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AN ANNOTATED BIBLIOGRAPHY OF PATENTS RELATED TO COASTAL ENGINEE--ETC(U)
NOV 79 R E RAY, M D DICKEY, A M LYLES
UNCLASSIFIED CERC-MR-79-6-VOL-1-APP NL

1 OF 6
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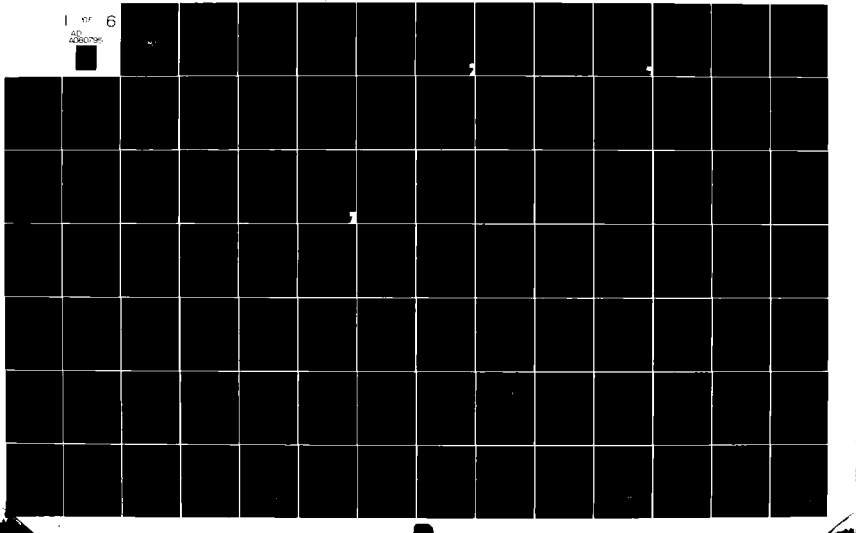

LEVEL II (2)

APP. TO MR 79-6

AD A080795

An Annotated Bibliography of Patents Related to Coastal Engineering

VOLUME I : 1967-70

by

Robert E. Ray, Michael D. Dickey, and Annie M. Lyles

APPENDIX TO MISCELLANEOUS REPORT NO. 79-6

NOVEMBER 1979

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7. AUTHOR(s): Robert E. Ray, Michael D. Dickey, and Annie M. Lyles	8. CONTRACT OR GRANT NUMBER(s)
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Bibliography; Coastal engineering; Patents

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This appendix presents a three-volume collection of patents on coastal engineering issued by the U.S. Patent Office from 1967 to 1976. Topics include coastal structures and structural components, structure protection and maintenance, construction methods and equipment, field research and survey instruments, hydraulic laboratory modeling equipment, marine pollution control apparatus, and ocean energy extraction devices. Abstracts and annotations for 2,468 patents are given in the three volumes covering the periods 1967 to 1970 (Vol. I), 1971 to 1973 (Vol. II), and 1974 to 1976 (Vol. III). Also included in each volume are a list of patent titles and numbers, and an index by keywords. Explanatory information on the overall collection and its use, abstracted from MR 79-6, is given in Volume I.

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PREFACE

This bibliography provides coastal engineers a collection of patents on coastal engineering issued by the U.S. Patent Office from 1967 to 1976. Preparation of the bibliography was carried out under the coastal engineering research program of the U.S. Army Coastal Engineering Research Center (CERC). Due to its size, the three-volume bibliography is published as a limited-edition appendix to MR 79-6 which describes the preparation and use of the collection and its search aids.

The bibliography was prepared by Robert E. Ray, Hydraulic Engineer, with the assistance of Michael D. Dickey and Annie M. Lyles, Civil Engineering Technicians, under the general supervision of R.A. Jachowski, Chief, Coastal Design Criteria Branch, Engineering Development Division. A. Szuwalski and T.J. Lawler prepared the computer programs that generated the keyword index to the bibliography, and W.T. Whitt assisted in preparing the annotations.

The authors gratefully acknowledge the efforts of T.O. Maser, C.L. Pistorino, and other personnel of the Office of the Chief Counsel, Office of the Chief of Engineers, for their guidance in choosing a method of searching for patents, their provision of publications used in the search, including arranging loans from other service libraries, and their help in obtaining high-quality copies of patents from the U.S. Patent Office.

The collection may be extended to earlier and more recent patents if use of the collection by coastal engineers in the Corps justifies the effort. The topics of an expanded collection may cover a broad range, as in the present collection, or may be more limited, depending on the needs of the Corps. Inquires and comments about this publication and the collection are invited.

Approved for publication in accordance with Public Law 166, 79th Congress, approved 31 July 1945, as supplemented by Public Law 172, 88th Congress, approved 7 November 1963.

TED E. BISHOP
Colonel, Corps of Engineers
Commander and Director

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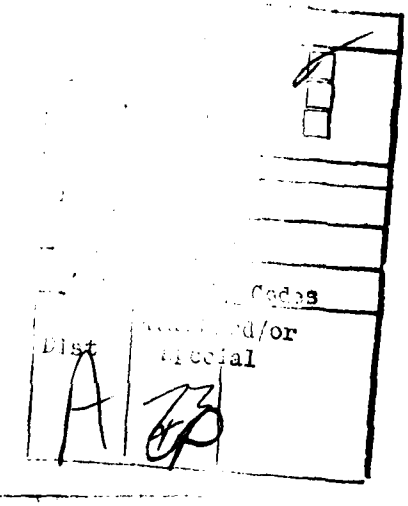

AN ANNOTATED BIBLIOGRAPHY OF PATENTS RELATED TO COASTAL ENGINEERING

VOLUME I: 1967-70

by
Robert E. Ray, Michael D. Dickey, and Annie M. Lyles

I. INTRODUCTION

1. General Information.

A *patent* is a legal document defining an invention and granting the inventor control of the manufacture, use, and sales of the invention in the United States for 17 years. It is valuable both as a grant of rights to the inventor and as a source of new ideas and, in cases where laboratory or field testing was conducted before application for a patent, of information on the performance of an invention. By the end of 1976, the United States had issued over 4 million patents. Searching such a massive collection for patents in particular categories is difficult, and scientists and engineers have found that problems with the classification system make use of the collection prohibitively time consuming.

The Coastal Engineering Research Center (CERC) has collected patents issued between 1967 and 1976 that are related to the Center's fields of interest and the Corps of Engineers' responsibilities. A report describing the information printed in patents, the selection process for the CERC collection, and the use of a bibliography indexing the collection has been published as MR 79-6. The bibliography itself has been published as a three-volume appendix to MR 79-6. This appendix has been distributed only to a limited number of public and university libraries, but it may be ordered from NTIS. The collection is also available in the Center's library. Each volume of the bibliography includes a list of the numbers and titles of the patents described in the volume, annotations giving information on each patent, and a subject index based on assigned keywords. The collection is already in use at CERC, where researchers have, for example, used the bibliography to locate patents describing the operating principles of specific types of electronic wave gages, information not found in electronics texts or in manufacturers' literature. Planners and designers in the Corps should find the CERC collection of patents useful as a source of data on new options in solving coastal engineering problems.

The Shore Protection Manual (SPM) (U.S. Army, Corps of Engineers, Coastal Engineering Research Center, 1977)[1] defines coastal engineering as "the application of the physical and engineering sciences to the planning, design and construction of works to modify or control the interaction of the air, sea, and land in the coastal zone for the benefit of

[1]U.S. ARMY, CORPS OF ENGINEERS, COASTAL ENGINEERING RESEARCH CENTER, *Shore Protection Manual*, 3d ed., Vols. I, II, and III, Stock No. 008-022-00113-1, U.S. Government Printing Office, Washington, D.C., 1977, 1,262 pp.

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man and for the enhancement of natural shoreline resources." The Corps' involvement in coastal engineering includes shore and beach restoration and protection, hurricane flood protection, construction and operation of navigation and recreation projects, the related control of water quality, conservation and enhancement of fish and wildlife in the coastal zone, and an interest in development of coastal electric power.

In general, the bibliography contains any water or earth control structure, and any large structures supported by piles, jackets, or the sea bottom, useful in the geographic area from tidal marshland and estuary to the Inner Continental Shelf. Related patents for seabed foundations and structural anchors, small-craft harbor structures, and fouling or corrosion prevention systems are presented. Also included are construction methods and equipment, emphasizing dredges and pile-drivers. Inventions useful in coastal research, such as bathymetric and seismic survey systems, water and seabed soil samplers, instruments for measuring water and bottom properties, and laboratory flumes and wave generators, comprise part of the patent collection. Also presented are pollutant detection, control, and removal equipment for use in open water, and ocean energy extraction devices.

Although mining, transporting, and prospecting for offshore minerals are not subjects of direct interest to the Corps, many devices used in those fields, from offshore mining equipment and pipeline trenchers to seabed storage tanks and jack-up drilling platforms, are included in the patent collection because of their relation to dredging, excavating, offshore harbors, and seabed foundations. Shipbuilding and loading structures, which fall into the fields of harbor and marine engineering, are not of specific interest to the Corps, but patents on small-craft harbor structures and methods for maintaining harbor navigation are also in the collection. The bibliography contains piles and pile-driving equipment of all types usable for work in the coastal region, not just those specifically used for offshore and harbor structures.

2. Information in Patents.

Patents are issued each Wednesday, and all patents for the week bear the same date of issue. Since 1836, patents have been assigned reference numbers in a common sequence; thus, the four-millionth patent issued received the number 4,000,000. In addition to the patent number, title, date of issue, application number, and date of application, each patent document contains the name and address of the inventor and, if the inventor has granted patent rights to a company or another individual, of the assignee. The bulk of the patent consists of the figures and the text, comprising a broad description of the figures and the inventor's ideas, a numbered list of claims which delineate the specific ideas that the patent controls, and, for patents issued after 1 January 1967, an abstract briefly summarizing the rest of the text. Corrections of typographical and other minor errors in a patent are noted on a "Certificate of Correction" included in the document.

Each patent is assigned a set of U.S. and international classification codes used for filing the patent according to precisely defined topics.

The U.S. classification system is revised periodically so the classification codes listed in the patent at the time of issue may not be the codes currently assigned to it. The patent codes represent an "original classification" best characterizing the patent, and "cross-reference classifications" which further describe aspects of the patent. The U.S. original classification code is printed on every patent. Patent documents have contained both U.S. cross-reference classification and international codes since December 1968. The *Manual of Classification of Patents* (Department of Commerce, Patent and Trademark Office, 1975)[2] gives explanations of the U.S. codes. The U.S. Patent Office has available lists of all patent numbers presently referenced to each U.S. classification code by original or cross-reference classification.

The names of the inventor's attorney and the U.S. Patent Office examiner who reviewed the application are included in the patent, along with information on closely related patents discovered in their search. The number, date of issue, inventor, and original classification code of these patents are listed. Most patents issued since October 1970 also have a list of the classifications searched for the review.

Inventors make revisions to patents by having them reissued. Reissued patents are assigned reference numbers preceded by the abbreviation "Re." in a sequence separate from the original patents. The complete text of the original patent is in the reissue with deletions in brackets and additions in italics.

The format of patents was changed in 1970 to streamline the search process and prepare the documents for inclusion in a computer processable library. All of the above information, an abstract, and an exemplary figure are on the first page of the patent document as shown in the Figure. Each data element on the page is identified with an internationally recognized numeric code for worldwide use of the information.

3. Finding Patents.

Complete copies of all patents in this bibliography are filed in numerical order in the CERC library for reference use. At the U.S. Patent Office Public Search Room, Crystal Plaza, 2221 Jefferson Davis Boulevard, Arlington, Virginia, all issued patents are filed both on microfilm in numerical order and in printed copies under their assigned classification codes (original or cross-reference). Table 1 lists the libraries in the United States that have patent collections open to the public. Copies of patents may be ordered by patent number for 50 cents apiece (1978) by writing the Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Several methods of finding patents in desirable categories are available to the searcher. Patent attorneys and examiners with access to the Public Search Room commonly use guides to the patent classification system to pick the classification codes covering the types of inventions

[2]DEPARTMENT OF COMMERCE, PATENT AND TRADEMARK OFFICE, *Manual of Classification of Patents*, U.S. Government Printing Office, Washington, D.C., 1975 (updated to 1978).

United States Patent [19]

Tazaki et al.

[11] **3,991,576**

[45] **Nov. 16, 1976**

[54] **FLOATING BREAKWATER**

[75] Inventors: **Sandanori Tazaki**, Yodaiwa, **Yozo Ishida**, Kunitachi, both of Japan

[73] Assignee: **Bridgestone Tire Company Limited**, Tokyo, Japan

[22] Filed: **Dec. 27, 1974**

[21] Appl. No.: **536,783**

Related U.S. Application Data

[62] Division of Ser. No. 398,268, Sept. 18, 1973.

[30] **Foreign Application Priority Data**

Sept. 19, 1972 Japan 47-107980
Sept. 30, 1972 Japan 47-113640
May 9, 1973 Japan 48-54312

[52] **U.S. Cl.** **61/5**
[51] **Int. Cl.**[2] **E02B 3/06**
[58] **Field of Search** ..... 9/8 R; 61/1 F, 3, 4, 61/5; 114/.5 F

[56] **References Cited**

UNITED STATES PATENTS

436,644	9/1890	White	61/5
1,933,597	11/1933	McVitty	61/5 X
2,658,350	11/1953	Magill	61/5
3,503,214	3/1970	Desty et al.	61/1 F
3,791,150	2/1974	Tachu	61/5

Primary Examiner—Paul R. Gilliam
Assistant Examiner—David H. Corbon
Attorney, Agent, or Firm—Sughrue, Rothwell, Mion, Zinn and Macpeak

[57] **ABSTRACT**

A floating breakwater in which the floating body is formed by housing a floating material as a floating source and a weighting material as a source for increasing weight in a hollow shell composed of a rigid material and provided with a projection on the upper portion. The specific gravity of the floating body is made to be 0.15 – 0.75 owing to the floating material and the weighting material.

1 Claim, 16 Drawing Figures

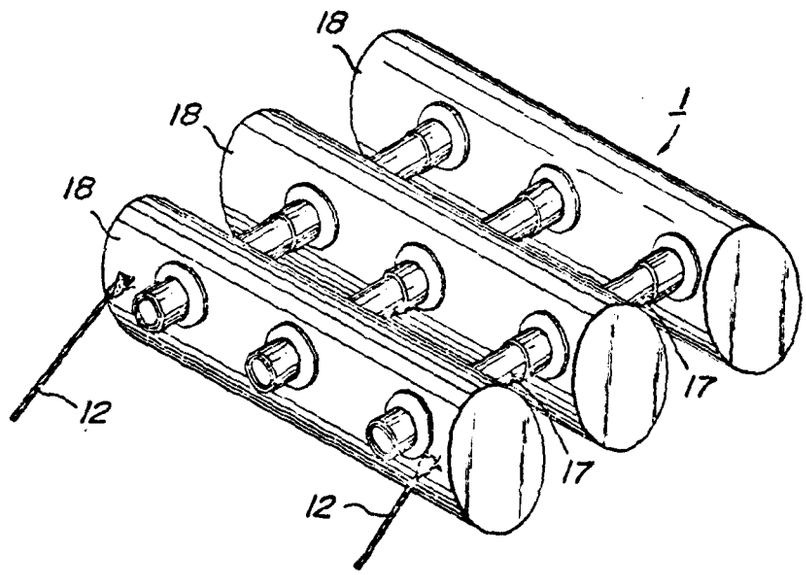

Figure. Typical front page of a patent document.

Table 1. Libraries having patent collections.

Albany, N.Y.	State University of New York Library
Atlanta, Ga.[1]	Price Gilbert Library Georgia Institute of Technology
Birmingham, Ala.[2]	Public Library
Boston, Mass.	Public Library
Buffalo, N.Y.	Buffalo and Erie County Public Library
Chicago, Ill.	Public Library
Cincinnati, Ohio	Public Library
Cleveland, Ohio	Public Library
Columbus, Ohio[1]	Ohio State University Library
Dallas, Tex.[1,2]	Public Library
Denver, Colo.[1,2]	Public Library
Detroit, Mich.	Public Library
Houston, Tex.[1]	Fondren Library Rice University
Kansas City, Mo.[1]	Linda Hall Library
Lincoln, Nebr.[1]	Love Memorial Library University of Nebraska
Los Angeles, Calif.[1]	Public Library
Madison, Wis.[1]	Wendt Engineering Library University of Wisconsin
Milwaukee, Wis.	Public Library
Newark, N.J.	Public Library
New York, N.Y.	Public Library
Philadelphia, Pa.	Franklin Institute Library
Pittsburgh, Pa.[1]	Carnegie Library
Providence, R.I.	Public Library
Raleigh, N.C.[1]	D.H. Hill Library North Carolina State University
Seattle, Wash.[1]	Engineering Library University of Washington
St. Louis, Mo.[1]	Public Library
Stillwater, Okla.	Oklahoma State University Library
Sunnyvale, Calif.[3]	Sunnyvale Patent Library
Toledo, Ohio	Public Library

[1]Collection between 1967 and 1976 on microfilm only.
[2]Collections start in 1974 or 1976.
[3]Collection arranged by classification. All other collections are arranged numerically.

desired, then directly search the files under those codes. If the sole available collection is filed only in numerical order, the searcher obtains the Patent Office's lists of patent numbers assigned the chosen codes. Searchers who must keep a current record of patents in a particular technical field can subscribe to the *Official Gazette* (Department of Commerce, Patent and Trademark Office)[3], a journal including summaries of each week's newly issued patents, listed by classification. They may also use the publications of organizations that search the *Official Gazette* to abstract patent information from classifications selected by the user. Computer-based record systems allowing sorting by classification codes or by keywords are available for parts of the classification system. Publications indexing patents by topics, such as this report and the earlier *Oceanic Patents 1959-1968* (Sinha, 1969)[4], exist for some technical fields.

4. Patent Selection.

The organization of the Patent Office's classification system did not match the categories of subjects related to coastal engineering; therefore, available aids using that system could not be used alone to find patents for this collection. When writing the claims in their patents, inventors describe the function of their invention in the broadest possible terms, while being more explicit in describing the principles of operation and construction. Following this pattern, the classification system is organized in a heirarchy under functional headings. The heading might be a general "class," symbolized by the first number in a classification code, or a subordinate, more specific "subclass," represented by the second code number. Some functional headings, such as subclass 54, "Dredgers," under class 37, "Excavating," were applicable to coastal engineering and the classification code, in this case 37-54, could be used directly to find interesting patents. In other cases the heading was a class or a general subclass and each patent classified under it had to be inspected. For example, patents for methods of removing marine pollutants were interspersed among those for straining soup under class 210, "Liquid Purification or Separation." This situation required the use of a combination of search methods.

As a first step in organizing a selection process, the *Manual of Classification* was used to choose the functional classifications most closely related to the coastal engineering categories. Several *Official Gazettes* were then reviewed thoroughly and the classification codes of interesting patents noted. The result was the list of classes and corresponding code numbers given in Table 2. Due to the length and generality of the list, use of the files in the Public Search Room was impractical so the *Official Gazettes* were searched with special emphasis on the classes in the list. If the information in the *Official Gazette* was insufficient to determine whether an invention was useful for

[3]DEPARTMENT OF COMMERCE, PATENT AND TRADEMARK OFFICE, *Official Gazette*, Washington, D.C., issued weekly.

[4]SINHA, E., *Oceanic Patents 1959-1968*, Ocean Engineering Information Series, Vol. 1, Ocean Engineering Information Service, La Jolla, Calif., 1969.

coastal engineering, a copy of the patent was ordered and examined before making a final decision on its selection.

Table 2 is presented only for the information of users familiar with the Patent Office classification system. The table does not include all of the classifications assigned to patents in this collection, just those classes examined most closely. The subclasses searched were too numerous to list. Patent attorneys and examiners using this publication for patent searches must realize that the criteria for patent selection were primarily functional, cutting across the Patent Office's classification system, so that this publication cannot be used to find all of the patents referenced to a particular classification code.

5. Bibliography Annotations.

Annotations for new patents are listed in numerical order, grouped by the weekly date of issue. Each annotation includes information identifying the patent and inventor, classifying the patent, and briefly describing the invention. The patent number, the title, and information on the inventor, assignee, patent application, classification, and number of claims were copied directly from the *Official Gazette*, unless obvious spelling errors made the title confusing, or a "Certificate of Correction" with the patent document indicated that printing errors in the inventor's name needed to be corrected. The format changes slightly between 1968 and 1969. Before 1969 the "original U.S. classification" is printed in parentheses after the abbreviation "Cl." For 1969 and the following years the parentheses are deleted, the abbreviation "U.S. Cl." is used, and all the assigned international classifications are listed after "Int. Cl." "Cross-reference U.S. classifications," listed after the abbreviation "U.S. Cl. X.R.," are added to the annotations for those patents assigned them from December 10, 1968, onward. All classification codes are those assigned to the patents at the time of issue and do not reflect changes caused by revisions in the classification system.

The description of the invention includes the abstract or, if the patent had no abstract, a representative claim, copied from the *Official Gazette* or patent with no corrections of printing errors. In addition, for those patents containing figures, a figure copied from the *Official Gazette* is included. Other items in the annotation are the keywords assigned to each patent for this bibliography and, if the patent was reissued before the end of 1976, the reissued patent number.

Annotations for reissued patents are listed after the original patents in Volumes II and III. No reissued patents were chosen for the collection from the period covered by Volume I. Due to the small number of reissued patents, the date of reissue for each is given in the annotation, along with information on the original patent and on the application for reissue. If the original patent had an abstract, the entire text of the abstract is presented with any deletions in brackets. Additions, including the complete abstract if the original patent did not have one, are in italics.

Several original patents annotated in Volumes I or II were reissued during periods covered by the other volumes. Information on these reissued editions, referenced in the annotations for the original patents, is included in Volumes I and II as the sections "Referenced Reissued Patents"

Table 2. Patent classes searched.

Class code	Class title
9	Boats, Buoys, and Aquatic Devices
14	Bridges
35	Education
37	Excavating
43	Fishing, Trapping, and Vermin Destroying
52	Static Structures, e.g., Buildings
60	Power Plants
61	Hydraulic and Earth Engineering
73	Measuring and Testing
94	Roads and Pavements
102	Ammunition and Explosive Devices
114	Ships
115	Marine Propulsion
117	Coating: Processes and Miscellaneous Products
137	Fluid Handling
141	Fluent Material Handling, with Receiver or Receiver Coacting Means
166	Wells
172	Earth Working
173	Tool Driving or Impacting
174	Electricity, Conductors, and Insulators
175	Boring or Penetrating the Earth
181	Acoustics
182	Fire Escapes, Ladders, Scaffolds
185	Motors, Spring, Weight, and Animal Powered
204	Chemistry, Electrical and Wave Energy
210	Liquid Purification or Separation
214	Material or Article Handling
239	Fluid Sprinkling, Spraying, and Diffusing
249	Static Molds
250	Radiant Energy
252	Compositions
253	Motors, Fluid
264	Plastic and Non-Metallic Article Shaping
290	Prime-Mover Dynamo Plants
299	Mining or In Situ Disintegration of Hard Material
302	Conveyors, Fluid Current
324	Electricity, Measuring, and Testing
340	Communications, Electrical
356	Optics, Measuring, and Testing
415	Rotary Kinetic Fluid Motors or Pumps
417	Pumps

and "Additional Referenced Reissued Patents," respectively. The reissued patents described in these sections are not included in the indexes of their respective volumes. Each entry includes, in a format similar to the annotations, information on the original patent, the application for reissue, the date of reissue, and the changes in the classification codes or keywords. If an abstract or figure was added or revised, the entry includes the new information.

6. Use of the Title List and Subject Index.

The list of titles and numbers in each volume, arranged in numerical order with reissued patents at the end of the list, may be used to determine whether a patent is in the collection when the patent number is available from an outside source. Use the subject index to find patents related to a chosen topic. To enter the index, refer to the list of keywords and the keyword definitions in Section II of Volume I, then find the list of patents referenced to that keyword in the subject index of each volume. Examine the title and other assigned keywords given for each patent to select the interesting patents, then use the patent numbers to find the annotations.

Other assigned keywords are included to aid patent identification. These are more descriptive than general titles, such as "Offshore Structure," or titles using ill-defined terms, such as "Jetty." The keywords were defined using the "Glossary of Terms" in Volume III of the SPM as a guide, and sometimes conflict with the titles. As an example, in coastal engineering a jetty is technically a barrier built at an inlet to prevent shoaling at a harbor entrance by channeling tidal flow and retarding sand movement along adjacent beaches. The term is also commonly used to describe a groin, a similar structure designed to hold or accumulate sand on a beach to prevent erosion. In this bibliography, a patent titled "jetty" but describing a shore protection structure, would be keyworded "groin" not "jetty." Problems also arise when foreign technical terms are translated into English. For instance, in many French patents the term "heave" is used for "surf" or "waves." The other keywords assigned to patents found under a chosen keyword may also serve as guides to further searching in the subject index.

Selecting keywords for the patents involved a compromise between keeping the subject index a manageable size and making it thorough. To focus attention on just the major points in each patent, words were picked which described the contents of first, the claims, and second, the other parts of the text. Problems were encountered whenever an inventor proposed a design for an entire system, then included only a small component in the claims. An example is a patent which described in detail a design for a floating small-craft pier while just the fenders were covered by the claims. Besides "pier fender," the keywords "pier, floating" and "small-craft pier" were added to represent the material in the text. Since only the claims may be of interest to patent attorneys and examiners, and the rest of the text may be valuable to engineers as an explanation of the claims and as general technical material, the lists in the subject index, based on both the claims and the text, will provide more patents than may be useful in researching a patent application, but less than all that may be interesting in searching for literature.

II. KEYWORD INFORMATION

1. List of Keywords.

ARTIFICIAL SEAWEED
ASPHALT
BAR PROTECTION
BATHYTHERMOGRAPH
BREAKWATER, CONCRETE
BREAKWATER, FLOATING
BREAKWATER, PNEUMATIC
BREAKWATER, RUBBLE
BREAKWATER, STEEL FRAME
BULKHEAD
BUOY MOORING SYSTEM
BUOY, INSTRUMENTED
CATHODIC PROTECTION
CHANNEL BARRIER
CHANNEL PROTECTION
COATING
COFFERDAM
COLLISION PROTECTION
CONCRETE ARMOR UNIT
CONCRETE BLOCK
CONCRETE FORM
CORROSION MEASUREMENT
CORROSION PREVENTION
CURRENT MEASUREMENT
DEPTH PRESSURE MEASUREMENT
DREDGE INTAKE
DREDGE LADDER CONTROL
DREDGE PIPE
DREDGE PROPULSION
DREDGE-SPOIL MEASUREMENT
DREDGE-SPOIL TRANSPORT
DREDGE, CUTTERHEAD
DREDGE, MECHANICAL
DREDGE, SUBMERGED
DREDGE, SUCTION
DUNE PROTECTION
ELECTRICAL GENERATOR
EMBEDMENT ANCHOR
FABRIC MAT
FOULING PREVENTION
FOULING REMOVAL
GABION
GROIN
GROUTING
HOPPER BARGE
HYDRAULIC MODEL BASIN
ICE PROTECTION
ICE STRUCTURE
INSTRUMENT CABLE
INSTRUMENT DEPLOYMENT
INSTRUMENT POWER SUPPLY
INSTRUMENT RETRIEVAL
INSTRUMENT, AIRBORNE
INSTRUMENT, LASER
INSTRUMENT, RADIOISOTOPE
INSTRUMENT, SEABED IN SITU
INSTRUMENT, TOWED
JETTY
LOW-COST SHORE PROTECTION
OFFSHORE CAISSON
OFFSHORE CONSTRUCTION
OFFSHORE HARBOR
OFFSHORE ISLAND
OFFSHORE MOORING STRUCTURE
OFFSHORE PLATFORM ANCHOR
OFFSHORE PLATFORM, FIXED
OFFSHORE PLATFORM, FLOATING
OFFSHORE PLATFORM, JACK UP
OFFSHORE PLATFORM, LEG
OFFSHORE PLATFORM, WALKING
OFFSHORE STORAGE TANK, EMERGENT
OFFSHORE STORAGE TANK, SUBMERGED
OFFSHORE STRUCTURE FENDER
PIER FENDER
PIER, FIXED
PIER, FLOATING
PIER, MOBILE
PILE DOLPHIN
PILE DRIVER LEADS
PILE DRIVER, IMPACT
PILE DRIVER, VIBRATORY
PILE DRIVER, WATER JET
PILE-DRIVING SHOE
PILE EXTRACTOR
PILE FOOTING
PILE LOAD MEASUREMENT
PILE PLACEMENT
PILE PROTECTION
PILE SECTION CONNECTION
PILE, CONCRETE
PILE, SHEET
PILE, STEEL
PILE, STRUCTURE CONNECTION
PILE, WOOD

POLLUTANT ABSORPTION
POLLUTANT BURNING
POLLUTANT COALESCENCE
POLLUTANT COLLECTION
POLLUTANT DEBRIS
POLLUTANT DISPERSION
POLLUTANT MEASUREMENT
POLLUTANT REMOVAL WATERCRAFT
POLLUTANT, MECHANICAL REMOVAL
POLLUTANT, SUBMERGED BARRIER
POLLUTANT, SUCTION REMOVAL
POLLUTANT, SURFACE BARRIER
POWER, SUBMERGED SOURCE
POWER, TIDE
POWER, WAVE
PUMP
REVETMENT
SALINITY MEASUREMENT
SAMPLER, BIOTA
SAMPLER, POWER SUPPLY
SAMPLER, SEABED-DRILLED CORE
SAMPLER, SEABED-DRIVEN CORE
SAMPLER, SEABED GRAB
SAMPLER, SURFACE
SAMPLER, SUSPENDED SEDIMENT
SAMPLER, WATER
SANDBAG
SAND FENCE
SEABED CABLE PLOW
SEABED FOUNDATION
SEABED GRADER
SEABED MATERIAL PLACEMENT
SEABED OIL, PROCESS STRUCTURE
SEABED PIPELINE PLACEMENT
SEABED PROPERTY MEASUREMENT
SEABED SCOUR PROTECTION
SEABED SITE SURVEY
SEABED SOIL TREATMENT
SEABED TRENCHER
SEABED WATER, PROCESS STRUCTURE
SEAWALL
SEDIMENTATION MEASUREMENT
SEISMIC ACOUSTIC TRANSMITTER ARRAY
SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER
SEISMIC HYDRAULIC ACOUSTIC TRANSMITTER
SEISMIC HYDROPHONE
SEISMIC HYDROPHONE ARRAY
SEISMIC IMPLOSIVE ACOUSTIC TRANSMITTER
SEISMIC RECORD PROCESSOR
SEISMIC STREAMER CABLE
SEISMIC SURVEY METHOD
SEISMIC VIBRATORY ACOUSTIC TRANSMITTER
SLOPE PROTECTION
SMALL-CRAFT LAUNCHER
SMALL-CRAFT MOORING DEVICE
SMALL-CRAFT PIER
SMALL-CRAFT SERVICE STRUCTURE
SONAR, DEPTH SOUNDER
SONAR, SIDE LOOKING
STRUCTURE INSPECTION
STRUCTURE REPAIR
TIDAL ESTUARY WATER LEVEL
TIDAL ESTUARY WATER QUALITY
TIDAL INLET
TIDE MEASUREMENT
TIRES
TOW WINCH CONTROL
TOWED BODY DEPTH CONTROL
TOWED VEHICLE
TOWING CABLE
WATER PLANT REMOVAL
WAVE ABSORBER BEACH
WAVE FLUME
WAVE GENERATOR
WAVE MEASUREMENT
WIND MEASUREMENT
WOOD PRESERVATIVE

2. Definitions of Keywords.

The assignment of a keyword to each of the numerous detailed categories of inventions in this collection was impractical. As a result, a keyword may cover several categories, including some unobvious ones. The following are not definitions of terms in the strictest sense, but, rather, explanations of the topics included under each keyword, and, taken as a whole, a list of all of the collection's topics.

ARTIFICIAL SEAWEED - Strands of synthetic material placed underwater in clumps or blankets to control scour.

ASPHALT - Bituminous material used as a binder or coating.

BAR PROTECTION - Formation or preservation of a bar or reef.

BATHYTHERMOGRAPH - A device for measuring the change of water temperature with depth, including air temperature just above the water surface.

BREAKWATER, CONCRETE - A concrete structure protecting a shore area, harbor, anchorage, or basin from waves, including large caissons and small low-cost units.

BREAKWATER, FLOATING - Moored buoyant units for protecting harbors and shore areas from wave attack.

BREAKWATER, PNEUMATIC - A bubble curtain for wave dissipation.

BREAKWATER, RUBBLE - A mound of soil or random-shaped and random-placed stones protected with a cover layer of selected stones or specially shaped concrete armor units, including structure cross sections useful as groins or jetties if the function was not specified in the patent.

BREAKWATER, STEEL FRAME - A wave-dissipating steel maze or a solid barrier of sunken ship sections or of steel caissons.

BULKHEAD - A structure or partition to retain or prevent sliding of the land. A secondary purpose is to protect the upland against damage from wave action.

BUOY MOORING SYSTEM - A method of anchoring a buoy or of fastening instruments to the anchor lines of a buoy.

BUOY, INSTRUMENTED - A buoy equipped with oceanographic instruments.

CATHODIC PROTECTION - Prevention of the corrosion or fouling of steel structures by electrical means.

CHANNEL BARRIER - A structure restricting tidal flow to permit energy production, storm protection, navigation, or water quality control.

CHANNEL PROTECTION - Control of siltation in harbors and navigation channels by means of structures or stationary dredging plants.

COATING - A protective paint, film, or covering or a method of application.

COFFERDAM - A temporary barrier allowing repair or construction of coastal structures under dry conditions.

COLLISION PROTECTION - Prevention of direct impact between ships and coastal structures.

CONCRETE ARMOR UNIT - A concrete object usually shaped to interlock, used in a protective outer layer on a coastal structure.

CONCRETE BLOCK - A concrete block used for coastal structures, usually a form of paving block used in revetments or of structural block used in seawalls.

CONCRETE FORM - A stationary or movable mold for concrete or grout.

CORROSION MEASUREMENT - Measurement of corrosion for research or control of cathodic protection systems.

CORROSION PREVENTION - Protection of metal coastal structures against corrosion damage.

CURRENT MEASUREMENT - Measurement of ocean or tidal current velocity or direction.

DEPTH PRESSURE MEASUREMENT - Determination of depth by measuring water pressure, usually to measure wave or tidal height or to control the depth of towed bodies.

DREDGE INTAKE - The sediment-gathering part of a dredge, including suction and cutterheads and the digging end of bucket ladders, but excluding seabed mining apparatus for sorting dredged sediment by size. When used with DREDGE PROPULSION, signifies that the intake is propelled independently of the dredging vessel. When used with PUMP, signifies that the intake includes a submerged pump.

DREDGE LADDER CONTROL - A mechanism or method of controlling the position of dredge bucket chains, ladders, and suction arms, including wave compensation devices.

DREDGE PIPE - Pipe for conveying dredge spoil, including flexible joints and floats.

DREDGE PROPULSION - A means of moving a dredge, including apparatus for placing spuds.

DREDGE-SPOIL MEASUREMENT - Determination of spoil concentration or volume, usually for control of the rate of dredging.

DREDGE-SPOIL TRANSPORT - A means of loading or unloading hopper barges or dredges, pumping spoil to a disposal site, or placing beach or land fill.

DREDGE, CUTTERHEAD - A suction dredge with a mechanical cutter.

DREDGE, MECHANICAL - A bucket ladder, bucket chain, dragline, grab, clamshell, or dipper dredge.

DREDGE, SUBMERGED - A dredge with pump, propulsion, and control means underwater, usually supported by the seabed, excluding seabed mining apparatus for sorting dredged sediment by size.

DREDGE, SUCTION - A plain suction, dustpan suction, or trailing suction dredge, with no mechanical excavating equipment.

DUNE PROTECTION - Formation or preservation of dunes or dikes.

ELECTRICAL GENERATOR - A source of electrical power.

EMBEDMENT ANCHOR - A propellant-actuated or vibration-driven plate anchor, a screw anchor, a driven or drilled-in-place anchor pile, or means for installing such anchors.

FABRIC MAT - A double-layered mattress of woven or nonwoven fabric or plastic film filled with sand or used as a form for grout or concrete, a single layer of such material used as filter cloth, or a web of synthetic material used to dissipate wave motion over a surface.

FOULING PREVENTION - Protection of coastal structures, including seawater intakes, against incrustation with marine organisms.

FOULING REMOVAL - Incrustation removal from watercraft.

GABION - A metal cage filled with rock and interconnected with others to form a revetment or bulkhead.

GROIN - A shore protection structure built on the bottom or suspended in the water at an angle to the shoreline to trap littoral drift or retard erosion of the shore.

GROUTING - Grout placement to underpin a coastal structure, to anchor a pile in the bottom or in a structure leg, or to seal a structure.

HOPPER BARGE - A barge or scow for transporting spoil or refuse, including bottom-dump barges and hopper dredges.

HYDRAULIC MODEL BASIN - A facility using three-dimensional wave or tide motion for educational demonstrations or model testing.

ICE PROTECTION - Prevention of damage to coastal structures by collision with floating floes or bergs, or by crushing or uplift by surrounding sheet ice.

ICE STRUCTURE - An offshore island of frozen material or a protective barrier of ice around an offshore structure.

INSTRUMENT CABLE - Waterproof power or data transmission cable for oceanographic instruments.

INSTRUMENT DEPLOYMENT - Placement of instruments or samplers at predetermined depths or locations using, for example, automatic depth-changing vehicles, free-fall probes, or buoy mooring cables.

INSTRUMENT POWER SUPPLY - A means of producing or delivering power to an instrument.

INSTRUMENT RETRIEVAL - Location and recovery of instruments, records, or samples.

INSTRUMENT, AIRBORNE - A remote-sensing instrument mounted in a tower, aircraft, or spacecraft, or a direct-measurement instrument in a projectile launched through the air.

INSTRUMENT, LASER - An oceanographic instrument using collimated beams of radiation.

INSTRUMENT, RADIOISOTOPE - An instrument using high-energy radiation, including means of measuring the radioactivity of samples, for handling irradiated sediment samples for tracer studies, or for X-ray photographing members of coastal structures.

INSTRUMENT, SEABED IN SITU - An instrument placed in or on the bottom for measuring the seabed's mechanical, electrical, or chemical properties in place.

INSTRUMENT, TOWED - Any oceanographic instrument towed through the water or across the bottom, except seismic surveying gear.

JETTY - A structure extending into a body of water at the mouth of a river or tidal inlet, designed to help deepen and stabilize a channel by preventing shoaling by littoral material and by directing and confining the stream or tidal flow.

LOW-COST SHORE PROTECTION - A shore protection structure, such as a revetment, seawall, or breakwater, that a private landowner can construct to protect beach-front property.

OFFSHORE CAISSON - A large hollow structure placed seaward of the breaker zone, including, for example, modular units for breakwaters, oversize legs for platforms, and rigid pollution barriers around platforms.

OFFSHORE CONSTRUCTION - Assembly of a coastal structure on or under the water's surface and placement of a structure on or in the bottom. Does not include means of transporting the structure to the construction site.

OFFSHORE HARBOR - A manmade structure not connected with the shore, forming an enclosure for mooring and protecting ships.

OFFSHORE ISLAND - A manmade island of rubble, ice, or fill.

OFFSHORE MOORING STRUCTURE - An unprotected structure for mooring ships in the open sea, including buoys with patented anchoring systems, bottom-supported mooring platforms, and docks for service boats on offshore drilling platforms. Does not include mooring buoys without new anchoring systems.

OFFSHORE PLATFORM ANCHOR - An anchoring means specifically for resisting the uplift or lateral motion of a buoyant offshore structure.

OFFSHORE PLATFORM, FIXED - A platform founded in the bottom and supported by rigid legs.

OFFSHORE PLATFORM, FLOATING - A floating drilling or mooring platform with patented anchoring system. When used with OFFSHORE PLATFORM, FIXED or OFFSHORE PLATFORM, JACK UP, signifies that the platform either is moored to a fixed platform or is semisubmersible and may be sunk until supported by the bottom in shallow water.

OFFSHORE PLATFORM, JACK UP - A platform equipped with vertically movable legs that are lowered to the bottom to support the working deck above the water's surface, including devices for changing the vertical position of the legs.

OFFSHORE PLATFORM, LEG - A support for the working deck of a fixed, floating, or jack-up platform.

OFFSHORE PLATFORM, WALKING - A platform that can be moved horizontally while supported by the bottom, including devices for changing the horizontal position of the legs.

OFFSHORE STORAGE TANK, EMERGENT - A tank with at least one storage chamber above or piercing the water's surface.

OFFSHORE STORAGE TANK, SUBMERGED - A tank with all storage chambers underwater, in some cases including an attached mooring and service structure protruding above the surface.

OFFSHORE STRUCTURE FENDER - A device for preventing or absorbing the impact between an offshore structure and ships, ice, or debris.

PIER FENDER - A device for absorbing the impact between a dock structure and a watercraft.

PIER, FIXED - A recreation or dock structure rigidly supported by piles or legs on the bottom or cantilevered out from the shore.

PIER, FLOATING - A dock structure supported by its buoyancy.

PIER, MOBILE - A fixed or floating dock structure designed to be dismantled, moved, and reassembled easily.

PILE DOLPHIN - A freestanding pile or cluster of piles, usually used in a harbor, designed to absorb impacts with watercraft.

PILE DRIVER LEADS - Guides for a pile or hammer, including means for controlling batter.

PILE DRIVER, IMPACT - A means of driving a pile by a succession of impacts, including drop hammers, steam hammers, and diesel hammers.

PILE DRIVER, VIBRATORY - A means of driving a pile by vibrating the pile at a resonant frequency, including "sonic drivers" and rotated eccentric weights.

PILE DRIVER, WATER JET - A means of driving a pile, or aiding other methods of pile driving, by using a jet of fluid to remove material below the pile.

PILE-DRIVING SHOE - A cutting shoe used at the bottom of concrete, wood, or thin steel piling to aid driving.

PILE EXTRACTOR - A means of removing a pile from the earth.

PILE FOOTING - A means of increasing a pile's bearing capacity by increasing the diameter of the bearing area in the surrounding soil.

PILE LOAD MEASUREMENT - Determination of pile capacity, driving resistance, or lateral load.

PILE PLACEMENT - Positioning piles for underwater driving or arranging piles in a specified pattern.

PILE PROTECTION - Prevention of damage to piles by ice, fouling, corrosion, or impact.

PILE SECTION CONNECTION - A means of splicing lengths of pile or joining adjacent sheet piling.

PILE, CONCRETE - A long concrete column placed in the ground or seabed as a support for an elevated deck or a foundation member, including cast-in-place piles, when specified for marine use, or any type of precast concrete pile or concrete-filled steel pipe pile.

PILE, SHEET - A pile with a generally slender flat cross section to be driven into the ground or seabed and meshed or interlocked with like members to form a diaphragm wall, cofferdam, or bulkhead. Pile material is signified by PILE, CONCRETE; PILE, STEEL; or PILE, WOOD.

PILE, STEEL - A long steel column placed in the ground or seabed as a support for an elevated deck, a foundation member, or a part of a protective barrier, including thin shell piles when specified for marine use, or any type of H or steel pipe piles.

PILE, STRUCTURE CONNECTION - A means of joining a pile to the structure it supports, for example, a pier deck or offshore platform jacket.

PILE, WOOD - A long timber column placed in the ground or seabed as a support for an elevated deck or a foundation member.

POLLUTANT ABSORPTION - Removal of liquid pollutants from the water's surface by absorbing them into a porous material or by adsorbing them onto a surface, the material or surface being in the form of particles, belts, or mats.

POLLUTANT BURNING - Control of combustion of floating liquid pollutants, either to encourage removal by burning or to extinguish accidental fires.

POLLUTANT COALESCENCE - Chemical treatment of a floating liquid pollutant to change its consistency, as a means to limit its spread, shrink the area of its slick, or aid removal of it from the water's surface.

POLLUTANT COLLECTION - Concentration of pollutants by mechanical means before removal from a body of water, including the use of inverted funnels to collect leakage from the seabed, of towed surface barriers to collect slicks, and of various forms of weirs or sluice gates to concentrate floating pollutants in collection barges.

POLLUTANT DEBRIS - Floating solid objects to be removed or excluded from an area.

POLLUTANT DISPERSION - Chemical treatment of a floating liquid pollutant to break up its slick and cause it to become emulsified with water.

POLLUTANT MEASUREMENT - Detection, identification, sampling, or measurement of marine pollutants, such as oil slicks, turbidity, or gases, by field equipment.

POLLUTANT REMOVAL WATERCRAFT - A navigable craft, usually a barge, equipped with apparatus for removing marine pollutants.

POLLUTANT, MECHANICAL REMOVAL - Removal of pollutants from the surface of a body of water by the use of rotating drums, conveyors, belts, or scoops.

POLLUTANT, SUBMERGED BARRIER - A barrier preventing the spread of pollutants from submerged leaks.

POLLUTANT, SUCTION REMOVAL - Removal of pollutants by pumping them directly from the surface of a body of water or from a collection barge, including the use of weirs to control the intake flow.

POLLUTANT, SURFACE BARRIER - A barrier preventing the spread of floating pollutants, usually a floating boom.

POWER, SUBMERGED SOURCE - A means of extracting power from ocean currents or from pressure or thermal gradients to drive electrical generators or samplers.

POWER, TIDE - A means of extracting power from impounded tidal flow, tidal currents, or the tidal rise and fall of the water's surface to drive electrical generators, pumps, or mechanical devices.

POWER, WAVE - A means of extracting power from wave motion to drive electrical generators, pumps, mechanical devices, or instruments.

PUMP - A means of moving a fluid or slurry under pressure, usually part of a dredge or means of extracting power from the ocean.

REVETMENT - A facing of stone, concrete blocks, grout-filled fabric mats or bags, or other material, built to protect a scarp, embankment, or shore structure against erosion by wave action or currents.

SALINITY MEASUREMENT - Determination of the salinity, conductivity, or acidity of water by field equipment.

SAMPLER, BIOTA - A means of collecting specimens of sea plant or animal life.

SAMPLER, POWER SUPPLY - A source of thrust for samplers such as driven or drilled corers, including explosives, vibratory devices, or implosive hydrostatic pressure chambers.

SAMPLER, SEABED-DRILLED CORE - Drilling apparatus taking sediment core samples from the seabed, usually coring bits with retainers for soft or granular material.

SAMPLER, SEABED-DRIVEN CORE - A means for taking sediment core samples from the seabed by thrusting a coring tube or box into the bed, using a propulsive device or the kinetic energy of a free fall to drive the corer.

SAMPLER, SEABED GRAB - A means of taking a disturbed surface sample from the seabed.

SAMPLER, SURFACE - A means for sampling matter, usually pollution or biota, floating on or near the water's surface.

SAMPLER, SUSPENDED SEDIMENT - A means for capturing samples of sediment suspended in or falling through water.

SAMPLER, WATER - A container taking a water sample at a preselected depth.

SANDBAG - A bag or tube of fabric or plastic film filled with sand, grout, or concrete to seal, underpin, or serve as a structural unit in a coastal structure.

SAND FENCE - A barrier for trapping windblown sand to prevent erosion and promote formation of dunes.

SEABED CABLE PLOW - A plow-shaped device for burying cable or flexible pipe in the seabed without excavating a trench.

SEABED FOUNDATION - A structure on or in the seabed for supporting a superstructure, such as oil- or water-process equipment, an offshore platform, a storage tank, or a breakwater.

SEABED GRADER - A remote-controlled submersible bulldozer or similar equipment for leveling a seabed site.

SEABED MATERIAL PLACEMENT - Placement of materials such as concrete, asphalt, sand, gravel, grout, or turbidity-reducing agents on the seabed as a layer or in a form.

SEABED OIL, PROCESS STRUCTURE - A structure fixed to the seabed for supporting or protecting submerged drilling, completion, or production equipment such as wellheads or gas-separation units.

SEABED PIPELINE PLACEMENT - Anchoring or burying a pipeline in the seabed, excluding methods for laying the pipeline itself from barges.

SEABED PROPERTY MEASUREMENT - Determination of seabed soil properties, such as bearing capacity, consolidation, specific gravity, or chemical composition, by measuring other properties, such as resistance to impact, sound transmission, electrical resistance, or radioactivity.

SEABED SCOUR PROTECTION - Prevention of the removal of underwater material at the base or toe of a coastal structure by waves and currents.

SEABED SITE SURVEY - A method of making a detailed survey of a small area, such as a construction site.

SEABED SOIL TREATMENT - Chemical or mechanical treatment of soil in the seabed to improve its qualities as construction or foundation material.

SEABED TRENCHER - A remote-controlled submersible excavator for forming trenches in the seabed, including towed units for burying pipeline.

SEABED WATER, PROCESS STRUCTURE - A structure fixed to the seabed for transporting or storing water, including cooling water intakes, sewer outfalls, or sewage storage tanks.

SEAWALL - A structure separating land and water areas, primarily designed to prevent erosion and other damage due to wave action.

SEDIMENTATION MEASUREMENT - Determination of sediment movement or accumulation, including tracer studies or the measurement of thin bottom layers.

SEISMIC ACOUSTIC TRANSMITTER ARRAY - A grouping of underwater seismic impulse sources, sometimes mounted in a three-dimensional framework.

SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER - An underwater seismic impulse source using a sudden discharge of pressure generated by igniting dynamite or a gas mixture, emitting a gas bubble, or producing an electric arc.

SEISMIC HYDRAULIC ACOUSTIC TRANSMITTER - An underwater seismic impulse source using the compression and flow properties of water to produce signal-generating water-hammer or turbulence effects.

SEISMIC HYDROPHONE - A single receiving unit for underwater seismic use.

SEISMIC HYDROPHONE ARRAY - A grouping of underwater seismic receivers, including one-dimensional arrangements within a streamer cable or three-dimensional arrangements of streamer cables or of hydrophones in a framework.

SEISMIC IMPLOSIVE ACOUSTIC TRANSMITTER - An underwater seismic impulse source using the sudden retraction of a piston or the collapse of a bubble of steam for implosion generation.

SEISMIC RECORD PROCESSOR - An electronic device for recording, deciphering, or printing signals from underwater seismic receivers.

SEISMIC STREAMER CABLE - A linear array of hydrophones attached to a towing cable, protective sheathing, and means for controlling the array's position.

SEISMIC SURVEY METHOD - A method of organizing and operating the components of an underwater seismic surveying system to use the equipment in different water depths or to detect features at specific depths in the seabed, including altering the instrument locations in a survey team's boats, the streamer cable arrangements, or the sequences of firing and recording cycles.

SEISMIC VIBRATORY ACOUSTIC TRANSMITTER - An underwater seismic signal source using an electrically, pneumatically, or hydraulically actuated vibrating transducer.

SLOPE PROTECTION - Stabilization of the faces of banks, dikes, or dunes to prevent sliding or erosion from runoff, including terracing or placement of mats, filter cloth, or other revetment materials.

SMALL-CRAFT LAUNCHER - A means for transferring watercraft to the water from storage on land and vice versa, including ramps, booms, or hoists.

SMALL-CRAFT MOORING DEVICE - A device for securing a watercraft in place in a harbor or dock, including mooring buoys, dock cleats, tie-off arrangements, or fender designs.

SMALL-CRAFT PIER - A fixed or floating dock structure for use in a small-craft harbor.

SMALL-CRAFT SERVICE STRUCTURE - A structure for storing or servicing small craft, including storage racks, drydocks, hull cleaning equipment, or sewage collection systems.

SONAR, DEPTH SOUNDER - A device or method using sound or light waves to determine the depth, and, in some cases, character of the seabed, and an associated piece of bathymetric mapping equipment, such as a recorder.

SONAR, SIDE LOOKING - A depth-measuring device or method using sound waves projected to the side of the survey track, at an oblique angle to the bottom, to detect the relief of the seabed, and, in some cases, associated equipment for producing bathymetric contour maps.

STRUCTURE INSPECTION - Detection of damage to coastal structures, including the X-ray photography or sonography of piles or platform legs to detect fouling, corrosion or fatigue damage, or the surveying of rubble structures to detect the removal of material.

STRUCTURE REPAIR - Correction of damage to coastal structures, in most cases replacement of damaged sections of a pile.

TIDAL ESTUARY WATER LEVEL - Control of tidal flow and water elevation in the part of a river affected by tides to permit navigation, energy production, or storm protection.

TIDAL ESTUARY WATER QUALITY - Control of tidal flow in the part of a river affected by tides to restrict the upstream movement of saltwater or to flush polluted water from stagnant parts of the estuary.

TIDAL INLET - Coastal structures that may be used in the short waterway between a tidal bay or lagoon and the parent body of water or at the mouth of a river where it flows into a large tidal body of water.

TIDAL MEASUREMENT - Determination of tidal height, current velocity, and period.

TIRES - Scrap tires used as structural units in coastal structures such as floating breakwaters or revetments.

TOW WINCH CONTROL - Operation of a tow winch to launch, retrieve, or control the depth of a towed instrument.

TOWED BODY DEPTH CONTROL - Operation of position control devices on towed instruments which, for example, regulate buoyancy of seismic streamer cables or manipulate diving planes on towed vehicles.

TOWED VEHICLE - A body containing or attached to a towed instrument to provide streamlining or buoyancy, or to control position, acceleration, or vibration.

TOWING CABLE - Cable for towing instruments, usually equipped with electrical conductors and fairings.

WATER PLANT REMOVAL - Removal of shallow-water weeds, to improve navigation or recreation in a body of water, by cutterhead dredges with special apparatus for cutting and shredding plants or by plant-harvesting watercraft with digging jets for uprooting plants and conveyors for removing them from the water.

WAVE ABSORBER BEACH - A wave-absorbing barrier or mattress to be placed in a model basin or on a beach face, a typical mattress being of loosely woven or perforated material which, unlike a revetment, does not cover the whole area with durable material.

WAVE FLUME - A facility using wave motion for research, educational demonstrations, or recreational activities.

WAVE GENERATOR - A means for making waves in a flume or model basin.

WAVE MEASUREMENT - Determination of wave height, force, period, and direction using, for example, stationary electronic or pressure gages, acceleration-measuring buoys, or remote-sensing radar or sonar equipment.

WIND MEASUREMENT - Determination of wind velocity and direction near the sea surface, including the use of anemometers on instrumented buoys.

WOOD PRESERVATIVE - A treatment for preventing rot or fouling damage to wood used in the coastal zone.

3295231 APPARATUS FOR REMOVING MATTER, PARTICULARLY WEED GROWTH FROM THE BOTTOM OF WATERWAYS
3295332 PROTECTIVE COVER FOR BUTT ENDS OF TIMBER PILES
3295616 FREE CORING DEVICE
3296579 CONTOUR MAP GENERATOR
3297300 APPARATUS FOR DERIVING USEFUL ENERGY FROM SEA WAVES
3299397 UNDERWATER DETECTOR STREAMER APPARATUS FOR IMPROVING THE FIDELITY OF RECORDED SEISMIC SIGNALS
3299399 METHODS AND APPARATUS FOR INDICATING AN UNDERWATER PARAMETER IN A MARINE SEISMIC SYSTEM
3299640 MEANS FOR INFLUENCING THE SUB-MARINE MIGRATION OF MATERIAL
3299969 SEDIMENT CORER
3301047 WAVE GAGE ARRAYS FOR OBTAINING OCEAN-WAVE SPECTRA
3301048 SEA STATE RECORDER
3301148 PAVING BLOCK
3301336 METHOD AND APPARATUS FOR DEEP SEA BOTTOM CORE SAMPLING
3301606 CYCLONIC ELEVATOR
3302412 INTERLOCKING SHEET PILES AND METHOD OF INSTALLATION
3302464 STERILE HIGH PRESSURE OCEAN SAMPLER
3303118 CATHODIC PROTECTION AND ANTI-MARINE FOULING ELECTRODE SYSTEM
3303892 FUEL ATOMIZATION DEVICE IN DIESEL PILE DRIVER
3304532 SIDE-LOOKING SONAR SYSTEM
3304533 MARINE SEISMIC SURVEYING
3304777 FLUID DIRECTION SYNCHRO
3306052 FLOATABLE STRUCTURE AND METHOD OF OPERATING SAME
3306053 MARINE FACILITIES
3306054 SKIRT TYPE PILE DRIVING POINT
3307143 SONAR DEVICE
3307144 BATHYMETRY
3307278 SONIC DREDGING PROCESS AND APPARATUS
3307362 POSTING PILING
3307514 BOAT MOORING DEVICE
3307624 LOAD-SUPPORTING STRUCTURE, PARTICULARLY FOR MARINE WELLS
3309650 PULSE-ECHO SOUNDER SYSTEM
3309876 EROSION PREVENTION APPARATUS
3310019 FLOATS
3310892 SUBMARINE DREDGE
3310984 AUTOMATIC PLANKTON SAMPLING SYSTEM
3311080 PRESSURE ACTUATED ANCHOR
3311081 DOCK AND LIKE FENDERS
3311142 TANKSHIP MOORING AND LOADING SYSTEM
3311238 SUCTION ROLLER APPARATUS
3312054 SEA WATER POWER PLANT
3312069 METHOD OF PREVENTING SCOUR AROUND UNDERWATER STRUCTURES
3312070 METHOD OF MAKING RECLAIMED GROUND WITH COAGULATIVE SURFACE ACTIVE AGENTS
3312295 METHOD AND APPARATUS FOR FLUID INJECTION IN VIBRATORY DRIVING OF PILES AND THE LIKE
3313357 UNDERWATER SAMPLING APPARATUS
3313721 DISH-SHAPED ANODE
3314045 ECHO SOUNDERS
3314239 METHOD AND APPARATUS FOR FORMING UNDERWATER STRUCTURES
3314240 METHOD AND APPARATUS FOR USE IN FORMING FOUNDATIONS
3314241 METHOD AND APPARATUS FOR USE IN DRIVING PILES
3314287 STEP CAPACITANCE WAVE PROFILE RECORDER
3314540 REMOVAL OF OIL FILMS FROM WATER
3314545 CLEANING WATER SURFACES
3315221 TRANSMISSION AND RECORDING OF SIGNALS IN ECHO-SOUNDING APPARATUS
3315473 OFFSHORE PLATFORM
3315627 PNEUMATICALLY OPERATED FLOATING DRY DOCK
3315629 UNDERWATER ANCHOR GUN DEVICE
3316530 ECHO-SOUNDING APPARATUS WITH STABILIZED NARROW BEAM
3316531 RELEASE MECHANISM
3316724 CONCRETE PILE JOINT AND METHOD OF ASSEMBLY

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3317890 OVERWATER SEISMIC EXPLORATION METHOD AND APPARATUS
3318394 METHOD AND APPARATUS FOR OBTAINING SOIL SAMPLES
3318411 SIGNAL GENERATOR
3319595 FINED ACTUATING MECHANISM
3319734 ELASTIC DETECTION STREAMER DEAD SECTION FOR A WATER BORNE SEISMIC SURVEYING SYSTEM
3320578 ELECTROACOUSTIC TRANSDUCERS FOR SUBMARINE ECHO SOUNDING
3321923 STEERABLE SELF-POWERED FLOATING STRUCTURES
3321924 PROTECTION OF SUBMERGED PILING
3322231 METHODS AND SYSTEMS UTILIZING LASERS FOR GENERATING SEISMIC ENERGY
3322232 SEISMIC EXPLORATION
3323310 INSTALLATION FOR BEACH EROSION PREVENTION
3323479 FLOATING DOCK STRUCTURE
3324451 ECHO RANGING AND RECORDING APPARATUS
3324665 METHOD OF STABILIZING PILES
3324666 FOOTING FOR EARTH PILE
3325778 SEISMIC SONOBUOY
3325923 HYDRAULIC CONTROLS FOR SPUD
3326000 IMMERSED PIPE STRUCTURE
3326005 RETAINING WALL FOR WATERWAYS
3326126 EXPLOSIVE CONTAINER
3326174 METHOD FOR PREVENTION OF GROWTH OF AQUATIC FOULING
3326379 WATER CRAFT WITH SCOOP
3328969 APPARATUS FOR DRIVING PILES
3329015 STABILIZED BUOY ASSEMBLY
3329117 DEVICE FOR MOORING BOATS
3329287 METHOD AND APPARATUS FOR SUCTION UNLOADING OF SAND BARGES
3330155 MAGNETIC TAPE OCEANOGRAPHIC METER
3330244 DEVICE FOR DOCKING BOATS
3330338 ANCHOR AND METHOD OF INSTALLING
3330751 CATHODIC PROTECTION CIRCUIT INCLUDING DIODE MEANS
3331050 METHOD OF UNDERWATER SEISMIC EXPLORATION
3331211 PILE INSPECTION AND REPAIR CELL
3332057 SINGLE CARDIOID WAVE DETECTOR FOR SEISMIC SIGNALS
3332058 DEPTH CONTROL SYSTEM FOR MARINE SEISMIC SURVEYING
3332503 DOUBLE-ACTING-STEAM-AIR HAMMER, IN PARTICULAR FOR PILE IMMERSION
3332867 CONDUCTIVE ADHESIVE BONDING OF A GALVANIC ANODE TO A HULL
3333427 BOOT FOR PILOT TIMBER PILE
3333428 OPEN END CUTTING SHOE
3333429 H-BEAM PILING
3333430 BOOT FOR PIPE PILE
3333431 CUTTING SHOE FOR STEEL SHEET PILING
3333432 ADJUSTABLE DEPTH SUBMARINE CABLE BURIER
3335401 NOISE-FILTERED DETECTION OF MARINE SEISMIC SIGNALS
3335572 MODULAR PANELS FOR CONSTRUCTION OF WATER BLOCKADES
3335667 WAVE MACHINE AND MEANS FOR RAISING WATER
3335689 LOW FRICTION DOCK BUMPER
3336799 FREE-FLOATING APPARATUS FOR MEASURING AND TELEMETERING SEA-WAVE CHARACTERISTICS
3336802 DEVICE FOR AVERAGING WIND VELOCITY AND DIRECTION
3336803 SUSPENDED-DROP CURRENT METER
3336892 CABLE DISPENSING AND LOCKING MEANS
3336987 DEVICE FOR TRANSMITTING FORCES
3338058 ADJUSTABLE COMPOSITE FORM
3338059 METHODS AND APPARATUS FOR ENTRENCHING SUBMERGED ELONGATE STRUCTURES
3338060 ARRANGEMENT TO BED FLEXIBLE LINES IN THE GROUND UNDER WATER
3338206 COMPOSITE MARINE DOCK BUMPER
3339367 METHOD AND APPARATUS FOR INSULATED SUBMERGED OIL STORAGE
3339368 APPARATUS FOR LAYING UNDERWATER CABLES
3339407 OCEANOGRAPHY PROBE
3339417 WATER SAMPLING APPARATUS
3340694 BUOYANT FENDERS
3342033 METHOD OF PROVIDING A SEALED JOINT EMPLOYING A FLEXIBLE BAG
3342716 ANODE FOR CATHODIC PROTECTION SYSTEM
3343370 EARTH EMBANKMENT WITH INTERNAL WATER BARRIER
3343371 LOCKING DEVICE FOR ESTABLISHING A LOAD-BEARING JOINT BETWEEN TWO STRUCTURES

3343372 DRILLING PLATFORM
3343468 PAVING BLOCK
3343515 MINIMUM WIDTH TOWLINE WITH DAMAGE SHIELD
3343516 MINIMUM WIDTH TOWLINES WITH STRETCHABLE ELECTRICAL CABLE AND IMPROVED CLAMPING MEANS
3344609 PREVENTION OF BEACH EROSION AND ENCOURAGEMENT OF LAND RESTORATION
3344612 SHALLOW WATER CAISSON
3344764 FLOATING BODY
3344867 BOTTOM BRACE FOR PILE HAMMER LEADS
3344873 MECHANICAL HETERODYNE OSCILLATOR
3344874 LOW-IMPEDANCE ISOLATOR FOR VIBRATORY PILE DRIVER MACHINES
3345824 METHOD AND MEANS FOR BRACING OR BOLSTERING SUBAQUEOUS STRUCTURES
3345825 PORTABLE DOCK
3345879 APPARATUS FOR EXTRACTING SAMPLES FROM THE BED OF A BODY OF WATER
3346838 PRESSURE SENSITIVE DETECTOR FOR MARINE SEISMIC EXPLORATION
3346839 ECHO-SOUNDING APPARATUS FOR EXAMINING STRATA BELOW THE SEA-BED WITH VARIABLE GAIN MEANS RESPONSIVE TO SEA-BED ECHOES
3347048 REVETMENT BLOCK
3347051 BULKHEAD STRUCTURE AND METHOD OF MAKING THEREOF
3347053 PARTIALLY SALVAGEABLE JACKET-PILE CONNECTION
3347054 UNDERWATER PIPE TRENCHING DEVICE
3347101 FREEZING-TYPE SEDIMENT SAMPLER
3348382 OFFSHORE PLATFORM FOR ICE CONDITIONS
3348690 CATCHER FOR CLEANING WATER SURFACES
3349367 ELECTROHYDROSONIC TRANSDUCER
3349624 REMOTELY CONTROLLED WATER SAMPLING DEVICE
3349745 DEVICE FOR FASTENING LINES
3349816 BOW MOORING
3349867 VACUUM ENERGIZED SEISMIC PULSE GENERATOR
3350682 ECHO SOUNDING APPARATUS
3350683 OPTIMUM DETECTOR TYPE AND DEPTH IN MARINE SEISMIC EXPLORATION
3350798 CONDITION RESPONSIVE ELEVATOR DREDGE
3351545 DEVICE FOR CHECKING CATHODIC PROTECTION
3351898 METHOD AND APPARATUS FOR MONITORING THE CONDITION OF A MARINE SEISMIC DETECTOR CABLE
3351899 PROGRAMMED MULTIPLE SHOT SOURCE SYSTEM AND METHOD
3352035 DREDGE
3352118 FRICTIONAL DRAG REDUCER FOR IMMERSED BODIES
3352119 BALLISTIC JACKET-PILE CONNECTION
3352120 REINFORCED CONCRETE PILE
3352160 CORING APPARATUS
3352274 HIGH SPEED FAIRED TOWING CABLE
3353149 ACOUSTIC RANGING SYSTEM
3353361 BREAKWATER
3353362 PILE DRIVING
3353363 PORTABLE BOAT RAMP
3353612 METHOD AND APPARATUS FOR EXPLORATION OF THE WATER BOTTOM REGIONS
3353623 SEISMIC PULSE GENERATOR USING COMBUSTIBLE GAS
3354653 METHOD FOR APPLYING BITUMINIZED MINERAL AGGREGATE TO AN UNDERWATER SURFACE
3354659 DEEP-SUBMERGENCE FOUNDATION VEHICLE
3354984 DEPTH CONTROLLED MARINE SEISMIC DETECTION CABLE
3355894 STRUCTURE FOR USE IN RIVER AND SEA
3356164 PILE DRIVING MECHANISMS
3357192 BREAKWATERS
3358600 SELF-DESTROYING EXPLOSIVE CARTRIDGE FOR UNDERWATER SEISMIC EXPLORATION
3358778 SPRING DRIVEN POWER HAMMER
3359536 CONTROL OF MARINE SEISMIC SYSTEMS
3359740 DOCK FENDER SYSTEMS
3359794 OMNI-DIRECTIONAL CURRENT METER
3359801 BATHYTHERMOGRAPH SYSTEM
3360070 APPARATUS FOR FIRING EXPLOSIVE CHARGES UNDER WATER
3362170 TRIANGULAR BASED OFFSHORE PLATFORM
3362172 INDIVIDUAL DRY DOCK FOR BOATS
3362336 WAVE MOTION OPERATED DEVICE
3363225 RANGING APPARATUS
3363226 DATA PROCESSING SYSTEM

3363596 DUMP MEANS FOR MACHINE FOR HARVESTING UNDERWATER PLANT LIFE AND WEEDS
3363873 SHUTTERING MEANS AND APPARATUS FOR THE CASTING OF UNDERWATER STRUCTURES
3364684 DEEP WATER OFFSHORE DRILLING PLATFORM
3364744 EXPENDABLE BATHYTHERMOGRAPH
3365019 SEISMIC VIBRATOR FOR MARSHLAND AND SUBMARINE USE
3365953 BIOLOGICAL SAMPLER
3366173 SUBSEA PRODUCTION SYSTEM
3367119 FLOTATION DEVICE FOR OFFSHORE PLATFORM ASSEMBLY
3367181 DIRECTIONAL WAVE SPECTRA MEASURING DEVICES
3367190 HERMETICALLY SEALING WATER SAMPLER
3367191 WATER SAMPLING APPARATUS
3367298 BOTTOM DUMP HOPPER BARGE
3368191 CONTINUOUS MARINE SEISMIC EXPLORATION WITH MULTIPLE SUBSURFACE COVERAGE
3368194 MEANS FOR GENERATING ELECTRICAL DISCHARGES UNDER WATER FOR CONTINUOUS SEISMIC SOUNDINGS
3368357 STRUCTURE FOR BREAKING WAVES
3368358 TRENCHING MACHINE
3368514 SYMMETRICAL SELF-ALIGNING CABLE FAIRING
3368632 PILE DRIVER AND EXTRACTOR
3368641 SOUND WAVE TRANSMITTING DEVICE
3368643 ELECTRIC ARC SEISMIC SOURCE
3369216 SYSTEM FOR REDUCING THE TRANSMISSION OF NOISE IN MARINE SEISMIC SURVEYING
3369217 METHOD AND APPARATUS FOR GENERATING AN UNDERWATER ACOUSTIC IMPULSE
3369218 METALLIZED PLASMA PATH SOURCE
3369516 STABLE OCEANIC STATION
3369627 MECHANICAL IMPLODER AND METHOD FOR GENERATING UNDER WATER SEISMIC SIGNALS
3369664 APPARATUS AND PROCESS FOR CONFINING FLOATING LIQUID PRODUCTS
3370432 ICE PROTECTIVE SLEEVE FOR PILINGS
3370462 WATER CURRENT METER
3370566 EMBEDMENT DEVICE
3370656 APPARATUS FOR SUBMARINE CORE DRILLING
3370672 SEISMIC RADIATOR
3371311 TOWED PRESSURE TRANSDUCERS WITH VIBRATION ISOLATION
3371643 HYDRAULICALLY ACTUATED DRIVER
3371726 ACOUSTIC APPARATUS
3371739 MEANS FOR VARIABLY CONTROLLING THE BUOYANCY OF A SEISMIC DETECTION STREAMER
3371740 SYSTEM AND METHOD FOR REDUCING SECONDARY PRESSURE PULSES IN MARINE SEISMIC SURVEYING
3372369 ACOUSTIC METHOD FOR MAPPING UNDERWATER TERRAIN EMPLOYING LOW FREQUENCY CONTINUOUS ACOUSTIC WAVES AND FIXEDLY SEPARATED TRANSDUCERS
3372552 WOODEN FENDER PILE PROTECTING APPARATUS
3372585 DEVICE FOR RECORDING CURRENT VELOCITY AND DIRECTION IN BODIES OF WATER
3372665 CABLE DISPENSING AND SECURING DEVICE
3372666 DEPTH CONTROLLER
3372760 FREE-FALL CORE SAMPLER
3373100 PRECONTROL SALINITY COMPENSATOR FOR AUTOMATIC CATHODIC PROTECTION SYSTEM
3373399 SONAR BOTTOM TRACKING RECORDING SYSTEM
3373400 DETERMINATION OF GEOPHYSICAL PROPERTIES OF THE SEA BOTTOM
3373568 SYSTEM FOR RECLAMATION OF LAND
3373569 ARTICULATED PILE STABILIZER AND ANCHORING DEVICE
3373713 APPARATUS FOR USE WITH OFFSHORE MARINE STRUCTURES
3373714 SMALL BOAT RESTRAINERS
3373806 APPARATUS AND METHOD FOR DRILLING WELLS
3373826 CORING DEVICE
3373827 APPARATUS FOR CORING SUBTERRANEAN FORMATIONS UNDER A BODY OF WATER
3373841 METHOD AND APPARATUS FOR GENERATING SOUND WAVES
3374635 BAGS FOR USE IN REVETMENT STRUCTURES
3374852 HYDROPHONE SUSPENSION SYSTEM FOR MAINTAINING HYDROPHONE FOR A PRESELECTED DEPTH
3375667 REVETMENT STRUCTURE AND UNITS THEREFOR
3375669 OFFSHORE MARINE STRUCTURES
3375715 SEA DIRECTION INDICATOR
3375800 SEISMIC CABLE DEPTH CONTROL APPARATUS
3375881 PILE DRIVER

3376742 OCEAN CURRENT MEASURING DEVICE
3376948 STREAMER COUPLER
3376949 WATER HAMMER MARINE SEISMIC SOURCE
3377808 CAP ASSEMBLY FOR PILE SHELL
3378815 HYDROPHONE EEL STRUCTURE FOR UNDERWATER SEISMIC EXPLORATION
3379015 PIER CONSTRUCTION
3379017 CONCRETE BLOCKS FOR SHORE AND BANK PROTECTION
3379020 DOLPHIN OR MARINE CONSTRUCTION
3379065 PRESSURE LIQUID SAMPLING SYSTEM AND APPARATUS
3379161 TOWLINES WITH MINIMUM WIDTH FAIRINGS
3379245 TENDED DRILLING PLATFORM FOR MULTIWELL SUBSURFACE COMPLETION
3379265 PILE EXTRACTOR AND SETTER
3379273 POWERFUL SOUND IMPULSE GENERATION METHODS AND APPARATUS
3380179 AUTOMATIC CONTROL OF SWING SPEED FOR DREDGES
3380253 APPARATUS FOR CONTROLLING EROSION
3380254 PROTECTIVE LININGS AND METHOD OF FORMING THE SAME IN WATERCOURSES
3380255 UNDERWATER ICE STRUCTURE AND METHOD FOR CONSTRUCTING SAME
3380256 UNDERWATER DRILLING INSTALLATION AND METHOD OF CONSTRUCTION
3380257 PORTABLE DOCK
3380304 REMOTE STATION FOR OCEANOGRAPHIC DATA SENSING
3380520 DRILLING AND PRODUCTION PLATFORM
3380541 SONIC METHOD AND APPARATUS FOR INSTALLING COMPLEX STRUCTURES
3381264 SUBMARINE TOPOGRAPHY
3381481 OFFSHORE STORAGE APPARATUS
3381482 MARINE DRILLING STRUCTURE
3381483 SEA WALL AND PANEL CONSTRUCTION
3381484 BUMPER
3382170 METHOD OF REMOVING AN OIL FILM FROM WATER
WITH SILICONE-COATED EXPANDED PERLITE
3382481 CANTILEVER MOUNTED HYDROPHONE
3382680 PRESTRESSED CONCRETE PILE SECTIONS
3382715 SOLION CURRENT METER
3382946 LIQUID SEISMIC EXPLOSIVE AND METHOD OF USING
3383297 ZINC-RARE EARTH ALLOY ANODE FOR CATHODIC PROTECTION
3383864 METHOD OF PROTECTING OR REPAIRING SCOURED AREAS OF SITUS
3383869 MARINE PIERS
3383870 OFFSHORE PLATFORM FOR UNDERWATER FACILITIES
3383915 DEEP-WATER WAVE RECORDER
3384169 UNDERWATER LOW TEMPERATURE SEPARATION UNIT
3384868 MARINE VIBRATORY DEVICE
3385069 MOBILE MARINE PLATFORM APPARATUS
3385071 HANDLING FLUENT MATERIAL
3385391 METHODS AND APPARATUS FOR CONTROLLING DEPTH OF MARINE SEISMIC CABLE
3385458 BOAT STORAGE RACK
3386075 SUPERSONIC WAVE RECORDING DEVICE
3386250 WATER CURRENT CONTROLLING MEANS
3386252 RIP RAP STRUCTURE DEVICE
3387458 SEAWALL STRUCTURES
3387460 MAGNETIC PILE STABBING APPARATUS AND METHOD
3388556 MARINE STORAGE STRUCTURE
3388752 COMBINATION PILEDRIVER AND DRIVABLE THREADED PIPE SECTIONS
3388753 DRIVING TOOL
3389332 METHOD AND INDUCTIVE APPARATUS FOR MEASURING FLUID CONDUCTIVITY
WITH TEMPERATURE COMPENSATING MEANS
3389559 FLUID RECOVERY SYSTEM AND METHOD
3389562 SALVAGEABLE MULTI-WELL OFFSHORE WELL PROTECTOR PLATFORM
3389564 METHOD AND DEVICE FOR INSTALLATION OF STEEL PIPE BELOW THE BOTTOM
OF A BODY OF WATER
3390408 LONG SPAR BUOY STRUCTURE AND ERECTION METHOD
3390530 MULTI-LEVEL BOAT HARBOR
3390531 OFFSHORE DRILLING PLATFORM
3392534 OFFSHORE DRILLING STRUCTURE
3392575 THERMAL PANEL FOR DETERMINING THE EFFECTS OF VARIOUS TEMPERATURES
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3392695 DEEP TOWING METHOD AND APPARATUS
3392794 DYNAMIC DEEP-OCEAN CORE SAMPLER
3393138 ALUMINUM ALLOY ANODE AND METHOD OF USING SAME IN CATHODIC PROTECTION

3393520 CONTAINER AND METHOD OF BUILDING A BREAKWATER
3393524 SUBMERGING VESSELS
3394553 UNDERWATER ANCHORED PILLAR FOR SUPPORTING A PLATFORM
3395663 DEEP SEA REFUSE DISPOSAL
3396542 METHOD AND ARRANGEMENTS FOR PROTECTING SHORELINES
3396544 STORAGE TANK FIXED ON THE OCEAN BOTTOM AND METHOD OF INSTALLATION
3396545 METHOD OF FORMING CONCRETE BODIES
3397260 METHOD FOR ENCASING RIGID MEMBERS WITH CONCRETE
3397545 MARINE STRUCTURE
3397546 ROLL OUT-ROLL IN DOCK
3397573 OCEANOGRAPHIC APPARATUS
3397574 FLOAT FOR MEASURING WAVE CHARACTERISTICS AND DIRECTION
3397755 PNEUMATIC SEISMIC SOURCE
3398394 MARINE SEISMIC ARRAY DEPTH CONTROL
3398395 SEISMIC AMPLIFIER SYSTEM WITH PREPROGRAMMED GAIN CONTROL
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3398715 SEISMIC UNDERWATER DETECTOR SYSTEM
3398801 PNEUMATIC IMPACT HAMMER FOR ROCK CRUSHING AND PILE DRIVING
3399535 BLOCK AND MARITIME STRUCTURE FORMED THEREFROM
3399566 FLOW METER
3399646 SUBMARINE ANCHOR ASSEMBLY
3399745 RECORDING ELASTIC WAVES WITH VARYING TRAVEL TIMES
3401473 APPARATUS FOR MARINE EXCAVATION
3401560 OCEANOGRAPHIC MEASURING AND RECORDING DEVICE
3401660 SEISMIC SHIP
3401661 HOPPER BARGE
3401755 DIESEL HAMMER CONVERTIBLE TO SINGLE OR DOUBLE ACTION
AND HAVING ENERGY RATING INDICATING MEANS FOR EACH MODE OF OPERATION
3401769 UNDERWATER GAS EXPLOSION SEISMIC WAVE GENERATOR
3401770 GAS EXPLODER APPARATUS FOR PROPAGATING SEISMIC WAVES
3401771 GAS EXPLODER APPARATUS FOR PROPAGATING SEISMIC WAVES
3401806 BOAT HANDLING DEVICE
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3402559 PROCESS OF FORMING A LARGE-DIAMETER TUBULAR PILE FOUNDATION
3402560 ACOUSTICALLY DEADENED PILING
3402605 MEASUREMENT OF CURRENTS IN LIQUIDS
3402828 BOAT LIFTING AND MOORING DEVICE
3403375 ACOUSTIC GENERATOR OF THE SPARK DISCHARGE TYPE
3404534 ENERGY-ABSORBING CAMEL
3404565 TOWED OCEANOGRAPHIC SENSOR SYSTEM
3404650 SYSTEM AND APPARATUS FOR TRANSLATING AND DISCHARGING A LOAD
3404654 STRUCTURE CAPABLE OF BEING USED AS A MONO-MOORING
3405527 PROTECTING MARINE STRUCTURES FROM FLOATING OBJECTS
3405558 OCEANOGRAPHIC INSTRUMENTATION
3406523 BUFFERS OR ENERGY ABSORBERS
3406524 FLUID-SONIC PILE DRIVING
3406649 METHOD AND APPARATUS FOR DRYDOCKING A BOAT HULL
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3406651 BOAT-MOORING MEANS
3406778 SEISMIC WAVE SOURCE FOR USE AT MARINE LOCATIONS
3407520 SUCTION DREDGER INSTALLATION,MORE PARTICULARLY A TOWED DREDGER
3408819 STABILIZING UNDERWATER SURFACE
3408864 WAVE HEIGHT MEASURING SYSTEM
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3409094 SPRING ACTUATED CORE RETAINER
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3409871 ELIMINATION OF MULTIPLE EVENTS ON SEISMOGRAMS OBTAINED
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3411305 TUBULAR INTERLOCKING PILING FOR WALL ASSEMBLIES
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3411473 DEEPWATER ANCHOR
3411595 HARD FORMATION OCEAN BOTTOM SAMPLING DEVICE
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3412563 JET CLOSING DEVICE
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3416631 DIGITAL REMOTE FIRING SYSTEM
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3417569 PROTECTIVE COATING AND METHOD
3417619 SINGLE WIRE MEASURING DEVICE FOR BATHYTHERMOGRAPH SYSTEM
3417724 VIBRATORY SEA ANCHOR DRIVER
3417828 METHOD FOR DRIVING PILES AND SIMILAR OBJECTS
3418230 GALVANIC ANODE AND ALUMINUM ALLOY THEREFOR
3418625 METHODS AND APPARATUS FOR ATTENUATING THE EFFECTS OF MULTIPLE SEISMIC REFLECTIONS
3418815 DOCK FENDER
3418816 FENDER FOR PROTECTING SHIPS ALONGSIDE A FIXED STRUCTURE
3418852 DRIFT DROGUE
3419796 COMPENSATED SALINOMETER
3421326 CONSTRUCTIONAL WORKS
3421327 DOCK HINGE
3421417 PAVEMENT
3422628 OFFSHORE STORAGE TANK SYSTEM
3422630 CONCRETE PILE CONSTRUCTION
3423777 BUOY APPARATUS
3423945 METHOD OF FORMING AN UNDERWATER TRENCH
3423946 UNDERSEA REPEATER BURYING PLOWSHARE
3424007 PRESSURE AND DEPTH DETECTOR
3424119 REVERSIBLE SELF-DUMPING AND SELF-BAILING SCOW
3424267 MARINE SEISMIC CABLE SUPPORT SYSTEM
3425227 FORM FOR CONSTRUCTING A SLAB FOR TALUS OR BOTTOM PROTECTION
3425228 FABRIC FORMS FOR CONCRETE STRUCTURES
3425499 HYDRAULIC VIBRATORY HAMMER FOR DRIVING AND OR EXTRACTING PILES AND THE LIKE
3425506 OFFSHORE SEISMIC STREAMER DEPTH CONTROL SYSTEM
3426109 METHOD OF FABRICATING A CONCRETE FLOTATION PIER
3426205 METHOD FOR TAGGING SAND WITH A GASEOUS RADIOACTIVE ISOTOPE
3426473 ANTIFOULING COVERING
3426536 BARRIER DEVICE FOR COASTAL PROTECTION
3426537 FLOATING BREAKWATERS
3426540 TIDEWATER POWER GENERATION SYSTEM
3426542 APPARATUS FOR USE WITH OFFSHORE MARINE STRUCTURES
3426585 ULTRASONIC SYSTEM FOR INSPECTING SUBMERGED PILES.
3426859 TELESCOPED CAISSON
3427812 METHOD AND APPARATUS FOR ANCHORING OFFSHORE PIPELINES
3428011 DREDGE PIPE PONTOONS
3428940 SONIC TRANSMITTER
3429127 METHOD AND APPARATUS FOR ESTABLISHING A FIXED SUPPORT OF A BUOYANT BODY IN ROUGH WATER

3429128 OFFSHORE STORAGE STRUCTURE
3429132 SUBMARINE PIPELINE TRENCHING MACHINE
3429133 OFFSHORE TOWER
3429289 MOORING DEVICE
3429388 SOLID MATERIAL SAMPLER PARTICULARLY FOR UNDERWATER SOIL SAMPLING
3430349 UNDERWATER TRIPOD AND PLUMBING GIMBAL
3430566 MARINE SEISMIC DETONATOR
3430598 MOORING DEVICE
3430599 MOORING DEVICE
3430600 MOORING DEVICE
3430695 METHOD AND APPARATUS FOR INSTALLING UNDERWATER WELLHEAD SUPPORT
3430727 SEISMIC SIGNAL TRANSDUCING APPARATUS
3431734 TOTALLY OR PARTIALLY PREFABRICATED STRUCTURE BAR-DAM FOR THE PROTECTION OF HARBORS
3431880 EXPLOSIVE EMBEDMENT ROCK ANCHOR
3431986 HYDRAULIC PILE-DRIVING DEVICE
3432000 SUBMERSIBLE DETECTOR FOR SENSING UNDERWATER SOUNDS
3432805 TIME BREAK CORRECTOR FOR MARINE SEISMIC SIGNAL
3433024 VERSATILE MARINE STRUCTURE
3433311 PILE DRIVER AND EXTRACTOR WITH ROTATING ECCENTRIC MASSES OF VARIABLE WEIGHTS
3434104 HYDROPHONE CABLE
3434444 WATERCRAFT WITH SCOOP
3434446 REMOTELY CONTROLLABLE PRESSURE RESPONSIVE APPARATUS
3434451 METHOD AND APPARATUS FOR UNDERWATER TOWING OF SEISMIC HYDROPHONE ARRAYS
3434551 BUOYANT COPING APPARATUS
3434561 FUEL MIXING AND IGNITION SYSTEM IN PNEUMATIC ACOUSTIC SOURCE
3434562 AIR FEED DEVICE FOR VALVE RETRACT SYSTEM IN PNEUMATIC ACOUSTIC SOURCE
3435410 SHALLOW WATER SEISMIC PROSPECTING CABLE
3435621 JACKING SYSTEM FOR OFFSHORE PLATFORMS
3435677 SYSTEM FOR MEASURING DIRECTION AND VELOCITY OF CURRENTS IN A LIQUID MEDIUM
3435737 COMPRESSED AIR,PRESSURE-SENSING ACTUATOR
3436722 EXTENDABLE INTRASECTION HYDROPHONE ARRAYS
3436776 SELF-BALLASTING STREAMER
3436914 HYDROSTATIC ENERGY ACCUMULATOR
3436920 PROTECTION OF OFFSHORE STRUCTURE FROM ICEBERGS
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3437171 MARINE HYDROPHONE VIBRATION ISOLATION
3437989 APPARATUS AND METHOD FOR CONTINUOUS MARINE MULTICHANNEL SEISMIC EXPLORATION
3437990 READ AFTER WRITE DIGITAL FIELD SYSTEM MONITOR
3438204 UNDERWATER STORAGE RESERVOIR
3438205 WATER SKIMMER
3438452 CORE SAMPLING
3438875 METHOD OF FORMING REFERENCE ELECTRODES
3439319 MARINE SEISMIC CABLE WITH DEPTH DETECTOR SYSTEM
3439537 UNDERWATER VEHICLES
3439642 HOPPER BARGE FOR TRANSPORTING ESPECIALLY LIQUID WASTE MATTER
3439875 APPLICATION OF CHEMICAL SUBSTANCES OVER LARGE AREAS
3440742 MULTIPLE MOTOR DREDGE
3440743 UNDERWATER TRENCHING APPARATUS
3440991 HAIR FAIRED CABLE
3440992 STREAMER CABLE DEPTH CONTROL
3440993 CABLE FAIRING
3441902 EXTENDABLE INTERSECTION HYDROPHONE ARRAYS
3442238 FLOATING LANDING-STAGE
3442339 SEA BOTTOM CORING APPARATUS
3442340 MOBILE/FIXED DRILLING AND PRODUCTION STRUCTURE
3444693 WATER WAVE SUPPRESSION DEVICE
3444734 DEEP WATER TIDE RECORDER
3444953 DEVICE TO AVOID THE PULSATION OF THE GAS BUBBLES GENERATED BY UNDERWATER EXPLOSIONS
3445008 HANDLING OF PARTICULATE SHIP CARGO
3446027 APPARATUS FOR DEPOSITING A LAYER OF FLOWABLE MATERIAL UNDERWATER

3446293 PILE DRIVER
3447124 UNDERWATER SURVEY
3447330 METHOD AND APPARATUS FOR ANCHORING SUBMERGED PIPELINES
3447371 IN-SITU VELOCIMETER
3447554 BUOY STABILIZATION SYSTEM
3447625 DEVICE FOR SEISMIC PROSPECTING
3448432 ISOLATOR FOR TOWED HYDROPHONE
3448585 PILE AND PILE PROTECTOR
3448709 MARINE FLOAT CONSTRUCTION
3449589 POWER SUPPLY SYSTEM
3449915 DESILTING EQUIPMENT
3449917 PORTABLE BOAT DOCK FENDERS
3449918 CONCRETE PILES AND METHODS AND APPARATUS FOR FORMING AND SPLICING THEM TOGETHER
3449950 APPARATUS FOR WAVE ANALYSIS
3450201 EXTENSIBLE CAISSON FOR UNDERWATER WELL
3450348 ELECTRICAL DISTRIBUTION SYSTEM
3452327 APPARATUS FOR SUPPORTING MARINE SEISMIC TRANSDUCER
3452830 DRIVING SYSTEMS
3453657 FLUID ACTUATED PERCUSSION TOOL
3453670 MARINE BUOY
3453830 METHOD AND APPARATUS FOR ALLEVIATING SCOURING ABOUT LEGS OF A MARINE STRUCTURE
3454112 PILE DRIVING HAMMER
3455112 INSTALLATION FOR PROTECTING SURF-ENDANGERED COASTAL SECTORS
3455115 FLOATING STRUCTURES
3455151 EXPENDABLE OCEAN BOTTOM SENSOR
3455159 NAUTICAL WEATHER STATION
3456371 PROCESS AND APPARATUS FOR MINING DEPOSITS ON THE SEA FLOOR
3456446 CONCRETE BLOCK
3456447 MOBILE MARINE DRILLING APPARATUS AND METHOD OF USE
3456448 LEG FOR SUPPORTING A MARINE STRUCTURE
3456720 APPARATUS AND METHOD FOR DRILLING WELLS
3457168 PROCEDURE FOR DISPOSING OF PETROLEUM OIL ON A WATER SURFACE
3457728 REPLACEABLE PILE SLEEVE INSERT
3457729 SYSTEMS FOR DAMPING MOORING SHOCKS
3458413 METHOD OF INHIBITING FOULING OF SEA WATER CONDUITS AND THE LIKE BY MARINE ORGANISMS
3458857 ACCELERATION CANCELLING HYDROPHONE
3459004 WHARF WITH A SHOCK-ABSORBING DEVICE
3460064 CANCELLATION OF HORIZONTALLY TRAVELING NOISE IN MARINE SEISMIC EXPLORATION
3460384 DEPTH CONTROLLING DEVICE
3461830 FAIRINGS FOR A MARINE TOWLINE
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3463002 WAVE AMPLITUDE MEASURING APPARATUS
3463085 UNDERWATER EXPLOSIVE CHARGE
3463113 RECOVERY RELEASE SYSTEM
3463114 METHOD FOR MANEUVERING A VESSEL WITH RESPECT TO ITS STATION
3463245 EXTENSIBLE AND RETRACTABLE BATTER ADJUSTMENT OF PILE HAMMER LEADS
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3464212 METHOD OF BUILDING CONCRETE STRUCTURES IN WATER BOTTOMS
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3464466 MOORING SYSTEM FOR TANKER VESSELS
3464909 ALUMINUM ALLOY GALVANIC ANODES
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3465528 FLOATING WAVE SUPPRESSOR
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3467047 MINIMUM-WIDTH CONTINUOUSLY FAIRED TOWLINE
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3473335 FLOATING SEAWALL
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3473505 MOORING DEVICE
3474549 APPARATUS FOR CONVEYING SAND OR THE LIKE
3474626 METHOD AND MEANS FOR PROTECTING BEACHES
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3478710 FLOATING DOCK STRUCTURE
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3479000 CLAMPS
3479580 APPARATUS INCLUDING A CONDUCTIVITY PROBE FOR DETERMINING THE SALINITY OF WATER
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3486341 FORM FOR CONCRETE OR THE LIKE
3486342 PILE MOORING BUMPER
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3486570 ALLUVIAL PROSPECTING UNITS
3487228 POWER GENERATING SYSTEM
3487484 TUNED FLOATING BODIES
3487645 WAVE DAMPING DEVICE
3488783 LONG SPAR BUOY
3488963 SAND STABILIZATION MACHINE
3488964 CONCRETE BLOCK
3488967 COMBINATION DEEP WATER STORAGE TANK AND DRILLING AND PRODUCTION PLATFORM
3488968 BOAT LANDING STAGES AND THE LIKE
3489012 WATER SAMPLER DEVICE
3489229 APPARATUS FOR DRIVING IN PILES,PLANKS AND THE LIKE
3489995 PRESSURE TRANSDUCER
3489996 SIGNAL PROCESSING SYSTEM
3490157 SUCTION PIPE HANDLING EQUIPMENT FOR A SUCTION DREDGER
3490239 BREAKWATER STRUCTURE

3490485 *EFFLUENT DISPOSING SYSTEM*
3490550 *VIBRATORY CORING APPARATUS*
3491023 *PROCESS FOR CONTAINMENT AND DEFLECTION OF AQUEOUS SURFACE POLLUTANTS*
3491287 *SALINOMETER INCLUDING FIRST AND SECOND ORDER TEMPERATURE COMPENSATION AND THIRD COMPENSATION FOR VARIATIONS BETWEEN CONDUCTIVITY AND SALINITY*
3491842 *APPARATUS FOR UNDERWATER DRILLING AND CORING LOOSE SEDIMENTS*
3491848 *WAVE GENERATOR ARRAYS FOR MARINE SEISMIC EXPLORATION*
3492822 *TIDAL FLUSHING SYSTEM*
3492826 *RETAINING WALL STRUCTURE*
3492963 *MOORING LINE STAND-OFF BARS*
3493072 *MARINE SEISMIC EXPLORATION ENERGY SOURCE*
3494132 *INFLATABLE FLOAT BOOM*
3494443 *TOWBOAT SYSTEM FOR HANDLING ACOUSTIC SOURCE IN MARINE SEISMIC OPERATIONS*
3494849 *ANCHORING DEVICE*
3495409 *APPARATUS FOR BUILDING A RETAINING WALL ALONG A BANK OF A BODY OF WATER*
3495561 *SALVAGE APPARATUS*
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3496085 *GALVANIC ANODE*
3496526 *SEISMIC CABLE DEPTH CONTROL SYSTEM*
3496532 *SYNCHRONIZED SEISMIC EXPLORATION SYSTEM*
3496728 *METHOD AND APPARATUS FOR FIELD REINFORCEMENT OF COLUMNAR STRUCTURES, PARTICULARLY OFFSHORE DRILLING AND PRODUCTION PLATFORMS*
3496900 *METHOD FOR INSTALLING A DEEP WATER ANCHOR*
3497018 *MARINE CORER WITH VALVE*
3497434 *METHOD FOR PREVENTING FOULING OF METAL IN A MARINE ENVIRONMENT*
3497450 *REMOVAL OF LIQUID CONTAMINANTS FROM THE SURFACE OF WATER*
3497579 *SLIP FORMING APPARATUS AND METHOD*
3498065 *METHOD AND APPARATUS FOR BARGE ANCHORING AND STABILIZING*
3498368 *PILE DRIVING SYSTEM*
3498391 *HYDRAULIC CUSHION BLOCK AND IMPACT TYPE PILE DRIVING HAMMERS*
3499290 *FLOATING BOOM*
3499291 *BOOM FOR SCREENING IN AND COLLECTING UP OF POLLUTION ON WATER*
3499292 *METHOD OF MAKING PARTIALLY SUBMERGED STRUCTURES*
3500302 *SONAR BATHYMETRY SYSTEM TRANSMIT-RECEIVE SEQUENCE PROGRAMMER*
3500484 *DEVICE FOR MOORING SHIPS*
3500678 *APPARATUS FOR DETERMINING SOIL RESISTANCE INCLUDING A DRILL*
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3501919 *METHOD AND APPARATUS FOR CARRYING OUT OPERATIONS AT AN UNDERWATER INSTALLATION*
3501920 *REINFORCED CONCRETE POLES,PILES AND THE LIKE*
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3502160 *RESILIENT YOKE MOUNTING FOR VIBRATORY PILE DRIVER AND EXTRACTOR*
3503214 *BARRIER FOR OIL SPILT ON WATER*
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3503217 *METHOD OF AND APPARATUS FOR ANCHORING WELL-DRILLING PLATFORMS TO THE OCEAN FLOOR*
3503467 *LADDER FOR BOAT DOCK,SEAWALL,OR THE LIKE*
3503508 *BARRIER FOR OIL SPILT ON WATER*
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3504501 *METHOD OF PILE SPLICING AND DRIVING*
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3504740 *SUBSEA SATELLITE FOUNDATION UNIT AND METHOD FOR INSTALLING A SATELLITE BODY WITHIN SAID FOUNDATION UNIT*
3505758 *ANTIFOULING COVERING FOR SUBMERGED MARINE OBJECTS*
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3506085 *PNEUMATIC ACOUSTIC SOURCE EMPLOYING ELECTROMAGNETIC CONTROLLED VALVE*
3506841 *OCEANOGRAPHIC DATA-COLLECTING BUOY ARRANGEMENT*
3506955 *MULTILINE SEISMIC EXPLORATION*
3507121 *TIE ROD ANCHORING METHOD AND APPARATUS*
3507123 *FENDER FOR DOCK WALL*
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3509522 *SHATTERPROOF HYDROPHONE*
3509727 *INSTALLATION FOR DRY-STORING OF WATERCRAFT*
3509772 *HYDROGRAPHIC SAMPLING DEVICE*

3509820 SEISMIC CHARGE ASSEMBLY,SEISMIC CHARGE PRIMER,AND METHOD AND SYSTEM EXPLORATION
3509948 PILE DRIVING SYSTEM
3509959 UNDERWATER SEISMIC EXPLORATION SYSTEM AND FIRING DEVICE AND CHARGE THEREFOR
3509961 UNDERWATER SEISMIC EXPLORATION
3510761 COMPENSATED SALINOMETER
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3511092 BATHYTHERMOGRAPHIC PROBE FOR UNIFORM DESCENT RATE
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3512280 SUCTION DREDGING APPARATUS
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3514881 APPARATUS FOR ADJUSTING THE SUCTION SLOT IN A DRAG SUCTION DREDGER
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3515889 POWER GENERATION APPARATUS
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3517514 SOIL PROTECTION MATS
3517516 FOLDING SUPPORT STRUCTURE FOR OFFSHORE DRILLING PLATFORMS
3517517 ENCAPSULATED CABLE FOR MARINE USE
3517812 PROCESS AND APPARATUS FOR REMOVING FLOATING WASTES FROM WATER SURFACES
3518183 PROCESS FOR SEPARATION OF OIL FILMS FROM WATER
3518677 ELECTRIC MARINE CABLE
3518835 METHOD FOR ALLEVIATING SCOURING ABOUT A MARINE STRUCTURE
3520117 UNDERWATER WEED CUTTER MECHANISMS
3520142 METHOD AND MEANS FOR PROTECTING AN EARTH SITUS AGAINST SCOUR
3520268 BALLISTICS EMBEDMENT ANCHORS
3520269 ANCHOR ASSEMBLY
3520412 NEMATODE EXTRACTION DEVICE
3520790 DEVICE FOR PREVENTING MARINE CREATURES FROM STICKING
3521387 DREDGING MACHINE
3521588 MOVABLE FLOATING BOAT ANCHORAGE
3521715 METHOD AND APPARATUS FOR SAMPLING
3522707 PILING CONSTRUCTION
3522709 MARINE PLATFORM STRUCTURE
3522862 METHOD AND MEANS FOR GENERATING ACOUSTIC PRESSURE IN FLUID MEDIUM
3523611 OIL SKIMMING APPARATUS
3524231 CIRCULAR UNDERWATER FORM WITH LOCK
3524313 TIDE CLOCK
3524320 METHOD OF PROTECTING AREAS OF AN EARTH SITUS AGAINST SCOUR
3524322 SPLAY FOOTED PLATFORM ANCHOR
3524323 OFFSHORE STORAGE TANK WITH SELF-CONTAINED GUY SYSTEM
3524324 FLEXIBLE PIER
3524349 BATHYTHERMOMETER
3525072 METHOD AND APPARATUS FOR PROCESSING SEISMIC DATA IN THE FIELD
3525187 EXPLOSIVELY DRIVEN SUBMARINE ANCHOR
3525224 METHOD AND APPARATUS FOR INSTALLING ANCHOR PILES
3525392 OFFSHORE PLATFORM HAVING A PARTIALLY REMOVABLE DRILLING DECK
3525409 CORE BARREL CLOSURE FOR SONIC DRILL
3525416 AIR OPERATED UNDERWATER SEISMIC SOURCE
3526096 METHOD OF MAKING ROCKFILL FOUNDATIONS
3526283 PILE DRIVER
3526436 MATERIAL LIFT SYSTEM
3527057 METHOD AND APPARATUS FOR CONTAINING WELL POLLUTANTS
3527188 POWER-PRODUCING MEANS FOR VESSELS
3527310 PILE DRIVING AND GUIDING APPARATUS

3527442 JACK-UP APPARATUS
3527553 APPARATUS FOR THE CONSTRUCTION OF ELEVATED WAYS
3528254 OFFSHORE PLATFORM STRUCTURE AND CONSTRUCTION METHOD
3529427 DEVICE FOR PREVENTING OR REDUCING SCOURS AT THE LOWER ENDS OF MEMBERS SUPPORTING MARINE STRUCTURES
3529681 HYDRAULICALLY CONTROLLED VIBRO-HAMMER
3529720 INSTALLATION FOR RECOVERY OF A LIQUID FLOATING ON A WATER SURFACE
3530051 ELECTROLYTIC METHOD FOR PREVENTING FOULING OF SEA WATER-IMMERSED STRUCTURES BY MARINE LIFE
3530952 UNDERSEA,LONG-RANGE TRACKING AND SIGNALLING SYSTEMS AND APPARATUS
3531761 DEPTH CONTROLLERS FOR SEISMIC STREAMER CABLES
3531762 DEPTH CONTROLLERS FOR SEISMIC STREAMER CABLES
3532219 APPARATUS FOR COLLECTING AND CONTAINING OIL ON THE SURFACE OF WATER
3532440 TIDALLY OPERATED SYSTEM FOR PUMPING WATER OUT OF BOATS AND FLOATING DOCKS
3532622 OIL SLICK DISPERSION METHOD
3532881 SUBMARINE RADIOACTIVITY LOGGING TECHNIQUE
3533240 FLOATING HARBOR
3533242 FENDER ASSEMBLY AND METHOD OF ASSEMBLING IT
3533697 WAVE HEIGHT MEASURING METHOD AND APPARATUS
3534477 METHOD,SYSTEM AND APPARATUS FOR SURVEYING REVETMENTS
3534558 FLOATING BREAKWATERS
3534599 EXPENDABLE OCEAN-WAVE METER
3534605 METHOD AND APPARATUS FOR THE UNDERWATER MEASUREMENT OF THE THICKNESS OF A SILT LAYER
3534668 PAVEMENT BLOCK
3534858 POLLUTION CONTROL DEVICE
3534859 APPARATUS FOR REMOVAL OF OIL FLOATING ON WATER OR THE LIKE
3534996 PILING EXTRACTOR
3535801 DREDGE CONSTRUCTION
3535884 OFFSHORE DRILLING AND PRODUCTION STRUCTURE
3535919 DYNAMIC DETERMINATION OF PILE LOAD CAPACITY
3535924 BATHYTHERMOGRAPH SYSTEM
3536135 UNDERWATER PRODUCTION FACILITY INCLUDING BASE UNIT AND PRODUCTION FLUID HANDLING UNIT
3536157 UNDERWATER SOUND SOURCES
3536199 PIPE EXTINGUISHING OIL SLICK SEPARATOR
3536615 METHOD OF AND APPARATUS FOR TREATING OIL LEAKAGE
3536616 METHOD FOR REMOVAL OF OILS FLOATING ON SURFACE OF WATER
3537268 MARINE STATION AND METHOD FOR FABRICATING THE SAME
3537536 PILE CLAMP FOR POWER HAMMERS
3537542 SPARKING DEVICES SUITABLE FOR SEISMIC PROSPECTING
3537587 FLEXIBLE FILTRATION BOOM
3538710 BREAKWATER STRUCTURE
3538711 DEVICE FOR CONTROL AND PREVENTION OF COAST EROSION
3538875 HOPPERBARGE
3539013 OIL COLLECTION BOOM
3539048 MEANS FOR COLLECTING FLOTSAM
3539979 HYDROPHONE ARRAY ERECTION
3540194 METHOD OF REMOVING MARINE GROWTHS AND ROOTS
3540224 RIGIDIZED SUPPORT ELEMENT
3540415 SYNTHETIC REEF ECOLOGICAL SYSTEM FOR LARGE BODIES OF WATER
3540543 MARINE ACOUSTIC ENERGY SOURCE
3541800 PILE PROTECTOR
3541989 HYDROPNEUMATIC MEASUREMENT AND CONTROL FROM BUOYED BODIES
3542140 ROTARY APPLIANCE FOR FACILITATING THE DRIVING OR WITHDRAWAL OF PILES,PIT-PROPS AND THE LIKE
3543422 UNDERWATER MINING ASSEMBLY
3543523 STRUCTURAL DOCK SYSTEM
3543565 METHOD AND APPARATUS FOR DETERMINING THE CONCENTRATION OF DREDGER SPOIL IN A SUSPENSION OF DREDGER SPOIL AND WATER FLOWING THROUGH A PIPE
3543709 DEVICE FOR CLOSING BOTTOM DUMP BARGE
3544456 DREDGING PROCESS
3545214 CONCRETE PILE SECTIONS AND JOINTS THEREFOR
3545274 SEA WATER DEPTH TRANSDUCER AND SYSTEM
3545539 SUBSEA SATELLITE FOUNDATION UNIT AND METHOD FOR INSTALLING SATELLITE BODY THEREWITHIN

3545563 DEVICE FOR EMITTING ACOUSTIC WAVES IN WATER
3546112 ABSORPTION OIL SKIMMER
3546456 MULTIPLE DETECTOR SUBMARINE RADIOACTIVITY LOGGING SYSTEM
3546473 OCEANOGRAPHIC GENERATOR
3546885 THREADED PILE FOR MARINE STRUCTURE
3547207 PERCUSSION HAMMER
3547553 FLOATING SURFACE SKIMMER
3548304 RESISTIVITY MEASURING DEVICE HAVING VERTICALLY-SPACED RING ELECTRODE AND A CENTRAL ELECTRODE
3548370 DEPTH SOUNDER
3548599 FLOATING OIL BARRIER
3548601 HYDRAULIC STRUCTURE FOR RESISTING WAVE ACTION
3548603 BRACED FRAME BULKHEAD
3548605 SUBMERGIBLE VEHICLE FOR EMERGENCY OFFSHORE GAS LEAKAGE
3549992 ELECTRICAL APPARATUS RESPONSIVE TO INDUCTIVE REACTANCE FOR MEASURING DISTANCE ALONG A PAIR OF CONDUCTORS
3549993 CORROSION RATE MEASURING METHOD BY MAINTAINING ELECTROLYTIC CONTACT AND EXCLUDING ANY SUBSTANTIAL OXYGEN CONTACT WITH A TEST SPECIMEN
3550384 LATERAL RESTRAINT OF PILE WITHIN JACKET LEG
3550693 PILE DRIVER
3550694 VIBROHAMMER
3551369 ANTIFOULING COMPOSITIONS COMPRISING A DISPERSION OF A MIXED POWDER IN A CARRIER

IV. ANNOTATED BIBLIOGRAPHY, 1967-70

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3,295,231 to 3,360,070

Note: Classification cross-references were not printed in patents issued in 1967.

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3,295,231
APPARATUS FOR REMOVING MATTER, PARTICULARLY WEED GROWTH FROM THE BOTTOM OF WATERWAYS
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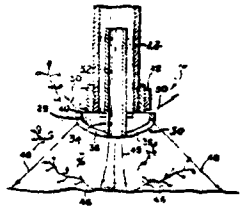
7 Claims. (Cl. 37—78)

Keywords: Water plant removal

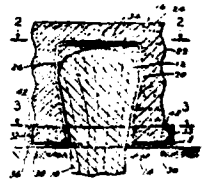
3. In combination with a substantially vertical pipe having an upper end adapted to be connected to a source of fluid pressure, a nozzle member at the lower end of said pipe, said nozzle member including a hollow body in open communication with said vertical pipe and having a substantially closed bottom wall, a relatively short pipe section of less diameter than said vertical pipe and having a lower end projecting through the bottom wall of said hollow body and extending co-axially upwardly in said vertical pipe beyond said body, and a straight slot through the bottom wall of said body and extending symmetrically on opposite sides of the lower end of said pipe section.



3,295,332
PROTECTIVE COVER FOR BUTT ENDS OF TIMBER PILES
John J. Dougherty, Cedar Grove, N.J.
(262 Rutherford Blvd., Clifton, N.J. 07014)
Filed Apr. 28, 1964, Ser. No. 363,240
2 Claims. (Cl. 61—53)

Keywords: Concrete form; Pile protection; Pile, wood

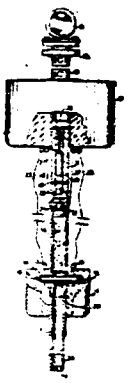
1. A protective cover for the end of a timber pile projecting out of the water or ground, comprising a substantially inverted U-shaped in cross-section concrete body opening upwardly from the bottom thereof, encompassing the area of the projecting end of the timber pile, inverted U-shaped rods extending about the periphery of the concrete pile for reinforcing the concrete body, laterally extending feet on the bottom ends of the rods, an annular plastic trough device having inner and outer peripheries opening upwardly supported on the feet below the bottom end of the concrete body, said trough device serving to seat the bottom end of the body, the bottom ends of the rods engaging the inner periphery of the trough device, and upstanding extensions on the free ends of the feet engaging the outer periphery for holding the trough device in place.



3,295,616
FREE CORING DEVICE
John D. Charlton, Washington, D.C. (829 W. Ave., J-12, Lancaster, Calif. 93534), and Edward A. Abbott, 8321 Still Spring Court, Bethesda, Md. 20034
Filed Dec. 2, 1964, Ser. No. 415,551
3 Claims. (Cl. 175—5)

1. An underwater earth sampling corer which comprises:
A core cutting means,
Weight means secured to said core cutting means,
A float means secured to said weighted core cutting means,
Means for timely releasing said float means to free said float relative to said weighted core cutting means,
Float stop means secured at the upper end of said core cutting means,
Means for timely releasing said weight means subsequent to timely releasing said float means,
Said weight means being released prior to said float means impacting with said float stop means,
Whereby said weight means forces said core cutting means into said earth subsequent to said release of said float means and prior to release of said weight means and said weight means is released prior to said float means impacting with said float stop means to withdraw said core cutting means from said earth and float the latter to the surface of said water.

Keywords: Sampler, seabed-driven core



3,296,579
CONTOUR MAP GENERATOR
Harold K. Farr, Westwood, Paul D. Frelich, Scituate, and Richard P. Curtis, Marblehead, Mass., assignors to General Instrument Corporation, Newark, N.J., a corporation of New Jersey
Filed July 17, 1964, Ser. No. 383,481
14 Claims. (Cl. 340—3)

1. Apparatus for generating a contour map in a mapping vehicle moving over an area to be mapped, said apparatus comprising means to transmit pulses of energy in a beam which is narrow in an x direction which is approximately the direction of travel of the vehicle, and which is wide in a y direction transverse to the x direction, means to receive energy reflected from the intersections of the narrow area illuminated by said beam with a plurality of collateral adjacent receiving beams which are wide in the x direction and narrow in the y direction, a computer responsive to the received energy for computing y and z coordinates defining a vertical profile of the area being mapped, the z coordinates being depth coordinates from the horizontal plane of the vehicle, a recording device having means to move a recording chart in proportion to the travel of the mapping vehicle, and having means to move a recording stylus repeatedly across the chart, the stylus of said recorder being responsive to an output of said computer for printing a dot at any y coordinate the z coordinate of which corresponds to a predetermined contour line for the map, the scanning travel and dot printing operation of the stylus being related to the travel of the vehicle by movement of the chart.

Keywords: Sonar, depth sounder; Sonar, side looking

3,297,300

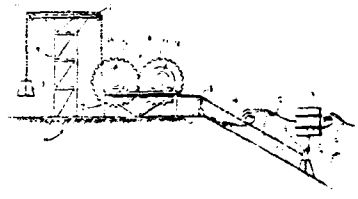
APPARATUS FOR DERIVING USEFUL ENERGY FROM SEA WAVES

Demetrios K. Mountanos, 132 Eddy St., San Francisco, Calif. 94102

Filed Sept. 30, 1964, Ser. No. 400,335
1 Claim. (Cl. 255—8)

Apparatus for converting wave motion into useful energy comprising, in combination, a support, a pair of aligned spaced power producing shafts rotatably mounted on said support, a power take-off means connected to one of said shafts, a pair of meshing gears, one mounted on each shaft, interconnecting said shafts for simultaneous rotation in opposite directions, a rectangular block fixed to an intermediate point on each shaft, oppositely disposed pawls pivotally mounted on each block, a sprocket having a hallow circular interior opening rotatable on each shaft surrounding an associated block, ratchet teeth on the inner periphery of each opening, the ratchet teeth of the two sprockets being oppositely disposed, said sprockets being linearly aligned, spring means biasing each pawl towards the ratchet teeth of its associated sprocket, the exterior periphery of each sprocket being transversely concaved and provided with chain engaging teeth, a chain extending beneath both aligned sprockets in engagement with said teeth, a first exteriorly mounted pulley over which said chain extends, a second exterior pulley located beneath the surface of an adjacent body of water under which said chain extends, a float in the body of water connected to that end of the chain, a tower adjacent said support, a transversely extending arm at the top of said tower, a third pulley at one end of said arm directly over the outside periphery of the sprocket remote from said float, the other end of said chain extending upwardly perpendicular to the length of chain beneath said aligned sprockets, a fourth pulley at the other end of said arm, said other end of said chain extending over said fourth pulley and depending vertically, and a weight secured to the depending end of said chain, said weight being equal to one-half the weight of the water displaced by said buoy.

Keywords: Power, wave



3,299,397

UNDERWATER DETECTOR STREAMER APPARATUS FOR IMPROVING THE FIDELITY OF RECORDED SEISMIC SIGNALS

George M. Pavey, Jr., Dallas, and Raymond H. Pearson, Richardson, Tex., assignors to Sonic Engineering Company, Dallas, Tex.

Filed Mar. 8, 1965, Ser. No. 439,136
17 Claims. (Cl. 340—7)

1. A waterborne seismic prospecting system for subaqueous geological structures comprising, in combination,

(1) an oil filled flexible elongated neutrally buoyant streamer adapted to be towed at various depths of submersion beneath the surface of a body of water,

(2) a plurality of pressure responsive detectors disposed at intervals within the streamer throughout the length thereof for producing an output electrical signal correlative with the character of a seismic wave reflected from subbottom strata beneath the streamer,

(3) means within the streamer for erasing the electrical signal generated by the pressure responsive detectors and caused by a secondary seismic wave reflected downwardly from the surface of the water and impinging on the streamer at each of said depths of submersion, said erasing means comprising,

(a) a plurality of vertically mounted particle velocity detectors each having means including an annular magnet resiliently mounted within and supported by a like number of gimbal supported sleeves and forming a circular magnetic air gap,

(b) a movable annular wire coil,

(c) means for resiliently supporting said coil by said magnet means in a manner to allow a reciprocal movement of the coil within said air gap, and

(d) a dome shaped diaphragm secured to said coil supporting means for causing reciprocal movement thereof in response to the instantaneous particle velocity of an acoustic wave applied thereto,

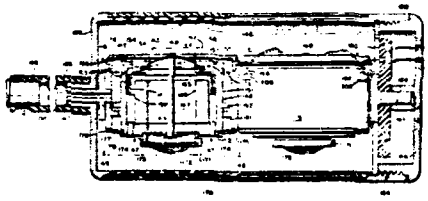
(4) a signal output circuit, and

(5) means connecting said pressure responsive devices and said particle velocity detectors electrically in said output circuit in a manner to generate a voltage signal of equal and opposite polarity to the signal generated by the pressure responsive detectors in response to a secondary wave acting on the streamer while the streamer is being towed through the water,

(6) the means resiliently mounting said annular magnet means within the gimbal supported sleeves including a pair of spring members respectively connected to and encircling the annular magnet means at the upper and lower portions thereof and having the outer peripheral portions of the springs connected to said gimbal supported sleeve at respective upper and lower portions thereof, and

(7) a pair of annular baffle devices respectively connected to said annular magnet means and said gimbal supported sleeves to restrict the flow of oil therebetween as the sleeve moves relative to said magnet sufficiently in response to a particle velocity wave applied to said streamer.

Keywords: Seismic streamer cable



3,299,399

METHODS AND APPARATUS FOR INDICATING AN UNDERWATER PARAMETER IN A MARINE SEISMIC SYSTEM

William E. Bowers, Houston, Tex., assignor to Vector Cable Company, Houston, Tex., a corporation of Texas

Filed Dec. 2, 1965, Ser. No. 511,076
8 Claims. (Cl. 340—7)

Keywords: Depth pressure measurement; Seismic streamer cable

2. In a marine seismic survey system, a device for indicating an underwater parameter at at least one point along the length of the cable, comprising:

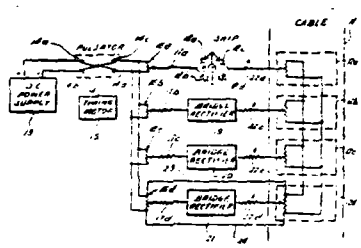
(a) at least one parameter measuring device located at at least one point along the length of the cable;

(b) first means for supplying a pulsating, polarity-reversing direct current signal to the parameter measuring device, said first means including:

(1) means for supplying a direct current signal;

(2) pulsating means for periodically reversing the polarity of the signal from the direct current supplying means to the parameter measuring device; and

(c) second means responsive to the parameter measured by the parameter measuring device for providing an indication of the underwater parameter, the changes in the parameter causing the parameter measuring device to vary the magnitude of the pulsating, polarity-reversing direct current signal applied to the second means.



JANUARY 24, 1967

3,299,640

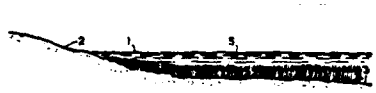
MEANS FOR INFLUENCING THE SUB-MARINE MIGRATION OF MATERIAL

Peter Søren Nielsen, Frederikshavn, Denmark, assignor to A/S Roblon, Frederikshavn, Denmark, a company of Denmark

Filed Dec. 31, 1963, Ser. No. 334,738
Claims priority, application Denmark, Jan. 14, 1963, 165
19 Claims. (Cl. 61—3)

Keywords: Artificial seaweed; Low-cost shore protection

1. A device for influencing the migration of material at the shore of a body of water, said device comprising anchoring means anchored in the bottom of said body of water and spaced from said shore; and a plurality of slender elongated members each having one end fixedly secured to said anchoring means; said members being flexible and buoyant along their entire length and consisting of synthetic nonwater absorbent material, each member extending generally upwardly and terminating in a freely floating end opposite to said fixed end, said members being grouped in a closely spaced unattached relationship along their length above said anchoring means.



3,299,969
SEDIMENT CORER
Anton L. Inderbitzen, San Diego, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.
Filed Aug. 1, 1963, Ser. No. 299,405
4 Claims. (Cl. 175—5)

Keywords: Sampler, seabed-driven core

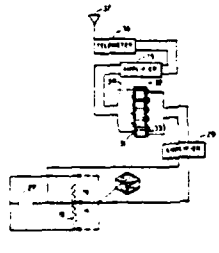
2. A sediment corer for collecting sediment samples comprising:
(a) a first body member;
(b) a second body member removably connected to said first body member and wherein said second body member comprises;
a coupling member having groove means at one end and an annular flange at its other end;
a plastic tubular member having an annular flange at one end abutting said flange on said coupling member;
clamp means encompassing said flanges to clamp together said cutter means to the other end of said plastic tubular member;
(c) cutter means connected to said second body at an end opposite to said second body;
(d) means for creating a vacuum within said second body member wherein said vacuum creating means comprises a piston slideably mounted in said plastic tube;
(e) a piston stop member depending from said annular flange on said coupling member and extending into said plastic tube; and
(f) means for holding said piston stationary when said cutter means penetrates the sediment.

JANUARY 31, 1967

3,301,047
WAVE GAGE ARRAYS FOR OBTAINING OCEAN-WAVE SPECTRA
Walter A. Von Wald, Jr., Hillcrest Heights, and Jacob E. Dinger, Silver Hill, Md., assignors to the United States of America as represented by the Secretary of the Navy
Filed Nov. 8, 1963, Ser. No. 322,544
3 Claims. (Cl. 73—170)

Keywords: Buoy, instrumented; Depth pressure measurement; Wave measurement

1. A wave analysis system which comprises:
(a) a buoy,
(b) at least one electrical calorimeter-telemetering system secured within said buoy,
(c) a line secured to said buoy and extending vertically downwardly from said buoy,
(d) at least one differential pressure transducer secured onto said vertically extending line secured to said buoy,
(e) said differential pressure transducers equal in number to that of said electrical calorimeter-telemetering systems,
(f) a separate variable resistor element controlled by one each of said differential pressure transducers,
(g) said resistor element comprising a pair of resistors with a center tap providing a null position between said resistors and a movable arm normally positioned at said null position and movable along said resistors in electrical contact therewith on opposite sides of said null position,
(h) an electrical power source with one side connected to said center tap of said resistor element and the other side of said electrical power source connected to the outer ends of each of said resistors,
(i) each of said pressure transducers mechanically connected with said movable arm of one each of said separate variable resistor elements, whereby
(j) said movable arm moves from said normal null position along said resistance element to supply different voltages to one each of said electrical calorimeter-telemetering systems in said buoy in accordance with any pressure change on said pressure transducer.



3,301,048

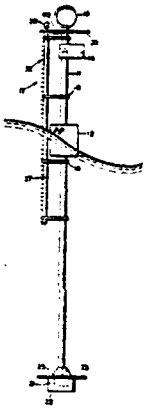
SEA STATE RECORDER

Harry D. Felsenthal, Jr., Camarillo, Walter W. Nakashima, Los Angeles, and William E. Zecher, Oxnard, Calif., and Eugene F. Ecker, Garland, Tex., assignors to the United States of America as represented by the Secretary of the Navy

Filed Apr. 20, 1964, Ser. No. 361,626
1 Claim. (Cl. 73—170)

A self-contained sea state recorder comprising: a mast and a float mounted upon the mast in the upper portion thereof for disposing the mast in an upright position in water; sea anchor means attached to the base of said mast for damping vertical mast motion; electrically conductive support means fixedly attached to said mast in the upper portion thereof; said support means disposed substantially parallel to said mast; wind vane means secured to said mast near the top thereof and extending outwardly therefrom in a direction different from the direction in which said support means extends so as to position said support means to windward of said mast; a plurality of electrical terminals spaced longitudinally along and attached to said support means and extending in a direction therefrom remote from said mast; a plurality of electrical resistance means connected one each intermediate adjacent pairs of said terminals; said resistance means being insulated from the water and said terminals being exposed to the water at least in portions remote from the support means; and electrical recorder means connected in series with said plurality of resistance means; said recorder means including an electrical power supply and a timer whereby wave height is determined by the number of terminals shunted by water contacting the terminals and the support means, and wave phase is determined by the span between successive waves; said sea anchor means including a flange attached to the mast at the base thereof; said recorder means includes accelerometer means to compensate for vertical oscillatory motion of said mast in response to wave motion; and a lamp positioned atop said support means and connected to said power supply and said timer whereby said lamp may be energized at the termination of a selected period of of sea state recording.

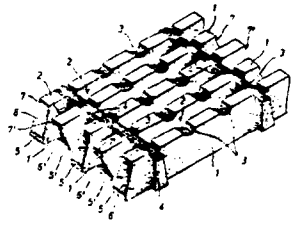
Keywords: Buoy, instrumented; Wave measurement



3,301,148
PAVING BLOCK
Paul Schraudenbach, Agnes-Bernauerstrasse 53A, Munich, Germany
Filed Dec. 18, 1963, Ser. No. 331,417
Claims priority, application Germany, Dec. 19, 1962, Sch 32,494
3 Claims. (Cl. 94—13)

1. A paving block comprising a plurality of bar-shaped parallel tread members spaced from each other and having at least one transverse groove in the upper side thereof, a plurality of parallel connecting webs extending transverse to said tread member, said connecting webs being spaced from one another so as to form an opening therebetween, said spaced tread members being of a cross-sectional size gradually decreasing from the lower side to the upper side of the block, each of said tread members having a length greater than the distance between the lateral outer surfaces of the outer webs, each of said webs having a length greater than the distance between the lateral outer surfaces of the outer tread members, all of said tread members projecting with their full cross-sectional size beyond the outer webs and all of said webs projecting with their full cross-sectional size beyond the outer tread members, and the end surfaces of adjacent tread members being alternately inclined in opposite directions.

Keywords: Concrete block; Low-cost shore protection; Revetment; Slope protection



3,301,336
METHOD AND APPARATUS FOR DEEP SEA BOTTOM CORE SAMPLING
Wadsworth W. Mount, Mountain Ave., Warren Township, Somerset County, N.J. 08873
Filed Mar. 24, 1964, Ser. No. 354,400
20 Claims. (Cl. 175—5)

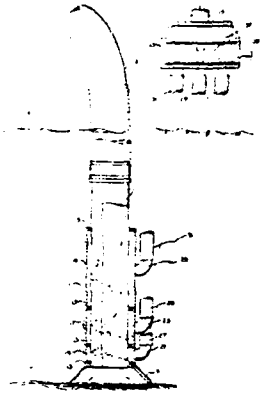
1. A core sampler for sea bottom use, comprising a core tube, a weight suspended in part from the top of the core tube and in part from the ship and mounted for movement along the core tube, and cable means for raising the weight upwardly along the tube, so that a force is produced urging the tube downwardly when the tube is positioned at the bottom of the sea.

Keywords: Sampler, seabed-driven core

3,301,606
CYCLONIC ELEVATOR
Anthony I. Bruno, 1335 Phelps Ave.,
San Jose, Calif. 95117
Continuation of application Ser. No. 472,805, July 19, 1965. This application June 23, 1966, Ser. No. 560,009
6 Claims. (Cl. 302—58)

Keywords: Dredge, suction; Dredge intake; Pump

1. An air lift device comprising in combination: (a) a tube for lifting material, (b) at least one chamber surrounding the tube adjacent one end thereof, (c) a plurality of passages leading from the chamber to the interior of the tube and arranged about the tube in a spiral pattern, and (d) means for supplying compressed air to said chamber and through said passages to said tube to impart a swirling motion to the material being lifted through the tube.

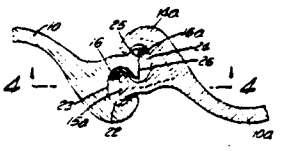


FEBRUARY 7, 1967

3,302,412
INTERLOCKING SHEET PILES AND METHOD OF INSTALLATION
William A. Hunsucker, 3741 Prestwick Drive,
Los Angeles, Calif. 90027
Filed June 29, 1964, Ser. No. 378,844
6 Claims. (Cl. 61—60)

Keywords: Pile section connection; Pile, sheet

1. In a sheet pile member having parallel side edges each provided with longitudinal interlock elements, the interlock elements on each side edge including a longitudinal thumb element and a longitudinal finger element defining a continuous cavity with a narrow lateral entrance slot of lesser width than the width of the cavity, the thumb element having a relatively thin portion of lesser width than that of the entrance slot and terminating in a thick portion which is smaller in cross-section than the cross-section of said cavity, the improvement comprising: a shoe fixed on one end of the thumb element and projecting therefrom and having an outer surface shaped like the inner surface of said cavity, whereby upon placing the lower end of said sheet pile member adjacent edge-to-edge with the upper end of another duplicate sheet pile member previously driven longitudinally into the earth, with the thumb elements each entering the cavity on the other member, respectively, the said member may be driven longitudinally into the earth in interlocking relation with the duplicate member, said shoe sliding within the cavity of the duplicate member to remove earth from that cavity, and thereby provide a sealant receiving chamber within that cavity and around the thumb element therein and longitudinally spaced spreader lugs within the cavity and attached to the cavity wall or thumb element for sliding contact with the companion element of the duplicate sheet pile member for spreading the sheet pile members within the limit allowed by the interlocking parts.



3,302,464

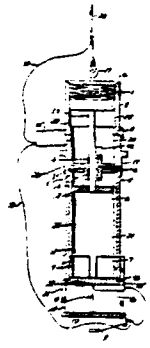
STERILE HIGH PRESSURE OCEAN SAMPLER

Arthur F. Langguth, 2125 Thrush Ave., Oxnard, Calif. 93030

Filed June 30, 1964, Ser. No. 379,418
10 Claims. (Cl. 73—425.4)

Keywords: Sampler, biota; Sampler, seabed grab

1. A sterile high pressure ocean sampler comprising:
an outer hollow cylindrical casing having a closed upper end and an open lower end;
a diametrical transverse bulkhead disposed in said outer casing, said bulkhead dividing the interior of said outer hollow casing into an upper closing chamber and a lower chamber;
an inner hollow cylindrical casing having an open upper end and a closed flanged lower end, said inner casing being adapted to fit telescopically within said lower chamber of said outer casing;
an inner sampling chamber formed between the interior walls and the closed flanged lower end of said inner casing;
means for reciprocating said inner casing with respect to said outer casing;
port means formed in the lower end of said inner casing for the reception of ocean samples into said sampling chamber; and
sealing means between said outer and inner casings for sealing said inner sampling chamber when said inner casing is fully telescopically inserted within said lower chamber of said outer casing.



3,303,118

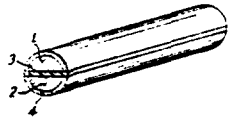
CATHODIC PROTECTION AND ANTI-MARINE FOULING ELECTRODE SYSTEM

Edward P. Anderson, Livingston, N.J., assignor to Engelhard Industries, Inc., Newark, N.J., a corporation of Delaware

Filed Apr. 8, 1963, Ser. No. 271,139
3 Claims. (Cl. 204—196)

Keywords: Cathodic protection; Corrosion prevention; Fouling prevention

1. A cathodic protection and anti-marine fouling system comprising a metal base in contact with an electrolyte, a composite electrode having first and second electrode components closely spaced from each other and bonded to each other with an insulation means therebetween insulating the electrode components from each other, said composite electrode being spaced from said base and in contact with said electrolyte, first electrical conductor means connected to the first electrode component, second electrical conductor means connected to the second electrode component, a first electrical input circuit connected to the first electrical conductor means, a second electrical input circuit connected to the second electrical conductor means, external source means for providing one of said circuits with a higher potential than the other thereby providing a differential potential between the first and second electrode components, and means for electrically connecting said metal base to said electrode components, said metal base being cathodic to both said electrode components.



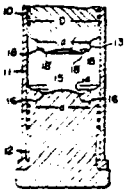
3,303,892
FUEL ATOMIZATION DEVICE IN DIESEL PILE DRIVER

Shojiro Nishimura, Ashiya-shi, Masao Ishizaki, Nada-ku, Kobe, and Hirotoshi Baba, Higashi-Nada-ku, Kobe, Japan, assignors to Kobe Steel Works, Ltd., Kobe, Japan

Filed June 23, 1964, Ser. No. 377,355
Claims priority, application Japan, June 24, 1963, 38/46,830
2 Claims. (Cl. 173—133)

Keywords: Pile driver, impact

1. A fuel atomization device and diesel pile driver, comprising a cylinder, a hammer disposed within said cylinder for reciprocal movement and having an impact surface at the lower end thereof, and an anvil fit in said cylinder at the lower end for a limited frictional movement and having an impact surface at the upper end thereof, said upper end impact surface of the anvil being opposed to said impact surface of the hammer and adapted to accumulate fuel thereon so that when said hammer drops and strikes against said anvil said fuel is atomized, said lower end impact surface of the hammer being provided with a centrally positioned concave circular groove and an annular ridge surrounding said groove, said upper end impact surface of the anvil being provided with a centrally positioned convexly shaped projection and an annular recess surrounding said projection whereby the fuel may be accumulated in the vicinity of the inner wall of said cylinder.



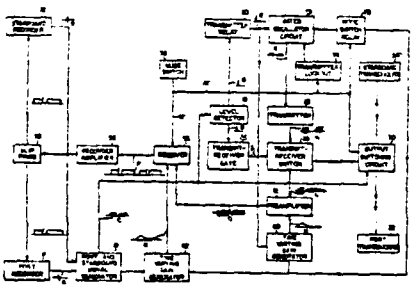
3,304,532
SIDE-LOOKING SONAR SYSTEM

Arthur Nelkin, Pittsburgh, and Dale D. Skinner, Turtle Creek, Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa., a corporation of Pennsylvania

Filed Apr. 16, 1965, Ser. No. 448,775
13 Claims. (Cl. 340—3)

Keywords: Sonar, side looking

2. A sonar system comprising:
(a) vehicle carried port and starboard long range side-looking sonar transducer means;
(b) vehicle carried port and starboard high resolution side-looking sonar transducer means;
(c) a source of sync signals;
(d) means responsive to said sync signals for providing sequentially occurring port and starboard signals;
(e) oscillator means for providing a limited pulse width output signal for each said port signal produced and each said starboard signal produced;
(f) amplifier means;
(g) port and starboard recording means;
(h) circuit means operable, during the period in which a port signal is provided,
  (1) to gate the output signal to a selected one of said port transducer means, whereupon said port transducer means transmits an acoustic signal to the surrounding medium and provides an echo signal upon receipt of any reflected acoustic signal, and
  (2) to gate the echo signal provided by said port transducer means to said amplifier and said port recording means;
(i) said circuit means being additionally operable during the period in which a starboard signal is provided,
  (1) to gate the output signal to a selected one of said starboard transducer means, whereupon said starboard transducer means transmits an acoustic signal to the surrounding medium and provides an echo signal upon receipt of any reflected acoustic signal, and
  (2) to gate the echo signal provided by said starboard transducer means to said amplifier and said starboard recording means.



3,304,533

MARINE SEISMIC SURVEYING

William B. Huckabay, Dallas, and William H. Parker, Richardson, Tex., assignors to Rayflex Exploration Company, Dallas, Tex., a corporation of Texas

Filed Dec. 4, 1964, Ser. No. 416,085
2 Claims. (Cl. 340—7)

Keywords: Seismic explosive acoustic transmitter

1. In a system for conducting a seismic survey of subsurface structure covered by water: plural arcing means disposed in the water, plural switch means connected to the respective arcing means, plural power sources connected to the respective switch means, and a decade counter effective to provide a plurality of sequential output pulses, each pulse of which is effective to close a switch means and thus enable an arc, said decade counter being pulse-enabled to deliver sequential output pulses for a predetermined short period, the last pulse of the sequence effective to disable the counter output.

FEBRUARY 24, 1967

3,304,777

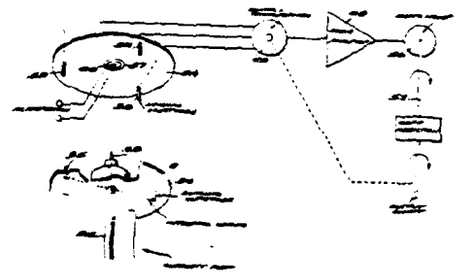
FLUID DIRECTION SYNCHRO

Albert A. Elwood, Pompano Beach, and Herbert A. Cook, Fort Lauderdale, Fla.; said Elwood assignor to Airpax Electronics Incorporated, Fort Lauderdale, Fla., a corporation of Maryland

Filed Mar. 30, 1964, Ser. No. 355,592
6 Claims. (Cl. 73—188)

Keywords: Current measurement

1. A transducer for transmitting a signal which is a measure of relative rotational displacement of one body to another, comprising two sets of electrodes immersed in a conductive fluid medium, a first set including a dipole mounted symmetrically about an axis, a second set including three electrodes symmetrically mounted about said axis in such a manner that relative rotational motion can be effected between said two sets of electrodes, said dipole and said tripole being spaced a fixed distance apart along said axis whereby each is positioned substantially in the plane of the electric field of the other, means to place an electric signal on one of said sets of electrodes to induce an electric signal in the other of said sets of electrodes so that the electric signal output of one of said sets of electrodes will induce a signal in the other of said sets of electrodes that is a measure of the rotational displacement of said one set of electrodes with respect to the said other set of electrodes.



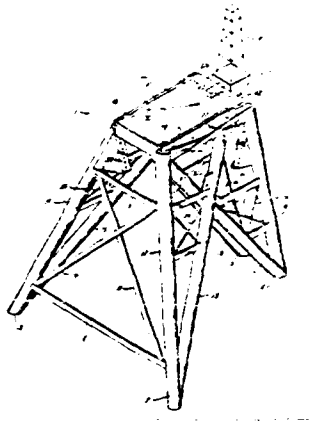
3,306,052
FLOATABLE STRUCTURE AND METHOD OF OPERATING SAME

Masasuke Kawasaki, Slidell, La., assignor, by mesne assignments, to Directo Corporation, Slidell, La., a corporation of Texas

Filed Aug. 26, 1963, Ser. No. 304,590
15 Claims. (Cl. 61—46.5)

Keywords: Offshore construction; Offshore platform, jack up

1. A platform structure for offshore location comprising,
a platform,
a plurality of V-shaped legs,
each leg including two tubular sections jointed together at one end and secured together at its other end by an arm to form the V-shaped legs,
each of said legs being pivotally secured to said platform at the arm end of one of said tubular sections,
each of said tubular sections being compartmented to receive ballast,
a bolting plate secured to the arm end of the tubular section of each leg opposite the tubular section which is pivotally secured to said platform for securing said leg to said platform, and
means for ballasting and deballasting the compartments in said tubular sections to pivot said legs with respect to said platform.



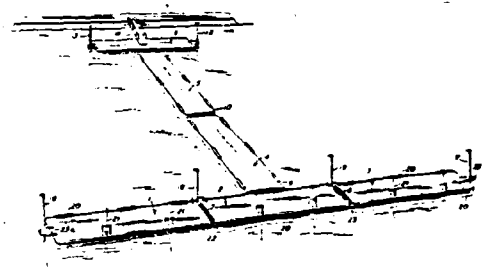
3,306,053
MARINE FACILITIES

Samuel King Fulton, 1756 SE. 9th St., Fort Lauderdale, Fla. 33316

Original application Jan. 12, 1961, Ser. No. 82,298. Divided and this application Sept. 17, 1964, Ser. No. 403,680
2 Claims. (Cl. 61—48)

Keywords: Pier fender; Pier, floating; Small-craft pier

1. A boat fender for an edge of a dock consisting of an inflated elongated tubular member of a single integral sheet of resilient material having a shape in cross-section compounded of approximately 270° of a circle completed by planar members of said material forming walls extending generally toward the center of said circle and meeting at an angle with respect to each other, a metal plate disposed entirely within each of said planar members, said metal plates serving as mounting plates for securing said fender to a dock.



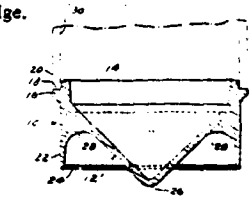
3,306,054
SKIRT TYPE PILE DRIVING POINT

John J. Dougherty, Cedar Grove, N.J.
(262 Rutherford Blvd., Clifton, N.J. 07014)

Filed Aug. 24, 1964, Ser. No. 391,677
2 Claims. (Cl. 61—53)

Keywords: Pile-driving shoe; Pile, steel; Pile, wood

1. A pile driving point for vertical downward penetration by successive power hammer blows, said point having a body circular in plan with a lower depending portion shaped as a hollow inverted circumferential cone and with an upper integral portion in the form of an annular collar, and a skirt depending from the junction of the collar and lower hollow cone, the extremity of the lower hollow cone extending below the lower edge of the skirt and having a blunt point, the lower edge of the skirt being sharpened, and an annular flange on the outer surface of the lower half of the collar, said flange having a level top surface forming a shoulder for seating the bottom end of a pipe, the upper outer surface of the collar above the shoulder being tapered, a series of spaced fins cast to the outer circumferential face of the skirt and flange, the fins extending from a point above the lowermost edge of the skirt to a point level with the shoulder, said fins being substantially triangular in shape with the apex thereof blunted, the lower side constituting the cutting edge.



3,307,143

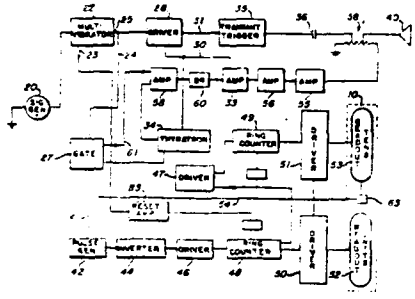
SONAR DEVICE

David S. Wyse and James E. Kienker, Dayton, Ohio, assignors to Projects Unlimited, Inc., Dayton, Ohio, a corporation of Ohio

Filed Dec. 28, 1964, Ser. No. 421,531
9 Claims. (Cl. 340—3)

Keywords: Sonar, depth sounder

1. A sonor system of the character described adapted for installation in a ship or the like for measuring the depth of a body of water below the ship or the like comprising, pulse generating means including a transducer adapted to be mounted on the bottom of the ship for generating a sound wave for passage from a transmitter to the bottom of the body of water to be reflected therefrom, a gate which is energized to a first non-conducting state simultaneously with the generation of said sound wave, a time base pulse generator connected to said gate for generating a series of pulses of predetermined length when said gate is in said first state, said pulses being correlated with the speed with which said sound wave passes through the water, first and second ring counter tubes each having ten outputs so that pulses supplied thereto sequentially advance said ring counters and current flow is sequentially produced in said outputs, first and second display tubes each having ten cathodes shaped in the form of numbers 0—9, said cathodes of said first and second display tubes being connected to one of said outputs of said first and second ring counter tubes, respectively, said cathodes adapted to glow when current flows therethrough thus presenting a visual display, said first ring counter tube being connected to said pulse generator and said second ring counter tube being connected to the number zero output of said first ring counter so that said cathodes display in units and tens the pulses from said generator, receiver means for receiving and amplifying the wave reflected from the bottom of the body of water and being connected to said gate to change said gate to a second state when a signal is received thereby terminating operation of said time base pulse generator so that the depth of water can be easily read on said cathodes of said digital display tubes, means connected to said gate for causing said display tubes to be inoperative when said gate is in said first state to eliminate scrambling of said cathodes, and means connecting said pulse generating means and said ring counter tubes for resetting said ring counter tube each time a sound wave is generated.



3,307,144

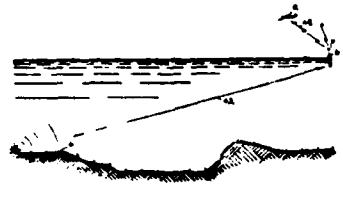
BATHYMETRY

David Epstein and Sidney Epstein, Brooklyn, N.Y., assignors to Vadys Associates, Ltd., Brooklyn, N.Y., a corporation of New York

Filed Jan. 22, 1965, Ser. No. 427,350
4 Claims. (Cl. 340—5)

Keywords: Instrument, airborne; Seabed site survey; Sonar, depth sounder

1. In the bathymetric mapping of deep ocean areas, the steps of depositing a predetermined geometric pattern of negatively buoyant explosive charges on the ocean bottom, sequentially detonating said deposited explosive charges in predetermined time sequenced relation and measuring the time interval intermediate each of said detonations and the first bubble pulse resulting therefrom at a common location remote from said charges and located at the ocean-air interface.



3,307,278
SONIC DREDGING PROCESS AND APPARATUS
Albert G. Bodine, Jr., 7877 Woodley Ave., Los Angeles, Calif. 91406
Filed Nov. 24, 1964, Ser. No. 413,495
21 Claims. (Cl. 37—195)

Keywords: Dredge, cutterhead; Dredge, suction

1. In a sonic apparatus for dredging earth material from the earthen bottom of a body of water, the combination of:

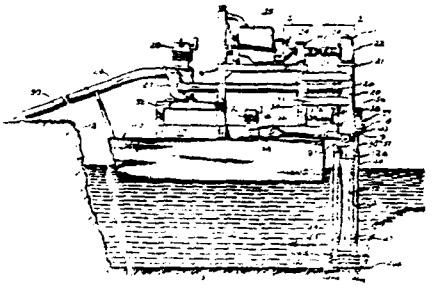
a dredge tube extending downwardly to a position adjacent to said earthen bottom,

a resonant sonic vibration radiator at the lower end of said dredge tube for stirring up earthen material at said bottom and bringing it into suspension in the water so as to form a slurry adjacent said lower end of said dredge tube,

a resonant elastic vibration system vibratorily coupled to said radiator,

sonic generating means for driving said sonic wave radiator, said generating means being operable at a frequency which will produce sonic wave vibration, and

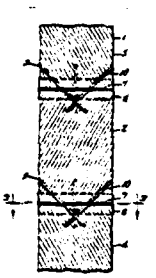
means for circulating said slurry up said dredge tube.



3,307,362
POSTING PILING
DuVal Cravens, Buffalo, N.Y., and Robert F. McGuire, Shawnee Mission, Kans., assignors to Osmose Wood Preserving Co. of America, Inc., Buffalo, N.Y.
Filed Dec. 12, 1963, Ser. No. 330,113
3 Claims. (Cl. 61—54)

Keywords: Pile section connection; Pile, wood; Structure repair

1. The method of repairing piling and the like having a deteriorated section which comprises removing the deteriorated section, preparing a replacement section slightly shorter than the removed deteriorated section, treating the exposed end surfaces of the piling and of the replacement section with preservative, applying spacing members to the exposed ends of the replacement section, applying an epoxy resin to the exposed ends of the piling and of the replacement section, positioning the replacement section in the piling in place of the removed deteriorated section, the replacement section being of sufficient length that with the spacing members and the resin it contacts the exposed ends of the piling forming a first set of pin-receiving holes extending obliquely through the replacement section across the joint and into the piling below the replacement section, and inserting pins in said holes, being spaced apart around the posted piling.



3,307,514

BOAT MOORING DEVICE

Melvin R. Young, P.O. Box 13089, Port Evergreen Station, Fort Lauderdale, Fla. 33316

Filed Oct. 1, 1965, Ser. No. 492,213
11 Claims. (Cl. 114—230)

Keywords: Small-craft mooring device

1. A mooring device adapted to moor a boat to a dock or the like comprising:

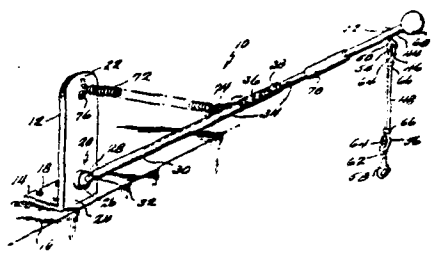
an upstanding plate member having a base adapted to be secured to the dock;

a ball joint means secured to the upstanding member intermediate its two ends, the ball joint means having a stud means extending therefrom in a direction away from the upstanding member;

a boom having one end seated on the stud means of the ball joint means and extending outwardly from the upstanding member;

tethering means secured adjacent the free end of the boom and adapted to be attached to the boat; and

tension spring means secured at one end to the upper end portion of the upstanding plate member and secured at the other end to the boom intermediate its two ends for supporting the boom.



3,307,624

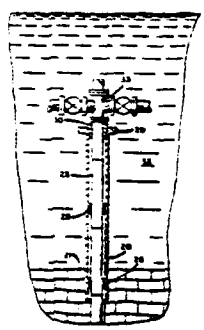
LOAD-SUPPORTING STRUCTURE, PARTICULARLY FOR MARINE WELLS

Arthur Lubinski, Tulsa, Okla., assignor to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware

Filed May 22, 1963, Ser. No. 282,462
14 Claims. (Cl. 166—.5)

Keywords: Offshore caisson; Seabed foundation; Seabed oil, process structure

1. A stable load-supporting marine structure comprising an elongated vertical hollow compression member having its bottom end fixed solidly in the earth below the marine bottom and its upper portion extending for a substantial distance through the water to a point in the vicinity of the water surface, the strength and stability of said hollow member being sufficient to support substantially only its own weight and any external loads or forces imposed on it, and a tension member for carrying additional weight extending below said bottom end of said hollow member, the combined loads carried by said hollow and said tension members substantially exceeding that which said hollow member alone may support as an external load without buckling, said tension member being attached to the center of the upper end of said hollow member and having a small clearance within said hollow member at at least one point intermediate its ends, so that the tendency of said hollow member to bend due to said additional weight brings said members into contact at least at said one point to substantially prevent increased bending of said hollow member by said additional weight.

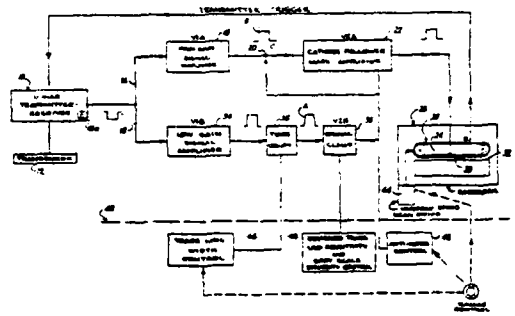


MARCH 14, 1967

3,309,650
PULSE-ECHO SOUNDER SYSTEM
Wayne M. Ross and John W. Dudley, Seattle, Wash., assignors to Ross Laboratories, Inc., Seattle, Wash., a corporation of Washington
Filed Sept. 24, 1963, Ser. No. 311,044
11 Claims. (Cl. 340—3)

Keywords: Sonar, depth sounder

11. In a pulse-echo system having a pulse-echo receiver and a display means therein for indicating received signals of different orders of magnitude, means to enhance the indications of received signals of a selected general order of magnitude in preference to signals of a different order of magnitude, including amplifier means operable to limit the magnitude of received signals before application thereof to said display means, and clamping circuit means operable in response to received signals to decrease the magnitude of such limited signals by amounts which increase with increase of received signal strength, said clamping circuit means including means adjustable at will therein to vary its gain and simultaneously to vary its threshold level of response to received signals, whereby such gain is increased as threshold level is decreased.

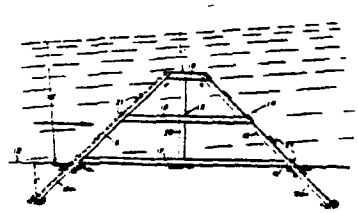


MARCH 21, 1967

3,309,876
EROSION PREVENTION APPARATUS
John M. Potter, 2224 Paris St.,
Virginia Beach, Va. 23454
Filed Feb. 13, 1964, Ser. No. 344,591
4 Claims. (Cl. 61—3)

Keywords: Breakwater, steel frame

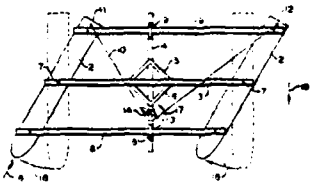
1. An erosion prevention system for preventing seashore beach erosion comprising a plurality of elongated frameworks positioned out from the beach submerged below the mean low water level without obstruction to navigation of surface craft thereover and in a position generally endwise adjacent each other to follow the general contour of the beach line, each elongated framework having a plurality of spaced apart transverse generally triangular frames with two legs of each frame diverging downwardly and interconnected with a base cross piece immediately adjacent the ocean bottom, at least some of said legs of the frames extending divergently downwardly beyond the cross pieces into the ocean bottom to anchor said elongated framework thereto, each framework having a plurality of spaced apart elongated baffle members connecting the legs of said two legs of each of said spaced apart frames defining shoreward and seaward faces of the framework and the baffle members having upwardly extending planar surfaces with their axes extending generally horizontally and arranged in a common plane on the shoreward face and on the seaward face and the two faces upwardly convergent at attitudes with respect to the general vertical height of each framework so as to retard the motion of the water, the lowermost baffle members being immediately adjacent the cross piece and the ocean bottom and the topmost baffle members being positioned on the legs of said frames below the mean low water without obstruction to navigation of surface craft, the other baffle members being spaced apart therebetween, and from each other a distance greater than the upwardly width of each planar surface, whereby incoming wave motion of the sea passes over and through the frameworks and between the baffles and is slowed down as it rushes up the ocean bottom and floor of the beach and has its undertow motion and backwash rate of flow arrested so that the sand carried in and the sand stirred up is deposited on the beach area spaced wall shoreward in from said frameworks.



3,310,019
FLOATS
James A. Standridge and Brian D. Nicholson, Lafayette, La., assignors to Phillips Petroleum Company, a corporation of Delaware
Filed June 18, 1965, Ser. No. 465,074
2 Claims. (Cl. 114—235)

Keywords: Instrument deployment; Seismic streamer cable; Towed vehicle

2. Apparatus for maintaining a towed member substantially on course comprising a frame means carrying a fixed cross member and at least one bidirectionally freely slidable cross member disposed on at least one side of said fixed cross member, at least two float means rotatably attached to each of said fixed and freely slidable cross members, rudder means carried on each of said float means, a rotatable means carried by at least one of said frame means and said fixed cross member between said at least two float means, a flexible means attached to said float means and carried by said rotatable means, said flexible means being attached to said float means in a manner such that rotation of said rotatable means causes rotation of said float means in substantially the same direction, and means for attaching said towed member to said frame means.



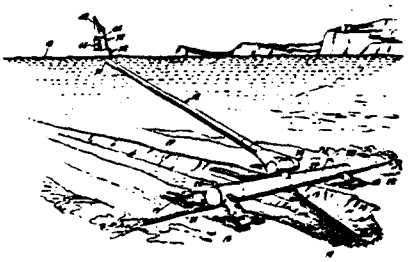
MARCH 28, 1967

3,310,892
SUBMARINE DREDGE
Ernest W. Spannhake, Kinnelon Borough, N.J., and Henri Prehn, Roslyn Heights, N.Y., assignors to John J. McMullen Associates, Inc., New York, N.Y., a corporation of New York
Filed Dec. 31, 1963, Ser. No. 334,740
10 Claims. (Cl. 37—56)

Keywords: Dredge, submerged; Seabed trencher

8. In combination, a hollow body which is adapted to be submerged in water; a hollow snorkel tube which has one end that is adapted to float freely above water; a hollow universal joint for permanently connecting the other end of said snorkel tube to said hollow body, said upper end being upwardly elongated and being normally free of connection with a vessel so as to respond to wave action in heave only in cooperation with the other parts of said snorkel tube and the universal joint; and nonbuoyant streamlined bow-shaped plates attached at the waterline to said snorkel tube at the free-floating end of said tube for minimizing wave slap.

9. A submarine dredge comprising a hollow submersible body, said body being divided into compartments for housing personnel, machinery and a source of power for driving the body along the bottom of a body of water to dig a trench; a hollow snorkel tube extending from said body on an incline relative to the surface of said body of water, the upper end of said snorkel tube being free-floating upon the water; a hollow universal joint for permanently connecting the lower end of said snorkel tube to said body for transferring personnel from said snorkel tube to said submersible body, said upper end being upwardly elongated and being normally free of connection with a vessel so as to respond to wave action in heave only in cooperation with the other parts of said snorkel tube and the universal joint, the upper portion of said snorkel tube being bent at a point slightly below the surface of said water so that said upper portion extends nearly vertically from said water at a moment when the remaining portion of said snorkel tube is inclined by an angle of forty-five degrees relative to the surface of said water; a landing cage; and means for supporting said cage in hinged relationship upon said upper portion of said snorkel tube.



3,310,984

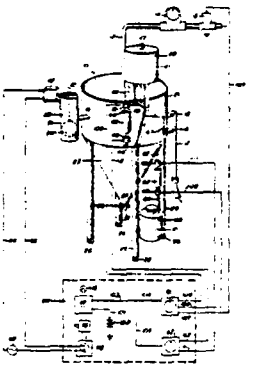
AUTOMATIC PLANKTON SAMPLING SYSTEM

George A. Swanson, Yankton, S. Dak., assignor to the United States of America as represented by the Secretary of the Interior

Filed Nov. 17, 1964, Ser. No. 411,948
7 Claims. (Cl. 73—421)

An automatic system to obtain samples of plankton in water has a cylindrical tank whose bottom is an inverted conical casing containing in a nested arrangement a multiplicity of mesh screens of sizes ranging from fine to coarse openings. Solenoid actuated valves which function to determine operation of the system are controlled in electrical circuits by a tank overflow float switch, and timer mechanisms which at regular intervals open and close contacts in the circuits, whereby samples of water are periodically directed to enter the tank into which are released measured amounts of preservative, and during subsequent sampling cycles screened samples treated with preservative are deposited in a collection vessel.

Keywords: Sampler, biota



3,311,080

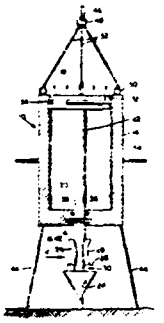
PRESSURE ACTUATED ANCHOR

Victor C. Anderson and Frederick H. Fisher, San Diego, Calif., assignors, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed Sept. 28, 1965, Ser. No. 491,065
3 Claims. (Cl. 114—206)

Keywords: Embedment anchor

1. A pressure actuated anchor comprising:
a piston cylinder having a bottom and an open top, said bottom having a centrally located opening;
a piston rod slidably extending through the cylinder bottom opening and adapted at its bottom end to anchor in the ocean bed;
means between the cylinder bottom opening and the rod for sealing the interior of the cylinder from sea pressure at anchor depth;
a piston slidably disposed within the piston cylinder and connected to the top of said rod;
means between the piston and the cylinder for sealing the interior of the cylinder from sea pressure at anchor depth;
means connected to the piston cylinder for retaining the piston and rod in an upward position within the cylinder until the anchor reaches anchor depth and then releasing the piston and rod so as to allow sea pressure to act on the piston and drive the anchor end of the rod into the ocean bed;
the retaining and releasing means including:
said rod and the bottom of the cylinder at said opening each having an annular groove which are located below the first mentioned sealing means, the cylinder bottom opening being counterbored below the annular groove; and
a soluble plug disposed within the counterbore and the annular grooves;
means connected to the cylinder for supporting the anchor on the ocean bed with the anchor end of the rod above the ocean bed;
cable means connected to the cylinder for connecting the anchor to a support ship; and
an annular dampening plate connected to the exterior of the cylinder for dampening upward movement of the cylinder when the piston and rod are released.



3,311,081

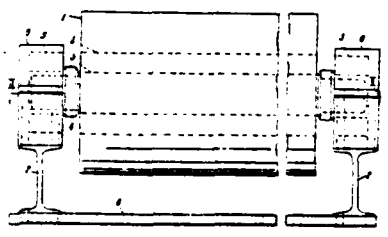
DOCK AND LIKE FENDERS

Wilfred Samuel Parker, Wombourne, England, assignor of one-half to Edge and Sons Limited, Shifnal, England

Filed Nov. 25, 1964, Ser. No. 413,809
Claims priority, application Great Britain, Dec. 5, 1963, 48,051/63
5 Claims. (Cl. 114—220)

Keywords: Pier fender

1. A fender for protecting structures such as dock walls, ship's hulls and like structures comprising rigid housing means attachable to the structure, non-metallic shell-bearing means resiliently mounted in the said rigid housing means, a resilient roller comprising an inner rigid shaft rotatably mounted in the said shell bearing means a layer of soft resilient material and an outer sleeve of hard resilient material, and resilient housing means encircling the shell bearing means to provide the resilient mounting therefor and to enable the shell-bearing means to yield resiliently to loads applied at any angle.



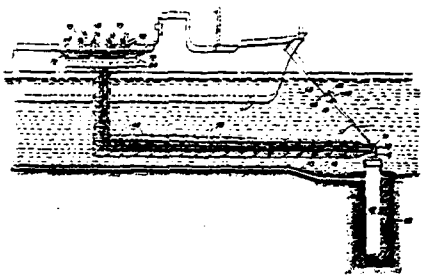
3,311,142
TANKSHIP MOORING AND LOADING SYSTEM

Eric V. Bergstrom, Byram, Conn., assignor to Mobil Oil Corporation, a corporation of New York

Filed Apr. 30, 1964, Ser. No. 363,844
6 Claims. (Cl. 141—388)

Keywords: Offshore mooring structure

1. An offshore mooring and ship loading and unloading system, suitable for the transfer of a liquid between shore facilities and a moored vessel, which comprises as elements in combination (1) a swivel joint located on sea bottom and comprising a fixed conduit, a movable conduit having an open bottom end and rotatable about a vertical axis, a substantial length of which is located within said fixed conduit, a fixed sheath located within said fixed conduit and substantially concentric with said movable conduit, said sheath adapted to receive a substantial length of said movable conduit, said sheath being partially filled with and adapted to retain mercury to provide a continuous seal between said liquid and seawater, said fixed conduit and said movable conduit adapted to be in liquid communication, said fixed and movable conduits being closed in a manner to exclude seawater from the interiors thereof, and means to substantially prevent vertical movement of said movable conduit; (2) a submarine line extending from and operatively connecting said shore facilities to said fixed conduit of said swivel joint; (3) a horizontally rotatable, vertically pivoted submerged boom attached to and extending radially from said movable conduit component of said swivel joint; (4) a vertical support located at the outboard end of said submerged boom and extending upwardly above water; (5) a loading platform supported above water by said vertical support; (6) a flexible loading line extending from and connecting said movable conduit component of said swivel joint to connecting means upon said loading platform, said loading line being adjacent and supported by said submerged boom and said vertical support, said connecting means adapted to effect liquid communication between said moored vessel and said flexible loading line.



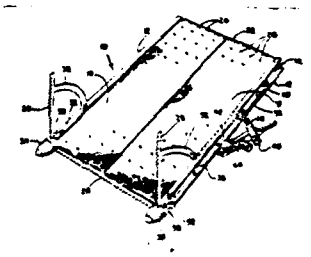
3,311,238
SUCTION ROLLER APPARATUS

Major Walter Huff, West Vancouver, British Columbia, Canada, assignor to Pacific Kelp Company Ltd., Vancouver, British Columbia, Canada, a British Columbia corporation

Filed Dec. 29, 1965, Ser. No. 517,376
6 Claims. (Cl. 210—160)

Keywords: Pollutant debris; Pollutant, mechanical removal; Water plant removal

1. A suction roller apparatus for conveyor means, comprising: (a) a generally rectangular conveyor table means with main side frame members adapted to be mounted at an angle and having a pervious, continuous conveyor belt thereon, said belt being disposed about a first roller located at the upper end of said conveyor table and a second roller located at the lower end of said table, (b) said conveyor side frame members having openings therein coinciding generally with the ends of said second roller, (c) said second roller being generally cylindrical and open at the ends and also being rotatably mounted and having a plurality of slots therein to permit passage of fluid through said slots, and (d) power driven impeller means mounted in said side frame member openings for drawing fluid through said pervious belt, through said slots to the inside of said second roller to be discharged out the sides of said conveyor through said openings in said side frame members.



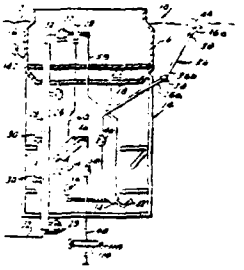
3,312,054
SEA WATER POWER PLANT

James H. Anderson and James H. Anderson, Jr., both of 1615 Hillock Lane, York, Pa. 17403

Filed Sept. 27, 1966, Ser. No. 600,287
21 Claims. (Cl. 60—26)

Keywords: Electrical generator; Power, submerged source

1. Apparatus for obtaining power from a naturally occurring body of water which is of sufficient depth to provide relatively warm surface water and relatively cold deep water, said apparatus comprising: boiler means for boiling a liquefied working fluid near the temperature of the warm water, said boiler means including a heat exchanger having separate sets of flow channels for passing warm and cold fluids in heat exchange relationship; means for flowing a stream of the warm water through one set of said boiler channels; means for passing a liquefied working fluid through the other set of boiler channels; power extracting gas expansion means having an outlet and an inlet, the latter being connected in fluid flow relationship to the other boiler flow channels; condenser means for condensing vaporized working fluid, said condenser means including a heat exchanger having separate sets of flow channels for passing warm and cold fluids in heat exchange relationship, at least one of said boiler means and condenser means being submerged below the surface of the body of water to a depth at which the water pressure is about equal to the vapor pressure of the working fluid at the temperature of the water flowing through the submerged heat exchanger to thereby achieve a low pressure differential between the separate sets of flow channels; conduit means connecting the outlet of said power extracting means to one of the sets of condenser channels; means for flowing a stream of the cold water through the other set of condenser channels to thereby condense said fluid; and means for flowing condensed working fluid from said one set of condenser channels to said other set of boiler channels.



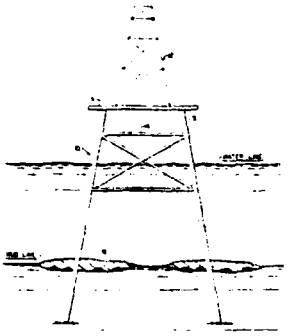
3,312,069
METHOD OF PREVENTING SCOUR AROUND UNDERWATER STRUCTURES

Robert M. Jorda, Houston, Tex., assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware

Filed Feb. 26, 1965, Ser. No. 435,571
18 Claims. (Cl. 61—1)

Keywords: Offshore platform, leg; Seabed scour protection

1. A method of installing an elongated structural member in an offshore earth formation where the ocean floor underlying the water comprises a mud line which is unconsolidated, said method comprising: (a) emplacing a portion of said member within the earth formation; (b) displacing a layer of solidifiable liquid resin-forming composition out into a radial zone surrounding said member at the mud line; and, (c) solidifying said liquid composition in intimate and static contact with both said member and the ocean floor at the mud line.



3,312,070

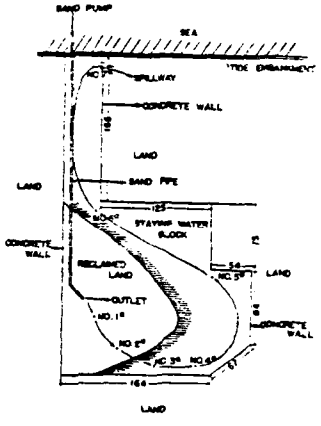
METHOD OF MAKING RECLAIMED GROUND WITH COAGULATIVE SURFACE ACTIVE AGENTS

Shinichiro Matsuo, Tenri, Nara Prefecture, and Hikaru Konishi, Kyoto, Japan; said Konishi assignor to Dai-Ichi Kogyo Seiyaku Kabushiki Kaisha, Kyoto, Japan, a corporation of Japan

Filed Oct. 11, 1965, Ser. No. 500,475
Claims priority, application Japan, Mar. 9, 1960, 35/1,271
13 Claims. (Cl. 61—36)

Keywords: Dredge-spoil transport

1. A method of depositing earth fill comprising
(i) passing a fluid mixture of solid earth particles comprising a variety of types and sizes including fines within a range of less than 5 microns to 50 microns and sand and larger particles in water through a pipe,
(ii) adding a small effective amount of a coagulative surface active agent to the pipe carrying said water solids mixture at a point from between about 20 meters and 200 meters from the discharge outlet of said pipe, said coagulative agent being a surface active agent which when admixed with the water-solids mixture will cause the fines and the solids to deposit after discharge at least four times faster than they would deposit in the absence of said agent, and
(iii) discharging said water-solid mixture on a reclamation site whereby the water runs off leaving the solids in the form of an earth-fill deposit having substantially uniform load bearing characteristics.



3,312,295

METHOD AND APPARATUS FOR FLUID INJECTION IN VIBRATORY DRIVING OF PILES AND THE LIKE

Albert G. Bodine, Jr., Los Angeles, Calif.
(7877 Woodley Ave., Van Nuys, Calif. 91406)

Filed Sept. 23, 1965, Ser. No. 489,652
31 Claims. (Cl. 175—19)

Keywords: Pile driver, vibratory; Pile driver, water jet

1. The method of vibratory driving of a longitudinally extended penetrating element having a penetrating end with a vibratory impacting end face into granular media for piling and the like, that includes:
bringing said impacting end face of said penetrating end of said element into forcible engagement with said media;
vibrating said element with longitudinally directed vibrations while in engagement with said media, so as to cause vibratory impacting of said end face against the media and thereby vibratory penetration in tight engagement with the media;
conducting a flow of wash fluid through a conduit directly to said vibratory impacting end face of said element with said flow maintained while said face is impacting against said media; and
providing, adjacent said impacting face, a cavity for reception of wash water and media displaced by said penetrating element and mixed with said wash fluid.

3,313,357
UNDERWATER SAMPLING APPARATUS

Alexis A. Venghiattis, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex., a corporation of Delaware

Filed Nov. 23, 1964, Ser. No. 413,106
17 Claims. (Cl. 175—6)

Keywords: Sampler, seabed-driven core

14. Apparatus for taking a sample of submerged earth substances, said apparatus comprising:

a gun body having a bore and a firing chamber;

a propelling charge of explosive disposed in said firing chamber;

a tubular sample-taking projectile slidingly disposed in said bore with one end located in said bore adjacent said firing chamber and with the other end extending out of said bore;

plug means threadingly engaging and closing the end of said projectile in said bore and having an aperture extending therethrough;

a sleeve removeably disposed in said projectile, said sleeve including two substantially hemi-cylindrical members disposed therein forming a sample receiving bore;

means connected with the other end of said projectile retaining said sleeve therein; and,

ignition means operably connected with said propelling charge for igniting said propelling charge to discharge said projectile, plug, and sleeve from said bore.

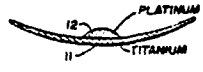
3,313,721
DISH-SHAPED ANODE

Rodney B. Teel, Wilmington, N.C., assignor, by mesne assignments, to Englehard Industries, Inc., Newark, N.J., a corporation of Delaware

Filed Dec. 31, 1958, Ser. No. 784,273
1 Claim. (Cl. 204—196)

Keywords: Cathodic protection; Corrosion prevention

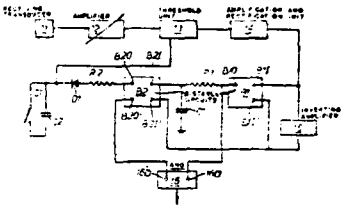
A substantially circular dish-shaped bi-layer anode especially well suited for use in impressed current cathodic protection systems for control of corrosion and capable of being subjected to current densities of up to about 550 amperes per square foot, which comprises a substantially circular dish-shaped non-porous mass of titanium metal, and affixed thereto and bonded in metal-to-metal electrical contact with the dish-shaped titanium metal mass a substantially centrally located electrical current discharging buttom of metal selected from the group consisting of platinum, rhodium, platinum group metal alloys containing at least about 50 percent platinum, platinum group metal alloys containing at least about 50 percent rhodium, and platinum group metal alloys containing at least about 50 percent platinum plus rhodium, the anode being free of a layer of metal intermediate the platinum group metal of the current discharging button and the titanium metal mass, and also free of material undergoing substantial consumption when in contact with sea water and during electrical current discharge through the anode.



3,314,045
ECHO SOUNDERS
Robert Lawton Williamson, Ilford, and John Henry Lindars, Chelmsford, England, assignors to Plessey-UK Limited, Ilford, England, a British company
Filed Nov. 30, 1964, Ser. No. 414,795
Claims priority, application Great Britain, Nov. 29, 1963, 47,171/63
15 Claims. (Cl. 340—3)

Keywords: Sonar, depth sounder

1. An echo sounder receiving system comprising a receiving transducer, an amplifier connected to said transducer, said amplifier having a gain which increases over a predetermined range during each sounding cycle, a comparison unit connected to said amplifier and operative during each sounding cycle to produce an electrical output pulse upon reception of the first significant amplified electrical echo-representing signal and a further electrical output pulse upon reception of each succeeding amplified electrical echo-representing signal which is greater than all the preceding amplified electrical echo-representing signals.

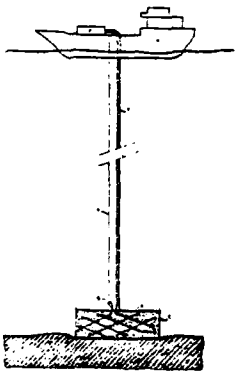


APRIL 18, 1967

3,314,239
METHOD AND APPARATUS FOR FORMING UNDERWATER STRUCTURES
Guy A. Baron, Colombes, Jean Berne, Vernouillet, Seine-et-Oise, and André Y. Giraud, Paris, France, assignors to Institut Francais du Petrole, des Carburants & Lubrifiants, Rueil-Malmaison, Seine-et-Oise, France
Filed Feb. 17, 1964, Ser. No. 345,422
Claims priority, application France, Feb. 21, 1963, 925,629, Patent 1,417,990; Sept. 27, 1963, 948,994, Patent 86,308
7 Claims. (Cl. 61—46)

Keywords: Concrete form; Offshore construction; Seabed material placement

5. A method for constructing structures of predetermined shape on the bottom of a body of water from an installation positioned at the surface thereof, comprising the steps of lowering to the bottom from said surface installation a container comprising a substantially rigid form, a container bottom secured to said rigid form, a movable cover provided with a safety valve and slidably mounted in said rigid form and displaceable therein from a collapsed position to an expanded position corresponding to the predetermined shape of the structure, said container being connected to said surface installation through flexible pipe means and an opening through said cover to fill progressively said container from said surface installation through said flexible pipe means with a mixture of liquid and solids capable of solidifying, thereby causing expansion of said movable cover, allowing said mixture to solidify, and then detaching the pipe means from said container.



3,314,240
METHOD AND APPARATUS FOR USE IN FORMING FOUNDATIONS

John J. Bardgette, New Orleans, La., assignor, by mesne assignments, to Esso Production Research Company, Houston, Tex., a corporation of Delaware

Filed Dec. 21, 1964, Ser. No. 420,070
5 Claims. (Cl. 61—53.5)

5. Apparatus for use in driving piles comprising:
a driving head having a chamber and fluid inlets to said chamber;
a tubular member secured to said driving head and adapted to extend from the lower end of said chamber, through a section of piling to be driven and into a section of driven piling;
an inflatable packer element arranged on said tubular member and adapted to be positioned in said driven section of piling;
a conduit extending from said driving head through said tubular member to said inflatable element adapted to carry packer inflate fluid from an external supply source to the interior of said inflatable element; and
means on said tubular member and means on said driven pile section cooperating to connect said tubular member to said driven pile section to hold said tubular member in position.

Keywords: Offshore construction; Pile driver, impact; Pile driver, water jet; Pile section connection; Pile, steel

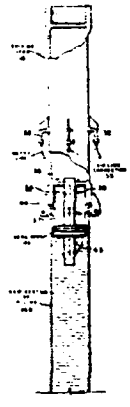
3,314,241
METHOD AND APPARATUS FOR USE IN DRIVING PILES

George E. Mayhall, New Orleans, La., assignor, by mesne assignments, to Esso Production and Research Company, Houston, Tex., a corporation of Delaware

Filed Dec. 21, 1964, Ser. No. 420,071
10 Claims. (Cl. 61—53.5)

1. A method for driving tubular, hollow piles comprising the steps of:
connecting a pile driving head to the top of a new section of tubular, hollow piling to be driven;
welding the lower end of said new section of piling to the top of a driven section of tubular, hollow piling;
said pile driving head containing a chamber and having connected to its lower end a conduit extending into said new section of piling and on which is arranged sealing means adapted to seal off the annulus between said conduit and the interior wall of said new pile section upon application of fluid pressure to the underside of said sealing means;
supplying fluid to the underside of said sealing means through said chamber and said conduit to cause said sealing means to expand and seal off the annulus between said conduit and the interior wall of said new pile section and thereby form a closed, hydrostatic system; and
then driving said piling into said formation with said driving head while supplying fluid to the interior of said piling through said chamber and said conduit.

Keywords: Offshore construction; Pile driver, impact; Pile driver, water jet; Pile, steel



3,314,287

STEP CAPACITANCE WAVE PROFILE RECORDER

Zeger H. Blankers, Ventura, Calif., assignor to the United States of America as represented by the Secretary of the Navy

Filed July 29, 1964, Ser. No. 386,097
10 Claims. (Cl. 73—170)

Keywords: Wave measurement

1. A device for determining ocean wave profiles comprising:

a wave staff arranged to be vertically disposed at the ocean's surface;

a plurality of conductive sensing bands spaced at equal intervals longitudinally along the outer surface of said wave staff;

a commutator having a rotary arm and at least as many terminals as there are sensing bands;

a plurality of conductive connectors disposed within said electrical insulation material;

each of said connectors connecting one of said bands to a respective one of said terminals;

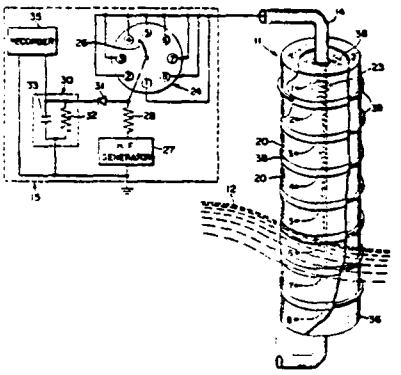
a high frequency generator having its output terminal connected to the rotary arm of said commutator through a resistor in series therewith;

a detector connected between said resistor and said rotary arm;

a recorder connected to the output terminal of said detector; and

said sensing bands being separated from contact with the water by covering means which forms a capacitive coupling between each band and the water;

whereby when said staff is partially submerged in the ocean the capacitance of each sensing band to the sea water will vary in relation to whether the band is above or below the surface of the water, and by recording information representative of the high voltage of non-submerged bands and of the low voltage of submerged bands, successive samplings of the bands will provide wave profile information.



3,314,540

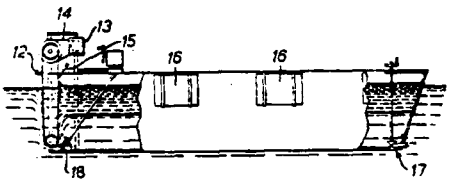
REMOVAL OF OIL FILMS FROM WATER

Edward James Lane, London, England, assignor to The British Petroleum Company Limited, London, England, a British joint-stock corporation

Filed July 5, 1963, Ser. No. 292,830
Claims priority application Great Britain, July 13, 1962, 27,002/62; Sept. 5, 1962, 34,031/62
2 Claims. (Cl. 210—77)

Keywords: Pollutant, mechanical removal; Pollutant removal watercraft

1. The method of recovering oil from the surface of water and transferring it to a craft having a receptacle in the craft for the transferred oil, comprising maintaining the craft afloat in the water, maintaining the base of the receptacle at least partially open to the water, forming one end of the craft with a substantially vertically positioned endless belt having one face thereof partially immersed in the water and having the other face thereof open to the receptacle, forming the operative surface of the belt of a material to which oil adheres, maintaining an opening in the craft between the bottom end of the belt and the base of the receptacle for the transference of oil thereinto, driving the belt so that the partially immersed belt face moves downwardly through the water and upwardly through the opening for transferring oil into the receptacle and causing the removed oil to flow into the receptacle.



3,314,545

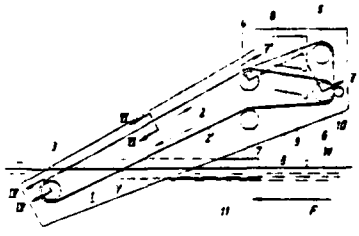
CLEANING WATER SURFACES

Friedbert Grabbe, Oelberg 21, Essen-Katernberg, Germany, and Karl Hintersdorf, Untere Fuhr 1, Essen, Germany

Filed Nov. 14, 1963, Ser. No. 323,685
Claims priority, application Germany, Nov. 20, 1962, G 36,447
6 Claims. (Cl. 210—242)

Keywords: Pollutant, mechanical removal

1. Apparatus for removing oil and other similar floating impurities forming an upper layer of a flow of water, comprising an endless convevor belt formed of a plurality of endless component bands located adjacent but spaced apart from one another and mounted on at least one lower roller and one upper roller spaced from one another, said belt being composed of material to which the oil sticks and having an upper run and a substantially straight lower run, said belt being adapted to be passed downwardly through the layer of oil and impurities into the water therebeneath so that the lower run extends into the water at an inclinded angle to the surface thereof in the direction of water flow, motor means for driving the belt so that said lower run thereof travels in a direction corresponding generally to the direction of water flow whereby oil from the upper layer is entrainable by said lower run through the water therebeneath, around the lower roller immersed in the water and upwardly out of the water along said upper run, and a cleaner for removing the oil from said belt located adjacent said upper run thereof between the surface of the water and said upper roller, the bands being made of a plastic material and the cleaner being formed by comb-like scrapers which scrape oil from the bands adjacent the upper roller into an oil collecting tank.



3,315,221

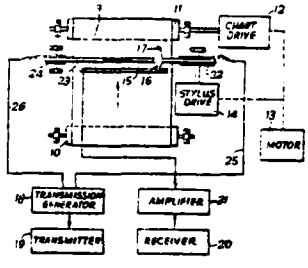
TRANSMISSION AND RECORDING OF SIGNALS IN ECHO-SOUNDING APPARATUS

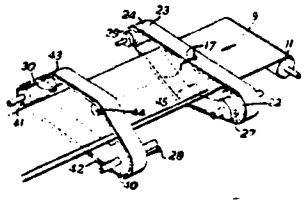
Victor Charles Buffery and Herbert Martin Jefferys, London, England, assignors to S. Smith & Sons (England) Limited, London, England, a British company

Filed Jan. 22, 1965, Ser. No. 427,281
Claims priority, application Great Britain, Jan. 31, 1964, 4,350/64
12 Claims. (Cl. 340—3)

Keywords: Sonar, depth sounder

8. Echo-sounding apparatus having a recording medium, a recording element sweepable repeatedly across said recording medium to record echo-signals, means for driving said recording element across said recording medium, a transmission generator for the transmission of sounding pulses, a trigger circuit connected to said transmission generator to control said transmission of sounding pulses, said trigger circuit including a first rotary switch positively coupled to said driving means and a second rotary switch, each of said rotary switches being operative at a predetermined angular position during the rotary motion of said switch, means coupling said rotary switches to one another for rotation at such relative speeds that the said switches are operative simultaneously to initiate a transmission once for each sweep of said recording element across said recording medium, and means for simultaneously adjusting the said predetermined angular positions by amounts having the same ratio as the angular speeds of said two switches.





3,315,473

OFFSHORE PLATFORM

Ferdinand R. Hauber and Claude L. Clark, both of Houston, Tex., assignors to Brown & Root, Inc., Houston, Tex., a corporation of Texas

Continuation of application Ser. No. 163,997, Jan. 10, 1962. This application Aug. 27, 1965, Ser. No. 494,289

6 Claims. (Cl. 61—46.5)

Keywords: Offshore construction; Offshore platform, fixed; Pile, structure connection

1. A tower resting on the bottom of a body of water in an offshore location and extending above the surface of said body, said tower comprising:

a central, substantially vertically extending leg;

a plurality of mutually spaced and substantially vertically extending intermediate legs, said intermediate legs being disposed laterally outwardly from said central leg;

a plurality of outer legs having upper submerged ends, said outer legs being inclinded downwardly and outwardly of said intermediate legs;

said intermediate and said outer legs being generally symmetrically disposed in relation to said central leg, with said intermediate and said outer legs being generally aligned with planes extending radially of said central leg;

said upper ends of said outer legs being mutually spaced, with each such upper end being disposed generally between adjacent intermediate legs;

each of said central, intermediate, and outer legs having hollow lower ends;

at least one pile projecting downwardly from and out of the hollow lower end of each of said central, intermediate and outer legs and extending into a submerged formation on the bottom of said body of water;

a generally annular body of cementitious material disposed and hardened in situ between an outer peripheral portion of each of said piles and an inner portion of the hollow lower end of the leg from which it projects;

a plurality of vertically spaced first securing means carried by the lower end of each of said legs, each comprising a ring secured to a leg interior and having a plurality of circumferentially spaced fingers inclined inwardly and downwardly thereof, and at least partially embedded within said cementitious material;

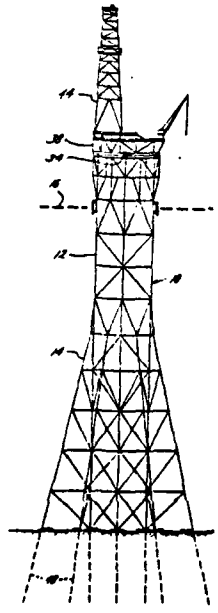
a plurality of vertically spaced second securing means carried by each of said piles, each comprising a ring secured to a pile exterior and having a plurality of circumferentially spaced fingers inclined outwardly and upwardly, thereof, and at least partially embeddad within said cementitious material;

at least some of said first securing means of each leg being each superposed above a second securing means and generally aligned longitudinally therewith in relation to their respectively associated leg and pile;

a plurality of vertically spaced guide stations, each said guide station including a plurality of horizontally displaced but interconnected annular collars, with at least some of the collars of said plurality of guide stations being superposed in axial alignment;

a plurality of conductor conduits, each conductor conduit passing generally axially through a plurality of superposed collars of a plurality of said guide stations; and

frame means interconnecting said central, intermediate, and outer legs, said guide stations and said collars.



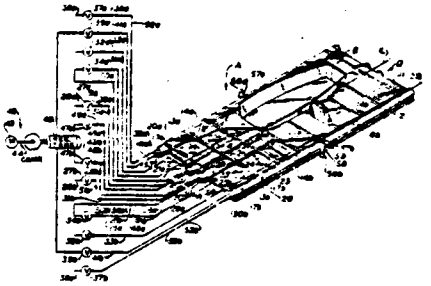
3,315,627
PNEUMATICALLY OPERATED FLOATING DRY DOCK

Harold Roberts, 3600 21st St., San Francisco, Calif. 94114

Filed Oct. 24, 1965, Ser. No. 504,538
8 Claims. (Cl. 114—45)

Keywords: Small-craft service structure

1. In a submergible dock to lift and support a vessel out of water, said dock having a rigid hollow ballast compartment secured to the underside thereof, first means to convey water into and out of said compartment, and second means in fluid communication with the atmosphere and said compartment to pump air into the compartment and expel water contained therein through said first means, the improvement comprising, in combination: an inflatable bag collapsible to a deflated condition; fastener means to secure said bag in the inflated and deflated condition to the underside of said dock; valve means connected in fluid communication with said bag to expel air therefrom when said dock is being submerged and block air from being expelled when the dock is being refloated and floating; and means in fluid communication with the atmosphere and said inflatable bag to pump air into said bag and expand the bag to its inflated condition, said inflated bag, ballast compartment and water displacing portions of said dock being selected to have a combined volume at least as great as a volume of water having a weight equal to said dock, including said rigid ballast compartment and bag, and the vessel supported thereon; whereby said dock may be submerged and the inflatable bag deflated when water is conveyed by said first means into said ballast compartment, and refloated to lift and support a vessel thereon when the water is expelled from said ballast compartment by said second means and the inflatable bag is filled with air by said means in fluid communication with the atmosphere and the inflatable bag.



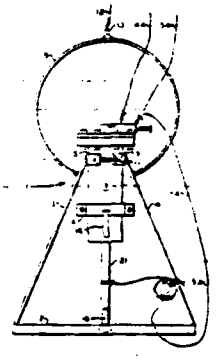
3,315,629
UNDERWATER ANCHOR GUN DEVICE

James A. Standridge and Brian D. Nicholson, Lafayette, La., assignors to Phillips Petroleum Company, a corporation of Delaware

Filed Nov. 30, 1964, Ser. No. 414,581
5 Claims. (Cl. 114—206)

Keywords: Buoy mooring system; Embedment anchor

1. Apparatus for anchoring a buoy to the earth beneath a body of water comprising: a frame assembly; means connected to said frame assembly for lowering said frame assembly through said body of water and for retrieving said frame assembly after said buoy has been anchored; a housing secured to said frame assembly; said housing having a chamber; an explosive charge positioned within said chamber; an anchor carried by said housing in register with said explosive charge; detonating means secured to said housing for detonating said explosive charge to propel said anchor into the earth, said detonating means including a firing pin positioned in register with said explosive charge, a hammer mounted to strike said firing pin, a spring-biased bolt member having a block portion and a rod portion, said block portion being positioned to strike said hammer, a removable safety pin positioned through said block portion of said spring-biased member to prevent accidental detonation of said explosive charge, and a release pin positioned through said rod portion of said spring-biased bolt member adapted to be removed from said rod portion to allow said detonating means to detonate said explosive charge; and means connecting said buoy and said anchor for holding said buoy after said anchor has been propelled into the earth.



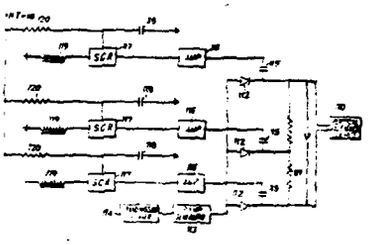
3,316,530
ECHO-SOUNDING APPARATUS WITH STABILIZED NARROW BEAM

Peter Roy Hopkin and William Halliday, London, England, assignors to S. Smith & Sons (England) Limited, London, England, a British company

Filed July 13, 1964, Ser. No. 381,982
10 Claims. (Cl. 340—3)

Keywords: Sonar, depth sounder

3. Echo-sounding apparatus having a row of transmitting transducers, a series of switches for effecting individual energization of the transducers, a control device for generating a steering signal representing the required deviation of the beam from a direction normal to the transducers, a voltage divider to which the steering signal is applied, a saw-tooth voltage generator and a series of comparators connected on the one hand to individual trappings of the voltage divider and on the other hand to the saw-tooth voltage generator, each of the series of switches being operated by a respective one of the comparators when the saw-tooth voltage reaches a value related to the voltage applied to that comparator by the voltage divider, whereby the transducers are energized in sequence at intervals determined by the magnitude of the steering signal.



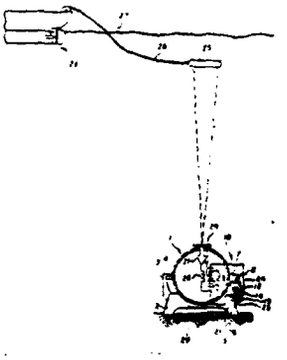
3,316,531
RELEASE MECHANISM

Buford M. Baker, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed Aug. 17, 1965, Ser. No. 505,297
6 Claims. (Cl. 340—7)

Keywords: Instrument retrieval

1. A release mechanism for holding two objects together comprising in combination a frame, first and second pivotally mounted levers on said frame, a compression spring mounted between said frame and said first lever to exert a force for rotating said first lever away from said frame, and a wire attached to but insulated from said frame and said first lever, thereby to hold said first lever against said spring and hold said spring in compression, said second lever being supported on one end by said first lever and pivotally mounted at the other end to said frame.



3,316,724
CONCRETE PILE JOINT AND METHOD OF ASSEMBLY

Yoshiro Tsuzuki, 76 Suehiro-cho, Numazu, Shizuoka Prefecture, Japan
Filed Jan. 13, 1964, Ser. No. 337,366
Claims priority, application Japan, Jan. 16, 1963, 38/1,935
5 Claims. (Cl. 61—56)

Keywords: Pile, concrete; Pile section connection

1. A connecting apparatus for solid cross shape concrete pile, which includes iron cross shape joint fittings for an upper solid cross shape concrete pile and iron cross shape joint fittings for a lower solid cross shape concrete pile, said joint fittings being dimensioned such that the former joint fittings may closely be fitted into the latter joint fittings, the cross shape joint fittings for the upper pile and the cross shape joint fittings for the lower pile being respectively used for the bottom end of the upper pile and the head of the lower pile; at least one set of crossed reinforcing bars having free bent ends are positioned inside of the said joint fittings, each free bent end of the said reinforcing bars being respectively welded to the corresponding inside face of the joint fittings; and connecting reinforcing bars, which are at their front ends welded to the inside faces of the joint fittings, each rear portion of the said connecting reinforcing bars being extended rearwardly from the cross shape joint fittings.

3,317,890
OVERWATER SEISMIC EXPLORATION METHOD AND APPARATUS

William A. Hensley, Jr., Bartlesville, Okla., assignor to Phillips Petroleum Company, a corporation of Delaware
Filed Mar. 22, 1965, Ser. No. 441,676
14 Claims. (Cl. 340—7)

Keywords: Seismic hydrophone array; Seismic streamer cable; Seismic survey method

1. An improved method for water-borne seismic exploration comprising pulling a series of sections of seismic detectors through the water, all of said sections being of equal length and the total number of said sections in said series being equal to a whole even integer, alternately creating seismic signals at a fixed distance from either end of said series as it is pulled through said water, said fixed distance being X, such that $X=Y(i)$, Y is the length of one of said sections and i is a whole integer that can be divided into the said total number of sections in said series to give a whole even integer, each seismic signal being created after said series has been pulled said fixed distance through said water following the next preceding created seismic signal, detecting the reflected seismic signals with said series and recording and compositing same.

3,318,394
METHOD AND APPARATUS FOR OBTAINING SOIL SAMPLES

Gale R. Gleason, Jr., and Frederick J. Ohlmacher, Mount Pleasant, Mich., assignors to Central Michigan University Board of Trustees, Mount Pleasant, Mich.
Filed Feb. 19, 1965, Ser. No. 434,048
10 Claims. (Cl. 175—5)

Keywords: Sampler, seabed-driven core

1. A sampler device for use in benthonic exploration and the like which comprises,

(a) an open-ended sampler tube adapted to be plunged into soil to be sampled,

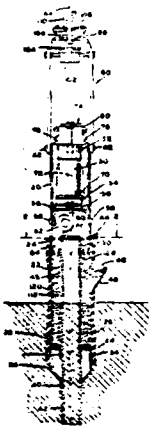
(b) a mounting means for said tube comprising a a jacket for supporting said tube therein to provide a refrigerant chamber around said tube,

(c) means in said jacket to permit the introduction of refrigerant from the outside of said jacket,

(d) a second means for storing a supply of refrigerant adjacent said jacket comprising a piston and cylinder arrangement,

(e) means for cocking said piston against a resilient force in a position poised to drive refrigerant into said jacket, and

(f) releasing means for tripping said cocking means to release said piston.

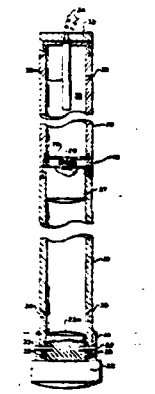


3,318,411
SIGNAL GENERATOR

Ralph A. Doubt, Bartlesville, Okla., assignor to Phillips Petroleum Company, a corporation of Delaware
Filed Dec. 18, 1964, Ser. No. 419,346
3 Claims. (Cl. 181—.5)

Keywords: Seismic explosive acoustic transmitter

1. Signal generating apparatus comprising an elongated generally cylindrical hollow member; a first generally cylindrical weight having one section thereof formed as a spherical segment; means resiliently securing said first weight to said elongated member so that said first weight is free to move away from said elongated member, said one section of said first weight facing the interior of said hollow member; a second generally cylindrical weight having one end formed as a spherical segment; means positioning said second weight in an intermediate region of said elongated member so that said one end of said second weight faces said first weight; means closing the end of said elongated member which is remote from said first weight so as to form a chamber between said second weight and said remote end of said elongated member, said chamber being adapted to contain an expansible material and a means capable of initiating rapid expansion of said material, whereby expansion of said material serves to propel said second weight through said elongated member toward said first weight; and a plurality of additional generally cylindrical weights positioned within and partially filling said hollow member, each of said additional weights having ends formed as spherical segments, said additional weights being of progressively smaller masses in the direction said member extends away from said first weight, said second weight and said additional weights each having a diameter substantially equal to but slightly smaller than the inner diameter of said hollow member, whereby said second weight strikes the additional weight of smallest mass and the resulting impact is transmitted through the remainder of said additional weights to said first weight.



3,319,595

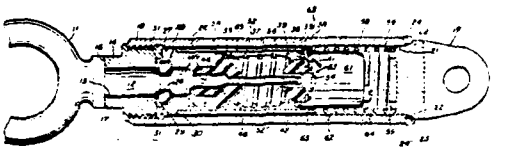
TIMED ACTUATING MECHANISM

William G. Van Dorn, 6611 Muirlands Drive, La Jolla, Calif. 92037, and Harry F. Fogleman, San Diego, Calif.; said Fogleman assignor to said Van Dorn

Filed Jan. 21, 1966, Ser. No. 522,108
6 Claims. (Cl. 114—206)

Keywords: Buoy mooring system; Instrument retrieval

1. A timed actuating mechanism comprising:
a compression spring retained by first and second mounting means;
a metallic link disposed axially within said compression spring and insulated therefrom;
said metallic link being carried by said first and second mounting means and defining the distance between first and second mounting means;
said metallic link being dimensioned for causing said compression spring to be in a compressed condition between said first and second mounting means;
an electric current regulating means electrically connected between said metallic link and said tension spring, whereby upon immersion in an electrically conducting medium said metallic link and said tension spring form an electrochemical cell which upon conduction of electrical current between said metallic link and said tension spring through said electrically conducting medium cause said metallic link to decompose and part.



3,319,734

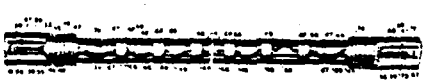
ELASTIC DETECTION STREAMER DEAD SECTION FOR A WATER BORNE SEISMIC SURVEYING SYSTEM

George M. Pavey, Jr., Dallas, Tex., assignor to Whitehall Electronics Corporation, Richardson, Tex.

Filed June 17, 1965, Ser. No. 464,739
9 Claims. (Cl. 181—.5)

Keywords: Seismic streamer cable

An elastic oil filled dead section streamer having a plurality of plastic strain cables therein connectable to a tow line from a vessel and the forward end of a submerged seismic detection streamer containing sensing means for transmitting seismic signals to receiving apparatus on the vessel corresponding to seismic impulses detected thereby. A plurality of loosely arranged conductors within the dead section streamer establish electrical communication between the detecting devices and the receiving apparatus. The dead section streamer prevents vibrations from the tow cable from adversely affecting the seismic detecting devices when the streamer is towed at high speed.



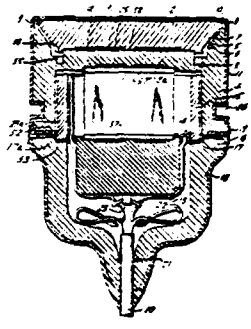
3,320,578
ELECTROACOUSTIC TRANSDUCERS FOR SUBMARINE ECHO SOUNDING

Erhard Ahrens and Karl Feher, both of Kiel, Germany, assignors to Electroacustic Geseilschaft mit beschrankter Haftung, Kiel, Germany, a corporation of Germany

Filed June 11, 1965, Ser. No. 463,257
Claims priority, application Germany, June 15, 1964, E 27,220
28 Claims. (Cl. 340—8)

Keywords: Seismic hydrophone; Sonar, depth sounder

1. Electroacoustic transducer for transmitting and receiving sonic waves in water, suitable for high water pressure and for arrangement in transducer groups, comprising a housing having a front wall forming the frontal side thereof and a thick side wall having an inside surface in said housing, a piston-type oscillatory diaphragm structure joined with said housing by pressure tight means and forming the front wall thereof, said pressure tight means comprising elastic means in interconnecting said diaphragm structure and housing to support said diaphragm structure for oscillatory movement relative to said housing, an oscillator member disposed in said housing behind said diaphragm structure and mechanically connected therewith, said diaphragm structure having a rear surface in said housing and a front face covering substantially the entire frontal side of said housing and extending to substantially the outer limits of the side wall of said housing, said diaphragm structure and said housing forming a sound-shielding and pressure-tight interspace behind said diaphragm front face and near and around the perimeter of said diaphragm structure between part of the rear surface of said diaphragm structure and part of the inside surface of the side wall of said housing and extending substantially to the front face of said diaphragm structure.



MAY 30, 1967

3,321,923
STEERABLE SELF-POWERED FLOATING STRUCTURES

Millard F. Smith, Westport, Conn. (% Fluid Solids, Inc., P.O. Box 295, Saugatuck, Conn. 06880), and Anthony V. Anusauckas, Bridgeport, Conn.; said Anusauckas assignor to said Smith

Filed Mar. 2, 1965, Ser. No. 436,502
8 Claims. (Cl. 61—1)

Keywords: Pollutant, surface barrier

1. A continuous flexible floating structure comprising in combination

(A) a substantially continuous flexible elongated upright fin having upper and lower edges,

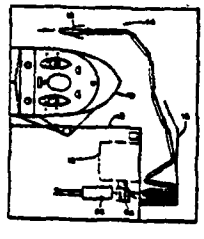
(B) ballast means mounted along the lower edge of the fin,

(C) a plurality of elongated buoyant floats mounted at spaced intervals along the upper edge of the fin,

(D) a buoyant towing unit flexibly secured to a first end of the fin and including a pair of nozzles facing the first end of the fin and mounted on the towing unit in side-by-side diverging relationship, and

(E) flexible conduit means extending beside the fin and supported by the floats joining each nozzle via a separate control throttle to a source of pressurized driving fluid,

whereby operation of the separate control throttles governs the rate at which pressurized fluid is supplied to the individual nozzles, forming exhaust jets therefrom having velocities variable to drive and steer the structure.



3,321,924
PROTECTION OF SUBMERGED PILING
Orval E. Liddell, P.O. Box 1533, Avalon, Calif. 90704
Filed June 29, 1964, Ser. No. 378,852
3 Claims. (Cl. 61—54)

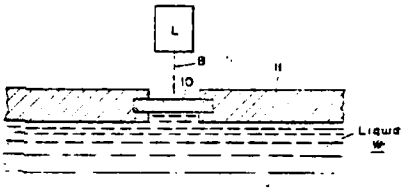
1. A method of protectively encasing a partially submerged pile in situ, comprising:
forming a sheet of synthetic plastic material into a convoluted roll having a diameter less than the diameter of said piling, said material having an inherent memory;
expanding said roll about said pile, said roll thereafter contracting into close engagement with said pile because of said inherent memory;
securing said roll to said pile;
and sealing the space between said pile and said roll from the ambient water surrounding said pile sufficiently to maintain the water in said space stagnant to prevent marine borer attack on said pile.

Keywords: Coating; Pile protection; Pile, wood; Wood preservative

3,322,231
METHODS AND SYSTEMS UTILIZING LASERS FOR GENERATING SEISMIC ENERGY
Luke S. Gournay, Dallas, Tex., assignor to Mobil Oil Corporation, a corporation of New York
Filed Dec. 29, 1964, Ser. No. 421,814
11 Claims. (Cl. 181—.5)

11. A system for producing seismic-frequency energy in a body of liquid comprising: a laser system for producing electromagnetic energy, means for programming the system to produce electromagnetic radiation energy of predetermined envelope and time duration, and means for applying the electromagnetic radiation to the body of liquid for conversion in the liquid to seismic energy whose frequency is a function of the time duration of the envelope of electromagnetic energy.

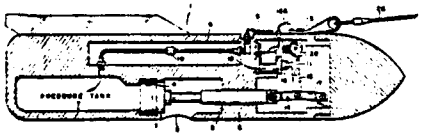
Keywords: Instrument, laser; Seismic vibratory acoustic transmitter



3,322,232
SEISMIC EXPLORATION
Franklin L. Chalmers and Tobias Flatow, Houston, Tex., assignors to Esso Production Research Company, a corporation of Delaware
Filed Oct. 18, 1965, Ser. No. 496,760
4 Claims. (Cl. 181—.5)

1. A submarine seismic source comprising:
a housing including a reservoir for pressurized gas;
port means opening to the exterior of said housing;
means including valve means for selectively connecting the interior of said reservoir to said port;
said valve means including a valve seat and a valve piston for seating on said valve seat to close fluid communication between the interior of said reservoir and said port;
a piston rod connected to said valve piston;
electrically actuatable solenoid means having a movable armature; and
an overtravel locking linkage means connected to said piston rod and to said housing for holding said valve piston on said valve seat against the pressure of gas in said reservoir when in he overtravel position thereof and to collapse to open said valve means when pushed away from said overtravel position, said armature being positioned to push said linkage away from said overtravel position.

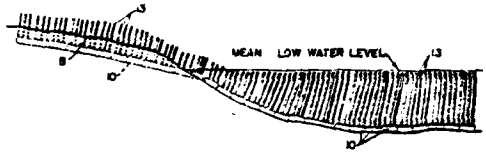
Keywords: Seismic explosive acoustic transmitter



3,323,310
INSTALLATION FOR BEACH EROSION PREVENTION
Donald J. Arpin, 161 NW. 33rd St., Fort Lauderdale, Fla. 33309
Filed July 14, 1964, Ser. No. 382,488
1 Claim. (Cl. 61—3)

Keywords: Artificial seaweed; Groin

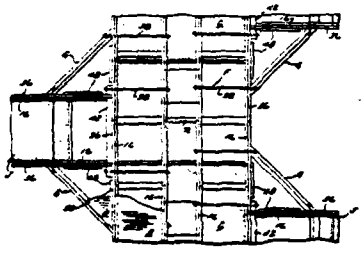
An installation for a body of water and for intercepting waves or currents and causing sand therefrom to settle, said installation comprising a rigid elongated structure of material heavier than water and disposed on the floor of the body of water, and a plurality of vertical rods embedded in said structure from one end of the structure to the other, said rods being flexible and being separated from each other above said structure, said structure comprising an aligned series of modular units disposed side-by-side to form the elongated structure, the height of said rods in succeeding units away from the water edge being greater whereby the top portions of all the rods in said succeeding units are substantially at the same vertical level although the water floor may gradually drop away relative to the water edge.



3,323,479
FLOATING DOCK STRUCTURE
Andrew M. Filak, 4105 Admirable Drive, Portuguese Bend, Calif. 90274
Filed June 28, 1965, Ser. No. 467,579
11 Claims. (Cl. 114—.5)

Keywords: Pier, floating; Small-craft pier

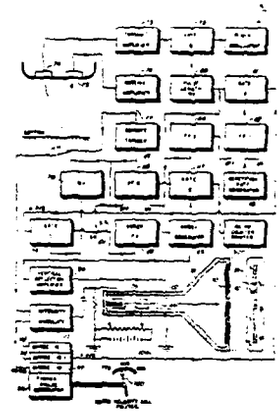
The present invention relates generally to the field of marine structures and more particularly to a lightweight modular docking and utility system that may be assembled in any desired configuration and easily placed on or removed from a body of water without the use of heavy equipment.



3,324,451
ECHO RANGING AND RECORDING APPARATUS
Joseph D. Richard, Miami, Fla. (531 S. Barrancas Ave., Warrington, Pensacola, Fla. 32507)
Filed June 3, 1964, Ser. No. 372,186
8 Claims. (Cl. 340—3)

7. The method of graphically recording the distance to sound reflecting objects in a medium which comprises: generating a series of timing pulses having a repetition rate numerically related to the velocity of sound in a medium; transmitting first and second acoustic pulses into the medium coincident with first and second timing pulses from the said series of timing pulses; receiving first and second acoustic pulses from which the said medium resulting from reflections of the said transmitted acoustic pulses; initiating the sweep waveform of a cathode ray tube coincident with the first timing pulse to occur after the reception of the first acoustic pulse of the said received first and second acoustic pulses; intensity modulating the electron beam current of the said cathode ray tube coincident with the reception of the second acoustic pulse of the said received first and second acoustic pulses; terminating the aforementioned sweep waveform coincident with a timing pulse from the said series of timing pulses; translating electron beam intensity variations impinging on the inner surface to corresponding light variations on the outer surface of the said cathode ray tube faceplate by means of a luminescent phosphor and fiber optic matrix combination within the said faceplate; and continually passing a strip of photosensitive paper across the surface of the said faceplate so that a graphic record is obtained of the distance to reflecting objects in the medium.

Keywords: Sonar, depth sounder

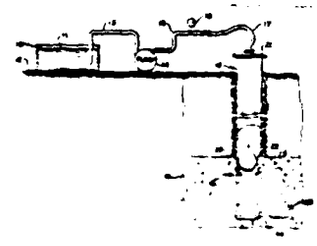


JUNE 13, 1967

3,324,665
METHOD OF STABILIZING PILES
Thomas J. Rubichaux, Corpus Christi, and Sam G. Gibbs and Robert M. Jorda, Houston, Tex., assignors to Shell Oil Company, New York, N.Y., a corporation of Delaware
Filed Oct 28, 1964, Ser. No. 407,123
10 Claims. (Cl. 61—53.68)

[illegible] structural elements such as [illegible] may be secured and [illegible] consolidated earth [illegible] a portion of the [illegible] surrounding the structure [illegible] bearing, [illegible]

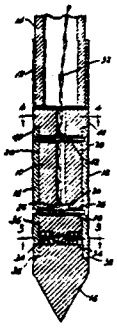
Keywords: Embedment anchor; Offshore construction; Offshore platform anchor; Pile footing; Pile, steel; Seabed foundation



3,324,666
FOOTING FOR EARTH PILE
Jack Lee, 142 Francis St., Bakersfield, Calif. 93308
Filed Dec. 29, 1964, Ser. No. 421,846
5 Claims. (Cl. 61—53.68)

1. A footing for a pile or the like comprising a footing base arranged to be disposed on the lower end of a pile so as to be driven into the earth thereby, a plurality of blades extending longitudinally along the sides of said base, pin-like means extending into said base transversely to the axis thereof and the outer ends thereof engaging said blades to retain them against separation from said base while being so driven into the earth, additional means operable to fracture said pin-like means, and means operable to extend the lower ends of said blades laterally outward from said base when said base is a predetermined position in the earth while the upper ends of said blades are maintaining in operative engagement with said base, whereby upon limited furthere driving of said base into the earth the lower ends of said blades will be moved laterally farther from said base toward horizontal position while the upper ends of blades remain engaged with said base to restrain the same against farther movement into the earth.

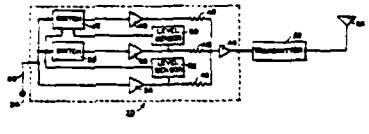
Keywords: Pile-driving shoe; Pile footing



3,325,778
SEISMIC SONOBUOY
Samuel S. Ballard, Hollis, N.H., assignor to Sanders Associates, Inc., Nashua, N.H., a corporation of Delaware
Filed Aug. 13, 1965, Ser. No. 479,491
8 Claims. (Cl. 340—7)

This invention relates to a seismic exploration system of the type used in oceanographic surveys and employing an acoustical source and a plurality of pickup units in buoys, the pickup units receiving signals generated by the source and relaying them to a monitoring station. Each of the pickup units employs an amplifier unit having a level sensor. The gain of the amplifier unit is controlled by the magnitude of the received signals. For example, when the magnitude of the received signals is high, the amplifier gain becomes low; when the magnitude of the received signals is low, the amplifier gain becomes high, thus providing a system having a wide dynamic range.

Keywords: Buoy, instrumented; Seismic hydrophone; Seismic survey method



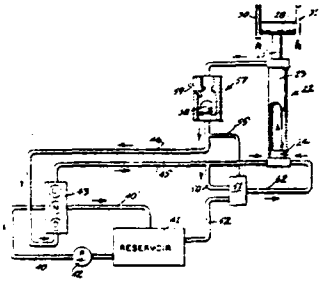
3,325,923
HYDRAULIC CONTROLS FOR SPUD

Neil H. Cargile, Jr., c/o American Marine and Machinery Co., Inc., 201 Woodycrest, Nashville, Tenn. 37211

Filed June 24, 1964, Ser. No. 377,743
5 Claims. (Cl. 37—73)

Keywords: Dredge propulsion

1. A device for controlling a spud comprising:
(a) a spud,
(b) means supporting said spud for substantially vertical reciprocable movement,
(c) a ram including a cylinder having one end and an opposite end and a piston adapted to be reciprocated in said cylinder by fluid pressure between said ends,
(d) means connecting said ram to said spud so that movement of said piston toward said one end will raise said spud, and movement of said piston toward said opposite end will lower said spud,
(e) a control valve,
(f) means supplying fluid under pressure to said control valve,
(g) a first fluid circuit communicating said control valve with said opposite end,
(h) a second fluid circuit communicating said control valve with said one end,
(i) means for actuating said control valve to selectively communicate said fluid supply means with said first circuit or said second circuit, the unsupplied circuit functioning as a return line from said cylinder,
(j) a branch circuit connected to said first circuit,
(k) an unloading valve in said branch circuit, and
(l) means responsive to pressure above a predetermined value in said second circuit for actuating said unloading valve to open said branch circuit, in order to rapidly lower said spud.



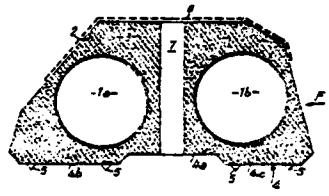
3,326,000
IMMERSED PIPE STRUCTURE

Jacques Edouard Lamy, Fontenay-aux-Roses, France, assignor to Societe d'Etude du Transport et de la Valorisation des Gaz Naturels du Sahara S.E.G.A.N.S., Paris, France, a corporation of France

Filed Sept. 27, 1963, Ser. No. 312,177
Claims priority, application France, Oct. 8, 1962, 911,540
5 Claims. (Cl. 61—1)

Keywords: Seabed pipeline placement; Seabed scour protection

1. Pipe structure for decreasing the action of cross currents on a pipe immersed in a body of water overlying a bed, said pipe resting on the bed, said structure comprising in combination, a pipe and a rigid outer element surrounding and enclosing said pipe, said element having a bottom face for resting on said bed, said bottom face having a recess, a top face and upwardly converging side faces, and perm ent throughway passage means in said element in spaced relation to said pipe and putting said recess in said bottom face in communication with said top face.



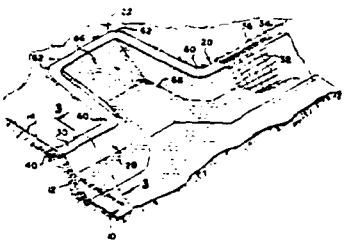
3,326,005

RETAINING WALL FOR WATERWAYS

Marcellus L. Jacobs, Fort Myers, Fla., assignor to Jacobs Wind Electric Company, Inc., Fort Myers, Fla., a corporation of Montana

Filed Apr. 16, 1965, Ser. No. 448,661
2 Claims. (Cl. 61—37)

The sloping retaining wall for a waterway having a bed and bank is formed of reinforced concrete and extends from the bed of the waterway to the top of the bank. The bank is shaped to the desired configuration such that the side surface thereof slopes upwardly from the bed at an angle of approximately 135 degrees. The side portion of the retaining wall conforms to the slope of the bank and at the top thereof the wall includes a laterally outwardly extending part which extends substantially normal to the side portion. This extending part has a generally wedge-shaped or V-shaped cross sectional configuration and tapers to a relatively sharp edge in a direction away from the side portion. The retaining wall further incorporates integral offset boat ramp sections which have side portions having a more gradually sloping surface than the side portions of the retaining wall. The side and top portions of the ramp section are interconnected with the side and top portions of the retainer wall by integral curved wall portions.



Keywords: Bulkhead; Revetment; Small-craft launcher

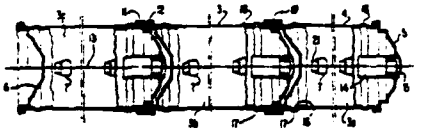
3,326,126

EXPLOSIVE CONTAINER

Adolf Berthmann, Leverkusen, and Maximilian Klünsch, Opladen, Germany, assignors to Dynamit Nobel Aktiengesellschaft, Troisdorf, Germany

Filed Feb. 12, 1965, Ser. No. 432,321
Claims priority, application Germany, Feb. 15, 1964, D 43,641
1 Claim. (Cl. 102—24)

An explosive charge container for seismic measurements at sea comprising a plurality of sections; coupling means detachably connecting said sections in series with each other; each of said sections being an independently serviceable container having a casing, a cover, a bottom and a secondary container means within said casing for receiving a detonator; each of said covers having a substantially identical, streamlined, convex, central curvature extending over the major portion of the cover profile; and each of said bottoms having a substantially identical, concave, central curvature substantially corresponding to the curvature of each of said covers; axially aligned handles rotatably and detachably mounted a substantial distance on each side of the center of each of said casings; means comprising outwardly projecting uniform seams operatively connecting each of said covers and said bottoms in a fluid tight manner with a corresponding casing; said seams encircling the perimeter of the corresponding casing; each of said casings having an outwardly extending bead-shaped ridge, extending around the entire periphery of the casing in a plane substantially perpendicular to the casing axis; said coupling means including a split sleeve having a channel shaped portion surrounding and engaging said seam, said sleeve having an additional channel shaped portion surrounding and engaging said ridges; means to engage the opposite ends of said split sleeve being operable to contract and hold said split sleeve tightly about said seams and said ridges; band means tightly surrounding all of said sections substantially within an axial plane of the container and being operable to axially clamp said sections together; and means to tighten said band means.



Keywords: Seismic explosive acoustic transmitter

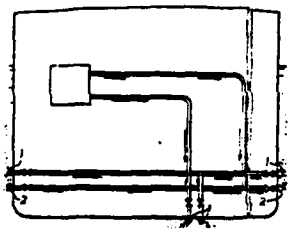
3,326,174

METHOD FOR PREVENTION OF GROWTH OF AQUATIC FOULING

Joseph Czekanski, Whickham, and James Smith, South Shields, England, assignors to Charlton, Weddle & Company Limited, Newcastle, England, a British company

Filed Sept. 2, 1965, Ser. No. 484,694
6 Claims. (Cl. 114—222)

1. A method for preventing or delaying the growth of marine fouling on the surfaces of a ship hull comprising forming a foam of fine air or gas bubbles in water containing a dispersed toxin and emitting jets of said foam at spaced positions along the ship's hull.

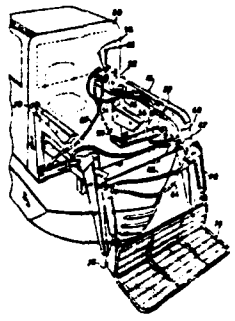


Keywords: Fouling prevention

3,326,379
WATER CRAFT WITH SCOOP
Francis Richard Caddick, 50 Orrell Road, Bootle, Liverpool 20, England
Continuation of application Ser. No. 368,137, May 18, 1964. This application Apr. 15, 1966, Ser. No. 542,972
Claims priority, application Great Britain, May 17, 1963, 19,632/63
15 Claims. (Cl. 210—242)

Keywords: Pollutant debris; Pollutant, mechanical removal; Pollutant removal watercraft

1. A cleansing device for removing flotsam floating on the surface of navigational waters comprising a craft for navigating said waters, driving means for said craft mounted thereon, steering means for said craft mounted thereon, power means mounted on said craft to actuate said driving means, hydraulic means to actuate said steering means, said craft having a hull, a support frame for a boom and scoop on the forward end of the hull, said support frame including transversely spaced portions projecting upwardly from the hull at locations spaced substantially rearwardly from the bow, a pair of booms having first elongated portions extending in transversely spaced interrelationship over the forward end of the hull in the general longitudinal direction of the craft, said booms further having second portions projecting respectively from said first boom portions forwardly and generally downwardly beyond the bow at an angle from said first boom portions, said first boom portions being respectively pivotally connected to said transversely spaced support frame portions at locations spaced above the hull, a rotatable scoop mounted across the lower free ends of said second boom portions, said booms being capable of raising said scoop from a position in which it is immersed in said waters to a position in which the booms are above said waters, a second hydraulic means to raise and lower said booms, and a third hydraulic means to rotate said scoop so as to discharge matter therefrom.

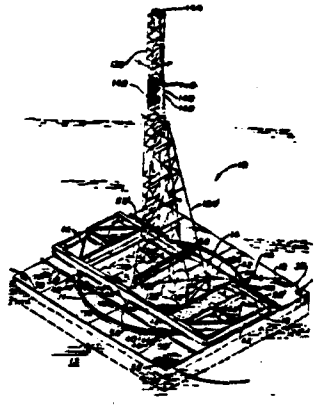


JULY 4, 1967

3,328,969
APPARATUS FOR DRIVING PILES
Francis J. Murphy, San Francisco, and Alpo J. Tokola, Lafayette, Calif., assignors to Kaiser Steel Corporation, Oakland, Calif., a corporation of Nevada
Filed Nov. 2, 1964, Ser. No. 408,089
9 Claims. (Cl. 61—535)

Keywords: Offshore construction; Pile driver, impact; Pile placement

1. An apparatus for use in driving and anchoring pile elements and the like in a preselected pattern in the ground and below the surface of a body of water comprising the combination of a buoyant platform anchorable adjacent the area where the piles are to be driven into the ground, a carriage and an intermediate frame member for supporting the carriage mounted on the platform, the platform and said frame member having alignable apertures, an intersecting series of track means affixed to said platform and pivotally mounted wheel means affixed to the frame member and selectively engagable with various track means of said series of said track means for adjustably moving the frame member either in a linear or acurate path relative to said platform, a drive means for moving the carriage in a linear path relative to the frame member and to a given one of a plurality of fixed positions on the frame member, and pile driving means mounted on the carriage, portions of said pile driving means being movable through the said aligned apertures of the frame member and platform for engaging individual pile elements located within the area defined by the peripheral portions of the aligned apertures of the platform and frame member.



3,329,015

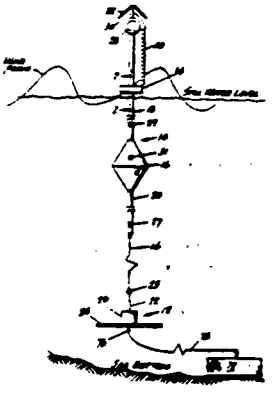
STABILIZED BUOY ASSEMBLY

Ole G. Bakke, Long Beach, David L. Black, Costa Mesa, and Joseph Giuffre, Fullerton, Calif., assignors, by mesne assignments, to Douglas Aircraft Company, Inc., Santa Monica, Calif.

Filed June 7, 1963, Ser. No. 286,251
4 Claims. (Cl. 73—170)

Keywords: Buoy, instrumented; Wave measurement

1. A free-floating, stabilized buoy assembly exhibiting only minor response to disturbing wave motions and serving as a stable reference for wave motion sensors, comprising: a buoyancy component and a ballast component; said buoyancy component including a main buoyancy section having a large lateral dimension and a large displacement, and an elongate upward extension having a relatively small cross-sectional area and a total displacement which is only a minor proportion of the displacement of the main buoyancy section and is less than 10 percent of the displacement of the buoy assembly; an extension secured to said main buoyancy section and extending downwardly therefrom and having a lower free end; a slender, elongate connector having its upper end flexibly coupled to the lower end of said downward extension; and said ballast component being secured to the lower end of said connector; the center of gravity of the assembly being below the center of buoyancy of the assembly; the total out-of-water weight of the assembly being just enough less than its total water displacement so that a portion of the upward extension will be above the still water level when the buoy assembly is free-floating; and in addition thereto, sensor means carried by said buoyancy component and acting to sense the instantaneous height of the water surface with respect to a reference point on said buoyancy component; a hydrophone carried by said buoyancy component to sense acoustical background noise; and means carried by said buoyancy component for correlating said noise and the sea state information gathered by said sensor means to provide a record of the correlation for use in segregating said noise from other signals.



3,329,117

DEVICE FOR MOORING BOATS

Pieter Meeuwse, De Waterman Achterzeedyke, Barendrecht, Netherlands

Filed Nov. 12, 1964, Ser. No. 410,453
Claims priority, application Netherlands, Nov. 11, 1963, 300,370
2 Claims. (Cl. 114—.5)

Keywords: Pier, floating; Small-craft mooring device; Small-craft pier

2. A device for mooring boats comprising

(a) a plurality of elongated floats;

(b) an elongated jetty supported on said floats, said elongated jetty having a plurality of spaced holes arranged in first and second rows, said rows being parallel with one another;

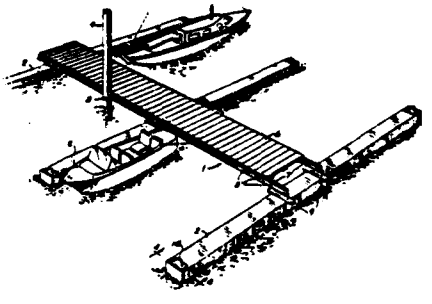
(c) means connecting the jetty to each of said floats, said connecting means comprising:

(1) first and second shackle means for girding and holding in place each float with respect to the jetty;

(2) means for securing the first shackle means to the first row of spaced holes of the jetty; and

(3) means for securing the second shackle means to the second row of spaced holes of the jetty;

(d) said connecting means being adjustable to permit attachment of each float to the jetty at any of a plurality of positions along the length of the float and at any of the plurality of positions of the float along the length of the jetty.



3,329,287

METHOD AND APPARATUS FOR SUCTION UNLOADING OF SAND BARGES

Jan de Koning, Amsterdam, Netherlands, assignor to N.V. Ingenieursbureau voor Systemen en Octrooien "Spanstaal," Rotterdam, Netherlands, a Dutch manufacturing company

Filed Apr. 5, 1965, Ser. No. 445,395
Claims priority, application Netherlands, Apr. 7, 1964, 6,403,663
6 Claims. (Cl. 214—14)

1. A method of suction-unloading at least one floating barge filled with sand or the like, the method comprising the steps of:

introducing a washing medium into the barge;

pumping the sand and the washing medium in suspension from the barge to a desired location by the action of successively employed first and second suction nozzles;

the barge being advanced with respect to the first suction nozzle in relation to the progress of the pumping operation;

the initial pumping operation of the first nozzle being of a suspension containing a high ratio of sand to pumping medium; and

further conveying the remaining sand to the location of the first nozzle by actuation of the second nozzle.

6. Apparatus for the suction-unloading of floating barges filled with sand or the like, the apparatus comprising:

a washing pump having an inlet connected to a source of washing medium and an outlet;

a first sand pump having an inlet and an outlet leading to a sand accumulation region;

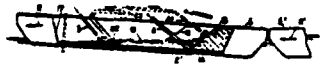
a first suction nozzle connected to the inlet of said first sand pump;

a discharge nozzle connected to the outlet of said washing pump and disposed to direct washing medium against a mass of sand within a barge at a point adjacent said first suction nozzle;

a second sand pump having an inlet and an outlet; a second suction nozzle connected to the inlet of said second sand pump and disposed to draw sand suspended in washing medium from a barge remote from said first suction nozzle; and

a second discharge nozzle connected to the outlet of said second sand pump and disposed to discharge sand suspended in washing medium against a mass of sand adjacent said first suction nozzle.

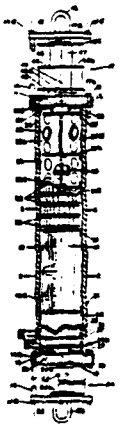
Keywords: Dredge-spoil transport



3,330,155
MAGNETIC TAPE OCEANOGRAPHIC METER
Charles A. Miville, Mont Vernon, N.H., assignor to Sanders Associates, Inc., Nashua, N.H., a corporation of Delaware
Filed Apr. 16, 1964, Ser. No. 360,259
14 Claims. (Cl. 73—189)

Keywords: Current measurement

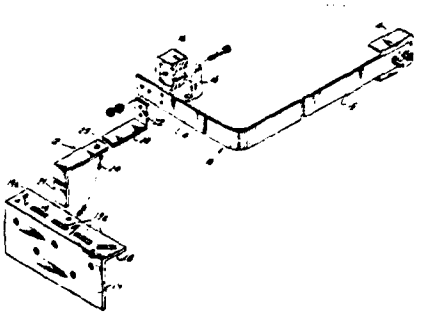
1. An oceanographic meter for measuring the direction and velocity of ocean currents, comprising, in combination, a hollow watertight pressure housing, a water current-actuated rotor and a water current-driven direction vane mounted externally of said housing, means driven by said rotor and said vane for producing magnetic fields within said housing, and electronic means within said housing for translating said magnetic fields into signals indicating water current velocity and direction, said meter characterized by the absence of mechanical or electrical connections between said rotor and said vane, said rotor and the interior of said housing, and said vane and the interior of said housing.



3,330,244
DEVICE FOR DOCKING BOATS
Eugene F. Page, 112 Lawn Terrace, Mamaroneck, N.Y. 10543
Filed Mar. 2, 1966, Ser. No. 531,168
8 Claims. (Cl. 114—230)

Keywords: Small-craft mooring device

1. A boat docking device comprising a clamp having a pair of arms disposed at about right angles to each other and having resilient bumper means at the free end of each arm adapted to engage the side or stern wall of a boat hull, a bracket adapted for securement to a dock or float having a section formed with openings extending therethrough, and a support provided with a first arm having its free end secured to one of said clamp arms and provided with a second arm disposed at about right angles to said first arm and being adapted to be inserted into one of said openings.

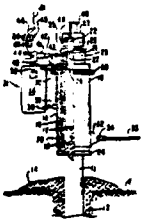


3,330,338
ANCHOR AND METHOD OF INSTALLING

James R. Dozier, Whittier, Calif., assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware
Filed Dec. 31, 1963, Ser. No. 334,812
17 Claims. (Cl. 166—.5)

1. An anchor adapted to secure anchor lines to the ocean floor, said anchor comprising
an anchor post sunk in the ocean floor,
connector housing adapted to fit in sliding axial engagement on the outside of said anchor post, said connector housing having a bore therein extending upwardly from the bottom thereof, said bore being of a size to receive said anchor post therein,
coupling means carried by said connector housing, said coupling means including rigid mechanical connector means extending inwardly into the bore of said connector housing and engageable with said anchor post therein, and
an anchor line connector carried outwardly on said connector housing for securing the end of an anchor line thereto, and a substantially laterally extending anchor line extending therefrom.

Keywords: Embedment anchor; Grouting; Offshore platform anchor; Seabed material placement

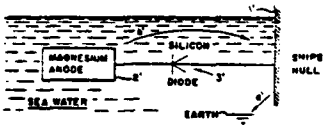


3,330,751
CATHODIC PROTECTION CIRCUIT INCLUDING DIODE MEANS

Stanley D. Warner, Upland, Calif., assignor to Lockheed Aircraft Corporation, Los Angeles, Calif.
Filed May 20, 1963, Ser. No. 281,577
4 Claims. (Cl. 204—196)

1. In an electrolytic system for cathodic protection of the type which
includes an electrolyte, an electrode adapted to be immersed in the electrolyte, a cathode structure to be protected adapted to be immersed in the electrolyte, said electrode being formed of a material higher in the electrochemical series than said structure, diode means having a consultant voltage drop conductively connected between said electrode and said structure, said system consisting solely of the series connection of said electrode, said constant voltage device, said structure and the electrolyte whereby a substantially constant polarization potential is developed between said electrode and said structure.

Keywords: Cathodic protection; Corrosion prevention

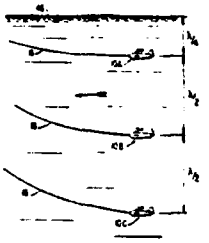


3,331,050
METHOD OF UNDERWATER SEISMIC EXPLORATION

Lauren G. Kilmer and John Benrose, Tulsa, Okla., assignors, by mesne assignments, to Sinclair Research, Inc., New York, N.Y., a corporation of Delaware
Filed Apr. 16, 1965, Ser. No. 448,827
7 Claims. (Cl. 340—7)

1. A method for underwater seismic surveying which comprises generating below the surface of the water seismic waves having an established frequency, said waves traveling upwardly and downwardly from their source, while providing a freeboard distance between the source of said waves and the surface of the water substantially equal to a multiple of one fourth of the wave length of the frequency of the seismic waves emitted from the source to reflect upwardly traveling waves at the water-air interface which reinforce succeeding downward traveling waves, and receiving and recording the reflections of the downwardly traveling waves.

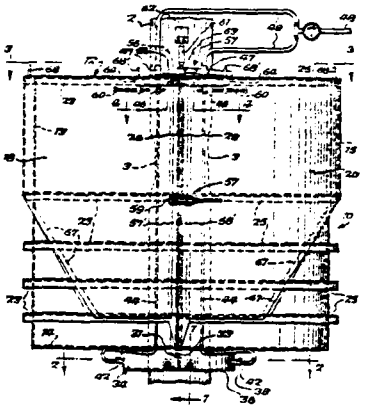
Keywords: Seismic acoustic transmitter array; Seismic explosive acoustic transmitter; Seismic survey method



3,331,211
PILE INSPECTION AND REPAIR CELL
Du Val Cravens, Buffalo, and Mark M. Philippbar, Kenmore, N.Y., assignors to Osmose Wood Preserving Co. of America, Inc., Buffalo, N.Y.
Filed Apr. 13, 1964, Ser. No. 359,035
8 Claims. (Cl. 61—63)

1. A pile inspection and repair cell comprising:
(a) a housing adapted for placement about a pile, said housing having a base and an upstanding wall;
(b) said base having a circular opening therein to accommodate the passage therethrough of a pile;
(c) a pneumatic seal carried by said housing about said opening, said seal being expandable radially inwardly to effect a fluid tight seal against a pile extending through said opening; and
(d) means for maintaining said cell in position about a pile, said means including gripper members comprising braces hinged adjacent one end to said wall on opposite sides of said housing adjacent the top thereof and inclining upwardly and inwardly from said wall, said braces having means at their other ends for engaging a pile extending through said opening to thereby resist the buoyancy of said cell.

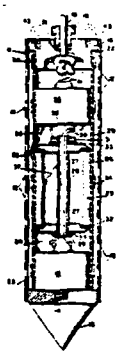
Keywords: Pile, concrete; Pile, wood, Structure inspection; Structure repair



3,332,057
SINGLE CARDIOID WAVE DETECTOR FOR SEISMIC SIGNALS
George M. Pavey, Jr., Dallas, Tex., assignor to Sonic Engineering Company, Dallas, Tex.
Filed Jan. 28, 1965, Ser. No. 428,643
4 Claims. (Cl. 340—17)

A composite wave detector for seismic signals jetted into the bottom of a marsh or suspended vertically at a fixed depth within the water from a surface floating cable, the device comprising a perforated cylindrical casing having pressure and particle velocity acoustic signal detecting devices mounted therein and a transformer so connected to the particle velocity and pressure detecting devices as to render the voltages generated thereby additive when the seismic wave sensed thereby is moving upwardly and the voltage are in opposition and of equal magnitude when the direction of the seismic wave is reversed thereby to provide a cardioid directional seismic signal.

Keywords: Seismic hydrophone



3,332,058
DEPTH CONTROL SYSTEM FOR MARINE SEISMIC SURVEYING

George B. Loper and Julius Podhrasky, Jr., Dallas, Tex., assignors to Mobil Oil Corporation, a corporation of New York

Continuation of application Ser. No. 288,180, June 17, 1963. This application Nov. 25, 1966, Ser. No. 597,173
9 Claims. (Cl. 340—7)

Keywords: Seismic streamer cable; Towed body depth control

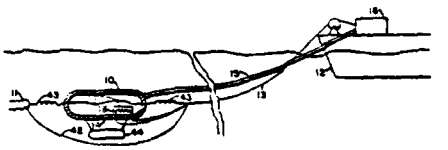
1. A system for controlling the depth of a marine seismic detector cable which is towed behind a vessel, comprising:

a flotation chamber for attachment to said detector cable, said flotation chamber having means for admitting and discharging water into and out of said chamber,

a source of compressed gas for mounting on said vessel,

conduit means for coupling the interior of said flotation chamber to said source of compressed gas, and

control means for mounting on said vessel and for controlling the injection of said gas via said conduit means into said flotation chamber to discharge the water therein and increase the buoyancy thereof, thus causing said flotation chamber and said detector cable to rise, said control means being operable to withdraw the gas from said flotation chamber via said conduit means, thus permitting admittance of water therein to cause decrease in buoyancy thereof and consequent lowering of said flotation chamber and said detector cable.



JULY 25, 1967

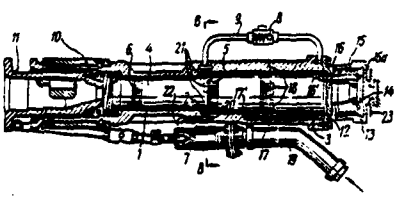
3,332,503
DOUBLE-ACTING STEAM-AIR HAMMER, IN PARTICULAR FOR PILE IMMERSION

Girsh Jakovlevich Klebanov, Moscow, U.S.S.R., assignor to Vsesouzny Nauchno-Issledovatelsky Institute Stroitelnogo i Dorozhnogo Maschinostroenia, Moscow, U.S.S.R.

Filed Mar. 12, 1964, Ser. No. 352,428
6 Claims. (Cl. 173—134)

Keywords: Pile driver, impact

1. A suspension double-acting steam-air hammer, comprising a cylinder having working and idling chambers, a differential percussive piston located within said cylinder for distributing a working medium delivered into the working and idling chambers, conduit means providing communication between said working and idling chambers, an adjustable non-return valve means operative for by-passing a part of the working medium from the working chamber to the idling chamber during the working stroke of the piston for permitting expansion of the remaining part of the working medium in dependence upon the adjustment of said valve means in accordance with the required power of a single impact, a travelling anvil operably related to said percussive piston, and a flow regulating slide valve arranged in the path of the working medium delivered to the hammer.



3,332,867
CONDUCTIVE ADHESIVE BONDING OF A GALVANIC ANODE TO A HULL

Walter L. Miller, 160 Hendrickson Ave., Lynbrook, N.Y., 11563, and Isidore Geld, 56—11 184th St., Flushing, N.Y. 11365

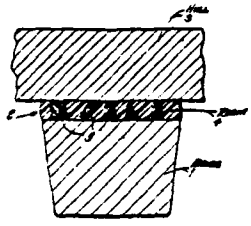
Filed Oct. 3, 1963, Ser. No. 313,712
2 Claims. (Cl. 204—197)

Keywords: Cathodic protection; Corrosion prevention

1. In the cathodic protection of ships' hulls, wherein a galvanic anode is bonded to a ship's hull by an electrically conducting, adhesive bonding agent interposed between the hull and the anode, that improvement in said interposed agent which comprises:

(a) a layer of a cured resin electrically nonconducting bonding agent disposed between and spacing said anode and hull and bonded to said anode and said hull, and

(b) electrically conducting coarse granules of irregular shapes with sharp edges and of approximately 30 mesh screen size distributed through said agent and forming approximately 10 percent by weight of the mixture of agent and granules, said agent having a thickness of between 1 and 1½ times the thickness of the largest granules therein, and said granules contacting at intervals said anode and hull forming electrically conducting paths between said anode and hull.



AUGUST 1, 1967

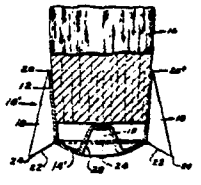
3,333,427
BOOT FOR PILOT TIMBER PILE

John J. Dougherty, Cedar Grove, N.J.
(262 Rutherford Blvd., Clifton, N.J. 07014)

Filed Mar. 9, 1965, Ser. No. 438,305
1 Claim. (Cl. 61—53)

Keywords: Pile-driving shoe; Pile, wood

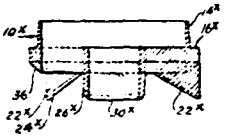
A boot for a pilot foundation timber pile having a hollow cylindrical body with a side wall and slightly curved bottom wall for receiving the end of a timber pile, a plurality of axially extending fins along the outer periphery of the side wall and extending below the bottom wall, the bottom wall serving to compact the soil into a supporting pressure bulb, the cylindrical body being substantially the same diameter at the bottom as at the top. Stiffening ribs are mounted on the outer surface of the bottom wall and a recess is formed in the center of the bottom wall.



3,333,428
OPEN END CUTTING SHOE
John J. Dougherty, Cedar Grove, N.J.
(262 Rutherford Blvd., Clifton, N.J. 07014)
Filed Oct. 19, 1964, Ser. No. 404,814
1 Claim. (Cl. 61—53)

Keywords: Pile-driving shoe; Pile, steel

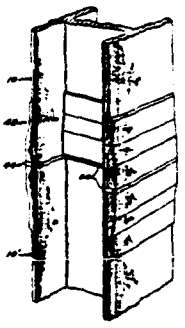
A pile driving shoe for vertical downward penetration of soil. The shoe has an annular body with an intermediate shoulder. Ribs extend from the shoulder. A central tubular member is supported by the ribs and extends below the bottom end edges of the body. A tapered cutting edge is formed on the bottom end of the tubular member below the ends of the ribs. The ribs have bottom tapered cutting edges. The outer surface of the annular body tapers downwardly and outwardly from the tubular member and the bottom ends of the ribs are pointed and disposed in a plane with the plane of the cutting edge of the tubular member.



3,333,429
H-BEAM PILING
John J. Dougherty, Cedar Grove, N.J.
(262 Rutherford Blvd., Clifton, N.J. 07014)
Filed Apr. 6, 1965, Ser. No. 446,034
1 Claim. (Cl. 61—53)

Keywords: Pile section connection; Pile, steel

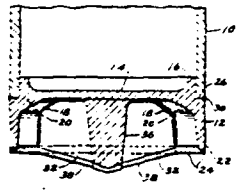
An H-beam pile section having an elongated H-shaped body with rectangular shaped web and flanges across the long edges of the web, the web and flanges defining channels on both sides of the web, the flanges being thickened at one end on the inner sides thereof with a series of thickened formations, the web being thickened at the same end and on both sides thereof with separate thickened formations, said formations being thickest at the outer one end and continuing into narrower formations, continuing inwardly into still narrower formations, and narrow slanting shoulders on the inner ends of said still narrower formations. A modification of the invention involves a joint between two pile sections, welded end to end, the adjacent ends having flanges with thickened formations, the web of one section adjacent the joint having thickened formations on both sides.



3,333,430
BOOT FOR PIPE PILE
John J. Dougherty, Cedar Grove, N.J.
(262 Rutherford Blvd., Clifton, N.J. 07014)
Filed Apr. 27, 1965, Ser. No. 451,209
1 Claim. (Cl. 61—53)

A boot for a pipe pile having a steel dish-shaped body with a flat bottom and an annular upstanding side wall, a skirt portion depending downwardly from the body and formed with a circular knife edge, reinforcing radial ribs extending from the body and the skirt portion to the center where they meet, the meeting edges being pointed, the ribs having knife edges along their outer long edges.

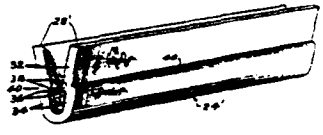
Keywords: Pile-driving shoe; Pile, steel



3,333,431
CUTTING SHOE FOR STEEL SHEET PILING
John J. Dougherty, Cedar Grove, N.J.
(262 Rutherford Blvd., Clifton, N.J. 07014)
Filed Apr. 16, 1965, Ser. No. 448,641
2 Claims. (Cl. 61—60)

A steel sheet pile cutting shoe having a steel body of channel-shape in configuration and V-shape in cross-section, with side walls inclined inwardly and downwardly and a curved bottom wall, the side walls having upper and lower sections offset from each other forming interior and exterior shoulders, the interior shoulders having knife edges. A modified shoe has an inclined bottom wall with serrations having knife edges.

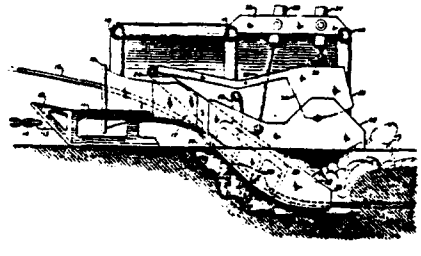
Keywords: Pile-driving shoe; Pile, sheet; Pile, steel



3,333,432
ADJUSTABLE DEPTH SUBMARINE CABLE BURIER
Albert L. Hale, Berkeley Heights, Otto C. Niederer, Westfield, and Francis J. Spollen, Elizabeth, N.J., assignors to Bell Telephone Laboratories, Incorporated, New York, N.Y., a corporation of New York
Filed Dec. 29, 1964, Ser. No. 421,865
6 Claims. (Cl. 61—72.4)

A submarine communications cable burying plow consists of a main frame mounted on sled-type runners, a large forward bell mouth that receives the cable, and a cable guide rotatably mounted to the forward end of the frame. The guide is lowerable into the ocean bed at varying depths and includes jetting nozzles that direct streams of water in front of the guide to dig a trench. The cable passes through the guide and into the trench.

Keywords: Seabed cable plow



AD-A080 795 COASTAL ENGINEERING RESEARCH CENTER FORT BELVOIR VA F/G 13/2
AN ANNOTATED BIBLIOGRAPHY OF PATENTS RELATED TO COASTAL ENGINEE--ETC(U)
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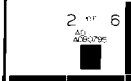


AUGUST 8, 1967

3,335,401
NOISE-FILTERED DETECTION OF MARINE SEISMIC SIGNALS

Clyde W. Kerns, Irving, Tex., assignor to Mobil Oil Corporation, a corporation of New York
Filed Jan. 7, 1966, Ser. No. 519,200
8 Claims. (Cl. 340—7)

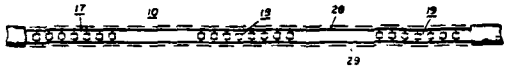
Keywords: Seismic hydrophone array; Seismic streamer cable

1. A marine seismic detector cable for receiving seismic waves reflected from subsurface horizons comprising:

a plurality of spaced-apart subarrays of detectors located along said cable, the detectors within each subarray being longitudinally spaced from one another distances such that each subarray acts as a high frequency filter adapted to attenuate high frequency horizontally traveling noise waves over a reject band,

a main detecting array comprised of said subarrays, said main detecting array having an impulse response according to a predetermined nonuniform weighting function to provide a low frequency filter for passing the reflected waves and for attenuating low frequency horizontally traveling noise waves over a reject band which overlaps with the reject bands of said high frequency filters, the number of detectors within each subarray being proportional to the amplitude of said nonuniform weighting function, and

means for combining the outputs of all of said detectors to produce a single signal representative of the reflected seismic waves and substantially free of horizontally traveling noise waves of both high and low frequency.



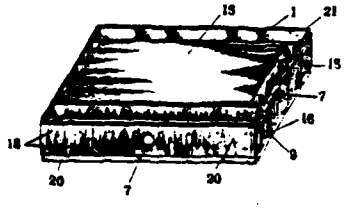
AUGUST 15, 1967

3,335,572
MODULAR PANELS FOR THE CONSTRUCTION OF WATER BLOCKADES

Tokutaro Tsujioka, 1-14 Kitasakoniban-cho, Tokushima, Japan
Filed Feb. 25, 1965, Ser. No. 435,265
5 Claims. (Cl. 61—34)

Keywords: Cofferdam; Offshore construction

An assembly of panels for use in forming an underwater wall or other structure, particularly for blocking the flow of water, each panel having a closed partitioned space between parallel flat walls, the partitions being apertured to provide communication throughout the closed space. Outer peripheral walls depend from the projecting edges of one of the flat walls and a plurality of pockets are formed around the closed space. Conduits extend into the closed space to provide communication between it and the space outside of the panels. The panels are assembled with the outer peripheral walls in abutting and mating relationship with the conduits aligned to provide communication between the closed spaces in adjacent panels. Connecting means in the form of bolts and nuts or the like bolt the adjacent panels to each other, and these nuts and bolts are accessible by means of the pockets.



3,335,667
WAVE MACHINE AND MEANS FOR RAISING WATER
James Murphy, 50 E. 69th St., New York, N.Y. 10021
Filed Oct. 21, 1965, Ser. No. 499,642
4 Claims. (Cl. 103—68)

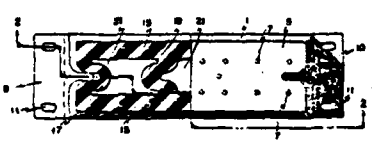
Keywords: Power, wave; Pump

1. A wave machine of the class described, including, in combination, an elongated flexible and resilient trough of substantial length, and of a lesser width, flanges formed on either margins of the long trough, one end of said trough held to a float, said float being anchored in the ocean at a distance away from the beach, the other end of said trough being moored on the beach, at a higher level than the surface of the water in the ocean, floats under said trough, means for supporting said trough upon uprights formed from said floats, said floats floating freely upon the surface of the ocean over the waves and being implanted a rhythmic up-and-down motion by the waves as they rise and fall, concave and convex sections being formed upon said resilient trough as the waves advance under it, the motion of the waves being imparted to said trough to carry substantial amounts of water from the ocean up to the water tank upon the shore.

3,335,689
LOW FRICTION DOCK BUMPER
Richard D. Hein, Wabash, Ind., assignor to The General Tire & Rubber Company, a corporation of Ohio
Filed May 11, 1965, Ser. No. 454,892
12 Claims. (Cl. 114—219)

Keywords: Pier fender

A generally rectangular dock bumper is provided with a scuff-resistant coating of cast polyurethane or other low-friction material mechanically attached or otherwise bonded to the crown thereof. The bumper contains a plurality of partially enclosed voids separated from one another by transversely extending energy absorbing webs.



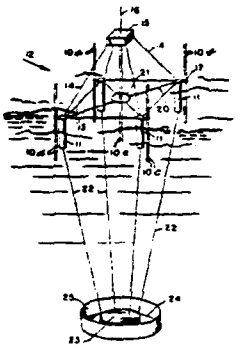
3,336,799

FREE-FLOATING APPARATUS FOR MEASURING AND TELEMETERING SEA-WAVE CHARACTERISTICS

David W. Kermode, Ridgecrest, Calif.
(Box 5156, China Lake, Calif. 93555)
Filed Sept. 14, 1964, Ser. No. 396,446
1 Claim. (Cl. 73—170)

Apparatus senses wave height variations at corners of a regular polygon and also the azimuth of a reference line on the apparatus. The variations with time are recorded at a remote locus and by data reduction, various wave characteristics are continuously determined.

Keywords: Buoy, instrumented; Wave measurement



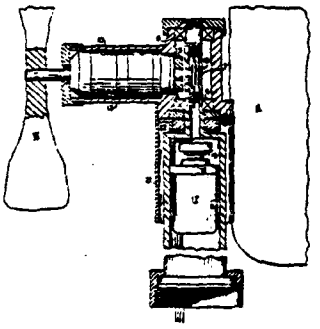
3,336,802

DEVICE FOR AVERAGING WIND VELOCITY AND DIRECTION

Walter A. Von Wald, Jr., Hillcrest Heights, Md., Robert A. Lindsay, Charleston, W. Va., and Samuel J. Riley, Upper Marlboro, Md., assignors to the United States of America as represented by the Secretary of the Navy
Filed Sept. 30, 1964, Ser. No. 400,616
1 Claim. (Cl. 73—189)

A device for averaging wind velocity and wind direction for use on a weather station such as a buoy or on shore. A magnetic switch is operated by a magnet secured to a propeller rotated shaft in which the magnetic switch controls an electrical circuit that sends a signal to a telemetering system which sends out a signal. A magnet mounted on a fuselage controls a magnet on a potentiometer to indicate wind direction which is also telemetered by a telemetering system.

Keywords: Wind measurement



3,336,803
SUSPENDED-DROP CURRENT METER

Edward M. Thorndike, Montrose, N.Y., assignor to the United States of America as represented by the Secretary of the Navy

Filed Nov. 16, 1964, Ser. No. 411,653
8 Claims. (Cl. 73—194)

Keywords: Current measurement

1. An instrument for measuring the velocity of flow of a fluid comprising, in combination:

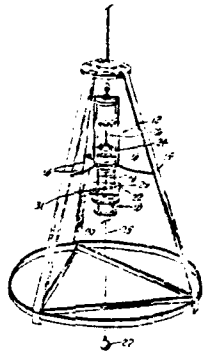
ejector means for ejecting a drop of a first fluid into said fluid the velocity of which is to be measured, said drop of said first fluid being immiscible with and visibly differentiable from said fluid;

camera means disposed in fixed relationship to said ejector means at a selected distance therefrom and adapted to make at least two time-spaced photographs of said drop;

reference means positioned in the field of view of said camera beyond said ejector means for indicating the distance said drop has moved in the time interval between said photographs; and

means for determining the time interval between said photographs;

whereby current velocity may be readily determined by dividing the distance a drop moves between photographs by the time interval between said photographs.



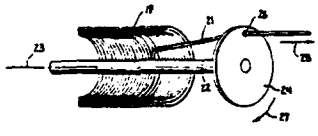
3,336,892
CABLE DISPENSING AND LOCKING MEANS

Gerald J. Barry and Thomas B. Harker, Fort Wayne, Ind., assignors to The Magnavox Company, Fort Wayne, Ind., a corporation of Delaware

Filed Jan. 19, 1966, Ser. No. 521,654
19 Claims. (Cl. 114—206)

Keywords: Buoy mooring system

A fixed coil of cable is unwound relative to a fixed core through a rotatable element which causes each turn of the cable to pay out freely without binding. When the desired length of cable has been payed out, the rotatable element is stopped. Stopping of the rotatable element causes the cable to wind itself on the core as it pays out until the friction of the wound cable on the core stops further pay out.



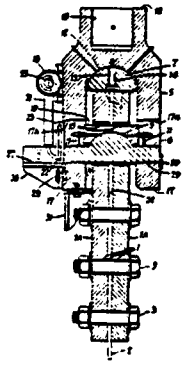
3,336,987
DEVICE FOR TRANSMITTING FORCES

Robert Glenville Taylor, Southall, England, assignor to Taylor Woodrow Construction Limited, Southall, England, a British company

Filed Sept. 21, 1964, Ser. No. 398,017
Claims priority, application Great Britain, Sept. 25, 1963, 37,814/63
10 Claims. (Cl. 173—130)

Keywords: Pile driver, impact; Pile, steel

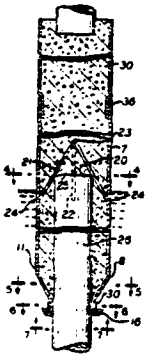
A device for transmitting force to a structural member, e.g. a pile, comprises an element for receiving the force and means providing a frictional surface connection between the element and the structural member. The frictional connection, effected by a clamping bolt which passes through registering apertures in the element and the member, with clearance in at least one of the apertures, alone transmits the force.



3,338,058
ADJUSTABLE COMPOSITE FORM
Edward M. Young, 90 Gregory Ave., West Orange, N.J. 07052
Filed July 27, 1964, Ser. No. 385,138
6 Claims. (Cl. 61—54)

1. A method for rehabilitating piles having defective areas utilizing a cylindrical pile form having axially slit distensible end members and comprising,
(a) removing the defective areas,
(b) positioning the cylindrical form having axially slit distensible end members over the pile to permit the distensible members to overlap and conform to the pile cross-sectional area,
(c) positioning the form in the defective area about the pile,
(d) fixedly adhering the form at the slit distensible end about the pile, and
(e) pouring in concrete into the form to rehabilitate the defective area.

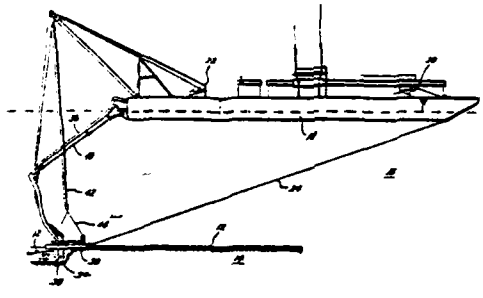
Keywords: Concrete form; Pile, concrete; Pile, steel; Pile, wood; Structure repair



3,338,059
METHODS AND APPARATUS FOR ENTRENCHING SUBMERGED ELONGATE STRUCTURES
John G. Tittle, Pasadena, Tex., assignor to Brown & Root, Inc., Houston, Tex., a corporation of Texas
Filed Jan. 7, 1963, Ser. No. 249,626
8 Claims. (Cl. 61—72.4)

1. An apparatus for entrenching submerged elongate means, said apparatus comprising:
a floating vessel;
a submerged vehicle;
means connecting said submerged vehicle with said vessel whereby movement of said vessel induces movement of said vehicle;
elongate means on a submerged surface;
said vehicle being disposed adjacent, but movable vertically and laterally of, said elongate means;
a first portion of said vehicle disposed on one side of a vertical plane extending longitudinally through said elongate means;
a second portion of said vehicle disposed on an opposite side of said plane;
first proximity detecting means carried by said first portion of said vehicle and operable independent of optical means to determine the proximity of said first portion of said vehicle to said one side of said plane;
second proximity detecting means carried by said second portion of said vehicle and operable independent of optical means to determine the proximity of said second portion of said vehicle to said opposite side of said plane, said first and second detecting means being spaced laterally on opposite sides of said vertical plane;
trench forming means carried by said vehicle and adapted to straddle said elongate means and form a trench opening downwardly from said submerged surface to receive said elongate means as said vehicle is moved generally longitudinally of said elongate means; and
indicating means on said vessel responsive to the operation of said first and second detecting means to provide an indication of the proximity of said first and second vehicle portions to said one and said opposite sides of said plane.

Keywords: Seabed pipeline placement; Seabed trencher



3,338,060

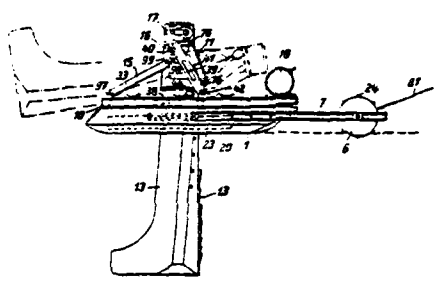
ARRANGEMENT TO BED FLEXIBLE LINES IN THE GROUND UNDER WATER

Rudolf Harmstorf, Strandweg 99, Hamburg-Blankenese, Germany

Filed Oct. 26, 1964, Ser. No. 406,368
Claims priority, application Germany, June 18, 1964, H 52,997
16 Claims. (Cl. 61—72.4)

Keywords: Seabed cable plow

1. In an arrangement to flush-bed flexible lines, especially plastic pipes, electric cables or the like underground at the bottom of waters, a sled member adapted to be moved along the water bottom in a flush-bedding direction, a cradle member, means rotatably supporting said cradle member on said sled member, power means adapted to rotate said cradle member on said sled member from a first position to a second position and adapted to selectively hold said cradle member in said first or said second position or in any intermediate position therebetween, a flush-bedding stand having longitudinally extending first and second channel structures each having an inlet defined therein, means detachably connecting said cradle member to said flush-bedding stand adjacent said inlet openings, said flush-bedding stand projecting downward from the underside of said sled member when said cradle member is in said first position and extending above said sled underside when said cradle member is in said second position, means feeding a pressurized fluid to said inlet of said first channel structure, a plurality of outlet nozzles defined in said stand in communication with said first channel structure and at least partially directed toward said flush-bedding direction when said cradle member is in said first position, means feeding at least one flexible line to said inlet of said second channel structure, and an outlet defined in said stand second channel structure at the end opposite said inlet of said second channel structure and extending in the direction opposite said flush-bedding direction when said cradle member is in said first position.



3,338,206

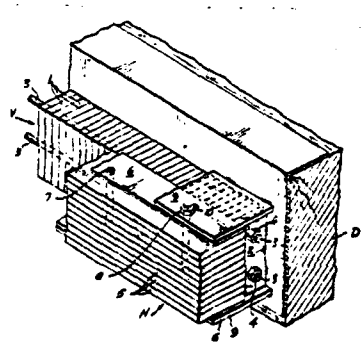
COMPOSITE MARINE DOCK BUMPER

Forrest E. Motter, New London, Ohio, assignor to Durable Mat Company, Norwalk, Ohio, a corporation of Washington

Filed May 19, 1965, Ser. No. 457,079
5 Claims. (Cl. 114—219)

Keywords: Pier fender

Two bumper sections are made from stacks of strips cut from used tire casings and arranged with the strip widths perpendicular to a dock face. An inner section is mounted between the dock face and an outer section. The outer section receives the impact of a vessel and is movable toward the inner section in response to impact so that both sections are effective in absorbing shock. The two sections have their strip edges abutting in edge-to-edge crossing relationship.

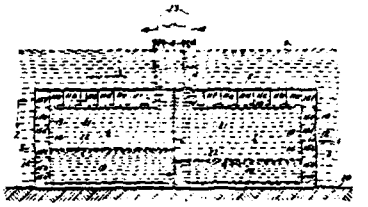


3,339,367
METHOD AND APPARATUS FOR INSULATED SUBMERGED OIL STORAGE

Ray S. Lacy, Jr., Beaumont, Tex., assignor to Bethlehem Steel Corporation, a corporation of Delaware
Filed May 27, 1965, Ser. No. 459,398
14 Claims. (Cl. 61—63)

Submersible oil storage apparatus with structural elements at the sides and top defining chambers from which liquid can be displaced by air. The layer of air thus interposed between the contents of the tank and the surrounding body of water acts as a thermal insulator.

Keywords: Offshore storage tank, submerged

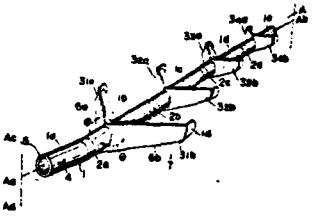


3,339,368
APPARATUS FOR LAYING UNDERWATER CABLES

Takuji Ezoe, 1089 8-chome, Koyama, Skinagawa-ku, Tokyo-to, Japan, and Kikuo Shirai, 1791 Kaneko-machi, Chofu-shi, Tokyo-to, Japan
Filed Sept. 27, 1965, Ser. No. 490,283
Claims priority, application Japan, Sept. 28, 1964, 39/54,498
26 Claims. (Cl. 61—72.4)

Keywords: Seabed cable plow

1. An apparatus for laying underwater cables, conduits, or the like comprising: a tubular structure adapted for passing therethrough at least one cable and composed, with respect to the longitudinal direction thereof, of a plurality of divided tube sections; joint means for successively connecting said divided tube sections to one another in a tandem row with flexible couplings each of which has an aperture to pass the cable and has some flexibility without rotatability with respect to the axis of the tubular structure; a plurality of pairs of plough blades, the blades of each pair of which are secured to respective sides of one of the divided tube sections so as to be symmetrical to each other with respect to a plane which contains the axis of the tubular structure and divides the tubular structure into two equal parts, each of the plurality of blades having an angle of sweepback with respect to the axis of its respective tube section, each of the lower edges of the blades constituting a cutting edge facing the forward end of the tubular structure, the lower edge of each of the blades arranged on one side of the tubular structure being intersected at a point outside of the tubular structure with the lower edge of the corresponding blade symmetrically arranged on the other side of the tubular structure so that said point is offset, by a distance less than the diameter of the tubular structure, from the outer surface of the tubular structure and lies in a plane which contains the axis of the tubular structure and divides the apparatus symmetrically into two equal parts, the lengths of said blades being successively reduced in proportion to the distances of the blades from the forward end of the tubular structure; and connection means disposed, at the forward end of the tubular structure for connecting the apparatus to means for towing the apparatus, whereby when the apparatus is towed along the bottom of a body of water by said means for towing the apparatus, said lower edges of the blades dig successively into the material of the bottom in accordance with the arrangement order of the blades so as to dig a trench in the material, and, at the same time, the cable guided through the tubular structure is laid in the trench.



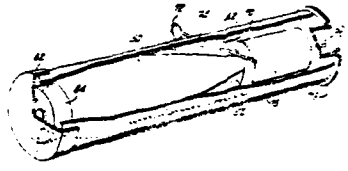
3,339,407
OCEANOGRAPHY PROBE

Walter G. Campbell, W. Van Alan Clark, Jr., and Courtland B. Converse, Marion, Mass., assignors to Buzzards Corporation, Marion, Mass., a corporation of Massachusetts

Filed Apr. 22, 1965, Ser. No. 450,151
5 Claims. (Cl. 73—170)

The present invention includes a canister, for use in a bathythermograph system in which a property of a fluid is measured at varying depths and such information is transmitted to a remote location, said canister including an elongated hollow container portion having a forward open end and a rearward end, the container portion being cylindrical, a stationary conductor coil in wound configuration within the container portion and comprising a continuous wire coiled for being freely payed out from the coil, electrical contact means comprising pin connectors secured to the rearward end of the container portion, said contact means adapted to electrically engage vehicle mounted electrical apparatus, means for releasing a probe front within the container portion, and a protective cap for covering the open end.

Keywords: Bathythermograph; Instrument deployment



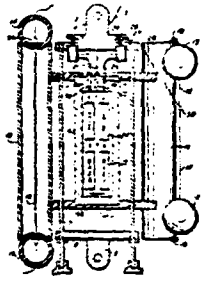
3,339,417
WATER SAMPLING APPARATUS

Joseph D. Richard, 3613 Loquat Ave., Miami, Fla. 33133

Filed Nov. 19, 1964, Ser. No. 412,541
10 Claims. (Cl. 73—425.4)

Water sampling apparatus having a plurity of remotely actuated sampling bottles. The assembly, including a watertight control housing, is lowered into the water on a wire with the sampling bottles latched in the open position. Signals from above the surface are received within the control housing where they trigger the sequential closure of the sampling bottles.

Keywords: Sampler, water

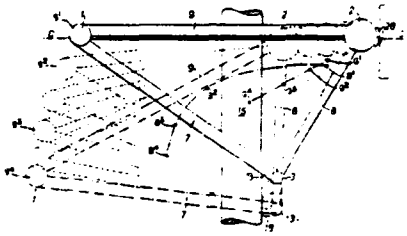


SEPTEMBER 12, 1967

3,340,694
BUOYANT FENDERS
Richard Pavry and Henry W. Stephenson, London, England, assignors to John Albert Posford, John Francis Causton Swansbourne, Peter Weston Rowley and said Pavry
Filed Apr. 22, 1965, Ser. No. 450,103
5 Claims. (Cl. 61—46)

A buoyant fender comprising fore and aft buoyant tubes, the fore buoyant tube being positioned so that it will be engaged by the hull of a ship, the fender being so constructed that it will yield to the force due to the impact of the ship therewith and absorb the impact by a displacement of the fore buoyant member in the water in which it floats. The fore and aft buoyant members are rigidly connected together by a framework having an axis of articulation which is displaceable in a direction having a vertical component. Two embodiments show in one case an arrangement in which the aft buoyant member is displaceable downwardly in the water, and in another embodiment is displaceable upwardly away from the water level.

Keywords: Collision protection; Offshore structure fender, Pier fender; Pile protection

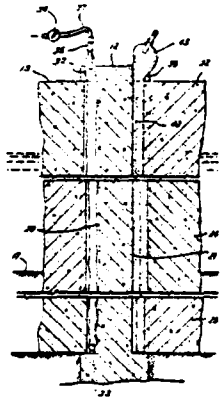


SEPTEMBER 19, 1967

3,342,033
METHOD OF PROVIDING A SEALED JOINT EMPLOYING A FLEXIBLE BAG
Robert L. Crouch and Andrew L. Williams, Jr., Houston, Tex., assignors to Layne Texas Company, Inc., Houston, Tex., a corporation of Texas
Filed Apr. 8, 1965, Ser. No. 446,533
4 Claims. (Cl. 61—30)

A method is disclosed for forming a sealed joint between two members, where one member has a groove into which the other extends. A flexible bag is located in a groove between the members. The bag has a porosity such that it will filter cement from a pumpable slurry of water and cement. Such a slurry is pumped into the bag, the excess water passes out of the bag leaving the cement. Slurry is pumped into the bag until the bag is filled with cement sufficiently to hold it in sealing engagement with members. Pressure is then held on the cement in the bag until the cement solidifies.

Keywords: Bulkhead; Channel barrier; Grouting; Pile, concrete; Sandbag



3,342,716

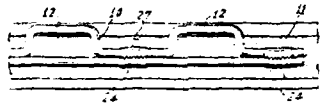
ANODE FOR CATHODIC PROTECTION SYSTEM

Edward P. Anderson, Livingston, and Samuel P. Crago, Wyckoff, N.J., assignors to Engelhard Industries, Inc., Newark, N.J., a corporation of Delaware

Filed June 12, 1964, Ser. No. 374,705
4 Claims. (Cl. 204—196)

Keywords: Cathodic protection; Corrosion prevention

1. An anode assembly for use in a cathodic protection system for underwater metal structures comprising, a support member of electric insulating material, a rod of electrically conductive metal, said rod being embedded in the support member with portions of the rod exposed outside the support member at spaced intervals along the length of the rod, and means for supplying electric power to the rod, said means including a second rod of electrically conductive metal completely embedded in the support member parallel to and in contact with the first mentioned rod.



SEPTEMBER 26, 1967

3,343,370

EARTH EMBANKMENT WITH INTERNAL WATER BARRIER

Gunther Twele, Weisbaden, Germany, and Karl Helmut Rothaug, deceased, late of Weisbaden-Biebrich, Germany, by Johanne Helgard Rothaug, nee Werner, heir and legal representative of minor heirs, Wiesbaden-Biebrich, Germany, assignors to Kalle Aktiengesellschaft, Wiesbaden-Biebrich, Germany, a corporation of Germany

Filed Oct. 16, 1963, Ser. No. 317,111
Claims priority, application Germany, Oct. 18, 1962, K 48,012
3 Claims. (Cl. 61—31)

Keywords: Fabric mat; Slope protection

1. An earth embankment having an internal barrier to prevent water penetration, comprising a water-impervious thermoplastic film extending in an inclined position within the embankment, said film separating the embankment into an upper portion and a lower portion and being in contact therewith, said thermoplastic film being directly supported on said lower portion and having anchored to at least the upper surface thereof a plurality of small solid particles, said particles being dispersed completely over the upper surface of said film and protruding into said upper portion to prevent slippage of said upper portion.

3,343,371

LOCKING DEVICE FOR ESTABLISHING A LOAD-BEARING JOINT BETWEEN TWO STRUCTURES

Roy S. Heithamp, Metairie, La., assignor to J. Ray McDermott & Co., Inc., New Orleans, La., a corporation of Delaware

Filed Jan. 25, 1965, Ser. No. 427,687
18 Claims. (Cl. 61—46.5)

Keywords: Offshore platform, jack up: Offshore platform, leg

1. In a locking device of the type described, the combination of

a rack having a series of rack teeth;

frame means disposed adjacent said rack;

support means mounted on said frame means for movement between a retracted position, in which said support means is spaced from said rack, and a second position, in which said support means is adjacent said rack;

a plurality of individual locking teeth carried by said support means and arranged in an elongated series which extends lengthwise of said rack when said support means is in said second position,

each of said locking teeth having a nose portion dimensioned for insertion between an adjacent pair of said rack teeth, the nose portion of each of said locking teeth including a load-bearing surface disposed to engage one rack tooth of the pair of rack teeth between which the nose portion is inserted, said load-bearing surfaces of said locking teeth all facing generally toward the same end of said series,

each of said locking teeth being carried by said support means for independent pivotal movement about a tooth axis extending transversely of said series,

engagement of said load-bearing surfaces of said locking teeth with the respective ones of said rack teeth tending to cause said locking teeth each to rotate in one direction about its tooth axis;

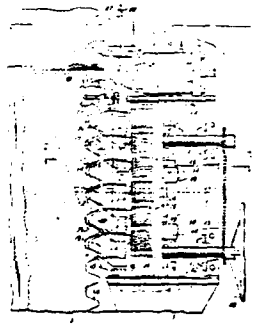
yieldable means carried by said support means and disposed to be engaged by said locking teeth to resist pivotal movement of said locking teeth in said one direction;

means carried by said frame means for releasably locking said support means in said second position against movement away from said rack,

said nose portions of said locking teeth all being engaged between said rack teeth when said support means is in said second position; and

loading means carried by said frame means and arranged to apply an axial load to said series of locking teeth in a direction toward the end of said series which is faced by said load-bearing surfaces,

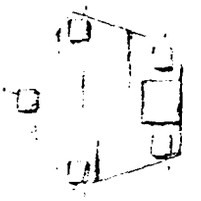
application of such axial load clamping said locking teeth against movement lengthwise of said series.



3,343,372
DRILLING PLATFORM
August Hendrik Maria Smulders, Wassenaar, Netherlands, assignor to N.V. Werf Gusto v.h. Firma A. F. Smulders, Schiedam, Netherlands
Filed May 17, 1965, Ser. No. 456,034
Claims priority, application Netherlands, May 15, 1964, 64—5,458
3 Claims. (Cl. 61—46.5)

A drilling platform of the type in which the platform and columns are vertically adjustable relative to each other, has five columns disposed in the corners of a regular pentagon, for increased safety against sagging.

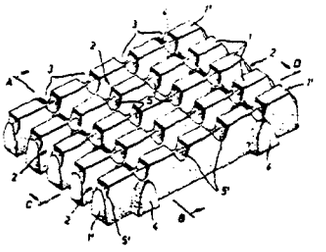
Keywords: Offshore platform, jack up



3,343,468
PAVING BLOCK
Paul Schraudenbach, 53A Agnes-Bernauer-Strasse, Munich 42, Germany
Filed May 13, 1965, Ser. No. 455,369
Claims priority, application Germany, May 14, 1964, Sch 35,163
8 Claims. (Cl. 94—11)

1. A paving block comprising a plurality of bar-shaped, parallel tread members spaced from each other, a plurality of parallel connecting webs interconnecting said tread members and extending transverse thereto, said connecting webs being spaced from each other in a manner such that said spaced tread members and said spaced connecting webs form intermediate apertures extending entirely through the block from the top to the bottom surface thereof, at least the upper surface of said tread members being broken away at appropriate points so as to form a plurality of spaced apart transverse grooves, the bottom of each groove having a narrow central longitudinal portion and downwardly slanting chamfered portions on each side of said central portion which merge into the side surfaces of said tread members to promote the growth of grass in said grooves upon said intermediate apertures being substantially filled with soil and grass being sowed thereon so as to form sod.

Keywords: Concrete block; Low-cost shore protection; Revetment; Slope protection



3,343,515

MINIMUM WIDTH TOWLINE WITH DAMAGE SHIELD

Donald A. Nichols, Old Lyme, Conn., assignor to the United States of America as represented by the Secretary of the Navy

Filed Aug. 31, 1966, Ser. No. 576,790
6 Claims. (Cl. 114—235)

1. A towline with fairings thereon by which a submerged object may be towed from a ship comprising:

a flexible strength member,

a plurality of electrical cables,

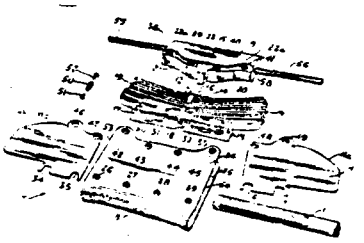
a plurality of fairing units each having a channel-shaped nose piece and a tail piece having a forward edge portion received in and closing the open face of said channel-shaped nose piece to define a passage for said strength member and cables,

means securing said cables in said fairings and pivotally securing said fairings on said strength member,

each of said fairings including a pair of shields fixed to the fairing on opposite sides of said cables and extending each laterally into the next adjacent fairing to provide continuous mechanical protection for said cables,

each of said shields being formed convexly arcuate along its trailing edge to avoid interference in the spread of said fairings upon bending of said strength member.

Keywords: Instrument cable; Towing cable



3,343,516

MINIMUM WIDTH TOWLINES WITH STRETCHABLE ELECTRICAL CABLE AND IMPROVED CLAMPING MEANS

Donald A. Nichols, Old Lyme, and Julius O. Natwick, Niantic, Conn., assignors to the United States of America as represented by the Secretary of the Navy

Filed Aug. 31, 1966, Ser. No. 576,793
6 Claims. (Cl. 114—235)

Keywords: Instrument cable; Towing cable

1. A towline with fairings thereon by which a submerged object may be towed from a ship comprising:

a flexible strength member,

a plurality of fairing units arranged in end-to-end abutting relationship along and individually pivotally mounted upon said strength member,

each such unit having a channel-shaped nose piece, with the strength member received in and extending along the channel of the nose piece, and a tail piece having an edge portion received in and closing the open face of the channel,

a support column positioned in each said nose piece adjacent said strength member and spaced from said tail piece,

each said support column extending beyond the opposite edges of said nose piece to prevent rubbing of adjacent nose piece surfaces and to act as pivot members for said fairings as said strength member curves in being towed through water,

stretchable electrical cables received in the space between said tail piece and column along said strength member for establishing electrical communication between said ship and submerged object,

clamp means for clamping and supporting said electrical cable at spaced points therealong,

means for pivotally securing selected of said fairings in spaced relation along said strength member to support on each of said selected pivoted fairings one or more of the remaining fairings,

said clamping means including:

a forward clamping block fixed to said column and adjacent one side of said electrical cables,

a rearward clamping block fixed to said tail piece and adjacent the opposite side of said electrical cables,

said rearward block being slotted to form a face portion integral with said block and movable in the direction of said electrical cable, and

cam means positioned in said slot and rotatable to urge said face portion forward to clamp said electrical cable between said blocks,

said tail piece being formed with a tongue or projection, and

said rearward block being formed with a groove to receive said tail piece tongue to support said rearward block on said tail piece.

108

3,344,609

PREVENTION OF BEACH EROSION AND ENCOURAGEMENT OF LAND RESTORATION

Melvin R. Greiser, % Carthage Mills, Inc., 124 W. 60th St., Cincinnati, Ohio 45216

Filed Oct. 23, 1959, Ser. No. 848,238
7 Claims. (Cl. 61—38)

Method and means for the prevention of erosion of a littoral formation subject to wave action and including a bank sloping toward the water. The bank is covered with anti-erosion means comprising a layer of thin, flexible, foraminous sheet material pervious to water but impervious to the substance of the littoral formation. Means are provided for inhibiting the entrance of water beneath edge portions of the layer.

Keywords: Concrete block; Fabric mat; Groin; Low-cost shore protection; Revetment; Seawall

3,344,612

SHALLOW WATER CAISSON

Paul R. Rininger, Woodland Hills, Calif., assignor to Global Marine Inc., Los Angeles, Calif., a corporation of California

Filed Feb. 17, 1966, Ser. No. 528,263
6 Claims. (Cl. 61—63)

1. A shallow water caisson capable of providing space below the floor of a body of water when such floor is composed of fluid displaceable material, such space being suitable for well fabricating and producing equipment, said shallow water caisson comprising:

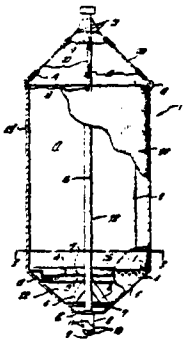
(a) a shell having an interior defining the space;

(b) a hollow tapered base fluid tightly joined at its largest end to the bottom of said shell with its taper extending downwardly and inwardly from said shell and having an opening at its apex of sufficient diameter to pass well drilling equipment;

(c) means for discharging fluid under pressure to the exterior of said caisson around its outer periphery proximate to the junction of said shell and said base with both a vertical and horizontal component of velocity; and

(d) a removable jetting nozzle assembly comprising: a jetting nozzle disposed below and coaxial with the opening having a plurality of fluid ports in fluid communication with the exterior of the nozzle, such ports being disposed to provide both a vertical and horizontal component of fluid velocity, means for providing fluid under pressure to the fluid ports, and means for preventing the material from the floor from entering the interior of said shell through the opening.

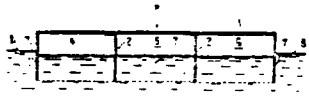
Keywords: Offshore caisson; Offshore construction; Pile driver, water jet; Seabed foundation



3,344,764
FLOATING BODY
Attila Ziermann, Rigistrasse, Buochs, Switzerland
Filed May 3, 1965, Ser. No. 452,579
Claims priority, application Switzerland, May 15, 1964, 6,412/64
9 Claims. (Cl. 114—121)

Keywords: Pier, floating

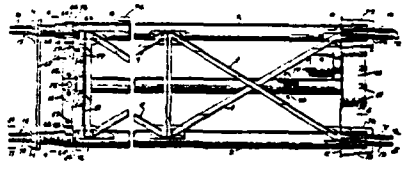
1. A floating body comprising a number of floating chambers open at their lower end and closed at their upper end, said chambers being rigidly interconnected side by side, at least three chambers being disposed in symmetrical distribution relatively to a vertical plane through the center point of the body, and a flow connection of high flow resistance from a place vertically spaced from said upper end and from the rim of said opening of each chamber to the outside of the chamber, an air cushion being formed in each chamber substantially between said place and said upper end when the floating body is positioned for use in water.



3,344,867
BOTTOM BRACE FOR PILE HAMMER LEADS
John J. Kupka, Gladstone, N.J., assignor, by mesne assignments, to KHG Associates, Merrick, N.Y., a partnership
Filed Apr. 20, 1965, Ser. No. 449,548
5 Claims. (Cl. 173—44)

Keywords: Pile driver leads

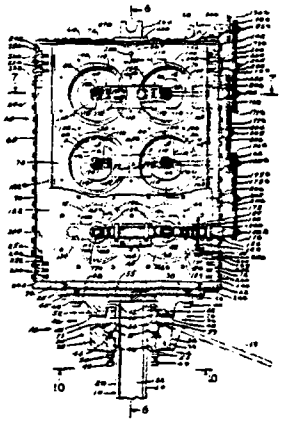
Bottom brace made up of a rigid frame having spaced parallel side struts, consisting of guide tubes and tubular extensions slideable therein, said frame pivotally supported at the inner end and the tubular extensions having means for connecting them with a leads frame, a tubular power strut mounted in the frame between and parallel with the side struts and comprising an inner, extension tube slideably operating within an outer guide tube, a yoke pivotally connected with the outer end of said inner extension tube and having self-adjusting connections with the outer ends of the tubular extensions of the side struts, the inner, extension tube of the power strut having a nut forming element on the inner end of the same, a lead screw journaled in the inner end of the outer guide tube of the power strut in cooperative engagement with said nut forming element, with a drive motor at the inner end of the frame and self-adjusting drive connections from said motor to said lead screw.



3,344,873
MECHANICAL HETERODYNE OSCILLATOR
Jack R. Baittinger, Scotch Plains, N.J., assignor of one-half to John J. Dougherty, Cedar Grove, N.J.
Filed Sept. 17, 1964, Ser. No. 397,210
11 Claims. (Cl. 175—55)

Keywords: Pile driver, vibratory

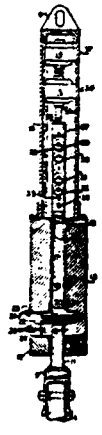
Apparatus for actuating piles, tubing and like elements comprising a housing coupled to the end of a pile, a source of alternating impulses in said housing balanced with respect to the axis of the pile and adapted to generate alternating impulses directed axially of the pile, a heavy metal block in the housing with pairs of opposed spaced recesses vertically and horizontally aligned, plate-like members rotatably mounted in the recesses, unbalanced ball weights carried by the plate-like members, opposed shafts in the block mounting the plate-like members, said opposed shafts rotatable about an axis extending perpendicular to the axis of the pile, the plate-like members spaced the same distance from the axis of the pile on opposite sides thereof, the center of gravity of each plate-like member being eccentric to the axis of rotation thereof, a turbine engine for rotating the plate-like members about the axes in opposite directions, the center of gravity of the pair of plate-like members being in phase with each other.



3,344,874
LOW-IMPEDANCE ISOLATOR FOR VIBRATORY PILE DRIVER MACHINES
Albert G. Bodine, 7877 Woodley Ave., Van Nuys, Calif. 91406
Filed May 28, 1965, Ser. No. 459,754
10 Claims. (Cl. 175—56)

Keywords: Pile driver, vibratory

The low-impedance isolator decouples the vibration of the pile and drive assembly from the support assembly by means of a substantial body of compressed gas suitably confined to provide a low acoustic impedance.

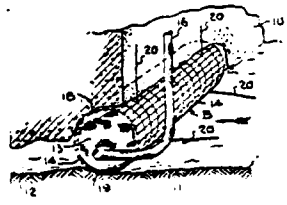


3,345,824
METHOD AND MEANS FOR BRACING OR BOLSTERING SUBAQUEOUS STRUCTURES

Lee A. Turzillo, Bath, Ohio
(2078 Glengary Road, Akron, Ohio 44313)
Filed May 6, 1964, Ser. No. 365,431
17 Claims. (Cl. 61—35)

Keywords: Grouting; Sandbag; Seabed foundation; Structure repair

1. A method of providing a subaqueous or other bracing structure in situ, comprising: placing closed expandible and generally porous walled bag means in relatively unexpanded condition at the situs in cooperation with a self-supportingly rigid openwork frame means adapted to engage opposing portions of the structure to be braced to have the unexpanded bag means loosely confined at the situs by the framework means; injecting a flowable grout under hydraulic pressure into said bag means to expand the porous walls thereof against opposing surface areas of the situs and continuing the injection of the flowable grout under pressure into the bag and through openwork frame means until a small fraction only of the flowable grout oozes out through the pores of the bag means and the expanded bag means conforms itself in shape to the opposing surface areas contacting the expanded bag means according to the strengths, weakness and voids of the surface areas; and permitting the flowable grout which has passed through the porous walls and the flowable grout within the bag means to solidify in pressure contact with said opposing surface areas of the situs, whereby the solidified grouting between the bag means and the pressure contacted surface areas by extension through the porous walls creates a bonding effect between the solidified grout mass within the bag means and the pressure contacted surface areas.

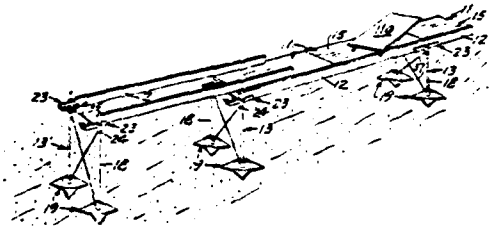


3,345,825
PORTABLE DOCK

Louis F. Parker, 3844 Xerxes Ave. S.,
Minneapolis, Minn. 55410
Filed Jan. 18, 1965, Ser. No. 426,255
4 Claims. (Cl. 61—48)

Keywords: Pier, mobile; Small-craft pier

A portable dock having lightweight deck sections supported on wood stringers substantially longer than the deck sections and carried by post-supported brackets which are clamped at two locations to each stringer; longitudinal frame elements of the deck sections lying flush against the stringers, and cross-bracing and base plates on the posts.



3,345,879

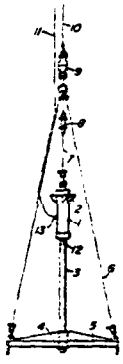
APPARATUS FOR EXTRACTING SAMPLES FROM THE BED OF A BODY OF WATER

Noriyuki Nasu, Tokyo, Hiroshi Yamazaki, Yokohama, and Hiroshi Shinozaki and Tadasu Yonekura, Oita-shi, Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, and Tsurumi-Seiki Kosakusho Co., Ltd., Yokohama, Japan, both corporations of Japan

Filed Sept. 23, 1964, Ser. No. 398,679
Claims priority, application Japan, Sept. 27, 1963, 38/50,816
3 Claims. (Cl. 73—425.2)

1. A sample recovering device comprising a core receiving tube, means for driving said core tube including a rocket attached directly to said tube at the top thereof and concentric therewith, said rocket having nozzles facing generally upwardly so that when the rocker is ignited the tube is driven downwardly and enters a body from which a sample is to be removed, said nozzles being inclined with respect to the axis of the tube to produce rotation of the tube when it is driven downwardly, means for igniting said rocket, support means slidably receiving the core tube at the lower end thereof and engaging the rocket after the same has been ignited and the core tube has been lowered, and means for recovering the entire sampler assembly.

Keywords: Sampler, power supply; Sampler, seabed-driven core



3,346,838

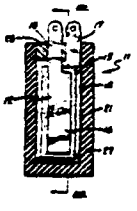
PRESSURE SENSITIVE DETECTOR FOR MARINE SEISMIC EXPLORATION

Walter P. Johnson III, and Eugene F. Florian, Houston, Tex., assignors to Mandrel Industries, Inc., Houston, Tex., a corporation of Michigan

Filed May 3, 1965, Ser. No. 452,685
10 Claims. (Cl. 340—7)

8. Pressure sensitive detector means comprising a sealed flexible water impervious elongated jacket; a plurality of detectors disposed in longitudinally spaced relation within said jacket, each of said detectors including a flat rectangular piezoelectric crystal slab, flexible contact elements conductively secured to the opposite faces of said slab to form a transducer sandwich assembly, fulcrum means rigidly supporting said assembly only adjacent opposite longitudinal ends of said slab, and a a flexible housing sealably enclosing said transducer assembly and fulcrum means with terminal portions of said contact plates projecting from said housing; a paired conductor cable extending longitudinally through said jacket; means connecting said terminal portions of said contact plates of said detectors respectively in parallel to said cable; and fluid filling the interior of said jacket.

Keywords: Seismic hydrophone; Seismic hydrophone array



3,346,839

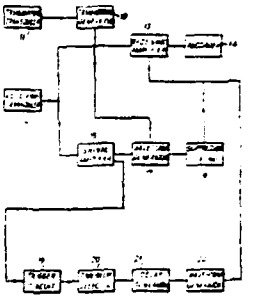
ECHO-SOUNDING APPARATUS FOR EXAMINING STRATA BELOW THE SEA-BED WITH VARIABLE GAIN MEANS RESPONSIVE TO SEA-BED ECHOES

Stanley Frederick Ovens and Geoffrey Harold Ellis, Cricklewood, London, England, assignors to S. Smith & Sons (England) Limited, Cricklewood, London, England, a British company

Filed May 24, 1965, Ser. No. 458,260
Claims priority, application Great Britain, May 29, 1964, 22,377/64
6 Claims. (Cl. 340—7)

Keywords: Seismic record processor; Sonar, depth sounder

1. Echo sounding apparatus for examining strata below the sea-bed comprising transmitter means for transmitting mechanical-wave energy towards the sea-bed, receiver means for receiving echoes of the transmitted energy to derive signals in accordance respectively with received sea-bed and strata echoes, display means responsive to said signals to provide a display of echoes received by the receiver means, and suppression means for attenuating the sea-bed echo-signal relative to the strata echo-signals, said suppression means comprising a controllable-gain amplifier coupled between said receiver means and said display means for passing said signals derived by said receiver means to said display means, and control means for controlling the amplifier-gain to increase from a low value during passage through the amplifier of the sea-bed echo-signal to a higher value during passage through the amplifier of the immediately-following strata echo-signals, said control means including first means triggerable to supply a predetermined control signal having at least a portion thereof that changes as a predetermined function of time from a first value to a second value, second means responsive to reception of the sea-bed echo by said receiver means to trigger said first means to supply said control signal, and third means coupled to the amplifier to increase the amplifier-gain immediately following passage through the amplifier of said sea-bed echo-signal, said third means being responsive to supply of said control signal by said first means to increase said amplifier-gain in accordance with change in said control signal from said first value to said second value.



OCTOBER 17, 1967

3,347,048

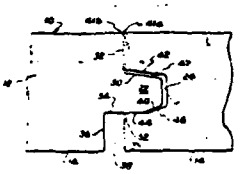
REVETMENT BLOCK

Richard A. Brown and James D. Brown, Glen Burnie, Md., assignors to Coastal Research Corporation, Glen Burnie, Md., a corporation of Maryland

Filed Sept. 27, 1965, Ser. No. 490,203
8 Claims. (Cl. 61—37)

Keywords: Concrete block; Low-cost shore protection; Revetment

Tongue and groove revetment blocks are loosely joined and have recesses between adjacent blocks. This permits the release of the hydrostatic pressure of the water beneath the blocks. Lightweight blocks are used which can move under the pressure without breaking the joints.



3,347,051

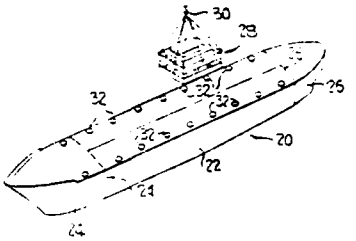
BULKHEAD STRUCTURE AND METHOD OF MAKING THEREOF

John O. Bierke, Newport News, John Halliday, Hampton, and John L. Stevens, Jr., Samuel A. Napier, and Donald A. Holden, Newport News, Va., assignors to Newport News Shipbuilding and Dry Dock Company, Newport News, Va., a corporation of Virginia

Filed Oct. 16, 1964, Ser. No. 404,433
12 Claims. (Cl. 61—46)

3. The method of making a bulkhead structure comprising providing a ship, removing the bow and the stern portions of the ship as well as the superstructure thereof, cutting the ship substantially in half longitudinally thereof to provide two longitudinally extending halves, sealing each half of the ship so as to be substantially watertight, separating said halves so that the halves each float in the water in such a position that the original side shell portions thereof are disposed downwardly, providing guide means extending down into a water bottom, interconnecting portions of each of said halves of the ship with said guide means, then sinking said halves until the original side shell portions rest upon the water bottom with the halves attached to said guide means for holding the halves in operative relationship.

Keywords: Breakwater, steel frame; Bulkhead; Offshore caisson; Offshore construction



3,347,053

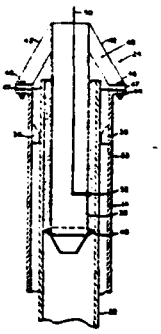
PARTIALLY SALVAGEABLE JACKET-PILE CONNECTION

William P. Manning, Springdale, Conn., assignor to Mobil Oil Corporation, a corporation of New York

Filed Apr. 28, 1965, Ser. No. 451,428
19 Claims. (Cl. 61—46.5)

This specification discloses a subsea connection for mooring an offshore facility comprising a tubular jacket as a first connecting element, which is permanently fixed to the offshore facility, a coaxial intermediate casing as a second connecting element releasably coupled at the upper ends thereof, as by bolts, to the first connecting element. A chamber is formed between the second connecting element and a pile as a mooring element for injecting grout or cement thereinto to form a permanent connection between the pile and the second connecting element. The jacket is generally cylindrical in shape and fits coaxially around the pipe. The intermediate casing also generally cylindrical, may be designed to be inserted within the pile, if the pile be hollow, or between the pile and the jacket. By unbolting the first and second connecting elements, the offshore facility can be removed without damage.

Keywords: Grouting; Offshore platform anchor; Pile, structure connection; Seabed foundation



3,347,054

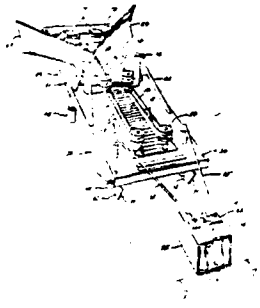
UNDERWATER PIPE TRENCHING DEVICE

Buddy L. Sherrod, P.O. Box 1075,
Conroe, Tex. 77301

Filed Nov. 15, 1966, Ser. No. 542,832
8 Claims. (Cl. 61—72.4)

The present invention relates to underwater pipe trenching apparatus, and more particularly to a method and means for digging a trench under water along a desired path and simultaneously laying pipe therein. A newly constructed sled or plow is used to provide greater ease of trenching as well as a novel guide means for more accurate control of the plow. In addition, an improved method of towing the plow is disclosed which allows continuous, rather than intermittent, move-

Keywords: Seabed pipeline placement;
Seabed trencher



3,347,101

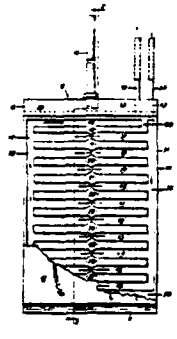
FREEZING-TYPE SEDIMENT SAMPLER

Vance C. Kennedy, Denver, Colo., assignor to the United States of America as represented by the Secretary of the Interior

Filed Sept. 15, 1965, Ser. No. 487,638
6 Claims. (Cl. 73—421)

Portable device having coolant-fluid flowing through passages therein and upon a substantially flat covering element whose outer surface constitutes a bearing support on which a solid sample of sedimentary material is formed by freezing, and which includes in cooperative association therewith positional indicator elements whose orientation is fixed by freezing when the sample is made.

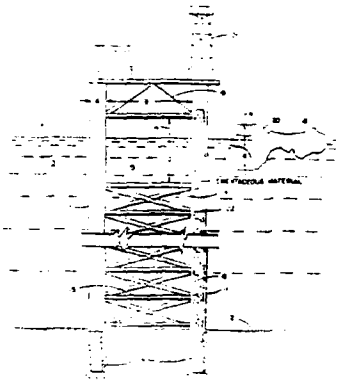
Keywords: Sampler, seabed-driven core;
Sampler, seabed grab



3,348,382
OFFSHORE PLATFORM FOR ICE CONDITIONS
Kenneth A. Blenkarn and George C. Howard, Tulsa, Okla., assignors to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware
Filed Apr. 21, 1965, Ser. No. 449,692
1 Claim. (Cl. 61—46)

A marine platform especially arranged to [illegible] includes a set of vertical girders or columns strongly cross braced from the bottom of the water to around 10 to 20 feet below low water line. The structure is also characterized by no cross bracing up to about 10 feet above the high water line, above which cross bracing continues to the operating platform. Space between adjacent vertical members in the platform preferably lies between about three to about eight diameters of the vertical members.

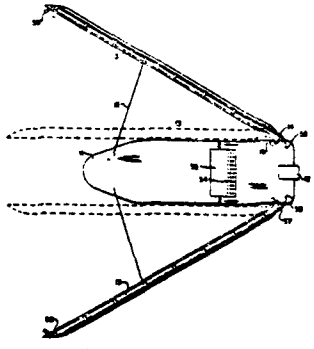
Keywords: Ice protection; Offshore platform, fixed



3,348,690
CATCHER FOR CLEANING WATER SURFACES
Jan Cornelissen, The Hague, Netherlands, assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware
Filed Nov. 9, 1964, Ser. No. 409,824
Claims priority, application Netherlands, Nov. 14, 1963, 300,508
8 Claims. (Cl. 210—242)

An oil skimming apparatus for removing oil films from the surface of large bodies of water comprises a floating vessel having two elongated booms that are pivotally secured at one end thereof to opposite sides of the vessel hull. The booms float longitudinally on the water surface and are secured in a forwardly and outwardly divergent position with respect to the vessel axis of movement. As the vessel moves, the booms are swept over the water surface, thereby funneling the oil film within the sweep of the booms axially therealong to the juncture between the booms and the hull. At the said juncture, vortex producing inlets are provided in the vessel hull for the oil to flow into and then to be conducted to an oil-water-separating tank within the vessel.

Keywords: Pollutant collection; Pollutant removal watercraft; Pollutant, suction removal



3,349,367
ELECTROHYDROSONIC TRANSDUCER
Serge S. Wisotsky, Sharon, Mass., assignor to Raytheon Company, Lexington, Mass., a corporation of Delaware
Filed Oct. 23, 1965, Ser. No. 505,311
1 Claim. (Cl. 340—12)

Keywords: Seismic vibratory acoustic transmitter

An electrohydrosonic transducer for imparting broad band, low frequency vibrational energy into a plastic medium comprising:

electrohydraulic servo valve means for oscillatory modulation of flow of entrapped high pressure fluid in response to excitation of low power level electrical control signals from an external source, said servo valve including a hydraulically loaded neutral positioning means;

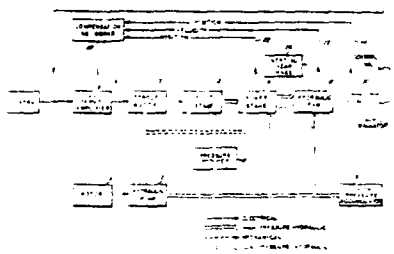
a mechanical member communicating with said modulated fluid flow to closely follow the oscillatory movement;

a sonic radiator member rigidly coupled to one end of said mechanical member having a surface area in contiguous relationship with the elastic medium to translate the oscillatory movement of the mechanical member into displacement of the medium adjacent thereto;

said radiator surface area providing an acoustic radiation impedance wherein the reactive component exceeds the resistive component of said impedance;

said low power level electrical control signals derived from negative electrical feedback signal means to provide a DC positioning reference for the oscillating movement of said sonic radiator member and mechanical member;

and positive feedback electrical signals from a sensor in the elastic medium automatically locking the frequency of the transducer to the resonant frequency of the coupled medium.

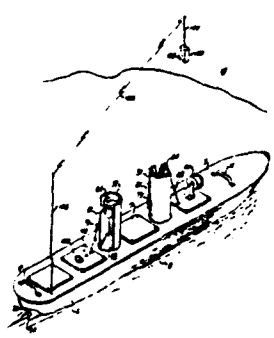


OCTOBER 31, 1967

3,349,624
REMOTELY CONTROLLED WATER SAMPLING DEVICE
Gilbert W. Fraga, Sacramento, Calif., assignor to The Regents of the University of California, Berkeley, Calif.
Filed June 7, 1965, Ser. No. 461,963
6 Claims. (Cl. 73—421)

Keywords: Instrument deployment; Sampler, water

6. A remotely controlled water sampling device comprising a hull adapted to float in the water and to be manually carried, means on said hull for furnishing driving power, means on said hull powered by said furnishing means for propelling and steering said hull, means on said hull powered by said furnishing means for descending from said hull to take a water sample, and means separate from said hull and operable at a point remote from said hull for controlling said propelling and steering means and said descending means.

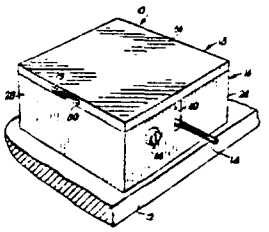


3,349,745
DEVICE FOR FASTENING LINES

Louis A. Berg, 9804 Plymouth Lane,
Raytown, Mo. 64133
Filed June 24, 1966, Ser. No. 560,202
5 Claims. (Cl. 114—230)

A line fastener comprising a massive block configured with a cavity therein and a channel communicating the cavity with the exterior of the block. A ball affixed to a line is received in the recess with the line extending outwardly through the channel for attachment to an object to be secured by the line. A cover is mounted on a block covering the cavity and channel to secure the line to the block and a tumbler lock releasably secures the cover over the cavity and channel. The cover is movable to permit selective insertion or removal of the ball and line.

Keywords: Small-craft mooring device

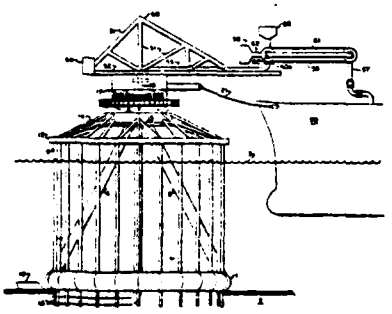


3,349,816
BOW MOORING

Roger W. Mowell, West Caldwell, and John Mascenik, Mount Tabor, N.J., assignors to Esso Research and Engineering Company, a corporation of Delaware
Filed Aug. 18, 1965, Ser. No. 483,014
3 Claims. (Cl. 141—387)

Keywords: Offshore mooring structure;
Offshore platform, fixed

1. In combination, a ship and mooring structure for transferring a liquid cargo at cryogenic temperature to and from said ship; said ship having a rigid manifold connection attached to its foredeck and being free to rotate about said mooring structure without the passage of the liquid through flexible hoses; and a mooring structure, said mooring structure including a lower base donut ring adapted to be positioned on the ocean floor, supporting legs affixed to said donut ring and extending upwardly and inwardly from said donut ring to a point above the surface of the water, a top rigid platform supported above the water by said supporting legs, fendering tubes extending upwardly from said donut ring and positioned about the periphery of said donut ring to a point above the surface of the water, a fendering ring rigidly attached at the upper ends of said fendering tubes, a top ring positioned within and above said fendering ring and rigidly attached to said fendering ring by means of structural members, said top ring being positioned about said rigid top platform, a turntable mechanism positioned on said rigid top platform and adapted to rotate with respect thereto, a first arm extending horizontally outwardly from said turntable mechanism, a second arm extending outwardly from said turntable mechanism and diametrically mounted with respect to said first arm, a loading mechanism positioned on the outboard end of said second arm and pivotally supported for horizontal rotation with respect thereto, a first counterweight positioned on the outboard end of said first arm, the weight of which is to produce substantially equivalent moments of said first arm and of said second arm and loading mechanism; said loading mechanisms including an inner rigid conduit pivotally connected through a swivel coupling to a support base, an outer rigid conduit pivotally connected through a swived coupling at one end to the inner conduit and at its opposite end arranged to be directly fastened to the rigid manifold on said ship, insulating means about said inner rigid conduit, and said outer rigid conduit, a second counterbalancing means to substantially counterbalance the inner conduit and, a third counterbalancing means being mounted for rotation relative to the outer conduit and rotatable in response to the movement of the outer conduit from a vertical position to change its movement arm in a direction and an amount to substantially counterbalance the outer conduit as it moves from said vertical position whereby said cryogenic liquid cargo may be transferred to and from said ship exclusively through insulated rigid conduits.



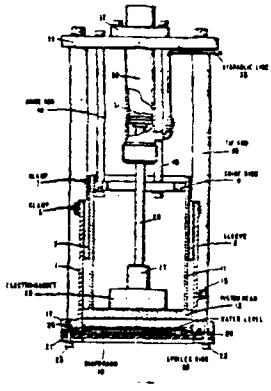
3,349,867
VACUUM ENERGIZED SEISMIC PULSE GENERATOR

Whitman D. Mounce, Houston, Tex., assignor to Esso Production Research Company, a corporation of Delaware

Filed Feb. 23, 1966, Ser. No. 529,446
1 Claim. (Cl. 181—.5)

A seismic pulse produced by lifting a piston and a flexible bottomed piston chamber to produce a vacuum slams the piston against the piston bottom when the piston is released. The piston is lifted by a hydraulically actuated piston connected thereto. A rolling, folded diaphragm provides vacuum-tight seal between piston and its cylinder.

Keywords: Seismic implosive acoustic transmitter



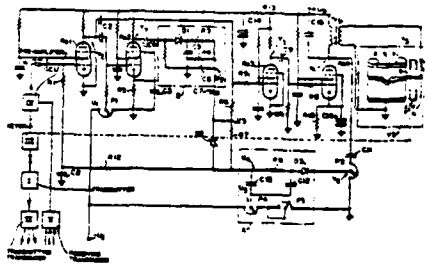
3,350,682
ECHO SOUNDING APPARATUS

Hans Drenkelfort, Kiel-Elmschenhagen, and Gustav Maass, Eutin, Germany, assignors to Electroacustic Gesellschaft mit Beschrankter Haftung, Kiel, Germany, a corporation of Germany

Filed June 23, 1965, Ser. No. 467,204
Claims priority, application Germany, June 26, 1964, E 27,282
11 Claims. (Cl. 340—3)

A first gain control is part of an amplifier for amplifying an echo signal voltage in sonar apparatus. A second gain control is joined with the first gain control in opposed control relation thereto. The second gain control has a smaller time constant than the first gain control to counteract the first gain control for an interval of time corresponding to an echo detail to be emphasized in the recording of echo details on an electrically sensitive record sheet in response to the amplified signal voltage.

Keywords: Seismic record processor; Sonar, depth sounder



3,350,683
OPTIMUM DETECTOR TYPE AND DEPTH IN MARINE SEISMIC EXPLORATION

Raymond L. Sengbush, Grand Prairie, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Filed Mar. 8, 1966, Ser. No. 532,730
4 Claims. (Cl. 340—7)

Keywords: Seismic survey method

1. The method of marine prospecting near the surface of a water layer overlaying a soft bottom having a negative reflection coefficient, said layer of water having a depth such that the two-way travel time of seismic energy between said surface and said bottom is T_w, said method comprising:

generating seismic energy near said surface which will penetrate and be reflected from subsurface strata, said seismic energy also being reflected between said bottom and said surface to produce reverberations,

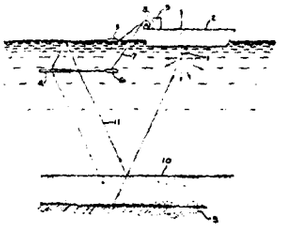
towing a pressure type seismic detector through said water layer at a depth such that the two-way travel time T_p of seismic energy between said surface and said detector is given by:

$$T_p = \frac{m}{k} T_w$$

where m and k are integers and k is equal to or greater than m,

detecting the reflected seismic energy in said detector, and

recording the detected seismic energy.



NOVEMBER 7, 1967

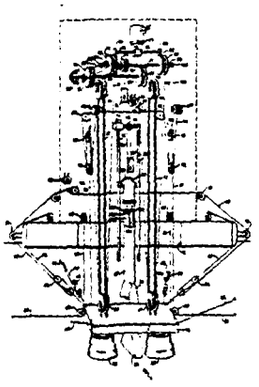
3,350,798
CONDITION RESPONSIVE ELEVATOR DREDGE

Arthur J. Nelson, 611 Las Palmas Drive, Santa Barbara, Calif. 93105

Filed Jan. 13, 1965, Ser. No. 425,256
10 Claims. (Cl. 37—65)

Keywords: Dredge, cutterhead; Dredge ladder control

A condition responsive control system for incorporation into a dredging apparatus employing a buoyant station, a submerged working platform, and interconnecting elements extending between the station and platform. The latter elements comprising guy lines to maintain the platform stably beneath the station, elevator lines to effect selective raising and lowering of the platform relative to the station, swing lines to effect traversal of the platform over the floor of a body of water being worked, and by resistance of the station to traversing movement with the platform. The system comprises monitoring apparatus to sense instantaneous fluctuations in the elevation of the station relative to the floor of a body of water being worked and misalignment between the station and platform, and control structure operable responsive to the monitoring apparatus to vary the lengths of the interconnecting elements. The monitoring apparatus and control structure function, together, to maintain a stable interrelationship between the station and platform and the floor of a body of water being worked.



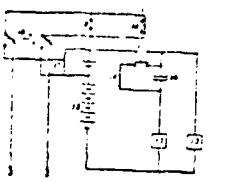
(121)

3,351,545
DEVICE FOR CHECKING CATHODIC PROTECTION

Bernard Marie Louis Heinze, Boulogne-sur-Seine, France, assignor to Societe d'Etudes Contre la Corrosion (Secco), Paris, France, a corporation of France
Filed Dec. 23, 1963, Ser. No. 332,633
Claims priority, application France, Dec. 22, 1962, 919,750
6 Claims. (Cl. 204—196)

The invention relates to a process and device for registering the number of times that the potential of a cathodic protection system of a structure exceeds the effective range of cathodic protection, and also registers the total period during which this ineffective potential is produced.

Keywords: Cathodic protection; Corrosion measurement

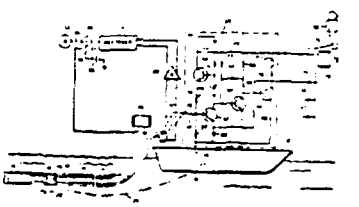


3,351,898
METHOD AND APPARATUS FOR MONITORING THE CONDITION OF A MARINE SEISMIC DETECTOR CABLE

Francis M. Romberg, Irvine, Tex., assignor to Mobil Oil Corporation, a corporation of New York
Filed May 27, 1966, Ser. No. 553,363
14 Claims. (Cl. 340—7)

This specification discloses a method and apparatus for monitoring the condition of a marine seismic cable being towed behind a boat to give an alarm signal before extensive ripping or tearing occurs when the cable is caught on a underwater object. A voltage is applied between the conductors within the cable for each detecting channel and the hull of the boat. The conductors form one electrode and the hull of the boat forms the other electrode of a current leakage detector. When a break occurs in the outer sheath of the detector cable to admit salt water, a current leakage path is created between the point on the conductors touched by the salt water and the hull of the boat. An indicator device provides an alarm signal when the current leakage exceeds a predetermined threshold level.

Keywords: Seismic streamer cable

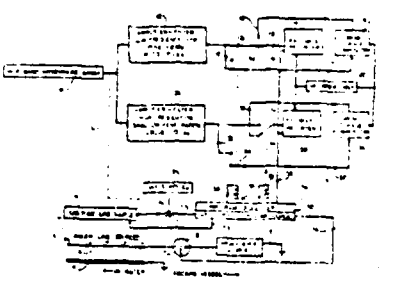


3,351,899
PROGRAMMED MULTIPLE SHOT SOURCE SYSTEM AND METHOD

William H. Luehrmann and Neil A. Moore, Dallas, Tex., assignors to Teledyne Industries, Inc., Geotech Division, a corporation of California
Filed June 27, 1966, Ser. No. 560,782
8 Claims. (Cl. 340—7)

A seismic survey technique in which different types of shock sources are alternately initiated and their associated reflections separately recorded after each shock initiation and prior to the next initiation. The sources include one type which is rich in low frequencies to obtain deep penetration, and another type which is rich in higher frequencies to obtain better resolution. The reflections are recorded both on separate facsimile recorders and on separate temporary storage recorders. The system is sequenced in such a way that when the storage recorder associated with an active source is receiving signals, the storage recorder associated with the idle source is receiving nothing but is used to play back the last-received reflections and re-record them on the associated facsimile recorder to increase the visual horizontal density and thereby reduce the vertical exaggeration of the facsimile image. The storage recorders can also be used to composite plural successive shots by the same source to enhance significant events.

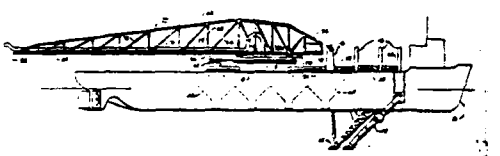
Keywords: Seismic record processor; Seismic survey method



3,352,035
DREDGE
ancis J. Joyce, Morris Plains, N.J., assignor to National Bulk Carriers, Inc., New York, N.Y., a corporation of Delaware
ntinuation of application Ser. No. 89,455, Feb. 15, 961. This application May 12, 1964, Ser. No. 369,651
2 Claims. (Cl. 37—54)

Keywords: Dredge, suction; Dredge-spoil transport

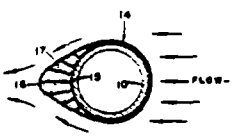
1. A self-propelled boom dredge for dredging while der way, said dredge comprising:
(a) a hull;
(b) propulsion means for driving said hull;
(c) an elongated, substantially horizontal boom;
(d) a support mounted amidships on said hull, said boom being attached near one end to said support to be pivotally supported to swing about a vertical axis with respect to said hull;
(e) a discharge pipe extending substantially the length of said boom and supported thereby, said pipe comprising an inverted U-pipe at the end thereof adjacent said support, one leg of said U-pipe being substantially coaxial with said vertical axis and comprising a swivel joint to permit said discharge pipe to swing with said boom, the other end of said discharge pipe being higher than the portion of said discharge pipe between said other end and said U-pipe to retain material in said discharge pipe;
(f) a dredge pump in said hull connected to said swivel joint to force liquid into said discharge pipe; and
(g) a counterbalance attached to said one end of said boom to balance the weight of said boom and discharge pipe with material therein, whereby said boom and discharge pipe with material therein may be swung abeam of the dredge without causing the dredge to list.



3,352,118
FRICTIONAL DRAG REDUCER FOR IMMERSED BODIES
oseph A. Burkhardt, Houston, Tex., assignor to Esso Production Research Company
Filed Aug. 11, 1965, Ser. No. 478,965
8 Claims. (Cl. 61—46)

Keywords: Offshore platform, leg; Pile protection

uble wall sleeve or sack having perme- elastic webbing connecting the walls ach other surrounds a body immersed in r to reduce frictional drag of such body it is subjected to wave and/or current es by streamlining the outer contour reof. A constant volume fluid is con- ed between the two walls. Under the lon of drag forces, the outer wall deforms contracts toward the leading edge of the and elongates from the trailing edge reof.



(123)

3,352,119
BALLISTIC JACKET-PILE CONNECTION
William F. Manning, Springdale, Conn., assignor to Mobil Oil Corporation, a corporation of New York
Filed Sept. 23, 1965, Ser. No. 489,527
1 Claim. (Cl. 61—46)

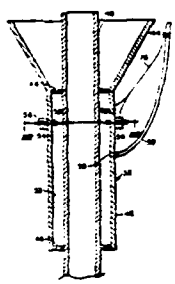
Keywords: Grouting; Pile, structure connection; Seabed foundation

A method for rigidly connecting a pair of telescoped elongated members, one of said members secured to a body beneath the surface of the sea including the following steps:

(a) insert the inner member into the outer member beneath said surface of the sea;

(b) detonate an explosive material to drive a spike through said outer and inner members to fix said inner member relative to said outer member; and

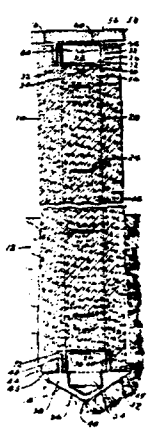
(c) inject a settable cementitious fluid material into an annular space between said inner and outer members until said space is filled whereby the connection allows the cementitious material to form a good bond between said inner and outer members as it sets.



3,352,120
REINFORCED CONCRETE PILE
Harold H. Pelzer, Long Island City, N.Y., assignor to Grace L. Pelzer, Long Island City, N.Y.
Filed Sept. 15, 1965, Ser. No. 487,403
6 Claims. (Cl. 61—56)

Keywords: Pile, concrete; Pile-driving shoe; Pile section connection

A reinforcing concrete pile with an H-beam in the center thereof projecting slightly above the concrete body to receive the driving impacts of a flanged driving hammer head, and with a boot or shoe on the lower end of the concrete body for reinforcing the lower end of the pile and concentrating the soil at and adjacent thereto.

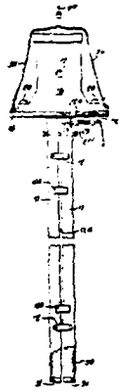


(24

3,352,160
CORING APPARATUS
Wadsworth W. Mount, Mountain Ave., Warren Township, Somerset County, N.J. 07060
Filed July 21, 1965, Ser. No. 473,657
3 Claims. (Cl. 73—425.2)

Keywords: Sampler, seabed-driven core

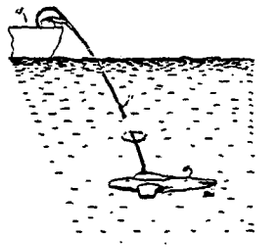
A device for obtaining a core sample from a loose formation such as sand on a beach or under water, comprising a plurality of elongated angular members positioned to form an elongated core receptacle between them, a plurality of links each pivotally mounted at each end on an adjacent member to hold the members in spaced-apart relation in one position, in which the receptacle is driven into the sand, and moving the members toward one another when the members are longitudinally moved with respect to one another to close the receptacle.



3,352,274
HIGH SPEED FAIRED TOWING CABLE
Dale E. Calkins, San Diego, Calif., assignor to the United States of America as represented by the Secretary of the Navy
Filed Mar. 3, 1966, Ser. No. 533,380
6 Claims. (Cl. 114—235)

Keywords: Towing cable

A low drag underwater towing cable having a high stability at high towing speeds. The cable comprises an elongated hydrofoil-shaped structure having leading edge and trailing edge portions. The leading and trailing portions are slidably engaged with each other along a plane located forward of the hydrodynamic center of the hydrofoil shape. The leading portion is the load bearing member. Because of the sliding connection tensional loads are confined to areas forward of the hydrodynamic center, a desirable stability criteria.

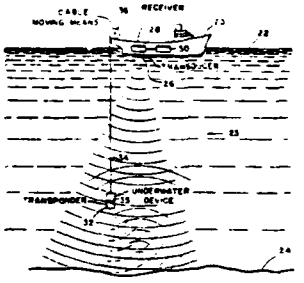


(125)

3,353,149
ACOUSTIC RANGING SYSTEM
David H. Frantz, Jr., West Tisbury, and David D. Ketchum, Falmouth, Mass., assignors to Ocean Research Equipment, Inc., Falmouth, Mass., a corporation of Massachusetts
Filed Mar. 30, 1966, Ser. No. 538,623
6 Claims. (Cl. 340—3)

Keywords: Sonar, depth sounder; Towed body depth control

An acoustic ranging system in which an acoustic generator and receiver are mounted on shipboard and an acoustic transponder is suspended from a cable below the ship, the transponder generating an acoustic signal responsively to acoustic signals received from the generator. The receiver then receives sound signals directly from the transponder and the bottom echoes of the sound generated both by the transponder and the generator, thereby allowing the distances between the ship, transponder and bottom to be determined readily.

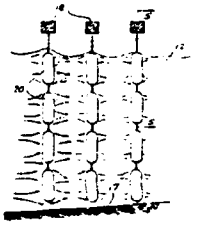


NOVEMBER 21, 1967

3,353,361
BREAKWATER
Louis E. Lloyd, 1519 26th Ave., Bradenton, Fla. 33510
Filed July 26, 1966, Ser. No. 567,872
8 Claims. (Cl. 61—3)

Keywords: Breakwater, concrete; Low-cost shore protection; Tires

1. A breakwater comprising a plurality of upstanding supports resting on the bed of a body of water and projecting above the surface of the water, rigid horizontal support means secured on the top ends of said upstanding supports, spaced depending flexible members secured to said horizontal support means, and a series of sequentially depending weighted non-buoyant toroidal breakwater elements secured by the uppermost element thereof to each flexible member and with the lowermost element closely adjacent the bed of the body of water in free immersed suspension, each element of each of the series being disposed with the axis of its central opening extending horizontally and having an overall size and opening of the order of those of an automobile tire, said elements intermediate the uppermost and lowermost elements of each series being flexibly interconnected to the adjacent ones of the elements vertically above and below, said toroidal elements being suspended so that they have a substantial degree of ability to turn freely, and the series of sequential toroidal elements being in side-by-side relationship along the horizontal support means to define a wave-retarding curtain.

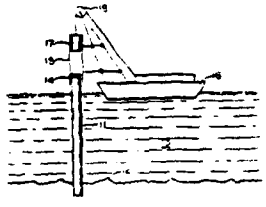


12

3,353,362
PILE DRIVING
Arthur Lubinski, Tulsa, Okla., assignor to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware
Filed Oct. 24, 1965, Ser. No. 504,609
4 Claims. (Cl. 61—53.5)

Keywords: Pile driver, impact

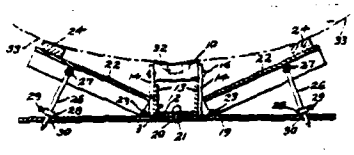
Ordinary pile driving using periodic impact of a hammer on the pile involves considerable rebound, and traveling waves moving up and down the pile, all resulting in the hammer imparting less than peak energy to the pile. In this invention the hammer is modified until its characteristic mechanical impedance essentially matches that of the pile. The velocity of hammer impact is chosen to be at least approximately twice the minimal striking velocity at which any penetration can occur. Under these circumstances, essentially the maximum energy transfer occurs from hammer to pile resulting in minimization of the losses inherent in prior systems.



3,353,363
PORTABLE BOAT RAMP
Jerry W. Edson, 1508 S. Seneca, Wichita, Kans. 67213
Filed May 17, 1966, Ser. No. 550,841
7 Claims. (Cl. 61—67)

Keywords: Small-craft launcher

1. A portable boat ramp comprising an elongated rigid keel rest having a transversely disposed keel engaging roller adjacent one end thereof, a rigid stabilizer bar having an intermediate portion disposed beneath and supporting a part of the keel rest, said stabilizer bar being spaced from said end of the keel rest and disposed crosswise thereof, elongated rigid bolsters disposed on the stabilizer bar at opposite sides of the keel rest and longitudinally of said bar, means swingably connecting inner ends of the bolsters to said bar for vertical swinging movement, and brace means adjustably connecting the bolsters to the bar for supporting the bolsters at different angles above the bar ends, said bolsters being adapted to engage the sides of a boat hull to cooperate with said keel engaging roller for supporting a boat on the ramp.



(127)

3,353,612

METHOD AND APPARATUS FOR EXPLORATION OF THE WATER BOTTOM REGIONS

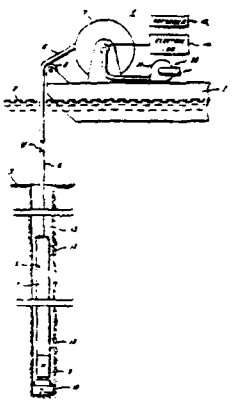
Clyde E. Bannister, 2727 Carolina Way, Houston, Tex. 77005

Filed June 1, 1964, Ser. No. 371,279
37 Claims. (Cl. 175—6)

1. Apparatus for sub-surface exploration, comprising oscillating rotary drilling means including an inertia barrel, an oscillating motor supported at the end of a weight carrying suspension means to produce stable movement of said drilling means into the formation, and means for surveying a sub-surface characteristic of a formation as said drilling means bores into said formation.

14. Apparatus for sub-surface exploration, comprising a rotary, oscillating drill, means for energizing said drill to bore into a formation, means mounted on said drill to remove a sample from the borehole wall of the formation being drilled, said sampling means comprising a core barrel having a bit for cutting into the formation and arranged to remove a substantially vertical core, said core barrel being rotatably driven to remove the core as said drill bores into the formation.

Keywords: Instrument, seabed in situ; Sampler, power supply; Sampler, seabed-drilled core; Seabed property measurement



3,353,623

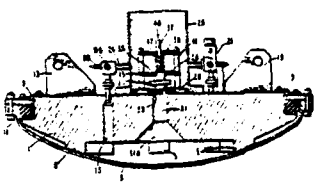
SEISMIC PULSE GENERATOR USING COMBUSTIBLE GAS

Tobias Flatow and Frank L. Chalmers, Houston, Tex., assignors to Esso Production Research Company, a corporation of Delaware

Filed Feb. 10, 1966, Ser. No. 526,535
4 Claims. (Cl. 181—.5)

Gas exploder seismic source uses dished earth coupling member connected to heavy upper reaction member by toroidal resilient sealing member. Exhaust port in reaction member controlled by valve piston having a spherical seating portion that is normally urged against a valve seat in the port.

Keywords: Seismic explosive acoustic transmitter



(128)

3,354,653

METHOD FOR APPLYING BITUMINIZED MINERAL AGGREGATE TO AN UNDERWATER SURFACE

Hermanus Meijer, Heemstede, and Jacobus E. Mebius, The Hague, Netherlands, assignors to Shell Oil Company, New York, N.Y., a corporation of Delaware

No Drawing. Filed Sept. 4, 1964, Ser. No. 394,601
Claims priority, application Netherlands, Sept. 9, 1963, 297,636
6 Claims. (Cl. 61—1)

Keywords: Asphalt; Seabed material placement; Seabed scour protection

1. In a process for applying bituminized mineral aggregate to reduce erosion of underwater surfaces by dumping a mass of warmed bitumenized mineral aggregate into the water and allowing it to sink through the water onto the surface to be protected, the improvement comprising (1) admixing with the bitumenized mineral aggregate, prior to dumping, a minor amount of water sufficient to completely fill the pores of said aggregate, the temperature of the water-containing mixture being between the softening point of the bitumen in the bituminized mineral aggregate and about 100° C., and (2) dumping the water-containing mixture while it is maintained within the aforesaid temperature limits.

No Figure

3,354,659

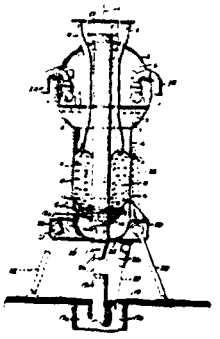
DEEP-SUBMERGENCE FOUNDATION VEHICLE

Guenther Wolfgang Lehmann, New London, Conn. (140 W. Kalmia St., San Diego, Calif. 92101)

Filed Sept. 27, 1965, Ser. No. 490,427
9 Claims. (Cl. 61—69)

Keywords: Concrete form; Grouting; Offshore construction; Seabed foundation; Seabed material placement

1. A deep-submergence foundation vehicle comprising separately and in combination, a vertical center tube, a spherical pressure vessel, a pressure-equalized cylinder below and attached to said spherical pressure vessel, a concrete stowage space at the lower portion of said pressure-equalized cylinder, said concrete stowage space being an annular space between the vertical center tube and the pressure-equalized cylinder, at least one concrete filling tube from atop the spherical pressure vessel to the head of the concrete stowage space, a first conical extension at the lower end of the concrete stowage space, a second conical extension below and in continuation of said first conical extension, said second conical extension having a sleeve around the vertical center tube, said sleeve having discharge openings, corresponding openings in the vertical center tube, a gear for rotating said second conical extension and sleeve for rotating said discharge openings in the sleeve and in the vertical center tube in juxtaposition, free excess to outside for concrete in the concrete space through said discharge openings in juxtaposition, propulsion means at the spherical pressure vessel, ballast tanks at the lower portion of the vehicle, said ballast tanks having draining holes at the bottom, means for ballasting and draining said ballast tanks, a box-ring at the lower end of the pressure-equalized cylinder, said box-ring carrying television cameras and stilts, an access hatch atop the spherical pressure vessel.



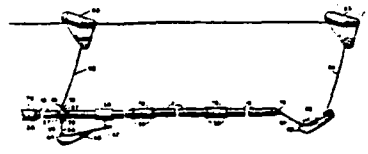
129

3,354,984
DEPTH CONTROLLED MARINE SEISMIC DETECTION CABLE

George M. Pavey, Jr., Dallas, Tex., assignor to Whitehall Electronics Corporation, Richardson, Tex.
Filed Aug. 19, 1965, Ser. No. 480,868
9 Claims. (Cl. 181—.5)

An elastic oil filled dead section streamer having a plurality of elastic longitudinally extensible plastic strain cables therein and connected at intervals between adjacent sections of a submerged seismic detection streamer containing means for transmitting seismic signals electrically to receiving apparatus on the towing vessel. Each dead section is provided with a float and depressor assembly respectively connected thereto for maintaining the streamer at a constant depth of submersion throughout the length thereof while being towed at a relatively high speed by the vessel. The dead section streams also attenuate vibrations from the float and depressor assemblies sufficiently to prevent impairment of the characteristics of seismic signals detected by the detection streamer.

Keywords: Seismic streamer cable; Towed body depth control



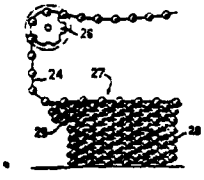
DECEMBER 5, 1967

3,355,894
STRUCTURE FOR USE IN RIVER AND SEA

Henri Charles Vidal, 17 Rue Armengaud, Saint-Cloud, France
Filed Mar. 23, 1964, Ser. No. 354,038
Claims priority, application France, Mar. 27, 1963, 929,422
5 Claims. (Cl. 61—4)

5. A structure, such as a tower, in particular for use in river and sea, said structure comprising at least one unit consisting of a plurality of rigid blocks constituting heads on a flexible tie which is thin relative to the blocks, said blocks being rigidly secured to said tie and spaced apart from each other and defining recesses opening upwardly and downwardly between successive blocks, said unit having a plurality of portions respectively disposed one above the other in a plurality of superimposed adjoining layers, some of said portions respectively extending spirally in every other of said layers and others of said portions extending radially back and forth relative to the centre of said structure in layers interposed between and adjoining said every other layers, said blocks of each of said portions of the layers intermediate the uppermost and lowermost layers extend-into said recesses of the adjoining portions of the adjacent layer above and below said respective intermediate layer portion, whereby said structure has sufficient stability to retain its shape.

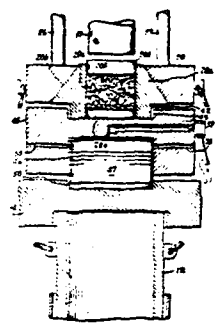
Keywords: Breakwater, rubble; Concrete armor unit; Offshore construction; Offshore platform, fixed



3,356,164
PILE DRIVING MECHANISMS
Wadsworth W. Mount, Warren Township, Somerset County, N.J. (Mountain Ave., Plainfield, N.J. 07060)
Filed June 7, 1965, Ser. No. 462,027
12 Claims. (Cl. 173—102)

Keywords: Pile driver, impact

A pile driving mechanism incorporating a lifting assembly between the base of a heavy hammer and the helmet mounted on the top of a core or pile to be driven. The lifting assembly includes a cylinder member and a piston sliding in the cylinder member. The top of the cylinder member bears against a cushion block which is struck by the ram point of the heavy hammer. A bottom surface of the cylinder contacts the top of the piston or the helmet directly, when the cylinder and piston are in closed position. A lower surface of the piston bears against the helmet. A chamber within the cylinder member exposed to a top surface of the piston contains a fluid which is applied under pressure to force the piston downwardly and the cylinder member upwardly, thereby raising the cylinder member and the entire structure thereabove, which includes the heavy hammer mechanism. The fluid pressure is dissipated to permit the cylinder member and structure to fall, thereby imparting a heavy blow to the helmet by virtue of the falling weight of the hammer assembly. Alternatively, a lifting mechanism of the type just described may be positioned in the bottom of a core that drives a pile shell and in which the cylinder member is positioned inside and is attached to the bottom of the core. Fluid pressure within the chamber raises the entire core and all that weight above the core to drop the core and such weight to drive the pile downwardly.



DECEMBER 12, 1967

3,357,192
BREAKWATERS
George Hibarger, Mead, Okla. 73449
Filed July 18, 1966, Ser. No. 565,903
13 Claims. (Cl. 61—5)

Keywords: Breakwater, floating; Low-cost shore protection; Tires

1. A floating breakwater including: a main body comprising a plurality of longitudinal parallel rows of annular members, said annular members having central apertures whose central horizontal axes extend perpendicularly relative to said rows, said annular members being adapted to float partly submerged in vertical positions, and an elongate flexible member interwoven through the annular members of each pair of adjacent rows holding the annular members of adjacent rows in longitudinally overlapped relation, overlapped portions of annular members of each row closing at least partially the central apertures of the annular members of an adjacent row.

(131)

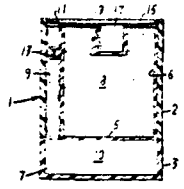
3,358,600
SELF-DESTROYING EXPLOSIVE CARTRIDGE FOR UNDERWATER SEISMIC EXPLORATION

George L. Griffith, Coopersburg, and William L. K. Schwoyer and Stephen L. Mayer, Allentown, Pa., assignors to Trojan Powder Company, Allentown, Pa., a corporation of New York

Filed Jan. 13, 1966, Ser. No. 520,330
14 Claims. (Cl. 102—24)

Keywords: Seismic explosive acoustic transmitter

An explosive cartridge is provided comprising an explosive charge, and means to expose and dissipate the explosive charge in water, the cartridge containing a water-expandible material which liberates a gas upon contact with water or which will expand in volume upon being contacted by water, such as polyvinyl alcohol, and so rupture the container in water.



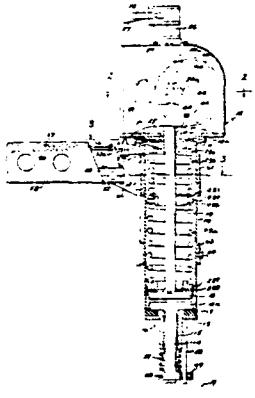
3,358,778
SPRING DRIVEN POWER HAMMER

Ray Ferwerda, 1050 NW. 163rd Drive, North Miami, Fla. 33161

Filed Aug. 19, 1965, Ser. No. 480,990
3 Claims. (Cl. 173—119)

Keywords: Pile driver, impact

A very heavy duty hammer suitable for pile driving and pavement breaking includes an elongated cylindrical housing carrying a working tool at the lower end thereof which tool has a shaft extending into the lower end of the housing and terminating inside of the housing with a blow receiving and transmitting anvil extension, together with a hammer reciprocatably mounted in the housing toward and away from the anvil extension to deliver repeated blows thereagainst. The hammer has an elongated axial extension which projects out of the upper end of the housing and is there provided with power means for repeatedly retracting the hammer away from the anvil and then suddenly releasing it. A two-part helical spring surrounds the hammer extension and is disposed between the hammer and the upper end of the housing so that the spring means is compressed when the power means lifts the hammer, after which the spring means causes the hammer to deliver a very powerful blow against the anvil when released by the power means. The novel feature of this invention is that the spring means includes at least two separate helical springs in end to end relationship differing from each other in frequency of vibration sufficiently so that they exert a mutual dampening effect upon spring release thus preventing destruction of the hammer and its driving spring.

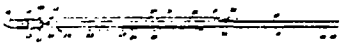


(13

3,359,536
CONTROL OF MARINE SEISMIC SYSTEMS
Herbert D. Coburn, Jr., Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware
Filed Dec. 12, 1963, Ser. No. 330,115
9 Claims. (Cl. 340—7)

Keywords: Seismic streamer cable; Seismic survey method; Towing cable

9. In a seismic exploration system, the combination which comprises:
(a) a marine vessel,
(b) a seismic detector streamer,
(c) winch means including a towing cable connected to the forward end of said streamer and a conductor cable connected to said vessel laterally of said winch means and to the rear of said streamer with a loop of length to accommodate movement of said streamer relative to said vessel under control of said winch means, and
(d) anchor means at the end of said streamer opposite said vessel responsive to towing forces on said streamer to produce drag forces which inversely vary in magnitude with respect to the magnitude of said towing forces to cause said loop to vary in length.

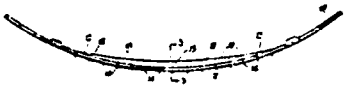


DECEMBER 26, 1967

3,359,740
DOCK FENDER SYSTEMS
Graham Hugh Cochrane, London, England, assignor to Taylor Woodrow International Limited, London, England, a British company
Filed Feb. 21, 1966, Ser. No. 529,077
Claims priority, application Great Britain, Feb. 26, 1965, 8,519/65
10 Claims. (Cl. 61—46)

Keywords: Collision protection; Offshore structure fender; Pier fender

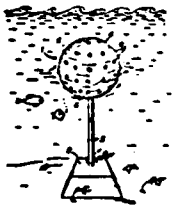
A dock fender system comprises a row of piles embedded in the water bed at spaced points. Transverse beam means interconnect the upper parts of the piles and are stressed by force acting forwardly toward that face of the construction against which berthing impact may occur. Means, which may be end piles or separate abutments at the opposite ends of the beam means, react against the stressing force. The stressing force may be applied by tensioned wires or the like, or may be caused by a method of construction in which the beam means, before assembly, has a line of longitudinal extent out of conformation with the layout line of the piles.



3,359,794
OMNI-DIRECTIONAL CURRENT METER
Edgar N. Rosenberg, 6814 Mission Gorge Road, San Diego Calif. 92120
Filed Feb. 4, 1965, Ser. No. 430,504
4 Claims. (Cl. 73—189)

Keywords: Current measurement

A spherical current meter for determining direction and speed of a fluid, the meter having closely and equidistantly spaced thermistor means carried on its surface and recorder means providing continuous information as to the temperature of each of the thermistor means. Fluid flowing past the spherical meter produces increasing temperature readings as the flow follows its arcuate curvature from an initial impact point. Consequently, by employing a computer or similar means, flow direction as well as flow speed can be ascertained.



133

3,359,801

BATHYTHERMOGRAPH SYSTEM

Robert A. Rasmussen, San Diego, Calif., assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed Sept. 15, 1964, Ser. No. 396,785
1 Claim. (Cl. 73—344)

A bathythermograph system including a radio-telemetering buoy for telemetering depth and temperature indications of a body of water and a receiving and recording network for receiving and recording said indications comprising:

said radio telemetering buoy including:

a container;

temperature sensing circuit means, located within said container and including circuit line means payable therefrom downwardly into the water, for producing a voltage which is a function of the water temperature;

means within said container coupled to said temperature sensing circuit means for receiving said voltage and producing a signal frequency variation which is proportional to the voltage;

means within said container for transmitting said frequency;

means within said container actuated by the circuit line means as it is paid out for interrupting the transmission of said frequency at constant interval lengths of the circuit line as it is paid out, whereby the transmission includes water temperature and depth indications; and

the receiving and recording network including:

means for receiving the interrupted signal transmitted by the radio telemetering buoy;

means coupled to the receiving means for converting the receiving means signal frequency output between the interruptions to a square wave frequency;

means coupled to the square wave converter for detecting the envelope of the square waves between the interruptions:

Keywords: Bathythermograph; Buoy, Instrumented; Instrument deployment

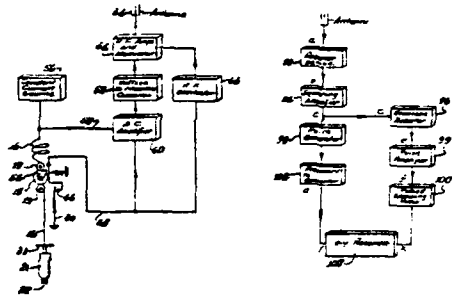
means coupled to the envelope detector for producing a pulse at the leading edge of each envelope;

a stepping motor coupeld to the pulse producing means and having an output shaft which is step rotated by each pulse received by the motor;

an X–Y recorder connected to the motor shaft so that the X-axis of the recorder is progressively increased by each step rotation of the motor shaft;

means coupled to the square wave converter for converting the square wave outputs between the interruptions to DC pulses which have amplitudes corresponding to the square wave frequencies; and

said X–Y recorder being coupled to the DC converter so that the Y-axis of the recorder is driven according to the magnitude of the DC pulses.



3,360,070

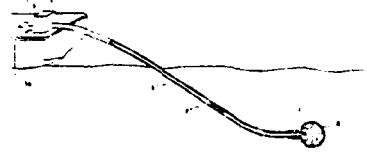
APPARATUS FOR FIRING EXPLOSIVE CHARGES UNDER WATER

Jacques Cholet, Rueil Malmaison, and Jean-Pierre Fail, Paris, France, assignors to Institut Francais du Petrole des Carburants et Lubrifiants, Rueil Malmaison, France

Filed Dec. 14, 1965, Ser. No. 513,690
Claims priority, application France, Dec. 18, 1964, 999,199
18 Claims. (Cl. 181—0.5)

The invention comprises an apparatus for firing explosive charges in a water body by the use of a surface installation, tube means having an inner wall of electrically insulating material and having one end immersed in the water body while the other end is connected to the surface installation, explosive cartridges of electrically insulating material adapted to be conveyed from the surface installation through the tube means to a final position at the immersed end of said tube means, and electrically operated means on the surface installation for detonating each cartridge after it has reached said final position.

Keywords: Seismic explosive acoustic transmitter



2. 1968
3,362,170 to 3,419,796

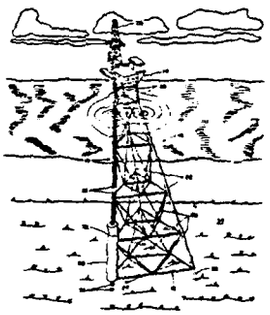
Note: Classification cross-references were not printed in patents issued before December 10, 1968.

JANUARY 9, 1968

3,362,170
TRIANGULAR BASED OFFSHORE PLATFORM
William F. Manning, Springdale, Conn., assignor to Mobil Oil Corporation, a corporation of New York
Filed June 17, 1965, Ser. No. 464,632
9 Claims. (Cl. 61—46.5)

This specification discloses a triangular drilling and/or production templet, and methods for installing the templet for drilling a subaqueous well and for completing, from a surface structure, an already drilled well terminating in an underwater stubbed-off conductor pipe. The templet has a vertical leg and a pair of fixedly angled legs forming a triangular base at the marine bottom, and converging upwardly. A buoyancy tank is fixed on the vertical leg near the marine bottom. An above-surface deck is mounted on the upper end of the templet. The templet legs are anchored against axial tension and compression forces by piles extending therethrough into the formations underlying the marine bottom. One or more wells are drilled and/or completed through the vertical leg which may be a single caisson or two or more rigidly connected parallel caissons.

Keywords: Offshore caisson; Offshore construction; Offshore platform, fixed

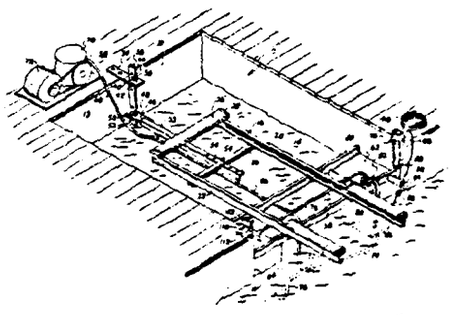


3,362,172
INDIVIDUAL DRY DOCK FOR BOATS
Henry A. Rutter, Rte. 1, Eucha, Okla. 74342
Filed Mar. 1, 1965, Ser. No. 435,816
10 Claims. (Cl. 61—65)

An individual dry dock particularly for relatively small water craft wherein a movable frame is pivotally and vertically reciprocally mounted in a boat well filled with water. In a lowered position of the frame the boat may be floated thereon and pontoons are provided for the frame which may be filled with air in order to elevate the frame and boat to a position out of the water. Conversely, air may be withdrawn from the pontoon for lowering the frame and boat into the water.

Keywords: Small-craft service structure

See: Re. 27,090

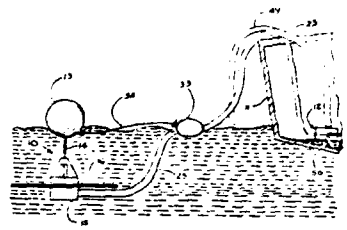


(135)

3,362,336
WAVE MOTION OPERATED DEVICE
Robert S. Kafka, 9 East Wind Lane,
Maitland, Fla. 32751
Filed Oct. 23, 1965, Ser. No. 503,487
7 Claims. (Cl. 103—44)

Keywords: Power, wave; Pump

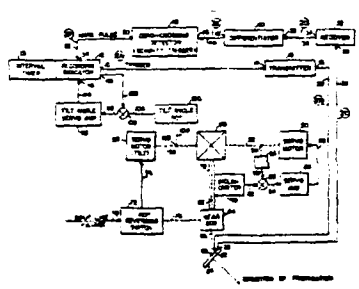
This invention relates to a two component device for utilizing wave motion to achieve a pumping action, being adapted to pump out the bilge of a boat or the like, and consisting of a float unit and a pump unit. The float unit is freely floating and equipped at a submerged location with a substantially horizontally disposed member of considerable area, such that the float unit is substantially less affected by wave action than is a float, movably attached to the upper portion of such device. Motion of the float with respect to the rest of the float unit brings about motion of a diaphragm disposed as part of a suitable pumping chamber in the float unit. A hose or other conduit attaches this pumping chamber of the float unit to the pump unit, and at latter location actuates a diaphragm pump that is responsible for removing water from the bilge of the boat and dumping it overboard. Another embodiment of my invention utilizes no diaphragm, but rather involves the use of an electric power generating arrangement in which wave motion causes the generation of current which can be rectified, and thereafter used for recharging batteries.



3,363,225
RANGING APPARATUS
William E. Currie and Paul M. Mettert, Seattle, Wash., assignors to Honeywell Inc., a corporation of Delaware
Filed Dec. 29, 1964, Ser. No. 421,911
2 Claims. (Cl. 340—3)

Keywords: Sonar, depth sounder; Sonar, side looking

1. Sonar profiling apparatus comprising, in combination: a transmitter having output means across which is developed a series of periodic pulses of electrical energy; transducer means connected to said transmitter output means, electrically driven by said transmitter, developing acoustic energy corresponding to said electric energy, directing a relatively narrow beam of acoustic energy toward the bed of a body of water, receiving acoustic energy reflected from the bed, and converting the received acoustic energy to a corresponding electric energy signal; actuating means connected to mechanically drive said transducer in a predetermined plane; a receiver having a signal input means connected to be energized by the reflected signal developed by said transducer and having a signal output means across which a pulse signal corresponding to the acoustic energy reflected from said bed is developed; a differentiator having a signal input means and output means, the input means connected to the receiver output means, said differentiator developing a signal at its output means representing the slope of the input signal, said slope changing polarity when a signal peak is traversed; a level detector having a signal input means connected to the differentiator output means, and an output means across which there is developed an output signal pulse of constant amplitude only as long as the input signal to the detector is less than a predetermined level; and, a recorder having a signal input means connected to be energized by the output means of said detector, said recorder synchronized with said transmitter and said transducer means and providing a linear time scale that is marked whenever said detector provides a signal to the recorder input means.



3,363,226

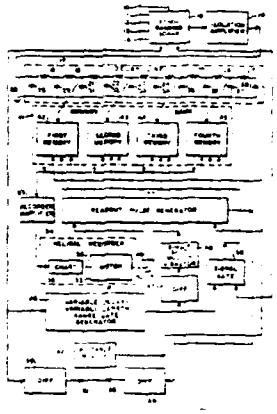
DATA PROCESSING SYSTEM

Francis J. Murphree, Sunnyside, Fla., assignor to the United States of America as represented by the Secretary of the Navy

Filed Oct. 12, 1965, Ser. No. 495,362
12 Claims. (Cl. 340—3)

A rapid-in-slow-out data processing system, which facilitates the permanent mapping of a sea floor, having a sonar with a delay line and memories for storing timely delayed output signals from said delay line and sonar. A recorder permanently records said timely delayed stored signals in response to a predetermined program and a given keying pulse.

Keywords: Sonar, depth sounder



JANUARY 16, 1968

3,363,596

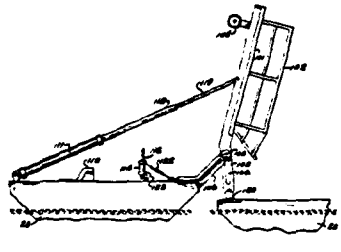
DUMP MEANS FOR MACHINE FOR HARVESTING UNDERWATER PLANT LIFE AND WEEDS

Mathias E. Grinwald, Hartland, Wis., assignor, by direct and mesne assignments, to Aquatic Controls Corporation, Hartland, Wis., a corporation of Wisconsin

Original application June 1, 1961, Ser. No. 114,105. Divided and this application Aug. 24, 1966, Ser. No. 581,670
3 Claims. (Cl. 114—32)

A dump means for a machine for harvesting underwater plant life and weeds is carried by a hull propelled by side paddle wheels. The forward end of the hull is provided with a driven cutter and a sloping pair of gathering conveyor screens revolving toward each other to feed weeds onto a longitudinal conveyor. From the longitudinal conveyor, the weeds move into a compactor consisting of a pair of angularly related conveyor bands one carrying the weeds and one above the weeds to compress them and drive off the water content. After moving through the compactor the weeds are carried to a hydraulically operated dump platform operated on a lost motion pivot and cam roller arrangement so that the platform is first lifted and moved rearwardly and is then pivoted to dump the weeds from the platform.

Keywords: Water plant removal

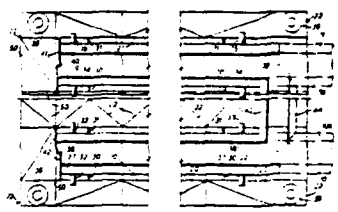


(137)

3,363,873
SHUTTERING MEANS AND APPARATUS FOR THE CASTING OF UNDERWATER STRUCTURES
Alan Barber and William Anthony Barber, both of Highfield Farm, Higher Road, Halewood, Lancashire, England
Filed June 1, 1965, Ser. No. 460,298
Claims priority, application Great Britain, June 2, 1965, 22,701/65
6 Claims. (Cl. 249—1)

The present apparatus is for use in the casting of underwater or partially submerged structures and for this purpose employs two buoyancy chambers arranged in spaced apart position, a superstructure connecting and supported by said buoyancy chambers which superstructure has downwardly extending sub-frames, carrier frames linked to opposed inner sides of said sub-frames. Main shuttering elements are mounted on said carrier frames and means are provided for advancing and retracting said carrier frames to move said shuttering into and out of operative position and there is also means for admitting and exhausting water to and from said buoyancy chambers.

Keywords: Concrete form; Offshore construction; Seabed material placement

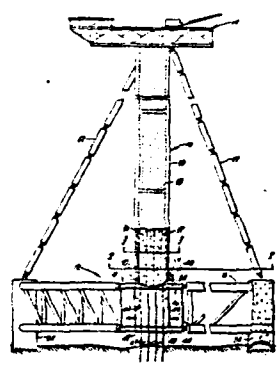


JANUARY 23, 1968

3,364,684
DEEP WATER OFFSHORE DRILLING PLATFORM
William A. Sandberg, 325 S. Orange Grove Blvd., Pasadena, Calif. 91105
Filed Oct. 1, 1965, Ser. No. 492,154
2 Claims. (Cl. 61—46)

There is shown an offshore drilling platform in which a vertical caisson or column is supported on the ocean floor and held vertically against lateral forces by a trigod base having a plurality of radial arms extending from a cylindrical hub. The outer ends of the arms are supported on the ocean floor and are attached by tension members to the upper end of the column. The top of the cylindrical hub engages the bottom of the caisson so that the caisson resists any tilting action of the base due to lateral forces on the caisson.

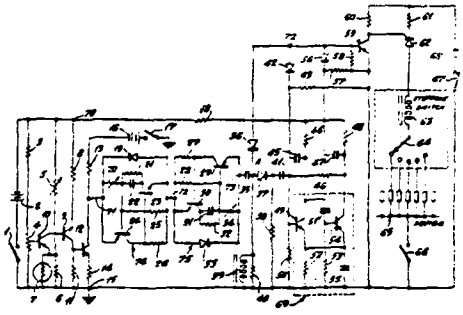
Keywords: Offshore caisson; Offshore platform, fixed; Seabed foundation



3,364,744
EXPENDABLE BATHYTHERMOGRAPH
Eugene A. McMahon, Fort Lauderdale, Fla., assignor to Halliburton Company, Duncan, Okla., a corporation of Delaware
Filed Apr. 13, 1965, Ser. No. 447,772
7 Claims. (Cl. 73—343)

A bathythermograph having a thermistor temperature sensor to control the voltage level applied to a threshold and storage device including a capacitor initially charged to a reference level. Upon a predetermined change of the voltage level, the capacitor is charged to the new level and a pulse with a polarity dependent upon the direction of such change is produced. Electrical circuitry is provided to energize sonic signal means either once or twice in rapid succession depending upon the polarity of the pulses.

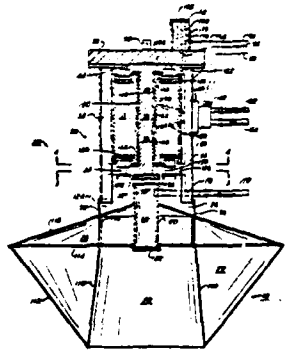
Keywords: Bathythermograph



3,365,019
SEISMIC VIBRATOR FOR MARSHLAND AND SUBMARINE USE
Marvin G. Bays, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla., a corporation of Delaware
Filed July 23, 1965, Ser. No. 474,311
11 Claims. (Cl. 181—.5)

A vibrator for marshland use having a cup-shaped earth coupling member oriented for contacting the earth at its open end and having a reaction mass member mounted to said coupling member. Suction means is provided for coupling the vibrator to the earth and pressure means for releasing the coupling member.

Keywords: Seismic vibratory acoustic transmitter



(139)

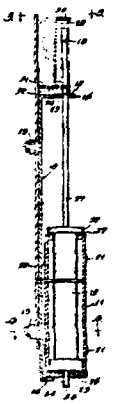
3,365,953
BIOLOGICAL SAMPLER

Harvey S. Gold, Park Forest, and Charles J. Calo, Chicago, Ill., assignors to Velsicol Chemical Corporation, Chicago, Ill., a corporation of Illinois

Filed Nov. 15, 1965, Ser. No. 507,814
2 Claims. (Cl. 73—425.6)

Keywords: Sampler, biota; Sampler, water

1. An aquatic biological sampler device for use with a cable and a messenger, said device comprising an elongated housing, means on said housing for securing it parallel to a cable, a hollow sampling cylinder seated in said housing and disposed parallel thereto, a bottom closure for said cylinder including a conduit opening therein and of substantially smaller diameter, a piston reciprocably disposed within said cylinder including a head portion adapted to project closely adjacent said cylinder bottom and an arm portion projecting outwardly of the cylinder including a collar portion, means to limit outward movement of said piston, compression spring means carried by said arm portion normally urging said piston head away from the cylinder bottom, trigger means carried by said housing adapted to yieldably retain said piston urged inwardly against the action of said spring, and means disposed in the path of a messenger descending on said cable whereby the set trigger can be actuated and the compressed spring released to thereby induce suction within said cylinder.



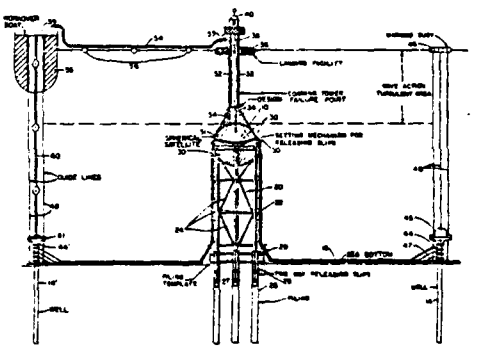
3,366,173
SUBSEA PRODUCTION SYSTEM

Donald F. J. McIntosh, Ventura County, Calif., assignor to Mobil Oil Corporation, a corporation of New York

Filed Sept. 29, 1965, Ser. No. 491,265
29 Claims. (Cl. 166—.5)

Keywords: Offshore construction; Offshore mooring structure; Offshore platform, fixed; Seabed foundation; Seabed oil, process structure

This specification discloses a subsea production system having spaced submerged wellheads, and a central submerged satellite supported by and rigidly fixed in the marine bottom. A conning tower is shown for permitting a man to reach the satellite from above the surface. The satellite contains production equipment such as group-test separator apparatus through which the fluid products from subaqueous wells flow from the submerged wellheads. The well control valves on the various submerged wellheads are controlled from the satellite in response to the flow of fluid products through the respective wellheads.



(140)

3,367,119
FLOTATION DEVICE FOR OFFSHORE PLATFORM ASSEMBLY
Chester A. Rybicki, Houston, Tex., assignor to Signal Oil and Gas Company, Los Angeles, Calif.
Filed Jan. 20, 1966, Ser. No. 528,329
7 Claims. (Cl. 61—46.5)

Keywords: Offshore platform, jack up; Offshore platform, leg

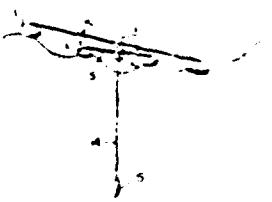
An offshore platform assembly comprises a platform and a plurality of depending legs, means connected to the platform and the legs to adjustably position the legs vertically and laterally relative to the platform, wherein each of the legs comprises a rigid frame structure having a submersible lower portion and wherein at least one of the legs includes a closed chamber disposed in the submersible portion of the frame with means for opening the chamber to allow the entry of water and an adjustable standpipe communicating with the exterior of the chamber and extending to a predetermined level within the chamber whereby the amount of air and water within the chamber may be automatically and adjustably controlled.

3,367,181
DIRECTIONAL WAVE SPECTRA MEASURING DEVICES
Cyrus Adler, 317 W. 99th St., New York, N.Y. 10025
Filed Feb. 11, 1965, Ser. No. 431,942
10 Claims. (Cl. 73—170)

Keywords: Wave measurement

A device for measuring and recording the amplitudes, shapes, wave lengths, frequencies, and directional spectra of fluid waves.

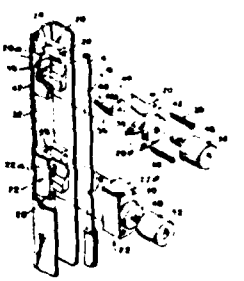
The device consists of a plumb means, at least one buoyant arm pivoted to the plumb means, an inclinometer means for measuring the roll and tilt of the arms, a device for measuring the azimuth orientation of the arms, an accelerometer for measuring the vertical motion of the waves, integrators and recorders.



3,367,190
HERMETICALLY SEALING WATER SAMPLER
Rudolf H. Bieri, Del Mar, Calif., assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Navy
Filed Dec. 30, 1965, Ser. No. 517,862
10 Claims. (Cl. 73—425.4)

Keywords: Sampler, water

The description discloses a water sampler for obtaining a hermetically sealed sample of water at a selected depth. The sampler may be supported at such depth by a cable. The sampler includes an open tube and means for pinching the ends of the tube at a selected time so that water within the tube is trapped at the selected depth. The sampler along with the tube may then be retrieved and the gaseous content within the water will be representative of the gas content at the selected depth.



(141)

3,367,191
WATER SAMPLING APPARATUS

Joseph D. Richard, 3613 Loquat Ave., Miami, Fla. 33133

Filed Oct. 22, 1965, Ser. No. 501,100
4 Claims. (Cl. 73—425.6)

Keywords: Sampler, water

1. Water sampling apparatus of the character described comprising: a cylinder; a piston within the said cylinder; a spring urging the said piston toward the first end of the said cylinder; latching means for restraining the said piston adjacent the second end of the said cylinder against the force of the said spring; a flexible plastic bag folded within the said cylinder adjacent the second end, one end of the said plastic bag comprising a semi-rigid disk-shaped lid portion which fits snugly over the second end of the said cylinder; a one-way valve passing through the aforementioned lid portion for admitting water into the said plastic bag when the said piston is retracted; means for attaching the said cylinder to an electrically conductive cable and means for electromechanically releasing the said latching means in response to an electrical signal over the aforementioned electrical cable.

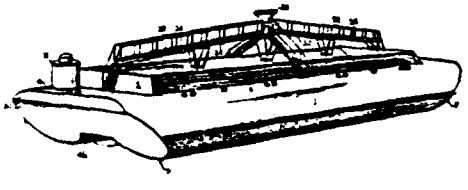
3,367,298
BOTTOM DUMP HOPPER BARGE

Raymond A. Jessup, Killara, New South Wales, Australia, assignor to Dredging Industries (Aust.) Pty. Limited, Killara, New South Wales, Australia, a company of Australia

Filed Aug. 25, 1966, Ser. No. 575,137
Claims priority, application Australia, Aug. 25, 1965, 63,217/65
7 Claims. (Cl. 114—36)

Keywords: Hopper barge

1. A bottom dump hopper barge comprising at least two tubular pontoons supported in spaced relationship to constitute the sides of the barge—by a bow structure a stern structure and at least two hollow bulkheads the bottom of the barge being formed of bottom wall plates fixed longitudinally to the pontoons and to the bow and stern structures and at least two tubular door members hinged to structural members in juxtaposition to the bottom wall plates, at least two hydraulic units mounted in the hollow bulkheads and operatively connected to the door members; a coaming structure fixed to the pontoons and to the bow and stern structures.



3,368,191

CONTINUOUS MARINE SEISMIC EXPLORATION WITH MULTIPLE SUBSURFACE COVERAGE

Frank J. McDonal, Dallas, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Filed Dec. 29, 1965, Ser. No. 517,319
1 Claim. (Cl. 340—7)

Keywords: Seismic survey method

1. The method of obtaining M-fold subsurface coverage with a continuously moving marine seismic exploration system including a repetitive seismic source and a plurality of hydrophone stations arranged in a spread, each of said hydrophone stations being connected in a separate recording channel, comprising the steps of:

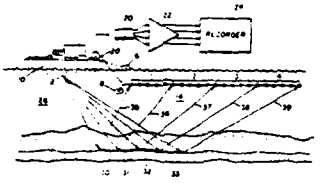
(a) firing said seismic source at repetitive time intervals T for travel of seismic energy downwardly to a plurality of subsurface reflecting elements on various subsurface horizons,

(b) detecting at N of said plurality of hydrophone stations, each being of length X, the energy reflected from said subsurface elements (where M/N is an integer),

(c) recording separately signals representative of the energy received at each of said N hydrophone stations during the time intervals between the firing of said seismic source, and

(d) moving said seismic source at a uniform velocity V such that

$$\frac{X}{2}=VT\left(\frac{M}{N}\right)$$



3,368,194

MEANS FOR GENERATING ELECTRICAL DISCHARGES UNDER WATER FOR CONTINUOUS SEISMIC SOUNDINGS

Jacques Cholet, Rueil Malmaison, Jean Claude Dubois, Royan, and Gérard Grau, Paris, France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants, Rueil-Malmaison, France

Filed Dec. 13, 1966, Ser. No. 601,372
Claims priority, application France, Dec. 18, 1965, 42,901
1 Claim. (Cl. 340—12)

Keywords: Seismic explosive acoustic transmitter

The means used comprises a cylindrical sleeve of insulating material enclosing and spaced from a central electrode connected to a source of electrical pulses of high tension. The sleeve is provided with orifices and also at the exterior thereof is provided with a plurality of peripheral electrodes connected to the other terminal of the source of electrical pulses. The discharge takes place between the central electrode and the peripheral electrodes to set up pressure waves whereby underwater prospecting may be carried out in a continuous way.

3,368,357
STRUCTURE FOR BREAKING WAVES
Masayuki Takamori, 5 281 Hiraoka-cho, Sakai-shi, Osaka-fu, Japan
Filed Nov. 3, 1965, Ser. No. 506,224
Claims priority, application Japan, Nov. 17, 1964, 39/64,684; Dec. 2, 1964, 39/68,055
4 Claims. (Cl. 61—37)

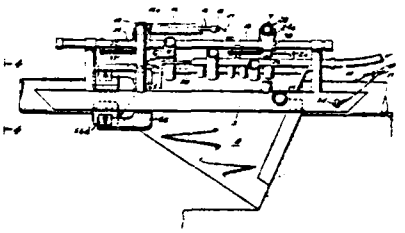
A breakwater structure in which a plurality of blocks are arranged in zig-zag form on a slope and wherein each block rests on two parallel columnar members and abuts columnar members of adjacent blocks such that third columnar members of the blocks extend above the slope in spaced parallel relation.

Keywords: Concrete armor unit; Revetment

3,368,358
TRENCHING MACHINE
Hartwell A. Elliott, Box 5512, Drew Station, Lake Charles, La. 70601
Filed July 19, 1965, Ser. No. 472,980
18 Claims. (Cl. 61—72.4)

Two spaced skids are connected to each other by rigid cross members to form a frame. Two adjustably spaced plates are pivotally suspended from the cross members and high pressure hydraulic jet nozzles are disposed adjacent each of the plates. Adjustable rollers are secured to the plates to space the plates from a pipeline passing through the space between the plates. Eductor tubes are secured to the plates with the inlet openings of the tubes inside the space between the plates and the outlet opening of the tube extending to the skids.

Keywords: Seabed trencher



3,368,514
SYMMETRICAL SELF-ALINING CABLE FAIRING
Raymond E. Kelly, Panama City, Fla., assignor to the United States of America as represented by the Secretary of the Navy
Filed Oct. 22, 1965, Ser. No. 502,734
5 Claims. (Cl. 114—235)

1. A faired cable which maintains a substantially streamlined geometrical configuration while being towed at any attitude through a fluid medium, comprising in combination:

a cable, having a substantially circular cross-section and a predetermined length, capable of being towed through said fluid medium; and

a plurality of flexible, resilient, substantially uniformly-spaced thrums effectively connected radially to the outer surface of said cable around the entire circumference thereof and along a predetermined length thereof and in such manner and with such density that an optimum streamlined disposition is acquired thereby in the slip-stream contiguous with said cable, as it is being towed at any attitude through said fluid medium.

Keywords: Towing cable

3,368,632

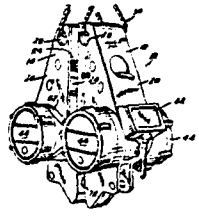
PILE DRIVER AND EXTRACTOR

Jean L. Lebelle, 35 Rue Gounod, Saint-Cloud, Seine-et-Oise, France

Filed Mar. 18, 1966, Ser. No. 535,479
Claims priority, application France, June 4, 1965, 19,671, Patent 1,445,736
14 Claims. (Cl. 173—49)

1. An apparatus for materially reducing the effort required to drive and extract elongated piling into and from soil, said apparatus comprising a pair of supports, a pair of shafts each mounted on a different support for rotation about spaced parallel axes, a pair of eccentric weights each fixed to a different shaft for rotation therewith, said weights being synchronized and phased to exert uniaxial vibratory force on the piling in a direction parallel to the longitudinal axis of the piling, the axes of rotation of the shafts lying in a plane perpendicular to said longitudinal axis, motor means driving the shafts in opposed directions at the same angular velocity, means pivotally interconnecting the supports for limited relative rocking movement about an axis parallel to the axes of the shafts, a pair of jaws located on the apparatus distantly from the pivotal axis of the supports and for rigidly gripping therebetween an upper portion of the piling, each jaw being attached to a different support, and means for selectively rocking the supports about their pivotal axis under power to move the jaws toward one another.

Keywords: Pile driver, vibratory; Pile extractor.



3,368,641

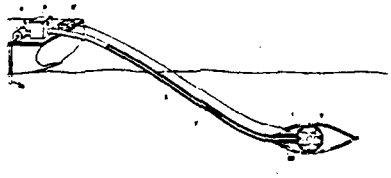
SOUND WAVE TRANSMITTING DEVICE

Jacques Cholet, Rueil-Malmaison, and Jean-Pierre Fail, Paris, France, assignors to Institut Francais du Petrole des Carburants et Lubrifiants, Rueil-Malmaison, Seine-et-Oise, France

Filed Jan. 21, 1965, Ser. No. 426,834
Claims priority, application France, Jan. 24, 1964, 961,562; July 8, 1964, 981,168; Oct. 10, 1964, 991,468
19 Claims. (Cl. 181—.5)

A device for effecting series of underwater explosions at a high rate of succession, adapted for marine seismic prospecting from a mobile installation by the use of explosive elements, each explosion being at a location substantially remote from said installation and at a predetermined depth, said installation comprising tube means and means for sequentially conveying said explosive elements through said tube means from said installation to said location, said tube means having a first end on said installation and a second end permanently immersed at said location during the firing of said explosions, means on said installation for feeding explosive elements at a high rate into said first end, means for firing said explosive elements at said second end, and switching means for controlling, by the closure of an electrical circuit, said firing means at the times selected for the explosions.

Keywords: Seismic explosive acoustic transmitter



145

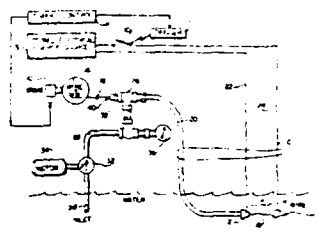
3,368,643
ELECTRIC ARC SEISMIC SOURCE

Carl O. Berglund, Dallas, and A. C. Hill, Richardson, Tex., assignors to Teledyne Industries, Inc., Geotech Division, a corporation of California

Filed Oct. 19, 1966, Ser. No. 587,741
6 Claims. (Cl. 181—.5)

An underwater acoustical source for efficiently converting electrical energy discharged between spaced immersed electrodes from a storage device into an intense plasma discharge to form a large steam bubble which subsequently collapses to provide an acoustical disturbance having an improved low-frequency content. The described embodiment includes means for pumping a stream of water through a hose and jetting the stream from one electrode toward and against the other. A fine wire is introduced through a T-joint at the pump end of the hose, and the stream entrains the wire pulling it through the hose, out through the jet at one electrode, and sweeping it into contact with the other electrode to form a metallized path of higher initial conductivity. A very high peak current is then discharged through the path to vaporize it.

Keywords: Seismic explosive acoustic transmitter



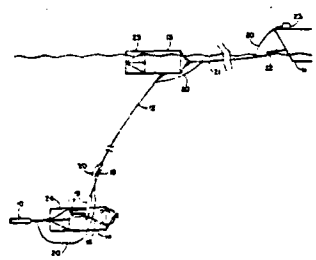
3,369,216
SYSTEM FOR REDUCING THE TRANSMISSION OF NOISE IN MARINE SEISMIC SURVEYING

George B. Loper, Duncanville, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Continuation of application Ser. No. 325,700, Nov. 22, 1963. This application July 28, 1966, Ser. No. 568,541
4 Claims. (Cl. 340—7)

A marine seismic towing system including a tow vessel, a seismic detecting system coupled to the tow vessel by a cable arrangement, and a float for maintaining the detecting system at a desired depth in water and above the bottom. The detecting system is employed to detect seismic signals while being towed in the water. The effect of mechanical noise upon the response of the detecting system and due to the towing operation is reduced by employing an inertia member coupled to the detecting system and resilient means coupled to the cable.

Keywords: Seismic streamer cable; Towed body depth control; Towing cable



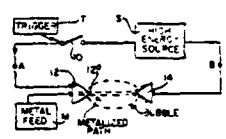
3,369,217
METHOD AND APPARATUS FOR GENERATING AN UNDERWATER ACOUSTIC IMPULSE

William H. Luehrmann, Carl O. Berglund, and William H. Parker, Dallas, Tex., assignors to Teledyne Industries, Inc., Geotech Division, a corporation of California

Filed Sept. 26, 1966, Ser. No. 581,932
4 Claims. (Cl. 340—7)

Method and apparatus for improving a seismic source by increasing the efficiency of conversion of electrical energy discharged between immersed electrodes from a given storage device into subaqueous seismic disturbances for the purpose of lowering the frequency of the resulting fundamental component of the disturbance by virtue of an increase in the size and duration of the resulting plasma bubble. The improved lower frequency content of the disturbance provides deeper penetration into subaqueous strata, and is the direct result of metallizing a small cross-section path between the electrodes prior to each discharge, and then discharging sufficient electrical energy therethrough to vaporize the path, the discharge persisting beyond the time required for such vaporization.

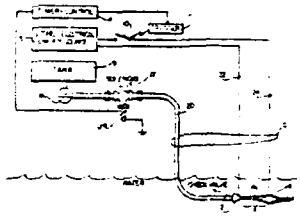
Keywords: Seismic explosive acoustic transmitter



3,369,218
METALLIZED PLASMA PATH SOURCE
William H. Luebrmann, Dallas, and William H. Parker, Richardson, Tex., assignors to Teledyne Industries, Inc., Geotech Division, a corporation of California
Filed Nov. 21, 1966, Ser. No. 595,695
7 Claims. (Cl. 340—12)

An underwater acoustical source for efficiently converting electrical energy discharged between spaced immersed electrodes from a storage device into an intense plasma discharge to form a large steam bubble which subsequently collapses to provide an acoustical disturbance having an improved low-frequency content. The described embodiment includes means for periodically pumping a conductive liquid through a hose and jetting the liquid from one electrode toward and against the other to form a metallized path of higher initial conductivity between them, and then discharging a very high peak current through the path to vaporize it.

Keywords: Seismic explosive acoustic transmitter

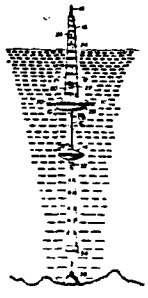


FEBRUARY 20, 1968

3,369.516
STABLE OCEANIC STATION
Roger J. Pierce, 900 Staub Court. NE., Cedar Rapids, Iowa 52402
Filed Mar. 17, 1966, Ser. No. 535,213
10 Claims. (Cl. 114—144)

A structure designed to serve as a fixed station in the open sea, the structure being designed so as to have excellent stability and to maintain a fixed geographic location and thereby is substantially unaffected by wind and water forces.

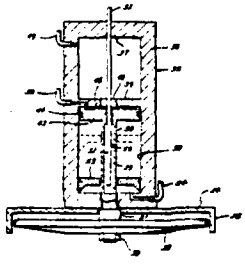
Keywords: Buoy, instrumented; Buoy mooring system



3,369,627
MECHANICAL IMPLODER AND METHOD FOR GENERATING UNDER WATER SEISMIC SIGNALS
Edward G. Schempf, 1754 Utica Square, Tulsa County, Okla. 74114
Filed July 25, 1966, Ser. No. 567,504
5 Claims. (Cl. 181—.5)

A mechanical imploder and method for generating under water seismic signals. The apparatus includes a pair of opposed plates, a supporting assembly for submerging the plates under water, and a quick acting piston assembly for driving the plates apart rapidly to create a cavitation or vacuum into which water rushes causing an implosion producing the desired seismic energy signals. The method contemplates passing two opposed plate along a predetermined path under water and over the formation to be explored and generating seismic signals by driving the plates apart at predetermined intervals at a sufficient rate of speed to cause the aforesaid cavitation and generation of seismic signals, which signals are thereafter sensed or monitored.

Keywords: Seismic implosive acoustic transmitter



(147)

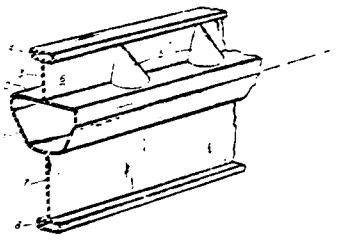
3,369,664
APPARATUS AND PROCESS FOR CONFINING FLOATING LIQUID PRODUCTS

Paul C. Dahan, Franklin Township, Hunterdon County, N.J., assignor to Mobil Oil Corporation, a corporation of New York

Filed Apr. 17, 1967, Ser. No. 631,528
3 Claims. (Cl. 210—83)

A floatable collar section is provided comprising an inflatable tube having attached thereto a weighed skirt located below the inflatable tube and a bulwark made semirigid by inflatable means located above the inflatable tube. A plurality of collar sections can be attached to form a flotable collar to enclose and confine a liquid floating on seawater. Means associated with the floatable collar can be provided to recover the floating liquid.

Keywords: Pollutant, suction removal; Pollutant, surface barrier



FEBRUARY 27, 1968

3,370,432
ICE PROTECTIVE SLEEVE FOR PILINGS

Roger M. Butler, Janis Bumbulis, and Leander B. Simpson, Sarnia, Ontario, Canada, assignors to Esso Research and Engineering Company, a corporation of Delaware

Filed Aug. 3, 1965, Ser. No. 476,894
6 Claims. (Cl. 61—54)

The present invention is directed towards providing apparatus and a method for preventing the gradual and almost universal jacking out of pilings subject to adverse winter environment. In accordance with the invention a tubular collar of a buoyant foam plastic material is positioned, surrounding and spaced from the piling. The interior annular space between the sleeve and the piling is filled with any suitable anti-freeze solution which is of a density less than water and insoluble therein. In this way ice forming on the surface of the water and freezing will freeze tightly against the exterior surface of the protective sleeve; and when said ice lifts to the changes in the water level, it will lift the sleeve and not the piling.

Keywords: Ice protection; Pile protection

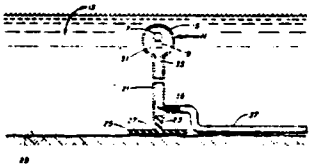
3,370,462
WATER CURRENT METER

William W. Bartlett, Portsmouth, and Richard M. Dunlap, Middletown, R.I., assignors to the United States of America as represented by the Secretary of the Navy

Filed Dec. 7, 1965, Ser. No. 512,247
9 Claims. (Cl. 73—189)

A pair of mutually perpendicular angle sensors are disposed within a sealed hollow sphere. The sphere is connected to a flexible rubber cord by way of a rigid hollow stem and the combination then inserted and anchored in a body of water. The amount of displacement of the angle sensors measured by a cable connected remote recorder allows for a direct measurement of the water velocity in a body of water.

Keywords: Current measurement

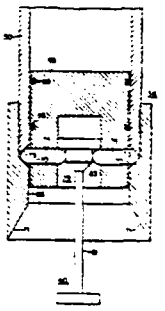


148

3,370,566
EMBEDMENT DEVICE
John A. Dorr and Wadsworth Owen, Baltimore, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa., a corporation of Pennsylvania
Filed June 17, 1965, Ser. No. 464,766
15 Claims. (Cl. 114—206)

1. An underwater embedment device comprising:
(a) an elongated hollow member closed at one end thereof;
(b) closure means for keeping the pressure within said hollow member at a predetermined value;
(c) actuator means movable relative to said closure means for displacing said closure means upon striking the bottom of a body of water, for permitting bottom sediment to enter said hollow member; and
(d) the predetermined value of said pressure being less than the pressure of the surrounding water medium just prior to striking said bottom.

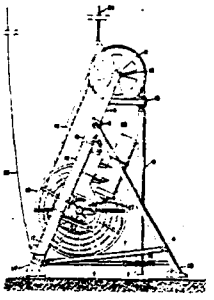
Keywords: Embedment anchor; Power, submerged source; Sampler, power supply; Sampler, seabed-driven core



3,370,656
APPARATUS FOR SUBMARINE CORE DRILLING
Pierre Grolet, Viroflay, Pierre Moulin, Montesson, and Jean Parola, Rueil Malmaison, France, assignors to Institut Francais du Petrole des Carburants et Lubrifiants, Rueil Malmaison, Seine-et-Oise, France
Filed Nov. 29, 1965, Ser. No. 510,285
Claims priority, application France, Dec. 4, 1964, 997,552
4 Claims. (Cl. 175—6)

A submarine core drilling aparatus comprising a basic structure which is suspended by a supporting cable from the surface installation. A flexible conduit is wound upon a storage reel which in turn is carried by the basic structure. The free end of the conduit is connected to a rigid tubular part comprising a bottom motor operatively connected to a core drill at its lower end. The apparatus further comprises means for guiding the rigid tubular part above the sea bottom, means supported by the basic structure for feeding water under pressure into the conduit, means associated with the conduit storage reel to control the unwinding of the flexible conduit when the core drill is lowered and advanced into the underwater strata, and at least one cable which may or may not be distinct from the supporting cable. This cable contains electric power and has control and command conductors connected to a source of electric energy and a switchboard on the surface installation.

Keywords: Instrument deployment; Sampler, power supply; Sampler, seabed-drilled core

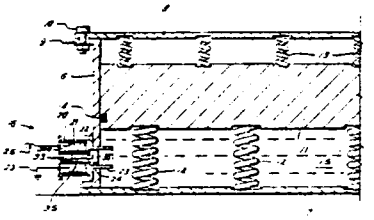


149

3,370,672
SEISMIC RADIATOR
John C. Eberlan, Houston, Tex., assignor, by mesne assignments, to McCollum Laboratories, Inc., Houston, Tex., a corporation of Texas
Filed Dec. 1, 1966, Ser. No. 598,254
2 Claims. (Cl. 181—.5)

A seismic radiator including a fluid-tight casing to be planted on the ground or in water and having a reciprocating inertia member therein forming a pulsing chamber filled with a hydraulic fluid. Primary actuators are mounted in the peripheral wall of the chamber for applying impacts through the hydraulic fluid to the inertia member and radiating plate at the bottom of the chamber casing.

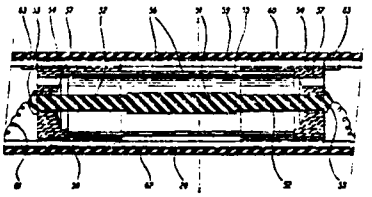
Keywords: Seismic explosive acoustic transmitter; Seismic vibratory acoustic transmitter



3,371,311
TOWED PRESSURE TRANSDUCERS WITH VIBRATION ISOLATION
Jacques Ciolet, Rueil-Malmaison, Michel Dubesset, Clermont-Ferrand, and Michel Lavergne, Le Vesinet, France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants, Rueil-Malmaison, France
Filed May 23, 1966, Ser. No. 552,165
Claims priority, application France, May 22, 1965, 18,075; Dec. 14, 1965, 42,280; Dec. 30, 1965, 44,440
11 Claims. (Cl. 340—17)

Apparatus for use in seismic prospecting and including towing means in the form of a deformable tube, at least one pressure sensor, and connecting means forming a vibration insulating connection between the sensor and the towing means, the connecting means essentially including a sheath of deformable material enclosing the sensor, two elastic arms connected to respective ends of the sheath, a rigid perforated cage surrounding the sheath, and elastic support means supporting the free ends of the arms and the ends of the cage and tightly inserted in the deformable tube constituting the towing means.

Keywords: Seismic streamer cable

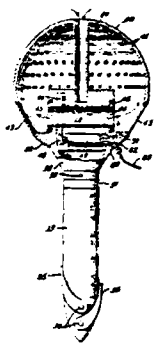


150

3,371,643
HYDRAULICALLY ACTUATED DRIVER
William Howard Dunham, 9911 Parkwood Drive, Bethesda, Md. 20014
Filed Aug. 6, 1962, Ser. No. 215,212
5 Claims. (Cl. 114—206)

Keywords: Embedment anchor; Power, submerged source

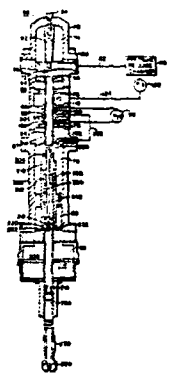
1. A marine anchor embedding apparatus comprising a fluid reservoir, having an inner surface and an outer surface, a plurality of protuberances mounted on said inner surface for creating turbulence in fluid flowing therein, a conduit extending into said reservoir, a rotatably mounted valve positioned in said conduit within said reservoir and intercommunicating said reservoir and said conduit, said valve comprising a hollow cylindrical body for changing the direction of flow of fluid through said conduit through an angle of substantially 90° and the inner surface of said reservoir changing the flow of fluid through substantially another 90°, means adapted to selectively rotate said valve from a position closing said conduit to a position permitting fluid to pass through said conduit, and a device mounted to the lower end of said reservoir.



3,371,726
ACOUSTIC APPARATUS
John V. Bouyoucos, Rochester, N.Y., assignor to General Dynamics Corporation, a corporation of Delaware
Filed May 24, 1965, Ser. No. 458,245
35 Claims. (Cl. 173—134)

Keywords: Pile driver, impact

This application discloses percussive tools suitable for use in earth boring, pile driving and other applications. Tools utilize a hammer and anvil system wherein the hammer element is included within a hydroacoustic device which converts the flow of a pressurized fluid, such as hydraulic oil, into alternating mechanical energy as exhibited by oscillatory motion of the hammer element. The anvil element is spaced from the hammer element except when receiving impacts therefrom and extracts mechanical force pulses from the hammer element during alternate one-half cycles of the oscillatory motion of the hammer element. These force pulses are transmitted by the anvil system to the work. This transmission may be via a drill steel when the work is an earth formation which is being drilled.



(151)

3,371,739

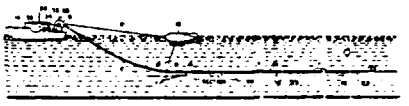
MEANS FOR VARIABLY CONTROLLING THE BUOYANCY OF A SEISMIC DETECTION STREAMER

Raymond H. Pearson, Richardson, Tex., assignor to Whitehall Electronics Corporation of the First Bank & Trust Building, Richardson, Tex.

Filed May 23, 1966, Ser. No. 552,098
22 Claims. (Cl. 181—.5)

A buoyancy control system for an expansible detection streamer comprising a plurality of serially connected oil filled sections, each containing a plurality of wave detectors therein for transmitting electrical seismic signals over a two conductor channel to a vessel while the streamer is towed thereby, each section having an oil line including a normally closed electrically operated inlet valve connected to a pressurized oil source on the vessel, a second normally closed electrically operated valve operable to exhaust oil from the section, a depth actuated transducer within each section connected by the channel to control apparatus on the vessel and effective during a towing operation to operate the inlet and exhaust valves selectively to maintain each section at a constant fixed depth of submersion.

Keywords: Depth pressure measurement; Seismic streamer cable; Towed body depth control



3,371,740

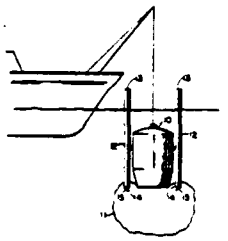
SYSTEM AND METHOD FOR REDUCING SECONDARY PRESSURE PULSES IN MARINE SEISMIC SURVEYING

George B. Loper, Dallas, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Continuation of application Ser. No. 353,874, Mar. 23, 1964. This application Aug. 22, 1966, Ser. No. 574,244
14 Claims. (Cl. 181—.5)

The specification discloses an arrangement in combination with a marine seismic source for reducing secondary pressure pulses caused by the oscillation of a bubble formed in the production of a seismic disturbance in water. A plurality of conduits is provided, each having an upper end extending to the surface and open to the atmosphere. The other ends of the conduits are located in water below the surface near the source and are positioned to be within the bubble formed upon the generation of the seismic disturbance. Valves are provided for normally closing the lower ends to maintain the conduits substantially free of water. The valves open when encompassed by the bubble to reduce secondary pressure pulses.

Keywords: Seismic explosive acoustic transmitter

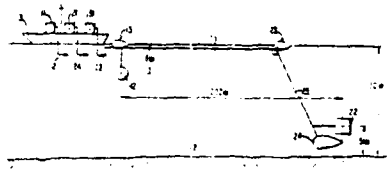


(52

3,372,369
ACOUSTIC METHOD FOR MAPPING UNDERWATER TERRAIN EMPLOYING LOW FREQUENCY CONTINUOUS ACOUSTIC WAVES AND FIXEDLY SEPARATED TRANSDUCERS
Andre Cecchini, Montrouge, Michel Hanff, Brest, and Pierre Jubel, Soyaux, France, assignors to Compagnie des Compteurs, Paris, France, a corporation of France
Filed Sept. 20, 1965, Ser. No. 488,468
14 Claims. (Cl. 340—7)

An acoustic method for prospecting the surface of the sea bed which consists in producing low frequency continuous acoustic waves at a first point below the water above the bed. The acoustic waves are received continuously at at least one second point lying below the surface of the water above the bed at a predetermined constant distance above the bed and at a predetermined constant distance from the first point. The received acoustic waves are continuously recorded and measured and the continuation of the signal employed to define data relating to the nature of the sea bed.

Keywords: Seabed property measurement; Seismic survey method; Towed body depth control

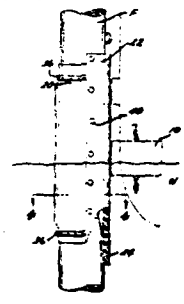


MARCH 12, 1968

3,372,552
WOODEN FENDER PILE PROTECTING APPARATUS
Orval E. Liddell, P.O. Box 1533, Avalon, Calif. 90704
Substituted for abandoned application Ser. No. 348,569, Mar. 2, 1964. This application Feb. 23, 1967, Ser. No. 642,258
2 Claims. (Cl. 61—54)

Apparatus usable with a floating bumper to protect wooden fender piling against marine borer attack and also against mechanical destruction utilizing a sheet of substantially waterproof material wrapped about the pile to define a generally circumferential water-filled space between the pile and the sheet, with circulation between such space and the ambient water being restricted to thereby maintain the water in the space stagnant and prevent marine borer attack on the submerged portion of the pile encased by the sheet. A rigid shoe of arcuate shape is disposed on the side of the fender pile facing a floating bumper exterior of the sheet. A resilient cushion membrane is interposed between the concave side of the shoe and the sheet. The shoe is held in place by lag bolts that extend through the shoe and cushion membrane into the fender pile with the cushion membrane providing a water seal between the lag bolts and the sheet and also absorbing mechanical impacts when a ship engages the floating bumper.

Keywords: Coating; Fouling prevention; Pier fender; Pile protection



153

3,372,585

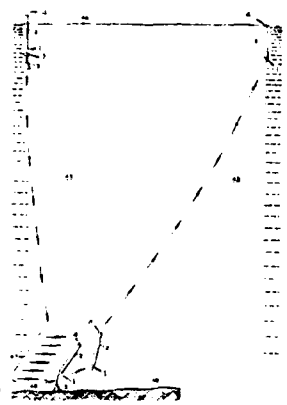
DEVICE FOR RECORDING CURRENT VELOCITY AND DIRECTION IN BODIES OF WATER

Shale J. Niskin, 9400 SW. 63 Court, Miami, Fla. 33156

Filed Feb. 17, 1966, Ser. No. 528,222
11 Claims. (Cl. 73—170)

A device for the automatic measurement and recording of water currents at various predetermined depths comprising a frame carrying a freely rotatable sphere which is submerged to the test depth. The rotatable sphere assumes a given vertical and azimuthal position. After a predetermined time the sphere is locked in position with respect to the frame and the device is retrieved.

Keywords: Current measurement; Instrument deployment; Instrument retrieval



3,372,665

CABLE DISPENSING AND SECURING DEVICE

Lilburn L. Mesler, Palmyra, Mich., assignor to American Chain & Cable Company, Inc., New York, N.Y., a corporation of New York

Continuation-in-part of application Ser. No. 392,560, Aug. 27, 1964. This application Sept. 20, 1966, Ser. No. 593,251
15 Claims. (Cl. 114—206)

Keywords: Buoy mooring system

1. A device for dispensing and securing a cable comprising

(a) a main body portion;

(b) a flyer rotatable on the body portion;

(c) a reel fixed to the body portion coaxial with the flyer;

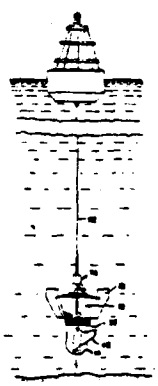
(d) a length of cable wrapped about the reel to be paid out from the end of the reel through the flyer to impart rotation to the flyer;

(e) locking means for preventing rotation of the flyer and pay out of the cable comprising

(i) positively engageable first and second locking elements mounted on the flyer and body portion respectively and biased toward locked position,

(ii) restraining means releasably holding said locking elements out of locked position, and

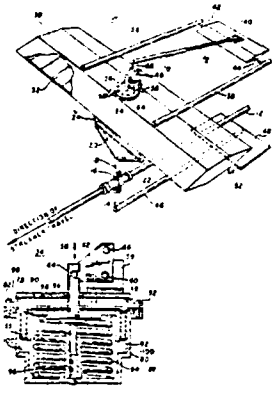
(iii) triggering means for disabling said restraining means to release said locking elements into locked position and prevent rotation of the flyer.



3,372,666
DEPTH CONTROLLER
Buford M. Baker, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware
Filed Oct. 24, 1965, Ser. No. 504,724
5 Claims. (Cl. 114—235)

Apparatus for controlling the depth of a device such as a towed streamer in a fluid medium. A pressure responsive sensor is connected to a wing for controlling the variance of the deflection angle of an elevator and the wing in a linear manner related to the depth of the sensor within a predetermined range of depths and in a constant manner at all depths above and below the predetermined range.

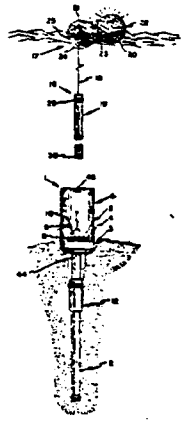
Keywords: Depth pressure measurement; Seismic streamer cable; Towed body depth control; Towed vehicle



3,372,760
FREE-FALL CORE SAMPLER
Samuel O. Raymond, North Falmouth, and Peter L. Sachs, Reading, Mass., assignors to the United States of America as represented by the Secretary of the Navy
Filed Mar. 30, 1965, Ser. No. 444,094
13 Claims. (Cl. 175—5)

The free-fall corer apparatus of the present invention consists of an expendable, elongated casing having an annular-shaped ballast member secured thereto. A cylindrical housing surmounts this ballast member and accommodates a float which is tied to the core liner. During descent of the apparatus, the float is latched to the ballast element, but when the apparatus strikes bottom, a pilot weight suspended from the float latching means moves upwardly and allows the float to freely ascend within the ocean. This ascent unlatches the core liner from the expendable casing and the former is thereafter raised to the surface.

Keywords: Instrument retrieval; Sampler, seabed-driven core



(155)

3,373,100

PRECONTROL SALINITY COMPENSATOR FOR AUTOMATIC CATHODIC PROTECTION SYSTEM

Hayda Rubelmann, 1222 Cromwell Ave., Chesapeake, Va. 23320

Filed May 22, 1964, Ser. No. 369,645
8 Claims. (Cl. 204—196)

Keywords: Cathodic protection; Corrosion prevention; Salinity measurement

1. A cathodic protection assembly for controlling the amount of alternating current supplied to a cathodic protection load in accordance with the resistance of an electrolyte, comprising:

a source of alternating current;

first and second input windings connected in opposing senses;

first and second current rectifying paths each coupled to said alternating current source and coupled to said first and second input windings respectively;

means in said second path responsive to the resistance of the electrolyte for changing its electrical characteristics in accordance with the resistance of the electrolyte;

bi-directional gating means coupled to said source for receiving supply current therefrom;

a threshold conduction device connected in circuit with said bi-directional gating means;

said threshold conduction device having a signal control element for receiving signals to drive said device to conduction; and

first and second signals control windings connected to the signal control element of said threshold device, said windings being located in coupling relation with said first and second input windings to thereby receive by induction the algebraic sum current thereof;

whereby when the current flowing in said first and second input windings is sufficiently unequal, a gating signal pulse is produced in said signal control windings to drive said threshold device to conduction thereby causing current to flow in said bi-directional gating means for a portion of an alternating current cycle according to the resistance of said electrolyte.

3,373,399

SONAR BOTTOM TRACKING RECORDING SYSTEM

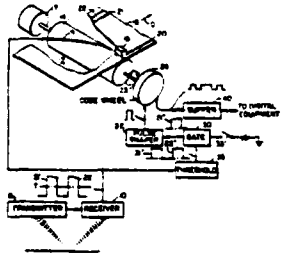
John A. Dorr, Baltimore, and Melvin L. Hiller, Annapolis, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa., a corporation of Pennsylvania

Filed Jan. 20, 1966, Ser. No. 521,912
4 Claims. (Cl. 340—3)

Keywords: Sonar, depth sounder

Sonar signals are successively transmitted toward the ocean bottom to obtain a profile display on a paper recorder having a rotating drum. A code wheel connected to the drum provides a digital representation of depth. When a point of interest on the display is encountered a manually operated switch is closed allowing the code wheel to be read out by a return signal thereby providing a corresponding digital representation of depth.

In another display a cathode ray storage tube is utilized in conjunction with a counter which provides a running digital representation of depth.



(156)

3,373,400
DETERMINATION OF GEOPHYSICAL PROPERTIES OF THE SEA BOTTOM

Sidney Epstein and David Epstein, Brooklyn, N.Y., assignors to Vadys Associates, Ltd., Brooklyn, N.Y., a corporation of New York

Filed Oct. 14, 1965, Ser. No. 495,822
6 Claims. (Cl. 340—7)

Keywords: Instrument, seabed in situ; Seabed property measurement

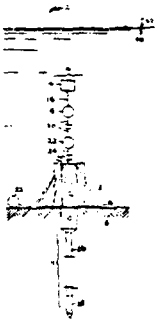
1. In the determination of the geophysical properties of localized sea bottom areas by observation of sediment flow behavior patterns, the steps of

positioning a first explosive charge at a predetermined location and at a selected distance above the sea bottom,

positioning a second explosive charge generally beneath said first explosive charge and on said sea bottom and

positioning a third explosive charge generally beneath said second explosive charge and at a selected distance beneath said sea bottom and

sequentially detonating said first, second and third charges in predetermined order and at spaced time intervals of sufficient duration to permit discrete recordation of the bubble-pulse characteristics of each such detonation.



MARCH 19, 1968

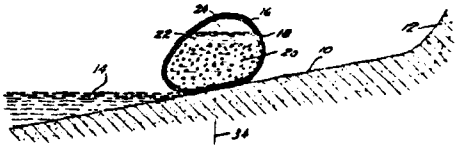
3,373,568
SYSTEM FOR RECLAMATION OF LAND

Lloyd Hornbostel, Jr., 1801 Chippewa Trail, Beloit, Wis. 53511

Filed Sept. 13, 1965, Ser. No. 486,706
5 Claims. (Cl. 61—5)

Keywords: Low-cost shore protection; Sandbag; Slope protection; Wave absorber beach

System for the reclamation of land by placing spaced elongated flexible sealed bags filled with a mixture of aggregate and water along the shore line in overlapping relationship. The bags are made from a plastic material and may be covered by a nylon netting and have anchors at their opposite ends for the attachment of anchoring cables, anchoring the bags to the shore to extend with their longest dimensions parallel to the short line. The bags may be anchored in staggered relation with respect to each other with two advance bags lapped at the ends thereof by a trailing bag spaced from the two advanced bags to take care of an on-shore wash. The bags also may be angularly disposed with respect to the shore line and extending in spaced parallel staggered relationship with respect to each other in positions orthogonally with respect to the direction of the wash, where the wash is a long-shore wash.



(157)

3,373,569
ARTICULATED PILE STABILIZER AND ANCHORING DEVICE
William O. Backman, 2120 Seminary St., Napa, Calif. 94558
Filed Nov. 1, 1966, Ser. No. 591,148
8 Claims. (Cl. 61—53.68)

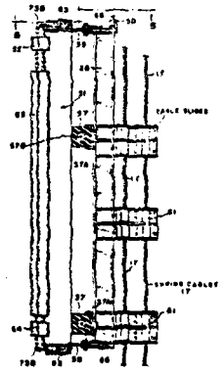
Keywords: Embedment anchor; Pile footing

1. An articulated pile stabilizer and anchoring device comprising:
(a) a support plate secured to a pile;
(b) a primary stabilizing fluke having one end pivotally secured to said plate and adapted to lie adjacent to the surface of the pile;
(c) an auxiliary fluke having an end pivotally secured to the other end of said primary fluke and adapted to lie adjacent to the pile surface;
(d) frangible means securing said auxiliary fluke to the pile;
(e) means between said auxiliary fluke and said pile for forcing said auxiliary fluke outwardly and for breaking said frangible means; and
(f) stop means on said primary fluke for abutting the support plate to limit the pivotal movement of said primary fluke about its pivotal connection to said plate and for limiting the pivotal movement of said auxiliary fluke about its connection to the primary fluke.

3,373,713
APPARATUS FOR USE WITH OFFSHORE MARINE STRUCTURES
Robert G. Hindman and John J. Bardgette, New Orleans, La., assignors, by mesne assignments, to Esso Production Research Company, Houston, Tex., a corporation of Delaware
Filed Mar. 15, 1965, Ser. No. 439,688
8 Claims. (Cl. 114—220)

Keywords: Offshore mooring structure; Offshore structure fender

Apparatus for fending off vessels from a marine structure uses a sheath of rubberlike material fixed to a cylindrical base member by pins on the base member and L-shaped slots in the sheath. The structure may include elongated cylindrical members suspended around the sheathed member in spaced relationship therewith.



(158)

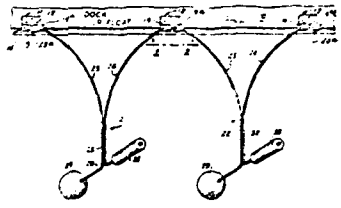
3,373,714
SMALL BOAT RESTRAINERS

Sterling Lenn Hart, 30 Windsor Terrace, White Plains, N.Y. 10601

Continuation of application Ser. No. 519,603, Jan. 19, 1966. This application Feb. 15, 1967, Ser. No. 616,389
6 Claims. (Cl. 114—230)

Means for restraining small boats tied to a dock from sidewise movement in the form, for each boat, of two opposed curved arms which together define a bow-shaped enclosure in which the bow of the boat is confined, each such two arms constituting one arm of two mutually adjacent wishbone-shaped members pivoted at one end to the dock and having at their outer or common end a downwardly extending float to float the member and upwardly extending fender means to engage the side of the boat.

Keywords: Small-craft mooring device



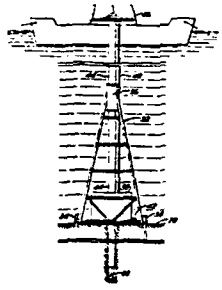
3,373,806
APPARATUS AND METHOD FOR DRILLING WELLS

Virgil D. Stone, Morgan City, La., assignor to Gulf Oil Corporation, Pittsburgh, Pa.

Filed Apr. 21, 1964, Ser. No. 361,447
18 Claims. (Cl. 166—.5)

1. A method of completing a well below a body of water at least about 50 feet deep comprising forcing a heavy-walled snorkel tube permanently encircling and separate from casing of the well downwardly into the ground below the body of water whereby said snorkel tube is supported by the ground and extends upwardly above the surface of the water, said snorkel tube having a diameter of approximately 40 to 72 inches to permit a workman to descend in the tube to install wellhead connections, pumping water out of the tube, cutting off casing of the well adjacent the bottom of the body of water, installing a wellhead assembly on the upper end of the casing, running a flow line from the wellhead assembly upwardly through the tube to above the surface of the water, and supporting the flow line within the tube for delivery of well fluids above the surface of the water.

Keywords: Offshore caisson; Offshore construction; Offshore platform, fixed; Offshore storage tank, submerged; Seabed oil, process structure



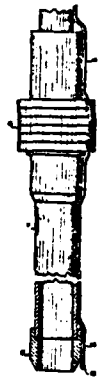
3,373,826
CORING DEVICE

Carey Ingram, 3207 Northampton St. NW., Washington, D.C. 20015

Filed Mar. 31, 1966, Ser. No. 540,152
3 Claims. (Cl. 175—5)

A device for facilitating the recovery of oceanographic bottom sampling instruments. A small tubular means paralleling the instrument has a loose fitting plug in the bottom end that relieves the vacuum effect created when the instrument is withdrawn from the sediment on the ocean's floor.

Keywords: Instrument retrieval; Sampler, seabed-driven core



159

3,373,827

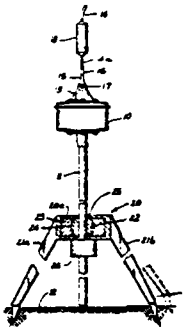
APPARATUS FOR CORING SUBTERRANEAN FORMATIONS UNDER A BODY OF WATER

Jules N. Biron, Durward B. Jones, and Durrell L. Sims, Houston, Tex., assignors, by mesne assignments, to the United States of America as represented by the National Science Foundation

Filed June 14, 1966, Ser. No. 557,531
1 Claim. (Cl. 175—6)

Keywords: Instrument deployment; Sampler, seabed-driven core

1. Apparatus for coring the subterranean formation lying under the bottom of a body of water, comprising, a coring assembly including an elongated elastic stem at least the lower portion of which is hollow to form a core barrel, a sonic frequency elastic wave generator acoustically coupled to said stem and operable at a longitudinal resonant frequency of the stem to establish a longitudinal elastic standing wave vibration in the stem to cause the lower end thereof to cut through a subterranean formation and collect a core of same in the core barrel, a flexible cable connected to the coring assembly to lower it into position to cut such core and to raise it with the core to the surface, a float attached to the cable immediately above the coring assembly to exert a buoyant force on the coring assembly that is less than the force required to keep the assembly from sinking but sufficient to hold the core barrel substantially vertical when it moves into engagement with the bottom of a body of water, a stand, means mounting the stand on the stem for longitudinal and limited pivotal movement relative to the stem, and stop means limiting the downward longitudinal movement of the stand relative to the stem, said stand having at least three downwardly extending legs extending below the bottom of the core barrel when the stand is in engagement with the stop means to engage the bottom before the core barrel does and stabilize the core barrel against lateral movement during the coring operation.



3,373,841

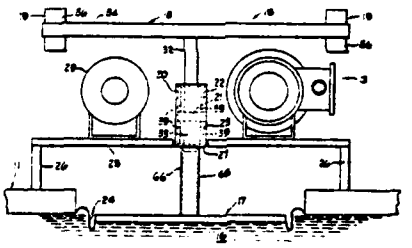
METHOD AND APPARATUS FOR GENERATING SOUND WAVES

Park H. Miller, Jr., Del Mar, Calif., assignor, by mesne assignments, to Gulf General Atomic Incorporated, San Diego, Calif., a corporation of Delaware

Filed Apr. 1, 1966, Ser. No. 539,365
25 Claims. (Cl. 181—.5)

Keywords: Seismic vibratory acoustic transmitter

A novel sound source and method of generating sound waves utilizing the source is disclosed which includes a power system, an oscillatory system and a radiating member coupled to the medium in which the waves are generated. The oscillatory system includes a spring member and an inertial member. The power system is coupled between the spring and the radiator and exerts force periodically on both the spring and the radiator to transfer energy to both of them. The resonant frequency of the source as coupled to the medium is adjustable and the power system is preferably operated at the resonant frequency.



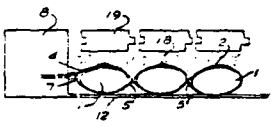
(160

MARCH 26, 1968

3,374,635
BAGS FOR USE IN REVETMENT STRUCTURES
Horace C. Crandall, Reading, Mass.
(35 Middlesex Road, Waltham, Mass. 02154)
Filed June 29, 1966, Ser. No. 562,449
4 Claims. (Cl. 61—38)

Keywords: Low-cost shore protection; Revetment; Sandbag

This invention relates to revetment structures, and particularly to a sandbag or cranion with an integral, longitudinal lip of unique construction utilized with cross lacing to form a flexible, erosion resistant covering therefor.



3,374,852
HYDROPHONE SUSPENSION SYSTEM FOR MAINTAINING HYDROPHONE FOR A PRESELECTED DEPTH
Booth B. Strange and Ben B. Thigpen, Shreveport, La., assignors to Western Geophysical Company of America, Los Angeles, Calif.
Filed Sept. 8, 1965, Ser. No. 485,896
1 Claim. (Cl. 181—.5)

Keywords: Seismic streamer cable; Towed body depth control

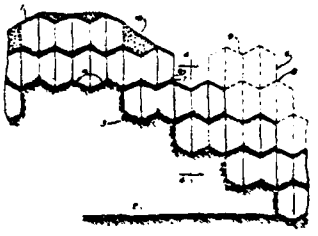
A hydrophone suspension system for maintaining hydrophones at a uniform depth is provided which includes a positive buoyancy cable for supported plurality of spaced hydrophones. Weights are spaced along the cable to provide a negative buoyancy for the cable and weights. A plurality of floats are provided which are connected to the cable adjacent to the aforesaid weights to provide a net positive buoyancy for the entire suspension system.

APRIL 2, 1968

3,375,667
REVETMENT STRUCTURE AND UNITS THEREFOR
Carl G. Hard, 14 Spring Lane, Framingham, Mass. 01701
Filed June 13, 1966, Ser. No. 557,866
6 Claims. (Cl. 61—37)

Keywords: Concrete armor unit; Revetment

The invention comprises a bar having a plurality of parallel grooves. The bars are stacked in a symmetrically interlocking relationship to form a revetment structure.



(161)

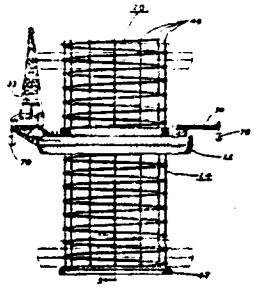
3,375,669
OFFSHORE MARINE STRUCTURES

Emilio C. Garcia, 302 Magazine St., New Orleans, La. 70130

Filed Sept. 15, 1966, Ser. No. 579,704
6 Claims. (Cl. 61—46.5)

A marine tower and an annular combination barge and work platform, said tower having helical tracks extending from end to end is carried vertically on the barge to an offshore location, supported in and above the annular aperture of the combination barge and work platform by radially extending rollers mounted thereon engaging the helical tracks of the tower, and means for driving the rollers in rotation thereby rotating the tower and the annular combination relative to each other to initially drive a base end of the tower into rotational contact with the sea bottom to cut a level footing therein assisted by streams of water jetted downward from said base end and then to drive the annular combination toward the top of the tower and out of the water to position it as desired vertically and any part of it in azimuth horizontally, said tower passing through said annular aperture in its relative movements.

Keywords: Offshore construction; Offshore platform, fixed; Seabed foundation



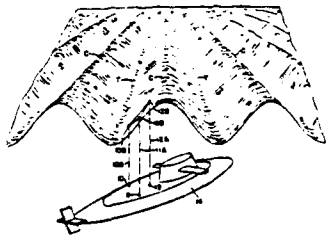
3,375,715
SEA DIRECTION INDICATOR

Frank P. Hodges, Baltimore, and John W. Luce, Arnold, Md., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa., a corporation of Pennsylvania

Filed Nov. 10, 1965, Ser. No. 507,149
13 Claims. (Cl. 73—170)

A device for measuring the slope of a portion of the sea surface including a plurality of transducers each of which directs a narrow beam acoustic signal toward the sea surface from below the sea surface. The return acoustic signals are utilized to indicate the slope of the sea surface above the transducers.

Keywords: Wave measurement



3,375,800
SEISMIC CABLE DEPTH CONTROL APPARATUS

Jimmy R. Cole, 1800 N. Ash, and Paul L. Buller, 2305 Drake Lane, both of Ponca City, Okla. 74601

Continuation-in-part of application Ser. No. 604,874, Dec. 27, 1966. This application Apr. 7, 1967, Ser. No. 629,276
25 Claims. (Cl. 114—235)

A paravane for maintaining a seismic cable being towed through the water at a predetermined depth. The paravane is journaled on the cable and is provided with ballast and stabilizing fins, whereby the paravane will remain oriented vertically and will not spin or turn upon twisting of the cable, as when the direction of movement of the cable is changed by turning of the towing vessel. Diving planes or fins are extended from the opposite sides of the paravane and are controlled by a pressure sensing device mounted in the paravane housing. The pressure sensing device is adjustable such that the diving planes will be turned when the paravane tends to rise or fall in the water above or below a predetermined depth to counteract the forces imposed on the paravane, such that the paravane will maintain the adjacent portion of the cable at the desired predetermined depth.

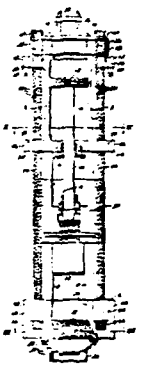
Keywords: Seismic streamer cable; Towed body depth control

16

3,375,881
PILE DRIVER
Ralph E. Myers, Leawood, Kans., and Dwayne C. Smith, Raytown, Mo., assignors to Conmaco, Inc., Kansas City, Kans., a corporation of Missouri
Filed Mar. 7, 1966, Ser. No. 532,244
9 Claims. (Cl. 173—139)

Keywords: Pile driver, impact

1. In a pile driver hammer:
(a) an upper head adapted to be suspended whereby to support said hammer,
(b) a lower head spaced below said upper head,
(c) a plurality of parallel, spaced apart columns extending vertically between said heads, the opposite ends of each column being engaged slidably in sockets provided therefor, respectively in said upper and lower heads,
(d) a plurality of reaches of flexible steel cables extending between and interconnecting said upper and lower heads, said cables being tensioned whereby to seat said columns firmly in said sockets,
(e) a ram carried slidably on said columns intermediate said heads and adapted at the bottom of its stroke to deliver a downward blow to a pile over which said hammer is suspended, and
(f) power means for moving said ram on said columns.

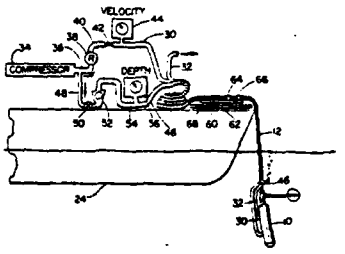


APRIL 9, 1968

3,376,742
OCEAN CURRENT MEASURING DEVICE
Renic P. Vincent, Tulsa, Okla., assignor to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware
Filed May 31, 1966, Ser. No. 553,974
8 Claims. (Cl. 73—170)

Keywords: Current measurement

This invention covers an apparatus for measuring the velocity of currents of water, particularly those far below the surface. A container enclosing a pendulum is suspended through a hinge joint to a flexible line which extends to a boat deck at the surface. A rudder is placed on the upper side of the hinge joint for orienting the container in the direction of the current flow. The container has two ports, one positioned in line with the arc of the pendulum. This latter port is connected through a conduit to an air supply at the surface. The other port is connected through a conduit to the atmosphere. Currents of the water move the container off vertical and the first port moves toward the pendulum such that the backpressure in the first conduit varies as a function of the current flow.

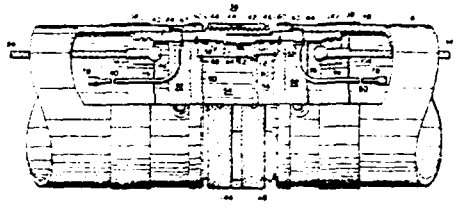


(163

3,376,948
STREAMER COUPLER
Donald E. Morrow, Irving, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware
Filed Dec. 30, 1966, Ser. No. 607,599
6 Claims. (Cl. 181—.5)

A coupler for connecting a pair of streamer sections comprising a pair of thin-walled shells forming a housing, housing insertion means mounted in the forward part of each pair of shells and having grooves located around its outer perimeter, sealing means in each of the grooves, external buoyant fluid filler and air bleed ports penetrating the shells, mating electrical connector halves in the hollow interior of each of the housing insertion means and tension receptacle means mounted in the rearward part of each of the shells for receiving the strain wires from the streamer section.

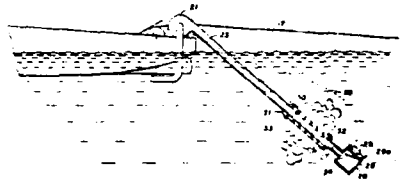
Keywords: Seismic streamer cable



3,376,949
WATER HAMMER MARINE SEISMIC SOURCE
Buford M. Baker, Dallas, and James H. Waugh, Jr., Coppell, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware
Filed Dec. 8, 1966, Ser. No. 600,102
4 Claims. (Cl. 181—.5)

A marine seismic detector streamer moves along a traverse for detecting seismic energy with a source vessel which employs a pump for directing a high energy flow of water along a confined course, at least a portion of which is submerged in the water with a valve abruptly terminating such flow of water to form a classical water hammer. A resilient sealed perforated section along the flow course provides for transmission of water hammer energy to generate seismic waves.

Keywords: Seismic hydraulic acoustic transmitter

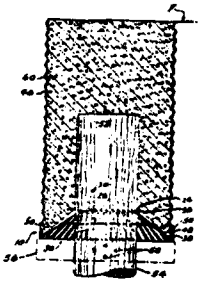


APRIL 16, 1968

3,377,808
CAP ASSEMBLY FOR PILE SHELL
John Joseph Dougherty, Cedar Grove, N.J. (262 Rutherford Blvd., Clifton, N.J. 07014)
Filed Dec. 23, 1966, Ser. No. 604,433
5 Claims. (Cl. 61—53)

1. As an article of manufacture, a cap assembly for a pile shell comprising a frusto-conical body of spring steel having an opening in the narrow end thereof and having a band around the wide end thereof, said band extending inwardly along the body in spaced relation thereto, said body being corrugated, the corrugations extending from the opening to the band, the edge of the body forming the opening being notched between the ends of the corrugations.

Keywords: Concrete form; Pile, structure connection; Pile, wood; Structure repair



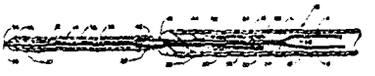
3,378,815
HYDROPHONE EEL STRUCTURE FOR UNDERWATER SEISMIC EXPLORATION

Stephen V. Chelminski, Wilton, Conn., assignor to Bolt Associates, Inc., East Norwalk, Conn., a corporation of Connecticut

Filed Sept. 16, 1966, Ser. No. 580,092
16 Claims. (Cl. 340—7)

A hydrophone eel structure for underwater seismic exploration is provided which is sensitive and accurate in response, is easily towed and is readily coiled for storage, wherein both ends of each hydrophone unit are responsive to the acoustical impulses, being non-responsive to axial acceleration, and the length of the tubular casing from end to end can be filled with liquid or emptied by removing the tail plug. The pressure of the liquid throughout the length of the casing is equalized by providing for passage of the liquid throughout the length of the casing, and because of the sealed arrangement of each hydrophone unit and the associated connection wires, it is possible to use fresh or salt water as the interior liquid. At the nose of the eel structure a towing assembly provides a flexural transition between the cable and the eel for preventing flexing stress concentration and for isolating the wire connections from towing stress, while the cable covering has braided filaments embedded therein surrounding its electrical wires for carrying the towing stress.

Keywords: Seismic streamer cable



APRIL 23, 1968

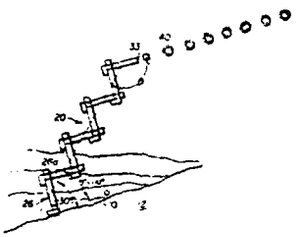
3,379,015
PIER CONSTRUCTION

Elmer Fred Macks, Willow Lane, Vermilion, Ohio 44089

Filed Dec. 7, 1965, Ser. No. 512,085
1 Claim. (Cl. 61—4)

A pier construction for diminishing erosion of a shore line of a body of water and for enhancing beach build-up. A first pier portion of interlocking members extends at an angle from the beach and forms a trap leg for sand and fines carried in the water and a second portion formed of spaced members extends from the off-shore end of the trap leg toward the direction from which fines and sand flow and forms a wave dissipation leg.

Keywords: Breakwater, concrete; Concrete block; Groin



(165)

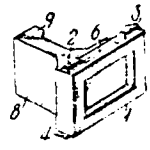
3,379,017
CONCRETE BLOCKS FOR SHORE AND BANK PROTECTION

Sugiaki Kusatake, 132 Nishikitsuji-hachikencho, Nara, Japan

Filed June 13, 1966, Ser. No. 557,284
Claims priority, application Japan, June 14, 1965, 40/48.368
9 Claims. (Cl. 61—37)

A block for use in the construction of a wall for river banks or seashores having a thickness in the form of a rectangular face plate provided on its upper and lower edges with a pair of halving joints, a prop member vertically extending behind the face plate in the position biassed inwardly by one quarter of the length of the face plate and a rib formed on one side of the tail end of the prop member, said prop member being formed with the same height as the face plate, said face plates being piled upside down in every other layer in a header formation with the result that the prop members of the face plates form a stiffener in a vertical straight line behind the wall and that the ribs of the tail ends of the prop members project right and left alternately.

Keywords: Concrete block; Low-cost shore protection; Revetment; Seawall



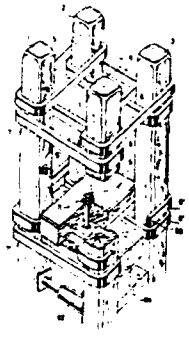
3,379,020
DOLPHIN OR MARINE CONSTRUCTION

Heinrich A. Krug, Friedensweg 29, Hamburg-Nienstedten, Germany

Filed Dec. 7, 1964, Ser. No. 416,210
Claims priority, application Germany, Dec. 10, 1963, K 51,576; Feb. 26, 1964, K 52,213
19 Claims. (Cl. 61—46)

1. A bound dolphin structure, comprising a plurality of spaced, rammed piles, resilient connecting means of rubber-elastic composition adapted to join said piles and to urge each pile toward each adjacent joined pile, said connecting means comprising elongated bands having an interior layer of material for imparting a limit of elongation to said bands, and inelastic spacing means interposed between said joined piles to maintain said bands in an expanded beyond normal state within the elastic limit of the material, said spacing means and said resilient bands cooperating to hold each of said piles in a predetermined space relationship one with the other.

Keywords: Collision protection; Offshore construction; Pile dolphin; Pile, wood



(166)

3,379,065
PRESSURE LIQUID SAMPLING SYSTEM AND APPARATUS

Harry A. Gibbon, Tarrytown, N.Y., assignor to Research Corporation, New York, N.Y., a nonprofit corporation of New York

Continuation-in-part of application Ser. No. 496,503, Oct. 15, 1965. This application Nov. 14, 1966, Ser. No. 604,097

11 Claims. (Cl. 73—425.4)

A device is provided for collecting a fluid sample from a body of fluid surrounding a selectively sealable container and withdrawing the container with the collected sample without contaminating the collected sample by fluid in an environment remote from the collection zone. Provision is also made for removing the collected sample while maintaining the sample at substantially the same pressure at which the sample existed in the collection zone.

Keywords: Sampler, water

3,379,161
TOWLINES WITH MINIMUM WIDTH FAIRINGS

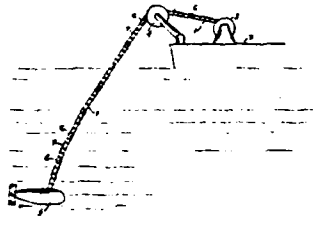
Donald A. Nichols, Old Lyme, and Julius O. Natwick, Niantic, Conn., assignors to the United States of America as represented by the Secretary of the Navy

Filed Aug. 31, 1966, Ser. No. 576,804

9 Claims. (Cl. 114—235)

A streamlined towline providing mechanical and electrical connection of a submerged body and a ship, comprising a strength member and electrical conductors in a streamlined fairing and fairing support rings. Fairing support rings fixed at intervals to the strength member each support a support-fairing unit, and each support-fairing unit supports a number of rider-fairing units. The rings prevent high compression loads accumlating in the fairing by transferring these loads in increments to the strength member and eliminate the need for links and stacking by preventing gaps from forming between fairing units.

Keywords: Towing cable



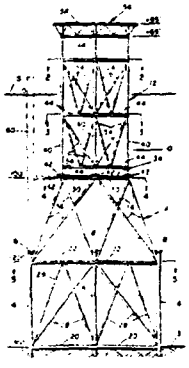
(167)

3,379,245
TENDED DRILLING PLATFORM FOR MULTIWELL SUBSURFACE COMPLETION

William F. Manning, Springdale, Conn., assignor to Mobil Oil Corporation, a corporation of New York
Filed May 17, 1966, Ser. No. 550,811
10 Claims. (Cl. 166—.5)

1. In the production of offshore oil and/or gas, a bottom-supported drilling and production platform comprising a lower production support section adapted to be submerged completely when supported on the marine bottom at a drilling site and an upper drilling support section adapted to be supported on said production support section and to extend above the surface of the body of water when at said drilling site; means for supporting production wellheads, of wells drilled from said upper drilling section, on said lower production section beneath the surface of a body of water at diving depth; means for supporting drilling equipment on said upper drilling support section above the surface of said body of water; and means for releasably mounting said upper drilling support section on said lower production support section.

Keywords: Offshore construction; Offshore platform, fixed; Pile placement; Seabed foundation

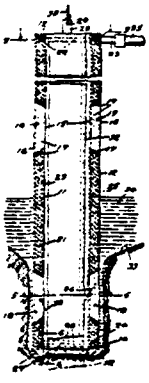


3,379,265
PILE EXTRACTOR AND SETTER

George F. Geiger, Rte. 1, Box 336A, Charleston, S.C. 29407
Filed Jan. 7, 1966, Ser. No. 519,310
7 Claims. (Cl. 175—215)

A tubular casing which is guided in its up and down movement by engagement over a piling and which utilizes a jet action and cutting teeth for excavating the earth around a piling to enable the piling to be raised and removed or for creating a hole in which the piling can be embedded. Ballast contained in a chamber of the casing weights the casing sufficiently to effect the excavating action as it is allowed to descend by gravity.

Keywords: Pile driver, water jet; Pile extractor



(168)

3,379,273
POWERFUL SOUND IMPULSE GENERATION METHODS AND APPARATUS

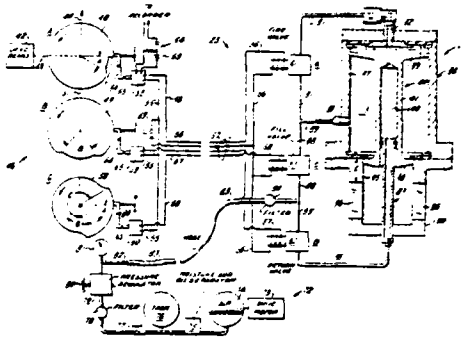
Stephen V. Chelminski, Redding, Conn., assignor to Bolt Associates, Inc., East Norwalk, Conn.

Continuation-in-part of application Ser. No. 151,853, Nov. 13, 1961. This application Nov. 12, 1963, Ser. No. 322,677

28 Claims. (Cl. 181—.5)

Methods and systems generating and utilizing powerful acoustical waves produced underwater, useful for reflection or refraction types of seismic surveys or for combinations of these. Compressed air fed to acoustical impulse generator apparatus is confined therein, electrical signals produced for firing to suddenly release the confined compressed air generating powerful acoustical waves. The pressure of compressed air is applied for re-closing the confined volume, to confine air again to repeat the sudden release; the amplitude and frequency spectrum characteristics of the acoustical waves may be varied; and in certain embodiments fuel is burned in the confined air, raising the pressure before release. Various embodiments of high-velocity shuttle configurations, pneumatic shuttle-return means, by-pass passages, seals, movable spring-biased seals, valve means, shapes of discharge vents, chamber arrangements, and electrical firing circuits are shown. Automatic firing arrangements are disclosed for self-firing without electrical signals, and a towing chassis unit with tail boom and fins is disclosed.

Keywords: Seismic explosive acoustic transmitter; Seismic survey method; Towed vehicle



APRIL 30, 1968

3,380,179
AUTOMATIC CONTROL OF SWING SPEED FOR DREDGES

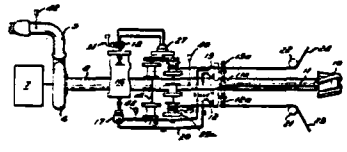
Fred J. Schmidt, Baltimore, Md., assignor to Ellicott Machine Corporation, Baltimore, Md., a corporation of Maryland

Continuation-in-part of application Ser. No. 591,193, Nov. 1, 1966. This application Mar. 20, 1967, Ser. No. 633,653

8 Claims. (Cl. 37—58)

Automatic speed control for the transverse swing of a dredge cutter comprising a command signal and condition sensors leading to a comparator so that the speed of the motor which induces swing may be varied in accordance with sensed dredging conditions including cutter load discharge pressure and suction pipe pressure, and cutter torque.

Keywords: Dredge, cutterhead; Dredge ladder control



(169)

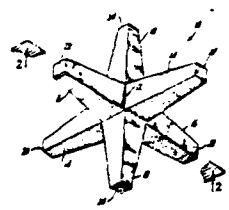
3,380,253
APPARATUS FOR CONTROLLING EROSION

Lawrence Vito, 1521 SW. 21st St., Fort Lauderdale, Fla. 33305

Filed Feb. 21, 1966, Ser. No. 528,999
5 Claims. (Cl. 61—3)

Apparatus for controlling erosion caused by moving water, consisting of a plurality of six-pronged jacks each molded integrally of concrete with the six prongs extending in different directions from a common central core of the same size as the base of the prongs. Each prong is in the shape of an elongated truncated pyramid having four planar sides defining sharp corners and the prongs of the adjacent jacks piled in random order are adapted to interlock to form a self-supporting rigid vertical structure such as an artificial reef having interconnecting small sharp-edged apertures.

Keywords: Breakwater, concrete; Concrete armor unit



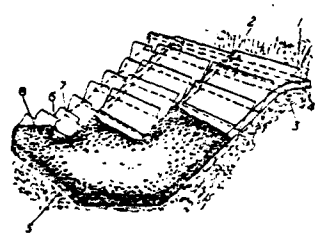
3,380,254
PROTECTIVE LININGS AND METHOD OF FORMING THE SAME IN WATERCOURSES

Mario Rossi, Bologna, Italy, assignor to S.p.A. Officine Maccaferri, Bologna, Italy

Filed Oct. 30, 1964, Ser. No. 407,746
12 Claims. (Cl. 61—7)

1. A protective lining for water courses and other exposed soil surfaces, said lining comprising a series of closed rectangular wire mesh containers which are substantially longer than they are wide and have a thickness not exceeding about ten percent of their width, said containers being joined together side by side and packed with stones the interstices of which packing are at least on the exposed face of the lining at least partially filled with a flexible binding material having flow characteristics and impervious to water, said binding material forming a protective coating on said wire mesh at least on the exposed face of the lining, each filled container forming a coherent mattress which is flexible and able to conform to the surface of the underlying soil.

Keywords: Asphalt; Gabion; Revetment, Slope protection



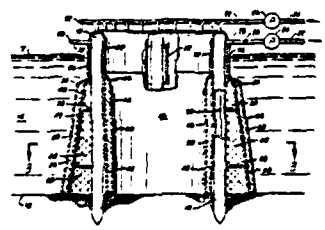
3,380,255
UNDERWATER ICE STRUCTURE AND METHOD FOR CONSTRUCTING SAME

Carl E. Schroeder, Jr., Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla., a corporation of Delaware

Filed Sept. 22, 1965, Ser. No. 489,117
15 Claims. (Cl. 61—34)

Apparatus and method for forming a cofferdam comprising a plurality of substantially vertical refrigerant-carrying tubes, thermal insulation along the opposite sides of the tubes and spaced therefrom to define an open space include the tubes, and a metal strip barrier at the upper ends of the tubes.

Keywords: Cofferdam; Offshore construction; Ice structure



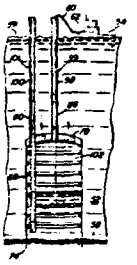
3,380,256
UNDERWATER DRILLING INSTALLATION AND METHOD OF CONSTRUCTION

Dimitri Issaiewitch Rebikoff, Fort Lauderdale, Fla., assignor to Rebikoff Oceanics, Inc., Fort Lauderdale, Fla., a corporation of Delaware

Filed Jan. 25, 1966, Ser. No. 522,869
2 Claims. (Cl. 61—46.5)

1. A method of installing a caisson on the bottom of a body of water which comprises providing a tubular caisson having one end open for being driven into the bottom of a water body and having a bulkhead extending thereacross in spaced relation to said one end for forming a working chamber therebetween and a shaft connection to said bulkhead for establishing communication between said chamber and the upper surface of the water body, immersing said caisson in the water body with said one end seated on the bottom of the water body and said bulkhead submerged in the water body, establishing communication between said chamber and the upper surface of the water body by a shaft extending from said shaft connection, and removing water from said chamber to cause the water pressure above said bulkhead to drive the caisson into the bottom of the water body.

Keywords: Offshore caisson; Offshore construction; Offshore platform, fixed



3,380,257
PORTABLE DOCK

Robert Gillman and Michael R. Linder, both of Dassel, Minn. 55325

Filed May 20, 1966, Ser. No. 551,802
5 Claims. (Cl. 61—48)

A portable dock having a reinforced support structure on which is mounted wheel supports at one extremity of the same, the wheel supports being relatively movable by sleeves mounted on the same which are raised and lowered to engage the reinforced support structure to move the dock relative to the wheel supports. The sleeves are moved by a pulley and cable system operated from a remote winch positioned on the reinforced support structure.

Keywords: Pier, mobile; Small-craft pier

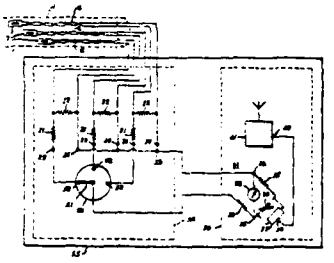
3,380,304
REMOTE STATION FOR OCEANOGRAPHIC DATA SENSING

Stephen Zysk, Stratford, Conn., and Tore E. Borg, Syracuse, N.Y., assignors to General Electric Company, a corporation of New York

Filed Nov. 26, 1965, Ser. No. 510,005
3 Claims. (Cl. 73—342)

A system for sensing the temperature of the ocean at vertically spaced points. A cable having a plurality of pairs of conductors is suspended from a buoy. Each pair of conductors is connected through a thermistor located at a different level. A read out device in the form of a stepping switch and bridge circuit is connected to a radio transmitter. Each conductor pair is connected to its individual compensating network so that signals indicative of the temperature at the various levels are sequentially transmitted.

Keywords: Bathythermograph; Buoy, instrumented; Instrument cable



(171)

3,380,520
DRILLING AND PRODUCTION PLATFORM

Floyd T. Pease, Houston, Tex., assignor to The Offshore Company, Houston, Tex., a corporation of Delaware

Filed Feb. 8, 1966, Ser. No. 525,936
14 Claims. (Cl. 166—.5)

1. A template structure for use in underwater well drilling operations and for supporting submerged devices associated with a producing well comprising:

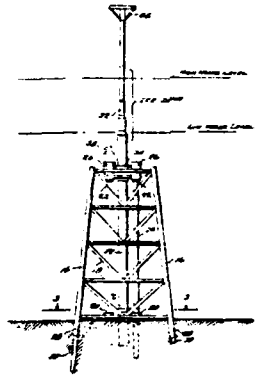
a guide and support frame structure for anchoring to an underwater floor at a drilling site,

guide sleeve means connected to said frame for guiding drive pipe means into the drilling site from a drilling rig located above the surface of the water,

wellhead protector means carried by said frame for encasing and supporting wellhead means of a completed producing well, and

a rigid control line access tube carried by said frame and communicating between the frame and the surface of the water, whereby control lines may be connected between the wellhead means and a surface station for remotely controlling well operations.

Keywords: Offshore caisson; Offshore construction; Offshore platform, fixed



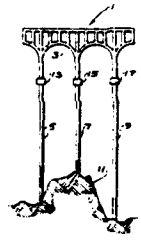
3,380,541
SONIC METHOD AND APPARATUS FOR INSTALLING COMPLEX STRUCTURES

Albert G. Bodine, Jr., 7877 Woodley Ave., Van Nuys, Calif. 91406

Filed Oct. 4, 1965, Ser. No. 492,553
18 Claims. (Cl. 175—19)

A method and apparatus is disclosed herein for driving prefab.icated structures having a plurality of longitudinal support members or piles into the earth. Independently acting acoustical driving apparatus coupled to each support member generates elastic waves in the members causing them to be driven downwardly. For asymmetrical structures, a fixed bias or balancing mass is affixed to permit the generated standing wave to be isolated from the lateral superstructure. Coupling means are provided between the longitudinal supports and the lateral superstructure for eliminating parasitic vibrations and flexure therein.

Keywords: Pile driver, vibratory



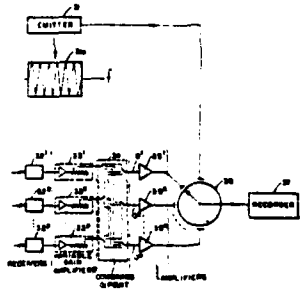
3,381,264
SUBMARINE TOPOGRAPHY

Michel Lavergne, Le Vesinet, and Jean-Paul Robert, Vaucresson, Hauts-de-Seine, France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants, Hauts-de-Seine, France

Filed Nov. 18, 1966, Ser. No. 595,506
Claims priority, application France, Nov. 19, 1965, 39,176
15 Claims. (Cl. 340—3)

The present invention relates to a novel method for directly determining the contour lines of the floor of a water body by emitting and receiving underwater sonic signals and by automatically processing these signals in order to obtain a topographical representation of the floor being measured. The present invention is also concerned with apparatus for carrying out this method.

Keywords: Sonar, depth sounder; Sonar, side looking

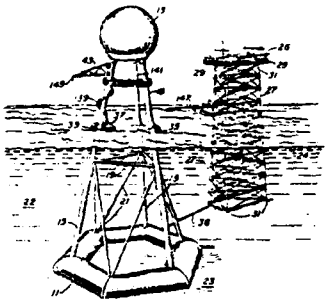


172

3,381,481
OFFSHORE STORAGE APPARATUS
Robert S. Chamberlin, Western Springs, Donald C. Stafford, Homewood, and Charles A. McDonald, Palos Heights, Ill., assignors to Chicago Bridge & Iron Company, Oak Brook, Ill., a corporation of Illinois
Filed Apr. 19, 1965, Ser. No. 448,947
18 Claims. (Cl. 61—46.5)

An offshore storage system having interconnected storage tanks, one of the tanks submerged in water and resting on the floor of the water body, while the other tank is supported above the surface of the water. Liquid passageways transport water and a water-immiscible liquid between the tank for selectively filling the tanks and providing a ballast sufficient to anchor the system in a substantially fixed position.

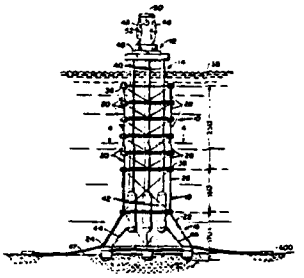
Keywords: Offshore platform, fixed; Offshore storage tank, emergent; Offshore storage tank, submerged; Seismic hydrophone array



3,381,482
MARINE DRILLING STRUCTURE
William F. Manning, Springdale, Conn., assignor to Mobil Oil Corporation, a corporation of New York
Filed May 17, 1966, Ser. No. 550,704
8 Claims. (Cl. 61—46.5)

This specification discloses a marine structure, designed to serve primarily as an offshore drilling platform, comprising a submerged bottom-supported lower portion, an upper portion supported above the surface of a body of water over the lower portion, and an extensible interconnecting portion buoyantly supporting the upper portion above the surface of the body of water and constrained by the bottom-supported lower portion. The bottom-supported lower portion of the marine structure is assembled at the site from prefabricated vertical sections while the upper portion, prior to installation, functions as a derrick barge for installing the vertical sections of the lower portion.

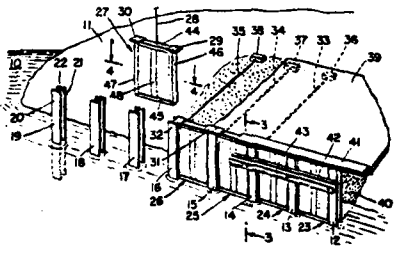
Keywords: Offshore construction; Offshore platform, fixed; Seabed foundation



3,381,483
SEA WALL AND PANEL CONSTRUCTION
Charles K. Huthsing, Jr., 1685 Shermer Road, Northbrook, Ill. 60062
Filed Sept. 15, 1966, Ser. No. 579,569
6 Claims. (Cl. 61—49)

A sea wall construction is provided formed from several I-beam columns driven into the ground off shore in parallel equidistantly spaced relationship extending above the surface of the water. A plurality of prefabricated unitary panels are successively positioned between the columns in interfitting relationship therewith to form a continuous vertical wall structure in conjunction with the columns. Overhanging end plates are provided on the top edges of each of the panels to engage the upper surfaces of the I-beams and thus assure that the top edges of all of the panels are in alignment.

Keywords: Bulkhead

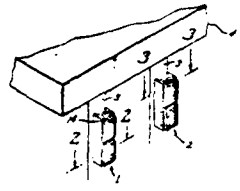


(173)

3,381,484
BUMPER
William N. Laughlin, Box 51422, Lafayette, La. 70501
Filed Sept. 15, 1965, Ser. No. 487,510
4 Claims. (Cl. 61—48)

Keywords: Offshore platform, leg; Offshore structure fender

A bumper assembly is provided for affixing to a support for an offshore platform. The assembly includes a channel shaped opening which may be formed by the flanges and web of an I-beam. Into this opening are placed a plurality of elastomeric bumper elements of identical configuration, the individual elements being aligned in face-to-face engagement. The bumper elements are retained in the opening by readily removable rods which extend between the flanges of the I-beam. Such rods may be readily removed so that individual bumper elements which are worn or damaged may be replaced.



3,382,170
METHOD OF REMOVING AN OIL FILM FROM WATER WITH SILICONE-COATED EXPANDED PERLITE
Hans Pape, Dortmund-Hoschsten, Germany, assignor to Deutsche Perlite Gesellschaft m.b.H., Dortmund, Ostenhellweg, Germany, a corporation of Germany
No Drawing. Filed Sept. 23, 1965, Ser. No. 489,764
Claims priority, application Germany, Nov. 13, 1964, D 45,841
4 Claims. (Cl. 210—36)

Keywords: Pollutant absorption

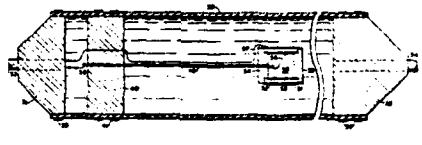
A method of removing an oil film from a body of water wherein mineral perlite, in an expanded state and coated with a silicone for an oleospecific adsorbent preferentially taking up oil from the water, is cast on the film.

No Figure

3,382,481
CANTILEVER MOUNTED HYDROPHONE
Buford M. Baker, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware
Filed June 24, 1966, Ser. No. 560,130
7 Claims. (Cl. 340—17)

Keywords: Seismic hydrophone

A marine seismometer insensitive to cable strumming forces wherein a liquid-filled flexible housing is provided with a resilient cantilever support for a pressure-responsive detector to form a vibratory mounting resonant at about 5 cycles per second.



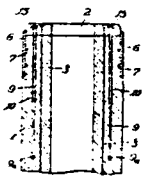
(17

3,382,680
PRESTRESSED CONCRETE PILE SECTIONS

Tamio Takano, Tokyo, Japan, assignor to Nippon Concrete Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed Sept. 21, 1965, Ser. No. 489,011
2 Claims. (Cl. 61—56)

A prestressed concrete pile section comprising a tubular body of concrete with a pair of annular metal discs at opposite ends thereof and reinforcing metal members extending between and secured to the metal discs in such a manner as to tension such reinforcing metal members and stress the concrete body is provided. Tubular metal plates are positioned on the periphery of the tubular concrete body and extend longitudinally thereof in partially axially overlapping relation with the metal discs to facilitate welding the tubular metal plates to the metal discs and strengthen end portions of the concrete body.

Keywords: Pile, concrete; Pile section connection

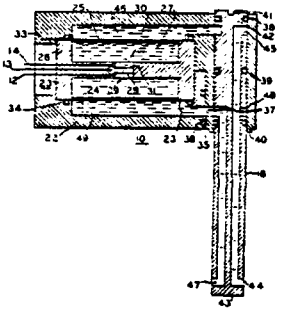


3,382,715
SOLION CURRENT METER

Charles W. Larkam, Austin, Tex., and Richard J. Miller, River Forest, Ill., assignors, by direct and mesne assignments, to the United States of America as represented by the Secretary of the Navy
Filed June 29, 1965, Ser. No. 468,170
6 Claims. (Cl. 73—212)

This invention relates to an improved flow meter including a solion transducer having first and second liquid cavities adjacent first and second flexible faces of the transducer and coupled through a rotating probe having two liquid passages therein to a moving fluid stream. The variation due to velocity pressure is received at the flexible diaphragms of the solion transducer and varied by rotation of the probe. The resulting signal is calibrated as flow in a sensing device.

Keywords: Current measurement

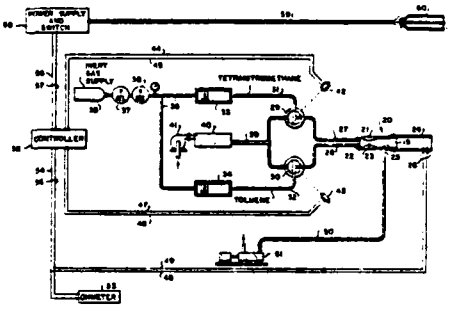


3,382,946
LIQUID SEISMIC EXPLOSIVE AND METHOD OF USING

Noyes D. Smith, Jr., and William L. Roever, Bellaire, Tex., assignors to Shell Oil Company, New York, N.Y., a corporation of Delaware
Filed Oct. 20, 1966, Ser. No. 588,053
10 Claims. (Cl. 181—.5)

A source of seismic energy for exploring water-covered areas wherein materials that are relatively explosively insensitive are mixed to form a sensitive water-immiscible liquid explosive. The mixed materials are discharged into the water and detonated to generate seismic waves.

Keywords: Seismic explosive acoustic transmitter

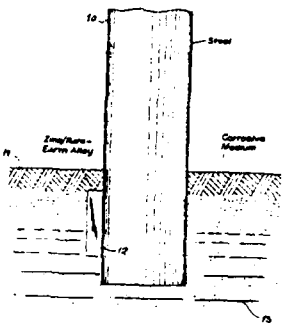


(175)

3,383,297
ZINC-RARE EARTH ALLOY ANODE FOR CATHODIC PROTECTION
Ernst Eberius, Dahlmannstr. 22, Duisburg-Hamborn, Germany
Filed Mar. 5, 1965, Ser. No. 437,474
Claims priority, application Germany, Mar. 6, 1964, A 45,417
15 Claims. (Cl. 204—148)

1. A zinc alloy consisting essentially of metallic zinc and from 0.02% to substantially 5% by weight of a rare-earth component consisting of at least one rare-earth element.

Keywords: Cathodic protection; Corrosion prevention

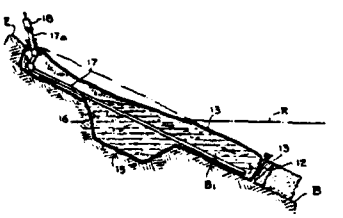


MAY 21, 1968

3,383,864
METHOD OF PROTECTING OR REPAIRING SCOURED AREAS OF A SITUS
Lee A. Turzillo, Bath, Ohio
(2078 Glengary Road, Akron, Ohio 44313)
Filed Jan. 23, 1967, Ser. No. 617,446
8 Claims. (Cl. 61—38)

Method of protecting a scoured area of an earth situs by injection of liquid grout into a flexible fabric bag, first to expand portions of the bag into a trench provided in the scoured area, and then to fill the remainder of the bag overlying the scoured area. When the grout hardens, the hardened portions thereof within the trench are utilized to anchor the bag in place.

Keywords: Concrete form; Fabric mat; Revetment; Slope protection



(7

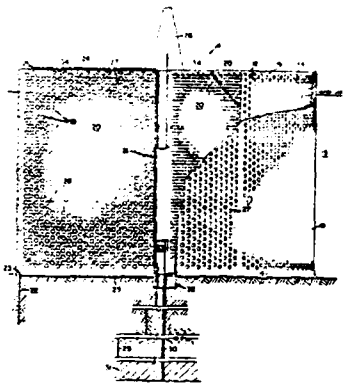
3,383,869
MARINE PIERS

Gerard Eugene Jarlan, Ottawa, Ontario, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Ontario, Canada, a corporation of Canada

Filed Jan. 18, 1965, Ser. No. 426,031
16 Claims. (Cl. 61—46)

1. A marine pier comprising an upright tubular column resting on seabed and extending above high water, said column having a diameter at least 50 feet and being apertured extensively over its surface by a large multiplicity of holes between three and four feet in diameter, the total cross sectional area of said holes comprising about 40% of the column surface area, each said hole having a tubular duct of matching diameter and length between three and four feet connected by one end with the margin of said hole, said ducts extending horizontally inwardly within the pier and providing an array of jet-guiding channels effective to produce translation of seawater in either direction when said pier is impinged by deep water waves, and means bracing said column to resist deformation under wave attack.

Keywords: Offshore caisson; Offshore platform, fixed; Seabed foundation



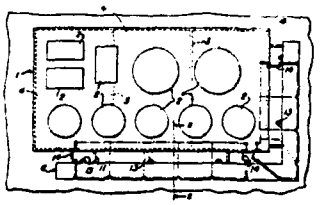
3,383,870
OFFSHORE PLATFORM FOR UNDERWATER FACILITIES

Daniel E. Costello, Elmhurst, N.Y., assignor to The Lummus Company, New York, N.Y., a corporation of Delaware

Filed Oct. 28, 1966, Ser. No. 590,347
7 Claims. (Cl. 61—48)

An offshore platform for servicing an underwater facility is provided, incorporating a floating barge. The barge supports fluid and/or slurry handling or processing equipment and is moored to the structure by means of fenders which permit motion of the barge relative the structure. Flexible fluid connections are provided between the barge and the facility.

Keywords: Offshore mooring structure; Offshore platform, fixed; Offshore platform, floating



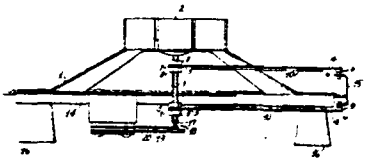
3,383,915
DEEP-WATER WAVE RECORDER

Reginald L. G. Gilbert, Dartmouth, Nova Scotia, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Ontario, Canada, a corporation of Canada

Filed Oct. 22, 1965, Ser. No. 501,632
13 Claims. (Cl. 73—170)

1. Apparatus for indicating a parameter of a reciprocating motion comprising, a stator for movement by said motion, an element freely movable relative to the stator in a direction substantially parallel to the movement of the stator, the element arranged to be urged gravitationally to a neutral position relative to said stator, a multivibrator for producing electrical pulses, switch means controlling said multivibrator to apply an electrical pulse to said element when said element is in the neutral position, the frequency of said pulses varying in accordance with the acceleration of the stator.

Keywords: Buoy, instrumented; Wave measurement



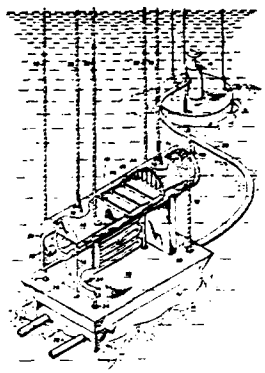
177

3,384,169
UNDERWATER LOW TEMPERATURE SEPARATION UNIT
John R. Leonard, Houston, Tex., assignor to Mobil Oil Corporation, a corporation of New York
Filed May 17, 1966, Ser. No. 550,705
10 Claims. (Cl. 166—.5)

1. A separator unit adapted to be mounted beneath the surface of a body of water, said separator unit comprising: an expansion chamber; a first conduit means for directing a high pressure natural gas into said expansion chamber; a second conduit means for drawing off cold expanded, and separated, gas from said chamber; and a heat exchange means in series with said second conduit means, said heat exchange means being a tortuous path for said cold expanded gas substantially adjacent said expansion chamber, said tortuous path being arranged so that the surrounding water of the body of water in which said separator will be submerged can flow freely in close proximity to said expanded gas whereby said cold expanded gas is warmed by the relatively warm water of said body of water to prevent the formation lines connecting said separator unit with central facilities.

Keywords: Seabed foundation; Seabed oil, process structure

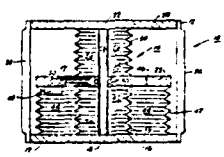
See: Re. 27,308



3,384,868
MARINE VIBRATOR DEVICE
Graydon L. Brown and Delbert W. Fair, Ponca City, Okla., assignors to Continental Oil Co., a corporation of Delaware
Filed Jan. 5, 1967, Ser. No. 607,551
11 Claims. (Cl. 340—8)

An apparatus for the generation of seismic energy waves within a water medium which consists of a rigid frame member and suspension attachments, the frame member movably securing a piston plate between upper and lower sealed bellows which are alternately pressurized by reciprocal oil flow to vibrate the piston plate relative to the frame member; the apparatus also including the employ[illegible] an additional bellows which is sealed be[illegible] the piston plate and frame member to [illegible] forming air pressure to thereby [illegible] static pressure balance.

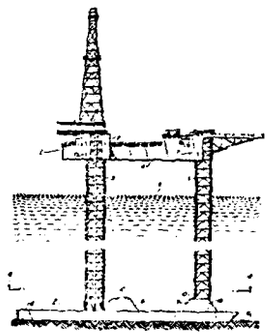
Keywords: Seismic vibratory acoustic transmitter



3,385,069
MOBILE MARINE PLATFORM APPARATUS
John C. Estes, Beaumont, Tex., assignor to Bethlehem Steel Corporation, a corporation of Delaware
Filed Oct. 7, 1966, Ser. No. 585,119
2 Claims. (Cl. 61—46.5)

The hull of a mobile marine platform comprises two or more horizontally spaced, parallel ballastable pontoons aligned parallel to the direction of tow. Bracing elements extend between and are secured to the top surfaces of the pontoons. Two vertical columns are secured to the pontoons and one vertical column to the midpoint of a bracing element. An operating platform is mounted to the columns in vertically adjustable relationship to the hull.

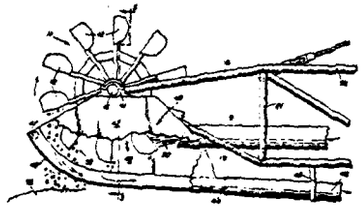
Keywords: Offshore platform, jack up; Seabed foundation



3,385,071
HANDLING FLUENT MATERIAL
Frank O. Paulson, 308 Parkwood Estates Drive, Charleston, S.C. 29407
Filed Sept. 2, 1966, Ser. No. 577,069
12 Claims. (Cl. 61—63)

1. In a hydraulic material handling system for handling a fluid mixture of liquid and solid particles having a discharge means for delivering the fluid mixture against a series of movable concave buckets wherein the mixture is separated into a predominantly liquid portion and a predominantly solid particles portion, the combination therewith of trough means to intercept said liquid portion and convey it apart from said solid particles portion.

Keywords: Dredge-spoil transport



(179)

3,385,391

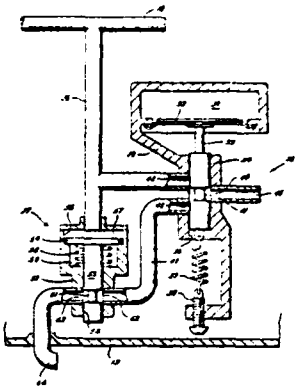
METHODS AND APPARATUS FOR CONTROLLING DEPTH OF MARINE SEISMIC CABLE

Kenneth W. McLoad, Houston, Tex., assignor to Schlumberger Technology Corporation, Houston, Tex., a corporation of Texas

Filed Aug. 24, 1966, Ser. No. 574,595
4 Claims. (Cl. 181—.5)

The particular embodiment disclosed herein as illustrative of one form of the invention is a marine seismic cable system provided with buoyancy control to maintain the cable at predetermined depth. Pressure operated control valves are positioned in separate sections throughout the length of the cable and function to admit or expel a buoyancy regulating fluid from each of the separate sections.

Keywords: Seismic streamer cable; Towed body depth control



3,385,458

BOAT STORAGE RACK

Joseph N. Gresham, 2700 Scott Blvd., Santa Clara, Calif. 95050

Filed Nov. 28, 1966, Ser. No. 597,422
7 Claims. (Cl. 214—16.4)

Keywords: Small-craft launcher; Small-craft service structure

1. A boat storage rack comprising:

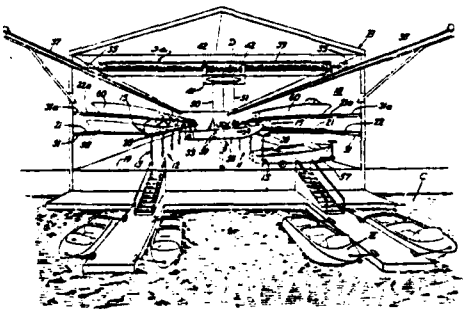
a plurality of lower leg portions mounted upright and in substantial alignment on a storage floor to define an upright plane and spaced apart to receive a boat of selected size mounted on a trailer of selected width between adjacent ones thereof,

a generally oblong frame portion of a size to receive a boat of a selected maximum size therethrough mounted upright on each lower leg portion in the plane defined by the lower leg portions, the bottom of each oblong frame portion being centered on its respective lower leg portion, adjacent oblong frame portions being laterally closely adjacent each other and firmly interconnected, the upper end of each oblong frame portion having a gap therein for free passage of a depending boat hoisting member therethrough,

a pair of elongated, parallel, horizontal lower boat support members mounted at one end thereof on the bottom of each oblong frame portion and extending therefrom in a common direction at right angles to said plane, each pair of lower boat support members being spaced apart on opposite sides of the center of their respective frame bottom by a distance sufficient to support a boat having its hull resting in longitudinally centered relation on said support members,

a generally similar pair of upper boat support members mounted similarly to the lower boat support members but on the upper side of each oblong frame portion, one thereof being located on each side of the gap in their associated oblong frame portion, the upper support members between the gaps in adjacent frame portions being spaced apart sufficiently on opposite sides of a vertical line centered between adjacent oblong frame portions to support a boat having its hull resting in longitudinally centered relation on said upper support members, and

means supporting the opposite ends of the upper and lower boat support members.

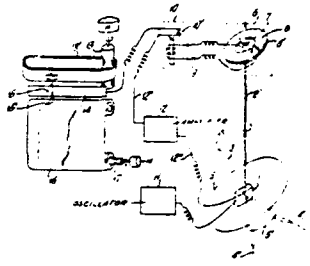


(18

3,386,075
SUPERSONIC WAVE RECORDING DEVICE
Isokazu Tanaka, Tokyo-to, Tomio Hotta, Kawaguchi-shi, and Arao Takao, Tokyo-to, Japan, assignors to Kabushiki Kaisha Koden Seisakusho, Shinagawa-ku, Tokyo-to, Japan, a company of Japan
Filed Nov. 21, 1966, Ser. No. 595,960
Claims priority, application Japan, Nov. 26, 1965, 40/72,200
2 Claims. (Cl. 340—3)

This invention relates to a supersonic device for the transmission and reception of supersonic pulses particularly useful for detecting configuration of the sea bottom, location of shoals and schools of fish and the like and embodies means for disconnecting the recorder from the receiver during a predetermined scanning angle.

Keywords: Sonar, depth sounder

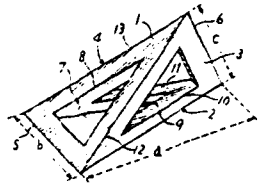


JUNE 4, 1968

3,386,250
WATER CURRENT CONTROLLING MEANS
Susumu Katayama, 1404 Kitashinchi, Kagami-cho, Kumamoto-ku, Yatsushiro-gun, Japan
Filed Dec. 1, 1964, Ser. No. 415,084
Claims priority, application Japan, Dec. 7, 1963, 38/65,530
10 Claims. (Cl. 61—3)

1. A water current control block comprising a four sided hollow body, each of said sides being in the shape of an isosceles triangle and having an opening communicating with the interior of said body the distance between the base of at least one triangular side and the opposite apex is greater than the length of said base.

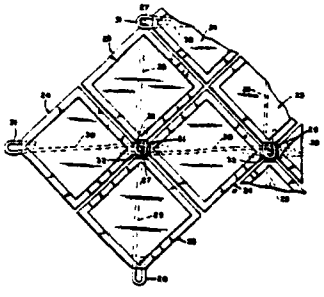
Keywords: Concrete armor unit; Revetment



3,386,252
RIP RAP STRUCTURE DEVICE
Carl P. Nelson, 511 Avenue C, Bismarck, N. Dak. 58501
Filed Sept. 8, 1966, Ser. No. 577,925
5 Claims. (Cl. 61—37)

The invention comprises a rip rap structure having a plurality of sets of rectangular blocks interconnected together at certain of their corner ends, each of said blocks in one of said sets having a hook at one corner end and an eyelet at the diagonally opposite corner end with each of said blocks in another of said sets of blocks having an eyelet at a pair of diagonally opposite corner ends with said hooks received in said eyelets to hook said blocks together.

Keywords: Concrete block; Revetment; Slope protection

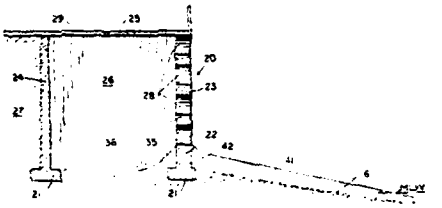


181

3,387,458
SEAWALL STRUCTURES
Gerard Eugene Jarlan, Ottawa, Ontario, Canada, assignor to Canadian Patents and Development Limited, Ottawa, Ontario, Canada, a corporation of Canada
Filed Mar. 10, 1965, Ser. No. 438,705
9 Claims. (Cl. 61—3)

A wave-absorbing seawall for controlling bottom-eroding currents tending to remove fine material from a strand when under attack by waves, comprising a landward wall and a frontal wall which is extensively apertured by a multiplicity of horizontal ducts above a substantially imperforate base portion of low height, the ducts having transverse dimensions from about 12 to 24 inches or larger, the frontal wall being spaced up to 20 feet from the landward wall to define an open surge chamber, and the action at high water being to fill the chamber freely through the ducts as a wave rises and then to cause jets of water to stream outward as the sea recedes so as to develop brisk seaward flow of surface layers in shallow water inducing underneath this flow a reverse make-up current which moves up the slope carrying entrained particles; the latter current is periodic.

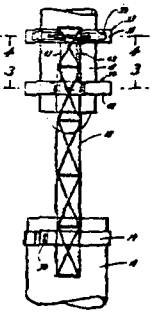
Keywords: Seawall



3,387,460
MAGNETIC PILE STABBING APPARATUS AND METHOD
Dorothy N. Morris, 110 Stephanie, Lafayette, La. 70501
Filed May 20, 1966, Ser. No. 551,688
13 Claims. (Cl. 61—53.5)

Apparatus and method for adding a magnetic responsive add-on pile section to a guide pile. In one embodiment of the invention, an electromagnet is utilized to attract and hold the pile section in a generally vertical position over the guide pile such that by lowering the pile section it is guided into the upper end of the guide pile. The invention is particularly useful in offshore installations where the driving of piling is subjected to effect of heavy seas which cause the pile section to be swung rather violently, particularly if the support for the pile section is a crane supported on a movable floating platform.

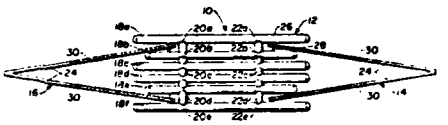
Keywords: Offshore construction; Pile placement



3,388,556
MARINE STORAGE STRUCTURE
William F. Manning, Dallas, Tex., assignor to Mobil Oil Corporation, a corporation of New York
Filed Oct. 10, 1966, Ser. No. 585,544
7 Claims. (Cl. 61—46.5)

This specification and the accompanying drawings disclose an articulated marine storage structure capable of floating substantially horizontally on the surface of a body of water for towing purposes. When installed at a marine site, a storage section thereof is supported on the marine bottom and a pair of support sections, connected to the storage section on spaced, hinged, or pivotal axes, converge above the storage section. Piles are driven through legs, or caissons, of the support section to anchor the structure, and a deck is mounted over the converged support sections, over the storage section, at least near the surface of the body of water. The storage section is disclosed as a plurality of parallel tubes interconnected by intersecting tubular sections. Also illustrated and described is a specific method for installing the structure at a site by selective flooding of the various components thereof.

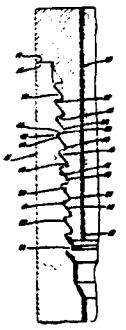
Keywords: Offshore construction; Offshore platform, fixed; Offshore storage tank, submerged; Seabed foundation



3,388,752
COMBINATION PILEDRIVER AND DRIVABLE THREADED PIPE SECTIONS
James W. E. Hanes and Carl F. Huntsinger, Ventura, Calif., assignors to Ventura Tool Company, Ventura, Calif., a corporation of California
Filed July 25, 1966, Ser. No. 567,718
8 Claims. (Cl. 173—131)

6. In a tool joint for connecting pipe sections together: a box member provided with an internal tapered thread of generally trapezoidal form; a pin member provided with an external tapered thread of generally trapezoidal form companion to and adapted to mesh with said internal tapered thread; said pin member having a drive shoulder engaging the outer end of said box member when said pin member is fully tightened within said box member, said shoulder and end being normal to the common axis of said pin member and box member; said pin member thread having a drive face normal to the axis of said pin member, a back face inclined to said drive face and a flat crest between said faces substantially parallel to said pin member axis; said box member thread having a drive face normal to the axis of said box member, a back face inclined to said drive face of said box member and a flat crest between said faces of said box member substantially parallel to said box axis; said drive faces engaging each other when said pin member shoulder and the box member end engage each other, said inclined back faces being free from contact with each other when said pin member shoulder and box member end are coengaged; the crest of said pin member thread and box member thread having clearance with the roots of said box member thread and pin member thread, respectively.

Keywords: Pile driver, impact; Pile section connection; Pile, steel



(183)

3,388,753

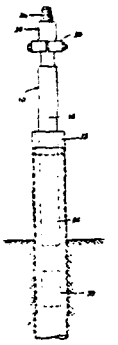
DRIVING TOOL

Allen E. Bardwell, East Brunswick, N.J., assignor to Trident Industries, Inc., Princeton, N.J., a corporation of Delaware

Filed June 16, 1965, Ser. No. 464,499
8 Claims. (Cl. 173—139)

A gravity drop driving tool constructed to increase the effectiveness thereof with less damage per operating cycle thereto and to driven items comprising an elongated casing, a heavy elongated bar member mounted in said casing for limited reciprocative movement, cushioning means at each end of said bar limiting movement, but having appreciable compression, a lifting member at one end of the casing, and tool holder at the other end of the casing.

Keywords: Pile driver, impact



3,389,332

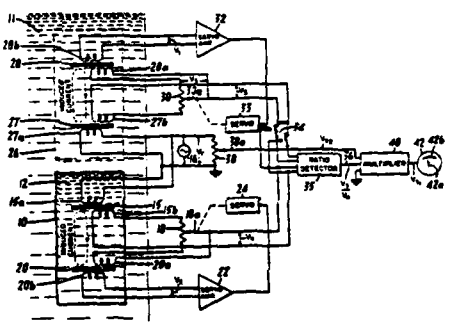
METHOD AND INDUCTIVE APPARATUS FOR MEASURING FLUID CONDUCTIVITY WITH TEMPERATURE COMPENSATING MEANS

George M. Ketcham, Mystic, Conn., assignor to General Dynamics Corporation, New York, N.Y., a corporation of Delaware

Filed Feb. 14, 1966, Ser. No. 527,027
13 Claims. (Cl. 324—30)

A device is provided for determining the salinity of a sample fluid in situ with temperature compensation by inducing an alternating current in a sample of the fluid being analyzed and in a cell immersed in the sample fluid and containing a reference fluid having known electrolytic properties. The signals from each are compared to produce a signal representing the ratio of fluid conductivity from which may be determined the ratio of the salinity of the sample to the salinity of the reference fluid.

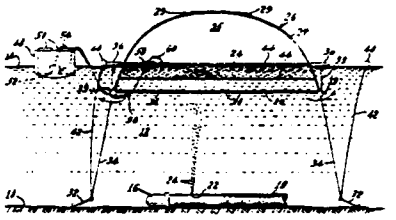
Keywords: Salinity measurement



3,389,559
FLUID RECOVERY SYSTEM AND METHOD
Campbell F. Logan, 1127 Brookwood Road, Jacksonville, Fla. 32207
Filed May 17, 1965, Ser. No. 456,263
11 Claims. (Cl. 61—1)

A method and apparatus for recovering a fluid, having a specific gravity lower than the specific gravity of water and immiscible therewith, which is leaking from a fracture in the flow line submerged in open water including the steps of locating the leak in the submerged flow line, centering with respect to the point where the fluid rises to the water surface a flexible air-impervious sheet on and just below the water surface for confining the fluid to a specific area on the water surface, floating the sheet adjacent the water surface to stabilize the sheet, weighting the sheet along its peripheral edge portion to maintain the edge portion a predetermined distance below the water surface, anchoring the sheet in a position generally vertically with respect to the leak, inflating the sheet with a gas between the sheet and the water surface to maintain the central portion of the sheet above the water surface, withdrawing the fluid confined between the sheet and the water surface, and storing the withdrawn fluid.

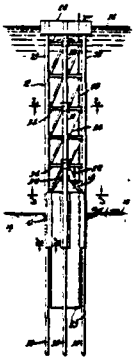
Keywords: Pollutant, suction removal; Pollutant, surface barrier



3,389,562
SALVAGEABLE MULTI-WELL OFFSHORE WELL PROTECTOR PLATFORM
George E. Mott, Metairie, and John T. Loggins, New Orleans, La., assignors to Texaco Inc., New York, N.Y., a corporation of Delaware
Filed Oct. 31, 1966, Ser. No. 590,929
10 Claims. (Cl. 61—46.5)

1. A salvageable offshore well protector platform for drilling a plurality of underwater wells from the same location into the ocean bottom comprising a caisson having a closed upper end and an open lower end, a jacket structure having at least three parallel hollow legs located along the circumference of a circle whose center corresponds to the center of said jacket structure, rigid connecting means comprising truss members for connecting said legs together, said legs extending below the top of said caisson, means for rigidly connecting the lengths of said legs extending below the top of said caisson to the outer wall of said caisson parallel to the longitudinal dimension thereof thereby transferring the loads and moments from the jacket structure to the caisson, a deck supported at the upper end of said packet structure, means for sinking the open end of said caisson into said ocean bottom, said caisson being sunk in said ocean bottom to a depth which in conjunction with the length of the jacket structure will maintain the deck at the desired height above the water surface, valve means located on the top of said caisson for releasing the water from within said caisson during sinking of the caisson into the ocean bottom, and means for pressurizing the interior of the caisson to provide an upward force on said caisson to aid in removal thereof from the ocean bottom.

Keywords: Offshore caisson; Offshore construction; Offshore platform, fixed; Pile driver, water jet; Seabed foundation



185

3,389,564
METHOD AND DEVICE FOR INSTALLATION OF STEEL PIPE BELOW THE BOTTOM OF A BODY OF WATER

Rudolf Harmstorf, Schillerstr. 45, Hamburg-Altona, Germany

Filed Nov. 22, 1965, Ser. No. 508,968
Claims priority, application Germany, Jan. 4, 1965, H 54,754
14 Claims. (Cl. 61—72.4)

The invention pertains to the installation of steel pipe below the bottom of a body of water wherein the steel pipe is inserted into plastic pipe flush embedded in position, and the steel pipe is forwardly fed into the plastic pipe at a rate equal to the forward motion of the flushing apparatus wherein the forward terminal end of the steel pipe is maintained adjacent the flushing apparatus to aid in its guidance.

Keywords: Seabed pipeline placement; Seabed trencher

JULY 2, 1968

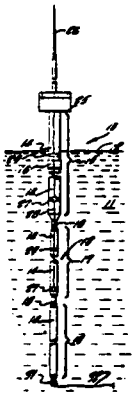
3,390,408
LONG SPAR BUOY STRUCTURE AND ERECTION METHOD

George S. Lockwood, Jr., Los Angeles, Thad Vreeland, Jr., Arcadia, and Nick Koot, South Laguna, Calif., assignors to Global Marine, Inc., Los Angeles, Calif., a corporation of Delaware

Filed May 9, 1966, Ser. No. 548,610
10 Claims. (Cl. 9—8)

A long spar buoy having an elongate, positively buoyant body which is many times greater in length than its maximum transverse dimension, in which the body is defined by a plurality of serially arranged body sections connected together in moment-free connector means which isolate bending moments developed in any one section from the adjacent sections of the body. The body sections have structures and buoyancy so related to each other than the buoy floats freely with the sections disposed vertically relative to each other.

Keywords: Buoy, instrumented

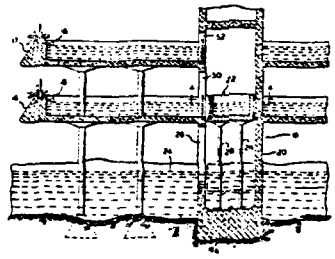


186

3,390,530
MULTI-LEVEL BOAT HARBOR
Robert L. Toben, 226 E. Ontario, Chicago, Ill. 60611
Filed Apr. 18, 1966, Ser. No. 543,163
5 Claims. (Cl. 61—46)

Multi-level harbor systems wherein hydraulically operated water-filled elevator cabs are used to transport ships between the different levels. Gates utilizing pneumatic seals control the fluid connection between the cab and the harbor facilities.

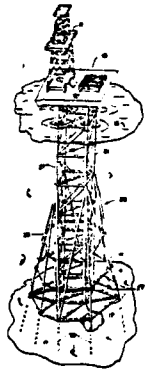
Keywords: Small-craft service structure



3,390,531
OFFSHORE DRILLING PLATFORM
Lowell P. Johnston, Metairie, La., and Dillard S. Hammett, Houston, Tex., assignors to Shell Oil Company, New York, N.Y., a corporation of Delaware
Filed Apr. 14, 1967, Ser. No. 631,092
10 Claims. (Cl. 61—46)

Tubular, battered, lateral support braces secured below the water-line to substantially vertically disposed tubular support columns for an offshore drilling platform may be made to receive foundation piles inserted and driven through the bore of said tubular support columns by affixing a pile deflecting shoe at the juncture between said battered braces and said tubular support columns and vertically driving the pile against said shoe to deflect the pile into the tubular brace and ultimately into the ocean floor.

Keywords: Offshore platform, fixed; Offshore platform, leg; Pile placement; Seabed foundation



(182)

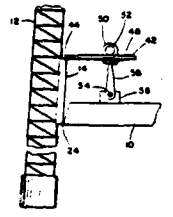
3,392,534
OFFSHORE DRILLING STRUCTURE

Kenneth A. Blenkarn, Tulsa, Okla., assignor to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware

Filed Sept. 9, 1965, Ser. No. 486,095
11 Claims. (Cl. 61—46.5)

Keywords: Offshore platform, jack up; Offshore platform, leg

This invention concerns an improvement in an offshore platform structure of the type commonly referred to as a jack-up barge. This type barge includes a platform supported by a plurality of legs which extend from the platform to the floor of the body of water. These legs pass through leg-guide means which are supported from the platform by horizontal hinge pins. Tilting means are provided for tilting each leg about its hinge pin. Resilient means, such as a very strong spring, connects the tilt assembly to the platform. The resilient means has a resiliency sufficient to provide limited restraint to movement of the leg about the hinge pin yet being sufficient to resist the rotational force about said hinge pin caused by gravity. Thus, energy can be absorbed by the resilient means without generating too great a bending moment in the leg.



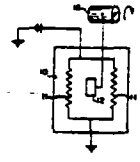
3,392,575
THERMAL PANEL FOR DETERMINING THE EFFECTS OF VARIOUS TEMPERATURES ON FOULING ORGANISMS

Sidney R. Galler, 6242 Woodcrest Ave., Baltimore, Md. 21209

Filed Oct. 21, 1965, Ser. No. 500,449
10 Claims. (Cl. 73—61.2)

Keywords: Fouling prevention

This disclosure is directed to a system of electrically heated plates for determining the growth of barnacles and other marine organisms on marine structures. Each of the plates are maintained at a different temperature and a record of the temperature is recorded while the plates are inspected periodically to determine the state of growth on each of the different plates.



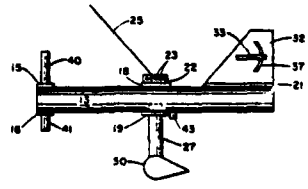
3,392,695
DEEP TOWING METHOD AND APPARATUS

Norman W. Lord, Yonkers, N.Y., assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed Dec. 16, 1966, Ser. No. 602,414
11 Claims. (Cl. 114—235)

Keywords: Towed body depth control; Towed vehicle

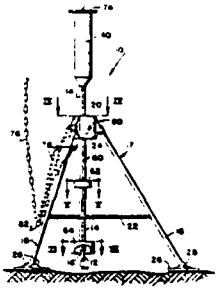
This invention consists primarily of two parallel tubes which are forced by vanes and a rigidly suspended weight to automatically tow through deep water along a path that is parallel to their axes. A shaped weight mounted on a rigid strut below the centroid provides a restorative couple that keeps the tubes horizontal. A vertical vane well behind the centroid constrains the tubes to align with the towing direction. A small nearly horizontal vane can be adjusted so that even over a speed range of several knots the unit does not tilt downward or upward but keeps the tube axes in the horizontal plane.



3,392,794
DYNAMIC DEEP-OCEAN CORE SAMPLER
Max R. Kurillo, Jr., 445 Magnolia Ave., Oxnard, Calif. 93030, and Larry R. Russell, 1740 Portsmouth, Apt. 3, Houston, Tex. 77006
Filed Mar. 28, 1966, Ser. No. 538,912
8 Claims. (Cl. 175—6)

The description discloses a deep-ocean core sampler which is self-supporting on the ocean bottom and will obtain vertical samples therefrom even though the ocean bottom may be inclined or has an irregular surface. The core sampler may include a sampling tube, a barrel which receives the sampling tube, a means for driving the sampling tube into the ocean bottom, and gimbals mounting the barrel and driving means to a support means which is adapted to rest on the ocean bottom. The barrel and driving means are free from restraint except for the gimbal connection to the support means.

Keywords: Sampler, power supply; Sampler, seabed-driven core



3,393,138
ALUMINUM ALLOY ANODE AND METHOD OF USING SAME IN CATHODIC PROTECTION
Roy A. Hine, Banbury, England, assignor to Aluminium Laboratories Limited, Montreal, Quebec, Canada, a company of Canada
No Drawing. Original application May 1, 1962, Ser. No. 191,430. Divided and this application Apr. 7, 1965, Ser. No. 446,426
Claims priority, application Great Britain, May 11, 1961, 17,277/61
2 Claims. (Cl. 204—148)

(1) A sacrificial aluminum anode for the cathodic protection of a metal body in sea water, and the method of protection using this anode, consisting essentially of tin, 0.01–2%; gallium, at least 0.005%, certain specified possible impurities; and the balance aluminum.

(2) A sacrificial aluminum anode for the cathodic protection of a metal body in sea water, and the method of protection using this anode, consisting essentially of tin, 0.01–2%; zinc, 0.5–10%; certain possible impurities; and the balance aluminum.

Keywords: Cathodic protection; Corrosion prevention

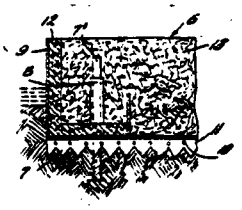
No Figure

JULY 23, 1968

3,393,520
CONTAINER AND METHOD OF BUILDING A BREAKWATER
Arthur B. Butterworth, Rushmere, Va. (R.F.D. 2, Box 277, Smithfield, Va. 23430)
Filed Sept. 7, 1965, Ser. No. 485,466
3 Claims. (Cl. 61—4)

A container and method of building a breakwater by utilizing a section of a ship as by removing the bow and stern ends of a ship and also all super structure and then cutting the remaining hull into sections as containers followed by welding plates to the cut sections to provide approximately rectangular sections to be placed end to end to form the breakwater and pinning the sections to the bottom of the sea.

Keywords: Breakwater, concrete; Breakwater, steel frame; Seabed foundation

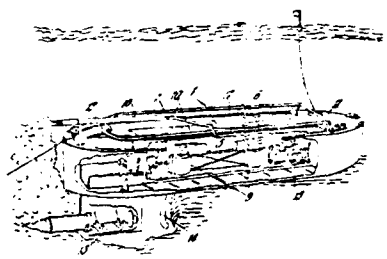


(189)

3,393,524
SUBMERGING VESSELS
Mark Terrell, Truro, Cornwall, England, assignor to Brown Brothers & Co. Limited, Edinburgh, Scotland
Filed Nov. 25, 1964, Ser. No. 413,808
15 Claims. (Cl. 61—69)

Keywords: Dredge propulsion; Dredge, submerged; Seabed pipeline placement; Seabed trencher

1. A submerging vessel comprising a pair of parts, means for adjusting the buoyancy of the vessel between a positive value and a negative value enabling the vessel to submerge and surface itself and means linking said parts together for controlled walking movements along a submerged surface with each part alernately resting on the surface whilst the other part is moved over the surface by reaction against the part resting on the surface.

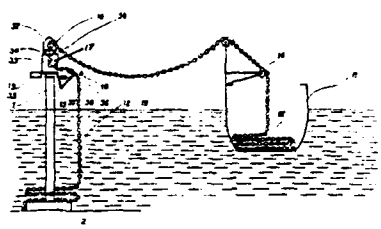


JULY 30, 1968

3,394,553
UNDERWATER ANCHORED PILLAR FOR SUPPORTING A PLATFORM
Henri Vidal, Saint-Cloud, France, assignor to L'Institut Francais du Petrole des Carburants et Lubrifiants, Rueil-Malmaison, Hauts-de-Seine, France
Filed May 23, 1966, Ser. No. 552,239
Claims priority, application France, May 26, 1965, 18,625
6 Claims. (Cl. 61—46.5)

Keywords: Offshore construction; Offshore platform, fixed; Seabed foundation

A pillar constituted by a vertically elongated structure terminated by a footing of greater cross-section designed to rest on the water-bottom. This pillar is provided with a removable anchorage formed by winding around the lower portion of the pillar an anchoring chain constituted by a plurality of heavy masses interconnected by a deformable connection, with a portion of this anchoring chain resting on the footing and forming a massive anchorage loading this footing.

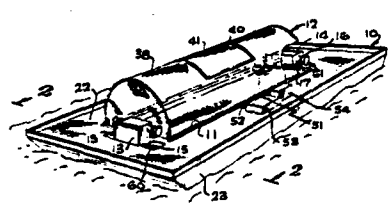


AUGUST 6, 1968

3,395,663
DEEP SEA REFUSE DISPOSAL
Richard H. Smith, San Mateo, Calif. (16831 Harkness Circle, Huntington Beach, Calif. 92647)
Filed Feb. 20, 1967, Ser. No. 617,309
6 Claims. (Cl. 114—28)

Keywords: Hopper barge

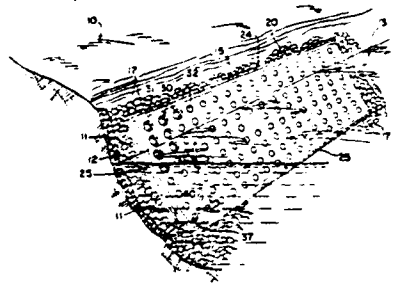
The invention relates to disposal at sea of material such as mixed trash or refuse of the character commonly collected in a community as household rubbish. More particularly, the invention relates to a means for submerging mixed refuse to a depth sufficient to render it nonbouyant and there dumping it so that the material will then sink to the ocean bottom.



3,396,542
METHOD AND ARRANGEMENTS FOR PROTECTING SHORELINES
Bruce Alexander Lamberton, Berea, Ohio, assignor to Construction Techniques, Inc., Cleveland, Ohio, a corporation of Delaware
Filed Oct. 5, 1965, Ser. No. 493,144
8 Claims. (Cl. 61—38)

A pair of large sheets of flexible material at least in part porous are joined around their entire outer periphery. The sheets have a plurality of aligned openings therethrough and the two sheets are joined together around the periphery of the openings thereby to define a fully enclosed interior space. A cementitious slurry is injected into the space between the two sheets.

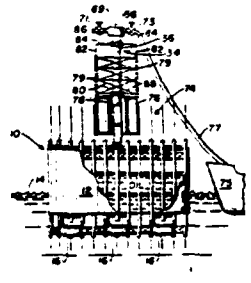
Keywords: Concrete form; Fabric mat; Revetment



3,396,544
STORAGE TANK FIXED ON THE OCEAN BOTTOM AND METHOD OF INSTALLATION
William F. Manning, Dallas, Tex., assignor to Mobil Oil Corporation, a corporation of New York
Filed Nov. 7, 1966, Ser. No. 592,412
26 Claims. (Cl. 61—46)

This specification and drawings disclose a storage tank structure to be installed on a marine bottom. Anchoring piles are preinstalled in jackets fixed to the structure, the piles being automatically released, for a later pile setting operation, as the structure comes into full contact with the marine bottom. Also disclosed is a method for lowering the main body of the storage tank structure to the marine bottom utilizing a flotation unit which becomes the buoyant base of a later installed surface terminal for servicing the bottom-anchored equipment. A rigid tether pipe provides mechanical and fluid connection between the surface terminal and the interior of the bottom storage tank structure.

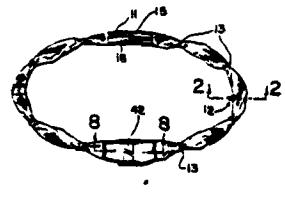
Keywords: Offshore construction; Offshore mooring structure; Offshore storage tank, submerged; Pile placement; Pile, steel; Seabed foundation



3,396,545
METHOD OF FORMING CONCRETE BODIES
Bruce Alexander Lamberton, Berea, Ohio, assignor to Construction Techniques, Inc., Cleveland, Ohio, a corporation of Delaware
Filed Apr. 7, 1965, Ser. No. 446,346
22 Claims. (Cl. 61—47)

A method of forming concrete bodies wherein a porous fabric form is provided and a cementitious grout having a water cement ratio in excess of 0.45 is pumped into the form until the form is inflated. The pumping is continued until enough of the water of the grout has been expressed outwardly through the pores of the form that the water cement ratio is reduced to around 0.30 and the grout is no longer flowable and has set up. This set up grout is now allowed to harden into a concrete body.

Keywords: Concrete armor unit; Concrete form; Offshore caisson; Offshore construction; Sandbag



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AD-A080 796 COASTAL ENGINEERING RESEARCH CENTER FORT BELVOIR VA F/G 13/2
AN ANNOTATED BIBLIOGRAPHY OF PATENTS RELATED TO COASTAL ENGINEE--ETC(U)
NOV 79 R E RAY, M D DICKEY, A M LYLES
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3 OF 6
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3,397,260
METHOD FOR ENCASING RIGID MEMBERS WITH CONCRETE

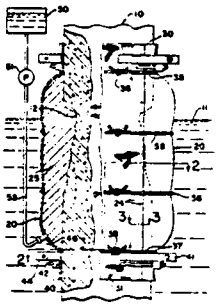
Bruce A. Lamberton, Berea, Ohio, assignor to Construction Techniques, Inc., Cleveland, Ohio, a corporation of Delaware

Continuation-in-part of application Ser. No. 446,346, Apr. 7, 1965, and a continuation of application Ser. No. 486,786, Sept. 13, 1965. This application June 26, 1967, Ser. No. 657,455
10 Claims. (Cl. 264—86)

A form comprised of a sleeve of flexible porous material is positioned around an elongated rigid member with the ends of the sleeve pressed against the members to form a space between the form and the material. A cementitious slurry of a known liquid-cement ratio is pumped into the space until a pressure is built up and the form is inflated. The pumping is continued until some of the liquid in the slurry passes outwardly through the pores of the fabric and the liquid-cement ratio is lowered.

Keywords: Concrete form; Pile protection; Structure repair

See: Re. 27,460



AUGUST 20, 1968

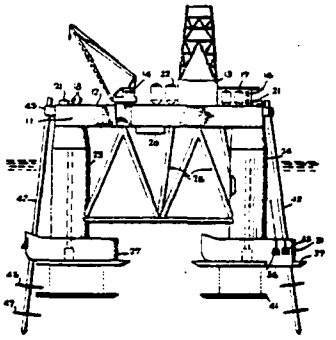
3,397,545
MARINE STRUCTURE

Clyde M. Leavitt, Pascagoula, Miss., assignor to The Ingalls Shipbuilding Corporation, Pascagoula, Miss.

Filed Oct. 11, 1965, Ser. No. 494,507
15 Claims. (Cl. 61—46.5)

A movable marine structure developed primarily for offshore oil drilling. The structure has been designed so that it may be towed to the oil drilling site and, if desired, anchored at the site or submerged into contact with the ocean floor. The structure has a triangular shape, including at the apices buoyant columns supported on separate boat-shaped footing members, each having damping plates and fins to increase the stability of the structure. The boat-shaped footing members are oriented with one of the members defining a bow of the structure and the two members define a stern. The two stern members each have their longitudinal axes inclined to the center line of the structure to facilitate the towing of the structure.

Keywords: Offshore platform, fixed; Offshore platform, floating; Seabed foundation



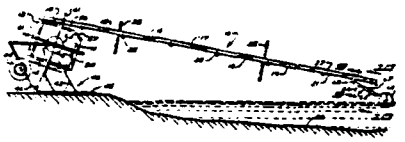
3,397,546
ROLL OUT-ROLL IN DOCK

Lyle H. Elsert and Walter C. Elsert, both of Crookston, Minn. 56716

Filed Mar. 25, 1966, Ser. No. 537,558
15 Claims. (Cl. 61—48)

A dock or walkway for use adjacent the shoreline of a body of water and which is supported above the body of water comprising a plurality of hinged sections made so that they will not move past a substantially common plane in one direction and which are made so they will hinge in the opposite direction for storage onto a reel. A walkway is initially supported on a float that is pushed out into the water and which supports the walkway above the surface of the water. The inner end of the walkway is then supported adjacent the shoreline, and individual support posts are then placed into the body of water and used to support the walkway sections independently of said float. For storage, the float is installed, the individual support posts are then removed so that the walkway is supported on the float and adjacent the shoreline, and the inner end of the walkway is attached onto a reel, the reel is rotated, and the walkway is wound onto the reel for storage.

Keywords: Pier, mobile; Small-craft pier



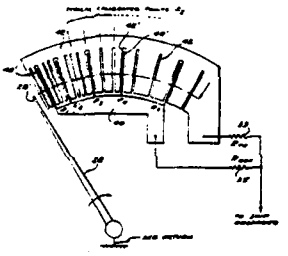
3,397,573
OCEANOGRAPHIC APPARATUS

Howard J. Carter, 2149 Anniversary Lane, Newport [illegible] Calif. 92660

Filed Oct. 23, 1965, Ser. No. 502,964
13 Claims. (Cl. 73—170)

An oceanographic apparatus for sensing and measuring temperature and depth in which a single telemetering signal is modulated as to amplitude in accordance with the sensed temperature and is interrupted to form pulses in accordance with the measured depth.

Keywords: Bathythermograph; Depth pressure measurement



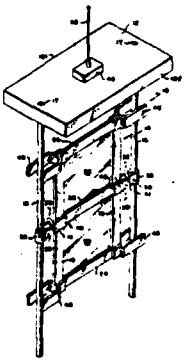
3,397,574
FLOAT FOR MEASURING WAVE CHARACTERISTICS AND DIRECTION

Herman A. Soulant, Rockville, Md., assignor to the United States of America as represented by the Secretary of the Navy

Continuation-in-part of application Ser. No. 491,469, Sept. 29, 1965. This application Nov. 14, 1967, Ser. No. 682,840
21 Claims. (Cl. 73—170)

This disclosure relates to a buoy for measuring wave characteristics. The float member moves with the surface of the wave while the tender member remains relatively stationary. The oscillatory motion between the float member and the tender member is sensed for subsequent determination of wave direction, height, period, velocity, slope and acceleration. A magnetic sensing means is utilized to indicate the magnetic direction of the wave relative to the earth.

Keywords: Buoy, instrumented; Wave measurement



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3,397,755

PNEUMATIC SEISMIC SOURCE

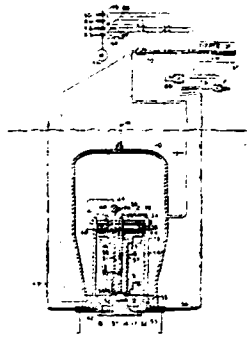
George B. Loper, Duncanville, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Continuation-in-part of application Ser. No. 354,083, Mar. 23, 1964. This application Mar. 14, 1966, Ser. No. 534,130

19 Claims. (Cl. 181—.5)

The specification discloses a repetitive marine seismic source formed by a rigid chamber for confining high pressure gases and having a controllable spool-shaped valve for rapidly releasing the high pressure gases into the water to generate an acoustic pulse. The chamber may be pressurized by injecting only compressed air or by injecting compressed air and diesel fuel for forming a combustible mixture which is ignited.

Keywords: Seismic explosive acoustic transmitter



3,398,394

MARINE SEISMIC ARRAY DEPTH CONTROL

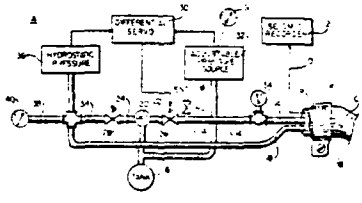
William H. Luebrmann, Dallas, and William H. Parker, Richardson, Tex., assignors to Teledyne Industries, Inc., Geotech Division, a corporation of California

Filed Dec. 9, 1966, Ser. No. 600,588

5 Claims. (Cl. 340—7)

A seismic-streamer towing and depth control apparatus which is improved by simplifying the components which are immersed outside the towing vessel to include only several plastic tubes, one inside the other, and a sleeve smoothly coupling the larger tube to the streamer for very quiet towing; and further improved by placing the remaining depth-control components all inside the vessel where their bulk is no handicap, these latter components comprising a source of gas pressure, an adjustable regulator, and ordinary pressure-differential responsive apparatus including servo means operating a control valve for introducing gas into the larger tube to cause the hydrostatic pressure measured through the smaller tube to approach the pressure from the adjustable regulator, the latter pressure representing the desired towing depth.

Keywords: Depth pressure measurement; Seismic streamer cable; Towed body depth control



3,398,395

SEISMIC AMPLIFIER SYSTEM WITH PREPROGRAMMED GAIN CONTROL

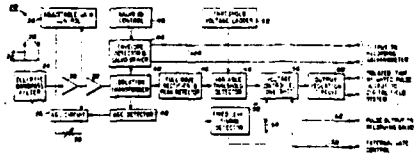
Phillip W. Ward, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed Apr. 28, 1966, Ser. No. 545,985

2 Claims. (Cl. 340—15.5)

A seismic sensor of waterborne energy including a passive band-pass filter designed to pass only energy in a frequency range characteristic of the energy to be detected to an amplifier having a relatively slow acting automatic gain control which initially amplifies the energy, then decreases in gain by means of a feedback circuit so as to essentially terminate the output of the amplifier system after a short period of time. A rectifier at the output of the amplifier produces an analog output having an initial sharp transition and an exponential decay. The output of the amplifier system is also applied to a pulse-forming circuit which initiates a pulse when the rectified output of the amplifier system exceeds a selected threshold.

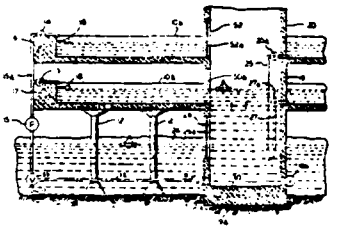
Keywords: Seismic record processor



3,398,540
MULTILEVEL BOAT HARBOR
Robert L. Toben, 226 E. Ontario, Chicago, Ill. 60611
Continuation-in-part of application Ser. No. 543,163, Apr. 18, 1966. This application Nov. 17, 1966, Ser. No. 595,230
2 Claims. (Cl. 61—46)

Multilevel boat harbor comprising one or more raised water-filled boat storing levels. A vertical transportation tower is hydraulically connected with each level. A boat enters the tower and is vertically transported between levels by varying the height of the water in the tower. The water height variation is accomplished without using any special pump for the transportation tower.

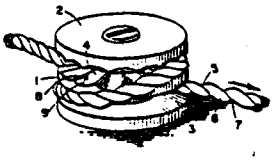
Keywords: Small-craft service structure



3,398,714
SECURING MEANS FOR ROPES, HAWSERS AND THE LIKE
Carl Olov Harry Wallin, Bergliden 20, Ektorp, Sweden, and Karl Axel Rune Kock, Ravstigen 1, Saltsjo-Duvnas, Sweden
Filed Feb. 7, 1966, Ser. No. 525,700
Claims priority, application Sweden, Feb. 9, 1965, 1,638/65
12 Claims. (Cl. 114—218)

An improved securing means for ropes, hawsers, and the like formed of twisted cords, which locks the rope without relying on frictional forces. The means comprises engaging surfaces having pronounced V-shaped waves so arranged that the crests of the waves on one engaging surface are approximately opposite the center of the troughs of the waves on the opposing engaging surface so that when a rope is secured therebetween the crests and troughs of the opposing surfaces engage the contours of the rope locking it in a substantially frictionless manner. The design of the wave-like surfaces is such that the distance between the opposing crests and troughs increases from the center of the means towards the periphery thereof, thus allowing ropes of various dimensions to be secured by the invention.

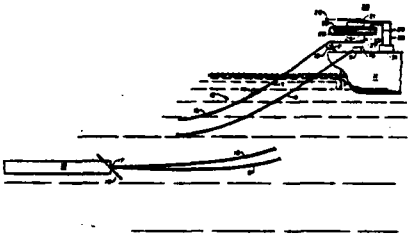
Keywords: Small-craft mooring device



3,398,715
SEISMIC UNDERWATER DETECTOR SYSTEM
Kenneth E. Berg, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware
Filed Dec. 30, 1966, Ser. No. 606,282
5 Claims. (Cl. 114—235)

An improved seismic underwater detector towing system which interposes tensioning means between the ends of a tow line, one end of which is attached to a tow vessel and the other end of which is attached to a neutrally buoyant seismic streamer. The tensioning means is adapted to maintain a constant tension in the tow line to reduce in-line, vertical and transverse movements of the streamer and thereby reduce noise generated by the towing system for permitting more accurate recording of seismic signals.

Keywords: Seismic streamer cable; Towing cable



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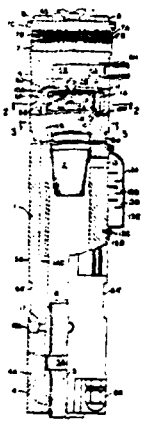
3,398,801
PNEUMATIC IMPACT HAMMER FOR ROCK CRUSHING AND PILE DRIVING
Eimatsu Kotone, 4 Aza-Nishiyama 194, Kobayashi, Takarazuka-shi, Hyogo-ken, Japan
Filed Aug. 22, 1966, Ser. No. 573,993
6 Claims. (Cl. 173—16)

A pneumatic impact hammer in which the piston is reciprocated in a cylinder which carries an impact tool for limited vibration in one end with pneumatic control means to prevent the impact piston from reciprocating when the tool is in its extended position and this is accomplished by suitable valve means which prevents all except one reciprocation of the impact piston when the impact tool is at the limit of its extended work position to prevent damage to the impact hammer and to the mechanism and also prevents loss of pneumatic pressure.

Keywords: Pile driver, impact

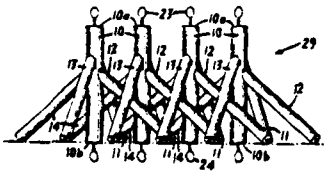


SEPTEMBER 3, 1968

3,399,535
BLOCK AND MARITIME STRUCTURE FORMED THEREFROM
Raymond Joseph O'Neill, 11 Chippewa Road, Yonkers, N.Y. 10710
Filed May 18, 1966, Ser. No. 551,025
17 Claims. (Cl. 61—3)

Maritime structures such as jetties, breakwaters or armours for other maritime structures and artificial blocks for constructing such structures. The blocks are of substantially equal dimensions within a given structure and are interlocked forming a water-permeable assembly within which the individual blocks cannot be moved laterally or vertically without moving several adjacent blocks. The individual blocks comprise a massive, central elongated body portion having a plurality of base legs extending outwardly therefrom on opposite sides thereof and extending generally longitudinally of the body portion in a common direction in a generally conical arrangement. The roots of the legs are integral with the body portion and disposed closer to an upper end of the body portion than to the lower end thereof. The roots are disposed along an axial length of the body portion which is considerably less than one-half the axial length of the central body portion. The base legs have their free ends concentric with the longitudinal axis of the body portion. The blocks are arranged into an assembly with their legs overlapping laterally and vertically interlocking the blocks on opposite sides thereof with one another to provide a completely interlocked assembly as to lateral and upward movement. The overlapping and interlocked legs define spaces comprising voids of different volumes with sufficient volume of voids to permit flows of water therethrough without creating excessive internal pressure in the structure.

Keywords: Breakwater, rubble; Concrete armor unit; Groin; Revetment



3,399,566
FLOW METER
Neil L. Brown, El Cajon, Calif., assignor to The Bissett-Berman Corporation, Santa Monica, Calif., a corporation of California
Filed Oct. 15, 1964, Ser. No. 404,025
6 Claims. (Cl. 73—204)

Keywords: Current measurement

1. A flow meter for measuring the velocity of a current of sea water, said meter including:

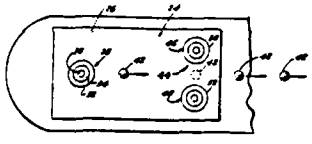
a support constructed to be disposed in said sea water and having first and second ends displaced from each other along a first line, the support being pivotable at the first end to become disposed in the direction of flow of the sea water,

a heater element mounted on said support at the first end for transferring heat into the sea water,

means interconnected with said heater element to energize said element for a particular interval of time to form a parcel of heated water adjacent the heater element,

at least a pair of pickup probes mounted on said support at the second end in symmetrically displaced relationship from the heater element relative to the first line, said probes being electrically interconnected with each other by the electrical conductivity of the sea water therebetween, and

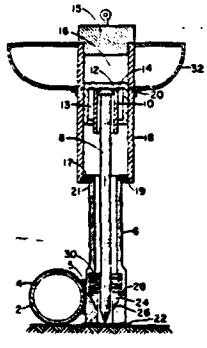
a bridge circuit electrically interconnected with said probes and responsive to the electrical conductivity between said probes for providing an indication of the passage of the parcel of heated water past the probes.



3,399,646
SUBMARINE ANCHOR ASSEMBLY
Renic P. Vincent, Tulsa, Okla., assignor to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware
Filed Aug. 14, 1967, Ser. No. 660,525
11 Claims. (Cl. 114—206)

Keywords: Embedment anchor; Seabed pipeline placement

An explosively driven submarine anchor assembly suitable for securing pipelines to the ocean floor comprises an explosively driven nail surrounded by a tubular member having a deceleration means therewithin to prevent the nail from passing entirely through the assembly and into the ocean floor. Affixed to the tubular member is a clamping means suitable for securing a pipeline to the anchor body. Means may also be used in the base of the aforesaid tubular member for preventing upward movement of the nail after it has been driven. The gun barrel(s) used in firing the nail is affixed to an air tank which causes the firing mechanism to automatically rise to the surface after the firing step has been completed.



(197)

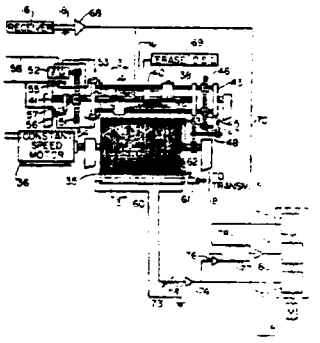
3,399,745
RECORDING ELASTIC WAVES WITH VARYING TRAVEL TIMES

Neil R. Sparks, Tulsa, Okla., assignor to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware

Filed May 4, 1967, Ser. No. 636,106
12 Claims. (Cl. 181—.5)

Seismic, acoustic, or elastic wave events traveling with constant amplitude and travel times between a moving pulsed transmitter and receiver are cancelled by reproducibly recording many received-signal traces, reproducing them simultaneously as an average or composite signal in synchronism with the next-received signals, subtracting the received and the composite signals with proper relative amplitudes to cancel the constant events, and displaying the remainder wave trace to show varying travel-time events that may otherwise be obscured. Preferably, when each received signal is reproducibly recorded for subsequent compositing, the oldest one of the previously composited traces is erased.

Keywords: Seismic record processor; Seismic survey method



SEPTEMBER 17, 1968

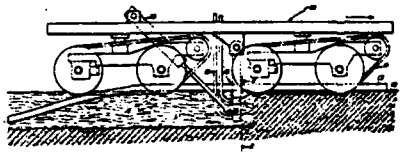
3,401,473
APPARATUS FOR MARINE EXCAVATION

Edward C. Schrom, Schenectady, N.Y., assignor to General Electric Company, a corporation of New York

Filed Apr. 29, 1966, Ser. No. 546,431
1 Claim. (Cl. 37—54)

An apparatus is disclosed for burying pipe or cable in marine floors or ocean bottoms. The apparatus comprises a carrier structure which is movable along the surface of the marine floor and carries a plurality of electrohydraulic discharge heads each comprising a pair of electrodes defining discharge gaps positioned under the elongated body to be buried. Successive electrical discharges across the discharge gaps cause the marine floor under the elongated body to become fluidized to a point where it cannot support the elongated body which then sinks into the floor where it subsequently becomes buried therein.

Keywords: Seabed cable plow; Seabed pipeline placement; Seabed trencher



19

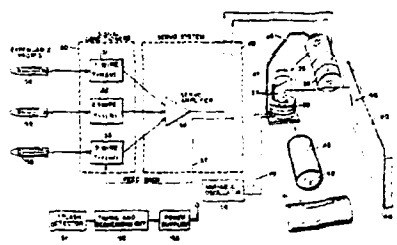
3,401,560
OCEANOGRAPHIC MEASURING AND RECORDING DEVICE

Samuel A. Francis, Marion, Mass., assignor to The Sippican Corporation, Mattapoisett, Mass., a corporation of Massachusetts

Filed Apr. 7, 1965, Ser. No. 446,342
8 Claims. (Cl. 73—170)

A signal conditioner senses changes in a property of a medium by sensing changes in an electrical signal supplied to it from the medium and indicating the property of the medium and produces a first signal derived from the changes. A reflective surface mounted for rotation about first and second perpendicular axes is rotated about the second axis by a first control servomotor under the control of the first signal and about the first axis by a second control electric motor. The electric motor is driven in accordance with time. The first control servomotor produes via a voltage divider a voltage in accordance with the rotation of the reflective surface about the second axis. The voltage and the electrical signal are compared to produce the first signal from the difference between the voltage and the first signal in a manner whereby the rotation of the reflective surface about the second axis is proportional to the magnitude of the changes in the property of the medium. A beam of light directed to the reflective surface is reflected therefrom and impinges upon a record medium. The record of light upon the record medium is developed by heat and the various components are controlled in their energization and deenergization by a controlled power source.

Keywords: Bathythermograph; Salinity measurement



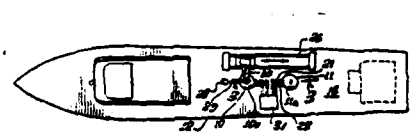
3,401,660
SEISMIC SHIP

Booth B. Strange, Houston, Tex., and Carl H. Savit, Van Nuys, and Thomas L. Slaven, Los Angeles, Calif., assignors to Western Geophysical Company of America, Los Angeles, Calif., a corporation of Delaware

Filed Apr. 21, 1967, Ser. No. 632,837
1 Claim. (Cl. 114—5)

This invention relates to a vessel for use in marine seismic surveying. A seismic surveying vessel in accordance with the present invention comprises a self-propelled vessel with a well extending from the working deck of the vessel through the hull of the vessel to below the waterline. A seismic signal transmission apparatus is removably positioned within the well. The well and signal transmission apparatus therein are so constructed and arranged in the vessel that the bottom of the ship's hull acts as a substantial baffle for the signal transmission apparatus to provide efficiency of signal transmission not heretofore possible by seismic exploration vessels except by positioning the signal transmission point at an inconvenient depth beneath the water surface.

Keywords: Seismic explosive acoustic transmitter; Seismic survey method; Seismic vibratory acoustic transmitter



(194)

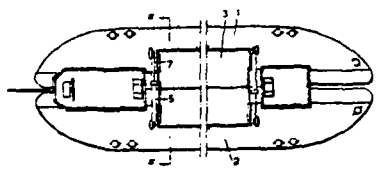
3,401,661
HOPPER BARGE

Bartele van der Werff, Capelle aan den Ijssel, Netherlands, assignor to A. Vuyk & Zonen's Scheepswerven N.V., Capelle aan den Ijssel, Netherlands, a corporation of the Netherlands

Filed Oct. 10, 1966, Ser. No. 585,607
Claims priority, application Netherlands, Oct. 22, 1965, 6513713
2 Claims. (Cl. 114—29)

A hopper barge comprising two pivotably connected floating body elements and a valved hydraulic circuit to control closing and opening of the cargo space defined between the floating body elements by hydraulic pump pressure, the power of a load in said cargo space, and the floating power of said body elements respectively.

Keywords: Hopper barge



3,401,755
DIESEL HAMMER CONVERTIBLE TO SINGLE OR DOUBLE ACTION AND HAVING ENERGY RATING INDICATING MEANS FOR EACH MODE OF OPERATION

Leonard L. Frederick, Whippany, N.J., assignor to MKT Corporation, Dover, N.J., a corporation of New Jersey

Filed Nov. 28, 1966, Ser. No. 597,412
10 Claims. (Cl. 173—20)

Keywords: Pile driver, impact

1. A diesel hammer convertible to either a gravity or gravity and air spring action, comprising the combination of

a cylinder and a ram operating as a piston in said cylinder,

said cylinder having an anvil block at the lower end cooperative with the ram for effecting compression ignition of injected fuel,

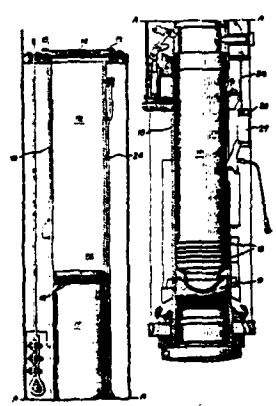
the upper end of said cylinder having means adapted to extend above and beyond the upward travel of the ram into an air compression chamber for applying accumulated pressure downward on the ram,

said means comprising an extension head closing the upper end of said air compression chamber for gravity and air spring action operation of the hammer,

means securing said head in readily removable relation on said cylinder and enabling removal of the head for operation of the hammer as a single stroke hammer, with the ram then free to project beyond the open upper end of the cylinder and providing visible means for disclosing the stroke of the ram in gravity action operation,

said means for securing the head being re-engageable with the cylinder for securing the head in position closing the upper end of the cylinder for conversion of the hammer back to gravity and air spring action operation, and

gauge means on the hammer subjected to the pressure generated in said air compression chamber when the cylinder is closed, for indicating effective energy of the hammer operating as a gravity and air spring action hammer.



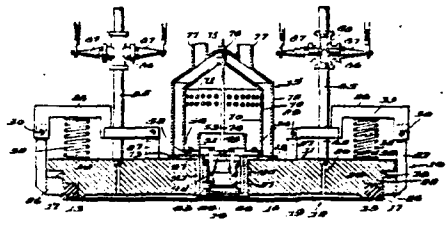
3,401,769
UNDERWATER GAS EXPLOSION SEISMIC WAVE GENERATOR

Lauren G. Kilmer, Tulsa, Okla., assignor, by mesne assignments, to Sinclair Research, Inc., New York, N.Y., a corporation of Delaware

Filed Apr. 22, 1966, Ser. No. 544,442
8 Claims. (Cl. 181—.5)

A highly effective gas exploder or impulse generator for underwater use having a rigid top and a rigid bottom which when at rest are so constructed as to form a chamber between them in which a gas explosion can take place but which are joined together such that relative vertical separating movement can take place between them. Such vertical movement is, however, also limited by a resilient fastening holding the top and bottom biased together. Internally a dynamic seal is provided positioned on the inner side of and adjacent the clearances at the joint between the top and bottom of the gas exploder. Also, in order that the resilient fastening which biases the top and bottom of the exploder together be not overly strained, a valving arrangement is employed to release the force of the exploded gas simultaneously as relative movement between the top and bottom of the exploder occurs.

Keywords: Seismic explosive acoustic transmitter



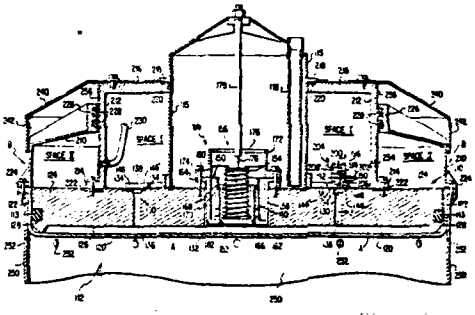
3,401,770
GAS EXPLODER APPARATUS FOR PROPAGATING SEISMIC WAVES

Lauren G. Kilmer and Phil W. Wise, Tulsa, Okla., assignors to Sinclair Research, Inc., New York, N.Y., a corporation of Delaware

Filed Feb. 6, 1967, Ser. No. 614,289
8 Claims. (Cl. 181—.5)

A seismic prospecting device comprising a gas exploder adapted for underwater use including an expansible explosion chamber having a rigid top and a rigid bottom connected together by an extensible sidewall and resilient fastening means including air cushion spring means arranged above the chamber for attaching the top and bottom together and for normally biasing the top and bottom together, resilient sealing means inside of the joint formed between the top and bottom, gas charging and ignition means for the chamber, exhaust means for the chamber, and bubble cap means above the air cushion spring means to protect it against cavitation.

Keywords: Seismic explosive acoustic transmitter



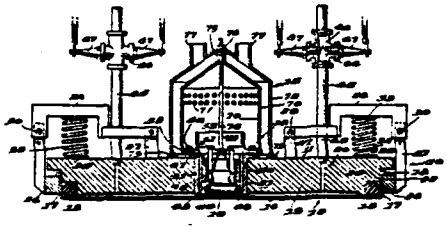
3,401,771
GAS EXPLODER APPARATUS FOR PROPAGATING SEISMIC WAVES

Lauren G. Kilmer, Tulsa, Okla., assignor to Sinclair Research, Inc., New York, N.Y., a corporation of Delaware

Continuation-in-part of application Ser. No. 544,442, Apr. 22, 1966. This application Feb. 3, 1967, Ser. No. 613,792
11 Claims. (Cl. 181—.5)

A seismic prospecting device comprising a gas exploder adapted for underwater use including an expansible explosion chamber having a rigid top and a rigid bottom connected together by an extensible sidewall and resilient fastening means including spring means, e.g. mechanical springs or air cushions, arranged on the top above the chamber for attaching the top and bottom together and for normally biasing the top and bottom together.

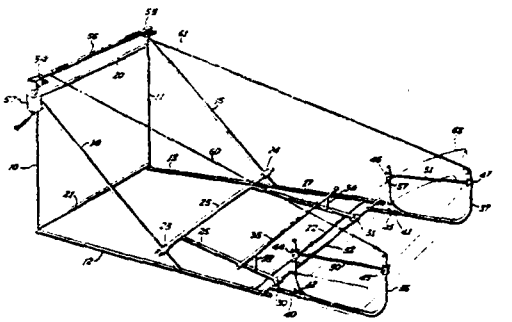
Keywords: Seismic explosive acoustic transmitter



3,401,806
BOAT HANDLING DEVICE
Nic C. Schmit, Paynesville, Minn., assignor to
Ranier L. Weis, Paynesville, Minn.
Filed Feb. 23, 1967, Ser. No. 617,986
6 Claims. (Cl. 214—1)

The present disclosure is directed to a frame mechanism that is foldable and is used to pick-up a boat from the water in a cradle at the end thereof through the use of cables and a winch, controlling the frame. The frame mechanism rotates about two different parallel axes and folds "upon itself" to bring the boat to a semi-inverted position. By restricting the rotational movement at each axis at a point short of having the center of gravity of the boat and frame pass through a vertical plane extended from each axis, the boat and frame mechanism will automatically "uncoil" itself and return the boat to its position of resting in the water when the cable is unwound. The frame is portable and may be removed from the water.

Keywords: Small-craft launcher; Small-craft service structure

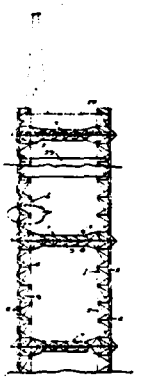


SEPTEMBER 24, 1968

3,402,557
SUPPORTING STRUCTURE FOR OFFSHORE DRILLING RIGS
Clayton R. Steele, 10421 8th Ave.,
Inglewood, Calif. 90303
Filed Aug. 24, 1966, Ser. No. 574,677
11 Claims. (Cl. 61—46.5)

A supporting structure for offshore drilling rigs in which a column structure of polygonal end aspect, having a column member at each apex joined by braces defining the sides of the column structure define the corners of the supporting structure. The column structures are joined at intervals by beam structures, each being polygonal in end aspect and having a beam member at each apex joined by braces defining the sides of the beam structure. The column structures are provided with vertical tracks which support a drilling platform within the space defined by the column and beam structures.

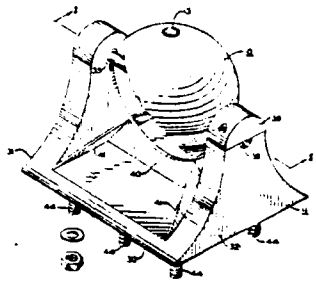
Keywords: Offshore platform, fixed



3,402,558
BOAT BUMPER
Robert H. Hellinger, Moeller Road, Rte. 7, Fort Wayne, Ind. 46806
Filed July 5, 1967, Ser. No. 651,313
2 Claims. (Cl. 61—48)

A spherical boat bumper is formed of two hemispheres of resilient material that are mounted for rotation about respective shafts. The two shafts are fastened to a main shaft so that they extend in opposite directions from the main shaft along a straight line that is perpendicular to the main shaft. The main shaft is mounted for rotation in bearings so that the spherical bumper can freely rotate in any direction.

Keywords: Pier fender

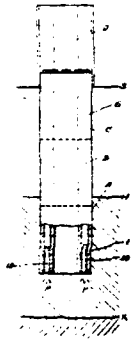


3,402,559
PROCESS OF FORMING A LARGE-DIAMETER TUBULAR PILE FOUNDATION
Yoshikiyo Fukushima, Tokyo, Japan, assignor to Nippon Concrete Kogyo Kabushiki Kaisha, Tokyo, Japan
Filed June 14, 1967, Ser. No. 646,116
Claims priority, application Japan, Sept. 26, 1966, 41/62,991
4 Claims. (Cl. 61—52)

A number of tubular concrete sections are formed at the work site one on another in vertically aligned relation to form an integral tubular concrete pile structure, which is let down vertically through the water to reach the bottom ground. Each of the tubular sections has a reinforcement including a set of vertical pipe piles, of concrete or steel, arranged in a circle. Such pipe piles in the sections are securely joined together to form multiple-length pipe piles extending from top to bottom of the pile structure. The tubular sections may be precast.

This invention relates to the forming of pile foundation and has for its object to provide a novel foundation process by which foundations required to withstand heavy loads, for example, bridge piers set in a sea or a river, can be formed easily in short periods of time.

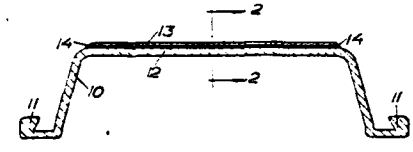
Keywords: Offshore caisson; Offshore construction; Pile, concrete; Pile driver, water jet; Pile section connection; Seabed foundation



3,402,560
ACOUSTICALLY DEADENED PILING
Karl Staffan Alm, Nacka, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden, a corporation of Sweden
Filed July 6, 1966, Ser. No. 563,222
Claims priority, application Sweden, July 13, 1965, 9,207/65
7 Claims. (Cl. 61—53)

Acoustically deadened piling is provided and including a substantially elongated solid steel pile body capable of withstanding longitudinally directed impacts and having disposed substantially over the surface of one and/or both sides thereof a coating of visco-elastic material, a thin metallic shell disposed over said coating in sandwich fashion and covering said coating, and welded points between said shell and said pile body for holding the entire structure together while still providing a spaced apart relationship between said body and said shell for accommodating said coating. Also included within the concept of said welded points is a welded seam extending along one end edge of said piling body and said shell which provides a firm driving edge for said piling body as it is driven into the ground.

Keywords: Pile, sheet; Pile, steel



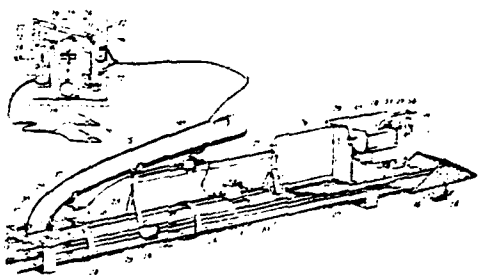
3,402,605
MEASUREMENT OF CURRENTS IN LIQUIDS

Randolph H. Baker, Efford Lodge, Plymouth Road, Crabtree, Plymouth, Devonshire, England

Filed Dec. 9, 1965, Ser. No. 522,999
9 Claims. (Cl. 73—194)

Apparatus for measuring the rate of flow of liquid by releasing movable bodies one-by-one at the upstream end of a straight guide path held horizontal and aligned with the direction of liquid flow and measuring the time taken by them to traverse the guide path.

Keywords: Current measurement



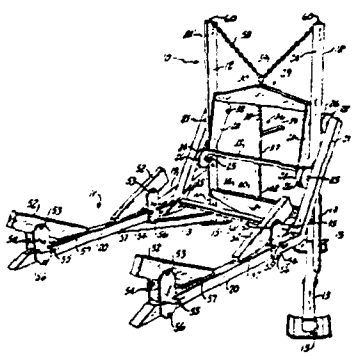
3,402,828
BOAT LIFTING AND MOORING DEVICE

Thomas R. Vilter, Oconomowoc, Wis., assignor to Hydraulic Unit Specialties Company, Pewaukee, Wis., a corporation of Wisconsin

Filed Aug. 23, 1966, Ser. No. 574,439
5 Claims. (Cl. 214—1)

A boat lifting unit supported from spaced columns has cantilever arms projecting outwardly over a stable base structure from which the columns rise. The arms are engageable under the hull of a boat to lift it out of the water during the application of power to the lifting unit to carry it upwardly along the columns.

Keywords: Small-craft launcher; Small-craft service structure



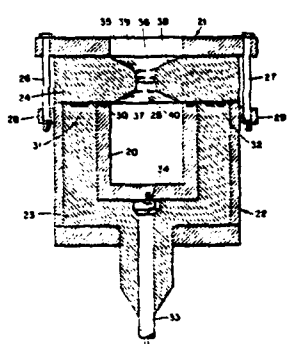
3,403,375
ACOUSTIC GENERATOR OF THE SPARK DISCHARGE TYPE

Hubert A. Wright, Jr., Lexington, Mass., and John P. Tobey, Jr., Nashua, N.H., assignors, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed Apr. 27, 1967, Ser. No. 637,033
4 Claims. (Cl. 340—12)

The present invention is directed to an impulse acoustic generator of the type which utilizes as the sound generating mechanism a controlled electrical discharge that takes place between two volumes of an electrically conductive fluid which are separated by a dielectric barrier having an aperture of small cross section formed therein.

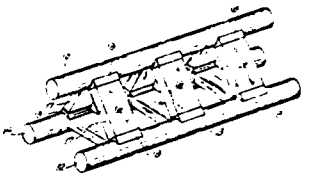
Keywords: Seismic explosive acoustic transmitter



3,404,534
ENERGY-ABSORBING CAMEL
Edward G. Cunney, 335 Bane Road, Mitchell Field, Garden City, N.Y. 11530
Filed Apr. 17, 1967, Ser. No. 632,155
5 Claims. (Cl. 61—48)

Keywords: Pier fender

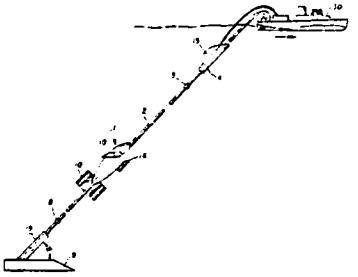
This invention is an energy-absorbing camel in the form of at least three wooden poles arranged parallel to each other. The poles are spaced from each other by a plurality of energy-absorbing spacers, e.g., rubber spacers. The camel floats in a longitudinal position at the side of a pier, both of its ends being loosely moored to the pier.



3,404,565
TOWED OCEANOGRAPHIC SENSOR SYSTEM
David T. Barry and Donald W. Branham, Dallas, Jack R. Strobel, Lewisville, and Billy J. Mullins, Carrollton, Tex., and Paul V. Hodge, Sydney, New South Wales, Australia, assignors to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware
Filed May 7, 1965, Ser. No. 454,015
6 Claims. (Cl. 73—170)

Keywords: Instrument deployment; Instrument, towed; Towed body depth control; Towing cable; Towed vehicle

An oceanographic surveying system having a towed cable maintained in an extended position by a depressor attached to one end. A vessel containing various types of sensors is slidably mounted on the towed cable for traversal along the cable between two spaced end regions. A movable hydrofoil is connected to the vessel and is movable between two positions in order to cause selective movement of the vessel up and down the cable. Shock absorbers and trigger devices are located at each of the two end regions on the cable for stopping the movement of the vessel and changing the position of the hydrofoil to change the direction of travel of the vessel along the cable. Telemetering equipment contained within the vessel transmits sensed data to a receiver located near the upper end of the towed cable.



3,404,650
SYSTEM AND APPARATUS FOR TRANSLATING AND DISCHARGING A LOAD
Robert H. Miller and Arthur J. Zuehlke, Manitowoc, Wis., assignors to Manitowoc Shipbuilding Inc., Manitowoc, Wis., a corporation of Wisconsin
Filed Apr. 14, 1965, Ser. No. 447,992
29 Claims. (Cl. 114—29)

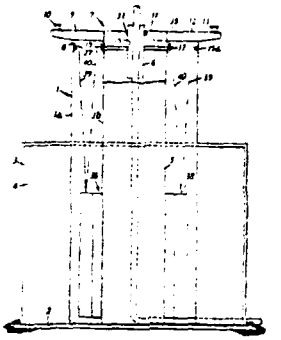
Keywords: Hopper barge

This invention relates to a vessel for moving and discharging a load comprised of a plurality of buoyant load-carrying portions pivoted together in such a manner that, when empty, the load-carrying portions inherently assume a closed bottomed receptacle. When the vessel is loaded, the load-carrying portions tend to separate to discharge the material between the load-carrying portions. Means are provided for holding the load-carrying portions in the closed position to allow the vessel to move from one location to another without discharging the material. Means are also provided for ensuring a tight fit between the load-carrying portions in order to prevent leakage of the carried material therebetween.

3,404,654
STRUCTURE CAPABLE OF BEING USED AS A MONO-MOORING
Walter Kohring, Garwood Cottage, Church Road, Rawreth, near Wickford, England
Filed Oct. 31, 1967, Ser. No. 679,421
26 Claims. (Cl. 114—230)

The invention provides a mooring structure capable of being used as a mono-mooring and having two relatively rotatable parts which in operation are engaged by an object moored thereto. Weights are attached to the rotatable parts so that relative rotation of the parts lifts the weights to provide a restoring force. The object may be a ship, nudging pontoon or fender for example, movement of which tends to cause relative rotation of the parts so that the object is subjected to the restoring force.

Keywords: Offshore mooring structure; Offshore platform, fixed

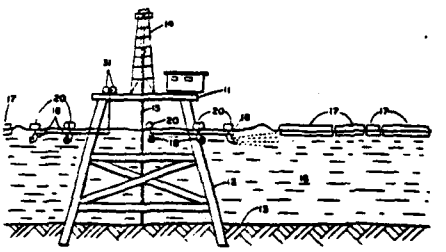


OCTOBER 15, 1968

3,405,527
PROTECTING MARINE STRUCTURES FROM FLOATING OBJECTS
John B. Farr and David E. Powley, Tulsa, Okla., assignors to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware
Filed Jan. 25, 1965, Ser. No. 427,625
3 Claims. (Cl. 61—1)

Marine structures suffer from possibility of destruction, in whole or in part, due to impacts of floating objects. While it is possible to protect against boats and similar floating objects, it is a much more difficult task to prevent impingement of floating logs, ice, etc. This invention provides protection against floating objects by repeatedly producing explosions at a number of points near but below the surface of the water to set up a standing wave pattern near the structure. This standing wave pattern inherently produces a component of force radially outward acting on any floating objects near the structure and, accordingly, tends to cause such objects to drift away from the structure. Preferably, the standing wave pattern is caused by uniform detonation of explosive at a plurality of points at an approximately uniform distance from the marine structure to be protected.

Keywords: Ice protection; Offshore structure fender



3,405,558
OCEANOGRAPHIC INSTRUMENTATION

Nick Koot, South Laguna, Calif., assignor to Global Marine Inc., Los Angeles, Calif., a corporation of Delaware

Filed May 9, 1966, Ser. No. 548,611
9 Claims. (Cl. 73—170)

An oceanographic instrumentation long spar buoy of a length which is many times greater than its maximum transverse dimension. Elongate guides extend along a portion of the length of the buoy and movably mount a carrier to the buoy. A transducer is secured to the carrier and is operatively coupled with a transmitter. The carrier is connected with a messenger line for moving it along the buoy to a desired position of the transducer along the length of the buoy.

Keywords: Buoy, instrumented; Instrument deployment

OCTOBER 22, 1968

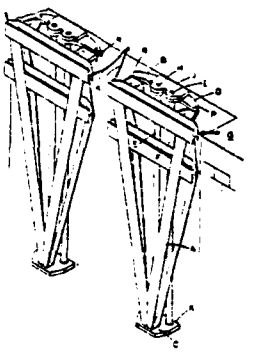
3,406,523
BUFFERS OR ENERGY ABSORBERS

John Fleetwood Baker and Philip Wilson Turner, Cambridge, England, assignors to Cambridge Fender & Engineering Company Limited, London, England, a British company

Filed July 11, 1966, Ser. No. 564,267
Claims priority, application Great Britain, Jan. 14, 1966, 1,953/66
8 Claims. (Cl. 61—48)

The buffer device includes a substantially vertically extending steel torque bar having one end thereof anchored to a base against rotation and an upwardly extending shock absorbing structure having its lower portion pivotally connected to the base. The upper end of the bar is free to rotate and the upper portion of the shock absorbing structure is movable in two directions. Means are employed to connect the upper portion of the shock absorbing structure to the upper end of the bar for imparting a torsional force to the torque bar when the upper portion of the shock absorbing structure is moved in one direction by the contacting force of a moving object.

Keywords: Pier fender



3,406,524

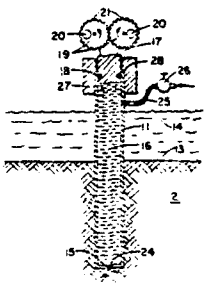
FLUID-SONIC PILE DRIVING

Kenneth A. Blenkarn and Arthur Lubinski, Tulsa, Okla., assignors to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware

Filed May 3, 1967, Ser. No. 635,918
10 Claims. (Cl. 61—53.5)

In the present invention a column of liquid (ordinarily water) is confined within the pile and extends substantially to its bottom. Sonic pressure is applied to this column, preferably setting up a standing quarter wave which applies alternating stress hydraulically at the bottom of the pile. This alternating pressure changes the transverse pile dimensions in the region of maximum interest, i.e., near the bottom of the pile. This markedly decreases skin friction and permits easier driving of the pile under any type of axial driving force.

Keywords: Offshore construction; Pile driver, vibratory; Pile driver, water jet; Pile, steel



3,406,649

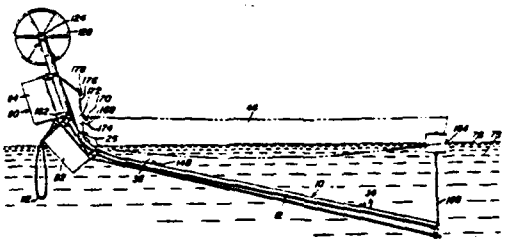
METHOD AND APPARATUS FOR DRYDOCKING A BOAT HULL OR OTHER FLOATING STRUCTURE IN A BODY OF WATER

James H. Burkhart, 1001 S. Lewis Ave., Pryor, Okla. 74361

Filed Nov. 25, 1966, Ser. No. 597,105
15 Claims. (Cl. 114—45)

A floating drydock construction having an elongated frame formed by spaced parallel frame bars secured together and having adjustable hull-supporting chocks, two buoyant tanks slidable longitudinally along the underside of the frame, a winch mechanism on one end of the frame connected to the tanks by flexible cables, and two floats connected to the other end of the frame by short lines that limit the extent of submergence of that end when the tanks are adjacent the other end. When a boat hull is disposed over the drydock in the inclined floating position, the tanks are shifted longitudinally along the frame to spaced positions causing the frame to rise to a horizontal position and lift the hull out of the water.

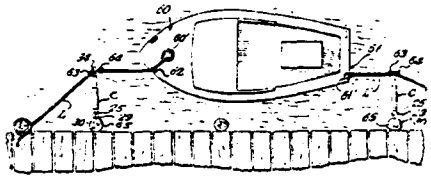
Keywords: Small-craft service structure



3,406,651
BOAT-MOORING MEANS
Joseph O. Jalbert, 401 W. Madison, Dumont, N.J. 07628
Continuation-in-part of application Ser. No. 660,116, Aug. 11, 1967. This application Jan. 12, 1968, Ser. No. 703,828
10 Claims. (Cl. 114—230)

Keywords: Small-craft mooring device

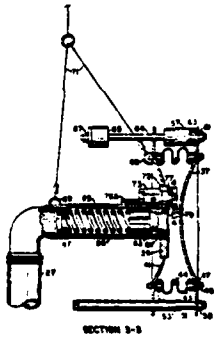
The boat mooring means of the present invention includes a novel check means which consists of at least two hollow tubes, one of which tubes is of less diameter than the other so as to snugly telescopically fit within the other hollow tube, and there is means for permitting attachment of one of the tubes relative to the other to lengthen or shorten the check means as desired. The check means further includes, at the end of one of the tubes, a hook with associated closure for opening therein, which associated closure acts automatically to close the opening in the hook when the same is attached to an eye bolt or the like that is fastened to the pilings of a wharf, dock or the like, or such eye bolt may be, of course, fastened to the wharf or dock proper. At the end of the other tube, there is an outwardly extending curved hook structure which is adapted to be hooked between two spaced apart knots in a line. There is a conventional cleat or what is known as a deck cleat adjacent the bow of the boat, and another such cleat adjacent the stern of the boat. One end of the said line is firmly attached to the cleat at both t e front and back of the boat, and the other end of each line is attached in any suitable way, such as by securing about the piling as shown. The check means has its hooked end substantially midway between two knots in the line placed 1 to 3 feet from the boat, and, as aforesaid, its other end is attached by means of an eye bolt or the like to a piling or to the wharf or dock proper. The boat with the said lines and the check means thus positioned and secured will positively be prevented from engaging the pilings or the wharf, dock or the like during any kind of weather, rough seas, storms, waves of passing ships or boats, etc.



3,406,778
SEISMIC WAVE SOURCE FOR USE AT MARINE LOCATIONS
Adelbert Barry, Franklin L. Chalmers, and John B. Pearson, Houston, Tex., assignors to Esso Production Research Company, a corporation of Delaware
Filed July 28, 1967, Ser. No. 656,866
5 Claims. (Cl. 181—.5)

Keywords: Seismic explosive acoustic transmitter

A seismic wave source includes opposed plates connected together by a gas impervious convoluted resilient bellows spring to form an expansible chamber. Combustible gas is injected into the chamber and ignited to produce a seismic pulse. Means are provided for venting to atmosphere the products of combustion.



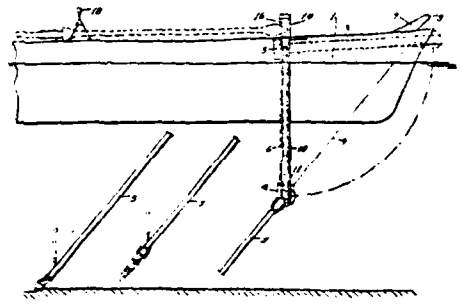
3,407,520
SUCTION DREDGER INSTALLATION, MORE PARTICULARLY A TOWED DREDGER

Jacobus Marinus Donkers, Amsterdam, Netherlands, assignor to Verschure & Co.'s, Scheepswerf en Machinefabriek N.V., Amsterdam, Netherlands, a Dutch Manufacturing company

Filed June 21, 1965, Ser. No. 465,280
Claims priority, application Netherlands, Sept. 3, 1964, 6410256
2 Claims. (Cl. 37—58)

A suction dredging assembly of U-shaped configuration pivotally connected to and straddling a vessel and carrying a sand pump to be swung into and out of the water between operative and inoperative positions. The pump has a suction opening and one arm of the U-shaped assembly provides a guide receiving one end of a suction line movable into registry and communication with the pump suction opening.

Keywords: Dredge, suction; Dredge ladder control; Pump



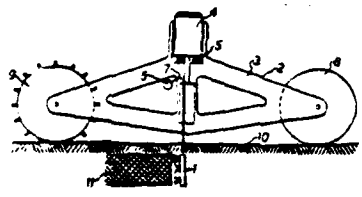
3,408,819
STABILISING UNDERWATER SURFACE

Joseph V. Delfosse, Bercham-Antwerp, Belgium, assignor to Esso Research and Engineering Company, a corporation of Delaware

Filed June 16, 1966, Ser. No. 558,067
Claims priority, application Great Britain, June 17, 1965, 25,715/65
15 Claims. (Cl. 61—35)

8. A method of stabilizing a subsurface layer of a bed of non-cohesive granular material which comprises: (a) fluidizing, at a depth below the surface layer of a non-cohesive granular material sufficient to minimize disturbance of said surface layer, a first portion of a subsurface layer of a non-cohesive granular material; (b) applying a binder material directly to the fluidized material; and (c) subsequently fluidizing and applying the binder material to a second portion of a subsurface layer of granular material to form a continuous stabilized subsurface layer.

Keywords: Seabed material placement; Seabed soil treatment; Seabed scour protection



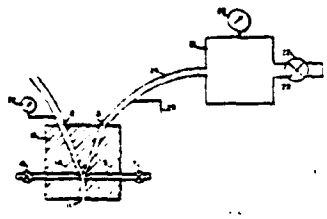
3,408,864
WAVE HEIGHT MEASURING SYSTEM

Julian Josephson, 4814 Eastern Lane, Apt. 103, Suitland, Md. 20023

Filed Aug. 18, 1966, Ser. No. 573,767
3 Claims. (Cl. 73—170)

This disclosure is directed to a wave measuring device constructed of pure-fluid logic components. The device includes a non-memory flip-flop fluid amplifier with one of two outputs suitably connected with a pressure tank. Wave pressure applied within the pressure tank operates to control the output of the fluid amplifier. A pressure indicator in the output side of the fluid amplifier indicates the wave height.

Keywords: Wave measurement



3,408,867

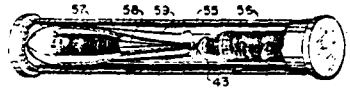
TEMPERATURE MEASURING SEA WATER PROBE, INSULATED WIRE SUITABLE THEREFOR AND METHOD OF MAKING SAME

Charles G. Henricks and William C. Le Mieux, Muskegon, Mich., assignors to Anaconda Wire and Cable Company, a corporation of Delaware

Filed Oct. 10, 1966, Ser. No. 585,430
9 Claims. (Cl. 73—339)

An apparatus for measuring the temperature of sea water has two spools encased in a probe. The spools are interconnected with a wire having a number of alternate insulating layers of epoxy enamel and nylon. Each layer of insulation is formed on the wires by a single pass.

Keywords: Bathythermograph; Instrument cable



3,409,094

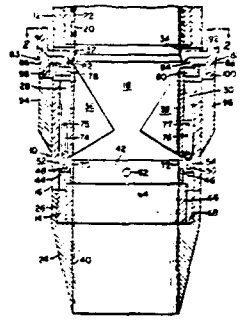
SPRING ACTUATED CORE RETAINER

Theodore R. Kretschmer, Port Hueneme, and Melvin C. Hironaka, Camarillo, Calif., assignors to the United States of America as represented by the Secretary of the Navy

Filed May 31, 1967, Ser. No. 643,325
7 Claims. (Cl. 175—242)

The invention is a spring actuated core retainer comprising a tubular body which is to be attached to the lower end of a core sampling barrel. Within the body are two rotatable closure elements connected to two torsion springs which tend to bias the closure elements so as to close the core barrel after a sample has been taken. Holding means restrain the closure elements during descent and penetration of the core barrel; upon removal of the barrell, pressure from the ocean sediment pivots the holding means from engagement with the closure means allowing the torsion springs to bias the closure elements to a closed position.

Keywords: Sampler, seabed-driven core



3,409,153

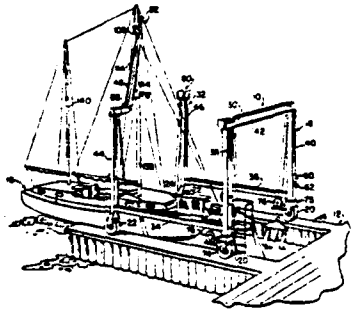
BOAT HOIST

Richard A. Stearn, Arnold Petersen, and Norbert Lenius, Sturgeon Bay, Wis., assignors to Marine Travelift, Inc., Sturgeon Bay, Wis., a corporation of Wisconsin

Filed Dec. 22, 1966, Ser. No. 603,952
9 Claims. (Cl. 214—396)

This invention relates to a boat hoist which has a frame, a boat sling connected to the frame for supporting a boat and a plurality of wheels movably supporting the frame. The frame includes a pair of columns and a catch is mounted on one of the columns. An elongated arm has one end pivotedly mounted on the other of the columns. The elongated arm has a lock mounted on the free end thereof for releasable engagement with the catch. The lock includes a fixed jaw and a movable jaw cooperative with the catch to lock the arm to the catch. A motor is connected to the arm and to the lock for raising and lowering the arm and operating the lock.

Keywords: Small-craft launcher



3,409,525

PROCESS FOR REDUCING CORROSION

Charles W. Taylor, Jr., Akron, and Daniel T. Conrad, Cuyahoga Falls, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio, a corporation of Ohio

No Drawing. Filed May 24, 1965, Ser. No. 458,436
8 Claims. (Cl. 204—147)

1. In the cathodic process of protecting ferrous articles from corrosion the improvement which comprises subjecting a ferrous article to a treatment that forms a phosphate coating on the surface of the article, then coating it with a fused resin, and then cathodically protecting said article.

Keywords: Cathodic protection; Corrosion prevention

No Figure

3,409,871

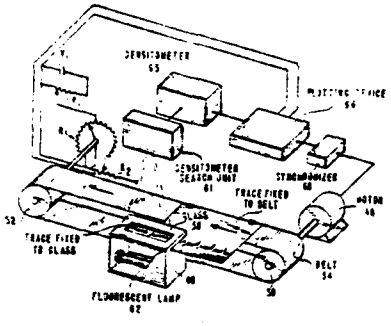
ELIMINATION OF MULTIPLE EVENTS ON SEISMOGRAMS OBTAINED AT WATER-COVERED AREAS OF THE EARTH

Harland H. Heffring, Calgary, Alberta, Canada, assignor to Esso Production Research Company, a corporation of Delaware

Filed Oct. 12, 1966, Ser. No. 586,075
7 Claims. (Cl. 340—15.5)

Ringing events are eliminated from a trace of a reproducible seismogram taken at marine locations by adjustably attenuating electrical signals produced from a trace, delaying the trace by an amount equal to the seismic wave travel time through the water layer beneath the source, and adding the original signal to the undelayed and unattenuated signal. This process is repeated using a delay equal to the travel time of waves in the water layer beneath the seismic wave detector. The appropriate attenuation and time delay is determined by autocorrelation of traces produced by vertically traveling seismic waves at the ends of a geophone spread.

Keywords: Seismic record processor



NOVEMBER 12, 1968

3,410,097

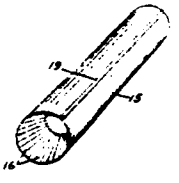
PILE CAPPING MECHANISM

Edward M. Young, 90 Gregory Ave., West Orange, N.J. 07052

Filed Mar. 21, 1966, Ser. No. 536,022
7 Claims. (Cl. 61—53)

A pile capping mechanism for rehabilitating the tops of old piles and also to provide concrete caps for new piles, the mechanism having a bottom member or portion of integral overlapping flexible fingers directed inwardly and angularly upwardly and of such length as to provide a central opening smaller than the pile and a casing extending from the bottom. The mechanism may provide U shaped side edges for the casing which are interengaged by contracting the casing and including internal braces when assembled to prevent inadvertent contraction of the casing and disengagement of the edges.

Keywords: Concrete form; Pile, wood; Structure repair



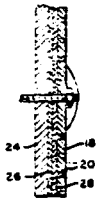
3,410,772
METHOD FOR ATTACHING IMPRESSED CURRENT ANODES FOR CATHODIC PROTECTION

Isidore Geld, Flushing, and Walter L. Miller, Lynbrook, N.Y., assignors to the United States of America as represented by the Secretary of the Navy

Filed May 28, 1965, Ser. No. 459,956
5 Claims. (Cl. 204—147)

Method of protecting a metal against electrolytic corrosion by bonding an anode to the metal with a curable electrically nonconducting adhesive in uncured state and then passing a direct current between the anode and the metal.

Keywords: Cathodic protection; Corrosion prevention



NOVEMBER 19, 1968

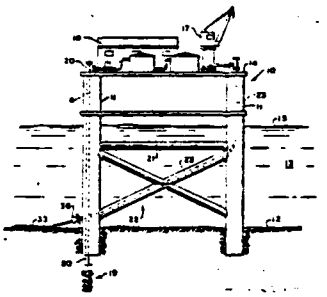
3,411,303
OFFSHORE PLATFORM WITH INTERNAL FLOWLINE

Richard D. Bates, Anchorage, Alaska, and Robert C. Visser, San Dimas, Calif., assignors to Shell Oil Company, New York, N.Y., a corporation of Delaware

Filed Dec. 28, 1966, Ser. No. 605,422
9 Claims. (Cl. 61—46)

An offshore platform provided with at least one internal passage in the structural members of the platform for receiving and protecting a flowline from ice floes, water current, debris and the like. The passage, which may be a separate tube within a leg and cross-bracing of the platform, serves to guide the flowline as it is pulled through the passage from the ocean floor up to the surface of the platform.

Keywords: Offshore platform, fixed; Offshore platform, leg



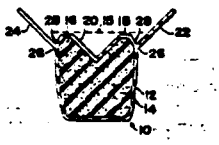
3,411,304
DOCK FENDER

Russell B. Miller, Akron, Ohio, assignor to Barberton Plastics Products, Inc., Barberton, Ohio, a corporation of Delaware

Filed May 15, 1967, Ser. No. 638,534
5 Claims. (Cl. 61—48)

A resilient body for use as a dock fender or the like having a face portion adapted to conform to the surface of the object to which the fender is to be secured. Integral flap portions extending outwardly from the body along the lateral margins of the face portion are provided to facilitate securing the fender to the object.

Keywords: Pier fender



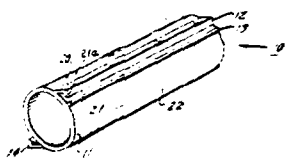
3,411,305
TUBULAR INTERLOCKING PILING FOR WALL ASSEMBLIES

Alexander A. Cella, Great Notch, N.J., assignor to Alexander A. Cella, Great Notch, and Charles Vinzant, Wharton, N.J.

Filed Jan. 23, 1967, Ser. No. 611,126
4 Claims. (Cl. 61—60)

A pile unit for use in interconnected tubular piling. The tubular unit has an interlocking element, L-shaped in cross-section, welded to the exterior surface of the tube, and a second L-shaped, interlocking element and a bead element welded to the exterior surface of the tube and spaced from the first connecting element. Two tubular units are interconnected by sliding an L-shaped element of one into an L-shaped element of a second, with the bead element of the second maintaining the engagement of the interlocking elements.

Keywords: Bulkhead; Pile, steel



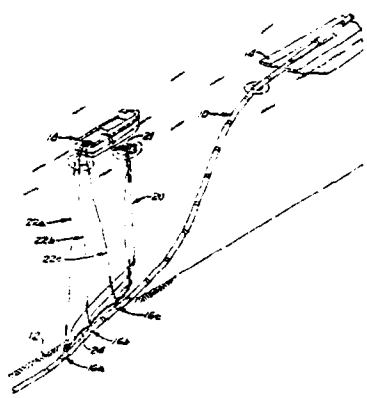
3,411,307
METHOD AND APPARATUS FOR BURYING OFFSHORE PIPELINES

Jimmie L. Huitt, Glenshaw, and James E. Knizner and Nicholas Marusov, Verona, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa., a corporation of Delaware

Filed Nov. 23, 1966, Ser. No. 596,494
8 Claims. (Cl. 61—72.4)

The invention comprises methods and apparatus to bury offshore pipelines with the use of moveable vibrating means which are selectively, rigidly fixed with respect to the pipeline. Because of the thixotropic nature of the underwater mud, the vibration permits the pipeline to fall by gravity through the liquefied mud to thereby bury itself.

Keywords: Seabed pipeline placement



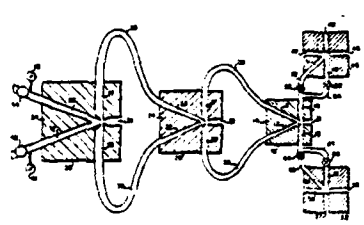
3,411,354
CURRENT METER

Julian Josephson, 4814 Eastern Lane, Apt. 103, Suitland, Md. 20023

Filed Aug. 18, 1966, Ser. No. 573,392
5 Claims. (Cl. 73—170)

This disclosure is directed to a device for determining ocean currents with a minimum of moving parts. The device includes a three stage fluid amplifier system in which the only movable parts are control valves and pressure gages none of which are directly in the current flow through the amplifier system. The fluid amplifiers are connected in series such that the outputs of one stage controls the fluid output flow through the next stage in the series, etc. The output of the last fluid amplifier stage is provided with a pressure gage and a fluid flow meter which determines the flow of the water through the last stage of the fluid amplifier system. The pressure indicated by the pressure gage and the fluid flow indicated by the flow meter represents the current flow measured by the amplifier system. In use, the device is suspended from a stationary ship, secured to a buoy, or any other means from which current flow may be determined.

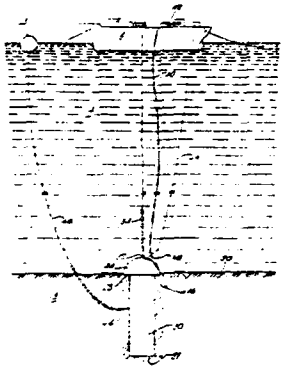
Keywords: Current measurement



3,411,473
DEEPWATER ANCHOR
George E. Mott, Metairie, and John T. Loggins, New Orleans, La., assignors to Texaco inc., New York, N.Y., a corporation of Delaware
Filed Dec. 19, 1966, Ser. No. 602,706
6 Claims. (Cl. 114—206)

The apparatus consists of an anchor for use in deep water which comprises a tubular member having an open lower end and a closed upper end. A concrete-weight cap is bonded to the top of the tubular member. Means are provided for evacuating and pressurizing the inside of the tubular member so as to aid in inserting and removing the anchor from a relatively soft, penetrable ocean bottom respectively. A pad eye is located at the top of the concrete-weight cap and another is located along the longitudinal length of the tubular member for connecting mooring chains or cables thereto.

Keywords: Embedment anchor



3,411,595
HARD FORMATION OCEAN BOTTOM SAMPLING DEVICE
Andre M. Rosfelder, La Jolla, Calif., assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Navy
Filed June 28, 1967, Ser. No. 649,751
12 Claims. (Cl. 175—6)

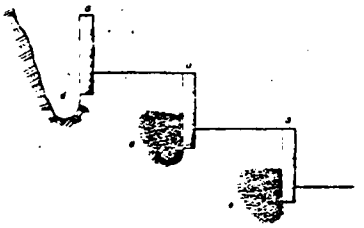
The invention is a hard formation ocean bottom sampling device which may use an explosive charge or environmental sea pressure to provide a penetration force and a spring which becomes biased during penetration to provide a pullout force from the ocean bottom. Penetration may be more effective by having perforations in the body of a sampling tube so as to pass water from its interior to the environmental sea while an expendable core cutter may be provided to facilitate pullout.

Keywords: Instrument retrieval; Power, submerged source; Sampler, power supply; Sampler, seabed-driven core

3,412,561
REED-TRENCH TERRACING
Giorgina Reid, 37—12 85th St., Jackson Heights, N.Y. 11372
Filed Dec. 16, 1965, Ser. No. 514,418
2 Claims. (Cl. 61—35)

A method of preventing the erosion of a sloping land surface is disclosed wherein the elongated planks are secured to the surface transversely of the slope, trenches are formed adjacent the planks on the upward side thereof controlling shorefront bluff erosion by establishing sand-binding vegetation quickly, with a minimum of expense and effort.

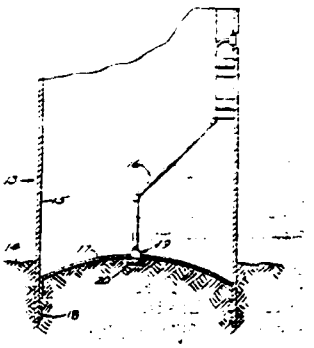
Keywords: Low-cost shore protection; Slope protection



3,412,563
JET CLOSING DEVICE
Frank W. Sharp, Jr., Houston, Tex., assignor to The Offshore Company, Houston, Tex., a corporation of Delaware
Filed Jan. 3, 1967, Ser. No. 607,000
12 Claims. (Cl. 61—46.5)

A closing device for a jet line system of a marine platform caisson. A valve housing an upper seating portion to close off the orifice of the jet line when the caisson is in a marine bottom, and a lower seating portion to seat on a keeper ring to allow flow of jet streams of fluid from the jet line when the caisson is to be raised from the marine bottom, and the valve being sized to be moved between the keeper ring and the orifice so as to permit seating of only one seating portion at a time.

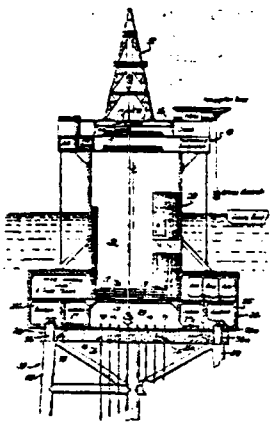
Keywords: Offshore caisson; Offshore platform, jack up; Offshore platform, leg



3,412,564
SUB-SEA WORKING AND DRILLING APPARATUS
Ross A. McClintock, Huntington Harbour, Calif., assignor to Pike Corporation of America, Los Angeles, Calif., a corporation of California
Filed Feb. 21, 1967, Ser. No. 617,580
2 Claims. (Cl. 61—46.5)

Apparatus and method for stabilizing floating structures, specifically semi-submersible structures by coupling them to a permanent submerged structure constructed on the ocean floor at a desired location. The apparatus as described comprises a platform supported by a floatable hollow cylindrical chamber having ballast tanks attached thereto and a stationary submerged base structure affixed to the ocean floor and extending upwardly therefrom to a predetermined depth below the ocean surface. To stabilize the platform, the cylinder is coupled to the submerged base structure. The apparatus is described as being particularly applicable for stabilizing drilling platforms for offshore oil drilling operations.

Keywords: Offshore platform, fixed; Offshore platform, floating



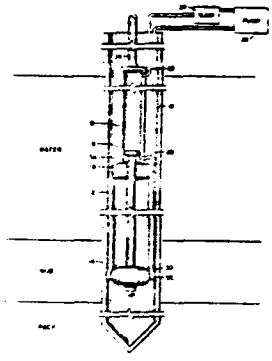
3,412,565
METHOD OF STRENGTHENING FOUNDATION PILING

Kenneth B. Lindsey, Houston, Garvin W. Cooper, Pasadena, and William A. Pearce, Houston, Tex., assignors to Continental Oil Company, Ponca City, Okla., a corporation of Delaware

Filed Oct. 3, 1966, Ser. No. 583,583
9 Claims. (Cl. 61—53.5)

A method for reinforcing foundation piling which are positioned in the ground. Said method comprises positioning a reinforcing member inside the pile at a point of localized stress and rigidly securing said reinforcing member to the inside of said pile by expanding the reinforcing member into frictional engagement with the interior wall of said pile or by securing by chemical or mechanical means.

Keywords: Pile protection; Seabed foundation; Structure repair



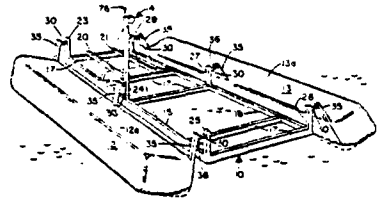
3,412,702
FLOATING DRY DOCK FOR SMALL BOATS

James M. Mann, 617 N. Florida Ave., Tarpon Springs, Fla. 33589

Filed July 5, 1966, Ser. No. 562,902
1 Claim. (Cl. 114—46)

A floating dry dock for small boats comprises an elongated cradle adapted to support a boat thereon. Two elongated floats or pontoons extend along opposite sides of the cradle and are flexibly connected with the cradle by laterally projecting arms attached thereto and spaced therealong, the arms being pivotally connected to the cradle at the outer ends thereof so that when the pontoons rotate about their longitudinal axes towards one another the arms are swung to lower the cradle into the water and when the pontoons rotate about their axes outwardly from one another the arms swing in an upright position to raise the cradle from the water. The pontoons rotate about their axes when they are drawn towards one another and about the pivotal connection between the arms and the cradle by a drum and cable arrangement which also controls spreading of the pontoons from one another which causes lowering the cradle into the water.

Keywords: Small-craft service structure



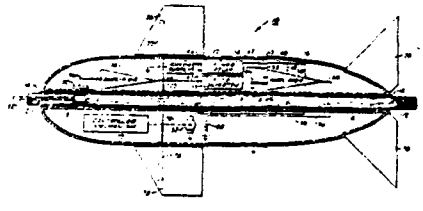
3,412,704
CABLE DEPTH CONTROLLER

Paul L. Buller and William L. Chapman, Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla., a corporation of Delaware

Filed Nov. 6, 1967, Ser. No. 680,752
13 Claims. (Cl. 114—235)

Apparatus for remotely adjustable cable depth control wherein one or more paravanes employed to maintain a cable or seismic streamer at a predetermined depth are adjustable by means of a remotely energized transmission linkage. A paravane having adjustable diving planes connected for positive or negative attack angles, and wherein a remotely generated signal transmission is detected at the paravane and the detected signal is employed to energize and to operate depth adjusting structure which will respond to a different, predetermined ambient water pressure to maintain the paravane at a different desired depth.

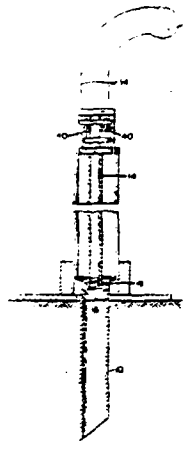
Keywords: Depth pressure measurement; Seismic streamer cable; Towed body depth control



3,412,814
HYDROSTATIC CORER
Andre M. Rosfelder, La Jolla, Calif., assignor, by mesne assignments, to the United States of America
Filed June 28, 1967, Ser. No. 650,164
10 Claims. (Cl. 175—6)

The present invention relates to a hydrostatic corer which may be used for obtaining core samples from the bottom of a body of water such as the ocean. The corer includes a coring barrel which at a selected time is powered by hydrostatic pressure within the body of water. The hydrostatic motive force is obtained by providing a vacuum chamber within the coring barrel, this vacuum chamber normally being at atmospheric pressure. A pair of pistons seal the top and bottom of the vacuum chamber, the top piston being adapted to drive the coring barrel into the water bottom and the bottom piston being adapted to remain stationary on the water bottom and undergoing piston action within the coring barrel during the barrel's penetration. Stability of the hydrostatic corer is accomplished by a skirt at the bottom of the corer which is subjected to a vacuum to draw it tight against the water bottom prior to penetration of the coring barrel.

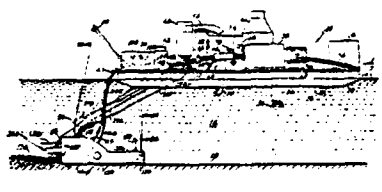
Keywords: Power, submerged source; Sampler, power supply; Sampler, seabed-driven core



3,412,862
METHOD AND APPARATUS FOR CLEANING AREAS OVERLAIN BY A WATER BODY
Merle P. Chaplin, 609 Driver Ave., Winter Park, Fla. 32789
Filed Sept. 7, 1967, Ser. No. 666,090
15 Claims. (Cl. 210—73)

A method and apparatus for cleaning a water covered sand bottom basin which has been polluted and contaminated by deposited materials lying on the bottom of the basin which includes the steps of moving a generally enclosed housing, containing a plurality of spaced fluid jets directed generally downwardly and a baffle positioned above the jets, over the polluted and contaminated sand bottom of the basin by the use of a pair of powered wheels positioned within the housing; producing a suction on the bottom of the contaminated and polluted basin within the housing to laden the deposited materials and sand within water moving into the housing and upward from the bottom of the basin; penetrating the contaminated and polluted bottom of the basin by the use of the pressurized fluid jets such that additional deposited materials and sand become laden within the water and fluid mixture moving upwardly from the bottom of the basin; changing the direction of flow and decreasing the rate of flow of the upwardly moving laden mixture by use of the baffle to permit the sand to become generally separated by settling on the bottom of the basin from the remainder of the laden mixture; removing the remainder of the laden mixture from the housing to the surface of the water by suction pumping; centrifugally separating the water and fluid from the remainder of the laden mixture; discharging the separated water and fluid back into the basin; and pumping the remainder of the laden mixture to a disposal area outwardly of the basin.

Keywords: Dredge, suction; Dredge intake; Dredge propulsion; Water plant removal



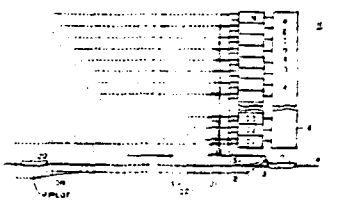
3,413,596
CONTINUOUS WAVE MARINE SEISMIC EXPLORATION

Milo M. Backus and Buford M. Baker, Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed Dec. 8, 1966, Ser. No. 600,101
2 Claims. (Cl. 340—7)

Monofrequency seismic energy varies in frequency from one limit to the other in the lower portion of the seismic frequency spectrum while the source thereof moves along a traverse. Cross-correlation between a pilot signal and reflection signals provide spatial averaging of the subsurface refractory horizons.

Keywords: Seismic survey method



DECEMBER 3, 1968

3,414,511
METHOD OF REMOVING OIL FROM POLLUTED WATER USING EXPANDED VERMICULITE

Donald O. Hitzman, Bartlesville, Okla., assignor to Phillips Petroleum Company, a corporation of Delaware

No Drawing. Filed Mar. 10, 1967, Ser. No. 622,097
8 Claims. (Cl. 210—40)

Exfoliated vermiculite is floated on oil polluted water to absorb oil which is removed from the water by skimming the vermiculite from the water.

Keywords: Pollutant absorption

No Figure

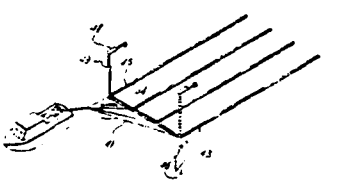
3,414,874
SEISMIC SURVEY SYSTEMS

Kenneth W. McLoad, Houston, Tex., assignor to Schlumberger Technology Corporation, Houston, Tex., a corporation of Texas

Filed Feb. 24, 1967, Ser. No. 618,383
6 Claims. (Cl. 340—7)

A marine seismic cable system, which is provided with a plurality of transducers arranged along its length, is towed behind a ship for conducting a seismic survey. The transducers are constructed so that upon energization by shipboard apparatus, they act as individual sound sources which when arranged in the elongated configuration of a cable provide an elongated, cylindrical acoustical source. The same transducers are also adapted to receive acoustical energy reflected from subsurface earth formations and transmit a signal indicative thereof to a recording apparatus aboard the ship.

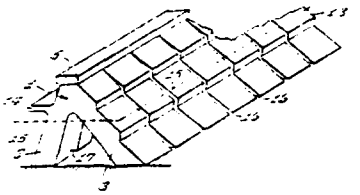
Keywords: Seismic acoustic transmitter array; Seismic hydrophone array; Seismic streamer cable; Seismic survey method; Seismic vibratory acoustic transmitter



3,415,061
SEA WALL STRUCTURE
Alexandre John Staempfli, Mies, Waadt, Switzerland
Continuation-in-part of application Ser. No. 136,551, Sept. 7, 1961. This application Aug. 24, 1966, Ser. No. 574,588
6 Claims. (Cl. 51—4)

A sea wall type structure formed of a series of individual inverted V-shaped structural elements the lower ends of which are supported by an underwater ground surface. The convergent upper end portions of the elements are located above the water and are interconnected by a continuous superstructure. The forward legs are directed toward the open sea and the rearward legs are directed toward the sheltered water. Each series of legs is spaced to define a series of turbulence producing upwardly convergent outer slots and similarly upwardly convergent turbulence producing inner slots for dissipating the energy in the water flowing therethrough. Wave breaking projections are optionally provided on the forward legs, or the entire structure may serve as a wave breaking protector for a conventional structure. In the latter case, the superstructure operates as a wave breaking device.

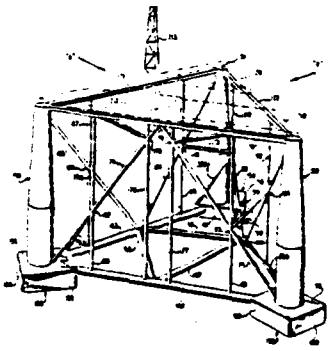
Keywords: Breakwater, concrete; Pier, fixed; Seawall



3,415,067
METHOD OF OPERATING A SUBMERSIBLE VESSEL FOR SUBMARINE OPERATIONS
Paul A. Wolff, Oklahoma City, Okla., assignor to Kerr-McGee Corporation, a corporation of Delaware
Original application Dec. 5, 1963, Ser. No. 328,301, now Patent No. 3,246,476. Divided and this application Jan. 11, 1966, Ser. No. 555,653
1 Claim. (Cl. 61—46.5)

Submersible vessels for submarine operations include a plurality of upstanding stabilizing members located at apices of substantial polygonal stabilizing patterns. Methods of operating such vessels are disclosed, including ballasting to establish maximum permissible loading as determined by the load-bearing strength of the land bottom, and deballasting to a backoff value less than the maximum permissible loading but at least three times greater than cyclic loading anticipated to be applied by winds, waves and currents.

Keywords: Offshore construction; Offshore platform, fixed; Seabed foundation; Seabed soil treatment

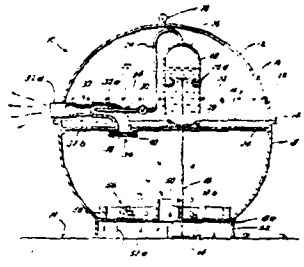


3,415,068
SUBMARINE DEVICE
Sam R. Casey, Jr., 2233 Troon Road 77019, and William L. Eddleman, Sr., 2810 Prescott 77025, both of Houston, Tex.
Filed Apr. 18, 1966, Ser. No. 543,164
9 Claims. (Cl. 61—69)

In submarine device, apparatus preferably including a body adapted to be flooded to sink to the bottom of a body of water; means responsive to arrival thereat to agitate the bottom and collect benthonic materials therefrom with a compartment during lateral movement on the bottom; means for generating a gas accumulated therein to obtain positive buoyancy and initiating a rise to the surface; said submarine device being non-rigid and constructed with a yieldable structure subjected to pressure variations without consequence and without crushing or failure.

Keywords: Instrument deployment; Instrument retrieval; Sampler, power supply; Sampler, seabed grab

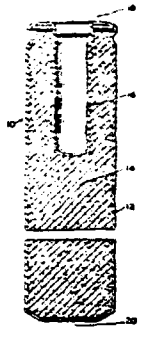
U.S. Cl. X.R. 115-11; 37-56



3,415,188
SEA WATER DESTRUCTIBLE BOOSTER ASSEMBLY
Thomas Z. Ball, New Ringgold, Pa., assignor to Atlas Chemical Industries, Inc., Wilmington, Del., a corporation of Delaware
Filed Mar. 31, 1967, Ser. No. 627,481
8 Claims. (Cl. 102—24)

In the art of explosive boosters, a sea water destructible member positioned in barrier relation with an explosive booster assembly to render same sea water destructible in the event of misfire and which is thus particularly useful for offshore seismographic exploration.

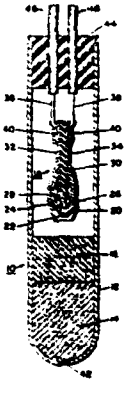
Keywords: Seismic explosive acoustic transmitter



3,415,189
WATER DESTRUCTIBLE ELECTRIC MATCH
William D. Trevorrow, Tamaqua, Pa., assignor to Atlas Chemical Industries, Inc., Wilmington, Del., a corporation of Delaware
Filed Mar. 24, 1967, Ser. No. 625,736
12 Claims. (Cl. 102—28)

In the art of electric matches and electric explosion initiators, a water destructible electric match having a coating or film generally characterized as a water dispersible polymeric material which renders the match ineffective in the event of misfire and which is particularly useful for offshore seismographic prospecting.

Keywords: Seismic explosive acoustic transmitter



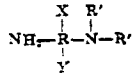
3,415,745

METHOD OF FLOCCULATING A WATER-BORNE OIL SLICK

Henry V. Isaacson, Oak Forest, and David W. Young, Homewood, Ill., assignors to Sinclair Research, Inc., New York, N.Y., a corporation of Delaware

No Drawing. Filed Nov. 7, 1966, Ser. No. 592,303
9 Claims. (Cl. 210—54)

1. A method of flocculating a water-borne oil slick which comprises applying to said oil slick a quaternary ammonium salt of a tertiary amine-containing, imidic reaction product of (A) a vinyl monomer-maleic anhydride polymer having an average molecular weight of about 600 to 100,000 and a molar ratio of vinyl monomer to maleic anhydride of about 1:1 to 4:1, said vinyl monomer being a monovinyl compound of 2 to about 12 carbon atoms and (B) a polyamine corresponding to the formula:



where X is hydrogen or

Y is hydrogen or

R is alkylene of 1 to about 10 carbon atoms and R' is a monovalent hydrocarbon radical of 1 to about 8 carbon atoms, about 80 to 100 percent of the maleic anhydride units of said polymer being imidated with said polyamine.

Keywords: Pollutant coalescence

U.S. Cl. X.R. 260-78.5

No Figure

DECEMBER 17, 1968

3,416,621

ACOUSTIC WAVE PRODUCING DEVICE

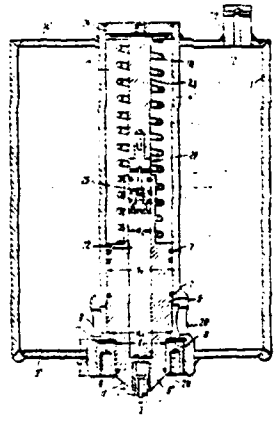
Mikhail Ivanovich Balashkand, Akademicheskaya ul. 8, kv. 13, Monino, Moskovskoi oblasti, U.S.S.R.; Georgy Stepanovich Evdokimov, Novoselskoe shosse, 35a, kv. 48, Ramenskoe, Moskovskoi oblasti, U.S.S.R; Berta Lvovna Kaplan, ulitsa Vorontsovskaya, 24/6, kv. 12, Moscow, U.S.S.R.; Sergei Alexandrovich Lovlya, 1 Radiatorskaya, 97, kv. 2, Moscow, U.S.S.R.; Leonid Nikolaevich Solodilov, ul. Studencheskaya, 32, kv. 145, Moscow, U.S.S.R., and Oleg Lanfanovich Chen, Podolsky raion, p. Vostryakovo, 1 Sadovaya ulitsa, 2, Moskovskaya oblasti, U.S.S.R.

Filed Mar. 6, 1967, Ser. No. 620,959
3 Claims. (Cl. 181—.5)

A device for producing acoustic waves for use in marine seismic surveying. The underwater multiple high power pulse emiter utilizes the energy of either highly compressed non-explosive gas, or of an explosive gas mixture when ignited. A reciprocating stepped piston controls the emission of the gas into the fluid media. In the case of the non-explosive gas, high-pressure gas is abruptly emitted from the device to produce an acoustic wave. When utilizing the explosive gas, high-pressure explosive gas is emitted into the fluid media and then ignited.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 43-4.5; 340-3; 340-7

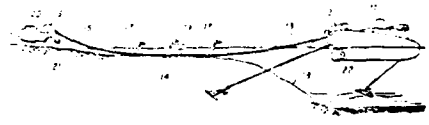


3,416,629
METHOD OF MOVING A SEISMIC CABLE IN UNNAVIGABLE WATERS
Erwin C. Brede, Metairie, La., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware
Filed Aug. 18, 1966, Ser. No. 573,237
1 Claim. (Cl. 181—.5)

A method of seismic exploration in shallow water areas wherein a boat is anchored to provide a first control station and a land vehicle is parked to establish a second control station. These control stations are located along the desired exploration path and displaced from each other. Lines connected between the control stations and a drag-type seismic cable are manipulated to position the cable along a desired exploration path.

Keywords: Seismic survey method

U.S. Cl. X.R. 340-7

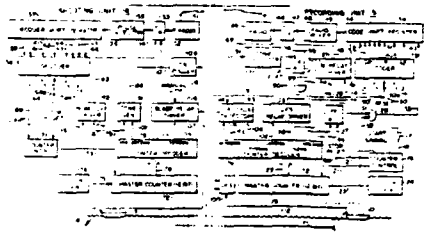


3,416,631
DIGITAL REMOTE FIRING SYSTEM
John David Patterson, Arlington, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware
Filed Dec. 30, 1966, Ser. No. 606,428
6 Claims. (Cl. 181—.5)

A digital system for controlling the actuation of a generator of seismic energy at a firing station which is located remote from a recording station is described. The firing station and recording station are linked by a two-way radio transmission link so that a first source at the recording station can transmit a first binary coded signal to the firing station. If the firing station receives the binary coded signal from the recording station, the firing station will transmit a tone signal. The tone signal from the firing station, if detected, at the recording station will permit enabling of the seismic signal recording means. Timing means at the firing station will effect actuation of the generator of the seismic energy in a predetermined time relationship with respect to generation of the first binary coded signal in the recording station. If the binary coded signal from the recording station is not received by the firing station in its properly coded form, no tone signal will be transmitted by the firing station and logic means at the recording station will initiate a repeat of the transmission of the first binary coded signal.

Keywords: Seismic explosive acoustic transmitter; Seismic survey method

U.S. Cl. X.R. 340-15

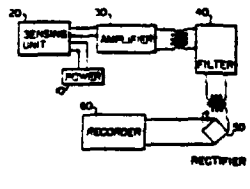


3,417,251
TOWED INSTRUMENT FOR CONTINUOUS MEASUREMENT OF OCEAN TURBIDITY
John M. Leonard, Chevy Chase, and John D. Bultman, Oxon Hill, Md., assignors to the United States of America as represented by the Secretary of the Navy
Filed Oct. 20, 1965, Ser. No. 499,110
6 Claims. (Cl. 250—218)

An improved instrument for measuring the turbidity of fluid media. The device may include a towable vessel of streamlined configuration to prevent light reflecting cavitation and within which are located a light source, a light beam chopper, means to direct and focus the light in a zone exterior of the vessel, and a light detecting element positioned within the vessel to measure backscattered light as a function of turbidity.

Keywords: Instrument, towed; Pollutant measurement; Towed vehicle

U.S. Cl. X.R. 88-14

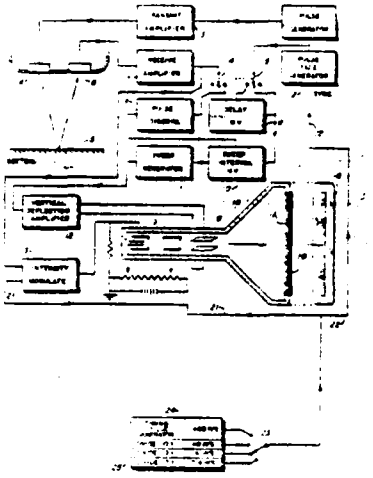


3,417,369
PULSE ECHO RECORDING
Joseph D. Richard, 3613 Loquat Ave., Miami, Fla. 33133
Continuation-in-part of application Ser. No. 353,171, Mar. 19, 1964. This application Aug. 23, 1967, Ser. No. 662,629
4 Claims. (Cl. 340—3)

Apparatus for graphically recording pulse echo signals wherein a fiber optic cathode ray tube and direct print photosensitive paper are used in place of the conventional mechanical stylus system. The high writing speed and random triggering capabilities make possible several unique applications.

Keywords: Sonar, depth sounder; Sonar, side looking

U.S. Cl. X.R. 343-13



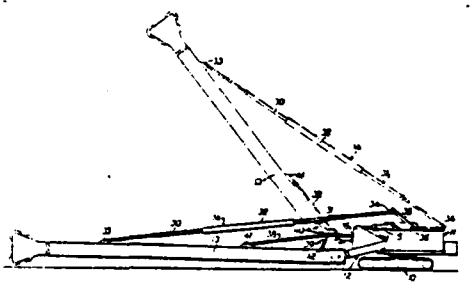
DECEMBER 24, 1968

3,417,524
DEVICES FOR OPERATING THE HAMMER LEADS IN PILE DRIVING ATTACHMENTS
Knut Bertil Norlin and Sven Bertil Ingmar Borg, Eslov, Sweden, assignors to Akermans Verkstad AB, Eslov, Sweden
Filed Dec. 19, 1966, Ser. No. 602,671
Claims priority, application Sweden, Dec. 22, 1965, 16,614/65
6 Claims. (Cl. 52—115)

A tractor crane having a rotatable windlass frame, the hammer lead being universally pivoted to said windlass frame and the requisite movements of the hammer lead being brought about by a small number of hydraulic power means.

Keywords: Pile driver, impact; Pile driver leads

U.S. Cl. X.R. 52-117; 173-43

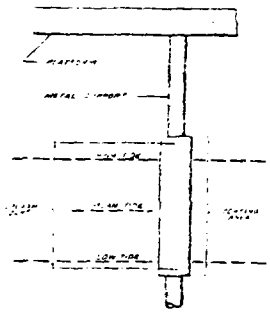


3,417,369
PROTECTIVE COATING AND METHOD
William N. Laughlin, 129 Brentwood Blvd., Lafayette, La. 70501
Continuation-in-part of application Ser. No. 496,153, Oct. 14, 1965. This application Jan. 25, 1968, Ser. No. 703,516
9 Claims. Cl. (61—46)

Supports for offshore platforms are provided which give effective and long-lasting protection to the corrosive forces existing in the splash zone adjacent the platform. Such supports comprise metal pipes which are covered over that portion thereof which is positioned in the splash zone with a corrosion-inhibiting coating of an elastomeric material. The coating is cured to the metal pipe to form a firm bond between coating and support. A process for coating the support in the splash zone is provided.

Keywords: Coating; Corrosion prevention; Offshore platform, leg; Pile protection; Pile, steel

U.S. Cl. X.R. 61-54; 117-49; 117-94; 117-132; 138-141; 138-145

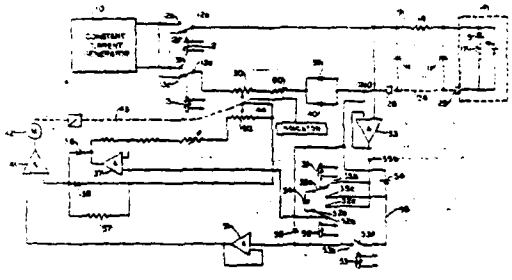


3,417,619
SINGLE WIRE MEASURING DEVICE FOR BATHYTHERMOGRAPH SYSTEM
Samuel A. Francis, Marion, Mass., assignor to The Buzzards Corporation, Marion, Mass., a corporation of Massachusetts
Filed Jan. 24, 1966. Ser. No. 522,505
8 Claims. (Cl. 73—362)

A condition sensing resistance in a sensor probe is connected by a single wire and a sea return path to a known resistance within the measuring system. The sensing resistance is supplied through the transmission path with a constant current. Polarity sensitivity switches are connected in a circuit in such a manner that unipolar constant amplitude current pulses alternately flow through the known and unknown resistances in opposite directions. By measuring the difference in the signal amplitudes developed across the known and unknown resistance, an error signal can be obtained. The error signal is then amplified by a servo amplifier and a drive motor which then repositions the known resistance to produce a zero error voltage. The actual adjustment of the resistance then provides a direct indication of the actual fluid condition being measured.

Keywords: Bathythermograph

U.S. Cl. X.R. 73-170; 73-343



3,417,724
VIBRATORY SEA ANCHOR DRIVER
Theodoric B. Edwards, deceased, late of Lorton, Va., by Helen M. Edwards, executrix, Manassas, Va., assignor to the United States of America as represented by the Secretary of the Army
Filed Sept. 27, 1967, Ser. No. 671,168
5 Claims. (Cl. 114—206)

This invention is directed to embedment of anchors and, more particularly, to a driver to embed an anchor by using the resonant frequency of the driver and anchor coupled together by an electromagnet. A variable speed motor is used to impart reciprocating motion to the anchor through a converter means. Inactivation of the current that energized the electromagnet permits the driver to be recovered while the anchor remains embedded. An indicating means enables the operator, aboard a vessel to determine that the anchor has been embedded and to what depth.

Keywords: Embedment anchor

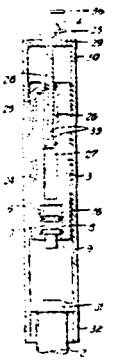
U.S. Cl. X.R. 175-6

3,417,823
METHOD FOR DRIVING PILES AND SIMILAR OBJECTS
Hoite C. Duyster, The Hague, Sybrand Noyon. Bennekom, and Joost W. Jansz, The Hague, Netherlands, assignors to Hollandse Beton Maatschappij N.V., The Hague, Netherlands
Filed Feb. 3, 1966, Ser. No. 524,773
Claims priority, application Netherlands, Feb. 3, 1965, 6501373; Jan. 24, 1966, 6600863
20 Claims. (Cl. 175—19)

A pile driving apparatus having a resilient cap or shoe between the pile head and the hammer, said cap or shoe being precompressible and maintainable in a particular state of precompression such that when the hammer strikes the cap, substantially no energy is lost by dissipation and the maximum impact force which is transmitted through the cap to the pile is less than the critical force at which the pile is damaged.

Keywords: Pile driver, impact

U.S. Cl. X.R. 61-53.5; 175-135



3,418,230
GALVANIC ANODE AND ALUMINUM ALLOY THEREFOR
Herbert C. Rutemiller, Cleveland, Ohio, assignor to Aluminum Company of America, Pittsburgh, Pa., a corporation of Pennsylvania
No Drawing. Filed Oct. 5, 1961, Ser. No. 143,041
5 Claims. (Cl. 204—197)

1. A galvanic anode in the non-heat treated condition composed of an aluminum base alloy consisting essentially of aluminum, 3.5% to 9.0% by weight of zinc and 0.008% to 0.05% by weight of indium, the total of all impurities not being over 0.50%, said anode in the as-cast or as-worked condition being characterized by a higher current efficiency than the same anode without indium.

Keywords: Cathodic protection; Corrosion prevention

U.S. Cl. X.R. 75-146; 204-148; 204-293

No Figure

3,418,625
METHODS AND APPARATUS FOR ATTENUATING THE EFFECTS OF MULTIPLE SEISMIC REFLECTIONS

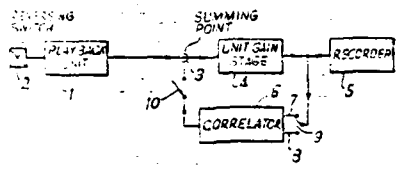
Nigel Allister Anstey, Orpington, Kent, England, assignor to Seismograph Service Corporation, Tulsa, Okla.

Filed Nov. 15, 1965, Ser. No. 507,953
Claims priority, application Great Britain, Nov. 13, 1964, 46,449/64
20 Claims. (Cl. 340—15.5)

An echo ranging system and method wherein multiple reflections are attenuated by passing a received signal including the multiple reflections through a given stage and then to a feedback loop extending around the stage. The latter loop includes a correlator having a pattern representing at least a portion of the received signal reversed in time for correlation with the received signal to produce a feedback signal or correlation output which is applied to the input of the stage. The resulting output from the stage represents the received signal with the multiple reflections attenuated.

Keywords: Seismic record processor; Sonar, depth sounder

U.S. Cl. X.R. 235-181; 343-100.7



DECEMBER 31, 1968

3,418,815
DOCK FENDER

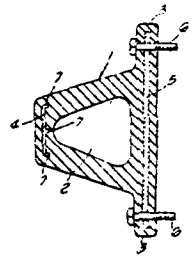
Michio Kumazawa, Yamatomachi, Japan, assignor to Seibu Gomu Kagaku Kabushiki, Kaisha (trade name: Seibu Rubber Chemical Co., Ltd.), Tokyo, Japan, a corporation of Japan

Filed May 24, 1967, Ser. No. 640,868
Claims priority, application Japan, May 26, 1966, 41/33,224
3 Claims. (Cl. 61—48)

A device for resiliently cushioning the engagement between a ship and a dock or similar uses where a hollow body of resilient material has a flat steel plate embedded therein near the ship-engaging surface and generally parallel to the side of the ship for distributing the applied forces.

Keywords: Pier fender

U.S. Cl. X.R. 73-170



3,418,816
FENDER FOR PROTECTING SHIPS ALONGSIDE A FIXED STRUCTURE

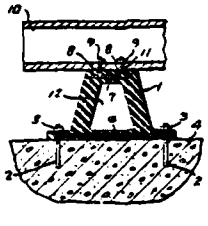
Michio Kumazawa, Yamatomachi, Japan, assignor to Seibu Gomu Kagaku Kabushiki Kaisha, Tokyo, Japan, a corporation of Japan

Filed May 26, 1967, Ser. No. 641,535
Claims priority, application Japan, Sept. 5, 1966, 41/83,434
2 Claims. (Cl. 61—48)

The present ships fender is provided by one or more hollow resilient bodies attached to a fixed structure such as a pier, wharf or the like and having one or more rigid members attached to said bodies for receiving the side of a ship and averting any concentration of the resulting bearing load on the fender or the side of the ship.

Keywords: Pier fender

U.S. Cl. X.R. 114-219; 267-1; 293-71



3,418,852
DRIFT DROGUE

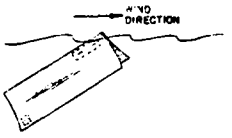
John Wilson Martin, Auke Bay, Alaska, assignor to the United States of America as represented by the Secretary of the Interior

Filed Apr. 28, 1967, Ser. No. 635,957
9 Claims. (Cl. 73—189)

A drift drogue for charting surface currents of water bodies which consists of a winged structure having a float and weights so arranged as to provide a canted attitude to the drogue when it is immersed in water so that the ratio of wind resistance to water drag is reduced to a minimum.

Keywords: Current measurement; Instrument deployment

U.S. Cl. X.R. 73-170



3,419,796
COMPENSATED SALINOMETER

Neil L. Brown, San Diego, Calif., assignor to The Bissett-Berman Corporation, Santa Monica, Calif., a corporation of California

Filed Mar. 4, 1963, Ser. No. 262,396
3 Claims. (Cl. 324—30)

1. In combination for measuring the salinity of sea water,

a first winding constructed to be disposed in said sea water,

first means operatively coupled to said first winding for introducing to said winding a signal having particular characteristics,

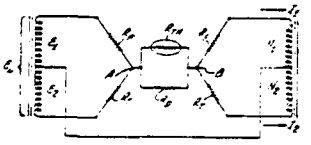
a second winding constructed to be disposed in said sea water and magnetically and electrostatically shielded from the first winding for a coupled relationship to said first winding only through said sea water to obtain an induction in said second winding of a signal having characteristics dependent upon the salinity characteristics of said sea water,

second means operatively coupled to said second winding for providing an indication of the characteristics of the signal induced in said second winding, and

third means coupled electrically to said first and second windings for providing a compensation for variations in the temperature of said sea water in accordance with variations in the characteristics of the signal induced in said second winding, said third means including a first impedance constructed to be disposed in the sea water, said third means includes first and second bridges and wherein said first bridge includes said first winding and at least the first impedance and a second impedance and wherein said first impedance is constructed to be disposed in said sea water to provide variable characteristics in accordance with variations in the temperature of said sea water and wherein said second bridge includes said second winding and at least third and fourth impedances and wherein said first and second bridges are connected to each other, and wherein the third impedance is constructed to be disposed in the sea water.

Keywords: Salinity measurement

U.S. Cl. X.R. 324-57

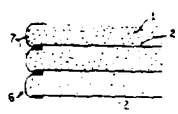


3,421,326
CONSTRUCTIONAL WORKS
Henri Charles Vidal, 17, Rue Armengaud, Saint-Cloud, Hauts-de-Seine, France
Filed Mar. 26, 1964, Ser. No. 354,947
Claims priority, application France, Mar. 27, 1963, 929,421
U.S. Cl. 61—39 16 Claims
Int. Cl. E02d 5/00; E02b 7/06

Earth reinforcement constructed by assembling a mass of pulverulent material frictionally bonded by elongated frictional elements which extend through the mass of particles. The particles frictionally engage the surface of the elements in a boundary layer and sufficient normal force is applied by internal pressure in the mass to resist relative movement of the boundary layer along the elements. Additional particles fill the space between the boundary layers of adjacent elements. Also abutments provided near the ends of the elements contain the particles along the exterior of the mass.

Keywords: Bulkhead

U.S. Cl. X.R. 61-30; 61-35

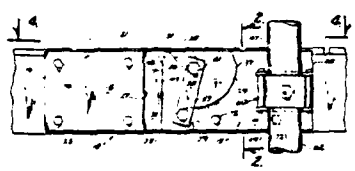


3,421,327
DOCK HINGE
Glen E. Donaldson, P.O. Box 63, Laurens, Iowa 50554
Filed June 6, 1966, Ser. No. 555,595
U.S. Cl. 61—48 10 Claims
Int. Cl. E02b 3/20; E05d 15/50; A47f 5/08

A hinge for use with boat docks or the like comprising first and second hinge sections which are secured to the ends of first and second support members. The hinge sections are detachably secured together by pivoting one of the hinge sections with respect to the other hinge section whereby a pair of posts on one of the hinge sections will be received by a pair of slots on the other hinge section.

Keywords: Pier, fixed; Small-craft pier

U.S. Cl. X.R. 5-331; 16-147; 16-156; 16-166; 16-172; 211-99; 211-148; 182-222



3,421,417
PAVEMENT
Jan Carel Pilaar, Boslaan 3, Warnsveld, Netherlands
Filed July 11, 1966, Ser. No. 564,167
Claims priority, application Netherlands, Nov. 7, 1965, 6514966
U.S. Cl. 94—11 18 Claims
Int. Cl. E01c 5/00

A paving block and a pavement made therefrom, said block having a bottom surface and an upper surface and at least two intersecting grooves extending in the plane of said upper surface, at least one of said grooves being spaced from the edges of said block, and at least one channel extending from the bottom of the intersection of said grooves through said bottom surface so that vegetation may grow in the channels and bend into the grooves.

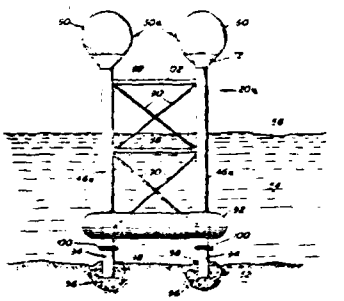
Keywords: Concrete block; Low-cost shore protection; Revetment; Slope protection

3,422,628
OFFSHORE STORAGE TANK SYSTEM
Charles A. McDonald, Palos Heights, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill., a corporation of Illinois
Filed Aug. 26, 1966, Ser. No. 575,272
U.S. Cl. 61—46 1 Claim
Int. Cl. E02d 21/00, 17/00; F17d 1/08

An offshore storage tank system is disclosed comprising a plurality of tubular column mounted tank units with the said tanks in fluid communication with the columns. The columns are interconnected by a plurality of struts thus forming a unitary structure and are detachably secured to support members near the bottom of a water body and an externally sealed hollow body is mounted on the lower part of the columns above the level of connection to the support members. The hollow body is below the water body surface whereby it can impart buoyancy to the structure.

Keywords: Offshore platform, fixed; Offshore storage tank, emergent

U.S. Cl. X.R. 137-10; 137-236; 220-1; 220-13

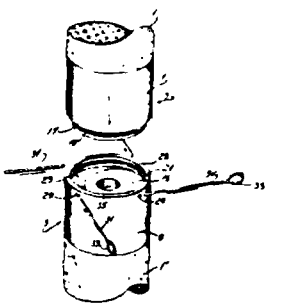


3,422,630
CONCRETE PILE CONSTRUCTION
Gaston Marier, P.O. Box 549, Princeville, Quebec, Canada
Continuation-in-part of application Ser. No. 458,299, May 24, 1965. This application Dec. 21, 1967, Ser. No. 697,275
U.S. Cl. 61—53 10 Claims
Int. Cl. E02d 5/30, 5/34; F16d 1/04

The method of driving piles and a concrete pile construction in which ends of cylindrical pile sections are telescopically connected by male and female metal caps having juxtaposed cylindrical surfaces having confronting grooves forming a passage removably receiving locking rod means inserted through at least one access passage opening to the exterior of one of the caps and communicating with the confronting passages, in which one groove fits the contour of one passage and the other groove is wider to allow for play when driving the piles and when driving the piles a male driving cap is provided and is temporarily connected with a female cap of the pile section being driven.

Keywords: Pile, concrete; Pile section connection

U.S. Cl. X.R. 61-53.5; 61-56; 285-305; 287-119

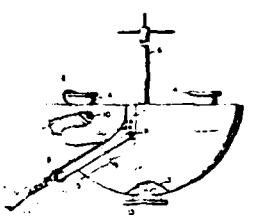


3,423,777
BUOY APPARATUS
Anders Fred Feyling, Cambridge, Mass., assignor, by mesne assignments, to EG & G International, Inc., Bedford, Mass., a corporation of Delaware
Filed Nov. 10, 1966, Ser. No. 593,458
U.S. Cl. 9—8 9 Claims
Int. Cl. B63b 21/52; H02b 3/00

Hemispherical buoy with an upper buoyant section, a compartmentalized lower free-flooding stabilizing section, and a counterweight below a flooding opening. A slot in the lower section contains a mooring bar pivoted at one end to the buoy substantially at its center of gravity and connected at the other end to a mooring line comprising a chain and an electrical conductor bound thereto by a surrounding sheath.

Keywords: Buoy, instrumented; Buoy mooring system

U.S. Cl. X.R. 174-70



3,423,945

METHOD OF FORMING AN UNDERWATER TRENCH

Jack O. Hill and James L. Harding, Morgan City, La., assignors, by mesne assignments, to Hycalog, Inc., a corporation of California

No Drawing. Continuation-in-part of application Ser. No. 448,281, Apr. 15, 1965. This application July 3, 1967, Ser. No. 650,665

U.S. Cl. 61—72.4 24 Claims

Int. Cl. B63b *35/02, 35/04;* E02d *3/12*

A method is described for forming a trench to unconsolidated clayey sedimentary deposits under brackish or saline water. According to the method, strong mineral acid, such as sulfuric or phosphoric, is injected into or formed in the clayey sedimentary deposits along the line the trench is to take. The acid reacts with ions, such as carbonate ions and the bicarbonate ions, in the interstitial brackish or saline water trapped between the clay particles of the sediment. It also reacts with any organic material that may be present, and which may be binding the clay particles together to destroy or reduce their binding effect. These reactions produce gas, such as CO_2 and H_2S. The gases produced expand, force the particles apart, and carry the particles upward where they are dispersed in the water. The method can be used to form a trench or ditch in several ways. If a relatively shallow trench is to be formed, the method can be used economically to remove all of the clay to leave a clean trench. If a trench relatively large in cross-section is desired, the method can be used to break-up the material to be removed into clods or clumps of a size that can be readily removed by conventional underwater trenching methods. When forming the acid in place a gas that will combine with water to form the desired acid is injected. For example, SO_2 or H_2S can be injected into the sedimentary deposits to react with the interstitial water and form sulfuric acid in place with the resultant reactions described above.

Keywords: Seabed trencher

U.S. Cl. X.R. 61-36

No Figure

3,423,946

UNDERSEA REPEATER BURYING PLOWSHARE

John C. MaClay, Basking Ridge, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J., a corporation of New York

Filed June 7, 1967, Ser. No. 644,222

U.S. Cl. 61—72.4 7 Claims

Int. Cl. B63b *35/04, 35/00*

A cable burying plow especially adapted for burying submarine cable comprises a sled with cable tube and plowshare attached to the tube rear. The plowshare includes a cable guide groove along its top surface and a tailgate which maintains the cable in the groove during burying. Repeaters are passed by raising the tailgate. This motion also lowers secondary plow vanes which dig a trench for the repeater.

Keywords: Seabed cable plow; Seabed trencher

U.S. Cl. X.R. 61-72.6

3,424,007

PRESSURE AND DEPTH DETECTOR

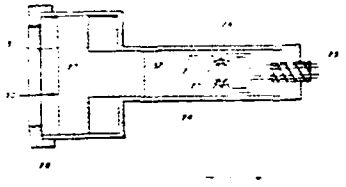
Michael Pasnak, 17408 Astoria Lane 20904, and Donald W. Ernst, 8709 Carroll Ave. 20903, both of Silver Spring, Md.

Filed Apr. 27, 1967, Ser. No. 635,330
U.S. Cl. 73—398 1 Claim
Int. Cl. G01l 9/16

A hydrostatic pressure detector having a ferrimagnetic toroid core sensing element directly sensitive to changes in hydrostatic pressure. A primary winding on the core biases the sensor into a desired detecting range and a secondary winding detects changes in inductive reactance corresponding to changes in the surrounding hydrostatic pressure.

Keywords: Depth pressure measurement

U.S. Cl. X.R. 73-419



3,424,119

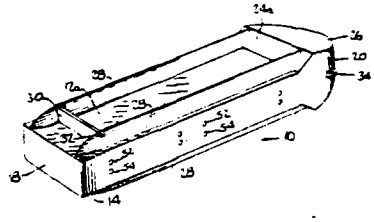
REVERSIBLE SELF-DUMPING AND SELF-BAILING SCOW

Peter J. Roche, Katonah, N.Y. (Wilner Road, Somers, N.Y. 10589), and Thomas J. Smith, 1500 Elm St., Stratford, Conn. 06497

Filed Nov. 20, 1967, Ser. No. 684,272
U.S. Cl. 114—38 7 Claims
Int. Cl. B63b 35/30

A reversible scow having opposing surfaces of identical construction alternately operative as deck or bottom and provided intermediate these surfaces with a plurality of water-tight compartments, means to flood selected compartments along one side of the scow to overturn the scow and automatic self-bailing means to drain the flooded compartments in the overturned position of the scow.

Keywords: Hopper Barge



3,424,267

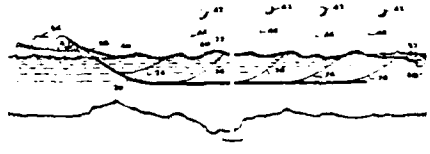
MARINE SEISMIC CABLE SUPPORT SYSTEM

John J. Babb, Jackson, Miss., assignor to Delta Exploration Company, Inc., Jackson, Miss., a corporation of Mississippi

Filed May 29, 1967, Ser. No. 641,943
U.S. Cl. 181—.5 10 Claims
Int. Cl. G10k 11/12

A seismic cable supported from an inflated hose by elastic lines oriented at an acute angle with respect to the hose and the line to provide a minimum of disturbance of the seismic cable due to surface disturbances.

Keywords: Seismic streamer cable; Towed body depth control



3,425,227

FORM FOR CONSTRUCTING A SLAB FOR TALUS OR BOTTOM PROTECTION

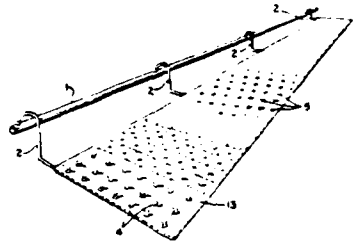
Henri F. J. Hillen, The Hague, Netherlands, assignor, by mesne assignments, to Construction Techniques, Inc., Cleveland, Ohio, a corporation of Delaware

Filed Oct. 22, 1965, Ser. No. 501,239
U.S. Cl. 61—38 4 Claims
Int. Cl. E02b *3/12, 5/02*

A form for forming slabs on a talus or other surface comprised of a pair of sheets of flexible material joined to each other around the peripheries thereof defining a closed space into which a hardenable cementitious material may be flowed and means inwardly of the periphery joining said sheets at a plurality of spaced points. Each point of attachment permits the passage of water therethrough whereby the hydrostatic pressure on both sides of the slab may be equalized. The points of attachment also comprise sections of reduced thickness which permit selective cracking of the slab, thereby allowing the slab to conform to the surface on which it is placed.

Keywords: Concrete form; Fabric mat; Revetment; Slope protection

U.S. Cl. X.R. 61-7; 249-10



3,425,228

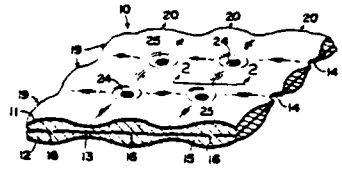
FABRIC FORMS FOR CONCRETE STRUCTURES

Bruce A. Lamberton, Berea, Ohio, assignor to Construction Techniques, Inc., Cleveland, Ohio, a corporation of Ohio

Filed Oct. 10, 1967, Ser. No. 674,289
U.S. Cl. 61—38 12 Claims
Int. Cl. E02b *3/12*

Two continuous sheets of flexible fabric material, at least in part porous, are joined around their entire outer periphery. A third fabric layer is interposed between the two sheets with the three sheets being joined at spaced points to form a plurality of tubes or pockets into which a cementitious slurry is pumped. The third layer of fabric has openings to facilitate the passage of the slurry between upper and lower surfaces of the third layer.

Keywords: Breakwater, concrete; Concrete form; Fabric mat; Groin; Slope protection



3,425,499

HYDRAULIC VIBRATORY HAMMER FOR DRIVING AND OR EXTRACTING PILES AND THE LIKE

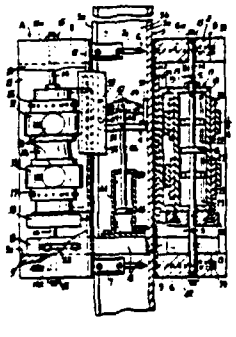
Earl H. Fisher, 630 Casgrain Ave., St. Lambert, Montreal, Quebec, Canada

Filed Nov. 4, 1966, Ser. No. 592,201
U.S. Cl. 173—125 14 Claims
Int. Cl. B25d *9/06*

A frame positionable around a pile and carrying a hammer which is engageable with the pile for selectively driving and extracting the same relative to the ground. The frame also carries means for step-by-step advancing itself along the pile as the hammering operation progresses.

Keywords: Pile driver, vibratory; Pile extractor

U.S. Cl. X.R. 173-129; 175-55



3,425,506
OFFSHORE SEISMIC STREAMER DEPTH CONTROL SYSTEM

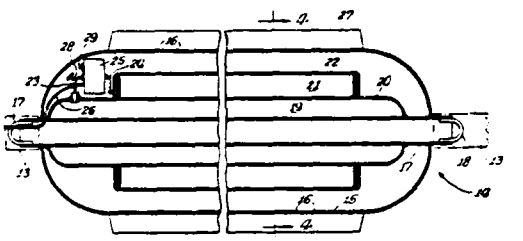
John S. Evans, Jr., Houston, Tex., assignor to Mandrel Industries, Inc., a corporation of Michigan

Filed June 5, 1967, Ser. No. 643,541
U.S. Cl. 181—.5 4 Claims
Int. Cl. G01v 1/20

The invention provides a float for suspending, at predetermined depths, a streamer of geophones used in geophysical exploration work. The float includes presettable automatic means for creating a neutral buoyancy at the desired depth, together with individually selectable means for creating a positive buoyancy to bring the float and the streamer portion attached thereto to the surface.

Keywords: Depth pressure measurement; Seismic streamer cable; Towed body depth control

U.S. Cl. X.R. 340-7



3,426,109
METHOD OF FABRICATING A CONCRETE FLOTATION PIER

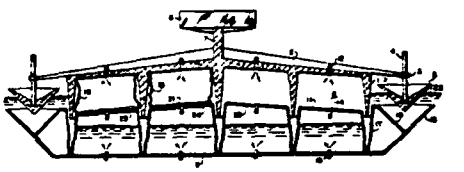
Harry E. Dempster, 6507 Neddy Ave., Canoga Park, Calif. 91304

Filed Oct. 24, 1965, Ser. No. 504,593
U.S. Cl. 264—34 6 Claims
Int. Cl. B63c 1/02

A method of casting buoyant pontoons or the like is described in which casting material is poured into a floating form. Thereafter, by sequentially controlling the ingress and egress of water into compartments within the form and also within the cast pontoon, the form is separated from the pontoon and recovered and the pontoon is left floating in the water.

Keywords: Concrete form; Pier, floating

U.S. Cl. X.R. 18-2; 25-120; 61-5; 61-63; 114-.5; 249-64; 249-65; 249-66; 264-250; 264-314; 264-335



3,426,205
METHOD FOR TAGGING SAND WITH A GASEOUS RADIOACTIVE ISOTOPE

Elick H. Acree and Forrest N. Case, Oak Ridge, Tenn., assignors to the United States of America as represented by the United States Atomic Energy Commission

No Drawing. Filed Sept. 28, 1967, Ser. No. 671,484
U.S. Cl. 250—106 4 Claims
Int. Cl. G21h 5/02

A process for tagging sand with a gaseous radioactive isotope is provided for the purpose of facilitating the tracing and monitoring of natural sand movement in coastal areas. The tagging of the sand is achieved by subjecting sand to an environment containing a gaseous radioisotope selected from ^{133}Xe, ^{85}Kr, ^{131}I, ^{125}I, and ^{37}Ar and the heating of the confined sand to effect sorption of the gaseous isotope into the sand.

Keywords: Instrument, radioisotope; Sedimentation measurement

U.S. Cl. X.R. 252-408

No Figure

3,426,473
ANTIFOULING COVERING

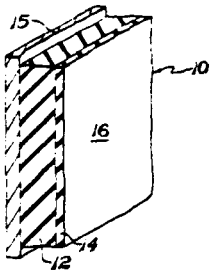
Nathan F. Cardarelli, Copley, and Samuel J. Caprette, Jr., Chagrin Falls, Ohio, assignors to The B. F. Goodrich Company, New York, N.Y., a corporation of New York

Filed Mar. 31, 1966, Ser. No. 539,177
U.S. Cl. 43—131 10 Claims
Int. Cl. A01m *1/20;* C09d *5/14;* E02d *5/60*

1. A covering resistant to marine fouling organisms comprising a reservoir layer of material saturated with a toxic agent for poisoning or repelling marine fouling organisms such as barnacles and the like, and a toxic transfer control layer of elastomeric material in which said toxic agent is soluble between said reservoir layer and the surface of said covering adapted for exposure to sea water containing said fouling organisms, said transfer control layer having a solubility rate such that the transfer layer is capable of dissolving said toxic agent at a rate which is appreciably slower than the rate at which said toxic is transferred to said control layer from said reservoir layer.

Keywords: Coating; Fouling prevention

U.S. Cl. X.R. 61-54; 106-15; 117-77; 239-53



3,426,536
BARRIER DEVICE FOR COASTAL PROTECTION

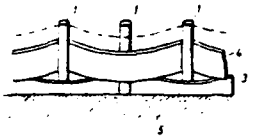
Heinrich Danz, 72 Christbuchenstrasse, Kassel, Germany

Filed Mar. 30, 1966, Ser. No. 538,656
Claims priority, application Germany, Apr. 2, 1965, D 46,951
U.S. Cl. 61—3 2 Claims
Int. Cl. E02b *3/12;* E02d *29/02;* E01f *7/00*

A device for impeding the flow of moveable sand or silt, such as wind and wave driven sand and mud, utilizes the concept of interweaving horizontal strips of material between spaced apart upright posts. The horizontal strips are susceptible of being relocated vertically when the buildup of such moveable sand or silt on the incoming side of the retaining structure warrants such action.

Keywords: Dune protection; Sand fence

U.S. Cl. X.R. 61-35; 256-12.5; 256-34



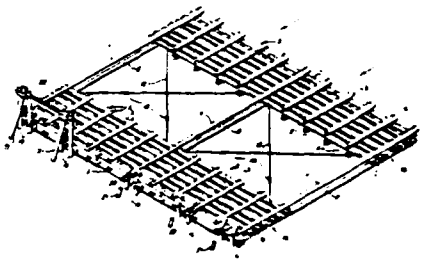
3,426,537
FLOATING BREAKWATERS

Harry H. Chenoweth and Gordon G. Ingman, Seattle, Wash., assignors, by mesne assignments, to Hill, Ingman, Chase & Co., Seattle, Wash., a corporation of Washington

Filed Nov. 5, 1965, Ser. No. 506,533
U.S. Cl. 61—5 5 Claims
Int. Cl. E02b *3/06*

Grids to dissipitate wave energy are composed of a series of substantially parallel elongated members, such as logs, connected positively in substantially parallel, definitely spaced relationship by upper and lower cross members in vertical registry. The elongated members and cross members are secured together by bolts extending through their crossing portions. The width of the grid is a plurality of times as great as its depth and the slots between the elongated members are of substantial width, but at least not appreciably greater than the width of one of such members. A plurality of grid portions are connected together by spaced spreaders to form bays between the grid portions. Tie rods extend diagonally across such bays in crossing relationship.

Keywords: Breakwater, floating



3,426,540

TIDEWATER POWER GENERATION SYSTEM

Arthur E. Fixel, 2163 Penobscot Bldg., Detroit, Mich. 48226

Continuation-in-part of application Ser. No. 523,682, Jan. 28, 1966. This application Jan. 27, 1967, Ser. No. 612,133

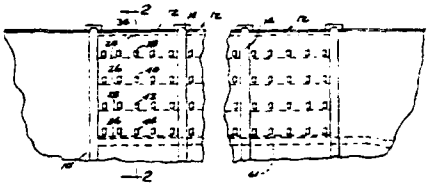
U.S. Cl. 61—20 8 Claims

Int. Cl. E02b *9/08*; F03b *13/12*; H02p *9/04*

A dam structure between the body of water in the sea and a natural or artificial reservoir or estuary, the dam structure having numerous vertically and laterally wall-separated chambers with power generating turbines in the horizontal walls between adjacent chambers, a plurality of individually controllable gates on both the seawater and the reservoir sides of the chambers and between adjacent chambers, with interior enclosures to selectively close the turbines from water flow between chambers, and bypass means for bypassing the turbines in permitting waterflow between the vertically adjacent chambers, and the dam having a large gate for rapid transfer of water from one side to the other when desired.

Keywords: Channel barrier; Electrical generator; Power, tide; Tidal estuary water level

U.S. Cl. X.R. 253-4; 290-42



3,426,542

APPARATUS FOR USE WITH OFFSHORE MARINE STRUCTURES

Robert G. Hindman, Madrid, Spain, and John J. Bardgette, New Orleans, La., assignors, by mesne assignments, to Esso Production Research Company, Houston, Tex., a corporation of Delaware

Original application Mar. 15, 1965, Ser. No. 439,688. Divided and this application Sept. 29, 1967, Ser. No. 671,838

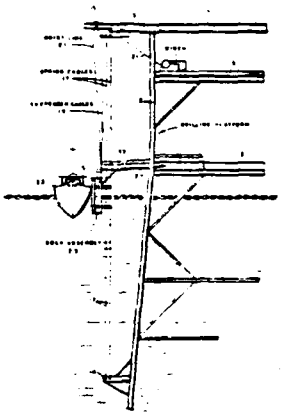
U.S. Cl. 61—46 2 Claims

Int. Cl. E02b *17/00, 3/20*; B63b *21/04*

A marine fender includes a curved rubber sheath affixed to a cylindrical base member detachable cap. The fender is used with a mooring structure including a rectangular dock suspended from a marine structure and having a personnel transfer deck. A ladder extends from normal level on the dock to the level of the personnel transfer deck, and ramp means extends from the deck to the marine structure.

Keywords: Offshore platform, fixed; Offshore structure fender

U.S. Cl. X.R. 14-71; 61-48; 114-219



3,426,585

ULTRASONIC SYSTEM FOR INSPECTING SUBMERGED PILES

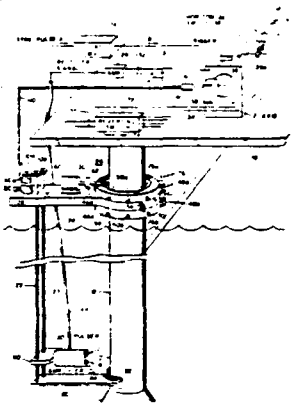
Joseph Zemanek, Jr., and Richard L. Caldwell, Dallas, Tex., assignors to Mobil Oil Corporation, a corporation of New York

Filed Feb. 3, 1966, Ser. No. 524,920
U.S. Cl. 73—67.7 1 Claim
Int. Cl. G01n 9/24

The specification discloses an ultrasonic system for inspecting the physical condition of the exterior surfaces of piles supporting offshore well platforms and the like. The system includes an ultrasonic transmitter-receiver for generating and receiving a directional beam of ultrasonic pulses. The transmitter-receiver is scanned both peripherally and longitudinally about the pile. The reflected sonic pulses are converted to electrical form and are used to intensity modulate the beam of a cathode-ray oscilloscope. The oscilloscope beam is swept along its X-axis in accordance with the peripheral scan of the transmitter-receiver. A motion picture camera optically coupled to the oscilloscope drives film past the oscilloscope face in proportion to the scan of the transmitter-receiver longitudinally of the pile. The film, developed from the motion picture camera, indicates the physical condition of the pile including flaws and weaknesses.

Keywords: Pile, steel; Pile, wood; Structure inspection

U.S. Cl. X.R. 73-67.9



3,426,859

TELESCOPED CAISSON

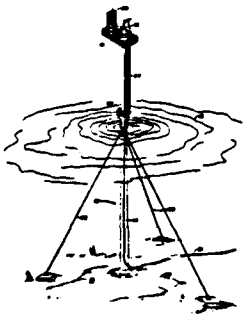
William F. Manning, Dallas, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Filed Sept. 2, 1966, Ser. No. 577,040
U.S. Cl. 175—9 7 Claims
Int. Cl. E21b 15/02, 17/04

This specification discloses a method and apparatus for drilling and completing an offshore well above the surface of a body of relatively shallow water. A two-piece well protector is utilized, the well protector comprising interconnecting lower pile and upper caisson sections. The lower pile section is first driven into the formations underlying the marine bottom with one of the recently developed underwater pile drivers. The caisson section is then lowered into the water and stabbed into or over the pile section to form the composite well protector. A well is drilled through the well protector and is completed by a wellhead supported on the upper end of the well protector.

Keywords: Offshore caisson; Offshore platform, fixed

U.S. Cl. X.R. 61-46



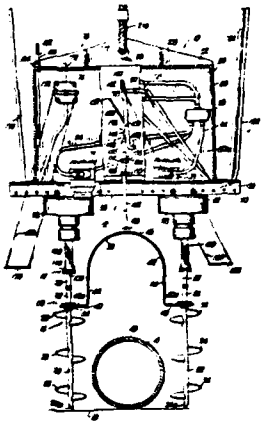
3,427,812
METHOD AND APPARATUS FOR ANCHORING OFFSHORE PIPELINES

William L. Hollander, Centralia, Mo., assignor to A. B. Chance Company, Centralia, Mo., a corporation of Missouri

Filed July 13, 1966, Ser. No. 564,872
U.S. Cl. 61—72.3 37 Claims
Int. Cl. F16l *1/00*

An underwater pipe anchoring device having pipe-spanning structure engages a pipe and holds the pipe in position by a pair of spaced depending screw anchors provided with oppositely inclined helixes for engagement with the earth in the vicinity of the pipe. Power means rotates the screw anchors simultaneously in opposite directions of rotation. A method secures the pipe using a device, senses the proximity of holding structure of the

Keywords: Embedment anchor; Seabed pipeline placement



3,428,011
DREDGE PIPE PONTOONS

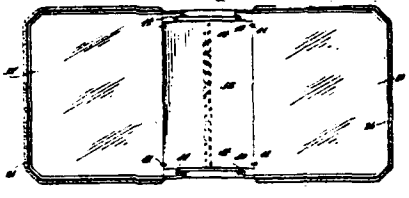
George F. Motter III. R.D. 1, Center Valley, Pa. 18034

Filed Aug. 23, 1966, Ser. No. 574,343
U.S. Cl. 14—43.5 2 Claims
Int. Cl. B63b *35/44, 35/38*

The present invention relates to pontoons particularly suitable for supporting dredge pipes, having firm saddle connection and opposed clamping members for anchorage at the dredge pipe, the saddle being supported directly above a deck which is mounted on trusses extending through the pontoon. The dredge pipe pontoons of the invention are capable of being assembled vertically for water navigation by socketing the bottom of the hull of one pontoon into a socket provided on the next lower pontoon, and interconnecting the pontoons vertically.

Keywords: Dredge pipe

U.S. Cl. X.R. 9-1



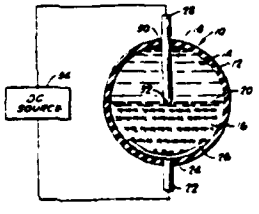
3,428,940
SONIC TRANSMITTER

William B. Huckabay, 4225 Greenbrier, Dallas, Tex. 75225

Filed Feb. 20, 1967, Ser. No. 617,263
U.S. Cl. 340—12 13 Claims
Int. Cl. H04b *13/02*

A sonic transmitter for use in distance measuring utilizing two solid electrodes connected by a liquid metal conductor in such a manner that a minor portion of the liquid metal is converted to a gaseous state when a breakdown potential is imposed across the solid electrodes to generate sonic waves, and the liquid metal is contained to promptly recomplete the circuit between the solid electrodes for a subsequent cycle of operation.

Keywords: Seismic explosive acoustic transmitter



3,429,127

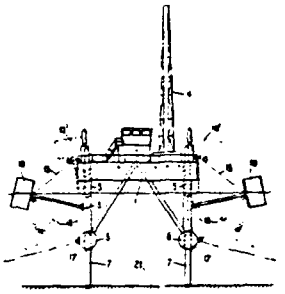
METHOD AND APPARATUS FOR ESTABLISHING A FIXED SUPPORT OF A BUOYANT BODY IN ROUGH WATER

Jacobus M. Donkers, Amsterdam, Netherlands, assignor to Verschure & Co's Scheepswerf en Machinefabriek N.V., Amsterdam, Netherlands, a Dutch limited-liability company

Filed Feb. 11, 1966, Ser. No. 526,772
Claims priority, application Netherlands, Feb. 17, 1965, 6501996
U.S. Cl. 61—46.5 3 Claims
Int. Cl. E02b *17/02*

An offshore drilling rig is provided with extensible supporting legs and auxiliary buoyancy devices. The latter raise the rig above its normal buoyancy level so that the legs may be extended and locked whereafter the auxiliary buoyancy is suddenly terminated to set the legs.

Keywords: Offshore platform, jack up; Offshore platform, leg



3,429,128

OFFSHORE STORAGE STRUCTURE

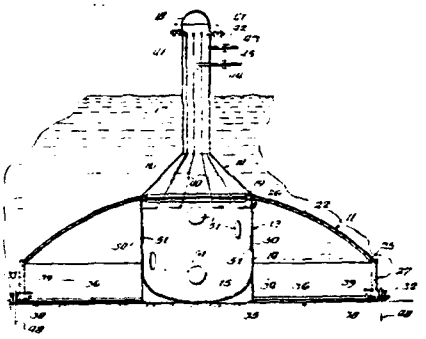
Donald Claude Stafford, Hinsdale, and Robert Simons Chamberlin, Western Springs, Ill., assignors to Chicago Bridge & Iron Company, Oak Brook, Ill., a corporation of Illinois

Filed Apr. 21, 1967, Ser. No. 632,697
U.S. Cl. 61—46.5 14 Claims
Int. Cl. E02b *17/00;* B65d *89/10*

Provided is an offshore liquid storage tank which rests submerged supported on the floor of a body of water. The tank is comprised of two vessels, both of which contribute to floating buoyancy and to controlled submergence of the tank at a desired site.

Keywords: Offshore storage tank, emergent

U.S. Cl. X.R. 114-5; 220-1; 220-13



3,429,132

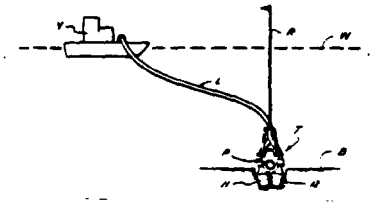
SUBMARINE PIPELINE TRENCHING MACHINE

Charles F. Martin, 3515 Bluebonnet, Houston, Tex. 77025

Continuation-in-part of application Ser. No. 625,201, Mar. 22, 1967. This application Nov. 20, 1967, Ser. No. 684,287
U.S. Cl. 61—72.4 10 Claims
Int. Cl. B63b *35/04*

An apparatus for forming a trench for a submarine pipeline wherein two substantially vertically disposed cutting cages are supported from a framework which rides above the pipeline and are rotated in opposite directions for cutting a single trench below the pipeline. A flexible hose is connected between a pump and an inlet tube opening inside each of the cutting cages to remove the cut formation.

Keywords: Seabed pipeline placement; Seabed trencher



3,429,133

OFFSHORE TOWER

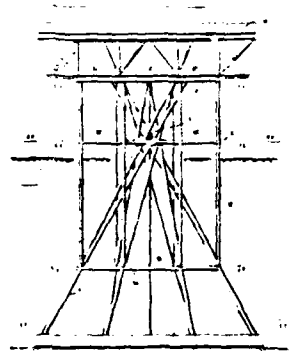
Ferdinand R. Hauber, Galena Park, Tex., assignor to Brown & Root, Inc., Houston, Tex., a corporation of Texas

Filed Apr. 19, 1967, Ser. No. 631,966
U.S. Cl. 61—46.5 8 Claims
Int. Cl. E02b 17/02

A tower suitable for use in offshore well operations and the like including a plurality of upwardly extending, generally straight legs spaced about and disposed in a swirling pattern generally along the exterior surfaces of two mutually intersecting, oppositely directed, upper and lower conoidal surfaces of revolution developed concentrically about a single vertical axis. Connecting means rigidly support the legs in spaced relation. A hollow toroidal base secured to the lower ends of the legs provides sufficient buoyancy to float the tower in the water and may be selectively flooded to cause the tower to rest on the seabed.

Keywords: Offshore platform, fixed

U.S. Cl. X.R. 52-648



3,429,289

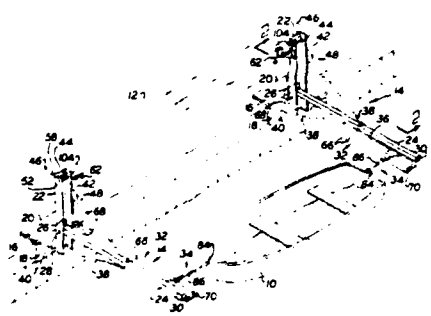
MOORING DEVICE

Edward Lezak, 50 E. Barclay St.,
Hicksville, N.Y. 11801

Filed Dec. 11, 1967, Ser. No. 689,513
U.S. Cl. 114—230 8 Claims
Int. Cl. B63b 21/00

A mooring device for securing small boats to a dock including a boom extendible over the water by movement in a plane vertical to the dock, means for securing the boat and a line mechanism operable from the dock for moving the boat toward or away therefrom. The boat is moved toward and away from the dock along the extended boom by an operating structure.

Keywords: Small-craft mooring device



3,429,388

SOLID MATERIAL SAMPLER PARTICULARLY FOR UNDERWATER SOIL SAMPLING

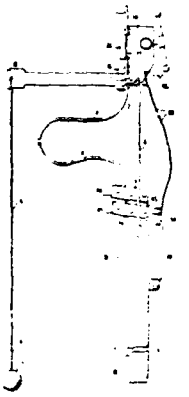
Wladimir Nesteroff, Yves Lancelot, and Bernard David, Paris, France, assignors to Etablissement Public: Centre National de la Recherche Scientifique, Paris, France, a corporation of France

Filed Jan. 26, 1967, Ser. No. 611,929
U.S. Cl. 175—245 12 Claims
Int. Cl. E21b 9/20, 7/12; G01n 1/08

A device for sampling solid material includes a vertical core barrel having an open lower end adapted to penetrate material to be sampled, and a piston in the barrel. The barrel is suspended releasably by means including a lowering cable portion and a clamping device comprising two relatively movable jaws between which the cable portion extends. Clamping of the cable by the jaws is effected by a screw threadably mounted in a member in turn mounted for pivotal movement about an axis transverse to the cable portion extending between the jaws. The screw is positionable at an inclination to the jaws by pivoting of said member, and the weight of the barrel and the friction of the cable in contact with the jaws imposes an additional clamping force on the jaws. The barrel is released from its suspension and dropped to penetrate the solid material. A time-delay device operates a predetermined time after penetration to clamp the barrel to a lifting cable portion which is connected to the piston so that when the sampling device is lifted there will be no relative movement between the barrel and the piston therein.

Keywords: Sampler, seabed-driven core

U.S. Cl. X.R. 24-134; 73-421; 175-5



MARCH 4, 1969

3,430,349

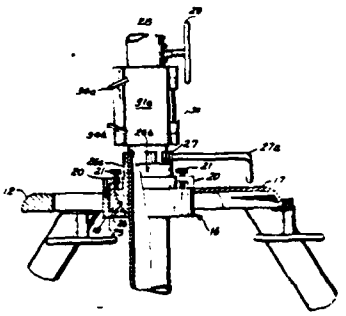
UNDERWATER TRIPOD AND PLUMBING GIMBAL

William J. Bunton, 3345 Eton Ave., La Jolla, Calif. 92037; John A. Beagles, 4814 33rd St., San Diego, Calif. 92116; and Dale E. Good, 1549 Morenci, San Diego, Calif. 92110

Filed Sept. 14, 1966, Ser. No. 579,804
U.S. Cl. 33—180 5 Claims
Int. Cl. G01b 5/14

An aligning device including a tripod supports a removable, adjustable pivot means. A stanchion is guided longitudinally through the pivot and water is jetted through the stanchion to permit insertion into the ocean floor.

Keywords: Embedment anchor



3,430,566

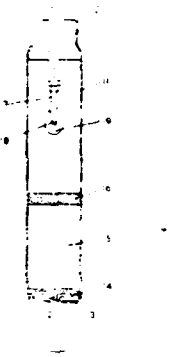
MARINE SEISMIC DETONATOR

Edward Mervyn Patterson, West Kilbride, Scotland, assignor to Imperial Chemical Industries Limited, London, England, a corporation of Great Britain

Filed Feb. 24, 1967, Ser. No. 618,413
Claims priority, application Great Britain, Mar. 18, 1966, 11,988/66
U.S. Cl. 102—28 **6 Claims**
Int. Cl. F42b *37/00*

A seismic detonator includes an explosive charge surrounded by a casing having at least one aperture therein which is closed by a water-destructible seal in the form of a layer of particulate water-gellable colloid. In the preferred embodiment the aperture is in the normally blind end of the casing and the layer of colloid is pressed into the casing between the aperture and the explosive charge.

Keywords: Seismic explosive acoustic transmitter



3,430,598

MOORING DEVICE

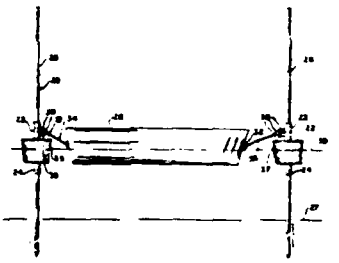
Joseph E. Soderberg, Warren, Minn. 56762

Filed Nov. 20, 1967, Ser. No. 684,112
U.S. Cl. 114—230 **2 Claims**
Int. Cl. B63b *21/00*

The invention comprises a mooring device for mooring a boat having an upright pair of shafts adapted to be inserted upright into the lake bottom in spaced parallel rotation to one another, with the upper portions of the shafts projecting above the surface of the lake, a pair of air tight containers acting as floats, said containers each having a vertical bore to slideably receive the said shafts, rope attaching means on each of said containers, said shafts being spaced further apart from one another than the length of said boat, rope means attached to the front of the boat may be attached to one of said containers and the rope means attached to the rear of said boat may be attached to the other of said containers, and said container will float upward and downward on said shaft in response to changes to the lake surface while maintaining said boat moored between said shaft.

Keywords: Small-craft mooring device

U.S. Cl. X.R. 9-8



3,430,599

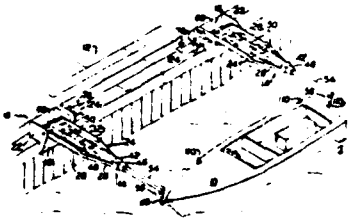
MOORING DEVICE

Edward Lezak, 50 E. Barclay St., Hicksville, N.Y. 11801

Filed Dec. 11, 1967, Ser. No. 689,517
U.S. Cl. 114—230 **7 Claims**
Int. Cl. B63b *21/00*

A mooring device for securing boats to a dock including a bendable boom that is extendable over the water. The boom is operated from the dock and includes structure for securing a boat to it. The boom includes a mechanism to cause it to bend intermediate its ends. As the boom bends it moves the boat towards and away from the dock.

Keywords: Small-craft mooring device



3,430,600

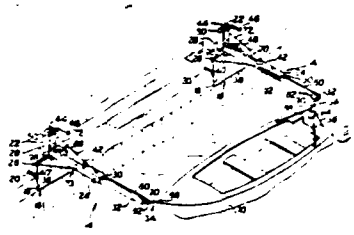
MOORING DEVICE

Edward Lezak, 50 E. Barclay St., Hicksville, N.Y. 11801

Filed Dec. 11, 1967, Ser. No. 689,518
U.S. Cl. 114—230 5 Claims
Int. Cl. B63b 21/16

A mooring device for securing small boats to a dock including a boom that is vertically pivotable and extendible over the water. The boom includes means for securing the boat to it and structure operable from the dock to cause the boom to extend and retract in length for moving the boat toward and away from the dock.

Keywords: Small-craft mooring device



3,430,695

METHOD AND APPARATUS FOR INSTALLING UNDERWATER WELLHEAD SUPPORT

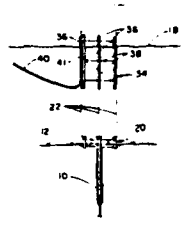
Jack L. Hubbard, Springdale, Conn., assignor to Mobil Oil Corporation, a corporation of New York

Continuation of application Ser. No. 520,591, Jan. 14, 1966. This application Nov. 8, 1967, Ser. No. 681,600
U.S. Cl. 166—.5 14 Claims
Int. Cl. E21b 33/035, 43/01; E21c 19/00

1. A base platform assembly to be located on a subaqueous bottom, beneath a body of water comprising: a base platform, means associated with said base platform for spacing the lower ends of a plurality of primary guidelines with respect to each other and with respect to an upstanding conductor pipe to be set in the formations underlying a subaqueous bottom, said plurality of primary guidelines being adapted to extend to the surface of a body of water in which said base platform assembly is to be located to position said base platform assembly and the upstanding conductor pipe with respect to each other and a wellbore extending into the formations underlying the subaqueous bottom; a plurality of upstanding leg guides of said base platform assembly fixedly spaced outward of said means for spacing the lower ends of a plurality of primary guidelines, each of said leg guides being adapted to coact with one of a plurality of spaced legs of a wellhead support structure to locate a wellhead support structure with respect to a conductor pipe to be set in the wellbore extending into the formations underlying a subaqueous bottom with the upper end of the conductor pipe located beneath the surface of the body of water; and a plurality of secondary guidelines, one end of each of said secondary guidelines being secured to said base platform at spaced intervals outward of said plurality of primary guidelines and adapted for extending to the surface of a body of water in which said base platform assembly is to be located to guide a wellhead support structure through the body of water to contact the legs of the wellhead support structure with said upstanding leg guides.

Keywords: Seabed foundation; Seabed oil, process structure

U.S. Cl. X.R. 175-7



3,430,727

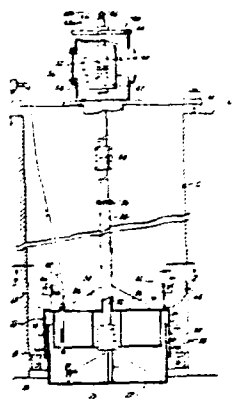
SEISMIC SIGNAL TRANSDUCING APPARATUS

Booth B. Strange and Ben B. Thigpen, Houston, Tex., assignors to Western Geophysical Company of America, Los Angeles, Calif., a corporation of Delaware

Filed Apr. 21, 1967, Ser. No. 632,741
U.S. Cl. 181—.5 8 Claims
Int. Cl. G01v 1/00

A marine seismic signal generator having at least two telescopically mated surfaces, one surface being free to reciprocally move relative to the other surface and including a generating surface exposed to a body of water. A source of air supplies air pressure to the cavity formed between the mated surfaces to preclude water from entering into the cavity. An energy source imparts motion to the generating surface to produce the desired impulses into the body of water.

Keywords: Seismic explosive acoustic transmitter; Seismic vibratory acoustic transmitter



MARCH 11, 1969

3,431,734

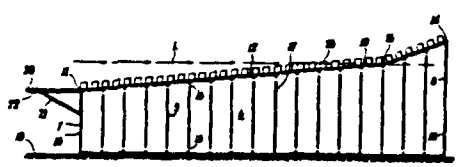
TOTALLY OR PARTIALLY PREFABRICATED STRUCTURE BAR-DAM FOR THE PROTECTION OF HARBORS

Giuseppe Vattuone, 11 Via Rovereto, Rome, Italy

Filed Aug. 22, 1966, Ser. No. 573,927
Claims priority, application Italy, June 13, 1966, 13,465/66
U.S. Cl. 61—4 9 Claims
Int. Cl. E02b 3/04

A harbor protecting bar-dam comprising a cellular structure adapted for resting on the sea bottom, and provided with an upper wave resolution surface carrying a plurality of spaced resistance elements. The wave resolution surface is inclined so as to extend upwards from an immersed point located at the outer end to a point above the level of the sea at its inner end.

Keywords: Breakwater, concrete; Offshore caisson



3,431,880

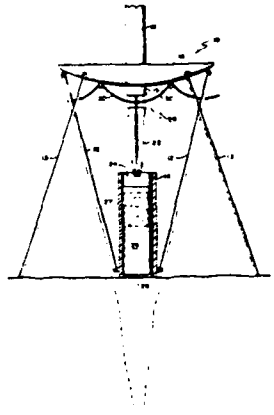
EXPLOSIVE EMBEDMENT ROCK ANCHOR

Otis R. Pannell, Alexandria, Va., assignor to the United States of America as represented by the Secretary of the Navy

Filed Dec. 18, 1967, Ser. No. 691,533
U.S. Cl. 114—206 3 Claims
Int. Cl. B63b 21/28

An explosive rock embedment anchor assembly having a shaped charge explosive for producing a hole in a hard ocean floor, and a projectile gun for subsequent embedment of a projectile anchor in the hole.

Keywords: Embedment anchor; Offshore platform anchor



3,431,986

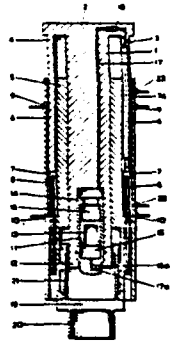
HYDRAULIC PILE-DRIVING DEVICE

Joost W. Jansz, The Haag, Netherlands, assignor to Hollandsche Beton Maatschappij, N.V.

Filed May 24, 1967, Ser. No. 640,994
Claims priority, application Netherlands, May 24, 1966, 6607149
U.S. Cl. 173—134 9 Claims
Int. Cl. E02d 7/10; B25d 9/12

A hydraulic pile-driving device includes at least one hydraulic cylinder which is connected with a ram body to move it up and down, a hydraulic main circuit operating the hydraulic cylinder being controlled by a hydraulic control circuit operating in dependence upon the position of the piston in the hydraulic ram cylinder. Special hydraulic circuit connections and components prevent hydraulic shocks and maintain the downward acceleration of the ram at a constant value.

Keywords: Pile driver, impact



3,432,000

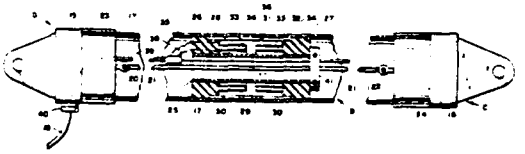
SUBMERSIBLE DETECTOR FOR SENSING UNDERWATER SOUNDS

Leo Ongkiehong and Harm Mast, Rijswijk, Netherlands, assignors to Shell Oil Company, New York, N.Y., a corporation of Delaware

Filed Mar. 21, 1967, Ser. No. 624,817
Claims priority, application Great Britain, Mar. 25, 1966, 13,489/66
U.S. Cl. 181—.5 3 Claims
Int. Cl. G01v *1/38*

In a liquid filled, flexible streamer carrying underwater seismic exploration hydrophones, the sound pressure wave detectors may be isolated from the false inertial forces that result when the mass of the liquid filling the streamer is shifted or accelerated by disposing the detectors in fluid-tight chambers having a rigid wall between the liquid filled interior of the streamer and the pressure detector containing chambers to include a portion of the flexible streamer casing as one wall thereof and filling the chamber with liquid in direct contact with both, the interior surface of the flexible streamer casing and the surface of the pressure detector, so that the flexible casing wall acts as a diaphragm to transmit sonic pressure waves directed against the outer surface of the casing directly to the pressure detector via the chamber liquid.

Keywords: Seismic hydrophone; Seismic streamer cable



3,432,805

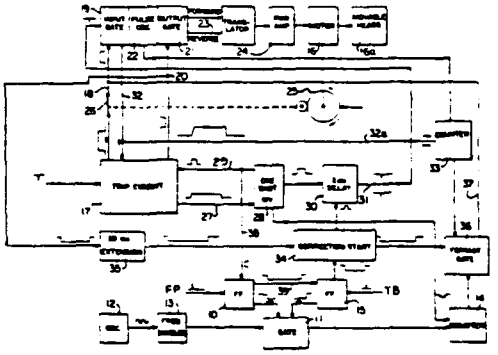
TIME BREAK CORRECTOR FOR MARINE SEISMIC SIGNALS

Francis M. Romberg, Irving, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Filed Jan. 31, 1968, Ser. No. 702,046
U.S. Cl. 340—15.5 9 Claims
Int. Cl. G01v *1/24*

A marine seismic source is triggered by a firing signal produced when the magnetic drum recorder is in a particular position. The variable delay between the firing signal and the actual seismic impulse is compensated for by a corrector system. Movable playback heads on the seismic signal recorder are positioned by the corrector system so that the signals reproduced by these heads are in correct time relation to the actual seismic impulse. The corrector system includes first and second counters and a comparator for determining when the proper correction has been made.

Keywords: Seismic record processor; Seismic survey method



3,433,024

VERSATILE MARINE STRUCTURE

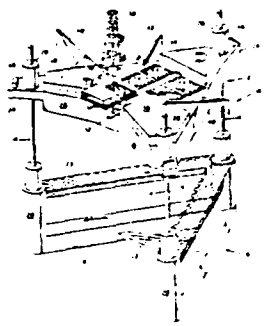
William E. Diamond, Diobu, Port Harcourt, Nigeria, and George W. Perry, Le Vesinet, Yvelines, France, assignors to Mobil Oil Corporation, a corporation of New York

Filed Mar. 31, 1966, Ser. No. 539,050
U.S. Cl. 61—46.5 1 Claim
Int. Cl. B63b *35/44, 21/50*

This specification discloses a versatile marine structure, primarily designed for drilling offshore wells, having an upper buoyant deck section, a lower buoyant wave transparent hull section, and jack-up legs between the sections whereby the structure is adapted to be used alternatively as a submerged barge in shallow water, a bottom-supported jack-up platform in intermediate depth water, and as a floating wave transparent vessel in deep water. The structure may also be floated with the lower buoyant wave transparent hull section at the surface of the body of water and the upper buoyant deck section at its lowest position with respect to the lower hull section, when the structure is to be transported through a body of water from one location to another.

Keywords: Offshore platform, floating; Offshore platform, jack up

U.S. Cl. X.R. 29-25.42



3,433,311

PILE DRIVER AND EXTRACTOR WITH ROTATING ECCENTRIC MASSES OF VARIABLE WEIGHTS

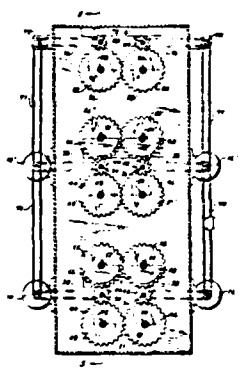
Jean Louis Lebelle, 35 Rue Gounod, Saint-Cloud, France

Filed May 31, 1967, Ser. No. 642,487
U.S. Cl. 173—49 10 Claims
Int. Cl. E02d *7/18*; F16h *33/14*; E21c *3/02*

A pile driver and extractor in which sets of balanced counter rotating eccentric masses are rigidly connected to an elongated ground engaging element in such fashion that the masses develop a vibratory force along the axis of the element with forces at right angles thereto being cancelled. Clutches are provided to vary the number of operating sets of such masses and the masses when driven turn in cadence (as hereinafter defined) so that the vibratory effect is equivalent to that of masses of variable weight.

Keywords: Pile driver, vibratory; Pile extractor

U.S. Cl. X.R. 74-61; 175-55

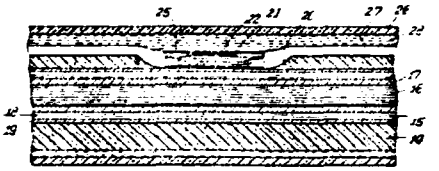


3,434,104
HYDROPHONE CABLE
Fred E. Stapleton and James E. Buescher, Houston, Tex., assignors to Mandrel Industries, Inc., a corporation of Michigan
Filed Aug. 10, 1967, Ser. No. 659,720
U.S. Cl. 340—7 1 Claim
Int. Cl. H04b 13/00

This invention provides a new type of hydrophone cable section wherein a body of cellular material such as foamed polyurethane is provided with cavities in its exterior surface, in which crystal detectors are recessed, and the body is enclosed by a waterproof jacket. Flotation liquid is contained in the space between the outer jacket and the body, and strain members and electrical conducting wires are enclosed within the body, the combination producing a cable section which will not lose its entire flotation ability nor its ability to protect the crystal detectors and wires even though the outer jacket may be ruptured by contact with external bodies.

Keywords: Seismic hydrophone; Seismic streamer cable

U.S. Cl. X.R. 340-10



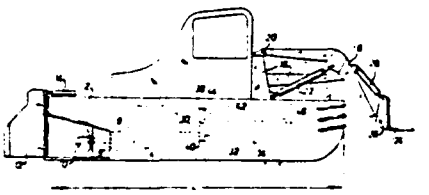
MARCH 25, 1969

3,434,444
WATERCRAFT WITH SCOOP
Francis Richard Caddick, 74 Winifred Lane, Aughton, near Ormskirk, England
Continuation-in-part of application Ser. No. 542,972, Apr. 15, 1966, now Patent No. 3,326,379. This application Apr. 25, 1967, Ser. No. 633,445
Int. Cl. B63b 1/16, 35/00
U.S. Cl. 114—57 16 Claims

A watercraft having a generally rectangular shape and a scoop situated beyond the bow for lifting flotsam or other debris from the surface of navigable waters. Supporting the scoop for movement between raised and lowered positions is a boom structure extending over the top surface of the hull and pivoted rearwardly of the bow to a support on the hull. In the stern, a pair of stabilizing fins project rearwardly from the bottom surface of the craft in underlying and spaced relationship from an upper stern portion of the craft. Extending in horizontal planes, the fins each have a generally right-triangular shape including first side portions which merge with the opposite sides of the craft respectively and second side portions extending normal to the former transversely of the craft. The fins are spaced inwardly towards the bow from the rearmost surface of the upper stern portion. Between the fins and the upper stern portion, is an intermediate stern portion including two surfaces projecting upwardly in vertical planes from the hypotenuse-sides of the fins respectively. These intermediate stern portions also extend rearwardly and inwardly from the sides of the boat in converging fashion. A mounting bracket for the bottom of the rudder pin projects rearwardly from between the fins to a point generally below the rearmost surface of the upper stern portion.

Keywords: Pollutant debris; Pollutant, mechanical removal; Pollutant removal watercraft

U.S. Cl. X.R. 114-126



3,434,446

REMOTELY CONTROLLABLE PRESSURE RESPONSIVE APPARATUS

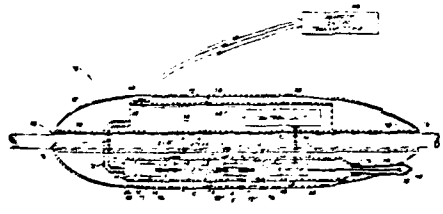
Jimmy R. Cole, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla., a corporation of Delaware

Filed Oct. 2, 1967, Ser. No. 672,341
Int. Cl. B63b 21/56, 17/00
U.S. Cl. 114—235 6 Claims

Apparatus for effecting depth keeping of a marine paravane wherein depth control is attained by utilizing the differential force resulting from water pressure acting upon a moveable diaphragm against the restoring force of a spring acting on the diaphragm, the differential force being transmitted to an actuating linkage which is connected such that proportional movement is applied to depth adjusting structure. The diaphragm member is positioned by spring tension which can be varied in response to acoustic or other type of energy transmission from a ship or surface station and the spring tension adjustment effectively selects the paravane operating depth.

Keywords: Depth pressure measurement; Seismic streamer cable; Towed body depth control

U.S. Cl. X.R. 114-25



3,434,451

METHOD AND APPARATUS FOR UNDERWATER TOWING OF SEISMIC HYDROPHONE ARRAYS

Edward C. Brainard II, Marion, Mass., assignor to Braincon Corporation, Marion, Mass., a corporation of Massachusetts

Filed June 28, 1967, Ser. No. 649,609
Int. Cl. B63b 21/56, 23/00
U.S. Cl. 114—235 10 Claims

A method and apparatus for the continuous towing of seismic hydrophone arrays at a substantially constant depth in a body of water is described. A number of towed vehicles capable of generating hydrodynamic lift are coupled together in pairs, the vehicles in each pair being oriented to generate lift in opposite directions when under tow so as to provide counterbalancing forces which maintain one vehicle very close to the surface of the water and the other vehicle at a relatively fixed depth below the surface when under tow. A seismic hyprophone array is connected to each of the pairs of vehicles and is also maintained at a relatively fixed depth by them. The vehicles are towed from one of the deeper underwater vehicles by means of a towing cable extending downwardly from a ship or other water-borne vessel which carries a sound source for the generation of the acoustic signals which are to be detected by the hydrophone array.

Keywords: Seismic hydrophone array; Towed body depth control

3,434,551

BUOYANT CORING APPARATUS

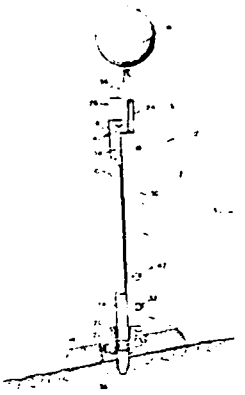
Andre M. Rosfelder, La Jolla, Calif., assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed June 26, 1967, Ser. No. 649,438
Int. Cl. E21b 7/12, 9/20, 25/00
U.S. Cl. 175—6 10 Claims

The description discloses a buoyant rig for supporting coring operations of an underwater coring barrel. The buoyant rig includes a float and a bottom weighted stand which are interconnected by at least one guide wire. The core barrel slidably extends through the weighted stand and is positioned parallel to the guide wire and is slidable therealong by a guide means. When the core barrel is powered the barrel will be guided along the guide wire as it penetrates the ocean bottom. A gimbal connection between the core barrel and the stand for uneven ocean bottoms and the guide wire may be separated from the stand after a sample is obtained so that the float will raise the core barrel and the remaining rigging apparatus to the ocean surface.

Keywords: Instrument retrieval; Sampler, seabed-driven core

U.S. Cl. X.R. 175-245; 175-248



3,434,561

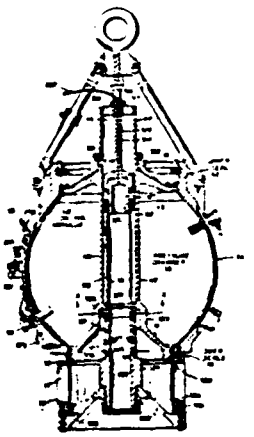
FUEL MIXING AND IGNITION SYSTEM IN PNEUMATIC ACOUSTIC SOURCE

George B. Loper, Duncanville, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Filed Aug. 28, 1967, Ser. No. 663,663
Int. Cl. G10k 11/00
U.S. Cl. 181—.5 14 Claims

The specification discloses a repetitive acoustic source having a chamber in which an air-diesel fuel mixture is ignited to form high pressure gasses which are rapidly released through a port by a quick-acting valve to generate an acoustic pulse in water. The fuel mixing and ignition system comprises an arrangement for injecting air in a swirling path in the chamber and a plurality of diesel fuel injectors and igniters alternately located in two spaced planes. Shields are provided to shield each igniter from the direct air to reduce cooling of the igniters. Each injector injects diesel fuel toward an igniter in an opposite plane on a side unobstructed by an associated shield.

Keywords: Seismic explosive acoustic transmitter



3,408,867

TEMPERATURE MEASURING SEA WATER PROBE, INSULATED WIRE SUITABLE THEREFOR AND METHOD OF MAKING SAME

Charles G. Henricks and William C. Le Mieux, Muskegon, Mich., assignors to Anaconda Wire and Cable Company, a corporation of Delaware

Filed Oct. 10, 1966, Ser. No. 585,430
9 Claims. (Cl. 73—339)

An apparatus for measuring the temperature of sea water has two spools encased in a probe. The spools are interconnected with a wire having a number of alternate insulating layers of epoxy enamel and nylon. Each layer of insulation is formed on the wires by a single pass.

Keywords: Bathythermograph; Instrument cable

3,409,094

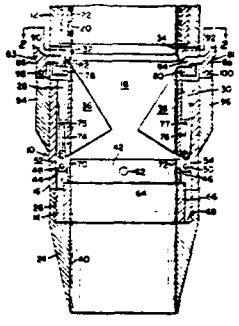
SPRING ACTUATED CORE RETAINER

Theodore R. Kretschmer, Port Hueneme, and Melvin C. Hironaka, Camarillo, Calif., assignors to the United States of America as represented by the Secretary of the Navy

Filed May 31, 1967, Ser. No. 643,325
7 Claims. (Cl. 175—242)

The invention is a spring actuated core retainer comprising a tubular body which is to be attached to the lower end of a core sampling barrel. Within the body are two rotatable closure elements connected to two torsion springs which tend to bias the closure elements so as to close the core barrel after a sample has been taken. Holding means restrain the closure elements during descent and penetration of the core barrel; upon removal of the barrell, pressure from the ocean sediment pivots the holding means from engagement with the closure means allowing the torsion springs to bias the closure elements to a closed position.

Keywords: Sampler, seabed-driven core



3,409,153

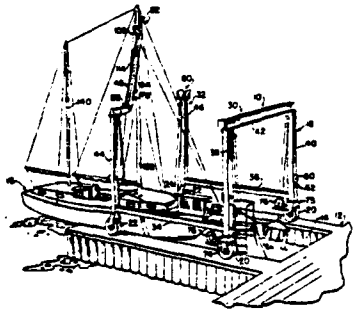
BOAT HOIST

Richard A. Stearn, Arnold Petersen, and Norbert Lenius, Sturgeon Bay, Wis., assignors to Marine Travelift, Inc., Sturgeon Bay, Wis., a corporation of Wisconsin

Filed Dec. 22, 1966, Ser. No. 603,952
9 Claims. (Cl. 214—396)

This invention relates to a boat hoist which has a frame, a boat sling connected to the frame for supporting a boat and a plurality of wheels movably supporting the frame. The frame includes a pair of columns and a catch is mounted on one of the columns. An elongated arm has one end pivotedly mounted on the other of the columns. The elongated arm has a lock mounted on the free end thereof for releasable engagement with the catch. The lock includes a fixed jaw and a movable jaw cooperative with the catch to lock the arm to the catch. A motor is connected to the arm and to the lock for raising and lowering the arm and operating the lock.

Keywords: Small-craft launcher



3,409,525

PROCESS FOR REDUCING CORROSION

Charles W. Taylor, Jr., Akron, and Daniel T. Conrad, Cuyahoga Falls, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio, a corporation of Ohio

No Drawing. Filed May 24, 1965, Ser. No. 458,436
8 Claims. (Cl. 204—147)

1. In the cathodic process of protecting ferrous articles from corrosion the improvement which comprises subjecting a ferrous article to a treatment that forms a phosphate coating on the surface of the article, then coating it with a fused resin, and then cathodically protecting said article.

Keywords: Cathodic protection; Corrosion prevention

No Figure

3,409,871

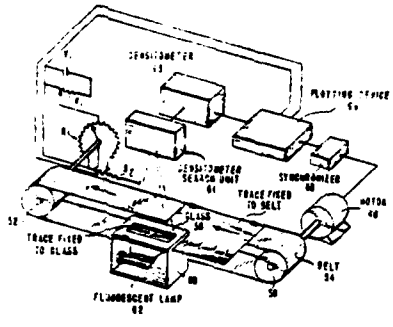
ELIMINATION OF MULTIPLE EVENTS ON SEISMOGRAMS OBTAINED AT WATER-COVERED AREAS OF THE EARTH

Harland H. Heffring, Calgary, Alberta, Canada, assignor to Esso Production Research Company, a corporation of Delaware

Filed Oct. 12, 1966, Ser. No. 586,075
7 Claims. (Cl. 340—15.5)

Ringing events are eliminated from a trace of a reproducible seismogram taken at marine locations by adjustably attenuating electrical signals produced from a trace, delaying the trace by an amount equal to the seismic wave travel time through the water layer beneath the source, and adding the original signal to the undelayed and unattenuated signal. This process is repeated using a delay equal to the travel time of waves in the water layer beneath the seismic wave detector. The appropriate attenuation and time delay is determined by autocorrelation of traces produced by vertically traveling seismic waves at the ends of a geophone spread.

Keywords: Seismic record processor



NOVEMBER 12, 1968

3,410,097

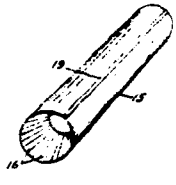
PILE CAPPING MECHANISM

Edward M. Young, 90 Gregory Ave., West Orange, N.J. 07052

Filed Mar. 21, 1966, Ser. No. 536,022
7 Claims. (Cl. 61—53)

A pile capping mechanism for rehabilitating the tops of old piles and also to provide concrete caps for new piles, the mechanism having a bottom member or portion of integral overlapping flexible fingers directed inwardly and angularly upwardly and of such length as to provide a central opening smaller than the pile and a casing extending from the bottom. The mechanism may provide U shaped side edges for the casing which are interengaged by contracting the casing and including internal braces when assembled to prevent inadvertent contraction of the casing and disengagement of the edges.

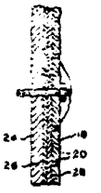
Keywords: Concrete form; Pile, wood; Structure repair



3,410,772
METHOD FOR ATTACHING IMPRESSED CURRENT ANODES FOR CATHODIC PROTECTION
Isidore Geld, Flushing, and Walter L. Miller, Lynbrook, N.Y., assignors to the United States of America as represented by the Secretary of the Navy
Filed May 28, 1965, Ser. No. 459,956
5 Claims. (Cl. 204—147)

Method of protecting a metal against electrolytic corrosion by bonding an anode to the metal with a curable electrically nonconducting adhesive in uncured state and then passing a direct current between the anode and the metal.

Keywords: Cathodic protection; Corrosion prevention

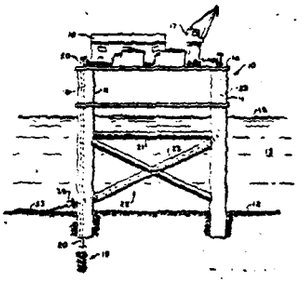


NOVEMBER 19, 1968

3,411,303
OFFSHORE PLATFORM WITH INTERNAL FLOWLINE
Richard D. Bates, Anchorage, Alaska, and Robert C. Visser, San Dimas, Calif., assignors to Shell Oil Company, New York, N.Y., a corporation of Delaware
Filed Dec. 28, 1966, Ser. No. 605,422
9 Claims. (Cl. 61—46)

An offshore platform provided with at least one internal passage in the structural members of the platform for receiving and protecting a flowline from ice floes, water current, debris and the like. The passage, which may be a separate tube within a leg and cross-bracing of the platform, serves to guide the flowline as it is pulled through the passage from the ocean floor up to the surface of the platform.

Keywords: Offshore platform, fixed; Offshore platform, leg



3,411,304
DOCK FENDER
Russell B. Miller, Akron, Ohio, assignor to Barberton Plastics Products, Inc., Barberton, Ohio, a corporation of Delaware
Filed May 15, 1967, Ser. No. 638,534
5 Claims. (Cl. 61—48)

A resilient body for use as a dock fender or the like having a face portion adapted to conform to the surface of the object to which the fender is to be secured. Integral flap portions extending outwardly from the body along the lateral margins of the face portion are provided to facilitate securing the fender to the object.

Keywords: Pier fender

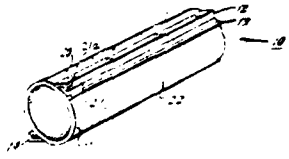
3,411,305
TUBULAR INTERLOCKING PILING FOR WALL ASSEMBLIES

Alexander A. Cella, Great Notch, N.J., assignor to Alexander A. Cella, Great Notch, and Charles Vinzant, Wharton, N.J.

Filed Jan. 23, 1967, Ser. No. 611,126
4 Claims. (Cl. 61—60)

Keywords: Bulkhead; Pile, steel

A pile unit for use in interconnected tubular piling. The tubular unit has an interlocking element, L-shaped in cross-section, welded to the exterior surface of the tube, and a second L-shaped, interlocking element and a bead element welded to the exterior surface of the tube and spaced from the first connecting element. Two tubular units are interconnected by sliding an L-shaped element of one into an L-shaped element of a second, with the bead element of the second maintaining the engagement of the interlocking elements.



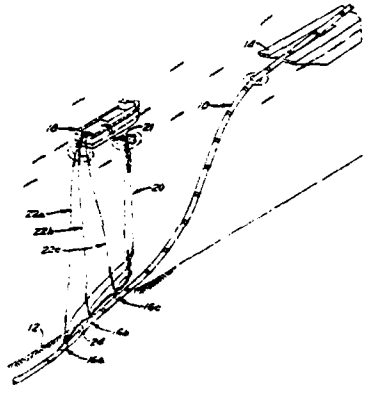
3,411,307
METHOD AND APPARATUS FOR BURYING OFFSHORE PIPELINES

Jimmie L. Huitt, Glenshaw, and James E. Knizner and Nicholas Marusov, Verona, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa., a corporation of Delaware

Filed Nov. 23, 1966, Ser. No. 596,494
8 Claims. (Cl. 61—72.4)

Keywords: Seabed pipeline placement

The invention comprises methods and apparatus to bury offshore pipelines with the use of moveable vibrating means which are selectively, rigidly fixed with respect to the pipeline. Because of the thixotropic nature of the underwater mud, the vibration permits the pipeline to fall by gravity through the liquefied mud to thereby bury itself.



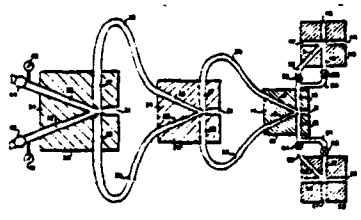
3,411,354
CURRENT METER

Julian Josephson, 4814 Eastern Lane, Apt. 103, Suitland, Md. 20023

Filed Aug. 18, 1966, Ser. No. 573,392
5 Claims. (Cl. 73—170)

Keywords: Current measurement

This disclosure is directed to a device for determining ocean currents with a minimum of moving parts. The device includes a three stage fluid amplifier system in which the only movable parts are control valves and pressure gages none of which are directly in the current flow through the amplifier system. The fluid amplifiers are connected in series such that the outputs of one stage controls the fluid output flow through the next stage in the series, etc. The output of the last fluid amplifier stage is provided with a pressure gage and a fluid flow meter which determines the flow of the water through the last stage of the fluid amplifier system. The pressure indicated by the pressure gage and the fluid flow indicated by the flow meter represents the current flow measured by the amplifier system. In use, the device is suspended from a stationary ship, secured to a buoy, or any other means from which current flow may be determined.



3,434,562

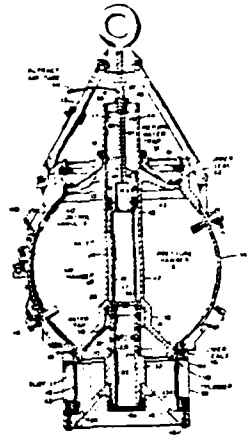
AIR FEED DEVICE FOR VALVE RETRACT SYSTEM IN PNEUMATIC ACOUSTIC SOURCE

Malcolm O. Johnson, Dallas, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Filed Aug. 28, 1967, Ser. No. 663,677
Int. Cl. G10k *11/00*
U.S. Cl. 181—.5 1 Claim

The specification discloses a repetitive marine acoustic source formed by a rigid chamber for confining high pressure gases and having a controllable spool-shaped valve for rapidly releasing the high pressure gases into the water to generate an acoustic pulse. The valve has an aperture extending axially therethrough in which is secured a retract piston slidably mounted within a retract chamber. Gas is fed to the retract chamber through the top of the source by way of a flexible conduit and an aperture extending through the retract piston for retracting the spool-shaped valve to its closed position following the generation of an acoustic pulse.

Keywords: Seismic explosive acoustic transmitter



3,435,410

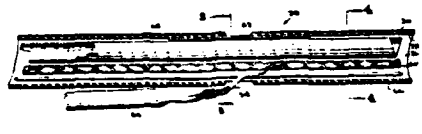
SHALLOW WATER SEISMIC PROSPECTING CABLE

John J. Babb, Jackson, Miss., assignor to Delta Exploration Company, Inc., Jackson, Miss., a corporation of Mississippi

Filed May 20, 1968, Ser. No. 730,503
Int. Cl. H04b *13/02*
U.S. Cl. 340—7 10 Claims

A shallow-water seismic cable having an elongated flexible enclosing tube which is inflatable and deflatable by an increase and decrease in internal pressure for causing the cable to float or sink with a hollow radially rigid tubular member having an outer diameter less than the inner diameter of the flexible tube located within the flexible tube and a multi-conductor wire cable also within the flexible tube exteriorly of the rigid tubular member so that the radially rigid tubular member prevents complete collapse of the enclosing tube upon reduction of pressure within the enclosing tube.

Keywords: Seismic streamer cable; Towed body depth control



3,435,621

JACKING SYSTEM FOR OFFSHORE PLATFORMS

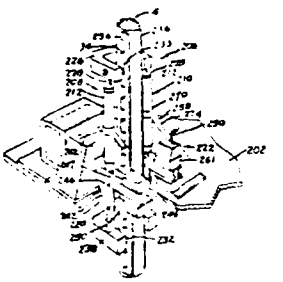
Roy Bernhard Johnson, York, Pa., assignor to American Machine & Foundry Company, a corporation of New Jersey

Filed July 26, 1966, Ser. No. 567,887
Int. Cl. E02b 17/04; B66f 1/02, 3/00
U.S. Cl. 61—46.5 9 Claims

An offshore platform assembly comprises a platform, a plurality of spuds extending through openings in the platform for engagement with a supporting surface and a jacking mechanism associated with each of the spuds for effecting relative movement between the platform and spuds. Fluid operated jacks are pivotally mounted on the platform for engagement with the spuds and latch means pivotally mounted to the jacks for movement to and from said spuds. Means are provided for moving the jacks into holding engagement with the spuds and the latch means are operable to fix the longitudinal position of the jacks on the spuds.

Keywords: Offshore platform, jack up; Offshore platform, leg

U.S. Cl. X.R. 254-106; 254-107; 254-119



3,435,677

SYSTEM FOR MEASURING DIRECTION AND VELOCITY OF CURRENTS IN A LIQUID MEDIUM

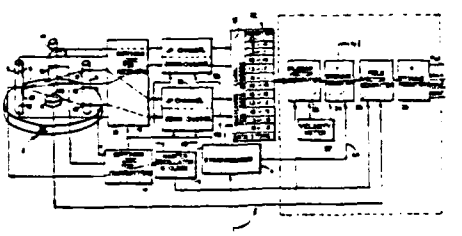
Frederick H. Gardner, Long Beach, Calif., assignor to North American Rockwell Corporation, a corporation of Delaware

Filed Apr. 3, 1967, Ser. No. 628,015
Int. Cl. G01w 1/02
U.S. Cl. 73—189 10 Claims

A plurality of sensor elements, each including receivers for receiving acoustic signals generated by transmitters on each of the elements, including digital data processing circuitry for computing the frequency change of signals transmitted between sensors and for generating output signals indicating the direction and velocity of ocean currents. The system includes circuitry for providing a reference plane for the sensor elements so that the output direction and velocity are oriented to the reference plane or to an earth fixed reference.

Keywords: Current measurement

U.S. Cl. X.R. 181-.5



3,435,797
COMPRESSED AIR, PRESSURE-SENSING ACTUATOR

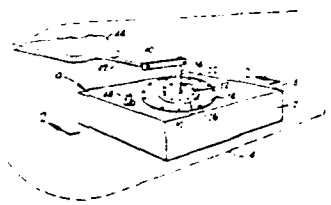
William L. Chapman, Ponca City, Okla., assignor to Continental Oil Company, a corporation of Delaware

Filed May 3, 1967, Ser. No. 635,861
Int. Cl. B63b *21/56*; B63g *8/14*; G01l *7/08*
U.S. Cl. 114—235 2 Claims

An automatic depth controller for a paravane having one or more diving planes and adapted to be towed through water. The apparatus utilizes a compressed air chamber separated from the water by a flexible diaphragm carrying a piston in order that the piston, which is connected to the paravane diving plane or planes, will move in response to variations in pressure between the compressed air chamber and the static pressure of the water. A biasing spring is anchored between the piston and a wall of the air chamber to eliminate hysteresis effect of the diaphragm when exposed to minor pressure differentials and to preposition the piston at discreet pressure differentials.

Keywords: Seismic streamer cable; Towed body depth control

U.S. Cl. X.R. 181-.5



3,436,722
EXTENDABLE INTRASECTION HYDROPHONE ARRAYS

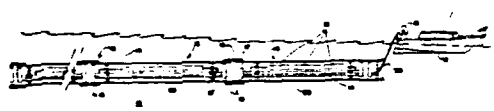
Booth B. Strange, Houston, Tex., assignor to Western Geophysical Company of America, Los Angeles, Calif., a corporation of Delaware

Filed Apr. 1, 1968, Ser. No. 717,535
Int. Cl. H04b *13/00*
U.S. Cl. 340—7 7 Claims

This invention relates to improved streamer cables for use in marine seismic exploration and, more particularly, to improved streamer sections each comprising at least two component arrays of hydrophones for detecting reflected seismic waves during marine exploration. Means are provided to detachably interconnect, at the end of each section, the component arrays to obtain composite intrasection arrays for optimum attenuation of noise and of unwanted signals, whereby desirable response curves can be selectively achieved.

Keywords: Seismic hydrophone array; Seismic streamer cable

U.S. Cl. X.R. 181-.5



APRIL 8, 1969

3,436,776
SELF-BALLASTING STREAMER

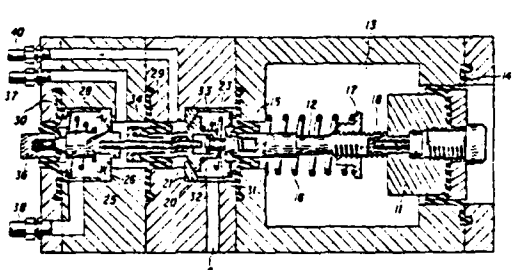
Billy W. Davis, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed Feb. 23, 1967, Ser. No. 618,114
Int. Cl. B63b *21/52*, *35/00*; B63g *8/14*
U.S. Cl. 9—8 2 Claims

A device for maintaining a body at a predetermined depth in a fluid medium. The device, which is secured to the body, includes a pressure sensitive valve which operates in response to pressure changes due to changes in depth in the medium. The valve controls the flow of a gas to or from an inflatable bag which expands or contracts depending on the quantity of gas contained therein, displaces an amount of fluid that causes the body and the device to rise or sink. When a predetermined depth is reached for which the valve is adjusted, the valve operates to shut off further gas from entering or leaving the bag, causing the body and the device to remain at the predetermined depth.

Keywords: Instrument retrieval

U.S. Cl. X.R. 114-16



3,436,914

HYDROSTATIC ENERGY ACCUMULATOR

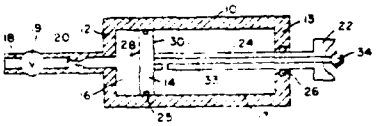
Andre M. Rosfelder, La Jolla, Calif., assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed May 29, 1967, Ser. No. 643,311
Int. Cl. F15b *1/02, 13/02, 21/04*
U.S. Cl. 60—51 9 Claims

The invention is several different embodiments of hydrostatic energy accumulators to be used in undersea environments. All the embodiments have in combination a valve means and a constriction means for improving operating characteristics; also in combination may be accumulator systems that are compressible providing a system whose pressure is substantially equal to the surrounding sea pressure. My invention also includes in several of the embodiments an amplification of pressure using dual pistons and a sealing arrangement about a piston using a variable diameter piston head.

Keywords: Power, submerged source; Sampler, power supply; Sampler, seabed-driven core

U.S. Cl. X.R. 60-1; 175-6



3,436,920

PROTECTION OF OFFSHORE STRUCTURE FROM ICEBERGS

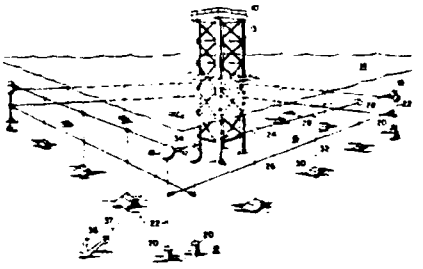
Kenneth A. Blenkarn and Alphia E. Knapp, Tulsa, Okla., assignors to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware

Filed Jan. 3, 1967, Ser. No. 607,050
Int. Cl. E02b *3/00*; E02d *21/00*; B63g *9/00*
U.S. Cl. 61—1 3 Claims

Fending systems for protecting offshore structure from icebergs. A fence or structure surrounds the offshore structure. The fending system incorporates members such as crush tubes for absorbing large amounts of energy. These large energy absorbing means permit the changing of the course of an iceberg by supplying the required impulse over a long time period. Three embodiments are described: (1) a system of buoy-supported cables anchored to the ocean floor, (2) a spider-web system with the outer ends of the cable anchored to the ocean floor and the inner ends anchored to the offshore structure through J tubes and crush tubes, and (3) a protecting structure surrounding offshore platform and attached to it through crush tubes. All systems are below the water surface sufficient to permit boat passage.

Keywords: Ice protection; Offshore platform, fixed

U.S. Cl. X.R. 61-46; 61-46.5; 114-240; 114-241



3,437,157

DIESEL PILEHAMMER

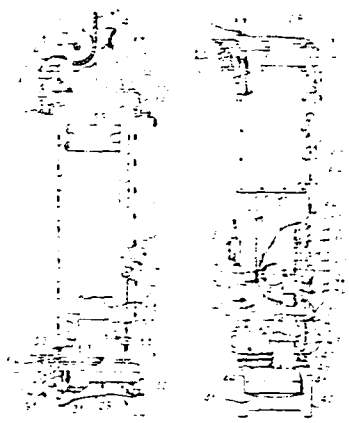
Kenneth E. Bailey, Marion, Iowa, Leland J. Frahm, Mendota, Ill., and Theodore M. Leigh, Cedar Rapids, Iowa, assignors to FMC Corporation, a corporation of Delaware

Filed Dec. 2, 1966, Ser. No. 598,663
Int. Cl. E21b 1/00; E21c 3/00; B25d 9/00
U.S. Cl. 173—133 22 Claims

A diesel pilehammer comprising a housing having a bore formed therein for receiving a free piston in sealing engagement therewith and slidably disposed therein for reciprocating axial movement; portions of the piston being formed to cooperate with corresponding portions of the housing for defining a scavenging chamber and a power chamber interconnected by a conduit including a valve for allowing gases to pass only in one direction from the power chamber to the scavenging chamber. The housing is formed with a port having valve means to allow gases to pass in one direction from the scavenging chamber to the atmosphere as the piston moves in a direction to decrease the volume of the scavenging chamber. The housing is also formed with a port for allowing the passage of gases to and from the power chamber. The free piston and housing cooperate to define a combustion chamber within the power chamber when the free piston is in a position providing a minimum volume in the power chamber. The diesel pilehammer further comprises appropriate fuel injection means for delivering fuel to the combustion chamber to be ignited and lifting means for raising the piston to its starting position. The lifting means includes a member for engaging a downwardly facing surface formed on the piston and a latch mechanism for automatically retaining the lifting means in its lowermost position to facilitate control of the entire hammer at all stages of the hammer operation. The diesel pilehammer, as described above, is a preferred embodiment of one of several apparatus for carrying out a method of operating a diesel pilehammer including igniting a compressed fuel-air mixture in a combustion chamber underlying the piston to cause the piston to ascend; evacuating a space separate from the combustion chamber during the ascent of the piston; permitting gases to flow to said evacuated space from the chamber underlying the piston while also admitting air into the latter space for the scavenging thereof during the ascent of the piston; reversing the direction of movement of the piston due to a reversal of the imbalance of forces acting thereon; forcing the gases in the previously evacuated space to flow to the atmosphere during the descent of the piston; confining and compressing air in the combustion chamber during the descent of the piston; and injecting fuel into the compressed air to be ignited for initiating a subsequent cycle.

Keywords: Pile driver, impact

U.S. Cl. X.R. 173-137



3,437,170

CONTROL OF ENERGY SPECTRUM IN MARINE SEISMIC EXPLORATION

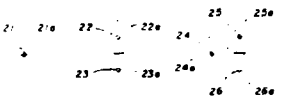
Fred A. Brock, Dallas, and Roy C. Johnston, Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed Dec. 12, 1966, Ser. No. 601,092
Int. Cl. G01v *1/38*; G10k *11/00*; H04b *13/02*
U.S. Cl. 181—.5 12 Claims

Seismic waves for marine operations generated by producing radiating bubbles at spaced locations where bubbles are of different sizes to oscillate at different frequencies for control of the energy level as a function of frequencies preferably at least three bubbles are employed with at least two bubbles located close enough to coalesce and one other bubble spaced sufficiently to prevent coalescence.

Keywords: Seismic acoustic transmitter array; Seismic explosive acoustic transmitter

U.S. Cl. X.R. 340-7



3,437,171

MARINE HYDROPHONE VIBRATION ISOLATION

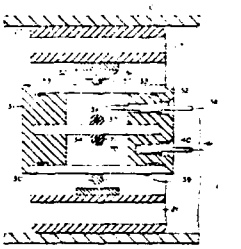
Billy W. Davis and Roy C. Johnston, Richardson, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Continuation-in-part of application Ser. No. 560,250, June 24, 1966. This application Nov. 3, 1967, Ser. No. 680,394
Int. Cl. F01n *1/00*
U.S. Cl. 181—.5 10 Claims

A vibration isolation suspension which reduces vibrations in marine hydrophones. A lightly damped elastic suspension in a seismic streamer is used to circumferentially engage the hydrophone to substantially reduce mechanically induced noise in the seismic frequency band of interest.

Keywords: Seismic hydrophone array; Seismic streamer cable

U.S. Cl. X.R. 340-10



3,437,989

APPARATUS AND METHOD FOR CONTINUOUS MARINE MULTICHANNEL SEISMIC EXPLORATION

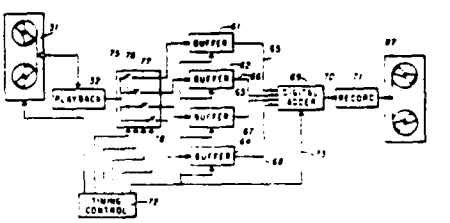
Jack M. Proffitt, Houston, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed June 7, 1966, Ser. No. 555,760
Int. Cl. G01v *1/13*
U.S. Cl. 340—15.5 12 Claims

A plurality of groups of marine seismometers are spaced apart predetermined distances and are moved together with a mobile seismic source along a marine traverse. The signals from seismometers in each group are combined to produce a plurality of electrical signals in response to seismic disturbances from the seismic source. The source is preferably actuated at predetermined time intervals related to the distance traveled by a given seismometer group such that seismic disturbances are created at distances of the order of the spacing between seismometer groups. Digital analog signals are produced representative of the analog electrical signals and preferably are combined as digital signals which represent energy derived from common distance points.

Keywords: Seismic hydrophone array; Seismic record processor; Seismic survey method

U.S. Cl. X.R. 340-7



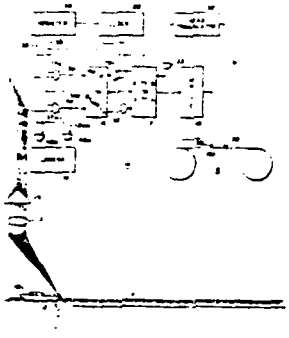
3,437,990
READ AFTER WRITE DIGITAL FIELD SYSTEM MONITOR

Edwin B. Neitzel, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed Dec. 30, 1966, Ser. No. 606,076
Int. Cl. G01v 1/38
U.S. Cl. 340—15.5 5 Claims

In seismic exploration, seismic signals are digitized and stored on magnetic tape in a field operation. A circuit is provided for reading the data recorded on the magnetic tape concurrently with recording by passing the data through the same converter and multiplexer as employed for the initial recording for monitoring the magnetic tape.

Keywords: Seismic record processor



APRIL 15, 1969

3,438,204
UNDERWATER STORAGE RESERVOIR

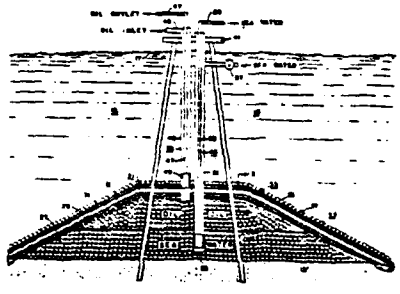
James M. Cleary, Dallas, Tex., assignor to Atlantic Richfield Company, Philadelphia, Pa., a corporation of Pennsylvania

Filed Oct. 9, 1967, Ser. No. 673,756
Int. Cl. B65g 5/00; E21f 17/16; E02d 29/06
U.S. Cl. 61—.5 39 Claims

Offshore underwater storage is created by forming a pile of objects heavier than water on the bottom of a body of water and by forming a thick impermeable upper barrier, preferably moldable, covering and supported by the pile. Two or more conduits are placed in the pile. A water-immiscible liquid lighter than water is added to, stored in and removed from the pile. The objects for the pile are preferably transported over water to location and may be deposited on a previously formed impermeable lower barrier. Pumping liquid from the pile consolidates the upper barrier and pile. Heavy material may be spread over the upper barrier. The pressure inside the pile may be maintained lower than water pressure on the upper barrier.

Keywords: Offshore construction; Offshore storage tank, submerged

U.S. Cl. X.R. 61-1

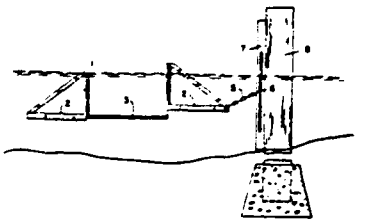


3,438,205
WATER SKIMMER
Horace L. Lindstrom, State Highway Rte. 73, Maple Shade, N.J. 08052
Filed Mar. 15, 1967, Ser. No. 623,302
Int. Cl. E02b *1/00*; B01d *17/00*; C02b *9/00*
U.S. Cl. 61—1 9 Claims

This invention pertains to a floating water skimmer comprising a trough having a bottom and two sides and adjustable water flow control means to regulate the water flow into the trough. Ballasts or floats are connected to the sides of the trough to regulate its floating depth in the water and may be used to regulate the water flow into the trough.

Keywords: Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 210-121; 210-242

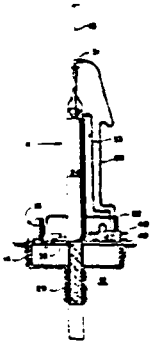


3,438,452
CORE SAMPLING
Hugh A. Bernard, Edwin E. Daigle, and Jacob C. Richardson, Houston, Tex., assignors to Shell Oil Company, New York, N.Y., a corporation of Delaware
Filed Dec. 18, 1967, Ser. No. 691,568
Int. Cl. E21b *7/12*, *1/00*, *49/00*
U.S. Cl. 175—6 10 Claims

Method and apparatus for taking a core sample from a liquid permeated sedimentary earth formation. Core sampling apparatus is anchored to the formation surface and coring means is thrust into the formation. A core sample is retained by the coring means when the coring means is retracted from the earth formation.

Keywords: Sampler, seabed-driven core

U.S. Cl. X.R. 175-20; 175-58; 175-94

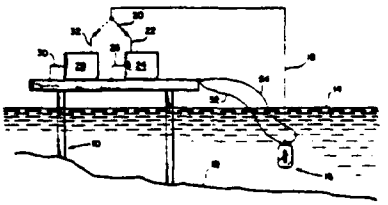


3,438,875
METHOD OF FORMING REFERENCE ELECTRODES
Hideo Watanabe, Fullerton, and John N. Harman III, La Habra, Calif., assignors to Beckman Instruments, Inc., a corporation of California
Filed Apr. 14, 1966, Ser. No. 542,623
Int. Cl. C23b *11/00*
U.S. Cl. 204—56 3 Claims

A silver-silver chloride reference electrode for use in control of anodic protection systems or for making ion concentration measurements of halide solutions, particularly sea water. The sea water constitutes the salt bridge solution of the reference electrode. After the silver chloride coating of the electrode erodes away, a constant direct anodic current is applied to the silver element of the electrode until it is completely coated by silver chloride and thus suitable for use as a stable and reliable reference electrode.

Keywords: Cathodic protection; Corrosion measurement; Corrosion prevention

U.S. Cl. X.R. 204-195

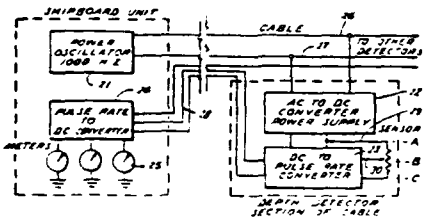


3,439,319
MARINE SEISMIC CABLE WITH DEPTH DETECTOR SYSTEM
William A. Whitfill, Jr., Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y., a corporation of Texas
Filed Aug. 7, 1968, Ser. No. 750,984
Int. Cl. H04b *13/02*
U.S. Cl. 340—7 6 Claims

A marine seismic cable system which is adapted for towing behind a boat, employs a depth detector system operating entirely from alternating current. The cable includes electrical conductors coupled to depth sensors located at spaced points along the cable. The depth sensors and electrical means provide a D.C. current signal representative of depth which controls a pulse rate generator to provide modulated pulse rate signals for cable transmission. A shipboard power oscillator supplies alternating current energy via the cable conductors to the electrical means in the cable. Also, at the ship, the pulse rate signals are reconverted to D.C. current and displayed.

Keywords: Depth pressure measurement; Seismic hydrophone array; Seismic streamer cable

U.S. Cl. X.R. 114-235



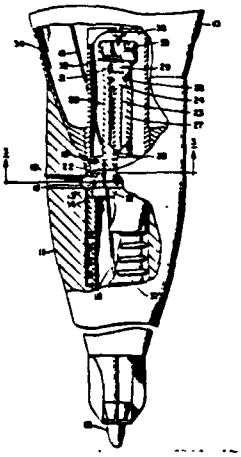
APRIL 22, 1969

3,439,537
UNDERWATER VEHICLES
Vlash A. Pullos, Garden Grove, Calif., assignor to North American Rockwell Corporation
Filed Nov. 15, 1965, Ser. No. 507,904
Int. Cl. G01n *1/00*
U.S. Cl. 73—170 14 Claims

An unmanned underwater vehicle for carrying oceanographic instruments provided with means for controlling its vertical motion in response to changes in depth. An actuator is described having a piston dividing a cylinder into two chambers. A frangible diaphragm communicating with one of the chambers is burst by underwater pressure thereby providing a single rapid forceful movement of the piston. In one embodiment the piston motion releases ball detents for releasing ballast from an underwater vehicle. In another embodiment check valves provide for rupture of the frangible disk on decreasing pressure and motion of the piston releases a sea anchor for preventing damage to a pop-up vehicle. In a third embodiment the piston is connected to a hollow tube which is driven into the ocean floor upon rupture of the diaphragm for obtaining bottom samples.

Keywords: Bathythermograph; Instrument deployment; Instrument retrieval; Sampler, power supply; Sampler, seabed-driven core

U.S. Cl. X.R. 9-8



3,439,642

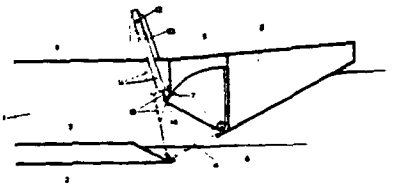
HOPPER BARGE FOR TRANSPORTING ESPECIALLY LIQUID WASTE MATTER

Bartele van der Werff, Capelle aan den Ijssel, Netherlands, assignor to A. Vuyk en Zonen's Scheepswerven N.V., Capelle aan den Ijssel, Netherlands, a corporation of Netherlands

Filed June 9, 1967, Ser. No. 644,928
Claims priority, application Netherlands, Dec. 20, 1966, 6617871
Int. Cl. B63b *35/30*
U.S. Cl. 114—37 4 Claims

A hopper barge for transporting waste matter to and unloading same in the open sea comprising a double bottom acting as an air-case and passageways at the stem and the stern which can be closed by hinged sector-shaped valves. The air-case extends along the entire length of the cargo-hold and from board to board; the passageways and the valves extend across the entire width of the hold.

Keywords: Hopper barge



3,439,875

APPLICATION OF CHEMICAL SUBSTANCES OVER LARGE AREAS

David Corbet Randall, Boundary House, Lady Margaret Road, Sunningdale, Berkshire, England, and Victor Edgar Sorapure, 23 Pembroke Place, Kensington, London W8, England

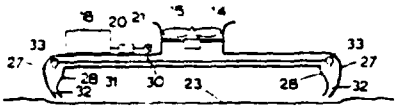
Filed Nov. 16, 1966, Ser. No. 594,842
Int. Cl. B05b *7/00;* B60v *1/16*
U.S. Cl. 239—8 8 Claims

A method and apparatus for dispersal of undesirable floating oil accumulations on a water surface by application of an emulsifying agent into the air stream of an air cushion vehicle and directing same in a manner creating turbulent condition and attacking both upper and under surfaces of the floating oil. An air cushion vehicle is provided having skirt means at the periphery thereof, said skirt means formed as a pair of depending skirt members spaced apart to define a peripheral duct terminating in a jet nozzle, fan means to force air into said duct and from said jet nozzle and spray means for dispensing an emulsifying agent from a source thereof carried by the vehicle to the vicinity of the jet nozzles whereby the emulsifying agent is entrained in the air stream from the jet nozzles and directed angularly both over and under the floating oil during travel of the air cushion vehicle. The skirt members terminate in arcuate portions directed inwardly relative the periphery of the vehicle to serve as stream guide means for the stream-emulsant mixture.

Keywords: Pollutant dispersion

U.S. Cl. X.R. 180-128; 239-77; 239-171

See: Re. 27,452



3,440,742

MULTIPLE MOTOR DREDGE

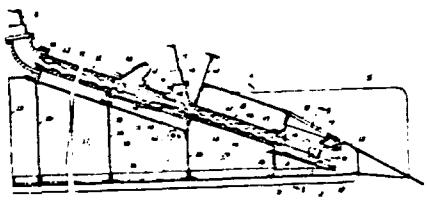
Albert S. Goldstein, Jr., 7530 Grandview Drive, Indianapolis, Ind. 46260

Filed Dec. 8, 1965, Ser. No. 513,661
Int. Cl. E02f 7/02, 3/94; F04b 23/12
U.S. Cl. 37—57 12 Claims

A pump type underwater dredge having fluid actuated motors arranged to operate a series of pumps which are operatively connected to augers which feed material collected by the dredge to the pumps for transmission to a remote collection station, the motors and pumps each comprising pairs of helical gears defining a rotor and a stator, the rotors of the motors being connected to the rotors of the pumps which in turn are connected to the augers.

Keywords: Dredge, cutterhead; Dredge intake; Pump

U.S. Cl. X.R. 37-63; 37-71; 103-5; 103-117; 103-118



3,440,743

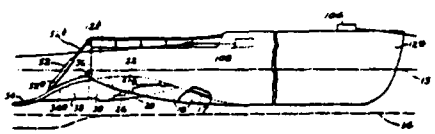
UNDERWATER TRENCHING APPARATUS

George T. Frederick Divine, 3337 NE. 132nd Ave., Portland, Oreg. 97230

Filed Apr. 8, 1966, Ser. No. 541,231
Int. Cl. E02f 3/90, 5/28
U.S. Cl. 37—79 8 Claims

Underwater trenching apparatus including a hull, axial flow propellers under the hull adjacent its stern for producing current flow in a direction extending aft of the hull, a hinged diverter aft of the propeller hinged at its forward margin on the hull and swingable up and down to control the pitch of the current of water produced by the propellers, rudders aft of the propellers and forwardly of the diverter for controlling lateral flow, stream guides joined to the hull and projecting downwardly on opposite sides of the propellers forming with the hull a passageway bounding the current flow, and a system for controlling movement of the hull through the water independently of the propellers.

Keywords: Seabed trencher



3,440,991

HAIR FAIRED CABLE

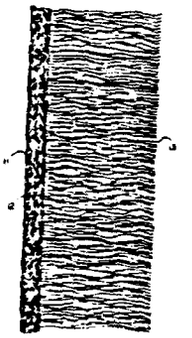
Henry D. Cubbage, Oxon Hill, Md., assignor to the United States of America as represented by the Secretary of the Navy

Filed Jan. 29, 1965, Ser. No. 429,178
Int. Cl. F04d 29/02
U.S. Cl. 114—235 9 Claims

Keywords: Towing cable

1. A fairing for an object to be towed through water, comprising:

a plurality of hair-like fibers each being affixed to said object at a single point on said fiber so that each hair-like fiber is free to trail in the water after said object.



3,440,992

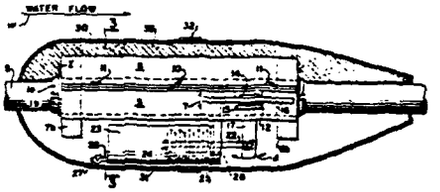
STREAMER CABLE DEPTH CONTROL

Calvin L. Chance, Dallas, Tex., assignor, by mesne assignments, to Teledyne Exploration Company, Houston, Tex.

Filed Dec. 7, 1967, Ser. No. 688,909
Int. Cl. B63b 17/00; G01c 13/00
U.S. Cl. 114—235 5 Claims

Keywords: Depth pressure measurement; Seismic streamer cable; Towed body depth control

An automatic depth-control device for attachment to a seismic streamer cable of the type which is towed behind a survey vessel at a predetermined depth beneath the surface of the sea, the streamer cable itself being weighted to approximate neutral buoyancy in the water, and the depth-control device including a hydrostatic pressure system for continuously maintaining the desired depth by controlling the angle of tilt of a horizontal vane in a manner which in its broadest aspects has been disclosed in the prior art. The structure of the depth-control device is illustrated by an embodiment including a faired housing enclosing a frame and bearing assembly which is split longitudinally for easy attachment at any desired position along the streamer cable to rotatably secure the device to the cable in such a way as to permit the device to freely rotate about the cable to maintain itself always in upright position. The upper portion of the housing is filled with a floatation material which is sufficient to impart neutral buoyancy to the whole device, and is so placed as to provide a restorative moment about the bearing for maintaining the housing upright and the vane substantially horizontal.



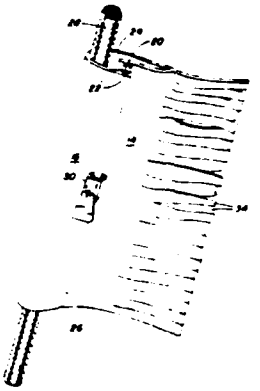
3,440,993
CABLE FAIRING

Wallace M. Taylor, Jr., Plantation, and Asa M. Reece, Fort Lauderdale, Fla., assignors to the United States of America as represented by the Secretary of the Navy

Filed Dec. 26, 1967, Ser. No. 693,399
Int. Cl. B63b 17/00
U.S. Cl. 114—235 2 Claims

A cable fairing for reducing drag and vibrations of submerged oceanographic cables wherein a thin flexible trailing member is attached to the cable to provide a streamline configuration thereto. Secured to the forward portion of the trailing member are a pair of corrosive resistant thin flexible flat members having complementary interlocking surfaces for quick attachment about the cable.

Keywords: Instrument cable; Towing cable



3,441,902
EXTENDABLE INTERSECTION HYDROPHONE ARRAYS

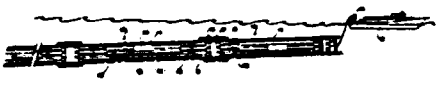
Carl H. Savit, Houston, Tex., assignor to Western Geophysical Company of America, Los Angeles, Calif., a corporation of Delaware

Filed Apr. 1, 1968, Ser. No. 717,534
Int. Cl. H04b 13/00, 13/02; G10k 11/00
U.S. Cl. 340—7 10 Claims

This invention relates to improved streamer cables for use in marine seismic exploration, and, more particularly, to improved streamer sections each comprising at least two overlapped component arrays of hydrophones for detecting reflected seismic waves during marine exploration. Means are provided to detachably connect at the end of each section, the component arrays of adjacent sections to obtain composite intersection arrays for spatial mixing of signals and for optimum attenuation of noise and of unwanted signals. Desirable hydrophone response patterns and curves can be selectively achieved.

Keywords: Seismic hydrophone array; Seismic streamer cable

U.S. Cl. X.R. 181-.5



3,442,238

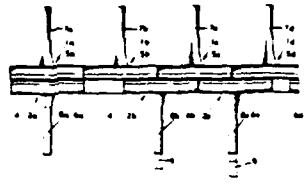
FLOATING LANDING-STAGE

Willem Cornelis van Oost, Harmelen, Netherlands, assignor to Grondverbetering- en Ontginningmaatschappij N.V., De Bilt, Netherlands

Filed May 22, 1967, Ser. No. 640,214
Claims priority, application Netherlands, May 23, 1966, 6607059
Int. Cl. B63b *35/34*
U.S. Cl. 114—.5 10 Claims

A floating landing stage consists of a plurality of buoyant T-shaped elements whose heads are in alignment in two contiguous parallel rows, the heads of the T's forming the main walkway of the landing stage and the limbs of the T's forming the mooring parts of the stage. Preferably, two parallel beams outwardly bound the heads of the T-shaped elements, and the elements are hollow and box-shaped.

Keywords: Pier, floating; Small-craft pier



3,442,339

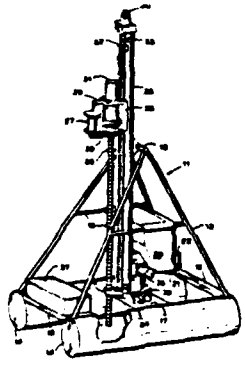
SEA BOTTOM CORING APPARATUS

Thomas N. Williamson, Houston, Tex., assignor to Hughes Tool Company, Houston, Tex., a corporation of Delaware

Filed Feb. 17, 1967, Ser. No. 616,893
Int. Cl. E21b *7/12*
U.S. Cl. 175—6 11 Claims

A marine bottom coring apparatus for drilling into and obtaining core samples from sub-sea formations. It is particularly useful for drilling into and obtaining core samples from hard rock formations.

Keywords: Sampler, seabed-drilled core



3,442,340

MOBILE/FIXED DRILLING AND PRODUCTION STRUCTURE

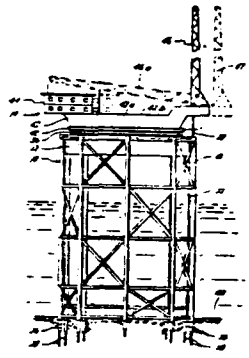
Lowell B. Christenson, 7410 Thurow, Houston, Tex. 77017

Filed June 9, 1967, Ser. No. 644,883
Int. Cl. E21b *15/02*; E02b *17/00*
U.S. Cl. 175—8 13 Claims

An offshore drilling and production structure having a plurality of vertical columnar support members secured in polygon spaced relation about a buoyant platform which is releasably maintained therewithin for vertical adjustment. The columnar support members are adapted to receive anchor or spud members as well as drill bit means such that the entire structure may function both as a drilling rig and a production platform. Also included is a method for drilling a sub-surface well by lowering the support members to the underwater ground and drilling through the spuds and support members.

Keywords: Offshore construction; Offshore platform, fixed

U.S. Cl. X.R. 61-46.5



MAY 20, 1969

3,444,693

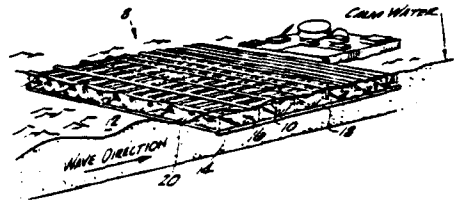
WATER WAVE SUPPRESSION DEVICE

Harold M. Busey, Kennewick, Wash., assignor, by mesne assignments, to McDonnell Douglas Corporation, Santa Monica, Calif., a corporation of Maryland

Filed Feb. 27, 1967, Ser. No. 618,841
Int. Cl. E02b *3/04*
U.S. Cl. 61—5 2 Claims

A horizontal structure of floating elements are attached to each other whereby the mechanical energy of water waves is converted to turbulence. Waves are progressively dampened as they travel through the structure.

Keywords: Breakwater, floating



3,444,734

DEEP WATER TIDE RECORDER

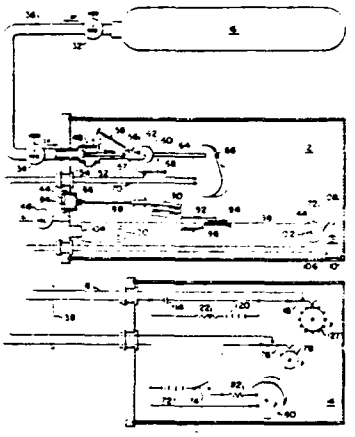
Edward C. Brainard II, Marion, Mass., assignor to Braincon Corporation, Marion, Mass., a corporation of Massachusetts

Filed Nov. 3, 1966, Ser. No. 591,813
Int. Cl. G01w 1/00
U.S. Cl. 73—170 8 Claims

An environmental pressure measuring and recording device which includes a means for producing a reference pressure and a differential pressure indicator which responds to the environmental and reference pressure.

Keywords: Depth pressure measurement; Tide measurement

U.S. Cl. X.R. 73-300



3,444,953

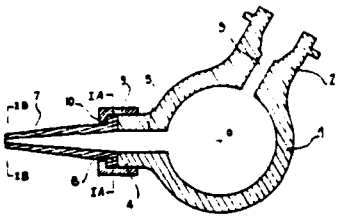
DEVICE TO AVOID THE PULSATION OF THE GAS BUBBLES GENERATED BY UNDERWATER EXPLOSIONS

Jacques Cholet, Rueil Malmaison, Jean Pierre Fail and Gerard Grau, Paris, and Pierre Magneville, Vernouillet, France, assignors to Institut Francais du Petrole des Carburants et Lubrifiants

Filed Sept. 15, 1967, Ser. No. 667,998
Claims priority, application France, Sept. 16, 1966, 76,741; Oct. 4, 1966, 78.782; Nov. 23, 1966, 84,742; Jan. 13, 1967, 91,173
Int. Cl G10k *10/00*
U.S. Cl. 181—.5 11 Claims

A device to avoid the pulsations of the gas bubbles generated by underwater explosions which comprises a container provided with a mouth-piece having an internal pipe for feeding from a surface installation the explosives to the container; the container itself includes at least one resilient closing and opening element which provides in effect an intermittent conection of the interior of the container with the surrounding liquid medium by deformation under the action of the pressure rise within the container as a result of the explosion. The container may be of substantially spherical shape, and the opening and closing element may be constituted by a tubular extension of the sphere.

Keywords: Seismic explosive acoustic transmitter



3,445,003

HANDLING OF PARTICULATE SHIP CARGO

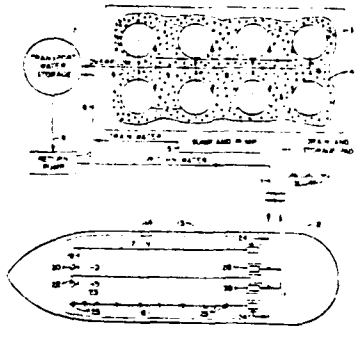
Ludwig W. Koch, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla., a corporation of Delaware

Filed Sept. 29, 1966, Ser. No. 582,815
Int. Cl. B63g 53/30, 53/60
U.S. Cl. 214—14 7 Claims

A system is provided for unloading solids from a ship's hold by forming a slurry, wherein a low pressure liquid fluidizes the solids at the bottom of the hold and the resulting fluid is picked up by adjacent eductors operated by high pressure liquid; the system can be readily installed in e.g. an existing oil tanker.

Keywords: Dredge-spoil transport

U.S. Cl. X.R. 214-152



MAY 27, 1969

3,446,027

APPARATUS FOR DEPOSITING A LAYER OF FLOWABLE MATERIAL UNDERWATER

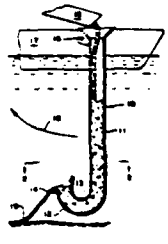
Hermanus Meijer, Heemstede, Netherlands, assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware

Filed Aug. 14, 1967, Ser. No. 660,320
Claims priority, application Netherlands, Aug. 16, 1966, 6611475
Int. Cl. E02b 3/12
U.S. Cl. 61—63 8 Claims

An apparatus for depositing flowable material, e.g., asphalt, underwater in which a supply conduit extending from the water surface to the point the material is to be deposited is provided at its lower end with a flow reversing device, such as a bent tube, having an outlet positioned above the lower end of the supply conduit. The flow reversing device thus forms a liquid trap to prevent the ingress of seawater into the supply conduit.

Keywords: Asphalt; Seabed material placement; Seabed scour protection

U.S. Cl. X.R. 61-1; 61-37; 61-72.2



3,446,293

PILE DRIVER

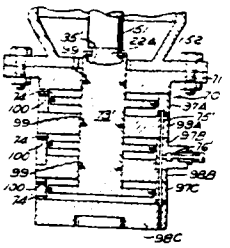
Charles L. Guild, East Providence, R.I., and Willard B. Goodman, Sherman Oaks, Calif., assignors to American Drilling & Boring Co., Inc., a corporation of Rhode Island

Filed Dec. 28, 1966, Ser. No. 605,317
Int. Cl. E02d 7/06; B25d 17/12
U.S. Cl. 173—131 2 Claims

A pile driving cushioning device for use for driving a member into the earth which may be readily attached to a driving ram and which includes a plurality of cushioning members which may be adjustable to vary the stiffness of the assembly and provide proper balance.

Keywords: Pile driver, impact

U.S. Cl. X.R. 173-139



3,447,124

UNDERWATER SURVEY

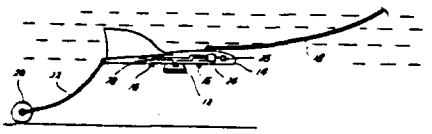
Allen J. Louviere, Galveston, Tex. (5001 Bayou Drive, Dickinson, Tex. 77539), and Leonard S. Nicholson, Clear Lake, Tex. (15811 Fathom Lane, Houston, Tex. 77058)

Filed Sept. 15, 1967, Ser. No. 667,903
Int. Cl. G01v 1/38
U.S. Cl. 340—4 10 Claims

A source of electromagnetic energy is provided and reflected off of the ocean floor. The reflected spectrum is received by a series of narrow band width sensors and the various amplitudes indicated. Comparison of these amplitudes with the signatures of known materials allows identification of the ocean floor composition. Amplitude changes can also be used to identify changes in composition.

Keywords: Instrument, towed; Seabed property measurement

U.S. Cl. X.R. 324-1; 324-6



3,447,330

METHOD AND APPARATUS FOR ANCHORING SUBMERGED PIPELINES

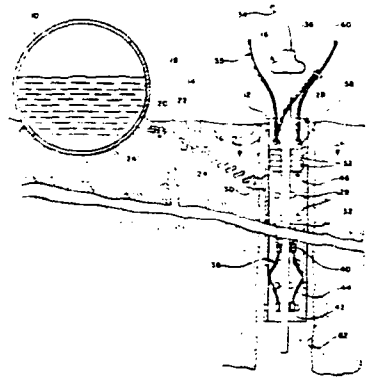
Malcolm R. J. Wyllie, Allison Park, Pa., assignor to Gulf Research & Development Company, Pittsburgh, Pa., a corporation of Delaware

Filed Dec. 12, 1966, Ser. No. 600,985
Int. Cl. F16l *1/00, 3/00;* E02d *7/24*
U.S. Cl. 61—72.3 7 Claims

A plain double open-ended hollow perforated pipe is jetted into the underwater formation to serve as an anchor while the pipeline, pre-assembled to the anchor pipe at the surface, is caused to be submerged. Thereafter, the pipeline is made to be bouyant, and resilient means are provided in the linkage between the pipeline and the anchor.

Keywords: Embedment anchor; Pile driver, water jet; Seabed pipeline placement

U.S. Cl. X.R. 61-46; 61-53.74



3,447,371

IN-SITU VELOCIMETER

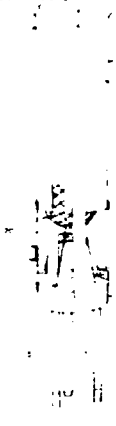
Robert S. Bennin, Spring Valley, N.Y., assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed Apr. 20, 1967, Ser. No. 634,036
Int. Cl. G01w *1/00*
U.S. Cl. 73—170 8 Claims

An in-situ velocimeter is provided for measuring and recording the velocity of sound propagation through the ocean floor. The velocimeter consists of a disposable free-fall vehicle, a buoyant retrievable vehicle and an ejection-release mechanism. The free-fall vehicle comprises a cylinder having three hollow legs two of which receive acoustic transducers and the third a plastic tube for taking core samples of sediment. The plastic tube and the transducers are removable from the hollow legs through attachment to a net which encloses the buoyant retrievable vehicle. Recording equipment and electronic circuitry for transmitting radio signals are housed in two of three spheres comprising the buoyant retrievable vehicle.

Keywords: Instrument retrieval; Instrument, seabed in situ; Sampler, seabed-driven core; Seabed property measurement

U.S. Cl. X.R. 181-.5; 340-5



3,447,554

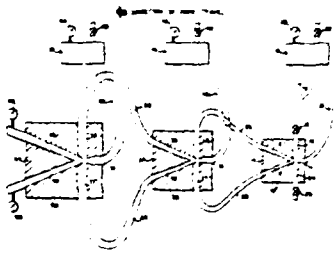
BUOY STABILIZATION SYSTEM

Julian Josephson, 4814 Eastern Lane, Apt. 103, Suitland, Md. 20023

Filed Aug. 18, 1966, Ser. No. 573,768
Int. Cl. F16c 1/12, 1/14
U.S. Cl. 137—81.5 2 Claims

This invention is designed to counteract buoy displacement by waves. It is based on the principle of pure-fluid amplifiers which produces a pressure pulse equal and opposite to that of the wave thereby inhibiting horizontal displacement of the buoy. The fluid amplifiers are arranged in three separate stages wherein the outlet pressure of the first stage operates as a control element to the second stage and the pressure from the second stage is directed to the next stage, etc. The output of the last stage counteracts the pressure of the oncoming wave. Separate units may be secured to opposite sides of a buoy for better stabilization.

Keywords: Buoy, instrumented; Wave measurement



3,447,625

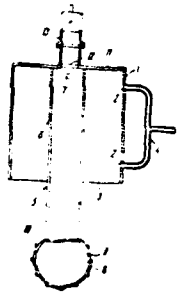
DEVICE FOR SEISMIC PROSPECTING

Mikhail Ivanovich Balashkand, Akademicheskaya ulitsa, 98, kv. 13, Monino Moskovskio Oblasti; Georgy Stepanovich Evdokimov, Novoselskoe shosse, 35-a, kv. 48, Ramenskoe Moskovski Oblasti; Berta Lvovna Kaplan, Vorontsovskaya ulitsa, 24/6, kv. 12; and Sergei Alexandrovich Lovlya, ulitsa Sretenka, 24, kv. 24; and Viktor Vasilievich Maiorov, Zveingorodskoe shosse, 3-a, kv. 197; and Leonid Nikolaevich Solodilov, Studencheskaya ulitsa, 32, kv. 145, Moscow; and Alexandr Ivanovich Teterin, ulitsa 2 Chkalovskaya, 29, kv. 6, Ramenskoe Moskovskoi Oblasti; and Oleg Lanfanovich Chen, 1 Sadovaya ulitsa, 2, Vostryakovo Moskovskoi Oblasti, all of U.S.S.R.

Filed Mar. 1, 1967, Ser. No. 619,726
Int. Cl. G01v 1/00
U.S. Cl. 181—.5 3 Claims

A device for sea seismic prospecting in which elastic waves are generated via an explosion of a gaseous explosive mixture. The device includes two chambers adapted to be sunk to a depth for exploding the mixture supplied thereto for producing a primary pressure pulse, with the first chamber having an outlet for releasing hot explosion gases. A secondary pressure pulse is generated upon the [illegible] of the gas bubble formed by such gases. A co[illegible] second chamber communicating with the first chamber [illegible] for exploding the mixture supplied thereto [illegible] the supply into a gas bubble of a medium [illegible] amplitude of the secondary pulse to weaken [illegible]

Keywords: Seismic explosive acoustic transmitter



3,448,432
ISOLATOR FOR TOWED HYDROPHONE

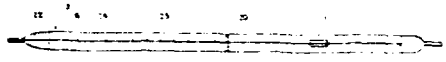
Francis W. Watlington, Pembroke, Bermuda, assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed Nov. 2, 1967, Ser. No. 680,157
Int. Cl. H04b 13/02
U.S. Cl. 340—5 9 Claims

An isolator is provided which is formed of a fluid-filled compliant member so as to induce fluid flow upon the occurrence of selected tension in the towing cable. Baffles are secured within the member either to axially extending electrical conductors or to the inner surface of the member to cause energy dissipating turbulence.

Keywords: Instrument, towed; Towed vehicle

U.S. Cl. X.R. 181-.5; 340-7; 340-8



JUNE 10, 1969

3,448,585
POLE AND PILE PROTECTOR

Roger G. Vogelsang, 105 Honeycreek Road, Ada Township, Kent County, Mich. 49330

Filed Aug. 1, 1966, Ser. No. 569,209
Int. Cl. E02d 5/60; F16l 9/14; E04b 1/64
U.S. Cl. 61—54 5 Claims

A protective shield for pilings and other such poles formed from a sleeve-like element of heat-shrinkable plastic material encircling such piling along a desired portion of its length and heat-shrunk into tight encircling engagement about the piling at a desired position thereupon.

Keywords: Coating; Ice protection; Pile protection; Pile, wood

U.S. Cl. X.R. 52-515; 138-142; 138-145

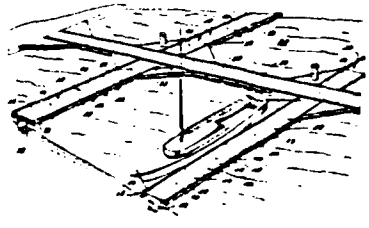
3,448,709
MARINE FLOAT CONSTRUCTION

Thomas C. Hardwick, Jr., San Leandro, Calif. 94577

Continuation-in-part of application Ser. No. 544,874, Apr. 25, 1966. This application June 12, 1967, Ser. No. 657,449
Int. Cl. B63b 35/02
U.S. Cl. 114—.5 10 Claims

A marine float comprising a flotation unit with deck-defining means. Light weight concrete poured into the deck-defining means affords the float with a sturdy, durable and non-slip deck. A plurality of light floats may be joined together to form a marina dock section. In the method of constructing such float, the flotation units are assembled at the site of installation and readied for receiving concrete. Then, with such assembled unit positioned adjacent or in the water, the concrete is poured. In those instances where a dock section is being formed, the individual floats are joined together.

Keywords: Concrete form; Pier, floating; Small-craft pier



3,449,589

POWER SUPPLY SYSTEM

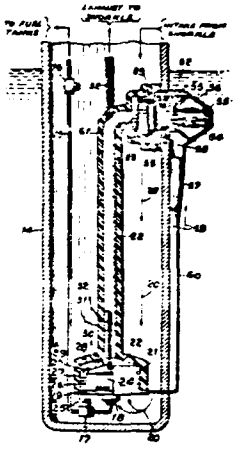
Charles P. Majkrzak, Nutley, and Michael S. Polgar, Eatontown, N.J., assignors to International Telephone and Telegraph Corporation, a corporation of Delaware

Filed June 13, 1966, Ser. No. 556,990
Int. Cl. F02e *3/22*
U.S. Cl. 290—2 7 Claims

A power supply for unattended oceanographic station. Propane gas tanks are used to supply fuel to a mercury vapor turbogenerator to generate the electrical energy. The free circulation of external sea water is used as a heat sink to condense the mercury vapor. A lubricating arrangement is included for long-term unattended operation of the generator.

Keywords: Buoy, instrumented; Electrical generator; Instrument power supply

U.S. Cl. X.R. 60-22, 60-108; 114-16; 290-52



JUNE 17, 1969

3,449,915

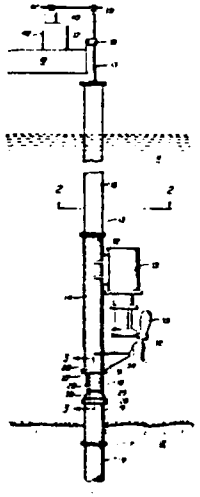
DESILTING EQUIPMENT

Timothy E. Cummings, Riverside, Conn., assignor to Bethlehem Steel Corporation, a corporation of Delaware

Filed Jan. 6, 1966, Ser. No. 519,151
Int. Cl. E02b *3/00, 17/00;* E02f *5/00*
U.S. Cl. 61—2 1 Claim

An apparatus for controlling silt by the production of an artificial current has a submerged propeller attached to a vertical column which is mounted on a support member secured to the bottom of a body of water.

Keywords: Channel protection



3,449,917

PORTABLE BOAT DOCK FENDERS

Donald L. Roskopf, 25140 Dallas Drive, Grosse Ile, Mich. 48138

Filed July 28, 1967, Ser. No. 656,836
Int. Cl. E02b 3/22; B63b 21/00
U.S. Cl. 61—48 5 Claims

Portable boat dock fenders of the type employable when tying-up or mooring a pleasure craft such as a sail boat, motor boat or cruiser to a dock, wharf or pier having a plurality of generally vertically disposed facing piles or bumper timbers spaced therealong, a typical portable boat dock fender of the invention consisting of a rigid vertically disposed back member onto the face of which is secured a resilient vertical continuous bumper element by such means as preferably vertically spaced transversely disposed pairs of through bolts therealong, upper and lower quickly securable and removable means for removably securing said portable boat dock fender to a dock pile or the like at a selected level to receive the bumping of the rub-rail of a boat thereagainst when the craft is tied up to a boat dock, the said portable boat dock fender including laterally spaced means at the upper and lower portions thereof positively engaging the pile or bumper timber of said wharf or pier whereby to prevent dislocation of said portable boat dock fender with respect to said pile or bumper timber when removably secured thereto and when in use.

Keywords: Pier fender; Small-craft mooring device

U.S. Cl. X.R. 114-219

3,449,918

CONCRETE PILES AND METHODS AND APPARATUS FOR FORMING AND SPLICING THEM TOGETHER

Gabriel Fuentes, Jr., 1501 Ashford Ave., Apt. 7-B, Santurce, Puerto Rico 00911

Filed Jan. 13, 1967, Ser. No. 609,102
Int. Cl. E02d 5/30, 7/06, 5/52
U.S. Cl. 61—56 1 Claim

A reinforced concrete pile section which can be spliced to another pile section. Each section is reinforced with longitudinally prestressed reinforcing rods and is cast vertically to orient the concrete. In one embodiment, each end of each section has an annular ring. In splicing sections together, a tubular sleeve is telescoped over the ends and its edges affixed to the rings. The sleeve completely encompasses and confines the concrete preventing shattering of the same while being driven. In a second embodiment, the sleeve is telescoped over the ends and bonded to the section with adhesive.

The tubular sleeve has a central transverse plate to completely enclose each pile section.

A special mandrel, which does not damage the pile section, is used as a driving means. It has a resilient liner and is centrally supported within the sleeve.

A tubular, tapered end pile section which can be conveniently shipped and/or stored and which can be affixed to the ring of the first pile section is used at the driving end of the pile section. A removable sleeve is affixed to the end of the last pile section for driving it.

Keywords: Pile, concrete; Pile section connection

U.S. Cl. X.R. 61-53; 61-53.5; 61-53.7; 173-131; 264-32

3,449,950

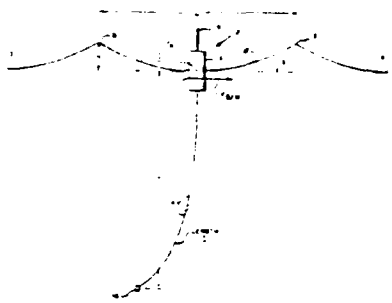
APPARATUS FOR WAVE ANALYSIS

John R. Dale, Willow Grove, Harry R. Menzel, Hatboro, Joseph M. McCandless, Feasterville, and Garnet Goss, Haverford, Pa., assignors to the United States of America as represented by the Secretary of the Army

Filed Mar. 1, 1967, Ser. No. 620,210
Int. Cl. G01w 1/00
U.S. Cl. 73—170 5 Claims

A method and apparatus for measuring and recording surface waves in any oceanic area by an oceanographic buoy sensing ambient pressure variations at a prescribed depth below the water surface and transmitting the sensed information to a remote location, and a receiving station receiving and recording the information for spectral analysis of the wave. The oceanographic buoy includes a radio transmitter in a float, a pressure sensor, and a flexible conduit operatively connected therebetween for suspending the sensor at a desired depth below the float. A float is selected having a very high buoyancy to weight ratio, a transmitter selected having a flat response over a range of very low frequencies, and a conduit selected having a very low scope. A minimum length of the conduit required is a function of the maximum wave length of the highest expected sea state, the scope of the buoy, and the measurement error tolerance.

Keywords: Buoy, instrumented; Depth pressure measurement; Wave measurement



3,450,201

EXTENSIBLE CAISSON FOR UNDERWATER WELL

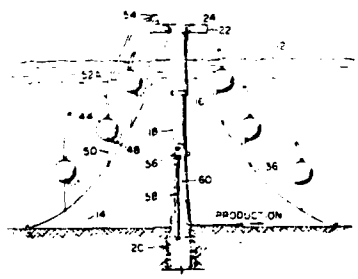
Kenneth A. Blenkarn, Tulsa, Okla., assignor to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware

Filed Aug. 3, 1967, Ser. No. 658,151
Int. Cl. E21b 33/035, 43/01; E02d 25/00
U.S. Cl. 166—.5 9 Claims

This describes a telescopic or extensible underwater caisson having a cap enclosing its upper end. The caisson is placed over the well head of a well which has been drilled in the floor of a body of water. The caisson has an upper extensible portion which when extended reaches above the surface of the water. Workovers or other required maintenance of the well or well head can then be made through the extended caisson, the interior of which is then at atmospheric pressure. Anchor lines extend from the upper part of the upper section of the caisson to anchors in the ocean floor spaced from the floor end of the caisson. When it is desired to perform maintenance on the well, the upper section of the caisson is extended, the cap removed and the anchor lines made taut. This is to maintain the upper end of the caisson relatively still while the maintenance operations are being conducted. If a sudden storm should appear, the anchor lines are let loose so that the upper end of the caisson can move freely and withstand great storms. Means can be added to the anchor lines to introduce damping for suppressing motion.

Keywords: Offshore caisson; Offshore platform anchor; Offshore platform, fixed

U.S. Cl. X.R. 61-81

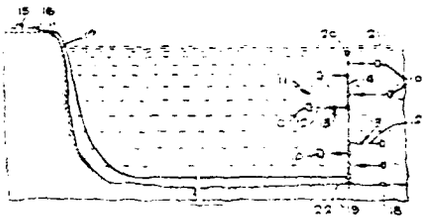


3,450,948
ELECTRICAL DISTRIBUTION SYSTEM
Glenn W. Gerlach, Thousand Oaks, Calif., and Albert E. Paul, Savage, Md., assignors to The Bunker-Ramo Corporation, Canoga Park, Calif., a corporation of Delaware
Filed Mar. 1, 1967, Ser. No. 619,812
Int. Cl. H02h 3/00, 7/00, 5/04
U.S. Cl. 317—26 13 Claims

An electrical distribution system for furnishing power to submerged power consuming stations carried on the end of conductors tethered from a common power cable incorporating a fuse apparatus in close proximity to the cable for the protection of all of the stations in the array in the event of malfunction or damage to the station or to a length of conductor disposed between the fuse apparatus and the station.

Keywords: Instrument cable; Instrument power supply

U.S. Cl. X.R. 307-39; 307-94; 307-131; 317-40; 317-262

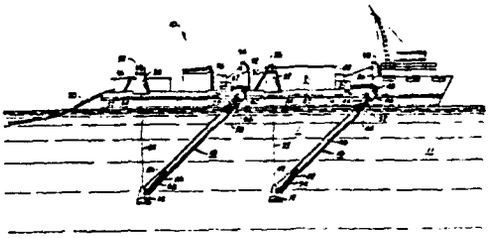


JUNE 24, 1969

3,452,327
APPARATUS FOR SUPPORTING MARINE SEISMIC TRANSDUCER
Frank Clynch, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla., a corporation of Delaware
Filed Apr. 13, 1967, Ser. No. 630,558
Int. Cl. G01v 1/38
U.S. Cl. 340—7 5 Claims

An apparatus for supporting a marine seismic transducer from an operating vessel so that it operates at a predetermined water depth. The apparatus consists of a hollow, elongated stiff-leg member which is mounted from a swivel off the ship's quarter and trails downward to support the seismic transducer at a preselected point in the water. The power and control lines for operating the seismic transducer are supplied through flexible couplings to the stiff-leg member, and additional flexible couplings at the bottom of the stiff-leg member apply the control and power lines to the proper connections at the seismic transducer.

Keywords: Seismic acoustic transmitter array; Towed body depth control; Towing cable



3,452,830

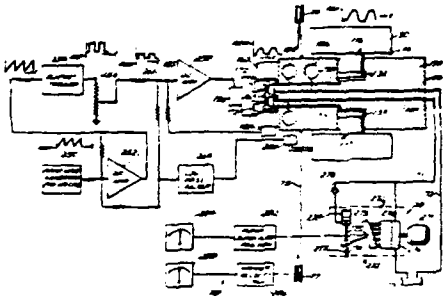
DRIVING SYSTEMS

George J. Gendron, Oradell, N.J., Kenneth D. Garnjost, Buffalo, N.Y., and Alfred J. Mastropole, Allendale, N.J., assignors, by direct and mesne assignments, to Raymond International, Inc., New York, N.Y., a corporation of New Jersey

Filed Dec. 5, 1966, Ser. No. 599,098
Int. Cl. E21c 3/02, 3/08, 3/20
U.S. Cl. 175—55 32 Claims

Vibratory driving arrangements for piles and the like using phase shift control between the vibratory driver and the pile, and using a bias weight with the vibratory driver interposed between the weight and the pile. Also, a hydraulic vibrator construction and coupling arrangement, and electrical means for controlling the vibrator.

Keywords: Pile driver, vibratory



3,453,657

FLUID ACTUATED PERCUSSION TOOL

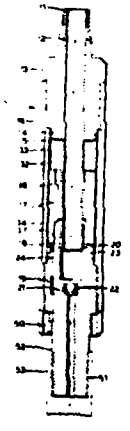
Maston C. Bolton, 2533 E. Main, and Justa L. Hayes, Box 874, both of Farmington, N. Mex. 87401

Filed Apr. 17, 1967, Ser. No. 637,312
Int. Cl. E21c 5/00, 3/00; B23q 5/00
U.S. Cl. 173—17 4 Claims

This invention relates to a fluid actuated percussion tool for use in such operations as oil well drilling, mine shafts, cores or pile drivers. It comprises in general an anvil and hammer arrangement with the hammer being alternatively lifted and dropped on the anvil by means of a fluid control system to drive the pile, drill a hole or the like.

Keywords: Pile driver, impact

U.S. Cl. X.R. 173-136



3,453,670

MARINE BUOY

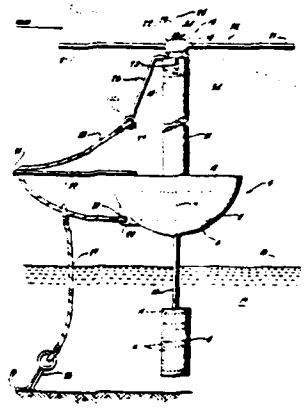
Lloyd H. Conry, Whittier, Calif., assignor to Global Marine Inc., Los Angeles, Calif., a corporation of Delaware

Filed June 30, 1967, Ser. No. 650,406
Int. Cl. B63b *21/52, 51/02;* B64c *27/00*
U.S. Cl. 9—8 4 Claims

A marine buoy having an airfoil device mounted to its buoyant portion to lift the body from the surface of a body of water. The airfoil device may operate in response to a relative wind past the buoy, or it may be power driven.

Keywords: Buoy, instrumented

U.S. Cl. X.R. 114-235; 244-17.17; 244-105



3,453,830

METHOD AND APPARATUS FOR ALLEVIATING SCOURING ABOUT LEGS OF A MARINE STRUCTURE

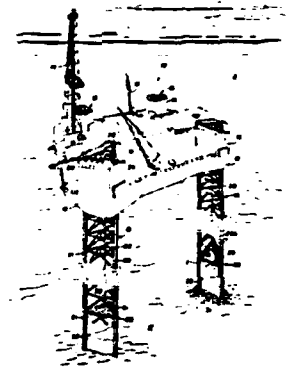
Albert C. Mitchell, Jr., Austin, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Filed Mar. 13, 1968, Ser. No. 712,657
Int. Cl. E02b *17/00;* E02d *5/24*
U.S. Cl. 61—46.5 11 Claims

A method and apparatus for placing antiscouring materials or objects about the lower end of an extendible leg of a marine structure to alleviate scouring wherein said lower end of said leg is positioned on the bottom of a body of water and the upper end supports a work platform. The invention includes at least one pallet attached to the leg. An extendible means such as a net is attached to each pallet; the net normally lying flat on the pallet when unextended and having a pyramidal configuration when extended. The antiscouring material or objects are piled on the net while it is in a flattened condition and prior to the positioning of the leg on the bottom. The net is extended by a cable after the leg is positioned to force the antiscouring material or objects off the pallet to place the objects around the leg.

Keywords: Offshore platform, jack up; Offshore platform, leg; Seabed material placement; Seabed scour protection

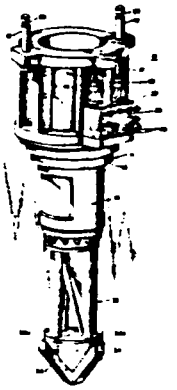
U.S. Cl. X.R. 61-50; 61-52



3,454,112
PILE DRIVING HAMMER
Henry G. Warrington, Palm Beach, Fla., assignor to Vulcan Iron Works Inc., Chattanooga, Tenn., a corporation of Illinois
Filed June 10, 1968, Ser. No. 735,691
Int. Cl. B25d 9/02
U.S. Cl. 173—128 10 Claims

There is provided a single-acting pile driving hammer for free riding and guiding on the top of a hollow tubular pile. The hammer is provided with an intermediate anvil with a ram reciprocably mounted above the anvil and a power cylinder and piston below the anvil. A piston rod interconnects the piston and ram. Guide mechanism is provided engageable with the inner surface of a pile to maintain axial alignment of the hammer and the pile. The housing of the hammer is provided with lifting horns and a quick release lifting bail is attachable to the lifting horns to permit the hammer to ride freely on top of a pile.

Keywords: Pile driver, impact



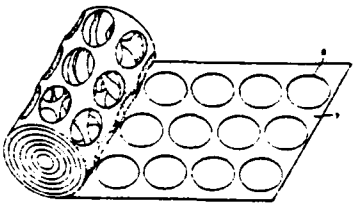
JULY 15, 1969

3,455,112
INSTALLATION FOR PROTECTING SURF-ENDANGERED COASTAL SECTORS
Gunther Twele, Wiesbaden, Germany, assignor to Kalle Aktiengesellschaft, Wiesbaden-Biebrich, Germany
Filed June 6, 1966, Ser. No. 556,809
Int. Cl. E02b 3/04
U.S. Cl. 61—3 4 Claims

This invention relates to a method for protecting surf-endangered coastal sectors which comprises covering endangered portions of a coast with loosely combined felted strips of plastic material and anchoring the material to the coast.

Keywords: Fabric mat; Slope protection; Wave absorber beach

U.S. Cl. X.R. 61-37



3,455,115

FLOATING STRUCTURES

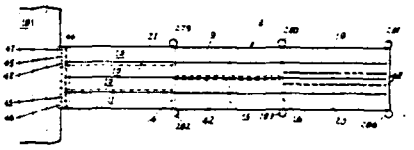
Robert H. Watts, 5760 Beech Grove Lane 45238, and Walter E. Ellis, 6235 Hawk Ridge Road 45243, both of Cincinnati, Ohio

Filed Apr. 20, 1966, Ser. No. 543,959
Int. Cl. E02b *3/20*; B63b *35/00*; E01d *15/14*
U.S. Cl. 61—48 26 Claims

An elongated planar platform structure twistable about a lengthwise axis having braces extending transversely and in spaced relation, and torsion bar means extending substantially the length of said platform structure and interconnecting said transverse braces to prevent substantial twisting of said platform structure about its lengthwise axis.

Keywords: Pier, floating; Small-craft pier

U.S. Cl. X.R. 8-9; 52-73; 52-146; 14-27; 114-.5



3,455,151

EXPENDABLE OCEAN BOTTOM SENSOR

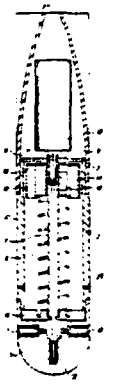
Joseph D. Richard, Miami, Fla. (531 S. Barrancas Ave., Warrington, Pensacola, Fla. 32507)

Filed Aug. 30, 1966, Ser. No. 576,093
Int. Cl. G01n *3/00*
U.S. Cl. 73—84 1 Claim

An expendable device for measuring the bearing strength and resistance to penetration of the ocean bottom. The ballistic shaped device sinks at a known and relatively high terminal velocity. Upon striking the bottom, two acoustic pulses are generated which indicates the peak deceleration. The deceleration is inversely proportional to the penetration of the device into the bottom and the time interval between the two acoustic pulses is proportional to the peak deceleration.

Keywords: Instrument, seabed in situ; Seabed property measurement

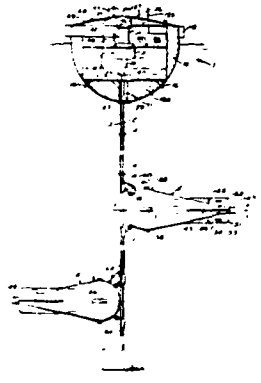
U.S. Cl. X.R. 73-170



3,455,159
NAUTICAL WEATHER STATION
Donald G. Gies, Sr., 313 Jack Coleman Drive NW., Huntsville, Ala. 35005
Filed July 6, 1966, Ser. No. 563,187
Int. Cl. G01w *1/00*
U.S. Cl. 73—170 10 Claims

A nautical weather system, useful also in detecting enemy submarines, etc., includes one or more floating buoys, a weighted cable attached to each buoy, and one or more hollow submerged bathymetric vehicles attached at various depths to the cable. Both the bathymetric vehicles and the buoy are equipped with means for sensing various weather and environmental data which the submerged vehicles transmit to the buoy. The unmanned buoy transmits all data to remote receiving stations on interrogation.

Keywords: Buoy, instrumented; Electrical generator; Instrument deployment; Instrument power supply; Wave measurement; Wind measurement



JULY 22, 1969

3,456,371
PROCESS AND APPARATUS FOR MINING DEPOSITS ON THE SEA FLOOR
John R. Graham, Newport Beach, and Algernon A. Mabson, Long Beach, Calif., assignors to Kennecott Copper Corporation
Filed May 6, 1965, Ser. No. 453,784
Int. Cl. E02f *1/00, 3/88, 3/90*
U.S. Cl. 37—195 11 Claims

Process and apparatus for mining deposits on the sea floor such as nodules of manganese and other minerals. The sea floor is skimmed and the skimmed material mixed with sea water to serve as a carrier which conveys the mixture through a dredge pipe to the surface of the sea where the solid material is separated from the sea water. A ship is on the surface and a self-propelled tractor operates on the sea floor and is supplied with power and controlled from the ship.

Keywords: Dredge, suction; Dredge intake; Dredge pipe; Dredge propulsion; Dredge, submerged; Pump

U.S. Cl. X.R. 172-777

3,456,446

CONCRETE BLOCK

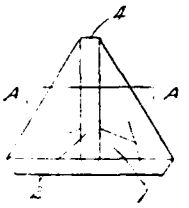
Sugiaki Kusatake, 132, Hachiken-cho, Nishikituzi, Nara, Nara Prefecture, Japan

Filed Nov. 13, 1967, Ser. No. 681,980
Int. Cl. E02b 3/12
U.S. Cl. 61—4
11 Claims

This invention relates to a concrete block which consists of a concrete structure comprising six triangular plate-shaped mural bodies integrally combined with the respective apexes concentrated at the center, the aim of which is to prevent seashores and river banks from the damage of the dashing waves by depositing such blocks at seashores and river banks.

Keywords: Concrete armor unit

U.S. Cl. X.R. 61-37



3,456,447

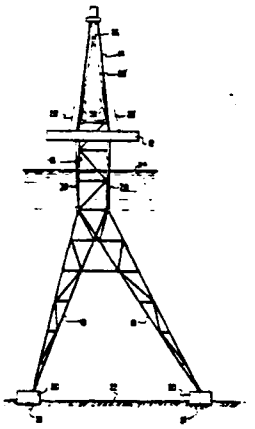
MOBILE MARINE DRILLING APPARATUS AND METHOD OF USE

William D. MacKintosh, Tulsa, Okla., assignor to Sinclair Research, Inc., New York, N.Y., a corporation of Delaware

Filed July 10, 1967, Ser. No. 652,249
Int. Cl. E02b 17/00
U.S. Cl. 61—46.5
10 Claims

A mobile marine drilling apparatus including an independent mobile derrick support which carries a drilling derrick including the supplementary equipment therefor and an independent mobile marine auxiliary platform adapted to be brought around the derrick support, attached thereto and raised by the supplementary derrick equipment including the traveling block. The auxiliary platform can be used to stabilize the derrick support and to raise and lower the derrick support.

Keywords: Offshore platform, jack up; Offshore platform, leg



3,456,448

LEG FOR SUPPORTING A MARINE STRUCTURE

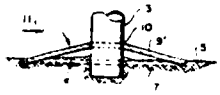
Rafael Fernandez Luque, Rijswijk, Netherlands, assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware

Filed July 21, 1967, Ser. No. 655,065
Claims priority, application Great Britain, Mar. 14, 1967, 11,822/67
Int. Cl. E02b *17/00, 3/20;* E02d *5/54*
U.S. Cl. 61—46.5 3 Claims

A leg for supporting at least part of a marine structure on the floor of a body of water including a generally flat plate surrounding the leg and resting on the water floor to prevent sea currents from causing the leg to sink into the floor. The plate is movable along at least a part of the lenght of the leg so that it will freely slide along the leg and into contact with the floor of the body of water. In addition to a unitary plate, several interconnected plates may be employed which are connected by flexible elements to permit limited angular displacement between the plates to accommodate irregularities in the water floor.

Keywords: Offshore platform, leg; Seabed scour protection

U.S. Cl. X.R. 37-73; 52-720; 61-48; 61-53



3,456,720

APPARATUS AND METHOD FOR DRILLING WELLS

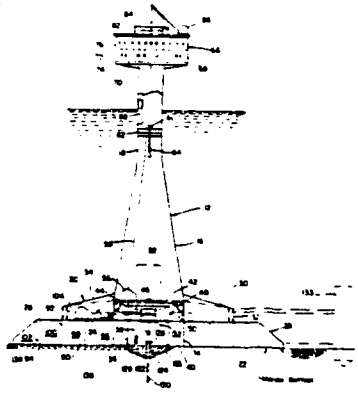
John S. Brewer, 1904 W. Hart, Orange, Tex. 77630

Filed Jan. 11, 1967, Ser. No. 608,953
Int. Cl. E21b *33/035, 43/01, 7/12*
U.S. Cl. 166—.5 7 Claims

A watertight floatable hull is disclosed for marine drilling comprising a caisson section extending from above the water line to the marine bottom, an annular base section extending about the lower portion of the caisson, a lower chamber at the bottom of the caisson, a lower floor extending across the bottom of the caisson and annular base section and resting directly on the marine bottom and having a skirt penetrating into the marine bottom, a covered opening in the floor of the lower chamber for pumping cement therethrough to lay a bed of cement, and a production line through the floor. The skirt and floor are detachable, together with the production line, from the balance of the hull so that after the well is sunk the hull may be removed, leaving the chamber floor and production line on the cement bed on the marine bottom.

Keywords: Offshore caisson; Offshore platform, fixed; Seabed oil, process structure

U.S. Cl. X.R. 175-8



3,457,168

PROCEDURE FOR DISPOSING OF PETROLEUM OIL ON A WATER SURFACE

Earl W. Malmberg, Wilmington, Del., and William M. Robinson, West Chester, Pa., assignors to Sun Oil Company, Philadelphia, Pa., a corporation of New Jersey

No Drawing. Filed Mar. 8, 1968, Ser. No. 711,511
Int. Cl. B01d *11/04*
U.S. Cl. 210—21 3 Claims

A method of dispersing a petroleum oil layer from the surface of a body of open water comprising coating the exposed surface of the oil with a layer of foamed surfactant and subsequently vigorously agitating the water-oil-surfactant layers after the foamed surfactant has become substantially digested by the oil layer.

Keywords: Pollutant dispersion

U.S. Cl. X.R. 252-1

No Figure

3,457,728

REPLACEABLE PILE SLEEVE INSERT

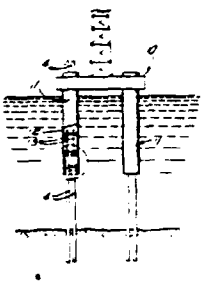
Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc., New York, N.Y., a corporation of Delaware

Filed Mar. 26, 1968, Ser. No. 716,042
Int. Cl. E02b 17/00; E02d 5/22, 21/00
U.S. Cl. 61—46.5 13 Claims

The invention relates to an elongated composite leg and stub pile structure for supporting an offshore drilling platform above the water surface. The leg comprises an outer casing enclosing a plurality of guide tubes to receive one or more piles which extend to and penetrate the sea bottom. An expendable collar functions as an extension to the respective guide tubes, and includes a rigid joint at which the pile and guide tube overlap.

Keywords: Offshore platform, leg; Pile, structure connection

U.S. Cl. X.R. 61-53



3,457,729

SYSTEMS FOR DAMPING MOORING SHOCKS

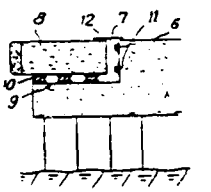
Roland Charles Wanneroy, Paris, France, assignor to Pneumatiques Caoutchouc Manufacture et Plastiques, Kleber-Colombes, France

Filed Nov. 29, 1967, Ser. No. 686,527
Claims priority, application France, Nov. 30, 1966, 85,710
Int. Cl. E02b 17/00, 3/22
U.S. Cl. 61—48 10 Claims

This invention relates to a system for damping mooring shocks exerted on structures such as quays and landing stages of the kind in which a movable part of a structure only is exposed to these shocks. The invention consists in that the movable part is constituted by a heavy horizontal slab or superstructure which is supported by rubber blocks distributed horizontally between the slab and the fixed part of the structure to form a supporting polygon so that the rubber blocks can support the slab in a suitable manner but operates only in compression.

Keywords: Pier fender

U.S. Cl. X.R. 114-219; 267-1



AD-A080 795 COASTAL ENGINEERING RESEARCH CENTER FORT BELVOIR VA F/G 13/2
AN ANNOTATED BIBLIOGRAPHY OF PATENTS RELATED TO COASTAL ENGINEE--ETC(U)
NOV 79 R E RAY, M D DICKEY, A M LYLES
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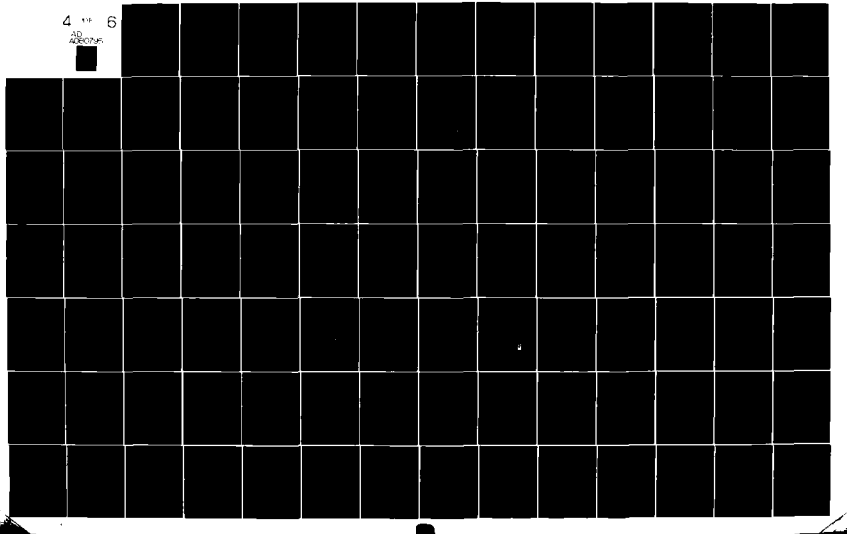


3,458,413

METHOD OF INHIBITING FOULING OF SEA WATER CONDUITS AND THE LIKE BY MARINE ORGANISMS

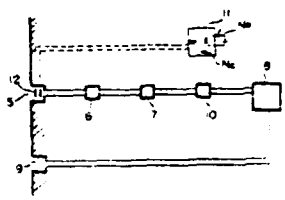
Kenji Ueda, Tsutomu Horiguchi, and Minoru Hirata, Nagasaki-shi, Japan, assignors to Messrs. Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 7, 1966, Ser. No. 532,155
Claims priority, application Japan, Mar. 10, 1965, 40/13,886
Int. Cl. C23f *13/00, 15/00*
U.S. Cl. 204—147 6 Claims

A method of inhibiting fouling and blocking, by marine organisms, of sea water passages, includes disposing a pair of electrodes in the sea water passage, the electrodes including an anode of material which is insoluble in sea water as an electrolyte. A current is passed between the electrodes and has a concentration, in the sea water in the passage, of from 0.06 to 1 ampere per cubic meter per hour of the flow rate of sea water through the passage.

Keywords: Cathodic protection; Corrosion prevention; Fouling prevention

U.S. Cl. X.R. 204-149; 204-196; 204-229



3,458,857

ACCELERATION CANCELLING HYDROPHONE

Dorothy E. Hancks, William C. Hubbard, and Claude C. Routh, San Diego, Calif., assignors to the United States of America as represented by the Secretary of the Navy

Filed Oct. 12, 1967, Ser. No. 674,990
Int. Cl. H04b *13/02*
U.S. Cl. 340—10 2 Claims

In a towed hydrophone, one piezoelectric element is compressed and another element is tensioned by acceleration in the direction of the towing cable. The voltages thus produced are out-of-phase and when added tend to cancel. Both elements, however, respond normally to the pressure waves producing in-phase voltages.

Keywords: Instrument, towed; Towed vehicle

3,459,004

WHARF WITH A SHOCK-ABSORBING DEVICE

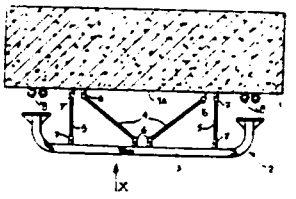
Emilio Morini, Milan, Italy, assignor to Società Applicazioni Gomma Antivibranti "SAGA" S.p.A., Milan, Italy

Filed Jan. 10, 1968, Ser. No. 696,775
Claims priority, application Italy, Apr. 27, 1967, 15,413-A/67
Int. Cl. E02b *3/22*; B60r *19/06*
U.S. Cl. 61—48 6 Claims

A rigid beam is suspended in a horizontal position parallel to a flank of the wharf by resilient suspension means which comprise an array of telescopic shock absorber. The arrangement of the shock absorbers is such that they converge by pairs towards the beams or the wharf or both. There are provided both absorbers with their axes inclined to said flank in vertical planes and absorbers with their axes inclined to said flank in horizontal planes.

Keywords: Pier fender

U.S. Cl. X.R. 114-219; 267-1; 293-72



3,460,064

CANCELLATION OF HORIZONTALLY TRAVELING NOISE IN MARINE SEISMIC EXPLORATION

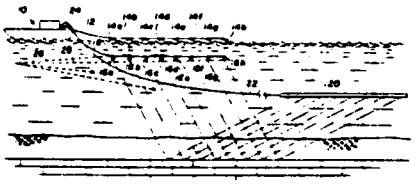
Ben F. Giles, Dallas, Tex., and Howard L. Viger, Metairie, La., assignors to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed Jan. 17, 1968, Ser. No. 698,571
Int. Cl. G01v *1/38*
U.S. Cl. 340—15.5 8 Claims

An array of spaced apart seismic disturbance sources are streamed behind a marine vessel and are simultaneously actuated to generate seismic disturbances. The direct vertical reflections from the seismic disturbances are received at reception points streamed behind the marine vessel and appear to emanate from a point source. Horizontally traveling wave trains resulting from the seismic disturbances arrive at the reception points out of phase with one another and therefore tend to cancel one another.

Keywords: Seismic acoustic transmitter array; Seismic streamer cable; Seismic survey method

U.S. Cl. X.R. 340-7



AUGUST 12, 1969

3,460,384
DEPTH CONTROLLING DEVICE
Timothy Fohl, East Acton, Mass., assignor to Harry Eugene Stubbs, Lexington, Mass.
Filed June 6, 1967, Ser. No. 643,907
Int. Cl. G01w *1/00*
U.S. Cl. 73—170 13 Claims

A depth control device for a submerged object which includes an adjustable boundary layer control coating with a liquid contacting surface of the structure.

Keywords: Pump; Towed body depth control

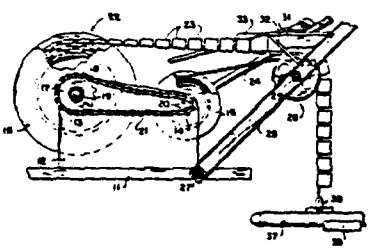
U.S. Cl. X.R. 114-235

AUGUST 19, 1969

3,461,830
FAIRINGS FOR A MARINE TOWLINE
Harry H. Pearce, James B. Turner, and Harold L. Wise, Houston, Tex., assignors to Shell Oil Company, New York, N.Y., a corporation of Delaware
Filed Feb. 20, 1968, Ser. No. 706,929
Int. Cl. B63b *21/56*
U.S. Cl. 114—235 9 Claims

A towline and a plurality of fairings are guided through a sheave arrangement into a converging, engaging relationship to automatically clip the fairings to the towline as it is being strung out below a towing vessel. The towline and fairings are automatically separated for winding on separate drums as the towline is pulled in.

Keywords: Towing cable



3,462,960

MOORING DEVICE FOR BOATS

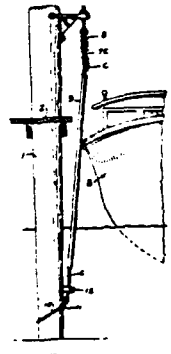
Anton Bruehl, Boca Raton, Fla., assignor to Emory L. Groff and Emory L. Groff, Jr., Bethesda, Md., as joint-tenants

Filed Mar. 25, 1968, Ser. No. 715,828
Int. Cl. E02b 3/22
U.S. Cl. 61—48 4 Claims

A mooring device for boats wherein a flexible cable is looped about a tapered dock pile at one end while its upper end is spring tensioned to a bracket near the upper end of the pile.

Keywords: Pier fender; Pile protection; Small-craft mooring device

U.S. Cl. X.R. 114-219; 114-230



3,462,963

APPARATUS FOR PIPELAYING AND TRENCHING OPERATIONS IN A BODY OF WATER

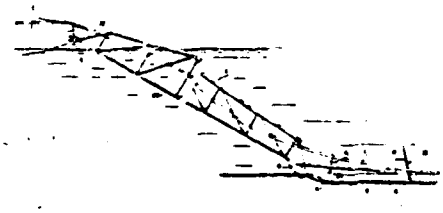
Warren T. Moore, Anchorage, Alaska, assignor to Brown & Root, Inc., Houston, Tex., a corporation of Texas

Filed Aug. 2, 1967, Ser. No. 657,802
Int. Cl. B63b 35/04; F16l 1/00; E02f 3/92
U.S. Cl. 61—72.4 16 Claims

A method of underwater trenching utilizing a floating vessel and which includes the steps of providing ground-engaging means adapted to slide along the bed of a body of water, and adjustably connecting a plow to the ground engaging-means for selective, vertically adjustable movement relative thereto. In additional steps, the plow is moved to extend to a predetermined depth beneath the ground-engaging means and is fixedly secured thereto. The ground-engaging means is connected with the vessel and towed along the bed to cut a trench of predetermined depth. Another method aspect includes the step of providing an eductor to remove detritus from the trench behind the plow and of pivotally mounting the eductor for free swinging motion about a horizontally disposed axis. A further method aspect includes providing a rigid elongate ramp for connecting the ground-engaging means to the vessel and supporting the upper end of the ramp for movement relative to the vessel about one pivotal axis extending transversely of the ramp and two mutually perpendicular rotational axes perpendicular to the pivotal axis.

Keywords: Seabed pipeline placement; Seabed trencher

U.S. Cl. X.R. 37-58



3,463,002

WAVE AMPLITUDE MEASURING APPARATUS

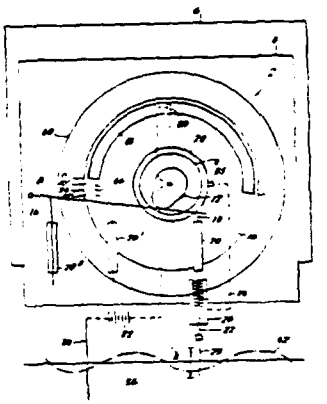
Alfred Edward Bugg, London, England, assignor to Bruce G. White, Allan Harry Beckett, William E. Gelson, and John W. T. Tapp, all of London, England

Filed Aug. 1, 1967, Ser. No. 657,563
Claims priority, application Great Britain, Aug. 4, 1966, 34,984/66
Int. Cl. G01w *1/00*
U.S. Cl. 73—170 10 Claims

The invention provides a wave amplitude measuring apparatus for measuring the amplitude of small surface waves in hydraulic models. The apparatus consists of an electrical circuit having a source of electrical power one terminal of which is connected to the liquid in the model, a light source connected to the power source and a probe which is arranged to oscillate into and out of contact with the liquid, thereby making and breaking a circuit to the light source. A rotating disc is provided to which the light source is attached and the wave form being analysed will become visible as an arc of light of varying length according to the wave amplitude in the model. A suitably calibrated scale is provided adjacent the light source so that the full scale wave amplitude can be read.

Keywords: Hydraulic model basin; Wave measurement

U.S. Cl. X.R. 73-148



3,463,085

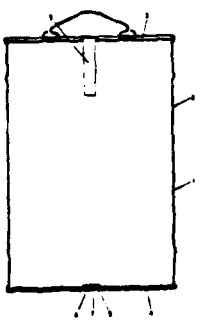
UNDERWATER EXPLOSIVE CHARGE

William Stewart Kerr Andrew, deceased, late of West Kilbride, Scotland, by Jeanie Andrew, sole executrix, West Kilbride, Scotland, assignor to Imperial Chemical Industries Limited, London, England, a corporation of Great Britain

Continuation of application Ser. No. 618,227, Feb. 23, 1967. This application Oct. 4, 1968, Ser. No. 769,469
Claims priority, application Great Britain, Mar. 18, 1966, 11,989/66
Int. Cl. F42d *3/00*
U.S. Cl. 102—24 8 Claims

An explosive charge for underwater use comprises a water-destructible explosive contained in a casing having an aperture and normally closed valve means for opening the aperture at a predetermined exterior pressure so that water will enter the casing upon sinking of the latter to a predetermined depth. The valve may take the form of a flexible flap which is displaceable away from the inner end of the aperture by the hydrostatic pressure outside the casing.

Keywords: Seismic explosive acoustic transmitter



3,463,113

RECOVERY RELEASE SYSTEM

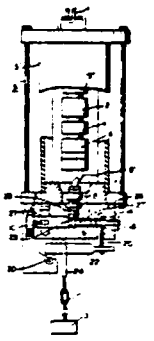
Anders F. Feyling, Cambridge, Mass., assignor, by mesne assignments, to EG & G International, Inc., Bedford, Mass., a corporation of Delaware

Filed May 23, 1966, Ser. No. 551,994
Int. Cl. B63b *9/00*; E21b *43/00, 29/00*
U.S. Cl. 114—221 11 Claims

Underwater equipment or the like is released automatically from an anchor or securing mechanism at a predetermined time. A timer produces pulses during a predetermined interval at the end of which release is to be effected, and a squib pressure cartridge is energized to effect the release mechanically upon the counting of a predetermined number of pulses corresponding to the predetermined time interval.

Keywords: Buoy mooring system; Instrument retrieval

U.S. Cl. X.R. 9-9; 166-54.5; 317-142



3,463,114

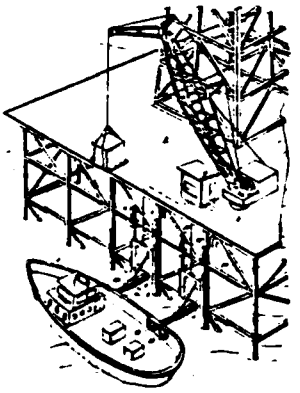
METHOD FOR MANEUVERING A VESSEL WITH RESPECT TO ITS STATION

Jack Lovell, McLean, Va., assignor to The Stanwick Corporation, Washington, D.C., a corporation of Delaware

Filed Apr. 24, 1968, Ser. No. 723,855
Int. Cl. B63b *21/00, 21/50*
U.S. Cl. 114—230 5 Claims

Method for maneuvering a vessel with respect to its station, particularly a method for fending the vessel horizontally and vertically with respect to a rigid station, such as an offshore oil well drilling platform. According to the method an extensible boom and suctorial cup assembly mounted upon a station is used to draw a vacuum upon integral portion of a maneuvering vessel freeboard. The boom is raised and lowered in horizontal alignment with the maneuvering vessel prior to drawing of the vacuum and is supported for free vertical movement corresponding to boat action after drawing the vacuum. The boom is telescoped with respect to the station, so as to control movement of the vessel about the station through the boom.

Keywords: Offshore structure fender



3,463,245
EXTENSIBLE AND RETRACTABLE BATTER ADJUSTMENT OF PILE HAMMER LEADS

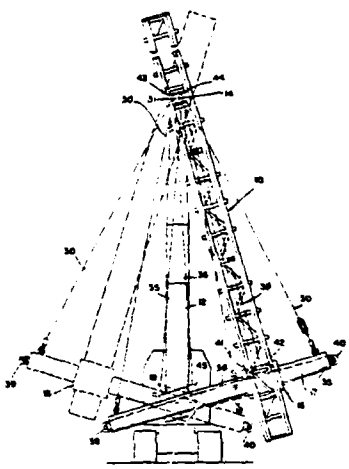
Everet Watabe, 171 New Dover Road, Colonia, N.J. 07067

Filed Apr. 22, 1968, Ser. No. 729,485
Int. Cl. E21c *9/00, 11/00*
U.S. Cl. 173—43 12 Claims

Pile hammer leads are adjusted side-to-side to full batter angles of inclination, being pivoted to a carriage which rides over a short straight beam pivoted in line with the bottom brace of the rig and which is extensible from this pivotal mounting to reach the leads out to the desired angles of inclination and retractable to reduce the sidewise projection, for operation in a restricted area.

Keywords: Pile driver, impact; Pile driver leads

U.S. Cl. X.R. 51-711



3,463,251
PNEUMATIC TRANSFORMER COUPLING FOR SONIC PILE DRIVER

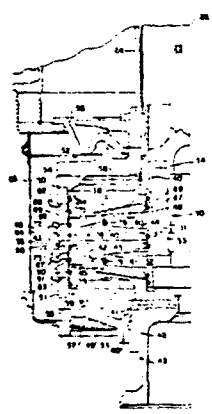
Willard B. Goodman, Sherman Oaks, Calif., assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware

Filed May 23, 1967, Ser. No. 640,553
Int. Cl. E21b *11/02, 7/00;* B06b *3/02*
U.S. Cl. 175—19 6 Claims

The force exerted on a pile member by a sonic oscillator may be multiplied at a proportionately smaller displacement amplitude by coupling a pneumatic transformer between the sonic oscillator shaft and the pile to be driven. The pneumatic transformer resiliently absorbs the force of the oscillator shaft over a long stroke and transmits the power thereof to the pile at a proportionately larger force and smaller displacement amplitude.

Keywords: Pile driver, vibratory

U.S. Cl. X.R. 175-56



3,464,212

METHOD OF BUILDING CONCRETE STRUCTURES IN WATER BOTTOMS

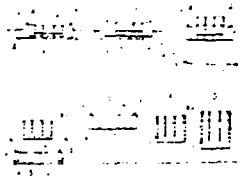
Kazumi Yamagata and Kazuo Kamisaka, Chuo-ku, Tokyo, Japan, assignors to Daiho Construction Company, Limited, Tokyo, Japan, a corporation of Japan

Filed Mar. 10, 1967, Ser. No. 622,192
Claims priority, application Japan, May 13, 1966, 41/30,432
Int. Cl. E02d *5/00*; B63c *1/06*; B63b *35/44*
U.S. Cl. 61—46 7 Claims

A method of building a concrete structure in one place and sitting it at another place in water wherein at least a base part of the structure is constructed in a floatable dock which is partially submerged and stably grounded on a water bed in shallow water by filling water into the dock so that the construction will be carried out under the same favorable stable conditions as would exist were the construction to be performed on land. The partially submerged dock is then refloated by pumping out the water and towed to deep water where it is again submerged by filling in water so that the dock sinks below and separates from the complete or incomplete concrete structure which remains floating. The latter is then sunk at the intended site by filling in water, and the dock is then refloated by pumping out the water and towed back to the original shallow water location for reuse.

Keywords: Breakwater, concrete; Offshore caisson; Offshore construction

U.S. Cl. X.R. 61-52; 61-65; 114-5; 264-34



3,464,213

BUOYANT FENDERS

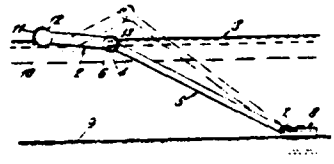
Henry W. Stephenson, Kingsdown Old Rectory, near Milstead, Sittingbourne, Kent, England

Filed Nov. 27, 1967, Ser. No. 685,795
Claims priority, application Great Britain, Nov. 29, 1966, 53,276/66
Int. Cl. B63b *43/18*
U.S. Cl. 61—46 11 Claims

A generally rectangular buoyant framework having spaced parallel buoyant elements one of which is just buoyant and the other of which is highly buoyant. The framework is pivoted to a pivotally anchored means arranged so that impact forces on the free edge of the framework and reaction from the anchored means causes the framework to tilt and shift its center of buoyancy in a manner to set up a restoring couple by its buoyancy and weight.

Keywords: Collision protection; Offshore structure fender; Pier fender

U.S. Cl. X.R. 61-48; 114-220

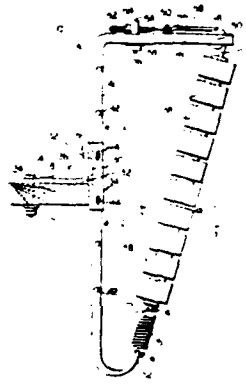


3,464,214
WATERCRAFT MOORING DEVICE
John S. L. King, 186 Glenview Ave.,
Toronto 12, Ontario, Canada
Filed Jan. 23, 1967, Ser. No. 611,111
Int. Cl. E02b *3/22*; B63b *21/04*; F16f *9/54*
U.S. Cl. 61—48 6 Claims

A boat mooring device which consists of a tensioned cable fixed at its upper end at a point above the water on which the boat is floating, the tension being provided by a spring or weight secured to its lower end. A mooring line for the boat is secured to a ring which is, in turn, secured to the tensioned cable.

Keywords: Pier fender; Small-craft mooring device

U.S. Cl. X.R. 114-219; 114-230; 267-69

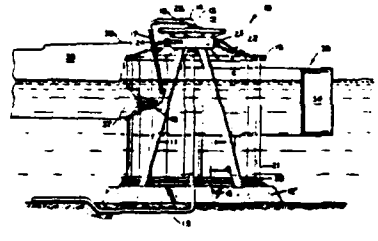


3,464,466
MOORING SYSTEM FOR TANKER VESSELS
James F. Bryan, Somerset, N.J., assignor to Esso Research and Engineering Company, a corporation of Delaware
Filed Jan. 24, 1967, Ser. No. 611,329
Int. Cl. B63b *21/00*
U.S. Cl. 141—346 9 Claims

The disclosure shows a fixed mooring station having fluid coupling means which can be rotated, raised or lowered suitably to position the coupling means relative to corresponding means installed in the bulb bow portion of a tanker vessel. Means are provided for positive engagement of the bulb within a housing in the mooring.

Keywords: Offshore mooring structure; Offshore platform, fixed

U.S. Cl. X.R. 61-46.5; 114-5; 137-236; 141-383; 141-387



3,464,909

ALUMINUM ALLOY GALVANIC ANODES

Kiyomi Yanagida and Ikuo Hatano, Nagoya-shi, and Kawai Masazumi, Osaka, Japan, assignors to Sumitomo Chemical Company, Ltd., Osaka, Japan, a corporation of Japan

No Drawing. Filed May 19, 1967, Ser. No. 639,605
Claims priority, application Japan, May 21, 1966, 41/32,621
Int. Cl. C23f *13/00*; B01k *3/06*
U.S. Cl. 204—197 6 Claims

Aluminum base alloy galvanic anodes for the cathodic protection of metal structure having a lower anodic potential and a higher current efficiency and substantially free of pitting or crevice formation due to selective corrosion during their useful life as consumable anodes to protect the metal structures containing 0.01–0.2% by weight of mercury, 0.01–10% by weight of zinc and 0.01–2% by weight of lead.

Keywords: Cathodic protection; Corrosion prevention

U.S. Cl. X.R. 75-146; 204-148; 204-293

No Figure

3,464,920

METHOD OF REMOVING OIL FROM THE SURFACE OF WATER USING OLEOPHILIC, HYDROPHOBIC COMMINUTED ORGANIC MATERIALS

Ewald Pirson, Michael Roth, and Siegfried Nitzsche, Burghausen, Upper Bavaria, Germany, assignors to Wacker-Chemie G.m.b.H., Munich, Germany

No Drawing. Filed July 20, 1967, Ser. No. 654,704
Int. Cl. B01d *15/00*
U.S. Cl. 210—29 4 Claims

Natural and synthetic oils floating on and contaminating the surface of bodies of water can be removed by absorption on a comminuted organic solid which has been rendered water repellent but remains oil absorptive after treatment with organosilanes.

Keywords: Pollutant absorption

U.S. Cl. X.R. 210-36; 210-40; 210-502

No Figure

SEPTEMBER 9, 1969

3,465,528

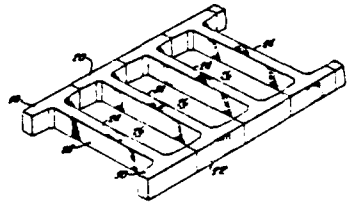
FLOATING WAVE SUPPRESSOR

Ernest M. Usab, Costa Mesa, Calif.
(1229 E. Wakeham Ave., Santa Ana, Calif. 92705)

Filed Apr. 25, 1967, Ser. No. 633,633
Int. Cl. E02b *3/04*
U.S. Cl. 61—5 9 Claims

A massive pair of spaced longitudinal members extending for a considerable distance are rigidly connected by a plurality of lateral members. Formed from modules joined by tension members, the longitudinal and lateral members have a concrete exterior shell surrounding a lightweight core so that the structure floats on water to suppress waves.

Keywords: Breakwater, concrete; Breakwater, floating



3,465,532
CONCRETE PILE AND JOINT
Robertson L. Belden, P.O. Box 607, Metairie, La. 70004
Filed Dec. 29, 1967, Ser. No. 694,576
Int. Cl. E02d *5/12, 5/14;* E04b *1/68*
U.S. Cl. 61—59 10 Claims

The structure relates to a prestressed concrete pile having a joint sealing means between adjacent piles comprising a plastic member interlocked between piles and being formed of material having stress and corrosion characteristics so as to resist movement between adjacent piles yet maintain a tight seal if some limited movement occurs and having configuration and composition characteristics which facilitate easy installation of the piling yet virtually unaffected by and resistant to detrioration by the surrounding conditions in which used.

Keywords: Bulkhead; Pile, concrete; Pile section connection; Pile, sheet

U.S. Cl. X.R. 52-396; 61-35, 61-49; 94-18

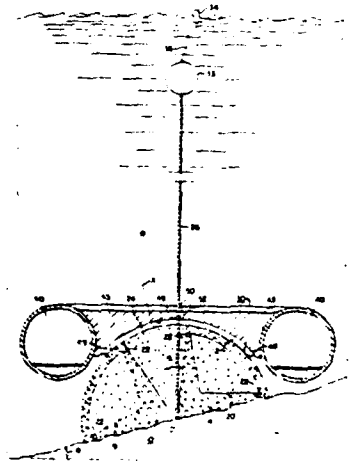
SEPTEMBER 16, 1969

3,466,877
SELF-LEVELING LAND OR UNDERWATER STATION
Thomas P. Foley, Severna Park, and Stanley L. Quick, Annapolis, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa., a corporation of Pennsylvania
Filed Mar. 17, 1967, Ser. No. 623,931
Int. Cl. E02d *29/00;* B63c *11/00*
U.S. Cl. 61—46 11 Claims

A hemispherical foundation member having hollow internal cavities is floated to a desired location in the sea and is caused to descend to the sea bottom with the admission of seawater to the cavities. The hemispherical foundation member includes an open cavity in the form of a cone having its apex in the vicinity of the center of curvature of the hemisphere. A cable connected to the foundation member at the apex of the cone extends vertically toward the surface when the foundation member comes to rest on either level or inclined bases. An underwater station structure having a concave undersurface is either lowered down the vertically extending cable or reels the cable into the station structure as it descends and comes to rest on top of the hemispherical foundation and assumes a horizontal orientation even through the foundation may rest on a sloping seabed.

Keywords: Offshore construction; Seabed foundation

U.S. Cl. X.R. 52-65; 61-69; 166-.5



3,466,878

RIG FOR WORK AT SEA, IN LAKES, LAGOONS

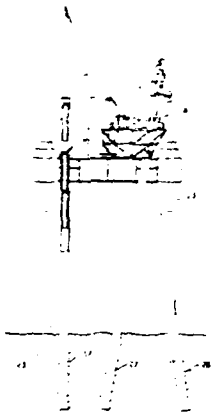
Nicolas Esquillan and Henri Houdin, Paris, France, assignors to Société des Entreprises Boussiron, Paris, France, a corporation of the French Republic

Filed Dec. 29, 1966, Ser. No. 606,109
Claims priority, application France, Jan. 17, 1966, 46.095
Int. Cl. E02d 27/50; E02b 17/00; B63b 35/44
U.S. Cl. 61—46.5 4 Claims

A rig for work at sea, in lakes, lagoons, comprising at least one structure supported above the water on permanent piles, each structure being made of concrete and arranged to be self-floating and being equipped with a set of provisional piles. After being launched, the structure is towed to its working site, then raised to its final height by means of the provisional piles, after which the permanent piles are erected to form the final supports, the provisional piles then being removed.

Keywords: Offshore construction; Offshore platform, fixed; Pile placement

U.S. Cl. X.R. 61-52



3,466,879

METHOD AND APPARATUS FOR MAKING PILING

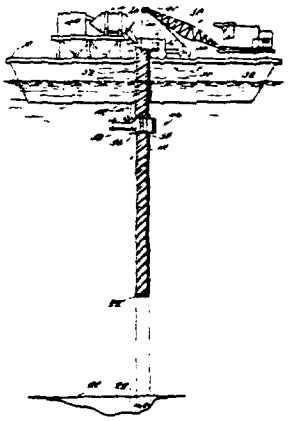
Donald S. Justice, Washington, D.C.
(1816 N. Queens Lane, Arlington, Va. 22201)

Filed Aug. 7, 1967, Ser. No. 658,694
Int. Cl. E02d 5/40; E04b 1/16; B23p 19/04
U.S. Cl. 61—53.5 10 Claims

A spiral type conduit is continuously formed vertically and a settable material such as concrete is commensurately placed in the conduit as it is formed. This growing elongation constantly approaches its point of geo-fix as a piling. The place of using the method may range from the deep ocean to low bottom pits on land. A result is quick in-place production for the relief of otherwise awkward delivery of heavy piling, sometimes longer than transport ships. Strength is added to the pile structure by a centrally extended twisted cable attached to the conduit bottom. The cable acts as a descending support during the forming and filling operation and may remain as a permanent reinforcement.

Keywords: Concrete form; Offshore construction; Pile, concrete; Pile placement

U.S. Cl. X.R. 29-202.5; 61-53.52; 61-53.58; 61-56; 61-56.5; 61-63; 264-31; 264-34



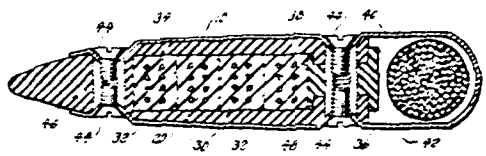
3,467,047
MINIMUM-WIDTH CONTINUOUSLY FAIRED TOWLINE

Clarence K. Chatten, Jackson Heights, and Samuel H. Behr, Uniondale, N.Y., assignors to the United States of America as represented by the Secretary of the Navy

Filed Dec. 21, 1967, Ser. No. 693,695
Int. Cl. B63b *21/56*
U.S. Cl. 114—235 3 Claims

A towline comprising a continuous fairing, a tension line, one or more communication modules comprising stretchable electrical wires enclosed in resilient insulation, a continuous fairing spacer, a plurality of nose pieces, yokes and restraining rings. The fairing is formed with a longitudinal internal cavity in which the communication modules are inserted. The cavity is connected to the head of the fairing by a passageway in which the fairing spacer is inserted. The tension line is placed against the outer surface of the spacer and the nose pieces are fitted over this assembly enclosing the tension line and are bolted to the fairing before and behind the communication modules. Yoke pieces and their associated restraining rings are substituted for nose pieces at intervals along the towline.

Keywords: Instrument cable; Towing cable



SEPTEMBER 23, 1969

3,468,132
PLATFORM LEG PACKER

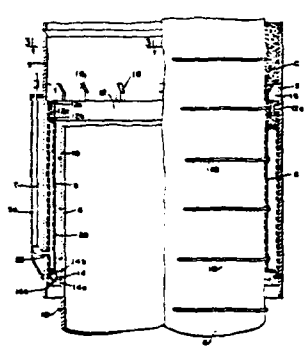
Glen H. Harris, Arlington, Tex., assignor to Oil States Rubber Co., a corporation of Texas

Filed Mar. 1, 1967, Ser. No. 619,749
Int. Cl. E02b *17/00*; B63b *21/50*
U.S. Cl. 61—63 7 Claims

A packer assembly for sealing the annulus between driven pilings and skirt guides through which they pass, the guides being located at the bottoms of marine drilling platforms secured by means of the pilings to the floor of the sea, and the annulus between the skirt guides and the pilings being poured full of grout above the packers when the latter are set after the pilings have been driven.

Keywords: Grouting; Offshore platform, leg; Pile, structure connection

U.S. Cl. X.R. 61-53.5; 61-56

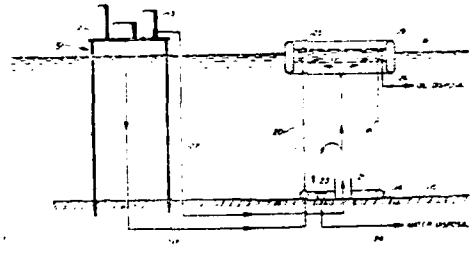


3,469,402
OFF-SHORE TANK SYSTEM
Judson D. Lowd, Tulsa, Okla., assignor to Combustion Engineering, Inc., New York, N.Y., a corporation of Delaware
Filed Jan. 4, 1968, Ser. No. 695,603
Int. Cl. E02b 3/00, 17/00; B65d 89/10
U.S. Cl. 61—1 4 Claims

A gas discharge distributor is disclosed at a subsurface location within a body of water generating an ascending curtain of bubbles as an effective retainer of liquid. Liquid is being introduced near the bottom of the enclosure. The liquid is contained as it ascends by the bubble curtain until the liquid reaches the surface. A floating ring at the surface is receiving the bubbles and ascended liquid and retaining the liquid while it is drained for disposal by a system not shown.

Keywords: Offshore storage tank, emergent; Pollutant, submerged barrier; Pollutant, surface barrier

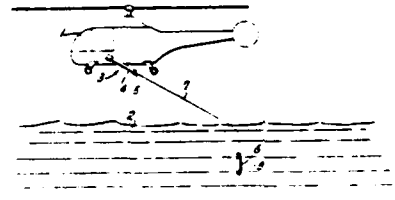
U.S. Cl. X.R. 61-6; 61-46.5



3,469,444
LAUNCHING APPARATUS
William H. Ayer, Scituate, Mass., assignor to Buzzards Corp., Marion, Mass., a corporation of Massachusetts
Filed July 17, 1967, Ser. No. 653,806
Int. Cl. G01w 1/08
U.S. Cl. 73—170 10 Claims

The present invention includes a launching apparatus having an adjustable support assembly, a housing portion integral with said support assembly for containing a canister assembly, a tubular member secured to said housing portion for guiding a probe initially contained within the canister and a breech assembly secured to the housing portion for electrically connecting the canister assembly to remote measuring apparatus.

Keywords: Bathythermograph; Instrument deployment



3,469,551
GEOPHYSICAL TOW BUOY
Rene L. Lefebvre, 2507 Lazybrook, Houston, Tex. 77008
Filed Mar. 11, 1968, Ser. No. 712,185
Int. Cl. B63b 21/52
U.S. Cl. 114—235 1 Claim

A buoy characterized by its light weight and continued buoyancy even though the buoy may be damaged, such buoy having a lifting eye at substantially its center of gravity. A pair of fins are mounted on the aft portion of the buoy.

Keywords: Seismic streamer cable; Towed body depth control

U.S. Cl. X.R. 9-8

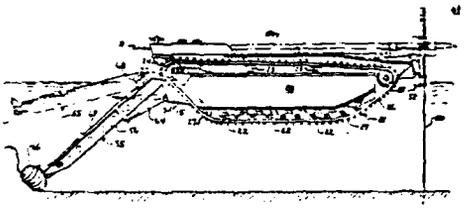
OCTOBER 7, 1969

3,470,633
AMPHIBIOUS DREDGE
Robert M. Soehnlen, Beloit, Wis., assignor to Beloit Pipe and Dredge, Inc., Beloit, Wis., a corporation of Wisconsin
Filed June 20, 1967, Ser. No. 647,494
Int. Cl. E02f 3/88, 3/62
U.S. Cl. 37—67 11 Claims

A hull having pontoons at either side and an endless track mounted about each pontoon. A hydraulic dredging apparatus at one end of the hull. A pair of spud carriers at the opposite end of the hull and each mounting a spud for vertical movement to selectively anchor the hull. Each spud carrier being tiltable to place the spud in a storage position overlying the hull and being urged toward an upright position when its spud is raised.

Keywords: Dredge, cutterhead; Dredge propulsion

U.S. Cl. X.R. 37-73; 61-46.5; 115-1



3,470,635

APPARATUS FOR CONTROLLING THE OUTPUT OF DREDGING, LOADING AND UNLOADING IMPLEMENTS

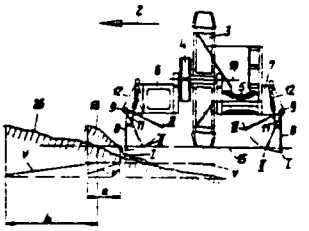
Alexander Langner and Raimonds Sukurs, Rheinhausen, Germany, assignors to Fried. Krupp Gesellschaft mit beschrankter, Haftung

Filed Dec. 14, 1966, Ser. No. 601,626
Claims priority, application Germany, Dec. 17, 1965, B 85,014
Int. Cl. E02f 3/24, 9/00
U.S. Cl. 37—190 9 Claims

Material handling apparatus having scanning means adjustable selectively for varying the rate of loading and unloading of material goods and supported to move ahead of the handling apparatus in probing the contour of the slope of a mass of material goods sufficient to assure constant and uniform output supply of material goods. A control means for the material handling apparatus is operable in response to deviation of the slope contour probed by said scanning means resulting in variation in speed of the handling movement to assure compensation in the handling operation for maintaining a constant and uniform output supply of material goods. Sensing signals due to probing of the slope of the mass of material goods are utilized for variable speed to and fro movement along the axis of a material cutting circle defined by a bucket wheel, the variable speed being effected by the control means.

Keywords: Dredge, mechanical; Dredge-spoil measurement; Dredge ladder control

U.S. Cl. X.R. 172-2; 173-4; 198-36; 198-37; 198-40; 299-1



3,470,700

WATER TURBULENCE PRODUCING AIR BUBBLING SYSTEM FOR BOAT DOCKS

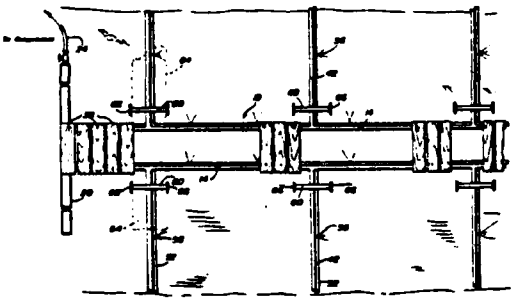
Robert L. Quaine, Clair J. Rhadigan, and Sherwood T. Rhadigan, Pearl Beach, Mich., assignors of one-sixth each to Donna Quaine, Dorothy Rhadigan, and Mary Rhadigan, all of Pearl Beach, Mich.

Filed Dec. 6, 1967, Ser. No. 688,530
Int. Cl. E02b 3/20, 15/02, 3/00
U.S. Cl. 61—48 10 Claims

A dock construction including a plurality of uprights spaced along at least one horizontal path and adapted at their lower ends to be supported from the bottom of the docking area on a body of water and means operative to discharge compressed air from locations spaced along the aforementioned path below the upper ends of the uprights.

Keywords: Ice protection; Pier, fixed; Small-craft pier

U.S. Cl. X.R. 61-1; 61-6



3,471,827
HYDROSTATIC-PRESSURE COMPENSATING HYDROPHONE STRUCTURE

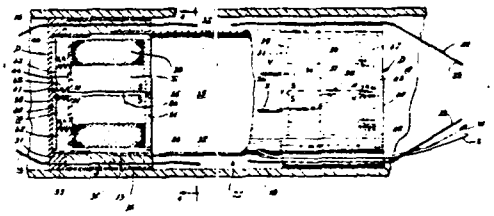
Stephen Victor Chelminski, West Redding, and Paul Chelminski, Norwalk, Conn., assignors to Bolt Associates, Inc., Norwalk, Conn., a corporation of Connecticut

Filed May 1, 1968, Ser. No. 725,622
Int. Cl. H04b *13/02*
U.S. Cl. 340—7 **14 Claims**

This invention provides a hydrostatic-pressure compensating hydrophone structure adapted to be towed from a craft to receive acoustic signals in a body of water such as an ocean, sea, lake, sound, etc., during the making of a seismic survey. The hydrophone structure includes a flexible tubular casing having a series of transducer assemblies positioned therein which include transducer units having a pressure compensating fluid-chamber or bladder interposed between each pair of the transducer units. The tubular body is arranged to have a liquid present between the transducer assemblies and throughout the structure. In counteraction to the hydrostatic pressure applied to the outside of the transducer units there is a compensating fluid pressure created by the corresponding depression of the fluid-chamber or bladder which is conducted through a passage in the transducer unit so as to counteract the pressure on the exterior of the units. The transducer assemblies are interconnected by conducting wires and by a stress member which have sufficient slack to remain slack during the norm.. towing of the structure. In the preferred embodiment, the hydrophone assemblies have peripheral water passages large enough to permit liquid to flow therethrough easily for maintaining a uniform pressure throughout the tubular body and to enable quick filling of the entire tubular body.

Keywords: Seismic streamer cable

U.S. Cl. X.R. 340-8



OCTOBER 14, 1969

3,471,949
AUTOMATIC SWING CONTROL SYSTEM FOR DREDGE

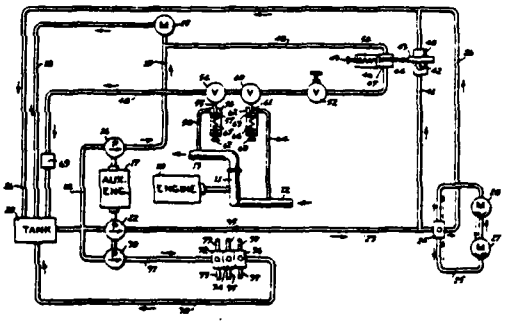
Neil H. Cargile, Jr., % American Marine & Machinery Co., 201 Woodycrest Ave., Nashville, Tenn. 37211

Filed May 8, 1967, Ser. No. 636,775
Int. Cl. E02f *3/88, 9/20*
U.S. Cl. 37—64 **4 Claims**

A control system for limiting the swing speed of a dredge including a variable flow control valve for varying the amount of fluid supplied to the swing motors, and a sensing system responsive to the load upon the cutter head for opening and closing the flow control valve.

Keywords: Dredge, cutterhead; Dredge-spoil measurement; Dredge ladder control

U.S. Cl. X.R. 91-449



3,472,031
PRECAST CONCRETE BODY

Rai B. Kelso, P.O. Box 659, Galveston, Tex. 77550

Continuation-in-part of application Ser. No. 439,333, Mar. 12, 1965. This application Nov. 6, 1967, Ser. No. 691,084

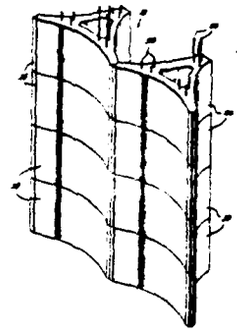
Int. Cl. E02d *5/12*; E02b *3/14*; E04c *5/08*

U.S. Cl. 61—39 1 Claim

A body of precast concrete of a particular configuration to form bulkheads, retaining walls, pilings, and other similar structures.

Keywords: Bulkhead; Concrete form; Pile, concrete; Pile, sheet

U.S. Cl. X.R. 52-159; 52-227; 52-608



3,472,033
FLUID STORAGE APPARATUS

Morris A. Brown, Dallas, Tex., assignor to H. J. Gruy and Associates, Incorporated, Dallas, Tex., a corporation of Texas

Filed Oct. 26, 1966, Ser. No. 589,603

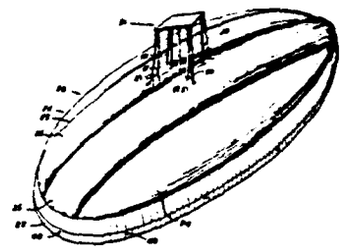
Int. Cl. B65g *5/00*; E02b *17/00*; E04b *1/32*

U.S. Cl. 61—46 18 Claims

A tank for storing materials at an underwater location having roof structure including curved portions defined by an inverted catenary, a conduit for introducing materials for storage into the tank and withdrawing them from the tank, and flow passages for water to flow into and out of the tank responsive to changes in the volume of the stored materials so that the tank remains full of fluid at all times.

Keywords: Offshore mooring structure; Offshore platform, fixed; Offshore storage tank, submerged

U.S. Cl. X.R. 52-80; 61-1; 61-5; 61-46.5; 220-1; 220-13



3,472,196

FAIRINGS FOR UNDERWATER CABLES, TOWLINES AND STRUCTURAL MEMBERS

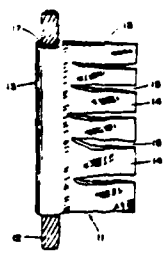
John I. Ewing, Palisades, and Roger L. Zaunere, West Nyack, N.Y., assignors, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed Jan. 17, 1968, Ser. No. 698,651
Int. Cl. B63b *21/10*
U.S. Cl. 114—235 10 Claims

A simplified fairing is provided which is made of heat shrinkable plastic applied at ambient temperature over the cable, hose or other line and thereafter heated to firmly enclose the supporting member. Fins, which may be single, double, quadruple, etc., or long filaments are attached to the body portion of the fairing and stream in the environment thereby reducing hydrodynamic drag. A ribbon form may be wound around the supporting member and may have filaments secured thereto. A tough, flexible material such as Teflon or a Teflon based material is suggested for use in the invention.

Keywords: Towing cable

U.S. Cl. X.R. 156-85



OCTOBER 21, 1969

3,473,334

APPARATUS AND METHOD FOR PRODUCING WAVES

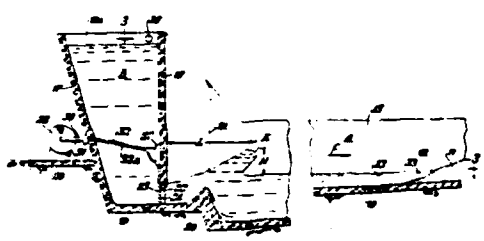
Phillip Dexter, 3533 W. Hazelwood, Phoenix, Ariz. 85019

Continuation-in-part of application Ser. No. 599,758, Dec. 7, 1966. This application June 24, 1968, Ser. No. 739,409
Int. Cl. E02b *3/00, 9/02*
U.S. Cl. 61—1 30 Claims

Apparatus and a method for producing translatory waves suitable for surfing including storing water in a reservoir to produce a predetermined head and subsequently releasing the water from beneath the surface of a body of water in the surfing area and for directing the water upward toward the surface, preferably by releasing the water against a deflector. The apparatus may be used in conjunction with natural or artificial bodies of water and provision is made for the removal of water from the surfing area at a point remote from the point of wave generation wherein interfering echo waves and the like are prevented from developing, at a rate substantially equal to the average rate of addition of water from the reservoir.

Keywords: Wave flume; Wave generator

U.S. Cl. X.R. 4-171; 4-172; 61-18; 61-19; 61-28

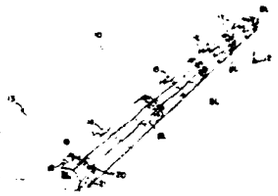


3,473,335
FLOATING SEAWALL
Robert H. Launer, 353 SW. 7th Terrace,
Boca Raton, Fla. 33432
Filed May 6, 1968, Ser. No. 726,701
Int. Cl. E02b 3/06
U.S. Cl. 61—5
5 Claims

A floating seawall intended to be anchored off shore a short distance from the shore line to break up the action of waves and prevent erosion of the shore.

The invention contemplates a plurality of longitudinally extending timbers secured to a suitable hub member to provide a cradle or crib of circumferential configuration, of extended length and rigid in construction. The action of the waves upwardly through the timbers breaks the force of the waves and reduces their force.

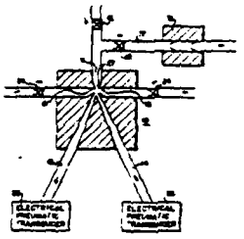
Keywords: Breakwater, floating



3,473,376
PURE-FLUID TIDE GAUGE
Julian Josephson, 4814 Eastern Lane,
Suitland, Md. 20023
Filed Nov. 30, 1966, Ser. No. 598,121
Int. Cl. G01w 1/00
U.S. Cl. 73—170
1 Claim

This invention is directed to a system which makes use of fluid amplifiers to measure tide fluctuations, and wave height, as well as internal waves, The incoming tide operates as a control to direct the output of a fluid amplifier through a special output to a recorder and the ebb tide operates to direct outputs through another separate output to be recorded. Each of the outputs may be telemetered to shore stations as well as ships so that knowledge of the tides may be known.

Keywords: Tide measurement

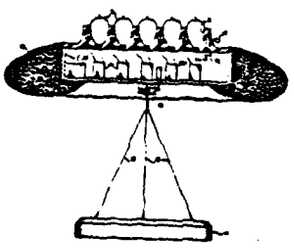


3,473,383
SUBMERSIBLE BATHYTHERMOGRAPH
Harold W. Dubach, 5908 85th Ave.,
Hyattsville, Md. 20784
Filed Apr. 25, 1967, Ser. No. 634,800
Int. Cl. G01k 1/08, 5/70, 1/02
U.S. Cl. 73—343
15 Claims

An apparatus for measuring the temperature of the ocean at various depths which is adapted to operate from the ocean floor. When the desired temperature measurements have been made the apparatus then rises to the ocean's surface to be retrieved along with the desired temperature information which is stored therein.

Keywords: Bathythermograph; Instrument deployment; Instrument retrieval

U.S. Cl. X.R. 73-343.5; 73-345



3,473,500
SUPPORT FOR ECHO SOUNDERS

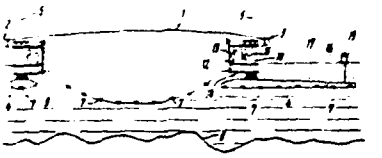
Hans Kietz, Bremen, and Karl Emil Johannsen, Hamburg, Germany, assignors to Krupp Fried. Gesellschaft mit beschrankter Haftung, Essen, Germany

Filed Feb. 8, 1968, Ser. No. 707,372
(Filed under Rule 47(a) and 35 U.S.C. 116)
Claims priority, application Germany, Feb. 8, 1967, B 91.086
Int. Cl. B63b *35/00, 43/04*
U.S. Cl. 114—.5 7 Claims

Support apparatus for a plurality of echo sounders used for mapping the contour of the floor of a body of water. The support apparatus includes outriggers, along which the echo sounders are disposed, which are connected to a surface ship and which, in their operational position, extend out from the ship transversely to the direction in which the ship is moving.

Keywords: Sonar, depth sounder

U.S. Cl. X.R. 114-126; 116-27



3,473,501
TUMBLE BARGE

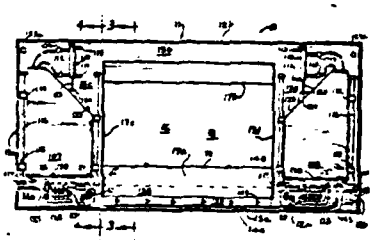
Albert B. Cady, Jr., Houston, Tex., and Thomas R. Hencey, Jr., 2707 57th St., Galveston, Tex. 77550; said Cady assignor to said Hencey

Filed Feb. 29, 1968, Ser. No. 709,408
Int. Cl. B63b *35/30, 13/02*
U.S. Cl. 114—38 12 Claims

The tumble barge takes load and is towed, unmanned, to dump site. Ballast tanks on bow and stern also serve as compressed air reservoirs to supply operational air, upon actuation of barge apparatus, as by remote control, to open flood valves on one side (port) and to open scupper valves on such side. Vessel normal metacenter and floodable space relationship is such that list increases with flooding until vessel capsizes almost 180 degrees completely to dump hold contents. The ballast arrangement is designed to build up a righting moment in clock direction counter to clock direction of capsizing, thus to right the barge. Apparatus may be actuated by remote control to admit compressed air to open and close flood valves and scupper valves.

Keywords: Hopper barge

U.S. Cl. X.R. 114-198



3,473,505
MOORING DEVICE

Paul R. Brown, Barrington, Ill., assignor to Seal Basin Marine Company, Chicago, Ill., a corporation of Illinois

Continuation of application Ser. No. 587,224, Oct. 17, 1966. This application July 29, 1968, Ser. No. 751,682
Int. Cl. B63b *21/00;* F16g *11/00*
U.S. Cl. 114—230 19 Claims

A mooring device having a base, a pair of ears formed integral with the base and extending upward from said base, each of said ears including an arm formed integral with the base and a generally U-shaped upper portion having one arm of the U formed integral with said arm and the other arm of the U extending toward the base.

Keywords: Small-craft mooring device

U.S. Cl. X.R. 24-123; 114-218

3,474,549
APPARATUS FOR CONVEYING SAND OR THE LIKE

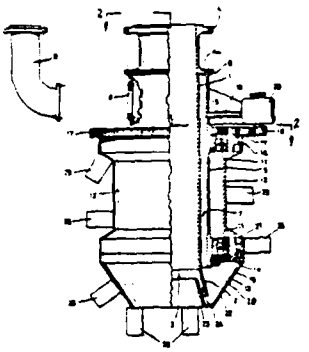
Ludwig Schnell, 86 Hauptstrasse, 7081 Aufhausen, Wurttemberg, Germany

Filed Sept. 6, 1967, Ser. No. 665,805
Claims priority, application Germany, Sept. 9, 1966, Sch 39,513
Int. Cl. E02f 3/92; B65g 53/30; F04f 5/24
U.S. Cl. 37—61 12 Claims

Apparatus for pumping silt, sand, gravel or other comminuted material from river beds or the like comprises a suction head whose inlet defines with a rotary nozzle an upwardly converging annular orifice for admission of a pressure medium which creates suction at the inlet to draw comminuted material into the suction head. The nozzle is detachably mounted on a tubular carrier surrounding a tubular pressure head which in turn surrounds the suction head and defines therewith an annular passage for admission of pressure medium into the nozzle. A set of helically distributed blades provided on the carrier and on the nozzle rotates about the inlet of the suction head to urge the nozzle into a supply of comminuted material when the carrier is driven by an electric motor mounted on the pressure head.

Keywords: Dredge, cutterhead; Dredge intake; Pump

U.S. Cl. X.R. 37-64; 103-263; 302-15



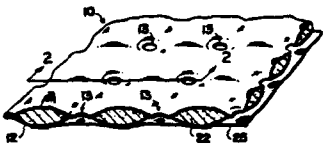
3,474,626
METHOD AND MEANS FOR PROTECTING BEACHES

Ervin Richard Colle, Haddonfeld, N.J., assignor to Construction Techniques, Inc., Cleveland, Ohio, a corporation of Delaware

Filed Aug. 24, 1967, Ser. No. 663,164
Int. Cl. E02b 3/12
U.S. Cl. 61—38 10 Claims

A protective mat and filter cloth assembly comprising an apertured concrete filled fabric envelope together with a filtering cloth or fabric attached to the envelope below the apertures to protect the surface of beaches, rivers or canal banks, dunes, revetments, groins or the like against the effect of erosion and scour by water and wind.

Keywords: Concrete form; Fabric mat; Revetment; Slope protection



3,475,834

HYDRAULIC MODELS

Alfred Edward Bugg, Longfield, England, assignor to Sir Bruce Gordon White, William Edward Gelson, Allan Harry Beckett, and John William Theodore Tapp, London, England

Filed Mar. 29, 1967, Ser. No. 626,898

Claims priority, application Great Britain, Apr. 29, 1966, 18,957/66

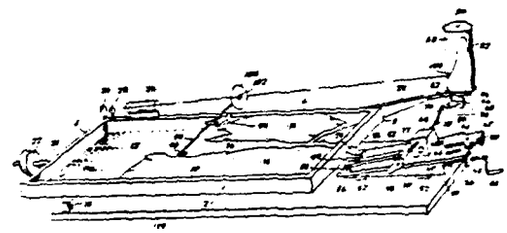
Int. Cl. G09b 23/06; G01m 9/00

U.S. Cl. 35—19 4 Claims

An hydraulic model for reproducing and determining the effects of water movement consists of a tray for containing water. Means is provided for adjustably tilting the tray and for rocking the tray at adjustable cyclic rate. An indicating device continuously monitors the levels of water at a selected point in the tray and comparator means compares the monitored water levels in the tray with a record of the water levels at a corresponding point in a natural area. The tilt and rocking of the tray can thus be adjusted until the water levels in the tray correspond to those on said record.

Keywords: Hydraulic model basin; Tide measurement

U.S. Cl. X.R. 73-148



3,475,842

DREDGE HAVING BUCKET EMPTYING MEANS

Heinrich Heitzer, Neuss, Rhine, Germany, assignor to Demag-Lauchhammer, Maschinen- und Stahlbau GmbH., Dusseldorf-Benrath, Germany

Filed June 7, 1966, Ser. No. 555,821

Claims priority, application Germany, June 9, 1965, D 47,465

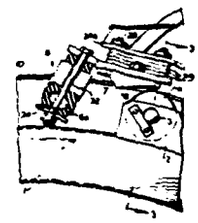
Int. Cl. E02f 3/24; B65g 47/40

U.S. Cl. 37—189 5 Claims

A dredging device comprises a dredging arm member which carries at its outer end a rotatable bucket wheel. The bucket wheel carries a plurality of buckets having forward opened ends and trailing closed ends. The buckets are pivotally mounted on the bucket wheels by arms which are connected around the forward ends of the buckets and which pivot adjacent the circumference of the wheels. The trailing bucket ends are connected through spring elements to the wheel and these spring elements urge the trailing ends inwardly toward the wheel circumference. As the wheel is rotated the trailing ends of the buckets are brought into contact with a lifting cam which strikes against the trailing ends and causes it to move outwardly from the circumference of the wheel to dislodge any material which is carried therein. When the bucket moves beyond the cam again it moves inwardly under the force of its connecting spring back against the wheel, to further loosen any material which may remain in the bucket.

Keywords: Dredge intake; Dredge, mechanical

U.S. Cl. X.R. 198-144

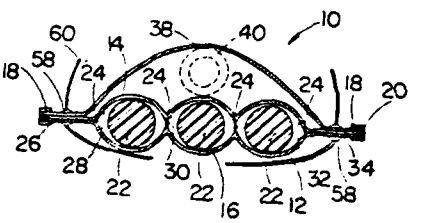


3,475,914
BOAT BUMPER
Charles D. Porter, Andrews, Ind., assignor of one-third to Mrs. John B. Leslie, Fort Wayne, Ind.
Filed Feb. 26, 1968, Ser. No. 708,347
Int. Cl. E02b 3/20; B65d 35/10
U.S. Cl. 61—46 8 Claims

A bumper comprising a flexible casing, a plurality of elongated resilient members in the casing, means forming constrictions in the casing to hold the members in a spaced-apart relationship, and means defining a pocket at one end of the casing for receiving the upper end of a post, thereby to mount the bumper on such post. Tie means is provided for shaping the bumper about the post. The casing is preferably formed by sewing together two identical rectangular panels and the constrictions are preferably formed by stitching the panels from end to end to define elongated chambers for receiving the members. Preferably, when the bumper is mounted on an upstanding post, the resilient members extend generally parallel to the post.

Keywords: Pier fender; Pile protection; Small-craft mooring device

U.S. Cl. X.R. 61-48; 114-219; 150-1

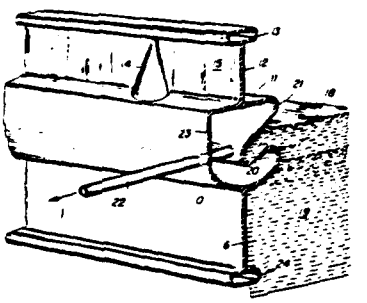


3,476,246
APPARATUS AND PROCESS FOR CONFINING FLOATING LIQUID PRODUCTS
Paul C. Dahan, Pittstown, Franklin Township, Hunterdon, N.J., assignor to Mobil Oil Corporation, a corporation of New York
Continuation-in-part of application Ser. No. 631,528, Apr. 17, 1967. This application Dec. 22, 1967, Ser. No. 692,897
Int. Cl. B01d 21/02, 21/24
U.S. Cl. 210—83 6 Claims

A floatable collar section comprising a main inflatable tube provided with means for skimming a floating liquid and a ballast means comprising a weighted skirt located below the inflatable tube. The skimming means can be formed with the main inflatable tube or can be attached thereto. A plurality of collar sections can be attached end to end forming a floatable collar to enclose and confine a liquid floating on seawater. The floatable collar is provided with means to recover a floating liquid.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier

U.S. Cl. X.R. 61-1; 210-242



3,477,233

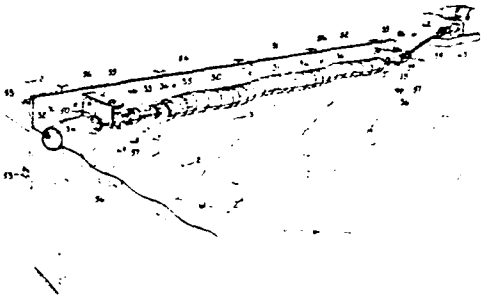
WAVE MACHINE INSTALLATIONS

Per F. Andersen, 200 Roehampton Ave., Apt. 914, Toronto, Ontario, Canada

Filed Mar. 7, 1966, Ser. No. 532,309
Int. Cl. E02b *15/02, 3/00;* E04h *3/20*
U.S. Cl. 61—1 15 Claims

The specification discloses machines for making gravity waves on the free surface of a body of liquid by the periodic motion of a buoyant member which is free to rise and fall with changes in the level of said surface. The buoyant member may be elongated and rotated about an axis parallel to its elongated direction by driving means separate from the member. Alternatively, the buoyant member may carry driving means and a weight, the driving means being arranged to move the weight relative to the buoyant member. The disclosure describes the machines as being used for keeping a channel or harbour free from ice.

Keywords: Ice protection; Wave flume; Wave generator



3,477,237

METHOD OF VIBRATING A MEMBER TO DRIVE IT IN A RESISTIVE MEDIUM

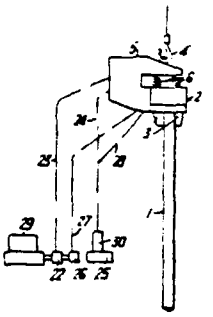
John C. Orkney, The Couch House, Drummond Place Lane, Stirling, Scotland

Continuation-in-part of application Ser. No. 460,171, June 1, 1965. This application Oct. 1, 1968, Ser. No. 764,099
Claims priority, application Great Britain, June 2, 1964, 22,696/64
Int. Cl. E02d *7/18;* E21c *3/02;* B06b *1/10*
U.S. Cl. 61—53.5 11 Claims

A method of driving a member such as a pile in a resistive medium such as earth is described. The member is biassed in a predetermined direction and a sinusoidally varying force is applied to the member while in contact with the resistive medium. The frequency of applied force is controlled so that it is always different from the fundamental natural frequency and harmonics thereof of the mass elastic system including the driven member and its driver. The controlled frequency is such that the driven member never vibrates at more than one-half the maximum amplitude at which it would vibrate if it were vibrated at that one of the instantaneous natural frequencies (fundamental resonant frequency and its harmonics) of the mass elastic system nearest to the controlled frequency.

Keywords: Pile driver, vibratory

U.S. Cl. X.R. 73-67.3; 74-61; 173-49; 175-19; 175-55



3,477,522

BOOM AND BRACING

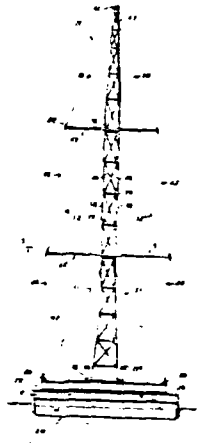
John B. Templeton, 1000 Singleton Blvd., Dallas, Tex. 75212

Filed July 7, 1967, Ser. No. 651,905
Int. Cl. E21c 9/00, 11/00; E04h 12/34
U.S. Cl. 173—43 14 Claims

A guide boom structure for a pile driver including longitudinal guy lines connected between the boom base, the boom tip, and lateral outrigger struts longitudinally spaced along the boom. The boom base is rotatable and has a cable arrangement for bracing and providing a supplementary turning force. The lateral boom bracing particularly adapts the boom to support pile driver and leads apparatus for driving heavy battered piles at angles which normally causes excesses cantilevered side loads on and resultant failure of a conventional boom.

Keywords: Pile driver leads

U.S. Cl. X.R. 52-117



3,477,931

METHOD AND APPARATUS FOR AUTOMATIC ELECTRIC CORROSION-PROOFING

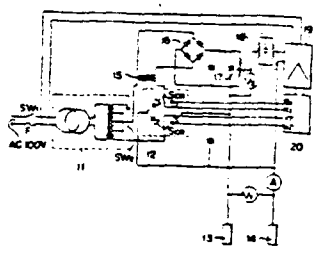
Kenji Ueda and Hiroshi Ogawa, Nagasaki-shi, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Chiyoda-ku, Tokyo, Japan

Filed Mar. 28, 1966, Ser. No. 537,845
Claims priority, application Japan, Mar. 30, 1965, 40/18,525; May 31, 1965, 40/32,093
Int. Cl. C23f 13/00; B01k 3/00
U.S. Cl. 204—147 11 Claims

In a method and apparatus for corrosion proofing metallic structures immersed in an electrolyte, such as sea water, the metallic structure is used as a cathode and an anode is placed in spaced relation thereto, the usual third or "standard" electrode being omitted. A potential is applied between the anode and the metallic structure to cause a relatively small current to flow from the anode to the metallic structure, the latter acting as a cathode. The current is maintained at a value such that the potential of the metallic structure or cathode is maintained at a value at which the metallic structure is corrosion-proof. The potential drop between the metallic structure and the anode, and the resistance drop through the electrolyte or sea water, between the anode and the metallic structure, are continuously measured and the difference between the two measured values is maintained at a constant value equal to the work potential necessary to corrosion-proof the work. In a variation, the current flow may be maintained within relatively small values either side of the required potential value for the metallic structure.

Keywords: Cathodic protection; Corrosion prevention

U.S. Cl. X.R. 204-196; 204-228



3,478,308

SEA BOTTOM CLASSIFIER

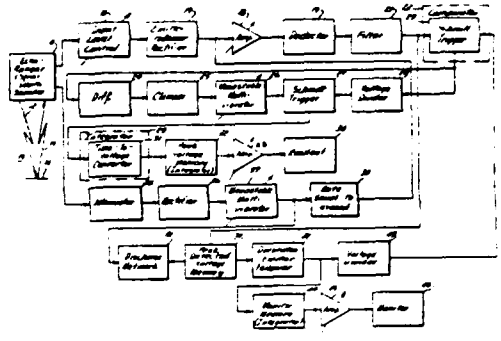
William C. Stanley, Panama City, William G. Harris, Jr., Titusville, and Edward G. McLeroy, Jr., Panama City, Fla., assignors to the United States of America as represented by the Secretary of the Navy

Filed Dec. 16, 1968, Ser. No. 783,898
Int. Cl. G01s *9/66*; G10k *11/00*; G01n *9/24*
U.S. Cl. 340—3 14 Claims

An acoustical sea floor analyzer system is herewith disclosed which uses a depth sounder to actively broadcast sonic pulses toward a sea floor and to receive the echoes therefrom which, in turn, constitute data signals that represent physical characteristics thereof. Said data signals are then processed to ascertain the extent to which they were elongated relative to a predetermined reference parameter by their impact on and volume reflection from the sea floor being sensed, and the measured elongation thereof is read out in terms of floor softness.

Keywords: Seabed property measurement; Sonar, depth sounder

U.S. Cl. X.R. 73-67.7; 181-.5



NOVEMBER 18, 1969

3,478,444

OCEAN CURRENT AND WAVE GENERATOR

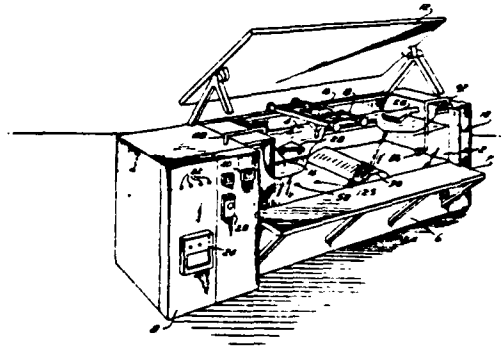
Carlton E. Presnell, Pasadena, and Guido Z. Zemgals, San Gabriel, Calif., assignors by mesne assignments, to the United States of America

Filed Nov. 28, 1967, Ser. No. 686,231
Int. Cl. G09b *23/06*; G01m *9/00*
U.S. Cl. 35—19 10 Claims

This invention provides means for readily studying and demonstrating wave, current, and wind action on and in a body of water, which were lacking in the prior art. Such means are provided in the form of a liquid filled glass fronted tank containing a plenum chamber which is connected to a pneumatic compressor and valving system to generate wave action in the liquid. Additional compressors and a pump, together with connecting ducts and plumbing, are provided to generate wind, tide and current effects. Models of marine structures and/or natural formations may be locked in the tank magnetically for studies and demonstrations. Means for introducing particles and/or dyes into thte tank are provided for demonstrating currents, aggredation and degradation of the ocean floor, and mass transport, as of sand and other materials. The tank may be expanded and/or the bottom surface contour altered readily by the use of the models.

Keywords: Wave flume; Wave generator

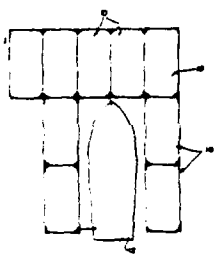
U.S. Cl. X.R. 73-148



3,478,710
FLOATING DOCK STRUCTURE
Jack W. Bethurem, Rock Island, Ill.
(7146 Sugarbin St., Orlando, Fla. 32807)
Filed July 31, 1968, Ser. No. 749,061
Int. Cl. B63c 1/02
U.S. Cl. 114—.5 10 Claims

A floating concrete dock is formed by connecting a number of identical, hollow, box-like concrete structures in the desired pattern. The individual structures are formed by providing a rigid welded steel frame having rectangular top, bottom and sides, securing panels to the frame interior to form a core, placing reinforcing wire around the core, and pouring high density concrete around the core, while utilizing the frame elements as the concrete forms.

Keywords: Concrete form; Pier, floating; Small-craft pier

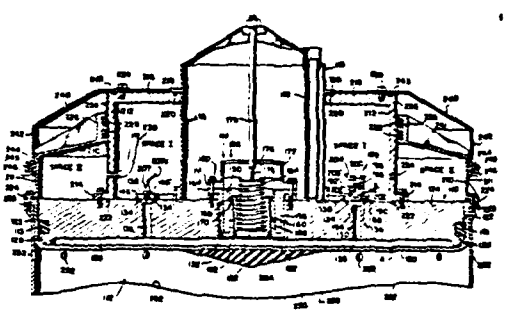


3,478,838
GAS EXPLODER SEISMIC SOURCE WITH CAVITATION EROSION PROTECTION
Lauren G. Kilmer, Tulsa, Okla., assignor to Sinclair Oil Corporation, a corporation of New York
Filed Sept. 13, 1968, Ser. No. 759,675
Int. Cl. G01v 1/00; G10k 11/00
U.S. Cl. 181—.5 17 Claims

A seismic prospecting device comprising a gas exploder adapted for underwater use including an expansible explosion chamber having a rigid top and a rigid bottom connected together by an extensible sidewall and resilient fastening means including air cushion spring means arranged above the chamber for attaching the top and bottom together and for normally biasing the top and bottom together, resilient sealing means inside of the joint formed between the top and bottom, gas charging and ignition means for the chamber, exhaust means for the chamber, bubble cap means including cap sealing means above the air cushion spring means to protect it against cavitation erosion, and cavitation erosion shield means on the underneath side of the rigid bottom.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 340-7

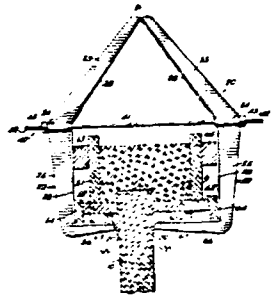


3,479,000
CLAMPS
Robert P. Powell, P.O. Box 281,
Fort Lauderdale, Fla. 33302
Filed Nov. 24, 1967, Ser. No. 685,442
Int. Cl. E04g 17/00; B25b 5/14
U.S. Cl. 249—219 1 Claim

The disclosure comprises a hinged clamp which may be positioned in series on a sea-wall to provide supports for forms into which a concrete cap for the sea-wall may be poured. After the setting of the cap and removal of the forms, the clamps in series may be disengaged and relocated for further operations.

Keywords: Concrete form; Seawall

U.S. Cl. X.R. 52-127; 61-49; 249-19; 269-237

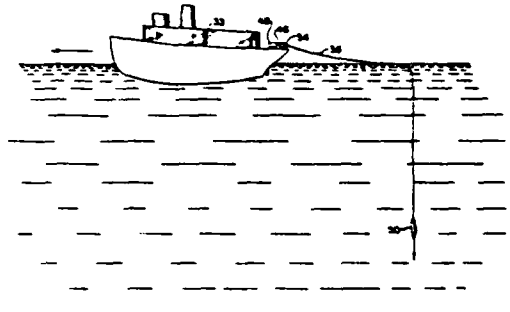


3,479,580
APPARATUS INCLUDING A CONDUCTIVITY PROBE FOR DETERMINING THE SALINITY OF WATER
Hoyt Clarke Hottel, Jr., Marion, Mass., assignor, by mesne assignments, to The Buzzards Corporation, Marion, Mass., a corporation of Massachusetts
Filed Apr. 22, 1965, Ser. No. 450,147
Int. Cl. G01v 3/02
U.S. Cl. 324—1 1 Claim

An apparatus for the determination of the salinity of a body of water including recording and measuring equipment aboard a vessel and a probe containing a sensing device, the probe being launched from the vessel into the water and penetrates the sea to various depths and measures the conductivity of the sea water on a confined path and communicates with the shipboard equipment through a single wire or through a plurality of wires, the probe itself being in electrical contact with the sea water.

Keywords: Instrument deployment; Salinity measurement

U.S. Cl. X.R. 324-30



3,479,638

BEAMFORMING IN SEISMIC SURVEYING

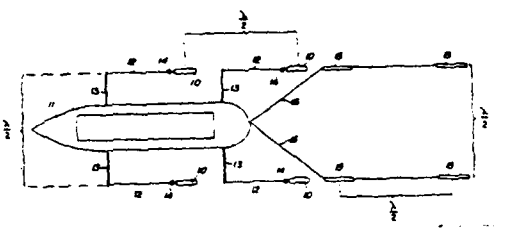
Gene A. Rusnak, Mountain View, Calif., assignor to the United States of America as represented by the Secretary of the Interior

Filed July 29, 1968, Ser. No. 748,394
Int. Cl. H04b 13/00
U.S. Cl. 340—7 8 Claims

Signal strength and resolution in seismic surveying are enhanced while side reflections and energy requirements are reduced by employing a plurality of acoustic sources spaced at even half wave lengths of the desired frequency response.

Keywords: Seismic acoustic transmitter array; Seismic explosive acoustic transmitter; Seismic survey method

U.S. Cl. X.R. 340-15.5



NOVEMBER 25, 1969

3,479,824

SEAWALL AND FENCE CONSTRUCTION

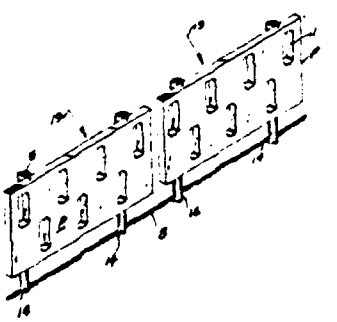
Cecil F. Schaaf, G-2126 E. Coldwater Road 48505, and Walter Macciomei, 5615 Marlowe Drive 48504, both of Flint, Mich.

Filed Sept. 18, 1967, Ser. No. 668,439
Int. Cl. E02b 3/06; E01f 7/00; E04b 17/16
U.S. Cl. 61—3 2 Claims

This invention relates to precast seawalls and concrete fence constructions in which panels are swingingly mounted on posts anchored in a lake bottom or on dry land and on which the panels are swingingly mounted to swing during storms, heavy winds, and other severe weather conditions to break the winds and waves to control the shifting of sand and make for quieter and more calm water flowing through and past the panels. Whereas the mounted panels are subjected to a swinging action in stormy weather, it is also true that the structure using this same construction can be utilized as a fence which can be erected on land adjacent the shore line and will break up heavy winds in the open or in a passageway without damage to the fence or the immediate area.

Keywords: Breakwater, concrete; Low-cost shore protection; Sand fence

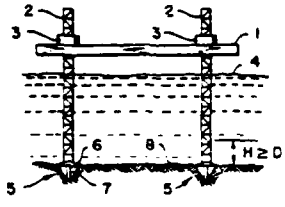
U.S. Cl. X.R. 61-4; 256-12.5



3,479,828
PLATFORM LEG
Rafael Fernández Luque, Rijswijk, Netherlands, assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware
Filed Mar. 20, 1968, Ser. No. 714,657
Claims priority, application Great Britain, Apr. 28, 1967, 19,618/67
Int. Cl. E02b *17/02*; B63b *35/44*
U.S. Cl. 61—46.5 8 Claims

A leg for supporting a structure, such as an offshore drilling platform, on a marine bottom, said leg including an upstanding framework terminating at its lower end in a foot member, said foot member being of a design that diminishes the turbulence resulting from water current flow in the vicinity of the leg where the framework is connected to the foot member thereby reducing scour of the marine bottom.

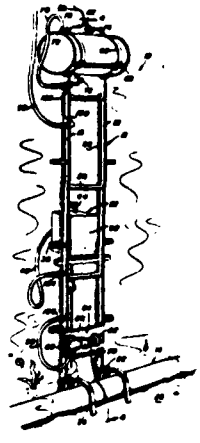
Keywords: Offshore platform, jack up; Offshore platform, leg; Seabed foundation; Seabed scour protection
U.S. Cl. X.R. 37-73; 61-53



3,479,830
ANCHORING MACHINE
Adam R. Ostarly, New Orleans, La., assignor to Global Divers and Contractors, Inc., a corporation of Louisiana
Filed Apr. 20, 1967, Ser. No. 632,254
Int. Cl. E02d *5/74*; B63b *21/26, 35/04*
U.S. Cl. 61—72.3 17 Claims

The anchoring of pipe line lying on the floor of the ocean by driving a screw anchor into the floor bed and tying its upper end to the pipeline before the anchor is further driven below the mud line. Apparatus for driving the anchor is floated to a location above the pipeline and pulled down to the bottom surface so as to drive the anchor into the bed adjacent to the pipeline.

Keywords: Embedment anchor; Seabed pipeline placement
U.S. Cl. X.R. 52-155; 61-63; 114-206



3,480,101

SEISMIC WAVE SOURCE USING EXPLOSIVE GAS IN AN EXPANSIBLE ENCLOSURE

Adelbert Barry, Franklin L. Chalmers, and John B. Pearson, Houston, Tex., assignors to Esso Production Research Company, a corporation of Delaware

Continuation-in-part of application Ser. No. 614,307, Feb. 6, 1967. This application June 5, 1967, Ser. No. 653,284

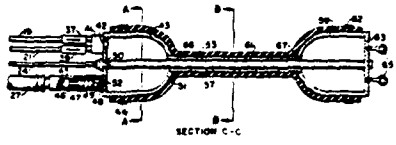
Int. Cl. G10k *11/00*; G01v *1/00, 1/10*

U.S. Cl. 181—.5 40 Claims

A marine seismic wave source includes an enclosure for combustible gas including a plurality of elongated tubular members a flexible, expansible elastomer around the tubular members, means for introducing a combustible gaseous mixture into the enclosure and for igniting the mixture. When the device is towed through the water after production of a seismic pulse after igniting the gaseous mixture, the gaseous combustion products and the components of the enclosure are rapidly cooled by water passing through the tubular members. The source may further include an exhaust conduit extending from the enclosure to the water surface and a check valve therein for permitting gaseous flow only from the enclosure to the earth's surface. Preferably, the movable member of the check valve has high inertia and comprises a spring-biased movable valve member seating on a valve seat.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 340-12



3,480,907

NEUTRALLY BUOYANT HYDROPHONE STREAMER

Joel D. King, Mesquite, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed Dec. 29, 1967, Ser. No. 694,532

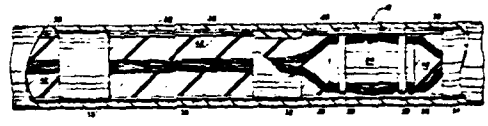
Int. Cl. H04b *13/00*

U.S. Cl. 340—9 13 Claims

An elongated hollow jacket towable underwater by a marine vessel includes a plurality of hydrophones spaced along the interior thereof. Solid polymeric material having a plurality of discrete air-filled particles distributed throughout fills all remaining space within the hollow jacket to provide a uniform cross-sectional hydrophone streamer having a specific gravity approximating the specific gravity of the surrounding water. The hydrophone streamer is thus neutrally buoyant and may be towed underwater at a selected depth without the requirement of exterior floats or weights.

Keywords: Seismic streamer cable; Towed body depth control

U.S. Cl. X.R. 114-235



DECEMBER 2, 1969

3,481,426

SEISMIC WAVE SOURCE FOR MARINE PROSPECTING

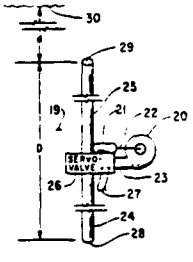
Daniel Silverman, Tulsa, Okla., assignor to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware

Filed June 4, 1968, Ser. No. 734,288
Int. Cl. G01v *1/38*
U.S. Cl. 181—.5 **11 Claims**

A seismic-wave source for prospecting in water-covered areas diverts a high-velocity water stream flowing in a first conduit alternately between a second and a third conduit having their respective outlets spaced a half water wave-length apart in the direction of desired wave transmission, to produce a train of pressure pulses in the water forming a constant- or a variable-frequency signal. Alternatively, the third conduit may open into a compliant energy-storage chamber, preferably tuned to the desired signal frequency.

Keywords: Seismic hydraulic acoustic transmitter

U.S. Cl. X.R. 340-12



DECEMBER 9, 1969

3,482,408

TELESCOPED CAISSON

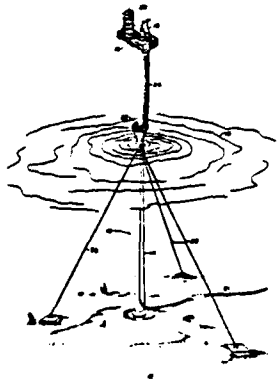
William F. Manning, Dallas, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Original application Sept. 2, 1966, Ser. No. 577,040, now Patent No. 3,426,859, dated Feb. 11, 1969. Divided and this application Mar. 29, 1968, Ser. No. 737,259
Int. Cl. E02d *5/52*; E02b *17/00*; E21b *7/12*
U.S. Cl. 61—46 **3 Claims**

This specification discloses apparatus for drilling and completing an offshore well above the surface of a body of relatively shallow water. A two-piece well protector is utilized, the well protector comprising lower pile and upper caisson sections. The lower pile section is first driven into the formation underlying the marine bottom with one of the recently developed underwater pile drivers. The caisson section is then lowered into the water and stabbed into or over the pile section and grout is injected therebetween to form the composite well protector.

Keywords: Offshore caisson; Offshore construction; Offshore platform, fixed; Pile, structure connection

U.S. Cl. X.R. 166-.5; 166-.6



3,482,646

MARINE VIBRATOR DEVICES

Graydon L. Brown and Delbert W. Fair, Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla., a corporation of Delaware

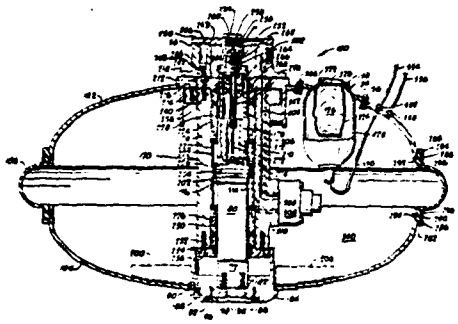
Continuation-in-part of application Ser. No. 607,551, Jan. 5, 1967. This application Dec. 13, 1967, Ser. No. 690,330

Int. Cl. G10k *11/00*; G01v *1/00*

U.S. Cl. 181—.5 3 Claims

An improved apparatus for the generation of seismic energy waves within a water medium, the apparatus consisting of a remotely actuatable drive means which is secured between upper and lower housing shells to impart reciprocal motion therebetween in predetermined manner. A flexible sealing means is disposed around the outer periphery and sealingly connected between the first and second housing shells, and means are provided for sampling and adjusting the internal air pressure within the housing shells.

Keywords: Seismic vibratory acoustic transmitter



DECEMBER 16, 1969

3,483,707

METHOD FOR REINFORCING STEEL PIPE PILING IN SITU AND THE RESULTANT PILING

Homayoun Joe Meheen, 6464 W. 14th Ave., Denver, Colo. 80214

Filed Mar. 11, 1968, Ser. No. 712,187

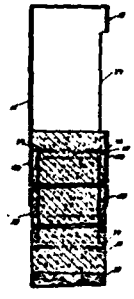
Int. Cl. E02d *5/40, 5/58*; E04c *3/34*

U.S. Cl. 61—46 7 Claims

Reinforcement for steel pipe piles, such as those supporting off-shore oil platforms, which have deteriorated and lost their strength. The pile is reinforced in situ, by cutting an access opening into its interior and introducing a partially prestressed and partially reinforced concrete pile inside the steel shell.

Keywords: Concrete form; Offshore construction; Pile, concrete; Pile, steel; Structure repair

U.S. Cl. X.R. 52-302; 52-724; 61-46.5; 61-53; 61-53.62; 61-54



3,483,708

METHOD OF ANCHORING MARINE STRUCTURES

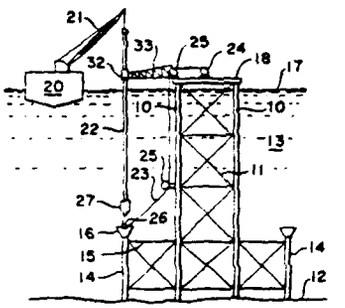
Peter W. Marshall, New Orleans, La., assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware

Filed Dec. 28, 1967, Ser. No. 694,243
Int. Cl. E02b 17/00; E21b 43/01, 7/12
U.S. Cl. 61—46.5 11 Claims

A method of installing a marine structure offshore wherein a marine structure with pile guides carried on the lower end is positioned on the floor of a body of water and a pile is lowered into axial alignment with one of the guides by pulling the lower end of the pile from a point on the guide; after which the pile is driven into the water floor through the guide to thereby anchor the structure.

Keywords: Offshore construction; Offshore platform, fixed; Pile placement; Seabed foundation

U.S. Cl. X.R. 52-745; 61-53.5; 166-6; 175-7



DECEMBER 23, 1969

3,485,050

MARINE STRUCTURES

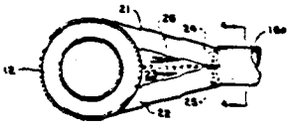
William M. Martinovich, San Francisco, Calif., assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware and Earl and Wright, San Francisco, Calif., a corporation of California, as tenants in common

Filed Oct. 12, 1967, Ser. No. 674,909
Int. Cl. E02b 17/00; E04b 12/10; E04c 3/32
U.S. Cl. 61—46 9 Claims

A marine structure or offshore "platform" having large diameter legs and interconnecting cross-bracing members of smaller diameter in which the cross-bracing members are provided with bifurcated ends forming spread-apart arms that are connected to the edges of the legs. The resultant structure smoothly transfers the loading from the cross-bracing to the legs while minimizing stress concentrations which tend to cause the legs to collapse or radially deform.

Keywords: Offshore platform, leg

U.S. Cl. X.R. 52-665; 52-693; 52-695; 52-697; 287-54; 287-189.36

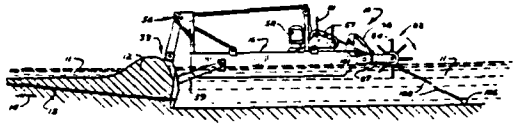


3,486,253
FLOATING EARTHMOVING APPARATUS
Morris J. Bruggeman, c/o Bruggeman Construction, Milaca, Minn. 56353
Filed Dec. 6, 1965, Ser. No. 511,810
Int. Cl. E02f 3/76; B63h 5/02
U.S. Cl. 37—54 11 Claims

An earthmoving machine having a transverse scraper blade pivotally connected to a flotation unit by a pair of arms extended adjacent the sides of the unit. A lift mechanism mounted on the flotation unit and connected to the top of the blade operates to control the elevation of the blade. The machine is propelled by water wheels secured to the rear of the flotation unit. During an excavating operation, the machine is propelled forward by a power unit separated from the flotation unit and connected to the blade by a cable.

Keywords: Seabed grader

U.S. Cl. X.R. 37-115; 115-54; 172-808

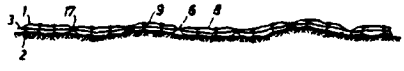


3,486,341
FORM FOR CONCRETE OR THE LIKE
Karl Huesker-Stiewe, Haupstr. 30, Gescher, Germany, and Otto Wagner, Taubenstr. 26, Dinslaken, Germany
Filed Oct. 11, 1966, Ser. No. 586,612
Claims priority, application Germany, Oct. 11, 1965, H 57,386; Sept. 16, 1966, H 60,523
Int. Cl. E02b 3/12; E04g 11/00
U.S. Cl. 61—38 14 Claims

A form for concrete or like hardenable material including an envelope of flexible sheet material adapted to be filled with a mass of hardenable material. The overlapping sheets of the envelope are directly connected by a plurality of seams so as to subdivide the interior of the envelope into a plurality of compartments and tie members provided in the compartments limit the expansion of the envelope during filling of the compartments with hardenable material. At least some of the seams are interrupted to provide openings communicating with the respective compartments through which the hardenable material may flow during filling of the compartments.

Keywords: Concrete form; Fabric mat; Seabed scour protection; Slope protection

U.S. Cl. X.R. 52-173; 249-10; 249-117



3,486,342

PILE MOORING BUMPER

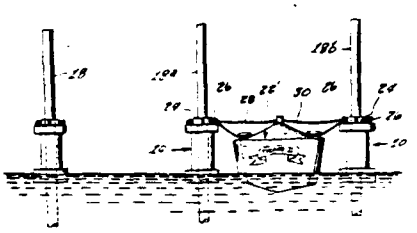
Stanleigh W. Aks, 3660 Ocean Ave., Seaford Harbor, N.Y. 11783

Filed Apr. 22, 1968, Ser. No. 723,092
Int. Cl. E02b 3/20; E02d 27/12
U.S. Cl. 61—46 6 Claims

A mooring bumper device having a floatable base floating on the water surface and loosely surrounding a mooring pile for up and down movement thereon under the action of tide and wind. The bumper device has an axial opening through which the mooring pile extends and the upper terminal end of the bumper device is flat and horizontal. A metal hitch ring provided with a plurality of eyes to one or more of which a boat mooring line is attached is freely seated on the flat upper end of the bumper device in surrounding relation to the mooring pile providing relative rotation between the bumper device and the hitch ring. The eyes on the hitch ring lie inwardly of the peripheral edge of the flat upper end of the bumper device.

Keywords: Pile protection; Small-craft mooring device

U.S. Cl. X.R. 61-48; 114-220; 114-230



3,486,343

PLATFORM FOR DRILLING WELLS AT WATER LOCATIONS

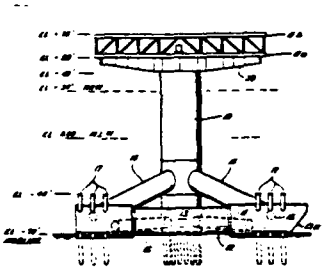
Robert G. Gibson, Mbeya, Tanzania, and Delbert B. Johnson, John G. Mackin, Jr., and James C. Stras, Houston, Tex., assignors to Brown & Root, Inc., Houston, Tex.

Filed Sept. 15, 1966, Ser. No. 579,662
Int. Cl. E02b 17/02; E04b 1/34; E04c 3/36
U.S. Cl. 61—46.5 6 Claims

A drilling platform is disclosed that is adapted to be floated to and sunk at an offshore location. The platform includes two spaced-apart pontoons at the base for floating it to an offshore location and for engaging the ocean floor when the platform is sunk. An upright central column composed of spaced-apart concentric shells is located between the pontoons to extend above the surface of the water when the platform is sunk. The column is supported between the pontoons by diagonal braces, which are connected between the column and the pontoons so as to be completely below expected ice floes when the platform is sunk. An X-shaped truss support is located on the top of the column for supporting an operations deck. The pontoons include separate water compartments, which may be filled with water to adjust the orientation of the platform as it floats or to sink the platform until the pontoons are seated on the ocean floor. The ends of the pontoons are connected by cross braces, which are positioned with their longitudinal axes above the longitudinal axes of the pontoons sufficiently for the braces to be above the surface of the water when the pontoons are floating. When the platform is sunk, piles are passed through openings in the end of the pontoons into the bottom to secure the structure against lateral movement on the ocean bottom. One or more surface holes are drilled into the ground below the platform through the center column. Surface casing is placed in the holes and cemented to the ground and to the center column. Thereafter, any increase in the vertical load of the platform is transferred to the ground through the surface casing, rather than through the pontoons.

Keywords: Offshore platform, fixed

U.S. Cl. X.R. 52-73; 52-721



3,486,570

ALLUVIAL PROSPECTING UNITS

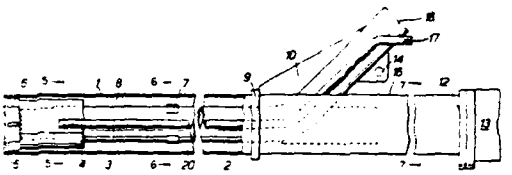
Henry John Richardson, Basildon, England, assignor, by mesne assignments, to Alluvial Mining and Shaft Sinking Company Limited, London, England, a British corporation

Filed May 15, 1967, Ser. No. 638,489
Int. Cl. E21b *15/02*
U.S. Cl. 175—5 6 Claims

An alluvial prospecting unit for use with a vessel rising and falling with the swell comprises an outer casing driven into an underwater layer and a production pipe movable longitudinally within the outer casing and having its lower end open to receive the spoil. The production pipe is directly supported from the vessel and movable therewith while a lost motion connection exists between the pipe and the outer casing. Air or water is supplied under pressure to the lower end of the production pipe to provide an air lift or jet pump action to lift the spoil through pipes to the vessel.

Keywords: Dredge, suction; Dredge intake; Pump; Sampler, seabed-driven core

U.S. Cl. X.R. 175-60



3,487,228

POWER GENERATING SYSTEM

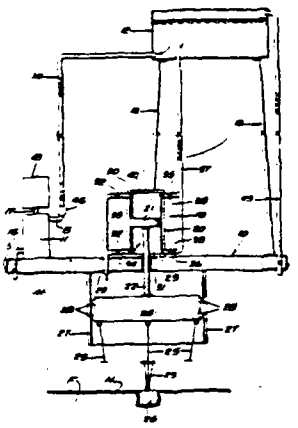
Bernard Kriegel, Los Angeles, Calif., assignor of one-tenth each to Jean K. Lamphere and Archer W. Kammerer, Jr., and three-tenths to Archer W. Kammerer, all of Fullerton, Calif.

Filed Apr. 17, 1967, Ser. No. 631,519
Int. Cl. H02p *9/04*, H02k *7/18*
U.S. Cl. 290—52 11 Claims

Power generating system in which vertical motion of an offshore floating oil well drilling vessel, or other floating device, operates one or more pumps that elevate water to an overhead storage reservoir from which a continuous supply of water is directed to a hydraulic turbine therebelow coupled to an electric generator to rotate the same.

Keywords: Electrical generator; Offshore platform, floating; Power, wave; Pump

U.S. Cl. X.R. 230-61; 230-67; 253-5; 253-10; 290-53



3,487,484
TUNED FLOATING BODIES

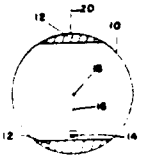
John F. Holmes, Andover, Mass., assignor to Sanders Associates, Inc., Nashua, N.H., a corporation of Delaware

Filed Sept. 5, 1967, Ser. No. 665,464
Int. Cl. B63b 39/00
U.S. Cl. 9—8 6 Claims

The invention disclosed herein relates to floating bodies and more particularly to a new and novel spherical body which is mechanically tuned such that it is decoupled from the motion of ocean waves. A tuning weight is disposed at the bottom of the body in order to provide a righting moment of a predetermined force.

Keywords: Buoy, instrumented; Buoy mooring system

U.S. Cl. X.R. 114-121



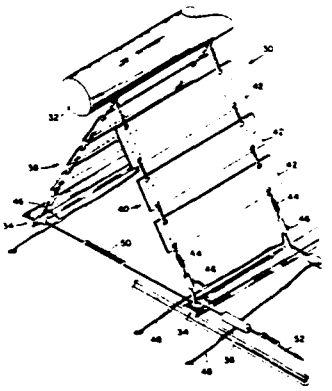
3,487,645
WAVE DAMPING DEVICE

Ernst G. Frankel, Boston, Mass., assignor to Litton Systems, Inc., Beverly Hills, Calif., a corporation of Maryland

Filed Aug. 21, 1968, Ser. No. 754,272
Int. Cl. E02b 3/04
U.S. Cl. 61—3 7 Claims

A wave damping device having a buoyant elongated body anchored by connecting lines to the bottom of a liquid container. A spring-damper device having operable adjusting means is arranged in the lines so that upon adjustment thereof the wave damping device can be tuned to the present ambient wave spectrum of the liquid, resulting in a most effective wave-filtering or liquid motion energy-absorption device.

Keywords: Breakwater, floating



3,488,783

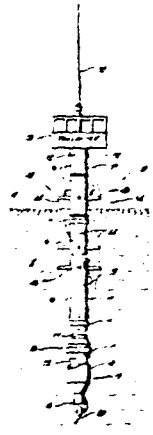
LONG SPAR BUOY

George S. Lockwood, Jr., Carmel Valley, Calif., assignor to Global Marine Inc., Los Angeles, Calif., a corporation of Delaware

Filed Jan. 12, 1968, Ser. No. 697,402
Int. Cl. B63b 21/52
U.S. Cl. 9—8 14 Claims

A long spar buoy adapted to float in a body of water in a substantially vertical attitude. At least a portion of the buoy adjacent the end thereof piercing the water surface is constructed of a flexible, non-metallic material. Stiffening means are provided to limit deflection of the body adjacent the water surface under lateral loads imposed on the buoy.

Keywords: Buoy, instrumented



3,488,963

SAND STABILIZATION MACHINE

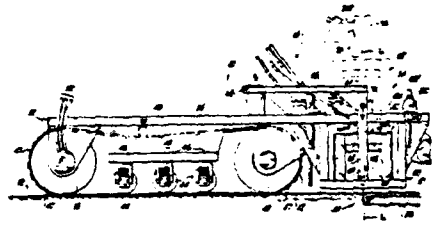
Walter R. Hnot, Mountainside, N.J., assignor to Esso Research and Engineering Company, a corporation of Delaware

Filed Nov. 22, 1967, Ser. No. 685,151
Int. Cl. E02b 3/04; A01c 23/02
U.S. Cl. 61—35 12 Claims

A mobile, self-propelled vehicle capable of traveling on a non-cohesive granular sea bed under the direction of a surface vessel varies a vibrating screen projecting into the sea bed. The vibrating screen is effective to fluidize the sea bed and at the same time inject a binder solution into the fluidized sea bed. The vibrating mechanism for driving the screen is adjustable to vary the motion pattern of the screen to provide optimum fluidization. The vibrating mechanism operates in a gas-filled submerged enclosure to reduce power losses to surrounding water.

Keywords: Seabed material placement; Seabed soil treatment

U.S Cl. X.R. 61-1; 61-63; 61-69; 61-72.3; 94-48; 111-7; 111-7.2; 172-699



3,488,964

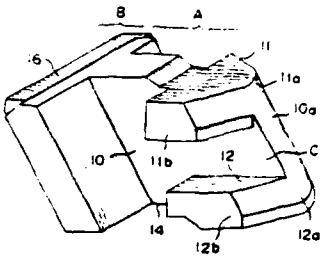
CONCRETE BLOCK

Tamotsu Kubo, Tokyo, Japan, assignor to Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 27, 1967, Ser. No. 685,925
Int. Cl. E02b 3/14
U.S. Cl. 61—37
2 Claims

A concrete block is provided for use in a wall embankment for dissipating the waves of a body of water. The block includes a vertical parallelepiped body member having two vertical flat surfaces on opposite sides of the block and front, near, top and bottom edges. The front edge inclines forwardly from top to bottom. The top edge includes an upwardly extending projection, and the bottom edge includes an inwardly projecting recess, the recess of one block mating with the projection of another block when formed as a wall. The rear edge has two square shaped revetment members positioned to extend perpendicularly to the flat surfaces of the body member. The two revetment members are arranged relative to each other such that their edges do not align in either the vertical or horizontal directions. These non-aligned edges of each block therefore interlock with similar non-aligned edges of blocks positioned above, below, or to either side. Upper and lower head pieces extend horizontally from the flat surfaces of the body member and have curved forward surfaces and flat, vertical side surfaces. This construction provides a space for dissipation of waves between the body member, the upper and lower head pieces and the revetment member.

Keywords: Concrete block; Low-cost shore protection; Revetment



3,488,967

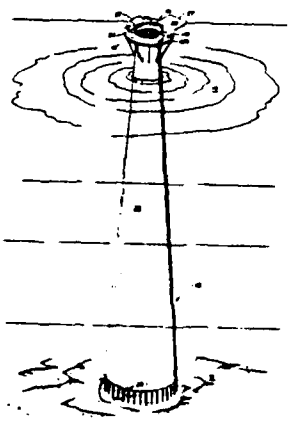
COMBINATION DEEP WATER STORAGE TANK AND DRILLING AND PRODUCTION PLATFORM

Mostafa Toossi, Dallas, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Filed Mar. 23, 1967, Ser. No. 625,387
Int. Cl. E02b 17/00; E21b 15/02
U.S. Cl. 61—46.5
51 Claims

This specification discloses a marine structure to be installed at a deep water site, the structure comprising a plurality of hollow tubes anchored in the formations underlying the marine bottom and extending upward to form the skeleton of the marine structure. A shell encloses and is secured to the support tubes to form a storage space therewithin, at least some of the tubes continuing to a drilling-production deck atop the structure and functioning as well conductor pipes for drilling wells therethrough into the formations underlying the marine bottom to produce fluid minerals from subaqueous deposits. The produced fluids are stored in the storage space formed within the marine structure between visits of a tanker.

Keywords: Grouting, Offshore construction; Offshore platform, fixed; Offshore storage tank, emergent; Pile, structure connection; Seabed foundation
U.S. Cl. X.R. 61-53; 114-12.1; 175-7; 220-1; 220-13



3,488,968
BOAT LANDING STAGES AND THE LIKE

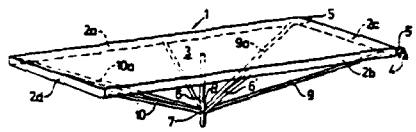
Sven Erik Julius Barkeling, Batsmansvagen 1, Danderyd, Sweden

Filed July 14, 1967, Ser. No. 653,528
Int. Cl. E02b 3/20; E04b 7/16
U.S. Cl. 61—48 6 Claims

The present invention relates to a landing stage which may be used by boats, small sea and river crafts, for instance. The front end of such a stage is carried by a support structure, resting on the sea or river bed while the rear end of the stage is removably anchored to the foreshore. The landing stage is, furthermore, provided with a framework presenting a deck in the form of planks, a plate or the like. The framework is either anchored to the foreshore direct or via coupling means, in a manner known per se. According to the invention there is a supporting structure comprising at least two stays which are secured to the frame in spaced relationship, in a plane perpendicular to the longitudinal direction of the landing stage, said stays cooperating with supporting elements extending from the lower portion of the stays towards the fastening point of the framework.

Keywords: Pier, fixed; Small-craft pier

U.S. Cl. X.R. 52-73



3,489,012
WATER SAMPLER DEVICE

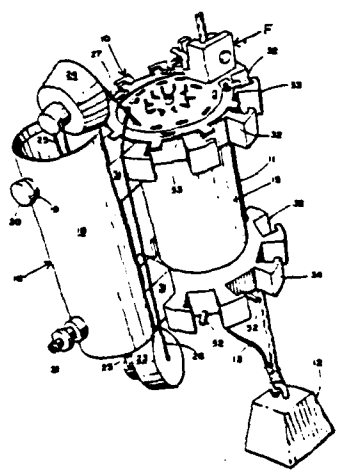
Shale J. Niskin, 9400 SW. 63rd Court, Miami, Fla. 33156

Filed July 17, 1967, Ser. No. 653,768
Int. Cl. G01n 1/10; F16h 5/40
U.S. Cl. 73—425.4 2 Claims

A cylindrical holder holding a plurality of removably mounted open ended bottles is lowered in an ocean or sea to obtain water samples. Each of the bottles has two plugs positioned adjacent the open ends of the bottle and prevented from sealing the open ends by a lanyard. As the holder is lowered an electrical tripping mechanism releases a lanyard at the desired depth, permitting the plugs to seal the ends of the bottle and trapping the water contained therein.

Keywords: Sampler, water

U.S. Cl. X.R. 24-123; 74-2



3,489,229

APPARATUS FOR DRIVING IN PILES, PLANKS AND THE LIKE

Philipp Uebel and Helmut Heckner, Munich, Germany, assignors to Wacker-Werke KG., Munich, Germany

Filed May 28, 1968, Ser. No. 732,777
Claims priority, application Germany, June 2, 1967, W 44,096
Int. Cl. B25d 9/04, 17/06, 17/24
U.S. Cl. 173—131 2 Claims

Pile or plank driving apparatus comprising a manually guided rapidly beating tamping device which employes a ram block in lieu of a tamping plate and includes guide means associated with the ram block and a guide head movably connected with the guide means and a ram bolt associated with a beating die with which it is connected in force transmitting fashion and which is displaceably mounted relative to the guide head.

Keywords: Pile driver, impact

3,489,995

PRESSURE TRANSDUCER

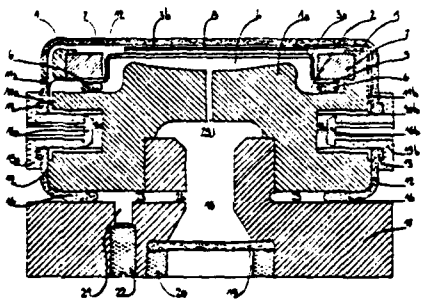
Jean Laurent, Germain-en-Laye, France, assignor to Institut Francais du Petrole, des Carburants et Lubrifiants, Rueil Malmaison, Hauts-de-Seine, France

Filed May 9, 1968, Ser. No. 727,953
Claims priority, application France, May 16, 1967, 106,637; Nov. 14, 1967, 128,199; Mar. 26, 1968, 145,515
Int. Cl. H04r 7/12, 17/00
U.S. Cl. 340—14 16 Claims

The present disclosure is directed to a pressure transducer of small dimensions and high sensitivity for picking up pressure waves, particularly pressure waves produced in a body of water. The pressure transducer of the present disclosure is composed of elements which can be readily changed when necessary, thereby saving time and reducing cost.

Keywords: Seismic hydrophone

U.S. Cl. X.R. 340-10



3,489,996

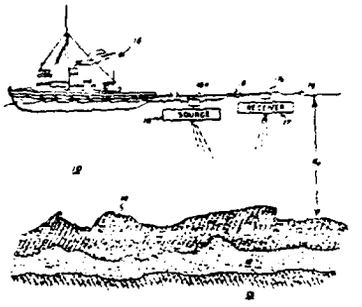
SIGNAL PROCESSING SYSTEM

Warren D. Moon and Richard J. Weiner, Norwood, Mass., assignors to Real Time Geophysics, Inc., Norwood, Mass., a corporation of Massachusetts

Filed July 29, 1968, Ser. No. 748,314
Int. Cl. G01v 1/16
U.S. Cl. 340—15.5 9 Claims

A signal processing system for processing an input signal which includes a primary information, or message, signal and one or more periodically repetitive forms of said primary signal. The signal processing system which is particularly useful in processing marine seismic signals includes a unique combination of analogue and digital computation means for producing an output signal in which distortion effects produced by the presence of such repetitive forms are eliminated.

Keywords: Seismic record processor



JANUARY 20, 1970

3,490,157

SUCTION PIPE HANDLING EQUIPMENT FOR A SUCTION DREDGER

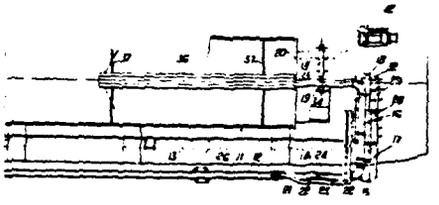
James Venus, North Devon, England, assignor to Appledore Shipbuilders Limited, North Devon, and Penfolds Engineering & Construction Limited, Barnham, Bognor Regis, Sussex, England, both British companies

Filed June 19, 1967, Ser. No. 646,881
Claims priority, application Great Britain, June 20, 1966, 27,537/66
Int. Cl. E02f 5/28, 3/88; B11e 5/02
U.S. Cl. 37—72 11 Claims

A suction dredger in which the suction pipe, which extends generally fore and aft, is hinged for folding, and when folded is carried by two gantries forward and amidships which travel athwartships on rails to transport the pipe between an inboard stowed position and an outboard position where the pipe is over the side of the vessel. In the outboard position, the pipe can be unfolded and the aft end, which is provided with a dredging head, lowered beneath the water, the dredging head end of the unfolded pipe being raised and lowered by a non-travelling luffing derrick located aft. The forward end of the pipe is coupled by a flexible pipe length and a swivel elbow to a transverse pipe extending athwartships to an inboard location where its inboard end is connected by a second non-swivel elbow to a fore-and-aft delivery pipe. Both the transverse and delivery pipes travel with the suction pipe when it is transported athwartships on the gantries.

Keywords: Dredge, suction

U.S. Cl. X.R. 37-58; 104-162; 212-3; 212-14



3,490,239

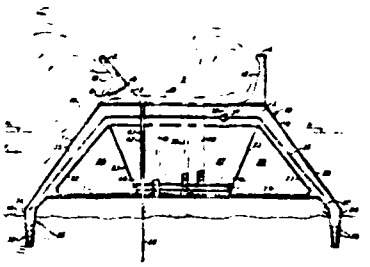
BREAKWATER STRUCTURE

Georges Vincent, Grenoble, Isere, France, assignor to Societe Grenobloise d'Etudes et d'Applications Hydrauliques (Sogreah), Grenoble, France, a corporation of France

Filed Sept. 13, 1968, Ser. No. 759,729
Claims priority, application France, Sept. 28, 1967, 5,173
Int. Cl. E02b *3/04*
U.S. Cl. 61—4 13 Claims

Two spaced walls exposed to wave attack are mounted on a breakwater having a sloping wall on the seaward side. The wall facing the open water forms a deflector and is constructed to divide the rising surge of water formed by a wave into two sheets, one of such sheets being deflected by such wall back to the open water, and the other sheet passing through such wall to the second wall which is constructed to throw such other sheet of water back onto the space between the two walls. The breakwater may be of any suitable construction, but preferably is mobile so that it can be moved from place to place. Such a mobile breakwater is disclosed herein as a caisson-like beam having means for temporarily anchoring it to the sea bottom.

Keywords: Breakwater, steel frame; Offshore caisson; Offshore construction; Seabed foundation



3,490,485

EFFLUENT DISPOSING SYSTEM

Frederick J. Munson, 19332 S. Mesa Drive, Villa Park, Calif. 92667

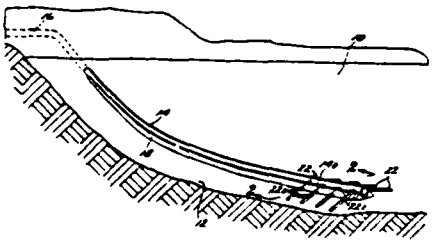
Filed Aug. 11, 1967, Ser. No. 659,963
Int. Cl. E03f *1/00, 3/04;* F16l *9/00*
U.S. Cl. 137—236 4 Claims

This invention pertains to systems for disposing of sewage into large bodies of water such as the oceans. It comprises a long outfall which extends from a sewage processing plant into the ocean. The extended end portion of the outfall is formed with orifices for discharging the effluent into diffusers aligned with such orifices.

The diffusers are spaced a predetermined distance from the orifices to entrain sea water with the effluent as it is forced under pressure into the diffusers. The diffusers are formed with diffuser openings for letting the sewage and intermixed sea water seep into the ocean for dissipation therein with normal ocean currents.

Keywords: Seabed water, process structure

U.S. Cl. X.R. 137-604



3,490,550

VIBRATORY CORING APPARATUS

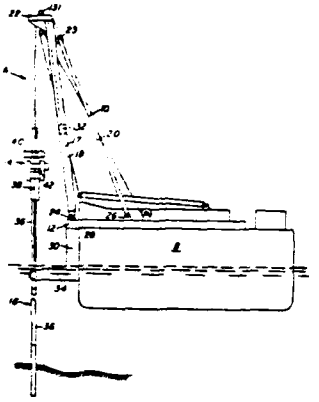
Edward E. Horton, Portuguese Bend, Calif., assignor to Ocean Science and Engineering, Inc., Washington, D.C., a corporation of Delaware

Filed July 14, 1967, Ser. No. 653,446
Int. Cl. E21b *1/10, 7/12, 15/02*
U.S. Cl. 175—5 9 Claims

A vessel-mounted apparatus for taking samples of alluvial materials from below water locations wherein a hydraulically operated clamping and vibrating assembly is supported by cables intermediate the length of a drill string together with a winch assembly having a cable connected to the upper end of the drill pipe for compensating for vessel movements.

Keywords: Sampler, seabed-drilled core

U.S. Cl. X.R. 175-60; 175-85; 175-213; 175-246; 175-293



3,491,023

PROCESS FOR CONTAINMENT AND DEFLECTION OF AQUEOUS SURFACE POLLUTANTS

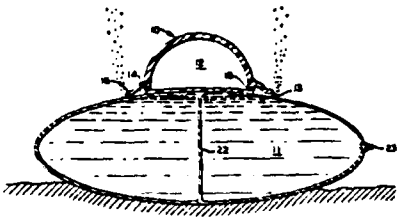
Frank McCormick, Stamford, Conn., assignor to Submersible Systems, Inc., Stamford, Conn., a corporation of Connecticut

Filed Dec. 1, 1967, Ser. No. 687,349
Int. Cl. B01d *35/02, 23/00*
U.S. Cl. 210—83 10 Claims

A method for containment and deflection of inorganic and organic aqueous surface pollutants such as an oil slick, flotsam, debris and jellyfish and apparatus for the operation of such method are disclosed. This method comprises the generation of an air or bubble barrier which permits the passage therethrough of surface vessels and large fish but halts the movement of floating surface pollutants by the creation of a flexible continuous band of surface turbulence. The system in one specific application is designed to protect harbor and beach areas and fishing grounds from contamination with oil from oil tankers and also acts as an "air wall" to keep harmful jellyfish from beach areas. The system can also be employed to recover oil from sunken or leaking tankers at sea by containment and collection of the oil released therefrom within the circumference of the bubble barrier wall created in a geometric pattern about the location of the stricken vessel.

Keywords: Pollutant collection; Pollutant, submerged barrier; Pollutant, surface barrier

U.S. Cl. X.R. 61-1; 61-6; 210-170; 210-242



3,491,287

SALINOMETER INCLUDING FIRST AND SECOND ORDER TEMPERATURE COMPENSATION AND THIRD COMPENSATION FOR VARIATIONS BETWEEN CONDUCTIVITY AND SALINITY

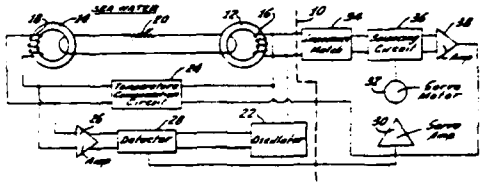
Neil L. Brown, El Cajon, Calif., assignor to The Blissett-Berman Corporation, Santa Monica, Calif., a corporation of California

Filed Apr. 14, 1967, Ser. No. 631,053
Int. Cl. G01r 11/44
U.S. Cl. 324—30 19 Claims

The present invention relates to a compensated salinometer which provides for an in situ measurement of the salinity of sea water by measuring the conductivity of the sea water and wherein the compensated salinometer of the present invention includes first order temperature compensating means for compensating for variations in the conductivity of the sea water with changes in the temperature of the sea water, second order temperature compensating means for compensating for errors in the first order temperature compensation with changes in the salinity of the sea water, and third compensating means for compensating for the variations in the ratio between conductivity and salinity of the sea water. The various compensating means described above are included in a closed loop circuit which is part of the measurement instrument of the present invention and the present invention also includes means for automatically balancing the closed loop to provide for a continuous indication of the salinity of the sea water in accordance with the automatic balancing of the closed loop.

Keywords: Salinity measurement

U.S. Cl. X.R. 324-99



JANUARY 27, 1970

3,491,842

APPARATUS FOR UNDERWATER DRILLING AND CORING LOOSE SEDIMENTS

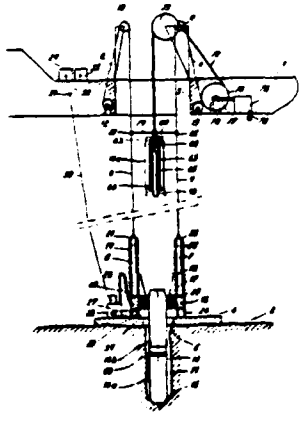
Jacques Delacour, Paris, André Castela, Mesnil le Roi, and Pierre Moulin, St.-Germain-en-Laye, France, assignors to Institut Francais du Petrole des Carburants et Lubrifiants, Rueil-Malmaison, Hauts-de-Seine, France

Filed May 6, 1968, Ser. No. 726,721
Claims priority, application France, May 8, 1967, 105,625
Int. Cl. E21b 7/12
U.S. Cl. 175—6 4 Claims

Apparatus for drilling cores at an underwater bottom with the core drill being inside a casing which prevents crumbling of the walls of the bore hole. Sections of the casing are connected or disconnected by rotary driven gripping means at the under bottom. The rotary driven gripping means can be driven up or down by an underwater drive means to insert or retract the casing. The core drill in the casing can be connected to the casing or disconnected therefrom.

Keywords: Sampler, seabed-drilled core

U.S. Cl. X.R. 175-7; 175-85; 175-171



3,491,848
WAVE GENERATOR ARRAYS FOR MARINE SEISMIC EXPLORATION

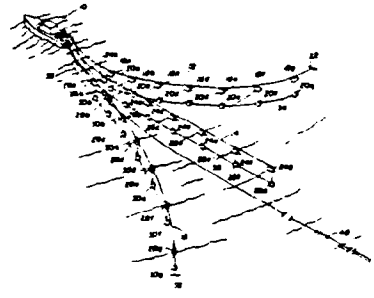
Ben F. Giles, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed Jan. 10, 1968, Ser. No. 696,861
Int. Cl. G01v *1/38*
U.S. Cl. 181—0.5 17 Claims

Seismic wave sources are streamed behind a marine vessel in a horizontal array such that horizontally traveling components of the generated seismic wave trains will be out of phase with one another when received by hydrophones streamed behind the marine vessel. The seismic wave sources are also streamed at depths proportional to the fundamental frequency of the generated seismic waves and are fired at different times such that vertically traveling components of the generated wave trains interact with one another in accordance with desired operating conditions.

Keywords: Seismic acoustic transmitter array; Seismic explosive acoustic transmitter; Seismic survey method; Towed body depth control

U.S. Cl. X.R. 340-7



FEBRUARY 3, 1970

3,492,822
TIDAL FLUSHING SYSTEM

Walter J. Josephs, 1924 Courtland Ave., Oakland, Calif. 94601

Filed Oct. 26, 1967, Ser. No. 678,440
Int. Cl. E02b *3/00*
U.S. Cl. 61—1 8 Claims

A system for the environmental improvement of a bay or similar body of water subject to tidal flow. The system includes a circulation channel extending along the periphery of the bay, with the channel having controllable gates, permitting selective ingress and egress of water to and from the channel. At high tide, for example, water may enter the channel adjacent the closed end of the bay, pass through the channel, and be discharged at the open end of the bay when the water level between the channel and this latter portion of the bay permits such egress. Conversely, water can be accumulated in the channel at high tide at the closed end of the bay and discharged through the same gates at the closed end of the bay at low tide.

In the first instance, improved circulation of the water in the bay will result, and in the second instance, build-up of sand or silt due to incoming tides are pushed back, and a harbor mouth, for example, may be kept open for shipping.

Keywords: Channel barrier; Tidal estuary water quality; Tidal inlet

3,492,826

RETAINING WALL STRUCTURE

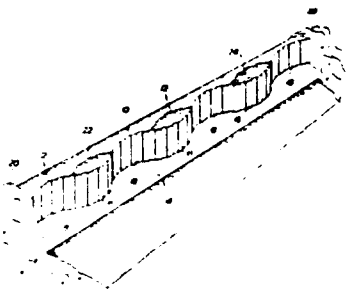
Eugene A. Horstketter, Elmer C. Gardner, and Constant R. Marks III, Houston, Tex., assignors to S.O.G. Research and Development Corporation, Houston, Tex., a corporation of Texas

Filed Feb. 28, 1968, Ser. No. 709,127
Int. Cl. E02b *3/12*; E02d *5/06, 27/16*
U.S. Cl. 61—49 12 Claims

This application discloses a sheet metal piling retaining wall structure and a method of construction. The retaining wall structure includes a continuous wall member, having no closures, and comprising arcuate wall sections alternately disposed to form a sinuous wall, and arcuate wall members disposed along one side of the continuous wall member to close alternate ones of said arcuate sections for forming regularly spaced cellular enclosures. The cellular enclosures are filled with an unconsolidated aggregate to provide vertical stability to the wall structure.

Keywords: Bulkhead; Cofferdam; Pile, sheet; Pile, steel

U.S. Cl. X.R. 52-169, 61-39; 61-52; 61-58



3,492,963

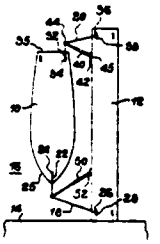
MOORING LINE STAND-OFF BARS

Charles W. Kaiser, 418 W. Shore Trail, Sparta, N.J. 07871

Filed Feb. 28, 1968, Ser. No. 709,104
Int. Cl. B63b *21/00*
U.S. Cl. 114—230 6 Claims

A mooring device for boats including a rigid stand-off bar projecting from a dock and intercepting a mooring line intermediate the ends thereof to preclude contact between a moored boat and the dock.

Keywords: Small-craft mooring device

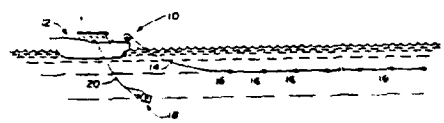


3,493,072
MARINE SEISMIC EXPLORATION ENERGY SOURCE
Roy Charles Johnston, Richardson, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware
Filed Dec. 29, 1967, Ser. No. 694,489
Int. Cl. G10k 11/00
U.S. Cl. 181—.5 14 Claims

Seismic energy for marine operations is generated by releasing pressurized gas from an underwater chamber in successively varying quantities to create air bubbles having varying fundamental frequencies. The chamber includes movable valve structure to control the quantity and the rate at which the pressurized gas is released.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 340-8; 340-17



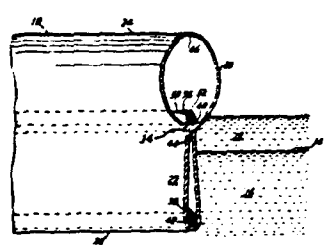
FEBRUARY 10, 1970

3,494,132
INFLATABLE FLOAT BOOM
Campbell F. Logan, 530 Goodwin St., Jacksonville, Fla. 32204
Filed Sept. 6, 1968, Ser. No. 757,849
Int. Cl. E02b 3/00, 3/04
U.S. Cl. 61—1 10 Claims

An inflatable float boom having a pair of elongated selectively inflatable tubes connected throughout their lengths by a joining web and a pair of elongated hollow members filled with particulate solids are disposed within respective tubes, such memoers being free to fall into the lower side portions of respective tubes. A separate gas valve is connected to each tube so that one tube can be inflated to float the boom on the surface of the liquid and the deflated tube functioning as a depending skirt therefore. A sleeve is provided between the end portions of the tubes to bridge the gap and to surround the releasable connectors therebetween.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-5



3,494,443

TOWBOAT SYSTEM FOR HANDLING ACOUSTIC SOURCE IN MARINE SEISMIC OPERATIONS

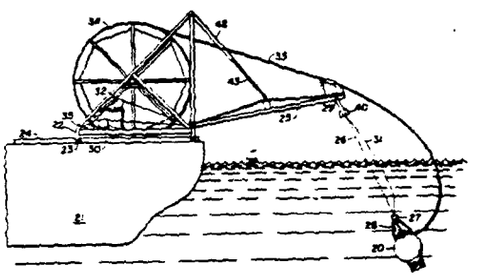
Donald F. Huffhines, Richardson, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Filed Feb. 29, 1968, Ser. No. 709,397
Int. Cl. G10k 11/00; G01v 1/00
U.S. Cl. 181—.5 7 Claims

The specification discloses a traveling carriage supporting a plurality of winches and a boom for handling a pneumatic acoustic source on a towboat in marine seismic operations. At the far end of the boom there is coupled a cradle which is employed for cradling the source when it is being lifted and raised from and into the water to prevent the source from swinging sideways. A large-diametered reel is mounted on the carriage for reeling in and out a fluid- and power-supply hose which extends to the pneumatic source. Air and other fluids are supplied to the hose through the reel. The winches are controlled by a hydraulic system driven from a common supply whereby all of the winches and the reel may be driven simultaneously to reel the cables and the hose concomitantly during raising and lowering operations.

Keywords: Seismic explosive acoustic transmitter; Tow winch control

U.S. Cl. X.R. 212-26; 212-74; 214-12; 214-13; 242-75.53; 340-7



3,494,849

ANCHORING DEVICE

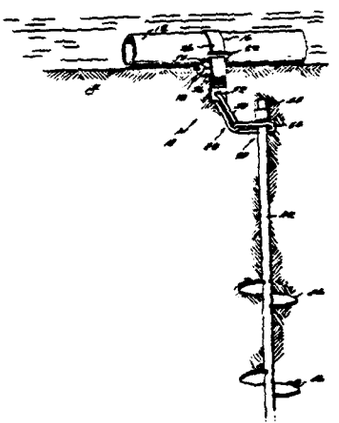
Owen B. Hess, Cambridge, Md., assignor to Cambridge Wire Cloth Company, Cambridge, Md., a corporation of Maryland

Filed Sept. 29, 1967, Ser. No. 671,817
Int. Cl. C23f 13/00; F16l 3/08
U.S. Cl. 204—197 16 Claims

An anchoring device comprising a strap with a female end fitting, a male end fitting, and a woven wire fabric therebetween; an anode appropriately secured to the strap preferably on the female fitting for retarding electrolytic corrosion; and an anchor secured to the strap preferably on the male end fitting, the device being adapted to anchor underwater pipeline.

Keywords: Cathodic protection; Corrosion prevention; Embedment anchor; Seabed pipeline placement

U.S. Cl. X.R. 174-6; 248-49; 248-74; 307-95

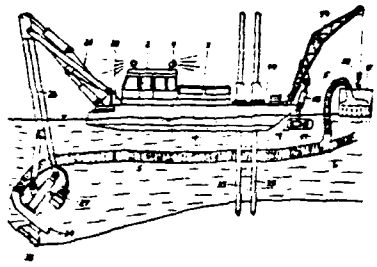


3,495,409
APPARATUS FOR BUILDING A RETAINING WALL ALONG A BANK OF A BODY OF WATER
Wilhelm Riedemann, Deichstrasse 5, Uetersen, Holstein, Germany
Filed July 10, 1967, Ser. No. 652,162
Claims priority, application Germany, Jan. 10, 1967, R 45,019
Int. Cl. E02b *3/00, 3/04*
U.S. Cl. 61—3 9 Claims

A dredge pump transported by a barge along a body of water, discharges dredged material into the space between a bank and a retaining wall built of blocks by a crane carried by the barge. During the preceding setting of the blocks by the crane, the discharge outlet means of the dredge pump is attached to each block, and water is pumped through passages in the blocks to wash away material at the bottom of the water so that the blocks can be set by the crane in a low position.

Keywords: Bulkhead; Dredge, cutterhead; Dredge pipe; Dredge propulsion; Offshore construction; Pump

U.S. Cl. X.R. 37-58; 61-37; 61-46; 61-49

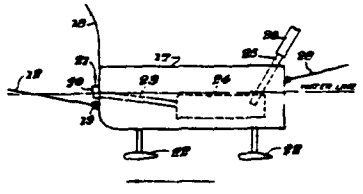


3,495,561
SALVAGE APPARATUS
George Joseph Trapp, 105 Aylward Road, Merton Park, London, SW. 20, England
Filed Apr. 10, 1968, Ser. No. 720,032
Claims priority, application Great Britain, Apr. 12, 1967, 16,687/67
Int. Cl. B63b *35/44*
U.S. Cl. 114—.5 5 Claims

Methods and apparatus for collecting oil or the like from the sea in which a floating boom made up of a number of buoyancy chambers flexibly coupled together is towed over the surface, each buoyancy chamber having an aperture, preferably slightly above the water level, through which the surface layer of oil (with a certain amount of water) enters an inner chamber within the buoyancy chamber, and the liquid in the inner chamber is drawn off through a pipe, passed through a centrifuge, the water is discharged and the oil is stored.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier; Towed body depth control

U.S. Cl. X.R. 210-242



3,495,565
POST INTENDED FOR MOORING BOATS OR FOR ANALOGOUS PURPOSES
Erik Verner Gustavii, 25 Bymarksgatan, 552 59 Jonkoping, Sweden
Filed June 11, 1968, Ser. No. 736,207
Int. Cl. B63b 21/00; E02b 3/22
U.S. Cl. 114—230 3 Claims

A post for mooring a boat which post is formed of two parts, one part being intended to be implanted in vertical position below the surface of the water, and a second part being situated partially above the surface of the water and arranged for vertical displacement relatively to the first part.

Keywords: Ice protection; Small-craft mooring device

U.S. Cl. X.R. 61-54

3,496,085
GALVANIC ANODE
John T. Reding, Freeport, and John J. Newport III, Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich., a corporation of Delaware
No Drawing. Filed Apr. 15, 1966, Ser. No. 542,727
Int. Cl. C23f 13/00
U.S. Cl. 204—197 4 Claims

An aluminum based, iron impurity-containing, sacrificial galvanic alloy composition, particularly useful in the form of a sacrificial anode, having improved current efficiency and good oxidation potential. The improved efficiency is attributed to controlled silicon addition to provide a silicon to iron ratio of between 0.5 and 5.

Keywords: Cathodic protection; Corrosion prevention

U.S. Cl. X.R. 75-138; 75-146

No Figure

3,496,526

SEISMIC CABLE DEPTH CONTROL SYSTEM

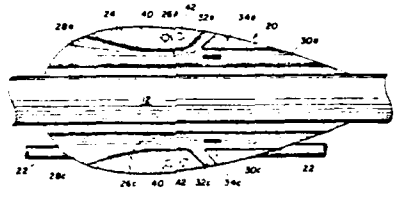
Donald W. Rockwell, Dallas, Tex., assignor to Gulf General Atomic Incorporated, San Diego, Calif., a corporation of Delaware

Filed Nov. 19, 1968, Ser. No. 777,039
Int. Cl. H04b *13/00*
U.S. Cl. 340—7 19 Claims

A plurality of streamlined housings are rigidly connected at spaced points along a seismic cable being towed underwater. A number of symmetrically spaced passageways extend through each of the housings for normally admitting and exhausting water along paths parallel to the seismic cable. Sensing structure is provided in each housing to determine when the seismic cable varies from a predetermined depth, upon which water passing through a selected one of the passageways is diverted through a secondary outlet to provide a jet water stream of sufficient force and direction to return the seismic cable to the predetermined depth.

Keywords: Depth pressure measurement; Seismic streamer cable; Towed body depth control

U.S. Cl. X.R. 114-23; 114-24; 114-25; 114-235; 137-81.5



3,496,532

SYNCHRONIZED SEISMIC EXPLORATION SYSTEM

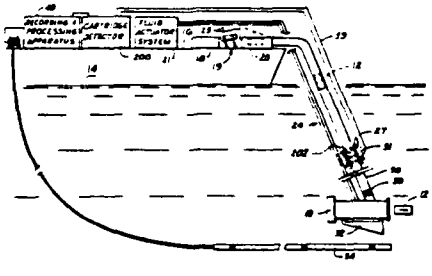
Ben B. Thigpen, Houston, Tex., assignor to Western Geophysical Company of America, Houston, Tex., a corporation of Delaware

Filed Mar. 4, 1969, Ser. No. 804,205
Int. Cl. G01v *1/26*
U.S. Cl. 340—15.5 10 Claims

This invention generally relates to seismic prospecting systems having means for consecutively firing explosive charges underwater to generate seismic waves and for producing seismic records in synchronism with the firing means. The system includes fluid means for rapidly delivering explosively operated charges to an underwater firing station through a flexible conduit for subsequent detonation of the charges outside the firing station. Detector means are coupled to the conduit near the firing station for detecting the consecutive passages of the charge-filled canisters through the conduit and for generating timing signals which are used to suitably initiate recorders and analog or digital electronic geophysical processing equipment on the deck of the towing boat.

Keywords: Seismic explosive acoustic transmitter; Seismic survey method

U.S. Cl. X.R. 340-7



3,496,728

METHOD AND APPARATUS FOR FIELD REINFORCEMENT OF COLUMNAR STRUCTURES, PARTICULARLY OFFSHORE DRILLING AND PRODUCTION PLATFORMS

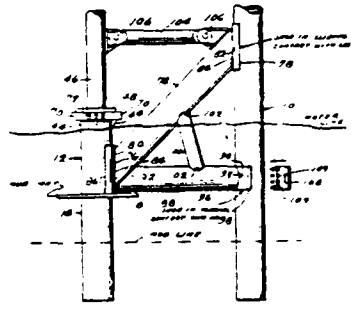
John Slack, Houston, Tex., assignor to Gray Tool Company, Houston, Tex., a corporation of Texas

Filed Aug. 10, 1967, Ser. No. 659,680
Int. Cl. E02d 37/00; E02b 17/00; E04c 3/04
U.S. Cl. 61—46
16 Claims

For reinforcing an offshore platform column against additional loading, lowering a templet to the mud line beside the column driving the templet into the mud until its mud mat contacts the mud line; disconnecting the lowering and driving pipe from the templet; rigidly securing the templet to the column; driving a piling into the ocean floor through the templet and circumferentially clamping the piling to the templet, thus reinforcing the column against horizontal and vertical movement. The clamping arrangement includes special hubs securely mounted on the templet and piling and an annular expansible contractile clamp adapted to circumferentially engage the hubs.

Keywords: Offshore construction; Offshore platform, fixed; Pile, structure connection; Seabed foundation

U.S. Cl. X.R. 52-655; 52-693; 61-46.5; 61-53.5; 256-36



3,496,900

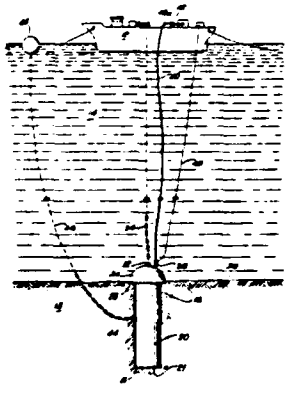
METHOD FOR INSTALLING A DEEP WATER ANCHOR

George E. Mott, Metairie, and John T. Loggins, New Orleans, La., assignors to Texaco Inc., New York, N.Y., a corporation of Delaware

Continuation-in-part of application Ser. No. 602,706, Dec. 19, 1966. This application May 23, 1968, Ser. No. 731,564
Int. Cl. B63b 21/26
U.S. Cl. 114—206
4 Claims

The invention relates to a method for controllably imbedding an anchor into a relatively soft ocean floor. The method comprises lowering the anchor in such manner to permit water and mud to enter the lower end of an evacuable chamber. The chamber is then maintained in a condition of partial evacuation by the controlled removal of said mud and water whereby pressure differential is established with the surrounding atmosphere. The said pressure differential urges the anchor downwardly, which downward progress is maintained so long as the received mud and water are removed, or until the consistency of the substratum permits no further entry.

Keywords: Embedment anchor



3,497,018

MARINE CORER WITH VALVE

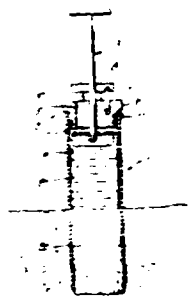
William S. Shultz, Cataumet, and George W. Gibson, East Falmouth, Mass., assignors to the United States of America as represented by the Secretary of the Navy

Filed Oct. 9, 1968, Ser. No. 766,054
Int. Cl. E21b 7/12, 47/00, E21c 19/00
U.S. Cl. 175—6 5 Claims

The marine corer disclosed, which has particular application to procuring sandy, clay, or soft sediment cores, consists of a coring tube having a manually operated valve mounted in one end thereof. This valve has as its control element a T-shaped handle which may be conveniently grasped by the jaws of a mechanical manipulator. The handle also serves as the means for introducing the coring tube into the ocean bottom.

Keywords: Sampler, seabed-driven core

U.S. Cl. X.R. 73-425.2; 175-20; 175-318



3,497,434

METHOD FOR PREVENTING FOULING OF METAL IN A MARINE ENVIRONMENT

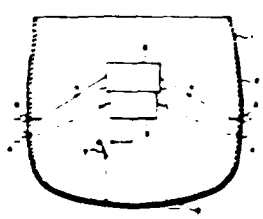
Ernest L. Littauer, Hollywood, Calif., assignor to Lockheed Aircraft Corporation, Burbank, Calif.

Filed July 20, 1967, Ser. No. 654,888
Int. Cl. C23f 13/00
U.S. Cl. 204—147 3 Claims

Metals toxic to marine organisms are anodically dissolved under controlled conditions to prevent fouling by marine organisms of structures immersed in a marine environment.

Keywords: Cathodic protection; Coating; Fouling prevention

U.S. Cl. X.R. 204-149; 204-196



3,497,450

REMOVAL OF LIQUID CONTAMINANTS FROM THE SURFACE OF WATER

Sorrell Roth, Irvington, N.J., assignor to Allied Chemical Corporation, New York, N.Y., a corporation of New York

No Drawing. Filed Oct. 31, 1968, Ser. No. 772,378
Int. Cl. B01d 17/02
U.S. Cl. 210—18 5 Claims

This invention relates to a method for removing a liquid contaminant, particularly petroleum oil, from the surface of water by covering the surface of said liquid contaminant with a salt water solution and then an aqueous solution of polyvinyl alcohol and alkali metal borate so as to form a skin around the liquid contaminant. The entrapped liquid contaminant can then be removed from the water surface by various methods.

Keywords: Pollutant coalescence; Pollutant absorption

U.S. Cl. X.R. 210-40

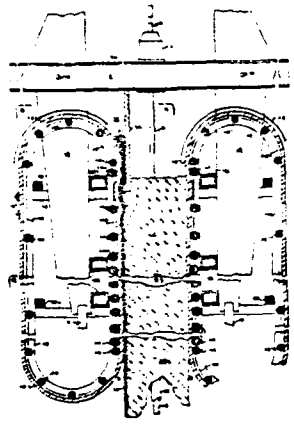
No Figure

3,497,579
SLIP FORMING APPARATUS AND METHOD
Maurice Barron, 291 Ridgeway,
White Plains, N.Y. 10605
Filed Mar. 25, 1965, Ser. No. 442,678
Int. Cl. E04b *1/16, 1/04*
U.S. Cl. 264—33 5 Claims

This invention is a slip form apparatus resembling a caterpillar tractor laid on its side, and includes the method of using a continuous flexible belt on rollers as a molding means for building structures of concrete or cementitious materials. It is particularly adapted to long, shallow, slab-like structures such as highway or airport pavement, or to various plan shaped tower-like structures such as chimneys, and underwater structures built automatically from the bottom up to and above the surface of the water.

Keywords: Concrete form; Offshore construction; Seabed materal placement

U.S. Cl. X.R. 25-118; 25-131; 249-20; 264-70; 264-228



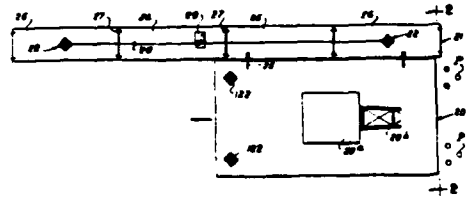
MARCH 3, 1970

3,498,065
METHOD AND APPARATUS FOR BARGE ANCHORING AND STABILIZING
John B. Templeton, 1000 Singleton Blvd.,
Dallas, Tex. 75212
Filed Oct. 30, 1967, Ser. No. 678,820
Int. Cl. E02b *17/06;* B63b *21/00*
U.S. Cl. 61—46.5 25 Claims

A system and method for anchoring and stabilizing a work barge, such as a pile driver barge, where longitudinally interconnected anchor barges have end units anchored by a spud driven into the water bed through a well in the barge. The work barge is also anchored by one or more spuds and is stabilized by one or more brackets coupling adjacent sides of the anchor barge assembly and the work barge. The work barge is movable along the row of anchor barges to new work positions without moving the anchor barges. The anchor barge assembly also is shiftable relative to the work barge to establish a new line or work locations.

Keywords: Offshore construction; Offshore platform anchor; Pile driver, impact; Pile extractor; Pile placement

U.S. Cl. X.R. 37-73; 61-48; 114-230



3,498,388
PILE DRIVING SYSTEM
Arthur Jovis, New York, N.Y.
(1501 Undercliff Ave., Bronx, N.Y. 10453)
Filed Dec. 5, 1967, Ser. No. 688,184
Int. Cl. E21c 3/24; E02d 5/34; G01n 3/42
U.S. Cl. 173—2 9 Claims

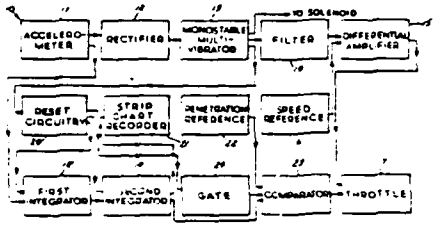
System: automatically controlling the pile driver, utilizing Engineering News formula

$$\left(P=\frac{2E}{S+C}\right)$$

marking the penetration per hammer blow on the pile; and keeping a permanent record of operation.

Keywords: Pile driver, impact; Pile load measurement

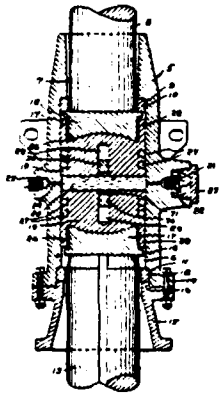
U.S. Cl. X.R. 61-53.5; 73-82; 73-84; 173-21



3,498,391
HYDRAULIC CUSHION BLOCK AND IMPACT TYPE PILE DRIVING HAMMERS
Charles L. Guild, 100 Water St., East Providence, R.I. 02914, and Willard B. Goodman, 5 Larkspur Drive, Belleville, Ill. 62221
Filed Oct. 24, 1968, Ser. No. 770,345
Int. Cl. E02d 7/02; E02f 3/04
U.S. Cl. 173—131 7 Claims

Hydraulic cushion blocks for pile driving hammers of the impact type are disclosed, each block having a cylinder in which upper and lower heads are slidably confined, the upper head for engagement by the ram point, the lower head for engagement with the pile. A pair of anvils are slidably sealed in the cylinder and confine a fluid body between them. The outer face of each anvil is in engagement with the inner face of an appropriate one of the heads, one engaged face being concave and the other convex.

Keywords: Pile driver, impact



3,499,290

FLOATING BOOM

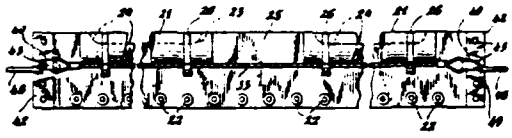
Millard F. Smith, Westport, Conn.
(P.O. Box 295, Saugatuck, Conn. 06882)

Filed June 24, 1968, Ser. No. 739,452
Int. Cl. E02b *15/04, 3/04*
U.S. Cl. 61—1 10 Claims

A portable flexible floating boom for confining oil or other material floating on the water, or as a current or wave controlling or inhibiting breakwater, groin, jetty, or the like, or for protecting beaches from harmful marine creatures, the boom incorporating a series of elongated floats of foamed elastomer connected in longitudinally spaced end-to-end relation by a continuous underwater barrier in the form of a water-impervious flexible polymer fin depending from and supported by the floats substantially in the central longitudinal vertical plane of the floats, the barrier being extended at its ends beyond the two end floats of the boom and having end plates secured thereto for connection of towing or anchoring lines, the upper edge of the barrier between the floats and along its extended ends being substantially level with the upper sides of the floats, and each of the floats having a series of longitudinally spaced yoke-like metal straps embracing its upper side in imbedded non-projecting snag-proof relation, the sides of the straps converging beneath the floats with their ends clamped upon opposite sides of the barrier fin, whereby the barrier fin is supported by the straps in suspended relation beneath the floats. A reinforcing cable extends the length of the boom at one side of the barrier fin adjacent the undersides of the floats and is anchored at its ends to the end plates, supporting clips being swaged to grip the cable in correspondingly spaced relation to the longitudinal spacing of the barrier fin supporting straps along the boom, each clip being clamped between one side of the barrier and one end of each respective strap. It is also contemplated that an auxiliary barrier, which may be in the form of a water-pervious net or the like of suitable extent may be suspended from the cable to extend to any desired depth in the water below the water-impervious barrier fin.

Keywords: Breakwater, floating; Groin; Low-cost shore protection; Pollutant collection; Pollutant, surface barrier

U.S. Cl. X.R. 61-5
See: Re. 27,452



3,499,291

BOOM FOR SCREENING IN AND COLLECTING UP OF POLLUTION ON WATER

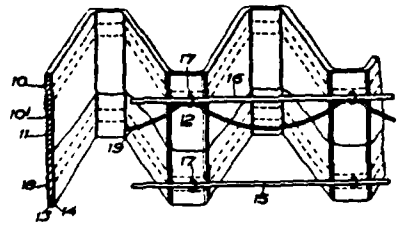
Trygve Mikkelsen, Straumesvingen 22, Straumsgrend, Norway

Filed Nov. 5, 1968, Ser. No. 773,621
Claims priority, application Norway, Nov. 6, 1967, 170,406
Int. Cl. E02b *15/04, 3/00*
U.S. Cl. 61—1 12 Claims

A boom construction for closing off and collecting up pollution, especially oil contamination on areas of the sea. A boom which comprises a plurality of floatable and foldable flat sections linked together in the form of a zig-zag rail and provided with one or more purse lines arranged to fold said flat sections on being drawn in. In water the boom will provide an upstanding barrier above the surface of the water. The boom can be set up in a ring in the water and by hauling in the purse lines the closed-off area will be decreased. The boom is manufactured of individual plates of porous plastic covered and linked together by a pliable material which is durable to sea-water and oil. The purse lines are guided by rings at alternate links. Between adjacent links are connected bands to limit the flattening out of the boom.

Keywords: Pollutant, collection; Pollutant, surface barrier

U.S. Cl. X.R. 61-5



3,499,292

METHOD OF MAKING PARTIALLY SUBMERGED STRUCTURES

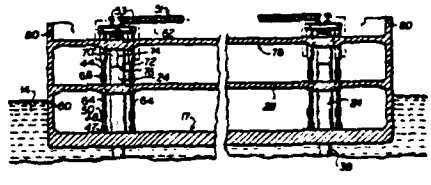
Carlos J. Tavares, San Diego, Calif., assignor to Marine Space Enclosures, Inc., New York, N.Y., a corporation of New York

Filed Dec. 20, 1968, Ser. No. 792,890
Int. Cl. E02b *29/06, 17/00*; E04b *5/16*
U.S. Cl. 61—46 17 Claims

Piles are driven into the bottom underlying a body of water, preferably into bedrock. Columns in the form of sleeves are disposed about the piles and are releasably restrained from downward movement relative thereto. A lowermost floor is constructed utilizing the sleeves as supports therefor, and vertically extending outer walls are erected from the bottom floor structurally upwardly one level. A second floor structure is then built using the sleeves as supports therefor and thereafter the structure is permitted to move downwardly toward or into the water under the urging of gravity, the downward movement being controlled as by jacks. Thereafter, additional outer walls are constructed and joined to the second floor and a third floor is constructed which third floor uses the sleeves as supports. Thereafter, the sleeves are lowered further into the water. The above described steps are continued until the desired amount of structure is submerged in the water. If hydrostatic pressure prevents the submergence of an adequate volume of structure, the structure may be temporarily flooded in order to overcome hydrostatic pressure and permit gravity to move the constructed floors downwardly into the water. Finally, an above water level structure is constructed using the piles as supporting columns therefor which structure provides the necessary weight to overcome hydrostatic pressure. Preferably, after the submerged portion has been constructed in accordance with the above method, the sleeves are fixed as by keys to the piles to prevent further relative movement therebetween.

Keywords: Offshore construction; Offshore platform, fixed; Pile, structure connection

U.S. Cl. X.R. 52-83; 61-50; 61-52



3,500,302

SONAR BATHYMETRY SYSTEM TRANSMIT-RECEIVE SEQUENCE PROGRAMMER

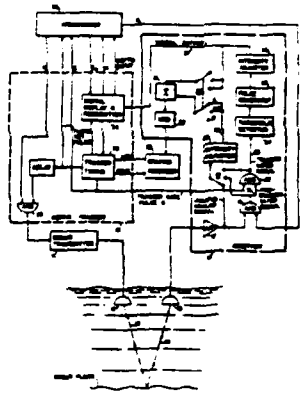
George J. Moss, Jr., Bethesda, and Robert W. Havey, Jr., Suitland, Md., and John M. Saunders, Alexandria, Va., assignors to the United States of America as represented by the Secretary of the Navy

Filed Jan. 13, 1969, Ser. No. 790,686
Int. Cl. G01s 9/68
U.S. Cl. 340—3 4 Claims

Depth information from a sonar system in the form of a plurality of digital outputs, each representing a 400 fathom depth increment, is coupled to an AND logic bank. The AND logic bank also receives the output from a shift register which functions as a memory circuit for sonar pulses transmitted by the sonar system. The output of the AND logic bank is a signal indicative of when a return echo from the bottom of the ocean is expected. This signal is fed to the programmer logic bank which analyzes the received information and, upon keying by a timing pulse from the sonar system, sends out a signal which will actuate either the sonar receiver or the sonar transmitter so that the minimum echo misinterpretation error and the maximum depth information will be provided.

Keywords: Sonar, depth sounder

U.S. Cl. X.R. 343-7.3; 343-7.5



MARCH 17, 1970

3,500,484

DEVICE FOR MOORING SHIPS

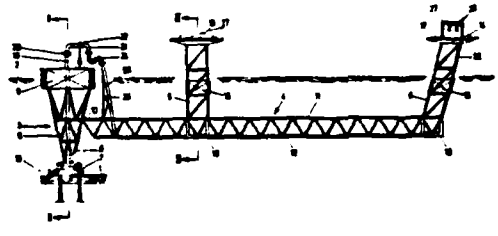
Cevdet A. Erzen, The Hague, Netherlands, (% Mr. Toulonkian, 258 Broadway, New York, N.Y. 10007)

Filed Nov. 6, 1968, Ser. No. 773,709
Claims priority, application Netherlands, Nov. 10, 1967, 6715247
Int. Cl. B63b 21/52, 21/00
U.S. Cl. 9—8 12 Claims

A device for mooring ships offshore, in particular for the transportation of liquids between a ship and the shore, having an upright mast structure rising from the sea bottom to the surface and anchored at its lower end for universal swinging movement and free rotation about its longitudinal axis, the mast structure carrying floats keeping the same in its upright position. A mooring boom is secured to the mast structure below the water level and extends sideways therefrom in a horizontal position which boom carries one or more mooring towers provided with floats and rising upwardly therefrom to a suitable height above the water level. A riser pipe runs upwardly through the mast structure being connected at its lower end to a pipeline running to the shore and being coupled at its upper end to a pipe running through the mooring boom and towers for connection with the pipe system of a ship.

Keywords: Offshore mooring structure; Offshore platform anchor

U.S. Cl. X.R. 114-230



3,500,678

APPARATUS FOR DETERMINING SOIL RESISTANCE INCLUDING A DRILL

Constant C. W. Van Romondt Vis, The Hague, Netherlands, assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware

Filed July 21, 1967, Ser. No. 655,034
Claims priority, application Netherlands, Aug. 17, 1966, 6611541
Int. Cl. G01n 3/36; E21b 47/026
U.S. Cl. 73—84 6 Claims

A method and apparatus for determining the resistance of the soil in the floor of a body of water. The apparatus (known as a penetrometer) includes an extensible sounding pin which can be driven into the soil and the stress in the pin measured to determine soil resistance. A fluid-turbine driven drill bit is rotatably mounted about the pin to assist the apparatus in penetrating into the soil. In operation, the stress in the pin can be measured continuously as the apparatus is buried or intermittently by retracting the pin, drilling to advance the apparatus into the soil and then extending the pin to measure soil resistance. Alignment of the device is maintained by a guide positioned on the floor of the body of water.

Keywords: Instrument power supply; Instrument, seabed in situ; Seabed property measurement

U.S. Cl. X.R. 73-151

3,500,949

MARINE SEISMOGRAPHIC PROSPECTING

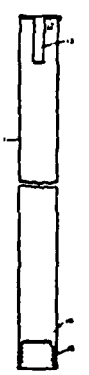
Stewart Paterson, Ardrossan, Scotland, assignor to Imperial Chemical Industries Limited, London, England, a corporation of Great Britain

Filed Dec. 18, 1967, Ser. No. 691,395
Int. Cl. G01v 1/38, 1/12, 1/13
U.S. Cl. 181—.5 6 Claims

Underwater seismic prospecting is carried out by detonating an immersed bubble-forming explosive having a length-to-diameter ratio exceeding 5:1 thereby suppressing bubble pulsation which would normally occur unless the explosive is located close to the water surface.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 340-5; 340-12



3,501,919

METHOD AND APPARATUS FOR CARRYING OUT OPERATIONS AT AN UNDERWATER INSTALLATION

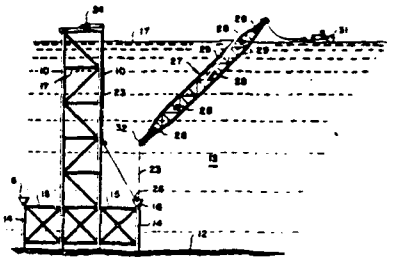
Peter W. Marshall, New Orleans, La., assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware

Filed Feb. 28, 1968, Ser. No. 709,093
Int. Cl. E02b 11/00
U.S. Cl. 61—46.5 11 Claims

A method and apparatus for carrying out operations on an underwater installation, for example, inserting stub piles to anchor a marine structure, in which an elongated buoyant truss member is lowered from the water surface into a substantially vertical position with the lower end in registry with the underwater installation to thereby provide communication between the water surface and the underwater installation for lowering pilings and the like.

Keywords: Offshore construction; Offshore platform, fixed; Pile driver leads; Pile placement; Seabed foundation

U.S. Cl. X.R. 61-53.5; 61-63; 166-.6; 175-7



3,501,920

REINFORCED CONCRETE POLES, PILES AND THE LIKE

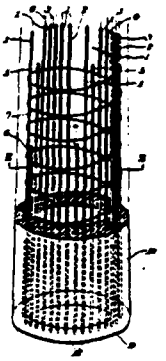
Minoru Uchiyama, Tokyo, Japan, assignor to Nippon Concrete Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 15, 1967, Ser. No. 683,242
Int. Cl. E02d 5/58; E04c 3/10
U.S. Cl. 61—56 1 Claim

For axial reinforcement of precast concrete poles, piles or the like products, nontensioned ordinary-strength steel wires are used in different lengths and in combination with conventional pretensioned high-strength steel wires thereby to save the latter as much as possible while imparting to the product a breaking strength varying along the axis of the pole in such a fashion as to afford a satisfactory crack-resisting feature thereto.

Keywords: Pile, concrete

U.S. Cl. X.R. 52-223; 52-224; 52-720



3,501,953

BATHYKYMOGRAPH AND METHOD

Stephen Cudlitz, Marblehead, and William W. Robblee, Randolph, Mass., assignors to KSC Semiconductor Corporation, Chelmsford, Mass., a corporation of Massachusetts

Filed Sept. 16, 1966, Ser. No. 579,992
Int. Cl. G01f *23/14*
U.S. Cl. 73—170 3 Claims

A system of ocean mapping is disclosed whereby the normal operations of fishermen drawing otter-trawl nets are utilised to collect data. A self-contained recording pressure instrument is adapted to be attached to the net headrope and handled as any other head-rope float. The instrument provides, upon return to port, a record of depth-versus-time which is correlated with position-versus-time records for the trawler obtained by other means, and compared with records from other boats to provide ever-improving bottom contour maps.

Keywords: Depth pressure measurement; Instrument, towed; Towed vehicle

U.S. Cl. X.R. 73-300; 73-391; 346-72

3,502,159

PILE DRIVING APPARATUS FOR SUBMERGED STRUCTURES

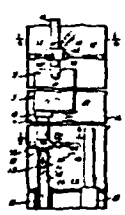
Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc., New York, N.Y., a corporation of Delaware

Filed Mar. 26, 1968, Ser. No. 716,043
Int. Cl. E21d *1/03*; E21c *3/00, 2/00*
U.S. Cl. 173—43 13 Claims

The invention relates to a novel method and apparatus therefor, adapted to driving piles into the ocean bottom for anchoring an offshore, deep water marine platform. the apparatus contemplates use on a platform supported on one or more canted legs, each of which includes at least one, and usually a plurality of pre-positioned piles. A mobile pile driving mechanism is adjustably and guidably suspended in a casing surrounding the piles. The driving mechanism is then sequentially rotated to drive the respective piles through relatively short increments of length. Positioning means carried on the pile driving apparatus includes outwardly radiating arms which are demotedly controlled from the water's surface. The arms, when in contact with the wall of a platform leg, are actuatable to position the pile driving mechanism with respect to said wall.

Keywords: Offshore construction; Offshore platform, leg; Pile driver, impact; Pile placement; Seabed foundation

U.S. Cl. X.R. 61-53.5; 173-20; 173-46; 175-6



3,502,160

RESILIENT YOKE MOUNTING FOR VIBRATORY PILE DRIVER AND EXTRACTOR

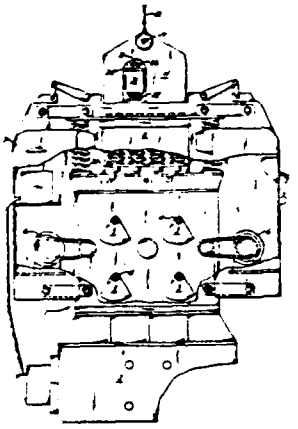
Alvin E. Herz, Nutley, N.J., assignor to L. B. Foster Company, Pittsburgh, Pa., a corporation of Pennsylvania

Filed Dec. 16, 1968, Ser. No. 783,869
Int. Cl. E02d 7/18
U.S. Cl. 173—49 5 Claims

A combined vibratory pile driver and extractor has a yoke assembly connected to a hoisting cable and a body assembly attached to a pile. The pile is subjected to vibrations generated by the rotation of eccentric weights mounted on the body. When the weight of the mechanism rests on the pile, the pile is driven into the ground. With the cable exciting an upward pull on the yoke, a driven pile can be extracted from the ground. To prevent impacts between yoke and body when pile driving and to suppress cable vibrations when pile extracting, the yoke is connected to the body by two separate sets of spring means. The first set has a defined stiffness that is sufficient to resist the inertial tendency of the yoke to separate from the body when driving a pile, but not sufficient to prevent separation of yoke and body by a distance greater than the maximum amplitude of the vibrations of the body when extracting a pile in response to minimum upward pull of the cable on the yoke. The second set of spring means has substantially greater stiffness than the first set for suppressing cable vibrations when substantially greater upward pull of the cable is required to extract a pile.

Keywords: Pile driver, vibratory; Pile extractor

U.S. Cl. X.R. 173-91



MARCH 31, 1970

3,503,214

BARRIER FOR OIL SPILT ON WATER

Denis Henry Desty, Walton-on-Thames, Surrey, Leslie Bretherick, Windsor, and Michael Guthrie Webb, Wootton Bridge, Isle of Wight, England, assignors to The British Petroleum Company Limited & Gordon Low (Plastics) Ltd., London, England

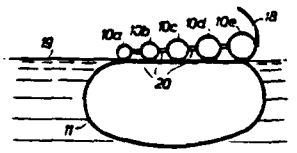
Filed June 20, 1968, Ser. No. 738,560
Int. Cl. E02b 15/04
U.S. Cl. 61—1 7 Claims

An inflatable barrier which comprises a plurality of air hoses positioned side by side to form, when inflated, a raft which has one or more water ballast chambers attached below. The barrier floats with part below and part above the water surface to impede the passage of floating oil.

Preferably the air hoses are graded to give a wedge-shaped raft.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier

U.S. Cl. X.R. 61-5; 210-242



3,503,216

UNDERWATER PAVING ELEMENT

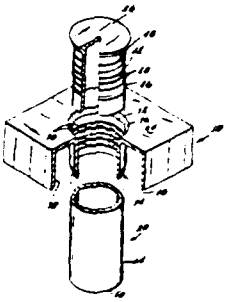
Ramiro M. Oquita, 547 Greenbank, Duarte, Calif. 91010

Filed Jan. 29, 1968, Ser. No. 701,236
Int. Cl. E02b *3/14*; E01e *5/00*
U.S. Cl. 61—37 3 Claims

A system is disclosed for paving the surface of a stratus, comprising for example a super-saturated, or semi-liquid earth, sediment or sludge, which may be covered with water. The system incorporates a plurality of individual elements each of which comprises a paving cap or surface element that is affixed to a hollow shaft to be vacuum-locked into the receiving stratum. A seal is provided to close the exterior end of the shaft (carrying the paving element) after the shaft is substantially filled with the sludge of the stratus. As a result, the element is locked in place by the sludge contained within the shaft and by the abutment of the paving cap against the surface of the stratum.

Keywords: Low-cost shore protection; Revetment; Seabed material placement; Seabed scour protection

U.S. Cl. X.R. 94-11



3,503,217

METHOD OF AND APPARATUS FOR ANCHORING WELL-DRILLING PLATFORMS TO THE OCEAN FLOOR

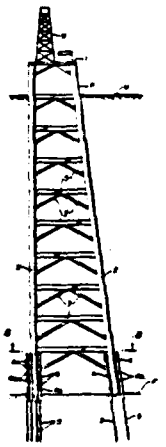
Max E. Kliewer, Whittier, Calif., assignor to Baker Oil Tools, Inc., Commerce, Calif., a corporation of California

Filed Mar. 7, 1968, Ser. No. 711,249
Int. Cl. E21b *40/00, 23/00*; E02b *17/00*
U.S. Cl. 61—46.5 17 Claims

A method of anchoring a well-drilling platform to the ocean floor by running lengths of pipe or piles through outer pipes attached to platform legs and into holes formed in the ocean floor. The lengths of pipe or piles are cemented in the holes, and are also connected to the outer pipes by cementing the annuli between the outer pipes and such piles. Apparatus is provided for supporting or anchoring the piles in the outer pipes, for enabling the cementing of the piles in the holes, and for cementing the annuli between the outer pipes and the piles.

Keywords: Grouting; Offshore construction; Offshore platform, leg; Pile placement; Pile, structure connection; Seabed foundation

U.S. Cl. X.R. 166-216



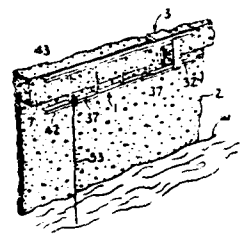
3,503,467
LADDER FOR BOAT DOCK, SEAWALL, OR THE LIKE

Frederick W. Lindblad, 835 Illinois Ave., Batavia, Ill. 60506

Filed Feb. 12, 1968, Ser. No. 704,793
Int. Cl. E06c 9/06
U.S. Cl. 182—97 2 Claims

A ladder is pivotally connected to a boat dock, seawall or like structure and overhangs the water. The ladder is rotatable to and from a storage position in which the ladder is horizontal and alongside of the structure to a vertical position in which the ladder projects downwardly from its pivot axis toward the water. A releasable locking mechanism secures the ladder in either of the two positions.

Keywords: Seawall; Small-craft pier



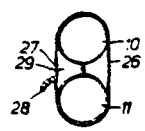
3,503,508
BARRIER FOR OIL SPILT ON WATER

Denis Henry Desty, Walton-on-Thames, Surrey, Leslie Bretherick, Windsor, and Michael Guthrie Webb, Wootton Bridge, Isle of Wight, England, assignors to The British Petroleum Company Limited and Gordon Low (Plastics) Limited, both of London, England

Filed June 20, 1968, Ser. No. 738,561
Int. Cl. E02b 15/04
U.S. Cl. 210—121 3 Claims

A floatable barrier for skimming spilt oil off water. A flexible flap whose density is between that of oil and water is connected below the skimming inlets. During use the flap finds the oil/water interface to encourage preferential skimming of oil.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier
U.S. Cl. X.R. 61-5; 210-242



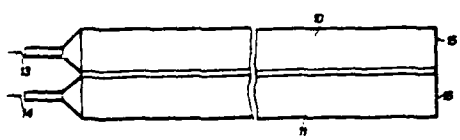
3,503,512
BARRIER FOR OIL SPILT ON WATER

Denis Henry Desty, Walton-on-Thames, Surrey, and Leslie Bretherick, Windsor, England, assignors to The British Petroleum Company Limited, London, England

Continuation of application Ser. No. 738,559, June 20, 1968. This application Oct. 14, 1969, Ser. No. 866,439
Claims priority, application Great Britain, June 22, 1967, 28,799/67
Int. Cl. B01d 17/02; E02b 15/04
U.S. Cl. 210—242 6 Claims

An inflatable barrier having water and air chambers which, when suitably inflated with air and water, floats with part below and part above the water surface to impede the passage of floating oil, e.g. a figure-of-eight cross-section which floats with its waist at the water level. The barrier may also have a skimming chamber which connects to water level.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier
U.S. Cl. X.R. 61-1; 210-170



3,504,500

PILE JOINTING DEVICE

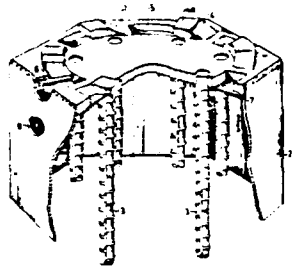
Jean Henry Winje Fristedt, Tyreso, Sweden, assignor to Johnson Construction Company AB., Stockholm, Sweden, a limited company of Sweden

Filed May 13, 1968, Ser. No. 728,675
Claims priority, application Sweden, May 17, 1967, 6,905/67
Int. Cl. E02d 5/30, 5/52
U.S. Cl. 61—53 5 Claims

A pile section has a jointing device secured to the end thereof. The jointing device includes a flat face from which extend a plurality of prong-like connecting elements disposed radially inwardly of the peripheral edge of the plate and distributed in a circle concentric with the common axis of the plate and pile section. The connecting elements extend above the face of the plate, the plate having a recess extending in front of and under each connecting element whereby a pair of such jointing device can be interconnected with one another upon relative angular displacement.

Keywords: Pile, concrete; Pile section connection; Pile, steel

U.S. Cl. X.R. 52-726; 61-56; 285-360; 287-2; 287-103



3,504,501

METHOD OF PILE SPLICING AND DRIVING

Gabriel Fuentes, Jr., 1501 Ashford Ave., Santurce, Puerto Rico 00923

Original application Jan. 13, 1967, Ser. No. 609,102. Divided and this application Oct. 10, 1968, Ser. No. 766,570
Int. Cl. E02d 5/12; F16b 17/00
U.S. Cl. 61—53.5 2 Claims

A reinforced concrete pile section which can be spliced to another pile section. Each section is reinforced with longitudinal prestressed reinforcing rods and is cast vertically to orient the concrete. In one embodiment, each end of each section has an annular ring. In splicing sections together, a tubular sleeve is telescoped over the edges affixed to the rings. The sleeve completely encompasses and confines the concrete preventing shattering of the same while being driven. In a second embodiment, the sleeve is telescoped over the ends and bonded to the section with adhesive.

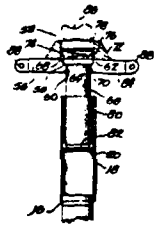
The tubular sleeve has a central transverse plate to completely enclose each pile section.

A special mandrel, which does not damage the pile section, is used as a driving means. It has a resilient liner and is centrally supported within the sleeve.

A tubular, tapered end pile section which can be conveniently shipped and/or stored and which can be affixed to the ring of the first pile section is used at the driving end of the pile section. A removable sleeve is affixed to the end of the last pile section for driving it.

Keywords: Pile, concrete; Pile driver, impact; Pile section connection

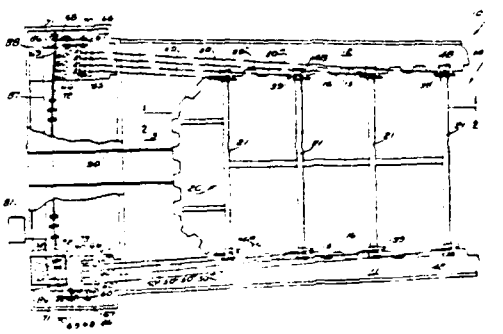
U.S. Cl. X.R. 61-56; 287-111



3,504,502
LIFT DOCK FOR A WATER BORNE VESSEL
Luther H. Blount, Popppasquash Road,
Bristol, R.I. 02809
Filed Nov. 6, 1967, Ser. No. 680,639
Int. Cl. B63c 3/06, 1/02
U.S. Cl. 61—65 3 Claims

A lift dock apparatus in which the sheaves over which the lifting cables extend to the drums upon which the cables are reeled have their axes all substantially parallel with the axis of the drums.

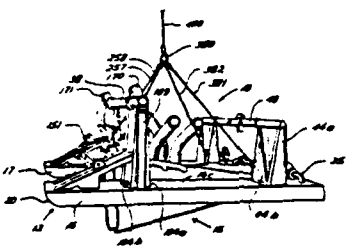
Keywords: Small-craft launcher



3,504,504
TRENCHING MACHINE APPARATUS
Hartwell A. Elliott, P.O. Box 5512, Drew Station,
Lake Charles, La.
Filed Sept. 13, 1968, Ser. No. 759,599
Int. Cl. E02f 5/02; F16l 1/00
U.S. Cl. 61—72.4 8 Claims

A scoop having adjustable curved jaw members in adjustably suspended between fixed pontoons. A plurality of jet nozzles force fluid outwardly into the space between the jaw members and the jet nozzles, along with cutting edges of the jaw members, cut away earthen formations for burying of a pipeline.

Keywords: Seabed pipeline placement;
Seabed trencher



3,504,740

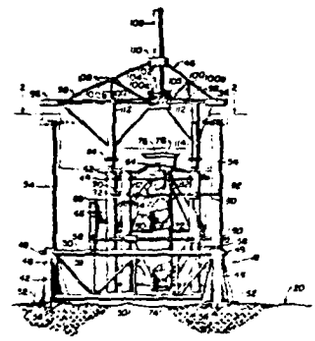
SUBSEA SATELLITE FOUNDATION UNIT AND METHOD FOR INSTALLING A SATELLITE BODY WITHIN SAID FOUNDATION UNIT

William F. Manning, Dallas, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Filed Aug. 28, 1967, Ser. No. 663,799
Int. Cl. E21b 7/12, 33/035
U.S. Cl. 166—.5 74 Claims

This specification discloses a three-component subsea foundation unit comprising a base structure, a conductor pipe template structure, and a removable handling structure. The base structure has a plurality of peripheral jackets through which piles are driven for fixing the foundation unit on a marine bottom. The conductor pipe template structure, through which the subaqueous wells are to be drilled and in which a subsea satellite body will later be cradled, is adjustably supported on the base structure so that it can be leveled prior to drilling wells therethrough. The removable handling structure holds the base and conductor pipe template structures rigidly together during installation and is removed thereafter. The satellite body, lowered from a surface handling vessel to just above the foundation unit on the marine bottom, after the completion of the wells therethrough, is drawn down into the subsea foundation unit by a tether line, having one end wound on a remotely controlled winch drum located either within or without the shell of the satellite body, at the other end anchored by a releasable spear latched within the conductor pipe template structure. The underwater operations are performed in conjunction with a tool-carrying submersible work vehicle.

Keywords: Seabed foundation; Seabed oil, process structure



APRIL 14, 1970

3,505,758

ANTIFOULING COVERING FOR SUBMERGED MARINE OBJECTS

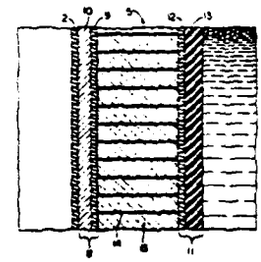
Laverne H. Willisford, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio, a corporation of Ohio

Filed Nov. 15, 1967, Ser. No. 683,229
Int. Cl. A01m 25/00
U.S. Cl. 43—131 8 Claims

An antifouling protective covering for preventing growth of barnacles and other marine organisms on the exterior of marine objects, such as sonar domes and the like, submerged in sea water. The covering consists of a double-wall, rubber-coated fabric reservoir which carries an intermediate layer of diffusible toxic or repellent material. The toxic material diffuses through the outer wall and provides a continuous supply of toxic material to the exposed outer surface to replace any toxic material lost to sea water.

Keywords: Coating; Fouling prevention

U.S. Cl. X.R. 21-2.7; 21-58; 21-61; 52-2; 52-517; 61-54; 114-222; 161-49; 161-159; 239-57



3,505,825

SYSTEM FOR REPLACING DETERIORATED WOOD PILING

James E. Colby, Rte. 5, Box 1069, Bremerton, Wash. 98310

Continuation-in-part of application Ser. No. 662,946, Aug. 24, 1967. This application Sept. 5, 1968, Ser. No. 757,708

Int. Cl. E02d 5/38, 5/64

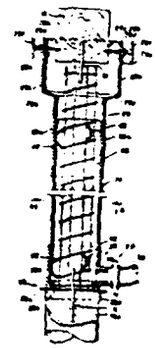
U.S. Cl. 61—54

13 Claims

Wood piling deteriorated by contact with water and air or by sea life can be replaced with an encased concrete piling extending from just below the mudline to the underside of the load-bearing cap of an overhead structure. The deteriorated piling is severed below the mudline and a tubular concrete form positioned between the stub head and the overhead cap. Concrete is then transferred in a continuous pour from the bottom up until the tubular form is filled. The tubular form may be designed as a permanent component of the replacement piling so as to protect the concrete from its environment.

Keywords: Concrete form; Pile, concrete; Pile, wood; Structure repair

U.S. Cl. X.R. 25-118; 61-48; 61-56.5; 264-32



3,506,085

PNEUMATIC ACOUSTIC SOURCE EMPLOYING ELECTROMAGNETIC CONTROLLED VALVE

George B. Loper, Duncanville, Tex., assignor to Mobil Oil Corporation, a corporation of New York

Filed Aug. 28, 1967, Ser. No. 663,800

Int. Cl. G01v 1/38, 3/00, 1/00

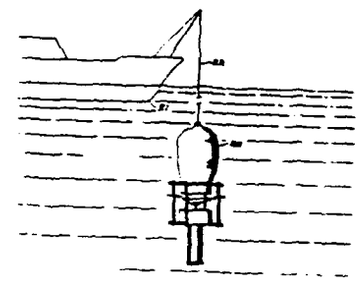
U.S. Cl. 181—5

36 Claims

The specification discloses a repetitive marine seismic source formed by a rigid chamber for confining high pressure gases and having a controllable valve of magnetic material for rapidly releasing the high pressure gases through an outlet port into the water to generate an acoustic pulse. An electrical coil supported adjacent the outlet port is energized to form a magnetic force for application to the valve for holding the valve in its closed position against the pressure in the chamber. Current to the coil is controlled by a switching arrangement to render the force ineffective to hold the valve closed against the gas pressure thereby allowing the gas pressure within the chamber to move the valve to an open position to release the gas into the water for the generation of an acoustic pulse.

Keywords: Siesmic explosive acoustic transmitter

U.S. Cl. X.R. 340-7



3,506,841
OCEANOGRAPHIC DATA-COLLECTING BUOY ARRANGEMENT

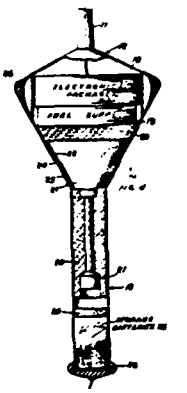
Charles P. Majkrzak, Nutley, N.J., assignor to International Telephone and Telegraph Corporation, Nutley, N.J., a corporation of Maryland

Filed Mar. 2, 1967, Ser. No. 619,978
Int. Cl. F01d *15/10;* H02k *7/18*
U.S. Cl. 290—2 4 Claims

The arrangement provides an oceanographic data-collecting buoy having a self-contained fuel supply, energy converter, electrical energy storage, and a data collecting and transmitting system. The energy converter includes a condenser arranged within the buoy so as to enhance the transfer of heat to the ocean.

Keywords: Buoy, instrumented; Electrical generator; Fouling prevention; Instrument power supply

U.S. Cl. X.R. 114-16; 290-52; 307-150



3,506,955
MULTILINE SEISMIC EXPLORATION

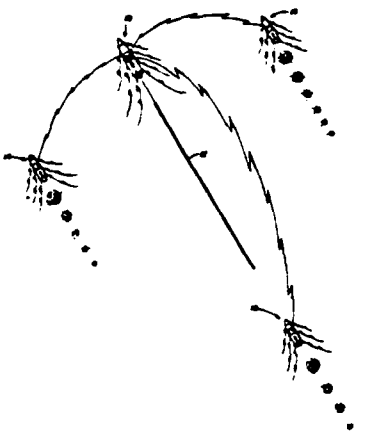
Milo M. Backus and William A. Schneider, Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed Oct. 26, 1967, Ser. No. 678,355
Int. Cl. G01v *1/13, 1/38*
U.S. Cl. 340—7 10 Claims

Discrete seismic signals are sequentially generated at spaced points along three parallel, spaced apart lines of traverse. Alternating ones of the discrete seismic signals are sequentially received along the middle line of traverse and are recorded. Additional lines of traverse are interleaved and intersected with the three lines of traverse in order to provide a grid coverage of a selected geologic area.

Keywords: Seismic acoustic transmitter array; Seismic explosive acoustic transmitter; Seiesmic survey method

U.S. Cl. X.R. 340-15.5



3,507,121

TIE ROD ANCHORING METHOD AND APPARATUS

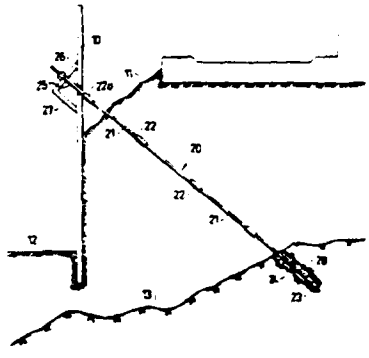
Carl-Olof Oskar Morfeldt, Lidingo, Sweden, assignor of one-half to Sandvikens Jernverks Aktiebolag, Sandviken, Sweden, a corporation of Sweden, and one-half to Atlas Copco Aktieboiaget, Nacka, Sweden, a corporation of Sweden

Continuation of application Ser. No. 505,877, Nov. 1, 1965. This appiication May 20, 1968, Ser. No. 731,685
Claims priority, application Sweden, Nov. 11, 1964, 13,549/64
Int. Cl. E02d *5/74*
U.S. Cl. 61—39 1 Claim

According to the present invention, anchoring of a structural part in the ground is effected with the use of a hollow tie rod which at one end thereof is provided with an anchoring head which can (where the same is required) penetrate rock as well as loose earth. The tie rod is forced—anchoring head first—into the ground, being extended as desired by the addition of lengths of hollow tie rod to the initial rod, until the anchoring head has reached a desired anchoring locus; then, a fluid grouting composition is passed into and through the tie rod and through the anchoring head into the area surrounding the anchoring head and fore part of the tie rod. Once the grouting has hardened it adheres to the head and the adjacent part of the tie rod, thereby anchoring the rod in the ground. Finally, the rear end of the tie rod is connected to the structural part to be anchored.

Keywords: Bulkhead; Grouting

U.S. Cl. X.R. 52-155; 52-742; 61-53.52



3,507,123

FENDER FOR DOCK WALL

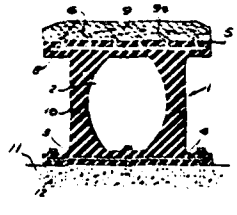
Misao Miura, Tokyo, Japan, assignor to Seibu Gomu Kagaku Kabushiki Kaisha, Tokyo, Japan, a corporation of Japan

Filed Feb. 20, 1968, Ser. No. 706,884
Claims priority, application Japan, Sept. 6, 1967, 42/56,938
Int. Cl. E02b *3/22*; B63b *21/04*
U.S. Cl. 61—48 2 Claims

A flexible hollow tubular fender for a dock wall is provided, having a base and a top buffer, and an intermediate resilient block which is hollow and has lateral sides which are each of a non-uniform cross-section.

Keywords: Pier fender

U.S. Cl. X.R. 114-219; 267-1



3,508,652

METHOD OF AND APPARATUS FOR SEPARATING OIL FROM WATER

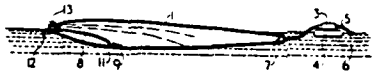
John E. Woolley, Southport, England, assignor to The Dunlop Company Limited, London, England, a British company

Filed Jan. 11, 1968, Ser. No. 700,670
Claims priority, application Great Britain, Jan. 11, 1967, 1,636/67
Int. Cl. B01d 17/02
U.S. Cl. 210—76 5 Claims

A method and apparatus for separating oil from water, particularly oil floating on the surface in a dock or at sea, in which an oil/water mixture is pumped continuously into one en dof an elongated container in which the mixture separates into an upper oil layer and a lower water layer, and water is drained continuously from the lower water layer.

Keywords: Pollutant collection; Pollutant, suction removal

U.S. Cl. X.R. 210-83; 210-242; 210-539; 210-540



3,509,522

SHATTERPROOF HYDROPHONE

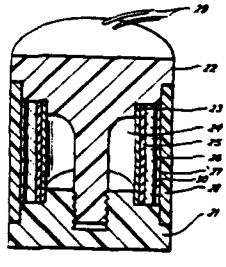
William A. Whitfill, Jr., Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y., a corporation of Texas

Filed May 3, 1968, Ser. No. 726,373
Int. Cl. H01r 17/00; H01v 7/00
U.S. Cl. 340—10 6 Claims

Disclosed is a new type of marine seismic transducer designed to continue efficient operation even if the sensing element is fractured. A series of coaxially aligned cylindrical elements comprise the transducer as follows: an inner conducting electrode; a bonding layer of conducting material; a seismic wave sensing element; and outer electrode of conducting metal; and appropriate housing means for the above.

Keywords: Seismic hydrophone; Seismic streamer cable

U.S. Cl. X.R. 310-8.7



3,509,727

INSTALLATION FOR DRY-STORING OF WATERCRAFT

Johan H. Zorab, Boornzwaag, and Jan J. Keulen, Langweer, Netherlands, assignors to Recreatiecentrum de Woudfennen N.V., Langweer, Netherlands

Filed Oct. 1, 1968, Ser. No. 764,204
Claims priority, application Netherlands, Oct. 6, 1967, 6713598
Int. Cl. B63c 1/00
U.S. Cl. 61—64 3 Claims

Installation for dry-storing of a large number of watercraft during the period that the atmospheric conditions or other reasons such as the climate renders it unpleasant to use the craft. To this end the installation comprises:

a basin with one or more narrow passages to an adjacent fairway or lake;

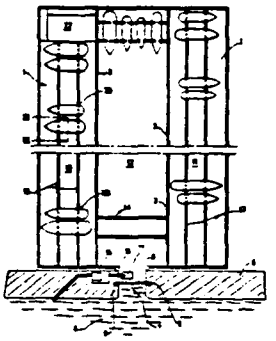
a movable closure means for each passage;

a pump for lowering the water level in the basin and for maintaining this low level;

supporting beams for the craft, near the bottom of the basin;

a covering of the basin when climatic conditions renders this desirable.

Keywords: Small-craft mooring device; Small-craft service structure



3,509,772

HYDROGRAPHIC SAMPLING DEVICE

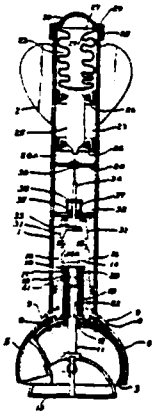
Alexander E. Blair, 75 Willow St., Marshfield, Mass. 02050

Filed May 22, 1968, Ser. No. 731,034
Int. Cl. G01n 1/04
U.S. Cl. 73—425.2 8 Claims

A hydrographic bottom sampling device which operates free of connection to any surface craft to sense the bottom to be sampled, operate a sample taking mechanism and return itself to the surface where it may be recovered. Bottom sensing is accomplished by a probe which extends downward below the device. On contact, the probe is pushed into the device and releases a spring loaded trigger mechanism. The trigger mechanism releases clam-shell scoops which rotate to take in a sample and close to contain it within a recess. The trigger mechanism also releases the return mechanism which consists of a deflated

Keywords: Instrument retrieval; Sampler, seabed grab

U.S. Cl. X.R. 9.8; 175-5



3,509,820

SEISMIC CHARGE ASSEMBLY, SEISMIC CHARGE PRIMER, AND METHOD AND SYSTEM EXPLORATION

Homer L. Fitch, Mount Arlington, N.J., and John F. Hamilton, Wilmington, Del., assignors to Hercules Incorporated, Wilmington, Del., a corporation of Delaware

Continuation-in-part of application Ser. No. 673,594, Oct. 9, 1967. This application Apr. 21, 1969, Ser. No. 818,476

Int. Cl. F42b *3/10;* F42c *1/00*

U.S. Cl. 102—24 28 Claims

The invention provides:

(1) A complete explosive charge assembly for offshore seismic exploration comprising a closed cartridge shell, and a small seismic explosive charge therein; and a percussion initiatable primer device for said charge extending into the detonating relationship therewith. The assembly is provided optionally with means for delay of the priming action for delayed detonation outside the firing system. The embodiment, with delay means, is now preferred.

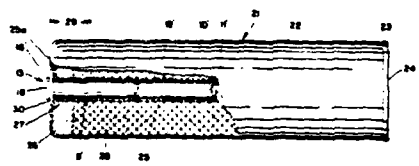
(2) A percussion initiatable primer device for the preferred embodiment of charge assembly comprising a combination of high explosive base charge, primer charge, delay fuse type composition and a percussion sensitive initiator means, generally an empty primed rifle cartridge casing, often for 0.22 caliber short ammunition.

(3) A seismic exploration method including the steps of delivering an above described delayed seismic charge assembly into an underwater seismic zone, and then impacting the assembly to percussion initiate it; and during the period of delay, directing the thus initiated assembly away from its point of initiation.

(4) A system for generating seismic disturbances under water utilizing a complete charge assembly above described, and including a movable platform, and associated means for loading and delivering the assemblies from the platform to an underwater seismic zone and there impacting same for the initiation; and detonation, to provide seismic energy.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 181-.5



3,509,948

PILE DRIVING SYSTEM

Pierre Besnard, Paris, France, Assignor to Societe Generale du Vide (Sogev), Paris, France, a corporation of France

Filed Sept. 20, 1968, Ser. No. 761,066

Claims priority, application France, Sept. 28, 1967, 122,627

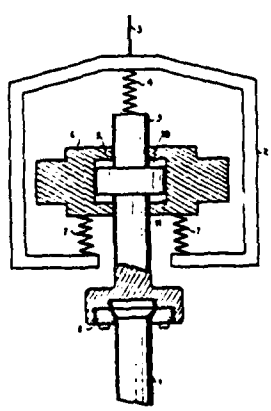
Int. Cl. E02d

U.S. Cl. 173—44 6 Claims

A housing, for example suspended on a crane or on pile driving guides, has a vibrator suspended therein by means of springs. The vibrator has an element movable in the direction to drive the pile and connect it thereto, as well as a reaction body. A first spring supports the reaction body within the housing and a second spring supports the housing on the movable element of the vibrating mass, so that the vibrating mass is low, while the static load of the weight of the entire vibrator and housing presses the pile to be driven into the soil.

Keywords: Pile driver, vibratory

U.S. Cl. X.R. 173-162; 175-56



3,509,959

UNDERWATER SEISMIC EXPLORATION SYSTEM AND FIRING DEVICE AND CHARGE THEREFOR

Homer L. Fitch, Mount Arlington, N.J., and Richard G. Guenter and Hugo Schlatter, Wilmington, Del., assignors to Hercules Incorporated, Wilmington, Del., a corporation of Delaware

Filed Apr. 29, 1968, Ser. No. 724,942
Int. Cl. G01v 1/12, 1/13, 1/38
U.S. Cl. 181—.5 29 Claims

The invention provides:

(1) A marine seismic system, in which explosively operated charges are initiated at a submersed firing station and then allowed to travel from the firing station for detonation outside the system;

(2) A firing mechanism as a now preferred firing station (per se, and also as a component of the above system) containing a combination of piston and muzzle structure for sequentially receiving, emplacing and initiating percussion initiatable seismic charges and then ejecting the initiated charges for detonation outside mechanism. Single, double and triple piston assemblies are disclosed;

(3) A marine seismic method including the steps of submersing a firing station, transporting charges to, and initiating them in, the firing station, and allowing the initiated charges to travel from the firing station for detonation;

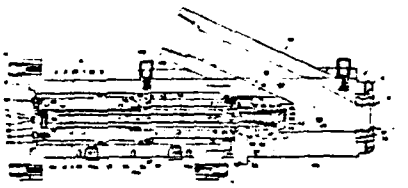
(4) A seismic cartridge unit, including booster well and seismic charge, having an external configuration for adaptation in the above firing mechanism; and,

(5) A complete seismic cartridge assembly comprising the above cartridge unit, and additionally, a percussion initiatable primer device, with delay fuse and with the explosive charge preferably of the NCN type.

Preferred embodiments utilize ejector means coupled to initiator means, for ejecting the initiated charges from the firing station for detonation; and, preferably, the system is applied to utilization of percussion initiatable NCN type charges containing a delay fuse in the primer element to delay the detonation until after the initiated charge is delivered from the system.

Keywords: Seismic explosive acoustic transmitter; Seismic survey method

U.S. Cl. X.R. 340-7; 340-8



3,509,961

UNDERWATER SEISMIC EXPLORATION

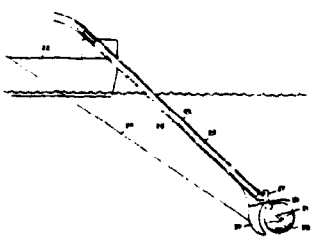
Homer L. Fitch, Mount Arlington, N.J., assignor to Hercules Incorporated, Wilmington, Del., a corporation of Delaware

Continuation-in-part of application Ser. No. 665,075, Sept. 1, 1967. This application Oct. 30, 1968, Ser. No. 773,371
Int. Cl. G01v 1/38, 1/12
U.S. Cl. 181—.5 6 Claims

A system for underwater seismic exploration in which a liquid-containing, expandable and contractable container disposed in water has an explosive charge detonated therein whereby the primary explosive pulse is enhanced and the secondary pulsations decreased to give an improved source of seismic waves.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 340-7; 340-12

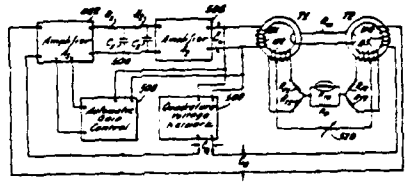


3,510,761
COMPENSATED SALINOMETER
Neil L. Brown, San Diego, Calif., assignor to The Bissett-Berman Corporation, Santa Monica, Calif., a corporation of California
Original application Mar. 4, 1963, Ser. No. 262,396, now Patent No. 3,419,796, dated Dec. 31, 1968. Divided and this application July 24, 1968, Ser. No. 765,720
Int. Cl. G01r 27/22
U.S. Cl. 324—30 9 Claims

This invention relates to a system for measuring the salinity of sea water. The system produces a first alternating signal in accordance with the salinity of the sea water. The system also produces a second alternating signal having a particular phase relationship transverse to the phase of the first signal. The first and second signals are combined in the system to produce a resultant signal having a phase dependent upon the characteristics of the first signal. The resultant signal is used in the system to obtain variations in the frequency of the first signal in accordance with the characteristics of the resultant signal. In this way, the frequency of the first signal indicates the salinity of the sea water.

Keywords: Salinity measurement

U.S. Cl. X.R. 324-57

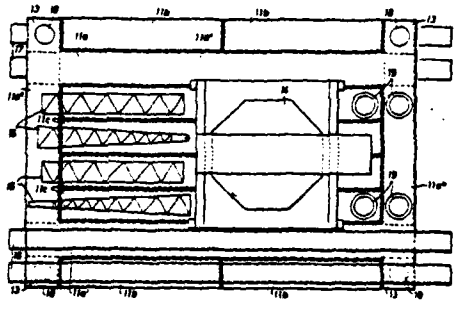


MAY 12, 1970

3,511,057
ERECTION AND CONSTRUCTION OF MULTISPAN BRIDGES AND PIERS
Bruno Suter, Hubertushone, Germany, assignor to Strabag Bau-AG., a corporation of Germany
Filed Oct. 14, 1968, Ser. No. 767,179
Int. Cl. E02b 17/00
U.S. Cl. 61—46.5 9 Claims

An apparatus for and a method of erecting multiple-span bridges or piers wherein the foundations and piles are laid from a supporting structure which floats to a prearranged area and while mounted on auxiliary supports the piles are constructed for each span, each new span becoming a supporting structure which rests on piles that have already been installed and auxiliary supports which are displaceable along the bridge, by means of construction plant arranged on the supporting structure such as lifting gear, pile drivers and so on.

Keywords: Offshore construction; Pier, fixed



3,511,092

BATHYTHERMOGRAPHIC PROBE FOR UNIFORM DESCENT RATE

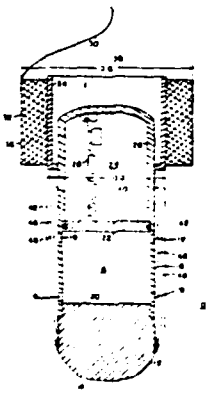
Roger I. Saunders, Hollis, N.H., assignor to Sanders Associates, Inc., Nashua, N.H., a corporation of Delaware

Filed Oct. 14, 1968, Ser. No. 767,418
Int. Cl. G01k 13/00
U.S. Cl. 73—344 3 Claims

A probe, adaptable for sensing a property of a fluid relative to a given dimension, whose buoyancy varies as a function of wire carried and payed out by the probe as it travels along that dimension. Means are provided for varying the velocity of the probe by varying the drag force on it as a function of the wire payed out to compensate for the variation in velocity of the probe caused by the variation in buoyancy thereof as the wire is payed out.

Keywords: Bathythermograph; Instrument deployment

U.S. Cl. X.R. 73-170



3,511,325

DEVICE FOR EXTRACTING PILES OR THE LIKE

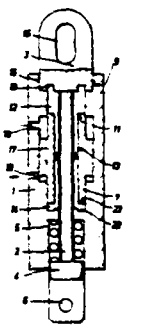
Paul Schmidt, Saalhausen, Sauerland, Germany, assignor to Tracto Technik Paul Schmidt, Saalhausen, Sauerland, Germany

Filed Nov. 8, 1968, Ser. No. 774,427
Claims priority, application Germany, Nov. 15, 1967, T 35,252
Int. Cl. E02d 7/06, 9/00
U.S. Cl. 173—131 6 Claims

An extractor device for extracting piles, sheet piles, jammed drill rods or like structures of the kind comprising a tension rod for attachment to the structure to be extracted, a crosshead fixed to the top of the tension rod and an impact hammer in the form of an annular piston which surrounds the tension rod and moves upwards and downwards within a cylinder mounted on the tension rod to provide impacts on the crosshead at each upward stroke, is provided with a buffer chamber at the top of the cylinder, the chamber being filled with buffer liquid with which the piston comes into contact at the end of its working stroke so that the impact is applied to the crosshead through the liquid. This provides a cushioning effect which greatly reduces the noise produced by the device.

Keywords: Pile extractor

U.S. Cl. X.R. 92-85; 173-91; 173-132

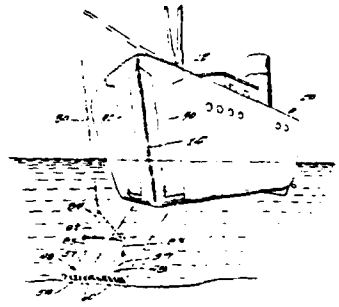


3,512,280
SUCTION DREDGING APPARATUS
James Di Perna, 85 Foxhill Terrace,
Staten Island, N.Y. 10305
Filed Oct. 13, 1967, Ser. No. 675,102
Int. Cl. E02f *3/94, 3/92*
U.S. Cl. 37—57 2 Claims

A dredging apparatus on a floating vessel having a bottom deck and prow, there being mounted on the bottom deck a suction pump and inlet pipe lines thereto adjacent to the prow, and below the water level. At least one dredging swing pipe is pivotally jointed to the pump inlet pipe line at the bottom deck level and at the prow of the vessel. Formed in the prow is a substantially vertical recess in which the swing pipe is received when raised into inoperative position. Secured to the swing pipe is a cover plate which completely closes the recess when the swing pipe is in raised position. A winch and derrick on the top deck of the vessel is cable connected to the free end of the swing pipe to manipulate the same. Carried at the free open end of the swing pipe is a nozzle within which is a rotatable toothed roller for crushing clods, rocks, etc., and extending forwardly of the nozzle is a ground engaging cutter blade.

Keywords: Dredge, cutterhead

U.S. Cl. X.R. 37-66

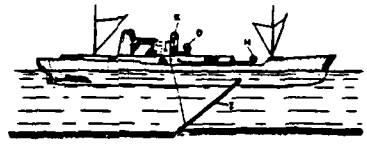


3,512,281
SWELL COMPENSATOR FOR A DRAG SUCTION DREDGER
Achilles Hadjidakis, The Hague, Netherlands, assignor to Mineraal Technologisch Instituut, Delft, Netherlands
Filed Nov. 24, 1967, Ser. No. 685,366
Claims priority, application Netherlands, Nov. 28, 1966, 6616728
Int. Cl. E02f *3/88;* G05b *5/01*
U.S. Cl. 37—58 5 Claims

A swell compensator for the suction pipe of a drag suction dredger has an indicating device which rises and falls opposite to the direction of the dredger in the swell. Switches on either side of the median position of the indicator actuate an integrator so that upon excessive frequency and/or duration of actuation of the switches on one side of the median position, the motor for the suction pipe winch is actuated in a direction to return the indicator to its median position.

Keywords: Dredge ladder control; Dredge, suction

U.S. Cl. X.R. 37-72; 254-172; 254-173; 318-448; 340-266



3,512,408
BATHOMETER
Robert H. Douglass, Jr., Manhattan Beach, Calif., assignor to TRW Inc., Redondo Beach, Calif., a corporation of Ohio
Filed Dec. 8, 1967, Ser. No. 689,013
Int. Cl. G01k *1/02*
U.S. Cl. 73—170 6 Claims

A bathometer for determining ocean water temperaature at programmed intervals of vertical distance from preselected ocean depth to the ocean surface, and for recording and subsequent transmission of the data to a remote receiving station. A housing and ballast are submerged to the preselected ocean depth and the ballast jettisoned. The ballast-free housing executes a turn around and ascends to the ocean surface while simultaneously measuring and recording ocean water temperature. Upon reaching the ocean surface, an antenna is deployed and the recorded data is transmitted to a remote station.

Keywords: Bathythermograph; Depth pressure measurement; Instrument deployment

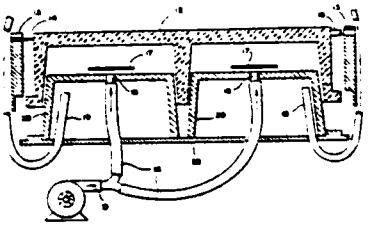
U.S. Cl. X.R. 73-343; 73-362

3,512,492
FLOATING STRUCTURE AND METHOD OF MAKING
Glenn Edward Hagen, Barataria Seaway, Lafitte, La. 70067
Filed Jan. 31, 1968, Ser. No. 701,960
Int. Cl. B63b *35/00;* B63c *1/02*
U.S. Cl. 114—.5 1 Claim

An open-bottomed floating structure, e.g. a platform, of molded material, particularly concrete, having tapered skirts. Air escapes holes are included near the bottom of the outer skirts and air injection means of minute dimensions are located in the inner skirts or baffles, both for stabilization purposes. The method of manufacture includes immersing the mold and molded structure in water, bushing the mold and pumping air between the structure and mold, thereby releasing the structure to float to the surface. The mold is then resurfaced to be reused.

Keywords: Concrete form; Pier, floating

U.S. Cl. X.R. 264-34



3,512,592

OFFSHORE DRILLING METHOD AND APPARATUS

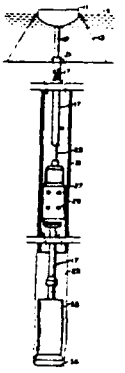
Jackson M. Kellner, *Houston, Tex., assignor to Esso* Production Research Company, a corporation of Delaware

Filed Mar. 14, 1968, Ser. No. 712,973
Int. Cl. E21b *7/12*; E21c *9/00*
U.S. Cl. 175—5 6 Claims

A method for coring unconsolidated subsurface formations from a floating drilling vessel wherein the upper portion of the drill string moves in response to vertical motion of the vessel and the lower portion is held in a fixed vertical position as the string is rotated. The apparatus employed generally includes a drill string containing an anchor member which permits rotation of the drill string but prevents vertical movement of the string below it, a slip joint in the drill pipe above the anchor member, and a rubber sleeve core barrel or similar device attached to the lower end of the drill string.

Keywords: Sampler, seabed-drilled core

U.S. Cl. X.R. 175-230



MAY 26, 1970

3,513,709

FLUID SAMPLER

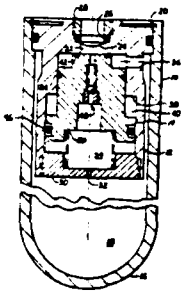
Vlash A. Pullos, 1441 S. Loara, Anaheim, Calif. 95125

Filed Jan. 21, 1969, Ser. No. 792,379
Int. Cl. G01n *1/10*
U.S. Cl. 73—425.4 9 Claims

The disclosed embodiment of the present invention is a device for extracting a sample of the water from the ocean. The device is generally formed of a housing and means in an opening of the housing for controlling fluid communication between the ambient surroundings and the inside of the housing in response to ambient pressure. A portion of the housing forms a fluid reservoir for accumulating the sample of water therein. The fluid communication means includes a rupturable disc across the opening in the housing and a piston which restricts fluid communication between the external surroundings and the inside of the housing and which is exposed to ambient pressure upon rupture of the disc. The piston is mounted for movement within the housing upon the application of ambient pressure thereto to permit fluid communication between the external surroundings and the inside of the housing. In one disclosed embodiment of the present invention, a time delay is provided for applying ambient pressure to the other side of the piston, which ambient pressure produces a force on the piston to move it to the closed position thereof. A second disclosed embodiment of the present invention includes a rupturable disc in one end of the piston which is ruptured upon the application of ambient pressure thereof to move the piston to its closed position.

Keywords: Depth pressure measurement; Sampler, water

U.S. Cl. X.R. 73-170



3,513,797

ENERGY-ABSORBING BEACH FOR SHIP'S WELLS AND TANKS

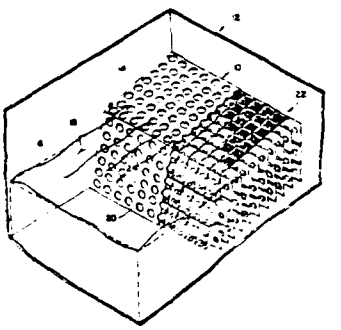
Ernst G. Frankel, Boston, Mass., assignor to Litton Systems, Inc., Beverly Hills, Calif., a corporation of Maryland

Filed Aug. 21, 1968, Ser. No. 754,214
Int. Cl. B63b 43/06
U.S. Cl. 114—125 1 Claim

A beach device which traps and absorbs the energy produced by a moving liquid disposed in a container, tank or well structure. The device includes a perforated material for guiding the moving liquid onto a ramp surface and into engagement with a structure disposed underneath the ramp, which structure has resilient properties and a multitude of surfaces for substantially deflecting, dissipating and absorbing the energy.

Keywords: Hydraulic model basin; Wave absorber beach

U.S. Cl. X.R. 61-4



JUNE 2, 1970

3,514,881

APPARATUS FOR ADJUSTING THE SUCTION SLOT IN A DRAG SUCTION DREDGER

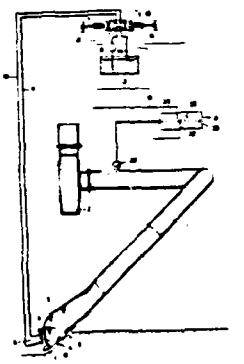
Achilles Hadjidakis, The Hague, Netherlands, assignor to Mineraal Technologisch Instituut, Delft, Netherlands

Filed Oct. 6, 1967, Ser. No. 673,515
Claims priority, application Netherlands, Oct. 6, 1966, 6614098
Int. Cl. E02f 3/92
U.S. Cl. 37—58 1 Claim

A drag suction dredger has a suction pipe at least a portion of whose suction head is automatically vertically adjustable according to the suction upstream of the pump. When the suction is above or below a predetermined range, a portion of the suction head is swung up or down to increase or decrease the width of the slot between the suction head and the soil, thereby to return the suction to a value within the predetermined range.

Keywords: Dredge intake; Dredge, suction

U.S. Cl. X.R. 138-104; 302-15



3,514,959

PEDESTAL TIMBER PILE SHOE

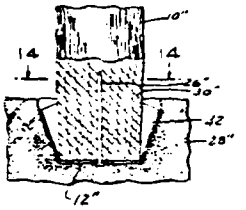
John J. Dougherty, Jr., 262 Rutherford Blvd., Franklin Lakes, N.J. 07014

Filed Sept. 3, 1968, Ser. No. 756,841
Int. Cl. E02d 5/26
U.S. Cl. 61—53 1 Claim

A shoe for the bottom end of a timber pile having a flat body with peripheral radial wings adapted to be bent against the side surface of the timber pile. The flat body has a central hole for receiving a fastening element for fastening the shoe to the pile.

Keywords: Pile-driving shoe; Pile, wood

U.S. Cl. X.R. 52-300



3,515,654

METHOD AND APPARATUS FOR REGULATING SUPPLIED CURRENT IN CATHODIC PROTECTION

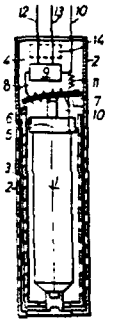
Knut Bordalen, Stabekk, near Oslo, and Eilif Risberg, Oslo, Norway, assignors to Sentralenstitutt for Industriell Forskning, Oslo, Norway

Filed May 25, 1965, Ser. No. 458,630
Int. Cl. C23f 13/00
U.S. Cl. 204—147 9 Claims

Regulation of cathodic protection of metal constructions in electrolyte solutions where inert anodes are connected to a source of electricity and where such regulation is by mechanical means. The mechanical means varies the permitted flow of electrolyte to and from the anode by perforated screens overlying the anode and adjustable with respect to each other to vary the size of the perforations. Movement of the screens may be effected by bi-metal elements heated by the anode current in turn controlled by a reference electrode in the solution. Such mechanical means may be concentric perforated cylinders, expandable and contractable resilient means operable to close or open passages to said anode or may include means for varying the shapes of individual anodes or varying the position of adjacent anodes with respect to each other.

Keywords: Cathodic protection; Corrosion prevention

U.S. Cl. X.R. 204-196; 204-197; 204-228



3,515,889

POWER GENERATION APPARATUS

Archer W. Kammerer, Fullerton, Calif., assignor of one-fifth each to Jean K. Lamphere and Archer W. Kammerer, Jr., both of Fullerton, Calif.

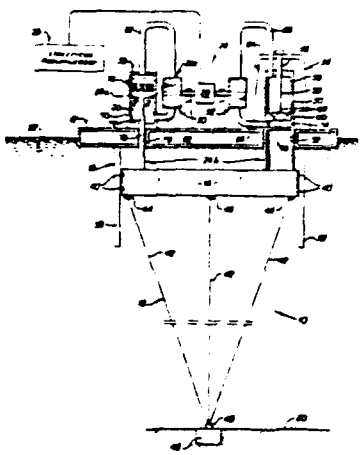
Continuation-in-part of application Ser. No. 627,948, Apr. 3, 1967. This application Aug. 14, 1967, Ser. No. 662,842

Int. Cl. F03b *13/10, 13/12*

U.S. Cl. 290—53 23 Claims

A floating wave-driven power generating station having a buoyant structure or platform to float at the surface of a body of water, a float to be anchored in a generally stationary submerged position below the platform in such a way that surface waves cause the platform to rise and fall in a vertical reciprocating motion relative to the float, and power generating means connected to and operated by the wave-induced relative reciprocating motion of the platform and float for transforming the kinetic energy of the rising and falling platform into useful energy, such as electrical power.

Keywords: Electrical generator; Power, wave; Pump



3,516,053

SPARK GENERATOR

Jacques Cholet, Rueil-Malmaison, and Jean Claude Dubois, Royan, France, assignors to Institut Francois du Petrole des Carburants et Lubrifiants, Rueil-Malmaison, Hauts-de-Seine, France

Filed July 3, 1967, Ser. No. 650,677

Claims priority, application France, July 6, 1966, 68,499

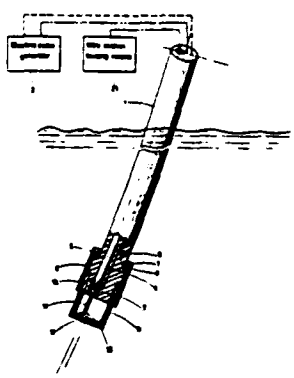
Int. Cl. G01v *1/28*

U.S. Cl. 340—12 7 Claims

A spark generator is described for use in underwater seismic prospecting. The spark generator comprises one pair of electrodes insulated from each other and respectively connected to the two terminals of a high energy source of electric current. A metallic exploding wire section having two ends which are respectively in contact with the ends of the pair of electrodes is also provided. A first electrode of the pair is secured substantially at the immersed end of a tube of insulating material dipping into the water, and the second electrode of the pair, also fixed at the immersed end of the tube, comprises an element which is external to the tube and forms in abutment in alignment with the inner passage of the tube at its immersed end. The tube is provided at its unimmersed end with exploding wire sections associated with means for stiffening the wire section along the length thereof substantially equal to the distance between the two electrodes of the pair. The stiffening means is destructible upon explosion, and means are provided for conveying the wire sections from the unimmersed end to the immersed end of the tube.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 181-.5



3,516,255

CONCRETE COMPONENT OR BLOCK FOR A PROTECTIVE COVERING STRUCTURE

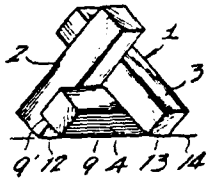
Tatsuo Akamatsu, Wakayama, Japan, assignor of one-half each to Tatsua Akamatsu, Wakayama, Japan, and Mitsui Real Estate Co., Ltd., Tokyo, Japan, a corporation of Japan, jointly

Filed July 23, 1968, Ser. No. 746,938
Int. Cl. E02b 3/12
U.S. Cl. 61—37 10 Claims

A concrete component or block for a protective covering structure which is adapted to protect breakwaters, harbour or river walls and other marine constructions and beaches which are subjected to wave action, comprising a molded concrete mass including three integrally molded elongated pillar members having substantially the same dimensions and cross-section and disposed substantially in the same angular relation to one another each having the length to width or diameter ratio of substantially 4 to 1. A protective covering structure comprising a plurality of such concrete components interlocked with each other in a uniform or random manner.

Keywords: Breakwater, rubble; Concrete armor unit; Seawall; Slope protection

U.S. Cl. X.R. 256-1



3,516,259

OFFSHORE STRUCTURE METHOD AND APPARATUS

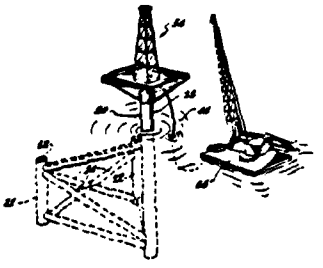
Alpo J. Tokola, Lafayette, Calif., assignor to Kaiser Steel Corporation, Oakland, Calif., a corporation of Nevada

Filed Sept. 12, 1966, Ser. No. 578,681
Int. Cl. E02d 21/00
U.S. Cl. 61—46.5 6 Claims

Method of constructing and installing an offshore supporting structure and the resulting structure wherein the structure is initially provided with a plurality of legs disposed in a polygonal arrangement and in a spaced relationship to one another and wherein at a preselected time and after installation of the structure at an offshore site the tops of all but one of the legs of the structure are caused to be terminated at a level substantially below a selected water level at the site.

Keywords: Ice protection; Offshore construction; Offshore mooring structure; Offshore platform, fixed; Offshore platform, leg

U.S. Cl. X.R. 61-48; 61-52



3,516,291

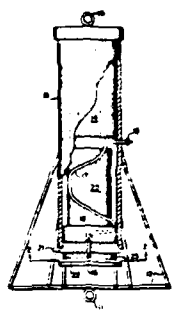
DIRECTION AND RATE OF FLOW MEASURING INSTRUMENT

Gilbert Jaffe, District Heights, and Joseph A. Kuhn, Jr., Kensington, Md., assignors to the United States of America as represented by the Secretary of the Navy

Filed May 24, 1968, Ser. No. 732,001
Int. Cl. G01d 21/02
U.S. Cl. 73—189 9 Claims

A method and apparatus for measuring the direction and rate of flow of a moving fluid, such as ocean currents. A fluid dispenser ejects a small quantity of tracer fluid having an electrical conductivity which differs from the conductivity of the fluid being studied. The flow rate is determined from the time required for the tracer fluid to be carried from the dispenser to one of a plurality of detectors which are equidistant from the dispenser. The direction of the flow is determined from the location of the particular detector which senses an abrupt change of conductivity as the tracer passes.

Keywords: Current measurement



3,516,503

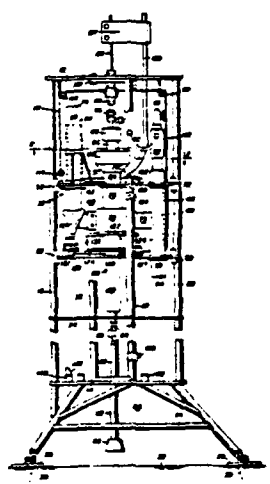
ELECTRICALLY CONTROLLED AND POWERED SUBMARINE ROTARY CORER SYSTEM

Ernest F. Mayer, Palo Alto, Ward Brannon, San Jose, and Edwin S. Schaller, Jr., Los Gatos, Calif., and Frank C. Pickard, Chatham, N.J., assignors to the United States of America as represented by the Secretary of the Interior

Filed Dec. 23, 1968, Ser. No. 785,918
Int. Cl. E21b 7/12
U.S. Cl. 175—6 5 Claims

Core sample drilling apparatus which is made operable when stationed on a sea floor. A carriage guided for vertical displacement in the apparatus supports self-contained pump and drill drive mechanism governed by interrelated remote and internal control devices. Included is an internal control device for automatically connecting the drill drive to a carriage retracting mechanism at the end of the drilling stroke.

Keywords: Sampler, power supply; Sampler, seabed-drilled core



3,516,917

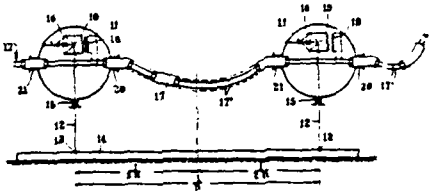
CATHODE PROTECTION DEVICE

Alexandre Maurin, 16 Rue de Varize, Paris 16°, France

Filed Sept. 12, 1966, Ser. No. 578,817
Claims priority, application France, Sept. 11, 1965, 1,462,276; Nov. 16, 1965, 89,053; Dec. 15, 1965, 89,491
Int. Cl. C23f *13/00*
U.S. Cl. 204—196 14 Claims

A cathode protection device for an immersed structure which is characterized in that it comprises a series of elementary protection D.C. sources fed in parallel from a single current source, in that each elementary current source is located within a water-tight immersed enclosure, the outer wall of the enclosure acting as or carrying a current outlet, and that said enclosure comprises two current lead-ins, one for the wires feeding the current source and the other for permitting the negative connection for protecting the structure, this other lead-in being therefore connected thereto.

Keywords: Cathodic protection; Corrosion prevention



JUNE 30, 1970

3,517,514

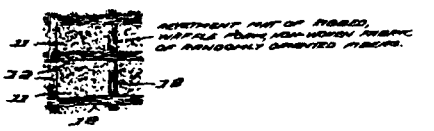
SOIL PROTECTION MATS

Christiaan Visser, deceased, late of Berwijk, Netherlands, by B. M. A. Batenburg, executor, Beverwijk, Netherlands, assignor to C. J. Vrendenberg, Nunspeet, and N.V. Vereenigde Touwfabrieken, Rotterdam, Netherlands

Filed Mar. 8, 1968, Ser. No. 712,336
Int. Cl. E02b *3/12*
U.S. Cl. 61—38 10 Claims

Revetment mats of non-woven fabrics having randomly oriented fibers are disclosed. Staking to a bank densifies the fabric about the stake rather than widening its meshes as occurs with woven fabrics. Polypropylene fibers are used. They resist attack by *Eriocheir sinensis*. Combinations of natural and synthetic fibers are employed; the decay of the former restores porosity to the fabric when soil tends to clog the same. Bundles of long loose fibers are fastened in the mats. They extend upwardly therefrom into the water. They cause mud particles in the water to deposit on the mats. This aids in securing the mats and in land reclamation work. Waffle-like formation may be used. The ribs strengthen the fabric. The compartments between ribs are thin and have relatively great permeability. Ribs or strips of polyester material reinforced with glass fiber may be attached. Strength and rigidity are correspondingly increased.

Keywords: Artificial seaweed; Fabric mat; Revetment; Slope protection



3,517,516

FOLDING SUPPORT STRUCTURE FOR OFFSHORE DRILLING PLATFORMS

Robert G. Bea, Houston, Tex., assignor to Shell Oil Company, New York, N.Y., a corporation of New York

Filed July 31, 1968, Ser. No. 749,182
Int. Cl. E02b *17/02*
U.S. Cl. 61—46.5 8 Claims

An offshore drilling structure having a buoyant, selectively floodable base unit and a plurality of buoyant, selectively floodable leg units pivotally attached to said base unit whereby the structure can be set-up by towing the entire assembly on the surface of a body of water to a predetermined offshore location, lowering the assembly to the water floor by flooding the base unit and legs, and pivoting the leg units upwardly to form a composite offshore drilling structure.

Keywords: Offshore construction; Offshore platform, fixed; Offshore platform, leg
U.S. Cl. X.R. 52-.5; 52-114; 52-116; 287-20.92

3,517,517

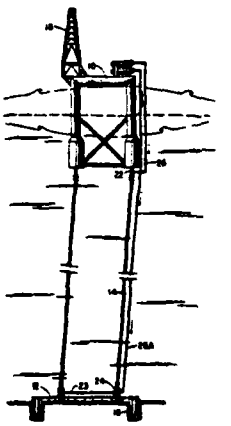
ENCAPSULATED CABLE FOR MARINE USE

Kenneth A. Blenkarn, Tulsa, Okla., assignor to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware

Filed Sept. 19, 1968, Ser. No. 760,895
Int. Cl. B63b *35/44*; E02b *17/00*
U.S. Cl. 61—46.5 11 Claims

This invention relates to a system for mooring a floating structure to the ocean floor. Load-bearing steel cables are preserved within non-load-bearing metal pipes. The cable connects the floating structure to anchors at the base of the body of water. Special terminations are provided which limit the curvature of the flexing of the cable. A non-corrosive fluid is contained within the encapsulating pipe.

Keywords: Corrosion prevention; Offshore platform anchor; Offshore platform, floating
U.S. Cl. X.R. 166-5; 166-6; 175-7



3,517,812

PROCESS AND APPARATUS FOR REMOVING FLOATING WASTES FROM WATER SURFACES

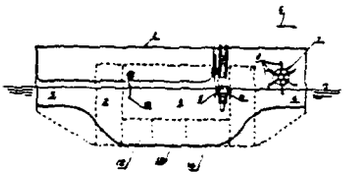
Dario Bucchioni, Via Bengasi 19, and Mirella Forgione De Toffoli, Viale Nazario Sauro 35, both of Leghorn, Italy

Filed Sept. 28, 1967, Ser. No. 671,405
Claims priority, application Italy, Oct. 4, 1966, 28,252/66; Jan. 12, 1967, 1,080/67
Int. Cl. B01d 17/02
U.S. Cl. 210—73 8 Claims

A process for removing oily and other floating wastes from water surfaces comprises flowing at least the upper water layer through a canal and under at least one floodgate immersed a selected distance in the water and extending transversely of the direction of flow. The cross section of the canal is markedly increased under the floodgate, for example by increasing the depth of the canal, in order to decrease the velocity of the water and promote decantation. Wastes collecting in front of the floodgate are led off with a portion of the water to at least one decantation tank where the wastes are separated from the water. Apparatus for carrying out the process comprises a canal and at least one floodgate extending transversely of the canal and immersed to a selected depth in the water. Under the floodgate the depth of the canal is markedly increased to decrease the speed of the water. Means is provided for removing and decanting wastes collected in front of the floodgate.

Keywords: Pollutant collection; Pollutant removal watercraft

U.S. Cl. X.R. 210-84; 210-242; 210-255; 210-262; 210-540



3,518,183

PROCESS FOR SEPARATION OF OIL FILMS FROM WATER

Anthony C. Evans, Redondo Beach, Calif., assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware

No Drawing. Filed June 9, 1969, Ser. No. 831,728
Int. Cl. B01d 17/02
U.S. Cl. 210—40 5 Claims

Hydrocarbon oil films may be removed from the surface of water by applying a large surface area of a block copolymer to the oil, absorbing the oil into the block copolymer, and separating the oil impregnated block copolymer from water.

Keywords: Pollutant absorption

U.S. Cl. X.R. 210-502; 260-880

No Figure

3,518,677

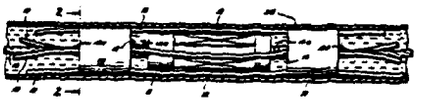
ELECTRIC MARINE CABLE

Eugene F. Florian, Houston, Tex., assignor to Mark Products, Inc., Houston, Tex.

Filed Sept. 16, 1968, Ser. No. 762,284
Int. Cl. G01v 1/38
U.S. Cl. 340—7 7 Claims

A marine electric cable is disclosed for towing through water for the detection of underwater sound. The cable includes a central core of flexible material to provide the cable with tensile strength. A plurality of sound detectors are spaced along the central core and conductors are provided to connect the sound detectors to a recorder. This assembly is encased in an outer sheath of flexible material, which is filled with a gelatinized material, having good sound transmitting qualities.

Keywords: Seismic streamer cable



JULY 7, 1970

3,518,835

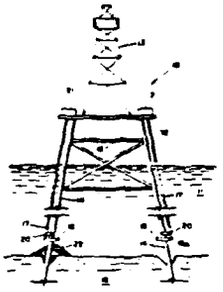
METHOD FOR ALLEVIATING SCOURING ABOUT A MARINE STRUCTURE

George W. Perry, Le Vesinet, France, assignor to Mobil Oil Corporation, a corporation of New York

Filed July 15, 1968, Ser. No. 744,993
Int. Cl. E02d 3/14
U.S. Cl. 61—46
8 Claims

A method for alleviating scouring around the legs of a marine structure which are partially embedded in the bottom of a body of water. The method comprises the placement of an insoluble, unconsolidated, particulate, antiscouring material having a specific gravity of four or greater in masses about the lower ends of each leg. The antiscouring material is preferably selected from materials which are normally used for weighting drilling muds, e.g., iron oxide, lead shot, celestite, and barite. Of these, barite is preferred due to its ready availability and relatively low cost. This material by having substantially greater density than that of the naturally occurring materials which normally comprise the bottom of the water will resist scouring and will fill any excavations caused by scouring of sand or gravel from the legs. It will thereby maintain a firm foundation about the legs and prevent shifting of the structure.

Keywords: Offshore platform, leg; Seabed material placement; Seabed scour protection
U.S. Cl. X.R. 61-1; 61-36; 61-46.6



JULY 14, 1970

3,520,117

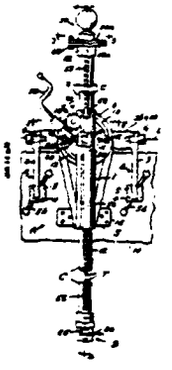
UNDERWATER WEED CUTTER MECHANISMS

Rudolph J. Pepke, Cleveland, and Charles E. Metzler, Avon, Ohio, assignors to R-C Water Weeder Company, Inc., Cleveland, Ohio, a corporation of Ohio

Continuation-in-part of application Ser. No. 538,491, Mar. 24, 1966. This application Nov. 30, 1967, Ser. No. 692,619
Int. Cl. A01d 45/08
U.S. Cl. 56—8
11 Claims

An underwater, weed cutting unit wherein the scythe-type cutter blade, during weed-cutting operations thereof incident to forward movement of a supporting boat, is held in cutting position by a torque rod-type supporting shaft in a tubular casing mounted in normally fixed upright position on the boat hull. The supporting shaft has a plurality of torsionally rigid sections and interposed leaf spring-like, twistably flexible sections designed for strong torque spring reactance to the cutting operation. Suitable adjustment means enables the cutter blade to project from a lower end portion of the supporting shaft at or into whatever angular positions, as about a vertical axis, are or may be found to be most effectual in respect to the particular weed growths, depths or other variables that are encountered. The cutter blade is raised and lowered by a rack and pinion mechanism; and the rack is manually releasable via a pawl biased to engage the rack. An adjustable jacking device, as between the tubular casing and the boat hull, enables the cutter blade to be disposed selectively at whatever angles, relative to a "normal" horizontal position of the blade are necessary in order to cut growths lying adjacent sloping shore surfaces, at approximately uniform heights.

Keywords: Water plant removal
U.S. Cl. X.R. 56-25

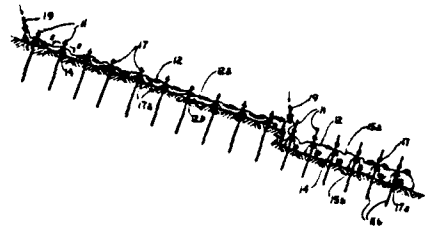


3,520,142
METHOD AND MEANS FOR PROTECTING AN EARTH SITUS AGAINST SCOUR

Lee A. Turzillo, Bath, Ohio
(2078 Glengary Road, Akron, Ohio 44313)
Filed Mar. 28, 1968, Ser. No. 716,965
Int. Cl. E02b 3/04
U.S. Cl. 61—38 20 Claims

Method and means for forming protective liner over a substantial surface area of an earth situs by injection of self-hardenable cementitious material into flexible bag means. Stop means on rigid tie elements, extending through bag superposed walls, variable before or during injection to vary expansion of bag for selective control of effective thickness of liner. Extension of tie elements into situs anchors bag walls against lateral movement and maintains adjusted position of stop means. Positioning of anchored tie elements in selectively varied spacing functions to adjust bag means accordion-style, lengthwise and/or widthwise of bag means, to cover a wide range of sizes or extents of surface areas of the situs with use of same given size of bag means.

Keywords: Concrete form; Fabric mat; Low-cost shore protection; Revetment; Slope protection

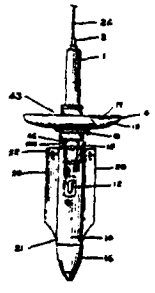


3,520,268
BALLISTICS EMBEDMENT ANCHORS

Bernal L. Bower, 2972 Pemba Drive,
Costa Mesa, Calif. 92626
Filed June 22, 1967, Ser. No. 654,301
Int. Cl. B63b 21/28
U.S. Cl. 114—206 32 Claims

An embedment anchor utilizing a combination of ballistics, inertial, and jetting driving means for providing deep penetration into a body of material from which location the anchor, although being a relatively light weight mechanism, is capable of resisting large vertical or horizontal, intermittent or continuous strains from any direction over a long duty life. A large portion of the propellant gases under internal ballistics pressures is retained in the anchor following its separation from the reactor, and the thermodynamic energy remaining to these gases is utilized to provide additional penetration into the body of material. Pressure staging is employed to adapt gas working pressure to the ability of the anchor structure to withstand stresses resulting from these internal ballistics pressures, making possible a considerable saving in weight. The anchor includes means for maintaining propulsion chamber pressure constant from short start to anchor and reactor separation thus greatly increasing anchor overall efficiency over current design. Impulse of the shot is reacted by maintaining a large pressure differential across a portion of the reactor during the ballistics phase of penetration. The anchor reactor is utilized also for providing a protecting shroud and fair-lead for the mooring cable, and footing in the body of material against which the cable bears preventing large unit loads being placed directly on the material by the mooring cable. A novel working seal for stopping high temperature gas at ballistic pressures, and also having other ordnance application, is disclosed.

Keywords: Embedment anchor



3,520,269

ANCHOR ASSEMBLY

Keith S. Yett, Seattle, Wash., assignor, by mesne assignments, to the United States of America as represented by the Secretary of the Navy

Filed Aug. 19, 1968, Ser. No. 753,372
Int. Cl. B63b 21/26
U.S. Cl. 114—206 2 Claims

An anchor assembly providing buoyant underwater oceanographic and acoustic instrumentation equipment with a fixed location and orientation, in the shape of a square, sharp-edged, inverted, cast iron cup having a plurality of carbon steel eye bolts secured thereto and a plurality of apertures passing therethrough to vent water trapped in the cup during deployment. The edge of the cup along the lip is sharp enough to penetrate the ocean bottom on contact such that the side walls of the cup become embedded in the bottom.

Keywords: Buoy mooring system; Corrosion prevention; Instrument deployment

3,520,412

NEMATODE EXTRACTION DEVICE

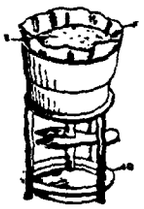
Morton Frank, 210 W. 19th St., Deer Park, N.Y. 11729, and Sol Lesh, 39 Monterey Drive, New Hyde Park, N.Y. 11040

Filed Mar. 1, 1968, Ser. No. 709,659
Int. Cl. B01d 37/00
U.S. Cl. 210—73 2 Claims

The invention relates to a means for extracting nematodes, which are microscopic worms, from soil samples, mud, sand, animal tissues, algae and the like. The principle of operation is based on the ability of living nematodes in a sample of soil or other substratum to pass through a membrane, such as filter paper, to be captured in an external water solution. Primarily, the invention comprises a soil sample chamber and water chamber terminating in a downwardly disposed spout, wherein a soil sample enclosed in filter paper is placed within the sample chamber and inundated with water. Following a period of time, such as 24 hours, the nematodes will be found to have filtrated through the filter paper into the water chamber into the spout, the water of which can be drawn off into an examination dish in small amounts for examination and study of the nematodes therein by a microscope.

Keywords: Sampler, biota

U.S. Cl. X.R. 210-250; 210-477



3,520,790
DEVICE FOR PREVENTING MARINE CREATURES FROM STICKING

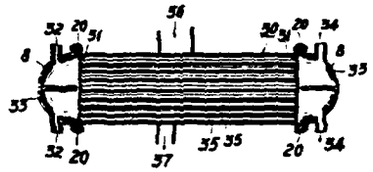
Mutsuro Araki and Sotojiro Hamada, Yokohama-shi, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 2, 1966, Ser. No. 569,667
Int. Cl. C23f *13/00*; F28f *13/00*
U.S. Cl. 204—196 1 Claim

A device for preventing clinging of marine creatures to the inner surface of a sea water conduit. An electrode assembly is situated in the conduit adjacent to the surface thereof to which marine creatures are not to cling. An electrical circuit coacts with this electrode assembly to generate from ions which dissolve in the sea water and inhibit the clinging of the marine creatures to the surface of the conduit, and a suitable mounting structure is provided for mounting the electrode assembly on the inner surface of the sea water conduit.

Keywords: Cathodic protection; Fouling prevention

U.S. Cl. X.R. 165-134; 165-157; 204-147; 204-149; 204-280; 204-284; 204-286



JULY 21, 1970

3,521,387
DREDGING MACHINE

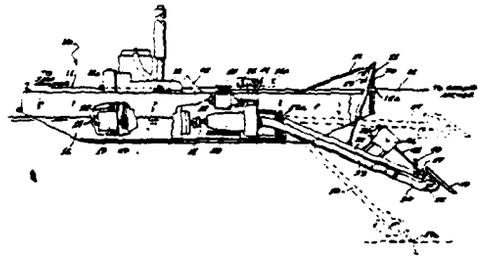
Norbert V. Degelman, 6283 Central Ave., Fridley, Minn. 55421

Continuation of application Ser. No. 522,703, Jan. 24, 1966. This application Apr. 4, 1969, Ser. No. 814,232
Int. Cl. E02f *3/92*; A01d *45/08*
U.S. Cl. 37—66 1 Claim

A dredging machine with a forwardly projecting boom to be raised and lowered to the bottom of the body of water, the boom carrying a suction head and a pair of transversely extending augers with teeth to dig and move the dredge material inwardly toward the suction head, there being a notched plate above the augers and digging teeth to cooperate therewith in moving the dredged material. The dredge is movable in a fore and aft direction whereby to produce digging and dredging all along the length of the augers.

Keywords: Dredge, cutterhead; Dredge intake; Dredge propulsion; Water plant removal

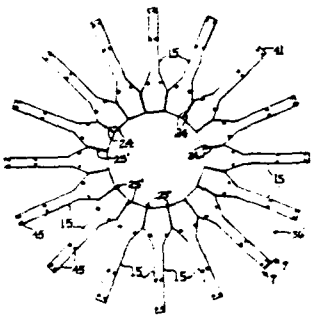
U.S. Cl. X.R. 37-72; 37-115; 37-189; 56-9



3,521,588
MOVABLE FLOATING BOAT ANCHORAGE
Gerald D. Atlas, 2940 W. Balmoral,
Chicago, Ill. 60625
Filed Nov. 20, 1968, Ser. No. 777,349
Int. Cl. B63b 35/00
U.S. Cl. 114—.5 9 Claims

A movable floating boat anchorage of modular construction for a multiplicity of boats, the modules of such anchorage providing therebetween individual boat slips. The corresponding inner end portions of the modules have substantially identical configuration in plan view and in side-by-side abutment with respect to each other to permit various arrangements of the modules, i.e., with the modules defining a circular anchorage in plan view or of longitudinal formation or other forms and arrangements as conditions may require.

Keywords: Pier, floating; Pier, mobile; Small-craft pier



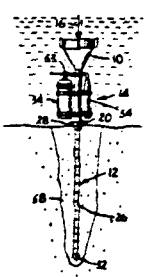
JULY 28, 1970

3,521,715
METHOD AND APPARATUS FOR SAMPLING
Manfred G. Krutein, San Diego, Calif., assignor to General Dynamics Corporation, New York, N.Y., a corporation of Delaware
Filed Oct. 23, 1968, Ser. No. 769,992
Int. Cl. E21b 49/00; G01n 1/08
U.S. Cl. 175—5 19 Claims

A sample of an earth formation or other bodies of relatively permeable material may be obtained by penetrating the material with a probe and introducing into the formation adjacent the probe a chemical grout which sets to form a substantially rigid body composed of the gelled chemical grout and the material which the chemical grout permeates. When the probe is removed, the rigid gel body is removed with it.

Keywords: Grouting; Sampler, power supply; Sampler, seabed-driven core

U.S. Cl. X.R. 61-36; 73-425; 175-59; 175-226



3,522,707
PILING CONSTRUCTION
Gabriel Fuentes, Jr., 1501 Ashford Ave., Santurce, Puerto Rico 00911
Continuation-in-part of application Ser. No. 609,102, Jan. 13, 1967. This application Nov. 20, 1967, Ser. No. 684,297
The portion of the term of the patent subsequent to June 17, 1986, has been disclaimed
Int. Cl. E02d 5/12, 7/02
U.S. Cl. 61—56 11 Claims

This invention relates to apparatus for driving a concrete piling formed of a number of concrete pile sections which are spliced together to form a piling of a predetermined length including a dummy pile for providing a pilot hole, special pile sections for hard or other special driving conditions, and a sleeve for splicing the pile sections together.

The same technique is applied to forming retaining walls, bulkheads and even to light poles, telephone poles and the like, in which case, the poles are easily repaired or replaced if damaged.

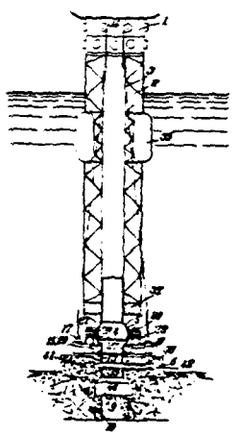
Keywords: Bulkhead; Pile, concrete; Pile section connection; Pile, sheet; Pile, steel

U.S. Cl. X.R. 61-39; 61-49; 61-53.5; 61-59

3,522,709
MARINE PLATFORM STRUCTURE
Robert Vilain, Maisons-Alfort, France, assignor, by direct and mesne assignments, to Compagnie Francaise d'Entreprises Metalliques, Paris, France, a corporation of France
Filed Feb. 19, 1968, Ser. No. 706,343
Claims priority, application France, Feb. 24, 1967, 96,468
Int. Cl. E02b 17/00; E02d 27/04; B63b 35/44
U.S. Cl. 61—46.5 22 Claims

The marine platform structure is movably articulated at its bottom to a base, which is constructed independently and fixed first to the marine bed. The base comprises initially a water tight work chamber. The overall platform structure is combined with a plate mounted at the bottom of the structure to receive the articulation. This plate is brought into the correct position, by appropriate guiding means, above the base to be fixed to the base.

Keywords: Offshore platform anchor; Offshore platform, floating



AD-A080 795 COASTAL ENGINEERING RESEARCH CENTER FORT BELVOIR VA F/G 13/2
AN ANNOTATED BIBLIOGRAPHY OF PATENTS RELATED TO COASTAL ENGINEE--ETC(U)
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UNCLASSIFIED CERC-MR-79-6-VOL-1-APP NL

5 OF 6
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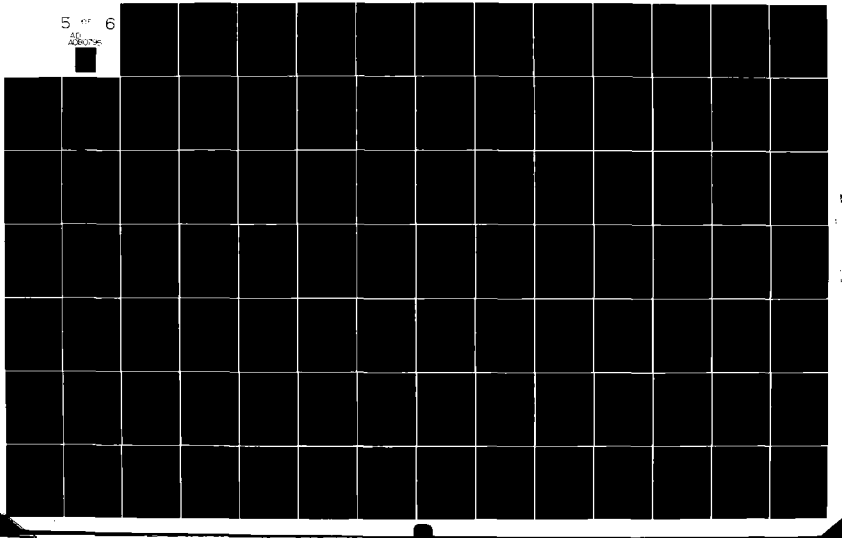
A080795

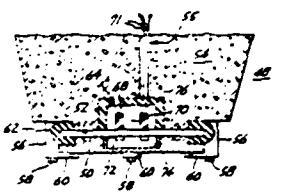


3,522,862
METHOD AND MEANS FOR GENERATING ACOUSTIC PRESSURE IN FLUID MEDIUM
Clive R. B. Lister, 3136 Portage Bay Place E., Seattle, Wash. 98102
Filed May 20, 1968, Ser. No. 730,276
Int. Cl. G01v *1/04, 1/38*
U.S. Cl. 181—.5 14 Claims

Method and means are disclosed for producing in a body of fluid a sound useful for seismic profiling. An immersed element is caused to move within, but away from, the immersing fluid in a manner avoiding cavitation while producing a negative acoustic pressure of predetermined magnitude. Thereupon the element momentarily impacts upon relatively immovable matter and abruptly reverses its direction of movement to produce a positive acoustic pressure materially greater than, and readily distinguishable from, the negative acoustic pressure.

Keywords: Seismic implosive acoustic transmitter

U.S. Cl. X.R. 340-12

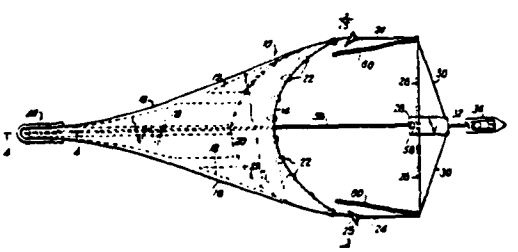


AUGUST 4, 1970

3,523,611
OIL SKIMMING APPARATUS
Hugh J. Fitzgerald, Austin, Tex., assignor to Ocean Pollution Control, Inc., Dallas Tex., a corporation of Texas
Filed Apr. 1, 1969, Ser. No. 811,713
Int. Cl. B01d *23/00*
U.S. Cl. 210—242 10 Claims

Apparatus for skimming an oil film from the surface of a large body of water including a towed funnel assembly with a flexible cover and side skirts of impermeable sheet material with floats to keep the leading edge of the cover spaced above the surface of the water so that the oil film will pass beneath it, with the remaining portions of the cover supported on the floating oil, a bottom panel of netting to hold the side skirts in downwardly projecting position to confine the oil laterally, while permitting the water beneath it to escape freely, and a sump at the apex of the funnel to receive the oil for transfer to storage vessel.

Keywords: Pollutant collection; Pollutant removal watercraft; Pollutant, suction removal; Pollutant, surface barrier



3,524,231
CIRCULAR UNDERWATER FORM WITH LOCK

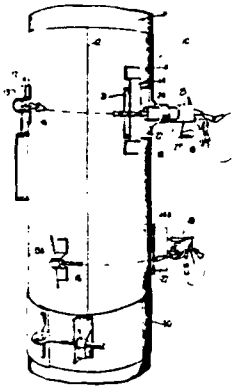
George C. Wiswell, Jr., 1014 Pequot Road,
Southport, Conn. 06490

Filed Jan. 10, 1968, Ser. No. 696,898
Int. Cl. B65d *63/00*; E02d *5/60*
U.S. Cl. 24—281 6 Claims

A form for applying a plastic coating to a cylindrical marine structure wherein a sheet of pliable material is wrapped around a cylindrical structure and tightened into position by a chain which interconnects loops on opposed sides of the contacting longitudinal edges of the sheet. A chain tightening member is detachably mounted in a loop formed on the sheet and has means for locking the chain in position and then further tightening the chain by means of a threaded rod.

Keywords: Coating; Corrosion prevention; Pile protection; Structure repair

U.S. Cl. X.R. 61-54



3,524,313
TIDE CLOCK

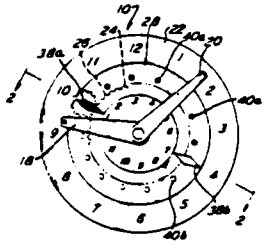
George W. Wood, R.D. 1, Hammonton, N.J. 08037

Filed Dec. 24, 1968, Ser. No. 786,630
Int. Cl. G04b *19/26*
U.S. Cl. 58—3 7 Claims

A clock for indicating the time of the occurrence of the high and low tides during each day. The clock also indicates the amount of time until the next high or low tide from any point of time during the day, and the time of the occurrence of the high and low tides for several days to come.

Keywords: Tide measurement

U.S. Cl. X.R. 58-152

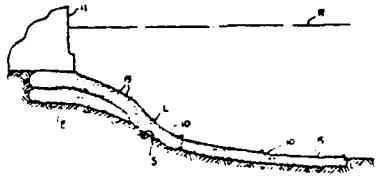


3,524,320
METHOD OF PROTECTING AREAS OF AN EARTH SITUS AGAINST SCOUR
Lee A. Turzillo, Bath, Ohio
(2078 Glengary Road, Akron, Ohio 44313)
Filed Jan. 23, 1967, Ser. No. 611,107
Int. Cl. E02b 3/12
U.S. Cl. 61—38 5 Claims

Method of protecting a scoured area of an earth situs by injection of pressurized liquid grout into a flexible fabric bag laid flatwise over said area, to expand opposing walls of the bag while simultaneously limiting expansion beyond a predetermined thickness of the bag. When the grout hardens, the bag has predetermined volumetric shape as well as thickness.

Keywords: Concrete form; Fabric mat; Grouting; Revetment; Seabed scour protection

U.S. Cl. X.R. 61-41; 61-42; 61-45

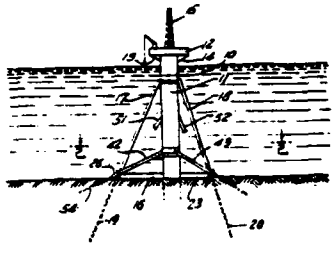


3,524,322
SPLAY FOOTED PLATFORM ANCHOR
Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc., New York, N.Y., a corporation of Delaware
Filed June 27, 1968, Ser. No. 740,585
Int. Cl. B63c 23/16; E02b 17/00
U.S. Cl. 61—46.5 9 Claims

This invention relates to a marine drilling, and/or producing platform for an offshore oil site. It relates in particular to such a platform which, in normal operating position rests on the floor of a body of water and is there anchored by piling. The anchoring means takes the shape of a splayed or spread pile arrangement to provide a more firm anchor, and stabilizing resistance against lateral storm forces.

Keywords: Offshore construction; Offshore platform, fixed; Pile placement; Seabed foundation

U.S. Cl. X.R. 61-53.5



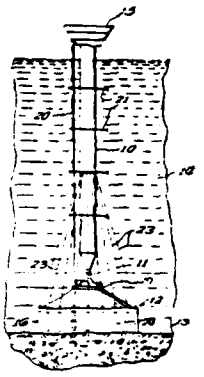
3,524,323
OFFSHORE STORAGE TANK WITH SELF-CONTAINED GUY SYSTEM

Clarence D. Miller, Naperville, Ill., assignor to Chicago Bridge & Iron Company, Oak Brook, Ill., a corporation of Illinois

Filed Feb. 24, 1969, Ser. No. 801,650
Int. Cl. E02b 17/02
U.S. Cl. 61—46.5 4 Claims

Disclosed is a structure for offshore exploration and production of oil. The structure has an elongated shaft positioned upright in water, a roofed tank, a pivotal connection joining the lower end of the shaft to a top portion of the tank, and a plurality of guy lines joined at their upper end to the shaft and at their lower end to a plurality of weight means radially arranged from the shaft and supported by the tank for vertical displacement upwardly upon tilting of the shaft beyond a predetermined tilt, said weights being substantially unsupported by the guy lines when the shaft is vertical.

Keywords: Offshore platform anchor; Offshore platform, floating; Offshore storage tank, submerged



3,524,324
FLEXIBLE PIER

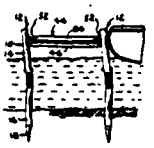
Louis F. Miklos, Lake County, Ind.
(6151 Delaware St., Gary, Ind. 64607)

Filed July 1, 1968, Ser. No. 741,769
Int. Cl. E02b 3/22
U.S. Cl. 61—48 3 Claims

A flexible pier comprising posts laterally aligned in transverse rows each of which are formed to include a closed coil spring in the body thereof so that the top section may laterally flex relative to the bottom section. A hanger member pivotally connecting the top section of each post and pendantally supporting a cross beam between a pair of laterally aligned posts through a slotted opening in the ends of the cross beam. Longitudinal frame members on each end of the cross beams being connected together end to end and to the cross beam through the slotted aperture therein. Cross boards laid side by side on the transversely spaced longitudinal runners forming the platform.

Keywords: Collision protection; Ice protection; Pier, fixed; Pile protection; Small-craft pier

U.S. Cl. X.R. 52-113, 114-230; 287-86



3,524,349

BATHYTHERMOMETER

Robert M. Robertson, Santa Barbara, Calif., and Robert B. Costello, Kokomo, Ind., assignors to General Motors Corporation, a corporation of Delaware

Original application Apr. 10, 1964, Ser. No. 358,746. Divided and this application Apr. 15, 1968, Ser. No. 721,256

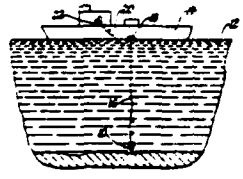
Int. Cl. G01k *1/14*

U.S. Cl. 73—343 1 Claim

Apparatus for making a temperature-depth profile of a body of water from a moving ship including a hydrodynamically designed probe carrying an electric temperature sensor, a quantity of conductor disposed within the probe to pay out rearwardly as the probe descends, a ship-board canister containing an additional quantity of conductor to be payed out as the ship proceeds away from a launch point, and a buoyant drogue connecting the probe and ship-board conductor portions.

Keywords: Bathythermograph; Instrument deployment

U.S. Cl. X.R. 73-170



3,525,072

METHOD AND APPARATUS FOR PROCESSING SEISMIC DATA IN THE FIELD

Roger L. Born, Edwin B. Neitzel, and Ernest F. Vigil, Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed Dec. 11, 1967, Ser. No. 689,448

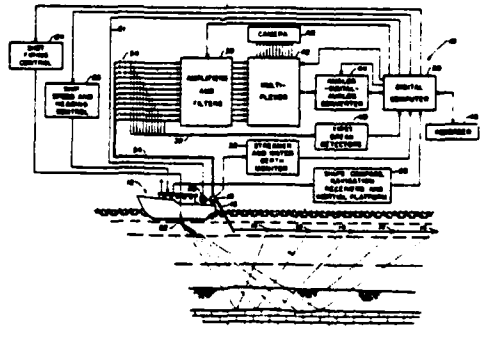
Int. Cl. G01v *1/28*

U.S. Cl. 340—*15.5* 12 *Claims*

Analog signals generated in response to seismic disturbances are multiplexed into a single channel and converted into digital signals. A digital computer corrects and analyzes the digital signals, records data from the digital signals, and controls various physical characteristics of the analog signals in dependence upon the quality of the digital signals. Data is fed back through the converter and multiplexer systems for a real time analog display during the recording of data.

Keywords: Seismic record processor; Seismic survey method

U.S. Cl. X.R. 340-7



3,525,187

EXPLOSIVELY DRIVEN SUBMARINE ANCHOR

Renic P. Vincent, Tulsa, Okla., assignor to Pan American Petroleum Corporation, Tulsa, Okla., a corporation of Delaware

Continuation-in-part of application Ser. No. 660,526, Aug. 14, 1967. This application Nov. 5, 1968, Ser. No. 777,980

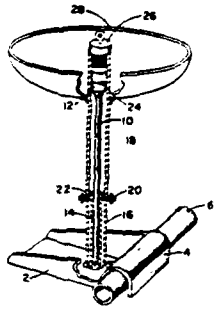
Int. Cl. E02d 5/80; B63b 21/28

U.S. Cl. 52—155 10 Claims

An explosively driven submarine anchor assembly suitable for securing pipelines to the ocean floor comprises an explosively driven nail surrounded by a tubular member having a deceleration means therewithin to prevent the nail from passing entirely through the assembly and into the ocean floor. Affixed to the tubular member is a clamping means suitable for securing a pipeline to the anchor body. Means may also be used in the base of the aforesaid tubular member for preventing upward movement of the nail after it has been driven. The gun barrel used in firing the nail is retrievable and may be reused.

Keywords: Embedment anchor; Seabed pipeline placement

U.S. Cl. X.R. 114-206



3,525,224

METHOD AND APPARATUS FOR INSTALLING ANCHOR PILES

John J. Bardgette, New Orleans, La., assignor to Esso Production Research Company

Filed Mar. 5, 1969, Ser. No. 804,619

Int. Cl. B63b 21/00; E02d 5/54; E21b 7/12

U.S. Cl. 61—46 17 Claims

Installation of piles for mooring floating rigs used in conducting offshore oil and gas drilling and production operations. A drill string having a drill bit on the lower end is suspended from a floating rig. The drill string extends through and is releasably attached to an anchor pile to be installed in the ocean floor. An antirotation sleeve arranged on the drill string surrounds and releasably engages the anchor pile. While so engaged and after the antirotation sleeve contacts and grips the ocean floor, rotation of the anchor pile is inhibited or prevented. An anchor cable connects the anchor pile to the drilling rig. Means connected to the anchor pile limits the depth reached by the anchor pile in the drilled hole. The drill string is lowered until the antirotation sleeve contacts the ocean floor. The drill bit and drill string are then rotated and the anchor cable is paid out from the floating rig as the hole is drilled by the drill bit and the anchor pile is carried deper into the drilled hole. When the anchor pile is located at a desired depth, cement is pumped through the drill string into the hole. The drill string is then released from its attachment to the anchor pile and the drill string and antirotation sleeve are raised to the floating rig, leaving the anchor pile cemented in the hole.

Keywords: Embedment anchor; Grouting; Offshore platform anchor; Pile placement

U.S. Cl. X.R. 52-156; 61-53.52; 61-63; 114-206; 175-171

3,525,392

OFFSHORE PLATFORM HAVING A PARTIALLY REMOVABLE DRILLING DECK

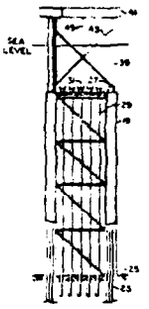
James R. Lloyd, Houston, Tex., Charles E. Kolodzey, New Orleans, La., and Kent T. Bailey, Houston, Tex., assignors to Esso Production Research Company, a corporation of Delaware

Filed Dec. 10, 1968, Ser. No. 782,574
Int. Cl. E21b 7/12, 43/01
U.S. Cl. 166—.5 6 Claims

A bottom-supported drilling platform is provided with a partially removable upper section so that part of the drilling deck can be removed after drilling operations are completed, leaving only a small production deck protruding above the water surface. Wellheads are mounted on a deck below the ocean surface, and lines connect the wellheads with the production deck so that pumpdown tools may be introduced into the wells from the production deck.

Keywords: Offshore platform, fixed

U.S. Cl. X.R. 61-46.5; 175-7



3,525,409

CORE BARREL CLOSURE FOR SONIC DRILL

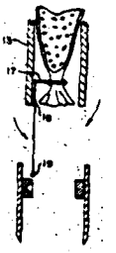
Johnston E. Holzman, La Jolla, Calif., assignor to Shell Oil Company, New York, N.Y., a corporation of Delaware

Filed Dec. 12, 1968, Ser. No. 783,240
Int. Cl. E21b 9/20, 25/00
U.S. Cl. 175—245 4 Claims

The coring barrel of a sonic core drill is provided with a flexible inner lining having a noose-like closure at its lower end which is connected to a suitable anchor so as to close off the lower end of the coring barrel upon withdrawal of the tubing string from a formation.

Keywords: Sampler, seabed-drilled core

U.S. Cl. X.R. 175-243



3,525,416

AIR OPERATED UNDERWATER SEISMIC SOURCE

Lewis Morton Mott-Smith, Houston, Tex., assignor to Mandrel Industries, Inc., Houston, Tex., a corporation of Michigan

Continuation-in-part of application Ser. No. 668,582, Sept. 18, 1967. This application Mar. 10, 1969, Ser. No. 806,348

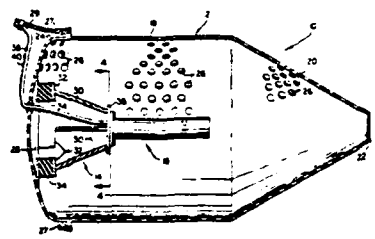
Int. Cl. G01v *1/04, 1/38*

U.S. Cl. 181—.5 3 Claims

A seismic source, utilizing a high-pressure fast-acting air valve, capable of imparting a burst of air and thus a seismic signal to a fluid medium, including a perforated shell surrounding the air valve, which shell has selected dimensions and degree of perforations which are determined by the particular characteristics of a seismic signal generated by the air valve. The shell is thus particularly designed for use with an air valve source, wherein secondary pulses peculiar to an air valve source are damped out by the shell. The degree of restriction generally determines the range of frequencies of the seismic signal which is produced. The valve is shock-mounted within the shell to protect the perforated shell from the force reaction produced by the air valve.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 340-7



SEPTEMBER 1, 1970

3,526,096

METHOD OF MAKING ROCKFILL FOUNDATIONS

Joseph P. Frein, Boise, Idaho, and Arthur Casagrande, Belmont, Mass., assignors to Morrison-Knudsen Company, Inc., a corporation of Delaware

Filed Dec. 11, 1968, Ser. No. 783,016

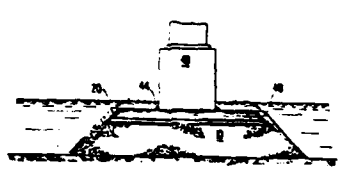
Int. Cl. E02d *27/04, 27/52*

U.S. Cl. 61—46 16 Claims

Rockfill foundation for support of a bridge pier, or the like, in which the lower portion of the foundation is made from large size, hard durable rock without any particular treatment. The upper portion of the foundation is formed from individually compacted rock layers raising to within a desired range of water surface. A surcharge of rock approximately equal to the expected load is added to the compacted layer. Surcharged rock is then used to form a breakwater around the work area for construction of a weight distributor block on the upper surface of the compacted layers.

Keywords: Breakwater, rubble; Offshore construction; Offshore island; Seabed foundation

U.S. Cl. X.R. 61-4; 61-50; 61-52

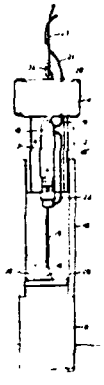


3,526,283
PILE DRIVER
Eugene A. Horstketter and Elmer C. Gardner, Houston, Tex., assignors to S.O.G. Research and Development Corporation, Houston, Tex., a corporation of Texas
Filed July 23, 1968, Ser. No. 746,808
Int. Cl. B25d 9/00
U.S. Cl. 173—126 19 Claims

A pile driver used for pipelike piles, including a hammer with a cylindrical guide member or sleeve attached to its lower side. The hammer strikes the upper rim of the pipe as it reciprocates in a path determined by the guide sleeve which slides into or over the upper end of the pipe. The hammer is driven from below by an air or hydraulic cylinder or the like, with one side of the power mechanism being permanently or releasably coupled to the inside of the pile.

Keywords: Pile driver, impact

U.S. Cl. X.R. 61-53.5; 175-135

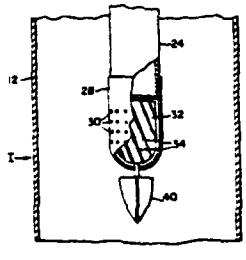


3,526,436
MATERIAL LIFT SYSTEM
Melvin W. Smith, Edgewater, and Charles S. Kluth, Baltimore, Md., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa., a corporation of Pennsylvania
Filed June 11, 1968, Ser. No. 736,036
Int. Cl. B65g 53/30
U.S. Cl. 302—14 8 Claims

An air lift for an underwater mining system wherein aggregates collected by a bottom collector are propelled through a conduit to a surface vessel by means of an air injection system wherein an air pipe supplying compressed air is situated within the conduit carrying the aggregates. The compressed air pipe is disposed within the conduit to maximize clearance between the air pipe and conduit. Connected to the bottom opening of the compressed air pipe is a member containing a plurality of small apertures behind which is a rotating turbine operable by air pressure. A tool means is connected to the end of the compressed air pipe and rotatable with the turbine to remedy any possible clogging of the conduit.

Keywords: Dredge, suction; Pump

U.S. Cl. X.R. 302-58



3,527,057
METHOD AND APPARATUS FOR CONTAINING WELL POLLUTANTS

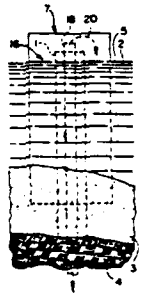
Chester George Riester, 10397 S. Lake Blvd., Parma, Ohio 44129

Filed Mar. 1, 1968, Ser. No. 709,704
Int. Cl. E02b *1/00*; E21b *15/02*
U.S. Cl. 61—34 7 Claims

Well installation apparatus and method utilizing a header surrounding the well casing and a large coffer or caisson surrounding the header, the diameter of the caisson being large enough to contain the well tailings which might otherwise pollute the area surrounding the well site, the caisson of an adjacent well site being used to contain the tailings of the initially completed well.

Keywords: Cofferdam; Offshore caisson; Pile, sheet; Pollutant, submerged barrier; Pollutant, surface barrier

U.S. Cl. X.R. 166-.5; 175-9



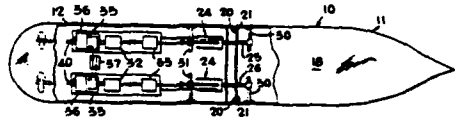
3,527,188
POWER-PRODUCING MEANS FOR VESSELS

John D. Shepard, Rte. 1 P.O., Box 10, Troy, Illinois, and Norman D. Shepard, Rte. 1 P.O., Box 10, Troy, Illinois

Filed June 13, 1968, Ser. No. 736,692
Int. Cl. B63h *19/02*
U.S. Cl. 115—4 4 Claims

The power-producing means includes front and rear hull portions of a vessel coupled together by a transversely disposed hinge member. A pair of plunger and cylinder assemblies are vertically spaced from the hinge, each plunger being attached to one portion of the hull and each cylinder being attached to the other portion of the hull. The plungers are received within the cylinders as the hull portions rotate about the hinge member in response to the undulating motion of the water whereby to translate such energy motion into useful work.

Keywords: Electrical generator; Power, wave



3,527,310

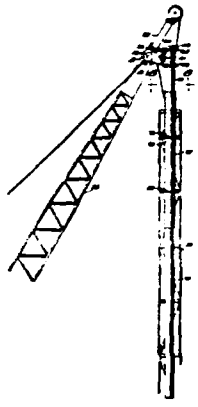
PILE DRIVING AND GUIDING APPARATUS

Frank P. Webber, Ronald W. Scholer, Paul J. Guptill, and Graham R. Sheely, Miami, and Clyde M. Rippy, Jr., Oklawaha, Fla., assignors of fifty percent to Webber Constructors, Inc., Miami, Fla.

Filed Sept. 9, 1968, Ser. No. 758,529
Int. Cl. E02d 7/14
U.S. Cl. 173—43 7 Claims

An improved means to connect a pile driving apparatus to the upper end of a crane boom, which includes a first and a second horizontal pivot axis for effecting relative swinging movement of the pile driving apparatus through an angle of elevation and an azimuth angle so that a plurality of piles may be installed in a row and column relation while the crane remains in a fixed station.

Keywords: Pile driver, impact; Pile driver leads



3,527,442

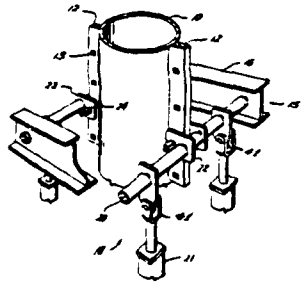
JACK-UP APPARATUS

Mehmet D. Korkut, 2801 N. Turnbull Drive, Metairie, La. 70002

Filed July 24, 1967, Ser. No. 655,470
Int. Cl. B66f 1/00
U.S. Cl. 254—106 3 Claims

In jack-up barge apparatus, means preferably comprising a support frame attached to a vessel near a spud well, a plurality of torsion bars in near proximity to the well, connector means on the torsion bars for engagement with the spud, means for joining the connector means to the spud to thereby transfer the loading of the spud to the torsion bars and thence to the vessel whereby the offset between the axis of the spud and the vessel, impacts on the spud, and bending of the spud do not interfere with routine use of the spud.

Keywords: Offshore platform, jack up; Offshore platform, leg



3,527,553
APPARATUS FOR THE CONSTRUCTION OF ELEVATED WAYS

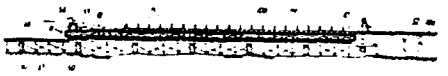
Felix M. Adler, Woodlands, Birds Hill Road, Oxshott, Surrey, England

Filed Feb. 4, 1969, Ser. No. 796,465
Claims priority, application Great Britain, Feb. 6, 1968, 5,920/68
Int. Cl. E01c *21/00*
U.S. Cl. 94—22 9 Claims

The invention is concerned with a method of forming an elevated structure, for instance a motor way, continuously, and the apparatus for carrying out this method. The apparatus comprises a material supporting member mounted on and supported by a movable member which is movable beneath and relative to the material support member and in that the material supporting member has an upper surface which is stationary relative to the material which it supports and which is continuously and endlessly extensible in the direction of movement of the movable member and continuously removable from the hardened material at the trailing end of the apparatus. The point at which the hardenable material is laid on the support member is stationary relative to the movable member and moves forwardly relative to the support member. This facilitates the continuous laying of the hardenable material in a fluid state although the process can be carried out step-wise.

Keywords: Concrete form; Offshore construction; Pier, fixed

U.S. Cl. X.R. 94-39; 264-34



SEPTEMBER 15, 1970

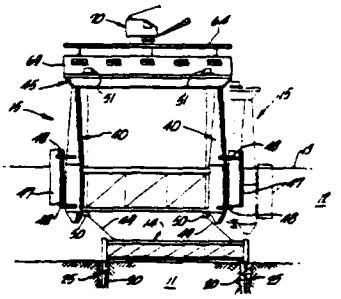
3,528,254
OFFSHORE PLATFORM STRUCTURE AND CONSTRUCTION METHOD

John R. Graham, Newport Beach, Calif., assignor to Global Marine Inc., Los Angeles, Calif., a corporation of Delaware

Continuation-in-part of application Ser. No. 560,477, June 27, 1966. This application Dec. 3, 1968, Ser. No. 805,058
Int. Cl. E02b *17/00*
U.S. Cl. 61—46.5 20 Claims

An offshore drilling structure which includes a drilled-in and cemented, wholly submerged base structure defining a plurality of upwardly open receptacles disposed a selected distance below the water surface, and an upper platform which is floated into place over the base structure and secured to the receptacles of the base structure. The receptacles and the platform are arranged so that the platform is engageable with the receptacles by ballasting the platform to sink into mating contact with the base structure. The platform unit is removable from the base structure and transferable to another similar base structure at a different location in a different depth of water, for example.

Keywords: Grouting; Offshore construction; Offshore platform, fixed; Pile, structure connection; Seabed foundation



3,529,427

DEVICE FOR PREVENTING OR REDUCING SCOURS AT THE LOWER ENDS OF MEMBERS SUPPORTING MARINE STRUCTURES

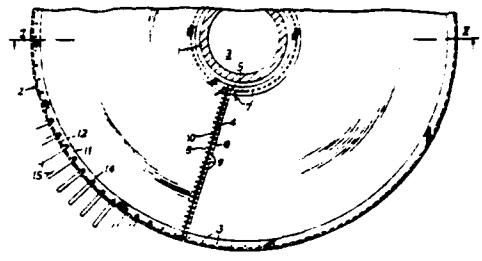
Richard T. G. Titman, London, England, assignor to Delta Diving Limited, London, England, a British company

Filed Nov. 5, 1968, Ser. No. 773,548
Int. Cl. E02d *29/00*
U.S. Cl. 61—46 7 Claims

This invention provides a device for preventing scours at the lower ends of members supporting a marine structure, for example an oil rig. The device comprises a reticulated or perforated collar which encircles the lower end of each member at the sea bed, the collar being secured to the member and having its outer margin anchored to the sea bed. The arrangement is such that the device prevents sand at the sea bed being washed away from the member by tidal movements, but allows the sea water to pass through the collar.

Keywords: Fabric mat; Offshore platform, leg; Seabed scour protection

U.S. Cl. X.R. 61-1; 61-52



3,529,681

HYDRAULICALLY CONTROLLED VIBRO-HAMMER

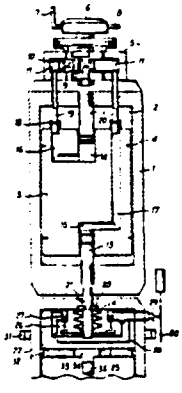
Emile Georges Berrié, 61 Rue Dominique Clos, Saint-Martin-du-Touch, Toulouse, Haute-Garonne, France

Filed Jan. 2, 1969, Ser. No. 788,485
Claims priority, application France, Jan. 3, 1968, 134,775
Int. Cl. E02d *7/02;* E21b *1/02*
U.S. Cl. 173—116 14 Claims

Vibro-hammer comprising a hollow weight serving as an inertia mass and a ram serving as a striking mass, the ram being reciprocated within the hollow weight by fluid pressure applied interiorly of two axial cylindrical members or cylinders at the ends of the ram and engaging two opposed pistons secured to respective ends of the hollow weight. The weight and ram drive various working tools through an auxiliary terminal element preferably including coupling means enabling a selected degree of elasticity between the ram and the tool so the tool can be driven either by percussion or in a vibratory condition at controlled intensity. The selected tool can be driven in rotation as well as longitudinally, if desired, as when the apparatus is for drilling boreholes.

Keywords: Pile driver, impact; Pile driver, vibratory

U.S. Cl. X.R. 60-54.5; 92-117; 173-125



3,529,720

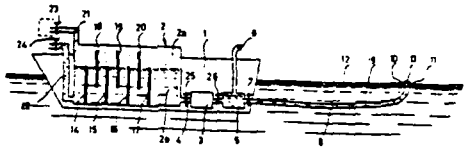
INSTALLATION FOR RECOVERY OF A LIQUID FLOATING ON A WATER SURFACE

Daniel Chablaix, 17 Route de Chavanne, 1007 Lausanne, Switzerland

Filed Apr. 8, 1968, Ser. No. 719,368
Claims priority, application Switzerland, Apr. 7, 1967, 4,972/67; Nov. 2, 1967, 15,390/67
Int. Cl. B01d 21/10
U.S. Cl. 210—123 8 Claims

This disclosure concerns an installation for the recovery of a liquid floating on the surface of a body of water, for example petroleum, characterized by the fact that it comprises a chamber for separating the liquid, and pumping means having a conduit connected thereto, the other end of the conduit being immersed and supported near the surface of the water. The chamber is divided into several compartments by transverse walls extending along a part of the height of the chamber and has a liquid entry in its lower part connected to the pump, an outlet for the water located at the bottom of the chamber, and an outlet conduit for the floating liquid leaving from the top of the chamber. The installation can be mounted in a boat, and a plurality of immersed conduits can be connected together by a belt of oil-impervious material positioned around an oil slick (for example), the surface area of which can be reduced to facilitate intake by the conduits, by reducing the perimeter of the belt.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier
U.S. Cl. X.R. 210-242; 210-320



3,530,051

ELECTROLYTIC METHOD FOR PREVENTING FOULING OF SEA WATER-IMMERSED STRUCTURES BY MARINE LIFE

Kenji Ueda, Nagasaki-shi, Minoru Hirata, Nishisonoki-gun, Nagasaki-ken, and Tsutomu Horiguchi, Nagasaki-shi, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed July 1, 1966, Ser. No. 562,316
Claims priority, application Japan, July 5, 1965, 40/40,269
Int. Cl. C23f 13/00
U.S. Cl. 204—147 2 Claims

In a method for preventing adherence to marine life to structures submerged in sea water by immersing, in the sea water adjacent the structure, an insoluble anode and at least one cathode in closely spaced relation and passing a current between the anode and the cathode or cathodes, the build up of deposits on the cathode or cathodes, is prevented by maintaining the current value so as to have a current density, on each cathode, in excess of 3 a./dm.².

Keywords: Cathodic protection; Fouling prevention
U.S. Cl. X.R. 204-149; 204-196; 204-272

3,530,952

UNDERSEA, LONG-RANGE TRACKING AND SIGNALLING SYSTEMS AND APPARATUS

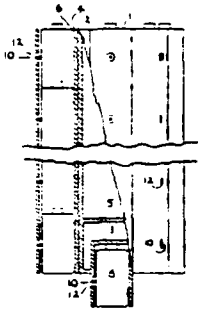
Sidney Epstein and David Epstein, Brooklyn, N.Y., assignors to Vadys Associates, Ltd., New York, N.Y., a corporation of New York

Filed May 23, 1968, Ser. No. 731,396
Int. Cl. G08b *3/14*
U.S. Cl. 181—.5 12 Claims

A neutrally buoyant deep-drifting float assembly formed of a neutrally buoyant core having a plurality of neutrally buoyant signalling modules releasably mounted thereon and incorporating means to effect preprogrammed release and selective modification of the buoyancy characteristics thereof to induce displacement of a released signalling module into a communication channel.

Keywords: Current measurement; Depth pressure measurement; Instrument deployment

U.S. Cl. X.R. 340-5; 116-23; 116-137



3,531,761

DEPTH CONTROLLERS FOR SEISMIC STREAMER CABLES

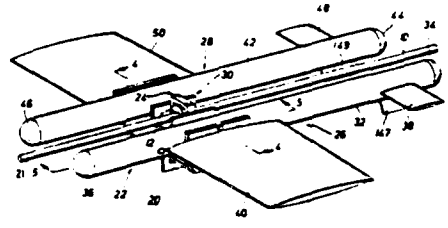
Edward B. Tickell and Gilbert B. Clift, Jr., Houston, Tex., assignors, by mesne assignments, to Numak, Inc., a corporation of Texas

Filed Dec. 26, 1968, Ser. No. 787,084
Int. Cl. G01v *1/38;* B63b *21/56*
U.S. Cl. 340—7 11 Claims

This invention relates to apparatus for marine seismic surveying and includes a plurality of depth controllers, each suspended from a section of the towed seismic streamer cable for maintaining the cable within predetermined depth levels. The suspension permits the cable and the frame of the depth controller to freely rotate relative to each other and to swing relative to each other in a limited arc. Depth regulating means on the frame effectively maintain the controller within predetermined water depth levels.

Keywords: Seismic streamer cable; Towed body depth control

U.S. Cl. X.R. 114-235



3,531,762
DEPTH CONTROLLERS FOR SEISMIC STREAMER CABLES

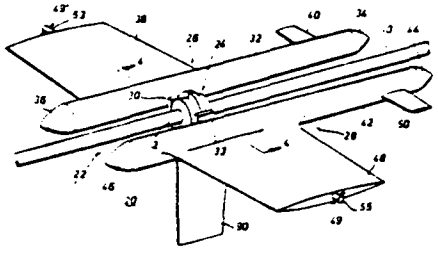
Edward B. Tickell, Houston, Tex., assignor, by mesne assignments, to Numak, Inc., a corporation of Texas

Filed Dec. 26, 1968, Ser. No. 787,085
Int. Cl. G01v *1/38;* B63b *21/56*
U.S. Cl. 340—7 13 Claims

This invention relates to apparatus for marine seismic surveying and includes a plurality of depth controllers, each suspended from a section of the towed seismic streamer cable for maintaining the cable within predetermined depth levels. The suspension permits the cable and the frame of the depth controller to freely rotate relative to each other and to swing relative to each other in a limited arc. Depth regulating means on the frame effectively maintain the controller within predetermined water depth levels.

Keywords: Seismic streamer cable; Towed body depth control

U.S. Cl. X.R. 114-235



OCTOBER 6, 1970

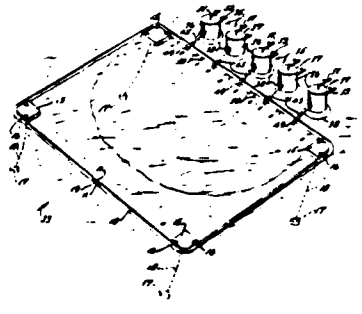
3,532,219
APPARATUS FOR COLLECTING AND CONTAINING OIL ON THE SURFACE OF WATER

Joe M. Valdespino, Orlando, Fla., assignor, by direct and mesne assignments, to Water Pollution Controls, Inc., a corporation of Delaware

Filed Apr. 22, 1969, Ser. No. 818,284
Int. Cl. B01d *17/02*
U.S. Cl. 210—242 6 Claims

Portable inflatable apparatus for confining and collecting oil on the surface of water, separating the oil from the water and containing such oil until collected, without the use of mechanical parts.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier; Pump



3,532,440

TIDALLY OPERATED SYSTEM FOR PUMPING WATER OUT OF BOATS AND FLOATING DOCKS

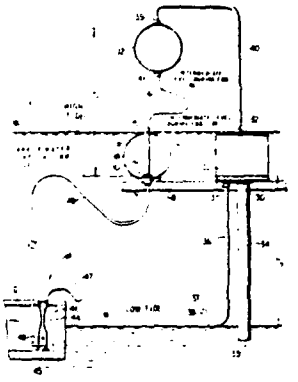
William B. Noe, 3540 Ewell St., Annandale, Va. 22203

Filed Jan. 13, 1969, Ser. No. 790,787
Int. Cl. F04b 23/04; E04f 5/10; E02b 9/00
U.S. Cl. 417—76 7 Claims

A system for pumping water out of a boat or dock floating on tidal water including a jet pump in the boat or dock, a floating first tank, fixed second and third tanks and fluid flow connections between the tanks arranged so that the first and second tanks are filled with water at high tide and water is drawn into the third tank at low tide and is subsequently released to deliver the water to the jet pump and operate the same to pump water out of the boat or dock.

Keywords: Pier, floating; Power, tide; Pump; Small-craft pier

U.S. Cl. X.R. 61-20; 103-64; 103-262; 417-100; 417-118



3,532,622

OIL SLICK DISPERSION METHOD

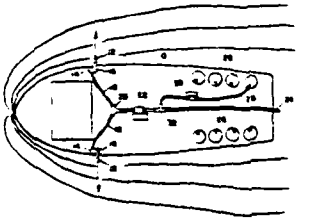
William H. McNeely, San Diego, Calif. (% Ara-Chem, Inc., 808 Gable Way, El Cajon, Calif. 92020)

Filed Oct. 24, 1969, Ser. No. 869,016
Int. Cl. C02f 9/02; E02b 15/04
U.S. Cl. 210—59 9 Claims

An oil slick on a body of water is dispersed by dividing the oil slick and concentrating the oil on the bow wave created by a boat propelled through the oil slick. At the same time a mixture of water and chemical dispersant is sprayed in high pressure jets which are swept across the bow wave in a cyclic oscillating motion substantially perpendicular to the length of the boat, thus producing a zigzag spray pattern on the oil slick due to the forward motion to the boat. A near constant angular speed in the oscillatory motion of the jets automatically applies a greater concentration of dispersant adjacent the boat, where the oil is heaviest on the bow wave. The high dilution of the dispersant with environment water increases emulsification and turbulence for increased efficiency.

Keywords: Pollutant dispersion

U.S. Cl. X.R. 114-0.5; 210-242

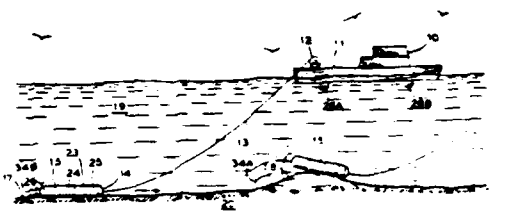


3,532,881
SUBMARINE RADIOACTIVITY LOGGING TECHNIQUE
John T. Dewan, Houston, Tex., assignor to Schlumberger Technology Corporation, New York, N.Y., a corporation of Texas
Filed Jan. 5, 1968, Ser. No. 695,897
Int. Cl. G01n *23/12*
U.S. Cl. 250—43.5 6 Claims

A typical embodiment of the invention enables characteristics of the bottom of a body of water to be measured and located with accuracy. Radioactivity logging equipment is housed within a sled that is towed along the bottom to scoop up mineral nodules or bottom samples in a mesh or grid. The sled and samples are lifted by the towing cable about ten feet off the bottom to provide a suitable environment for gamma radiation spectrum analysis. The elevation above the bottom is measured by a fathometer within the sled. Hydrophone equipment on board the towing vessel responds to the sound pulses emitted by the fathometer in order to fix the position of the sled relative to known geographical references and thereby establish the precise location of each sample measurement. Optionally, an integral drill bit is fixed to one end of the sled for the purpose of boring through sediment.

Keywords: Instrument, radioisotope; Instrument, seabed in situ; Instrument, towed; Sampler, seabed grab; Seabed property measurement

U.S. Cl. X.R. 250-83; 250-83.6



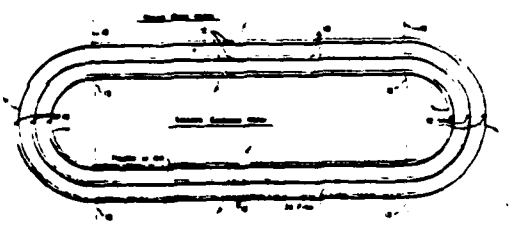
OCTOBER 13, 1970

3,533,240
FLOATING HARBOR
Edward J. Lesh, 1337 Woods Run Ave., Pittsburgh, Pa. 15230
Filed Mar. 24, 1967, Ser. No. 625,769
Int. Cl. E02b *15/04*; B63b *39/00*
U.S. Cl. 61—5 4 Claims

Means are provided for controlling rough seas to provide a protected harbor including a buoyant tubing to rest on rough water to enclose an area to be rendered smooth and to confine a film of oil on the enclosed area.

Keywords: Breakwater, floating; Offshore harbor; Pollutant, surface barrier

U.S. Cl. X.R. 61-1; 114-5



3,533,242

FENDER ASSEMBLY AND METHOD OF ASSEMBLING IT

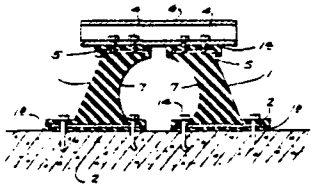
Jiro Narabu, Tokyo, Japan, assignor to Seibu Gomu Kaguku Kabushiki Kaisha, Tokyo, Japan, a corporation of Japan

Filed Oct. 18, 1968, Ser. No. 768,658
Claims priority, application Japan, Apr. 3, 1968, 43/26,149, 43/26,150
Int. Cl. E02b *3/22*
U.S. Cl. 61—48 4 Claims

A fender assembly and the method of assembling it, said fender assembly comprising a pair of resilient solid supports opposite to each other, a wharf engaging surface at one side of each of the supports, an iron plate embedded within each support near its opposite edge, and a fender laid across the tops of said supports and being fastened to said iron plates.

Keywords: Pier fender

U.S. Cl. X.R. 114-219



3,533,697

WAVE HEIGHT MEASURING METHOD AND APPARATUS

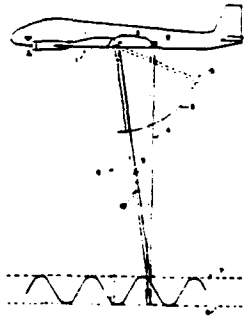
Bill B. Hughes, Orlando, Fla., assignor to Electronic Communications, Inc., a corporation of New Jersey

Filed Apr. 1, 1966, Ser. No. 539,571
Int. Cl. G01c *3/08*; G01g *11/24*
U.S. Cl. 356—5 3 Claims

A method and apparatus for measuring the height of waves on the surface of a body of water from a moving aircraft over the water are described. A pair of prisms are downwardly directed from the aircraft toward the waves, with one prism fixed and the other cyclically and selectively scanned to periodically intersect the one prism sighting axis. Apparatus for detecting the amplitude of combined images is used to provide an electrical signal which is displayed in synchronism with the scanning of the other prism to provide a display pattern representative of the height of a wave.

Keywords: Instrument, airborne; Wave measurement

U.S. Cl. X.R. 73-290; 350-6; 356-120



3,534,477

METHOD, SYSTEM AND APPARATUS FOR SURVEYING REVETMENTS

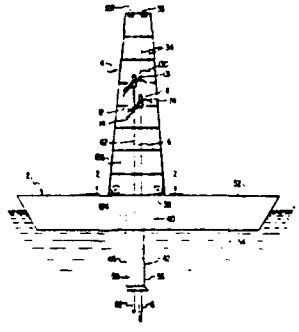
Jack N. Nahas, 4835 Gladys Ave., Beaumont, Tex. 77706

Filed Sept. 14, 1967, Ser. No. 673,531
Int. Cl. B43l *13/20*
U.S. Cl. 33—1 24 Claims

This invention relates to a method, system and apparatus of surveying with precision, speed, and economy, the extent and underwater location of articulated concrete mattresses and other revetments when in place by extending a probe down to the mattress and measuring the movement of the probe from a reference position in order to locate the mattress.

Keywords: Revetment; Seabed site survey; Sedimentation measurement; Structure inspection

U.S. Cl. X.R. 33-126; 116-113; 175-50



3,534,558

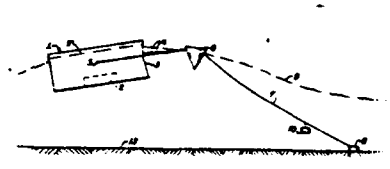
FLOATING BREAKWATERS

Gaetan Le Bouteiller, Villard-de-Lans, France, assignor to Societe Grenobloise d'Etudes et d'Applications Hydrauliques (Sogreah), Grenoble, France, a corporation of France

Filed Dec. 22, 1967, Ser. No. 692,826
Claims priority, application France, Dec. 23, 1966, 5,031
Int. Cl. E02b *3/10*
U.S. Cl. 61—5 13 Claims

The useful effect of the rolling motion of floating breakwaters in opposing wave propagation is increased by giving the float such dimensions, shape, or moorage as to reduce the natural heaving motion of the breakwater or make it out of phase with the wave motion.

Keywords: Breakwater, floating



3,534,599

EXPENDABLE OCEAN-WAVE METER

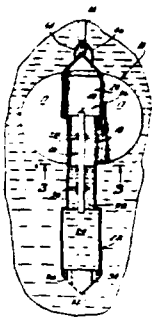
Walter E. Hoehne, Fairfax, Va., assignor to the United States of America as represented by the Secretary of the Navy

Filed Apr. 12, 1968, Ser. No. 720,966
Int. Cl. G01l 7/18
U.S. Cl. 73—170 5 Claims

A cylindrical pressure-sensing element is suspended from a floating element containing a transmitter. The pressure on the sensing element will be greater when the floating element is in a trough than when the floating element is on the crest of the wave. Accordingly such changes in pressure alter the height of water within the sensing element changing the electrical resistance therein. This resistance value is relayed to the transmitter where it is broadcast to a receiving station.

Keywords: Buoy, instrumented; Depth pressure measurement; Wave measurement

U.S. Cl. X.R. 73-304



3,534,605

METHOD AND APPARATUS FOR THE UNDERWATER MEASUREMENT OF THE THICKNESS OF A SILT LAYER

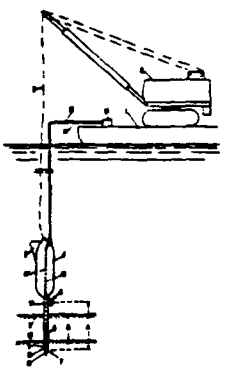
Jan de Koning, Amsterdam, Romke van der Veen, Jutphaas, Netherlands, assignors, by mesne assignments, to N.V. Nestum II, The Hague, Netherlands, a Dutch corporation

Filed Sept. 6, 1968, Ser. No. 757,927
Claims priority, application Netherlands, Sept. 28, 1967, 6713192
Int. Cl. G01f 23/14; G01n 3/30
U.S. Cl. 73—290 3 Claims

A first pressure sensing device is moved downwardly first to measure the pressure change at the interface between the water and the top of an underwater silt layer and then the interface between the bottom of the silt layer and the bottom layer material which it overlies. At the same time, a second pressure sensing device is moved with but in spaced relation above the first device, the second device measuring the water pressure and thus giving an indication of the linear movement of the first device. Outputs from the two devices are applied to the X and Y axes of an XY axis recorder so that the thickness of the silt layer may be determined.

Keywords: Seabed site survey; Sedimentation measurement

U.S. Cl. X.R. 73-84; 73-170; 73-299



3,534,668

PAVEMENT BLOCK

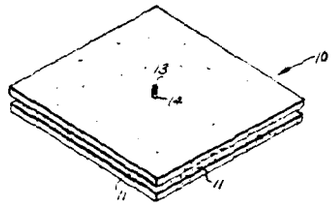
Harvey D. Scheinoha, Rte. 2, Box 322, Mosinee, Wisconsin 54455

Filed July 15, 1968, Ser. No. 744,852
Int. Cl. E01c 5/08, E04c 2/06, F04f 15/08
U.S. Cl. 94—12

5 Claims

A block for pavement one adjacent to the other to form a farmyard. These blocks are constructed of reenforced concrete having half lap edges to join with other similar blocks. The block is constructed so as to have a center lifting arrangement consisting of a narrow cavity around a stainless steel rod to be attached to a hook that will lift and move the block.

Keywords: Concrete block; Low-cost shore protection; Revetment; Slope protection
U.S. Cl. X.R. 52-125; 52-173; 52-592



3,534,858

POLLUTION CONTROL DEVICE

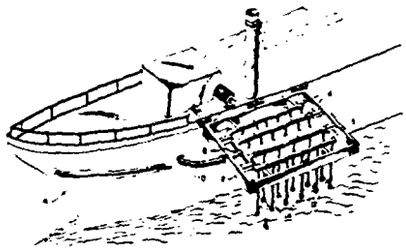
John W. Harrington, 7123 Merrimac Drive, McLean, Va. 22101

Filed May 31, 1968, Ser. No. 733,438
Int. Cl. B01d 21/00
U.S. Cl. 210—242

6 Claims

An apparatus for removing pollutants, particularly oil and chemical pollutants floating on a body of liquid, comprising a flexible suction hose connected with a suitable vacuum source and a floatable skimmer being capable of moving with varying wave motions in such manner that the suction apertures provided in the skimmer are maintained substantially at all times within the layer of pollutant. For "sweeping" operations to remove large bodies of oil or chemical pollutants on water surfaces, a bed comprising headers connected with a manifold to a common suction pump is utilized. A plurality of the skimmer apparatuses are connected to each header. The individual suction lines are then tied together in such manner as to allow freedom of movement by the individual units, but function as a "sweeping" unit to cover a large area.

Keywords: Pollutant, suction removal
U.S. Cl. X.R. 210-523



3,534,859

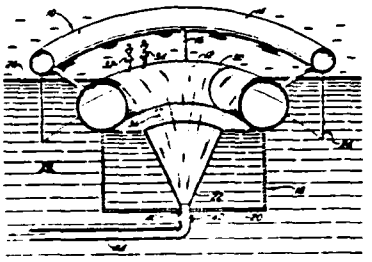
APPARATUS FOR REMOVAL OF OIL FLOATING ON WATER OR THE LIKE

Robert C. Amero, Gleashaw, and Garnet L. Karner, Monroeville, Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa., a corporation of Delaware

Filed Mar. 11, 1969, Ser. No. 806,220
Int. Cl. B01d *17/02*
U.S. Cl. 210—242 10 Claims

A device for removing and collecting oil floating on water comprising a first inner member which serves as both a main flotation member and a notched weir, and an outer buoyancy member held above the flotation member and closely adjacent the surface of the oil. A flotsam screen is provided. An inflatable embodiment easily carried on vessels or other vehicles is also provided.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier



3,534,996

PILING EXTRACTOR

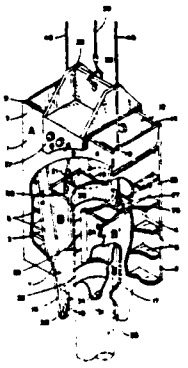
Wayne De Witt, 10816 SE. Evergreen St., Vancouver, Wash. 98664

Filed Feb. 6, 1969, Ser. No. 796,992
Int. Cl. B66c *1/00*
U.S. Cl. 294—102 4 Claims

A device for releasably gripping the upper end of piling, of different sizes and configurations, while in place and extracting them from their fixed position by conventional power means, as a suitable crane boom, with or without the assistance of vibro or other types of drivers, sometimes necessary to loosen the piling from its bind.

Keywords: Pile extractor

U.S. Cl. X.R. 24-263R



3,535,801

DREDGE CONSTRUCTION

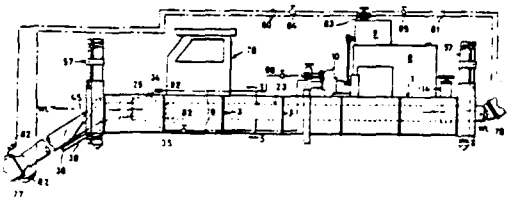
John Edward Richter, Felton, Calif., assignor to Shovel Mire, Inc., Milpitas, Calif., a corporation of California

Filed May 5, 1969, Ser. No. 821,910
Int. Cl. E02f 3/88, 3/90
U.S. Cl. 37—61 3 Claims

An improved dredge construction for dredging solids from the bed of a body of water. The dredge employs an open ended conduit mounted on a pair of spaced pontoons in conjunction with fluid jet means opening into an intermediate section of the conduit so as to project fluid under pressure in the said intermediate section to create suction and draw solids into the conduit for movement from an inlet section to an outlet section of the same. A flexible portion of the conduit between said intermediate and inlet section also enables substantially universal movements of the inlet section in response to hydraulically actuated means for moving the inlet section. The dredge further employs a high capacity pump in conjunction with a power source mounted in spaced relation on the pontoons so that the pontoons will remain substantially level during dredging operations.

Keywords: Dredge, suction; Dredge intake; Dredge propulsion; Pump

U.S. Cl. X.R. 37-72; 37-57; 114-125; 103-262; 103-263



3,535,884

OFFSHORE DRILLING AND PRODUCTION STRUCTURE

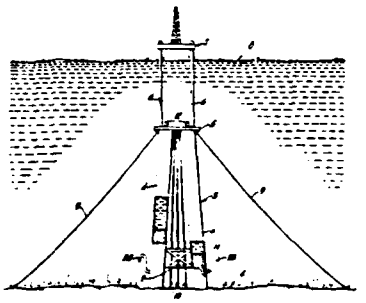
Preston E. Chaney, Dallas, Tex., assignor to Sun Oil Company, a corporation of New Jersey

Filed June 30, 1967, Ser. No. 650,528
Int. Cl. E02d 17/00; E21b 15/02
U.S. Cl. 61—46.5 16 Claims

For offshore drilling in deep water, a rigid elongated structure having its lower end secured to the ocean floor is utilized. The upper end of this structure comprises a platform which is located 100–200 feet below the sea water surface. For drilling, the legs or columns of a "jack-up" drilling rig rest on and are supported by this platform. The same platform may later be used as a permanent production platform. If wells must be pumped this can be accomplished by mounting an electric generator on the platform for powering downhole electric pumps. Tubular members incorporated into the structure are used as underwater oil storage tanks, and the platform supports marine loading apparatus for transferring the oil stored in the tanks to a tanker.

Keywords: Offshore platform, jack up; Offshore storage tank, submerged; Seabed oil, process structure

U.S. Cl. X.R. 175-7



3,535,919

DYNAMIC DETERMINATION OF PILE LOAD CAPACITY

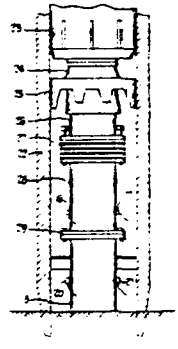
John P. Budlong and Kathleen S. Budlong, both of Anderson Road, Musquodoboit Harbour, Halifax, Nova Scotia, Canada

Filed Dec. 2, 1968. Ser. No. 780,443
Int. Cl. G01n 3/30
U.S. Cl. 73—84 21 Claims

Apparatus and the method of dynamically determining the static load bearing capacity of piles is disclosed with a representative electronic circuit being shown utilizing a strain gauge and an accelerometer physically connected to the pile near the top of the pile. The outputs of these instruments are modified and summed to yield a signal proportional to the instantaneous resistance of the soil into which the pile is being driven. The static load bearing capacity of the pile is proportional to the average resistance of the soil over a certain time interval and this is obtained from the instantaneous signal by an averaging circuit which divides the integral of the instantaneous signal over said time interval by the integral of a constant voltage. Control circuits are provided to set the apparatus in operation at any selected time upon the next hammer blow on the pile. The foregoing abstract is merely a resume of one general application, is not a complete discussion of all principles of operation or applications, and is not to be construed as a limitation on the scope of the claimed subject matter.

Keywords: Pile driver, impact; Pile load measurement

U.S. Cl. X.R. 73-509



3,535,924

BATHYTHERMOGRAPH SYSTEM

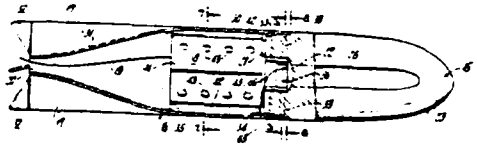
Richard Bixby, Little Compton, R.I., assignor to Buzzards Corp., Marion, Mass., a corporation of Massachusetts

Continuation-in-part of application Ser. No. 630,746, Apr. 13, 1967. This application Sept. 11, 1969, Ser. No. 857,177
Int. Cl. G12b 9/00, 9/04, 9/06
U.S. Cl. 73—170 15 Claims

A bathythermograph system employs an expendable probe that has external symmetrical grooves on its nose portion to direct water to measuring devices in the tail portion. The probe is adapted to be stored in a hollow cylinder having a coil wound on its external surface. A cannister surrounds the coil and has a removable cover for releasing the probe.

Keywords: Bathythermograph; Instrument deployment

U.S. Cl. X.R. 73-344



3,536,135

UNDERWATER PRODUCTION FACILITY INCLUDING BASE UNIT AND PRODUCTION FLUID HANDLING UNIT

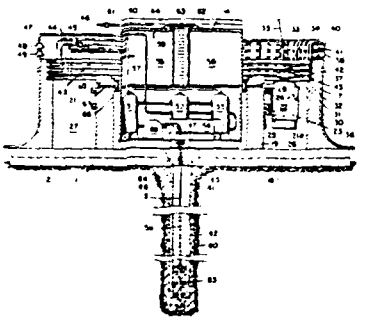
James R. Dozier, Tulsa, Oklahoma, assignor to Shell Oil Company, New York, New York a corporation of Delaware

Filed June 27, 1968, Ser. No. 740,688
Int. Cl. E21b *43/01, 43/00*
U.S. Cl. 166—.5 17 Claims

A production facility for use at an offshore location and including a base unit situated on the ground under a body of water and a production fluid handling unit adapted to be selectively positioned in engagement with said base unit. Cooperating conduit means are provided between said units and incorporate coupling means. The production fluid handling unit is adapted to be selectively disengaged from the base unit and brought to the surface of the water and during such operation the coupling means operates to disengage said cooperating conduit means.

Keywords: Seabed foundation; Seabed oil, process structure

U.S. Cl. X.R. 166-267



3,536,157

UNDERWATER SOUND SOURCES

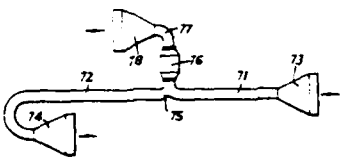
Nigel Allister Anstey, Orpington, Kent, England, assignor to Seismograph Service Corporation, Tulsa, Oklahoma

Filed Jan. 3, 1969, Ser. No. 788,784
Claims priority, application Great Britain, Jan. 3, 1968, 388/68
Int. Cl. B63b *45/08*; G10k *1/00*
U.S. Cl. 181—0.5 18 Claims

A sound source for generating underwater acoustic pulses comprises an open-ended pipe which is provided at one or both of its ends with a velocity transformer, such that when the pipe moves through water beneath the surface thereof the water flows through the pipe at a speed greater than the speed of the sound source through the water. The sound source includes a valve or other cutoff means for suddenly interrupting the flow of water to produce an acoustic signal which is radiated from the sound source.

Keywords: Seismic hydraulic acoustic transmitter

U.S. Cl. X.R. 116-27; 116-137; 340-7; 340-12



3,536,199

FIRE EXTINGUISHING OIL SLICK SEPARATOR

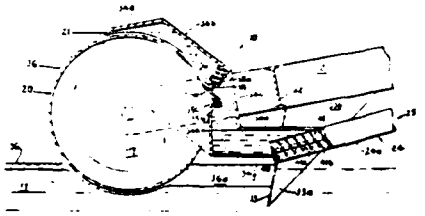
Bill G. Cornelius, Houston, Tex., assignor of one-half to McRae Oil Corporation, Houston, Texas a corporation of Colorado

Filed June 27, 1969, Ser. No. 837,091
Int. Cl. E02b *15/04*, B01d *17/02*
U.S. Cl. 210—242 15 Claims

A frame, carrying a cowled drum with cowl providing a chamber, is pivoted from a base, as a propelled means, (barge or tug), or a stationary means, (dock, slip or shore based structure), in manner that the drum is buoyed by a heavier fluid carrying a lighter fluid, the drum bearing the lighter fluid, as oil, on its surface into an enclosed cowl provided chamber designed to be kept substantially full and thus not well calculated to support combustion, the drum surface film of lighter fluid being scraped off by a scraper which deflects the lighter fluid into the chamber interior, a conveyor being provided to transfer the lighter fluid from the lower part of the chamber in direction of the base.

Keywords: Pollutant, mechanical removal

U.S. Cl. X.R. 169-2; 210-523



3,536,615

METHOD OF AND APPARATUS FOR TREATING OIL LEAKAGE

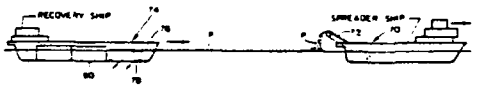
Clinton O. Bunn, Springfield, Va., assignor to Col-Mont Corporation, Butte, Mont., a corporation of Delaware

Filed Aug. 6, 1969, Ser. No. 848,039
Int. Cl. B01d *15/00, 17/02*
U.S. Cl. 210—36 10 Claims

Oil leakage on the surface of bodies of water is treated by spreading over the surface of the water discrete particles coated with finely divided carbonaceous or the like material having a high affinity for oil. Oil is adsorbed on the surface of the particles, with the particles being thereafter collected for further treatment, for example, drying and agglomerating. The particles following such treatment constitute an economic fuel source immediately usable for fuel purposes.

Keywords: Pollutant absorption; Pollutant collection; Pollutant removal watercraft

U.S. Cl. X.R. 210-40; 210-502



3,536,616

METHOD FOR REMOVAL OF OILS FLOATING ON SURFACE OF WATER

Goro Kondoh, Nishinomiya-shi, and Sigeru Honda and Yukio Murakami, Osaka, Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan, a quasi-governmental agency

No Drawing. Filed June 20, 1968, Ser. No. 738,396
Claims priority, application Japan, June 24, 1967 42/40,356
Int. Cl. C02b *9/02*
U.S. Cl. 210—40 5 Claims

This invention relates to a method of removing oils floating on the surface of water which comprises spraying a solution of a synthetic polymer dissolved in a low-boiling point organic solvent over the oil floating in thin film form on the surface of water, thereby forming a thin film or fine droplets of said solution on the surface, allowing the floating oil to adhere to said thin film or fine droplets, and collecting these by an appropriate means.

Keywords: Pollutant coalescence

No Figure

3,537,268

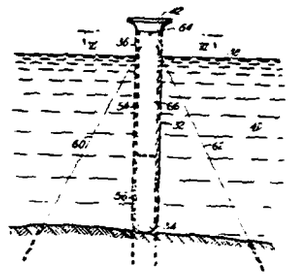
MARINE STATION AND METHOD FOR FABRICATING THE SAME

Hans Christer Georgii, 42 Rindogatan, Stockholm, Sweden

Filed Aug. 8, 1968, Ser. No. 751,113
Claims priority, application Sweden, Aug. 9, 1967, 11,318/67
Int. Cl. E02d 29/06
U.S. Cl. 61—46
9 Claims

A marine station is formed of one or more concrete cylinders cast in situ in a body of water over the location intended for the station. The cylinder or cylinders are then sunk into position. The cylinders are provided with internal chambers adapted to accommodate personnel and/or equipment. Moreover, peripheral hollows or bores are provided, surrounding the chamber through which hollows or bores may be passed communication devices, tools, etc. The cylinders may be supported on piles or by cables or on platforms or the like.

Keywords: Offshore caisson; Offshore construction; Offshore platform, fixed; Pile placement; Seabed foundation; Seabed oil, process structure
U.S. Cl. X.R. 114-.5



3,537,536

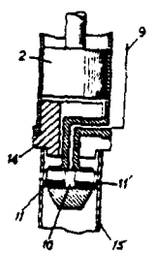
PILE CLAMP FOR POWER HAMMERS

Hugo H. Cordes, 78 Brunnenstr, Hamburg 50 and Hans A. Kroeger, Hamburg 62, Germany, said Kroeger, assignor to said Cordes, Hamburg, Germany

Filed Sept. 20, 1968, Ser. No. 761,259
Claims priority, application Germany, Sept. 21, 1967, 1,634,303
Int. Cl. B25d 9/00
U.S. Cl. 173—92
5 Claims

A clamping device for a power hammer of the type having a housing and ram reciprocable by fluid pressure, the clamping device comprising at least one cylinder having transverse clamping means solidly contacting the pile to be driven, the cylinder being supplied with pressure fluid from the ram, thereby controlling clamping pressure between the hammer housing and pile along with fluid pressure for the downward stroke of the ram. A return spring may be provided for retraction of the clamping piston.

Keywords: Pile driver, impact



3,537,542

SPARKING DEVICES SUITABLE FOR SEISMIC PROSPECTING

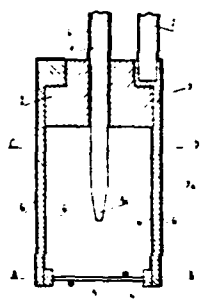
Jean Claude Dubois, Royan, and Andre James, le Verdon/Mer, France, assignors to Institut Francais du Petrole, des Carburants et Lubrifiants, Hauts-de-Seine, France

Filed Dec. 13, 1968, Ser. No. 783,586
Claims priority, application France, Dec. 14, 1967, 132,358
Int. Cl. G01v 1/06
U.S. Cl. 181—.5 12 Claims

A sparking device for underwater seismic prospecting comprising at least two immersed electrodes and means for suddenly discharging a high electrical energy, in combination with a burner supplied with an inflammable gaseous mixture adapted to produce a conducting ionized flame.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 340-12



3,537,587

FLEXIBLE FILTRATION BOOM

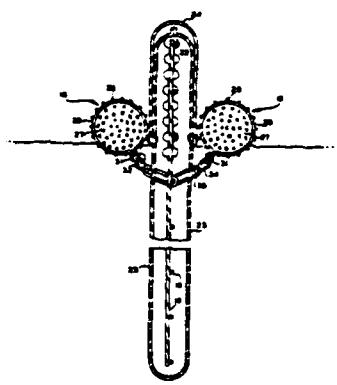
Calvin L. Kain, 1325 Rockdale, Bartlesville, Oklahoma 74003

Filed June 5, 1969, Ser. No. 830,602
Int. Cl. B01d *33/00*
U.S. Cl. 210—242 10 Claims

A flexible weighted net is supported in a vertical position by at least one horizontally elongated floatation unit. A flexible layer of hydrophobic, oleophilic material is attached to the net to generally conform to the position and movement of the net. Water passes through the filter layer while liquid hydrocarbons are blocked.

Keywords: Pollutant, surface barrier

U.S. Cl. X.R. 61-1



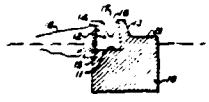
3,538,710
BREAKWATER STRUCTURE

Louis Tourmen, Grenoble, France, assignor to Societe Grenobloise d'Etudes et d'Applications Hydrauliques, Grenoble, France, a corporation of France

Continuation-in-part of application Ser. No. 630,873, Apr. 14, 1967. This application Apr. 7, 1969, Ser. No. 822,818
Claims priority, application France, Apr. 16, 1966, 4,920
Int. Cl. E02b 3/04, 3/14
U.S. Cl. 61—4 19 Claims

A breakwater composed of two vertical, spaced parallel walls exposed to wave attack and forming therebetween a drain basin capable of holding back water from each incoming wave, and the landward wall being higher than the seaward wall. The landward wall is preferably curved seawardly to function as a wave deflector.

Keywords: Breakwater, concrete; Breakwater, floating; Breakwater, rubble
U.S. Cl. X.R. 61-49



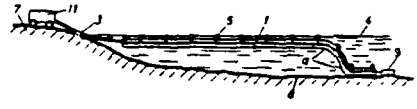
3,538,711
DEVICE FOR CONTROL AND PREVENTION OF COAST EROSION

Erik Nielsen, Frederikshavn, Denmark, assignor to Fyens Sae:kekompagni A/S, Odense, Denmark

Filed Mar. 5, 1968, Ser. No. 710,529
Claims priority, application Denmark, Mar. 7, 1967, 1,170/67
Int. Cl. E02b 3/12
U.S. Cl. 61—38 2 Claims

Effective seabed protection of coasts is achieved at low cost by perforated or pervious flexible tubes or hoses laid out in lengths and filled selectively with sand and small stones without any binding agents. Length of the tube is very large compared to the cross section filled to lie the same throughout its length. Since no hardeners are used, the filled tube is able to follow possible movements or changes in the seabed without showing any cracks. Sealing of one end of the tube occurs and filling of at least a small length continues while progressively moving the tube or hose during the filling to place the same along the path where the coast protecting means is being deposited.

Keywords: Groin; Low-cost shore protection; Revetment; Sandbag; Seabed material placement



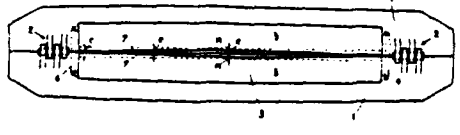
3,538,875
HOPPERBARGE

Jan de Koning, Amsterdam, Netherlands, assignor to N.V. Ingenieursbureau voor Systemen en Octrooien "Spanstaal", Rotterdam, Netherlands, a Dutch contracting company

Filed Nov. 18, 1968, Ser. No. 776,561
Claims priority, application Netherlands, Dec. 7, 1967, 6 716 647
Int. Cl. B63b 35/30
U.S. Cl. 114—29 2 Claims

With a hopperbarge, comprising two air cases swinging with respect to each other and together bordering the hold, sealing the lower side of the hold is difficult, because the lower edges of the air cases, owing to deformation under influence of the load deflect more in the middle than at their ends. The opposed lower edges of the air case being arched and elastic means being mounted between them result in a good seal.

Keywords: Hopper barge



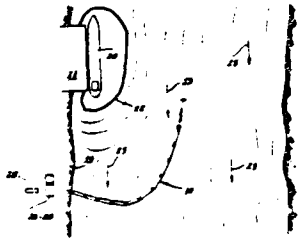
3,539,013
OIL COLLECTION BOOM

Millard F. Smith, Westport, Connecticut (P.O. Box 295, Saugatuck, Conn. 06882)

Filed June 24, 1968, Ser. No. 739,231
Int. Cl. B01d *15/06, 17/00*
U.S. Cl. 210—242 6 Claims

An oil absorbing boom for the purpose of collecting and removing from water thin films of oil comprising an elongated flat tubular sleeve of polymer netting enclosing within itself a plurality of flat elongated slabs or bats of "picker-lap" fibrous polymer material such as blown polypropylene film arrayed end to end within the tubular sleeve and sufficiently spaced apart to permit accordion folding of the sleeve at fold lines between adjacent bats, with a tension-bearing rope or cable being positioned within the tubular sleeve alongside the successive plurality of absorbent bats to reinforce the structure for carrying its own weight or impact loads placing it in tension between its ends.

Keywords: Pollutant absorption; Pollutant collection; Pollutant, surface barrier



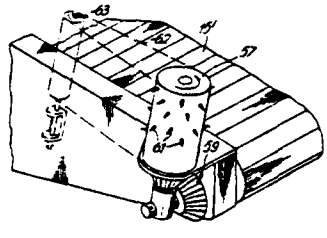
3,539,048
MEANS FOR COLLECTING FLOTSAM

Anthony Fabian Austin Pearson, 24B Upminster Road South, Rainham, Essex, England

Filed Oct. 9, 1968, Ser. No. 766,085
Claims priority, application Great Britain, Oct. 10, 1967, 46,186/67
Int. Cl. C02b *1/08*
U.S. Cl. 210—242 14 Claims

This invention relates to a device for collecting flotsam and other garbage floating on or adjacent the surface of the water in harbours and locks and the like, comprising a vessel such as a ship having endless conveyor means mounted or adapted to be mounted thereon and projects forwardly of the bow of the vessel into the water, whereby flotsam etc. in the water is gathered by the conveyor means and carried by it, upwardly, and into a collecting receptacle which may either be a hold of the ship or a barge. It will thus be appreciated that the vessel may be of single or or twin hull construction, the barge being adapted to be located between the hulls of the latter construction.

Keywords: Pollutant collection; Pollutant debris; Pollutant, mechanical removal; Pollutant removal watercraft



3,539,979

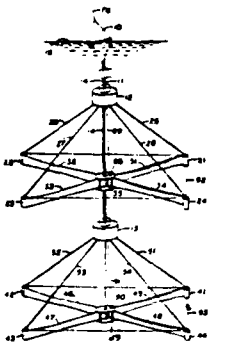
HYDROPHONE ARRAY ERECTION

Russell D. Crail, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex., a corporation of Delaware

Filed Dec. 16, 1964, Ser. No. 418,786
Int. Cl. G01v *1/16*
U.S. Cl. 340—7 3 Claims

A device is disclosed for supporting an array of seismic transducers which includes a plurality of support members which are prestressed to assume a nonplanar configuration. Means are provided for constraining the support members in this configuration and the supports may be released to permit them to unwind and extend radially from their central support. Transducers are attached at the ends of the support members. One or more central supports with the accompanying radial members may be provided.

Keywords: Buoy, instrumented; Instrument deployment; Seismic hydrophone array
U.S. Cl. X.R. 340-8; 340-9; 340-17



NOVEMBER 17, 1970

3,540,194

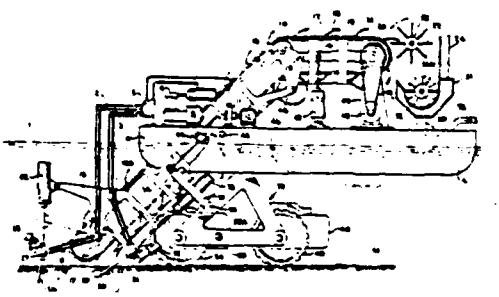
METHOD OF REMOVING MARINE GROWTHS AND ROOTS

Merle P. Chaplin, 609 Driver Ave.,
Winter Park, Fla. 32789

Filed Oct. 2, 1968, Ser. No. 764,586
Int. Cl. A01d *45/08*
U.S. Cl. 56—1 5 Claims

A method of removing weeds and plants from the bottoms of lakes and waterways, involving injecting water and subsequently compressed air directly below the root systems of such plants, thus forcing them away from the bottom of the lake or waterway. A preferred embodiment of my invention involves a conveyor utilized in concert with this fluid pressure injection method, which enables the removed plants to be carried to the surface of the water and disposed of, instead of leaving portions of the uprooted plants in the water to decay.

Keywords: Pollutant, mechanical removal; Pollutant removal watercraft; Water plant removal
U.S. Cl. X.R. 37-78; 37-195; 56-9; 299-9



3,540,224

RIGIDIZED SUPPORT ELEMENT

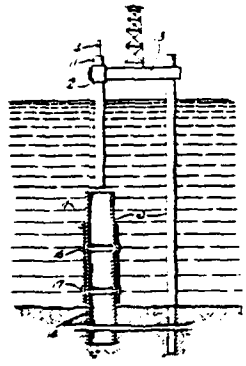
Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc., New York, N.Y., a corporation of Delaware

Filed Mar. 29, 1968, Ser. No. 722,138
Int. Cl. E02b 17/00; F16l 13/14, 39/00
U.S. Cl. 61—46 13 Claims

This invention relates to a foundation member for a structure normally elevated above a working surface such as the ocean floor. The foundation member, or members if more than one is used, is normally in a state of compression and comprises at least two concentrically arranged cylindrical elements, one within the other. The outer of said elements is operably carried on the elevated structure, and the remaining element comprises a pile adapted to penetrate the ocean floor. The respective cylindrical element walls are contiguous, and rigidized at one or more longitudinally spaced joints formed by the peripheral deformation of one element wall into the adjacent wall of the other to define one or more annular rings.

Keywords: Offshore construction; Offshore platform, leg; Pile, structure connection; Seabed foundation

U.S. Cl. X.R. 24-20; 285-321; 285-382.4



3,540,415

SYNTHETIC REEF ECOLOGICAL SYSTEM FOR LARGE BODIES OF WATER

James E. Bromley, 6121 Jasmine Road, Pensacola, Florida 32503

Filed April 18, 1969, Ser. No. 817,470
Int. Cl. A01k 61/00
U.S. Cl. 119—3 8 Claims

A synthetic reef for installation on the floor of large natural or manmade bodies of water is provided to facilitate the colonizing of harvestable fish therefrom. The reef is made of a flexible perforated base material weighted sufficiently so that the reef is submergible to the floor. A plurality of spaced-apart thin elongated ribbonlike members are attached at one of their ends to said base material and have a density sufficiently low so that when the reef is submerged the other ends of the members will tend to float upward. A method of installing such a reef is also disclosed.

Keywords: Artificial seaweed; Fabric mat; Seabed material placement

U.S. Cl. X.R. 261-77; 119-5

3,540,543

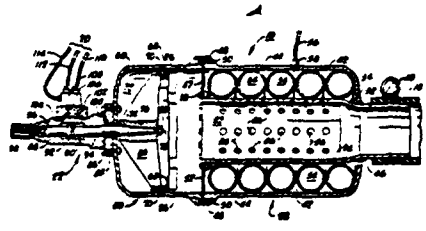
MARINE ACOUSTIC ENERGY SOURCE

Marvin G. Bays, Jackson, Mississippi, assignor to Continental Oil Company, Ponca City, Oklahoma a corporation of Delaware

Filed Jan. 6, 1969, Ser. No. 789,273
Int. Cl. G01v 1/38
U.S. Cl. 181—.5 7 Claims

Apparatus for generating compressional seismic wave energy in a water medium, the apparatus consisting of a high volume, low pressure fluid source connected to a chamber having controllable outlet port openings in communication with its surrounds, and having pressure accumulator means disposed therein. A suitable form of linear actuator is mounted axially on the chamber to control a porting sleeve which is reciprocally movable to periodically open the outlet port openings at a controlled rate; and the rapid volume differentiation results in generation of a compressional wave within the water medium.

Keywords: Seismic hydraulic acoustic transmitter; Seismic vibratory acoustic transmitter

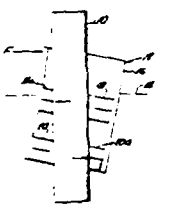


3,541,800
PILE PROTECTOR
Grant W. Walker, 4339 Lantzy Court, Sacramento, Calif. 95825, and Duane B. Ford, 2811 Hocking St., Placerville, Calif. 95667
Filed Sept. 17, 1968, Ser. No. 760,142
Int. Cl. E02b 3/22
U.S. Cl. 61—48 7 Claims

A pile protector comprising a rigid housing surrounding the pile to be protected in spaced relation therefrom and upper and lower non-energy storing collapsible assemblies filling the space between the pile and the rigid housing for being collapsed without significant storage of energy upon impact of a vessel with the rigid housing, the collapsible assemblies normally containing water which is expelled at a rate commensurate with the severity of impact is disclosed.

Keywords: Collision protection; Pile protection

U.S. Cl. X.R. 114-219; 293-1

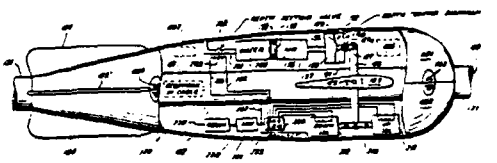


3,541,989
HYDROPNEUMATIC MEASUREMENT AND CONTROL FROM BUOYED BODIES
Willie Burt Leonard, 1922 W. Gray, Houston, Texas 77003
Filed March 4, 1968, Ser. No. 710,003
Int. Cl. B63b 21/00; G01n 9/00; B63g 8/14
U.S. Cl. 114—235 17 Claims

A diaphragm motor drives a mud densitometer gauge or depth control vanes for a barge or cable. One side of diaphragm is subject to air pressure received from a hydropneumatic converter which responds to hydraulic pressure at a predetermined depth (densitometer) or at ambient depth (barge) or at controlled depth (cable).

Keywords: Depth pressure measurement; Seismic streamer cable; Towed body depth control; Towed vehicle

U.S. Cl. X.R. 73-439; 114-16



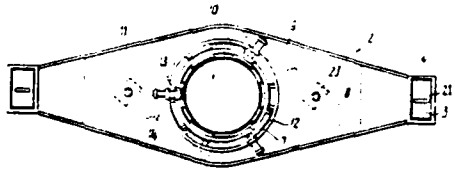
3,542,140
ROTARY APPLIANCE FOR FACILITATING THE DRIVING OR WITHDRAWAL OF PILES, PIT-PROPS AND THE LIKE

Robert Hochstrasser, Saarbruecken, Germany, deceased, by Elisabeth Hochstrasser, and Juergen Hochstrasser, administrators, Kobenhuttenweg 22, Saarbruecken, Germany

Filed Apr. 9, 1968, Ser. No. 719,995
Claims priority, application Germany, April 14, 1967, 1,634,404
Int. Cl. B25d 15 00
U.S. Cl. 173—93 12 Claims

Rotary appliances for driving and withdrawing piles, pit-props and the like, wherein the weights responsible for producing the inertia forces, and the pile or the like which is being driven or withdrawn by it, can all be separated from one another for ease of handling by conventional lifting tackle. The inertial energy developed by the rotary appliance is transformed into torsional hammer blows through coupling arrangements which incorporate elements which are easily exchanged and replaced when wear has taken place.

Keywords: Pile driver, impact; Pile extractor



DECEMBER 1, 1970

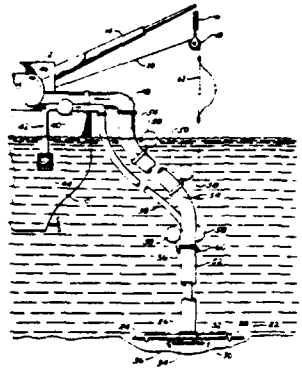
3,543,422
UNDERWATER MINING ASSEMBLY

Noel B. Plutchak, San Diego, Calif., assignor to The Bendix Corporation, a corporation of Delaware

Filed June 28, 1968, Ser. No. 740,964
Int. Cl. E02f 3/94, 3/92
U.S. Cl. 37—57 10 Claims

A mining head having a flexible suspension arrangement for mining material from the bottom of the ocean or from any location where the material can be converted into a slurry. The head consists of a circular plate having a smoothly contoured circular passageway through its center connected with a large diameter hose and a bell-shaped member attached in close proximity to the central passageway to direct the flow into the hose. A manifold carries water at high pressure to a number of nozzles located around the edge of the plate, and flow from these nozzles puts the solids into suspension. The resulting slurry is drawn into the central passageway by means of a pump which carries the slurry to the desired location. The head is suspended from a crane carried on a ship by means of a cable having a flexible link to take up vertical movement due to wave action. Flotation buoys are fastened to the hose to keep the loaded hose essentially neutrally buoyant irrespective of its length or the weight of the slurry carried.

Keywords: Dredge, suction; Dredge intake
U.S. Cl. X.R. 37-63; 37-72; 254-135; 254-195



3,543,523

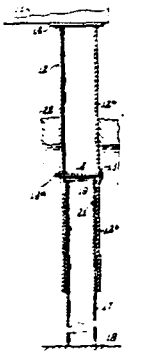
STRUCTURAL DOCK SYSTEM

Harry E. Nelson, La Pointe, Wis., assignor, by mesne assignments, to Gary Industries, Inc., Chicago, Ill., a corporation of Nevada

Filed Feb. 6, 1969, Ser. No. 797,084
Int. Cl. E02b *17/00*
U.S. Cl. 61—46 6 Claims

The subject structure pertains to a dock system wherein the dock platform carries on its under side a plurality of sleeves which telescope freely over driven piling so as to enable the dock platform to rise and fall with the rise and fall of the level of ice on the water mass and thereby prevent pulling of the piling from its anchorage.

Keywords: Ice protection; Pier, fixed; Pile protection; Small-craft pier
U.S. Cl. X.R. 61-52; 61-54



3,543,565

METHOD AND APPARATUS FOR DETERMINING THE CONCENTRATION OF DREDGER SPOIL IN A SUSPENSION OF DREDGER SPOIL AND WATER FLOWING THROUGH A PIPE

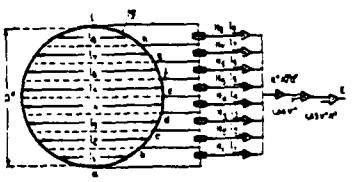
Jan de Koning, Amsterdam, and Romke van der Veen, Jutphaas, Netherlands, assignors to N.V. Ingenieursbureau voor Systemen en Octrooien, Spanstaal, Rotterdam, Netherlands, a Dutch contracting company

Filed Mar. 28, 1968, Ser. No. 716,809
Claims priority, application Netherlands, Mar. 31, 1967, 6704596
Int. Cl. G01n *15/06, 9/26*
U.S. Cl. 73—61 9 Claims

For determining the concentration of dredger spoil in a suspension of dredger spoil and water flowing through a horizontal pipe, the difference is measured between the pressures at two different levels at least of the horizontal pipe and the concentration is derived from this pressure difference.

Keywords: Dredge-spoil measurement

U.S. Cl. X.R. 73-205; 73-438



3,543,709

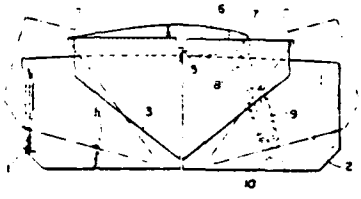
DEVICE FOR CLOSING BOTTOM DUMP BARGE

Ludwig Bock, Hornstorf-Straubing and Georg Onderca, Metten, Germany, assignors to Deggendorfer Werft und Eisenbau G.m.b.H., Deggendorf Danube, Germany

Filed March 12, 1969, Ser. No. 806,420
Claims priority, application Germany, April 30, 1968, 1,756,273
Int. Cl. B63b *35/30, 35/38*
U.S. Cl. 114—29 12 Claims

A bottom dump barge is comprised of a pair of barge sections hinged together along a longitudinally extending axis located at approximately the deck level of the barge. For moving the barge sections from the closed to the opened position, an arm is secured to one barge section and extends in cantilever fashion transversely across the hinge axis to a point above the other barge section and a closing device is secured at its upper end to the free end of the cantilever arm and at its lower end to the other barge section. The closing member can be locked to retain the barge sections in the closed position.

Keywords: Hopper barge



3,544,456

DREDGING PROCESS

Donald Y. Shanfelt, Sunnyvale, and Robert A. Douglas, Palo Alto, Calif., assignors to Calgon Corporation, Pittsburgh, Pa.

No Drawing. Filed Sept. 18, 1968, Ser. No. 760,702
Int. Cl. B01d *21/01*
U.S. Cl. 210—54 6 Claims

In a dredging process wherein silt and water are removed from the floor of a body of water and pumped to a barge or other container to be transported, an improvement is effected by adding to the silt-water mixture a water-soluble polymeric flocculating agent, which causes the silt to settle more quickly and compactly, permitting a more efficient continuous removal of relatively clear water from the barge.

Keywords: Dredge-spoil transport; Hopper barge

U.S. Cl. X.R. 37-195

No Figure

DECEMBER 8, 1970

3,545,214

CONCRETE PILE SECTIONS AND JOINTS THEREFOR

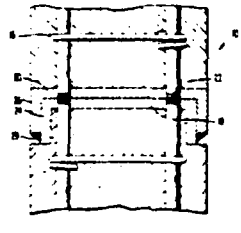
John Grazel, Santurce, Puerto Rico, assignor to John Grazel, Inc., San Juan, Puerto Rico, a corporation of Puerto Rico

Filed Oct. 2, 1968, Ser. No. 764,418
Int. Cl. E02d *5/12, 5/30*
U.S. Cl. 61—53 12 Claims

Each cast concrete pile section has longitudinally extending reinforcing rods, the opposite ends of which are partially received within openings formed through normally disposed end plates. The rod ends extend intermediate the lengths of the openings and are welded to the end plates along the inside faces of the plates about the openings. Weld is also applied within the openings from the outer faces of the plates. The end plates have flanges which extend in like axial directions. To secure the pile sections in end-to-end relation, the end plate of one pile section is received within the recess formed by the flanges of the end plate of the adjoining pile section.

Keywords: Pile, concrete; Pile section connection

U.S. Cl. X.R. 52-301; 52-601; 52-725; 61-56; 287-103



3,545,274

SEA WATER DEPTH TRANSDUCER AND SYSTEM

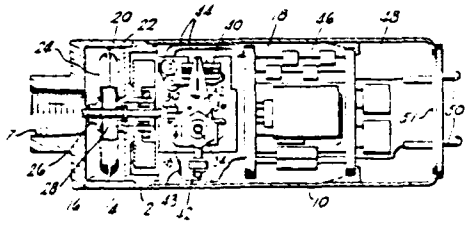
William M. Derr and Bill J. Harper, Albuquerque, N. Mex., assignors to Sparton Corporation, Jackson, Mich., a corporation of Ohio

Filed Oct. 3, 1968, Ser. No. 764,737
Int. Cl. G01 *3/02*
U.S. Cl. 73—393 4 Claims

A sea water depth transducer and system for use in determining underwater pressures and pressure fluctuations, particularly suitable for use in geological explorations wherein calibration and inaccuracies due to conductor loss is minimized as current, rather than voltage, is sensed as regulated by a transducer potentiometer resistance element. A current amplifier, and temperature compensation means are incorporated in the circuitry, along with readout apparatus in the form of a current sensing gauge. The current output to resistance curve is maintained substantially linear by relating the tap of the potentiometer to its resistance coil in a unique manner to compensate for the usual nonlinearity of the current to resistance relationship.

Keywords: Depth pressure measurement; Seismic hydrophone; Seismic hydrophone array

U.S. Cl. X.R. 73-398; 338-41



3,545,539

SUBSEA SATELLITE FOUNDATION UNIT AND METHOD FOR INSTALLING SATELLITE BODY THEREWITHIN

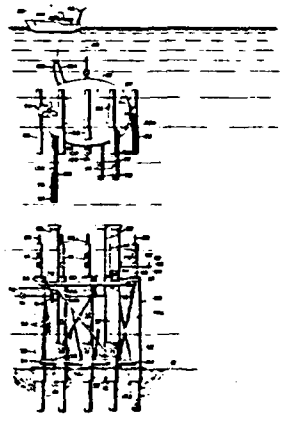
William F. Manning, Dallas, Texas, assignor to Mobil Oil Corporation, a corporation of New York

Filed Aug. 28, 1967, Ser. No. 663,798
Int. Cl. E21b *33/035, 43/01*
U.S. Cl. 166—.5 28 Claims

This specification discloses a method and apparatus for lowering a satellite body through a body of water to a foundation unit rigidly fixed on a marine bottom while preventing the motion of the surface handling vessel, from which the satellite body is being lowered, from being transferred to the satellite body as it comes into contact with the installed foundation unit. The apparatus comprises corresponding elements on the foundation unit and the satellite body which telescope together, trapping water therebetween. A remotely controlled bleeding off of the trapped water permits the satellite body to settle at a controlled rate in the foundation unit, the telescoping elements automatically locking together to insure that the satellite body is rigidly fixed in the foundation unit. The telescoping elements also orient the satellite body on the foundation unit so that stab connections between the satellite body and subsea wellheads, mounted on the foundation unit, come into registry and interlock to connect subaqueous wells drilled through the foundation unit, with production equipment within the satellite body. The subsea operations are assisted by a submersible work vehicle in attendance at the underwater site.

Keywords: Offshore construction; Seabed foundation; Seabed oil, process structure

U.S. Cl. X.R. 61-46.5; 61-72.3



3,545,563

DEVICE FOR EMITTING ACOUSTIC WAVES IN WATER

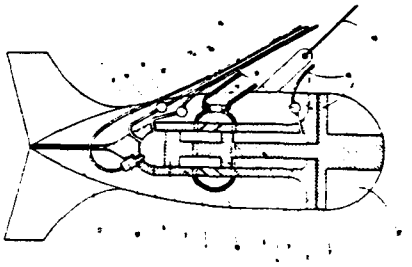
Jacques Cholet, Rueil Malmaison, France, assignor to Institut Francais du Petrole, Des Carburants et Lubrifiants, (Hauts de Seine), France

Filed Jan. 14, 1969, Ser. No. 790,966
Claims priority, application France, Jan. 18, 1968, 136.593
Int. Cl. G01v *1/04, 1/38*
U.S. Cl. 181—0.5 3 Claims

Method and apparatus for emitting acoustic waves in water by forcefully separating a pair of plates by means of a piston and cylinder arrangement providing a combustion chamber and a counter pressure chamber on respective sides of the piston, a pressure being provided in said counter pressure chamber to simultaneously position one plate against the other plate and compress the gases in the combustion chamber so that ignition of the compressed gas produces a separation of the plates.

Keywords: Seismic explosive acoustic transmitter

U.S. Cl. X.R. 340-7



3,546,112

ABSORPTION OIL SKIMMER

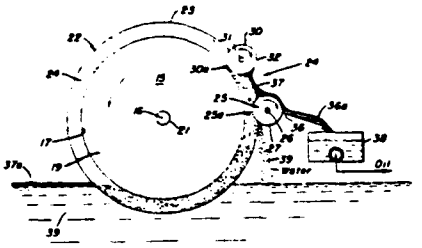
Robert G. Will, Munster, and William F. Swiss, Jr., Highland, Ind., assignors to Standard Oil Company, Chicago, Ill., a corporation of Indiana

Filed Jan. 29, 1968, Ser. No. 701,395
Int. Cl. B01d *15/06, 17/04*
U.S. Cl. 210—30 11 Claims

A power driven apparatus having a rotation means with a closed supporting surface, absorber means for absorbing water and oil supported on the surface, removal means for sequentially removing water and oil from the absorber means, the removal means being a plurality of rollers exerting different pressures against the absorber means, and wiper means for effectuating the withdrawal of the oil.

Keywords: Pollutant, mechanical removal; Pollutant removal watercraft

U.S. Cl. X.R. 210-40; 210-73; 210-242



3,546,456

MULTIPLE DETECTOR SUBMARINE RADIOACTIVITY LOGGING SYSTEM

Charles Fitzhugh Grice, Houston, Tex., assignor to Schlumberger Technology Corporation, Houston, Tex., a corporation of Texas

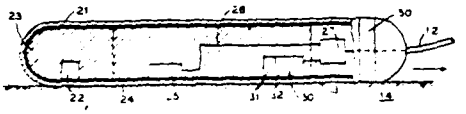
Filed Jan. 5, 1968, Ser. No. 695,978
Int. Cl. G01v 5/00
U.S. Cl. 250—83.3 5 Claims

An illustrative embodiment of the invention shows a radioactivity logging device for measuring the density of the sediment on the bottom of a body of water. A housing containing a neutron or gamma radiation source is towed along the bottom to irradiate the sediment. Also within the housing, a pair of radiation counters that are spaced at different distances from the source respond to neutron reactions or those source radiations that are back-scattered to the housing by the sediment. These two counters indicate the sediment density, the quality of the contact with the bottom, and the homogeneity of the sediment.

Keywords: Instrument, radioisotope; Instrument, seabed in situ; Instrument, towed; Seabed property measurement

U.S. Cl. X.R. 250-43.5, 250-83.6

See: Re. 3,532,881



3,546,473

OCEANOGRAPHIC GENERATOR

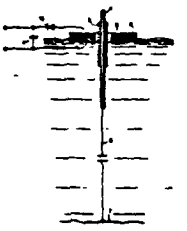
Alan H. Rich, 9910 Jacqueline Drive, Oxon Hill, Md. 20021

Filed Feb. 24, 1969, Ser. No. 801,646
Int. Cl. F03b 13/12
U.S. Cl. 290—42 9 Claims

The invention consists of a device for generating electrical energy by utilizing the motion of the surface of a body of water. It comprises two floats, one which follows the displacement of the water surface and another which remains in a substantially stable position independent of the motion of the water. By attaching a permanent magnet and a coil to the floats, an electromotive force can be induced in the coil upon the occurrence of relative motion between the floats.

Keywords: Electrical generator; Power, wave

U.S. Cl. X.R. 290-53



3,546,885

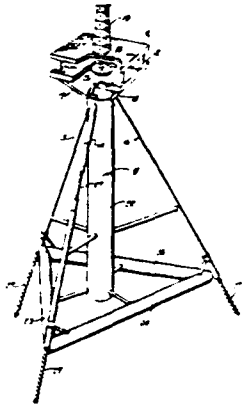
THREADED PILE FOR MARINE STRUCTURE

Ivo C. Pogonowski, Houston, Tex., assignor to Texaco Inc., New York, N.Y., a corporation of Delaware

Filed Sept. 30, 1968, Ser. No. 763,709
Int. Cl. E02b 17/00
U.S. Cl. 61—46.5 10 Claims

The invention relates to a deep water drilling platform for use in offshore or inland waters, which platform embodies one or more support legs extending downward toward the ocean floor. The platform is maintained relatively stationary with respect to the ocean surface and floor by anchoring into the ocean substratum with piles that depend from the lower ends of one or more of the support legs. The respective piles are provided with an externally positioned, upstanding helical member which permits a pile to be rotatably driven into the anchoring medium by activation of the pile through rotary motor means at the water surface.

Keywords: Embedment anchor; Offshore platform, fixed; Pile placement; Pile, steel; Pile, structure connection; Seabed foundation
U.S. Cl. X.R. 52-155



3,547,207

PERCUSSION HAMMER

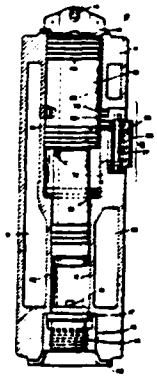
Henry G. Warrington, Palm Beach, Fla., assignor to Vulcan Iron Works, Inc., Chattanooga, Tenn., a corporation of Illinois

Filed Nov. 7, 1968, Ser. No. 774,082
Int. Cl. E02d 7/02
U.S. Cl. 173—127 4 Claims

There is provided a submersible percussion hammer of the type used for underwater pile driving and the like, including a differential diameter piston defining a ram reciprocally positioned within a differential diameter cylinder. An anvil is mounted for limited movement in on one end of the cylinder positioned in the path of the ram to receive percussion blows therefrom. The anvil is hermetically sealed with the cylinder so as to form a watertight device. Means are provided for controlling the exhaust and inlet of the working fluid into the cylinder to cycle the ram through power and return strokes.

Keywords: Offshore construction; Pile driver, impact

U.S. Cl. X.R. 92-85; 92-144; 173-133; 173-138; 175-6



3,547,553

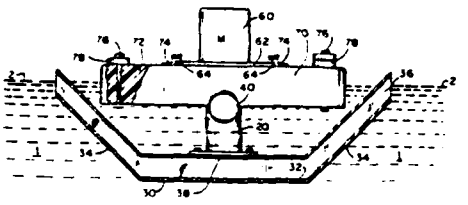
FLOATING SURFACE SKIMMER

Howard E. Stanfield, Tulsa, Okla., assignor to Acme Products Incorporated, a corporation of Nevada

Filed Dec. 30, 1968, Ser. No. 787,823
Int. Cl. F04d 13/02
U.S. Cl. 415—7 4 Claims

A floating pump assembly having intake scoops drawing from the surface layer only of a body or pool of liquid, and an exhaust outlet and hose for directing the removed layer to some other place than that of the body or pool of liquid itself.

Keywords: Pollutant, suction removal; Pump



3,548,304

RESISTIVITY MEASURING DEVICE HAVING VERTICALLY-SPACED RING ELECTRODE AND A CENTRAL ELECTRODE

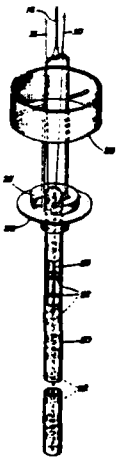
Robert A. Lohnes, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa, a corporation of Iowa

Filed Dec. 5, 1967, Ser. No. 688,258
Int. Cl. G01r 27/02
U.S. Cl. 324—65 5 Claims

Consolidation of subaqueous sediment is measured in situ by lowering a probe from a ship or other floating object; and the probe includes an elongated tube which penetrates the sediment under weight of the probe. A cylindrical shroud attached to the top of the probe acts as a stabilizer to keep the probe upright as it descends and penetrates the soil. The tube is a hollow cylinder, and it is provided with a plurality of torroidal electrodes spaced at constant longitudinal increments along its interior. Each of the electrodes is separately coupled through a selection switch to an ammeter on board the ship. A generator on board ship energizes an electrode extending axially of the tube through the ring electrodes. As the selection switch completes the circuit between the axial electrode and each of the ring electrodes, the ammeter measures the current flowing between the axial electrode and the ring electrode selected to complete the circuit. Thus, there is obtained a resistance or conductivity measurement for different depths of sediment. The resistivity measurements are indicative of consolidation of the sediment as a function of depth and they may be used to generate an equation for predicting future settlements of the soil under load.

Keywords: Instrument, seabed in situ; Seabed property measurement; Sedimentation measurement

U.S. Cl. X.R. 324-10



3,548,370
DEPTH SOUNDER

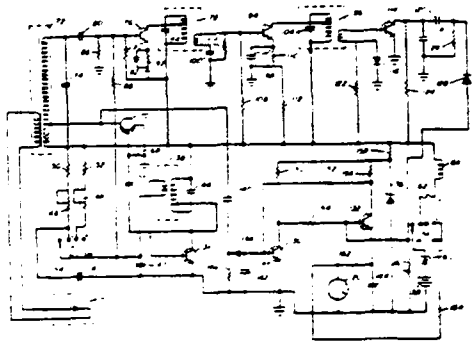
Frank E. Hoxsie, Tulsa, Okla., assignor to Lowrance Electronics Mfg. Corp., Tulsa, Okla., a corporation of Missouri

Filed Sept. 10, 1968, Ser. No. 758,838
Int. Cl. G01s 9/68
U.S. Cl. 340—3 5 Claims

This invention relates to a depth sounder for detecting the depth of objects under water. More particularly, the invention provides an improved depth sounder having a transducer means for imparting sound pulses in response to electrical energization and in turn for providing electrical signal output in response to reflected sound pulses, an oscillator circuit providing sequential bursts of electrical energy to the transducer, a receiving amplifier connected to the transducer amplifying the reflected signal output in response to reflected sound waves, a metering circuit connected to the oscillator and the amplifier providing means of indicating the time response between the transmitted signal and the signal received in response to receipt of sound waves as an indication of the distance to the surface reflecting the sound waves from the transducer and a time varying gain controlled circuit connected to the oscillator and receiver amplifier providing a time varying bias to the amplifier following each burst of electrical energy output of the amplifier, the bias being applied to the amplifier circuit serving to increase the amplification of the amplifier with time whereby signals resulting from reflecting surfaces at greater distances from the transducer are amplified more than signals resulting from closer reflective surfaces.

Keywords: Sonar, depth sounder

U.S. Cl. X.R. 331-112



DECEMBER 22, 1970

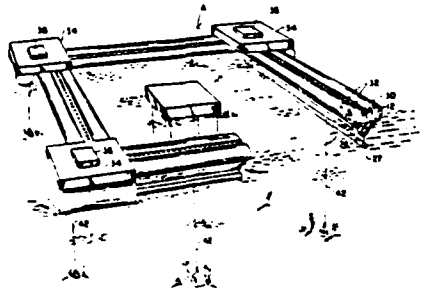
3,548,599
FLOATING OIL BARRIER

William A. Reilly, Dover, Mass., assignor to Sawyer-Tower Products, Inc., Watertown, Mass., a corporation of Massachusetts

Filed July 9, 1969, Ser. No. 840,353
Int. Cl. E02b 3/00, 15/04
U.S. Cl. 61—1 14 Claims

A barrier for intercepting surface spread of oil in a body of water includes a semi-flexible buoyant section and a semi-flexible submerged stabilizing section which hold the upper surface of an elongated trough-shaped deck above the normal water level, from which liquid sloshing over one side of the barrier into the trough can be drained out of one or both ends of the trough. A series of the barriers float in enclosing array around a source of oil leakage.

Keywords: Pollutant collection; Pollutant, suction removal; Pollutant, surface barrier



3,548,600

HYDRAULIC STRUCTURE FOR RESISTING WAVE ACTION

Jan Stolk, Jr., Rontgenstraat 2, and Johan Hendrik Stolk, Edisonstraat 47, both of Ijmuiden, Netherlands

Continuation-in-part of application Ser. No. 665,494, Sept. 5, 1967. This application Feb. 26, 1969, Ser. No. 872,781

Claims priority, application Netherlands, Sept. 5, 1966, 6612460

Int. Cl. E02b 3/06

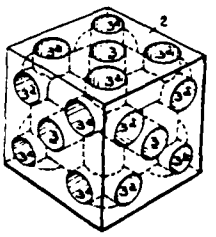
U.S. Cl. 61—4

3 Claims

This hydraulic structure comprises an embankment having thereon a heap of concrete blocks, each of which is a six-sided quandrangular prism. Each edge of each block is at least one meter in length and is not more than 10% longer than any other edge of the block. Each side of each block has therein at least one opening the area of which is at least 1% of the total area of the side, the total area of the openings in each side being from 4 to 10% of the total area of the side. Leading inward from each opening is a passage which has a substantially uniform cross-sectional area equal to the area of the opening, and which is connected to a passage leading inward from the opposite side and to passages leading inward from at least some of the adjacent sides of the block. The weight of each block is at least 70% of the weight of a solid block of the same size, and the blocks are dropped at random in the heap with the sides of different blocks facing in different directions.

Keywords: Breakwater, rubble; Concrete armor unit

U.S. Cl. X.R. 61-37



3,548,603

BRACED FRAME BULKHEAD

Robert J. Spinna, Crestwood, and James D. Brierley, Seaford, N.Y., assignors of one-third to Manhattan College, Bronx, N.N.Y., an educational institution

Filed July 18, 1968, Ser. No. 745,807

Int. Cl. E02b 3/06

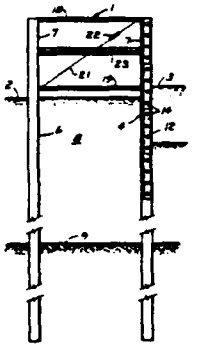
U.S. Cl. 61—49

6 Claims

A bulkhead is here taught which has a plurality of piles arranged in seaward and landward rows. Paired seaward and landward piles are connected to form frames. This design is adaptable to many construction materials and it is particularly well suited to welding or reinforced concrete because moment resistance can be developed conveniently at upper ends of the piles.

Keywords: Bulkhead

U.S. Cl. X.R. 61-3



3,548,605

SUBMERGIBLE VEHICLE FOR EMERGENCY OFFSHORE GAS LEAKAGE

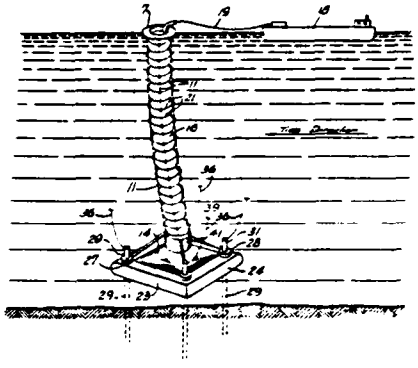
Peter L. Paull, Weston, and Fontaine C. Armistead, Darien, Conn., assignors to Texaco Development Corporation, New York, N.Y., a corporation of Delaware

Filed May 7, 1969, Ser. No. 822,529
Int. Cl. E02b *3/00*; E02d *23/00*
U.S. Cl. 61—69 23 Claims

The invention relates to a self contained submersible structure adapted to be lowered through a body of water to form a provisional passage for crude oil and/or gas escaping from a well or substratum fissure. The structure includes a support frame forming a fluid guiding and entrapping means, together with a collapsible conduit which communicates the source of escaping fluid with the water's surface whereby to form a confined pool.

Keywords: Pollutant collection; Pollutant, submerged barrier

U.S. Cl. X.R. 61-1, 61-46; 61-82



3,549,992

ELECTRICAL APPARATUS RESPONSIVE TO INDUCTIVE REACTANCE FOR MEASURING DISTANCE ALONG A PAIR OF CONDUCTORS

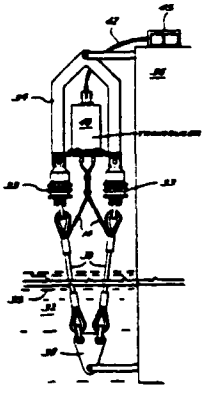
Tom R. Reinhart, 5310 Glenmont Drive, Houston, Tex. 77036

Filed Mar. 31, 1967, Ser. No. 627,509
Int. Cl. G01r *27/00*
U.S. Cl. 324—57 8 Claims

An apparatus electrically responsive to the inductance of a plurality of electrical conductors to be short circuited by an electrically conductive object whose position is to be measured including means for applying and detecting signals on the conductors in which the frequency of the signal and the size and spacing of the conductors are selected so that the position of the conductive object along the conductors is responsive only to changes in the inductive reactance of the conductors.

Keywords: Tide measurement; Wave measurement

U.S. Cl. X.R. 73-304; 324-59



3,549,993

CORROSION RATE MEASURING METHOD BY MAINTAINING ELECTROLYTIC CONTACT AND EXCLUDING ANY SUBSTANTIAL OXYGEN CONTACT WITH A TEST SPECIMEN

Glenn A. Marsh and Edward Schaschl, Fullerton, Calif., assignors to Union Oil Company of California, Los Angeles, Calif., a corporation of California

Continuation-in-part of abandoned application Ser. No. 213,171, July 30, 1962. This application June 14, 1966, Ser. No. 557,492

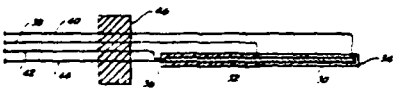
Int. Cl. G01n 27/00

U.S. Cl. 324—71 7 Claims

A corrosion test probe comprised of a corrodible test element enclosed in an electrically conductive, oxygen-impermeable material that renders the test element anionic, and a method for determining the maximum corrosion rate of a cathodically protected corrodible object exposed to a corrosive environment by measuring the corrosion rate of a test specimen placed in the corrosive environment and electrically connected to the corrodible object and maintained out of contact with oxygen. The test specimen can be temperature compensated for improved accuracy.

Keywords: Cathodic protection; Corrosion measurement

U.S. Cl. X.R. 204-1; 338-13



DECEMBER 29, 1970

3,550,384

LATERAL RESTRAINT OF PILE WITHIN JACKET LEG

John J. Bardgette, Orleans Parish, La., and William J. Ruez III, Houston, Tex., assignors to Esso Production Research Company

Filed Feb. 7, 1969, Ser. No. 797,469

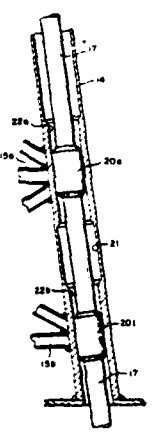
Int. Cl. E02d 5/60

U.S. Cl. 61—46 10 Claims

Ring members are attached to the outer surface of piles which are positioned in the lower jacket legs (hollow tubular members) used in foundations for offshore platforms. The ring members bridge the annular space between the outer surfaces of the piles and the inner surfaces of the lower jacket legs.

Keywords: Offshore platform, leg; Pile, structure connection; Seabed foundation

U.S. Cl. X.R. 61-53



3,550,693
PILE DRIVER

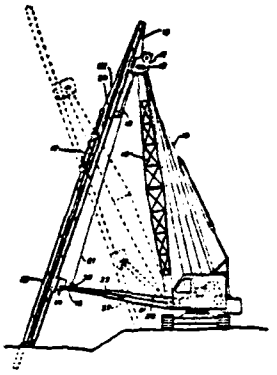
Christopher W. Bermingham, Dundas, Ontario, Canada, assignor to Bermingham Construction Limited, Marine Terminal, Hamilton, Ontario, Canada

Filed June 9, 1969, Ser. No. 831,681
Claims priority application Canada, June 19, 1968, 22,968
Int. Cl. E21c 11/00
U.S. Cl. 173-43 3 Claims

This invention is directed to a crane mounted pile driving assembly, the crane being of the type having a boom which is rotatable through 360° and is vertically adjustable through operation of an extensible kicker. A lead for the hammer is vertically slidably mounted in a pair of guide members, the upper of which is mounted at the free end of the boom for pivoting about a generally horizontal axis and the lower of which is mounted at the free end of the kicker for pivoting about a generally horizontal axis. Since the overall arrangement provides for swinging of the lead in a plane at right angles to a plane containing the lead and the boom, a wider variety of pile driving operations can be carried out without shifting the location of the crane than has hitherto been possible. Furthermore, the conventional but troublesome problem of levelling the crane body is avoided.

Keywords: Pile driver, impact; Pile driver leads

U.S. Cl. X.R. 173-28



3,550,694
VIBROHAMMER

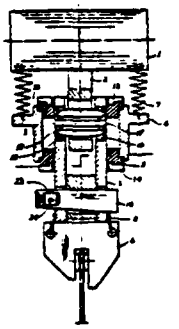
Czeslaw Wincenty Gawlik, Gdynia, Grotigera, and Dionizy Simson, Gdansk, Stryjewskiego, Poland, assignors to Zaklady Remontu Maszyn Budowlanych Nrz, Gdansk, Sieosicka, Poland

Filed Nov. 25, 1968, Ser. No. 778,514
Claims priority, application Poland, Dec. 12, 1967, P 124,044
Int. Cl. E02d 7/06; B06b 1/16
U.S. Cl. 173—131 8 Claims

A vibrohammer used for driving and also removing piles, bulkheads and similar elements from ground including ring-shaped elastic links of variable profile which absorb the transverse and torsional vibrations of the anvil, bolt of tapered ends mounted in the holes of the anvil by means of expanded sleeves eliminating superfluous backlashes between bolts and holes of the anvil. Moreover, the said vibrohammer includes the wedge with longitudinal and transverse grooves connecting the grip of driven element with the anvil, springs, shaped conically and clamped preliminary by weight of vibrator, working on tension, as well as suspension gear, a rope of which is engaged below and above of center of gravity of vibrohammer.

Keywords: Pile driver, vibratory; Pile extractor

U.S. Cl. X.R. 173-49, 173-139



3,551,369
ANTIFOULING COMPOSITIONS COMPRISING A DISPERSION OF A MIXED POWDER IN A CARRIER

Katsuji Shimizu, 3-79 Miyahara, Omiya, Saitama, Japan, and Kinzo Sekiyama, 1248 Shumugawara, Kawasaki, Kanagawa, Japan

No Drawing. Filed June 12, 1968, Ser. No. 736,284
Int. Cl. C09d 3/42, 5/16
U.S. Cl. 260—23.3 3 Claims

An antifouling composition, comprising a dispersion of a mixed powder in a carrier, the mixed powder comprising a substance toxic to sea organisms and a complex of a non-crystalline sodium silicate and a colloidal aluminum silicate, the grains of said mixed powder being coated with a water-soluble synthetic resin in the state of a gel.

Keywords: Coating; Fouling prevention

U.S. Cl. X.R. 106-15; 106-308; 117-68 117-132; 117-148; 117-149; 117-161; 117-165; 260-17; 260-23; 260-27; 260-33.6; 260-41

No Figure

5. Referenced Reissued Patents

The following reissued patents published between the end of 1970 and the end of 1976 are revisions of original patents in this volume. These reissued patents are not included in the annotations or subject index in this volume. Listed below are key information referencing the reissued patent to the original patent and new material added to or replacing information in this volume's annotation for the original patent. Complete annotations for these reissued patents are in the volume for the years the revisions were published.

Re. 27,090

INDIVIDUAL DRY DOCK FOR BOATS

Henry A. Rutter, Rte. 1, Eucha, Okla. 74342

Original No. 3,362,172, dated Jan. 9, 1968, Ser. No. 435,816, Mar. 1, 1965. Application for reissue Nov. 6, 1969, Ser. No. 871,497

Int. Cl. B63c *1/06*; E02c *3/00*

U.S. Cl. 61—65 — 10 Claims

Reissued Mar. 23, 1971
Added U.S. Cl. X.R. 6-48; 61-67

Re. 27,292

APPARATUS FOR SUBMARINE CORE DRILLING

Pierre Grolet, Pierre Moulin, and Jean Parola, Rueil Malmaison, France, assignors to Institut Francais du Petrole des Carburants et Lubrifiants, Rueil Malmaison, France

Original No. 3,370,656, dated Feb. 27, 1968, Ser. No. 510,285, Nov. 29, 1965. Application for reissue Feb. 27, 1970, Ser. No. 15,305

Int. Cl. E21b 7/12

U.S. Cl. 175—6 — 5 Claims

Reissued Feb. 22, 1972
Added U.S. Cl. X.R. 175-22

Re. 27,308

UNDERWATER LOW TEMPERATURE SEPARATION UNIT

John R. Leonard, Houston, Tex., assignor to Mobil Oil Corporation

Original No. 3,384,169, dated May 21, 1968, Ser. No. 550,705, May 17, 1966. Application for reissue Apr. 8, 1970, Ser. No. 26,477

Int. Cl. E21b *43/01, 39/00*

U.S. Cl. 166—.5 — 18 Claims

Reissued Mar. 14, 1972
Added U.S. Cl. X.R. 166-267

An apparatus involving an underwater separator assembly comprising a landing base and a removable separator which mates therewith. The base is adapted to be affixed to the marine bottom and be connected through a first flowline means to a producing well and through one or more additional flowlines to production facilities. The separator which has an inlet adapted to be releasably connected to said first flowline and one or more outlets adapted to be releasably coupled to said additional flowlines, respectively, is lowered on guide means to the base and is mated therewith.

Re. 27,452

FLOATING BOOMS

Millard F. Smith, Westport, Conn.
(P.O. Box 295, Saugatuck, Conn. 06880)

Original No. 3,499,290, dated Mar. 10, 1970, Ser. No. 739,452, June 24, 1968. Application for reissue Apr. 8, 1971, Ser. No. 132,345

Int. Cl. E02b *3/04, 15/04*

U.S. Cl. 61—1 F — 15 Claims

Reissued Aug. 1, 1972
No U.S. Cl. X.R.

Re. 27,460

METHOD FOR ENCASING RIGID MEMBERS WITH CONCRETE

Bruce A. Lamberton, Berea, Ohio
(Box 5951, Cleveland, Ohio 44101)

Original No. 3,397,260, dated Aug. 13, 1968, Ser. No. 657,455, June 26, 1967, which is a continuation of Ser. No. 486,786, Sept. 13, 1965, and a continuation-in-part of Ser. No. 446,346, Apr. 7, 1965. Application for reissue July 30, 1970, Ser. No. 59,589

Int. Cl. B28b *1/26*

U.S. Cl. 264—86 — 13 Claims

Reissued Aug. 15, 1972
Added U.S. Cl. X.R. 264-31; 264-35; 264-36

Re. 27,640

INFLATABLE FLOAT BOOM

Campbell F. Logan, 530 Goodwin St., Jacksonville, Fla. 32204

Original No. 3,494,132, dated Feb. 10, 1970, Ser. No. 757,849, Sept. 6, 1968. Application for reissue Sept. 25, 1970, Ser. No. 75,556

Int. Cl. E02b 15/04

U.S. Cl. 61-1 F — 17 Claims

Reissued May 8, 1973
No U.S. Cl. X.R.

ARTIFICIAL SEAWEED

3299640 *MEANS FOR INFLUENCING THE SUB-MARINE MIGRATION OF MATERIAL*
OTHER KEYWORDS:LOW-COST SHORE PROTECTION

3323310 *INSTALLATION FOR BEACH EROSION PREVENTION*
OTHER KEYWORDS:GROIN

3517514 *SOIL PROTECTION MATS*
OTHER KEYWORDS:FABRIC MAT ; REVETMENT ; SLOPE PROTECTION

3540415 *SYNTHETIC REEF ECOLOGICAL SYSTEM FOR LARGE BODIES OF WATER*
OTHER KEYWORDS:FABRIC MAT ; SEABED MATERIAL PLACEMENT

ASPHALT

3354653 *METHOD FOR APPLYING BITUMINIZED MINERAL AGGREGATE TO AN UNDERWATER SURFACE, OTHER KEYWORDS:SEABED MATERIAL PLACEMENT ; SEABED SCOUR PROTECTION*

3380254 *PROTECTIVE LININGS AND METHOD OF FORMING THE SAME IN WATERCOURSES*
OTHER KEYWORDS:GABION ; REVETMENT ; SLOPE PROTECTION

3446027 *APPARATUS FOR DEPOSITING A LAYER OF FLOWABLE MATERIAL UNDERWATER*
OTHER KEYWORDS:SEABED MATERIAL PLACEMENT ; SEABED SCOUR PROTECTION

BATHYTHERMOGRAPH

3339407 *OCEANOGRAPHY PROBE*
OTHER KEYWORDS:INSTRUMENT DEPLOYMENT

3359801 *BATHYTHERMOGRAPH SYSTEM*
OTHER KEYWORDS:BUOY, INSTRUMENTED ; INSTRUMENT DEPLOYMENT

3364744 *EXPENDABLE BATHYTHERMOGRAPH*

3380304 *REMOTE STATION FOR OCEANOGRAPHIC DATA SENSING*
OTHER KEYWORDS:BUOY, INSTRUMENTED ; INSTRUMENT CABLE

3397573 *OCEANOGRAPHIC APPARATUS*
OTHER KEYWORDS:DEPTH PRESSURE MEASUREMENT

3401560 *OCEANOGRAPHIC MEASURING AND RECORDING DEVICE*
OTHER KEYWORDS:SALINITY MEASUREMENT

3408867 *TEMPERATURE MEASURING SEA WATER PROBE, INSULATED WIRE SUITABLE THEREFOR ; AND METHOD OF MAKING SAME*
OTHER KEYWORDS:INSTRUMENT CABLE

3417619 *SINGLE WIRE MEASURING DEVICE FOR BATHYTHERMOGRAPH SYSTEM*

3439537 *UNDERWATER VEHICLES*
OTHER KEYWORDS:INSTRUMENT DEPLOYMENT ; INSTRUMENT RETRIEVAL ; SAMPLER, POWER SUPPLY ; SAMPLER, SEABED-DRIVEN CORE

3469444 *LAUNCHING APPARATUS*
OTHER KEYWORDS:INSTRUMENT DEPLOYMENT

3473383 *SUBMERSIBLE BATHYTHERMOGRAPH*
OTHER KEYWORDS:INSTRUMENT DEPLOYMENT ; INSTRUMENT RETRIEVAL

3511092 *BATHYTHERMOGRAPHIC PROBE FOR UNIFORM DESCENT RATE*
OTHER KEYWORDS:INSTRUMENT DEPLOYMENT

3512408 BATHOMETER
OTHER KEYWORDS:DEPTH PRESSURE MEASUREMENT ; INSTRUMENT DEPLOYMENT

3524349 BATHYTHERMOMETER
OTHER KEYWORDS:INSTRUMENT DEPLOYMENT

3535924 BATHYTHERMOGRAPH SYSTEM
OTHER KEYWORDS:INSTRUMENT DEPLOYMENT

BREAKWATER, CONCRETE

3353361 BREAKWATER
OTHER KEYWORDS:LOW-COST SHORE PROTECTION ; TIRES

3379015 PIER CONSTRUCTION
OTHER KEYWORDS:CONCRETE BLOCK ; GROIN

3380253 APPARATUS FOR CONTROLLING EROSION
OTHER KEYWORDS:CONCRETE ARMOR UNIT

3393520 CONTAINER AND METHOD OF BUILDING A BREAKWATER
OTHER KEYWORDS:BREAKWATER, STEEL FRAME ; SEABED FOUNDATION

3415061 SEA WALL STRUCTURE
OTHER KEYWORDS:PIER, FIXED ; SEAWALL

3425228 FABRIC FORMS FOR CONCRETE STRUCTURES
OTHER KEYWORDS:CONCRETE FORM ; FABRIC MAT ; GROIN ;
SLOPE PROTECTION

3431734 TOTALLY OR PARTIALLY PREFABRICATED STRUCTURE BAR-DAM
FOR THE PROTECTION OF HARBORS
OTHER KEYWORDS:OFFSHORE CAISSON

3464212 METHOD OF BUILDING CONCRETE STRUCTURES IN WATER BOTTOMS
OTHER KEYWORDS:OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION

3465528 FLOATING WAVE SUPPRESSOR
OTHER KEYWORDS:BREAKWATER, FLOATING

3479824 SEAWALL AND FENCE CONSTRUCTION
OTHER KEYWORDS:LOW-COST SHORE PROTECTION ; SAND FENCE

3538710 BREAKWATER STRUCTURE
OTHER KEYWORDS:BREAKWATER, FLOATING ; BREAKWATER, RUBBLE

BREAKWATER, FLOATING

3357192 BREAKWATERS
OTHER KEYWORDS:LOW-COST SHORE PROTECTION ; TIRES

3426537 FLOATING BREAKWATERS

3444693 WATER WAVE SUPPRESSION DEVICE

3465528 FLOATING WAVE SUPPRESSOR
OTHER KEYWORDS:BREAKWATER, CONCRETE

3473335 FLOATING SEAWALL

3487645 WAVE DAMPING DEVICE

3499290 FLOATING BOOM
OTHER KEYWORDS:GROIN ; LOW-COST SHORE PROTECTION ;
POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3533240 FLOATING HARBOR
OTHER KEYWORDS:OFFSHORE HARBOR ; POLLUTANT, SURFACE BARRIER

3534558 FLOATING BREAKWATERS

3538710 BREAKWATER STRUCTURE
OTHER KEYWORDS:BREAKWATER, CONCRETE ; BREAKWATER, RUBBLE

BREAKWATER, RUBBLE

3355894 STRUCTURE FOR USE IN RIVER AND SEA
OTHER KEYWORDS:CONCRETE ARMOR UNIT ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED

3399535 BLOCK AND MARITIME STRUCTURE FORMED THEREFROM
OTHER KEYWORDS:CONCRETE ARMOR UNIT ; GROIN ; REVETMENT

3516255 CONCRETE COMPONENT OR BLOCK FOR A PROTECTIVE COVERING STRUCTURE
OTHER KEYWORDS:CONCRETE ARMOR UNIT ; SEAWALL ; SLOPE PROTECTION

3526096 METHOD OF MAKING ROCKFILL FOUNDATIONS
OTHER KEYWORDS:OFFSHORE CONSTRUCTION ; OFFSHORE ISLAND ; SEABED FOUNDATION

3538710 BREAKWATER STRUCTURE
OTHER KEYWORDS:BREAKWATER, CONCRETE ; BREAKWATER, FLOATING

3546600 HYDRAULIC STRUCTURE FOR RESISTING WAVE ACTION
OTHER KEYWORDS:CONCRETE ARMOR UNIT

BREAKWATER, STEEL FRAME

3309876 EROSION PREVENTION APPARATUS

3347051 BULKHEAD STRUCTURE AND METHOD OF MAKING THEREOF
OTHER KEYWORDS:BULKHEAD ; OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION

3393520 CONTAINER AND METHOD OF BUILDING A BREAKWATER
OTHER KEYWORDS:BREAKWATER, CONCRETE ; SEABED FOUNDATION

3490239 BREAKWATER STRUCTURE
OTHER KEYWORDS:OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; SEABED FOUNDATION

BULKHEAD

3326005 RETAINING WALL FOR WATERWAYS
OTHER KEYWORDS:REVETMENT ; SMALL-CRAFT LAUNCHER

3342033 METHOD OF PROVIDING A SEALED JOINT EMPLOYING A FLEXIBLE BAG
OTHER KEYWORDS:CHANNEL BARRIER ; GROUTING ; PILE, CONCRETE ; SANDBAG

3347051 BULKHEAD STRUCTURE AND METHOD OF MAKING THEREOF
OTHER KEYWORDS:BREAKWATER, STEEL FRAME ; OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION

3381483 SEA WALL AND PANEL CONSTRUCTION

3411305 TUBULAR INTERLOCKING PILING FOR WALL ASSEMBLIES
OTHER KEYWORDS:PILE, STEEL

3421326 CONSTRUCTIONAL WORKS

3465532 CONCRETE PILE AND JOINT
OTHER KEYWORDS:PILE, CONCRETE ; PILE SECTION CONNECTION ; PILE, SHEET

3472031 *PRECAST CONCRETE BODY*
OTHER KEYWORDS:CONCRETE FORM ; PILE, CONCRETE ; PILE, SHEET

3492826 *RETAINING WALL STRUCTURE*
OTHER KEYWORDS:COFFERDAM ; PILE, SHEET ; PILE, STEEL

3495409 *APPARATUS FOR BUILDING A RETAINING WALL ALONG A BANK OF A BODY OF WATER*
OTHER KEYWORDS:DREDGE, CUTTERHEAD ; DREDGE PIPE ; DREDGE PROPULSION ; OFFSHORE CONSTRUCTION ; PUMP

3507121 *TIE ROD ANCHORING METHOD AND APPARATUS*
OTHER KEYWORDS:GROUTING

3522707 *PILING CONSTRUCTION*
OTHER KEYWORDS:PILE, CONCRETE ; PILE SECTION CONNECTION ; PILE, SHEET ; PILE, STEEL

3548603 *BRACED FRAME BULKHEAD*

BUOY MOORING SYSTEM

3315629 *UNDERWATER ANCHOR GUN DEVICE*
OTHER KEYWORDS:EMBEDMENT ANCHOR

3319595 *TIMED ACTUATING MECHANISM*
OTHER KEYWORDS:INSTRUMENT RETRIEVAL

3336892 *CABLE DISPENSING AND LOCKING MEANS*

3369516 *STABLE OCEANIC STATION*
OTHER KEYWORDS:BUOY, INSTRUMENTED

3372665 *CABLE DISPENSING AND SECURING DEVICE*

3423777 *BUOY APPARATUS*
OTHER KEYWORDS:BUOY, INSTRUMENTED

3463113 *RECOVERY RELEASE SYSTEM*
OTHER KEYWORDS:INSTRUMENT RETRIEVAL

3487484 *TUNED FLOATING BODIES*
OTHER KEYWORDS:BUOY, INSTRUMENTED

3520269 *ANCHOR ASSEMBLY*
OTHER KEYWORDS:CORROSION PREVENTION ; INSTRUMENT DEPLOYMENT

BUOY, INSTRUMENTED

3301047 *WAVE GAGE ARRAYS FOR OBTAINING OCEAN-WAVE SPECTRA*
OTHER KEYWORDS:DEPTH PRESSURE MEASUREMENT ; WAVE MEASUREMENT

3301048 *SEA STATE RECORDER*
OTHER KEYWORDS:WAVE MEASUREMENT

3325778 *SEISMIC SONOBUOY*
OTHER KEYWORDS:SEISMIC HYDROPHONE ; SEISMIC SURVEY METHOD

3329015 *STABILIZED BUOY ASSEMBLY*
OTHER KEYWORDS:WAVE MEASUREMENT

3336799 *FREE-FLOATING APPARATUS FOR MEASURING AND TELEMETERING SEA-WAVE CHARACTERISTICS*
OTHER KEYWORDS:WAVE MEASUREMENT

3359801 BATHYTHERMOGRAPH SYSTEM
OTHER KEYWORDS:BATHYTHERMOGRAPH ; INSTRUMENT DEPLOYMENT

3369516 STABLE OCEANIC STATION
OTHER KEYWORDS:BUOY MOORING SYSTEM

3380304 REMOTE STATION FOR OCEANOGRAPHIC DATA SENSING
OTHER KEYWORDS:BATHYTHERMOGRAPH ; INSTRUMENT CABLE

3383915 DEEP-WATER WAVE RECORDER
OTHER KEYWORDS:WAVE MEASUREMENT

3390408 LONG SPAR BUOY STRUCTURE AND ERECTION METHOD

3397574 FLOAT FOR MEASURING WAVE CHARACTERISTICS AND DIRECTION
OTHER KEYWORDS:WAVE MEASUREMENT

3405558 OCEANOGRAPHIC INSTRUMENTATION
OTHER KEYWORDS:INSTRUMENT DEPLOYMENT

3423777 BUOY APPARATUS
OTHER KEYWORDS:BUOY MOORING SYSTEM

3447554 BUOY STABILIZATION SYSTEM
OTHER KEYWORDS:WAVE MEASUREMENT

3449589 POWER SUPPLY SYSTEM
OTHER KEYWORDS:ELECTRICAL GENERATOR ; INSTRUMENT POWER SUPPLY

3449950 APPARATUS FOR WAVE ANALYSIS
OTHER KEYWORDS:DEPTH PRESSURE MEASUREMENT ; WAVE MEASUREMENT

3453670 MARINE BUOY

3455159 NAUTICAL WEATHER STATION
OTHER KEYWORDS:ELECTRICAL GENERATOR ; INSTRUMENT DEPLOYMENT ;
INSTRUMENT POWER SUPPLY ; WAVE
MEASUREMENT ; WIND MEASUREMENT

3487484 TUNED FLOATING BODIES
OTHER KEYWORDS:BUOY MOORING SYSTEM

3488783 LONG SPAR BUOY

3506841 OCEANOGRAPHIC DATA-COLLECTING BUOY ARRANGEMENT
OTHER KEYWORDS:ELECTRICAL GENERATOR ; FOULING PREVENTION ;
INSTRUMENT POWER SUPPLY

3534599 EXPENDABLE OCEAN-WAVE METER
OTHER KEYWORDS:DEPTH PRESSURE MEASUREMENT ; WAVE MEASUREMENT

3539979 HYDROPHONE ARRAY ERECTION
OTHER KEYWORDS:INSTRUMENT DEPLOYMENT ; SEISMIC HYDROPHONE ARRAY

CATHODIC PROTECTION

3303118 CATHODIC PROTECTION AND ANTI-MARINE FOULING ELECTRODE SYSTEM
OTHER KEYWORDS: CORROSION PREVENTION ; FOULING PREVENTION

3313721 DISH-SHAPED ANODE
OTHER KEYWORDS: CORROSION PREVENTION

3330751 CATHODIC PROTECTION CIRCUIT INCLUDING DIODE MEANS
OTHER KEYWORDS: CORROSION PREVENTION

3332867 *CONDUCTIVE ADHESIVE BONDING OF A GALVANIC ANODE TO A HULL*
OTHER KEYWORDS: CORROSION PREVENTION

3342716 *ANODE FOR CATHODIC PROTECTION SYSTEM*
OTHER KEYWORDS: CORROSION PREVENTION

3351545 *DEVICE FOR CHECKING CATHODIC PROTECTION*
OTHER KEYWORDS: CORROSION MEASUREMENT

3373100 *PRECONTROL SALINITY COMPENSATOR FOR AUTOMATIC CATHODIC PROTECTION SYSTEM*
OTHER KEYWORDS: CORROSION PREVENTION ; SALINITY MEASUREMENT

3383297 *ZINC-RARE EARTH ALLOY ANODE FOR CATHODIC PROTECTION*
OTHER KEYWORDS: CORROSION PREVENTION

3393138 *ALUMINUM ALLOY ANODE AND METHOD OF USING SAME IN CATHODIC PROTECTION*
OTHER KEYWORDS: CORROSION PREVENTION

3409525 *PROCESS FOR REDUCING CORROSION*
OTHER KEYWORDS: CORROSION PREVENTION

3410772 *METHOD FOR ATTACHING IMPRESSED CURRENT ANODES FOR CATHODIC PROTECTION*
OTHER KEYWORDS: CORROSION PREVENTION

3418230 *GALVANIC ANODE AND ALUMINUM ALLOY THEREFOR*
OTHER KEYWORDS: CORROSION PREVENTION

3438875 *METHOD OF FORMING REFERENCE ELECTRODES*
OTHER KEYWORDS: CORROSION MEASUREMENT ; CORROSION PREVENTION

3458413 *METHOD OF INHIBITING FOULING OF SEA WATER CONDUITS AND THE LIKE BY MARINE ORGANISMS*
OTHER KEYWORDS: CORROSION PREVENTION ; FOULING PREVENTION

3464909 *ALUMINUM ALLOY GALVANIC ANODES*
OTHER KEYWORDS: CORROSION PREVENTION

3477931 *METHOD AND APPARATUS FOR AUTOMATIC ELECTRIC CORROSION-PROOFING*
OTHER KEYWORDS: CORROSION PREVENTION

3494849 *ANCHORING DEVICE*
OTHER KEYWORDS: CORROSION PREVENTION ; EMBEDMENT ANCHOR ; SEABED PIPELINE PLACEMENT

3496085 *GALVANIC ANODE*
OTHER KEYWORDS: CORROSION PREVENTION

3497434 *METHOD FOR PREVENTING FOULING OF METAL IN A MARINE ENVIRONMENT*
OTHER KEYWORDS: COATING ; FOULING PREVENTION

3515654 *METHOD AND APPARATUS FOR REGULATING SUPPLIED CURRENT IN CATHODIC PROTECTION*
OTHER KEYWORDS: CORROSION PREVENTION

3516917 *CATHODE PROTECTION DEVICE*
OTHER KEYWORDS: CORROSION PREVENTION

3520790 *DEVICE FOR PREVENTING MARINE CREATURES FROM STICKING*
OTHER KEYWORDS: FOULING PREVENTION

3530051 ELECTROLYTIC METHOD FOR PREVENTING FOULING OF SEA WATER-IMMERSED STRUCTURES BY MARINE LIFE
OTHER KEYWORDS: FOULING PREVENTION

3549993 CORROSION RATE MEASURING METHOD BY MAINTAINING ELECTROLYTIC CONTACT AND EXCLUDING ANY SUBSTANTIAL OXYGEN CONTACT WITH A TEST SPECIMEN
OTHER KEYWORDS: CORROSION MEASUREMENT

CHANNEL BARRIER

3342033 METHOD OF PROVIDING A SEALED JOINT EMPLOYING A FLEXIBLE BAG
OTHER KEYWORDS: BULKHEAD ; GROUTING ; PILE, CONCRETE ; SANDBAG

3426540 TIDEWATER POWER GENERATION SYSTEM
OTHER KEYWORDS: ELECTRICAL GENERATOR ; POWER TIDE ; TIDAL ESTUARY WATER LEVEL

3492822 TIDAL FLUSHING SYSTEM
OTHER KEYWORDS: TIDAL ESTUARY WATER QUALITY ; TIDAL INLET

CHANNEL PROTECTION

3449915 DESILTING EQUIPMENT

COATING

3321924 PROTECTION OF SUBMERGED PILING
OTHER KEYWORDS: PILE PROTECTION ; PILE, WOOD ; WOOD PRESERVATIVE

3372552 WOODEN FENDER PILE PROTECTING APPARATUS
OTHER KEYWORDS: FOULING PREVENTION ; PIER FENDER ; PILE PROTECTION

3417569 PROTECTIVE COATING AND METHOD
OTHER KEYWORDS: CORROSION PREVENTION ; OFFSHORE PLATFORM, LEG ; PILE PROTECTION ; PILE, STEEL

3426473 ANTIFOULING COVERING
OTHER KEYWORDS: FOULING PREVENTION

3448585 POLE AND PILE PROTECTOR
OTHER KEYWORDS: ICE PROTECTION ; PILE PROTECTION ; PILE, WOOD

3497434 METHOD FOR PREVENTING FOULING OF METAL IN A MARINE ENVIRONMENT
OTHER KEYWORDS: CATHODIC PROTECTION ; FOULING PREVENTION

3505758 ANTIFOULING COVERING FOR SUBMERGED MARINE OBJECTS
OTHER KEYWORDS: FOULING PREVENTION

3524231 CIRCULAR UNDERWATER FORM WITH LOCK
OTHER KEYWORDS: CORROSION PREVENTION ; PILE PROTECTION ; STRUCTURE REPAIR

3551369 ANTIFOULING COMPOSITIONS COMPRISING A DISPERSION OF A MIXED POWDER IN A CARRIER
OTHER KEYWORDS: FOULING PREVENTION

COFFERDAM

3335572 MODULAR PANELS FOR CONSTRUCTION OF WATER BLOCKADES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3380255 UNDERWATER ICE STRUCTURE AND METHOD FOR CONSTRUCTING SAME
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; ICE STRUCTURE

3492826 *RETAINING WALL STRUCTURE*
OTHER KEYWORDS: BULKHEAD ; PILE, SHEET ; PILE, STEEL

3527057 *METHOD AND APPARATUS FOR CONTAINING WELL POLLUTANTS*
OTHER KEYWORDS: OFFSHORE CAISSON ; PILE, SHEET ; POLLUTANT, SUBMERGED BARRIER ; POLLUTANT, SURFACE BARRIER

COLLISION PROTECTION

3340694 *BUOYANT FENDERS*
OTHER KEYWORDS: OFFSHORE STRUCTURE FENDER ; PIER FENDER ; PILE PROTECTION

3359740 *DOCK FENDER SYSTEMS*
OTHER KEYWORDS: OFFSHORE STRUCTURE FENDER ; PIER FENDER

3379020 *DOLPHIN OR MARINE CONSTRUCTION*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DOLPHIN ; PILE, WOOD

3464213 *BUOYANT FENDERS*
OTHER KEYWORDS: OFFSHORE STRUCTURE FENDER ; PIER FENDER

3524324 *FLEXIBLE PIER*
OTHER KEYWORDS: ICE PROTECTION ; PIER, FIXED ; PILE PROTECTION ; SMALL-CRAFT PIER

3541800 *PILE PROTECTOR*
OTHER KEYWORDS: PILE PROTECTION

CONCRETE ARMOR UNIT

3355894 *STRUCTURE FOR USE IN RIVER AND SEA*
OTHER KEYWORDS: BREAKWATER, RUBBLE ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED

3368357 *STRUCTURE FOR BREAKING WAVES*
OTHER KEYWORDS: REVETMENT

3375667 *REVETMENT STRUCTURE AND UNITS THEREFORE*
OTHER KEYWORDS: REVETMENT

3380253 *APPARATUS FOR CONTROLLING EROSION*
OTHER KEYWORDS: BREAKWATER, CONCRETE

3386250 *WATER CURRENT CONTROLLING MEANS*
OTHER KEYWORDS: REVETMENT

3396545 *METHOD OF FORMING CONCRETE BODIES*
OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; SANDBAG

3399535 *BLOCK AND MARITIME STRUCTURE FORMED THEREFROM*
OTHER KEYWORDS: BREAKWATER, RUBBLE ; GROIN ; REVETMENT

3456446 *CONCRETE BLOCK*

3516255 *CONCRETE COMPONENT OR BLOCK FOR A PROTECTIVE COVERING STRUCTURE*
OTHER KEYWORDS: BREAKWATER, RUBBLE ; SEAWALL ; SLOPE PROTECTION

3548600 *HYDRAULIC STRUCTURE FOR RESISTING WAVE ACTION*
OTHER KEYWORDS: BREAKWATER, RUBBLE

CONCRETE BLOCK

3301148 PAVING BLOCK
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; REVETMENT ; SLOPE PROTECTION

3343468 PAVING BLOCK
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; REVETMENT ; SLOPE PROTECTION

3344609 PREVENTION OF BEACH EROSION AND ENCOURAGEMENT OF LAND RESTORATION
OTHER KEYWORDS: FABRIC MAT ; GROIN ; LOW-COST SHORE PROTECTION ; REVETMENT ; SEAWALL

3347048 REVETMENT BLOCK
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; REVETMENT

3379015 PIER CONSTRUCTION
OTHER KEYWORDS: BREAKWATER, CONCRETE ; GROIN

3379017 CONCRETE BLOCKS FOR SHORE AND BANK PROTECTION
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; REVETMENT ; SEAWALL

3386252 RIP RAP STRUCTURE DEVICE
OTHER KEYWORDS: REVETMENT ; SLOPE PROTECTION

3421417 PAVEMENT
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; REVETMENT ; SLOPE PROTECTION

3488964 CONCRETE BLOCK
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; REVETMENT

3534668 PAVEMENT BLOCK
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; REVETMENT ; SLOPE PROTECTION

CONCRETE FORM

3295332 PROTECTIVE COVER FOR BUTT ENDS OF TIMBER PILES
OTHER KEYWORDS: PILE PROTECTION ; PILE, WOOD

3314239 METHOD AND APPARATUS FOR FORMING UNDERWATER STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED MATERIAL PLACEMENT

3338058 ADJUSTABLE COMPOSITE FORM
OTHER KEYWORDS: PILE, CONCRETE ; PILE, STEEL ; PILE, WOOD ; STRUCTURE REPAIR

3354659 DEEP-SUBMERGENCE FOUNDATION VEHICLE
OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ; SEABED FOUNDATION ; SEABED MATERIAL PLACEMENT

3363873 SHUTTERING MEANS AND APPARATUS FOR THE CASTING OF UNDERWATER STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED MATERIAL PLACEMENT

3377808 CAP ASSEMBLY FOR PILE SHELL
OTHER KEYWORDS: PILE, STRUCTURE CONNECTION ; PILE, WOOD ; STRUCTURE REPAIR

3383864 METHOD OF PROTECTING OR REPAIRING SCOURED AREAS OF SITUS
OTHER KEYWORDS: FABRIC MAT ; REVETMENT ; SLOPE PROTECTION

3396542 METHOD AND ARRANGEMENTS FOR PROTECTING SHORELINES
OTHER KEYWORDS: FABRIC MAT ; REVETMENT

3396545 METHOD OF FORMING CONCRETE BODIES
OTHER KEYWORDS: CONCRETE ARMOR UNIT ; OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; SANDBAG

3397260 METHOD FOR ENCASING RIGID MEMBERS WITH CONCRETE
OTHER KEYWORDS: PILE PROTECTION ; STRUCTURE REPAIR

3410097 PILE CAPPING MECHANISM
OTHER KEYWORDS: PILE, WOOD ; STRUCTURE REPAIR

3425227 FORM FOR CONSTRUCTING A SLAB FOR TALUS OR BOTTOM PROTECTION
OTHER KEYWORDS: FABRIC MAT ; REVETMENT ; SLOPE PROTECTION

3425228 FABRIC FORMS FOR CONCRETE STRUCTURES
OTHER KEYWORDS: BREAKWATER CONCRETE ; FABRIC MAT ; GROIN ; SLOPE PROTECTION

3426109 METHOD OF FABRICATING A CONCRETE FLOTATION PIER
OTHER KEYWORDS: PIER, FLOATING

3448709 MARINE FLOAT CONSTRUCTION
OTHER KEYWORDS: PIER, FLOATING ; SMALL-CRAFT PIER

3466879 METHOD AND APPARATUS FOR MAKING PILING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, CONCRETE ; PILE PLACEMENT

3472031 PRECAST CONCRETE BODY
OTHER KEYWORDS: BULKHEAD ; PILE CONCRETE ; PILE-SHEET

3474626 METHOD AND MEANS FOR PROTECTING BEACHES
OTHER KEYWORDS: FABRIC MAT ; REVETMENT ; SLOPE PROTECTION

3478710 FLOATING DOCK STRUCTURE
OTHER KEYWORDS: PIER, FLOATING ; SMALL-CRAFT PIER

3479000 CLAMPS
OTHER KEYWORDS: SEAWALL

3483707 METHOD FOR REINFORCING STEEL PIPE PILING IN SITU AND THE RESULTANT PILING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, CONCRETE ; PILE, STEEL ; STRUCTURE REPAIR

3486341 FORM FOR CONCRETE OR THE LIKE
OTHER KEYWORDS: FABRIC MAT ; SEABED SCOUR PROTECTION ; SLOPE PROTECTION

3497579 SLIP FORMING APPARATUS AND METHOD
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED MATERIAL PLACEMENT

3505825 SYSTEM FOR REPLACING DETERIORATED WOOD PILING
OTHER KEYWORDS: PILE, CONCRETE ; PILE, WOOD ; STRUCTURE REPAIR

3512492 FLOATING STRUCTURE AND METHOD OF MAKING
OTHER KEYWORDS: PIER, FLOATING

3520142 METHOD AND MEANS FOR PROTECTING AN EARTH SITUS AGAINST SCOUR
OTHER KEYWORDS: FABRIC MAT ; LOW-COST SHORE PROTECTION ; REVETMENT ; SLOPE PROTECTION

3524320 METHOD OF PROTECTING AREAS OF AN EARTH SITUS AGAINST SCOUR
OTHER KEYWORDS: FABRIC MAT ; GROUTING ; REVETMENT ; SEABED SCOUR PROTECTION

3527553 APPARATUS FOR THE CONSTRUCTION OF ELEVATED WAYS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PIER, FIXED

CORROSION MEASUREMENT

3351545 DEVICE FOR CHECKING CATHODIC PROTECTION
OTHER KEYWORDS: CATHODIC PROTECTION

3438875 METHOD OF FORMING REFERENCE ELECTRODES
OTHER KEYWORDS: CATHODIC PROTECTION ; CORROSION PREVENTION

3549993 CORROSION RATE MEASURING METHOD BY MAINTAINING ELECTROLYTIC CONTACT AND EXCLUDING ANY SUBSTANTIAL OXYGEN CONTACT WITH A TEST SPECIMEN
OTHER KEYWORDS: CATHODIC PROTECTION

CORROSION PREVENTION

3303118 CATHODIC PROTECTION AND ANTI-MARINE FOULING ELECTRODE SYSTEM
OTHER KEYWORDS: CATHODIC PROTECTION ; FOULING PREVENTION

3313721 DISH-SHAPED ANODE
OTHER KEYWORDS: CATHODIC PROTECTION

3330751 CATHODIC PROTECTION CIRCUIT INCLUDING DIODE MEANS
OTHER KEYWORDS: CATHODIC PROTECTION

3332867 CONDUCTIVE ADHESIVE BONDING OF A GALVANIC ANODE TO A HULL
OTHER KEYWORDS: CATHODIC PROTECTION

3342716 ANODE FOR CATHODIC PROTECTION SYSTEM
OTHER KEYWORDS: CATHODIC PROTECTION

3373100 PRECONTROL SALINITY COMPENSATOR FOR AUTOMATIC CATHODIC PROTECTION SYSTEM
OTHER KEYWORDS: CATHODIC PROTECTION ; SALINITY MEASUREMENT

3383297 ZINC-RARE EARTH ALLOY ANODE FOR CATHODIC PROTECTION
OTHER KEYWORDS: CATHODIC PROTECTION

3393138 ALUMINUM ALLOY ANODE AND METHOD OF USING SAME IN CATHODIC PROTECTION
OTHER KEYWORDS: CATHODIC PROTECTION

3409525 PROCESS FOR REDUCING CORROSION
OTHER KEYWORDS: CATHODIC PROTECTION

3410772 METHOD FOR ATTACHING IMPRESSED CURRENT ANODES FOR CATHODIC PROTECTION
OTHER KEYWORDS: CATHODIC PROTECTION

3417569 PROTECTIVE COATING AND METHOD
OTHER KEYWORDS: COATING ; OFFSHORE PLATFORM, LEG ; PILE PROTECTION ; PILE, STEEL

3418230 GALVANIC ANODE AND ALUMINUM ALLOY THEREFOR
OTHER KEYWORDS: CATHODIC PROTECTION

3438875 METHOD OF FORMING REFERENCE ELECTRODES
OTHER KEYWORDS: CATHODIC PROTECTION ; CORROSION MEASUREMENT

3458413 METHOD OF INHIBITING FOULING OF SEA WATER CONDUITS AND THE LIKE BY MARINE ORGANISMS
OTHER KEYWORDS: CATHODIC PROTECTION ; FOULING PREVENTION

3464909 *ALUMINUM ALLOY GALVANIC ANODES*
OTHER KEYWORDS: CATHODIC PROTECTION

3477931 *METHOD AND APPARATUS FOR AUTOMATIC ELECTRIC CORROSION-PROOFING*
OTHER KEYWORDS: CATHODIC PROTECTION

3494849 *ANCHORING DEVICE*
OTHER KEYWORDS: CATHODIC PROTECTION ; EMBEDMENT ANCHOR ; SEABED PIPELINE PLACEMENT

3496085 *GALVANIC ANODE*
OTHER KEYWORDS: CATHODIC PROTECTION

3515654 *METHOD AND APPARATUS FOR REGULATING SUPPLIED CURRENT IN CATHODIC PROTECTION*
OTHER KEYWORDS: CATHODIC PROTECTION

3516917 *CATHODE PROTECTION DEVICE*
OTHER KEYWORDS: CATHODIC PROTECTION

3517517 *ENCAPSULATED CABLE FOR MARINE USE*
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ; OFFSHORE PLATFORM, FLOATING

3520269 *ANCHOR ASSEMBLY*
OTHER KEYWORDS: BUOY MOORING SYSTEM ; INSTRUMENT DEPLOYMENT

3524231 *CIRCULAR UNDERWATER FORM WITH LOCK*
OTHER KEYWORDS: COATING ; PILE PROTECTION ; STRUCTURE REPAIR

CURRENT MEASUREMENT

3304777 *FLUID DIRECTION SYNCHRO*

3330155 *MAGNETIC TAPE OCEANOGRAPHIC METER*

3336803 *SUSPENDED-DROP CURRENT METER*

3359794 *OMNI-DIRECTIONAL CURRENT METER*

3370462 *WATER CURRENT METER*

3372585 *DEVICE FOR RECORDING CURRENT VELOCITY AND DIRECTION IN BODIES OF WATER*
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT RETRIEVAL

3376742 *OCEAN CURRENT MEASURING DEVICE*

3382715 *SOLION CURRENT METER*

3399566 *FLOW METER*

3402605 *MEASUREMENT OF CURRENTS IN LIQUIDS*

3411354 *CURRENT METER*

3418852 *DRIFT DROGUE*
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT

3435677 *SYSTEM FOR MEASURING DIRECTION AND VELOCITY OF CURRENTS IN A LIQUID MEDIUM*

3518291 *DIRECTION AND RATE OF FLOW MEASURING INSTRUMENT*

3530952 UNDERSEA,LONG-RANGE TRACKING AND SIGNALLING SYSTEMS AND APPARATUS
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; INSTRUMENT DEPLOYMENT

DEPTH PRESSURE MEASUREMENT

3299399 METHODS AND APPARATUS FOR INDICATING AN UNDERWATER PARAMETER IN A MARINE SEISMIC SYSTEM
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3301047 WAVE GAGE ARRAYS FOR OBTAINING OCEAN-WAVE SPECTRA
OTHER KEYWORDS: BUOY, INSTRUMENTED ; WAVE MEASUREMENT

3371739 MEANS FOR VARIABLY CONTROLLING THE BUOYANCY OF A SEISMIC DETECTION STREAMER
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL

3372666 DEPTH CONTROLLER
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL ; TOWED VEHICLE

3397573 OCEANOGRAPHIC APPARATUS
OTHER KEYWORDS: BATHYTHERMOGRAPH

3398394 MARINE SEISMIC ARRAY DEPTH CONTROL
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL

3412704 CABLE DEPTH CONTROLLER
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL

3424007 PRESSURE AND DEPTH DETECTOR

3425506 OFFSHORE SEISMIC STREAMER DEPTH CONTROL SYSTEM
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL

3434446 REMOTELY CONTROLLABLE PRESSURE RESPONSIVE APPARATUS
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL

3439319 MARINE SEISMIC CABLE WITH DEPTH DETECTOR SYSTEM
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY ; SEISMIC STREAMER CABLE

3440992 STREAMER CABLE DEPTH CONTROL
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL

3444734 DEEP WATER TIDE RECORDER
OTHER KEYWORDS: TIDE MEASUREMENT

3449950 APPARATUS FOR WAVE ANALYSIS
OTHER KEYWORDS: BUOY, INSTRUMENTED ; WAVE MEASUREMENT

3496526 SEISMIC CABLE DEPTH CONTROL SYSTEM
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL

3501953 BATHYKYMOGRAPH AND METHOD
OTHER KEYWORDS: INSTRUMENT, TOWED ; TOWED VEHICLE

3512408 BATHOMETER
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT DEPLOYMENT

3513709 FLUID SAMPLER
OTHER KEYWORDS: SAMPLER, WATER

3530952 UNDERSEA,LONG-RANGE TRACKING AND SIGNALLING SYSTEMS AND APPARATUS
OTHER KEYWORDS: CURRENT MEASUREMENT ; INSTRUMENT DEPLOYMENT

3534599 EXPENDABLE OCEAN-WAVE METER
OTHER KEYWORDS: BUOY, INSTRUMENTED ; WAVE MEASUREMENT

3541989 HYDROPNEUMATIC MEASUREMENT AND CONTROL FROM BUOYED BODIES
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL ; TOWED VEHICLE

3545274 SEA WATER DEPTH TRANSDUCER AND SYSTEM
OTHER KEYWORDS: SEISMIC HYDROPHONE ; SEISMIC HYDROPHONE ARRAY

DREDGE INTAKE

3301606 CYCLONIC ELEVATOR
OTHER KEYWORDS: DREDGE, SUCTION ; PUMP

3412862 METHOD AND APPARATUS FOR CLEANING AREAS OVERLAIN BY A WATER BODY
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE PROPULSION ; WATER PLANT REMOVAL

3440742 MULTIPLE MOTOR DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; PUMP

3456371 PROCESS AND APPARATUS FOR MINING DEPOSITS ON THE SEA FLOOR
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE PIPE ; DREDGE PROPULSION ; DREDGE, SUBMERGED ; PUMP

3470635 APPARATUS FOR CONTROLLING THE OUTPUT OF DREDGING, LOADING AND UNLOADING IMPLEMENTS
OTHER KEYWORDS: DREDGE, MECHANICAL ; DREDGE-SPOIL MEASUREMENT ; DREDGE LADDER CONTROL

3474549 APPARATUS FOR CONVEYING SAND OR THE LIKE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; PUMP

3475842 DREDGE HAVING BUCKET EMPTYING MEANS
OTHER KEYWORDS: DREDGE, MECHANICAL

3486570 ALLUVIAL PROSPECTING UNITS
OTHER KEYWORDS: DREDGE, SUCTION ; PUMP ; SAMPLER, SEABED-DRIVEN CORE

3514881 APPARATUS FOR ADJUSTING THE SUCTION SLOT IN A DRAG SUCTION DREDGER
OTHER KEYWORDS: DREDGE, SUCTION

3521387 DREDGING MACHINE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE PROPULSION ; WATER PLANT REMOVAL

3535801 DREDGE CONSTRUCTION
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE PROPULSION ; PUMP

3543422 UNDERWATER MINING ASSEMBLY
OTHER KEYWORDS: DREDGE, SUCTION

DREDGE LADDER CONTROL

3350798 CONDITION RESPONSIVE ELEVATOR DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD

3380179 AUTOMATIC CONTROL OF SWING SPEED FOR DREDGES
OTHER KEYWORDS: DREDGE, CUTTERHEAD

3407520 SUCTION DREDGER INSTALLATION, MORE PARTICULARLY A TOWED DREDGER
OTHER KEYWORDS: DREDGE, SUCTION ; PUMP

3470635 APPARATUS FOR CONTROLLING THE OUTPUT OF DREDGING, LOADING AND UNLOADING IMPLEMENTS

OTHER KEYWORDS: DREDGE INTAKE ; DREDGE, MECHANICAL ; DREDGE-SPOIL MEASUREMENT

3471949 AUTOMATIC SWING CONTROL SYSTEM FOR DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE-SPOIL MEASUREMENT

3512281 SWELL COMPENSATOR FOR A DRAG SUCTION DREDGER
OTHER KEYWORDS: DREDGE, SUCTION

DREDGE PIPE

3428011 DREDGE PIPE PONTOONS

3456371 PROCESS AND APPARATUS FOR MINING DEPOSITS ON THE SEA FLOOR
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE ; DREDGE PROPULSION ; DREDGE, SUBMERGED ; PUMP

3495409 APPARATUS FOR BUILDING A RETAINING WALL ALONG A BANK OF A BODY OF WATER. OTHER KEYWORDS: BULKHEAD ; DREDGE, CUTTERHEAD ; DREDGE PROPULSION ; OFFSHORE CONSTRUCTION ; PUMP DREDGE PROPULSION

DREDGE PROPULSION

3325923 HYDRAULIC CONTROLS FOR SPUD

3393524 SUBMERGING VESSELS
OTHER KEYWORDS: DREDGE, SUBMERGED ; SEABED PIPELINE PLACEMENT ; SEABED TRENCHER

3456371 PROCESS AND APPARATUS FOR MINING DEPOSITS ON THE SEA FLOOR
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE ; DREDGE PIPE ; DREDGE, SUBMERGED ; PUMP

3470633 AMPHIBIOUS DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD

3495409 APPARATUS FOR BUILDING A RETAINING WALL ALONG A BANK OF A BODY OF WATER. OTHER KEYWORDS: BULKHEAD ; DREDGE, CUTTERHEAD ; DREDGE PIPE ; OFFSHORE CONSTRUCTION ; PUMP

3521387 DREDGING MACHINE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE INTAKE ; WATER PLANT REMOVAL

3535801 DREDGE CONSTRUCTION
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE ; PUMP

DREDGE-SPOIL MEASUREMENT

3470635 APPARATUS FOR CONTROLLING THE OUTPUT OF DREDGING, LOADING AND UNLOADING IMPLEMENTS. OTHER KEYWORDS: DREDGE INTAKE ; DREDGE, MECHANICAL ; DREDGE LADDER CONTROL

3471949 AUTOMATIC SWING CONTROL SYSTEM FOR DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE LADDER CONTROL

3543565 METHOD AND APPARATUS FOR DETERMINING THE CONCENTRATION OF DREDGER SPOIL IN A SUSPENSION OF DREDGER SPOIL AND WATER FLOWING THROUGH A PIPE

DREDGE-SPOIL TRANSPORT

3312070 METHOD OF MAKING RECLAIMED GROUND WITH COAGULATIVE SURFACE ACTIVE AGENTS

3329287 METHOD AND APPARATUS FOR SUCTION UNLOADING OF SAND BARGES

3352035 DREDGE
OTHER KEYWORDS: DREDGE, SUCTION

3385071 HANDLING FLUENT MATERIAL

3445008 HANDLING OF PARTICULATE SHIP CARGO

3544456 DREDGING PROCESS
OTHER KEYWORDS: HOPPER BARGE

DREDGE, CUTTERHEAD

3307278 SONIC DREDGING PROCESS AND APPARATUS
OTHER KEYWORDS: DREDGE, SUCTION

3350798 CONDITION RESPONSIVE ELEVATOR DREDGE
OTHER KEYWORDS: DREDGE LADDER CONTROL

3380179 AUTOMATIC CONTROL OF SWING SPEED FOR DREDGES
OTHER KEYWORDS: DREDGE LADDER CONTROL

3440742 MULTIPLE MOTOR DREDGE
OTHER KEYWORDS: DREDGE INTAKE ; PUMP

3470633 AMPHIBIOUS DREDGE
OTHER KEYWORDS: DREDGE PROPULSION

3471949 AUTOMATIC SWING CONTROL SYSTEM FOR DREDGE
OTHER KEYWORDS: DREDGE-SPOIL MEASUREMENT ; DREDGE LADDER CONTROL

3474549 APPARATUS FOR CONVEYING SAND OR THE LIKE
OTHER KEYWORDS: DREDGE INTAKE ; PUMP

3495409 APPARATUS FOR BUILDING A RETAINING WALL ALONG A BANK
OF A BODY OF WATER. OTHER KEYWORDS: BULKHEAD ; DREDGE PIPE ;
DREDGE PROPULSION ; OFFSHORE CONSTRUCTION ; PUMP

3512280 SUCTION DREDGING APPARATUS

3521387 DREDGING MACHINE
OTHER KEYWORDS: DREDGE INTAKE ; DREDGE PROPULSION ;
WATER PLANT REMOVAL

DREDGE, MECHANICAL

3470635 APPARATUS FOR CONTROLLING THE OUTPUT OF DREDGING, LOADING
AND UNLOADING IMPLEMENTS. OTHER KEYWORDS: DREDGE INTAKE ;
DREDGE-SPOIL MEASUREMENT ; DREDGE LADDER CONTROL

3475842 DREDGE HAVING BUCKET EMPTYING MEANS
OTHER KEYWORDS: DREDGE INTAKE

DREDGE, SUBMERGED

3310892 SUBMARINE DREDGE
OTHER KEYWORDS: SEABED TRENCHER

3393524 SUBMERGING VESSELS
OTHER KEYWORDS: DREDGE PROPULSION ; SEABED PIPELINE PLACEMENT ;
SEABED TRENCHER

3456371 PROCESS AND APPARATUS FOR MINING DEPOSITS ON THE SEA FLOOR
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE ; DREDGE PIPE ;
DREDGE PROPULSION ; PUMP

DREDGE, SUCTION

3301606 CYCLONIC ELEVATOR
OTHER KEYWORDS: DREDGE INTAKE ; PUMP

3307278 SONIC DREDGING PROCESS AND APPARATUS
OTHER KEYWORDS: DREDGE, CUTTERHEAD

3352035 DREDGE
OTHER KEYWORDS: DREDGE-SPOIL TRANSPORT

3407520 SUCTION DREDGER INSTALLATION ; MORE PARTICULARLY A TOWED DREDGER
OTHER KEYWORDS: DREDGE LADDER CONTROL ; PUMP

3412862 METHOD AND APPARATUS FOR CLEANING AREAS OVERLAIN BY A WATER BODY
OTHER KEYWORDS: DREDGE INTAKE ; DREDGE PROPULSION;
WATER PLANT REMOVAL

3456371 PROCESS AND APPARATUS FOR MINING DEPOSITS ON THE SEA FLOOR
OTHER KEYWORDS: DREDGE INTAKE ; DREDGE PIPE ; DREDGE PROPULSION ;
DREDGE, SUBMERGED ; PUMP

3486570 ALLUVIAL PROSPECTING UNITS
OTHER KEYWORDS: DREDGE INTAKE ; PUMP ; SAMPLER, SPARED-DRIVEN CORE

3490157 SUCTION PIPE HANDLING EQUIPMENT FOR A SUCTION DREDGER

3512281 SWELL COMPENSATOR FOR A DRAG SUCTION DREDGER
OTHER KEYWORDS: DREDGE LADDER CONTROL

3514881 APPARATUS FOR ADJUSTING THE SUCTION SLOT IN A DRAG SUCTION DREDGER
OTHER KEYWORDS: DREDGE INTAKE

3526436 MATERIAL LIFT SYSTEM
OTHER KEYWORDS: PUMP

3535801 DREDGE CONSTRUCTION
OTHER KEYWORDS: DREDGE INTAKE ; DREDGE PROPULSION.; PUMP

3543422 UNDERWATER MINING ASSEMBLY
OTHER KEYWORDS: DREDGE INTAKE

DUNE PROTECTION

3426536 BARRIER DEVICE FOR COASTAL PROTECTION
OTHER KEYWORDS: SAND FENCE

ELECTRICAL GENERATOR

3312054 SEA WATER POWER PLANT
OTHER KEYWORDS: POWER, SUBMERGED SOURCE

3426540 TIDEWATER POWER GENERATION SYSTEM
OTHER KEYWORDS: CHANNEL BARRIER ; POWER, TIDE ;
TIDAL ESTUARY WATER LEVEL

3449589 POWER SUPPLY SYSTEM
OTHER KEYWORDS: BUOY, INSTRUMENTED ; INSTRUMENT POWER SUPPLY

3455159 NAUTICAL WEATHER STATION
OTHER KEYWORDS: BUOY, INSTRUMENTED ; INSTRUMENT DEPLOYMENT ; INSTRUMENT POWER SUPPLY ; WAVE MEASUREMENT ; WIND MEASUREMENT

3487228 POWER GENERATING SYSTEM
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING ; POWER, WAVE ; PUMP

3506841 OCEANOGRAPHIC DATA-COLLECTING BUOY ARRANGEMENT
OTHER KEYWORDS: BUOY, INSTRUMENTED ; FOULING PREVENTION ; INSTRUMENT POWER SUPPLY

3515889 POWER GENERATION APPARATUS
OTHER KEYWORDS: POWER, WAVE ; PUMP

3527188 POWER-PRODUCING MEANS FOR VESSELS
OTHER KEYWORDS: POWER, WAVE

3546473 OCEANOGRAPHIC GENERATOR
OTHER KEYWORDS: POWER, WAVE

EMBEDMENT ANCHOR

3311060 PRESSURE ACTUATED ANCHOR

3315629 UNDERWATER ANCHOR GUN DEVICE
OTHER KEYWORDS: BUOY MOORING SYSTEM

3324665 METHOD OF STABILIZING PILES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM ANCHOR ; PILE FOOTING ; PILE, STEEL ; SEABED FOUNDATION

3330338 ANCHOR AND METHOD OF INSTALLING
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM ANCHOR ; SEABED MATERIAL PLACEMENT

3370566 EMBEDMENT DEVICE
OTHER KEYWORDS: POWER, SUBMERGED SOURCE ; SAMPLER, POWER SUPPLY ; SAMPLER, SEABED-DRIVEN CORE

3371643 HYDRAULICALLY ACTUATED DRIVER
OTHER KEYWORDS: POWER, SUBMERGED SOURCE

3373569 ARTICULATED PILE STABILIZER AND ANCHORING DEVICE
OTHER KEYWORDS: PILE FOOTING

3399646 SUBMARINE ANCHOR ASSEMBLY
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3411473 DEEPWATER ANCHOR

3417724 VIBRATORY SEA ANCHOR DRIVER

3427812 METHOD AND APPARATUS FOR ANCHORING OFFSHORE PIPELINES
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3430349 UNDERWATER TRIPOD AND PLUMBING GIMBAL

3431880 EXPLOSIVE EMBEDMENT ANCHOR
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR

3447330 METHOD AND APPARATUS FOR ANCHORING SUBMERGED PIPELINES
OTHER KEYWORDS: PILE DRIVER, WATER JET ; SEABED PIPELINE PLACEMENT

3479830 ANCHORING MACHINE
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3494849 *ANCHORING DEVICE*
OTHER KEYWORDS: CATHODIC PROTECTION ; CORROSION PREVENTION ; SEABED PIPELINE PLACEMENT

3496900 *METHOD FOR INSTALLING A DEEP WATER ANCHOR*

3520268 *BALLISTICS EMBEDMENT ANCHORS*

3525187 *EXPLOSIVELY DRIVEN SUBMARINE ANCHOR*
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3525224 *METHOD AND APPARATUS FOR INSTALLING ANCHOR PILES*
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM ANCHOR ; PILE PLACEMENT

3546885 *THREADED PILE FOR MARINE STRUCTURE*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT ; PILE, STEEL ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

FABRIC MAT

3343370 *EARTH EMBANKMENT WITH INTERNAL WATER BARRIER*
OTHER KEYWORDS: SLOPE PROTECTION

3344609 *PREVENTION OF BEACH EROSION AND ENCOURAGEMENT OF LAND RESTORATION*
OTHER KEYWORDS: CONCRETE BLOCK ; GROIN ; LOW-COST SHORE PROTECTION ; REVETMENT ; SEAWALL

3383864 *METHOD OF PROTECTING OR REPAIRING SCOURED AREAS OF SITUS*
OTHER KEYWORDS: CONCRETE FORM ; REVETMENT ; SLOPE PROTECTION

3396542 *METHOD AND ARRANGEMENTS FOR PROTECTING SHORELINES*
OTHER KEYWORDS: CONCRETE FORM ; REVETMENT

3425227 *FORM FOR CONSTRUCTING A SLAB FOR TALUS OR BOTTOM PROTECTION*
OTHER KEYWORDS: CONCRETE FORM ; REVETMENT ; SLOPE PROTECTION

3425228 *FABRIC FORMS FOR CONCRETE STRUCTURES*
OTHER KEYWORDS: BREAKWATER, CONCRETE ; CONCRETE FORM ; GROIN ; SLOPE PROTECTION

3455112 *INSTALLATION FOR PROTECTING SURF-ENDANGERED COASTAL SECTORS*
OTHER KEYWORDS: SLOPE PROTECTION ; WAVE ABSORBER BEACH

3474626 *METHOD AND MEANS FOR PROTECTING BEACHES*
OTHER KEYWORDS: CONCRETE FORM ; REVETMENT ; SLOPE PROTECTION

3486341 *FORM FOR CONCRETE OR THE LIKE*
OTHER KEYWORDS: CONCRETE FORM ; SEABED SCOUR PROTECTION ; SLOPE PROTECTION

3517514 *SOIL PROTECTION MATS*
OTHER KEYWORDS: ARTIFICIAL SEAWEED ; REVETMENT ; SLOPE PROTECTION

3520142 *METHOD AND MEANS FOR PROTECTING AN EARTH SITUS AGAINST SCOUR*
OTHER KEYWORDS: CONCRETE FORM ; LOW-COST SHORE PROTECTION ; REVETMENT ; SLOPE PROTECTION

3524320 *METHOD OF PROTECTING AREAS OF AN EARTH SITUS AGAINST SCOUR*
OTHER KEYWORDS: CONCRETE FORM ; GROUTING ; REVETMENT ; SEABED SCOUR PROTECTION

3529427 *DEVICE FOR PREVENTING OR REDUCING SCOURS AT THE LOWER ENDS OF MEMBERS SUPPORTING MARINE STRUCTURE, OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; SEABED SCOUR PROTECTION*

3540415 *SYNTHETIC REEF ECOLOGICAL SYSTEM FOR LARGE BODIES OF WATER*
OTHER KEYWORDS: ARTIFICIAL SEAWEED ; SEABED MATERIAL PLACEMENT

FOULING PREVENTION

3303118 CATHODIC PROTECTION AND ANTI-MARINE FOULING ELECTRODE SYSTEM
OTHER KEYWORDS: CATHODIC PROTECTION ; CORROSION PREVENTION

3326174 METHOD FOR PREVENTION OF GROWTH OF AQUATIC FOULING

3372552 WOODEN FENDER PILE PROTECTING APPARATUS
OTHER KEYWORDS: COATING ; PIER FENDER ; PILE PROTECTION

3392575 THERMAL PANEL FOR DETERMINING THE EFFECTS OF VARIOUS TEMPERATURES ON FOULING ORGANISMS

3426473 ANTIFOULING COVERING
OTHER KEYWORDS: COATING

3458413 METHOD OF INHIBITING FOULING OF SEA WATER CONDUITS AND THE LIKE BY MARINE ORGANISMS. OTHER KEYWORDS: CATHODIC PROTECTION ; CORROSION PREVENTION

3497434 METHOD FOR PREVENTING FOULING OF METAL IN A MARINE ENVIRONMENT
OTHER KEYWORDS: CATHODIC PROTECTION ; COATING

3505758 ANTIFOULING COVERING FOR SUBMERGED MARINE OBJECTS
OTHER KEYWORDS: COATING

3506841 OCEANOGRAPHIC DATA-COLLECTING BUOY ARRANGEMENT
OTHER KEYWORDS: BUOY, INSTRUMENTED ; ELECTRICAL GENERATOR ; INSTRUMENT POWER SUPPLY

3520790 DEVICE FOR PREVENTING MARINE CREATURES FROM STICKING
OTHER KEYWORDS: CATHODIC PROTECTION

3530051 ELECTROLYTIC METHOD FOR PREVENTING FOULING OF SEA WATER-IMMERSED STRUCTURES BY MARINE LIFE
OTHER KEYWORDS: CATHODIC PROTECTION

3551369 ANTIFOULING COMPOSITIONS COMPRISING A DISPERSION OF A MIXED POWDER IN A CARRIER. OTHER KEYWORDS: COATING

GABION

3380254 PROTECTIVE LININGS AND METHOD OF FORMING THE SAME IN WATERCOURSES
OTHER KEYWORDS: ASPHALT ; REVETMENT ; SLOPE PROTECTION

GROIN

3323310 INSTALLATION FOR BEACH EROSION PREVENTION
OTHER KEYWORDS: ARTIFICIAL SEAWEED

3344609 PREVENTION OF BEACH EROSION AND ENCOURAGEMENT OF LAND RESTORATION
OTHER KEYWORDS: CONCRETE BLOCK ; FABRIC MAT ; LOW-COST SHORE PROTECTION ; REVETMENT ; SEAWALL

3379015 PIER CONSTRUCTION
OTHER KEYWORDS: BREAKWATER, CONCRETE ; CONCRETE BLOCK

3399535 BLOCK AND MARITIME STRUCTURE FORMED THEREFROM
OTHER KEYWORDS: BREAKWATER, RUBBLE ; CONCRETE ARMOR UNIT ; REVETMENT

3425228 FABRIC FORMS FOR CONCRETE STRUCTURES
OTHER KEYWORDS: BREAKWATER, CONCRETE ; CONCRETE FORM ; FABRIC MAT ; SLOPE PROTECTION

3499290 FLOATING BOOM
OTHER KEYWORDS: BREAKWATER, FLOATING ; LOW-COST SHORE PROTECTION ; POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3538711 DEVICE FOR CONTROL AND PREVENTION OF COAST EROSION
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; REVETMENT ; SANDBAG ; SEABED MATERIAL PLACEMENT

GROUTING

3330338 *ANCHOR AND METHOD OF INSTALLING*
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE PLATFORM ANCHOR ; SEABED MATERIAL PLACEMENT

3342033 *METHOD OF PROVIDING A SEALED JOINT EMPLOYING A FLEXIBLE BAG*
OTHER KEYWORDS: BULKHEAD ; CHANNEL BARRIER ; PILE, CONCRETE ; SANDBAG

3345824 *METHOD AND MEANS FOR BRACING OR BOLSTERING SUBAQUEOUS STRUCTURES*
OTHER KEYWORDS: SANDBAG ; SEABED FOUNDATION ; STRUCTURE REPAIR

3347053 *PARTIALLY SALVAGEABLE JACKET-PILE CONNECTION*
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3352119 *BALLISTIC JACKET-PILE CONNECTION*
OTHER KEYWORDS: PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3354659 *DEEP-SUBMERGENCE FOUNDATION VEHICLE*
OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CONSTRUCTION ; SEABED FOUNDATION ; SEABED MATERIAL PLACEMENT

3468132 *PLATFORM LEG PACKER*
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; PILE, STRUCTURE CONNECTION

3488967 *COMBINATION DEEP WATER STORAGE TANK AND DRILLING AND PRODUCTION PLATFORM. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; OFFSHORE STORAGE TANK, EMERGENT ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION*

3503217 *METHOD OF AND APPARATUS FOR ANCHORING WELL-DRILLING PLATFORMS TO THE OCEAN FLOOR. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG ; PILE PLACEMENT ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION*

3507121 *TIE ROD ANCHORING METHOD AND APPARATUS*
OTHER KEYWORDS: BULKHEAD

3521715 *METHOD AND APPARATUS FOR SAMPLING*
OTHER KEYWORDS: SAMPLER, POWER SUPPLY ; SAMPLER, SEABED-DRIVEN CORE

3524320 *METHOD OF PROTECTING AREAS OF AN EARTH SITUS AGAINST SCOUR*
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; REVETMENT ; SEABED SCOUR PROTECTION

3525224 *METHOD AND APPARATUS FOR INSTALLING ANCHOR PILES*
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE PLATFORM ANCHOR ; PILE PLACEMENT

3528254 *OFFSHORE PLATFORM STRUCTURE AND CONSTRUCTION METHOD*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

HOPPER BARGE

3367298 *BOTTOM DUMP HOPPER BARGE*

3395663 *DEEP SEA REFUSE DISPOSAL*

3401661 *HOPPER BARGE*

3404650 *SYSTEM AND APPARATUS FOR TRANSLATING AND DISCHARGING A LOAD*

3424119 *REVERSIBLE SELF-DUMPING AND SELF-BAILING SCOW*

3439642 HOPPER BARGE FOR TRANSPORTING ESPECIALLY LIQUID WASTE MATTER

3473501 TUMBLE BARGE

3538875 HOPPERBARGE

3543709 DEVICE FOR CLOSING BOTTOM DUMP BARGE

3544456 DREDGING PROCESS
OTHER KEYWORDS: DREDGE-SPOIL TRANSPORT

HYDRAULIC MODEL BASIN

3463002 WAVE AMPLITUDE MEASURING APPARATUS
OTHER KEYWORDS: WAVE MEASUREMENT

3475834 HYDRAULIC MODELS
OTHER KEYWORDS: TIDE MEASUREMENT

3513797 ENERGY-ABSORBING BEACH FOR SHIP'S WELLS AND TANKS
OTHER KEYWORDS: WAVE ABSORBER BEACH

ICE PROTECTION

3348382 OFFSHORE PLATFORM FOR ICE CONDITIONS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3370432 ICE PROTECTIVE SLEEVE FOR PILINGS
OTHER KEYWORDS: PILE PROTECTION

3405527 PROTECTING MARINE STRUCTURES FROM FLOATING OBJECTS
OTHER KEYWORDS: OFFSHORE STRUCTURE FENDER

3436920 PROTECTION OF OFFSHORE STRUCTURE FROM ICEBERGS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3448585 POLE AND PILE PROTECTOR
OTHER KEYWORDS: COATING ; PILE PROTECTION ; PILE, WOOD

3470700 WATER TURBULENCE PRODUCING AIR BUBBLING SYSTEM FOR BOAT DOCKS
OTHER KEYWORDS: PIER, FIXED ; SMALL-CRAFT PIER

3477233 WAVE MACHINE INSTALLATIONS
OTHER KEYWORDS: WAVE FLUME ; WAVE GENERATOR

3495565 POST INTENDED FOR MOORING BOATS OR FOR ANALOGOUS PURPOSES
OTHER KEYWORDS: SMALL-CRAFT MOORING DEVICE

3516259 OFFSHORE STRUCTURE METHOD AND APPARATUS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE MOORING STRUCTURE ;
OFFSHORE PLATFORM, FIXED ; OFFSHORE PLATFORM, LEG

3524324 FLEXIBLE PIER
OTHER KEYWORDS: COLLISION PROTECTION ; PIER, FIXED ;
PILE PROTECTION ; SMALL-CRAFT PIER

3543523 STRUCTURAL DOCK SYSTEM
OTHER KEYWORDS: PIER FIXED ; PILE PROTECTION ; SMALL-CRAFT PIER

ICE STRUCTURE

3380255 UNDERWATER ICE STRUCTURE AND METHOD FOR CONSTRUCTING SAME
OTHER KEYWORDS: COFFERDAM ; OFFSHORE CONSTRUCTION

INSTRUMENT CABLE

3343515 MINIMUM WIDTH TOWLINE WITH DAMAGE SHIELD
OTHER KEYWORDS: TOWING CABLE

3343516 MINIMUM WIDTH TOWLINES WITH STRETCHABLE ELECTRICAL CABLE AND IMPROVED CLAMPING MEANS.OTHER KEYWORDS: TOWING CABLE

3380304 REMOTE STATION FOR OCEANOGRAPHIC DATA SENSING
OTHER KEYWORDS: BATHYTHERMOGRAPH ; BUOY, INSTRUMENTED

3408867 TEMPERATURE MEASURING SEA WATER PROBE,INCULATED WIRE SUITABLE THEREFOR AND METHOD OF MAKING SAME
OTHER KEYWORDS: BATHYTHERMOGRAPH

3440993 CABLE FAIRING
OTHER KEYWORDS: TOWING CABLE

3450948 ELECTRICAL DISTRIBUTION SYSTEM
OTHER KEYWORDS: INSTRUMENT POWER SUPPLY

3467047 MINIMUM-WIDTH CONTINUOUSLY FAIRED TOWLINE
OTHER KEYWORDS: TOWING CABLE

INSTRUMENT DEPLOYMENT

3310019 FLOATS
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED VEHICLE

3339407 OCEANOGRAPHY PROBE
OTHER KEYWORDS: BATHYTHERMOGRAPH

3349624 REMOTELY CONTROLLED WATER SAMPLING DEVICE
OTHER KEYWORDS: SAMPLER, WATER

3359801 BATHYTHERMOGRAPH SYSTEM
OTHER KEYWORDS: BATHYTHERMOGRAPH ; BUOY, INSTRUMENTED

3370656 APPARATUS FOR SUBMARINE CORE DRILLING
OTHER KEYWORDS: SAMPLER, POWER SUPPLY ; SAMPLER, SEABED-DRILLED CORE

3372585 DEVICE FOR RECORDING CURRENT VELOCITY AND DIRECTION IN BODIES OF WATER. OTHER KEYWORDS: CURRENT MEASUREMENT ; INSTRUMENT RETRIEVAL

3373827 APPARATUS FOR CORING SUBTERRANEAN FORMATIONS UNDER A BODY OF WATER
OTHER KEYWORDS: SAMPLER, SEABED-DRIVEN CORE

3404565 TOWED OCEANOGRAPHIC SENSOR SYSTEM
OTHER KEYWORDS: INSTRUMENT, TOWED ; TOWED BODY DEPTH CONTROL ; TOWING CABLE ; TOWED VEHICLE

3405558 OCEANOGRAPHIC INSTRUMENTATION
OTHER KEYWORDS: BUOY, INSTRUMENTED

3415068 SUBMARINE DEVICE
OTHER KEYWORDS: INSTRUMENT RETRIEVAL ; SAMPLER, POWER SUPPLY ; SAMPLER, SEABED GRAB

3418852 DRIFT DROGUE
OTHER KEYWORDS: CURRENT MEASUREMENT

3439537 UNDERWATER VEHICLES
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT RETRIEVAL ; SAMPLER, POWER SUPPLY ; SAMPLER, SEABED-DRIVEN CORE

3455159 *NAUTICAL WEATHER STATION*
OTHER KEYWORDS: BUOY, INSTRUMENTED ; ELECTRICAL GENERATOR ; INSTRUMENT POWER SUPPLY ; WAVE MEASUREMENT ; WIND MEASUREMENT

3469444 *LAUNCHING APPARATUS*
OTHER KEYWORDS: BATHYTHERMOGRAPH

3473383 *SUBMERSIBLE BATHYTHERMOGRAPH*
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT RETRIEVAL

3479580 *APPARATUS INCLUDING A CONDUCTIVITY PROBE FOR DETERMINING THE SALINITY OF WATER*
OTHER KEYWORDS: SALINITY MEASUREMENT

3511092 *BATHYTHERMOGRAPHIC PROBE FOR UNIFORM DESCENT RATE*
OTHER KEYWORDS: BATHYTHERMOGRAPH

3512408 *BATHOMETER*
OTHER KEYWORDS: BATHYTHERMOGRAPH ; DEPTH PRESSURE MEASUREMENT

3520269 *ANCHOR ASSEMBLY*
OTHER KEYWORDS: BUOY MOORING SYSTEM ; CORROSION PREVENTION

3524349 *BATHYTHERMOMETER*
OTHER KEYWORDS: BATHYTHERMOGRAPH

3530952 *UNDERSEA,LONG-RANGE TRACKING AND SIGNALLING SYSTEMS AND APPARATUS*
OTHER KEYWORDS: CURRENT MEASUREMENT ; DEPTH PRESSURE MEASUREMENT

3535924 *BATHYTHERMOGRAPH SYSTEM*
OTHER KEYWORDS: BATHYTHERMOGRAPH

3539979 *HYDROPHONE ARRAY ERECTION*
OTHER KEYWORDS: BUOY, INSTRUMENTED ; SEISMIC HYDROPHONE ARRAY

INSTRUMENT POWER SUPPLY

3449589 *POWER SUPPLY SYSTEM*
OTHER KEYWORDS: BUOY, INSTRUMENTED ; ELECTRICAL GENERATOR

3450948 *ELECTRICAL DISTRIBUTION SYSTEM*
OTHER KEYWORDS: INSTRUMENT CABLE

3455159 *NAUTICAL WEATHER STATION*
OTHER KEYWORDS: BUOY, INSTRUMENTED ; ELECTRICAL GENERATOR ; INSTRUMENT DEPLOYMENT ; WAVE MEASUREMENT ; WIND MEASUREMENT

3500678 *APPARATUS FOR DETERMINING SOIL RESISTANCE INCLUDING A DRILL*
OTHER KEYWORDS: INSTRUMENT, SEABED IN SITU ; SEABED PROPERTY MEASUREMENT

3506841 *OCEANOGRAPHIC DATA-COLLECTING BUOY ARRANGEMENT*
OTHER KEYWORDS: BUOY, INSTRUMENTED ; ELECTRICAL GENERATOR ; FOULING PREVENTION

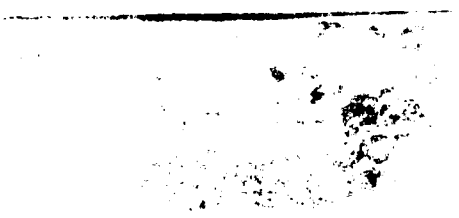
INSTRUMENT RETRIEVAL

3316531 *RELEASE MECHANISM*

3319595 *TIMED ACTUATING MECHANISM*
OTHER KEYWORDS: BUOY MOORING SYSTEM

3372585 *DEVICE FOR RECORDING CURRENT VELOCITY AND DIRECTION IN BODIES OF WATER.OTHER KEYWORDS: CURRENT MEASUREMENT ; INSTRUMENT DEPLOYMENT*

3372760 *FREE-FALL CORE SAMPLER*
OTHER KEYWORDS: SAMPLER, SEABED-DRIVEN CORE



3373826 CORING DEVICE
OTHER KEYWORDS: SAMPLER, SEABED-DRIVEN CORE

3411595 HARD FORMATION OCEAN BOTTOM SAMPLING DEVICE
OTHER KEYWORDS: POWER, SUBMERGED SOURCE ; SAMPLER, POWER SUPPLY ; SAMPLER, SEABED-DRIVEN CORE

3415068 SUBMARINE DEVICE
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; SAMPLER, POWER SUPPLY ; SAMPLER, SEABED GRAB

3434551 BUOYANT CORING APPARATUS
OTHER KEYWORDS: SAMPLER, SEABED-DRIVEN CORE

3436776 SELF-BALLASTING STREAMER

3439537 UNDERWATER VEHICLES
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT DEPLOYMENT ; SAMPLER, POWER SUPPLY ; SAMPLER, SEABED-DRIVEN CORE

3447371 IN-SITU VELOCIMETER
OTHER KEYWORDS: INSTRUMENT-SEABED IN SITU , SAMPLER, SEABED-DRIVEN CORE , SEABED PROPERTY MEASUREMENT

3463113 RECOVERY RELEASE SYSTEM
OTHER KEYWORDS: BUOY MOORING SYSTEM

3473383 SUBMERSIBLE BATHYTHERMOGRAPH
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT DEPLOYMENT

3509772 HYDROGRAPHIC SAMPLING DEVICE
OTHER KEYWORDS: SAMPLER, SEABED GRAB

INSTRUMENT, AIRBORNE

3307144 BATHYMETRY
OTHER KEYWORDS: SEABED SITE SURVEY ; SONAR, DEPTH SOUNDER

3533697 WAVE HEIGHT MEASURING METHOD AND APPARATUS
OTHER KEYWORDS: WAVE MEASUREMENT

INSTRUMENT, LASER

3322231 METHODS AND SYSTEMS UTILIZING LASERS FOR GENERATING SEISMIC ENERGY
OTHER KEYWORDS: SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

INSTRUMENT, RADIOISOTOPE

3426205 METHOD FOR TAGGING SAND WITH A GASEOUS RADIOACTIVE ISOTOPE
OTHER KEYWORDS: SEDIMENTATION MEASUREMENT

3532881 SUBMARINE RADIOACTIVITY LOGGING TECHNIQUE
OTHER KEYWORDS: INSTRUMENT, SEABED IN SITU ; INSTRUMENT, TOWED ; SAMPLER, SEABED GRAB ; SEABED PROPERTY MEASUREMENT

3546456 MULTIPLE DETECTOR SUBMARINE RADIOACTIVITY LOGGING SYSTEM
OTHER KEYWORDS: INSTRUMENT, SEABED IN SITU ; INSTRUMENT, TOWED ; SEABED PROPERTY MEASUREMENT

INSTRUMENT, SEABED IN SITU

3353612 METHOD AND APPARATUS FOR EXPLORATION OF THE WATER BOTTOM REGIONS
OTHER KEYWORDS: SAMPLER, POWER SUPPLY ; SAMPLER, SEABED-DRILLED CORE ; SEABED PROPERTY MEASUREMENT

3373400 DETERMINATION OF GEOPHYSICAL PROPERTIES OF THE SEA BOTTOM
OTHER KEYWORDS: SEABED PROPERTY MEASUREMENT

3447371 *IN-SITU VELOCIMETER*
OTHER KEYWORDS: INSTRUMENT RETRIEVAL ; SAMPLER, SEABED-DRIVEN CORE ; SEABED PROPERTY MEASUREMENT

3455151 *EXPENDABLE OCEAN BOTTOM SENSOR*
OTHER KEYWORDS: SEABED PROPERTY MEASUREMENT

3500678 *APPARATUS FOR DETERMINING SOIL RESISTANCE INCLUDING A DRILL*
OTHER KEYWORDS: INSTRUMENT POWER SUPPLY ; SEABED PROPERTY MEASUREMENT

3532881 *SUBMARINE RADIOACTIVITY LOGGING TECHNIQUE*
OTHER KEYWORDS: INSTRUMENT, RADIOISOTOPE ; INSTRUMENT, TOWED ; SAMPLER, SEABED GRAB ; SEABED PROPERTY MEASUREMENT

3546456 *MULTIPLE DETECTOR SUBMARINE RADIOACTIVITY LOGGING SYSTEM*
OTHER KEYWORDS: INSTRUMENT, RADIOISOTOPE ; INSTRUMENT, TOWED ; SEABED PROPERTY MEASUREMENT

3548304 *RESISTIVITY MEASURING DEVICE HAVING VERTICALLY-SPACED RING ELECTRODE AND A CENTRAL ELECTRODE. OTHER KEYWORDS: SEABED PROPERTY MEASUREMENT ; SEDIMENTATION MEASUREMENT*

INSTRUMENT, TOWED

3404565 *TOWED OCEANOGRAPHIC SENSOR SYSTEM*
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; TOWED BODY DEPTH CONTROL ; TOWING CABLE ; TOWED VEHICLE

3417251 *TOWED INSTRUMENT FOR CONTINUOUS MEASURING OF OCEAN TURBIDITY*
OTHER KEYWORDS: POLLUTANT MEASUREMENT ; TOWED VEHICLE

3447124 *UNDERWATER SURVEY*
OTHER KEYWORDS: SEABED PROPERTY MEASUREMENT

3448432 *ISOLATOR FOR TOWED HYDROPHONE*
OTHER KEYWORDS: TOWED VEHICLE

3458857 *ACCELERATION CANCELLING HYDROPHONE*
OTHER KEYWORDS: TOWED VEHICLE

3501953 *BATHYKYMOGRAPH AND METHOD*
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; TOWED VEHICLE

3532881 *SUBMARINE RADIOACTIVITY LOGGING TECHNIQUE*
OTHER KEYWORDS: INSTRUMENT, RADIOISOTOPE ; INSTRUMENT, SEABED IN SITU ; SAMPLER, SEABED GRAB ; SEABED PROPERTY MEASUREMENT

3546456 *MULTIPLE DETECTOR SUBMARINE RADIOACTIVITY LOGGING SYSTEM*
OTHER KEYWORDS: INSTRUMENT, RADIOISOTOPE ; INSTRUMENT, SEABED IN SITU ; SEABED PROPERTY MEASUREMENT

LOW-COST SHORE PROTECTION

3299640 *MEANS FOR INFLUENCING THE SUB-MARINE MIGRATION OF MATERIAL*
OTHER KEYWORDS: ARTIFICIAL SEAWEED

3301148 *PAVING BLOCK*
OTHER KEYWORDS: CONCRETE BLOCK ; REVETMENT ; SLOPE PROTECTION

3343468 *PAVING BLOCK*
OTHER KEYWORDS: CONCRETE BLOCK ; REVETMENT ; SLOPE PROTECTION

3344609 *PREVENTION OF BEACH EROSION AND ENCOURAGEMENT OF LAND RESTORATION*
OTHER KEYWORDS: CONCRETE BLOCK ; FABRIC MAT ; GROIN ; REVETMENT ; SEAWALL

3347048 *REVETMENT BLOCK*
OTHER KEYWORDS: CONCRETE BLOCK ; REVETMENT

3353361 *BREAKWATER*
OTHER KEYWORDS: BREAKWATER, CONCRETE ; TIRES

3357192 *BREAKWATERS*
OTHER KEYWORDS: BREAKWATER, FLOATING ; TIRES

3373568 *SYSTEM FOR RECLAMATION OF LAND*
OTHER KEYWORDS: SANDBAG ; SLOPE PROTECTION ; WAVE ABSORBER BEACH

3374635 *BAGS FOR USE IN REVETMENT STRUCTURES*
OTHER KEYWORDS: REVETMENT ; SANDBAG

3379017 *CONCRETE BLOCKS FOR SHORE AND BANK PROTECTION*
OTHER KEYWORDS: CONCRETE BLOCK ; REVETMENT ; SEAWALL

3412561 *REED-TRENCH TERRACING*
OTHER KEYWORDS: SLOPE PROTECTION

3421417 *PAVEMENT*
OTHER KEYWORDS: CONCRETE BLOCK ; REVETMENT ; SLOPE PROTECTION

3479824 *SEAWALL AND FENCE CONSTRUCTION*
OTHER KEYWORDS: BREAKWATER, CONCRETE ; SAND FENCE

3488964 *CONCRETE BLOCK*
OTHER KEYWORDS: CONCRETE BLOCK ; REVETMENT

3499290 *FLOATING BOOM*
OTHER KEYWORDS: BREAKWATER, FLOATING ; GROIN ; POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3503216 *UNDERWATER PAVING ELEMENT*
OTHER KEYWORDS: REVETMENT ; SEABED MATERIAL PLACEMENT ; SEABED SCOUR PROTECTION

3520142 *METHOD AND MEANS FOR PROTECTING AN EARTH SITUS AGAINST SCOUR*
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; REVETMENT ; SLOPE PROTECTION

3534668 *PAVEMENT BLOCK*
OTHER KEYWORDS: CONCRETE BLOCK ; REVETMENT ; SLOPE PROTECTION

3538711 *DEVICE FOR CONTROL AND PREVENTION OF COAST EROSION*
OTHER KEYWORDS: GROIN ; REVETMENT ; SANDBAG ; SEABED MATERIAL PLACEMENT

OFFSHORE CAISSON

3307624 *LOAD-SUPPORTING STRUCTURE; PARTICULARLY FOR MARINE WELLS*
OTHER KEYWORDS: SEABED FOUNDATION ; SEABED OIL, PROCESS STRUCTURE

3344612 *SHALLOW WATER CAISSON*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, WATER JET ; SEABED FOUNDATION

3347051 *BULKHEAD STRUCTURE AND METHOD OF MAKING THEREOF*
OTHER KEYWORDS: BREAKWATER, STEEL FRAME ; BULKHEAD ; OFFSHORE CONSTRUCTION

3362170 *TRIANGULAR BASED OFFSHORE PLATFORM*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED

3364684 *DEEP WATER OFFSHORE DRILLING PLATFORM*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3373806 *APPARATUS AND METHOD FOR DRILLING WELLS*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; OFFSHORE STORAGE TANK, SUBMERGED ; SEABED OIL, PROCESS STRUCTURE

3380256 *UNDERWATER DRILLING INSTALLATION AND METHOD OF CONSTRUCTION*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED

3380520 *DRILLING AND PRODUCTION PLATFORM*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED

3383869 *MARINE PIERS*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3389562 *SALVAGEABLE MULTI-WELL OFFSHORE WELL PROTECTOR PLATFORM*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; PILE DRIVER, WATER JET ; SEABED FOUNDATION

3396545 *METHOD OF FORMING CONCRETE BODIES*
OTHER KEYWORDS: CONCRETE ARMOR UNIT ; CONCRETE FORM ; OFFSHORE CONSTRUCTION ; SANDBAG

3402559 *PROCESS OF FORMING A LARGE-DIAMETER TUBULAR PILE FOUNDATION*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, CONCRETE ; PILE DRIVER, WATER JET ; PILE SECTION CONNECTION ; SEABED FOUNDATION

3412563 *JET CLOSING DEVICE*
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP ; OFFSHORE PLATFORM, LEG

3426859 *TELESCOPED CAISSON*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3431734 *TOTALLY OR PARTIALLY PREFABRICATED STRUCTURE BAR-DAM FOR THE PROTECTION OF HARBORS. OTHER KEYWORDS: BREAKWATER, CONCRETE*

3450201 *EXTENSIBLE CAISSON FOR UNDERWATER WELL*
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ; OFFSHORE PLATFORM, FIXED

3456720 *APPARATUS AND METHOD FOR DRILLING WELLS*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED OIL, PROCESS STRUCTURE

3464212 *METHOD OF BUILDING CONCRETE STRUCTURES IN WATER BOTTOMS*
OTHER KEYWORDS: BREAKWATER, CONCRETE ; OFFSHORE CONSTRUCTION

3482408 *TELESCOPED CAISSON*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; PILE, STRUCTURE CONNECTION

3490239 *BREAKWATER STRUCTURE*
OTHER KEYWORDS: BREAKWATER, STEEL FRAME ; OFFSHORE CONSTRUCTION ; SEABED FOUNDATION

3527057 *METHOD AND APPARATUS FOR CONTAINING WELL POLLUTANTS*
OTHER KEYWORDS: COFFERDAM ; PILE, SHEET ; POLLUTANT, SUBMERGED BARRIER ; POLLUTANT, SURFACE BARRIER

3537268 MARINE STATION AND METHOD FOR FABRICATING THE SAME
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT ; SEABED FOUNDATION ; SEABED OIL, PROCESS STRUCTURE

OFFSHORE CONSTRUCTION

3306052 FLOATABLE STRUCTURE AND METHOD OF OPERATING SAME
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP

3314239 METHOD AND APPARATUS FOR FORMING UNDERWATER STRUCTURES
OTHER KEYWORDS: CONCRETE FORM ; SEABED MATERIAL PLACEMENT

3314240 METHOD AND APPARATUS FOR USE IN FORMING FOUNDATIONS
OTHER KEYWORDS: PILE DRIVER, IMPACT ; PILE DRIVER, WATER JET ; PILE SECTION CONNECTION ; PILE, STEEL

3314241 METHOD AND APPARATUS FOR USE IN DRIVING PILES
OTHER KEYWORDS: PILE DRIVER, IMPACT ; PILE DRIVER, WATER JET ; PILE, STEEL

3315473 OFFSHORE PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; PILE, STRUCTURE CONNECTION

3324665 METHOD OF STABILIZING PILES
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE PLATFORM ANCHOR ; PILE FOOTING ; PILE, STEEL ; SEABED FOUNDATION

3328969 APPARATUS FOR DRIVING PILES
OTHER KEYWORDS: PILE DRIVER, IMPACT ; PILE PLACEMENT

3335572 MODULAR PANELS FOR CONSTRUCTION OF WATER BLOCKADES
OTHER KEYWORDS: COFFERDAM

3344612 SHALLOW WATER CAISSON
OTHER KEYWORDS: OFFSHORE CAISSON ; PILE DRIVER, WATER JET ; SEABED FOUNDATION

3347051 BULKHEAD STRUCTURE AND METHOD OF MAKING THEREOF
OTHER KEYWORDS: BREAKWATER, STEEL FRAME ; BULKHEAD ; OFFSHORE CAISSON

3354659 DEEP, SUBMERGENCE FOUNDATION VEHICLE
OTHER KEYWORDS: CONCRETE FORM ; GROUTING ; SEABED FOUNDATION ; SEABED MATERIAL PLACEMENT

3355894 STRUCTURE FOR USE IN RIVER AND SEA
OTHER KEYWORDS: BREAKWATER, RUBBLE ; CONCRETE ARMOR UNIT ; OFFSHORE PLATFORM, FIXED

3362170 TRIANGULAR BASED OFFSHORE PLATFORM
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM, FIXED

3363873 SHUTTERING MEANS AND APPARATUS FOR THE CASTING OF UNDERWATER STRUCTURES. OTHER KEYWORDS: CONCRETE FORM ; SEABED MATERIAL PLACEMENT

3366173 SUBSEA PRODUCTION SYSTEM
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION ; SEABED OIL, PROCESS STRUCTURE

3373806 APPARATUS AND METHOD FOR DRILLING WELLS
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM, FIXED ; OFFSHORE STORAGE TANK, SUBMERGED ; SEABED OIL, PROCESS STRUCTURE

3375669 *OFFSHORE MARINE STRUCTURES*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3379020 *DOLPHIN OR MARINE CONSTRUCTION*
OTHER KEYWORDS: COLLISION PROTECTION ; PILE DOLPHIN ; PILE, WOOD

3379245 *TENDED DRILLING PLATFORM FOR MULTIWELL SUBSURFACE COMPLETION*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT ; SEABED FOUNDATION

3380255 *UNDERWATER ICE STRUCTURE AND METHOD FOR CONSTRUCTING SAME*
OTHER KEYWORDS: COFFERDAM ; ICE STRUCTURE

3380256 *UNDERWATER DRILLING INSTALLATION AND METHOD OF CONSTRUCTION*
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM, FIXED

3380520 *DRILLING AND PRODUCTION PLATFORM*
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM, FIXED

3381482 *MARINE DRILLING STRUCTURE*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3387460 *MAGNETIC PILE STABBING APPARATUS AND METHOD*
OTHER KEYWORDS: PILE PLACEMENT

3388556 *MARINE STORAGE STRUCTURE*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE STORAGE TANK, SUBMERGED ; SEABED FOUNDATION

3389562 *SALVAGEABLE MULTI-WELL OFFSHORE WELL PROTECTOR PLATFORM*
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM, FIXED ; PILE DRIVER, WATER JET ; SEABED FOUNDATION

3394553 *UNDERWATER ANCHORED PILLAR FOR SUPPORTING A PLATFORM*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3396544 *STORAGE TANK FIXED ON THE OCEAN BOTTOM AND METHOD OF INSTALLATION*
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ; OFFSHORE STORAGE TANK, SUBMERGED ; PILE PLACEMENT ; PILE, STEEL ; SEABED FOUNDATION

3396545 *METHOD OF FORMING CONCRETE BODIES*
OTHER KEYWORDS: CONCRETE ARMOR UNIT ; CONCRETE FORM ; OFFSHORE CAISSON ; SANDBAG

3402559 *PROCESS OF FORMING A LARGE-DIAMETER TUBULAR PILE FOUNDATION*
OTHER KEYWORDS: OFFSHORE CAISSON ; PILE, CONCRETE ; PILE DRIVER, WATER JET ; PILE SECTION CONNECTION ; SEABED FOUNDATION

3406524 *FLUID-SONIC PILE DRIVING*
OTHER KEYWORDS: PILE DRIVER, VIBRATORY ; PILE DRIVER, WATER JET ; PILE, STEEL

3415067 *METHOD OF OPERATING A SUBMERSIBLE VESSEL FOR SUBMARINE OPERATIONS*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION ; SEABED SOIL TREATMENT

3438204 *UNDERWATER STORAGE RESERVOIR*
OTHER KEYWORDS: OFFSHORE STORAGE TANK, SUBMERGED

3442340 *MOBILE/FIXED DRILLING AND PRODUCTION STRUCTURE*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3464212 METHOD OF BUILDING CONCRETE STRUCTURES IN WATER BOTTOMS
OTHER KEYWORDS: BREAKWATER, CONCRETE ; OFFSHORE CAISSON

3466877 SELF-LEVELING LAND OR UNDERWATER STATION
OTHER KEYWORDS: SEABED FOUNDATION

3466878 RIG FOR WORK AT SEA, IN LAKES, LAGOONS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT

3466879 METHOD AND APPARATUS FOR MAKING PILING
OTHER KEYWORDS: CONCRETE FORM ; PILE, CONCRETE ; PILE PLACEMENT

3482408 TELESCOPED CAISSON
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM, FIXED ;
PILE, STRUCTURE CONNECTION

3483707 METHOD FOR REINFORCING STEEL PIPE PILING IN SITU AND THE RESULTANT
PILING. OTHER KEYWORDS: CONCRETE FORM ; PILE, CONCRETE ;
PILE, STEEL ; STRUCTURE REPAIR

3483708 METHOD OF ANCHORING MARINE STRUCTURES
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT ;
SEABED FOUNDATION

3488967 COMBINATION DEEP WATER STORAGE TANK AND DRILLING AND
PRODUCTION PLATFORM. OTHER KEYWORDS: GROUTING ;
OFFSHORE PLATFORM, FIXED ; OFFSHORE STORAGE TANK, EMERGENT ;
PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3490239 BREAKWATER STRUCTURE
OTHER KEYWORDS: BREAKWATER, STEEL FRAME ; OFFSHORE CAISSON ;
SEABED FOUNDATION

3495409 APPARATUS FOR BUILDING A RETAINING WALL ALONG A BANK
OF A BODY OF WATER. OTHER KEYWORDS: BULKHEAD ;
DREDGE, CUTTERHEAD ; DREDGE PIPE ; DREDGE PROPULSION ; PUMP

3496728 METHOD AND APPARATUS FOR FIELD REINFORCEMENT OF COLUMNAR STRUCTURES;
PARTICULARLY OFFSHORE DRILLING AND PRODUCTION PLATFORMS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3497579 SLIP FORMING APPARATUS AND METHOD
OTHER KEYWORDS: CONCRETE FORM ; SEABED MATERIAL PLACEMENT

3498065 METHOD AND APPARATUS FOR BARGE ANCHORING AND STABILIZING
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ; PILE DRIVER, IMPACT ;
PILE EXTRACTOR ; PILE PLACEMENT

3499292 METHOD OF MAKING PARTIALLY SUBMERGED STRUCTURES
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; PILE, STRUCTURE CONNECTION

3501919 METHOD AND APPARATUS FOR CARRYING OUT OPERATIONS
AT AN UNDERWATER INSTALLATION. OTHER KEYWORDS:
OFFSHORE PLATFORM, FIXED ; PILE DRIVER LEADS ; PILE PLACEMENT ;
SEABED FOUNDATION

3502159 PILE DRIVING APPARATUS FOR SUBMERGED STRUCTURES
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; PILE DRIVER, IMPACT ;
PILE PLACEMENT ; SEABED FOUNDATION

3503217 METHOD OF AND APPARATUS FOR ANCHORING WELL-DRILLING PLATFORMS TO THE OCEAN FLOOR. OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM, LEG ; PILE PLACEMENT ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3511057 ERECTION AND CONSTRUCTION OF MULTISPAN BRIDGES AND PIERS
OTHER KEYWORDS: PIER, FIXED

3516259 OFFSHORE STRUCTURE METHOD AND APPARATUS
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, FIXED ; OFFSHORE PLATFORM, LEG

3517516 FOLDING SUPPORT STRUCTURE FOR OFFSHORE DRILLING PLATFORMS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE PLATFORM, LEG

3524322 SPLAY FOOTED PLATFORM ANCHOR
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT ; SEABED FOUNDATION

3526096 METHOD OF MAKING ROCKFILL FOUNDATIONS
OTHER KEYWORDS: BREAKWATER, RUBBLE ; OFFSHORE ISLAND ; SEABED FOUNDATION

3527553 APPARATUS FOR THE CONSTRUCTION OF ELEVATED WAYS
OTHER KEYWORDS: CONCRETE FORM ; PIER, FIXED

3528254 OFFSHORE PLATFORM STRUCTURE AND CONSTRUCTION METHOD
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM, FIXED ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3537268 MARINE STATION AND METHOD FOR FABRICATING THE SAME
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT ; SEABED FOUNDATION ; SEABED OIL, PROCESS STRUCTURE

3540224 RIGIDIZED SUPPORT ELEMENT
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3545539 SUBSEA SATELLITE FOUNDATION UNIT AND METHOD FOR INSTALLING SATELLITE BODY THEREWITHIN. OTHER KEYWORDS: SEABED FOUNDATION ; SEABED OIL, PROCESS STRUCTURE

3547207 PERCUSSION HAMMER
OTHER KEYWORDS: PILE DRIVER, IMPACT

OFFSHORE HARBOR

3533240 FLOATING HARBOR
OTHER KEYWORDS: BREAKWATER, FLOATING ; POLLUTANT, SURFACE BARRIER

OFFSHORE ISLAND

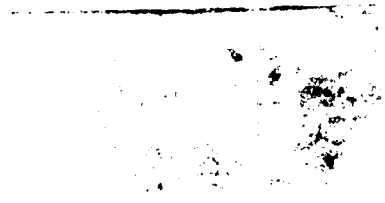
3526096 METHOD OF MAKING ROCKFILL FOUNDATIONS
OTHER KEYWORDS: BREAKWATER, RUBBLE ; OFFSHORE CONSTRUCTION ; SEABED FOUNDATION

OFFSHORE MOORING STRUCTURE

3311142 TANKSHIP MOORING AND LOADING SYSTEM

3349816 BOW MOORING
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3366173 SUBSEA PRODUCTION SYSTEM
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION ; SEABED OIL, PROCESS STRUCTURE



3373713 APPARATUS FOR USE WITH OFFSHORE MARINE STRUCTURES
OTHER KEYWORDS: OFFSHORE STRUCTURE FENDER

3383870 OFFSHORE PLATFORM FOR UNDERWATER FACILITIES
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE PLATFORM, FLOATING

3396544 STORAGE TANK FIXED ON THE OCEAN BOTTOM AND METHOD OF INSTALLATION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
OFFSHORE STORAGE TANK, SUBMERGED ; PILE PLACEMENT ;
PILE, STEEL ; SEABED FOUNDATION

3404654 STRUCTURE CAPABLE OF BEING USED AS A MONO-MOORING
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3464466 MOORING SYSTEM FOR TANKER VESSELS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3472033 FLUID STORAGE APPARATUS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ;
OFFSHORE STORAGE TANK, SUBMERGED

3500484 DEVICE FOR MOORING SHIPS
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR

3516259 OFFSHORE STRUCTURE METHOD AND APPARATUS
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM, FIXED ; OFFSHORE PLATFORM, LEG

OFFSHORE PLATFORM ANCHOR

3324665 METHOD OF STABILIZING PILES
OTHER KEYWORDS: EMBEDMENT ANCHOR , OFFSHORE CONSTRUCTION ,
PILE FOOTING ; PILE, STEEL ; SEABED FOUNDATION

3330338 ANCHOR AND METHOD OF INSTALLING
OTHER KEYWORDS: EMBEDMENT ANCHOR ; GROUTING ;
SEABED MATERIAL PLACEMENT

3347053 PARTIALLY SALVAGEABLE JACKET-PILE CONNECTION
OTHER KEYWORDS: GROUTING ; PILE-STRUCTURE CONNECTION ;
SEABED FOUNDATION

3431880 EXPLOSIVE EMBEDMENT ANCHOR
OTHER KEYWORDS: EMBEDMENT ANCHOR

3450201 EXTENSIBLE CAISSON FOR UNDERWATER WELL
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM, FIXED

3498065 METHOD AND APPARATUS FOR BARGE ANCHORING AND STABILIZING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT ,
PILE EXTRACTOR ; PILE PLACEMENT

3500484 DEVICE FOR MOORING SHIPS
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE

3517517 ENCAPSULATED CABLE FOR MARINE USE
OTHER KEYWORDS: CORROSION PREVENTION ; OFFSHORE PLATFORM, FLOATING

3522709 MARINE PLATFORM STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING

3524323 OFFSHORE STORAGE TANK WITH SELF-CONTAINED GUY SYSTEM
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING ;
OFFSHORE STORAGE TANK, SUBMERGED

3525224 METHOD AND APPARATUS FOR INSTALLING ANCHOR PILES
OTHER KEYWORDS: EMBEDMENT ANCHOR ; GROUTING ; PILE PLACEMENT

OFFSHORE PLATFORM, FIXED

3315473 OFFSHORE PLATFORM
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, STRUCTURE CONNECTION

3348382 OFFSHORE PLATFORM FOR ICE CONDITIONS
OTHER KEYWORDS: ICE PROTECTION

3349816 BOW MOORING
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE

3355894 STRUCTURE FOR USE IN RIVER AND SEA
OTHER KEYWORDS: BREAKWATER, RUBBLE ; CONCRETE ARMOR UNIT ;
OFFSHORE CONSTRUCTION

3362170 TRIANGULAR BASED OFFSHORE PLATFORM
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION

3364684 DEEP WATER OFFSHORE DRILLING PLATFORM
OTHER KEYWORDS: OFFSHORE CAISSON ; SEABED FOUNDATION

3366173 SUBSEA PRODUCTION SYSTEM
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE MOORING STRUCTURE ;
SEABED FOUNDATION ; SEABED OIL, PROCESS STRUCTURE

3373806 APPARATUS AND METHOD FOR DRILLING WELLS
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ;
OFFSHORE STORAGE TANK, SUBMERGED ; SEABED OIL, PROCESS STRUCTURE

3375669 OFFSHORE MARINE STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED FOUNDATION

3379245 TENDED DRILLING PLATFORM FOR MULTIWELL SUBSURFACE COMPLETION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE PLACEMENT ;
SEABED FOUNDATION

3380256 UNDERWATER DRILLING INSTALLATION AND METHOD OF CONSTRUCTION
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION

3380520 DRILLING AND PRODUCTION PLATFORM
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION

3381481 OFFSHORE STORAGE APPARATUS
OTHER KEYWORDS: OFFSHORE STORAGE TANK, EMERGENT ;
OFFSHORE STORAGE TANK, SUBMERGED

3381482 *MARINE DRILLING STRUCTURE*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED FOUNDATION

3383869 *MARINE PIERS*
OTHER KEYWORDS: OFFSHORE CAISSON ; SEABED FOUNDATION

3383870 *OFFSHORE PLATFORM FOR UNDERWATER FACILITIES*
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ;
OFFSHORE PLATFORM, FLOATING

3388556 *MARINE STORAGE STRUCTURE*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
OFFSHORE STORAGE TANK, SUBMERGED ; SEABED FOUNDATION

3389562 *SALVAGEABLE MULTI-WELL OFFSHORE WELL PROTECTOR PLATFORM*
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ;
PILE DRIVER, WATER JET ; SEABED FOUNDATION

3390531 *OFFSHORE DRILLING PLATFORM*
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; PILE PLACEMENT ;
SEABED FOUNDATION

3394553 *UNDERWATER ANCHORED PILLAR FOR SUPPORTING A PLATFORM*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED FOUNDATION

3397545 *MARINE STRUCTURE*
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING ; SEABED FOUNDATION

3402557 *SUPPORTING STRUCTURE FOR OFFSHORE DRILLING RIGS*

3404654 *STRUCRURE CAPABLE OF BEING USED AS A MONO-MOORING*
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE

3411303 *OFFSHORE PLATFORM WITH INTERNAL FLOWLINE*
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG

3412564 *SUB-SEA WORKING AND DRILLING APPARATUS*
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING

3415067 *METHOD OF OPERATING A SUBMERSIBLE VESSEL FOR SUBMARINE OPERATIONS*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED FOUNDATION ;
SEABED SOIL TREATMENT

3422628 *OFFSHORE STORAGE TANK SYSTEM*
OTHER KEYWORDS: OFFSHORE STORAGE TANK, EMERGENT

3426542 *APPARATUS FOR USE WITH OFFSHORE MARINE STRUCTURES*
OTHER KEYWORDS: OFFSHORE STRUCTURE FENDER

3426859 *TELESCOPED CAISSON*
OTHER KEYWORDS: OFFSHORE CAISSON

3429133 *OFFSHORE TOWER*

3436920 *PROTECTION OF OFFSHORE STRUCTURE FROM ICEBERGS*
OTHER KEYWORDS: ICE PROTECTION

3442340 *MOBILE/FIXED DRILLING AND PRODUCTION STRUCTURE*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3450201 *EXTENSIBLE CAISSON FOR UNDERWATER WELL*
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM ANCHOR

3456723 *APPARATUS AND METHOD FOR DRILLING WELLS*
OTHER KEYWORDS: OFFSHORE CAISSON ; SEABED OIL, PROCESS STRUCTURE

3464466 *MOORING SYSTEM FOR TANKER VESSELS*
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE

3466878 *RIG FOR WORK AT SEA;IN LAKES,LAGOONS*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE PLACEMENT

3472033 *FLUID STORAGE APPARATUS*
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ;
OFFSHORE STORAGE TANK, SUBMERGED

3482408 *TELESCOPED CAISSON*
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ;
PILE, STRUCTURE CONNECTION

3483708 *METHOD OF ANCHORING MARINE STRUCTURES*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE PLACEMENT ;
SEABED FOUNDATION

3486343 *PLATFORM FOR DRILLING WELLS AT WATER LOCATIONS*

3488967 *COMBINATION DEEP WATER STORAGE TANK AND DRILLING*
AND PRODUCTION PLATFORM. OTHER KEYWORDS: GROUTING ;
OFFSHORE CONSTRUCTION ; OFFSHORE STORAGE TANK, EMERGENT ;
PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3496728 *METHOD AND APPARATUS FOR FIELD REINFORCEMENT OF COLUMNAR STRUCTURES,*
PARTICULARLY OFFSHORE DRILLING AND PRODUCTION PLATFORMS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, STRUCTURE CONNECTION ;
SEABED FOUNDATION

3499292 *METHOD OF MAKING PARTIALLY SUBMERGED STRUCTURES*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, STRUCTURE CONNECTION

3501919 *METHOD AND APPARATUS FOR CARRYING OUT OPERATIONS AT AN*
UNDERWATER INSTALLATION. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ;
PILE DRIVER LEADS ; PILE PLACEMENT ; SEABED FOUNDATION

3516259 *OFFSHORE STRUCTURE METHOD AND APPARATUS*
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE CONSTRUCTION ;
OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, LEG

3517516 *FOLDING SUPPORT STRUCTURE FOR OFFSHORE DRILLING PLATFORMS*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG

3524322 *SPLAY FOOTED PLATFORM ANCHOR*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE PLACEMENT ;
SEABED FOUNDATION

3525392 *OFFSHORE PLATFORM HAVING A PARTIALLY REMOVABLE DRILLING DECK*

3528254 *OFFSHORE PLATFORM STRUCTURE AND CONSTRUCTION METHOD*
OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ;
PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3537268 *MARINE STATION AND METHOD FOR FABRICATING THE SAME*
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ;
PILE PLACEMENT ; SEABED FOUNDATION ; SEABED OIL, PROCESS STRUCTURE

3546885 *THREADED PILE FOR MARINE STRUCTURE*
OTHER KEYWORDS: EMBEDMENT ANCHOR ; PILE PLACEMENT ; PILE, STEEL ;
PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

OFFSHORE PLATFORM, FLOATING

3383870 *OFFSHORE PLATFORM FOR UNDERWATER FACILITIES*
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, FIXED

3397545 *MARINE STRUCTURE*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3412564 *SUB-SEA WORKING AND DRILLING APPARATUS*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3433024 *VERSATILE MARINE STRUCTURE*
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP

3487228 *POWER GENERATING SYSTEM*
OTHER KEYWORDS: ELECTRICAL GENERATOR ; POWER, WAVE ; PUMP

3517517 *ENCAPSULATED CABLE FOR MARINE USE*
OTHER KEYWORDS: CORROSION PREVENTION ; OFFSHORE PLATFORM ANCHOR

3522709 *MARINE PLATFORM STRUCTURE*
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR

3524323 *OFFSHORE STORAGE TANK WITH SELF-CONTAINED GUY SYSTEM*
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ;
OFFSHORE STORAGE TANK, SUBMERGED

OFFSHORE PLATFORM, JACK UP

3306052 *FLOATABLE STRUCTURE AND METHOD OF OPERATING SAME*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3343371 *LOCKING DEVICE FOR ESTABLISHING A LOAD-BEARING JOINT BETWEEN TWO STRUCTURES. OTHER KEYWORDS: OFFSHORE PLATFORM, LEG*

3343372 *DRILLING PLATFORM*

3367119 *FLOTATION DEVICE FOR OFFSHORE PLATFORM ASSEMBLY*
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG

3385069 *MOBILE MARINE PLATFORM APPARATUS*
OTHER KEYWORDS: SEABED FOUNDATION

3392534 *OFFSHORE DRILLING STRUCTURE*
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG

3412563 *JET CLOSING DEVICE*
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM, LEG

3429127 *METHOD AND APPARATUS FOR ESTABLISHING A FIXED SUPPORT OF A BUOYANT BODY IN ROUGH WATER. OTHER KEYWORDS: OFFSHORE PLATFORM, LEG*

3433024 *VERSATILE MARINE STRUCTURE*
OTHER KEYWORDS: OFFSHORE PLATFORM, FLOATING

3435621 *JACKING SYSTEM FOR OFFSHORE PLATFORMS*
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG

3453830 *METHOD AND APPARATUS FOR ALLEVIATING SCOURING ABOUT LEGS OF A MARINE STRUCTURE. OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; SEABED MATERIAL PLACEMENT ; SEABED SCOUR PROTECTION*

3456447 *MOBILE MARINE DRILLING APPARATUS AND METHOD OF USE*
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG

3479828 *PLATFORM LEG*
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; SEABED FOUNDATION ; SEABED SCOUR PROTECTION

3527442 *JACK UP APPARATUS*
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG

3535884 OFFSHORE DRILLING AND PRODUCTION STRUCTURE
OTHER KEYWORDS: OFFSHORE STORAGE TANK, SUBMERGED ; SEABED OIL, PROCESS STRUCTURE

OFFSHORE PLATFORM, LEG

3312069 METHOD OF PREVENTING SCOUR AROUND UNDERWATER STRUCTURES
OTHER KEYWORDS: SEABED SCOUR PROTECTION

3343371 LOCKING DEVICE FOR ESTABLISHING A LOAD-BEARING JOINT BETWEEN TWO STRUCTURES. OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP

3352118 FRICTIONAL DRAG REDUCER FOR IMMERSED BODIES
OTHER KEYWORDS: PILE PROTECTION

3367119 FLOTATION DEVICE FOR OFFSHORE PLATFORM ASSEMBLY
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP

3381484 BUMPER
OTHER KEYWORDS: OFFSHORE STRUCTURE FENDER

3390531 OFFSHORE DRILLING PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT ; SEABED FOUNDATION

3392534 OFFSHORE DRILLING STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP

3411303 OFFSHORE PLATFORM WITH INTERNAL FLOWLINE
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3412563 JET CLOSING DEVICE
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM, JACK UP

3417569 PROTECTIVE COATING AND METHOD
OTHER KEYWORDS: COATING ; CORROSION PREVENTION ; PILE PROTECTION ; PILE, STEEL

3429127 METHOD AND APPARATUS FOR ESTABLISHING A FIXED SUPPORT OF A BUOYANT BODY IN ROUGH WATER
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP

3435621 JACKING SYSTEM FOR OFFSHORE PLATFORMS
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP

3453830 METHOD AND APPARATUS FOR ALLEVIATING SCOURING ABOUT LEGS OF A MARINE STRUCTURE, OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP ; SEABED MATERIAL PLACEMENT ; SEABED SCOUR PROTECTION

3456447 MOBILE MARINE DRILLING APPARATUS AND METHOD OF USE
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP

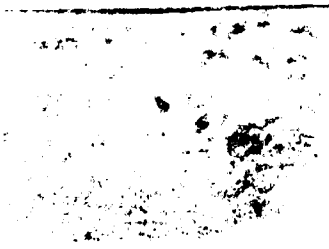
3456448 LEG FOR SUPPORTING A MARINE STRUCTURE
OTHER KEYWORDS: SEABED SCOUR PROTECTION

3457728 REPLACEABLE PILE SLEEVE INSERT
OTHER KEYWORDS: PILE, STRUCTURE CONNECTION

3468132 PLATFORM LEG PACKER
OTHER KEYWORDS: GROUTING ; PILE, STRUCTURE CONNECTION

3479828 PLATFORM LEG
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP ; SEABED FOUNDATION ; SEABED SCOUR PROTECTION

3485050 MARINE STRUCTURES



3502159 PILE DRIVING APPARATUS FOR SUBMERGED STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT ; PILE PLACEMENT ; SEABED FOUNDATION

3503217 METHOD OF AND APPARATUS FOR ANCHORING WELL-DRILLING PLATFORMS TO THE OCEAN FLOOR. OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ; PILE PLACEMENT ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3516259 OFFSHORE STRUCTURE METHOD AND APPARATUS
OTHER KEYWORDS: ICE PROTECTION ; OFFSHORE CONSTRUCTION ; OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, FIXED

3517516 FOLDING SUPPORT STRUCTURE FOR OFFSHORE DRILLING PLATFORMS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED

3518835 METHOD FOR ALLEVIATING SCOURING ABOUT A MARINE STRUCTURE
OTHER KEYWORDS: SEABED MATERIAL PLACEMENT ; SEABED SCOUR PROTECTION

3527442 JACK-UP APPARATUS
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP

3529427 DEVICE FOR PREVENTING OR REDUCING SCOURS AT THE LOWER ENDS OF MEMBERS SUPPORTING MARINE STRUCTURES
OTHER KEYWORDS: FABRIC MAT ; SEABED SCOUR PROTECTION

3540224 RIGIDIZED SUPPORT ELEMENT
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3550384 LATERAL RESTRAINT OF PILE WITHIN JACKET LEG
OTHER KEYWORDS: PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

OFFSHORE STORAGE TANK, EMERGENT

3381481 OFFSHORE STORAGE APPARATUS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE STORAGE TANK, SUBMERGED

3422628 OFFSHORE STORAGE TANK SYSTEM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3429128 OFFSHORE STORAGE STRUCTURE

3469402 OFF-SHORE TANK SYSTEM
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER ; POLLUTANT, SURFACE BARRIER

3488967 COMBINATION DEEP WATER STORAGE TANK AND DRILLING AND PRODUCTION PLATFORM. OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

OFFSHORE STORAGE TANK, SUBMERGED

3339367 METHOD AND APPARATUS FOR INSULATED SUBMERGED OIL STORAGE

3373806 APPARATUS AND METHOD FOR DRILLING WELLS
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; SEABED OIL, PROCESS STRUCTURE

3381481 OFFSHORE STORAGE APPARATUS
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE STORAGE TANK, EMERGENT

3388556 *MARINE STORAGE STRUCTURE*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3396544 *STORAGE TANK FIXED ON THE OCEAN BOTTOM AND METHOD OF INSTALLATION*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE MOORING STRUCTURE ; PILE PLACEMENT ; PILE, STEEL SEABED FOUNDATION

3438204 *UNDERWATER STORAGE RESERVOIR*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3472033 *FLUID STORAGE APPARATUS*
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM, FIXED

3524323 *OFFSHORE STORAGE TANK WITH SELF-CONTAINED GUY SYSTEM*
OTHER KEYWORDS: OFFSHORE PLATFORM ANCHOR ; OFFSHORE PLATFORM, FLOATING

3535884 *OFFSHORE DRILLING AND PRODUCTION STRUCTURE*
OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP ; SEABED OIL, PROCESS STRUCTURE

OFFSHORE STRUCTURE FENDER

3340694 *BUOYANT FENDERS*
OTHER KEYWORDS: COLLISION PROTECTION ; PIER FENDER ; PILE PROTECTION

3359740 *DOCK FENDER SYSTEMS*
OTHER KEYWORDS: COLLISION PROTECTION ; PIER FENDER

3373713 *APPARATUS FOR USE WITH OFFSHORE MARINE STRUCTURES*
OTHER KEYWORDS: OFFSHORE MOORING STRUCTURE

3381484 *BUMPER*
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG

3405527 *PROTECTING MARINE STRUCTURES FROM FLOATING OBJECTS*
OTHER KEYWORDS: ICE PROTECTION

3426542 *APPARATUS FOR USE WITH OFFSHORE MARINE STRUCTURES*
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED

3463114 *METHOD FOR MANEUVERING A VESSEL WITH RESPECT TO ITS STATION*

3464213 *BUOYANT FENDERS*
OTHER KEYWORDS: COLLISION PROTECTION ; PIER FENDER

PIER FENDER

3306053 *MARINE FACILITIES*
OTHER KEYWORDS: PIER, FLOATING ; SMALL-CRAFT PIER

3311081 *DOCK AND LIKE FENDERS*

3335689 *LOW FRICTION DOCK BUMPER*

3338206 *COMPOSITE MARINE DOCK BUMPER*

3340694 *BUOYANT FENDERS*
OTHER KEYWORDS: COLLISION PROTECTION ; OFFSHORE STRUCTURE FENDER ; PILE PROTECTION

3359740 *DOCK FENDER SYSTEMS*
OTHER KEYWORDS: COLLISION PROTECTION ; OFFSHORE STRUCTURE FENDER

3372552 *WOODEN FENDER PILE PROTECTING APPARATUS*
OTHER KEYWORDS: COATING ; FOULING PREVENTION ; PILE PROTECTION

3402558 *BOAT BUMPER*

3404534 *ENERGY-ABSORBING CAMEL*

3406523 *BUFFERS OR ENERGY ABSORBERS*

3411304 *DOCK FENDER*

3418815 *DOCK FENDER*

3418816 *FENDER FOR PROTECTING SHIPS ALONGSIDE A FIXED STRUCTURE*

3449917 *PORTABLE BOAT DOCK FENDERS*
OTHER KEYWORDS: SMALL-CRAFT MOORING DEVICE

3457729 *SYSTEMS FOR DAMPING MOORING SHOCKS*

3459004 *WHARF WITH A SHOCK-ABSORBING DEVICE*

3462960 *MOORING DEVICE FOR BOATS*
OTHER KEYWORDS: PILE PROTECTION ; SMALL-CRAFT MOORING DEVICE

3464213 *BUOYANT FENDERS*
OTHER KEYWORDS: COLLISION PROTECTION ; OFFSHORE STRUCTURE FENDER

3464214 *WATERCRAFT MOORING DEVICE*
OTHER KEYWORDS: SMALL-CRAFT MOORING DEVICE

3475914 *BOAT BUMPER*
OTHER KEYWORDS: PILE PROTECTION ; SMALL-CRAFT MOORING DEVICE

3507123 *FENDER FOR DOCK WALL*

3533242 *FENDER ASSEMBLY AND METHOD OF ASSEMBLING IT*

PIER, FIXED

3543523 *STRUCTURAL DOCK SYSTEM*
OTHER KEYWORDS: ICE PROTECTION ; PILE PROTECTION ; SMALL-CRAFT PIER

3415061 *SEA WALL STRUCTURE*
OTHER KEYWORDS: BREAKWATER, CONCRETE ; SEAWALL

3421327 *DOCK HINGE*
OTHER KEYWORDS: SMALL-CRAFT PIER

3470700 *WATER TURBULENCE PRODUCING AIR BUBBLING SYSTEM FOR BOAT DOCKS*
OTHER KEYWORDS: ICE PROTECTION ; SMALL-CRAFT PIER

3488968 *BOAT LANDING STAGES AND THE LIKE*
OTHER KEYWORDS: SMALL-CRAFT PIER

3511057 *ERECTION AND CONSTRUCTION OF MULTISPAN BRIDGES AND PIERS*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3524324 *FLEXIBLE PIER*
OTHER KEYWORDS: COLLISION PROTECTION ; ICE PROTECTION ; PILE PROTECTION ; SMALL-CRAFT PIER

3527553 *APPARATUS FOR THE CONSTRUCTION OF ELEVATED WAYS*
OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CONSTRUCTION

PIER, FLOATING

3306053 MARINE FACILITIES
OTHER KEYWORDS: PIER FENDER ; SMALL-CRAFT PIER

3323479 FLOATING DOCK STRUCTURE
OTHER KEYWORDS: SMALL-CRAFT PIER

3329117 DEVICE FOR MOORING BOATS
OTHER KEYWORDS: SMALL-CRAFT MOORING DEVICE ; SMALL-CRAFT PIER

3344764 FLOATING BODY

3426109 METHOD OF FABRICATING A CONCRETE FLOTATION PIER
OTHER KEYWORDS: CONCRETE FORM

3442238 FLOATING LANDING-STAGE
OTHER KEYWORDS: SMALL-CRAFT PIER

3448709 MARINE FLOAT CONSTRUCTION
OTHER KEYWORDS: CONCRETE FORM ; SMALL-CRAFT PIER

3455115 FLOATING STRUCTURES
OTHER KEYWORDS: SMALL-CRAFT PIER

3478710 FLOATING DOCK STRUCTURE
OTHER KEYWORDS: CONCRETE FORM ; SMALL-CRAFT PIER

3512492 FLOATING STRUCTURE AND METHOD OF MAKING
OTHER KEYWORDS: CONCRETE FORM

3521588 MOVABLE FLOATING BOAT ANCHORAGE
OTHER KEYWORDS: PIER, MOBILE ; SMALL-CRAFT PIER

3532440 TIDALLY OPERATED SISTEM FOR PUMPING WATER OUT OF BOATS AND FLOATING DOCKS. OTHER KEYWORDS: POWER, TIDE ; PUMP ; SMALL-CRAFT PIER

PIER, MOBILE

3345825 PORTABLE DOCK
OTHER KEYWORDS: SMALL-CRAFT PIER

3380257 PORTABLE DOCK
OTHER KEYWORDS: SMALL-CRAFT PIER

3397546 ROLL OUT-ROLL IN DOCK
OTHER KEYWORDS: SMALL-CRAFT PIER

3521588 MOVABLE FLOATING BOAT ANCHORAGE
OTHER KEYWORDS: PIER, FLOATING ; SMALL-CRAFT PIER

PILE DOLPHIN

3379020 DOLPHIN OR MARINE CONSTRUCTION
OTHER KEYWORDS: COLLISION PROTECTION ; OFFSHORE CONSTRUCTION ; PILE, WOOD

PILE DRIVER LEADS

3344867 BOTTOM BRACE FOR PILE HAMMER LEADS

3417524 DEVICES FOR OPERATING THE HAMMER LEADS IN PILE DRIVING ATTACHMENTS
OTHER KEYWORDS: PILE DRIVER, IMPACT

3463245 EXTENSIBLE AND RETRACTABLE BATTER ADJUSTMENT OF PILE HAMMER LEADS
OTHER KEYWORDS: PILE DRIVER, IMPACT

3477522 BOOM AND BRACING

3501919 METHOD AND APPARATUS FOR CARRYING OUT OPERATIONS AT AN UNDERWATER INSTALLATION. OTHER KEYWORDS: OFFSHORE CONSTPUCTION ; OFFSHORE PLATPORM, FIXED ; PILE PLACEMENT ; SEABED FOUNDATION

3527310 PILE DRIVING AND GUIDING APPARATUS
OTHER KEYWORDS: PILE DRIVER, IMPACT

3550693 PILE DRIVER
OTHER KEYWORDS: PILE DRIVER, IMPACT

PILE DRIVER, IMPACT

3303892 FUEL ATOMIZATION DEVICE IN DIESEL PILE DRIVER

3314240 METHOD AND APPARATUS FOR USE IN FORMING FOUNDATIONS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, WATER JET ; PILE SECTION CONNECTION ; PILE, STEEL

3314241 METHOD AND APPARATUS FOR USE IN DRIVING PILES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, WATER JET ; PILE, STEEL

3328969 APPARATUS FOR DRIVING PILES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE PLACEMENT

3332503 DOUBLE-ACTING-STEAM-AIR HAMMER, IN PARTICULAR FOR PILE IMMERSION

3336987 DEVICE FOR TRANSMITTING FORCES
OTHER KEYWORDS: PILE, STEEL

3353362 PILE DRIVING

3356164 PILE DRIVING MECHANISMS

3358778 SPRING DRIVEN POWER HAMMER

3371726 ACOUSTIC APPARATUS

3375881 PILE DRIVER

3388752 COMBINATION PILEDRIVER AND DRIVABLE THREADED PIPE SECTIONS
OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, STEEL

3388753 DRIVING TOOL

3398801 PNEUMATIC IMPACT HAMMER FOR ROCK CRUSHING AND PILE DRIVING

3401755 DIESEL HAMMER CONVERTIBLE TO SINGLE OR DOUBLE ACTION AND HAVING ENERGY RATING INDICATING MEANS FOR EACH MODE OF OPERATION

3417524 DEVICES FOR OPERATING THE HAMMER LEADS IN PILE DRIVING ATTACHMENTS
OTHER KEYWORDS: PILE DRIVER LEADS

3417828 METHOD FOR DRIVING PILES AND SIMILAR OBJECTS

3431986 HYDRAULIC PILE-DRIVING DEVICE

3437157 DIESEL PILEHAMMER

3446293 PILE DRIVER

3453657 FLUID ACTUATED PERCUSSION TOOL

3454112 PILE DRIVING HAMMER

3463245 EXTENSIBLE AND RETRACTABLE BATTER ADJUSTMENT OF PILE HAMMER LEADS
OTHER KEYWORDS: PILE DRIVER LEADS

3489229 APPARATUS FOR DRIVING IN PILES,PLANKS AND THE LIKE

3498065 METHOD AND APPARATUS FOR BARGE ANCHORING AND STABILIZING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM ANCHOR ; PILE EXTRACTOR ; PILE PLACEMENT

3498388 PILE DRIVING SYSTEM
OTHER KEYWORDS: PILE LOAD MEASUREMENT

3498391 HYDRAULIC CUSHION BLOCK AND IMPACT TYPE PILE DRIVING HAMMERS

3502159 PILE DRIVING APPARATUS FOR SUBMERGED STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,LEG ; PILE PLACEMENT ; SEABED FOUNDATION

3504501 METHOD OF PILE SPLICING AND DRIVING
OTHER KEYWORDS: PILE,CONCRETE ; PILE SECTION CONNECTION

3526283 PILE DRIVER

3527310 PILE DRIVING AND GUIDING APPARATUS
OTHER KEYWORDS: PILE DRIVER LEADS

3529681 HYDRAULICALLY CONTROLLED VIBRO-HAMMER
OTHER KEYWORDS: PILE DRIVER,VIBRATORY

3535919 DYNAMIC DETERMINATION OF PILE LOAD CAPACITY
OTHER KEYWORDS: PILE LOAD MEASUREMENT

3537536 PILE CLAMP FOR POWER HAMMERS

3542140 ROTARY APPLIANCE FOR FACILITATING THE DRIVING OR WITHDRAWAL OF PILES,PIT-PROPS AND THE LIKE
OTHER KEYWORDS: PILE EXTRACTOR

3547207 PERCUSSION HAMMER
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3550693 PILE DRIVER
OTHER KEYWORDS: PILE DRIVER LEADS

PILE DRIVER,VIBRATORY

3312295 METHOD AND APPARATUS FOR FLUID INJECTION IN VIBRATORY DRIVING OF PILES AND THE LIKE. OTHER KEYWORDS: PILE DRIVER,WATER JET

3344873 MECHANICAL HETERODYNE OSCILLATOR

3344874 LOW-IMPEDANCE ISOLATOR FOR VIBRATORY PILE DRIVER MACHINES

3368632 PILE DRIVER AND EXTRACTOR
OTHER KEYWORDS: PILE EXTRACTOR

3380541 *SONIC METHOD AND APPARATUS FOR INSTALLING COMPLEX STRUCTURES*

3406524 *FLUID-SONIC PILE DRIVING*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, WATER JET ; PILE, STEEL

3425499 *HYDRAULIC VIBRATORY HAMMER FOR DRIVING AND OR EXTRACTING PILES AND THE LIKE.OTHER KEYWORDS: PILE EXTRACTOR*

3433311 *PILE DRIVER AND EXTRACTOR WITH ROTATING ECCENTRIC MASSES OF VARIABLE WEIGHTS.OTHER KEYWORDS: PILE EXTRACTOR*

3452830 *DRIVING SYSTEMS*

3463251 *PNEUMATIC TRANSFORMER COUPLING FOR SONIC PILE DRIVER*

3477237 *METHOD OF VIBRATING A MEMBER TO DRIVE IT IN A RESISTIVE MEDIUM*

3502160 *RESILIENT YOKE MOUNTING FOR VIBRATORY PILE DRIVER AND EXTRACTOR*
OTHER KEYWORDS: PILE EXTRACTOR

3509948 *PILE DRIVING SYSTEM*

3529681 *HYDRAULICALLY CONTROLLED VIBRO-HAMMER*
OTHER KEYWORDS: PILE DRIVER, IMPACT

3550694 *VIBROHAMMER*
OTHER KEYWORDS: PILE EXTRACTOR

PILE DRIVER, WATER JET

3312295 *METHOD AND APPARATUS FOR FLUID INJECTION IN VIBRATORY DRIVING OF PILES AND THE LIKE.OTHER KEYWORDS: PILE DRIVER, VIBRATORY*

3314240 *METHOD AND APPARATUS FOR USE IN FORMING FOUNDATIONS*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT ; PILE SECTION CONNECTION ; PILE, STEEL

3314241 *METHOD AND APPARATUS FOR USE IN DRIVING PILES*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT ; PILE, STEEL

3344612 *SHALLOW WATER CAISSON*
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; SEABED FOUNDATION

3379265 *PILE EXTRACTOR AND SETTER*
OTHER KEYWORDS: PILE EXTRACTOR

3389562 *SALVAGEABLE MULTI-WELL OFFSHORE WELL PROTECTOR PLATFORM*
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3402559 *PROCESS OF FORMING A LARGE-DIAMETER TUBULAR PILE FOUNDATION*
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; PILE, CONCRETE ; PILE SECTION CONNECTION ; SEABED FOUNDATION

3406524 *FLUID-SONIC PILE DRIVING*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, VIBRATORY ; PILE, STEEL

3447330 *METHOD AND APPARATUS FOR ANCHORING SUBMERGED PIPELINES*
OTHER KEYWORDS: EMBEDMENT ANCHOR ; SEABED PIPELINE PLACEMENT

PILE-DRIVING SHOE

3306054 SKIRT TYPE PILE DRIVING POINT
OTHER KEYWORDS: PILE, STEEL ; PILE, WOOD

3324666 FOOTING FOR EARTH PILE
OTHER KEYWORDS: PILE FOOTING

3333427 BOOT FOR PILOT TIMBER PILE
OTHER KEYWORDS: PILE, WOOD

3333428 OPEN END CUTTING SHOE
OTHER KEYWORDS: PILE, STEEL

3333430 BOOT FOR PIPE PILE
OTHER KEYWORDS: PILE, STEEL

3333431 CUTTING SHOE FOR STEEL SHEET PILING
OTHER KEYWORDS: PILE, SHEET ; PILE, STEEL

3352120 REINFORCED CONCRETE PILE
OTHER KEYWORDS: PILE, CONCRETE ; PILE SECTION CONNECTION

3514959 PEDESTAL TIMBER PILE SHOE
OTHER KEYWORDS: PILE, WOOD

PILE EXTRACTOR

3368632 PILE DRIVER AND EXTRACTOR
OTHER KEYWORDS: PILE DRIVER, VIBRATORY

3379265 PILE EXTRACTOR AND SETTER
OTHER KEYWORDS: PILE DRIVER, WATER JET

3425499 HYDRAULIC VIBRATORY HAMMER FOR DRIVING AND OR EXTRACTING PILES AND THE LIKE.OTHER KEYWORDS: PILE DRIVER, VIBRATORY

3433311 PILE DRIVER AND EXTRACTOR WITH ROTATING ECCENTRIC MASSES OF VARIABLE WEIGHTS.OTHER KEYWORDS: PILE DRIVER, VIBRATORY

3498065 METHOD AND APPARATUS FOR BARGE ANCHORING AND STABILIZING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM ANCHOR ; PILE DRIVER, IMPACT ; PILE PLACEMENT

3502160 RESILIENT YOKE MOUNTING FOR VIBRATORY PILE DRIVER AND EXTRACTOR
OTHER KEYWORDS: PILE DRIVER, VIBRATORY

3511325 DEVICE FOR EXTRACTING PILES OR THE LIKE

3534996 PILING EXTRACTOR

3542140 ROTARY APPLIANCE FOR FACILITATING THE DRIVING OR WITHDRAWAL OF PILES, PIT-PROPS AND THE LIKE.OTHER KEYWORDS: PILE DRIVER, IMPACT

3550694 VIBROHAMMER
OTHER KEYWORDS: PILE DRIVER, VIBRATORY

PILE FOOTING

3324665 METHOD OF STABILIZING PILES
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM ANCHOR ; PILE, STEEL ; SEABED FOUNDATION

3324666 FOOTING FOR EARTH PILE
OTHER KEYWORDS: PILE-DRIVING SHOE

3373569 ARTICULATED PILE STABILIZER AND ANCHORING DEVICE
OTHER KEYWORDS: EMBEDMENT ANCHOR

PILE LOAD MEASUREMENT

3498388 PILE DRIVING SYSTEM
OTHER KEYWORDS: PILE DRIVER, IMPACT

3535919 DYNAMIC DETERMINATION OF PILE LOAD CAPACITY
OTHER KEYWORDS: PILE DRIVER, IMPACT

PILE PLACEMENT

3328969 APPARATUS FOR DRIVING PILES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT

3379245 TENDED DRILLING PLATFORM FOR MULTIWELL SUBSURFACE COMPLETION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3387460 MAGNETIC PILE STABBING APPARATUS AND METHOD
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3390531 OFFSHORE DRILLING PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM, FIXED ; OFFSHORE PLATFORM, LEG ; SEABED FOUNDATION

3396544 STORAGE TANK FIXED ON THE OCEAN BOTTOM AND METHOD OF INSTALLATION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE MOORING STRUCTURE ; OFFSHORE STORAGE TANK, SUBMERGED ; PILE, STEEL ; SEABED FOUNDATION

3466878 RIG FOR WORK AT SEA, IN LAKES, LAGOONS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED

3466879 METHOD AND APPARATUS FOR MAKING PILING
OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CONSTRUCTION ; PILE, CONCRETE

3483708 METHOD OF ANCHORING MARINE STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3498065 METHOD AND APPARATUS FOR BARGE ANCHORING AND STABILIZING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM ANCHOR ; PILE DRIVER, IMPACT ; PILE EXTRACTOR

3501919 METHOD AND APPARATUS FOR CARRYING OUT OPERATIONS AT AN UNDERWATER INSTALLATION. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; PILE DRIVER LEADS ; SEABED FOUNDATION

3502159 PILE DRIVING APPARATUS FOR SUBMERGED STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG ; PILE DRIVER, IMPACT ; SEABED FOUNDATION

3503217 METHOD OF AND APPARATUS FOR ANCHORING WELL-DRILLING PLATFORMS TO THE OCEAN FLOOR. OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

3524322 SPLAY FOOTED PLATFORM ANCHOR
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3525224 METHOD AND APPARATUS FOR INSTALLING ANCHOR PILES
OTHER KEYWORDS: EMBEDMENT ANCHOR ; GROUTING ; OFFSHORE PLATFORM ANCHOR

3537268 MARINE STATION AND METHOD FOR FABRICATING THE SAME
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION ; SEABED OIL, PROCESS STRUCTURE

3546885 THREADED PILE FOR MARINE STRUCTURE
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE PLATFORM, FIXED ; PILE, STEEL ; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

PILE PROTECTION

3295332 PROTECTIVE COVER FOR BUTT ENDS OF TIMBER PILES
OTHER KEYWORDS: CONCRETE FORM ; PILE, WOOD

3321924 PROTECTION OF SUBMERGED PILING
OTHER KEYWORDS: COATING ; PILE, WOOD ; WOOD PRESERVATIVE

3340694 BUOYANT FENDERS
OTHER KEYWORDS: COLLISION PROTECTION ; OFFSHORE STRUCTURE FENDER ; PIER FENDER

3352118 FRICTIONAL DRAG REDUCER FOR IMMERSED BODIES
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG

3370432 ICE PROTECTIVE SLEEVE FOR PILINGS
OTHER KEYWORDS: ICE PROTECTION

3372552 WOODEN FENDER PILE PROTECTING APPARATUS
OTHER KEYWORDS: COATING ; FOULING PREVENTION ; PIER FENDER

3397260 METHOD FOR ENCASING RIGID MEMBERS WITH CONCRETE
OTHER KEYWORDS: CONCRETE FORM ; STRUCTURE REPAIR

3412565 METHOD OF STRENGTHENING FOUNDATION PILING
OTHER KEYWORDS: SEABED FOUNDATION ; STRUCTURE REPAIR

3417569 PROTECTIVE COATING AND METHOD
OTHER KEYWORDS: COATING ; CORROSION PREVENTION ; OFFSHORE PLATFORM, LEG ; PILE, STEEL

3448585 POLE AND PILE PROTECTOR
OTHER KEYWORDS: COATING ; ICE PROTECTION ; PILE, WOOD

3462960 MOORING DEVICE FOR BOATS
OTHER KEYWORDS: PIER FENDER ; SMALL-CRAFT MOORING DEVICE

3475914 BOAT BUMPER
OTHER KEYWORDS: PIER FENDER ; SMALL-CRAFT MOORING DEVICE

3486342 PILE MOORING BUMPER
OTHER KEYWORDS: SMALL-CRAFT MOORING DEVICE

3524231 CIRCULAR UNDERWATER FORM WITH LOCK
OTHER KEYWORDS: COATING ; CORROSION PREVENTION ; STRUCTURE REPAIR

3524324 FLEXIBLE PIER
OTHER KEYWORDS: COLLISION PROTECTION ; ICE PROTECTION ; PIER, FIXED ; SMALL-CRAFT PIER

3541800 PILE PROTECTOR
OTHER KEYWORDS: COLLISION PROTECTION

3543523 STRUCTURAL DOCK SYSTEM
OTHER KEYWORDS: ICE PROTECTION ; PIER, FIXED ; SMALL-CRAFT PIER

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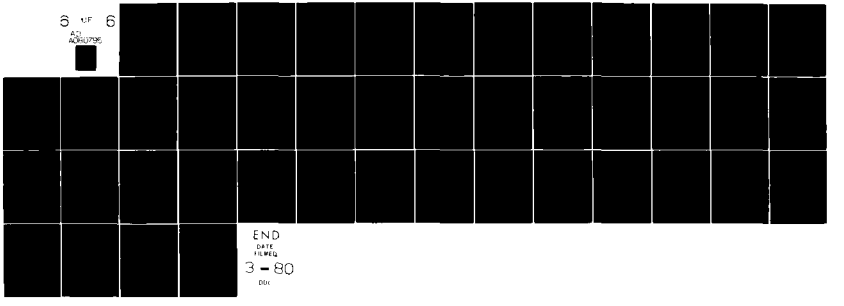

PILE SECTION CONNECTION

3302412 INTERLOCKING SHEET PILES AND METHOD OF INSTALLATION
OTHER KEYWORDS: PILE, SHEET

3307362 POSTING PILING
OTHER KEYWORDS: PILE, WOOD ; STRUCTURE REPAIR

3314240 METHOD AND APPARATUS FOR USE IN FORMING FOUNDATIONS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT ; PILE DRIVER, WATER JET ; PILE, STEEL

3316724 CONCRETE PILE JOINT AND METHOD OF ASSEMBLY
OTHER KEYWORDS: PILE, CONCRETE

3333429 H-BEAM PILING
OTHER KEYWORDS: PILE, STEEL

3352120 REINFORCED CONCRETE PILE
OTHER KEYWORDS: PILE, CONCRETE ; PILE-DRIVING SHOE

3382680 PRESTRESSED CONCRETE PILE SECTIONS
OTHER KEYWORDS: PILE, CONCRETE

3388752 COMBINATION PILEDRIVER AND DRIVABLE THREADED PIPE SECTIONS
OTHER KEYWORDS: PILE DRIVER, IMPACT ; PILE, STEEL

3402559 PROCESS OF FORMING A LARGE-DIAMETER TUBULAR PILE FOUNDATION
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; PILE, CONCRETE ; PILE DRIVER, WATER JET ; SEABED FOUNDATION

3422630 CONCRETE PILE CONSTRUCTION
OTHER KEYWORDS: PILE, CONCRETE

3449918 CONCRETE PILES AND METHODS AND APPARATUS FOR FORMING AND SPLICING THEM TOGETHER. OTHER KEYWORDS: PILE, CONCRETE

3465532 CONCRETE PILE AND JOINT
OTHER KEYWORDS: BULKHEAD ; PILE, CONCRETE ; PILE, SHEET

3504500 PILE JOINTING DEVICE
OTHER KEYWORDS: PILE, CONCRETE ; PILE, STEEL

3504501 METHOD OF PILE SPLICING AND DRIVING
OTHER KEYWORDS: PILE, CONCRETE ; PILE DRIVER, IMPACT

3522707 PILING CONSTRUCTION
OTHER KEYWORDS: BULKHEAD ; PILE, CONCRETE ; PILE, SHEET ; PILE, STEEL

3545214 CONCRETE PILE SECTIONS AND JOINTS THEREFOR
OTHER KEYWORDS: PILE, CONCRETE

PILE, CONCRETE

3316724 CONCRETE PILE JOINT AND METHOD OF ASSEMBLY
OTHER KEYWORDS: PILE SECTION CONNECTION

3331211 PILE INSPECTION AND REPAIR CELL
OTHER KEYWORDS: PILE, WOOD ; STRUCTURE INSPECTION ; STRUCTURE REPAIR

3338058 ADJUSTABLE COMPOSITE FORM
OTHER KEYWORDS: CONCRETE FORM ; PILE, STEEL ; PILE, WOOD ; STRUCTURE REPAIR

3342033 METHOD OF PROVIDING A SEALED JOINT EMPLOYING A FLEXIBLE BAG
OTHER KEYWORDS: BULKHEAD ; CHANNEL BARRIER ; GROUTING ; SANDBAG

3352120 *REINFORCED CONCRETE PILE*
OTHER KEYWORDS: PILE-DRIVING SHOE ; PILE SECTION CONNECTION

3382680 *PRESTRESSED CONCRETE PILE SECTIONS*
OTHER KEYWORDS: PILE SECTION CONNECTION

3422630 *CONCRETE PILE CONSTRUCTION*
OTHER KEYWORDS: PILE SECTION CONNECTION

3449918 *CONCRETE PILES AND METHODS AND APPARATUS FOR FORMING AND SPLICING THEM TOGETHER. OTHER KEYWORDS: PILE SECTION CONNECTION*

3465532 *CONCRETE PILE AND JOINT*
OTHER KEYWORDS: BULKHEAD ; PILE SECTION CONNECTION ; PILE, SHEET

3466879 *METHOD AND APPARATUS FOR MAKING PILING*
OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CONSTRUCTION ; PILE PLACEMENT

3472031 *PRECAST CONCRETE BODY*
OTHER KEYWORDS: BULKHEAD ; CONCRETE FORM ; PILE, SHEET

3483707 *METHOD FOR REINFORCING STEEL PIPE PILING IN SITU AND THE RESULTANT PILING. OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CONSTRUCTION ; PILE, STEEL ; STRUCTURE REPAIR*

3501920 *REINFORCED CONCRETE POLES, PILES AND THE LIKE*

3504500 *PILE JOINTING DEVICE*
OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE, STEEL

3504501 *METHOD OF PILE SPLICING AND DRIVING*
OTHER KEYWORDS: PILE DRIVER, IMPACT ; PILE SECTION CONNECTION

3505825 *SYSTEM FOR REPLACING DETERIORATED WOOD PILING*
OTHER KEYWORDS: CONCRETE FORM ; PILE, WOOD ; STRUCTURE REPAIR

3522707 *PILING CONSTRUCTION*
OTHER KEYWORDS: BULKHEAD ; PILE SECTION CONNECTION ; PILE, SHEET ; PILE, STEEL

3545214 *CONCRETE PILE SECTIONS AND JOINTS THEREFORE*
OTHER KEYWORDS: PILE SECTION CONNECTION

PILE, SHEET

3302412 *INTERLOCKING SHEET PILES AND METHOD OF INSTALLATION*
OTHER KEYWORDS: PILE SECTION CONNECTION

3333431 *CUTTING SHOE FOR STEEL SHEET PILING*
OTHER KEYWORDS: PILE-DRIVING SHOE ; PILE, STEEL

3402560 *ACOUSTICALLY DEADENED PILING*
OTHER KEYWORDS: PILE, STEEL

3465532 *CONCRETE PILE AND JOINT*
OTHER KEYWORDS: BULKHEAD ; PILE, CONCRETE ; PILE SECTION CONNECTION

3472031 *PRECAST CONCRETE BODY*
OTHER KEYWORDS: BULKHEAD ; CONCRETE FORM ; PILE, CONCRETE

3492826 *RETAINING WALL STRUCTURE*
OTHER KEYWORDS: BULKHEAD ; COFFERDAM ; PILE, STEEL

3522707 PILING CONSTRUCTION
OTHER KEYWORDS: BULKHEAD ; PILE, CONCRETE ; PILE SECTION CONNECTION ; PILE, STEEL

3527057 METHOD AND APPARATUS FOR CONTAINING WELL POLLUTANTS
OTHER KEYWORDS: COFFERDAM ; OFFSHORE CAISSON ; POLLUTANT, SUBMERGED BARRIER ; POLLUTANT, SURFACE BARRIER

PILE, STEEL

3306054 SKIRT TYPE PILE DRIVING POINT
OTHER KEYWORDS: PILE-DRIVING SHOE ; PILE, WOOD

3314240 METHOD AND APPARATUS FOR USE IN FORMING FOUNDATIONS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT ; PILE DRIVER, WATER JET ; PILE SECTION CONNECTION

3314241 METHOD AND APPARATUS FOR USE IN DRIVING PILES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, IMPACT ; PILE DRIVER, WATER JET

3324665 METHOD OF STABILIZING PILES
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE CONSTRUCTION; OFFSHORE PLATFORM ANCHOR ; PILE FOOTING ; SEABED FOUNDATION

3333428 OPEN END CUTTING SHOE
OTHER KEYWORDS: PILE-DRIVING SHOE

3333429 H-BEAM PILING
OTHER KEYWORDS: PILE SECTION CONNECTION

3333430 BOOT FOR PIPE PILE
OTHER KEYWORDS: PILE-DRIVING SHOE

3333431 CUTTING SHOE FOR STEEL SHEET PILING
OTHER KEYWORDS: PILE-DRIVING SHOE ; PILE, SHEET

3336987 DEVICE FOR TRANSMITTING FORCES
OTHER KEYWORDS: PILE DRIVER, IMPACT

3338058 ADJUSTABLE COMPOSITE FORM
OTHER KEYWORDS: CONCRETE FORM ; PILE, CONCRETE ; PILE, WOOD ; STRUCTURE REPAIR

3388752 COMBINATION PILEDRIVER AND DRIVABLE THREADED PIPE SECTIONS
OTHER KEYWORDS: PILE DRIVER, IMPACT ; PILE SECTION CONNECTION

3396544 STORAGE TANK FIXED ON THE OCEAN BOTTOM AND METHOD OF INSTALLATION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION , OFFSHORE MOORING STRUCTURE ; OFFSHORE STORAGE TANK, SUBMERGED ; PILE PLACEMENT ; SEABED FOUNDATION

3402560 ACOUSTICALLY DEADENED PILING
OTHER KEYWORDS: PILE, SHEET

3406524 FLUID-SONIC PILE DRIVING
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; PILE DRIVER, VIBRATORY ; PILE DRIVER, WATER JET

3411305 TUBULAR INTERLOCKING PILING FOR WALL ASSEMBLIES
OTHER KEYWORDS: BULKHEAD

3417569 PROTECTIVE COATING AND METHOD
OTHER KEYWORDS: COATING ; CORROSION PREVENTION ; OFFSHORE PLATFORM, LEG ; PILE PROTECTION

3426585 *ULTRASONIC SYSTEM FOR INSPECTING SUBMERGED PILES*
OTHER KEYWORDS: PILE, WOOD ; STRUCTURE INSPECTION

3483707 *METHOD FOR REINFORCING STEEL PIPE PILING IN SITU AND THE RESULTANT PILING. OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CONSTRUCTION ; PILE, CONCRETE ; STRUCTURE REPAIR*

3492826 *RETAINING WALL STRUCTURE*
OTHER KEYWORDS: BULKHEAD ; COFFERDAM ; PILE, SHEET

3504500 *PILING JOINTING DEVICE*
OTHER KEYWORDS: PILE, CONCRETE ; PILE SECTION CONNECTION

3522707 *PILING CONSTRUCTION*
OTHER KEYWORDS: BULKHEAD ; PILE, CONCRETE ; PILE SECTION CONNECTION ; PILE, SHEET

3546885 *THREADED PILE FOR MARINE STRUCTURE*
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT; PILE, STRUCTURE CONNECTION ; SEABED FOUNDATION

PILE, STRUCTURE CONNECTION

3315473 *OFFSHORE PLATFORM*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED

3347053 *PARTIALLY SALVAGEABLE JACKET-PILE CONNECTION*
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM ANCHOR ; SEABED FOUNDATION

3352119 *BALLISTIC JACKET-PILE CONNECTION*
OTHER KEYWORDS: GROUTING ; SEABED FOUNDATION

3377808 *CAP ASSEMBLY FOR PILE SHELL*
OTHER KEYWORDS: CONCRETE FORM ; PILE, WOOD ; STRUCTURE REPAIR

3457728 *REPLACEABLE PILE SLEEVE INSERT*
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG

3468132 *PLATFORM LEG PACKER*
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM, LEG

3482408 *TELESCOPED CAISSON*
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED

3488967 *COMBINATION DEEP WATER STORAGE TANK AND DRILLING AND PRODUCTION PLATFORM. OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; OFFSHORE STORAGE TANK, EMERGENT ; SEABED FOUNDATION*

3496728 *METHOD AND APPARATUS FOR FIELD REINFORCEMENT OF COLUMNAR STRUCTURES , PARTICULARLY OFFSHORE DRILLING AND PRODUCTION PLATFORMS*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3499292 *METHOD OF MAKING PARTIALLY SUBMERGED STRUCTURES*
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED

3503217 *METHOD OF AND APPARATUS FOR ANCHORING WELL-DRILLING PLATFORMS TO THE OCEAN FLOOR. OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG ; PILE PLACEMENT.; SEABED FOUNDATION*

3528254 *OFFSHORE PLATFORM STRUCTURE AND CONSTRUCTION METHOD*
OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, FIXED ; SEABED FOUNDATION

3540224 RIGIDIZED SUPPORT ELEMENT
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM, LEG ; SEABED FOUNDATION

3546885 THREADED PILE FOR MARINE STRUCTURE
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT ; PILE, STEEL ; SEABED FOUNDATION

3550384 LATERAL RESTRAINT OF PILE WITHIN JACKET LEG
OTHER KEYWORDS: OFFSHORE PLATFORM, LEG ; SEABED FOUNDATION

PILE, WOOD

3295332 PROTECTIVE COVER FOR BUTT ENDS OF TIMBER PILES
OTHER KEYWORDS: CONCRETE FORM ; PILE PROTECTION

3306054 SKIRT TYPE PILE DRIVING POINT
OTHER KEYWORDS: PILE-DRIVING SHOE ; PILE, STEEL

3307362 POSTING PILING
OTHER KEYWORDS: PILE SECTION CONNECTION ; STRUCTURE REPAIR

3321924 PROTECTION OF SUBMERGED PILING
OTHER KEYWORDS: COATING ; PILE PROTECTION ; WOOD PRESERVATIVE

3331211 PILE INSPECTION AND REPAIR CELL
OTHER KEYWORDS: PILE, CONCRETE ; STRUCTURE INSPECTION ; STRUCTURE REPAIR

3333427 BOOT FOR PILOT TIMBER PILE
OTHER KEYWORDS: PILE-DRIVING SHOE

3338058 ADJUSTABLE COMPOSITE FORM
OTHER KEYWORDS: CONCRETE FORM ; PILE, CONCRETE ; PILE, STEEL ; STRUCTURE REPAIR

3377808 CAP ASSEMBLY FOR PILE SHELL
OTHER KEYWORDS: CONCRETE FORM ; PILE, STRUCTURE CONNECTION ; STRUCTURE REPAIR

3379020 DOLPHIN OR MARINE CONSTRUCTION
OTHER KEYWORDS: COLLISION PROTECTION ; OFFSHORE CONSTRUCTION ; PILE DOLPHIN

3410097 PILE CAPPING MECHANISM
OTHER KEYWORDS: CONCRETE FORM ; STRUCTURE REPAIR

3426585 ULTRASONIC SYSTEM FOR INSPECTING SUBMERGED PILES
OTHER KEYWORDS: PILE, STEEL; STRUCTURE INSPECTION

3448585 POLE AND PILE PROTECTOR
OTHER KEYWORDS: COATING ; ICE PROTECTION ; PILE PROTECTION

3505825 SYSTEM FOR REPLACING DETERIORATED WOOD PILING
OTHER KEYWORDS: CONCRETE FORM ; PILE, CONCRETE ; STRUCTURE REPAIR

3514959 PEDESTAL TIMBER PILE SHOE
OTHER KEYWORDS: PILE-DRIVING SHOE

POLLUTANT ABSORPTION

3382170 METHOD OF REMOVING AN OIL FILM FROM WATER WITH SILICONE-COATED EXPANDED PERLITE

3414511 METHOD OF REMOVING OIL FROM POLLUTED WATER USING EXPANDED VERMICULITE

3464920 METHOD OF REMOVING OIL FROM THE SURFACE OF WATER USING OLEOPHILIC, HYDROPHOBIC COMMINUTED ORGANIC MATERIALS

3497450 REMOVAL OF LIQUID CONTAMINANTS FROM THE SURFACE OF WATER
OTHER KEYWORDS: POLLUTANT COALESCENCE

3518183 PROCESS FOR SEPARATION OF OIL FILMS FROM WATER

3536615 METHOD OF AND APPARATUS FOR TREATING OIL LEAKAGE
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT

3539013 OIL COLLECTION BOOM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

POLLUTANT COALESCENCE

3415745 METHOD OF FLOCCULATING A WATER, BORNE OIL SLICK

3497450 REMOVAL OF LIQUID CONTAMINANTS FROM THE SURFACE OF WATER
OTHER KEYWORDS: POLLUTANT ABSORPTION

3536616 METHOD FOR REMOVAL OF OILS FLOATING ON SURFACE OF WATER

POLLUTANT COLLECTION

3348690 CATCHER FOR CLEANING WATER SURFACES
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT, SUCTION REMOVAL

3438205 WATER SKIMMER
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3476246 APPARATUS AND PROCESS FOR CONFINING FLOATING LIQUID PRODUCTS
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

3491023 PROCESS FOR CONTAINMENT AND DEFLECTION
OF AQUEOUS SURFACE POLLUTANTS. OTHER KEYWORDS:
POLLUTANT, SUBMERGED BARRIER ; POLLUTANT, SURFACE BARRIER

3495561 SALVAGE APPARATUS
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER ; TOWED BODY DEPTH CONTROL

3499290 FLOATING BOOM
OTHER KEYWORDS: BREAKWATER, FLOATING ; GROIN ;
LOW-COST SHORE PROTECTION ; POLLUTANT, SURFACE BARRIER

3499291 BOOM FOR SCREENING IN AND COLLECTING UP OF POLLUTION ON WATER
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3503214 BARRIER FOR OIL SPILT ON WATER
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

3503508 BARRIER FOR OIL SPILT ON WATER
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

3503512 BARRIER FOR OIL SPILT ON WATER
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ;
POLLUTANT, SURFACE BARRIER

3508652 METHOD OF AND APPARATUS FOR SEPARATING OIL FROM WATER
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL

3517812 PROCESS AND APPARATUS FOR REMOVING FLOATING WASTES FROM WATER SURFACES. OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3523611 OIL SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ; POLLUTANT, SUCTION REMOVAL ; POLLUTANT, SURFACE BARRIER

3529720 INSTALLATION FOR RECOVERY OF A LIQUID FLOATING ON A WATER SURFACE
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ; POLLUTANT, SURFACE BARRIER

3532219 APPARATUS FOR COLLECTING AND CONTAINING OIL ON THE SURFACE OF WATER
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ; POLLUTANT, SURFACE BARRIER ; PUMP

3534859 APPARATUS FOR REMOVAL OF OIL FLOATING ON WATER OR THE LIKE
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ; POLLUTANT, SURFACE BARRIER

3536615 METHOD OF AND APPARATUS FOR TREATING OIL LEAKAGE
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT REMOVAL WATERCRAFT

3539013 OIL COLLECTION BOOM
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT, SURFACE BARRIER

3539048 MEANS FOR COLLECTING FLOTSAM
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT, MECHANICAL REMOVAL ; POLLUTANT REMOVAL WATERCRAFT

3548599 FLOATING OIL BARRIER
OTHER KEYWORDS: POLLUTANT, SUCTION REMOVAL ; POLLUTANT, SURFACE BARRIER

3548605 SUBMERGIBLE VEHICLE FOR EMERGENCY OFFSHORE GAS LEAKAGE
OTHER KEYWORDS: POLLUTANT, SUBMERGED BARRIER

POLLUTANT DEBRIS

3311238 SUCTION ROLLER APPARATUS
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ; WATER PLANT REMOVAL

3326379 WATER CRAFT WITH SCOOP
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ; POLLUTANT REMOVAL WATERCRAFT

3434444 WATERCRAFT WITH SCOOP
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ; POLLUTANT REMOVAL WATERCRAFT

3539048 MEANS FOR COLLECTING FLOTSAM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, MECHANICAL REMOVAL ; POLLUTANT REMOVAL WATERCRAFT

POLLUTANT DISPERSION

3439875 APPLICATION OF CHEMICAL SUBSTANCES OVER LARGE AREAS

3457168 PROCEDURE FOR DISPOSING OF PETROLEUM OIL ON A WATER SURFACE

3532622 OIL SLICK DISPERSION METHOD

POLLUTANT MEASUREMENT

3417251 TOWED INSTRUMENT FOR CONTINUOUS MEASURING OF OCEAN TURBIDITY
OTHER KEYWORDS: INSTRUMENT, TOWED ; TOWED VEHICLE

POLLUTANT REMOVAL WATERCRAFT

3314540 REMOVAL OF OIL FILMS FROM WATER
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL

3326379 WATER CRAFT WITH SCOOP
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT, MECHANICAL REMOVAL

3348690 CATCHER FOR CLEANING WATER SURFACES
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL

3434444 WATERCRAFT WITH SCOOP
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT, MECHANICAL REMOVAL

3517812 PROCESS AND APPARATUS FOR REMOVING FLOATING WASTES FROM WATER SURFACES. OTHER KEYWORDS: POLLUTANT COLLECTION

3523611 OIL SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SUCTION REMOVAL ; POLLUTANT, SURFACE BARRIER

3536615 METHOD OF AND APPARATUS FOR TREATING OIL LEAKAGE
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT COLLECTION

3539048 MEANS FOR COLLECTING FLOTSAM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT DEBRIS ; POLLUTANT, MECHANICAL REMOVAL

3540194 METHOD OF REMOVING MARINE GROWTHS AND ROOTS
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ; WATER PLANT REMOVAL

3546112 ABSORPTION OIL SKIMMER
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL

POLLUTANT, MECHANICAL REMOVAL

3311238 SUCTION ROLLER APPARATUS
OTHER KEYWORDS: POLLUTANT DEBRIS ; WATER PLANT REMOVAL

3314540 REMOVAL OF OIL FILMS FROM WATER
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

3314545 CLEANING WATER SURFACES

3326379 WATER CRAFT WITH SCOOP
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT REMOVAL WATERCRAFT

3434444 WATERCRAFT WITH SCOOP
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT REMOVAL WATERCRAFT

3536199 FIRE EXTINGUISHING OIL SLICK SEPARATOR

3539048 MEANS FOR COLLECTING FLOTSAM
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT DEBRIS ; POLLUTANT REMOVAL WATERCRAFT

3540194 METHOD OF REMOVING MARINE GROWTHS AND ROOTS
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT ; WATER PLANT REMOVAL

3546112 ABSORPTION OIL SKIMMER
OTHER KEYWORDS: POLLUTANT REMOVAL WATERCRAFT

POLLUTANT, SUBMERGED BARRIER

3469402 OFF-SHORE TANK SYSTEM
OTHER KEYWORDS: OFFSHORE STORAGE TANK, EMERGENT ; POLLUTANT, SURFACE BARRIER

3491023 PROCESS FOR CONTAINMENT AND DEFLECTION OF AQUEOUS SURFACE POLLUTANTS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3527057 METHOD AND APPARATUS FOR CONTAINING WELL POLLUTANTS
OTHER KEYWORDS: COFFERDAM ; OFFSHORE CAISSON ; PILE, SHEET ; POLLUTANT, SURFACE BARRIER

3548605 SUBMERGIBLE VEHICLE FOR EMERGENCY OFFSHORE GAS LEAKAGE
OTHER KEYWORDS: POLLUTANT COLLECTION

POLLUTANT, SUCTION REMOVAL

3348690 CATCHER FOR CLEANING WATER SURFACES
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT

3369664 APPARATUS AND PROCESS FOR CONFINING FLOATING LIQUID PRODUCTS
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3389559 FLUID RECOVERY SYSTEM AND METHOD
OTHER KEYWORDS: POLLUTANT, SURFACE BARRIER

3476246 APPARATUS AND PROCESS FOR CONFINING FLOATING LIQUID PRODUCTS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3495561 SALVAGE APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER ; TOWED BODY DEPTH CONTROL

3503214 BARRIER FOR OIL SPILT ON WATER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3503508 BARRIER FOR OIL SPILT ON WATER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3503512 BARRIER FOR OIL SPILT ON WATER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3508652 METHOD OF AND APPARATUS FOR SEPARATING OIL FROM WATER
OTHER KEYWORDS: POLLUTANT COLLECTION

3523611 OIL SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ; POLLUTANT, SURFACE BARRIER

3529720 INSTALLATION FOR RECOVERY OF A LIQUID FLOATING ON A WATER SURFACE
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3532219 APPARATUS FOR COLLECTING AND CONTAINING OIL ON THE SURFACE OF WATER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER ; PUMP

3534858 POLLUTION CONTROL DEVICE

3534859 APPARATUS FOR REMOVAL OF OIL FLOATING ON WATER OR THE LIKE
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

3547553 FLOATING SURFACE SKIMMER
OTHER KEYWORDS: PUMP

3548599 FLOATING OIL BARRIER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT, SURFACE BARRIER

POLLUTANT, SURFACE BARRIER

3321923 STEERABLE SELF-POWERED FLOATING STRUCTURES

3369664 APPARATUS AND PROCESS FOR CONFINING FLOATING LIQUID PRODUCTS
OTHER KEYWORDS: POLLUTANT,SUCTION REMOVAL

3389559 FLUID RECOVERY SYSTEM AND METHOD
OTHER KEYWORDS: POLLUTANT,SUCTION REMOVAL

3438205 WATER SKIMMER
OTHER KEYWORDS: POLLUTANT COLLECTION

3469402 OFF-SHORE TANK SYSTEM
OTHER KEYWORDS: OFFSHORE STORAGE TANK,EMERGENT ;
POLLUTANT,SUBMERGED BARRIER

3476246 APPARATUS AND PROCESS FOR CONFINING FLOATING LIQUID PRODUCTS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT,SUCTION REMOVAL

3491023 PROCESS FOR CONTAINMENT AND DEFLECTION OF AQUEOUS SURFACE POLLUTANTS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT,SUBMERGED BARRIER

3494132 INFLATABLE FLOAT BOOM

3495561 SALVAGE APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT,SUCTION REMOVAL ;
TOWED BODY DEPTH CONTROL

3499290 FLOATING BOOM
OTHER KEYWORDS: BREAKWATER,FLOATING ; GROIN ;
LOW-COST SHORE PROTECTION ; POLLUTANT COLLECTION

3499291 BOOM FOR SCREENING IN AND COLLECTING UP OF POLLUTION ON WATER
OTHER KEYWORDS: POLLUTANT COLLECTION

3503214 BARRIER FOR OIL SPILT ON WATER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT,SUCTION REMOVAL

3503508 BARRIER FOR OIL SPILT ON WATER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT,SUCTION REMOVAL

3503512 BARRIER FOR OIL SPILT ON WATER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT,SUCTION REMOVAL

3523611 OIL SKIMMING APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT REMOVAL WATERCRAFT ;
POLLUTANT,SUCTION REMOVAL

3527057 METHOD AND APPARATUS FOR CONTAINING WELL POLLUTANTS
OTHER KEYWORDS: COFFERDAM ; OFFSHORE CAISSON ; PILE,SHEET ;
POLLUTANT,SUBMERGED BARRIER

3529720 INSTALLATION FOR RECOVERY OF A LIQUID FLOATING ON A WATER SURFACE
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT,SUCTION REMOVAL

3532219 APPARATUS FOR COLLECTING AND CONTAINING OIL ON THE SURFACE OF WATER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT,SUCTION REMOVAL ;
PUMP

3533240 FLOATING HARBOR
OTHER KEYWORDS: BREAKWATER,FLOATING ; OFFSHORE HARBOR

3534859 APPARATUS FOR REMOVAL OF OIL FLOATING ON WATER OR THE LIKE
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT,SUCTION REMOVAL

3537587 FLEXIBLE FILTRATION BOOM

3539013 OIL COLLECTION BOOM
OTHER KEYWORDS: POLLUTANT ABSORPTION ; POLLUTANT COLLECTION

3548599 FLOATING OIL BARRIER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT,SUCTION REMOVAL

POWER,SUBMERGED SOURCE

3312054 SEA WATER POWER PLANT
OTHER KEYWORDS: ELECTRICAL GENERATOR

3370566 EMBEDMENT DEVICE
OTHER KEYWORDS: EMBEDMENT ANCHOR ; SAMPLER,POWER SUPPLY ; SAMPLER,SEABED-DRIVEN CORE

3371643 HYDRAULICALLY ACTUATED DRIVER
OTHER KEYWORDS: EMBEDMENT ANCHOR

3411595 HARD FORMATION OCEAN BOTTOM SAMPLING DEVICE
OTHER KEYWORDS: INSTRUMENT RETRIEVAL ; SAMPLER,POWER SUPPLY ; SAMPLER,SEABED-DRIVEN CORE

3412814 HYDROSTATIC CORER
OTHER KEYWORDS: SAMPLER,POWER SUPPLY ; SAMPLER,SEABED-DRIVEN CORE

3436914 HYDROSTATIC ENERGY ACCUMULATOR
OTHER KEYWORDS: SAMPLER,POWER SUPPLY ; SAMPLER,SEABED-DRIVEN CORE

POWER,TIDE

3426540 TIDEWATER POWER GENERATION SYSTEM
OTHER KEYWORDS: CHANNEL BARRIER ; ELECTRICAL GENERATOR ; TIDAL ESTUARY WATER LEVEL

3532440 TIDALLY OPERATED SYSTEM FOR PUMPING WATER OUT OF BOATS AND FLOATING DOCKS.OTHER KEYWORDS: PIER,FLOATING ; PUMP ; SMALL-CRAFT PIER

POWER,WAVE

3297300 APPARATUS FOR DERIVING USEFUL ENERGY FROM SEA WAVES

3335667 WAVE MACHINE AND MEANS FOR RAISING WATER
OTHER KEYWORDS: PUMP

3362336 WAVE MOTION OPERATED DEVICE
OTHER KEYWORDS: PUMP

3487228 POWER GENERATING SYSTEM
OTHER KEYWORDS: ELECTRICAL GENERATOR ; OFFSHORE PLATFORM,FLOATING ; PUMP

3515889 POWER GENERATION APPARATUS
OTHER KEYWORDS: ELECTRICAL GENERATOR ; PUMP

3527188 POWER-PRODUCING MEANS FOR VESSELS
OTHER KEYWORDS: ELECTRICAL GENERATOR

3546473 OCEANOGRAPHIC GENERATOR
OTHER KEYWORDS: ELECTRICAL GENERATOR

PUMP

3301606 CYCLONIC ELEVATOR
OTHER KEYWORDS: DREDGE,SUCTION ; DREDGE INTAKE

3335667 WAVE MACHINE AND MEANS FOR RAISING WATER
OTHER KEYWORDS: POWER,WAVE

3362336 WAVE MOTION OPERATED DEVICE
OTHER KEYWORDS: POWER,WAVE

3407520 SUCTION DREDGER INSTALLATION,MORE PARTICULARLY A TOWED DREDGER
OTHER KEYWORDS: DREDGE,SUCTION ; DREDGE LADDER CONTROL

3440742 MULTIPLE MOTOR DREDGE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE INTAKE

3456371 PROCESS AND APPARATUS FOR MINING DEPOSITS ON THE SEA FLOOR
OTHER KEYWORDS: DREDGE,SUCTION ; DREDGE INTAKE ; DREDGE PIPE ;
DREDGE PROPULSION ; DREDGE,SUBMERGED

3460384 DEPTH CONTROLLING DEVICE
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3474549 APPARATUS FOR CONVEYING SAND OR THE LIKE
OTHER KEYWORDS: DREDGE,CUTTERHEAD ; DREDGE INTAKE

3486570 ALLUVIAL PROSPECTING UNITS
OTHER KEYWORDS: DREDGE,SUCTION ; DREDGE INTAKE ;
SAMPLER,SEABED-DRIVEN CORE

3487228 POWER GENERATING SYSTEM
OTHER KEYWORDS: ELECTRICAL GENERATOR ; OFFSHORE PLATFORM,FLOATING ;
POWER,WAVE

3495409 APPARATUS FOR BUILDING A RETAINING WALL ALONG A BANK
OF A BODY OF WATER.OTHER KEYWORDS: BULKHEAD ; DREDGE,CUTTERHEAD ;
DREDGE PIPE ; DREDGE PROPULSION ; OFFSHORE CONSTRUCTION

3515889 POWER GENERATION APPARATUS
OTHER KEYWORDS: ELECTRICAL GENERATOR ; POWER,WAVE

3526436 MATERIAL LIFT SYSTEM
OTHER KEYWORDS: DREDGE,SUCTION

3532219 APPARATUS FOR COLLECTING AND CONTAINING OIL ON THE SURFACE OF WATER
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT,SUCTION REMOVAL ;
POLLUTANT,SURFACE BARRIER

3532440 TIDALLY OPERATED SYSTEM FOR PUMPING WATER OUT OF BOATS
AND FLOATING DOCKS.OTHER KEYWORDS: PIER,FLOATING ;
POWER,TIDE ; SMALL-CRAFT PIER

3535801 DREDGE CONSTRUCTION
OTHER KEYWORDS: DREDGE,SUCTION ; DREDGE INTAKE ; DREDGE PROPULSION

3547553 FLOATING SURFACE SKIMMER
OTHER KEYWORDS: POLLUTANT,SUCTION REMOVAL

REVETMENT

3301148 PAVING BLOCK
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION ;
SLOPE PROTECTION

3326005 RETAINING WALL FOR WATERWAYS
OTHER KEYWORDS: BULKHEAD ; SMALL-CRAFT LAUNCHER

3343468 PAVING BLOCK
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION ;
SLOPE PROTECTION

3344609 PREVENTION OF BEACH EROSION AND ENCOURAGEMENT OF LAND RESTORATION
OTHER KEYWORDS: CONCRETE BLOCK ; FABRIC MAT ; GROIN ;
LOW-COST SHORE PROTECTION ; SEAWALL

3347048 REVETMENT BLOCK
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION

3368357 *STRUCTURE FOR BREAKING WAVES*
OTHER KEYWORDS: CONCRETE ARMOR UNIT

3374635 *BAGS FOR USE IN REVETMENT STRUCTURES*
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; SANDBAG

3375667 *REVETMENT STRUCTURE AND UNITS THEREFORE*
OTHER KEYWORDS: CONCRETE ARMOR UNIT

3379017 *CONCRETE BLOCKS FOR SHORE AND BANK PROTECTION*
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION ; SEAWALL

3380254 *PROTECTIVE LININGS AND METHOD OF FORMING THE SAME IN WATERCOURSES*
OTHER KEYWORDS: ASPHALT ; GABION ; SLOPE PROTECTION

3383864 *METHOD OF PROTECTING OR REPAIRING SCOURED AREAS OF SITUS*
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; SLOPE PROTECTION

3386250 *WATER CURRENT CONTROLLING MEANS*
OTHER KEYWORDS: CONCRETE ARMOR UNIT

3386252 *RIP RAP STRUCTURE DEVICE*
OTHER KEYWORDS: CONCRETE BLOCK ; SLOPE PROTECTION

3396542 *METHOD AND ARRANGEMENTS FOR PROTECTING SHORELINES*
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT

3399535 *BLOCK AND MARITIME STRUCTURE FORMED THEREFROM*
OTHER KEYWORDS: BREAKWATER,RUBBLE ; CONCRETE ARMOR UNIT ; GROIN

3421417 *PAVEMENT*
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION ; SLOPE PROTECTION

3425227 *FORM FOR CONSTRUCTING A SLAB FOR TALUS OR BOTTOM PROTECTION*
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; SLOPE PROTECTION

3474626 *METHOD AND MEANS FOR PROTECTING BEACHES*
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; SLOPE PROTECTION

3488964 *CONCRETE BLOCK*
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION

3503216 *UNDERWATER PAVING ELEMENT*
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; SEABED MATERIAL PLACEMENT ; SEABED SCOUR PROTECTION

3517514 *SOIL PROTECTION MATS*
OTHER KEYWORDS: ARTIFICIAL SEAWEED ; FABRIC MAT ; SLOPE PROTECTION

3520142 *METHOD AND MEANS FOR PROTECTING AN EARTH SITUS AGAINST SCOUR*
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; LOW-COST SHORE PROTECTION ; SLOPE PROTECTION

3524320 *METHOD OF PROTECTING AREAS OF AN EARTH SITUS AGAINST SCOUR*
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; GROUTING ; SEABED SCOUR PROTECTION

3534477 *METHOD;SYSTEM AND APPARATUS FOR SURVEYING REVETMENTS*
OTHER KEYWORDS: SEABED SITE SURVEY ; SEDIMENTATION MEASUREMENT ; STRUCTURE INSPECTION

3534668 *PAVEMENT BLOCK*
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION ; SLOPE PROTECTION

3538711 DEVICE FOR CONTROL AND PREVENTION OF COAST EROSION
OTHER KEYWORDS: GROIN , LOW COST SHORE PROTECTION , SANDBAG , SEABED MATERIAL PLACEMENT

SALINITY MEASUREMENT

3373100 PRECONTROL SALINITY COMPENSATOR FOR AUTOMATIC CATHODIC PROTECTION SYSTEM. OTHER KEYWORDS: CATHODIC PROTECTION ; CORROSION PREVENTION

3389332 METHOD AND INDUCTIVE APPARATUS FOR MEASURING FLUID CONDUCTIVITY WITH TEMPERATURE COMPENSATING MEANS

3401560 OCEANOGRAPHIC MEASURING AND RECORDING DEVICE
OTHER KEYWORDS: BATHYTHERMOGRAPH

3419796 COMPENSATED SALINOMETER

3479580 APPARATUS INCLUDING A CONDUCTIVITY PROBE FOR DETERMINING THE SALINITY OF WATER. OTHER KEYWORDS: INSTRUMENT DEPLOYMENT

3491287 SALINOMETER INCLUDING FIRST AND SECOND ORDER TEMPERATURE COMPENSATION AND THIRD COMPENSATION FOR VARIATIONS BETWEEN CONDUCTIVITY AND SALINITY

3510761 COMPENSATED SALINOMETER

SAMPLER, BIOTA

3302464 STERILE HIGH PRESSURE OCEAN SAMPLER
OTHER KEYWORDS: SAMPLER, SEABED GRAB

3310984 AUTOMATIC PLANKTON SAMPLING SYSTEM

3365953 BIOLOGICAL SAMPLER
OTHER KEYWORDS: SAMPLER, WATER

3520412 NEMATODE EXTRACTION DEVICE

SAMPLER, POWER SUPPLY

3345879 APPARATUS FOR EXTRACTING SAMPLES FROM THE BED OF A BODY OF WATER
OTHER KEYWORDS: SAMPLER, SEABED DRIVEN CORE

3353612 METHOD AND APPARATUS FOR EXPLORATION OF THE WATER BOTTOM REGIONS
OTHER KEYWORDS: INSTRUMENT, SEABED IN SITU ; SAMPLER, SEABED-DRILLED CORE ; SEABED PROPERTY MEASUREMENT

3370566 EMBEDMENT DEVICE
OTHER KEYWORDS: EMBEDMENT ANCHOR ; POWER, SUBMERGED SOURCE ; SAMPLER, SEABED-DRIVEN CORE

3370656 APPARATUS FOR SUBMARINE CORE DRILLING
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; SAMPLER, SEABED-DRILLED CORE

3392794 DYNAMIC DEEP-OCEAN CORE SAMPLER
OTHER KEYWORDS: SAMPLER, SEABED-DRIVEN CORE

3411595 HARD FORMATION OCEAN BOTTOM SAMPLING DEVICE
OTHER KEYWORDS: INSTRUMENT RETRIEVAL ; POWER, SUBMERGED SOURCE ; SAMPLER, SEABED-DRIVEN CORE

3412814 HYDROSTATIC CORER
OTHER KEYWORDS: POWER, SUBMERGED SOURCE ; SAMPLER, SEABED-DRIVEN CORE

3415068 *SUBMARINE DEVICE*
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT RETRIEVAL ; SAMPLER, SEABED GRAB

3436914 *HYDROSTATIC ENERGY ACCUMULATOR*
OTHER KEYWORDS: POWER, SUBMERGED SOURCE ; SAMPLER, SEABED-DRIVEN CORE

3439537 *UNDERWATER VEHICLES*
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT DEPLOYMENT ; INSTRUMENT RETRIEVAL ; SAMPLER, SEABED-DRIVEN CORE

3516503 *ELECTRICALLY CONTROLLED AND POWERED SUBMARINE ROTARY CORER SYSTEM*
OTHER KEYWORDS: SAMPLER, SEABED-DRILLED CORE

3521715 *METHOD AND APPARATUS FOR SAMPLING*
OTHER KEYWORDS: GROUTING ; SAMPLER, SEABED-DRIVEN CORE

SAMPLER, SEABED-DRILLED CORE

3353612 *METHOD AND APPARATUS FOR EXPLORATION OF THE WATER BOTTOM REGIONS*
OTHER KEYWORDS: INSTRUMENT, SEABED IN SITU ; SAMPLER, POWER SUPPLY ; SEABED PROPERTY MEASUREMENT

3370656 *APPARATUS FOR SUBMARINE CORE DRILLING*
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; SAMPLER, POWER SUPPLY

3442339 *SEA BOTTOM CORING APPARATUS*

3490550 *VIBRATORY CORING APPARATUS*

3491842 *APPARATUS FOR UNDERWATER DRILLING AND CORING LOOSE SEDIMENTS*

3512592 *OFFSHORE DRILLING METHOD AND APPARATUS*

3516503 *ELECTRICALLY CONTROLLED AND POWERED SUBMARINE ROTARY CORER SYSTEM*
OTHER KEYWORDS: SAMPLER, POWER SUPPLY

3525409 *CORE BARREL CLOSURE FOR SONIC DRILL*

SAMPLER, SEABED-DRIVEN CORE

3295616 *FREE CORING DEVICE*

3299969 *SEDIMENT CORER*

3301336 *METHOD AND APPARATUS FOR DEEP SEA BOTTOM CORE SAMPLING*

3313357 *UNDERWATER SAMPLING APPARATUS*

3318394 *METHOD AND APPARATUS FOR OBTAINING SOIL SAMPLES*

3345879 *APPARATUS FOR EXTRACTING SAMPLES FROM THE BED OF A BODY OF WATER*
OTHER KEYWORDS: SAMPLER, POWER SUPPLY

3347101 *FREEZING-TYPE SEDIMENT SAMPLER*
OTHER KEYWORDS: SAMPLER, SEABED GRAB

3352160 *CORING APPARATUS*

3370566 *EMBEDMENT DEVICE*
OTHER KEYWORDS: EMBEDMENT ANCHOR ; POWER, SUBMERGED SOURCE ; SAMPLER, POWER SUPPLY

3372760 *FREE-FALL CORE SAMPLER*
OTHER KEYWORDS: INSTRUMENT RETRIEVAL

3373826 *CORING DEVICE*
OTHER KEYWORDS: INSTRUMENT RETRIEVAL

3373827 APPARATUS FOR CORING SUBTERRANEAN FORMATIONS UNDER A BODY OF WATER
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT

3392794 DYNAMIC DEEP-OCEAN CORE SAMPLER
OTHER KEYWORDS: SAMPLER, POWER SUPPLY

3409094 SPRING ACTUATED CORE RETAINER

3411595 HARD FORMATION OCEAN BOTTOM SAMPLING DEVICE
OTHER KEYWORDS: INSTRUMENT RETRIEVAL ; POWER, SUBMERGED SOURCE ; SAMPLER, POWER SUPPLY

3412814 HYDROSTATIC CORER
OTHER KEYWORDS: POWER, SUBMERGED SOURCE ; SAMPLER, POWER SUPPLY

3429388 SOLID MATERIAL SAMPLER PARTICULARLY FOR UNDERWATER SOIL SAMPLING

3436914 HYDROSTATIC ENERGY ACCUMULATOR
OTHER KEYWORDS: POWER, SUBMERGED SOURCE ; SAMPLER, POWER SUPPLY

3438452 CORE SAMPLING

3439537 UNDERWATER VEHICLES
OTHER KEYWORDS: BATHYTHERMOGRAPH ; INSTRUMENT DEPLOYMENT ; INSTRUMENT RETRIEVAL ; SAMPLER, POWER SUPPLY

3447371 IN-SITU VELOCIMETER
OTHER KEYWORDS: INSTRUMENT RETRIEVAL ; INSTRUMENT, SEABED IN SITU ; SEABED PROPERTY MEASUREMENT

3486570 ALLUVIAL PROSPECTING UNITS
OTHER KEYWORDS: DREDGE, SUCTION , DREDGE INTAKE , PUMP

3497018 MARINE CORER WITH VALVE

3521715 METHOD AND APPARATUS FOR SAMPLING
OTHER KEYWORDS: GROUTING ; SAMPLER, POWER SUPPLY

SAMPLER, SEABED GRAB

3302464 STERILE HIGH PRESSURE OCEAN SAMPLER
OTHER KEYWORDS: SAMPLER, BIOTA

3347101 FREEZING-TYPE SEDIMENT SAMPLER
OTHER KEYWORDS: SAMPLER, SEABED-DRIVEN CORE

3415068 SUBMARINE DEVICE .
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT RETRIEVAL ; SAMPLER, POWER SUPPLY

3509772 HYDROGRAPHIC SAMPLING DEVICE
OTHER KEYWORDS: INSTRUMENT RETRIEVAL

3532881 SUBMARINE RADIOACTIVITY LOGGING TECHNIQUE
OTHER KEYWORDS: INSTRUMENT, RADIOISOTOPE ; INSTRUMENT, SEABED IN SITU ; INSTRUMENT, TOWED ; SEABED PROPERTY MEASUREMENT

SAMPLER, WATER

3339417 WATER SAMPLING APPARATUS

3349624 REMOTELY CONTROLLED WATER SAMPLING DEVICE
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT

3365953 BIOLOGICAL SAMPLER
OTHER KEYWORDS: SAMPLER, BIOTA

3367190 HERMETICALLY SEALING WATER SAMPLER

3367191 WATER SAMPLING APPARATUS

3379065 PRESSURE LIQUID SAMPLING SYSTEM AND APPARATUS

3489012 WATER SAMPLER DEVICE

3513709 FLUID SAMPLER
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT

SANDBAG

3342033 METHOD OF PROVIDING A SEALED JOINT EMPLOYING A FLEXIBLE BAG
OTHER KEYWORDS: BULKHEAD ; CHANNEL BARRIER ; GROUTING ; PILE,CONCRETE

3345824 METHOD AND MEANS FOR BRACING OR BOLSTERING SUBAQUEOUS STRUCTURES
OTHER KEYWORDS: GROUTING ; SEABED FOUNDATION ; STRUCTURE REPAIR

3373568 SYSTEM FOR RECLAMATION OF LAND
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; SLOPE PROTECTION ;
WAVE ABSORBER BEACH

3374635 BAGS FOR USE IN REVETMENT STRUCTURES
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; REVETMENT

3396545 METHOD OF FORMING CONCRETE BODIES
OTHER KEYWORDS: CONCRETE ARMOR UNIT ; CONCRETE FORM ;
OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION

3538711 DEVICE FOR CONTROL AND PREVENTION OF COAST EROSION
OTHER KEYWORDS: GROIN ; LOW-COST SHORE PROTECTION ; REVETMENT ;
SEABED MATERIAL PLACEMENT

SAND FENCE

3426536 BARRIER DEVICE FOR COASTAL PROTECTION
OTHER KEYWORDS: DUNE PROTECTION

3479824 SEAWALL AND FENCE CONSTRUCTION
OTHER KEYWORDS: BREAKWATER,CONCRETE ; LOW-COST SHORE PROTECTION

SEABED CABLE PLOW

3333432 ADJUSTABLE DEPTH SUBMARINE CABLE BURIER

3338060 ARRANGEMENT TO BED FLEXIBLE LINES IN THE GROUND UNDER WATER

3339368 APPARATUS FOR LAYING UNDERWATER CABLES

3401473 APPARATUS FOR MARINE EXCAVATION
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT ; SEABED TRENCHER

3423946 UNDERSEA REPEATER BURYING PLOWSHARE
OTHER KEYWORDS: SEABED TRENCHER

SEABED FOUNDATION

3307624 LOAD-SUPPORTING STRUCTURE; PARTICULARLY FOR MARINE WELLS
OTHER KEYWORDS: OFFSHORE CAISSON ; SEABED OIL,PROCESS STRUCTURE

3324665 METHOD OF STABILIZING PILES
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM ANCHOR ; PILE FOOTING;PILE,STEEL

3344612 SHALLOW WATER CAISSON
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ;
PILE DRIVER,WATER JET

3345824 METHOD AND MEANS FOR BRACING OR BOLSTERING SUBAQUEOUS STRUCTURES
OTHER KEYWORDS: GROUTING ; SANDBAG ; STRUCTURE REPAIR

3347053 PARTIALLY SALVAGEABLE JACKET-PILE CONNECTION
OTHER KEYWORDS: GROUTING ; OFFSHORE PLATFORM ANCHOR ;
PILE,STRUCTURE CONNECTION

3352119 BALLISTIC JACKET-PILE CONNECTION
OTHER KEYWORDS: GROUTING ; PILE,STRUCTURE CONNECTION

3354659 DEEP-SUBMERGENCE FOUNDATION VEHICLE
OTHER KEYWORDS: CONCRETE FORM ; GROUTING ; OFFSHORE CONSTRUCTION ;
SEABED MATERIAL PLACEMENT

3364684 DEEP WATER OFFSHORE DRILLING PLATFORM
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM,FIXED

3366173 SUBSEA PRODUCTION SYSTEM
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE MOORING STRUCTURE ;
OFFSHORE PLATFORM,FIXED ; SEABED OIL,PROCESS STRUCTURE

3375669 OFFSHORE MARINE STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED

3379245 TENDED DRILLING PLATFORM FOR MULTIWELL SUBSURFACE COMPLETION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ;
PILE PLACEMENT

3381482 MARINE DRILLING STRUCTURE
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED

3383869 MARINE PIERS
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM,FIXED

3384169 UNDERWATER LOW TEMPERATURE SEPARATION UNIT
OTHER KEYWORDS: SEABED OIL,PROCESS STRUCTURE

3385069 MOBILE MARINE PLATFORM APPARATUS
OTHER KEYWORDS: OFFSHORE PLATFORM,JACK UP

3388556 MARINE STORAGE STRUCTURE
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ;
OFFSHORE STORAGE TANK,SUBMERGED

3389562 SALVAGEABLE MULTI-WELL OFFSHORE WELL PROTECTOR PLATFORM
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ;
OFFSHORE PLATFORM,FIXED ; PILE DRIVER,WATER JET

3390531 OFFSHORE DRILLING PLATFORM
OTHER KEYWORDS: OFFSHORE PLATFORM,FIXED ; OFFSHORE PLATFORM,LEG ;
PILE PLACEMENT

3393520 CONTAINER AND METHOD OF BUILDING A BREAKWATER
OTHER KEYWORDS: BREAKWATER,CONCRETE ; BREAKWATER,STEEL FRAME

3394553 UNDERWATER ANCHORED PILLAR FOR SUPPORTING A PLATFORM
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED

3396544 STORAGE TANK FIXED ON THE OCEAN BOTTOM AND METHOD OF INSTALLATION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE MOORING STRUCTURE ;
OFFSHORE STORAGE TANK,SUBMERGED ; PILE PLACEMENT ; PILE,STEEL

3397545 MARINE STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM,FIXED ; OFFSHORE PLATFORM,FLOATING

3402559 PROCESS OF FORMING A LARGE-DIAMETER TUBULAR PILE FOUNDATION
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ;
PILE,CONCRETE ; PILE DRIVER,WATER JET ;PILE SECTION CONNECTION

3412565 METHOD OF STRENGTHENING FOUNDATION PILING
OTHER KEYWORDS: PILE PROTECTION ; STRUCTURE REPAIR

3415067 METHOD OF OPERATING A SUBMERSIBLE VESSEL FOR SUBMARINE OPERATIONS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ; SEABED SOIL TREATMENT

3430695 METHOD AND APPARATUS FOR INSTALLING UNDERWATER WELLHEAD SUPPORT
OTHER KEYWORDS: SEABED OIL,PROCESS STRUCTURE

3466877 SELF-LEVELING LAND OR UNDERWATER STATION
OTHER KEYWORDS: OFFSHORE CONSTRUCTION

3479828 PLATFORM LEG
OTHER KEYWORDS: OFFSHORE PLATFORM,JACK UP ; OFFSHORE PLATFORM,LEG ; SEABED SCOUR PROTECTION

3483708 METHOD OF ANCHORING MARINE STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ; PILE PLACEMENT

3488967 COMBINATION DEEP WATER STORAGE TANK AND DRILLING AND PRODUCTION PLATFORM.OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ; OFFSHORE STORAGE TANK,EMERGENT ; PILE,STRUCTURE CONNECTION

3490239 BREAKWATER STRUCTURE
OTHER KEYWORDS: BREAKWATER,STEEL FRAME ; OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION

3496728 METHOD AND APPARATUS FOR FIELD REINFORCEMENT OF COLUMNAR STRUCTURES, PARTICULARLY OFFSHORE DRILLING AND PRODUCTION PLATFORMS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ; PILE,STRUCTURE CONNECTION

3501919 METHOD AND APPARATUS FOR CARRYING OUT OPERATIONS AT AN UNDERWATER INSTALLATION.OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ; PILE DRIVER LEADS ; PILE PLACEMENT

3502159 PILE DRIVING APPARATUS FOR SUBMERGED STRUCTURES
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,LEG ; PILE DRIVER,IMPACT ; PILE PLACEMENT

3503217 METHOD OF AND APPARATUS FOR ANCHORING WELL-DRILLING PLATFORMS TO THE OCEAN FLOOR.OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,LEG ; PILE PLACEMENT ; PILE,STRUCTURE CONNECTION

3504740 SUBSEA SATELLITE FOUNDATION UNIT AND METHOD FOR INSTALLING A SATELLITE BODY WITHIN SAID FOUNDATION UNIT.OTHER KEYWORDS: SEABED OIL,PROCESS STRUCTURE

3524322 SPLAY FOOTED PLATFORM ANCHOR.OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ; PILE PLACEMENT

3526096 METHOD OF MAKING ROCKFILL FOUNDATIONS
OTHER KEYWORDS: BREAKWATER,RUBBLE ; OFFSHORE CONSTRUCTION ; OFFSHORE ISLAND

3528254 OFFSHORE PLATFORM STRUCTURE AND CONSTRUCTION METHOD
OTHER KEYWORDS: GROUTING ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ; PILE,STRUCTURE CONNECTION

3536135 UNDERWATER PRODUCTION FACILITY INCLUDING BASE UNIT AND PRODUCTION FLUID HANDLING UNIT.OTHER KEYWORDS: SEABED OIL,PROCESS STRUCTURE

3537268 MARINE STATION AND METHOD FOR FABRICATING THE SAME
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ; PILE PLACEMENT; SEABED OIL, PROCESS STRUCTURE

3540224 RIGIDIZED SUPPORT ELEMENT
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,LEG ; PILE STRUCTURE CONNECTION

3545539 SUBSEA SATELLITE FOUNDATION UNIT AND METHOD FOR INSTALLING SATELLITE BODY THEREWITHIN. OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED OIL, PROCESS STRUCTURE

3546885 THREADED PILE FOR MARINE STRUCTURE
OTHER KEYWORDS: EMBEDMENT ANCHOR ; OFFSHORE PLATFORM, FIXED ; PILE PLACEMENT ; PILE,STEEL ; PILE,STRUCTURE CONNECTION

3550384 LATERAL RESTRAINT OF PILE WITHIN JACKET LEG
OTHER KEYWORDS: OFFSHORE PLATFORM,LEG ; PILE,STRUCTURE CONNECTION

SEABED GRADER

3486253 FLOATING EARTHMOVING APPARATUS

SEABED MATERIAL PLACEMENT

3314239 METHOD AND APPARATUS FOR FORMING UNDERWATER STRUCTURES
OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CONSTRUCTION

3330338 ANCHOR AND METHOD OF INSTALLING
OTHER KEYWORDS: EMBEDMENT ANCHOR ; GROUTING ; OFFSHORE PLATFORM ANCHOR

3354653 METHOD FOR APPLYING BITUMINIZED MINERAL AGGREGATE TO AN UNDERWATER SURFACE. OTHER KEYWORDS: ASPHALT ; SEABED SCOUR PROTECTION

3354659 DEEP-SUBMERGENCE FOUNDATION VEHICLE
OTHER KEYWORDS: CONCRETE FORM ; GROUTING ; OFFSHORE CONSTRUCTION ; SEABED FOUNDATION

3363873 SHUTTERING MEANS AND APPARATUS FOR THE CASTING OF UNDERWATER STRUCTURES. OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CONSTRUCTION

3408819 STABILIZING UNDERWATER SURFACE
OTHER KEYWORDS: SEABED SOIL TREATMENT ; SEABED SCOUR PROTECTION

3446027 APPARATUS FOR DEPOSITING A LAYER OF FLOWABLE MATERIAL UNDERWATER
OTHER KEYWORDS: ASPHALT ; SEABED SCOUR PROTECTION

3453830 METHOD AND APPARATUS FOR ALLEVIATING SCOURING ABOUT LEGS OF A MARINE STRUCTURE. OTHER KEYWORDS: OFFSHORE PLATFORM, JACK UP ; OFFSHORE PLATFORM, LEG ; SEABED SCOUR PROTECTION

3488963 SAND STABILIZATION MACHINE
OTHER KEYWORDS: SEABED SOIL TREATMENT

3497579 SLIP FORMING APPARATUS AND METHOD
OTHER KEYWORDS: CONCRETE FORM ; OFFSHORE CONSTRUCTION

3503216 UNDERWATER PAVING ELEMENT
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; REVETMENT ; SEABED SCOUR PROTECTION

3518835 METHOD FOR ALLEVIATING SCOURING ABOUT A MARINE STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM,LEG ; SEABED SCOUR PROTECTION

3538711 DEVICE FOR CONTROL AND PREVENTION OF COAST EROSION
OTHER KEYWORDS: GROIN ; LOW-COST SHORE PROTECTION ; REVETMENT ; SANDBAG

3540415 SYNTHETIC REEF ECOLOGICAL SYSTEM FOR LARGE BODIES OF WATER
OTHER KEYWORDS: ARTIFICIAL SEAWEED ; FABRIC MAT

SEABED OIL,PROCESS STRUCTURE

3307624 LOAD-SUPPORTING STRUCTURE, PARTICULARLY FOR MARINE WELLS
OTHER KEYWORDS: OFFSHORE CAISSON ; SEABED FOUNDATION

3366173 SUBSEA PRODUCTION SYSTEM
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE MOORING STRUCTURE ; OFFSHORE PLATFORM,FIXED ; SEABED FOUNDATION

3373806 APPARATUS AND METHOD FOR DRILLING WELLS
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ; OFFSHORE STORAGE TANK,SUBMERGED

3384169 UNDERWATER LOW TEMPERATURE SEPARATION UNIT
OTHER KEYWORDS: SEABED FOUNDATION

3430695 METHOD AND APPARATUS FOR INSTALLING UNDERWATER WELLHEAD SUPPORT
OTHER KEYWORDS: SEABED FOUNDATION

3456720 APPARATUS AND METHOD FOR DRILLING WELLS
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE PLATFORM,FIXED

3504740 SUBSEA SATELLITE FOUNDATION UNIT AND METHOD FOR INSTALLING A SATELLITE BODY WITHIN SAID FOUNDATION UNIT.OTHER KEYWORDS: SEABED FOUNDATION

3535884 OFFSHORE DRILLING AND PRODUCTION STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM,JACK UP ; OFFSHORE STORAGE TANK,SUBMERGED

3536135 UNDERWATER PRODUCTION FACILITY INCLUDING BASE UNIT AND PRODUCTION FLUID HANDLING UNIT.OTHER KEYWORDS: SEABED FOUNDATION

3537268 MARINE STATION AND METHOD FOR FABRICATING THE SAME
OTHER KEYWORDS: OFFSHORE CAISSON ; OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ; PILE PLACEMENT,SEABED FOUNDATION

3545539 SUBSEA SATELLITE FOUNDATION UNIT AND METHOD FOR INSTALLING SATELLITE BODY THEREWITHIN.OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; SEABED FOUNDATION

SEABED PIPELINE PLACEMENT

3326000 IMMERSED PIPE STRUCTURE
OTHER KEYWORDS: SEABED SCOUR PROTECTION

3338059 METHODS AND APPARATUS FOR ENTRENCHING SUBMERGED ELONGATE STRUCTURES
OTHER KEYWORDS: SEABED TRENCHER

3347054 UNDERWATER PIPE TRENCHING DEVICE
OTHER KEYWORDS: SEABED TRENCHER

3389564 METHOD AND DEVICE FOR INSTALLATION OF STEEL PIPE BELOW THE BOTTOM OF A BODY OF WATER.OTHER KEYWORDS: SEABED TRENCHER

3393524 SUBMERGING VESSELS
OTHER KEYWORDS: DREDGE PROPULSION ; DREDGE, SUBMERGED ; SEABED TRENCHER

3399646 SUBMARINE ANCHOR ASSEMBLY
OTHER KEYWORDS: EMBEDMENT ANCHOR

3401473 APPARATUS FOR MARINE EXCAVATION
OTHER KEYWORDS: SEABED CABLE PLOW ; SEABED TRENCHER

3411307 METHOD AND APPARATUS FOR BURYING OFFSHORE PIPELINES

3427812 METHOD AND APPARATUS FOR ANCHORING OFFSHORE PIPELINES
OTHER KEYWORDS: EMBEDMENT ANCHOR

3429132 SUBMARINE PIPELINE TRENCHING MACHINE
OTHER KEYWORDS: SEABED TRENCHER

3447330 METHOD AND APPARATUS FOR ANCHORING SUBMERGED PIPELINES
OTHER KEYWORDS: EMBEDMENT ANCHOR ; PILE DRIVER, WATER JET

3462963 APPARATUS FOR PIPELAYING AND TRENCHING OPERATIONS IN A BODY OF WATER
OTHER KEYWORDS: SEABED TRENCHER

3479830 ANCHORING MACHINE
OTHER KEYWORDS: EMBEDMENT ANCHOR

3494849 ANCHORING DEVICE
OTHER KEYWORDS: CATHODIC PROTECTION ; CORROSION PREVENTION ; EMBEDMENT ANCHOR

3504504 TRENCHING MACHINE APPARATUS
OTHER KEYWORDS: SEABED TRENCHER

3525187 EXPLOSIVELY DRIVEN SUBMARINE ANCHOR
OTHER KEYWORDS: EMBEDMENT ANCHOR

SEABED PROPERTY MEASUREMENT

3353612 METHOD AND APPARATUS FOR EXPLORATION OF THE WATER BOTTOM REGIONS
OTHER KEYWORDS: INSTRUMENT, SEABED IN SITU ; SAMPLER, POWER SUPPLY ; SAMPLER, SEABED-DRILLED CORE

3372369 ACOUSTIC METHOD FOR MAPPING UNDERWATER TERRAIN EMPLOYING LOW FREQUENCY CONTINUOUS ACOUSTIC WAVE AND FIXEDLY SEPARATED TRANSDUCERS. OTHER KEYWORDS: SEISMIC SURVEY METHOD ; TOWED BODY DEPTH CONTROL

3373400 DETERMINATION OF GEOPHYSICAL PROPERTIES OF THE SEA BOTTOM
OTHER KEYWORDS: INSTRUMENT, SEABED IN SITU

3447124 UNDERWATER SURVEY
OTHER KEYWORDS: INSTRUMENT, TOWED

3447371 IN-SITU VELOCIMETER
OTHER KEYWORDS: INSTRUMENT RETRIEVAL ; INSTRUMENT, SEABED IN SITU ; SAMPLER, SEABED-DRIVEN CORE

3455151 EXPENDABLE OCEAN BOTTOM SENSOR
OTHER KEYWORDS: INSTRUMENT, SEABED IN SITU

3478308 SEA BOTTOM CLASSIFIER
OTHER KEYWORDS: SONAR, DEPTH SOUNDER

3500678 APPARATUS FOR DETERMINING SOIL RESISTANCE INCLUDING A DRILL
OTHER KEYWORDS: INSTRUMENT POWER SUPPLY ; INSTRUMENT, SEABED IN SITU

3532881 SUBMARINE RADIOACTIVITY LOGGING TECHNIQUE
OTHER KEYWORDS: INSTRUMENT,RADIOISOTOPE ; INSTRUMENT,SEABED IN SITU; INSTRUMENT,TOWED ; SAMPLER-SEABED GRAB

3546456 MULTIPLE DETECTOR SUBMARINE RADIOACTIVITY LOGGING SYSTEM
OTHER KEYWORDS: INSTRUMENT,RADIOISOTOPE ; INSTRUMENT,SEABED IN SITU ; INSTRUMENT,TOWED

3548304 RESISTIVITY MEASURING DEVICE HAVING VERTICALLY-SPACED RING ELECTRODE AND A CENTRAL ELECTRODE.OTHER KEYWORDS: INSTRUMENT,SEABED IN SITU ; SEDIMENTATION MEASUREMENT

SEABED SCOUR PROTECTION

3312069 METHOD OF PREVENTING SCOUR AROUND UNDERWATER STRUCTURES
OTHER KEYWORDS: OFFSHORE PLATFORM,LEG

3326000 IMMERSED PIPE STRUCTURE
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3354653 METHOD FOR APPLYING BITUMINIZED MINERAL AGGREGATE TO AN UNDERWATER SURFACE.OTHER KEYWORDS: ASPHALT ; SEABED MATERIAL PLACEMENT

3408819 STABILIZING UNDERWATER SURFACE
OTHER KEYWORDS: SEABED MATERIAL PLACEMENT ; SEABED SOIL TREATMENT

3446027 APPARATUS FOR DEPOSITING A LAYER OF FLOWABLE MATERIAL UNDERWATER
OTHER KEYWORDS: ASPHALT ; SEABED MATERIAL PLACEMENT

3453830 METHOD AND APPARATUS FOR ALLEVIATING SCOURING ABOUT LEGS OF A MARINE STRUCTURE.OTHER KEYWORDS: OFFSHORE PLATFORM,JACK UP ; OFFSHORE PLATFORM,LEG ; SEABED MATERIAL PLACEMENT

3456448 LEG FOR SUPPORTING A MARINE STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM,LEG

3479828 PLATFORM LEG
OTHER KEYWORDS: OFFSHORE PLATFORM,JACK UP ; OFFSHORE PLATFORM,LEG ; SEABED FOUNDATION

3486341 FORM FOR CONCRETE OR THE LIKE
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; SLOPE PROTECTION

3503216 UNDERWATER PAVING ELEMENT
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; REVETMENT ; SEABED MATERIAL PLACEMENT

3518835 METHOD FOR ALLEVIATING SCOURING ABOUT A MARINE STRUCTURE
OTHER KEYWORDS: OFFSHORE PLATFORM,LEG ; SEABED MATERIAL PLACEMENT

3524320 METHOD OF PROTECTING AREAS OF AN EARTH SITUS AGAINST SCOUR
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; GROUTING ; REVETMENT

3529427 DEVICE FOR PREVENTING OR REDUCING SCOURS AT THE LOWER ENDS OF MEMBERS SUPPORTING MARINE STRUCTURES.OTHER KEYWORDS: FABRIC MAT ; OFFSHORE PLATFORM,LEG

SEABED SITE SURVEY

3307144 BATHYMETRY
OTHER KEYWORDS: INSTRUMENT,AIRBORNE ; SONAR,DEPTH SOUNDER

3534477 METHOD,SYSTEM AND APPARATUS FOR SURVEYING REVETMENTS
OTHER KEYWORDS: REVETMENT ; SEDIMENTATION MEASUREMENT ; STRUCTURE INSPECTION

3534605 METHOD AND APPARATUS FOR THE UNDERWATER MEASUREMENT OF THE THICKNESS OF A SILT LAYER.OTHER KEYWORDS: SEDIMENTATION MEASUREMENT

SEABED SOIL TREATMENT

3408819 STABILIZING UNDERWATER SURFACE
OTHER KEYWORDS: SEABED MATERIAL PLACEMENT ; SEABED SCOUR PROTECTION

3415067 METHOD OF OPERATING A SUBMERSIBLE VESSEL FOR SUBMARINE OPERATIONS
OTHER KEYWORDS: OFFSHORE CONSTRUCTION ; OFFSHORE PLATFORM,FIXED ; SEABED FOUNDATION

3488963 SAND STABILIZATION MACHINE
OTHER KEYWORDS: SEABED MATERIAL PLACEMENT

SEABED TRENCHER

3310892 SUBMARINE DREDGE
OTHER KEYWORDS: DREDGE,SUBMERGED

3338059 METHODS AND APPARATUS FOR ENTRENCHING SUBMERGED ELONGATE STRUCTURES
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3347054 UNDERWATER PIPE TRENCHING DEVICE
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3368358 TRENCHING MACHINE

3389564 METHOD AND DEVICE FOR INSTALLATION OF STEEL PIPE BELOW THE BOTTOM OF A BODY OF WATER.OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3393524 SUBMERGING VESSELS
OTHER KEYWORDS: DREDGE PROPULSION ; DREDGE,SUBMERGED ; SEABED PIPELINE PLACEMENT

3401473 APPARATUS FOR MARINE EXCAVATION
OTHER KEYWORDS: SEABED CABLE PLOW ; SEABED PIPELINE PLACEMENT

3423945 METHOD OF FORMING AN UNDERWATER TRENCH

3423946 UNDERSEA REPEATER BURYING PLOWSHARE
OTHER KEYWORDS: SEABED CABLE PLOW

3429132 SUBMARINE PIPELINE TRENCHING MACHINE
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3440743 UNDERWATER TRENCHING APPARATUS

3462963 APPARATUS FOR PIPELAYING AND TRENCHING OPERATIONS IN A BODY OF WATER
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

3504504 TRENCHING MACHINE APPARATUS
OTHER KEYWORDS: SEABED PIPELINE PLACEMENT

SEABED WATER,PROCESS STRUCTURE

3490485 EFFLUENT DISPOSING SYSTEM

SEAWALL

3344609 PREVENTION OF BEACH EROSION AND ENCOURAGEMENT OF LAND RESTORATION
OTHER KEYWORDS: CONCRETE BLOCK ; FABRIC MAT ; GROIN ; LOW-COST SHORE PROTECTION ; REVETMENT

3379017 CONCRETE BLOCKS FOR SHORE AND BANK PROTECTION
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION ; REVETMENT

3387458 SEAWALL STRUCTURES

3415061 SEA WALL STRUCTURE
OTHER KEYWORDS: BREAKWATER,CONCRETE ; PIER,FIXED

3479000 CLAMPS
OTHER KEYWORDS: CONCRETE FORM

3503467 LADDER FOR BOAT DOCK,SEAWALL,OR THE LIKE
OTHER KEYWORDS: SMALL-CRAFT PIER

3516255 CONCRETE COMPONENT OR BLOCK FOR A PROTECTIVE COVERING STRUCTURE
OTHER KEYWORDS: BREAKWATER,RUBBLE ; CONCRETE ARMOR UNIT ;
SLOPE PROTECTION

SEDIMENTATION MEASUREMENT

3426205 METHOD FOR TAGGING SAND WITH A GASEOUS RADIOACTIVE ISOTOPE
OTHER KEYWORDS: INSTRUMENT,RADIOISOTOPE

3534477 METHOD,SYSTEM AND APPARATUS FOR SURVEYING REVETMENTS
OTHER KEYWORDS: REVETMENT ; SEABED SITE SURVEY ; STRUCTURE INSPECTION

3534605 METHOD AND APPARATUS FOR THE UNDERWATER MEASUREMENT OF THE THICKNESS
OF A SILT LAYER.OTHER KEYWORDS: SEABED SITE SURVEY

3548304 RESISTIVITY MEASURING DEVICE HAVING VERTICALLY-SPACED RING ELECTRODE
AND A CENTRAL ELECTRODE.OTHER KEYWORDS: INSTRUMENT,SEABED IN SITU ;
SEABED PROPERTY MEASUREMENT,SEISMIC SURVEY METHOD

SEISMIC ACOUSTIC TRANSMITTER ARRAY

3331050 METHOD OF UNDERWATER SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3414874 SEISMIC SURVEY SYSTEMS
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY ; SEISMIC STREAMER CABLE ;
SEISMIC SURVEY METHOD ; SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

3437170 CONTROL OF ENERGY SPECTRUM IN MARINE SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3452327 APPARATUS FOR SUPPORTING MARINE SEISMIC TRANSDUCER
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL ; TOWING CABLE

3460064 CANCELLATION OF HORIZONTALLY TRAVELING NOISE
IN MARINE SEISMIC EXPLORATION.OTHER KEYWORDS:
SEISMIC STREAMER CABLE ; SEISMIC SURVEY METHOD

3479638 BEAMFORMING IN SEISMIC SURVEYING
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ;
SEISMIC SURVEY METHOD

3491848 WAVE GENERATOR ARRAYS FOR MARINE SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ;
SEISMIC SURVEY METHOD ; TOWED BODY DEPTH CONTROL

3506955 MULTILINE SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ;
SEISMIC SURVEY METHOD

SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3304533 MARINE SEISMIC SURVEYING

3318411 SIGNAL GENERATOR

3322232 *SEISMIC EXPLORATION*

3326126 *EXPLOSIVE CONTAINER*

3331050 *METHOD OF UNDERWATER SEISMIC EXPLORATION*
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ; SEISMIC SURVEY METHOD

3353623 *SEISMIC PULSE GENERATOR USING COMBUSTIBLE GAS*

3358600 *SELF-DESTROYING EXPLOSIVE CARTRIDGE FOR UNDERWATER SEISMIC EXPLORATION*

3360070 *APPARATUS FOR FIRING EXPLOSIVE CHARGES UNDER WATER*

3368194 *MEANS FOR GENERATING ELECTRICAL DISCHARGES UNDER WATER FOR CONTINUOUS SEISMIC SOUNDINGS*

3368641 *SOUND WAVE TRANSMITTING DEVICE*

3368643 *ELECTRIC ARC SEISMIC SOURCE*

3369217 *METHOD AND APPARATUS FOR GENERATING AN UNDERWATER ACOUSTIC IMPULSE*

3369218 *METALLIZED PLASMA PATH SOURCE*

3370672 *SEISMIC RADIATOR*
OTHER KEYWORDS: SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

3371740 *SYSTEM AND METHOD FOR REDUCING SECONDARY PRESSURE PULSES IN MARINE SEISMIC SURVEYING*

3379273 *POWERFUL SOUND IMPULSE GENERATION METHODS AND APPARATUS*
OTHER KEYWORDS: SEISMIC SURVEY METHOD ; TOWED VEHICLE

3382946 *LIQUID SEISMIC EXPLOSIVE AND METHOD OF USING*

3397755 *PNEUMATIC SEISMIC SOURCE*

3401660 *SEISMIC SHIP*
OTHER KEYWORDS: SEISMIC SURVEY METHOD ; SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

3401769 *UNDERWATER GAS EXPLOSION SEISMIC WAVE GENERATOR*

3401770 *GAS EXPLODER APPARATUS FOR PROPAGATING SEISMIC WAVES*

3401771 *GAS EXPLODER APPARATUS FOR PROPAGATING SEISMIC WAVES*

3403375 *ACOUSTIC GENERATOR OF THE SPARK DISCHARGE TYPE*

3406778 *SEISMIC WAVE SOURCE FOR USE AT MARINE LOCATIONS*

3415188 *SEA WATER DESTRUCTIBLE BOOSTER ASSEMBLY*

3415189 *WATER DESTRUCTIBLE ELECTRIC MATCH*

3416621 *ACOUSTIC WAVE PRODUCING DEVICE*

3416631 *DIGITAL REMOTE FIRING SYSTEM*
OTHER KEYWORDS: SEISMIC SURVEY METHOD

3428940 *SONIC TRANSMITTER*

3430566 *MARINE SEISMIC DETONATOR*

3430727 *SEISMIC SIGNAL TRANSDUCING APPARATUS*
OTHER KEYWORDS: SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

3434561 *FUEL MIXING AND IGNITION SYSTEM IN PNEUMATIC ACOUSTIC SOURCE*

3434562 *AIR FEED DEVICE FOR VALVE RETRACT SYSTEM IN PNEUMATIC ACOUSTIC SOURCE*

3437170 *CONTROL OF ENERGY SPECTRUM IN MARINE SEISMIC EXPLORATION*
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY

3444953 *DEVICE TO AVOID THE PULSATION OF THE GAS BUBBLES GENERATED BY UNDERWATER EXPLOSIONS*

3447625 *DEVICE FOR SEISMIC PROSPECTING*

3463085 *UNDERWATER EXPLOSIVE CHARGE*

3478838 *GAS EXPLODER SEISMIC SOURCE WITH CAVITATION EROSION PROTECTION*

3479638 *BEAMFORMING IN SEISMIC SURVEYING*
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ; SEISMIC SURVEY METHOD

3480101 *SEISMIC WAVE SOURCE USING EXPLOSIVE GAS IN AN EXPANSIBLE ENCLOSURE*

3491848 *WAVE GENERATOR ARRAYS FOR MARINE SEISMIC EXPLORATION*
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ; SEISMIC SURVEY METHOD ; TOWED BODY DEPTH CONTROL

3493072 *MARINE SEISMIC EXPLORATION ENERGY SOURCE*

3494443 *TOWBOAT SYSTEM FOR HANDLING ACOUSTIC SOURCE IN MARINE SEISMIC OPERATIONS.OTHER KEYWORDS: TOW WINCH CONTROL*

3496532 *SYNCHRONIZED SEISMIC EXPLORATION SYSTEM*
OTHER KEYWORDS: SEISMIC SURVEY METHOD

3500949 *MARINE SEISMOGRAPHIC PROSPECTING*

3506085 *PNEUMATIC ACOUSTIC SOURCE EMPLOYING ELECTROMAGNETIC CONTROLLED VALVE*

3506955 *MULTILINE SEISMIC EXPLORATION*
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ; SEISMIC SURVEY METHOD

3509820 *SEISMIC CHARGE ASSEMBLY, SEISMIC CHARGE PRIMER, AND METHOD AND SYSTEM EXPLORATION*

3509959 *UNDERWATER SEISMIC EXPLORATION SYSTEM AND FIRING DEVICE AND CHARGE THEREFORE. OTHER KEYWORDS: SEISMIC SURVEY METHOD*

3509961 *UNDERWATER SEISMIC EXPLORATION*

3516053 *SPARK GENERATOR*

3525416 *AIR OPERATED UNDERWATER SEISMIC SOURCE*

3537542 *SPARKING DEVICES SUITABLE FOR SEISMIC PROSPECTING*

3545563 *DEVICE FOR EMITTING ACOUSTIC WAVES IN WATER*

SEISMIC HYDRAULIC ACOUSTIC TRANSMITTER

3376949 *WATER HAMMER MARINE SEISMIC SOURCE*

3481426 *SEISMIC WAVE SOURCE FOR MARINE PROSPECTING*

3536157 *UNDERWATER SOUND SOURCES*

3540543 *MARINE ACOUSTIC ENERGY SOURCE*
OTHER KEYWORDS: SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

SEISMIC HYDROPHONE

3320578 ELECTROACOUSTIC TRANSDUCERS FOR SUBMARINE ECHO SOUNDING
OTHER KEYWORDS: SONAR, DEPTH SOUNDER

3325778 SEISMIC SONOBUOY
OTHER KEYWORDS: BUOY, INSTRUMENTED ; SEISMIC SURVEY METHOD

3332057 SINGLE CARDIOID WAVE DETECTOR FOR SEISMIC SIGNALS

3346838 PRESSURE SENSITIVE DETECTOR FOR MARINE SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY

3382481 CANTILEVER MOUNTED HYDROPHONE

3432000 SUBMERSIBLE DETECTOR FOR SENSING UNDERWATER SOUNDS
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3434104 HYDROPHONE CABLE
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3489995 PRESSURE TRANSDUCER

3509522 SHATTERPROOF HYDROPHONE
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3545274 SEA WATER DEPTH TRANSDUCER AND SYSTEM
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ;
SEISMIC HYDROPHONE ARRAY

SEISMIC HYDROPHONE ARRAY

3317890 OVERWATER SEISMIC EXPLORATION METHOD AND APPARATUS
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; SEISMIC SURVEY METHOD

3335401 NOISE-FILTERED DETECTION OF MARINE SEISMIC SIGNALS
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3346838 PRESSURE SENSITIVE DETECTOR FOR MARINE SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC HYDROPHONE

3414874 SEISMIC SURVEY SYSTEMS
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ;
SEISMIC STREAMER CABLE ; SEISMIC SURVEY METHOD;
SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

3434451 METHOD AND APPARATUS FOR UNDERWATER TOWING
OF SEISMIC HYDROPHONE ARRAYS. OTHER KEYWORDS:
TOWED BODY DEPTH CONTROL

3436722 EXTENDABLE INTRASECTION HYDROPHONE ARRAYS
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3437171 MARINE HYDROPHONE VIBRATION ISOLATION
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3437989 APPARATUS AND METHOD FOR CONTINUOUS MARINE MULTICHANNEL
SEISMIC EXPLORATION. OTHER KEYWORDS: SEISMIC RECORD PROCESSOR ;
SEISMIC SURVEY METHOD

3439319 MARINE SEISMIC CABLE WITH DEPTH DETECTOR SYSTEM
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE

3441902 EXTENDABLE INTERSECTION HYDROPHONE ARRAYS
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3539979 HYDROPHONE ARRAY ERECTION
OTHER KEYWORDS: BUOY,INSTRUMENTED ; INSTRUMENT DEPLOYMENT

3545274 SEA WATER DEPTH TRANSDUCER AND SYSTEM
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC HYDROPHONE

SEISMIC IMPLOSIVE ACOUSTIC TRANSMITTER

3349867 VACUUM ENERGIZED SEISMIC PULSE GENERATOR

3369627 MECHANICAL IMPLODER AND METHOD FOR GENERATING UNDER WATER SEISMIC SIGNALS

3522862 METHOD AND MEANS FOR GENERATING ACOUSTIC PRESSURE IN FLUID MEDIUM

SEISMIC RECORD PROCESSOR

3346839 ECHO-SOUNDING APPARATUS FOR EXAMINING STRATA BELOW THE SEABED WITH VARIABLE GAIN MEANS RESPONSIBLE TO SEABED ECHOES
OTHER KEYWORDS: SONAR, DEPTH SOUNDER

3350682 ECHO SOUNDING APPARATUS
OTHER KEYWORDS: SONAR, DEPTH SOUNDER

3351899 PROGRAMMED MULTIPLE SHOT SOURCE SYSTEM AND METHOD
OTHER KEYWORDS: SEISMIC SURVEY METHOD

3398395 SEISMIC AMPLIFIER SYSTEM WITH PREPROGRAMMED GAIN CONTROL

3399745 RECORDING ELASTIC WAVES WITH VARYING TRAVEL TIMES
OTHER KEYWORDS: SEISMIC SURVEY METHOD

3409871 ELIMINATION OF MULTIPLE EVENTS ON SEISMOGRAMS OBTAINED AT WATER-COVERED AREAS OF THE EARTH

3418625 METHODS AND APPARATUS FOR ATTENUATING THE EFFECTS OF MULTIPLE SEISMIC REFLECTIONS. OTHER KEYWORDS: SONAR, DEPTH SOUNDER

3432805 TIME BREAK CORRECTOR FOR MARINE SEISMIC SIGNAL
OTHER KEYWORDS: SEISMIC SURVEY METHOD

3437989 APPARATUS AND METHOD FOR CONTINUOUS MARINE MULTICHANNEL SEISMIC EXPLORATION. OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY ; SEISMIC SURVEY METHOD

3437990 READ AFTER WRITE DIGITAL FIELD SYSTEM MONITOR

3489996 SIGNAL PROCESSING SYSTEM

3525072 METHOD AND APPARATUS FOR PROCESSING SEISMIC DATA IN THE FIELD
OTHER KEYWORDS: SEISMIC SURVEY METHOD

SEISMIC STREAMER CABLE

3299397 UNDERWATER DETECTOR STREAMER APPARATUS FOR IMPROVING THE FIDELITY OF RECORDED SEISMIC SIGNALS

3299399 METHODS AND APPARATUS FOR INDICATING AN UNDERWATER PARAMETER IN A MARINE SEISMIC SYSTEM
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT

3310019 FLOATS
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; TOWED VEHICLE

3317890 OVERWATER SEISMIC EXPLORATION METHOD AND APPARATUS
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY ; SEISMIC SURVEY METHOD

3319734 *ELASTIC DETECTION STREAMER DEAD SECTION FOR A WATER BORNE SEISMIC SURVEYING SYSTEM*

3332058 *DEPTH CONTROL SYSTEM FOR MARINE SEISMIC SURVEYING*
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3335401 *NOISE-FILTERED DETECTION OF MARINE SEISMIC SIGNALS*
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY

3351898 *METHOD AND APPARATUS FOR MONITORING THE CONDITION OF A MARINE SEISMIC DETECTOR CABLE*

3354984 *DEPTH CONTROLLED MARINE SEISMIC DETECTION CABLE*
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3359536 *CONTROL OF MARINE SEISMIC SYSTEMS*
OTHER KEYWORDS: SEISMIC SURVEY METHOD ; TOWING CABLE

3369216 *SYSTEM FOR REDUCING THE TRANSMISSION OF NOISE IN MARINE SEISMIC SURVEYING. OTHER KEYWORDS: TOWED BODY DEPTH CONTROL ; TOWING CABLE*

3371311 *TOWED PRESSURE TRANSDUCERS WITH VIBRATION ISOLATION*

3371739 *MEANS FOR VARIABLY CONTROLLING THE BUOYANCY OF A SEISMIC DETECTION STREAMER. OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; TOWED BODY DEPTH CONTROL*

3372666 *DEPTH CONTROLLER*
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; TOWED BODY DEPTH CONTROL ; TOWED VEHICLE

3374852 *HYDROPHONE SUSPENSION SYSTEM FOR MAINTAINING HYDROPHONE FOR A PRESELECTED DEPTH. OTHER KEYWORDS: TOWED BODY DEPTH CONTROL*

3375800 *SEISMIC CABLE DEPTH CONTROL APPARATUS*
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3376948 *STREAMER COUPLER*

3378815 *HYDROPHONE EEL STRUCTURE FOR UNDERWATER SEISMIC EXPLORATION*

3385391 *METHODS AND APPARATUS FOR CONTROLLING DEPTH OF MARINE SEISMIC CABLE*
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3398394 *MARINE SEISMIC ARRAY DEPTH CONTROL*
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; TOWED BODY DEPTH CONTROL

3398715 *SEISMIC UNDERWATER DETECTOR SYSTEM*
OTHER KEYWORDS: TOWING CABLE

3412704 *CABLE DEPTH CONTROLLER*
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; TOWED BODY DEPTH CONTROL

3414874 *SEISMIC SURVEY SYSTEMS*
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ; SEISMIC HYDROPHONE ARRAY ; SEISMIC SURVEY METHOD ; SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

3424267 *MARINE SEISMIC CABLE SUPPORT SYSTEM*
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3425506 *OFFSHORE SEISMIC STREAMER DEPTH CONTROL SYSTEM*
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; TOWED BODY DEPTH CONTROL

3432000 *SUBMERSIBLE DETECTOR FOR SENSING UNDERWATER SOUNDS*
OTHER KEYWORDS: SEISMIC HYDROPHONE

3434104 HYDROPHONE CABLE
OTHER KEYWORDS: SEISMIC HYDROPHONE

3434446 REMOTELY CONTROLLABLE PRESSURE RESPONSIVE APPARATUS
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; TOWED BODY DEPTH CONTROL

3435410 SHALLOW WATER SEISMIC PROSPECTING CABLE
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3435797 COMPRESSED AIR,PRESSURE-SENSING ACTUATOR
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3436722 EXTENDABLE INTRASECTION HYDROPHONE ARRAYS
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY

3437171 MARINE HYDROPHONE VIBRATION ISOLATION
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY

3439319 MARINE SEISMIC CABLE WITH DEPTH DETECTOR SYSTEM
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC HYDROPHONE ARRAY

3440992 STREAMER CABLE DEPTH CONTROL
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; TOWED BODY DEPTH CONTROL

3441902 EXTENDABLE INTERSECTION HYDROPHONE ARRAYS
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY

3460064 CANCELLATION OF HORIZONTALLY TRAVELING NOISE
IN MARINE SEISMIC EXPLORATION.OTHER KEYWORDS:
SEISMIC ACOUSTIC TRANSMITTER ARRAY ; SEISMIC SURVEY METHOD

3469551 GEOPHYSICAL TOW BUOY
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3471827 HYDROSTATIC-PRESSURE COMPENSATING HYDROPHONE STRUCTURE

3480907 NEUTRALLY BUOYANT HYDROPHONE STREAMER
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3496526 SEISMIC CABLE DEPTH CONTROL SYSTEM
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; TOWED BODY DEPTH CONTROL

3509522 SHATTERPROOF HYDROPHONE
OTHER KEYWORDS: SEISMIC HYDROPHONE

3518677 ELECTRIC MARINE CABLE

3531761 DEPTH CONTROLLERS FOR SEISMIC STREAMER CABLES
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3531762 DEPTH CONTROLLERS FOR SEISMIC STREAMER CABLES
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3541989 HYDROPNEUMATIC MEASUREMENT AND CONTROL FROM BUOYED BODIES
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ;
TOWED BODY DEPTH CONTROL ; TOWED VEHICLE

SEISMIC SURVEY METHOD

3317890 OVERWATER SEISMIC EXPLORATION METHOD AND APPARATUS
OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY ; SEISMIC STREAMER CABLE

3325778 SEISMIC SONOBUOY
OTHER KEYWORDS: BUOY,INSTRUMENTED ; SEISMIC HYDROPHONE

3331050 METHOD OF UNDERWATER SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ;
SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3350683 OPTIMUM DETECTOR TYPE AND DEPTH IN MARINE SEISMIC EXPLORATION

3351899 PROGRAMMED MULTIPLE SHOT SOURCE SYSTEM AND METHOD
OTHER KEYWORDS: SEISMIC RECORD PROCESSOR

3359536 CONTROL OF MARINE SEISMIC SYSTEMS
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWING CABLE

3368191 CONTINUOUS MARINE SEISMIC EXPLORATION
WITH MULTIPLE SUBSURFACE COVERAGE

3372369 ACOUSTIC METHOD FOR MAPPING UNDERWATER TERRAIN EMPLOYING
LOW FREQUENCY CONTINUOUS ACOUSTIC WAVES AND FIXEDLY
SEPARATED TRANSDUCERS.OTHER KEYWORDS: SEABED PROPERTY MEASUREMENT ;
TOWED BODY DEPTH CONTROL

3379273 POWERFUL SOUND IMPULSE GENERATION METHODS AND APPARATUS
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ;
TOWED VEHICLE

3399745 RECORDING ELASTIC WAVES WITH VARYING TRAVEL TIMES
OTHER KEYWORDS: SEISMIC RECORD PROCESSOR

3401660 SEISMIC SHIP
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ;
SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

3413596 CONTINUOUS WAVE MARINE SEISMIC EXPLORATION

3414874 SEISMIC SURVEY SYSTEMS
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ;
SEISMIC HYDROPHONE ARRAY ; SEISMIC STREAMER
CABLE ; SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

3416629 METHOD OF MOVING A SEISMIC CABLE IN UNNAVIGABLE WATERS

3416631 DIGITAL REMOTE FIRING SYSTEM
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3432805 TIME BREAK CORRECTOR FOR MARINE SEISMIC SIGNAL
OTHER KEYWORDS: SEISMIC RECORD PROCESSOR

3437989 APPARATUS AND METHOD FOR CONTINUOUS MARINE MULTICHANNEL
SEISMIC EXPLORATION OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY ;
SEISMIC RECORD PROCESSOR

3460064 CANCELLATION OF HORIZONTALLY TRAVELING NOISE
IN MARINE SEISMIC EXPLORATION OTHER KEYWORDS:
SEISMIC ACOUSTIC TRANSMITTER ARRAY ; SEISMIC STREAMER CABLE

3479638 BEAMFORMING IN SEISMIC SURVEYING
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ;
SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3491848 WAVE GENERATOR ARRAYS FOR MARINE SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ;
SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ; TOWED BODY DEPTH CONTROL

3496532 SYNCHRONIZED SEISMIC EXPLORATION SYSTEM
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3506955 MULTILINE SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ;
SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3509959 UNDERWATER SEISMIC EXPLORATION SYSTEM AND FIRING DEVICE AND CHARGE THEREFOR. OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3525072 METHOD AND APPARATUS FOR PROCESSING SEISMIC DATA IN THE FIELD
OTHER KEYWORDS: SEISMIC RECORD PROCESSOR

SEISMIC VIBRATORY ACOUSTIC TRANSMITTER

3322231 METHODS AND SYSTEMS UTILIZING LASERS FOR GENERATING SEISMIC ENERGY
OTHER KEYWORDS: INSTRUMENT, LASER

3349367 ELECTROHYDROSONIC TRANSDUCER

3365019 SEISMIC VIBRATOR FOR MARSHLAND AND SUBMARINE USE

3370672 SEISMIC RADIATOR
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3373841 METHOD AND APPARATUS FOR GENERATING SOUND WAVES

3384868 MARINE VIBRATORY DEVICE

3401660 SEISMIC SHIP
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ; SEISMIC SURVEY METHOD

3414874 SEISMIC SURVEY SYSTEMS
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ; SEISMIC HYDROPHONE ARRAY ; SEISMIC STREAMER CABLE ; SEISMIC SURVEY METHOD

3430727 SEISMIC SIGNAL TRANSDUCING APPARATUS
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

3482646 MARINE VIBRATOR DEVICES

3540543 MARINE ACOUSTIC ENERGY SOURCE
OTHER KEYWORDS: SEISMIC HYDRAULIC ACOUSTIC TRANSMITTER

SLOPE PROTECTION

3301148 PAVING BLOCK
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION ; REVETMENT

3343370 EARTH EMBANKMENT WITH INTERNAL WATER BARRIER
OTHER KEYWORDS: FABRIC MAT

3343468 PAVING BLOCK
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION ; REVETMENT

3373568 SYSTEM FOR RECLAMATION OF LAND
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; SANDBAG ; WAVE ABSORBER BEACH

3380254 PROTECTIVE LININGS AND METHOD OF FORMING THE SAME IN WATERCOURSES
OTHER KEYWORDS: ASPHALT ; GABION ; REVETMENT

3383864 METHOD OF PROTECTING OR REPAIRING SCOURED AREAS OF SITUS
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; REVETMENT

3386252 RIP RAP STRUCTURE DEVICE
OTHER KEYWORDS: CONCRETE BLOCK ; REVETMENT

3412561 *REED-TRENCH TERRACING*
OTHER KEYWORDS: LOW-COST SHORE PROTECTION

3421417 *PAVEMENT*
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION ; REVETMENT

3425227 *FORM FOR CONSTRUCTING A SLAB FOR TALUS OR BOTTOM PROTECTION*
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; REVETMENT

3425228 *FABRIC FORMS FOR CONCRETE STRUCTURES*
OTHER KEYWORDS: BREAKWATER,CONCRETE ; CONCRETE FORM ; FABRIC MAT ; GROIN

3455112 *INSTALLATION FOR PROTECTING SURF-ENDANGERED COASTAL SECTORS*
OTHER KEYWORDS: FABRIC MAT ; WAVE ABSORBER BEACH

3474626 *METHOD AND MEANS FOR PROTECTING BEACHES*
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; REVETMENT

3486341 *FORM FOR CONCRETE OR THE LIKE*
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; SEABED SCOUR PROTECTION

3516255 *CONCRETE COMPONENT OR BLOCK FOR A PROTECTIVE COVERING STRUCTURE*
OTHER KEYWORDS: BREAKWATER,RUBBLE ; CONCRETE ARMOR UNIT ; SEAWALL

3517514 *SOIL PROTECTION MATS*
OTHER KEYWORDS: ARTIFICIAL SEAWEED ; FABRIC MAT ; REVETMENT

3520142 *METHOD AND MEANS FOR PROTECTING AN EARTH SITUS AGAINST SCOUR*
OTHER KEYWORDS: CONCRETE FORM ; FABRIC MAT ; LOW-COST SHORE PROTECTION ; REVETMENT

3534668 *PAVEMENT BLOCK*
OTHER KEYWORDS: CONCRETE BLOCK ; LOW-COST SHORE PROTECTION ; REVETMENT

SMALL-CRAFT LAUNCHER

3326005 *RETAINING WALL FOR WATERWAYS*
OTHER KEYWORDS: BULKHEAD ; REVETMENT

3353363 *PORTABLE BOAT RAMP*

3385458 *BOAT STORAGE RACK*
OTHER KEYWORDS: SMALL-CRAFT SERVICE STRUCTURE

3401806 *BOAT HANDLING DEVICE*
OTHER KEYWORDS: SMALL-CRAFT SERVICE STRUCTURE

3402828 *BOAT LIFTING AND MOORING DEVICE*
OTHER KEYWORDS: SMALL-CRAFT SERVICE STRUCTURE

3409153 *BOAT HOIST*

3504502 *LIFT DOCK FOR A WATER BORNE VESSEL*

SMALL-CRAFT MOORING DEVICE

3307514 *BOAT MOORING DEVICE*

3329117 *DEVICE FOR MOORING BOATS*
OTHER KEYWORDS: PIER,FLOATING ; SMALL-CRAFT PIER

3330244 *DEVICE FOR DOCKING BOATS*

3349745 DEVICE FOR FASTENING LINES

3373714 SMALL BOAT RESTRAINERS

3398714 SECURING MEANS FOR ROPES; HAWSERS AND THE LIKE

3406651 BOAT-MOORING MEANS

3429289 MOORING DEVICE

3430598 MOORING DEVICE

3430599 MOORING DEVICE

3430600 MOORING DEVICE

3449917 PORTABLE BOAT DOCK FENDERS
OTHER KEYWORDS: PIER FENDER

3462960 MOORING DEVICE FOR BOATS
OTHER KEYWORDS: PIER FENDER ; PILE PROTECTION

3464214 WATERCRAFT MOORING DEVICE
OTHER KEYWORDS: PIER FENDER

3473505 MOORING DEVICE

3475914 BOAT BUMPER
OTHER KEYWORDS: PIER FENDER ; PILE PROTECTION

3486342 PILE MOORING BUMPER
OTHER KEYWORDS: PILE PROTECTION

3492963 MOORING LINE STAND-OFF BARS

3495565 POST INTENDED FOR MOORING BOATS OR FOR ANALOGOUS PURPOSES
OTHER KEYWORDS: ICE PROTECTION

3509727 INSTALLATION FOR DRY-STORING OF WATERCRAFT
OTHER KEYWORDS: SMALL-CRAFT SERVICE STRUCTURE

SMALL-CRAFT PIER

3306053 MARINE FACILITIES
OTHER KEYWORDS: PIER FENDER ; PIER,FLOATING

3323479 FLOATING DOCK STRUCTURE
OTHER KEYWORDS: PIER,FLOATING

3329117 DEVICE FOR MOORING BOATS
OTHER KEYWORDS: PIER,FLOATING ; SMALL-CRAFT MOORING DEVICE

3345825 PORTABLE DOCK
OTHER KEYWORDS: PIER,MOBILE

3380257 PORTABLE DOCK
OTHER KEYWORDS: PIER,MOBILE

3397546 ROLL OUT-ROLL IN DOCK
OTHER KEYWORDS: PIER,MOBILE

3421327 DOCK HINGE
OTHER KEYWORDS: PIER,FIXED

3442238 FLOATING LANDING-STAGE
OTHER KEYWORDS: PIER,FLOATING

3448709 *MARINE FLOAT CONSTRUCTION*
OTHER KEYWORDS: CONCRETE FORM ; PIER,FLOATING

3455115 *FLOATING STRUCTURES*
OTHER KEYWORDS: PIER, FLOATING

3470700 *WATER TURBULENCE PRODUCING AIR BUBBLING SYSTEM FOR BOAT DOCKS*
OTHER KEYWORDS: ICE PROTECTION ; PIER,FIXED

3478710 *FLOATING DOCK STRUCTURE*
OTHER KEYWORDS: CONCRETE FORM ; PIER,FLOATING

3488968 *BOAT LANDING STAGES AND THE LIKE*
OTHER KEYWORDS: PIER,FIXED

3503467 *LADDER FOR BOAT DOCK,SEAWALL,OR THE LIKE*
OTHER KEYWORDS: SEAWALL

3521588 *MOVABLE FLOATING BOAT ANCHORAGE*
OTHER KEYWORDS: PIER,FLOATING ; PIER,MOBILE

3532440 *TIDALLY OPERATED SYSTEM FOR PUMPING WATER OUT OF BOATS AND FLOATING DOCKS.OTHER KEYWORDS: PIER,FLOATING ; POWER,TIDE ; PUMP*

3543523 *STRUCTURAL DOCK SYSTEM*
OTHER KEYWORDS: ICE PROTECTION ; PIER FIXED ; PILE PROTECTION

SMALL-CRAFT SERVICE STRUCTURE

3315627 *PNEUMATICALLY OPERATED FLOATING DRY DOCK*

3362172 *INDIVIDUAL DRY DOCK FOR BOATS*

3385458 *BOAT STORAGE RACK*
OTHER KEYWORDS: SMALL-CRAFT LAUNCHER

3390530 *MULTILEVEL BOAT HARBOR*

3398540 *MULTILEVEL BOAT HARBOR*

3401806 *BOAT HANDLING DEVICE*
OTHER KEYWORDS: SMALL-CRAFT LAUNCHER

3402828 *BOAT LIFTING AND MOORING DEVICE*
OTHER KEYWORDS: SMALL-CRAFT LAUNCHER

3406649 *METHOD AND APPARATUS FOR DRYDOCKING A BOAT HULL OR OTHER FLOATING STRUCTURE IN A BODY OF WATER*

3412702 *FLOATING DRY DOCK FOR SMALL BOATS*

3509727 *INSTALLATION FOR DRY-STORING OF WATERCRAFT*
OTHER KEYWORDS: SMALL-CRAFT MOORING DEVICE

SONAR,DEPTH SOUNDER

3296579 *CONTOUR MAP GENERATOR*
OTHER KEYWORDS: SONAR,SIDE LOOKING

3307143 *SONAR DEVICE*

3307144 *BATHYMETRY*
OTHER KEYWORDS: INSTRUMENT,AIRBORNE ; SEABED SITE SURVEY

3309650 *PULSE-ECHO SOUNDER SYSTEM*

3314045 *ECHO SOUNDERS*

3315221 TRANSMISSION AND RECORDING OF SIGNALS IN ECHO-SOUNDING APPARATUS

3316530 ECHO-SOUNDING APPARATUS WITH STABILIZED NARROW BEAM

3320578 ELECTROACOUSTIC TRANSDUCERS FOR SUBMARINE ECHO SOUNDING
OTHER KEYWORDS: SEISMIC HYDROPHONE

3324451 ECHO RANGING AND RECORDING APPARATUS

3346839 ECHO-SOUNDING APPARATUS FOR EXAMINING STRATA BELOW THE SEABED WITH VARIABLE GAIN MEANS RESPONSIVE TO SEABED ECHOES
OTHER KEYWORDS: SEISMIC RECORD PROCESSOR

3350682 ECHO SOUNDING APPARATUS
OTHER KEYWORDS: SEISMIC RECORD PROCESSOR

3353149 ACOUSTIC RANGING SYSTEM
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3363225 RANGING APPARATUS
OTHER KEYWORDS: SONAR, SIDE LOOKING

3363226 DATA PROCESSING SYSTEM

3373399 SONAR BOTTOM TRACKING RECORDING SYSTEM

3381264 SUBMARINE TOPOGRAPHY
OTHER KEYWORDS: SONAR, SIDE LOOKING

3386075 SUPERSONIC WAVE RECORDING DEVICE

3417369 PULSE ECHO RECORDING
OTHER KEYWORDS: SONAR, SIDE LOOKING

3418625 METHODS AND APPARATUS FOR ATTENUATING THE EFFECTS OF MULTIPLE SEISMIC REFLECTIONS. OTHER KEYWORDS: SEISMIC RECORD PROCESSOR

3473500 SUPPORT FOR ECHO SOUNDERS

3478308 SEA BOTTOM CLASSIFIER
OTHER KEYWORDS: SEABED PROPERTY MEASUREMENT

3500302 SONAR BATHYMETRY SYSTEM TRANSMIT-RECEIVE SEQUENCE PROGRAMMER

3548370 DEPTH SOUNDER

SONAR, SIDE LOOKING

3296579 CONTOUR MAP GENERATOR
OTHER KEYWORDS: SONAR, DEPTH SOUNDER

3304532 SIDE-LOOKING SONAR SYSTEM

3363225 RANGING APPARATUS
OTHER KEYWORDS: SONAR, DEPTH SOUNDER

3381264 SUBMARINE TOPOGRAPHY
OTHER KEYWORDS: SONAR, DEPTH SOUNDER

3417369 PULSE ECHO RECORDING
OTHER KEYWORDS: SONAR, DEPTH SOUNDER

STRUCTURE INSPECTION

3331211 PILE INSPECTION AND REPAIR CELL
OTHER KEYWORDS: PILE, CONCRETE ; PILE, WOOD ; STRUCTURE REPAIR

3426585 ULTRASONIC SYSTEM FOR INSPECTING SUBMERGED PILES
OTHER KEYWORDS: PILE,STEEL ; PILE,WOOD

3534477 METHOD,SYSTEM AND APPARATUS FOR SURVEYING REVETMENTS
OTHER KEYWORDS: REVETMENT ; SEABED SITE SURVEY ;
SEDIMENTATION MEASUREMENT

STRUCTURE REPAIR

3307362 POSTING PILING
OTHER KEYWORDS: PILE SECTION CONNECTION ; PILE,WOOD

3331211 PILE INSPECTION AND REPAIR CELL
OTHER KEYWORDS: PILE,CONCRETE ; PILE,WOOD ; STRUCTURE INSPECTION

3338058 ADJUSTABLE COMPOSITE FORM
OTHER KEYWORDS: CONCRETE FORM ; PILE,CONCRETE ; PILE,STEEL ;
PILE,WOOD

3345824 METHOD AND MEANS FOR BRACING OR BOLSTERING SUBAQUEOUS STRUCTURES
OTHER KEYWORDS: GROUTING ; SANDBAG ; SEABED FOUNDATION

3377808 CAP ASSEMBLY FOR PILE SHELL
OTHER KEYWORDS: CONCRETE FORM ; PILE,STRUCTURE CONNECTION ;
PILE,WOOD

3397260 METHOD FOR ENCASING RIGID MEMBERS WITH CONCRETE
OTHER KEYWORDS: CONCRETE FORM ; PILE PROTECTION

3410097 PILE CAPPING MECHANISM
OTHER KEYWORDS: CONCRETE FORM ; PILE,WOOD

3412565 METHOD OF STRENGTHENING FOUNDATION PILING
OTHER KEYWORDS: PILE PROTECTION ; SEABED FOUNDATION

3483707 METHOD FOR REINFORCING STEEL PIPE PILING IN SITU
AND THE RESULTANT PILING.OTHER KEYWORDS: CONCRETE FORM ;
OFFSHORE CONSTRUCTION ; PILE,CONCRETE ; PILE,STEEL

3505825 SYSTEM FOR REPLACING DETERIORATED WOOD PILING
OTHER KEYWORDS: CONCRETE FORM ; PILE,CONCRETE ; PILE,WOOD

3524231 CIRCULAR UNDERWATER FORM WITH LOCK
OTHER KEYWORDS: COATING ; CORROSION PREVENTION ; PILE PROTECTION

TIDAL ESTUARY WATER LEVEL

3426540 TIDEWATER POWER GENERATION SYSTEM
OTHER KEYWORDS: CHANNEL BARRIER ; ELECTRICAL GENERATOR ; POWER,TIDE

TIDAL ESTUARY WATER QUALITY

3492822 TIDAL FLUSHING SYSTEM
OTHER KEYWORDS: CHANNEL BARRIER ; TIDAL INLET

TIDAL INLET

3492822 TIDAL FLUSHING SYSTEM
OTHER KEYWORDS: CHANNEL BARRIER ; TIDAL ESTUARY WATER QUALITY

TIDE MEASUREMENT

3444734 DEEP WATER TIDE RECORDER
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT

3473376 PURE-FLUID TIDE GAUGE

3475834 HYDRAULIC MODELS
OTHER KEYWORDS: HYDRAULIC MODEL BASIN

3524313 TIDE CLOCK

3549992 ELECTRICAL APPARATUS RESPONSIVE TO INDUCTIVE REACTANCE FOR MEASURING DISTANCE ALONG A PAIR OF CONDUCTORS.OTHER KEYWORDS: WAVE MEASUREMENT

TIRES

3353361 BREAKWATER
OTHER KEYWORDS: BREAKWATER,CONCRETE ; LOW-COST SHORE PROTECTION

3357192 BREAKWATERS
OTHER KEYWORDS: BREAKWATER,FLOATING ; LOW-COST SHORE PROTECTION

TOW WINCH CONTROL

3494443 TOWBOAT SYSTEM FOR HANDLING ACOUSTIC SOURCE IN MARINE SEISMIC OPERATIONS.OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER

TOWED BODY DEPTH CONTROL

3332058 DEPTH CONTROL SYSTEM FOR MARINE SEISMIC SURVEYING
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3353149 ACOUSTIC RANGING SYSTEM
OTHER KEYWORDS: SONAR,DEPTH SOUNDER

3354984 DEPTH CONTROLLED MARINE SEISMIC DETECTION CABLE
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3369216 SYSTEM FOR REDUCING THE TRANSMISSION OF NOISE IN MARINE SEISMIC SURVEYING.OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWING CABLE

3371739 MEANS FOR VARIABLY CONTROLLING THE BUOYANCY OF A SEISMIC DETECTION STREAMER.OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE

3372369 ACOUSTIC METHOD FOR MAPPING UNDERWATER TERRAIN EMPLOYING LOW FREQUENCY CONTINUOUS ACOUSTIC WAVES AND FIXEDLY SEPARATED TRANSDUCERS. OTHER KEYWORDS: SEABED PROPERTY MEASUREMENT ; SEISMIC SURVEY METHOD

3372666 DEPTH CONTROLLER
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE ; TOWED VEHICLE

3374852 HYDROPHONE SUSPENSION SYSTEM FOR MAINTAINING HYDROPHONE FOR A PRESELECTED DEPTH.OTHER KEYWORDS: SEISMIC STREAMER CABLE

3375800 SEISMIC CABLE DEPTH CONTROL APPARATUS
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3385391 METHODS AND APPARATUS FOR CONTROLLING DEPTH OF MARINE SEISMIC CABLE
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3392695 DEEP TOWING METHOD AND APPARATUS
OTHER KEYWORDS: TOWED VEHICLE

3398394 MARINE SEISMIC ARRAY DEPTH CONTROL
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE

3404565 TOWED OCEANOGRAPHIC SENSOR SYSTEM
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT,TOWED ; TOWING CABLE ; TOWED VEHICLE

3412704 CABLE DEPTH CONTROLLER
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE

3424267 MARINE SEISMIC CABLE SUPPORT SYSTEM
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3425506 OFFSHORE SEISMIC STREAMER DEPTH CONTROL SYSTEM
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE

3434446 REMOTELY CONTROLLABLE PRESSURE RESPONSIVE APPARATUS
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE

3434451 METHOD AND APPARATUS FOR UNDERWATER TOWING OF SEISMIC HYDROPHONE ARRAYS, OTHER KEYWORDS: SEISMIC HYDROPHONE ARRAY

3435410 SHALLOW WATER SEISMIC PROSPECTING CABLE
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3435797 COMPRESSED AIR, PRESSURE-SENSING ACTUATOR
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3440992 STREAMER CABLE DEPTH CONTROL
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE

3452327 APPARATUS FOR SUPPORTING MARINE SEISMIC TRANSDUCER
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ; TOWING CABLE

3460384 DEPTH CONTROLLING DEVICE
OTHER KEYWORDS: PUMP

3469551 GEOPHYSICAL TOW BUOY
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3480907 NEUTRALLY BUOYANT HYDROPHONE STREAMER
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3491848 WAVE GENERATOR ARRAYS FOR MARINE SEISMIC EXPLORATION
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ; SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ; SEISMIC SURVEY METHOD

3495561 SALVAGE APPARATUS
OTHER KEYWORDS: POLLUTANT COLLECTION ; POLLUTANT,SUCTION REMOVAL ; POLLUTANT,SURFACE BARRIER

3496526 SEISMIC CABLE DEPTH CONTROL SYSTEM
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE

3531761 DEPTH CONTROLLERS FOR SEISMIC STREAMER CABLES
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3531762 DEPTH CONTROLLERS FOR SEISMIC STREAMER CABLES
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3541989 HYDROPNEUMATIC MEASUREMENT AND CONTROL FROM BUOYED BODIES
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE ; TOWED VEHICLE

TOWED VEHICLE

3310019 FLOATS
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; SEISMIC STREAMER CABLE

3372666 *DEPTH CONTROLLER*
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL

3379273 *POWERFUL SOUND IMPULSE GENERATION METHODS AND APPARATUS*
OTHER KEYWORDS: SEISMIC EXPLOSIVE ACOUSTIC TRANSMITTER ; SEISMIC SURVEY METHOD

3392695 *DEEP TOWING METHOD AND APPARATUS*
OTHER KEYWORDS: TOWED BODY DEPTH CONTROL

3404565 *TOWED OCEANOGRAPHIC SENSOR SYSTEM*
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT,TOWED ; TOWED BODY DEPTH CONTROL ; TOWING CABLE

3417251 *TOWED INSTRUMENT FOR CONTINUOUS MEASURING OF OCEAN TURBIDITY*
OTHER KEYWORDS: INSTRUMENT,TOWED ; POLLUTANT MEASUREMENT

3448432 *ISOLATOR FOR TOWED HYDROPHONE*
OTHER KEYWORDS: INSTRUMENT,TOWED

3458857 *ACCELERATION CANCELLING HYDROPHONE*
OTHER KEYWORDS: INSTRUMENT,TOWED

3501953 *BATHYKYMOGRAPH AND METHOD*
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; INSTRUMENT,TOWED

3541989 *HYDROPNEUMATIC MEASUREMENT AND CONTROL FROM BUOYED BODIES*
OTHER KEYWORDS: DEPTH PRESSURE MEASUREMENT ; SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL

TOWING CABLE

3343515 *MINIMUM WIDTH TOWLINE WITH DAMAGE SHIELD*
OTHER KEYWORDS: INSTRUMENT CABLE

3343516 *MINIMUM WIDTH TOWLINES WITH STRETCHABLE ELECTRICAL CABLE AND IMPROVED CLAMPING MEANS. OTHER KEYWORDS: INSTRUMENT CABLE*

3352274 *HIGH SPEED FAIRED TOWING CABLE*

3359536 *CONTROL OF MARINE SEISMIC SYSTEMS*
OTHER KEYWORDS: SEISMIC STREAMER CABLE ; SEISMIC SURVEY METHOD

3368514 *SYMMETRICAL SELF-ALIGNING CABLE FAIRING*

3369216 *SYSTEM FOR REDUCING THE TRANSMISSION OF NOISE IN MARINE SEISMIC SURVEYING.OTHER KEYWORDS: SEISMIC STREAMER CABLE ; TOWED BODY DEPTH CONTROL*

3379161 *TOWLINES WITH MINIMUM WIDTH FAIRINGS*

3398715 *SEISMIC UNDERWATER DETECTOR SYSTEM*
OTHER KEYWORDS: SEISMIC STREAMER CABLE

3404565 *TOWED OCEANOGRAPHIC SENSOR SYSTEM*
OTHER KEYWORDS: INSTRUMENT DEPLOYMENT ; INSTRUMENT,TOWED ; TOWED BODY DEPTH CONTROL ; TOWED VEHICLE

3440991 *HAIR FAIRED CABLE*

3440993 *CABLE FAIRING*
OTHER KEYWORDS: INSTRUMENT CABLE

3452327 *APPARATUS FOR SUPPORTING MARINE SEISMIC TRANSDUCER*
OTHER KEYWORDS: SEISMIC ACOUSTIC TRANSMITTER ARRAY ; TOWED BODY DEPTH CONTROL

3461830 FAIRINGS FOR A MARINE TOWLINE

3467047 MINIMUM-WIDTH CONTINUOUSLY FAIRED TOWLINE
OTHER KEYWORDS: INSTRUMENT CABLE

3472196 FAIRINGS FOR UNDERWATER CABLES; TOWLINES AND STRUCTURAL MEMBERS

WATER PLANT REMOVAL

3295231 APPARATUS FOR REMOVING MATTER; PARTICULARLY WEED GROWTH FROM THE BOTTOM OF WATERWAYS

3311208 SUCTION ROLLER APPARATUS
OTHER KEYWORDS: POLLUTANT DEBRIS ; POLLUTANT, MECHANICAL REMOVAL

3363596 DUMP MEANS FOR MACHINE FOR HARVESTING UNDERWATER PLANT LIFE AND WEEDS

3412862 METHOD AND APPARATUS FOR CLEANING AREAS OVERLAIN BY A WATER BODY
OTHER KEYWORDS: DREDGE, SUCTION ; DREDGE INTAKE ; DREDGE PROPULSION

3520117 UNDERWATER WEED CUTTER MECHANISMS

3521387 DREDGING MACHINE
OTHER KEYWORDS: DREDGE, CUTTERHEAD ; DREDGE INTAKE ; SLOPE PROTECTION

3540194 METHOD OF REMOVING MARINE GROWTHS AND ROOTS
OTHER KEYWORDS: POLLUTANT, MECHANICAL REMOVAL ; POLLUTANT REMOVAL WATERCRAFT

WAVE ABSORBER BEACH

3373568 SYSTEM FOR RECLAMATION OF LAND
OTHER KEYWORDS: LOW-COST SHORE PROTECTION ; SANDBAG ; DREDGE PROPULSION

3455112 INSTALLATION FOR PROTECTING SURF-ENDANGERED COASTAL SECTORS
OTHER KEYWORDS: FABRIC MAT ; SLOPE PROTECTION

3513797 ENERGY-ABSORBING BEACH FOR SHIP'S WELLS AND TANKS
OTHER KEYWORDS: HYDRAULIC MODEL BASIN

WAVE FLUME

3473334 APPARATUS AND METHOD FOR PRODUCING WAVES
OTHER KEYWORDS: WAVE GENERATOR

3477233 WAVE MACHINE INSTALLATIONS
OTHER KEYWORDS: ICE PROTECTION ; WAVE GENERATOR

3478444 OCEAN CURRENT AND WAVE GENERATOR
OTHER KEYWORDS: WAVE GENERATOR

WAVE GENERATOR

3473334 APPARATUS AND METHOD FOR PRODUCING WAVES
OTHER KEYWORDS: WAVE FLUME

3477233 WAVE MACHINE INSTALLATIONS
OTHER KEYWORDS: ICE PROTECTION ; WAVE FLUME

3478444 OCEAN CURRENT AND WAVE GENERATOR
OTHER KEYWORDS: WAVE FLUME

WAVE MEASUREMENT

3301047 WAVE GAGE ARRAYS FOR OBTAINING OCEAN-WAVE SPECTRA
OTHER KEYWORDS: BUOY, INSTRUMENTED ; DEPTH PRESSURE MEASUREMENT

3301048 SEA STATE RECORDER
OTHER KEYWORDS: BUOY, INSTRUMENTED

3314287 STEP CAPACITANCE WAVE PROFILE RECORDER

3329015 STABILIZED BUOY ASSEMBLY
OTHER KEYWORDS: BUOY, INSTRUMENTED

3336799 FREE-FLOATING APPARATUS FOR MEASUPING
AND TELEMETERING SEA-WAVE CHARACTERISTICS
OTHER KEYWORDS: BUOY, INSTRUMENTED

3367181 DIRECTIONAL WAVE SPECTRA MEASURING DEVICES

3375715 SEA DIRECTION INDICATOR

3383915 DEEP-WATER WAVE RECORDER
OTHER KEYWORDS: BUOY, INSTRUMENTED

3397574 FLOAT FOR MEASURING WAVE CHARACTERISTICS AND DIRECTION
OTHER KEYWORDS: BUOY, INSTRUMENTED

3408864 WAVE HEIGHT MEASURING SYSTEM

3447554 BUOY STABILIZATION SYSTEM
OTHER KEYWORDS: BUOY, INSTRUMENTED

3449950 APPARATUS FOR WAVE ANALYSIS
OTHER KEYWORDS: BUOY, INSTRUMENTED ; DEPTH PRESSURE MEASUREMENT

3455159 NAUTICAL WEATHER STATION
OTHER KEYWORDS: BUOY, INSTRUMENTED ; ELECTRICAL GENERATOR ;
INSTRUMENT DEPLOYMENT ; INSTRUMENT POWER SUPPLY ; WIND MEASUREMENT

3463002 WAVE AMPLITUDE MEASURING APPARATUS
OTHER KEYWORDS: HYDRAULIC MODEL BASIN

3533697 WAVE HEIGHT MEASURING METHOD AND APPARATUS
OTHER KEYWORDS: INSTRUMENT, AIRBORNE

3534599 EXPENDABLE OCEAN-WAVE METER
OTHER KEYWORDS: BUOY, INSTRUMENTED ; DEPTH PRESSURE MEASUREMENT

3549992 ELECTRICAL APPARATUS RESPONSIVE TO INDUCTIVE REACTANCE
FOR MEASURING DISTANCE ALONG A PAIR OF CONDUCTORS
OTHER KEYWORDS: TIDE MEASUREMENT

WIND MEASUREMENT

3336802 DEVICE FOR AVERAGING WIND VELOCITY AND DIRECTION

3455159 NAUTICAL WEATHER STATION
OTHER KEYWORDS: BUOY, INSTRUMENTED ; ELECTRICAL GENERATOR ;
INSTRUMENT DEPLOYMENT ; INSTRUMENT POWER SUPPLY ; WAVE MEASUREMENT

WOOD PRESERVATIVE

3321924 PROTECTION OF SUBMERGED PILING
OTHER KEYWORDS: COATING ; PILE PROTECTION ; PILE, WOOD

Ray, Robert E.

An annotated bibliography of patents related to coastal engineering / by Robert E. Ray, Michael D. Dickey, and Annie M. Lyles. – Ft. Belvoir, Va. : U.S. Coastal Engineering Research Center ; Springfield, Va. : available from National Technical Information Service, 1979.
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