

L 23800-66

ACC NR: AP6007251

established the existence of a compound with the composition  $\text{ScMnO}_3$  and three types of cubic solid solutions; based on  $\text{Sc}_2\text{O}_3$ ,  $\text{Mn}_2\text{O}_3$ , and a cubic modification with the composition  $\text{Mn}_3\text{O}_4$ . The compound  $\text{ScMnO}_3$  crystallizes in a hexagonal lattice; its specific magnetic susceptibility is  $18.0 \pm 0.5 \times 10^{-6}$  abs. el. units/gram; at  $1350 \pm 20^\circ\text{C}$  it decomposes with the formation of solid solutions based on  $\text{Sc}_2\text{O}_3$  and the cubic modification  $\text{Mn}_3\text{O}_4$ . The solubility of  $\text{Mn}_2\text{O}_3$  in scandium oxide changes only slightly with temperature and is from 17 to 20 mole %; the solubility of  $\text{Sc}_2\text{O}_3$  in cubic  $\text{Mn}_3\text{O}_4$  rises sharply from 10.5 mole % at  $1200^\circ\text{C}$  to 30.0 mole % at  $1500^\circ\text{C}$ . The article demonstrates further that scandium oxide does not form compounds or a wide range of solid solutions with  $\text{MnO}$ ,  $\text{NiO}$ ,  $\text{CoO}$ ,  $\text{CdO}$ , and  $\text{ZnO}$ . Orig. art. has: 5 figures and 4 tables.

SUB CODE: 07/ SUBM DATE: 30Jul65/ ORIG REF: 002/ OTH REF: 003

Card

2/2 *W*

POSTNIKOV, B. N.; SHAPLYGIN, P. Ya.

Russian dermatome and its practical use. Khirurgia, Moskva  
no.10:85-87 Oct. 1950. (CLML 20:1)

1. Of Leningrad Scientific-Research Institute of First Aid  
(Director -- A. R. Grushkin; Scientific Supervisor -- Prof. Yu.  
Yu. Dzhanelidze, deceased) and of Krasnogvardeyets State Union  
Order of Lenin Medical Instrument Factory (Director -- G. S.  
Budagov).

SHAPLYKA, K.I.

[How we obtained good corn yields] Iak my atrymali vysokia uradzhai kukuruzy. Minsk, Dziarzh. vyd-va BSSR, 1958. 50 p. (MIRA 12:3)  
(Corn (Maize))

SHAPLYKO, K.I.

AUTHOR: Gerardi, I.A., Engineer

SOV/99-58-10-13/13

TITLE: Melioration Problems at the Joint Session of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin in Minsk (Voprosy melioratsii na ob'yedinennoy S'ssii Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk imeni V.I. Lenina v g. Minske)

PERIODICAL: Gidrotekhnika i melioratsiya, 1958, Nr 10, pp 61-64 (USSR)

ABSTRACT: From 8-11 July 1958, a joint scientific session of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin took place in Minsk. The main subject of this conference was the generalization of scientific achievements and experience in the draining and utilization of swamps in the non-black soil regions of the European part of the USSR. Representatives of many scientific research institutes, the respective ministries and of some kolchozes took part in this meeting. P.P. Lobanov, President of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin reported on "The Growing Role of Scientific Institutions in the Organization of Agricultural Production According to the Regulations of the July Plenum of the TsK KPSS". I.S. Lupinovich, President of the Byelorussian Academy of Agriculture spoke on the necessity of a fundamental change in

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SOV/99-58-10-13/13

Melioration Problems at the Joint Session of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin in Minsk

drainage methods in the BSSR and the Baltic Republics. Te.Ye. Smirnov, head of the kolkhoz BVO and Hero of Socialist Labor, and K.I. Chaplyko, head of the kolkhoz "Chyrvonaya zmena" and Hero of Socialist Labor, reported on the importance and influence of drainage methods in the production of kolkhozes. Academician I.A. Sharov dealt with "The Improvement of Drainage Methods in Other Than Chernozem Regions of the USSR, and Its Further Development". I.A. Ceicys, Director of the Lithuanian Scientific Research Institute of Melioration, reported on progress made in this field in the Lithuanian Republic. Ya.Ya. Bergman, Director of the Latvian Scientific Research Institute of Hydraulic Engineering and Melioration, presented some data on a harvest increase in drained areas of the kolkhozes "Nakotne" and "Dayle". There is 1 table.

1. Soils--Moisture content
2. Water--Control
3. Drainage
4. Scientific reports

Card 2/2

USCOMM-DC-60239

L-57760-65 EWT(m)/EWP(i)/EWP(t)/EWP(b) IJP(c) JD  
ACCESSION NR: AR5012749 UR/0276/65/000/003/B077/B077  
631.357.7:669.228

SOURCE: Ref. zh. Tekhnologiya mashinostroyeniya. Svodnyy tom, Abs. 3B585 16  
B

AUTHORS: Poptsova, Z. P.; Shapnik, M. S.; Gudin, N. V.

TITLE: Investigation of the process of electrical deposition of silver from an electrolyte containing its monoethanol complex 16 21

CITED SOURCE: Sb. Nekotoryye vopr. teorii i praktiki ispol'z. v gal'vanotekhn. neyadovit. elektrolitov. Kazan', 1964, 91-93

TOPIC TAGS: electrolyte, electrodeposition, silver, anode, cathode

TRANSLATION: The influence of the electrolyte composition based on ammonia complexes and used in silver coating, and of the methods of its preparation on the properties of the electrically deposited coatings was investigated. The covering and the dispersing ability of the electrolyte and the physico-chemical properties of the coating were studied. The cathode and anode polarization was measured, and methods for analyzing and correcting the electrolyte were developed. Silver coatings well attached to brass were obtained from the ethylenediamine

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L-57760-65

ACCESSION NR: AR5012749

electrolyte with pH = 7.5-8.5 when a preliminary amalgamation or silvering with a ferrocyanide electrolyte was employed. Microhardness of the coating was 110-120 kg/mm<sup>2</sup>.

SUB CODE: IE, MM

ENCL: 00

KE  
Card 2/2

VOZDVIZHENSKIY, G.S.; GUDIN, N.V.; SHAPNIK, M.S.; GARIF'YANOV, N.S.;  
IL'YASOV, A.V.

Electron paramagnetic resonance study of the electrode processes  
of copper complexes with organic amino derivatives. Zhur. fiz.  
khim. 38 no.6:1682-1685 Je '64. (MIRA 18:3)

1. Kazanskiy khimiko-tehnologicheskii institut imeni Kirova  
i Institut organicheskoy khimii AN SSSR, Kazan'.



VOZDVIZHENSKIY, G.S.; GUDIN, N.V.; SHAPNIK, M.S.; IL'YASOV, A.V.;  
GARIF'YANOV, N.S. (Kazan')

Electron paramagnetic resonance study of electrode processes in  
aqueous solutions of copper complexes. Zhur. fiz. khim. 39 no. 1:  
64-67 Ja '65 (MIRA 19:1)

1. Institut organicheskoy khimii AN SSSR, Kazan'. Submitted  
January 10, 1964.

*SHAPCHKA, D. F.*

USSR / Diseases of Farm Animals. Diseases Caused by Protozoa. R

Abs Jour : Ref Zhur - Biol., No 22, 1958, No 101361

Author : Shapochka, D. F.

Inst : Not given

Title : Treating Theileriasis in Cattle with Biomecin-Sulfantrol Combinations.

Orig Pub : Khodzhaigi gishlogi Tadzhikistan, 1957, No 10, 33-34; S. kh. Tadzhikistana, 1957, No. 10, 30-31.

Abstract : Sulfantrol was intravenously and intramuscularly injected in 0.01 g/kg doses, and simultaneously biomecin in 1.25 g doses in 250 ml. of boiled water was given orally 4 times daily. At the same time the following preparations were also given: ferrum lactate, camphor oil, small doses of sodium sulfate, urotropin with salol, diuretin, antifebrin (15 - 30 gr.). Fifteen heifers were subjected to such treatment. All treated animals recovered. -- A. D. Musin.

Card 1/1

SHAPOCHKA, N. M.

Dissertation: "Study of K. F. Rul'ye on the Development of Living Nature."  
Cand Biol Sci, Moscow Order of Lenin State U imeni M. V. Lomonosov, 4 Jun 54.  
Vechernyaya Moskva, Moscow, 26 May 54.

SO: SUM 284, 26 Nov 1954

SHAPOCHKA, Nikolay Mikhaylovich; DANIL'CHENKO, O.P., red.;  
YERMAKOV, M.S., tekhn. red.

[Lamarck's theory of evolution; lecture from a course in  
Darwinism] Evoliutsionnoe uchenie Lamarka; lektsiia iz  
kursa "Darvinizma." Moskva, Izd-vo Mosk. univ. 1963. 82 p.  
(Evolution) (MIRA 16:12)

ШАПОЧКА, О.Я.

Impregnation of wooden parts with petroleatum. Der. prom. 13  
no.6:24. Je '61. (MIRA 17:6)

1. Novosibirskiy zavod sel'skokhozyaystvennogo mashinostroyeniya  
"Sibsel'mash."

14(5)

SOV/112-59-1-1306

Translation from: Referativnyy zhurnal. Elektrotehnika, 1959, Nr 1, p 176 (USSR)

AUTHOR: Shapochka, P. V., and Belotserkovskiy, A. A.

TITLE: A New Automatic Speed Controller for Mine Hoists

PERIODICAL: Ugol' Ukrainy, 1958, Nr 3, pp 34-39

ABSTRACT: An automatic speed controller serves as a controlling link in the automatic program speed control system and also serves to limit hoisting speed. The accuracy and reliability of existing speed limiters are inadequate; the limiters are unfit to operate in automated mining hoists. The controller compares the actual and set speeds, the latter being recorded magnetically. A speed deviation brings about a variation in frequency induced in a reading head. The controller also comprises a self-supervisory device and can be used for both drum and multirope-friction hoists. Five illustrations.

M.R.S.

Card 1/1

SHAPOCHKIN, B.A., kand.tekhn.nauk

Asphericity produced by application of an additional layer of  
a substance under vacuum. [Trudy] MVTU no.102:43-49  
102 '61. (MIRA 14:8)  
(Optical instruments)

SHAPOCHKIN, B.A., kand.tekhn.nauk

Vignetting in multiple-prism disperse systems. [Trudy] MVTU  
no.102:61-65 '61. (MIRA 14:8)  
(Optical instruments)



SHAPOCHKIN, B.A., kand.tekhn.nauk; KUZICHEV, V.I., inzh.

Calculation of masks for making aspheric surfaces by  
application of an additional layer under vacuum.  
[Trudy] MVTU no.102:50-60 :61. (MIRA 14:8)  
(Optical instruments)

*SHAPOCHKIN, P.YA.*  
BESHKETO, V.K., inzhener (stantsiya Cheremoshniki); SHAPOCHKIN, P.Ya.  
(stantsiya Cheremoshniki); ZAPEKIN, P.YA. (stantsiya Cheremosh-  
niki).

Container for transporting lumber. Zhel.dor.transp.39 no.1:69-70  
Ja '57. (MLRA 10:2)  
(Lumber--Transportation)

SHAPOCHKIN, V. A.  
Spectroscopy

Dissertation: "An Investigation of the Basic Characteristics of Spectrum Apparatus."  
Cand Tech Sci, Moscow Higher Technical School, Moscow, 1953. (Referativnyy Zhurnal,  
Fizika, Moscow, Mar 54)

SO: SUM 213, 20 Sep 1954

SHAPOCHKIN, B. A.

A double-prism dispersion system with an interposed mirror. Izv.  
AN SSSR. Ser. fiz. 19 no.1:82-84 Ja-F '55. (MLRA 8:9)

1. Moskovskoye vyssheye tekhnicheskoye uchilishche imeni Bauman  
(Spectrum analysis) (Spectrometer)

USSR/Optics - Optical Methods of Analysis. Instruments, K-7

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35890

Author: Shapochkin, B. A.

Institution: None

Title: Prism Dispersing System of Variable Dispersion

Original

Periodical: Sb. statey Mosk. vyssh. uch-shcha, 1955, 57, 108-113

Abstract: Discussion of a prism dispersing system, proposed by Makishima (Makishima, S., Journal of Optical Society of America, 1951, 41, No 4; 249) consisting of 2 prisms with intermediate flat mirror. The system makes it possible to change the angular dispersion while maintaining the angle of deflection. Several structural variants of the system described are recommended for use.

Card 1/1

SHAPCHIKIN, V.A.

Category : USSR/Optics - Optical Methods of Analysis. Instruments

K-7

Abs Jour : Ref Zhur : Fizika, No 2, 1957, No 5214

Author : Shapchkin, V.A.

Title : Comparative Description of the Spectral Instruments with Prisms and with Diffraction Gratings.

Orig Pub : Sb. statey Mosk. vyssh. tekhn. un-shcha, 1955, 57, 114-130

Abstract : Prism and diffraction spectral instruments are compared with respect to the following properties: 1) dispersion and resolving power; 2) transmission coefficient; 3) width of spectrum region covered; 4) other properties of the spectrum.

Card : 1/1

VERESHCHAGIN, L.F.; ZUBOVA, Ye.V.; SHAPOCHKIN, V.A.

Equipment and methods for measuring the shearing of solids at high pressures. Prib.i tekhn. eksp. no.5:89-93 S-0 '60. (MIRA 13:11)

1. Institut fiziki vysokikh davleniy AN SSSR.  
(Shear (Mechanics)—Measurement)

SOV/126-7-3-43/44

AUTHORS: Vereshchagin, L. F. and Shapochkin, V. A.

TITLE: Investigation of the Shear Force of Materials at a Hydro-Static Pressure of up to 170 000 kg/cm<sup>2</sup> and above  
(Issledovaniye sily sdviga materialov pri gidrostaticheskom davlenii do 170 000 kg/cm<sup>2</sup> i vyshe)

PERIODICAL: Fizika metallov i metallovedeniye, Vol 7, Nr 3, p 479, 1957  
(USSR)

ABSTRACT: The experimental equipment and research technique have been described by Vereshchagin (Ref.4). The investigations were carried out with pure substances of D.I. Mendeleev's periodic system and with special steels. For all investigated substances and steels an increase in resistance to shear, with increase in pressure, is observed (except for polymorphic transformation compounds). Comparative data as to the increase in the resistance to shear with increase in pressure are shown in the table on p 479 ( $\tau_{25}$ ,  $\tau_{50}$  etc. constant for resistance to shear at pressures of 25, 50 thousand kg/cm<sup>2</sup> etc. respectively). ✓

Card 1/2



SOV/126-7-3-43/44

Investigation of the Shear Force of Materials at a Hydro-Static Pressure  
of up to 170 000 kg/cm<sup>2</sup> and Above

There is 1 table and 4 references, all Soviet.

ASSOCIATION: Laboratorii fiziki sverkhvysokikh davleniy AN SSSR  
(Laboratories of the Physics of Super-High Pressures,  
Ac. Sc., USSR) ✓

SUBMITTED: July 8, 1958

Card 2/2

67735

18.9200

SOV/126-7-3-44/44

AUTHORS: Vereshchagin, L. F. and Shapochkin, V. A.

TITLE: Investigation of the Resistance of Metals to Shear<sup>16</sup> at a Hydrostatic Pressure of up to 300 000 kg/cm<sup>2</sup>  
(Issledovaniye soprotivleniya sdvigu metalloy pri gidrostaticheskom davlenii do 300 000 kg/cm<sup>2</sup>)

PERIODICAL: Fizika metallov i metallovedeniye, Vol 7, Nr 3, pp 479-480, 1957  
(USSR)

ABSTRACT: Complete Translation

As already reported by Vereshchagin (Ref.1), the authors of this paper are carrying out research on the influence of hydrostatic pressure on the change in resistance to shear for various substances. Further improvement of the existing equipment enabled the resistance to shear at pressures of up to 300 000 kg/cm<sup>2</sup> to be studied.

A constant increase in resistance to shear with increase in pressure can be observed for both the investigated materials: technically pure iron and high temperature steel "A" - up to a pressure of 300 000 kg/cm<sup>2</sup>. In technically

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67715

SOV/128-7-3-44/44

Investigation of the Resistance of Metals to Shear at a Hydrostatic Pressure of up to 300 000 kg/cm<sup>2</sup>

pure iron the increase in resistance to shear is even accelerated with increase in pressure.

Comparative data as to change in resistance to shear with change in pressure are given in the table on p 480.  $\tau_{25}$ ,  $\tau_{100}$  etc. stand for a pressure of 25, 100 thousand kg/cm<sup>2</sup> etc. respectively.

The absolute values for the resistance to shear at pressures of around 300 000 kg/cm<sup>2</sup> are so high that, for instance, for technically pure iron they become equal to the theoretical strength.

There is 1 table and 2 Soviet references.

ASSOCIATION: Laboratoriya fiziki sverkhvysokikh davleniy AN SSSR  
(Laboratory of the Physics of Super-High Pressures,  
Ac. Sc., USSR) ✓

SUBMITTED: July 23, 1958

Card 2/2

85432

S/170/60/003/011/003/016  
B019/B056

~~18 6100~~ also 2108

AUTHORS: Vereshchagin L. F., Shapochkin, V. A.  
TITLE: The Problem of the Contact Stability of a Cermet of the Type BK8 (VK8) at Pressures of Several Hundreds of Thousands of kg/cm<sup>2</sup>  
PERIODICAL: Inzhenerno-fizicheskiy zhurnal, 1960, Vol. 3, No. 11, pp. 42-47

TEXT: For the experiments described here the specimens were produced partly at the Institut tverdykh splavov (Institute of Hard Alloys) and partly at the Institute mentioned under Association. These specimens had the shape of frustums, and by honing the surfaces were improved. The shear stress under high pressure (500,000 kg/cm<sup>2</sup>) was measured. From the radial and circular cracks the authors draw conclusions as to the quality of the material. The destruction of the contact surfaces was photographically recorded, viz. by pictures taken before the experiment, at the beginning of the forming of cracks, and after the experiment. Likewise, hardness measurements and microphotographs were made. During pressing;

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85432

The Problem of the Contact Stability of  
Germet of the Type BK8 (VK8) at Pressures  
of Several Hundreds of Thousands of  $\text{kg/cm}^2$

S/170/60/003/011/003/016  
B019/B056

radial cracks developed, which then spread onto the conical part of the  
frustums. At high pressures ( $200 - 300\,000\ \text{kg/cm}^2$ ) the local destruction  
of the specimen was not accompanied by a general splitting up of the speci-  
men. At lower pressures ( $50 - 100\,000\ \text{kg/cm}^2$ ) a general splitting up  
occurred. In the first case, the contact surface had a diameter of 2-3 mm.  
in the second case one of 5-10 mm. Rotation of the specimen accelerates  
the process of destruction and diminishes the load necessary for destruc-  
tion. The Rockwell hardness increases in the contact zone by 10-20%, the  
microhardness according to Vickers increased by 50-70%. A theoretical in-  
vestigation is intended to follow in a second part of this paper. S. A.  
Tsukerman is mentioned. There are 3 figures and 8 Soviet references.

ASSOCIATION: Institut fiziki vysokikh davleniy. g. Moskva  
(Institute of the Physics of High Pressures, Moscow)

SUBMITTED: November 23, 1959

Card 2/2

85350

1.1210

S/120/60/000/005/020/051  
E191/E381

AUTHORS: Vereshchagin, L.F., Zubova, Ye.V. and Shapochkin, V.A.

TITLE: Apparatus and Methods for the Measurement of Shear in  
Solid Bodies at High Pressures

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No. 5,  
pp. 89 - 93

TEXT: Referring to a publication by Vereshchagin and Shapochkin (scheduled to appear in Zh.fiz.metallov i metallovedeniye) on measurements of shear stress in pure elements at pressures up to 50 000 atm, in which certain regularities were revealed, improvements in apparatus are described which permitted an extension of the range of measurement to 500 000 atm. A plate of the metal under investigation is placed between the polished faces of two truncated cones pressed against each other. The combination of axial pressure and friction causes the metal plate to flow in a manner which creates a bi-convex lens shape, whilst the initially flat faces of the conical pistons become concave. Two such assemblies are placed in line inside the press and the middle part between the two specimen metal plates is provided with means of being rotated about the axis. This creates a

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85350

S/120/60/000/005/020/051

E191/E381

Apparatus and Methods for the Measurement of Shear in Solid Bodies at High Pressures

plastic torsional deformation in the specimen. Beyond a certain axial pressure the deformation takes the form of internal slipping inside the specimen. The torque was applied by a rack and pinion mechanism at the rate of 1 degree/sec and measured by a piston-type hydraulic dynamometer. Plates of 3 - 5 mm diameter and various thicknesses between 0.03 and 0.3 mm were used as specimens. Steps were taken to reduce the contact between the specimen and the conical surface of the plungers or else to measure the error caused by such contact. Several tests were carried out with each specimen and if the first of these tests gave singular results, it was ignored. The relation between the torque and angle of rotation was determined for each value of the pressure applied by the press, so that the resistance torque to shear deformation was found to grow with increasing pressure. An example shows the increase of the torque with pressure for 0.45% carbon steel and another example the same relation for molybdenum oxide. The latter

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S/120/60/000/005/020/051  
E191/E381

Apparatus and Methods for the Measurement of Shear in Solid Bodies at High Pressures

illustrates points of chemical transformation by the presence of steps in the curve. The evaluation of the shear stresses from the torque is shown. The presence of hydrostatic support at the point of contact and the mounting of the plungers in tapered holes of large steel rings have made it possible to increase the strength of the plungers made of a stellite-type material by a factor of 10 (details to be published by Shapochkin, V.A. in Inzhenerno-fiz. Zh., 1960). There are 6 figures and 3 Soviet references.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR  
(Institute of High-pressure Physics of the  
AS USSR)

SUBMITTED: August 28, 1959

Card 3/3



68628

18.8200

S/126/60/009/02/016/035

E073/E355 V.A.

AUTHORS: Vereshchagin, L.F. and Shapochkin, V.A.

TITLE: Effect of Hydrostatic Pressure on the Shear Resistance<sup>26</sup>  
of Solid Bodies

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 2,  
pp 258 - 264 (USSR)

ABSTRACT: In earlier work (Refs 11, 12) the authors have described results obtained with hydrostatic pressures up to 300 kg/cm<sup>2</sup>. In this paper results are described of the effects of hydrostatic pressures up to 500 000 kg/cm<sup>2</sup> on the shear resistance in solid bodies. A modification of the Bridgman apparatus, described in an earlier paper (Ref 7) was used. More than 20 elements and 10 steels and alloys were studied; data on the mechanical properties of these are entered in Table 1, p 260. The obtained results are given in Tables 2 and 3 and plotted in graphs, Figures 1 and 2. Most of the substances were tested at pressures of 100 000 to 150 000 kg/cm<sup>2</sup>; iron and tungsten - at pressures up to 500 000 kg/cm<sup>2</sup>; ✓

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08628

S/126/60/009/02/016/055

E075/E355

Effect of Hydrostatic Pressure on the Shear Resistance of Solid Bodies

St45 and nickel, stainless and heat-resistant 2Kh18N9 alloys - at pressures up to 500 000 kg/cm<sup>2</sup>. Analysis of the results indicates that the shear resistance increases almost linearly with increasing pressure up to 500 000 kg/cm<sup>2</sup>; in the first approximation, this is in agreement with previous experimental data and theoretical calculations carried out by B. Deryagin (Ref 8) about twenty-five years ago. The calculated coefficients A<sub>1</sub> and B<sub>1</sub> :

$$\tau = A_1 + B_1 \cdot P \tag{4}$$

do not differ greatly from those calculated by I.V. Kragel'skiy (Ref 10) on the basis of the experimental results of Bridgman (Ref 9). Those for Sb, Bi, Te and other elements - local breaks were observed in the straight lines at sections which are near to the points of polymorphic transformation, Figure 3. For very high pressures,

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68628

S/126/60/009/02/016/055

E073/E335

Effect of Hydrostatic Pressure on the Shear Resistance of Solid Bodies

of the order of hundreds of thousands of  $\text{kg/cm}^2$ , the dependence of the shear resistance on the pressure is more pronounced still. For several substances, the shear resistance at pressures of several hundred thousand  $\text{kg/cm}^2$  was of the same order as the pressure. The absolute values are equal or even higher than the theoretical strength of these substances at atmospheric pressure. Thus, for armco iron the shear resistance at  $300\,000\ \text{kg/cm}^2$  was about  $750\ \text{kg/mm}^2$  and for the steel 45 it was about  $1\,300\ \text{kg/mm}^2$  ( $1\,500\ \text{kg/mm}^2$  according to Figure 2). The relatively small number of investigated substances does not permit deriving a quantitative dependence of the periodic change of the shear resistance at such high pressures on the atomic number of the element. but a qualitative conclusion on the correctness of the periodic law and on the gradual attenuation of the periodicity with increasing pressure can be made on the

Card3/4

✓

06020

S/126/60/009/02/016/033

E073/335

Effect of Hydrostatic Pressure on the Shear Resistance of Solid Bodies

basis of the results now available. Acknowledgments are expressed to Mechanic S.T. Vlasov for his assistance in carrying out the experiments. There are 3 figures, 3 tables and 12 references, 3 of which are English and 9 Soviet.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR  
(Institute of High-pressure Physics of the Ac.Sc., USSR)

SUBMITTED: January 21, 1959 ✓

Card 4/4

S/126/60/009/02/026/033

E111/E555

AUTHOR: Shapochkin, V.A.

TITLE: Mechanical Properties of Special Steels and Alloys  
Under High Hydrostatic Pressure 18

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 2,  
pp 303 - 305 (USSR)

ABSTRACT: The author (with L.F. Vereshchagin) has already shown  
(Ref 1) that resistance to shear at pressures of some  
hundreds of thousands of  $\text{kg/cm}^2$  can increase more than  
50-fold. He now reports the study of this effect for  
heat-resisting alloys and steels, using equipment available  
at the Institute of High-pressure Physics of the Ac.Sc.,  
USSR. The materials tested were Nr 1 titanium alloy,  
Nr 2 chromium-nickel steel and Nr 3 heat-resisting blade  
alloy and (for comparison) steel 45 and technical iron.  
The results are shown graphically as plots of resistance  
to shear against pressure and also tabulated as ratio of  
resistance at the test pressure to that at 25 000  $\text{kg/cm}^2$ .  
Test pressures up to 500 000  $\text{kg/cm}^2$  and over were used.  
The table also shows ratios of resistance to shear to

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S/126/60/009/02/026/033

E111/E335

Mechanical Properties of Special Steels and Alloys Under High Hydrostatic Pressure

tensile strength. The increase in resistance to shear tends to rise with increasing pressure. The greatest effect is shown by the titanium alloy and the least by alloy Nr 3; the resistance rises faster for all the heat-resisting alloys than for the iron and type 45 steel. Above a pressure characteristic for each material the rate of increase of resistance becomes approximately the same for all.

There are 1 figure, 1 table and 3 Soviet references.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR  
(Institute of High-pressure Physics of the Ac.Sc., USSR)

SUBMITTED: April 15, 1959

Card 2/2



*Shapochkin, V.A.*

81909

S/126/60/010/01/015/019  
E073/E535

*18.8200*

AUTHORS: Vereshchagin, L.F., Shapochkin, V. A., and Zubova, Ye.V.

TITLE: On the Question of Friction and Shear at High Contact Pressures *76*

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.1, pp.135-139

TEXT: Bridgman (Ref.2) and the authors of this paper (Refs.3 and 4) used pressures of up to 5 000 kg/cm<sup>2</sup> in their experiments in order to study the changes in the friction forces and internal shear (sliding) at very high pressures and to study the phenomenon of "freezing" (seizing) of contact surfaces. The principle of the operation of the test machine used by the authors of this paper for bringing about shear under the effect of pressure was described in an earlier paper (Ref.5). A sketch of the test-rig for applying normal pressure and a torque is shown in Fig.1. A thin plate of the investigated material is placed between two carbide pistons and pressed down and, following that, the pistons are turned relative to each other. The rotation was proceeded with until the torque stopped increasing. Thereby,  
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E073/E535

On the Question of Friction and Shear at High Contact Pressures  
the speed of turning was constant and so small that the thermal effects could be disregarded. The dependence of the turning angle on the torque for various specific pressures in the normal direction were determined. Under the effect of the applied normal pressure the plate assumed the shape of a double concave lens, whilst the surfaces of the pistons remained convex. The results are plotted in Figs.2, 3 and 4 and entered in a Table, p.138. The increase in internal sliding with increasing pressure was measured up to pressures of 500 000 kg/cm<sup>2</sup>, whilst the increase in the friction force and the change in the friction coefficient (in absence of seizing) was measured for pressures up to 100 000 kg/cm<sup>2</sup> for the following rubbing pairs: the carbides VK8 against VK8, the steel ShKh15 against the steel ShKh15, the carbide VK8 against the steel ShKh15 (Fig.4, Table, p.138). Furthermore, the "freezing" phenomenon was investigated which is caused by transition from external friction to internal slips. For most of the chemical elements, steels and commercial alloys the critical pressure range at which the transition from external friction to

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On the Question of Friction and Shear at High Contact Pressures  
internal slipping takes place varies between 15 and 50 000 kg/cm<sup>2</sup>  
and depends on the nature of the investigated material, namely,  
its crystal structures. There are 4 figures, 1 table and  
5 Soviet references.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR  
(Institute of High Pressure Physics, AS, USSR)

SUBMITTED: January 3, 1960

4

Card 3/3

1.1210

85971

S/126/60/010/005/024/030

E193/E483

AUTHORS: Vereshchagin, L.F., Shapochkin, V.A., and Pirogova, L.B.

TITLE: On the Residual Strength (Resultant) From Shear Under High (Hydrostatic) Pressure

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.5, pp.783-785

TEXT: Although strength and plasticity of metals, subjected to ultra-high ( $> 100000$  atm) hydrostatic pressure, are considerably higher than those displayed under normal conditions, the permanent (residual) gain in strength and plasticity due to the action of hydrostatic pressure is small, except in cases when the application of high pressure brings about phase transformations or other similar changes which may profoundly affect the mechanical properties of metals. The present authors studied the effect of high hydrostatic pressure on the properties of commercial grade iron and steels ЭИ437А (EI437A) and 45. Experimental specimens, in the form of thin (less than 0.1 mm thick) round discs, were subjected either to the action of hydrostatic pressure (100000 to 300000 atm) alone, or were sheared in torsion while under pressure. For the shear tests, the specimens were placed between flat faces of two Card 1/2

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E193/E483

On the Residual Strength (Resultant) From Shear Under High  
(Hydrostatic) Pressure

rods, made of the carbide BK(VK), through which the torque of up to 1000 kg cm was applied, the maximum deformation attained being 55°. The residual effects of both treatments were studied by hardness and micro-hardness measurements and by metallographic examination. The results obtained confirmed that no permanent increase in strength of a metal is attained by the application of high hydrostatic pressure alone. However, in the case of specimens subjected to the simultaneous action of pressure and shear, increase in hardness, reaching 150% in the most heavily deformed regions, was observed. Acknowledgments are expressed to laboratory assistant Z.A.Levchenko for helping with the measurements. There are 3 figures, 1 table and 3 Soviet references (one of which is a translation from English).

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR  
(Institute of High Pressure Physics AS USSR)

SUBMITTED: May 20, 1960

Card 2/2

VERESHCHAGIN, L.F.; SHAPOCHKIN, V.A.

Contact strength of the VK8 cermet hard alloy under a pressure of  
several hundred thousand  $\text{kg}/\text{cm}^2$ . Inzh.-fiz.zhur. no.11:42-47 N  
'60. (MIRA 13:11)

1. Institut fiziki vysokikh davleniy, Moskva.  
(Strains and stresses) (Cermets--Testing)

07771

S/126/61/011/001/019/019  
E193/E483

1.1210

AUTHOR: Shapochkin, V.A.TITLE: On the Problem of Uniform Distribution of Stresses in 26  
the Contact Zone of Metal Tested in Shear Under PressurePERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.1,  
pp.156-157

TEXT: In their earlier studies of shear under pressure, Bridgeman (Ref.1) and the present author (Ref.2) assumed uniform distribution of the normal and tangential stresses in the contact zone. In view of the increasing field of application of high pressures in metallurgical research, it was necessary to verify this assumption; hence the investigation described in the present paper. When a thin foil specimen is tested in shear under pressure by a method entailing the use of two axially-loaded, flat-ended rods made of the carbide БК (VK), the faces of the rods between which the foil specimen is compressed remain flat up to pressures of 150000 to 200000 kg/cm<sup>2</sup>, after which they become concave. When the faces of carbide rods are in direct contact during the test, they remain flat until fracture takes place. For this reason, rods with both flat and concave end faces were used in the Card 1/4

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S/126/61/011/001/019/019  
E193/E483

On the Problem of Uniform Distribution of Stresses in the Contact Zone of Metal Tested in Shear Under Pressure

course of the present investigation, the curvature of the concave contact zones having been chosen so as to resemble that which is obtained in practice under very high pressures (depth of the hollow amounting to 50 to 100 microns for the contact zone 3 to 4 mm in diameter). In addition, contact zones of complex shape, comprising a flat ring at the periphery and a several mm deep hollow in the centre, were employed. The experiments consisted in placing red phosphorus between the end-faces of the experimental rods, subjecting it to both normal and tangential loads, and assessing the distribution of the loads by the manner in which red phosphorus changed to its black modification. Red phosphorus was applied either by painting a very thin layer, in which case the conditions obtained in direct contact of the hard alloy rods were reproduced, or spread in the form of a relatively thick layer, in which case conditions approaching those when a foil specimen is stressed between the rods were obtained. To facilitate observation of the effect studied, contact zones of the largest possible diameter.

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On the Problem of Uniform Distribution of Stresses in the Contact Zone of Metal Tested in Shear Under Pressure

(9 to 11 mm) were employed. In all cases, the transformation of phosphorus from red to black modification started at the periphery of the contact zone and then spread towards its centre. In the case of a small degree of concavity (corresponding to loading of the foil under very high pressures), the change of colour of phosphorus took place almost simultaneously at all points of the contact zone. In the case of contact zones of complex geometry, the change from red to black started in the flat portion and then spread gradually towards the centre of the cavity; with increasing load the pressure distribution became more uniform. Application of tangential stresses at the moment at which phosphorus started to change its colour from red to black owing to the action of normal pressure brought about a widening of the region of polymorphic transformation. In order to spread the transformation over the whole contact area, it was necessary to increase the torsion moment only by 10 to 20%; as in the case of normal load applied alone, the change of colour due to combined action of normal

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On the Problem of Uniform Distribution of Stresses in the Contact Zone of Metal Tested in Shear Under Pressure

and tangential stresses spread from the periphery inwards. The results obtained were taken to indicate a relatively uniform distribution of both normal and tangential stresses in the contact zone of material subjected to shear under ultra-high pressures. There are 6 references: 5 Soviet and 1 non-Soviet.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR  
(Institute of Physics of High Pressures, AS USSR)

SUBMITTED: June 6, 1960

Card 4/4



18.8200 also 2108,2808<sup>25926</sup>

S/126/61/012/001/018/020  
E073/E535

**AUTHORS:** Shapochkin, V.A. and Pirogova, L.B.

**TITLE:** Determination of the shear stresses on ring-shaped specimens under pressure

**PERIODICAL:** Fizika metallov i metallovedeniye, 1961, Vol.12, No.1, pp.148-149

**TEXT:** Bridgman and Vereshchagin found that with increasing hydrostatic pressure the shear resistance changes and increases by several times at pressures of the order of 50-100 thousand atm. In these experiments circular plates were investigated and the distribution of normal pressures along the areas of contact were assumed uniform. It was considered that the shape of the epures of the shear stresses is triangular or occupies a position which is intermediate between the triangular and the rectangular. Since the real distribution of the normal and the tangential stresses differ from those assumed in the calculations, a certain error was introduced. For reducing this error and for evaluating it, the authors carried out experiments in which the shear strength under pressure was determined for ring specimens made of commercial iron

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Determination of the shear <sup>25728</sup> ...

S/126/61/012/001/018/020  
E073/E535

and niobium. The tests were carried out on equipment described by L. F. Vereshchagin, Ye. V. Zubova and V. A. Shapochkin (Ref. 4: PTE, 1960, 5). For producing high pressure pistons of the carbide BK6 (VK6) with a ring-shaped face were used. The external diameter of the ring equalled 10.2 mm, the internal 9.0 mm. The specimens under investigation were cut from sheet metal 0.04 mm thick. They were ring-shaped with dimensions corresponding to the dimensions of the ring area of the piston. During the tests, specimens of the investigated material were placed between pistons on ring-shaped areas. The loading was in steps; when the normal pressure reached a certain value torque was applied. Turning of one piston relative to the other was effected until the torque reached its maximum for the given normal pressure. In the experiments the magnitude of the normal pressure was 100 000 kg/cm<sup>2</sup> and of the torque 1000 kg·cm. The experiments yielded linear relations between the torque and the axial force, which were the same for commercial iron and niobium. Since the ratio of the width of the ring to its average diameter was below 1:10, a uniform distribution of the normal and the tangential stresses throughout the width of the ring could be

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Determination of the shear ...  
25926

S/126/61/012/001/018/020  
E073/E535

assumed with a sufficiently high degree of accuracy. In this case the dependence of the shear strength on the normal pressure was linear; the value of the shear strength was 15-20% lower than that obtained earlier for circular specimens without a hole and 40-50% lower than the values obtained by Bridgman. As a result of the non-uniform distribution of the normal and tangential stresses on the circular contact area the measured value of the shear strength will be excessively high; at pressures of 50-100 thousand kg/cm<sup>2</sup> the excess value reached 40-50% in the case of Bridgman and 15-20% in the experiments carried out at the Institute of High Pressure Physics AS USSR. L. F. Vereschagin and V. A. Shapochkin (Ref. 5: Inzh.-fiz. zhurnal, 3, 1960) found that the non-uniformity in the distribution of the normal stresses along the area of contact decreases at pressures exceeding 100 000 kg/cm<sup>2</sup>. This should lead to a decrease in the error of calculating shear stresses. There are 2 figures and 5 Soviet references.

[Abstractor's Note: Complete translation.]

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Determination of the shear ...  
25926

S/126/61/012/001/018/020  
E073/E535

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR  
(Institute of High Pressure Physics AS USSR) and  
Kafedra khimii i fiziki vysokikh davleniy MGU  
(Department of High Pressure Chemistry and Physics,  
Moscow State University)

SUBMITTED: October 17, 1960

Legend Fig.1 Dependence of the torque,  $M$ ,  $\text{kg}\cdot\text{cm}$ , on the pressure  
of the press,  $F$ , tons for ring specimens.  
0 - niobium,  $\Delta$  - iron.

Legend Fig.2 Dependence of the tangential stresses,  $\tau\cdot 10^{-3}$ ,  $\text{kg}/\text{cm}^2$   
on the normal pressure,  $p\cdot 10^{-3}$ ,  $\text{kg}/\text{cm}^2$ , for ring  
specimens.  
0 - niobium,  $\Delta$  - iron.

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S/126/62/013/005/027/031  
E073/E535

AUTHORS: Shapochkin, V.A. and Pirigova, L.B.  
TITLE: Influence of temperature on the shear under pressure  
PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.5, 1962,  
785-787

TEXT: The change in the shear resistance with increasing average normal stress at various temperatures was investigated on a test machine which ensured that measurements were under conditions approximating hydrostatic pressure. The part of the test apparatus containing the sample was placed into a thermostat which enabled lowering the temperature to  $-50^{\circ}\text{C}$ . Heating apparatus was also provided whereby the highest heating temperature was  $200^{\circ}\text{C}$ . Tin, lead, zinc, cadmium, indium and other low melting point metals were tested at pressures between 0 and  $100\ 000\ \text{kg/cm}^2$ . Curves of the shear resistance  $\tau$  as a function of the pressure  $p$  were obtained for various temperatures. In the same way as curves obtained at room temperature, these curves consist of two sections - the initial, corresponding to external friction caused by sliding between the piston and the specimen

Card 1/3

Influence of temperature on the ... S/126/62/013/005/027/031  
E075/E535

surface, and the section corresponding to internal shifts when the slip at the contact surface stops and slip occurs inside the material. For a number of substances the shear force increased considerably with temperature at the initial part of the  $\tau$  vs.  $p$  curve and this is explained by an increase of the friction coefficient with increasing temperature. As the pressure increases further and there is a change over from external to internal sliding, the shear resistance at elevated temperatures becomes lower than at room temperature. At pressures of the order of 100 000 kg/mm<sup>2</sup> and test temperatures of 200°C, the shear resistance of a number of metals drops by a factor of 4. Simultaneously there will be a displacement of the zone of change over from external friction to internal sliding towards lower pressures. The  $\tau$  vs.  $p$  curves for elevated temperatures form a divergent beam. With increasing temperatures the influence of hydrostatic pressure on the shear resistance decreases. At low temperatures the opposite picture is observed, the initial section of external friction lengthens and the shear resistance increases. The curves form a more divergent beam than in the case of

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Influence of temperature on the ... E073/E535

elevated temperatures. For the materials investigated the shear resistance at a pressure of 100000 kg/cm<sup>2</sup> increased by a factor of 2 for a temperature drop from room temperature to -50°C. Those metals which had a lower shear resistance at room temperature proved to be more sensitive to changes in the shear resistance at low temperatures. There are 2 figures.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR  
(Institute of High Pressure Physics AS USSR)

SUBMITTED: July 7, 1961 (initially)  
January 12, 1962 (after revision)

Card 3/3

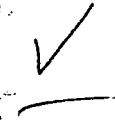
S/057/62/032/002/016/022  
B124/B102

AUTHORS: Vereshchagin, L. F., Zubova, Ye. V., and Shapochkin, V. A.

TITLE: Electric contact resistance at high normal pressures

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 2, 1962, 230 - 232

TEXT: The pressure dependence of the electric contact resistance of pistons made of ШХ15 (ShKh15) steel and of a powder-metallurgical hard alloy of the type ВК6 (VK6) was examined at pressures of up to 100,000 kg/cm<sup>2</sup>, using the high-contact-pressure method developed at the authors' institute. The purity and the quality of the contact surfaces were kept constant in all experiments. The diameter of the rated contact area of the pistons was also constant and equal to 3 or 6 mm. The electric contact was calculated from the change in contact resistance measured with a potentiometer of type ППТН-1 (PPTN-1) and a high-sensitivity galvanometer of type М21/4 (M21/4) with low internal resistance. Heating of the contact and the relevant change in resistance were excluded by using 1- to 2-ma currents. The voltage drop was measured for two current directions, and the average value was determined. The contact resistance was calculated from Card 1/3





Electric contact resistance ...

S/057/62/032/002/016/022  
B124/B102

$R_x = \frac{R_n U_x}{U_n}$  where  $R_n$  is the standard resistance,  $U_n$  is the voltage drop on the standard sample, and  $U_x$  is the voltage drop on the sample examined. ✓

Pressure was gradually raised by 1,000 to 10,000 kg/cm<sup>2</sup> up to 100,000 kg/cm<sup>2</sup>. Voltage drop measurements were repeated 15 to 20 times, and each test 3 to 4 times, with the first test results being neglected, as a rule. The results shown in Fig. 2 are in good agreement with those of other authors. There are 2 figures and 4 Soviet references.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR, Moskva (Institute of High-Pressure Physics, AS USSR, Moscow)

SUBMITTED: February 6, 1961

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Electric contact resistance ...

S/057/62/032/002/016/022  
B124/B102

Fig. 1. Circuit diagram for the measurement of contact resistance. (1) oil switch; (2) operating current battery of the potentiometer; (3) standard cell for the operating-current device; (r) galvanometer. Legend: (1) PPTN-1.

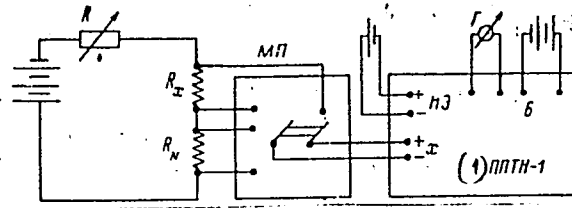
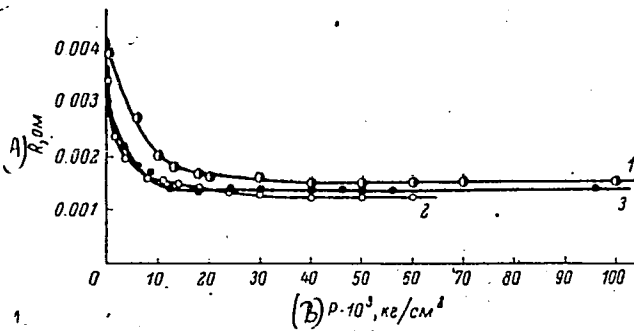


Fig. 2. Contact resistance versus normal pressure. (1) for the couple VK6-VK6 with a rated piston diameter of 3 mm; (2) and (3) for the couples VK6-VK6 and ShKh15-ShKh15, respectively, with a rated diameter of 6 mm. Legend: (A) R, ohms; (B)  $p \cdot 10^3$ , kg/cm<sup>2</sup>.



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S/057/62/032/002/017/022  
B124/B102

15.2240

AUTHORS: Vereshchagin, L. F., Shapochkin, V. A., and Pirogova, L. B.

TITLE: Contact compressive strength of hard alloys of type BK(VK)

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 2, 1962, 233 - 237

TEXT: The compressive strength and residual properties (strength and plasticity) of pistons made of the sintered carbides BK8B(VK8V), BK6B(VK6V), BK6(VK6), and BK4B(VK4V) were tested using special device. The diameter of the contact surface was 3-3.5 mm. Pistons were tested by applying only perpendicular pressure or perpendicular pressure and torque simultaneously. In the former case, the load was raised first to 100,000 kg/cm<sup>2</sup>, then the sample was unloaded and examined for cracks, and loaded again at intervals of 100,000 kg/cm<sup>2</sup> until the first cracks appeared. In the latter case, stepwise loading by 10,000-20,000 kg/cm<sup>2</sup> was used, and, at a certain perpendicular pressure, torque was applied until the first cracks appeared. The results indicate that the contact compressive strength of the alloys increases with decreasing cobalt content. The breaking load is lowered by 20% when

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Contact compressive strength ...

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S/057/62/032/002/017/022  
B124/B102

torque has been applied. The highest perpendicular load (350,000 kg/cm<sup>2</sup>) could be applied to VK4V pistons, while VK84 pistons cracked under a pressure of 220,000 kg/cm<sup>2</sup>. Application of torque to VK4V gave most pronounced effects; the breaking load of the BK6TaC (VK6TaS) alloy was about 200,000 kg/cm<sup>2</sup>. It was found by microhardness tests with the device ПМТ-3 (PMT-3) that (1) microhardness increases equally both with perpendicular pressure and with pressure plus torque; (2) cold hardening of the contact surface is constant at all points of the surface except the border; (3) residual hardening reaches a maximum in VK4V (about 20%) and a minimum in VK8V (about 5%). Radial and annular cracks were formed in positions and distributions dependent on the kind of load. Tangential stresses as a function of perpendicular pressure were measured for VK8V, VK6V, and VK4V between 10,000 and 200,000 to 300,000 kg/cm<sup>2</sup>. The friction coefficients of all alloys at pressures up to 250,000 - 300,000 kg/cm<sup>2</sup> were all about 0.185, with a 1.5- to 2-fold decrease with increasing pressure. Mechanic L. M. Voyeykov and laboratory assistant Z. A. Levchenko are thanked. There are 5 figures, 1 table, and 5 Soviet references.

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Contact compressive strength ...

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S/057/62/0 32/002/017/022  
B124/B102

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR, Moskva (Institute  
of High-pressure Physics, AS USSR, Moscow)

SUBMITTED: February 5, 1961

Card 3/3

X

ACCESSION NR: AT4013967

S/2659/63/010/000/0290/0295

AUTHOR: Shapochkin, V. A.

TITLE: Testing for shear under pressure at various temperatures

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochny<sup>m</sup> splavam, v. 10, 1963, 290-295

TOPIC TAGS: shear strength, technical iron shear strength, fusible metal shear strength, shear strength pressure dependence, shear strength temperature dependence, activation energy

ABSTRACT: Thin, round plates (diameter 5-10 mm, thickness 0.05-0.1 mm) of Sn, Pb, Zn, Cd, In and technically pure iron were tested on a special tester (mean normal pressures up 100,000 kg/cm<sup>2</sup>, temperature range -50 to +200°C, stress stage values 100-1000 kg/cm<sup>2</sup> in the low pressure range and 10,000-20,000 kg/cm<sup>2</sup> in the high pressure range). Each test used 10-20 specimens, was repeated 3-5 times and the results (see Figs. 1, 2 and 3 in the Enclosure) were subjected to statistical evaluation. It was established that the pressure dependence of shear strength remains linear for the given temperature range. Effects of hydrostatic pressure decrease as temperature rises. The temperature dependence of shear strength remains analogous at high pressure or in the absence of pressure. The curve  $\ln \tau - T$

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ACCESSION NR: AT4015967

is linear over a wide temperature range. The temperature coefficient of shear strength decreases in value as pressure rises. The energy parameter, i.e. activation energy, increases as pressure rises. The function  $\ln \tau - 1/T$  can be assumed to be linear for a wide temperature range, whether pressure is present or not. The strength of technical grades of Fe was affected directly by temperature (room temperature to 200C) in the presence of pressure, in that its shear strength increased with temperature, while the temperature coefficient  $\alpha$  increased and the activation energy  $\Delta H$  decreased. Orig. art. has: 3 graphs, 7 formulas.

ASSOCIATION: Institut metallurgi AN SSSR (Institute of Metallurgy)

SUBMITTED: 00

DATE ACQ: 27Feb64

ENCL: 03

SUB CODE: ML

NO REF SOV: 010

OTHER: 003

Card 2/5 <sup>7</sup>

ANLIKAYN, P.A., kand.tekhn.nauk, dotsent; SHAPCHIKIN, V.A., kand.tekhn.  
nauk, dotsent

Strength and heat resistance of austenitic steels for  
high-temperature heat exchangers. Energomashinostroenie  
11 no.10:35-36 0 '65. (MIRA 18:11)



L 16902-65 EWT(m)/EWA(d)/EWP(t)/EWP(k)/EWP(b) Pr-4 SSD/ASD(f)-2/  
ACCESSION NR: AP4047990 ASD(m)-3/AFTC(p) HJW/ S/0096/64/000/011/0058/0059  
JD/HW

AUTHORS: Antikayn, P. A. (Candidate of technical sciences); Shapochkin, V. A.  
(Candidate of technical sciences)

TITLE: Long term strength of tubes from steel Kh25T at temperatures 800 to 900C

SOURCE: Teploenergetika, no. 11, 1964, 58-59

TOPIC TAGS: rupture strength, stress load, stress analysis, plastic deformation,  
stress corrosion, corrosion / MP 3M testing machine, Kh25T high chromium steel

ABSTRACT: An experimental investigation of the long-term (stress-rupture)  
strength of thin tubes 25 mm in external diameter and 2 mm thick, made of high  
chromium steel Kh25T, was conducted. The chemical composition of the material  
was 0.11% C, 0.57% Ti and 24.7% Cr. The experiments were performed in an MP-3M  
machine designed for testing at temperatures up to 1200C. The values of the  
stress at fracture were so chosen that the time under load varied from a few  
hours to 1000-2000 hours. At each temperature 7 specimens were tested. The  
relation between the temperature and stress-rupture strength is given by the  
formula  $T(C + \lg t) = \text{const}$ , where C = 24. It was found that with sustained

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L 16902-65

ACCESSION NR: AP4047990

heating the resistance to corrosion diminished and brittleness<sup>4</sup> increased at 450-520C. Heating at 600-850C lowers the tendency to intercrystal corrosion. At above 850C the grain size increased and so did the brittleness. Steel Kh25T is recommended for high-temperature heat exchangers because of its resistance to corrosion and high stress-rupture strength. Orig. art. has: 1 formula, 5 figures, and 1 table. <sup>2</sup>

ASSOCIATION: MEL-NIIVT

SUBMITTED: 00

ENCL: 00

SUB CODE: MM

NO REF SOV: 002

OTHER: 000

Card 2/2

L 18942-65 EWT(m)/EWP(w)/EPF(n)-2/EWA(d)/EPR/T/EWP(t)/EWP(b) Ps-l/Pu-l  
ASD(m)-3 JD/JG

ACCESSION NR: AP50C1156

S/0294/64/002/006/0922/0926

AUTHOR: Shapochkin, V. A.

TITLE: Experimental unit for the study of physical, mechanical, and heat-resistant properties of refractory materials at high temperatures <sup>β</sup>

SOURCE: Teplofizika vysokikh temperatur, v. 2, no. 6, 1964, 922-926

TOPIC TAGS: refractory material, refractory alloy, refractory alloy property, refractory alloy heat resistance, heat resistant alloy, alloy property, UVP unit

ABSTRACT: The Scientific Research Institute of High Temperatures has designed and built a unit (UVP) for testing the physical and mechanical properties and heat resistance of refractory materials and heat-resistant alloys at high temperatures. Hardness, compression, and thermal-stability tests can be conducted in inert or aggressive media at temperatures up to 2500C. Stress-rupture and creep tests can be conducted at temperatures up to 1600 and 2500C for up to 1000 and 10 hr, respectively. Orig. art. has: 3 figures.

Card 1/2

L 18942-65

ACCESSION NR: AP5001156

ASSOCIATION: Nauchno-issledovatel'skiy institut vysokikh temperatur (Scientific Research Institute of High Temperatures)

SUBMITTED: 15May64

ENCL: 00

SUB CODE: MM, MT

NO REF SOV: 001

OTHER: 000

ATD PRESS: 3158

Card 2/2

L 21651-66 EWT(m)/EWA(d)/EWP(t) MJW/JD

ACC NR: AP6006139

(N)

SOURCE CODE: UR/0114/65/000/010/0035/0036

AUTHORS: Antikayn, P. A.; (Candidate of technical sciences, Docent); Shapochkin, V. A. (Candidate of technical sciences, Docent)

ORG: none

TITLE: Strength and heat resistance of austenitic steels for high temperature heat exchangers

53  
51  
B

SOURCE: Energomashinostroyeniye, no. 10, 1965, 35-36

TOPIC TAGS: austenitic steel, steel, high temperature strength, heat resistant steel/ EI448 steel, EI417 steel, EI283 steel

ABSTRACT: The long duration strength and high temperature oxidation resistance of austenitic steels EI448 (Kh18N12M2T), EI417 (1Kh23N18), and EI283 (Kh25N20S2) were experimentally investigated at high temperatures (900 and 1000C) by MEI and NIIVT. The stress-time curves for 900 and 1000C are presented, and the limit stresses for 1000-, 10 000-, and 100 000-hour operation at 700, 800, 900, and 1000C are tabulated. Curves for estimating the limit stresses for 10<sup>4</sup>-hour

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UDC: 669.14.018.4:536.27.001.4

2

L 21651-66

ACC NR: AP6006139

operation at any temperature between 670 and 1000C are given. Oxidation resistance was measured by subjecting flat steel specimens to a heated atmosphere, removing the oxidation products, and weighing the clean specimens. All steels were found to have sufficient resistance, but steel Kh25N20S2 was superior. It is concluded that steel Kh18N12M2T has the best combination of properties for heat exchanger applications (at 0.5 kg/mm<sup>2</sup> it can be used for 10<sup>4</sup> hours at 960C). For temperatures below 800C the cheaper steel Kh25T should be used. Orig. art. has: 2 figures and 1 table. 18

SUB CODE: 13/      SUBM DATE: none/      ORIG REF: 003/      OTH REF: 001

Card 2/2

*LJC*

SHAPOCHKIN, Ye.Ya., red.; YELAGIN, A.S., tekhn.red.

[Let's inform our masses about the decisions of the plenum of the Central Committee of the CPSU in December 1959; for evening gatherings in clubs] Resheniia dekabr'skogo (1959 g.) Plenuma TsK KPSS - v massy!; tematicheskii vecher v klube. Moskva, Izd-vo "Sovetskaya Rossiya," 1960. 34 p. (Bibliotekha "Sel'skogo klubnogo rabotnika," no.1) (MIRA 13:2) (Agriculture)

48-5-33/56

SUBJECT: USSR/Luminescence

AUTHORS: Gugel', B.K. and Shapochnik, M.M.

TITLE: Improvement of the quality of Luminophore Films in Luminescence Tubes (Uluchsheniye kachestva lyuminoformogo sloya v lyuminestsentnykh lampakh)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol 21, #5, pp 705-706 (USSR)

ABSTRACT: The main luminophores for luminescent tubes are a mixture of magnesium tungstate with zinc-beryllium silicate activated by manganese and calcium halogen-phosphate activated by antimony and manganese.

The luminophore coating by calcium halogen-phosphate is very stable with respect to irradiation by light at  $\lambda = 2,357 \text{ \AA}$  and  $1,850 \text{ \AA}$  in the oxidation atmosphere. The presence of  $\text{H}_2\text{O}$  and  $\text{CO}_2$  leads to instability.

Luminophores with a high value of R (ratio of the sum of main oxides to  $\text{PO}_4$ ) and sufficiently high content of antimony soluble in

Card 1/2

HCl are the stablest ones. The best results are obtained at



GUGEL', B.M., kand. khim. nauk; SHAPOCHNIK, M.M., inzh.

Destruction of the calcium halidephosphate in fluorescent lamps.  
Svetotekhnika 5 no.4:18-23 Ap '59. (MIRA 13:1)

1.Moskovskiy elektrolampovyy zavod.  
(Fluorescent lamps)

SHAPOCHNIKOV, N.M. (Odessa)

Generalized practice in carrying out tests and thematic grading  
of the knowledge of students. Mat.v shkole no.6:46-53 N-D '57.  
(MIRA 10:11)

(Mathematics--Study and teaching)

MOCHALOVSKIY, A.N.; SHAPOCHNIKOVA, A.F.

Effect of parenteral administration of protein on the patho-  
genesis of tumors of the mammary gland in mice. Vop.onk. 7  
no.3:72-75 '61. (MIRA 14:5)  
(BREAST—TUMORS) (PROTEINS)

SHAPOCHNIKOVA, D.B.

Skin allergy reactions in rheumatic fever. Vrach.delo no.11:131-132  
N '60. (MIRA 13:11)

1. Kafedra fakul'tetskoy terapii (zav. - prof. S.Ya.Shteynberg)  
lechebnogo fakul'teta Khar'kovskogo meditsinskogo instituta.  
(RHEUMATIC FEVER)  
(SKIN)  
(ALLERGY)

SHAFOLATOV, Zh.

Rare case of ascariasis in the swine liver. Uzb. biol.  
zhur. 7 no.6:87 '63. (MIRA 17:6)

1. Samarkandskiy sel'skokhozyaystvennyy institut.

*SHAPORENKO*  
BUDNIKOV, V.I., dots.; ZHOKHOVSKIY, V.V., starshiy prepodavatel'; SHAPORENKO,  
I.S., inzh.

Inaccuracies in a series of educational posters. Tekst. prom. 18  
no.3:66-67 Mr '58. (MIRA 11:3)

1. Zaveduyushchiy kafedroy pryadeniya khlopka TTI for (Budnikov)
2. Kafedra pryadeniya khlopka TTI (for Zhokhovskiy)  
(Textile industry--Study and teaching)

SHAFORENKO, P.

Marginal treatments are effective. Zashch. rast. ot vred. i bol.  
10 no.3:15 '65. (MIRA 19:1)

1. Zaveduyushchaya Trostyanetskoy kontrol'no-semennoy laboratoriyey,  
Sumskaya oblast'.

SHAPORENKO, V.G.

Rotation of crops on our collective farm. Zemledelie 27  
no.10:21-23 0 '65. (MIRA 18:10)

1. Predsedatel' kolkhoza imeni Il'icha, Trostyanetskogo rayona,  
Sumskoy oblasti, UkrSSR.



SHAPOREV, F. [Shaporiev, F.]; LIKHOLAT, V. [Lykholat, V.]

Corals on the Yaila. Znan.ta pratsia no.8:30 Ag '62.

(MIRA 15:12)

(Crimean Mountains--Corals, Fossil)

SHAPOREV, Foma Ferapontovich; LITVINOVA, L., red.

[Simeiz and Laspi; a regional study and guidebook]  
Simeiz - Laspi; kraevédcheskii ocherk-putevoditel'.  
Simferopol', Izd-vo "Krym," 1965. 108 p.  
(MIRA 18:7)

1. 1963.

1. 1963. Figures of Marxism-Leninism or the conservation of  
science. OZOR, print. na Dal'. Vest. no.1:5-8 '63.

(MIRA 13.7)

1. Dal'nevostochnyy filial Ineni Komarovy Sibirskogo otsheniya  
in 1963.

SHAPORIN, Yuriy, narodnyy artist SSSR.

Acquaintance with Sobinov. Sev. foto 17 no.4:75 Ap '57. (MLRA 10:6)  
(Sobinov, Leonid Vital'evich, 1872-1934)

SHAPORINSKIY, S.A.

The natural and technological sciences. Politekh. obuch. no.10:13-19  
0 '57. (MLRA 10:9)

(Physics) (Chemistry) (Technology)

SHAPORINSKIY, S.A. (Moscow).

Fundamental aspects of studying industrial production on the basis  
of local plants. Politekh. obuch. no.7:56-62 JI '58. (MIRA 11:8)  
(Technical education) (Field work (Educational method))

SHAPORINSKIY, S.A.

Industrial in secondary schools. Politekh.obuch. no.11:  
9-16 H '59. (MIRA 13:2)

1. Institut metodov obucheniya APN RSFSR.  
(Vocational education) (Field work (Educational method))

SHARPOVINSKIY, S.A.

Content and varieties of work operations. Vop. psikhol. 10 no.6:  
27-36 N-D '64. (MIRA 18:2)

1. Institut proizvodstvennogo obucheniya Akademii pedagogicheskikh  
nauk RSFSR, Moskva.



23562

S/118/61/000/005/005/006  
D203/D306

9, 2584  
AUTHORS:

Shaporov, B.D. and Volchkov, V.F., Engineers

TITLE:

A contactless transmitter

PERIODICAL:

Mekhanizatsiya i avtomatizatsiya proizvodstva, no. 5,  
1961, 35-36

TEXT: A contactless transmitter of the type АИП-1 (DIP-1) induction type semiconductor transmitter) has been designed in the Laboratoriya avtomatiki (Automation Laboratory) of the Pervoural'skiy Novotrubnyy zavod (Pervoural Novotrubnyy Plant) (Fig. 1).

Fig. 1. Circuit diagram of the transmitter.  $L_1$  - 700 turns;

$L_2$  - 350 turns;  $C_1$  - 0.07;  $C_2$  - 0.1;  $C_3$  - 1.0;  $R$  - 7.5 Kilohms

For figure 1 see card 3/3

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X

23562

S/118/61/000/005/005/C06  
D203/D306

A contactless transmitter

A triode of the type  $\Gamma 4\Upsilon$  (P4U) is used as generator of the sinusoidal oscillations. Its collector circuit is connected to the winding of a relay. The interconnected collector and base circuits of the triode generate self-oscillations and there is mutual induction between the windings  $L_1$  and  $L_2$ , situated at some distance apart. When a metallic screen is introduced into the air gap between the windings  $L_1$  and  $L_2$ , the oscillations of the generator cease. The resistance of the collector circuit of the triode in the absence of oscillations is much smaller than in their presence and, thus, the current in the collector circuit increases when the oscillations cease. The current increase brings the relay into operation. The relay of the transmitter is 20V. The transmitter works in a stable manner when the distance between the faces of the transmitter is 40 mm or less. The accuracy of the breaking screen position is 1 mm when the width of the metallic screen is equal to the double width of the face; the limiting factor for the speed of the screen is the relay speed. The transmitter of the type (DIP-1) works in a stable manner at a screen speed of up to 16 mm per/sec.

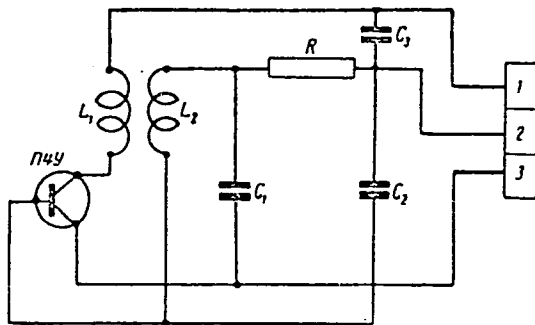
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S/118/61/000/005/005/006  
D203/D306

A contactless transmitter

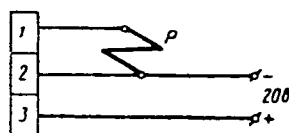
in the Pervoural Novotrubnyy Plant. Improvements are being made to the transmitter by widening its range. There are 3 figures.



X

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Рис. 1. Схема датчика:  
 $L_1 - 700 \text{ } \mu\text{H}; L_2 - 350 \text{ } \mu\text{H}; C_1 - 0,07;$   
 $C_2 - 0,1; C_3 - 1,0;$   
 $R - 7,5 \text{ ком.}$



MARSHAK, Yu.L., kandidat tekhnicheskikh nauk; SHAPOROV, D.V.,  
inzhener.

Starting and operating a furnace with a maximum catch of ashes  
designed by the All-Union Heat Engineering Institute. Elek. sta.  
24 no.12:9-15 D '53. (MLRA 6:12)  
(Furnaces)

GULYAYEV, V.N., kand.tekhn.nauk; RATNER, A.V., kand.tekhn.nauk;  
SHAPOROVSKAYA, Z.A., inzh.

Sleeve connections for pipelines. Elek.sta 31 no.1:10-12  
Ja '60. (MIRA 13:5)

(Pipelines)

SAMSONOV, Mikhail Yakovlevich, podpolkovnik; SHAPOSHNIK, Vsevolod  
Maksimovich; MURZAYEV, N.I., red.; BUKOVSKAYA, N.A., tekhn.  
red.

[Ski training; soldiers' manual] Lyzhnaia podgotovka; posobie  
dlia voisk. Moskva, Voenizdat, 1962. 60 p. (MIRA 15:11)  
(Ski troops)

ISAYEV, N.I.; SHAPOSHNIK, V.A.

Method for determining the electroconductivity of ion-exchanger membranes. Zav.lab. 31 no.10:1213-1216 '65.

(MIRA 19:1)

1. Voznezhskiy tekhnologicheskii institut.

BARANSKIY, N.; BLIZNYAK, Ye.; BUKHGOL'TS, O.; VOSKRESENSKIY, S.; IVANOV, K.;  
KOVALEV, S.; KOVAL'SKAYA, N.; MAKUNINA, A.; MARKOV, K.; PETROVSKIY, I.;  
PROZOROV, Ye.; RAKITNIKOVA, A.; SAUSHKIN, Yu.; SOLOVTSEVA, T.; STEPANOV,  
P.; SHAPOSHNIKOV, A.; KHRUSHCHEV, A.

Nikolai Nikolaevich Kolosovskii. [Obituary] Vest.Mosk.un.9 no.12:139-141  
D '54. (MIRA 8:3)

(Kolosovskii, Nikolai Nikolaevich, 1891-1954)



SHAPOSHNIKOV, A., inzh.

Hydraulic removal of manure from livestock buildings. Sel', stroi.  
12 no.3:20-21 Mr '58. (MIRA 11:3)  
(Germany, East--Centrifugal pumps) (Farm manure)

SHAPOSHNIKOV, A.A., d. 1942; ZHIGAREV, A.A., redaktor; TYAGUNOV, G.A., redaktor.

[Electronic and ionic instruments] Elektronnye i ionnye pribory. [4. izd.,  
perer.] Moskva, Gos. energ. izd-vo, 1952. 336 p. (MLRA 7:1)  
(Electron tubes)

21177

S/141/60/003/006/016/025  
E192/E382

9,4220

AUTHORS: Yergakov, V.S. and Shaposhnikov, A.A.

TITLE: Klystron with an Electron Beam Controlled by a  
Transverse Electric Field

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy,  
Radiofizika, 1960, Vol. 3, No. 6, pp. 1045-1053

TEXT: This paper was read at the Third All-Union Conference  
on Electronics of the Ministry of Higher Education, Kiyev,  
1959.

Recent years have witnessed some successful attempts at  
devising methods of amplification, giving a low level of noise.  
However, analysis of any <sup>other</sup> possible low-noise amplifiers is  
still of considerable interest. In the following a klystron  
with a transverse field is considered. In this, the control  
of the electron beam is effected by a high-frequency electric  
field which is perpendicular to the static trajectories of  
the electrons. The operation of a klystron with a transverse  
electric field can be explained on a simple model illustrated  
in Fig. 1. A resonator with an electric field concentrated in  
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Klystron with ....

<sup>21177</sup>  
S/141/60/003/006/016/025  
E192/E382

a narrow gap and directed perpendicularly to the plane of symmetry of the system (along the axis  $x$ ) is used as the input device which velocity-modulates the electrons. Such a resonator can be in the form of a cylindrical cavity with two plates forming a capacitive gap. The output device is in the form of a toroidal resonator with an electric field parallel to the axis. An electron beam in the form of a ribbon enters the first resonator and interacts with the electric field of the input signal. The electrons thus receive a transverse velocity component and move along rectilinear trajectories in the drift space. After the drift space, the electron beam, whose position in the plane  $z = \text{const.}$  is a function of time, enters into the output device and excites it if the intensity of the longitudinal electric field varies in the direction of the beam deflection (along  $x$ ). First, it is assumed that in the klystron of Fig. 1. the average plane of the electron beam coincides with the central plane of the input resonator gap and that the width of the beam  $2h$  and its deflection in the gap are so small in comparison with the distance  $d_1$  that the

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