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1 Attorney Docket No. 78640

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3 UNDERWATER DEPLOYABLE TESTING PLATFORM

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5 STATEMENT OF GOVERNMENT INTEREST

6 The invention described herein may be manufactured and used
7 by or for the Government of the United States of America for
8 Governmental purposes without the payment of any royalties
9 thereon or therefor.

10

11 BACKGROUND OF THE INVENTION

12 (1) Field of the Invention

13 The invention relates to platforms for testing various
14 underwater devices and is directed more particularly to a
15 platform assembly which has facility for attachment to a surface
16 vessel and for being lowered beneath the water surface and
17 retained in an underwater position, and which can be moved about
18 in the water similarly to an underwater vehicle.

19 (2) Description of the Prior Art

20 To obtain an underwater test of a new apparatus, as for
21 example, a sonar receiver, it has been common practice to place
22 the receiver on a submersible vehicle, such as a submarine or an
23 unmanned underwater vehicle, which is able to travel and maneuver
24 underwater. In view of budget restraints, it has become
25 increasingly more difficult to obtain submersibles for the
26 purpose of testing underwater devices.

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1 Accordingly, there is a need for a test platform assembly,
2 which provides facility for underwater testing and which is
3 movable through the water and maneuverable, similar to a
4 submersible, but not requiring a submersible vehicle.

5

6 SUMMARY OF THE INVENTION

7 It is, therefore, an object of the invention to provide a
8 platform assembly for attachment to a surface vessel, and which
9 is adapted for disposition, in part, underwater, and which is
10 susceptible to being moved through the water and maneuvered
11 therein.

12 With the above and other objects in view, as will
13 hereinafter appear, a feature of the invention is the provision
14 of an underwater testing platform assembly comprising first and
15 second rails for disposition in part in a body of water. Each of
16 the rails is adapted for connection to a surface vessel, and the
17 rails are vertically oriented and spaced from each other in a
18 substantially parallel manner. A cage is mounted on the rails
19 and comprises a network of struts. A skid is mounted on, and is
20 movable in, the cage and is adapted to receive and retain
21 apparatus to be tested. First and second travelers are fixed to
22 the cage and are respectively movably mounted on the first and
23 second rails, such that the cage is vertically movable on the
24 first and second rails. Instrumentation is mounted on the cage.
25 A transmission line is connected to the instrumentation and

1 extends to a receiver on the surface vessel. The receiver is
2 adapted to receive data signals from the instrumentation.

3 In accordance with a further feature of the invention, there
4 is provided an underwater testing assembly comprising a surface
5 vessel having first and second connection structures on deck
6 proximate a side of the vessel and spaced from each other. Third
7 and fourth connection structures are fixed on a hull portion of
8 the vessel and on the same side of the vessel, each of the third
9 and fourth structures being in substantially vertical alignment
10 with one of the first and second structures. The assembly
11 further includes a test platform comprising first and second
12 rails for disposition in part in water supporting the vessel.
13 The rails are substantially parallel and are disposed
14 substantially vertically. The assembly still further includes a
15 test platform cage movably attached to the rails for disposition
16 beneath the water, the first rail being connectingly engageable
17 with the first and third connection structures, and the second
18 rail being connectingly engageable with the second and fourth
19 connection structures, such that the test platform cage is
20 attachable to the vessel by the first, second, third and fourth
21 connection structures.

22 The above and other features of the invention, including
23 various novel details of construction and combinations of parts,
24 will now be more particularly described with reference to the
25 accompanying drawings and pointed out in the claims. It will be
26 understood that the particular device embodying the invention is

1 shown by way of illustration only and not as a limitation of the
2 invention. The principles and features of this invention may be
3 employed in various and numerous embodiments without departing
4 from the scope of the invention.

5

6 BRIEF DESCRIPTION OF THE DRAWINGS

7 Reference is made to the accompanying drawings in which is
8 shown an illustrative embodiment of the invention, from which its
9 novel features and advantages will be apparent, wherein
10 corresponding reference characters indicate corresponding parts
11 throughout the several views of the drawings and wherein:

12 FIG. 1 is a diagrammatic perspective view of a surface
13 vessel and platform assembly illustrative of an embodiment of the
14 invention;

15 FIG. 2 is a perspective bow and outboard view, in part
16 diagrammatic, of the platform assembly of FIG. 1, and further
17 illustrative of the embodiment of the invention;

18 FIG. 3 is a perspective stern and inboard view of a portion
19 of the platform assembly of FIG. 2;

20 FIG. 4 is a top plan view of one rail of the platform
21 assembly of FIG. 2;

22 FIG. 5 is a diagrammatic illustration of means on deck of
23 the surface vessel for securing the platform assembly of FIG. 2
24 to the deck of the surface vessel;

1 FIG. 6 is a diagrammatic illustration of a means on the
2 surface vessel hull for securing the platform assembly of FIG. 2
3 to the hull of the surface vessel; and

4 FIG. 7 is a perspective view of a skid portion of the
5 platform assembly of FIGS. 2 and 3.

6
7 DESCRIPTION OF THE PREFERRED EMBODIMENT

8 Referring to FIG. 1, it will be seen that the platform
9 assembly 10 of the present invention is adapted for connection to
10 a surface vessel 12.

11 Turning to FIG. 2, the platform assembly 10 is seen to
12 include first and second rails 14, 16, preferably of a steel I-
13 beam construction. At the upper end of each rail 14, 16, there
14 is fixed a mounting plate 18 having a hole 20 therein and a
15 plurality of smaller orifices 22. Fixed to inboard surfaces 24
16 of rails 14, 16 are rail tabs 26. The mounting plates 18 and
17 tabs 26 provide platform assembly 10 with a four-point attachment
18 facility for connection of the platform assembly to surface
19 vessel 12, as will be further described hereinbelow. One or more
20 rigid beams 28 may be connected to rails 14, 16 to provide
21 strength and rigidity to the assembly and to maintain the rails
22 substantially parallel to one another.

23 Movably mounted on rails 14, 16 is a cage 30 (shown mounted
24 on rails 14, 16 in FIG. 2 and removed from rails 14, 16 in FIG.
25 3) which comprises a network of struts 32. Fixed to cage 30 are
26 first and second travelers 34, 36. The first traveler 34 is

1 movably mounted on the first rail 14, and the second traveler 36
2 is movably mounted on the second rail 16. Referring to FIGS. 3
3 and 4, it will be seen that each traveler includes a housing 38
4 on which are mounted rotatable wheels 40, the housing 38 and
5 wheels 40 being so arranged as to lock onto an outboard portion
6 42 (FIG. 4) of the associated rail 14, 16. The interior 43 of
7 traveler housing 38 is coated with Delrin[™], or the like, which
8 becomes very slippery when wet. Thus, the wheels 40 of the
9 travelers 34, 36 are able to move in the middle grooves of the I-
10 beam rails, and the traveler housings 38 are readily slidable up
11 and down the rails 14 and 16.

12 The cage 30 is provided with one or more harnesses 44, (FIG.
13 2) by which cage 30 may be raised and lowered on rails 14, 16. A
14 crane (not shown) on the deck of surface vessel 12 is utilized to
15 raise and lower the cage.

16 In FIGS. 2 and 3, there is shown a particular assembly of
17 instruments and components for testing mine-hunting sonar and,
18 more particularly, for testing a sonar receiver designed for use
19 in mine-hunting operations. It will be apparent that for other
20 purposes other instruments and components may be substituted.

21 The cage 30, as illustrated in FIG. 2, is provided with a
22 skid 46 (shown independently of cage 30 in FIG. 7) which is
23 movable lengthwise out of and into cage 30 and is adapted to be
24 locked in place in the cage (locking mechanism not shown). The
25 skid 46 is adapted to receive an apparatus 48 which is to undergo
26 testing. The apparatus 48 may be secured to skid 46 by straps

1 50, or the like. The skid 46 is provided with two elongated
2 pockets 56 (one shown in FIG. 7) for receiving tongues of a fork-
3 lift (not shown), by which the skid 46 may be moved out of, and
4 into, the cage 30. The skid further is provided with a shield 58
5 for protecting test apparatus 48.

6 The rail 16 is provided with a leading edge fairing 52
7 (FIGS. 2 and 4) to reduce drag of the platform assembly through a
8 water environment. Similarly, smaller leading edge fairings 54
9 may be fixed to various leading struts to reduce drag.

10 In the illustrative configuration, there is mounted on cage
11 30 a sonar transducer, or "pinger" 60 (FIG. 2) for sending out
12 detection signals. A side scan sonar 62 enables mapping of the
13 ocean bottom; a velocity sensor 64 provides data from which can
14 be determined speed over the ocean bottom; and a water
15 conductivity and density sensor 66 provides data from which the
16 water conductivity and density can be determined.

17 The cage 30 is further provided with a deck 68 for receiving
18 weights, if needed (not shown) for counterbalancing the weight of
19 test apparatus 48.

20 Referring to FIG. 5, it will be seen that the surface vessel
21 12 is provided with a pole 70 upstanding from a plate 72 fixed to
22 a deck 74 of vessel 12. The mounting plate hole 20 is adapted to
23 receive pole 70 and to slide down pole 70 to engage plate 72.
24 The mounting plate orifices 22 are alignable with threaded holes
25 76 in the plate 72. Threaded bolts 78 extend through orifices 22
26 and into threaded holes 76 to secure plate 18 to plate 72.

1 The surface vessel 12 is provided with a second pole
2 assembly of the type shown in FIG. 4 and described immediately
3 above, such that the mounting plates 18 of both rails 14, 16 may
4 be secured to surface vessel deck 74, to provide two points of
5 interconnection between platform assembly 10 and surface vessel
6 12.

7 The surface vessel is further provided with two U-shaped
8 brackets 80 fixed to a side 82 (FIG. 6) of surface vessel 12
9 above the water line. Each rail tab 26 is adapted to enter one
10 of the brackets 80 to provide two additional points of
11 interconnection between platform assembly 10 and surface vessel
12 12.

13 A transmission line 84 (FIG. 2) is connected at its lower
14 end to each of the sensors 62, 64, 66 and to the test apparatus
15 48 and pinger 60. At its upper end, transmission line 84 is
16 connected to test equipment 86, such as a computer adapted to
17 receive signals from the various sensors and test apparatus, and
18 to provide data interpretations required.

19 In operation, skid 46 is removed from cage 30, preferably by
20 use of a fork-lift, the tongues of which are inserted into
21 pockets 51, such that the skid 46 may be slightly lifted and
22 moved forwardly out of the cage. A test apparatus, such as
23 apparatus 48, is fixed in place on the skid, and the skid 46 and
24 test apparatus 48 are slid back into cage 30 and locked therein.
25 If not previously done, appropriate sensors are mounted on cage

1 30 and transmission line 84 is fixed thereto. If needed, weights
2 are secured on deck 68.

3 The platform assembly 10 is then lifted by crane, using the
4 harness 44, and brought alongside surface vessel 12 in the
5 vicinity of the poles 70 and the brackets 80. The platform
6 assembly 10 is lowered and guided such that tabs 26 enter
7 brackets 80 and poles 70 enter mounting plate holes 20. The
8 platform assembly 10 is further lowered until mounting plates 18
9 engage deck plates 72 and are secured thereto by bolts 78.

10 The transmission line 84 is connected to the test equipment
11 86 on surface vessel 12.

12 The crane is then operated to lower cage 30 on rails 14, 16,
13 the travelers 34, 36 moving down the rails, until the cage is
14 underwater and disposed at the lower ends of the rails. The
15 rails are provided with stops (not shown) which prevent downward
16 movement of cage 30 beyond the lower ends of rails 14, 16.

17 Once platform assembly 10 is in operative position, the
18 crane is removed and surface vessel 12 moves forwardly to attain
19 the speed at which tests are desired to be run. As the assembly
20 moves forwardly, the sensors 62, 64, and 66 gather information as
21 to the ocean bottom, the speed of the test apparatus over the
22 ocean bottom, and water conductivity and density.

23 The pinger 60 is activated to send out signals. Upon
24 encountering a mine, or other metallic object, the signals are
25 reflected back to the cage and picked up by test apparatus 48.
26 The operations of the pinger 60 and test apparatus 48, as well as

1 the sensed parameters of the water and ocean bottom, are all fed
2 into the test equipment 86, through the transmission line 84.

3 As noted above, the particular components and sensors can
4 vary. For example, test apparatus 48 having capability for both
5 pinging and receiving reflected pings can be mounted on skid 46
6 and tested.

7 It will be understood that many additional changes in the
8 details, materials, steps and arrangement of parts, which have
9 been herein described and illustrated in order to explain the
10 nature of the invention, may be made by those skilled in the art
11 within the principles and scope of the invention.

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1 Attorney Docket No. 78640

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3 UNDERWATER DEPLOYABLE TESTING PLATFORM

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5 ABSTRACT OF THE DISCLOSURE

6 An underwater testing platform assembly includes first and
7 second rails for disposition in part in a body of water, each of
8 the rails having facility for connection to a surface vessel.
9 The rails are disposed vertically, and parallel to each other. A
10 cage comprising a network of struts is mounted on the rails. A
11 skid is mounted on, and is movable in, the cage, and can receive
12 and retain an apparatus to be tested. First and second travelers
13 are fixed to the cage and are movably mounted, respectively, on
14 the rails, such that the cage is vertically movable on the rails.
15 Instrumentation is mounted on the cage. A transmission line is
16 connected at a first end to the instrumentation and extends to
17 the surface vessel. A receiver on the surface vessel has a
18 second end of the transmission line connected thereto and
19 receives data signals from the instrumentation.

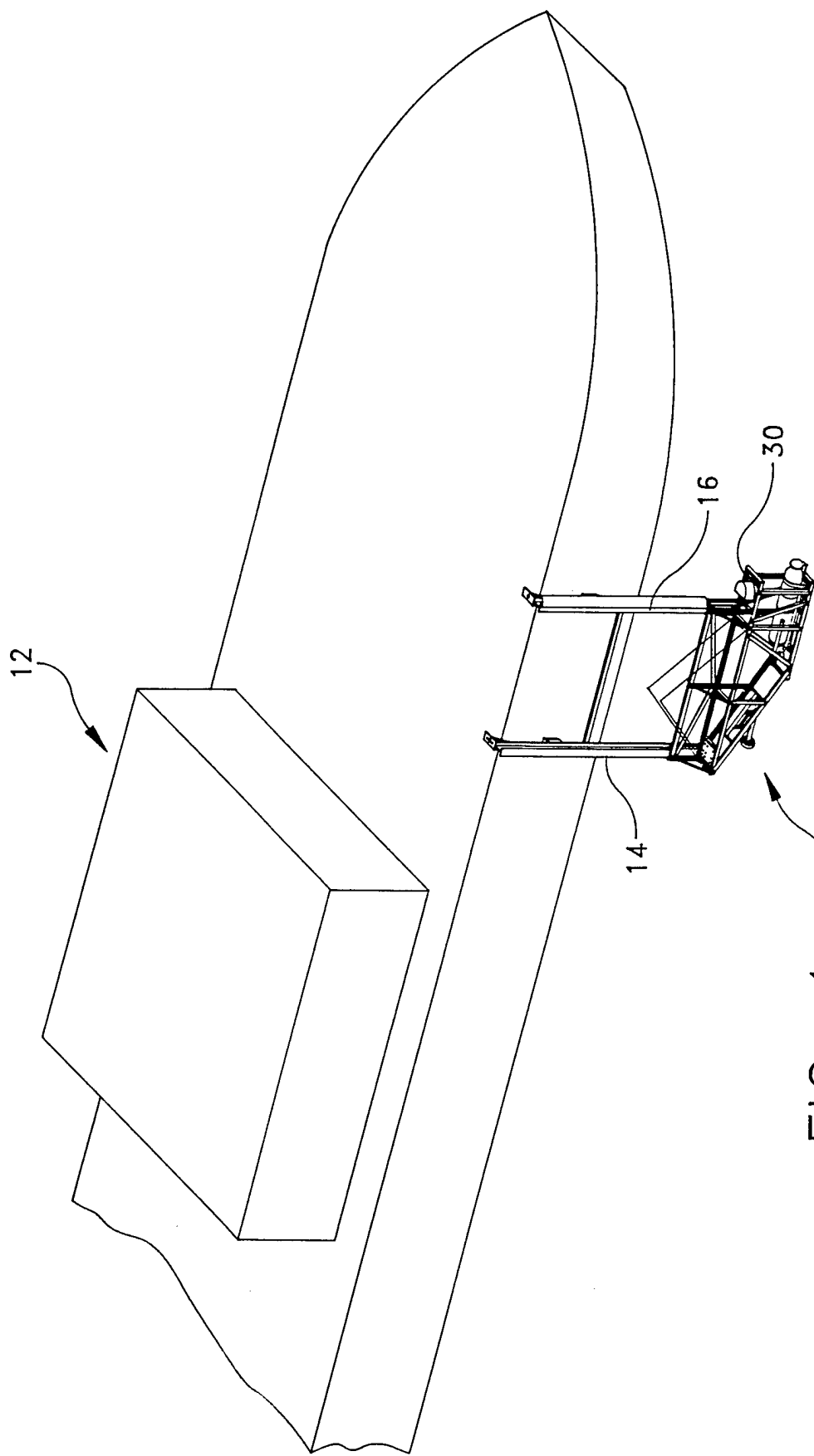
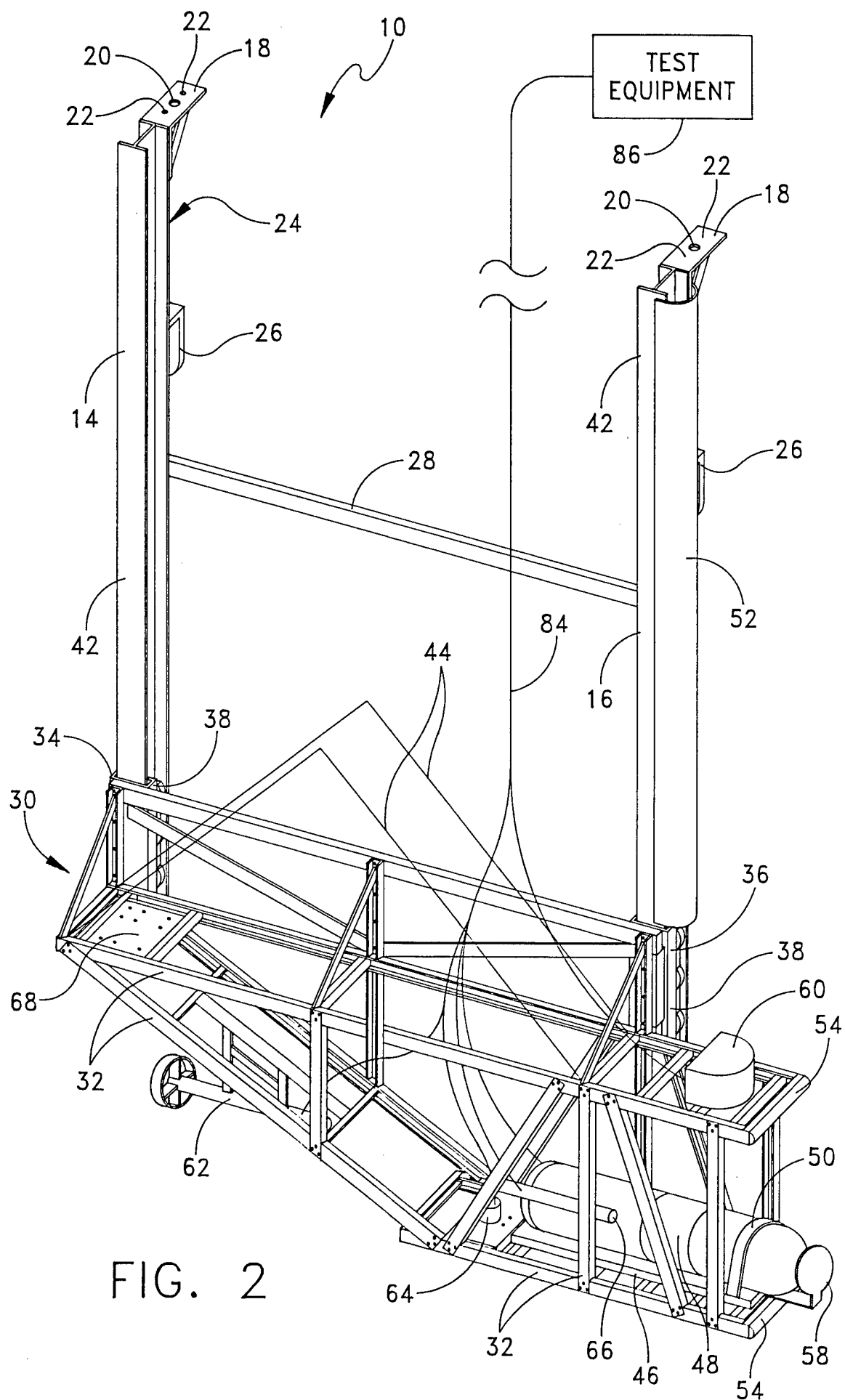


FIG. 1 10



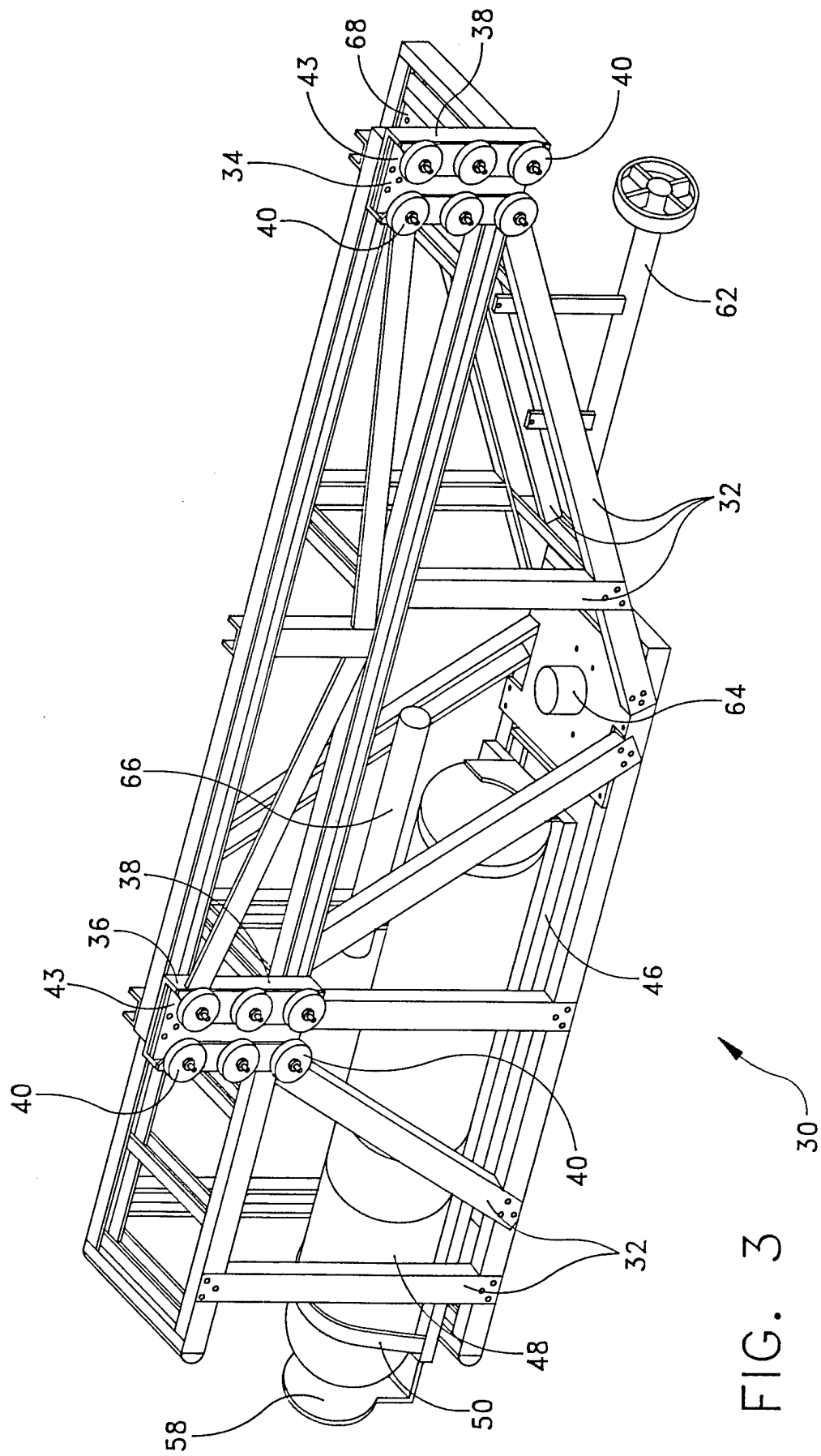


FIG. 3

