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ENGINEERING AND EQUIPMENT

No. 35

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ENGINEERING AND EQUIPMENT

No. 35

This serial publication contains abstracts of articles and news items from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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CONTENTS PAGE

ENGINEERING
Acoustical & Ultrasonic

USSR

UDC 623.983.621.395.089.6

EXCLUSION OF THE INFLUENCE OF FIELD INHOMOGENEITY IN THE LOW-FREQUENCY CALIBRATION OF HYDROPHONES

Moscow IZMERITEL'NAYA TEKHNIKA in Russian No 4, 1977 pp 68-70

GOLENKOV, A. N.

[Abstract] The classical inertial calibration of hydrophones by the method of a column of oscillating fluid uses a determination of the depth of the layer of fluid H_1 from the plane of the acoustical center of the hydrophone, which does not coincide with the plane of geometric symmtry of the hydrophone. In an earlier work (TrudyVNIIFTRI--Proceedings of the All-Union Scientific-Research Institute of Physicotechnical and Radiotechnical Measurements--No 23 (53) 1975) the author described an experimental determination of the depth of the acoustic center of a hydrophone in a column of oscillating fluid where an inhomogeneous field is generated with a constant gradient. However the inhomogeneous field of inertial forces can be used as a basis for calibrating the hydrophone even without a determination of the position of the acoustical center. This can be done by conducting only two experiments using precisely the same conditions except the height of the level of free surface of the fluid in the test chamber. The method involved a simplification of the form of the inhomogeneous field with constant gradient with depth and simplifies the determination of the dependence of the acoustical pressure on the coordinates, and the presence in all cases of a particular reference plane of free surface at which the pressure is equal to zero. Ill 3; Biblio 6.

USSR UDC 621.039.5.001.24

THE PRACTICE OF DESIGN OF THE TRANSITION ZONE OF NUCLEAR POWER PLANT REACTOR BODIES

Leningrad ENERGOMASHINOSTROYENIYE in Russian No 3, 1977 pp 19-20

YEGOROV, M. F., Candidate of Technical Sciences, PAVLOV, YE. A. and GERASIMOV, YU. N., Engineers, Izhorskiy Plant

[Abstract] One important part of the design of equipment for nuclear power plants is calculation of the stress state in the zone of transition of pipe fittings to the cylindrical body of the reactor. This study shows an approximate method of performing this task which has been used in design practice, and compares it with the results of experiments performed using a model of a reactor body made of epoxy resin. To perform the calculation, a pipe fitting and the adjacent portion of the wall of the body are considered, where the cylindrical portion of the shell is replaced with a circular plate, the thickness of which is equal to the thickness of the body wall. Calculation of the stress state of the transition zone between pipe fitting and reactor body is performed by the method of finite elements using the general equations of the theory of elasticity in their axisymmetrical statement. Analysis of stresses shows that the maximum circular stresses arise on the internal surface in the transition zone of the body of the reactor, while meridianal stresses have their maximum on the internal surface at some distance from the point of attachment of the pipe to the body of the reactor. The calculation plan used in this work produces comparatively good agreement of calculated and experimental results. Maximum deviations do not exceed 10%, the calculated stresses in all cases being higher than the experimental stresses.

USSR UDC 621.039.58:621.311.25:530.91

FLOW-RATE CHARACTERISTICS OF HOT-WATER DISCHARGE TO THE ATMOSPHERE AT AN INITIAL PRESSURE BELOW 22.8 MPa

Moscow ATOMNAYA ENERGIYA in Russian Vol 42, No 3, Mar 77 pp 216-218 manuscript received 28 May 76

KHLESTKIN, D. A., KANISHCHEV, V. P. and KELLER, V. D.

[Abstract] This article utilizes data from a previous article published in 1972 in TEPLOENERGETIKA by two of the authors and B. K. Mal'tsev. The experimental values cited here are a generalization of the previously obtained results and make more precise the value of the critical flow rate in the

near-saturation temperature area, in the region of great underheating, and for the critical and supercritical initial parameters of the water. The authors give the relative coordinates for treating the experimental data and the reasons for such choice, e. g., the graphic presentation of the test data clearly demonstrates the flow region of metastable and balanced streams; the coordinates allow the test data to be compared under different initial conditions; and they more precisely establish the flow rate in more characteristic discharge regimes. These generalized and refined test functions derived by the authors for the specific flow rate of water must be taken into account when the empirical functions derived in the above article are used. Figure 1; references 3: 3 Russian.

USSR UDC 629.113.001.4

ON THE LOAD CAPACITY OF A TRIPLE AXLE AUTOMOBILE INVOLVING DIFFERENT SCHEMES FOR CONNECTING THE DRIVE AXLES

Moscow AVTOMOBIL'NAYA PROMYSHLENNOST' in Russian No 4, 1977 pp 13-14

MOSKOVKIN, V. V., Candidate of Technical Sciences, REDCHITZ, V. V., Candidate of Technical Sciences, TABOLIN, V. V., CHERGEYKO, V. I., and SHUKLIN, S. A., Candidate of Technical Sciences, Kremenchugsk Automobile Plant imeni Fiftieth Year of the Soviet Ukraine, Central Scientific Research Institute of Automobiles and Automobile Engines

[Abstract] The authors of this article are concerned with an analysis of the results of experimental investigations on the distribution characteristics of torsional forces. They make this analysis on the basis of type 6 x 6 KrAZ automobile axles under operational conditions for various drive schemes for the purpose of establishing the qualitative side of this question as it pertains to the technical and economic computations for selection of a rational scheme for driving multidrive vehicles. Figures 3; references 3: 3 Russian.

USSR

UDC 627,824.7.012.4042.7

INVESTIGATION OF SEISMIC STABILITY OF A LIGHTENED CONCRETE GRAVITY DAM

Moscow GIDROTEKHNICHESKOYE STROITEL'STVO in Russian No 3, Mar 77 pp 16-20

LYATKHER, V. M., doctor of technical sciences and SEMENOV, I. V., engineer

[Abstract] This is the concluding article in a series of five on a dam designed for the Kurpsay Hydroelectric Plant in Kirgizia. The authors evaluate the stressed and strained state, stability and strength of the dam under earthquake conditions with consideration of the nonlinear nature of oscillations. Studies were done on plaster models in a scale of 1:100. It was found that opening of horizontal block seams on the upper water side under the action of vibrations has little effect on the level of dynamic tensile stresses in the dam because of a sharp increase in the internal absorption of energy due to collisions and sliding of the edges of seams. The zones of maximum tensile stresses move from the pressure side to the discharge side of the seams. The seismic stability of a gravity dam on a firm rock foundation is determined by the strength of the upper part of the dam. To increase the seismic stability of the structure it is advisable to lighten the crest of the dam and to avoid sharp bends in the profile. The resistance to tipping of blocks in the dam that have been separated by horizontal cracks is not a decisive factor in evaluating the seismic stability of the structure represented as a system of rigid blocks. For the assumed level of seismic action, the dynamic tensile stresses in the zone of action of the maximum static tensile stresses do not exceed 20 kgf/cm^2 even with consideration of opening of horizontal block seams. Irreversible horizontal movements of the blocks arise along the seam at an elevation of 113 m when accelerations in the base exceed the rated values by a factor of 1.2. These deformations do not exceed 5 mm. Blocks of the dam that are separated by seams retain resistance to tipping at accelerations of up to 2.5 g in the foundation. The results show that lightening of the profile of a gravity dam when antifiltration measures are used on the pressure face has a promising future as a way to economize on this kind of structure erected in earthquake regions. Figures 6, table 1, references 8: 6 Russian, 2 Western.

USSR UDC 69.057.528:728

EXPERIENCE IN THE CONSTRUCTION OF A SIXTEEN-STORY HIGH-RISE RESIDENTIAL BUILDING BY SLIPFORMING

Moscow BETON I ZHELEZOBETON in Russian No 3, 1977 pp 22-24

DZHAFAROV, G. M., MAMEDOV, A. R., BALAGOZOV, A. M., BASHIROV, T. G., Baku Laboratory of Scientific Research Institute for Reinforced Concrete, RZAYEV, S. A., ALIYEV, A. B., AKHUNDOV, T. G., and SULTANOV, A. M., Baku Main Construction Administration

[Abstract] A plan developed by the Central Scientific Research Institute for Experimental Planning was used by Housing Trust No 11 of the Baku Main Construction Administration for the construction of the republic's first experimental 16-story, 75-apartment residential building erected by the slipforming method. The quality of all operations was high and the building was rated "outstanding." According to the plan, the load-bearing external walls, 28 cm thick, and internal walls, 18 cm thick, as well as the elevator shafts, were constructed of monolithic porous-clay-filler concrete type L-200 with a volumetric mass of 1600 kg/m^3. The walls of the building were concreted in a slipform, the intermediate floors by means of a prefabricated form which was always two stories behind the outer rising slipform. The external slipform was stopped for the time required to concrete intermediate floors. The slipform was raised by means of 200 OGD-6 hydraulic jacks controlled from a central automatic control station. Two type KL-160-2 tower cranes were used to perform installation operation. References: 3.

USSR UDC 669.841:627.824.7

ENGINEERING EVALUATION OF THE SEISMIC STABILITY OF A LIGHT-CONSTRUCTION GRAVITY DAM AS A BLOCK SYSTEM

Moscow GIDROTEKHNICHESKOYE STROITEL'STVO in Russian No 3, Mar 77 pp 13-16

ARKHIPPOVA, YE. K., Engineer

[Abstract] This is one of a series of articles on the new design of a light-profile concrete gravity dam adapted to conditions at the Kurpsay Hydroelectric Plant in Kirgizia. A dynamic engineering method using analog accelerograms is used to evaluate the influence that duration of earthquake action has on the shear resistance of the dam. The analysis enables determination of the most dangerous analog accelerogram among a number that are possible in the region of dam construction. The dynamic method of calculating the seismic stability of a lightened gravity dam shows a greater reserve of resistance to shearing than that found in analysis by the normative procedure. Figures 2, tables 2, references 4 Russian.

USSR UDC 69.057.3

DESIGNING AND TESTING BUILDINGS ERECTED BY THE LIFTING METHOD

Moscow BETON I ZHELEZOBETON in Russian No 5, 1977 pp 8-10

SAAKYAN, A. O., and SAAKAYN, R. O., Special Planning and Experiment Design Office, Ministry of Industrial Construction Armenian SSR

[Abstract] On the basis of research and experimental construction the authors give recommendations for designing 16- to 25-story buildings to be erected by the lifting method, the architectural planning and municipal planning possibilities and technical-economic advantage of the construction method for higher buildings with braced frame where the roll of collar beams is played by flat beamless ceilings, and the bracing element is the three-dimensional rigid core. Results are given of vibromachine field tests of dynamic characteristics. Use of shock-absorbing devices for increasing seismic stability is considered. These tests, conducted on 9- to 12-story buildings, showed that the periods and waveforms of the vibrations of the rigid core and frame are practically identical, which indicates that the structure acts as a single spatial unit. The ratio of the natural frequencies of the translational vibrations forms the series 1 : 3.4 : 6.3, and for torsional vibrations 1 : 3 : 5. With increased excitation forces the natural frequencies of the oscillations of the buildings are reduced, whereas the values of the logarithmic decrements of the oscillations are increased. Ill 3.

USSR UDC 624.078

PECULIARITIES OF THE PERFORMANCE OF COLUMN JOINTS WITH LATERAL CUTOUTS DURING ECCENTRIC COMPRESSION IN THE FRAMES OF INDUSTRIAL BUILDINGS

Moscow BETON I ZHELEZOBETON in Russian No 5, 1977 pp 26-29

MATKOV, N. G., Scientific-Research Institute of Concrete and Reinforced Concrete

[Abstract] A study was made of the performance of the joints of columns with shoulder cutouts with precompression in the erection and employment stages under loads close to the true loads for the frame of an industrial building. On the basis of the study some recommendations are given for computing the strength of eccentrically compressed joints of columns for the frames of multistory structures. It is shown that the joint can be loaded during erection until it becomes monolithic with complete use of the reinforcements. In the monolithic condition the joint under eccentric compression can be computed without the preloading being taken into account. Ill 4; Tab 1; Biblio 4.

USSR UDC 627.824.33.004.1

NEW ENGINEERING SOLUTIONS IN THE CONSTRUCTION OF THE CHARVAK HYDROELECTRIC POWER STATIONS

Moscow GIDROTEKHNICHESKOYE STROITEL'STVO in Russian No 4, 1977 pp 5-7

ZHIGAREV, D. A., and SEMENIKHIN, A. D.

[Abstract] A brief description is given of the original engineering solutions applied in the design and construction of the Charvak Hydroelectric Power Station. The rock-earth dam 760 meters long at the crest was built to provide electric power and to irrigate 145 thousand hectars of land in Central Asia and went into use in 1973. The penstocks are 9 m in diameter and 770 and 852 m long. The powerhouse has four hydrosets of radial-axial turbines with 4.1-m diameter rotors and hydraulic generators rated at 176.5 thousand kva and 187.5 rpm. The dam had to withstand up to 8-ball earthquakes which necessitated the use of very large prismatic retaining walls at the sides, other design considerations and the use of over 1,000 measuring devices for constant monitoring of the slightest deformations of the body of the dam, discharging and other equipment. Biblio 3; Ill 3.

USSR UDC 627.824.3:624.152.5

CUTOFF TRENCH UNDER THE CENTRAL CORE OF THE NUREK DAM

Moscow GIDTROTEKHNICHESKOYE STROITEL'STVO in Russian NO 4, 1977 pp 7-9

BONDAR', I. YA., BAGDASAROV, A. G. and YEROFEYEV, YE. V.

[Abstract] A description is given of the method used at Nurek for constructing the cutoff trench under the core by blasting from underground workings. Because of the complex relief at the site, the difficulty in making access along the horizontal, and difficult working conditions, a one-time cave-in by explosion method was employed. The lateral approach and disposition of explosive charges are illustrated. A total of 1,544 bores were drilled (732 loose bores and 812 line bores) over a total distance of 41,680 meters. The explosion was detonated in Nov 1975; and the heap was removed in three months' time (large area of rubble allowed use of several excavators at the same time). Volume of the cave-in was 175,800 m^3; the adit trenching volume was 3,558 m^3; the total amount of explosives used was 99,746 kg (0.57 kg/m^3), and the single blast cost 493.48 rubles. Ill 2.

USSR UDC 556.555.6.001.5

FORMATION, PROPAGATION, AND STRUCTURE OF THE DENSE BOTTOM FLOW IN THE NUREK RESERVOIR

Moscow GIDROTEKHNICHESKOYE STROITEL'STVO in Russian No 4, 1977 pp 9-13

PYRKIN, YU. G., PETROV, V. P., and SAMOLYUBOV, B. I.

[Abstract] An analysis is made of the results of studies of the velocity distribution of the flow and turbidity of the water in the head bay of the Nurek reservoir in the area where a turbid bottom flow generates and propagates. The steady-state density of flow and its kinematic structure are examined; the silting characteristics of the reservoir in the low-water-level period are given on the basis of 1974-1975 data. Plots of the dependence of flow thickness, turbidity, and velocity on distance show that the formulas given here can be applied for practical calculations. Ill 5; Biblio 3.

USSR UDC 627.83.001.42

FIELD AND LABORATORY STUDIES OF CAVITATION IN THE DISCHARGE OUTLETS AT THE BUKHTARMA HYDROELECTRIC STATION

Moscow GIDROTEKHNICHESKOYE STROITEL'STVO in Russian No 4, 1977 pp 28-32

ZHAROV, N. I., IVOYLOV, A. A., and SHUMKOV, R. V.

[Abstract] Results are given of comparative field and laboratory studies of cavitation in the "ski-jump" configured spillway at Bukhtarma. Certain problems are studied with respect to predicting cavitation phenomena for various physical conditions of the water in nature and in the experimental models. The differences (air-saturation, chemical composition, presence of undissolved impurities in the water, etc.) are found to be negligible if the vacuum-cavitation type installation is used in the laboratory study. The "ski-jump" configuration is shown to be unfavorable in respect to both possible deformations and cavitation build-up. The unfavorable situation is best aleviated by diversion of the flow or by altering the streamlined configuration of the spillway. Ill 5; Biblio 2.

USSR

UDC 624.122.35:627.8.001.4

CONSTRUCTION OF THE EXPERIMENTAL DAM ON THE BURLYKIYA RIVER

Moscow GIDROTEKHNICHESKOYE STROITEL'STVO in Russian No 5, 1977 pp 15-20

KUPERMAN, V. L., KORNAKOV, G. I., and KORCHEVSKIY, V. F.

[Abstract] For the erection of the Kambaratinsk hydrostation rock dam, preliminary experimental explosions were used as directional explosions which simulated the process of construction under natural conditions. The main problems of the experiment were: refining the calculated parameters of the massive explosion; studying the geotechnical properties of the heap of blast-fragmented rock and development of methods of predicting these properties; and estimating the effect of the explosion on the state of preservation of the massif and of the structures. In 1973 the Central Asian Department of the All-Union Planning, Surveying and Scientific-Research Institute (Gidroproyekt) completed a feasibility study of the Kambaratinsk Hydroelectric Power Station on the Naryn River as a 2-million-kilowatt facility. The main construction undertaking was to be the high (300 m) rock dam formed by directional blasting. Originally 687 tons of granulite were to be detonated; in the working plans this was increased to 703 tons; powdered granulite 79/21 was to be used as the detonator. By 1974 all the required engineering-geological, geophysical and seismic studies had been completed. The preparatory work was completed at the end of January 1975, and at 1300 hours local time on 8 Feb 1975 the explosion was detonated. Unfortunately four days before the blast the air temperature dropped sharply, and the river channel froze to a depth of 1-1.5 m, which had a detrimental affect on the results of the blast, which produced a dam 50 m high and 330 m long at the crest with an embankment volume of approximately 300 thousand m^3. Experimental filling of the reservoir began in March and terminated at the end of June 1976. Partial manipulation of the gates destroyed their water-tight integrity, which precluded raising the level to stabilization. The maximum head was 35 m, and filtration reached 2.3 m^3/sec, which corresponds to a filtration coefficient of 600 m^3/day (turbulent mode) for the entire body of the dam; in the central parts of the dam the filtration coefficient did not exceed 250-300 m^3/day. Further studies are to be made to determine the nature of the filtration deformations under extended use of the dam at maximum head. Ill 3.

USSR UDC 624.122.35:627.8.001.4

CHANGE IN CONDITIONS OF ROCKS AFFECTED BY LARGE-SCALE BLASTS

Moscow GIDROTEKHNICHESKOYE STROITEL'STVO in Russian No 5, 1977 pp 29-32

KAGAN, M., and ANDRIANOV, A. V.

[Abstract] The authors consider the changes in the engineering-geological conditions of rocks affected by an explosion of very high force. Patterns of change of cracking and of the properties of surrounding rock with distance from the detonation are explained for various engineering-geological zones and subzones. The influence of the explosion on the stability of underground structures of various sizes and methods of attachment is estimated. Explosive effects are divided into two zones for strong effects and weak effects. For a 100-ton charge the zone of strong effects is about 30 meters thick, and 45 meters thick for a 500-ton charge; the zone of weak effects is somewhat thicker. On the line portion of the Kambaratinsk hydroelectric station the zone of strong effects was nearly 100 m thick. Within the zones of strong explosive effects the change of the rock involves the formation of new cracks up to one meter wide (on the surface) and an enlargement of existing cracks; in the zones of weak effects there is a widening of existing cracks and fine cracking. Ill 5; Tab 1; Biblio 4.

USSR UDC 624.122.35:627.8:550.834.001.4

INSTRUMENT OBSERVATIONS OF THE MECHANICAL AND SEISMIC AFFECTS OF THE EXPLOSION ON THE BURLYKIYA RIVER

Moscow GIDROTEKHNICHESKOYE STROITEL'STVO in Russian No 5, 1977 pp 32-35

ADUSHKIN, V. V., FOMICHEV, A. G., KONDRAT'YEV, S. V., LIBIN, V. YA., LAVRINENKO, V. L., PERNIK, L. M., and SVINTSOV, I. S.

[Abstract] Results are given of measurements with instruments of the main parameters of the automatic effect of the large-scale explosion for constructing a dam on the Burlykiya River. The system for automatic switching of apparatus is described. The rate of motion of the blast-ejected rock fragments was observed by motion picture records. Both the seismic and air-shock waves were recorded. The actual intervals of delayed action and the sequence of explosion of charges were ascertained. The main stages of construction of the dam are explained. The air-shock wave recorders had sensitivities of 0.007 kg/cm^2 and 0.02 kg/cm^2 per mm of recording. The S5S seismic recorders revealed the parameters of the seismic waves at distances from 0.1 to 1 km with an average sensitivity of 125 mv/(cm/sec) and a 5-sec period of natural oscillation of the pendulum. More than fifty S5S seismic recorders were used. The explosion involved five successive

blasts of charges weighing 2.3, 88, 125, 470, and 18 tons at intervals of 35, 162, 190, and 280 msec respectively. Motion picture studies showed the maximum rate of escape of explosion gases at 450-500 m/sec. The maximum rate of rise of the dome of rock at the epicenter on the left bank was 15-20 m/sec, and on the right bank 25-30 m/sec. Ill 7; Tabl 3.

USSR UDC 624.042.8:539.41

PROBLEMS OF EXPLOSION SAFETY IN INDUSTRIAL BUILDINGS. LOADS AND CALCULATION OF STRUCTURAL DESIGNS

Moscow STROITEL'NAYA MEKHANIKA I RASCHET SOORUZHENIY in Russian No 2, 1977 pp 9-16

RAZDOL'SKIY, L. G., and CHERNOV, YU. T.

[Abstract] On the basis of the literature (64-item bibliography) the authors discuss first the works devoted to a general discussion of the problem of safety measures against explosions in industrial buildings, physics of combustion of gas-vapor-dust mixtures, and structural designing of buildings where the danger of explosion is present. They then discuss the results of works on the experimental and theoretical study of structural elements exposed to intensive dynamic effects, including the inelastic stage of deformation of structures, and the behavior of materials and specimens during very high rates of deformation. It is shown that reinforced concrete structures should be considered in two clases: those that will retain structural integrity after a single explosive loading, but will have such a degree of permanent deformation as to make them not available for further use; and those that will withstand repeated brief explosive overloads and retain load bearing capacity even though not readily suitable for further use. Biblio 64.

USSR UDC 624.04:539

LINEAR MODEL OF AN IDEAL FREQUENCY-INDEPENDENT INTERNAL FRICTION

Moscow STROITEL'NAYA MEKHANIKA IS RASCHET SOORUZHENIY in Russian No 2, 1977 pp 28-31

TSEYTLIN, A. I., Central Scientific-Research Institute of Structural Designs, Moscow

[Abstract] A linear hereditary model is given for frequency-independent internal friction that satisfies the principle of causality. It is shown

that such a model exists in a class of physically real linear systems, and that the force of internal resistance (elastic and inelastic) should in this case be described by a fractional differential operator. Precise values are given for the parameters of the complex rigidity, that are used in calculating the damping in accordance with the complex hypothesis. This model may be used for solving dynamic problems that arise during a calculation of structural designs as well as for the analysis of the results obtained on the basis of various linear models of "nearly" frequency-independent internal friction. It provides a correct solution of the equations of motion of the problems in question for any dynamic effects that do not contain static components. Fig 2; Biblio 10.

USSR UDC 621.18.001.5

COMPUTING THE PERIODIC PROCESSES IN ELEMENTS OF STEAM GENERATORS IN ACCORDANCE WITH A NONLINEAR MATHEMATICAL MODEL

Moscow IZVESTIYA AN SSSR ENERGETIKA I TRANSPORT in Russian No 2, 1977
pp 126-133 manuscript received 31 Mar 75 revised 5 May 1976

KHOR'KOV, N. S., and SHTERNFEL'D

[Abstract] For obtaining the dynamic characteristics according to linear mathematical models which describe the nonstationary processes in boiler installations the authors propose the use of the method of integral relations, which has a number of advantages over other methods more frequently used in engineering practice. An algorithm and program are given for obtaining the transient processes for the case of deep-seated perturbations. The computed curves are compared with experimental curves obtained on the test stand at the All-Union Institute of Heat Engineering. The mean deviation of the computed curves from the experimental is 6%, and maximum 10% close to the critical point. The method of integral relations affords the possibility of solving the boundary-value problem and taking the influence of the equation of motion into account, which is not possible with iteration processes. Ill 4; Biblio 10.

USSR UDC 532.529.5

THREE-DIMENSIONAL ANISOTHERMICITY OF PARTICLES IN MIXED-PHASE FLOWS

Moscow IZVESTIYA AN SSSR ENERGETIKA I TRANSPORT in Russian No 2, 1977
pp 134-143 manuscript received 30 Dec 75

GARKUSHA, V. I., and STASENKO, A. I.

[Abstract] A numerical study is made of the heat conductivity inside various spherical particles and the dynamic problem of acceleration or deceleration of the particles by a spherically symmetrical flow of gas. Mean three-dimensional and isothermic temperatures are compared for various heat conductivities of the material of the particles. The numerical estimate of the characteristic times of various relaxation processes showed that the problem of heat conductivity for the particles moving in a gas is directly connected with the dynamics of the particle. A numerical solution is obtained for the joint problem of the dynamics and heat conductivity of particles moving in a spherically symmetrical flow of gas. The results obtained confirm the generally used presumption of the isothermicity of the particles when only the heat content of the phase is studied. However, when highly nonlinear surface processes (radiation, phase transitions, ionization of gas molecules) or internal stresses are taken into account the joint solution of the dynamics and heat conductivity of the particles becomes mandatory. Ill 5; Biblio 19.

USSR UDC 652.997:537.22

STUDY OF THE CHARACTERISTICS OF CONVECTIVE HEAT TRANSFER IN CYLINDRICAL SOLAR RECEIVERS ON THE BASIS OF THE SOLUTION OF THE CONJUGATE PROBLEM OF HEAT EXCHANGE

Tashkent GELIOTEKHNIKA in Russian No 2, 1977 pp 56-63 manuscript received 16 Sep 76

ROZHKOV, I. A., and GRILEKHES, V. A.

[Abstract] A study is made of the convective heat exchange during a laminar flow of a fluid in a flat duct with a nonuniform heat conductor on one side. The influence of the heat conductivity of the wall, change of Reynolds number in the laminar region and of the maximum value of the heat flux on the Nusselt number is shown. Approximate dependences of the Nusselt number on the length of the duct obtained for the nonuniform heat conductor can be used in the heat engineering calculations of cavity-type high-temperature cylindrical solar receivers with characteristic heat flux distributions of $q(x)_{max} = 2.7 \cdot 10^4$ to $5 \cdot 10^5$ w/m^2 during a laminar flow mode of the heat carrier. Ill 6; Biblio 7.

USSR UDC 621.9.015

OPERATIONAL ACCURACY IN CROSS-FEED TURNING OF TITANIUM

Moscow IZVESTIYA VUZOV MASHINOSTROYENIYE in Russian No 2, 1977 pp 141-144
manuscript received 23 Oct 75

TOLOCHKOV, YU. A. and LUZHNIKOVSKAYA, M. A.

[Abstract] A study was made of the operational accuracy of cross-feed turning of titanium VT1-0 by means of cutting tools with VK6 sheets welded on. The cutting rate was 0.9 - 1.5 m/sec, feed rate 0.027 - 0.04 mm/rev, depth of cut 2 mm. A complex measuring apparatus was used that consisted of a Muchin dynamometer, amplifier and recorder to establish the cutting force at various tool wear values at all stages of the cutting process with cross-feed (cutting, sustained turning, surfacing). Diagrams are given that show: (1) the influence of wear along the cutting tool flank on the increase of the radial component of the cutting force; (2) influence of wear along cutting-tool flank on the change of the work diagram for cross-feed; and (3) the influence of wear along the cutting tool flank on the duration of cutting and surface finishing portions of the operation. The experimental study showed that a stable stochastic relationship exists between the wear along the cutting-tool flank and the magnitude of the cutting force. In the cutting of VT1-0 a stable increase of cutting force is observed up to a wear of 0.3 mm for a 5-mm width of cut, and up to 0.2 mm for a 2.8-mm width of cut. Ill 3 Biblio 2.

USSR UDC 629.113:621.762

MANUFACTURE OF VALVE GUIDE BUSHINGS BY THE METHOD OF POWDER METALLURGY

Moscow AVTOMOBIL'NAYA PROMYSHLENNOST' in Russian No 4, 1977 pp 25-26

NIKITINA, N. V., Candidate of Technical Sciences, NIKOLAYEV, YE. N., DOKUKIN, YU. I., GURVICH, I. B., Candidate of Technical Sciences, RUDYK, M. G. and SOKOL'SKIY, V. I., Scientific Research Institute of the Technology of the Automobile Industry

[Abstract] The authors cite the results of experimental research on the high-frequency-current sintering of bushings for valves. They also give the plans for a semiautomatic installation to sinter the bushings in a multiwound inductor with a variable pitch, which allows a smooth elevation in sintering temperature and holding. This experimental apparatus is connected to an MGZ-108A device with a rated capacity of 100 kWt and a frequency of 8 kHz. Figures 2; table 1; references 2: 2 Russian.

USSR UDC 539.234

OPTICAL COATINGS ON A TITANIUM DIOXIDE BASE

Leningrad OPTIKO-MEKHANICHESKAYA PROMYSHLENNOST' in Russian No 2, 1977 pp 41-43 manuscript received 19 Apr 76

MATSKEVICH, L. L. and BAZHINOV, V. V.

[Abstract] Sulfides and oxides of metals are widely used for vacuum deposition of thin-film optical systems with a high refractive index. The authors describe the method used to deposit titanium dioxide films with a refractive index of 2.5-2.7 on optical surfaces. This method involves reactive evaporation of titanium monoxide in an oxygen atmosphere on a heated substrate. They investigate the dependence of the refractive index on temperature. They also give the spectral coefficients of transmission of single and multilayer light dividers on a titanium dioxide base. The authors find that these coatings on a TiO_2 base have high mechanical strength, good chemical and thermal stability and stability of the time characteristics. Figures 2; tables 2; references 6: 2 Russian, 4 Western.

USSR UDC 621.923.6:[621.922.025:621.921.3:661.65]

EFFECTIVENESS OF SHARPENING CUTTING TOOLS WITH "ELBOR" WHEELS

Moscow STANKI I INSTRUMENT in Russian No 10, Oct 76 pp 24-27

KAMENKOVICH, A. S. and BOROVSKIY, G. V.

[Abstract] Cutting tools made of high-speed steel are sharpened in either one or two stages. In the first case one uses wheels made of electrocorundum or monocorundum with ceramic bonding or phenolic bonding. In the second case one uses wheels made of monocorundum with phenolic bonding or electrocorundum with ceramic bonding for the preliminary operation and wheels made of silicon carbide with phenolic bonding or made of synthetic diamonds for the finish operation. A comparative analysis of tool performance and production costs, based on conventional simple relations and a mathematical evaluation of experimental data, indicates the economic advantages of a changeover to Elbor wheels and using them for a single-stage sharpening operation. An important characteristic of these wheels is that, unlike with conventional abrasive wheels, all quality indicators can be improved by increasing their width. Elbor wheels with ceramic bonding are easily trimmed with diamond pencils and, therefore, can be used in automatic production processes. They are less affected by the feed rate than by the cut depth. Their wear resistance will be improved upon impregnation with special surfactants or upon cryogenic treatment (e.g., in liquid nitrogen). Further improvements in their cutting and wear characteristics are still needed, if the economic potential of using Elbor wheels for tool sharpening is to be fully realized. References 4: Russian.

USSR UDC 621.787

IMPROVING THE FATIGUE STRENGTH OF CYLINDERS IN HEAVY HYDRAULIC PRESSES BY SURFACE PLASTIC DEFORMATION

Moscow VESTNIK MASHINOSTROYENIYA in Russian No 3, Mar 77 pp 45-47

BELKIN, M. YA., candidate of technical sciences, and GOROZHANKIN, YE. A., engineer (deceased)

[Abstract] Experiments were done on optimizing the geometry of fillets in heavy hydraulic press cylinders and the use of surface plastic deformation to improve the fatigue strength of fillet areas. The cylinder specimens were made to conform to the geometry of cylinders used in presses with a force of 800-5000 metric tons. The material used was grade 35 normalized rolled steel stock with ultimate strength of 55.7-58.8 kgf/mm^2, yield stress of 26.0-29.4 kgf/mm^2, relative longitudinal extension of 27.2-29.4%, relative lateral contraction of 50.1-53.3%, impact toughness of 6.9-11.3 kgf·m/cm^2, and Brinell hardness of 156-170. The results show that the fatigue strength of hydraulic press cylinders is determined chiefly by the ratio of fillet radius to diameter in the case where the fillet joining is machined. An increase in fillet radius by a factor of 3 (from r/D= 0.0093 to r/D= 0.028) increases the fatigue limit by a factor of 2. A more effective way to increase fatigue strength is to make small fillets ($r/D \leqslant 0.001$) with subsequent plastic deformation that leaves the fillet radius fairly short ($r/D \leqslant 0.01$). In this case the fatigue limit is increased by a factor of more than 3 as compared with that of cylinders having an identical fillet radius machined by cutters. Figures 2, tables 2, references 3 Russian.

USSR UDC 621.787

IMPROVING THE DURABILITY OF WELDS BY A COMBINED HARDENING TECHNIQUE

Moscow VESTNIK MASHINOSTROYENIYA in Russian No 3, Mar 77 pp 45-47

KRAYCHIK, M. M., candidate of technical sciences, PAVLOV, N. V., candidate of technical sciences, ANDERSON, YA. E., engineer and SOLODKOVA, V. G., engineer

[Abstract] A report on research by the All-Union Scientific Research Institute of Railroad Transportation on a combined method of surface hardening welds based on multiple-striker work hardening and flashing off the edges of the welds by using a tungsten arc in argon. Initial flashing removes defects and increases the hardness of the surface layers, which prepares the weld for subsequent multiple-striker work hardening. Tests of the method on beam specimens showed a reliable increase in the fatigue limit by 80% when hardening was done in the optimum way. The proposed method has been introduced into series production at the Riga Railroad Car Plant. The technique is recommended for hardening welds in high-strength low-alloy steels to improve resistance to fatigue and brittle fracture under cold weather conditions. Figures 2, tables 1, references 5 Russian.

USSR UDC 662.997.004.14

ANALOG ALGORITHMS AND THEIR REALIZATION ON THE COMPUTER FOR COMPUTING THE CAPACITY OF THE ACCUMULATING DEVICES OF WIND AND SOLAR POWER STATIONS

Tashkent GELIOTEKHNIKA in Russian No 2, 1977 pp 75-83 manuscript received 12 Jun 76

SALIYEVA, R. B., Tashkent Electrotechnical Institute of Communications

[Abstract] The fact that the productivity of wind and solar power stations varies greatly in accordance with the variation of wind and solar radiation modes, which can be interpreted as continuous stochatic processes, and rarely coincides with the customer demand for productivity, indicates that without organized regulation of the productivity of wind and solar stations the prospects for using the energy of the wind and sun are very limited. The energy storage capacities thus are of great importance. This work deals with a method of computing the capacity of the storage devices, on the basis of a mathematical model of which a statistical model is obtained. For simulating the calculations on the computer the corresponding analog algorithms are constructed, which provide a means of determining the capacity of the storage facilities, the total productivity, waste of unutilized production, energy deficit, and other characteristics. Block diagrams of the algorithms are given. Ill 4; Biblio 6.

USSR

UDC [620.193:669.15-194]:661.53

EMBRITTLEMENT OF STEELS UNDER THE INFLUENCE OF NITROGEN-HYDROGEN-AMMONIUM ENVIRONMENTS

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 2, Feb 77 pp 24-25

SEREDYUK, F. S., BEZZUBOV, YU. L., Engineers, MOROZ, V. G., Candidate of Technical Sciences, and IVAKO, L. P., Engineer

[Abstract] The atmosphere mentioned in the title causes simultaneous saturation of steels with nitrogen and hydrogen. The nitriding of the metal causes a significant increase in its volume, resulting in compressive stresses in the nitrided layer. The tensile stress thus produced in the non-nitrided metal create favorable conditions for intensive hydrogen saturation and embrittlement of the metal. Studies of the degree of embrittlement of steels in the process of nitriding and the influence of embrittlement on load-bearing capacity were performed using cylindrical specimens 10 mm in diameter and 90 mm in length under both laboratory and industrial conditions. The degree of embrittlement was estimated on the basis of the change in mechanical properties, embrittlement being characterized by empirical parameters dependent on the content of alloying elements in the steel. The embrittlement of 12Kh18N10T steel was somewhat less than that of 20KhZMVF and 15Kh5M steel, but was still quite high at a nitriding temperature of 450 C (reaching 30%). Type 20Kh23N18 steel has high resistance to the test atmosphere up to 500-520 C; the best of the steels tested was type 08Kh17N15M3T, which retained its ductility up to 540-550 C. Embrittlement also increases with time of exposure to the atmosphere. It is concluded that pearlitic and martensitic steels can be used for the manufacture of equipment for the synthesis of ammonia operating over 320 C at pressures of 200-300 kg/cm^2 only when the equipment is operated intermittently for relatively short periods of time.

USSR UDC 621.787

USE OF SURFACE PLASTIC DEFORMATION TO IMPROVE FATIGUE STRENGTH OF 25GS STEEL IN LARGE FORGINGS

Moscow VESTNIK MASHINOSTROYENIYA in Russian No 4, Apr 77 pp 44-46

KUDRYAVTSEV, N. V., doctor of technical sciences, and NAUMCHENKOV, N. YE., candidate of technical sciences

[Abstract] Tests were done at the Central Scientific Research Institute of Technology and Machine Building on the mechanical properties of large specimens of 25GS silicon-manganese steel specimens cut from 17-ton forgings. The UP-200 resonance machine was used with symmetric bending at 1200-1600 cycles per minute. The load was increased every $2 \cdot 10^6$ cycles until fatigue fracturing occurred. The fatigue limit was determined from the highest stress reached without fracture. Deformations were recorded by strain gages and electronic instrumentation. The paper describes a special device that was developed for work hardening the specimens by surface plastic deformation. Test results show that specimens hardened by the proposed technique have a fatigue limit of 17.7 kgf/mm^2 as compared with 13.9 kgf/mm^2 for the untreated specimens. Figures 4, tables 2, references 3 Russian.

USSR UDC 772.99

EFFECTIVENESS OF OPTICAL RECORDING ON A CHALCOGENIDE LAYER

Moscow ZHURNAL NAUCHNOY I PRIKLADNOY FOTOGRAFII I KINEMATOGRAFII in Russian Vol 22, No 2, Mar/Apr 77 pp 138-139 manuscript received 2 Sep 76

SEMAK, D. G., KIKINESHI, A. A. and TURYANITSA, I. I., Uzhgorod State University

[Abstract] Thin layers of a number of glass-like chalcogenide semiconductors are used for optical holographic recording. Since these materials may have a reflectance of the order of 50% on the wavelength of widely used He-Ne lasers (6328 Å), the authors consider the feasibility of improving the effectiveness of such holographic recording systems by the use of reflection reducing coatings. It is shown that by proper matching of the parameters of chalcogenide layer and the reflection reducing coating, a system can be made with a high recording speed and a diffraction efficiency of 7-8% in the recording and reconstruction mode on a single wavelength. Figure 1, references 8: 6 Russian, 2 Western.

USSR UDC 548.551

OPTICAL TRANSPARENCY OF COARSE LUCOSAPPHIRE CRYSTALS

Leningrad OPTIKO-MEKHANICHESKAYA PROMYSHLENNOST' in Russian No 2, 1977 pp 30-40 manuscript received 2 Apr 76

MUSATOV, M. I., SIDOROVA, YE. A. and IVANOV, B. G.

[Abstract] The authors are concerned with one of the most important characteristics of optical materials used in modern technology, i.e., the region of their transparency. The nature of any material will impose limits on each specific material, but due to the impurities and the various natural defects contained therein these limits cannot always be achieved. The authors demonstrate that those parts of coarse leucosapphire crystals formed at the final stage of the crystallization process have a lower transmission in the spectral wavelength band below 0.26 micrometers. The transmission of these parts become higher when the wavelength is greater than 0.26 micrometers. In this article the authors mention that tungsten crucibles have an advantage over iridium ones. Figures 3.

USSR

ELECTROLYTE FOR ELECTROCHEMICAL TREATMENT OF TITANIUM ALLOYS

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 7, 1977 pp 39-40 Patent No 547321

PRONICHEV, N. D., SHMANEV, V. A. and SENINA, O. A., Kuybyshev Order of Labor of the Red Banner Aviation Institute imeni Academician S. P. Korolev

[Text] The electrolyte, on a base of sodium chloride, is distinguished by the fact that for the purpose of raising the quality of the treated surface into its composition are additionally introduced ammonium nitrate and ammonium hypersulfate and the components are taken in the following amounts, in %:

Sodium chloride	10-12
Ammonium nitrate	6.5-8.5
Ammonium hypersulfate	0.9-1.1
Water	Remainder

USSR

UDC 691.327:536.485

INFLUENCE OF FROST RESISTANCE BY THE UNBURNED FUEL IN THE ASH ADDED TO SAND CONCRETES

Moscow BETON I ZHELEZOBETON in Russian No 5, 1977 pp 29-30

VOLZHENSKIY, A. V., DR Technical Sciences, Professor, GOL'DENBERG, L. B., Engineer, Moscow Institute of Construction Engineering, and VOYEVODA, G. F., Design-Technological Office, Mosorgstroymaterialy

[Abstract] Studies at the Moscow Institute of Construction Engineering and other facilities showed that adding ashes throughout a cement-sand mixture, that is steam-cured, can produce concrete of grades M 200-300 with the same amount of cement used for ordinary concrete in accordance with SN 386-74. The dispersion of the brown-coal ash should not be more than 3,000 cm^2/g, and of the hard-coal ash 4,000 to 4,500 cm^2/g. A study of the influence of the unburned fuel in the ash added to sand concretes showed that in the ash additives prepared by the burning of hard coals losses of ignition in the cements of up to 20% had no essential influence on the frost resistance of the concretes. Ill 1; Tab 1; Biblio 3.

USSR

UDC 546.92:537.311:536.531

TEMPERATURE DEPENDENCE OF RESISTANCE IN THE PL-2 PLATINUM USED IN INDUSTRIAL LOW-TEMPERATURE THERMOMETERS

Moscow IZMERITEL'NAYA TEKHNIKA in Russian No 4, 1977 pp 44-47

BELYANSKIY, L. B., DOTSENKO, V. V., RABUKH, L. I., DAN'KIV, T. S., and MAZALETSKAYA, G. L.

[Abstract] On the basis of experimental data the authors compute the standard temperature dependence of the relative resistance of PL-2 platinum in the temperature range 13.8-273.5K. The standard dependence $W^{st}(100)$ of relative resistance on temperature of the International Practical Temperature Scale for a thermometer with W(100) is 1.392597 where W(100) is the relative resistance of a thermometer at t=100°C. An analogous value W(100) for a thermometer with PL-2 platinum does not exceed 1.3916. By applying the computed standard dependence and by linear interpolation in the ranges 13.8-20.3K, 20.3-77K, and 77-273K, the authors obtain the temperature dependence of PL-2 thermometers as $1.3910 \leqslant W(100) \leqslant 1.3916$ with an error of 0.05K in the 13.8-90K range and 0.15K in the 900273K range. In this case the thermometers need be calibrated at only four points on the entire 13.8-273K scale, Ill 2; Tab 4; Biblio 7.

USSR UDC 662.997:621.362.621.383

RADIATION STABILITY OF SILICON PHOTOELECTRIC TRANSDUCERS WITH ELECTRIC FIELD INCORPORATED IN THE BASE

Tashkent GELIOTEKHNIKA in Russian No 2, 1977 pp 3-8

GERASIMOVA, YE. M., GRIGOR'YEVA, G. M., and CHETVERIKOVA, G. A.

[Abstract] On the basis of fact that the limited service life of solar cells in space is caused by degradations resulting from the effects of high-energy protons and electrons, and the fact that the literature lacks data on the radiation stability of silicon drift photoelectric transducers during irradiation by protons, the authoresses studied the radiation stability of silicon photoelectric transducers with electric field in their base. Protons with energies of 6.3 Mev were used in vacuum. The temperature of the specimens during the irradiation did not exceed 30°C, and the intensity of the beam of protons was varied from 10^8 to 10^{11} prot/cm^2·sec. The dependence of the radiation stability of the transducers on the magnitude of the incorporated electric field was ascertained. It is shown that photoelectric transducers with incorporated electric field have higher radiation stability even with electrical field values of approximately 20 v/cm. Ill 5; Biblio 7.

USSR UDC 662.997:537.22.001.24

STUDY OF THE GEOMETRIC IMPROVEMENT OF STARTING-SHEET POLYURETHANE-FOAM REPLICAS FOR SOLAR CONCENTRATORS

Tashkent GELIOTEKHNIKA in Russian No 2, 1977 pp 25-29 manuscript received 9 Mar 76

BAZAROV, B. A., KAPELYUSHNIKOV, V. M., and KALININ, B. A., Physico-technical Institute, Academy of Sciences Turkmen SSR

[Abstract] From hard polyurethane solid foams the authors obtained replicas by spraying on a standard parabolic mirror 1.5 m in diameter with 0.87-m focal length and 48° aperture. The efficiency and simplicity of the technology used makes the process feasible for producing a large number of polymer copies with diameters of 0.46 to 1.5 m. The research shows that the copies of solar concentrators obtained by the spraying of hard polyurethane foams duplicates its own standard with sufficient accuracy (0.8 to 0.98). The discrepancy in the dispersion angles does not exceed 0.1%. The use of the standard reflector considerably simplifies the process of measuring the geometric perfection of the prepared replicas, and allows them to be used as secondary standards without reflective coatings. For the reflective layers of solar concentrators prepared on the basis of polyurethane foams it is best always to use film coatings applied by the galvanic method. Ill 2; Tab 1; Biblio 7.

USSR UDC 621.643

ON THE DETERMINATION OF THE NATURAL FREQUENCIES OF THE TRANSVERSE OSCILLATIONS OF UNDERGROUND PIPELINES OF ASBESTOS CEMENT PIPE

Tashkent IZVESTIYA AN UZ SSR SERIYA TEKHNICHESKIKH NAUK in Russian No 6, 1977 pp 36-39 manuscript received 17 Apr 76

GOTOVTSEV, V. I., YERMOLAYEV, A. V., KHOZHMETOV, G. KH., and PUSHKIN, V. V., Institute of Mechanics and Seismic Stability of Structures, Academy of Sciences Uzbek SSR

[Abstract] The authors obtain experimentally the dynamic characteristics of the underground pipes and establish the theoretical premises for their study. The experiments were conducted at the Lyaur seismic test station of the Institute of Seismology and Seismic Stability of the Academy of Sciences Tadzhik SSR to determine the natural frequencies, period of the oscillations and decrement of decay for asbestos cement pipelines. VT-9 asbestos cement pipe with outside and inside diameters of 330 and 279 mm were layed with the top of the pipe 1.4 m below the surface of soil which at that depth had a specific weight of 1.53 t/m^3. There was a considerable difference between the amplitude and frequency of oscillations of the ground and of the pipe (38.4 Hz for ground and max of 57.4 Hz for one of three test pipes for frequency, but 0.5 and 0.57 logarithmic decrement of decay for the ground and the same pipe, respectively). It is found that in obtaining numerical values of the stresses generated in underground structures during earthquakes one should, in accordance with the seismo-dynamic theory of underground structures, use the values of their dynamic characteristics (period of natural oscillations, amplitude of oscillations) measured directly at the structures. In the absence of experimental data on the dynamic characteristics of pipelines, they must be determined theoretically; the accuracy of such values essentially depends on the coefficient of resistance of the ground. Ill 2; Tab 1; Biblio 3.

USSR/BULGARIA UDC 772.93

SOME INVESTIGATIONS OF THE METHOD OF DEVELOPING ELECTROGRAPHIC IMAGES WITH THE USE OF THE CHARGED VAPORS OF DIELECTRICS

Moscow ZHURNAL NAUCHNOY I PRIKLADNOY FOTOGRAFII I KINEOMATOGRAFII in Russian No 3, 1977 pp 161-168 manuscript received 19 Nov 75

ANTONOV, A., Physics Faculty, Sofia University; MARKOV, S., Higher Chemical-Technological Institute, Burgas; and YUSKESELIYEVA, L., Geophysics Institute, Bulgarian Academy of Sciences

[Abstract] A study is made of the possibility of developing electrographic images by means of charged particles of dielectrics (here aerosols from a

film of polymethyl methacrylate) under the conditions of development with fine crystals and droplets formed in the vapors of the developer (ammonium chloride). A description is given for the device for determining electrographic images. Sulphur, camphor, rosin, and tobacco smoke were also as developers. The results obtained are illustrated and can be used in the study of the electrostatic charging of aerosols as well as to obtain electrographic images under conditions where the potential relief has areas with dimensions in microns and low charge density. Ill 8; Tab 1; Biblio 5.

USSR UDC 666.11.01:539.213.1

PROCEDURE FOR USING DESIGN FORMULAS IN THE QUANTITATIVE ANALYSIS OF MICRO-CRYSTALLINE STRUCTURES BY AN ADVANCED PETROGRAPHIC METHOD

Moscow STEKLO I KERAMIKA in Russian No 2, 1977 pp 15-17

KIM, E. I., Engineer

[Abstract] The design aspect of the visual-computational advanced petrographic method (KIM, E. I. and SOLOMIN, N. V., STEKLO I KERAMIKA, 1976, No 8) involves computing the volume of the visible portion of the alloying phase, the maximum number of levels of its crystals and the real volume of the alloying phase. The volume of the visible portion of the alloying phase is computed by a formula derived on the basis of probability theory. The maximum number of levels of the crystals of the alloying phase is determined by the ratio of the observed thickness of the structure to the sum of the diameter of the crystal of the alloying phase plus the diameter of the portion of the main phase. The real volume of the alloying phase is determined as the product of the volume of the visible portion of the alloying phase times the mean number of levels of its crystals. Nomograms and tables are given for direct determinations of the above values, and the procedure is described for using the advanced petrographic method. A qualitative analysis of one specimen by the method described requires three to four days, provided its qualitative phase composition is known. Ill 2; Tab 2; Biblio 2.

USSR UDC 536.431.2.081.089.68:536.483

STATE SPECIAL STANDARD OF THE TKLR (TEMPERATURE COEFFICIENT OF LINEAR EXPANSION) UNIT IN THE 4.2-90K TEMPERATURE RANGE

Moscow IZMERITEL'NAYA TEKHNIKA in Russian No 4, 1977 pp 7-10

AGRANOVICH, YA. S., and ASTROV, D. N.

[Abstract] The special standard follows the general scheme established by the All-Union Scientific-Research Institute of Physicotechnical and Radiotechnical Measurements. Results are given of a certification of the standard with specimens of copper OSCh11-4 and fused quartz. An illustration is given of the arrangement of the specimens in the cryostat with platinum resistance thermometers for measuring the 13.81-273.15K range and for automatic regulation of temperature above 20K, a standard germanium resistance thermometer for measuring in the 4.2-20K range, and a germanium resistance thermometer used as a transducer for temperature regulation below 20K. The certification testing procedure is described. The results obtained differ by less than

$1 \cdot 10^{-8} K^{-1}$ from the data of T. Rubin a.o. (J. American Chem. Soc., Vol 76, No 5, 1954), and by less than $3 \cdot 10^{-8} K^{-1}$ from data of White and Collins (J. Low Temp. Phys., Vol 7, No 1, 1972). Ill 2; Tab 3; Biblio 18.

USSR UDC 621.317.313.081.1.089.68

STATE SPECIAL STANDARD INSTRUMENT FOR MEASURING THE UNIT OF INTENSITY OF A HIGH-FREQUENCY CURRENT AND ITS APPLICATION IN METROLOGICAL PRACTICE

Moscow IZMERITEL'NAYA TEKHNIKA in Russian No 4, 1977 pp 10-13

LOPAN', V. R.

[Abstract] A description is given of the standard measuring installation consisting of six sections: two electrodynamic ammeter sections, calibration photoammeter section with radial photoillumination, test transformer section with photocomparator, control-display console, and high-frequency current generator. The standard instrument measures currents in the 3-100-a range at frequencies of 0.1-100 MHz; the mean square deviation of measures values S_o does not exceed $5 \cdot 10^{-4}$, and the systematic error Θ does not exceed $8.5 \cdot 10^{-4}$. A description is given of the principle of operation. Ill 3; Biblio 5.

USSR UDC 534.612.081.1.089.68-4

STATE SPECIAL STANDARD INSTRUMENT FOR MEASURING THE UNIT OF SONIC PRESSURE--THE PASCAL--IN WATER IN THE 0.01-1 HZ FREQUENCY RANGE

Moscow IZMERITEL'NAYA TEKHNIKA in Russian No 4, 1977 pp 13-17

GOLENKOV, A. N., GOLUB', S. G., LIKHACHEV, S. M., and FADEYEV, V. G.

[Abstract] The standard instrument was officially approved by GOSSTANDART USSR on 16 December 1976. It is based on a modification of the hydrostatic (variable-depth) method developed by the All-Union Scientific-Research Institute of Physicotechnical and Radiotechnical Measurements for calibrating hydrophones in the range below 1 Hz. The modified method utilizes mass forces generated in the oscillating medium in a gravity force field. The dynamic phenomena are not connected with the vibrating hydrophone, but are localized in the moving portion of the system where they can be computed precisely and readily controlled in experiments. The measurement chamber has two parts, one movable and one immobile, both containing the fluid. They are joined

by a flexible tube which permits vertical, uniform sinusoidal oscillations of the movable part and of the free surface of the water in both parts as a whole. The total systematic error in calibrating hydrophones does not exceed $4.7 \cdot 10^{-2}$ and depends on the properties of the hydrophone. In the calibration of piezoceramic hydrophones with a sensitivitity of approximately 150 microvolts per pascal the maximum mean square error does not exceed $0.2 \cdot 10^{-2}$, and does not exceed $0.1 \cdot 10^{-2}$ for most frequencies. Ill 4; Biblio 15.

USSR

METHOD OF DETERMINING THE ERRORS OF THE DIAMETERS OF THE LIMBS OF INSTRUMENTS FOR MEASURING ANGLES

Author's Certificate 556314 (21) 2169144/10(22) 28 Aug 75

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 16, 1977 p 107

ALEKSEYEV, I. A., and YELISEYEV, S. V., Moscow Institute of Engineers of Geodesy, Aerophotography, and Cartography

[Text] A method of determining the errors of the diameters of the limbs of instruments for measuring angles consisting of a comparison by means of readout devices of the intervals of passage of the lines of a standard limb and the tested limb, respectively, which are attached to a single rotating axis, distinguished by the fact that, for the purpose of increasing the accuracy of measurement, when the standard limb is mounted on the rotating axis it is displaced relative to the tested limb by an angle greater than the limiting error of the diameter, but less than the graduation of the tested limb, and, by rotation of the axis, a successive comparison of the intervals between the moment of passage of lines of the standard and lines of the tested limb through the sighting axis of the readout.

USSR

UDC 771.537.33:778.35

ON THE PROBLEM OF REDUCING THE INFLUENCE OF GRANULATION NOISE ON THE ERROR IN THE MEASUREMENT OF QUALITY CHARACTERISTICS OF AERIAL PHOTOGRAPHIC SYSTEMS

Moscow ZHURNAL NAUCHNOY I PRIKLADNOY FOTOGRAFII I KINEOMATOGRAFII in Russian No 3, 1977 pp 199-204 manuscript received 17 Jun 75

KOROLEVA, V. P., MEL'KANOVICH, A. F., and VASIL'YEV, G. P.

[Abstract] Theoretical and experimental studies are described for three methods of measuring the dispersion function and frequency transfer

functions of photographic systems on the basis of the images of brightness discontinuities and bright lines distorted by the granulation noise of the photographic film. The methods are based on the use of apriori information on the photographic system and produce a nonlinear filtration of the noise. The first two methods obtain an approximation of the dispersion function of the aerial photographic system with the expression

$$g(x) = \frac{2.3}{np} \exp\left[-4.6\left|\frac{x-a}{p}\right|^{n}\right].$$

where p and n are the parameters and a is the abscissa of the point of maximum dispersion function. The third method is based on a smoothed transition curve of functions of an essentially more general type, which widens the sphere of photographic systems to which this method may be applied. However, in spite of the universality of the third method, in those cases when it is known that the dispersion function is symmetrical, the second method may give better results because the limit on the determination of the noise of the third method will result, as a rule, in a nonsymmetrical dispersion function and, consequently, a phase-frequency characteristic that is non-zero. Ill 1; Tab 2; Biblio 10.

USSR UDC 666.364:553.613:622.766

PILOT-SCALE TESTING OF TECHNOLOGY FOR BENEFICIATION OF ORTHOCLASE IN HEAVY SUSPENSION

Moscow STEKLO I KERAMIKA in Russian No 4, Apr 77 pp 30-32

DUMANOV, I. I. and DAVYDENKO, I. I., Engineers, Belogorsk Mining and Beneficiation Combine, ZAGAYNOV, V. G., Zolotoredmet Administration, and KAZIYEVA, G. YE., All-Union Scientific Research Institute for Nonferrous Metallurgy

[Abstract] The Belogorsk Combine began research work in 1973, intended to improve the separation of microcline from quartz, mica, albite and dark minerals by flotation and to separate microcline from the same impurities in heavy suspensions. The experiments with heavy suspensions were performed using suspensions prepared of granulated ferrosilicon, grain size 63 μm and magnetite, grain size 74 μm, ratio 60:40, density 2.45-2.5 g/cm^3. Viscosity was reduced by introducing liquid glass. Then, by increasing the grain size of the magnetite to 200 μm, the density of the suspension was increased to 2.57 g/cm^3. The material was screened into these classes before beneficiation in the laboratory. The experiments showed the high effectiveness of this method of separation of gangue. Pilot-plant scale beneficiation was performed in a drum separator with an elevator wheel 2000 mm in diameter in a suspension with a density of 2.57 g/cm^3, viscosity 3.5-5.5 cP. A concentrate was produced with a yield of 22.3% of the initial mass, potassium oxide content 9.63%, sodium oxide content 3.77%, iron oxide content 0.21%. This was twice the yield achieved by conveyor beneficiation. Industrial introduction of heavy-medium beneficiation almost completely eliminates manual labor, and allows small lump (less than 25 mm) tailings from sorting units to be included in the process. The productivity of labor and production of orthoclase are increased, and costs are decreased.

USSR

METHOD OF SEISMIC PROSPECTING

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 10, 1977 pp 106-107 No 550607

POLSHIKOV, M. K., KOZLOV, YE. A., BRODOV, L. YU. and MUSHIN, I. A., All-Union Scientific Research Institute of Geophysical Prospecting Methods

[Text] The procedure, based on the joint observation of longitudinal and transverse waves, is distinguished by the fact that for the purpose of increasing the accuracy of determining the elements of the structure and lithology of the geological cross section to be studied, the transverse and longitudinal waves are excited repeatedly with time delays between excitation events, the signals of the longitudinal and transverse waves are accumulated also for the maximum accumulated signal which corresponds to the determined time delay and judgments are made on the geometry of the cross section and lithology of its component rocks.

USSR UDC 629.7.058.47

COMPARATIVE ESTIMATE OF THE DETERMINATION OF THE ANGULAR COORDINATES OF A FLIGHT VEHICLE BY GYROSCOPIC AND ASTRONOMICAL MEANS

Leningrad IZVESTIYA VUZOV PRIBOROSTROYENIYE in Russian No 11, 1977 pp 71-75
manuscript received 19 May 76

SERGEYEV, M. A., BUGROV, YE. A., LEONOV, V. N. and YUSHCHENKO, V. I.,
Leningrad Institute of Precision Mechanics and Optics

[Abstract] Results are given of a measurement of the angular coordinates of a flight vehicle by a gyroscopic instrument and a navigation system with star corrections. It is shown that the angular oscillations of the vehicle in the low-frequency region of the spectrum are for all practical purposes not measured by the gyroscopic system, but are determined by the navigational system with star corrections. For this reason the navigation system with star corrections is not only better suited for studying the motion of a slight vehicle relative to its center of mass, but also for analyzing the errors of gyroscopic instruments. The combination of the star-correction navigational system and digital computer provides the possibility of more accurate instruments for determining the actual motions of an object with respect to angular coordinates and for measuring the errors of instruments that give the angular coordinates of the axes of a moving vehicle.

USSR UDC [66.023:669.15-194]:539.43.001.24

STRENGTH DESIGN OF WELDED PRESSURE VESSELS OF LOW-CARBON AND LOW-ALLOY STEELS WITH SMALL NUMBER OF LOADING CYCLES

Moscow KHIMICHESKOYE I NEFTYANOYE MASHINOSTROYENIYE in Russian No 2, Feb 77 pp 12-14

LARIONOV, V. V., Candidate of Technical Sciences

[Abstract] The method of strength design of a pressure vessel when the number of loading cycles is small is based on the criterion of local strength, according to which calculations are performed using the amplitudes of adjusted arbitrary elastic cycle stresses, equal to half the product of the local deformation times the modulus of elasticity at the design temperature. Calculated fatigue curves characterizing the relationship between permissible stresses and permissible numbers of cycles are constructed using the results of testing of the material under rigid loading with strength reserves of two as to stresses and ten as to number of loading cycles. In estimating the strength of welded pressure vessels, one must consider certain structural and technological peculiarities inherent in welded structures. They include primarily the difference in the properties of the metal in various zones around the welded seam. Therefore, the calculation curve must be constructed using the results of testing of specimens cut from the welded seam zone, where the rupture will be localized. A formula is presented for the relationship between the criterion of crack growth rate and the stress intensity factor. This formula is correct over a broad range of stresses, up to 70-90% of tensile strength. References 6: 5 Russian, 1 Western.

USSR UDC 620.311.81

CREEP-LIMIT TESTING OF SPECIMENS WITH A FATIGUE CRACK

Moscow ZAVODSKAYA LABORATORIYA in Russian No 1, 1977 pp 95-98 manuscript received 22 Dec 75

NESHPOR, G. S., MIKLYAYEV, P. G., VOROB'YEV, N. A., and KURAKINA, G. D.

[Abstract] A comparison is made of the results of creep-limit tests of specimens of the aluminum alloy AMg6 with a notch and with a notch plus a prepared fatigue crack at the notch. It is shown that the creep limit of specimens with the prepared fatigue crack may give valuable information on the materials tested and for this reason can be recommended as an additional procedure in the testing of notched specimens. The 25-mm AMg6 aluminum specimens were necked to approximately 14 mm and further notched to approximately 11 mm diameter; those with the fatigue crack were narrowed an additional 1.5 mm by the crack. The specimens were subjected to repeated tensile loads of 100-500 kg. Data are tabulated for 20 mechanical properties of five heat treatments of specimens. Ill 2; Tab 1.

USSR UDC 620.173

RADIAL COMPRESSION AS A METHOD OF MECHANICAL TESTING

Moscow ZAVODSKAYA LABORATORIYA in Russian No 1, 1977 pp 98-100 manuscript received 22 Dec 75

SEDOKOV, L. M., MARTYNENKO, A. G., and SIMONENKO, G. A., Tomsk Polytechnic Institute

[Abstract] It is shown that a detailed explanation is required for the indirect method of determining the ultimate tensile strength of brittle materials on the basis of the results of radial compression of cylindrical specimens. By using the strength criterion most reliable for brittle materials in plane stress, the authors derive a theoretical equation for the conversion factor A. Results are given of additional experiments which confirm the high degree of reliability of this equation. Some practical recommendations are proposed for applying the method of radial compression. For many materials the consistency of the test results by radial compression is greater than by direct tensile testing by a factor of 1.5 to 2.0. Ill 4; Biblio 5.

USSR UDC 669.14-419.4:620.174.251.2

MEASURING THE BENDING OF BIMETALLIC SHEETS DURING HIGH-TEMPERATURE HEATING

Moscow ZAVODSKAYA LABORATORIYA in Russian No 1, 1977 pp 102-103 manuscript received 12 Jan 76

MASLOV, A. M., USTIMENKO, V. A., BYKOV, A. A., CHERVYAKOV, V. V., TKACHEV, A. V., and VEREVKIN, A. N., Central Scientific-Research Institute of Ferrous Metallurgy, Moscow

[Abstract] An illustration and description are given of an apparatus for measuring the bending of bimetallic sheets as a result of heating in a vacuum at temperatures of 20-1,200°C. The base layer of the sheets was low alloyed steel and the surface layer was 12Kh18N10T stainless. The curves plotted for the dependence of the degree of bending on the temperature of heating and cooling have an S-shape. The experimental data are in good agreement with theory. The specimens were placed in the horizontal position and clamped at one end so that they could bend freely upward or downward with the heating or cooling. The dimensions of the specimens were 1 X 10 X 110; 2.5 X 10 X 110, and 12 X 20 X 110 mm. The thickness of the stainless outer layer was 30% of the entire thickness of the bimetallic specimen. The bending was measured every 100°C. During heating from room temperature to 600-700°C the bending increments are approximately uniform. Increasing temperature to 900-1,000°C is accompanied by increased bending increments,

apparently associated with phase transitions in the base layer metal. The curves of the variation of bendings during cooling and heating do not coincide. The graphic thus resembles a hysteris loop. With increased heating temperature and number of cycles of heating and cooling residual deformation increases. Ill 2; Biblio 4.

USSR UDC 532.5.071.4:621.224-253

CHARACTERISTICS OF THE TURBULENCE OF THE FLOW IN A TURBINE CASCADE WITH BLOWING INTO THE RIM

Moscow IZVESTIYA AN SSSR ENERGETIKA I TRANSPORT in Russian No 2, 1977 pp 168-172 manuscript received 18 Dec 75 revised 22 Jan 76

KOPELEV, S. Z., and LIKHERZAK, YE. YE.

[Abstract] Results are given of an experimental study of the turbulent structure of the flow in a turbine cascade and behind its leading edge in the presence of blowing into the rim wake through slots in the outlet edges. The measurements were made with pneumosonds and thermoanemometers. Data are given on the parameters that characterize the mean velocity field, the intensity of the turbulence, frequency spectrum of the oscillations in the core flow and wake at various blowing rates. The strong influence of the blowing on the structure of the rim wake and particularly on the intensity of turbulent fluctuations in the wake and extent of the region of recirculation is shown. The characteristics of the near wake behind the blade edge change in both the faired and turbulent parameter even at comparatively low blowing rates but are commensurate with the flow rate of air entrained into the viscous wake. With increased blowing, the intensity and energy of the turbulent pulsations in the wake drop abruptly. Ill 3; Biblio 4.

USSR UDC 629.133:621.43

START-UP PERFORMANCE CHARACTERISTICS OF THE YAMZ-740 AND YAMZ-741 DIESELS

Moscow AVTOMOBIL'NAYA PROMYSHLENNOST' in Russian No 5, 1977 pp 7-9

GORYUNOV, V. G., DEMIDOV, G. F., KHRESTIN, N. A., KVAYT, S. M., PETROV, V. A., and CHIZHKOV, YU. P., Scientific-Research and Experimental Institute of Automobile Electrical Equipment, Carburetors and Instruments

[Abstract] Results are given of start-up tests of the YaMZ-740 and YaMZ-741 diesels at temperatures down to minus 40°C and show that the use of an electric heater and an increase of the gear ratio at the contact of the starter gear and flywheel starter ring from 9.9 to 11.3 are effective means of improving start up. The increased gear ratio brought a 9-14% reduction (50-75 amps) in the current required for a start at -15°C for the YaMZ-470 and an 8-12% reduction (55-85 amps) for the YaMZ-741 engine. At lower temperatures the influence of an increased gear ratio was even greater. At -30°C the engine crankshaft rpm increased 48%, and the starter current dropped from 1,005 to 850 amps (15.5%) in the YaMZ-741 engine test. In the YaMZ-740 the crankshaft rpm increased 5% at -30°C, and the starter current dropped from 680 to 610 amps, or 10%. The authors recommend that the higher gear ratio be introduced into production. Ill 3; Tab 4; Biblio 5.

USSR

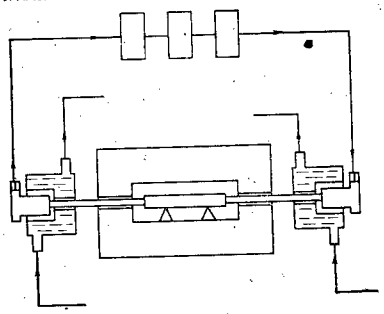
UDC 620.179.16

DEVICE FOR HIGH-TEMPERATURE ULTRASONIC INSPECTION

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 17, 1977 Author's Certificate No 557313 filed 28 Jul 75 p 143

KOKSHAROV, V. D., SAYPEYEV, G. A., MALYUTIN, A. A., and ZABOLOTSKAYA, R. M., Eastern Scientific-Research and Design Institute of the Refractories Industry

[Text] For high-temperature ultrasonic inspection, a device containing, in tandem, a sounding pulse generator, illuminator, transmitting and receiving delay lines, receiver and indicator with jacket cooling, distinguished by the fact that, for the purpose of increasing the measurement accuracy during inspection of materials in an oxidizing medium, the ultrasonic delay lines are made of a single crystal of a highly refractive mineral such as ruby.



USSR

ACOUSTICAL AUTOCORRELATOR

Author's Certificate (11)556448 (21) 2018006/09 (22) 15 Feb 74

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 16 1977 p 138

BONDARENKO, V. S., IVANOV, P. G., and PLUZHNIKOV, V. M.

[Text] An acoustic autocorrelator containing a piezoelectric sonic waveguide of rectangular cross section, input and output transducers of the surface acoustic waves attached to the working surface of the sonic waveguide, distinguished by the fact that, for the purpose of reducing the level of the spurious signals, the end of the piezoelectric sonic waveguide is terminated in an acute angle to the working surface and on it are attached the transducers of the longitudinal acoustic body waves.

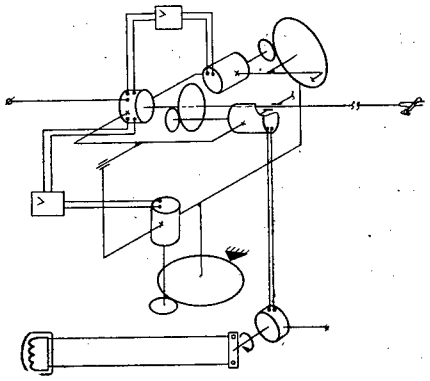
USSR UDC 372.66/.67

TRAINING APPARATUS FOR AN AIRCRAFT SIMULATOR WITH CORD MODELS

Moscow OTKRYTIYA, IZOBRETENIYA, PRMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 3, 1977 No 549828 28 Mar 75

BROVKIN, V. N.

[Text] Training apparatus for an aircraft simulator containing an aircraft model on a supporting bar, a Cardan joint linked to the steering arm, and a drive coupled to a transducer for measuring the tilt angle of the model, with the distinguishing feature that, for allowing the model to execute various figures taught in advanced piloting, a transducer for measuring the roll of the model is coupled to the supporting bar and the latter is mounted in the Cardan joint on bearings.



USSR UDC 629.7.065

A DEVICE FOR LAYING CABLE FROM AN AIRCRAFT

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 3, 1977 pp 48-49

KHAYZERUK, YE. M., POTOTSKIY, V. A., SHINKARENKO, YU. V., and ZAYNATDINOV, I. M.

[Description of USSR Author's Certificate No 543550 filed 13 Feb 75, published 25 Jan 77]

[Text] This Author's Certificate introduces a device for laying cables from an aircraft, primarily for helicopters. The installation contains a cable holder installed in the fuselage of the aircraft and made in the form of a rectangular box with a converging funnel attached to the rear wall for paying out cable, the outlet being turned downward at an acute angle to the longitudinal axis of the aircraft. As a distinguishing feature of the patent,

the holder is made to accommodate cable with lead sleeves by making it wider than the input opening of the funnel, and by making the ratio between the width of the holder and the distance from the rear wall of the holder to the center of the payout opening of the funnel equal to 1.8-2.2.

USSR UDC 62-50

A SYSTEM FOR EXTREME CONTROL OF THE FOCUSING OF AN ELECTRON BEAM

USSR AUTHOR'S CERTIFICATE NO 555378, Filed 04/01/76

[Translated from Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI in Russian No 15, 1977 p 134]

KUZNETSOV, N. N., TIMOFEYEV, B. S., UKHANOV, S. P. and FEDOSOV, B. A., Leningrad Institute for Aviation Instrument Building

[Text] A system for extreme control of the focusing of an electron beam, containing a television signal sensor, first amplifier, detection and filtration circuit, fixing and strobing circuit and second amplifier, focusing current power supply, the outputs of which are connected to the corresponding inputs of the television signal sensor, a test signal generator, the first output of which is connected through the strobing pulse shaping circuit to the corresponding inputs of the fixing and strobing circuit and a reversing flip-flop, the first output of which is connected through the first counter and third amplifier to the control input of the television signal sensor, with all circuits connected in series, is distinguished by the fact that to increase the accuracy of the extreme control system, it includes two AND circuits and series-connected slave multivibrator, a second counter, a decoder and a time-fixing oscillator, the output of which is connected through the first AND element to the input of the focusing current power supply and through the second AND element to the corresponding inputs of the first counter and reversing flip-flop, the second output of which is connected to the corresponding inputs of the slave multivibrator and the second counter, the second and third outputs of the test signal oscillator are connected to the second inputs of the first AND element and the reversing flip-flop, the output of the second amplifier is connected to the second input of the second AND element, the second output of the time-fixing oscillator is connected to the control input of the second counter.

USSR UDC 62-50

A TRACKING SCANNING DEVICE

USSR AUTHOR'S CERTIFICATE NO 555412, Filed 03/09/75

[Translated from Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI in Russian No 15, 1977 p 143]

SLOBODYAN, S. M., Institute of Atmospheric Optics, Siberian Affiliate, Academy of Sciences, USSR

[Text] A tracking scanning device containing a master oscillator, scanning oscillator, the first output of which is connected to the first inputs of the error signal shaper and the first adder, the second output of the scanning oscillator is connected to the second input of the error signal shaper and the first input of the second adder, the outputs of the first and second adders are connected to the first and second inputs of a cathode-ray tube respectively, the output of which is connected to the third input of the error signal shaper and the input of the operating mode switch, the first and second outputs of the error signal shaper are connected to the first inputs of the first and second integraters, the output of the first of which is connected to the second input of the first adder and to the first input of the scanning reverse shaper, the output of the second integrater is connected to the second inputs of the second adder and the scanning reverse shaper, the output of which is connected to the second inputs of the first and second integraters, is distinguished by the fact that to increase the sensitivity and interference-stability of the device, it contains two switches, a flip-flop, an OR logic circuit and a scanning pulse shaper, the first, second and third outputs of which are connected to the first inputs of the first and second switches and to the input of the flip-flop, the first and second outputs of which are connected to the second inputs of the first and second switches, the outputs of which are connected to the third and fourth inputs of the integraters, the first and second outputs of the operating mode selector are connected to the first and second inputs of the OR circuit, the output of which is connected to the inputs of the scanning oscillator and master oscillator, to the third inputs of the switches and to the first input of the scanning pulse shaper, the second, third and fourth inputs of which are connected to the first output of the operating mode selector and the outputs of the reverse scanning shaper and the master oscillator.

USSR

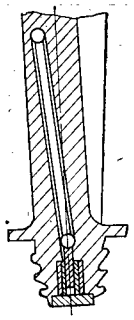
UDC 621.438-226

VANE FOR A TURBOMACHINE

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 9, 1977 No 549581 23 May 75

KOLESNIKOV, V. A., OSHUROV, A. I., and FROLOV, V. A., Kuybyshev Aviation Institute

[Text] 1. Vane for a turbomachine, especially for a turbine, with damper plates which can be shifted in the planes of this vane and with the distinguishing feature that, for better reliability, rods with spherical caps are propped along grooves in the vane blade between these plates and the groove shoulders. 2. Same vane, except with the distinguishing feature that the movable plates are placed between immovable plates and pressed against them by springs.



USSR

PRESS FOR STRAIGHTENING THE BLADES OF AIR SCREWS

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY TOVARNYYE ZNAKI in Russian No 7, 1977 pp 22-23 No 547254

YEFREMOV, N. D., MERKULOV, A. I., DUNAYEV, E. V., PYATILYSHEV, V. S., ROSHIN, I. A. and SAVUSHKIN, V. N.

[Text] The press, containing supports mounted on the base and positioned on the drive shaft with a thread for moving the blades, a mechanism for straightening in the form of a pressure die and also a movable device for limiting the amount of deflection of the blade, interacting with the master placed on one of the supports, is distinguished by the fact that for the purpose of simplifying the press design one of the supports is fastened rigidly on the base and the thread at the ends of the drive shaft is made with different gauges; here the master is installed with the possibility of movement relative to the movable support and positioned at the end of the drive shaft, the thread on which is made with a smaller gauge.

USSR

DEVICE FOR FORMING A CODE FOR THE SHORTEST PATH IN A DIGITAL COMMUNICATION NETWORK

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 7, 1977 p 143 No 547770

VASIL'YEV, V. I., KONOVALOV, V. M., and ZAMANSKIY, L. YA., Moscow Institute of Civil Aviation Engineers

[Text] The device, containing a generator, the first group of AND elements, an output register, the first group of inputs of which is connected with the outputs of the buffer register, is distinguished by the fact that for the purpose of increasing the device's speed of operation, it includes a counter, two groups of AND elements, an OR element, an interrogation unit, two address code registers, the generator output being connected with the input of the counter whose outputs are connected with the first inputs of the AND elements of the first group and the group of inputs of the interrogation unit whose control input is connected through the OR element with the outputs of the AND elements of the first group whose second inputs are connected with the outputs of the AND elements of the second group whose inputs are connected with the outputs of the AND elements of the third group whose inputs are connected with the outputs of the address code registers whose information inputs are connected with the input of the device; the control input of the second address code register is connected with the generator output whose input is connected with the output of the OR elements; the output of the interrogation unit is connected with the input of the output register whose second group of inputs is connected with the outputs of the first address code register and the output is connected with the output of the device.

UDC 621.643

USSR

A DYNAMIC DAMPER OF OSCILLATIONS OF AN ELASTIC VESSEL HOLDING A LIQUID

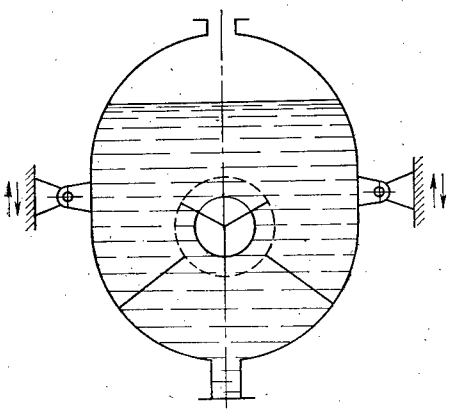
Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 3, 1977 p 106

ABGARYAN, K. A., MAL'TSEV, O. P., and SAMOYLOV, YE. A., Moscow Order of Lenin Aviation Institute imeni Sergo Ordzhonikidze

[Description of USSR Author's Certificate No 543795 filed 31 Oct 74, published 25 Jan 77]

[Text] This Author's Certificate introduces a dynamic damper of oscillations of an elastic vessel holding a liquid. The device contains an elastic gas-filled envelope enclosed in a perforated shell and connected by rods to the

walls of the vessel. As a distinguishing feature of the patent, provision is made for damping several frequencies of oscillations. The elastic envelope and the shell are partitioned into separate sectors, the walls of the sectors in the elastic envelope having different elasticities and being filled with gas at different pressures, while the walls of the shell have different degrees of performation in the different sectors.



USSR UDC 621.398

A MULTICHANNEL COMMUTATOR FOR A DATA TRANSMISSION SYSTEM

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 3, 1977 p 149

FEDOROV, V. V., SMIRNOV, G. A., and KALACHEVA, A. A., Leningrad Institute of Aviation Instrument Building

[Description of USSR Author's Certificate No 543972 filed 30 Jul 75, published 25 Jan 77]

[Text] This Author's Certificate introduces a multichannel commutator for a data transmission system. The device contains a control unit with output connected through a delay element to the input of a scaling module. As a distinguishing feature of the patent, the speed of the multichannel commutator is increased by adding a state register based on flip-flops with the set terminals connected in groups, a ripple-through carry unit made up of AND gates connected in series with respect to the first input, and a group reset

module made up of AND gates connected in series with respect to the first input, these AND gates being combined into groups in accordance with the commutation frequency. The second inputs of these AND gates are connected to the zero states of the corresponding digital places of the scaling module. The outputs of the groups of AND gates in the group reset module are connected to the corresponding groups of the set terminals in the flip-flops of the state register. The output of the control unit is connected to the input of the group reset module. The output of the delay element is connected to the first input of the first AND gate of the ripple-through carry unit and to the reset terminal of the first flip-flop in the state register. The "one" states of the flip-flops in the state register are connected to the outputs of the multichannel commutator, and the "zero" states of these flip-flops are connected to the second inputs of the corresponding AND gate in the ripple-through carry unit. The output of each of these AND gates is connected to the reset terminal of the next flip-flop in the state register.

USSR

DEVICE FOR DETERMINING THE COORDINATES OF POINT LIGHT OBJECTS

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 10, 1977 pp 121-122 No 550658

VILESOV, L. D., MURZINOV, L. D., PAVLOV, V. S., POGODIN, A. B., and PROLYGIN, YE. V., Leningrad Institute of Aviation Instrument Construction

[Text] The device, containing a dissector connected through the amplifier-clipper to the input of the control divider, three counters, the first and second of which are connected in sequence to the information inputs of the corresponding coordinate registers and through digital-to-analog converters to the control inputs of the dissector, a two-threshold comparison block, the input of which is connected to the output of the control divider and the outputs respectively to the input from the first counter and to the control inputs of the coordinate registers, a pulse generator, the elements AND, OR and a control trigger, is distinguished by the fact that for the purpose of expanding the operating range of the device it contains a discharge pulse shaper, an inverter, a delay element and supplemental register, the information inputs of which are connected with the discharge outputs of the third counter, and the outputs are connected to the other inputs of the control divider, one of the inputs of which is connected with the output of the control trigger and through the first element AND with the other input of the two-threshold comparison block, the output of the pulse generator is connected to the other input of the first element AND and to the input of the discharge pulse shaper, the output of which is connected directly with the control input of the supplemental register, with the inverter input and through a sequentially connected delay element and OR element with one of the inputs of the third counter, and the other input of which is connected through the second element AND, connected with the output of the amplifier-clipper to the output of the inverter and to one of the inputs of the control trigger.

USSR

FERROACOUSTICAL MEMORY

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 10, 1977 pp 126-127 No 550674

KORONEV, L. YU. and PETROVYKH, S. V., Leningrad Institute of Aviation Instrument Construction

[Text] 1. The memory, containing a backing on which a recording and readout bus is placed and thin magnetic films, is distinguished by the fact that for the purpose of increasing the capacity and raising the memory reliability, grooves in which the thin magnetic films are placed are positioned in the recording and readout bus.

2. The memory, after paragraph 1, is distinguished by the fact that the backing is made in the form of a disk of a foil-plated dielectric, the recording and readout bus is arranged in a spiral and the grooves in it are arranged radially with respect to the disk.

3. The memory, after paragraph 2, is distinguished by the fact that the recording and readout bus is made in the form of two counter aligned engaged spirals.

USSR

UDC 531.715.27

ANGLE OF ROTATION PICKUP

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 17, 1977 p 131 Author's Certificate No 557260 filed 19 Dec 75

ZARIPOV, M. F., NIGMATOV, N. T., SULEYMANOV, N. T., GINIYATULLIN, N. I., and KALINCHUK, N. N., Ufa Aviation Institute

[Text] An angle of rotation pickup containing, in tandem, a light source, rotation angle to light signal transducer in the form of a semitransparent cylinder, photocell and unit for processing the signals from it, distinguished by the fact that, for the purpose of simplifying the design and of broadening the functional possibilities of the pickup, on the surface of the cylinder are two profiled masks, one reflecting, the other absorbing.

USSR

UDC 371.66/67

A GYRO-VERTICAL DRIFT IMITATOR

USSR AUTHOR'S CERTIFICATE NO 554556, Filed 25/04/75

[Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 14, 1977 p 139]

GAVRIKOV, V. M., TELESH, V. M. and UDAL'TSOV, I. I.

[Text] A gyro-vertical drift imitator, containing a gyro-vertical, a control device, the output of which is connected to a relay connected to the horizon indicator, and a power supply, is distinguished by the fact that to expand the functional capabilities, increase the range of speeds and the accuracy of processing of imitated gyro-vertical drifts, it has the following system, the output of which carries an angular displacement center, a generator producing a linearly increasing voltage and a relay which disconnects the power supply of the tracking system, one input of the tracking system being connected to the output of the gyro-vertical and the relay, the other to the output of the generator producing the linearly increasing voltage, the inputs of which are connected to the two outputs of the control device, its thrid input being connected to the deflector relay of the tracking system, while the output of the angular displacement sensor is connected through a relay to the horizon indicator.

USSR

UDC 531.383

ON THE USE OF STEREOGRAPHIC PROJECTION FOR COMPUTING THE STATIC CHARACTERISTIC OF A ROTOR-MASK ANGLE PICKOFF OF A TWO-DEGREE-OF-FREEDOM GYROSCOPE

Leningrad IZVESTIYA VUZOV PRIBOROSTROYENIYE in Russian No 11, 1976 pp 75-78
manuscript received 14 Jul 76

SHURSHALOV, V. N., and VORONOV, S. A., Saratov Polytechnic Institute

[Abstract] A graphical-analytical method is proposed for determining the limits of the active portions on the surface of a spherical rotor, and a calculation is made of the lengths of the output pulses of the rotor-mask attitude sensors of two-degree-of-freedom gyroscopes. The method is based on the use of stereographic projection. The method is particularly useful in cases when the static characteristics of the rotor-mask attitude sensor are nonlinear. Formulas are given for plotting the stereographic projection of the limits of the active zone on a given surface of the casing. Two beams from the center of the spherical rotor pass through the intersection of

of the stereographic projections of the active portion of the rotor and a circle formed by a central angle. A formula is given which is used to apply the central angle to determine the length of the output pulses for each value of the given angle of rotor deviation from the position of the casing. Ill 2; Biblio 6.

USSR

UDC 621.979.07

AN APPARATUS FOR THE CREATION OF HIGH PRESSURE

USSE AUTHOR'S CERTIFICATE NO 553997, Filed 10/01/75

[Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 14, 1977 p 13]

MAZURENKO, A. M., Belorussian State University imeni V. I. Lenin

[Text] 1. An apparatus for the creation of high pressure, including two coaxially placed anvils with pressing recesses on their functional ends of variable depth, as well as a container placed between the anvils in the pressing recesses, is distinguished by the fact that to increase the reaction volume of the chamber, the pressing recess of each anvil is made with a central projection, the tip of which is located below the level of the edge of the recess, and the container is made in the form of the recesses as coaxial rings forming a cavity for the material being processed.

2. An apparatus as in claim 1 is distinguished by the fact that the side surfaces of the pressing recesses and the projections of each anvil are conical, the cone angle of the side surface of the projection being 60-85°, the cone angle of the side surfaces of the pressing recess being 100-160°.

3. An apparatus as in claims 1 and 2 is distinguished by the fact that the central projection of the pressing recess in each anvil is made in the form of an insert.

USSR

UDC 621.317.77

A DEVICE FOR THE SHAPING OF A MONOPOLAR SIGNAL

USSR AUTHOR'S CERTIFICATE NO 554508, Filed 02/12/75

[Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 14, 1977 p 126]

FEDOROV, I. M., Institute of Geophysics, Urals Scientific Center, Academy of Sciences USSR

[Text] A device for shaping of a single-pole signal, containing sources of initial signals, short pulse shapers connected to them, the outputs of which are connected through an OR logic circuit to a frequency divider, is distinguished by the fact that to eliminate phase ambiguity of the single-pole signal, the circuit includes an additional frequency divider, pulse counter, first and second OR logic circuits, AND logic circuits, an adder, a delay line, a decoder and multipliers, the outputs of which are connected to the

inputs of both frequency dividers and through the decoder to one of the initial signal sources, and also to the short pulse shaper, the outputs are connected through the adder to one of the inputs of the first OR logic circuit, the second input of which is connected to the second initial signal source, the output of which is connected through the AND logic elements to the inputs of an OR logic circuit and additionally a second OR logic circuit, the output of which is connected to the input of the additional frequency divider, while one of the outputs is connected to the input of the OR logic circuit, the second inputs of the AND logic circuits being connected to the outputs of the pulse counter, the input of which is connected to the output of the first additional OR logic circuit through the delay line.

USSR UDC 621.165:621.187.146/147.001.4

TESTING THE LENINGRAD METAL PLANT K-300-400 TURBINE REGENERATOR SYSTEM WITH ONE LOW-PRESSURE OPEN FEED-WATER HEATER

Moscow ELEKTRICHESKIYE STANTSII in Russian No 2, 1977 pp 25-28

YEFIMOCHKIN, G. I., VERBITSKIN, V. L., BEL'FERMAN, M. D., SHIPILEV, S. G., and KROKHALEV, B. M., All-Union Institute of Heat Engineering, Karmanov State Regional Electric Power Plant

[Abstract] The open feed-water heater No 2 with pressurized water distributor, devised by the above institute for the K-300-240 LMZ turbine, provides guaranteed heating of the water up to the saturation temperature of the process steam. Maximum heating in the tests was 48°C. Admission of drainage and extraction of steam from low-pressure heater PND-3 below the water level into the condensate intake of PND-2 produces an additional 2-3°C temperature increase. The tests revealed the possibility of increasing its dimensions. Shutdown tests of the first stage pumps showed that the emergency overflow line reliably acts as a safety valve, preventing a pressure rise above 1.4 kg/cm^2. The use of simple and reliable configurations with one PNK-2 low-pressure open feed-water heater is feasible in redesigning existing 300-Mw power units, as well as in designing the new heavy-duty power units where the use of a gravity system with open feed-water low-pressure heaters PND-1 and PND-2 is difficult because of total design considerations. The tests and operational experience have provided a basis for recommending the described design and for designing a heat with pressurized water distributor for wide usage. Ill 4; Biblio 4.

USSR

STAMP FOR HOT DEFORMATION OF PARTS

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 7, 1977 p 29 No 547275

GRESHNOV, V. M., KHAYRETDINOV, E. F., KAYBYSHEV, O. A., GALIMOV, M. D., and KOZLOV, V. A.

[Text] The stamp, containing a die mounted on the upper plate with a heat insulating jacket positioned concentrically to it, and also a die installed on the lower plate, the die also being equipped with a heat insulating jacket with a window for loading and unloading billets, is distinguished by the fact that for the purpose of mechanizing removal of the parts from the die, it is made in the form of a bottom part fixed on the lower plate and a movable ring that moves relative to it with a drive for its reciprocating axial motion by means of a rod connected to it and coupled with the power organ; here the path of movement of the rod is greater than the path of movement of the die.

USSR

DEVICE FOR URGENT DECELERATION OF A SHIP

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 7, 1977 p 53 No 547374

FADEYEV, YU. I. and NAUGOL'NOV, V. I., Leningrad Order of Lenin Shipbuilding Institute

[Text] The device, containing a system of opening gates positioned in the side niches of the ship's hull below the water line, is distinguished by the fact that for the purpose of reducing deceleration time and the deceleration path of the ship, the device is equipped with additional deceleration means, made in the form of pneumatic elastic vessels which are air tight with an internal volume of the niche with compressed gas and remote control valves, the pneumatic elastic capacitances being equipped with tanks by means of the remote control valves.

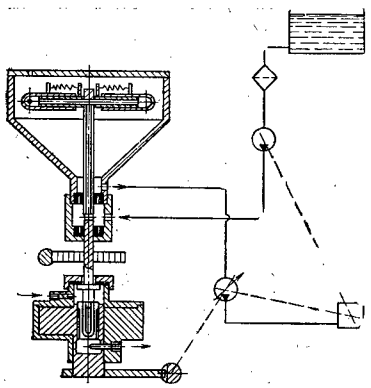
USSR UDC 621.436-545

HYDRAULIC SPEED REGULATOR FOR A SHIPBOARD MOTOR

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 3, 1977 No 549587 4 Feb 75

MEZYUKAYEV, V. A.

[Text] Hydraulic speed regulator for a shipboard motor consisting of a housing and a cavity, connected to the fluid pump, kinematically coupled to the shaft, and containing a rotary spring-loaded sensing element which interacts with the fuel injection gauge, with the distinguishing feature that, for a more precise regulation during rocking of the ship, this sensing element has been designed as a Segner wheel with elastically coupled movable telescopic tubes.



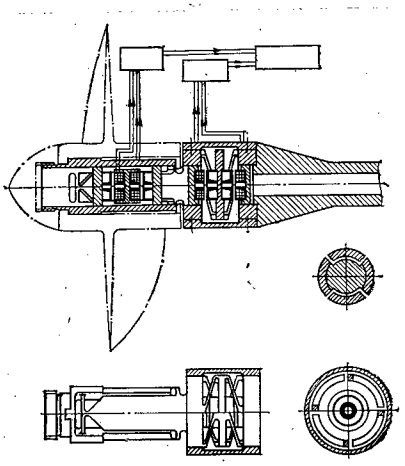
USSR

DEVICE FOR MEASURING TORQUE AND STOP OF A PROPELLER

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 7, 1977 p 116 No 547658

MALYKH, I. M., OSIPOV, YE. S. and SERGEYEV, V. I.

[Text] The device, containing units built into the shaft for measuring torque and stop including elastic elements and inductive movement converters, is distinguished by the fact that for the purpose of increasing measurement accuracy, the elastic element in it for the unit to measure momentum is made in the form of a torsion bar inside which a speed-enhancing mechanism is concentrically positioned in the form of a disk connected with opposite ends of the torsion bar by two "squirrel cages" with sloped beams and the elastic element for measuring stop is made in the form of two counter directed forks, the cantilever flanges of which are connected with seals of the flanges of the response forks by elastic beams; here the inductive movement converters are positioned inside the elastic elements.



USSR

LIGHT SIGNAL LAMP

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 8, 1977 p 126 No 548748

SHAPOSHNIKOV, YE. A., GONCHAR, V. P., TABACHNIKOV, M. L., PINKUS, R. S., SIORA, V. T., KHIKHLACK, A. F., and ANDREYEV, V. S.

[Text] The lamp contains a case, a switch, a reflector, protective glass, light filters, supply elements, a light source and a means for controlling the light filters and is distinguished by the fact that for the purpose of increasing convenience of operation and reliability of signalization, the means of controlling the light filters is made in the form of an L-shaped contact strip and the light filters are made in the form of sequentially connected hollow cylinders mounted on the contact strip.

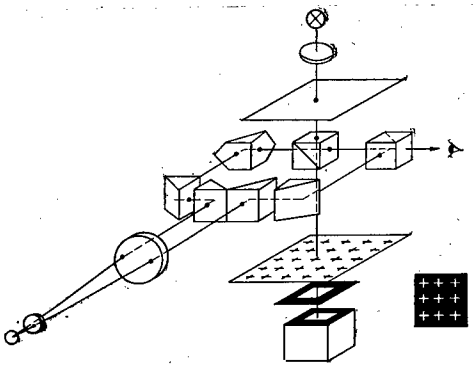
USSR UDC 528.722.7

DEVICE FOR AUTOMATICALLY MEASURING THE ERRORS OF A PHOTOGRAPH

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 3, 1977 No 549682 27 Nov 72

ZOTOV, G. A., AFREMOV, V. G., and SVERDLOV, F. K., Central Scientific Research Institute of Geodesy, Aerial Photography, and Cartography

[Text] Device for automatically measuring the errors on a photograph, consisting of a photograph holder rigidly fastened to the negative frame, a mesh of reference crosslines inside the camera, a lamp, an autocollimating objective which projects a congruent image of the photograph on the plane of the negative in the 1:1 scale, a scanner, and a photoelectric system including a photoreceiver, with the distinguishing features that, for a better measuring accuracy, between the photograph holder and the negative copy of the crosslines mesh is mounted a cube-prism with a diagonal mirror face at 45° to the planes of the photograph and of the negative, both sides of this diagonal face facing the photograph and the negative, respectively, are optically linked to the autocollimating objective, a plane mirror is mounted in the focal plane of the latter, the scanner is mounted between the two, and a square diaphragm with the side 1-2 crossline spaces long is mounted between the negative and the photoreceiver.



USSR UDC 550.834

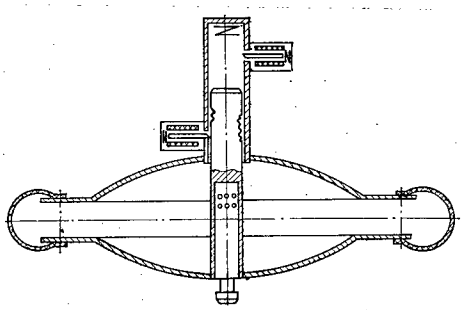
GENERATOR OF SEISMIC SIGNALS FOR AN AQUATORIUM

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 3, 1977 No 549761 17 Apr 74

YEZHOV, V. A.

[Text] Generator of seismic signals consisting of a housing made of two parts such as, for example, two hemispheres facing each other with their open sides

and connected through a flexible element, one of them also connected to a plunger running inward and the other containing a cylinder, with the distinguishing feature that, for separately utilizing the first and the second seismic shocks while eliminating the pulsations, the plunger enters the cylinder equipped with an index pin and two racks whose teeth engage in opposite directions.



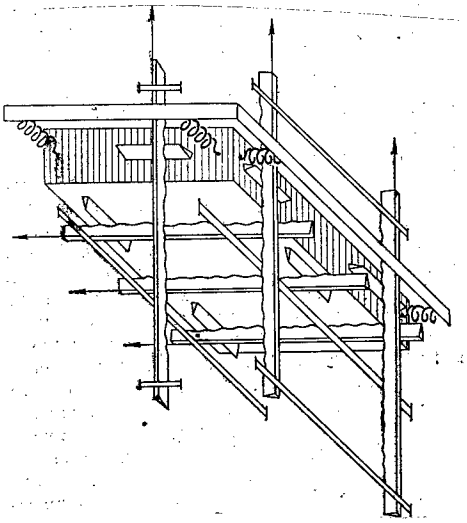
USSR UDC 550.83

SIX-PART SEISMIC STAND

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 3, 1977 No 549762 1 Oct 75

LEVSHENKO, V. T., FEDOROV, S. A., and SHEYN, B. N., O. J. Schmidt Order-of-Lenin Institute of Geophysics

[Text] Six-part seismic stand consisting of an adjustment table, a moving mechanism, and a drive, all interlinked, with the distinguishing feature that, for making the earthquake-test conditions approach real conditions, the moving mechanism includes at least six racks with a profiled edge each and mounted so as to allow for a simultaneous movement of the table in three orthogonal planes, with the table joined to these racks by dovetailing.



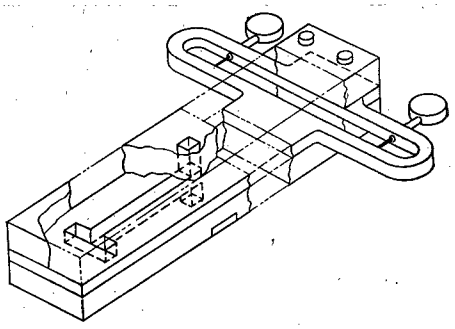
USSR UDC 531.781

DEVICE FOR STRESS MEASUREMENTS

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 3, 1977 No 549694 4 Jul 75

KAN, K. N., Leningrad Institute of Aviation Instruments

[Text] Device for stress measurements which includes an elastic element and a recording instrument, with the distinguishing feature that, for broader functional capabilities and simpler operation, it is made of three plates rigidly coupled on one side, namely two outer plates and one inner plate, the inner one being integral with the elastic element and movable relative to the outer two, the outer two having a notch each to accommodate one bearing end of the test specimen and the inner one having a notch to accommodate the second bearing end of the test specimen.



USSR

SEISMOMETER

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 8, 1977 p 140 No 548817

FEDOSEYENKO, N. YE., BRULEV, YU. V., and FROLOV, A. D., Institute of Earth Physics imeni O. Yu. Shmidt

[Text] The seismometer, containing a frame, and electrodynamic converter and spiral-radial, e.g., quadruradial, springs is distinguished by the fact that for the purpose of increasing sensitivity and the period of natural oscillations of the inert mass, the end surfaces of the springs are made with flanges on the inner and outer surfaces, these flanges being arranged symmetrically and displaced relative to the middle of the working segments of the springs by an angle $\alpha = 45 \pm 2°$ and fastened on the frame and coil frame of the instrument converter.

USSR

UDC 621.387.426

A METHOD OF MEASURING DYNAMIC DISPLACEMENTS OF ATOMS IN CRYSTALLINE SOLIDS

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 3, 1977 p 122

SIROTA, N. N. and BULAT, I. A., Institute of Solid State and Semiconductor Physics, Academy of Sciences Belorussian SSR

[Description of USSR Author's Certificate No 543857 filed 22 Jul 75, published 25 Jan 77]

[Text] This Author's Certificate introduces a method of measuring dynamic displacements of atoms in crystalline solids based on measuring the spectrum of slow neutrons coherently scattered by the solid. As a distinguishing feature of the patent, this technique provides for direct determination of dynamic displacements of the atoms, as well as the way that these displacements depend on frequency and temperature. Neutrons that are inelastically coherently scattered by the solid are registered by a time-of-flight spectrometer at different temperatures, scattering angles and incident neutron energies. The amount of displacement of atoms is determined from the width of coherent peaks in accordance with the formula

$$U = nQ\left[\left(\frac{2mE_1}{h^2} - 2K_0\sqrt{\frac{2mE_1}{h^2} + K_0^2}\cos\theta + 2K_0^2\right)^{-1/2} - \left(\frac{2mE_2}{h^2} - 2K_0\sqrt{\frac{2mE_2}{h^2} + K_0^2}\cos\theta + 2K_0^2\right)^{-1/2}\right]$$

where U is the dynamic displacement of the atom from the equilibrium position, cm; Q is the energy resolution of the spectrometer (expressed in fractions of a unit); h is Planck's constant, ergs/s; m is the mass of the neutrons, g; ε_1, ε_2 give the position of the wings of the coherent peak on the energy scale, ergs; K_0 is the modulus of the wave vector of the incident neutrons, cm^{-1}; θ is the angle at which the spectrum of the scattered neutrons is measured, deg.

USSR

DEVICE FOR MEASURING THE DISPERSE COMPOSITION OF AEROSOLS

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 10, 1977 p 97 No 550560

KOL'TSOV, B. YU., NEYMAN, L. A., POPOV, B. I., RUMYANTSEV, V. V., and TURUBAROV, V. I., Leningrad Institute of Aviation Instrument Construction

[Text] The device, containing deposition electrodes of charged particles with a supply block installed in sequence in the stream of the aerosol of

the electrode for a corona discharge, a measuring electrode, an electrometer connected to the measuring electrode and a register is distinguished by the fact that for the purpose of increasing the measurement accuracy and sensitivity, the deposition electrode supply block is made in the form of an experimental voltage generator, the output of which is connected to one of the register inputs and the other input of which is connected through the summator to the electrometer, it being equipped with a charge differentiation block fed to the electrometer; the input of this block is connected to the measuring electrode and the output is connected to the summator.

USSR

ACCELEROMETER

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 10, 1977 p 101 No 550584

ANIKIN, S. A., Penzensk Branch of the All-Union Scientific Research Technological Institute of Instrument Construction

[Text] The accelerometer, containing a frame, a sensing element in the form of a lever with an inertial load at the end and units for power compensation, is distinguished by the fact that for the purpose of eliminating the influence of side acceleration components, the sensing element is made in the form of two identical levers, the inertial loads of which have a mutual contact by curvilinear surfaces through elastic bands enveloping these surfaces in different directions.

EAST GERMANY

PROBE FOR SENSING TEMPERATURE DISTRIBUTION IN THICK-WALLED STRUCTURAL ELEMENTS (WALL-TEMPERATURE PROBE)

Leipzig ENERGIETECHNIK in German No 7, 1976 pp 291-295 manuscript received 27 Feb 76

KIESSLING, GERHARD, Engineer, VEB Combine for Power Plant Installations Construction, Dresden

[Abstract] Two types of wall temperature probe (WT1 and WT2) were developed for monitoring wall temperature distribution in steam power installations. Two experimental models have been in use for the past two years in the turbine housings at the Luebbenau/Vetschau power plant. The models can be attached to already installed equipment. The probes can measure temperatures in the 200-550°C range in wall thicknesses of 30-400 mm. The two temperature sensing inserts in each probe can be replaced without difficulty during operation. The two types of probe are designed for different wall thicknesses: the WT1 is for wall thicknesses of 30-160 mm and has a 3-mm diameter insert; the WT2 is for 120-400 mm walls and has 6-mm diameter temperature sensing inserts. Wall temperatures are measured in two planes. Each temperature sensing insert has two thermocouples for better recording of absolute temperature. Ill 6; Biblio 4.

EAST GERMANY

DESCRIPTION OF A PRECISION BULB MANOMETER WITH EMPHASIS ON ERROR EFFECTS

Leipzig FEINGERAETETECHNIK in German No 6, 1976 pp 269-272

BROEKE, H., Dr of Engineering, Standardization, Measurement and Commodity Testing Office, Technical Department of Thermodynamics

[Abstract] A description and first results of tests are given for a bulb manometer for the 133-106.658-Pa (1-800 torr) range, with error less than 4 Pa 90.03 torr). The gas volume required for measurements is less than 2 dm^3. Several measurement series on different days showed a maximum deviation of 1.5 /u from a single null point setting. With an initial temperature of 19°C and measurement tempetature of 20°C the required temperature constant is obtained after about five hours; thereafter the variation is less than 0.01 K/h. The thermal stratification in the liquid was measured at three levels (each vertically separated 200 mm) within an error of 0.005 K; the largest temperature difference was less than 0.005 K. One person can operate the manometer with ease, and a complete measurement cycle takes no more than 12 minutes. Since the uncertainty of the mercury density is the main influencing factor in the measurement inaccuracy, its determination, which can be done at ASMW with an error of only $1 \cdot 10^{-6}$, can lead to an even smaller total measurement error. Ill 1; Tab 2; Biblio 2.

USSR UDC 550.83

A DEVICE FOR CONSTRUCTION OF SEISMIC CROSS SECTIONS

USSR AUTHOR'S CERTIFICATE NO 554518, Filed 29/07/74

[Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 14, 1977 p 128]

GUTGARTS, YE. I., MIKHAYLIK, I. YU., NESIN, S. P., and RUCHKO, V. L., Ukrainian Geophysical Prospecting Trust "Ukrgeofizrazvedka"

[Text] A device for construction of seismic cross sections containing a unit for reproduction of digital magnetic tapes with digital information sensors, a digital-to-analog converter for seismic information, an amplifier and recording modulator, a drum with a photographic information carrier and rotation mechanism, a cathode ray tube (CRT) with a lens, a cycle pulse counter and separation unit, a horizontal scan unit, a unit for horizontal displacement of the CRT and lens, so that the outputs of the digital information sensors of the reproduction unit of the digital magnetic tapes are connected through the train consisting of the series-connected digital-to-analog seismic information converter, amplifier and recording modulator to the control electrode and horizontal deflecting system of the CRT, the outputs of the digital information sensors are connected through the separation unit and cycle pulse counter, connected in series, to the horizontal deflecting system of the CRT, is distinguished by the fact that to increase productivity, a reversing counter, digital-analog converter for the mismatch signal, digital magnetic tape speed regulation unit and sensor for the drum angular speed are introduced; the output of the drum angular speed sensor is connected to one of the inputs of the reversing counter, the second input of which is connected to the output of the unit for separation of cycle pulses, the outputs of the reversing counter are connected to the inputs of the digital-analog mixmatch signal converter, the output of which is connected through the digital magnetic tape speed regulating unit to the digital magnetic tape reproducing drive.

USSR UDC 550.834

A SOURCE OF SEISMIC SIGNALS IN WATER

USSR AUTHOR'S CERTIFICATE NO 554517, Filed 10/06/75

[Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 14, 1977 p 128]

LIVSHITS, M. KH., BOLDAVESHKO, YE. I., SMYSLOV, YU. M., and SHLYAPIN, I. G., All-Union Scientific Research Institute for Marine Geology and Geophysics

[Text] A source of seismic signals in water utilizing detonation of a gas mixture, containing an explosive chamber in the form of an elastic envelope

with a metal structure in the central portion of the elastic envelope, the diameter of the metal structure being at least half of the outside diameter of the explosive chamber, and a device for input and ignition of the mixture, is distinguished by the fact that to provide a stable radiated signal and improve the usage qualities, the metal structure is made in the form of a hollow cylinder, the elastic envelope is attached to the ends of the cylinder by two circular elements, the explosive chamber is connected to the surrounding medium by one constantly open channel in one circular element, while the other circular element has a channel connecting the explosive chamber to the device which feeds and ignites the gas mixture.

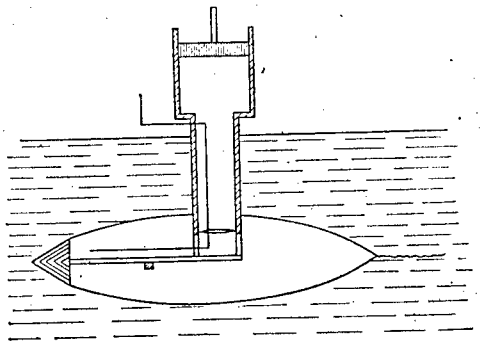
USSR UDC 621.671

DEVICE FOR EXPERIMENTAL STUDY OF CAVITATION FLOW

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHELENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 9, 1977 Patent No 549704 27 Jan 75

ZHURAVLEV, YU. F., UVAROV, G. V., and TSEYTLIN, M. YU.

[Text] Device for experimental study of cavitation flow, consisting of a cavitator in the wake of which in the stream there forms a gas-filled stationary pocket connected to a pressure gauge, with the distinguishing feature that, for the purpose of extending the range over which the elastic properties of the gas pocket may vary at constant stream velocity and pressure around the cavitator, a tank of adjustable volume is placed outside the stream and connected to that pocket.



USSR

DIFFRACTION MONOCHROMATOR

Author's Certificate (11) 556347 (21) 2179667/25 (22) 10 Nov 75

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 16, 1977 p 115

AFANAS'YEV, V. V. and STARTSEV, G. P.

[Text] A diffraction monochromator with deflection angle not over 45° containing a concave diffraction grating, fixed inlet and outlet slots and spectrum scanning mechanism that rotates the grating around the vertical axis which passes through its apex, distinguished by the fact that, for the purpose of reducing the defocussing and aberrations, the distance from the center of the diffraction grating to the inlet slot is equal to 0.9-1.1 the radius of curvature of the grating, and the diffraction grating is designed with variable distance between neighboring lines, the variation in accordance with linear law, whereby the spacing coefficient is selected from the condition of minimum defocussing.

USSR

UDC 681.121

GAS FLOWMETER

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 17, 1977 p 133 Author's Certificate No 55727 filed 9 Oct 72

VOYTSEKHOV, YU. R., and CHERNYAKOVA, M. M.

[Text] 1. Gas flowmeter containing a double breakdown pulse generator, discharger with two electrodes, and a device for recording the displacement of the repeated electrical breakdown, distinguished by the fact that, in order to increase the precision of measurement, one of the electrodes of the discharger is in the form of a calibrated wire loop, the arms of which are symmetrical with the other electrode with respect to resistance, and, for recording the displacement of the repeated electrical breakdown, a device connected to the loop electrode and containing a transformer with two opposite-phase current windings and test winding terminated in a tester.

2. Flowmeter according to 1., distinguished by the fact that the device for recording the displacement of the repeated electrical breakdown contains an additional transformer, the current windings of which are in phase synchronism, and the test windings of both transformers terminate in a ratiometer.

USSR UDC 536.521.08

PYROMETER FOR MEASURING THE TEMPERATURE OF THE BLADES OF A GAS TURBINE ENGINE

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 17, 1977 Author's Certificate No 557272 filed 19 Mar 75 pp 133-134

LEONT'YEV, K. L., TSVETKOV, V. A., TSINSKIY, S. S., and MAKUKH, A. A.

[Text] A pyrometer for measuring the temperature of the blades of a gas turbine engine containing a temperature pickup, time selector, measuring device, beam splitter, and thermal radiation gradient sensor, distinguished by the fact that, in order to improve measurement accuracy, it has two slaved linearly increasing voltage generators, a maximum voltage value clamping circuit and comparator, whereby the input of one of the generators is connected to the output of the terminal radiation gradient sensor, and the output is connected to the input of the maximum voltage value clamping circuit, the output of which is connected to one of the inputs of the comparator, whereas the synchronizing input and output of the second generator are connected, respectively, to the synchronizing output of the clamping circuit and second input of the comparator, the output of which is connected to the trigger input of the second generator and second input of the time selector.

USSR UDC 550.834

MULTICHANNEL SYSTEM FOR SEISMIC RESEARCH AT SEA

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 18, 1977 p 107 Author's Certificate No 558236 filed 6 Jun 75

MEYER, V. V., ZHELUDKOV, N. I., TARAKANOV, A. V., GARKALENKO, I. A., and SHISHANOV, G. V.

[Text] 1. A multichannel system for seismic research at sea containing in the towed section an acoustic generator, code transmission line, linear synchronization line, and, in each channel, a seismic signal encoder consisting of a series-connected seismic sensor and analog-to-digital converter, and, in the on-board section, a synchronous generator, receiving shift register and recorder, distinguished by the fact that, for increased reliability of the code transmission and reception, the on-board part of the system contains a code correction device connected between the recorder and receiving shift register, a programming device connected through the pulse shaper to the acoustic generator, a servo autosynchronizer connected between the signal and control inputs of the receiving shift register and, in the towed section, each seismic signal encoder is additionally connected

to a cyclic code translator; the two lines are separated according to the number of signals at cutoff and between them in the code transmission line is an OR circuit, and in the synchronization line a delay line and pulse shaper, whereby the output of each circuit is connected to the timing input of the analog-to-digital converter, and the input of each is connected to the trigger input of the cyclic code translator, the output of which is connected to the input of the OR circuit.

2. A system in accordance with 1., distinguished by the fact that the code correction device is in the form of a correction adder to which is connected the secondary input of the correction memory in the form of a shift register shorted to the feedback loop through the primary pulse input of a push-pull rectifier, the secondary pulse input of which is connected to the output line of the code transmitter, and the strobing inputs are connected to the otuputs of the programming device.

3. A system in accordance with 1. and 2., distinguished by the fact that a servo synchronizer is incorporated as a series connection of a marker pulse discrimation circuit and impact excitation pulse generator to the control inputs of the shift register.

USSR UDC 550.834

DEVICE FOR ANALYZING SEISMIC VIBRATIONS

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 18, 1977 pp 107-108 Author's Certificate No 558237 filed 13 Feb 74

ANTONOV, R. O., KRAS', D. P., PESKOV, V. I., TRISHCH, G. G., CHERKASSKIY, N. V., SHVETSKIY, B. I., RAPOPORT, M. B., RYZHENKOV, V. N., RYBINKIN, L. A., GIL'BERSHTEYN, P. G., ALFEROV, V. V., YUNERMAN, L. SH., KAPLAN, S. A., LIKHTEROV, E. B., MALINSKIY, S. A., RYBAKOV, L. A., TROYANOVSKIY, V. V., and AYZMAN, YU. A., L'vov Polytechnic Institute, Moscow Institute of the Petrochemical and Gas Industry, Central Geophysical Trust, and Moscow "Nefteprибor" Works

[Text] Device for analyzing seismic vibrations containing input and output data registers, multiplier, adder, output address register, operation code register connected to the control unit, registers of real-time addresses of the massifs and registers of initial massif addresses whose inputs are connected to the outputs of the cycle counter, operation code register, register of the number of operations in a cycle and to the output of the input register, distinguished by the fact that, for the purpose of increasing the data processing rate for a seismic survey, the system includes four units of magazine-type registers, and intermediate register, a scale mask, and an address increment control circuit, whereby the input of the first unit of the magazine-type registers, included in the feedback loop, is connected to the output of the input data register, and its output is

connected to one of the adder outputs and, through the second unit of magazine-type registers, is connected to one of the inputs of the multiplier, the other input being connected to the output of the input data register through a third unit of magazine-type registers included in the feedback loop, and the output is connected through the intermediate register to a second input adder; the input of the fourth unit of magazine-type registers is connected to the output of the adder, and its output through the scale mask is connected to the output data register; the counter inputs of the real-time-address and initial-address registers are connected to the input of the cycle counter and output of the address increment control circuit; the remaining inputs of the real-time-address and initial-address registers are connected to the output of the number-of-operations-in-a-cycle register, and the outputs of the initial-address registers are connected through the real-time-address register to the input of the address register.

USSR UDC 550.830

DEVICE FOR INDICATING A GIVEN POSITION OF THE MOVING INDEX OF A GRAVIMETER

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 18, 1977 p 108 Author's Certificate No 558238 filed 4 Feb 75

IGNAT'YEV, O. N., and KAPUSTKIN, V. V., Scientific-Production Association "Geofizika"

[Text] Device for indicating a given position of the moving index of a gravimeter including a lamp, optical projection system, mask connected to the index, a screen with window and photocell, distinguished by the fact that, in order to increase the accuracy of indication, the focal length (f) of the optical projection system, the linear dimension (h) of the mask, linear dimension (K) of the window, and distance (g_1) from the optical center of the projection system to the screen is selected from the condition

$$\frac{f}{f - g_1} = \frac{h}{K - n\lambda}$$

where n is an arbitrary integer greater than unity; and λ is the wavelength of the incident light.

USSR UDC 621.317.001.12 + 621.318.1.001.12

STATUS AND PROMISE OF DEVELOPMENT OF THE PRODUCTION OF MEASURING DEVICES FOR THE PARAMETERS OF MAGNETIC FIELDS AND MAGNETIC MATERIALS

Moscow METROLOGIYA in Russian No 4, 1977 pp 3-16

KOVAL'CHUK, L. V., ORESHNIKOV, V. V., SKORODUMOV, S. A., SEMENOV, N. M., and TRET'YAKOV, L. M.

[Abstract] Tables are given showing the parameters of the two galvanometric Hall-generator-type meters and the one radiospectroscopic NMR-type meter now series produced and the two magneto-modulation-type and the six Hall-generator-type galvanomagnetic instruments to be series-produced in coming years as products of the planned joint efforts of the All-Union Scientific-Research Institute of Electrical Measuring Instruments and the manufacturing plant "Elektroizmeritel'". Measurements of the magnetic induction of the magnetic fields of 10 Tesla and over in the temperature range of minus 271 to plus 70°C are expected. An improved measuring instrument for hard magnetic materials is expected to go into production in 1978. The manufacturing plant, "Tochelektropribor", has begun production of a digital ferrometer (F5063) for determining the maximum values of the magnetic induction and field intensity of a magnetic field in the frequency range of 25 to 10,000 Hz and parameters of the hysteresis loop in the range of 50 to 1,000 Hz. The measurement error is computed at $\pm$ 0.01 + 0.001. Tab 7; Biblio 16.

USSR UDC 621.317.42:621.318.1/2

MAGNETIC MEASURING INSTRUMENTS AND INSTALLATIONS FOR TESTING THE QUALITY OF MAGNETIC SYSTEMS, FERROMAGNETIC MATERIALS AND PERMANENT MAGNETS

Moscow METROLOGIYA in Russian No 4, 1977 pp 37-51

SHIKHIN, A. YA., KOMAROV, YE. V., and SERGEYEV, V. G.

[Abstract] The Laboratory for Problems of Permanent Magnets at the Moscow Power Engineering Institute (MEI) has produced a number of devices for automatic recording of coordinate components (topography) of the magnetic field of various types of systems with permanent magnets. The UKT-3U device automatically records the topography of the magnetic field of magnetic focusing systems with axial symmetry both at normal temperature as well as in the range of -60 to +125°C. The UKT-4pm instrument tests the external topography of the field of permanent magnets and PM systems with plane parallel field. It measures the components of magnetic induction from $\pm$2 to $\pm$500 mT. The UKT-5tss automatically records the topography of the stray field of magnetic systems of cylindrical or spherical configuration. The UKT-60 records the topography of the magnetic field along the axis of miniature periodic magnetic recording systems by measuring and recording the distribution of

the axial and radial components of the field induction. It measures in the range of ±10 to ±500 mT with a 1.0% error. The MIS-1M tests the parameters of soft magnetic materials of small size and permanent magnets. Test length 4-10 mm, cross section 2-200 mm^2; max electromagnet field intensity 2,000 kA/m. The MIS-1N tests the parameters of hard magnetic materials by a method of gradual variation of the external field. It handles annular specimens with 30-mm inside diameter and 0.2-cm^2 cross section with magnetizing current of 15 a. The TsIMI-6 instrument measures induction up to 1,000 Hz of magnetic fields from ±0.1 to ±1,000 mT, has a digital readout and a measurement error of ±5% at the ±0.1mT limit and ±2.5% at the ±1,000-mT limit. Ill 3; Biblio 7.

USSR

SENSOR FOR A SYSTEM OF PROTECTING A TURBINE FROM AN INTOLERABLE INCREASE IN FREQUENCY OF ROTATION OF THE ROTOR

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 7, 1977 p 87 No 547531

KHARITSKIY, G. F.

[Text] The sensor, containing a valve seat attached in the rotor gap and a spring-held discharge valve for the working liquid from the impulse line positioned eccentrically to the axis of rotation, is distinguished by the fact that for the purpose of raising the reliability of protection by decreasing the influence of the pressure of the working liquid to the level of operation, the valve is made with two support belts, and a second valve seat, interacting with the second support belt, is affixed in the rotor gap symmetrical to the first valve seat with respect to the axis of rotation.

USSR

BLADE FOR AXIAL TURBOMACHINERY

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 7, 1977 p 87 No 547530

KOLESNIKOV, V. A., FROLOV, V. A., and OSHURKOV, A. I., Kuybyshev Order of Labor of the Red Banner Aviation Institute imeni Academician S. P. KOROLEV

[Text] The blade, with a channel made in the main part of the palm and in the shaft and installed in the channel with a rod, is distinguished by the fact that for the purpose of raising the quality of damping the peripheral end the rod is made with a bulge and bunches of plates, installed on supports, made in the longitudinal groove of the shaft, are installed on the two sides of the other end.

USSR

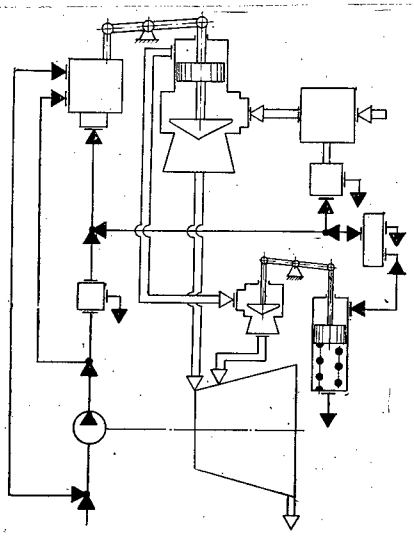
UDC 621.165-546

A DEVICE FOR TURBINE REGULATION AND PROTECTION

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 3, 1977 No 549582 10 Nov 75

LUKASHENKO, YU. L. and BRUSNITSYN, N. A., Kaluga Turbine Plant

[Text] Device for regulating and protecting a turbine such as, for example, a steam turbine and for driving the feed pump, consisting of a check valve whose servomotor is connected to the pulse line of the protective system and a regulating valve whose discharge chamber is connected through an external steam conduit through the discharge valve to the feed chamber, while the servomotor is connected to the pulse line of the speed regulator, with the distinguishing feature that, for a more reliable performance under normal and fault conditions, the discharge valve is equipped with a two-position servomotor connected to the pulse line of the protective system through an electromagnetic switch.



USSR

UDC 621.224-2

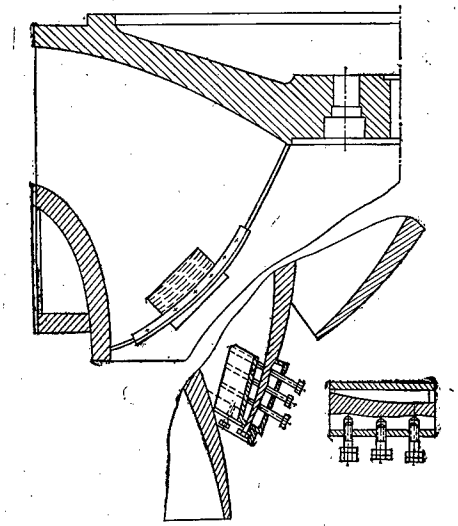
A METHOD OF CHECKING THE GEOMETRY OF THE SURFACE OF A VANE IN THE WORKING WHEEL OF A RADIAL-AXIAL HYDRAULIC TURBINE

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 3, 1977 p 101

MISHEV, YU. N., UGOL'NIKOV, V. V., ROBUK, N. N., FRIDMAN, L. I., DUBKOV, S. YA., GERSHENZON, B. A., LINETSKIY, N. G., RUBTSOV, V. K., ISAYEV, A. I., and TRAMPOL'SKIY, V. D., Khar'kov Order of Lenin Turbine Plant imeni S. M. Kirov

[Description of USSR Author's Certificate No 543778 filed 11 Jan 75, published 25 Jan 77]

[Text] This Author's Certificate introduces a method of checking the geometry of the surface of a vane in the working wheel of a radial-axial hydraulic turbine during repair after cavitation damage. The technique is based on using three-dimensional templates fitted with stop cleats and bolts. As a distinguishing feature of the patent, inspection accuracy is improved by basing a section of a three-dimensional template on the working surface with specially shaped sheets, setting the bolts against undamaged sections of the trailing edge, using bolts to immobilize the damaged sections of the non-working surface of the vane and its trailing edge, and then determining the amount of restoration of the damaged section from the difference in position of the bolt heads in the initial position and in the position corresponding to the coordinates of the damaged surface.



USSR

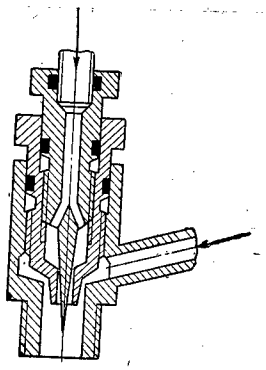
NOZZLE FOR INJECTING FUEL INTO AN INTERNAL COMBUSTION ENGINE

Author's Certificate 556235 (21) 196086/06 (22) 22 Oct 73

Moscow OKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 16, 1977 pp 87-88

PERSHIN, P. P., Khar'kov Aviation Institute

[Text] 1. Nozzle for injecting fuel into an internal combustion engine, containing a hollow housing with mixing chamber, and inside the housing a fuel injection pipe with needle valve and conical tab and fuel nozzle positioned around the conical tab and connected with the mixing chamber, distinguished by the fact that for the purpose of enhancing the atomization of the fuel and of reducing the expenditure of gas the nozzle is executed as a divergent type in the direction of the mixing chamber with a cone angle of 5-30°. 2. Nozzle according to 1., distinguished by the fact that the surface of the nozzle is executed with spiral grooves.



USSR

ROTOR BLADE OF A TURBOMACHINE

Author's Certificate No 556222 (21) 2323722/06 (22) 17 Feb 76

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 16, 1977 pp 84-85

TIKHONOV, N. T., Kuybyshev Aviation Institute

[Text] Blade of the rotor of a turbomachine, preferably of a turbine, the chute of which is configured as an arc of a circle and on the back of which

is a hollow oriented along the blade axis, distinguished by the fact that for the purpose of increasing the reliability of the turbomachine by reducing the maximum rpm at idle, the hollow cavity is positioned at a distance which is 35-45% of the blade width from the inlet edge and executed along the arc of the circle with a radius 0.95-1.05 the radius of the chute.

USSR

DEVICE FOR COOLING THE DISK OF A TURBOMACHINE

Author's Certificate No 556221 (21) 2190475/06 (22) 20 Nov 75

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 16, 1977 p 84

KAPUSTIN, N. K., and TRUSHIN, V. A., Ufa Aviation Institute

[Text] A device for cooling the disk of a turbomachine, preferably a gas turbine, containing fixed guides for preliminary swirling of the cooling air, a baffle attached to the disk with centripedal blades on the inside surface forming, together with the surface of the disk, an annular cavity that is connected at the inlet ports with the guide vane apparatus and at the outlet with openings running through the disk, distinguished by the fact that, for the purpose of increasing the efficiency of the cooling, there is at the outlet from the through holes a centrifugal blade lattice, the blading of which is set at an angle of 20-35° to the direction of motion of the rotating disk.

USSR

HYDROSTATIC STEP BEARING

Author's Certificate No 557214(21)1919872/6(22) 28 May 73

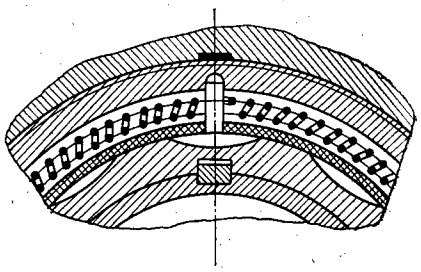
Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 17, 1977 p 120

ANTONOV, O. N., and LEVIN, V. A., Ufa Aviation Institute

[Text] 1. Hydrostatic step bearing, preferably as a support for gas turbine engines, containing a case, bearing mounted shaft within the case, a vertical journal with peripheral seal rigidly attached to the shaft, operating chambers on both sides of the vertical journal with channels for supplying fluid, and sleeve-valve distributor for regulating pressure in the chambers, distinguished

by the fact that, for the purpose of increasing the reliability of the step bearing, the sleeve-valve distributor is designed as projections on both sides of the vertical journal with flat keyways which interact with the moveable ring-shaped seals of the case.

2. Hydrostatic step bearing in accordance with No 1., distinguished by the fact that it has two differential seals, and, on both sides of the ridge of the vertical journal, anti-friction packing inserts with radial grooves alternately pointing in opposite directions.



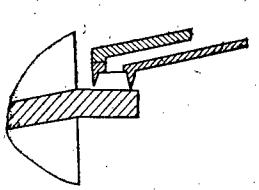
USSR UDC 621.165

FLOW SECTION OF AN AXIAL TURBOMACHINE

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 20, 1977 p 95 Author's Certificate No 560070 filed 21 Mar 75

SANDOVSKIY, V. B., MOZGOV, N. N., and KHRABROV, P. V.

[Text] Flow section of an axial turbomachine, preferably a steam turbine, containing a two-layer stage with rotor blade separating partition piece and, on it, the diaphragm sealing ring of the previous stage and radial seal between the partition piece and sealing ring, distinguished by the fact that, for the purpose of enhancing the efficiency, above the ring and parallel to it is a baffle, and the cavity between the baffle and the ring is connected to the intermediate part of the seal.



USSR

UDC 621.573.001.4

TESTS OF THE TKhM1-25 TURBOREFRIGERATOR AT HIGH ATMOSPHERIC TEMPERATURE AND HUMIDITY

Moscow KHOLODIL'NAYA TEKHNIKA in Russian No 2, 1977 pp 10-12

BONDARENKO, L. F., MYTIL', A. K., SEMENYUK, YE. V., and KHAYUTIN, YU. D., Odessa Technological Institute of the Refrigeration Industry

[Abstract] At the Special Design Office for Air and Gas Turborefrigerators design values of the characteristics of the TKhM1-25 were computed for a wide range of temperature, barometric pressure and humidity values of the intake air. Since Technical Specification (TU-26-03-258-73) guarantee reliable operation in moderate climate at air temperatures of 40°C and humdity of 20 g/kg dry air, the Odessa Technological Institute conducted tests at higher temperatures (45°-50°C) and humidities (25-50 g/kg dry air). The dependence of cold production on humidity of intake air for temperatures of -40, -60, -80, and -100°C at freezer inlet was found to be linear. For every 10 g/kg dry air increase of humidity the cold production drops 1250-1400 watts over the entire range of temperatures. By percentages this amounts to 4% at -40°C, 6% at -60°C, 8% at -80°C (machine rating) and 11% at -100°C. The coefficient of performance likewise has a linear dependence on humidity of intake air at the same temperatures, i.e., a drop of 20% at -40°C, 28% at -60°C, 38% at -80°C, and 47% at -100°C. The tests show that the TkhM1-25 operates reliably at humidities of 50 g/kg dry air and intake air temperatures of 50°C. Ill 4; Biblio 3.

USSR

CRYOGENIC SYSTEM

Moscow OTKRYTIYA, IZOBRETENIYA, PROMYSHLENNYYE OBRAZTSY, TOVARNYYE ZNAKI in Russian No 7, 1977 p 103 No 547601

LYAPIN, V. I., PRUSMAN, YU. O., BARTKEVICH, N. YA., and BORODIN, A. V.

[Text] The system, containing a multistage gas refrigerating machine, for example, operating on the Stirling inverse cycle, with heat exchangers for preliminary cooling positioned on cold heads of the machine stages and connected to the choke loop which has a compressor and basic heat exchangers, is distinguished by the fact that for the purpose of increasing the compactness and prolonging lifetime, each of the heat exchangers for preliminary cooling is made as a slit and is connected to the adsorber also positioned on the head of the corresponding stage of the machine.

CSO: 1861

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