POLYAK, A.L., kand. tekhn. nauk; GRINCHENKO, V.F., inzh.; [illegible], E.I., inzh.

Investigating the performance of bits for combination drilling machinery designed by the All-Union Scientific Research Institute for the Organization and Mechanization of Mine Construction. Trudy VNIIOMSHSa no.15:32-47 '64. (MIRA 18:2)

POLYAK, A. L., kand. tekhn. nauk; NIKOLAYENKO, A. T., inzh.; GRICHENKO, R. N., inzh.; BAKUL', V. N., kand. tekhn. nauk; ISAKOV, E. I., inzh.; STARKOV, V. I., inzh.

Efficient geometry and makes of hard alloys for the blades of cutter loaders with a planetary-cutting actuating member. Ugol' Ukr. 6 no.10:20-22 O '62. (MIRA 15:10)

1. Ukrainskiy nauchno-issledovatel'skiy institut organizatsii i mekhanizatsii shakhtnogo stroitel'stva (for Polyak, Nikolayenko, Grichenko). 2. Ukrainskiy nauchno-issledovatel'skiy institut sinteticheskikh sverkhtverdykh materialov i instrumentov (for Bakul', Isakov, Starkov).

(Coal mining machinery)

HUNGARY

POLYAK, Bela, Dr; Uzsoki Street Hospital, II. Surgical Ward (Uzsoki Utcai Korhaz, II. sz. Sebeszeti Osztaly).

"Modification of the Swenson-Type Rectum Resection."

Budapest, Magyar Sebeszet, Vol XVI, No 2, May 63, pages 114-118.

Abstract: [Author's German summary] The author discusses the more common complications of the Swenson-type rectum resection which induced him to work out a modification of it. Based on the relatively small number of 8 operations, it is not his intention to again evaluate the value of the Swenson technique since this was done by several authors already. The good results of the author show that the modification of the surgical technique retains the good functional results of the Swenson operation. The possibilities for error and complications in the original technique, however, are eliminated by the new method and the procedure is simplified. 1 Hungarian, 11 Western references.

1/1

POLYAK, A. L.

Cand Tech Sci - (diss) "Study of the performance of planetary-cutting operating /ispolnitel'nyy/ member for boring of mine-shafts." Khar'kov, 1961. 21 pp with diagrams; (Ministry of Higher and Secondary Specialist Education Ukrainian SSR, Dnepropetrovsk Order of Labor Red Banner Mining Inst imeni Artem); 150 copies; free; (KL, 6-61 sup, 223)

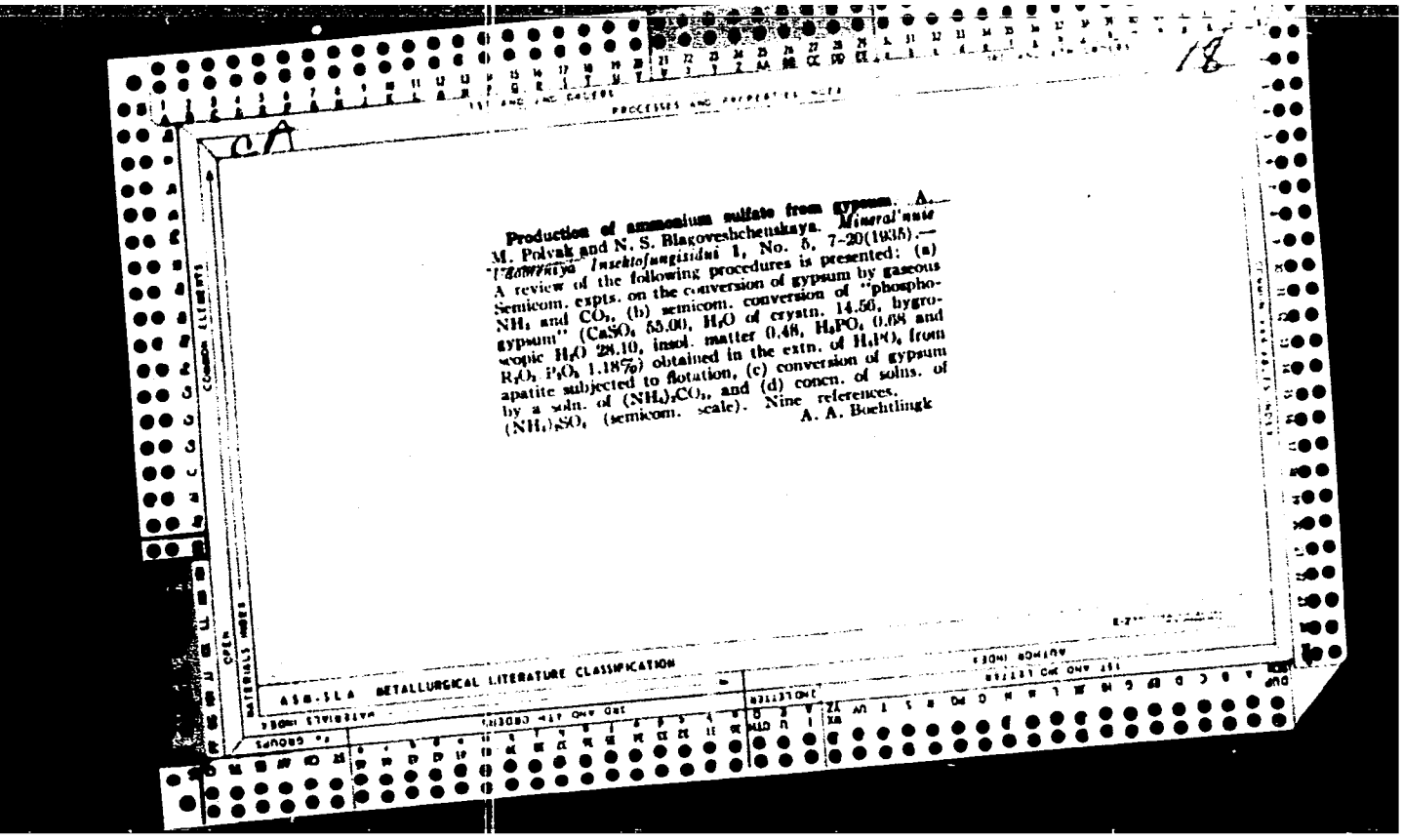
NIKOLAYENKO, A.T.; YUDITSKIY, G.I.; POLYAK, A.L.

Drilling equipment for the sinking of shafts and large diameter boreholes. Ugol' Ukr. 5 no.7:14-16 Jl '61. (MIRA 15:1)

1. Ukrainskiy nauchno-issledovatel'skiy institut organizatsii i mekhanizatsii shakhtnogo stroitel'stva.
(Rock drills)

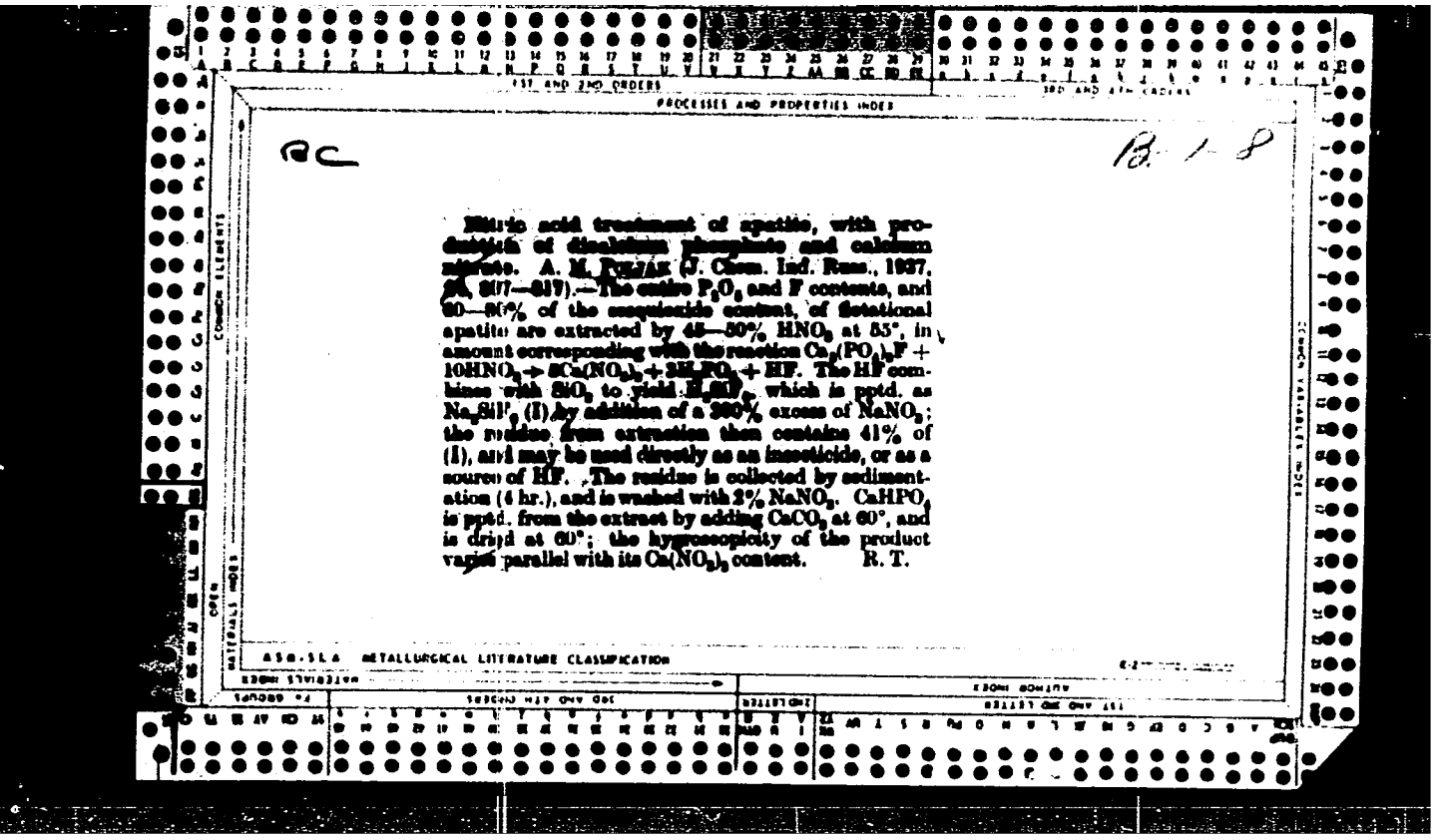
POLYAK, Aleksandr Alekseyevich; AKOPYAN, G.S., otv. red.; POLTAVSKAYA, S.V., red.

[The economic system of Afghanistan; essays] Ekonomicheskii stroi Afganistana; ocherki. Moskva, Nauka, 1964. 161 p. (MIRA 17:12)



Production of ammonium sulfate from gypsum. A. M. Polyak and N. S. Blagoveshchenskaya. *Mineral'nye Udobreniya Insektofungitsidy* 1, No. 5, 7-20(1935).—A review of the following procedures is presented: (a) Semicom. expts. on the conversion of gypsum by gaseous NH_3 and CO_2, (b) semicom. conversion of "phosphogypsum" ($CaSO_4$ 55.00, H_2O of crystn. 14.50, hygroscopic H_2O 28.10, insol. matter 0.48, H_3PO_4 0.68 and R_2O_3, P_2O_5 1.18%) obtained in the extn. of H_3PO_4 from apatite subjected to flotation, (c) conversion of gypsum by a soln. of $(NH_4)_2CO_3$, and (d) concn. of solns. of $(NH_4)_2SO_4$ (semicom. scale). Nine references.

A. A. Boehtlingk



RC

B-1-8

Nitric acid treatment of apatite, with production of dicalcium phosphate and calcium nitrate. A. M. Fuzak (J. Chem. Ind. Russ., 1937, 14, 817—819).—The entire P_2O_5 and F contents, and 80—90% of the sesquioxide content, of flotational apatite are extracted by 45—50% HNO_3 at 55°, in amount corresponding with the reaction $Ca_3(PO_4)_2F + 10HNO_3 \rightarrow 3Ca(NO_3)_2 + 2H_3PO_4 + HF$. The HF combines with SiO_2 to yield H_2SiF_6, which is pptd. as Na_2SiF_6 (I) by addition of a 300% excess of $NaNO_3$; the residue from extraction then contains 41% of (I), and may be used directly as an insecticide, or as a source of HF. The residue is collected by sedimentation (4 hr.), and is washed with 2% $NaNO_3$. $CaHPO_4$ is pptd. from the extract by adding $CaCO_3$ at 60°, and is dried at 60°; the hygroscopicity of the product varies parallel with its $Ca(NO_3)_2$ content. R. T.

POLYAK, A. M.

"Semiplant Experiments with the Carbonation of $(NH_4)_2SO_4$ Solutions in Honigmann Apparatus," A. P. Belopol'skiy, A. M. Polyak, N. A. Rubinshteyn, N. P. Aleksandrov, V. V. Rusov, Ye. F. Yablonskiy, Works of the Sci Inst of Fert and Insectofung im Ya. V. Samoylov, 1940, 130-52 pp, Khim Referat Zhur IV. No 6, pp 83 (1941) (SEE: Inst. Inst/Fungi. in Ya. V. Samoylov)

SO: U-237/49, 8 April 1949

POLYAK, A. M.

"The Carbonation of $NH_3ONa_2SiN_4$ solutions in the Soda Column," A.P. Belopol'skiy, A. M. Polyak, Works of Sci Inst of Fert and Insectofung im Ya. V. Samoylov, 1940 No 144, pp 184-210, Khim Deferat Zhur IV, No 6, pp 84 (1941) (SME: Inst. Insect/Fungi. In Ya. V. Samoylov)

SO: U-237/49, 8 April 1949

VOL'FKOVICH, S. I.; LOGINOVA, A. I.; POLYAK, A. M.
POLYAK, A. M.

"Solution of Phosphates by Nitric Acid," 1952.

U-1882, 29 April 52

POLYAK, Anatoliy Markovich

[Expanding the selection of ferrous metals in the U.S.S.R.] Razvitie sortamenta chernykh metallov v SSSR. Moskva, Metallurgiia, 1965. 115 p. (MIRA 19:1)

L 56493-65 EWT(m)/EPF(c)/EPR/EWP(t)/EWP(b) Pr-4/Ps-4 LJP(c)/RPL JD/WW/JW/JG

ACCESSION NR: AP5017801 UR/0286/65/000/011/0031/0031 19 16 28 B

631.859.13.002.2

AUTHOR: Polyak, A. M.; [illegible]ize, D. F.

TITLE: A method for producing nitrogen-phosphorous fertilizer. Class 16, No. 171-410

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 11, 1965, 31

TOPIC TAGS: fertilizer, nitrogen, phosphorous

ABSTRACT: This Author's Certificate introduces: 1. A method for producing nitrogen-phosphorous fertilizer using simple superphosphate. Concentrated nitrogen-phosphorous fertilizer is produced by ammonium sulfate treatment of a superphosphate suspension and then separating out the gypsum. 2. A modification of this method in which the mono-ammonium phosphate filtrate obtained after gypsum separation is treated with gaseous ammonia after which the potassium fluoride, rare earths and sesquioxides are removed.

Card 1/2

L 56493-65

ACCESSION NR: AP5017801

ASSOCIATION: Ural'skiy nauchno-issledovatel'skiy khimicheskiy institut (Ural Scientific Research Institute of Chemistry)

SUBMITTED: 19Oct64 ENCL: 00 SUB CODE: GC, LS

NO REF SOV: 000 OTHER: 000

Card 2/2

POLYAK, A.M., kand.tekhn.nauk

Present state and prospects for the production of chromium compounds.
Zhur.VKHO 7 no.1:56-66 '62. (MIRA 15:3)
(Chromium compounds)

POLYAK, A.M., referent

Italian research organizations in ferrous metallurgy.
[from "Iron and Coal Trades Review," no. 4795, 1960].
Biul. TSIICHM no.2:62 '61. (MIRA 14:9)
(Italy--Metallurgical research)

POLYAK, A.M.

Conference on prospects for the development and technological progress in the production of chromium compounds. Zhur.VKHO 6 no.3:345 '61. (MIRA 14:6)

(Chromium compounds—Congresses)

80624

SOV/81-59-5-15978

5.2400 (A)

Translation from: Referativnyy zhurnal, Khimiya, 1959, Nr 5, p 327 (USSR)

AUTHORS: Polyak, A.M., Sheveleva, S.S., Uspenskaya, Z.P.

TITLE: The Replacement of Hydrochloric Acid by Sulfuric Acid in the Production of Elemental Boron

PERIODICAL: Tr. Ural'skogo n.-i. khim. in-ta, 1957 (1958), Nr 5, pp 222-227

ABSTRACT: The results of laboratory and semi-industrial experiments are submitted which showed that in the production of elemental B by reduction of boracic acid with Mg metal (RZhKhim, 1959, 1824) for the lixiviation of MgO from the sinter commercial contact H_2SO_4 can be used (instead of HCl acid). The cost of B is hereby reduced by 10% and working conditions are improved as a result of less gas liberated. The balance of materials in the production of B is submitted, when using H_2SO_4 for lixiviation.

G. Rabinovich

Card 1/1

POLYAK, A.M.

5(2) PHASE I BOOK EXPLOITATION SOV/1916

Vsesoyuznoye soveshchaniye po khimii bora, 1955

Bor; trudy Konferentsii po khimii bora i yego soyedineniy (Boron; Transactions of the Conference on the Chemistry of Boron and its Compounds) Moscow, Goskhimizdat, 1958. 189 p. Errata slip inserted. 2,400 copies printed.

Ed.: G.P. Luchinskiy; Tech. Ed.: N.S. Lar'ye.

PURPOSE: This book is intended for chemists, as well as for industrial personnel working with boron and its compounds.

COVERAGE: This collection contains 24 studies on the chemistry, crystalline structure, physicochemical properties, and technology of boron and its compounds. Twenty-two of the studies were presented at the All-Union Conference on Boron Chemistry, held at the Institut Obshchey i Neorganicheskoy Khimii im. L. Ya. Karpova (Scientific Research Physicochemical Institute im. L. Ya. Karpov) in December 1955. Two of these articles deal with the thermochemistry of boron. The two studies on "borundum" production are being published for the first time. The studies are well illustrated and accompanied by bibliographies.

TABLE OF CONTENTS:

Card 5/6

POLYAK, A.M.

Distr: 4E4J

Chromium oxide. A. M. Polyak, E. N. Pivarovskaya, and A. S. Korolesa. U.S.S.R. 107,488, Sept. 25, 1957. Cr_2O_3 is obtained by the thermal decompn. of $(NH_4)_2Cr_2O_7$ to which is added $Na_2Cr_2O_7$ to obtain a heavier product and preventing dusting of the heated mass. M. Hoseh

SOV/81-59-16-57594

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 16, pp 278-279 (USSR)

AUTHORS: Amirova, S.A., Polyak, A.M.

TITLE: The Study of Chlorination Roasting of the Cinders of the Sulfuric Acid Industry With the Utilization of Its Heat

PERIODICAL: Tr. Ural'skogo n.-i. khim. in-ta, 1958, Nr 7, pp 217-224

ABSTRACT: Chlorination roasting is combined with the process of cooling of cinders dumped from sulfuric acid roasting kilns. For this purpose the hot cinders are mixed with the corresponding quantity of finely-ground NaCl. Thanks to this method the heat of the cinders coming out of the kilns is used in their chlorination treatment and chlorinated cinders are obtained directly in the sulfuric acid plants relatively simple, without considerable capital expenditures. From the chlorinated cinders Cu, Zn and precious metals are extracted by the hydrometallurgical method. The obtained product is used as raw material in the ferrous metallurgy. Chlorination roasting was carried out in the course of 0.5 - 2 hours at 350, 450 and 550°C and also under the conditions of decreasing temperature from 700 to 450°C. NaCl was introduced in the quantity of 10 - 20% of the cinder

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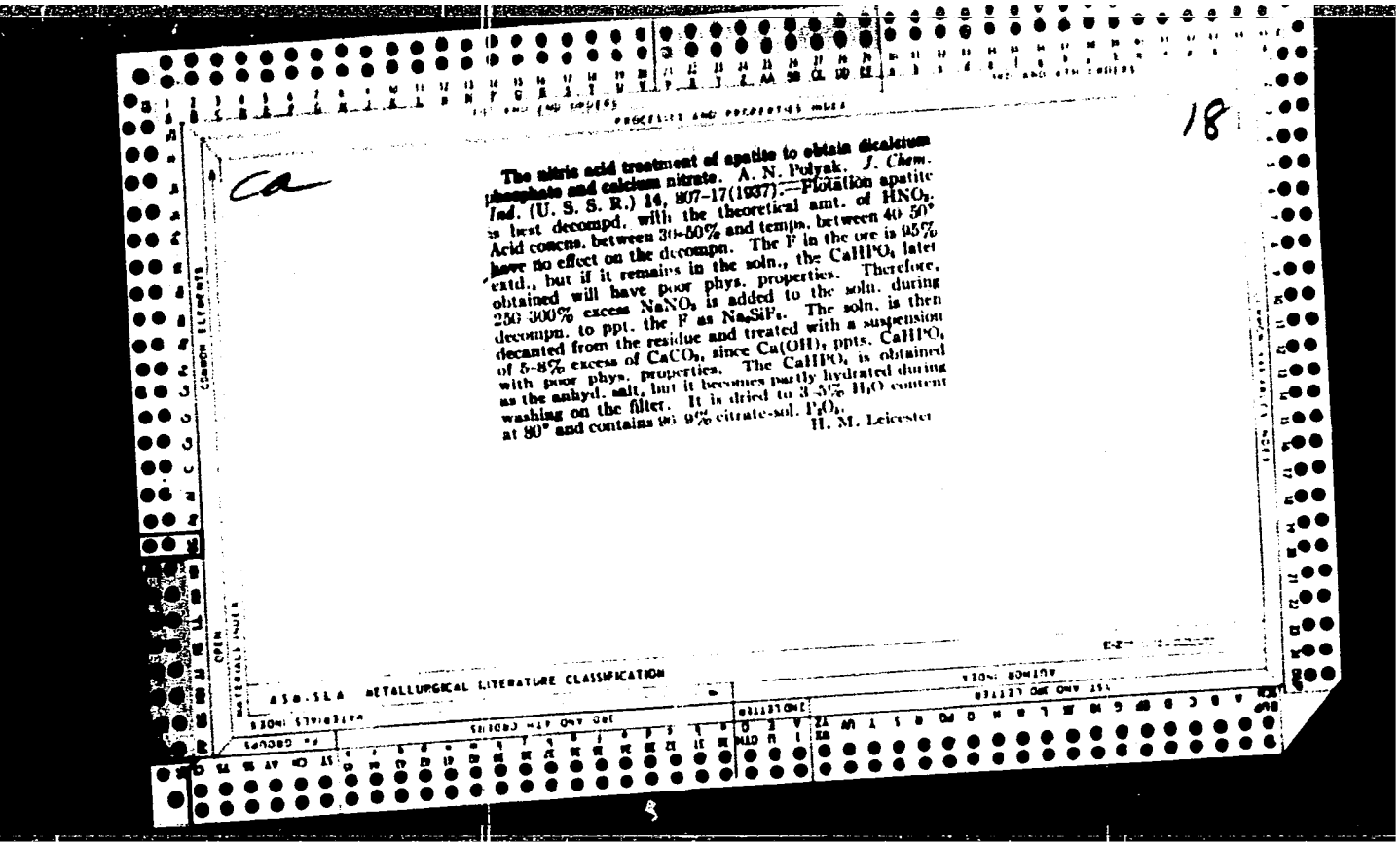
The Study of Chlorination Roasting of the Cinders of the Sulfuric Acid Industry With the Utilization of Its Heat

weight. The highest degree of Cu extraction (94%) and Zn extraction (52%) was obtained in 2-hour chlorination at 550°C and an addition of 10% NaCl of the cinder weight. There are 10 references.

V. Borisova.



The nitric acid treatment of apatite to obtain dicalcium phosphate and calcium nitrate. A. N. Polyak. *J. Chem. Ind.* (U. S. S. R.) 14, 807–17(1937).—Flotation apatite is best decompd. with the theoretical amt. of HNO_3. Acid concns. between 30–50% and temps. between 40–50° have no effect on the decompn. The F in the ore is 95% extd., but if it remains in the soln., the $CaHPO_4$ later obtained will have poor phys. properties. Therefore, 250–300% excess $NaNO_3$ is added to the soln. during decompn. to ppt. the F as Na_2SiF_6. The soln. is then decanted from the residue and treated with a suspension of 5–8% excess of $CaCO_3$, since $Ca(OH)_2$ ppts. $CaHPO_4$ with poor phys. properties. The $CaHPO_4$ is obtained as the anhyd. salt, but it becomes partly hydrated during washing on the filter. It is dried to 3–5% H_2O content at 80° and contains 98–99% citrate-sol. P_2O_5.

H. M. Leicester

POLYAK, A.Ya., inzh.; SHCHUPAK, A.D.

Study of the dynamic indices of a wheel-type tractor of the 1,4 ton class operating at increased speeds in excess of 9 km./hour. Mekh.i elek.sots.sel'khoz. 20 no.4:18-21 '62. (MIRA 15:8)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut mekhanizatsii sel'skogo khozyaystva.

(Tractors)

POLYAK, A.Ya., inzh.; SOLOVEYCHIK, A.G., inzh.; SHCHUPAK, A.D.

First results. Mekh. i elek. sots sel'khoz. 16 no.3:18-20 '58.
(MIRA 11:6)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut mekhnaizatsii sel'skogo khozyaystva.
(Tractors)

POLYAK, A.Ya., kand.tekhn.nauk

At increased speeds. Nauka i zhizn' 27 no.12:6-11 D '60.
(MIRA 13:12)

(Agricultural machinery)

SOV/124-58-2-1605

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 2, p 17 (USSR)

AUTHOR: Polyak, A. Ya.

TITLE: Instruments for Measurement of the Shaft Torque of Tractor and Agricultural Machines (Pribory dlya izmereniya krutyashchego momenta na valakh traktorov i sel'skokhozyaystvennykh mashin)

PERIODICAL: V kn.: Sb. trudov po zemledel'cheskoy mekhanike. Moscow, Sel'khozgiz, 1954, Vol 2, pp 242-259

ABSTRACT: Requirements are defined for a torque-measuring instrument. Schematic arrangements of the instruments are compiled, and a table illustrating methods for torque measurement is given. The article describes the author's mechanical instrument wherein the torque or the peripheral force is transmitted mechanically to a connecting rod acting along the shaft axis. Three types of the instrument have been developed, namely, 1) for the determination of the moment transmitted through pulleys, sprocket wheels, etc., mounted, at the end of a shaft, 2) for measurements applicable to any location of pulleys and axes located butt-to-butt, and 3) for the measurement of torque transmitted between coaxial shafts.

Card 1/2

Card 2/2

POLYAK, A.Ya., inzh.; SHCHUPAK, A.D., inzh.

Increasing performance speeds of wheeled tractors. Mekh. i elek. sots.sel'khoz. no.4:4-11 '57. (MIRA 12:4)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut mekhanizatsii sel'skogo khozyaystva.
(Tractors)

POLYAK, A. YA.

"Investigation of the Power Capacity of the C-4 Self-Propelled Combine." Thesis for degree of Cand. Technical Sci. Sub 8 Dec 50, Moscow Inst for the Mechanization and Electrification of Agriculture imeni V. M. Molotov

Summary 71, 4 Sep 52, Dissertations Presented for Degrees in Science and Engineering in Moscow in 1950. From Vechernyaya Moskva, Jan-Dec 1950.

POLYAK, Aleksandr Yakovlevich; SHCUPAK, Ayzik Davydovich; KOSOROTOV, B.V., red.; SOKOLOVA, N.N., tekhn. red.; OKOLELOVA, Z.P., tekhn. red.

[Operation of tractor-drawn machinery units at increased speeds] Ekspluatatsiia mashinno-traktornykh agregatov na povyshennykh skorostiakh. Moskva, Sel'khozizdat, 1963. 286 p. (MIRA 17:4)

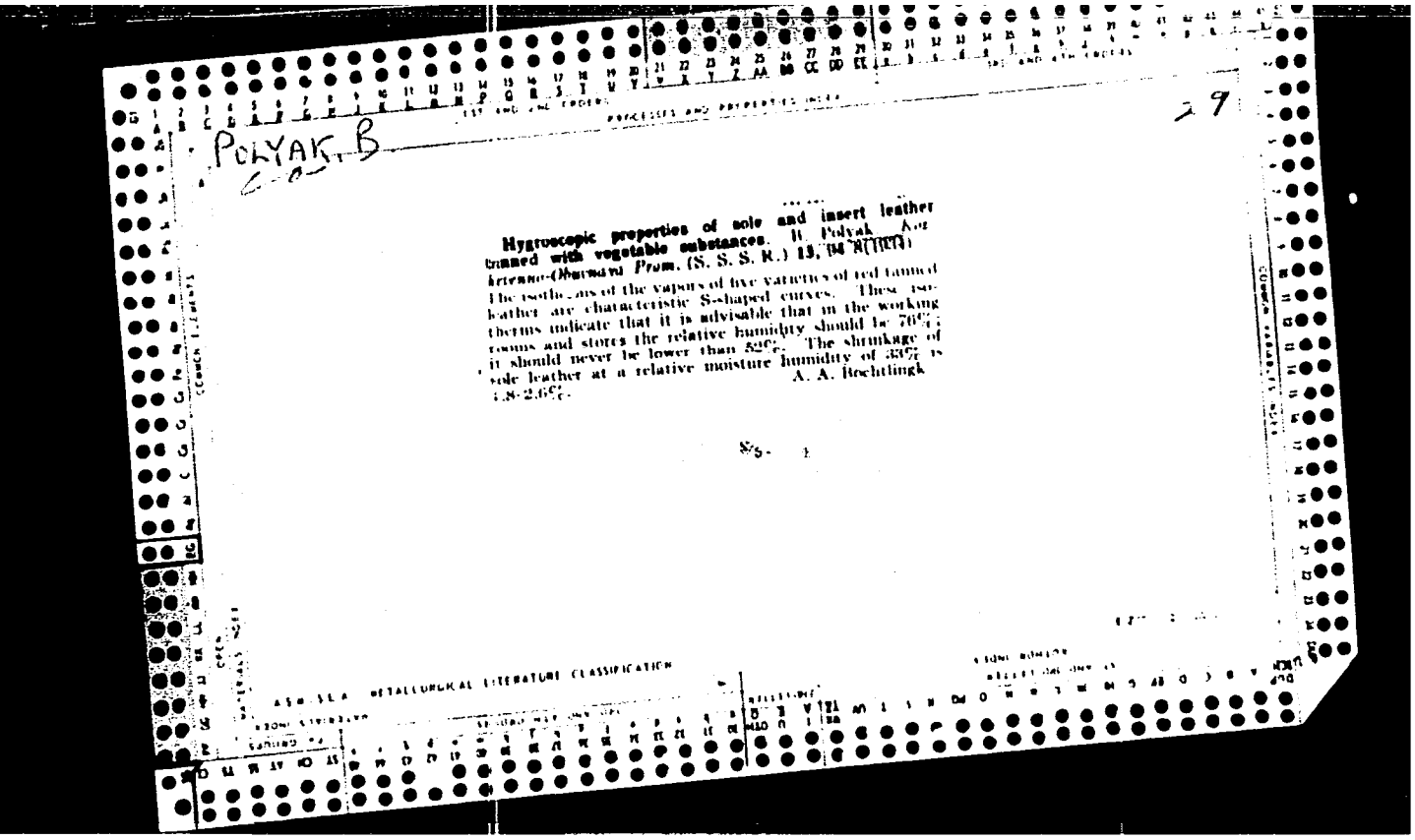
POLYAKOV,A.Ye.; SKVORTSOV,S.O.

Use of methanol and wther-aldehyde fractions. Gidroliz. i lesokhim. prom. 8 no.3:21-24 '55. (MLRA 8:9)
(Wood alcohol) (Aldehydes)

ADRASHEV,G.R., kand.tekhn.nauk; BARAM,Kh.G., kand.tekhn.nauk; VAS'KOVSKIY,S.Ye., inzh.; VOSTRIKOV,N.A., inzh.; IVANOV,N.A., inzh.; NANKIN,G.A., inzh.; POLYAK,A.Ya., kand.tekhn.nauk; BOLTINSKIY,V.N., akademik,red.; VOLKOV,G.I., inzh.,red.; LEVYKIN, N.N., kand.tekhn.nauk,red.; PORTNOV, M.N., kand.tekhn.nauk, red.; BUD'KO, V.A., red.; TRUKHINA, O.N., tekhn. red.

[Tractor performance at increased speeds] Traktornye raboty na povyshennykh skorostiakh. Moskva, Sel'khozgiz, 1961. 174 p. (MIRA 15:7)

1. Moscow. Vsesoyuznyy nauchno-issledovatel'skiy institut mekhanizatsii sel'skogo khozyaystva.
(Tractors)



POLYAK, B

29

Hygroscopic properties of sole and insert leather tanned with vegetable substances. B. Polyak. *Arkhiv Khimii i Tekhnologii Prom.* (S. S. S. R.) 13, [illegible]

The isotherms of the vapors of five varieties of red tanned leather are characteristic S-shaped curves. These isotherms indicate that it is advisable that in the working rooms and stores the relative humidity should be 70%; it should never be lower than 55%. The shrinkage of sole leather at a relative moisture humidity of 35% is 1.8–2.6%.

A. A. Bechtlingk

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

POLNAK, Bela, dr.

Data on the surgical treatment of ulcerative colitis. Orv. hetil. 105 no.42:1986-1987 O 18 '64.

1. Uzsoki utcai Korhaz, II. Sebeszeti Osztaly.

POLYAK, Bela, dr.

Treatment of severe edema by peritoneal dialysis. Orv. hetil. 105 no.32:1517-1518 9 Ag '64.

1. Uzsoki utcai korhaz, II. Sebeszeti Osztaly.

HUNGARY

POLYAK, Dr Bela, Department of Surgery (Sebeszeti Osztaly) No 2, Uzsoki Street Hospital in Budapest (Fovarosi Uzsoki u. Korhaz).

"Struma at the Root of the Tongue"

Budapest, Magyar Sebeszet, Vol 19, No 5, Oct 66; pp 326-329.

Abstract: A case of struma at the root of the tongue is described, which had the symptoms of thyrectoxic adenoma. The elimination of the struma was followed, after some time, by mild hypothyreosis. After describing the case, author discusses the literature data relating to the embryonological and symptomatological aspects of the disease. In considering surgical intervention, the advantages of submandibular penetration are stressed. 12 References, mainly Western.

1/1

POLYAK, Boris Grigor'yevich; VAKIK, Yevgeniy Aleksandrovich; OVCHINNIKOVA, Yekaterina Nikolayevna; AVER'YEV, V.V., kand. geol.-miner. nauk, otv. red.

[Hydrogeothermal conditions in the volcanic area of Kamchatka (the city of Petropavlovsk)] Gidrogeotermicheskie usloviia vulkanicheskogo raiona Kamchatki (g. Petropavlovsk). Moskva, Nauka, 1965. 93 p. (MIRA 18:9)

POLYAK, B.G.

Heat capacity of the interparoxysmal stage of the activity of the Mutnovskiy Volcano. Dokl. AN SSSR 162 no.3:643-646 My '65. (MIRA 18:5)

1. Geologicheskiy institut AN SSSR. Submitted November 9, 1964.

ACCESSION NR: AP4012086 S/0020/64/154/002/0329/0332

AUTHOR: Polyak, B.G.

TITLE: Characteristics of earth temperature field in the area of Avacha volcano.

SOURCE: AN SSSR. Doklady*, v. 154, no. 2, 1964, 329-332

TOPIC TAGS: volcano , earth temperature field, earth temperature, geophysics, earth temperature measurement, magma center, spherical magma center

ABSTRACT: Earth temperature field T around a spherical magma center has been studied, using the formula $T = U(x,y,z) + B_z + C$; z being the depth, U(x,y,z) the function expressing the disturbance of the earth temperature field by the magma center, B the regional geothermal gradient (35 O/km), and C the temperature of the lower limit of the yearly temperature cycle zone. The heating effect of the magma center is found to be practically perceptible at distances not exceeding 12-15 km, for its depths of 5 and 8 km and for its surface

Card 1/2

POLYAK, B.G.

Geothermal gradient of the Russian Platform. Trudy Lab.gidrogeol.-probl. 42:25-35 '62. (MIRA 15:8)
(Russian Platform--Earth temperature)
(Russian Platform--Water, Underground)

NAUDENOVA, V.I.; POLYAK, B.G.

Geothermal conditions in the Volga-Ural region. Trudy Lab.- gidrogeol.probl. 42:36-42 '62. (MIRA 15:8)
(Volga-Ural region--Earth temperature)
(Volga-Ural region--Water underground)

S/169/61/000/009/007/056
D228/D304

AUTHOR: Polyak, B. G.

TITLE: The variability of the geothermal gradient

PERIODICAL: Referativnyy zhurnal. Geofizika, no. 9, 1961, 11, abstract 9A81 (V sb. Materialy k V Konferentsii mladsh. sotrudn. i aspirantov. Labor. gidrogeol. problem AN SSSR, M., 1960, 38-42)

TEXT: The magnitude of the geothermal gradient is, on the whole, determined by three factors: structural-tectonic, lithologic, and hydrodynamic. The first factor reflects differences in the distribution of heat sources, and the other two determine the conditions of heat propagation. The character of a platform's geothermal field chiefly reflects the influence of the hydrodynamic factor. On the formation of a field in the alpine foredeep zone, apart from dynamics, a considerable role is played by the increase in the electroconductivity of rocks in consequence of their gravitational compaction. This is possibly the result of exothermic processes in rocks. [Abstracter's note: Complete translation.]

Card 1/1

POLYAK, B.G.

Character of the geothermal field in the region of the Avacha Volcano. Dokl. AN SSSR 154 no.2:329-332 Ja'64.
(MIRA 17:2)

1. Predstavleno akademikom D.I. Shcherbakovym.

L 09102-67 EWT(1) GW

ACC NR: AP7002372 SOURCE CODE: UR/0020/66/168/001/0170/0172

AUTHOR: Polyak, B. G.; Smirnov, Ya. B.

ORG: Institute of Geology, AN SSSR (Geologicheskiy institut AN SSSR)

TITLE: Heat flux on the continents

SOURCE: AN SSSR. Doklady, v. 168, no. 1, 1966, 170-172

TOPIC TAGS: thermodynamics, physical geology

ABSTRACT: The most recent literature on the heat flux on the continents is reviewed and the results of statistical processing of empirical distributions are summarized in Table 1.

Table 1

1) Величины теплового потока в областях с различным возрастом тектогенеза

2) Возраст тектогенеза	7) Число наблюдений n		8) Значение теплового потока, мкал/см²·сек				σ	9) Закон распределения
	N	n	min	max	$\bar{q}_i$	M		
3) Докембрийский	73	50	0,60	1,34	0,95	0,95	0,19	Нормальный 10)
4) Палеозойский	70	62	0,60	2,24	1,28	1,25	0,33	»
5) Мезозойский	24	24	1,00	2,12	1,48	1,48	0,34	»
6) Кайнозойский	104	87	0,37	3,60	1,78	—	0,74	Не установлен 11)

1) Values of heat flux in regions with different age of tectogenesis;

Card 1/2

UDC: 550.36+551.24

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2) Age of tectogenesis; 3) Precambrian; 4) Paleozoic; 5) Mesozoic; 6) Cenozoic; 7) Number of observations; 8) Value of heat flux in $\mu cal/cm^2 \cdot sec$; 9) Distribution law; 10) Normal; 11) Not established. N = total; n = analyzed.

These data indicate that the heat flux $\bar{q}_1$ in regions with different age of tectogenesis is different. It was possible to determine the area s_i of each of the considered regions. The region of Precambrian folding on the continents constitutes 64.2% of the total area S of the continents, Paleozoic -- 14.7%, Mesozoic -- 7.5% and Genozoic -- 13.6%. These data make it possible to compute the mean weighted value of the heat flux on the continents $\bar{q}$ from the relation

$$\bar{q} = \left(\sum_{i=1}^{n} \bar{q}_i s_i\right)/S = 1{,}15 \pm 0{,}115 \ \mu \text{ cal/cm}^2 \cdot \text{sec}.$$

The total heat loss through the continents ($S = 1.48 \cdot 10^{18} cm^2$) is equal to

$Q = 1.70 \cdot 10^{12}$ cal/sec = $7.11 \cdot 10^{19}$ ergs/sec. This paper was presented by Academician A. L. Yanshin on 4 February 1966. Orig. art. has: 3 figures and 1 table. [JPRS: 37,710]

SUB CODE: 08 / SUBM DATE: 05Nov65 / ORIG REF: 007 / OTH REF: 013

28(1)

AUTHOR: Polyak, B. I. SOV/131-59-6-11/15

TITLE: Mechanization of Brick Feeding for Repairing Rotary Furnaces (Mekhanizatsiya podachi kirpicha pri remonte vrashchayushchikhsya pechey)

PERIODICAL: Ogneupory, 1959, Nr 6, pp 282-284 (USSR)

ABSTRACT: A simple and reliable solution of this problem was found by the working Collective of the new department for magnesite powder of the works "Magnezit". In the furnaces 90 m long and 35 m in diameter, several hatches were built through which bricks are conveyed by means of a console link-belt conveyor. The conveyor was designed by Yu. A. Kuznetsov, and is shown in figures 1 and 2, followed by a detailed description. Inside the furnace the bricks are transported by means of a roller conveyor from the hatch to the working place, that is over a distance of from 3 - 5 meters. The weight of the conveyor amounts to 220 kg and its performance is 14 t/h. In the works "Magnezit" such conveyors are also used for repairing stack furnaces and also in building. There are 2 figures.

Card 1/1

ACC NR: AT6036939 SOURCE CODE: UR/0000/66/000/000/0178/0202

AUTHORS: Polyak, B. I.; Poluboyarinov, D. N.; Balkevich, V. L.

ORG: none

TITLE: Conditions for direct thermoelectric firing of silicon carbide heating elements

SOURCE: Nauchno-tekhnicheskoye obshchestvo chernoy metallurgii. Moskovskoye pravleniye. Vysokoogneupornyye materialy (Highly refractory materials). Moscow, Izd-vo Metallurgiya, 1966, 178-202

TOPIC TAGS: silicon carbide, electric device, electric equipment

ABSTRACT: The conditions for direct thermoelectric firing of moist and plastic silicon carbide heating elements were studied. The study supplements the results of A. D. Svenchanskiy (Elektricheskiye promyshlennyye pechi. Ch. I, Gosenergoizdat, 1958). Properties of specimens made from five different initial mixtures were investigated. Four of the mixtures were prepared by a plastic compression technique, and the remaining one by a vibration technique. The optimum composition of specimens and the voltage and current during thermoelectric firing were determined. The results are tabulated. An x-ray and microstructural analysis of the specimens was carried out. The experimental results are shown graphically, and a schematic of the

Card 1/3

ACC NR: AT6036939

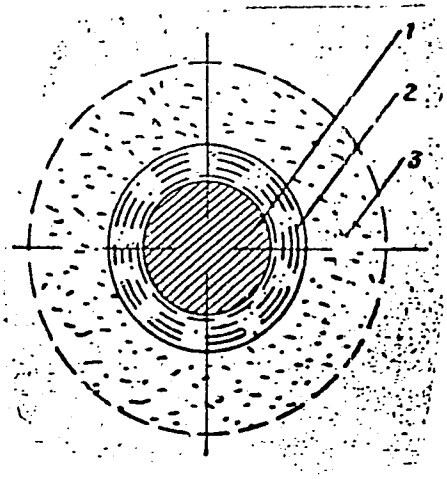

Fig. 1.
Schematic of cross section of firing zone. 1 - silicon carbide element; 2 - firing surplus; 3 - filler

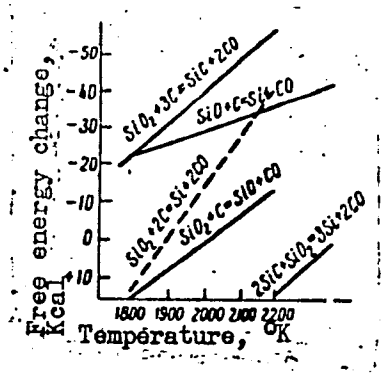

Fig. 2.
Free energy change for the system Si-O-C; dashed line: overall reaction

Card 2/3

ACC NR: AT6036939

specimen firing cross section is presented (see Fig. 1). The behavior of different fillers during firing was studied. The study was carried out after the method of V. P. Yelyutin, Yu. A. Pavlov, and B. Ye. Levin (Ferrosplavy, Metallurgizdat, 1951). The results are shown graphically (see Fig. 2). It was found that thermoelectric firing of silicon carbide elements yields a strong monolithic material. The composition of the completely fired material consists mainly of hexagonal silicon carbide, some cubic silicon carbide, and unreacted components. It is concluded that, to insure a high quality of product, the firing of each element must be individually controlled. Orig. art. has: 9 tables, 10 graphs, and 4 equations.

SUB CODE: 11,09 SUBM DATE: 02Nov65/ ORIG REF: 016/ OTH REF: 001

Card 3/3

ACC NR: AT6036940 SOURCE CODE: UR/0000/66/000/000/0203/0212

AUTHORS: Polyak, B. I.; Kudryavtsev, P. N.

ORG: none

TITLE: Simple tubular silicon carbide electric heater and its properties

SOURCE: Nauchno-tekhnicheskoye obshchestvo chernoy metallurgii. Moskovskoye pravleniye. Vysokoogneupornyye materialy (Highly refractory materials). Moscow, Izd-vo Metallurgiya, 1966, 203-212

TOPIC TAGS: silicon carbide, electric device, electric equipment

ABSTRACT: The construction and properties of uniform-diameter, simple, tubular silicon carbide electric heaters are described. The description supplements that presented in (Byulleten' izobreteniy, 1963, No. 22, 29). Porosity, specific electrical resistivity, surface temperature, voltage drop, and chemical composition of the heaters are presented in graphs and tables (see Fig. 1). It is concluded that the developed simple tubular heaters have all the desired properties to render them suitable for industrial applications.

Card 1/2

ACC NR: AT6036940

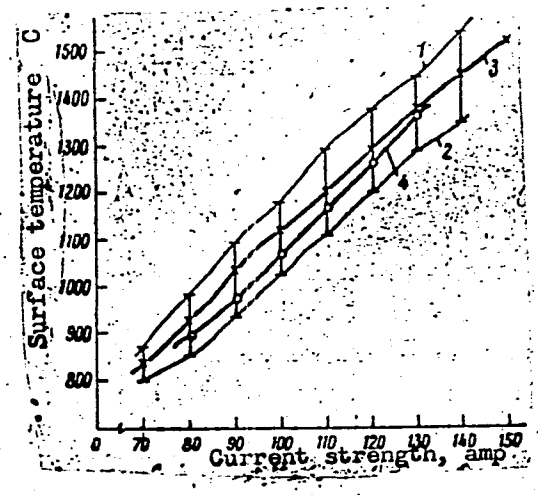

Fig. 1. Dependence of surface temperature on the surface of 25/14-mm electric heater on the current flow (for two experimental series). 1 - maximum deviation, 2 - minimum; 3 - 1st series; 4 - 2nd series

Orig. art. has: 6 tables and 5 graphs.

SUB CODE: 11, 09, 13/ SUBM DATE: 02Nov65/ ORIG REF: 002/ OTH REF: 001

Card 2/2

ACC NR: AT6036941 SOURCE CODE: UR/0000/66/000/000/0213/0220

AUTHORS: Balkevich, V. L.; Polyak, B. I.

ORG: none

TITLE: High-density carborundum electrical heaters

SOURCE: Nauchno-tekhnicheskoye obshchestvo chernoy metallurgii. Moskovskoye pravleniye. Vysokoogneupornyye materialy (Highly refractory materials). Moscow, Izd-vo Metallurgiya, 1966, 213-220

TOPIC TAGS: carborundum, electric device, electric energy, electric equipment

ABSTRACT: The electrical and mechanical properties of carborundum electrical heaters were studied as a function of the grain size composition of the initial materials. Mixtures consisting of three sizes were investigated. The chemical composition, density, porosity, moisture content, and electrical resistance of the carborundum heaters were determined. The experimental results are summarized in graphs and tables (see Fig. 1). It was found that carborundum heaters made of tri-fractional mixtures exhibit higher densities, greater mechanical strength, and more stable electrical characteristics than those of two-fractional mixtures.

Card 1/3

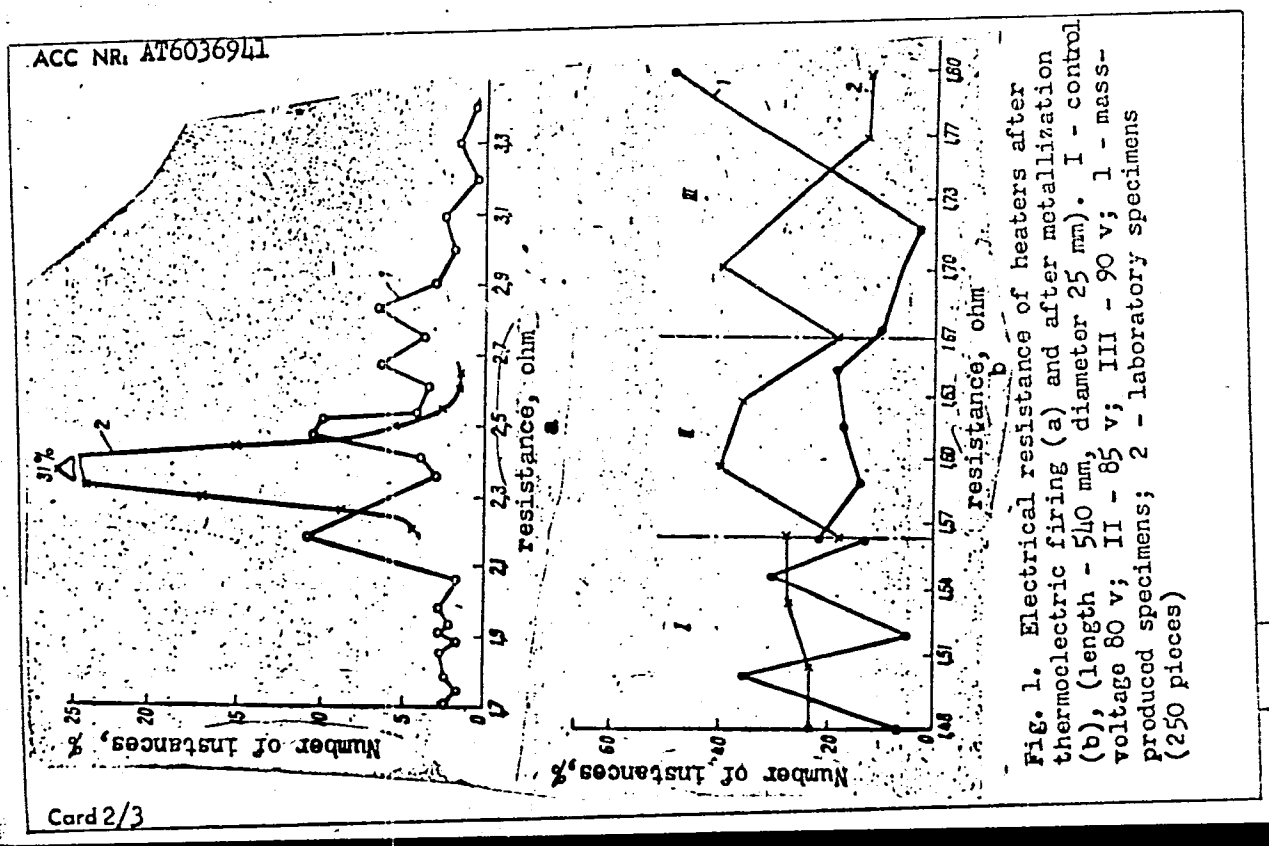

Fig. 1. Electrical resistance of heaters after thermoelectric firing (a) and after metallization (b), (length - 540 mm, diameter 25 mm). I - control voltage 80 v; II - 85 v; III - 90 v; 1 - mass-produced specimens; 2 - laboratory specimens (250 pieces)

ACC NR: AT6036941

Orig. art. has: 5 tables and 1 graph.

SUB CODE: 13, 09, 11 /SUBM DATE: 02Nov65/ ORIG REF: 002

Card 3/3

POLYAK, B.L., Prof, Col Med Serv.

"Surgical Treatment and Healing of Experimental Penetrating Wounds of the Cornea"
Vestnik Oftalmologii, No 2, Mar-Apr '48 1948.

Chair of Ophtalmalogy; Mil Med Acad iml Kirov.

POLYAK, B. L.

42739. POLYAK, B. L. O Klassifikatsii Pervichnoy Glaukomy. Oftalmol. Zhurnal, 1948, No 3, s. 104-10

SO: Letopis' Zhurnal'nykh Statey, Vol. 7, 1949

POLYAK, B. L.,

42740. POLYAK, B. L., VOLKOV, V. V., i KOGAN, Ye S. O Deystvii Novogo Sovetskogo Preparata Puramona Na Zdorovyy I Glaukomatoznyy Glaz. Oftalmol. Zhurnal, 1948, No 3. s. 126-32.

SO: Letopis' Zhurnal'nykh Statey, Vol. 7, 1949

POLYAK, B. L.

POLYAK, B. L. "Pincers for inserting corneal stitches", Oftalmol. zhurnal, 1948, No. 4, p. 180.

SO: U-3042, 11 March 53, (Letopis 'nykh Statey, No. 10, 1949).

KUZ'MINYKH, V.I.: VINOGRADOVA-VOLZHINSKAYA, N.A.; POLYAK, B.L.

"Surgical Treatment and Healing of Large Penetrating Wounds of the Corneo-Scleral Area", Vest. Oftalmologii, No 1, Jan-Feb '50.

Chair of Ophtalmology; Mil Med Acad im. Kirov.

POLYAK, B.L.; CHUTKO, M.B.

[Gonioscopy in glaucoma and in foreign bodies in the anterior chamber] O gonioskopii pri glaukome i pri inorodnykh telakh v uglu perednei kamery. Vest.oft. 29 no.2:26-31 Mr-Ap '50. (CLML 19:1)

1. Of the Department of Ophthalmalogy (Head -- Prof. V.L.Polyak, Colonel, Medical Corps) of the Military Medical Academy imeni S.M.Kirov.

POLYAK, B.L., Col Med Serv.; REL', L.M.

"Trepanocyclodialysis in Glaucoma", Vestnik Oftalmologii, No 6, Nov-Dec 1952

Chair of Ophtalmology; Mil Med Acad im. Kirov

POLYAK, B. L.: VOLKOV, V. V.

Glaucoma

"Benzamon", a new Soviet miotic preparation; its therapeutic significence in glaucoma. Vest. oft. 21, No. 1, 1952.

9. Monthly List of Russian Accessions, Library of Congress, April 1952. ~~1953~~, Uncl.

POLYAK, B. L. PROF.

USSR/Medicine - New Drugs Jan 52
Glaucoma

"New Soviet Miotic Preparation Benzamon and Its Medical Significance in Glaucoma," Prof B.L. Polyak, V.V. Valkov, Mil Med Acad imeni S.M. Kirov

"Vestnik Oftalmol" Vol XXXI, No 1, pp 18-21

The new Soviet miotic benzamon is similar to furamon in its effect upon glaucoma. It is not inferior to pilocarpine (which has to be imported) and even occasionally surpasses its effectiveness. Benzamon is preferable to furamon because its synthesis does not require the use of iodine and

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USSR/Medicine - New Drugs (Contd) Jan 52

because the cost of its manuf is half that of furamon. Benzamon is not hygroscopic and is therefore easy to store and handle. It is advisable to shift from the production of furamon (which now replaces pilocarpine in the USSR to a large extent) to that of benzamon.

207T71

POLYAK, B. L., VOLGOGRADSKAYA-VOLZHSKAYA, M. A., [illegible]

Eye - Surgery

Exclusion of the iris in the healing of experimental penetrating corneal wounds in various surgical methods. Vest. oft. 31 No. 2, 1952.

9. Monthly List of Russian Accessions, Library of Congress, June 1952. 1953, Uncl.

POLYAK, B.L.;REL', L.M.

Trepanocyclodialysis in glaucoma. Vest. oft., Moskva 31 no.6:11-17 Nov-Dec 1952. (CIML 23:4)

1. Professor for Polyak. 2. Military Medical Academy imeni S. M. Kirov.

POLYAK, B.L., polkovnik meditsinskoy sluzhby, professor

Lesions of the eyes induced by penetrating radiation. Voen.-med. zhur. no.9:13-16 S '55. (MLRA 9:9)
(EYE--WOUNDS AND INJURIES)
(RADIATION--PHYSIOLOGICAL EFFECT)

POLYAK, B.L.

Determination of the concentration of fluorescein in the eyeball fluid without its extraction (biocolorimetry). B. L. Polyak and A. I. Gorban (S. M. Kirov Military Med. Acad., Moscow). *Vestnik Oftalmol.* 34, No. 4, 21–2(1955). —The concn. of the dye in the eye is detd. by direct visual comparison of the color with that of a set of standards mounted in a convenient holder which can be placed in the proximity of the organ, the necessary light being focused by a hand-lens. G. M. Kosolapoff

MD

POLYAK, B.L., professor.

Eye injuries from atomic explosion in Hiroshima and Nagasaki; review of foreign literature. Vest.oft. 34 no.6:38-45 N-D '55. (MLRA 9:1)

(ATOMIC WARFARE,
eye, inj. in Hiroshima & Nagasaki, review)
(EYE, wounds and injuries,
atomic explosion inj. in Hiroshima & Nagasaki, review)

POLYAK, B.L.

"Burns of the Organs of Vision and Their Stage Therapy," p. 42
Military Medicine 1956

lecture delivered at a conference of Soviet military physicians at the Military Academy Medicine im. S.M. Kirov, Leningrad, 29-October - 2 Nov 56.

POLYAK, B. L.

"Burns of the Organs of Vision and Their Stage Therapy," from the book Theses of the Reports of the Scientific Session of the Military Medical Academy im. S. M. Kirov, Tezisy Dkoklodov Nauchnoy Sessi, 29 Oct-2 Nov, 1956, Leningrad.

Polyak, B.L.

GALANIN, N.F., polkovnik meditsinskoy sluzhby, professor; POLYAK, B.L., polkovnik meditsinskoy sluzhby, professor; VOLKOV, V.V., kandidat meditsinskikh nauk; KRICHAGIN, V.I., kandidat meditsinskikh nauk; MEDVEDEV, V.I., kandidat meditsinskikh nauk

Working conditions of radar operators and possible means of preventing general and visual fatigue. Voen.-med.zhur. no.9:28-32 S '56. (MLRA 10:3)

1. Chlen-korrespondnet AMN SSSR (for Galanin)
(ELECTRICITY--PHYSIOLOGICAL EFFECT)
(RADAR--HYGIENIC ASPECTS)
(EYE--CARE AND HYGIENE)

POLYAK, BORIS L'VOVICH

N/5
610.312
.P7
1957

Voyenno-polevaya oftalmologiya; boyevvye povrezhdeniya organa zreniya; dlya vrachey oftalmologov Field--station ophthalmology: combat injuries to the eye; for ophthalmologists Izd. 2, dop. Leningrad, Medgiz, Leningradskoye Otdeleniye, 1957.

387 p. illus., Diagrs., tables.
"Literatura": p. 320-338

17(10) SOV/177-58-4-2/32

AUTHOR: Polyak, B.L., Colonel of the Medical Corps, Professor

TITLE: Special Features of the Course in Injuries and Burns of the Eye, Complicated by Radiation Disease (Osobennosti techeniya raneniy i ozhogov organa zreniya, oslozhnennykh luchevoy bolezn'yu)

PERIODICAL: Voyenno-meditsinskiy zhurnal, 1958, Nr 4, pp 8-11 (USSR)

ABSTRACT: Many physicians, including A.S. Rovnov (1955), A.N.Berkutov (1956), G.T. Golikov (1957) and P.I. Atavin (1957), have experimentally proved that the healing of wounds in radiated animals is complicated by the development of a wound infection, especially during the climax period, i.e. 2-3 weeks after affection. This fact raised the question whether radiation disease influences also the healing process of wounds and burns of the eye. The author reports on many animal experiments concerning this problem, performed during the past years at the

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Special Features of the Course in Injuries and Burns of the Eye, Complicated by Radiation Disease

Voyenno-meditsinskaya ordena Lenina akademiya imeni S. M. Kirova (Military Medical Order of Lenin Academy imeni S.M. Kirov). Based on experiments on rabbits and dogs, A.I. Gorban' concludes that: a) the healing of ragged-penetrating injuries of the cornea without surgical treatment takes the same course in radiated rabbits as in the control rabbits; b) a transparent suture on injuries of the cornea of radiated rabbits, stitched after 24 hours (i.e. in the latent period of the radiation disease) helps to develop the same tight and stable scar as in control experiments. P.V. Preobrazhenskiy, A.P. Belousov, N.S. Dzhavadyan, V.N. Lizogubov, L.F. Orkodashvili and A.N.Pokrovskiy concluded that suturation on the cornea may also be successful in patients who were exposed to ionizing radiation. V.A. Zakharov examined the healing of

Special Features of the Course in Injuries and Burns of the Eye, Complicated by Radiation Disease.

the wound after enucleation of an eye of a radiated animal which did not much differ from the healing of wounds in the control rabbits. V.S. Krasnovidov and O.A. Dzhaliashvili experimentally investigated the prophylaxis and treatment of purulent complications in infected wounds of the eye in radiated animals. The data obtained have proved that the effectiveness of antibiotics is insufficient, so that the problem of fighting against infections in injuries of the eye, complicated by radiation disease, is to be considered unsolved. Experiments performed by P.I. Lebekhov concerning the features of the course of thermal burns of the eye in radiation disease have proved that second-degree thermal burns of the cornea in radiated rabbits have the same course as those in control animals. In more serious burns, the healing is often

Special Features of the Course in Injuries and Burns of the Eye, Complicated by Radiation Disease.

accompanied by secondary infections in the burnt cornea, thus sharply aggravating the healing. I.S. Shimkhovich studied the effect of blood transfusion as a stimulator of resoluting intraocular hemorrhage in contusions or injuries of the eye. His experiments on an experimental hyphema gave evidence of the good healing effect of blood transfusions in radiation disease. Based on experiments, V.V. Volkov demonstrated that wounds of the palpebra, the conjunctiva and the cornea, infected by radioactive phosphorus have a more serious course than those of non-infected wounds. It has been proved clinically and pathologically that a sharply pronounced and durable inflammation reaction and hemorrhage in tissues adjacent to the wound with following destruction and atrophy of these tissues is characteristic for infected wounds. In this case surgical treatment prevents further complications. There is 1 diagram and 1 Soviet reference.

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SOV/177-58-11-22/50

17(8)

AUTHORS: Polyak, B.L., Professor, Colonel of the Medical Corps, Zav'yalov, I.A., Lieutenant-Colonel of the Medical Corps

TITLE: A New Powerful Electromagnet for Field Use

PERIODICAL: Voyenno-meditsinskiy zhurnal, 1958, Nr 11, pp 65 - 68 (USSR)

ABSTRACT: The Vsesoyuznyy nauchno-issledovatel'skiy institut meditsinskogo instrumentariya i oborudovaniya (All-Union Scientific-Research Institute for Medical Instruments and Equipment) and the Tsentral'noye konstruktorskoye byuro Minzdrava SSSR (Central Design Office of the USSR Ministry of Public Health), in cooperation with Professor B.L. Polyak, designed a new powerful electromagnet which is able to extract magnetic foreign bodies from the eye even when they are already fixed in the eye's tissues. In such cases it will be used instead of the "Magniko" type magnet. The new magnet was tested in the eye clinic of the

Card 1/3

A New Powerful Electromagnet for Field Use

Voyenno-meditsinskaya ordena Lenina akademiya imeni S.M. Kirova (Military-Medical Academy of the Lenin Order imeni S.M. Kirov) [Ref 1]. The new magnet can be dis-assembled and put into 2 special cases. This makes it suitable for use in the field. The electromagnet (Figure 1) consists of the following fundamental parts: the base of the support with a column (1), the suspension system of the magnet (2), counterweight (3), electromagnet (4), pedal (5) with a power switch and a switch, and a box with feeding block (6). The support of the electromagnet can be fastened to the head of an operation table. The authors carried out a relative evaluation of the capacity of three magnets: the powerful field electromagnet, the powerful interpolar electromagnet and the constant "Magniko" type magnet. The results (Table 1) show that the new electromagnet in its capacity considerably surpasses the Magniko and does not lag behind the interpolar electromagnet.

POLYAK, B.L., prof.

A set of optotypes for the determination of visual acuity below 0.1.
Oft zhur 14 no.1:3-4 '59. (MIRA 12:6)

1. Kafedra oftal'mologii Voyenno-meditsinskoy ordena Lenina akademii imeni S.M. Kirova.
(EYE, APPARATUS AND INSTRUMENTS FOR)

POLYAK, B.L.

Hundredth anniversary of the birth of L.G. Belliarminov. Vest.oft. 72 no.2:50-51 Mr-Ap '59. (MIRA 12:4)
(BIOGRAPHIES
Belliarminov, Leonid G. (Rus))

POLYAK, B. L. (Prof., Col. of the Med. Serv.)

"Injuries to the Organ of Sight Affected by Penetrating Radiation" Voyenno-meditsinskiy zhurnal, No. 9, 1955, pp. 13-16

Summary-550053

POLYAK, B. L. and PREOBRAZHENSKIY, P. V.

"The Treatment of Eye Burns".

Voyenno Meditsinskiy Zhurnal, No. 4, 1962

POLYAK, B. L., prof.; GORBAN', A. I.

Method of biomicroscopic examination of the eye. Vest. oft. no.2:18-24 '62. (MIRA 15:4)

(OPHTHALMOSCOPY)

POLYAK, B.L., prof.

Passow's operation and its modification (sector conjunctivotomy) in chemical and thermal burns of the eye. Vest.oft. no.6:32-37 '61. (MIRA 14:12)

1. Kafedra oftal'mologii Voyenno-meditsinskoy ordena Lenina akademii imeni S.M. Kirova.
(EYE--WOUNDS AND INJURIES) (CONJUNCTIVA--SURGERY)
(BURNS AND SCALDS)

POLYAK, B.L., professor; KRASNOVIDOV, V.S., kand.meditsinskikh nauk

Virus diseases of the conjunctiva and cornea. Oft. zhur. 15 no.5: 299-308 '60. (MIRA 13:9)

1. Iz kafedry oftal'mologii (nachal'nik - prof. B.L. Polyak) Voyenno-meditsinskoy ordena Lenina akademii im. S.M. Kirova.
(CONJUNCTIVA--DISEASES) (CORNEA--DISEASES)

POLYAK, B.L., prof.

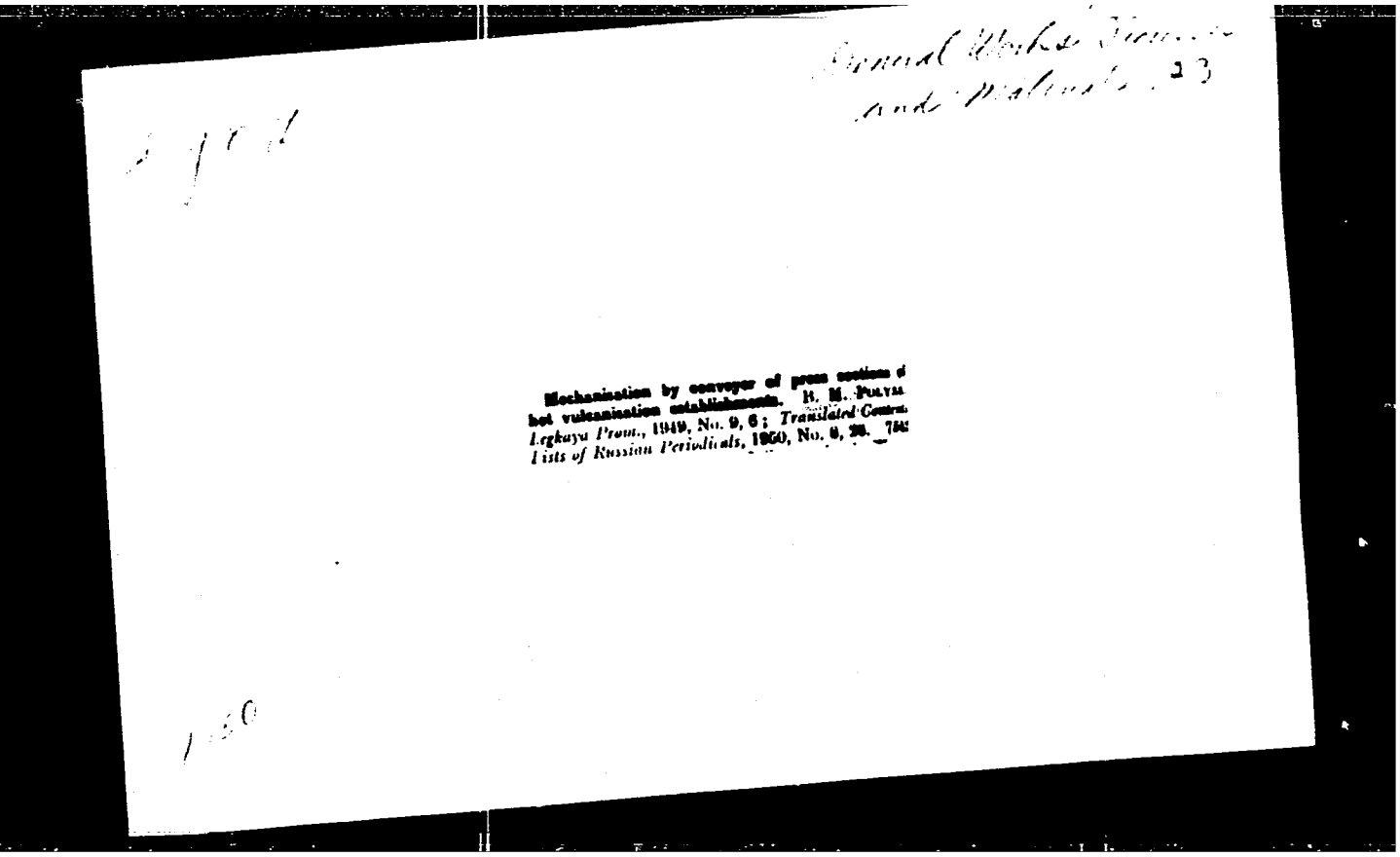
"Diseases of the lacrimal organs and their treatment" by N.IA. Pokhisov. Reviewed by B.L. Poliak. Oft. zhur. 15 no. 6:378-380 '60. (MIRA 13:10)

(LACRIMAL ORGANS--DISEASES) (POKHISOV, N.IA.)

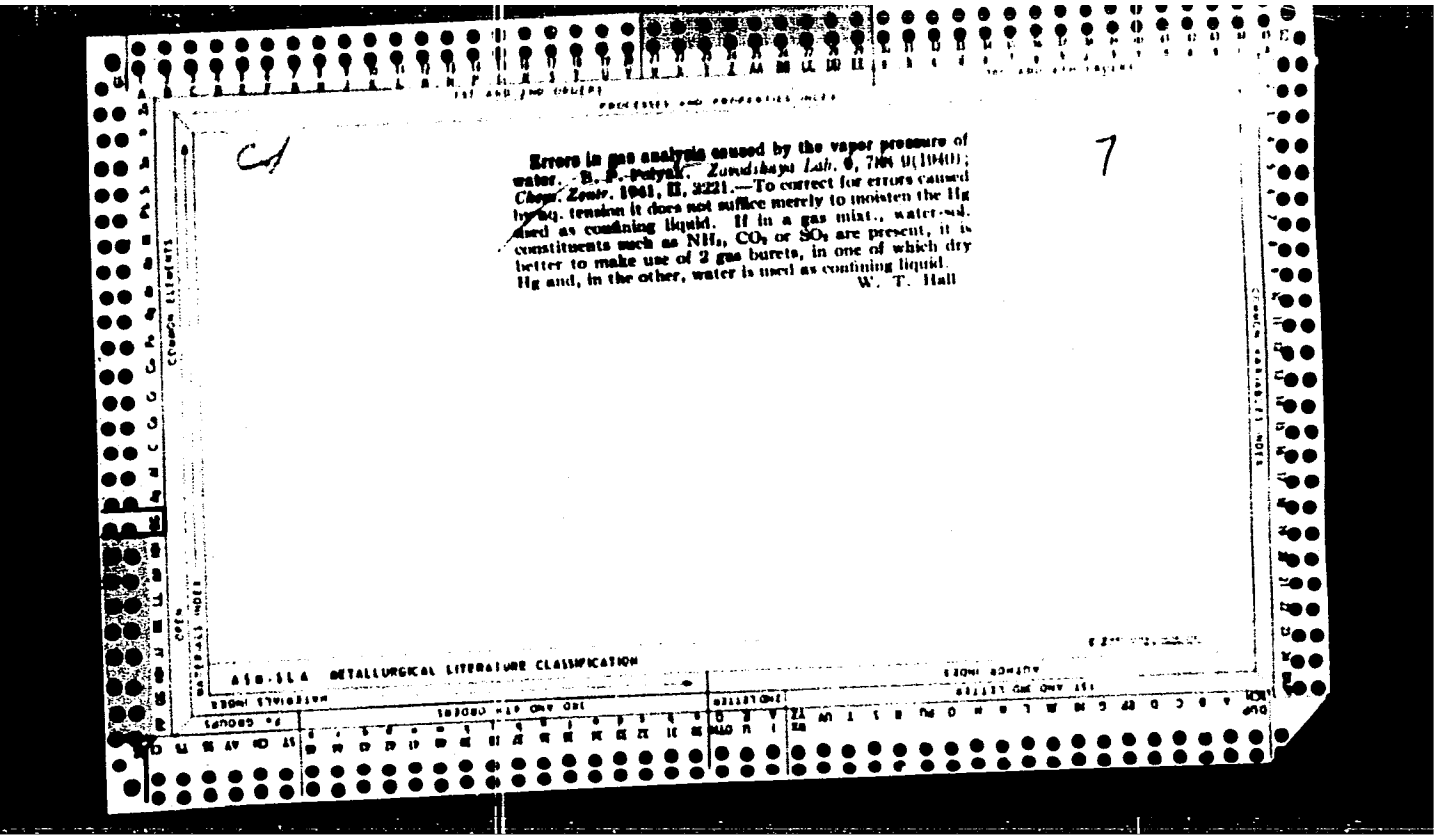
POLYAK, B. ...

34047. Konveyerizatsiya pressovykh tsekhov goryechkey vulkanizatsii. (Iz praktiki obuvnoy fabriki ((Serokhod))). Legkaya prom-st', 1949, No. 9, s. 6-8

SO: Knizhnaya Letopis', Vol. 7, 1955



Mechanization by conveyer of press sections of hot vulcanization establishments. B. M. Polyak. *Legkaya Prom.*, 1949, No. 9, 6; *Translated Centre. Lists of Russian Periodicals*, 1950, No. 8, 28. 78[illegible]



Errors in gas analysis caused by the vapor pressure of water. B. F. Dolgov. *Zavodskaya Lab.* 9, 788 U(1940); *Chem. Zentr.* 1941, II, 3221.—To correct for errors caused by aq. tension it does not suffice merely to moisten the Hg used as confining liquid. If in a gas mixt., water-sol. constituents such as NH_3, CO_2 or SO_2 are present, it is better to make use of 2 gas burets, in one of which dry Hg and, in the other, water is used as confining liquid.

W. T. Hall

POLYAK, B.T. (Moskva)

Some techniques for improving the convergence of iterative methods. Zhur. vych. mat. i mat. fiz. 4 no.5:791-803 S-O '64. (MIRA 17:12)

POLYAK, B.T. (Moskva)

Gradient methods of solving equations and inequalities. Zhur. vych. mat. i mat. fiz. 4 no.6:995 N-D '64.
(MIRA 18:2)

L 18533-63 EWT(d)/FCC(w)/BDS AFFTC/IJP(C) Pg-4

ACCESSION NR: AP3004955 S/0208/63/003/004/0643/0653

AUTHOR: Polyak, B. T. (Moscow)

TITLE: Gradient methods for minimizing functionals

SOURCE: Zhurnal vy*chisl. matematiki i matematich. fiziki, v. 3, no. 4, 1963, 643-653

TOPIC TAGS: Hilbert space, minimum of functional, steepest descent, gradient method

ABSTRACT: Let f(x) be a functional given on the (real) Hilbert space H. The author is interested in finding its minimal value f* = inf f(x) and some minimizing point x* (if it exists), f(x*) = f*. He assumes that the functional is continuously differentiable, i. e., for any x,y

$$f(x+y) = f(x) + (h(x), y) + O(\|y\|), \quad (1)$$

where h(x) ∈ H -- the gradient of the function f(x) at the point x -- is assumed

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to depend continuously on x. Gradient methods of minimization consist of constructing a minimizing sequence $x^0, x^1, \ldots, x^n, \ldots$ by the formula

$$x^{n+1} = x^n - \alpha_n h(x^n). \qquad (2)$$

The size of the step $\alpha_n \geq 0$ can be chosen by various methods. Thus, for the method of simple iteration, $\alpha_n = \text{const}$. For the method of steepest descent, α_n is chosen so as to minimize the functional at each step, i.e., α_n realizes the minimum $\varphi(\alpha) = f(x^n - \alpha h(x^n))$. In the case where f(x) is a quadratic functional, the problem of minimization is equivalent to solution of the linear equation h(x) = 0. In the majority of research in this area, the problem for the extremum is considered as auxiliary with respect to the solving of the equation h(x) = 0. Therefore the conditions of convergence are expressed in the form of conditions on h(x). The author uses another approach; the problem of the extremum is considered basic, while the equation h(x) = 0 is simply a necessary condition for the extremum. The theorems of this paper are as follows:
Theorem 1. Let Z be a topological space, f(z) be a continuous functional on it, P be an operator mapping Z into Z, $f(Pz) \leq f(z)$, and f(Pz) be a semicontinuous

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from above function of x? Then if the sequence $x^0, x^1 = Px^0, \ldots, x^{n+1} = Px^n, \ldots$ has a limit point x^*, $f(Px^*) = f(x^*)$.

Theorem 2. If the set $S = \{x: f(x) \leq c\}$ is compact for some c and $x^0 \in S$, then in the method of steepest descent, $h(x^n) \underset{n\to\infty}{\to} 0$.

Corollary. If, in addition to the conditions of Theorem 2, the functional f is convex, then $f(x^n) \to f^*$

Theorem 3. If $f(x)$ satisfies

$$|h(x+y) - h(x)| \leq R|y|, \tag{3}$$

$$f > -\infty, \tag{4}$$

then, for the sequence (2), $\lim_{n\to\infty} h(x^n) = 0$ for any x^0 if

$$\varepsilon_1 \leq \alpha_n \leq \frac{2}{R} - \varepsilon_2 \quad \text{for} \quad \varepsilon_1, \varepsilon_2 > 0. \tag{5}$$

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Theorem 4. Let f(x) satisfy (3), (4) and

$$\|h(x)\|^2 \geq 2r\,[f(x) - f^*], \quad r > 0. \tag{6}$$

Then, if α_n satisfies (5), for any x^0 there is convergence $x^n \to x^*$, $f(x^n) \to f^*$, where

$$f(x^n) - f^* \leq q^n\,[f(x^0) - f^*], \quad \|x^n - x^*\|^2 \leq c_0 q^n, \quad 0 < q < 1. \tag{7}$$

Theorem 5. Suppose that in the region $S = \left\{ x: \|x - x^0\| \leq \rho \right\}$ conditions (3), (4), and (6) are satisfied, where $\gamma = \sqrt{2R\varphi(x^0)}$ $\gamma\rho < 1$. Then in S there exists a minimizing point x^* and $\|x^0 - x^*\| \leq \gamma\rho$. If α satisfies

$$0 < \alpha < \bar{\alpha}, \quad \bar{\alpha} = 2\frac{1-\gamma}{R-\gamma^2}, \tag{8}$$

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then for the method of simple iteration there is convergence

$$\varphi(x^n) < \varphi(x^0)\, q^n, \quad |x^n - x^*| < C(\alpha)\, q^{n/2},$$

$$q = 1 - \alpha(2 - R\alpha)\, r, \quad 0 < q < 1, \quad C(\alpha) = \frac{\alpha\sqrt{2R\varphi(x^0)}}{1 - \sqrt{q}}. \tag{9}$$

The variable q is minimal and equals 1 - r/R when $\alpha = 1/R$.

Lemma. From (3) and

$$(h(x + y) - h(x), y) > m|y|^2, \quad m > 0. \tag{10}$$

(or $(h(x^0 + y), y) > m|y|^2, \quad m > 0.$) (11)

follow (4) and (6).

Corollary. Theorems 4 and 5 hold for functionals satisfying (3) and (10) (or (11)).

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Corollary. Theorems 4 and 5 hold for functionals satisfying

$$M(x) \leq M, \quad M(x) = \sup_{|y|=1} (A(x)\,y, y); \tag{12}$$

$$m(x) \geq m > 0, \quad m(x) = \inf_{|y|=1} (A(x)\,y, y). \tag{13}$$

Theorem 6. Let the functional satisfy (12) and (13). Then in the method of simple iteration for $0 < \alpha < 2/M$

$$|x^n - x^*| \leq q^n |x^0 - x^*|, \quad q = \max(|1 - \alpha m|, |1 - \alpha M|), \tag{14}$$

q is minimal for $\alpha = 2/(M + m)$ and equals $(M - m)/(M + m)$.

Theorem 7. Suppose that, in the region $S = \{x: f(x) \leq c\}$, (3), (4) and (6) are satisfied. Then for any $x^0 \in S$ in the method of steepest descent $f(x^n) \to f^*$, where

$$\varphi(x_j^n) \leq \varphi(x^0)(1 - r/R)^n. \tag{15}$$

Further, suppose that in

$$T = \left\{x : |x - x^0| < \sqrt{\frac{2\varphi(x^0)}{m}}\right\} \qquad (16)$$

(12 and (13) are satisfied. Then $x^n \to x^*$ at the rate of the geometrical progression

$$|x^n - x^*| < \sqrt{\frac{2\varphi(x^0)}{m}}\left(\frac{M-m}{M+m}\right)^n. \qquad (17)$$

Theorem 8. If f(x) satisfies (3) and (4), then for any x(0), $\lim_{t \to \infty} h(t) = 0$.

Theorem 9. Suppose that, in the region $S = \{x: \|x - x(0)\| \leq \rho\}$, (3), (4), and (6) are satisfied, where

$$\gamma = \frac{\sqrt{2R\varphi(0)}}{r\rho} \leq 1.$$ Then in S there exists a

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minimizing point x^* and $\| x(0) - x^* \| \leq \gamma\rho$. Also, there is convergence

$$\varphi(t) < \varphi(0)\, e^{-\sigma t}, \quad |x(t) - x^*| < \gamma\rho e^{-\sigma t}. \tag{18}$$

Orig. art. has: 10 formulas.

ASSOCIATION: none

SUBMITTED: 02Jul62 DATE ACQ: 30Aug63 ENCL: 00

SUB CODE: MM NO REF SOV: 008 OTHER: 003

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ACCESSION NR: AP4045705 S/0208/64/004/005/0791/0803

AUTHOR: Polyak, B. T. (Moscow)

TITLE: Methods of accelerating convergence of iteration methods

SOURCE: Zhurnal vy*chislitel'noy matematiki i matematicheskoy fiziki, v. 4, no. 5, 1964, 791-803

TOPIC TAGS: convergent series, numerical solution

ABSTRACT: The author gives a Banach space formulation of n-step iteration schemes in which he proves existence and uniqueness of a solution as well as giving iterative methods of solution. In the second section he makes a detailed study of some two-step methods and shows that they accelerate convergence in comparison to the corresponding one-step methods. Orig. art. has: 13 formulas.

ASSOCIATION: none

SUBMITTED: 26Nov62 ENCL: 00

SUB CODE: MA NO REF SOV: 008 OTHER: 004

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