ROZENBERG, L D

976. CONDITIONS FOR OBTAINING MAXIMUM ULTRASOUND CONCENTRATION. L.D.Rozenberg. 534.21

Dokl. Akad. Nauk SSSR, Vol. 94, No. 5, 845-8 (1954). In Russian.

Theoretical paper. The author calculates the amplitude distribution function over the wavefront for maximum values of acoustic pressure and vibrational velocity. The value of the sound pressure for the optimum distribution function is worked out. Curves are given for the variation, with angular aperture of the wavefront, of the pressure and velocity focusing factors.

C.R.S.Manders

ROZENBERG, Lazar' Davydovich, laureat Stalinskoy premiy, doktor tekhnicheskikh nauk, professor; KIPNIS, S.Ye., redaktor; ISLENT'YEVA, P.G., tekhnicheskiy redaktor.

[Ultrasonics in engineering] Ul'trazvuk v tekhnike. Moskva, Izd-vo "Znanie," 1955. 39 p. (Vsesoiuznoe obshchestvo po rasprostraneniiu politicheskikh i nauchnykh znanii Ser.4, no.20) (MLRA 8:9)
(Ultrasonic waves)

ROZENBERG, L.D.

BREKHOVSKIKH, L.M., doktor fiziko-matematicheskikh nauk; BYALOVA, V.V.; IVANOV, I.D., kandidat fiziko-matematicheskikh nauk; ISAKOVICH, M.A., doktor fiziko-matematicheskikh nauk, redaktor; RABINOVICH, N.Ya., redaktor; ROZENBERG, L.D., doktor tekhnicheskikh nauk, redaktor; TARTAKOVSKIY, B.D., kandidat tekhnicheskikh nauk. GUROV, K.P., redaktor; GRAKOVA, Ye.D., tekhnicheskiy redaktor.

[Scientific literature on acoustics during the years 1945-1949] Nauchnaia literatura po akustike za 1945-1949 gg. Moskva, 1955. 276 p. (MLRA 8:12)

1. Akademiya nauk SSSR. Komissiya po akustike. 2. Chlen-korrespondent AN SSSR (for Brekhovskikh)
(Bibliography--Sound)

ROZENBERG, L.D.

3006

Akusticheskii Zhurnal, vol. 1, No. 1, 1955

L. D. ROZENBERG: Computation of the amplification of a cylindrical sound-focussing system. 70

Abstract: On the assumption of the smallness of the length in comparison with the dimensions of the radiator, general expressions are derived for the amplification coefficients and the focussing factors of a converging cylindrical wave front. It is shown that to obtain the maximum focussing factor, the optimum distribution function of the pressure is: $\Phi(\alpha) = 1$, and for velocity $\Phi(\alpha) = \cos \alpha$. The quantities K_p, K_v, k and k' are computed for certain specific cases depending on the wedge angle of the front. The results obtained can be used to compute actual focussing systems with an error not exceeding 10%, with the exception of the tip section of length $\sqrt{\lambda f}$.

Rozenberg, L. D.

534.231

4919. REVIEW OF METHODS FOR RENDERING ULTRASONIC FIELDS VISIBLE. L.D.Rozenberg.
Akust. Zh., Vol. 1, No. 2, 99-105 (1955). In Russian.

The paper divides methods into three types: methods using the basic parameters of a sound field; methods using quadratic effects; methods using secondary effects. Well illustrated examples under each type are given. 45 refs.

C.R.S.Manders

Rozenberg, L.D.

534.232

4929. AN ELECTROACOUSTIC CONVERTER FOR MAKING SOUND IMAGES VISIBLE. P.K.Oshchepkov, L.D.Rozenberg and Yu.B.Sememmikov.
Akust. Zh., Vol. 1, No. 4, 348-51 (1955). In Russian.

The paper describes a device with a barium titanate receiving element, having an operating threshold of 3×10^{-9} volt/cm^2 at low megacycle frequencies and a sensitivity of 2×10^{-8} volt per bar. Functioning is linear over the range 3×10^{-9}-3×10^{-3} volt/cm^2. C.R.S.Manders

3

ROZENBERG, L.D.

Ultrasound concentrators. Trudy Kom. po akust. 8:102-113 '55. (MLRA 8:8)

1. Fizicheskiy institut im. P.N.Lebedeva AN SSSR. (Ultrasonics)

ROSENBERG, L. D. and KANEVSKIY, I. N.

Acoustical Institute of the Academy of Sciences of the USSR, Moscow

"Diffraction Pattern near the Focal Line of a Converging Cylindrical Wave" paper presented at 2nd International Congress on Acoustics, Cambridge, Mass., 17-23 June 1956.

So: B-100200

ROZENBERG, Lazar D.

ROZENBERG, L. D., BEBCHUK, A. S., and MAKAROV, L. O.

"Mechanism of Destruction of Solid Surface Films by Acoustically Induced Gavitation," paper presented at the Second International Congress on Aooustics, Cambridge, Mass., 17-23 Jun 56.

Acoustical Institute of the AS USSR, Moscow, USSR.

ROZENBERG, L. D. (Prof.)

"Acoustic Methods of Measurement of Non-acoustic Magnitudes,"

paper read at the Session of the Acad. Sci. USSR, on Scientific Problems of Automatic Production, 15-20 October 1956.
Avtomatika i telemekhanika, No. 2, p. 182-192, 1957.

9015229

BERGMANN, Ludwig, 1898- ; GRIGOR'YEV, V.S., redaktor; ROSENBERG, L.D., redaktor

[Ultrasonic waves and their application in science and technology. Translated from the German] Ul'trazvuk i ego primenenie v nauke i tekhnike. Perevod s nemetskogo. Pod red. B.S.Grigor'eva i L.D. Rozenberga. Moskva, Izd-vo inostrannoi lit-ry, 1956. 726 p. (MLRA 10:1)
(Ultrasonic waves--Industrial applications)

ROZENBERG, L.D.

J-4

Category : USSR/Acoustics - Ultrasound

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 2139

Author : Bebchuk, A.S., Makarov, L.O., Rozenberg, L.D.

Inst : Acoust. Inst., Acad. of Science USSR; Scient. Res. Inst. of Min. of Radio-technical Industry, Moscow.

Title : On the Mechanism of Cavitational Destruction of Surface Films in the Sonic Field.

Orig Pub : Akust. Zh., 1956, 2, No 2, 113-117

Abstract : The subject of the study was a thin layer of rosin, coated in the form of an alcohol solution on the surface of a glass plate and then dried out. The better to distinguish the fragments of the film from cavitational bubbles, pulverized graphite was introduced into the layer. The film was placed in a cuvette measuring 4 x 1 x 5 cm, filled with distilled water. The sound pressure was produced in the cuvette with a magnetostriction vibrator operating at 8 kc. The distruction of the film by cavitation was photographed with a motion-picture camera capable of up to 4000 frames per second. A study of the film obtained showned that at least two destruction mechanisms take place. The first is due to the flapping of the bubbles near the surface of the film, and leads to strong local damages; the second is due to the penetration of the bubbles under the film, causing the latter to peel.

Card : 1/1

ROZENBERG, L.D.

"Sonics. Technique for the use of sound and ultrasound in engineering and science" [in English] by T.F. Huter, R.H. Bolt. Reviewed by L.D. Rozenberg. Akust. zhur. 2 no.3:317-318 Jl-S '56. (MLRA 9:12)

(Sound waves--Industrial applications)
(Huter, T.F.) (Bolt, R.H.)
(Ultrasonic waves--Industrial applications)

ROZENBERG, L.D.

"Ultrasonic Engineering" [in English]. A.E. Crawford. Reviewed by L.D. Rozenberg. Akust. zhur. 2 no.3:318-319 Jl-S '56.
(MLRA 9:12)

(Ultrasonic waves--Industrial applications)
(Crawford, A.E.)

ROZENBERG LAZAR' DAVYDOVICH

PHASE I BOOK EXPLOITATION 374

Rozenberg, Lazar' Davydovich

Primeneniya ul'trazvuka (Application of Ultrasound) Moscow, Izd-vo AN SSSR, 1957. 103 p. (Akademiya nauk SSSR. Nauchno-populyarnaya seriya) 25,000 copies printed.

Resp. Ed.: Andreyev, N.N.; Ed. of Publishing House: Veger, A.L.; Tech. Ed.: Prusakova, G.A.

PURPOSE: This booklet is designed to acquaint the general reader with fundamentals of ultrasonics and its application.

COVERAGE: This booklet deals with fundamentals of ultrasonics and its application in measurement of distances, controlling of chemical processes, detection of internal defects in materials, measurement of flow velocity, and the application of ultrasonics in medicine. Special emphasis is placed on application of ultrasonics in metallurgy, nondestructive testing of materials and

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Application of Ultrasound

material treatments. The basic properties of audible sound and ultrasound waves are given and the methods of waves generation and their propagation in various media are discussed. The booklet contains numerous illustrations of various Soviet and foreign ultrasonic equipment. The following Soviet personalities, organizations and their contributions are mentioned: the Leningrad Institute of Physics and Technology, on the suggestion of Academician N.N. Andreyev, has developed an air blower based on the principle of ultrasonic wind and with sufficient capacity to supply air required for a gas burner; Corresponding Member, Academician B.M. Vul, is said to have developed a new piezoelectric material--barium titanate ceramics, now widely used in the construction of piezoelectric transducers; the Institute of Reinforced Concrete has developed an ultrasonic defectoscope employed for detection of cavities and cracks in concrete materials; Acoustical and Metallurgical Institutes of the USSR Academy of Sciences have developed an electronic-acoustical image converter with a sensitivity equal to 10^{-9} watt/cm^2;

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Application of Ultrasound 374

Physicist Ya. I. Frenkel is mentioned in connection with the subject of ultrasonic cavitation. According to his hypothesis the process of formation and collapse of cavitation bubbles produces a local electrification which is believed to be the basis for the chemical action of ultrasonics. According to the author experimental work is being conducted to develope a mechanical method for generating ultrasonic waves in liquids, which would have an intensity in the range between 5-10 watt/cm^2 at full generator capacity of a few kilowatts and an efficiency of 30-50%. The author claims that such a development would represent a milestone in the field of industrial application of ultrasonics. There are 5 references, 3 of which are Soviet, and 2 English.

TABLE OF CONTENTS:

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APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001445610008-2"

ROZENBERG, L.D. 46-1-6/20

AUTHOR: Kanevskiy, I.N. and Rozenberg, L.D.

TITLE: Evaluation of the sound field in the focal region of a cylindrical focussing system (Raschet zvukovogo pola v fokalnoy oblasti tsilindricheskoy fokusiruyushchey sistemy.)

PERIODICAL: "Akusticheskiy Zhurnal" (Journal of Acoustics), 1957, Vol. III, No. 1, pp. 46 - 61 (U.S.S.R.)

ABSTRACT: Rozenberg, 1) has evaluated the magnitudes of acoustic pressure and of velocity of oscillations along the axis (in the focus) of a cylindrical focussing surface. In the present article, the mathematical method of calculation of the acoustic field is given for regions in the proximity of the focus, both for infinite and finite lengths of focussing surfaces and for various radii of their curvature. It is assumed that the wave-length is small as compared with the focal length of the system.

First, the general expression for the potential at any point of the region, as represented by the potential at the surface of the cylinder is derived by applying Green's theorem for the case of infinitely long cylinders with various radii of curvature. The potential then becomes the contour integral of the Hankel function of the second kind and of zero order and of the potential and its derivative at the surface of the cylinder. Results permit the application of the same technique to cylinders of finite lengths. Rozenberg, 1) has shown that fringe effects in this case may be neglected provided the distance from the end of the axis is not less than 1-2 Fresnel Zones. The analysis of the thus obtained formulae shows that

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46-1-20/26

AUTHOR: Rozenberg, L.D.

TITLE: ~~Performance of~~ ultra-sonic focussing sources (K voprosu o proizvoditelnosti ultrazvukovykh fokusiruyushchikh izluchateley.)

PERIODICAL: "Akusticheskiy Zhurnal" (Journal of Acoustics), 1957, Vol. III, No. 1, pp. 94 - 96, (U.S.S.R.)

ABSTRACT: Huelter and Bolt (1) give the following explanation of the mechanism of the output of spherical focussing sources: the amount of liquid is proportional to the product of the surface area of the focal spot and of the focal length (to the 1st significant figure). Since both the focal spot radius and the focal length are proportional to the wavelength λ the output is proportional to λ^3. Hence the authors deduce that lowering the working frequency, e.g. from 400 to 100 kc/s, will increase the output from the source 64 times.

The fallacy of this reasoning is pointed out by the author of the present article. It lays in the fact that the authors of (1) forget about the dependence of coefficient of amplification of the focussing source on frequency. If the frequency goes down 4 times whilst maintaining the same geometry this coefficient will become 4 times smaller and the effective cross-section of the focal beam may even drop to zero. This drop may be compensated by increase in power, but such an increase has practical limits and it is also thought

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ROZENBERG, L.D.

AUTHOR: Rozenberg, L.D. 46-2-19/23

TITLE: The International Congress on Ultrasonics. (Trudy Mezhdunarodnogo kongressa po ultrazvuku)

PERIODICAL: "Akusticheskiy Zhurnal" (Journal of Acoustics), 1957, Vol,3 No.2, pp. 200-202 (U.S.S.R.)

ABSTRACT: A report on the proceedings of the Congress held in Marseilles, May 23 - 28, 1955.

ABSTRACT: Library of Congress
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ROZENBERG, L.D.

46-4-15/17

AUTHORS: Makarov, L.O. and Rozenberg, L.D.

TITLE: On the Mechanism of Ultrasonic Cleaning (O mekhanizme ul'trazvukovoy ochistki)

PERIODICAL: Akusticheskiy Zhurnal, 1957, Vol.III, Nr 4, pp.374-376 (USSR)

ABSTRACT: In a previous paper (Ref.1) the authors have suggested the following two possible mechanisms for the phenomenon of degreasing of solid surfaces by the action of an acoustic field in a liquid: (1) catastrophic disintegration of the surface layer by the shock wave which appears during the annihilation of a cavitation bubble (2) gradual peeling off of the surface layer due to the penetration of bubbles in between the layer and the solid. Further experiments, using high speed photography, have now shown that the second mechanism may well be the predominant one. Photographs show that bubbles move with almost constant speed towards the solid surface until they come close to it (or other bubbles) when their speed rapidly increases. There are 3 figures and 1 Russian reference.

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46-4-15/17

On the Mechanism of Ultrasonic Cleaning.

ASSOCIATION: Acoustics Institute of the Academy of Sciences of the USSR, Moscow (Akusticheskiy institut AN SSSR, Moskva)

SUBMITTED: September 16, 1957.

AVAILABLE: Library of Congress.

Card 2/2 1. Ultrasonic cleaning-Application

24-10-24/26

AUTHORS: Glembotskiy, V.A. Kolchemanova, A. Ye., Plaksin, I. N. and Rozenberg, L. D. (Moscow)

TITLE: On the possibility of applying ultrasonics for liberating mineral particles from the adsorbed reagent coatings during flotation beneficiation of minerals. (O vozmozhnosti primeneniya ul'trazvuka dlya osvobozhdeniya chastits mineralov ot adsorbtsionnykh pokrytiy reagentov pri flotatsionnom obogashchenii poleznykh iskopayemykh)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1957, No.10, pp. 111-112. (USSR)

ABSTRACT: The authors investigated the effects of ultrasonics on a number of sulphide minerals (Ga, chalcopyrite, sphalerite, pyrite) of various Soviet origins. The crushed sulphides were subjected to flotation using xanthogenate and a foam forming agent in quantities ensuring complete removal of the minerals into the foam product which, after filtration, was transferred into a vessel and subjected to the effect of ultrasonics generated by means of a magnetostriction radiator. After irradiation with ultrasonics, the mineral was transferred into the flotation machine and subjected to flotation using a foam forming agent. Parallel tests

Card 1/2

AUTHOR Rozenberg, L.D., Doctor of Techn. Sc. 30-7-25/36

TITLE The Use of Ultrasonics in Industry (Conference Report). (Primeneniye ul'trazvuka v promyshlennosti - Russian)

PERIODICAL Vestnik Akademii Nauk SSSR, 1957, Vol 27, Nr 7, pp 96-98 (U.S.S.R.)

ABSTRACT Sound and ultrasonic waves are now used in various fields of chemical technology, medicine, biology, in agriculture and in laboratories. The work done on the occasion of the conference (Moscow, 16-20 April) was divided into four sections: ultrasonic defectoscopy, the use of ultrasonics in technological processes, the use of ultrasonics in technological analyses and controls, as well as the further development of ultrasonic apparatuses. Several speakers dealt with the problems of the physico-chemical process in standing oscillations (V.M.Fridman), - the physics of ultrasonic cavitation- an important phenomenon which plays an important part in the technological use of ultrasonics (speaker N.A.Roy). The speaker dealt very concretely with the problems of the so-called immersion method in which the object to be examined is immersed into a tank with liquid. Special meetings were held in which the use of ultrasonics in metallurgy and metal-physics was thoroughly elucidated. Concerning the topic of ultrasonic apparatuses; Several papers treated the construction of new electromechanical and aerodynamic emitters of ultrasonics (sirens) which are mainly used in industry. The use of ultrasonics for purposes of technological analysis and control was given much room in the pertinent papers. In the final plenary meeting a resolution on the further development of ultrasonic engineering was carried.

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20-2-11/60

On the Causes of the Swelling of the Surface of a Liquid Under the Influence of Ultrasonics

scheme of the experiment by means of a sketch. In a plane glass box (dimensions 50 x 50 x 15 mm) made of optical glass there is a layer of water and above it a layer of transformer oil. Through an opening in the rubber bottom of the box the end of an exponential concentrator is introduced, which is excited by a magnetic structure radiator of a frequency of 24 kilohertz. This process was recorded on normal 35 mm cinema film by a Zeiss slow motion cinema camera with a speed of 2000 pictures per second. In the moment when the sound is switched on at the end of the vibrator, there begins a turbulent occurrence of fine bubbles; the sonic wind carries these bubbles with it and at the end of the vibrator new bubbles are constantly created. Although the velocity of the shift of the front edge of the bubble cloud depends on the velocity of the sonic wind, these two velocities are not the same. A diagram shows the dynamic aspects of the phenomenon. The following can be assumed to be proved: Under the conditions prevailing in the experiment under discussion, a swelling of the separating surface between two liquids is observed, and this swelling is caused not by the pressure of the radiation, but

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20-2-11/60

On the Causes of the Swelling of the Surface of a Liquid Under the Influence of Ultrasonics

rather by the sonic wind. There are 2 figures, and 2 references, 1 of which is Soviet.

ASSOCIATION: Acoustic Institute of the AS USSR (Akusticheskiy institut Akademii nauk SSSR)

PRESENTED: January 3, 1957, by N. N. Andreyev, Academician

SUBMITTED: December 21, 1956

AVAILABLE: Library of Congress

Card 3/3

ROZENBERG, L. D.

24(1) PHASE I BOOK EXPLOITATION SOV/1627

Vsesoyuznaya akusticheskaya konferentsiya. 4th, Moscow, 1958

Referaty dokladov (Abstracts of Reports at the Fourth All-Union Acoustical Conference) Pt. 2. Moscow, Akad. nauk SSSR, 1958. 44 p. Number of copies printed not given.

Sponsoring Agency: Akademiya nauk SSSR.

Resp. Ed.: L.M. Brekhovskikh, Corresponding Member, USSR Academy of Sciences.

PURPOSE: These abstracts are intended for scientists and engineers interested in acoustics.

COVERAGE: This is a mimeographed collection of brief abstracts of papers presented at the Fourth All-Union Acoustical Conference. The subjects covered are propagation of sound in nonhomogeneous media, nonlinear acoustics, ultrasonics, acoustic measurements, electroacoustics and architectural and structural acoustics.

TABLE OF CONTENTS:

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SOV-46-4-3-13/18

AUTHORS: Rzhevkin, S. N. and Rozenberg, L. D.

TITLE: Book Reviews (Bibliografiya)

PERIODICAL: Akusticheskiy Zhurnal, 1958, Vol 4, Nr 3, pp 295-296 (USSR)

ABSTRACT: There is a factual review of "Technical Aspects of Sound" by E. G. Richardson, and a critical review of J. Matauschek's "Einführung in die Ultraschalltechnik".

1. Literature--USSR 2. Acoustics

Card 1/1

30-58-3-4/45

AUTHOR: Rozenberg, L. D., Doctor of Technical Sciences

TITLE: Making Visible of Ultrasonic Images (Vizualizatsiya ul'tra-zvukovykh izobrazheniy)

PERIODICAL: Vestnik Akademii Nauk SSSR, 1958, Nr 3, pp. 33-39 (USSR)

ABSTRACT: Ultrasonic waves penetrate metals, plastic masses, the major part of the building materials (ceramics, concrete and others), living tissues and optically nontransparent liquids. But they are almost entirely reflected by the boundary surfaces of solid bodies-gas and liquid-gas and to a considerable extent from the boundary surface liquid-solid bodies. Therefore, it is possible to discover solid bodies and gasbubbles in liquids by means of ultrasonics, as well as cracks, fissures, bubbles and hollow spaces in solid bodies. Ultrasonic images of any heterogeneity and foreign inclusions are obtained in this way. These images of ultrasonics must be made visible in order to make this method practically applicable. Approximately 30 different methods of making visible are available for the time being. These methods can be divided into three main groups according to the kind of physical effect. Methods

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Making Visible of Ultrasonic Images

based upon the variable extent of the sound field (sonic pressure, density and polarity) belong to the first group. The methods of the second group are based on the effect of constant forces of the sound field. Methods utilizing secondary effects of ultrasonic waves (thermal action, cavitation, acceleration of the diffusion processes, immediate action of the sonics on a photosensitive layer) belong to the third group. The electron-acoustic method was applied by S. Ya. Sokolov, but it was perfected by P. K. Oshchepkov, L. D. Rozenberg and Yu. B. Semennikov (Ref 2 and Figure 1). An ultrasonic image according to the method of the second group (the watersurface swells under the action of sonics) is shown in Figure 2 . An image according to the suspension method is shown in Figure 3. Further, the methods of thermal action and cavitation are fully described. The methods based on the acceleration of the diffusion process of a liquid in gel under the action of an ultrasonic field may be considered as suitable. The works by M. Ye. Arkhangel'skiy and V. Ya. Afanas'yev are mentioned here. (Ref 3 and Figure 4). The author subsequently states that not all possibilities in the field of making visible are already exploited. All proposed methods are given in a coordinate-system in Figure 5, viz.

Making Visible of Ultrasonic Images 30-58-3-4/45

according to 2 parameters (sensibility and duration of exposure). The different methods are subsequently critically considered again. The method of photodiffusion is designated by the author to be the most adequate one, but the proposed methods should be ·rfected and the search for new methods ought to be continued, so more as the method of making visible of the ultrasonic images exists only since some years. There are 5 figures and 2 references, 2 of which are Soviet.

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SOV/46-4-4-10/20

AUTHORS: Babchak, A.S., Borisov, Yu.Ya. and Rozenberg, L.D.

TITLE: On the Problem of Cavitational Erosion (K voprosu o kavitatsionnoy erozii)

PERIODICAL: Akusticheskiy Zhurnal, 1958, Vol 4, Nr 4, pp 361-362 (USSR)

ABSTRACT: In Refs 1-3 it was shown that the magnitude of cavitational erosion depends on the number of bubbles formed and the rate of their collapse, which determines the strength of the shock wave produced on collapse of such bubbles. The mean level of the cavitational noise depends also on the number and rate of collapse of bubbles and there should be, therefore, a relationship between the cavitational noise and the cavitational erosion. The present paper describes the experimental work on the subject of this relationship. The cavitational erosion was observed at the flat end surface of an aluminium sample subjected to 8.1 kc/s acoustic vibrations. Three series of experiments were made: in water, in water with a surface-active substance OP-10 and in acetone. In all cases the time of irradiation was 6 minutes. In each series measurements were made at three distances of the acoustic source from the flat end of the aluminium sample; these distances were 0.5, 1.5 and 2.25 mm. The cavitational erosion was measured by

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On the Problem of Cavitational Erosion

determining the loss in weight of the sample. The cavitational noise was measured with a probe (developed by Yu.A. Borisov) consisting of a metal rod with a barium titanate ring pushed onto it. This metal rod had a cross-section similar to that of the aluminium sample and was placed in the same position as the sample, with respect to the acoustic source. Care was taken to eliminate standing waves in the probe and transmission of the acoustic energy through the curved surface of the probe: only the flat end surface of the probe was meant to receive the acoustic energy. Most of the power radiated by the vibrator source was dissipated in cavitation; only a small proportion of the power was spent on producing sound directly. The results are shown in the figure on p 351. The ordinate shows the mass lost by cavitation (in grams), while the abscissa gives the mean square of the cavitational pressure (in atmospheres). The meaning of the experimental points

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in the figure on p 361 is as follows: 3, 2, 1 represent the results obtained in acetone; 8, 7, 5 - in water with OP-10; 9, 6, 4 - in water. Within the ranges of the erosion (1:100) and pressure (1:50) studied by the authors the experimental points lie approximately on a straight line. There are 1 figure, 1 table and 3 Soviet references.

ASSOCIATION: Akusticheskiy institut, AN SSSR, Moskva (Acoustical Institute, Academy of Sciences of the U.S.S.R., Moscow)

SUBMITTED: August 14, 1958

Rozenberg, L.D

PHASE I BOOK EXPLOITATION SOV/3528

Moscow. Dom nauchno-tekhnicheskoy propagandy

Primeneniye ul'trazvuka v promyshlennosti; sbornik statey (Industrial Use of Ultrasound; Collection of Articles) Moscow, Mashgiz, 1959. 301 p. 8,000 copies printed.

Sponsoring Agency: Obshchestvo po rasprostraneniyu politisheskikh i nauchnykh znaniy RSFSR.

Ed. (Title page): V.F. Nozdrev, Doctor of Physical and Mathematical Sciences, Professor; Ed. (Inside book): G.F. Kochetova, Engineer; Tech. Ed.: V.D. El'kind; Managing Ed. for Literature on Machinery and Instrument Manufacturing (Mashgiz): N.V. Pokrovskiy, Engineer.

PURPOSE: This book is intended for engineers and technicians engaged in the application of ultrasonics in machinery manufacture and in other branches of industry.

COVERAGE: This is a collection of papers read at the first all-Union conference on the use of ultrasonics in industry. Attention

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is focused mainly on the description of ultrasonic equipment and on the use of ultrasound for the machining of hard materials and for flaw detection. The effect of ultrasound on metal-crystallation processes is also discussed. No personalities are mentioned. References accompany many of the papers.

TABLE OF CONTENTS:

SOV/46-5-2-13/34

AUTHORS: Rozenberg, L.D. and Sirotyuk, M.G.

TITLE: A Device for Producing Focused Ultrasound of High Intensity (Ustanovka dlya polucheniya fokusirovannogo ul'trazvuka vysokoy intensivnosti)

PERIODICAL: Akusticheskiy zhurnal, 1959, Vol 5, Nr 2, pp 206-211 (USSR)

ABSTRACT: The authors review briefly the published work on high-intensity ultrasonic sources with and without focusing (Refs.1-5). The highest intensities reported so far were of the order of 1 kW/cm^2 or 50 atm. (at 980 kc/s) The present paper describes a focusing device capable of reaching 60 - 70 kW/cm^2 ultrasonic intensities. The device consists essentially of a radiator in the form of a resonant half-wave spherical aluminium shell (radius 314 mm, angle of aperture $\alpha_m = 70°$). The radiator was excited by means of 200 small X-cut quartz plates stuck to its back. The device is shown in Fig.1, where 1 is the shell, 2 are the quartz plates and 0 is the focus of the radiator. Fig.3 shows the external form of the

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A Device for Producing Focused Ultrasound of High Intensity

device. The working frequency was 500 kc/s and the design voltage across the quartz plates was 7 kV. The plates were excited by means of an 8 kW oscillator, whose output stage used a GKO-10 water-cooled valve (tube). The radiator shell was filled with outgassed water and the pressure distribution at its focus was found to follow closely design predictions. The radius of the effective focal area was 1.95 mm, its area was 0.12 cm^2. With 3.6 kV applied to the quartz plates (half the design voltage) the mean intensity in the focal area was 6 kW/cm^2 and 18 - 20 kW/cm^2 at the centre of this area. The authors suggest that with 7 kV applied to the quartz plates an intensity of 60 - 70 kW/cm^2 should be obtainable at the focal-area centre (this intensity corresponds to 500 atm). Acknowledgments are made to V.P. Shesternev, V.M. Pevtsov, V.S. Kachanov and V.S. Mikhaylov who helped with the experiments. There are 6 figures and 12 references, of which 7 are Soviet, 4 English, and 1 German.

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SOV/46-5-2-13/34

A Device for Producing Focused Ultrasound of High Intensity

ASSOCIATION: Akusticheskiy institut AN SSSR, Moskva (Acoustics Institute, Ac. Sc. USSR, Moscow)

SUBMITTED: February 13, 1959.

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SOV/122-59-2-17/34

AUTHORS: Rozenberg, L.D., Doctor of Technical Sciences and Yakhimovich, D.F., Engineer

TITLE: Ultrasonic Methods of Machining Hard and Brittle Materials (Ul'trazvukovoy sposob obrabotki tverdykh i khrupkikh materialov)

PERIODICAL: Vestnik Mashinostroyeniya, 1959, 39, Nr 2, pp 51-55 (USSR)

ABSTRACT: The main parameters for ultrasonic machining are discussed. The capacities and characteristics of three English, one German, two American and seven Soviet types of machine are tabulated (table 3). A medium power Soviet machine is illustrated in Fig 6. The cutting rate (mm^3/min) is tabulated, together with tool wear (as a percentage of amount of material removed from workpiece) and maximum area of cut (cm^2) for eleven materials ranging from glass to tungsten carbide and hardened tool steel (table 1). These were established on a 700 watt machine operating at 25,000 cps with amplitude 0.076 mm using cold-drawn steel tools 0.5" dia cutting to a depth of 0.5" with boron-carbide abrasive of

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Ultrasonic Methods of Machining Hard and Brittle Materials

320 mesh. The relation of rate of cutting (mm/min) to pressure of feed (kg) for different diameter tools is shown in Fig 2. The accuracy of the cut depends primarily on the size of the abrasive particles and the stability of the tool and work holder. Cutting hard alloys accuracy can be as high as 0.005 mm, cutting ceramic 0.05 mm. Table 2 states accuracy of cut (microns) and rms value of surface roughness (microns) using particle sizes of abrasive varying from 120 to 1000 mesh. Machines are available from 0.05 to 2.4 kilowatt power and holes or apertures from 0.15 mm to 90 mm diameter can be machined. Cutting tools are usually made from .45 to .5 carbon steel, occasionally stainless steel. Boron carbide is found to be the most effective abrasive. Silicon carbide and corundum are cheaper and are frequently used for working glass and ceramic materials. Water is the best suspension medium for the abrasive, which is best held at 30% concentration (by volume) in suspension. Fig 3 shows depth cut versus concentration of abrasive in the suspension for (1) boron carbide of 100 mesh and (2) silicon carbide (220 mesh). Fig 4

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illustrates rate of cutting (mm/min) versus viscosity of suspending vehicle (poises). Various particular machining operations on different materials which are appropriate to ultra-sonic methods are listed. Tungsten carbide dies for forming square of hexagonal bolt heads 8.96 mm by 4 mm deep can be machined in 22 to 27 minutes. The main improvements needed in ultrasonic machines relate to reliability, stability of tool and work piece and need for more simple means of setting and changing tools. Not infrequently two stage machining is adopted with a change of tool after making a preliminary roughing cut and using abrasive of different grain size. Various forms of magnetostrictive generators and intensifiers are described and half-wave, full wave and duplex intensifiers systems are illustrated in Fig 7. Hydraulic intensification is mentioned. Table 4 sets out a suggested range of five "universal" ultrasonic cutting machines which should cover the main requirements of industry. Types 1 and 3 in this table have been constructed as prototypes by OKB and ENIMS. The necessity

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Ultrasonic Methods of Machining Hard and Brittle Materials

for further theoretical study of the action of ultrasonic machining in order to determine the proper direction for increased capacity and lower wear on tools is stressed. There are 7 figures and 4 tables.

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24(6)

AUTHORS: Rozenberg, L. D., Kazantsev, V. F. SOV/20-124-1-22/69

TITLE: On the Physics of the Ultrasonic Treatment of Solid Materials (O fizike ul'trazvukovoy obrabotki tverdykh materialov)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 1, pp 79-82 (USSR)

ABSTRACT: In spite of the comparatively rapid and extensive development of the ultrasonic method of treating solid materials, the physical bases of these processes have, as yet, not been made clear. The hypotheses concerning the nature of the forces causing the impacts of abrasive particles upon the surface to be treated may be subdivided into the following 3 main groups: 1) Ponderomotoric forces of the sonic field and hydrodynamic currents (sonic wind). 2) Shock waves forming in connection with the annihilation of cavitation bubbles. 3) Purely mechanical shocks of the oscillating front surface of the instrument. For hypothesis 3 there are the following 3 variants: a) the impact is transmitted by the abrasive particles located on the surface treated; b) the impact is transmitted by the particles suspended in the intermediate space; c) the front surface of the

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oscillating instrument is charged (sharzhirovat') by the abrasive particles. For the purpose of solving this physically interesting problem, which is of great practical importance, the authors used the slow-motion picture method. The experimental apparatus is described in short. Investigations were carried out at the resonance frequency of the resonator of 6.8 kilocycles. A table contains the main parameters of several series of tests. The average size of the abrasive grain was 220 μ with a scattering of 150-440 μ. The exposed films were visually investigated after being treated, after which they too were treated by the "kineogram" method. By evaluating the experimental material in this manner it was possible to observe a motion of the abrasive particles, which is due to nearly all the aforementioned causes. However, this motion of abrasive particles did not by any means in all cases lead to a cutting off of the glass particles. Treatment of the glass was observed only in the case of a direct impact of the instrument onto the abrasive particle located on the surface of the glass. Such a case is explained on the basis of a photograph. A motion of abrasive particles that is due to other causes does not destroy the glass. The velocities transmitted by the cavitation bubbles on to the suspended particles are only low. For the purpose of determining the empirical dependence of the reproducibility of the process upon the viscosity of the working liquid it will suffice to compare the rates at which particles move in water and in glycerin. The authors thank Kafedra nauchnoy i uchebnoy fotografii i kinematografii MGU (Chair for Scientific and Instructional Photography and Cinematography at Moscow State University), and especially S. R. Zhukovskiy for making it possible to work with the FP-22 camera and for his help in developing the slow-motion picture method. There are 4 figures, 1 table, and 3 Soviet references.

ASSOCIATION: Akusticheskiy institut Akademii nauk SSSR (Acoustics Institute of the Academy of Sciences, USSR)

BORISOV, Yulian Yaroslavovich; MAKAROV, Leonid Olegovich; ROZENBERG, L.D., otv.red.; MOSKATOV, Ye.P., red.izd-va; SIMKINA, G.S., tekhn.red.

[Present and future industrial application of ultrasonic waves] Ul'trazvuk v tekhnike nastoiashchego i budushchego. Moskva, Izd-vo Akad.nauk SSSR, 1960. 86 p. (MIRA 13:9)
(Ultrasonic waves--Industrial applications)

PHASE I BOOK EXPLOITATION SOV/4718

Sovremennoye sostoyaniye i napravleniya razvitiya tekhnologii mashinostroyeniya i priborostroyeniya (Present State of the Manufacturing Processes in the Machine and Instrument Industries and Trends for Development) Moscow, Mashgiz, 1960. 563 p. 5,000 copies printed.

Ed.: Anatoliy Nikolayevich Gavrilov, Doctor of Technical Sciences, Professor; Managing Ed. for Literature on Machine Building and Instrument Construction (Mashgiz): N.V. Pokrovskiy, Engineer; Ed. of Publishing House: G.F. Kochetova, Engineer; Tech. Eds.: T.D. El'kind and A.Ya. Tikhanov.

PURPOSE: This book is intended for technical and scientific personnel in the machine and instrument industries and for students and teachers of schools of higher education.

COVERAGE: The book deals with current theory and practice in the manufacturing processes of the machine and instrument industries and includes discussions on trends for development. The physical nature of the processes and their technical-economic features and possibilities are considered. Particular attention is given to new and progressive processing (supersonic machining, electric machining, cold pressworking, precision casting, precision pressing, new methods of welding, etc.). The book consists of papers presented at the All-Union

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Scientific-Industrial Conference on "Advanced Machine and Instrument Manufacturing Processes," held in 1958. The papers have been revised in the light of recent developments in the field. A chapter is devoted to the automation and mechanization of the industry. Soviet and non-Soviet references accompany some of the chapters.

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ROZENBERG, L.D.

Present State (Cont.) SOV/4718

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PHASE I BOOK EXPLOITATION SOV/5291

Soveshchaniye po kompleksnoy mekhanizatsii i avtomatizatsii tekhnologicheskikh protsessov v mashinostroyenii. 2d, Moscow, 1956

Avtomatizatsiya mashinostroitel'nykh protsessov. t. III: Obrabotka rezaniyem i obshchiye voprosy avtomatizatsii (Automation of Machine-Building Processes, v. 3: Metal Cutting and General Automation Problems) Moscow, Izd-vo AN SSSR, 1960. 296 p. (Series: Its: Trudy, t. 3) 4,700 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut mashinovedeniya. Komissiya po tekhnologii mashinostroyeniya.

Resp. Ed.: V. I. Dikushin, Academician; Ed. of Publishing House: V. A. Kotov; Tech. Ed.: I. F. Kuz'min.

PURPOSE: This collection of articles is intended for technical personnel concerned with the automation of the machine industry.

COVERAGE: This is Volume III of the transactions of the Second Conference on the Full Mechanization and Automation of Manufacturing Processes in the Machine Industry, held September 25-29, 1956. The transactions have been published in three volumes. Volume I deals with the hot pressworking of metals, and volume II, with the actuation and control of machines. The present volume deals with the automation of metal machining and work-hardening, and with general problems encountered in automation. The transactions on the automation of metal-machining processes were published under the supervision of F. S. Dem'yanok and A. M. Karatygin, and those on the automation of work hardening processes, under the supervision of E. A. Satel' and M. O. Yakobson. No personalities are mentioned. There are no references.

Automation of Machine-Building Processes (Cont.) SOV/5291

S/046/60/006/003/007/012
B019/B063

AUTHORS: Naugol'nykh, K. A., Rozenberg, L. D.

TITLE: Optimum Operating Conditions of a High-power Concentrator

PERIODICAL: Akusticheskiy zhurnal, 1960, Vol. 6, No. 3, pp. 352-355

TEXT: A previous paper (Ref. 1) described the operation of a spherical, focusing system with high intensities of the sound to be focused. This study was performed for the case in which non-linear distortions of the wave shape existed. The present paper deals with some results of the preceding paper, which are important for practical purposes and concern especially the determination of the operating conditions of high-power concentrators and the attainment of a maximum amplitude of the wave velocity in the focus. Formula (1) is given for the amplitude of the vibration velocity in the focus. The range of application of this formula is discussed, and an analysis shows that there is an unclear relationship between the maximum amplitude in the focus and the power of the emitter. It follows from the further investigation that the amplitude of sound particle velocity in the focus is slightly dependent on the

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Optimum Operating Conditions of a High-power Concentrator

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vibration velocity of the surface of the emitter. After examining the efficiency of the concentrator, the authors study the problem as to which maximum the amplitude of sound particle velocity exists in the focus with a given efficiency. Formula (12) is derived for the maximum amplitude of sound particle velocity in the focus, and the results obtained are finally illustrated by a calculation. Fig. 3 shows the maximum amplitude of sound particle velocity in the focus as a function of efficiency. It is noted that an increase in efficiency from 3.4% to 100% entails a 50% decrease in the maximum amplitude of sound particle velocity in the focus. There are 3 figures and 2 Soviet references.

ASSOCIATION: Akusticheskiy institut AN SSSR Moskva (Institute of Acoustics of the AS USSR, Moscow)

SUBMITTED: January 13, 1960

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85750

S/046/60/006/003/017/017/XX
B013/B063

6.8000 (3201, 1099, 1162, 3202)

AUTHORS: Rozenberg, L. D., Eknadiosyants, O. K.

TITLE: Kinetics of Ultrasonic Formation of Fog

PERIODICAL: Akusticheskiy zhurnal, 1960, Vol. 6, No. 3, pp. 370-373

TEXT: Ultrasonic formation of fog was studied by means of high-speed (1600-5200 pictures per second) macro- and microfilms. These pictures were taken with an "ultrasonic fountain" (Figs. 3-11). The authors used cameras of the types ZL-16 and CKC-1 (SKS-1) which they connected to a metallographic microscope of the type MBT(MVT). The arrangement set up for the SKS-1 camera is schematically represented in Fig. 2. It may be seen from the pictures that the formation of fog is a discontinuous process. The fog is ejected in small portions by short ($<$ 400 μsec) explosions. The interval between the individual explosions is much longer than the explosions themselves. The explosions are of different kinds: The authors observed both broad and narrow, "acute" ejections. The formation of fog in the jet of an "ultrasonic fountain" can be regarded as a two-stage process. The first, preparatory stage includes the lifting of the

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Kinetics of Ultrasonic Formation of Fog S/046/60/006/003/017/017/XX
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liquid and the brightening of several pearls. During the second stage (main stage), which starts 200 to 250 µsec after the brightening of pearls, explosive formation of fog takes place. It is accompanied by the deformation (Fig. 8) or destruction (Fig. 10) of pearls. The ejection of fog takes 200 - 400 µsec. The deformation and destruction of pearls goes on after the explosion. On the strength of the kinetics of ultrasonic fog formation alone, the authors are not able to verify the existing hypotheses on the mechanism of this phenomenon. Fig. 1 illustrates the dependence of the diameter of the most frequently appearing fog drops upon the ultrasonic frequency according to data from Ref. 2. In a table, the lengths of the capillary waves λ_1 are compared with the lengths of the capillary waves λ_2 calculated from formula (1) of Ref. 3. V. I. Sorokin is mentioned. There are 11 figures, 1 table, and 5 references: 2 Soviet and 1 German.

ASSOCIATION: Akusticheskiy institut AN SSSR, Moskva (Institute of Acoustics AS USSR, Moscow)

SUBMITTED: February 29, 1960

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86358
S/046/60/006/004/007/022
B019/B056

6.8000 (3201, 1099, 1162)

AUTHORS: Rozenberg, L. D., Sirotyuk, M. G.

TITLE: The Sound Emission in a Liquid in the Presence of Cavitation

PERIODICAL: Akusticheskiy zhurnal, 1960, Vol. 6, No. 4, pp. 478 - 481

TEXT: The measurements described here were carried out in a glass container having a diameter of 40 cm and a height of 40 cm. For the purpose of forestalling standing waves, the water was covered with a thick layer of sound-absorbing resin. A magnetostrictive vibrator of the type НЭЛ-4 (NEL-4) served as a sound source, measurement was carried out by means of a bariumtitanate pickup. As may be seen from the results shown in Fig. 1, the radiation resistance at low intensities of the 21 kc/sec radiation is constant and has a value of $\bar{R}_{rad}/S = 1.5 \cdot 10^5$, where $\bar{R}_{rad} = 2W_a/v_m^2$ and S are the area of the emitter, W_a the power irradiated into the medium, and v_m the sound particle velocity. With beginning cavitation, the radiation resistance decreases to roughly 30%, and remains constant with a further

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The Sound Emission in a Liquid in the Presence of Cavitation

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increase of intensity. The radiated intensity at first grows proportional to the square of the sound particle velocity, during the decrease of the radiation resistance of the liquid the intensity remains constant at about 1.5 watt/cm^2, and again begins to rise with the square of the sound particle velocity on an increase of the sound particle velocity above 25 cm/sec. Here the proportionality factor is 1/3 as compared with the first rise of intensity. This disproves the often used method of determining the power of a sound emitter by extrapolation of its power from the region where no cavitation occurs to that where it does. There follow some considerations concerning the finding of sound pressure spectrum. For this purpose, the formation, the oscillation, and the annihilation of the cavities must be known. A mean value with respect to time of sound pressure may be determined from the reaction of the medium to the oscillating emitter. The author thanks V. P. Shesternev for taking part in the experiments. There are 2 figures and 3 references: 2 Soviet and 1 US.

ASSOCIATION: Akusticheskiy institut AN SSSR, Moskva (Institute of Acoustics of the AS USSR, Moscow)

SUBMITTED: August 3, 1960

S/046/60/006/004/013/022
B019/B056

AUTHORS: Bebchuk, A. S., Rozenberg, L. D.

TITLE: The Dependence of the Cavitation Erosion on the Solubility of a Gas Above a Liquid

PERIODICAL: Akusticheskiy zhurnal, 1960, Vol. 6, No. 4, pp. 498 - 499

TEXT: One of the authors (Bebchuk) showed in an earlier paper (Ref. 3) that the concentration of a gas dissolved in a liquid may, under some simplifying conditions, be given in the caverns produced by the cavitation with

$$N(t) = \frac{6\alpha p_o}{R}\sqrt{\frac{D}{\pi}}\,t \qquad (2)$$

Here, p_o denotes the hydrostatic pressure, R is the cavern radius, D - the coefficient of the diffusion of the dissolved gas through the liquid surface, and α the solubility of the gas. The experimental determination of the dependence of the cavitation erosion, distilled water, and ethyl alcohol were chosen as liquids and O_2, N_2, and CO_2 as gases. The experiments

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The Dependence of the Cavitation Erosion on the Solubility of a Gas Above a Liquid

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were carried out with an 8 kc/sec ultrasonic, the loss in weight of the specimen being determined after 6 minutes of irradiation. In the diagram attached, the loss in weight is represented as a function of the solution of the gases in water (curve 1) and in ethyl alcohol (curve 2). As may be seen, the cavitation erosion monotonously decreases with increasing solution, and vanishes in the case of high solubility. There are 1 figure, 1 table, and 5 Soviet references.

ASSOCIATION: Akusticheskiy institut AN SSSR, Moskva (Institute of Acoustics of the AS USSR, Moscow)

SUBMITTED: May 13, 1960

ROZENBERG, L.D., doktor tekhn.nauk; EL'PINER, I.Ye., doktor biol.nauk

Ultrasound in medicine. Priroda 49 no.10:35-41 O '60. (MIRA 13:10)
(Ultrasonic waves)

ROZENBERG, Lazar' Davydovich; LEVIT, Ye.I., red.izd-va; MAKUNI, Ye.V., tekhn.red.

[Story of inaudible sound] Rasskaz o neslyshimom zvuke. Moskva, Izd-vo Akad.nauk SSSR, 1961. 158 p. (MIRA 14:12)
(Ultrasonic waves--Industrial applications)

USSR

S/887/61/000/000/051/069
E194/E135

AUTHORS: Makarov L.O., and Rozenberg L.D.

TITLE: An acoustic head for ultrasonic welding.
A.c. no.127876, cl. 42s (z. no.634246 of July 18, 1959)

SOURCE: Sbornik izobreteniy; ul'trazvuk i yego primeneniye.
Kom. po delam izobr. i otkrytiy. Moscow, Tsentr. byuro
tekhn. inform., 1961, 72-73.

TEXT: The workpieces are compressed by means of a rod which oscillates at ultrasonic frequency in the plane of the intended welds. The special feature of the device is that to increase the efficiency of the head a torsional acoustical vibrator is used, which is connected to a contact element through a torsional oscillation concentrator. The instrument circuit includes: an oscillator, a torsional electromechanical transducer, a fixing system, a mechanical feed system, a work table with the parts to be welded (Fig.58). The sheets to be welded are pressed together by means of the contact pieces of the condenser [concentrator?] from which oscillatory motion is communicated along the surfaces of the sheets. This device can be used for seam welding and can

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produce seams in the form of rings, whose dimensions depend on the dimensions of the concentrator. The proposal has been recognized as useful by the Institut metallurgii im. Baykova (Metallurgical Institute imeni Baykov). The proposal has been sent to the Leningradskiy sovnarkhoz (Leningrad sovnarkhoz) for introduction. There is 1 figure.

[Abstracter's note: Complete translation.]

Fig.58. Diagram of the device.
a - oscillator; b - transducer; B - concentrator;
ꝛ - fixing system; ∂ - feed system; e - work table.

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OSHCHEPKOV, P.K.; ROZENBERG, L.D.; SEMENNIKOV, Yu.B.

Electronic acoustic transducer for the visualization of sound images. Akust.zhur. 7 no.2:268 '61. (MIRA 14:7)

1. Akusticheskiy institut AN SSSR, Moskva.
(Sound waves) (Transducers) (Electron optics)

PHASE I BOOK EXPLOITATION SOV/6312

Rozenberg, L. D., V. F. Kazantsev, L. O. Makarov, and D. F. Yakhimovich

Ul'trazvukovoye rezaniye (Ultrasonic Machining) Moscow, Izd-vo AN SSSR, 1962. 251 p. Errata slip inserted. 5000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Akusticheskiy institut.

Resp. Eds.: V. I. Dikushin, Academician, and L. D. Rozenberg, Doctor of Technical Sciences; Ed. of Publishing House: L. V. Gessen; Tech. Ed.: A. P. Guseva.

PURPOSE: This book is intended for scientific workers, design and process engineers, and for aspirants working in the field of ultrasonic machining.

COVERAGE: Although the book is mostly based on results of investigations conducted by the authors in the ultrasonic laboratory of the Acoustics Institute, Academy of Sciences USSR, and

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in the Special Design Bureau of Mosgorsovnarkhoz, an attempt is made to review, generalize, and sum up all available information, both Soviet and non-Soviet, on different aspects of ultrasonic machining. No personalities are mentioned. References accompany each chapter.

TABLE OF CONTENTS:

ROZENBERG, L.D.

Ultrasonics institute in Rome. Akust. zhur. 8 no.2:248-249 '62. (MIRA 15:8)

(Rome--Ultrasonics)

BELLE, T.S.; GORBUNKOV, V.M.; ROZENBERG, L.D.

Calculating the amplification factor of a sound wave falling obliquely on a parabolic mirror. Akust.zhur. 8 no.3:273-280 '62. (MIRA 15:11)

1. Akusticheskiy institut AN SSSR, Moskva.
(Sound waves)

ROZENBERG, L.D., doktor tekhn.nauk

Visiting with Italian acousticians. Vest.AN SSSR 32 no.4:102-103 Ap '62. (MIRA 15:5)

(Rome--Ultrasonics--Research)

ROZENBERG, L.D.; SIROTYUK, M.G.

A concentrator for generating high-intensity ultrasonic vibrations at a frequency of 1 Mc. Akust. zhur. 9 no.1:61-65 '63. (MIRA 16:5)

1. Akusticheskiy institut AN SSSR, Moskva.
(Sound—Apparatus)

KANEVSKIY, I.N.; ROZENBERG, L.D.

Cylindrical focusing systems with nonuniform amplitude distribution. Akust. zhur. 9 no.4:418-423 '63. (MIRA 17:3)

1. Akusticheskiy institut AN SSSR, Moskva.

ROZENBERG, L. D.

"Measurement of Sound Fields by the Presence of Cavitation."

report submitted for Ultrasonic Symp, Santa Monica, Calif, 14-16 Oct 64.

Acoustics Inst, AS USSR.

BERG, A.I., glav.red.; TRAPEZNIKOV, V.A., glav.red.; TSYPKIN, Ya.Z., doktor tekhn.nauk, prof., red.; VORONOV, A.A., doktor tekhn.nauk, prof., red.; SOTSKOV, B.S., doktor tekhn.nauk, red.; AGEYKIN, D.I., doktor tekhn. nauk, red.; GAVRILOV, M.A., red.; VENIKOV, V.A., doktor tekhn.nauk, prof., red.; CHELYUSTKIN, A.B., doktor tekhn. nauk, red.; PROKOF'YEV, V.N., doktor tekhn.nauk, prof., red.; IL'IN, V.A., doktor tekhn.nauk, prof., red.; KITOV, A.I., doktor tekhn.nauk, red.; KRINITSKIY, N.A., kand. fiz.-matem.nauk, red.; KOGAN, B.Ya., doktor tekhn.nauk, red.; USHAKOV, V.B., doktor tekhn.nauk, red.; LERNER, Yu.A., doktor tekhn. nauk, prof., red.; FEL'DBAUM, A.A., prof., doktor tekhn.nauk, red.; SHREYDER, Yu.A., kand. fiz.-mat. nauk, dots., red.; KHARKEVICH, A.A., akad., red.; TIMOFEYEV, P.V., red.; MASLOV, A.A., dots., red.; LEVIN, G.A., prof., red.; LOZINSKIY, M.G., doktor tekhn.nauk, red.; NETUSHIL, A.V., doktor tekhn.nauk, prof., red.; POPKOV, V.I., red.; ROZENBERG, L.D., doktor tekhn.nauk, prof., red.; LIVSHITS, A.L., kand. tekhn.nauk, red.

[Automation of production and industrial electronics] Avtomatizatsiia proizvodstva i promyshlennaia elektronika; entsiklopediia sovremennoi tekhniki. Moskva, Sovetskaia Entsiklopediia. Vol.3. Pogreshnost' resheniia - Teleizmeritel'naia sistema chastotnaia. 1964. 487 p. (MIRA 17:10)

1. Chlen-korrespondent AN SSSR (for Sotskov, Gavrilov, Timofeyev, Popkov).

L 17804-65 EWT(l)/EWT(m)/T/EWP(t)/EWP(k)/EWP(b) Pf-4/Pi-4 ASD(a)-5/
AFWL/RAEM(c)/RAEM(j)/ESD(dp)/ESD(gs)/ESD(t)/IJP(c) JD

ACCESSION NR: AP4049294 S/0046/64/010/004/0403/0406

AUTHORS: Vas'kova, V. I.; Viktorov, I. A.; Rozenberg, L. D.

TITLE: Amplification of ultrasonic signal and noise in a CdS crystal

SOURCE: Akusticheskiy zhurnal, v. 10, no. 4, 1964, 403-406

TOPIC TAGS: cadmium sulfide, ultrasound amplification, ultrasonic pulse, single crystal, field intensity, noise immunity

ABSTRACT: The experiments described were made with a CdS crystal grown from a melt under pressure at the Vsesoyuzny*y n.-i. institut monokristallov (Khar'kov). The experimental setup was analogous to that described by A. R. Hutson et al. (Phys. Rev. Let. 1961, v. 7, 6, 237-239). A pulse of transverse ultrasonic waves of 1 μsec duration with carrier frequency ~30 Mcs was radiated by a Y-cut quartz slab and transmitted through a system consisting of the investigated crystal, placed between two auxiliary fused-quartz waveguides, re-

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ACCESSION NR: AP4049294

ceived by a second quartz slab, and observed on an oscilloscope screen after amplification by a tuned amplifier and detection. A maximum gain of 35 dB was obtained at 30 Mcs for a sample 12.3 mm long under the following optimal conditions: crystal conductivity 6.5×10^{-5} ohm^{-1} cm^{-1}, field intensity 2857 V/cm. It is shown that noise affects the gain of an ultrasound signal both by changing the waveform of the signal and by reducing the maximum gain. "The authors thank L. A. Sy*soyev for supplying the cadmium sulfide single crystals, A. A. Chabam for valuable advice and a discussion of the work, and N. I. Bezrukova for help in the development of the experimental setup." Orig. art. has: 3 figures, 2 tables, and 1 formula.

ASSOCIATION: Akusticheskiy institut AN SSSR, Moscow (Acoustics Institute, AN SSSR)

SUBMITTED: 19Jul64 ENCL: 00

SUB CODE: GP, SS NR REF SOV: 003 OTHER: 004

Card 2/2

BERG, A.I., glav. red.; TRAPEZNIKOV, V.A., glav. red.; TSYPKIN, Ya.Z., doktor tekhn. nauk, prof., red.; VORONOV A.A., prof., red.; AGEYKIN, D.I., doktor tekhn.nauk red.;GAVRILOV, M.A., red.; VENIKOV, V.A., doktor tekhn. nauk, prof., red.; SOTSKOV, B.S., red.; CHELYUSTKIN, A.B., doktor tekhn. nauk, red.; PROKOF'YEV, V.N., doktor tekhn. nauk, prof., red.; IL'IN, V.A., doktor tekhn. nauk, prof., red.; KITOV, A.I., doktor tekhn. nauk, red.; KRINITSKIY, N.A., kand. fiz. mat. nauk, red.; KOGAN, B.Ya., doktor tekhn. nauk, red.; USHAKOV, V.B., doktor tekhn. nauk, red.; LERNER, A.Ya., doktor tekhn. nauk, prof., red.; FEL'DBAUM, A.A., doktor tekhn. nauk, prof., red.; SHREYDER, Yu.A., kand. fiz.-mat. nauk, red.; KHARKEVICH, A.A., akademik, red. [deceased]; TIMOFEYEV, P.V., red.; MASLOV, A.A., dots., red.; TRUTKO, A.F., inzh., red.; LEVIN, G.A., prof., red.; LOZINSKIY, M.G., doktor tekhn. nauk, red.; NETUSHIL, A.V., doktor tekhn. nauk, prof., red.; POPKOV, V.I., red.; ROZENBERG, L.D., doktor tekhn. nauk, prof., red.; LIFSHITS, A.L., kand. tekhn. nauk, red.; AVEN, O.I., kand. tekhn. nauk, red.; BLANN, O.M [Blunn, O.M.], red.; BROYDA, V., inzh.,prof.,red.; BREKKL', L [Brockl,L.] inzh., knad. nauk, red.; VAYKHARDT, Kh. [Weichardt, H.], inzh., red.; BOCHAROVA,M.D., kand. tekhn. nauk, st. nauchn. red.

[Automation of production processes and industrial electronics] Avtomatizatsiia proizvodstva i promyshlennaia elektronika; entsiklopediia sovremennoi tekhniki. Moskva, Sovetskaia entsiklopediia. Vol.4. 1965. 543 p. (MIRA 18:6)

EWT(d)/EWT(l)/EWT(m)/EWP(v)/T/EWP(t)/EWP(k)/EWP(b)/EWP(l) Pf-4/Pi-4

L 35018-65 S/0046/65/011/001/0121/0124

JD

ACCESSION NR: AP5006183

AUTHOR: Rozenberg, L. D.

TITLE: Assessment of the cavitation efficiency of acoustic energy

SOURCE: Akusticheskiy zhurnal, v. 11, no. 1, 1965, 121-124

TOPIC TAGS: cavitation measurement, ultrasonic engineering, ultrasonic cavitation, cavitation process

ABSTRACT: Despite the widespread use of cavitation in ultrasonic engineering (ultrasonic cleaning, etching, tinning, production of emulsions and suspensions, etc.), no method has yet been devised for assessing the absolute efficiency of cavitation processes. The major problem appears to be how to use costly acoustic energy in the most efficient way in industry. Radiometric measurements were carried out which showed that the efficiency of coefficient $\varkappa$ (degree to which cavitation uses acoustic energy) can be increased 3—4 times as compared to that of industrial radiators currently used. The radiometric measurements demonstrated that the use of focusing radiators makes it possible to obtain higher sound-intensity levels which in turn produce smaller cavitation nuclei. The increase in intensity at the focal point is gained at the expense of a decrease in intensity in the inactive peripheral sections

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of the reaction bath. The value $\varkappa$ is not the only property of a cavitation process. The coefficients ε (potential erosion effect) and, similarly, X (chemical activity) of cavitation are no less important. No methods have yet been found to determine the values ε and X. Orig. art. has: 2 figures. [VM]

ASSOCIATION: Akusticheskiy institut AN SSSR, Moscow (Acoustics Institute, AN SSSR)

SUBMITTED: 19Oct64 ENCL: 00 SUB CODE: GP

NO REF SOV: 003 OTHER: 008 ATD PRESS: 3215

Card 2/2

L 30383-66 EWP(k)/EWT(1)/T

ACC NR: AP6007992 (N) SOURCE CODE: UR/0046/66/012/001/0001/0006 52 50 B

AUTHOR: Vas'.ova, V. I.; Viktorov, I. A.; Rozenberg, L. D.

ORG: Institute of Acoustics, AN SSSR, Moscow (Akusticheskiy institut AN SSSR)

21

TITLE: The generation and amplification of an ultrasonic signal in CdS crystals with a barrier layer

SOURCE: Akusticheskiy zhurnal, v. 12, no. 1, 1966, 1-6

TOPIC TAGS: ~~single crystal,~~ crystal surface, cadmium sulfide, ultrasonic wave, ultrasonic amplification, TRANSVERSE WAVE

ABSTRACT: The direct amplification of transverse and dilatational ultrasonic waves by means of a static electric field (drift field) has been observed many times. Some authors have also described the use of CdS crystals for the excitation and reception of hf ultrasonic waves. If a high-resistance barrier or diffusion layer is formed on the surface of a CdS crystal; when electric current is fed to the crystal, most of it remains in the surface layer instead of penetrating into the bulk of the crystal. This circumstance is, apparently, the main factor which makes difficult the generation and subsequent amplification of a drift field of ultrasonic waves in a CdS crystal, and why this effect has not been observed heretofore. In order to create a drift field of the required magnitude in the crystal it is necessary to use very high voltages. The present authors made an attempt to achieve the generation and amplification of transverse ultrasonic waves in a CdS crystal. The experiments showed that a signal observed (C) proved

Card 1/2 UDC: 534-16

L 46139-66 EWT(1)/EWP(e)/EWT(m)/T-2/EWP(t)/ETI/EWP(k) IJP(c) JD/WW/

ACC NR: AP6022884 SOURCE CODE: UR/0121/66/000/004/0023/0027

AUTHOR: Kazantsev, V. F.; Mechetner, B. Kh.; Rozenberg, L. D.

ORG: None

TITLE: Increasing the productivity and accuracy of ultrasonic machining

SOURCE: Stanki i instrument, no. 4, 1966, 23-27

TOPIC TAGS: ultrasonic machining, ultrasonic machine tool, abrasive, machine vibration, production engineering, vacuum pump

ABSTRACT: The problem of reliable abrasive suspension volume in the machining zone is studied as the sole means for increasing the productivity of ultrasonic machining. Significant progress was made towards the solution of this problem by the Lefeldt Company in West Germany with the production of the Diatron type A ultrasonic machine tool. This machine is equipped with a vacuum pump which draws off the abrasive suspension through a central opening in the tool. The productivity of this machine is higher by a factor of 2-3, and accuracy does not depend on machining depth. A table is given showing the effect which such basic parameters as feed force, vibration amplitude and machining area have on machining efficiency during abrasive suspension removal from the machining zone. These data show that the rate of machining approaches

UDC: 621.9.048.6.014-187

Card 1/3

L 40...-66

ACC NR: AP6022884

a certain value at a hole depth greater than 0.5 mm and does not vary up to a tool depth of 10 mm and more. By studying the relationship between machining rate and feed force at a constant amplitude, it was established that machining rate increases in proportion to the specific pressure with which the tool is fed into the workpiece surface. Under these conditions the proportionality factor is the same for tools with various areas. However, if the specific pressure is increased past a critical value, machining rate decreases. This shows that the critical feed force is independent of tool area. This is explained by the fact that the rate of machining decreases as a result of the presence of torsional instead of longitudinal vibrations at a critical feed force greater than 4 kg. Further studies were conducted to explain the nature of abrasive suspension removal from the machining zone. An experimental unit was set up with a powerful vibration system and higher efficiency. The model 4672 ultrasonic machine tool was used for this purpose. This machine is equipped with vacuum pumps for circulating the abrasive suspension. The test results are tabulated. A comparison of these data shows that productivity decreases and reaches zero as the feed force increases. This is explained by the fact that the abrasive is crushed as the feed force is increased. Although maximum productivity was observed at a critical feed force of 13.7 kg, productivity decreased with machining depth. Tests were conducted to determine the relationship between productivity and the rate of abrasive suspension replacement. Abrasive suspension removal was controlled by the amount of abrasive in solution. The results show that the rate of suspension replacement has a definite effect on productivity, and an even greater

ACC NR: AP6022884

effect on machining depth. Without removal, the rate of machining approaches zero. It was shown that in order to increase productivity further, it is necessary to increase the pulse force transmitted by the tool to the abrasive, force the abrasive suspension into the machining clearance and make other modification. Surface finish was studied with respect to suspension circulation and removal. Further improvements in ultrasonic machine tools are suggested such as automation and modification. Orig. art. has: 7 figures, 2 tables, 1 formula.

SUB CODE: 13/ SUBM DATE: None/ ORIG REF: 004/ OTHER REF: 003

ROZENBERG, L.I.

Rozenberg, L.I. "On methods of dispensary workers in a village under postwar period conditions," Nauch. zapiski Gor'k. in-ta dermatologii i venerologii & Kafedry kozhno-verenich. boleznev GGMI im. Kirova, Issue 12, 1948, p. 18-27

SO: U-3264, 10 April 1953, (Letopis 'Zhurnal 'nykh Statey, No. 3, 1949)

ROZENBERG, L.I.

Rozenberg, L.I. "Organisation of the fight against veneroal diseases in a village," Nauch. zapiski Gor'k. in-ta dermatologii i venerologii i Kafedry kozhno-verenich. bolezney GMI im. Kirova, Issue 12, 1948, p. 30-35

SO: U-3264, 10 April 1953, (Letopis 'Zhurnal 'nykh Statey, No. 3, 1949)

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Kagan, M. Z. and Rozenberg, L. I.--"Characteristics of contagious forms of syphilis from data of the Syphilis Department of the Gor'kovskiy Venereal Disease Institute after 1945," Nauch. zapiski Gor'k. in-ta dermatologii i venerologii i Kafedry kozhno-verenich boleznay im Kirova, Issue 12, 1948, p. 36-41

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SO: U-3264, 10 April 1953, (Letopis 'Zhurnal 'nykh Statey, No. 3, 1949)

ROZENBERG, L. I.

GALINOV, M.F., laureat Stalinskoy premii; ROZENBERG, L.I., inzhener; AFANAS'YEV, L.L., kandidat tekhnicheskikh nauk, redaktor.

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Ethyl chloride block therapy of neurodermatitis. Vest.ven.i derm. no.2:55 Mr-Ap '53. (MLRA 6:5)

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Dissertation: "Investigation of Certain Properties of Porous Chrome Plating During Work With Cylinder Cast Irons." Cand Tech Sci, Moscow Automobile Highway Inst imeni V. M. Molotov, 29 Apr 54. (Vechernyaya Moskva, Moscow, 16 Apr 54)

SO: SUM 243, 19 Oct 1954

YEVDOKIMOV, V.G.; ROZENBERG, L.I.; SKIRKO, S.F.; MATTER, I.M., dots., red.

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Work in training skilled personnel. Zdrav. Ros. Feder. 6 no.3:18-21 Mr '62. (MIRA 15:4)

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