3.9200 (1080, 1121, 1132)

29065
S/179/61/000/004/008/019
E031/E135

AUTHOR: Kuzmak, G.Ye. (Moscow)

TITLE: The motion of an axisymmetric body about a fixed point under the influence of moments which vary slowly with the time

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Mekhanika i mashinostroyeniye, No.4, 1961, pp. 65-78

TEXT: The moments are denoted by $M_z(\tau, \theta)$, where $\tau = \varepsilon t$ (ε is a small quantity) and θ is the angle of nutation, and $\varepsilon M_i^{\omega i}(\tau, \theta)$ where i is x, y, z in turn. The angular velocity of the body is the resultant of three rotations: one about an axis perpendicular to the plane containing the vertical and the axis of symmetry of the body, and the other two about these axes. The following functions are defined:

$$F(\tau,\theta) = -\frac{1}{A} M_z(\tau, \theta), \quad f^y(\tau, \theta) = -\frac{1}{A} M_y^{\omega_y}(\tau, \theta),$$

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$$r = \frac{C}{A}\omega_x, \qquad f_z(\tau, \theta) = -\frac{1}{A} M_z^{\omega_z}(\tau, \theta)$$

It is assumed that F, f_x, f_y, f_z are sufficiently smooth. The equations of motion are solved by the method of "standard equations". Basically this method (Ref.5: A.A. Dorodnitsyn, Usp. matem. nauk, 1952, Vol.VII, No.6) consists in expressing the solution of the given equations in terms of the solution of a simpler set of (standard) equations having the same fundamental features. In the present case the standard equations contain three arbitrary functions $\varphi(\tau)$, $G_0(\tau)$ and $r_0(\tau)$ in terms of which $\theta_0(\tau, \omega)$ and $\lambda_0(\tau, \omega)$ (λ the velocity of precession) can be determined. We introduce first order perturbations of the functions r_0, G_0, θ_0 and λ_0 and, using the perturbed functions, attempt to satisfy the initial equations of motion to an accuracy of ε^2 in $0 \leqslant t \leqslant \tau_0/\varepsilon$. Equating coefficients gives equations for the perturbations. The conditions that these functions are periodic are derived. The differential equatimns expressing the conditions are integrable if the problem is considered in linearised form or if $f_x = f_y = f_z$; in both these cases these functions are

The motion of an axisymmetric body ...

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By a solution of the problem is meant the establishment of a relation between the parameters of the motion at $t = t_o$ and the parameters of the motion for large values of the intensity of the field when the angle of nutation can be considered small. This is done by applying the theory derived above. V.S. Pugachev, N.G. Chetayev, V.Ya. Yaroshevskiy and V.V. Voyeykovyy are mentioned in the article for their contributions in this field.
There are 6 figures and 8 Soviet-bloc references.

SUBMITTED: February 8, 1960

Card 4/4

The motion of an axisymmetric body ....

independent of θ. The solution of the standard equations is particularly simple if θ_0 and λ_0 are independent of ω, which is the case of regular precession with slowly varying parameters. The case when

$$F(\tau, \theta_0) = g(\tau) \sin \theta_0 \qquad \left(g(\tau) \geqslant 0\right) \qquad (2.1)$$

is discussed. In the general case the standard equations can only be solved in terms of known functions if $F(\tau,\theta) = g(\tau) \sin \theta$. With the assumption (2.1) the energy integral may be solved in terms of elliptic functions. A simple graphical technique is described. The case of two-dimensional motion is analysed. The case $\theta_0(t_0) = 0$ is of interest as this is usually assumed in investigating the motion of shells. The problem of the motion of a body in a force field of increasing intensity is next considered. A time t_2 is defined, such that for $t \geqslant t_2$ the angle of nutation can be considered a small quantity. It is assumed that f_x, f_y, f_z are independent of θ. For $t \geqslant t_2$, $f_y = f_z \neq f_x$, for $t < t_2$, $f_x = f_y = f_z$. Thus one of the above-mentioned conditions for periodicity can always be satisfied.

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L 18535-63 EPA(b)/EWT(1)/FCC(w)/FS(v)-2/BDS/ES(v) AFFTC/AFMDC/ESD-3/
APGC/SSD Pg-4/Po-4/Pq-4/Pe-4/Pd-4 GW

ACCESSION NR: AP3004960 S/0208/63/003/004/0730/0741

AUTHORS: Kuzmak, G. Ye.; Kopnin, Yu. M. (Moscow) 83

TITLE: New form of equations for satellite motion and application of these equations to the study of nearly Keplerian motions

SOURCE: Zhurnal vy*chisl. matematiki i matematich. fiziki, v. 3, no. 4, 1963, 730-741

TOPIC TAGS: satellite, motion, mechanics, celestial mechanics

ABSTRACT: The position of the center of mass for a satellite, with reference to the system of inertial axes ξ, η, ζ related to the earth's center, is determined by the angles i — angular deviation of the orbit, Ω — length of the ascending node, u — the argument of width, and r — the radial distance. The angles i and Ω determine the position of the so-called instant orbital plane (Oxy) which at each moment of time contains the radius-vector of the satellite and the vector of its absolute velocity. The authors derive the equations of motion for the satellite

$$\left.\begin{aligned} r'' - rv'^2 &= -\frac{\mu}{r^2} + j_r, \\ rv'' + 2r'v' &= j_v; \end{aligned}\right\} \qquad (1)$$

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ACCESSION NR: AP3004960

$$\left.\begin{aligned} i' &= \frac{j_z}{rv'}\cos(v+w),\\ w' &= -\frac{j_z}{rv'}\sin(v+w)\operatorname{ctg} i,\\ \Omega' &= \frac{j_z}{rv'}\frac{\sin(v+w)}{\sin i}. \end{aligned}\right\} \quad (2)$$

where v is an angle such that $v' = \omega_z$, $\omega_z = u' + \Omega' \cos i$, μ is the constant of gravity, $w = u - v$; j_r, j_v, j_z are components of the vector of perturbing acceleration (radial direction, perpendicular to r in the orbital plane and perpendicular to orbital plane respectively). In order to obtain these equations, the authors have introduced the axes Ox_1, Oy_1, turning with respect to the axes Ox, Oy with angular velocity $w' = -\Omega' \cos i$, where w is the angle formed by the Ox_1 and Ox axes (of the linear nodes). Ox_1y_1 is called the plane V. At the initial moment of time it is assumed that $w = 0$. The equations set up for the angles i and Ω have the same form as the well known equations of motion in osculating elements in celestial mechanics. As for the remaining equations, in contrast to the above-mentioned equations of motion, due to the introduction of the plane V which moves with respect to the Oxy plane, the motion of the satellite is represented as the result of

L 18535-63

ACCESSION NR: AP3004960 0

superposition of two motions: the motion of the satellite in the plane V (equations (1)) and the motion of the plane V itself around the center O (equations (2)). One should note the case where, in equations (1), the components j_r and j_ν of perturbing acceleration do not depend on the orientation of the Oxy plane in the space (ξ, η, ζ). In this case the first of the indicated motions does not depend on the second (equations (1) are separated). The second section of this paper deals with the case where the perturbing acceleration j is much smaller than the acceleration of the force of gravity. In the third section the authors treat some examples. Orig. art. has: 31 formulas and 3 figures.

ASSOCIATION: none

SUBMITTED: 18Aug62 DATE ACQ: 30Aug63 ENCL: 00

SUB CODE: AS NO REF SOV: 009 OTHER: 002

Card 3/3

KUZMAK, G.Ye.; ISAYEV, V.K.; DAVIDSON, B.Kh.

Optimum conditions for the motion of a point of variable mass in a uniform central field. Dokl.AN SSSR 149 no.1:58-61 Mr '63. (MIRA 16:2)

1. Predstavleno akademikom A.A.Dorodnitsynym.
(Automatic control) (Gravitation)

KUZMAK,G.YE.; LAVRENKO, N.I. (Moscow)

"Linearized theory of optimum multi-impulsive orbital transfers".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - Feb 64.

KUZMAK, G.YE.; MILOVANOVA, V.YE. (Moscow)

"Investigation of a class of discrete selfcorrective systems".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

KUZMAK, G. Ye.; LAVRENKO, N. Y.; ISAYEV, V. K.; SONIN, V. V.

"The linearized theory of optimal multi-impulsive travers. The problem about optimal rocket flight."

report submitted for 15th Intl Astronautical Cong, Warsaw, 7-12 Sep 64.

Comm for Space Research USSR

ACCESSION NR: AP4034531 S/0020/64/155/005/1025/1028

AUTHOR: Kuzmak, G. Ye.

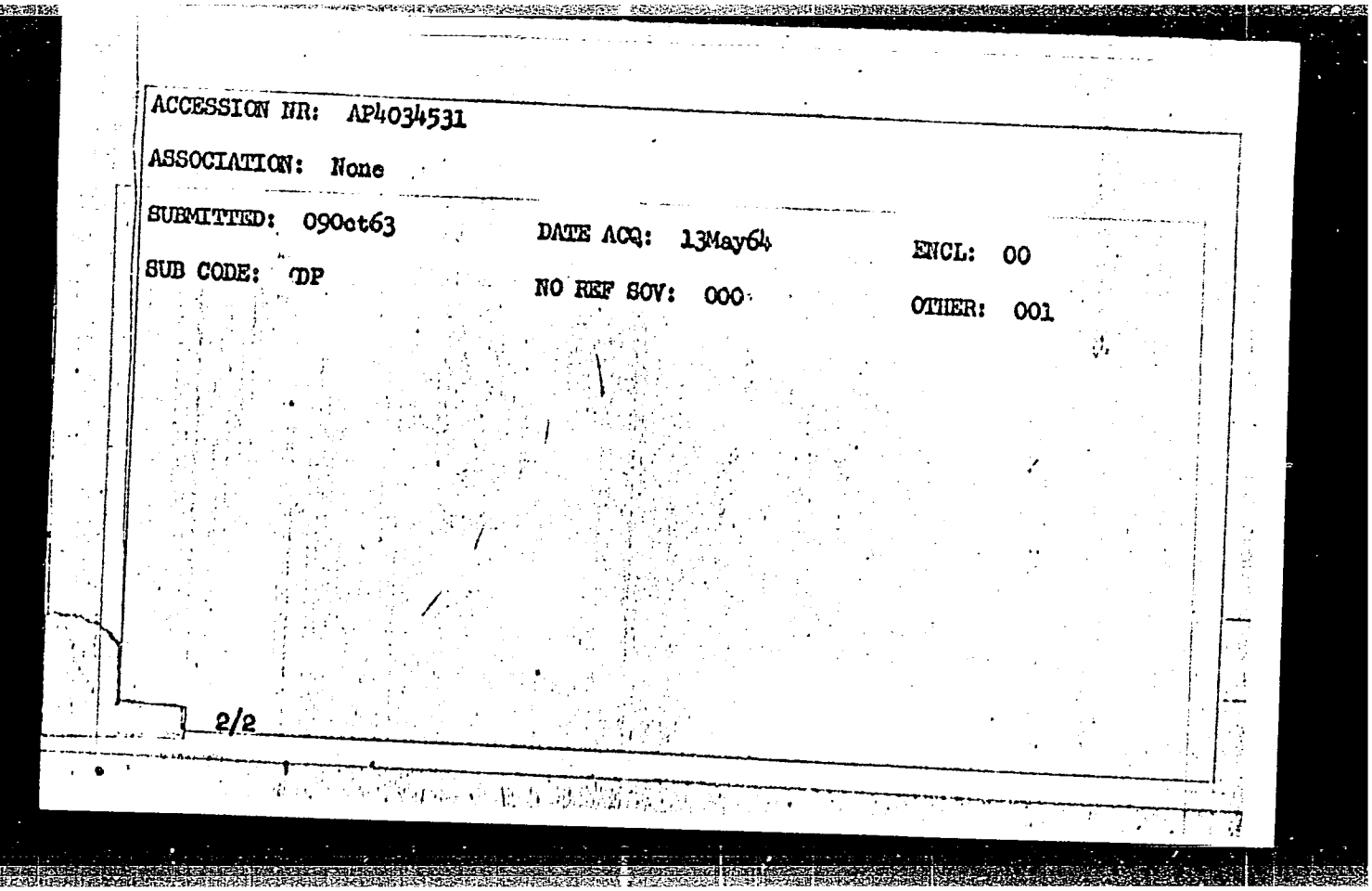
TITLE: Theory of a class of discrete self-correcting systems

SOURCE: AN SSSR. Doklady*, v. 155, no. 5, 1964, 1025-1028

TOPIC TAGS: cybernetics, control theory, control function, discrete self correcting system, discontinuous control function

ABSTRACT: A dynamic system is given by differential equations which contain phase coordinates of the system, control functions, and certain constants. The values of this constant may deviate from the normal values. It is assumed that there are time moments when the control functions are discontinuous, or there are periods when these functions are greatly changed. A function S, which depends on the phase coordinates, will also depend on the constants of the differential equations. The conditions are found at which the change of the constants does not affect the function S. However, the use of the method requires very complete information about the motion. Orig. art. has: 2 figures, 18 equations.

1/2



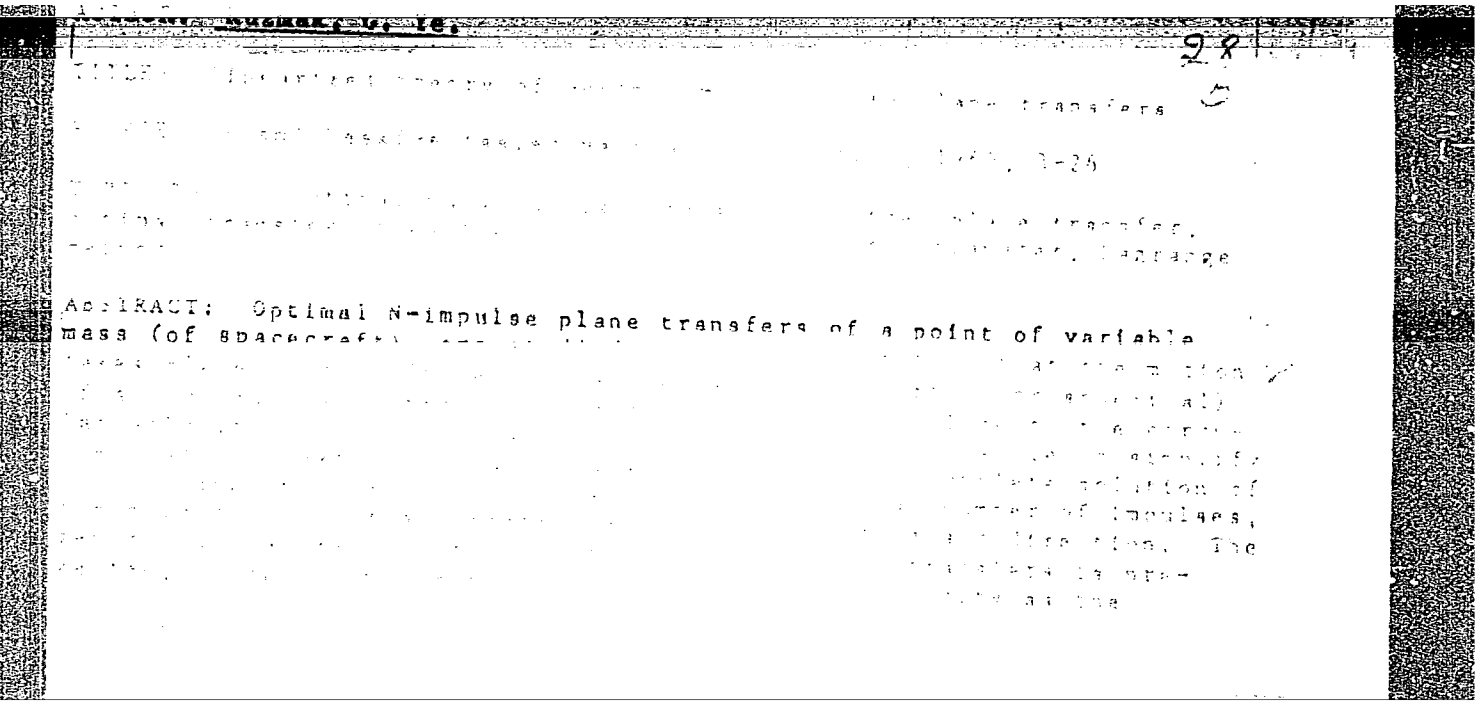
ACCESSION NR: AP4034531

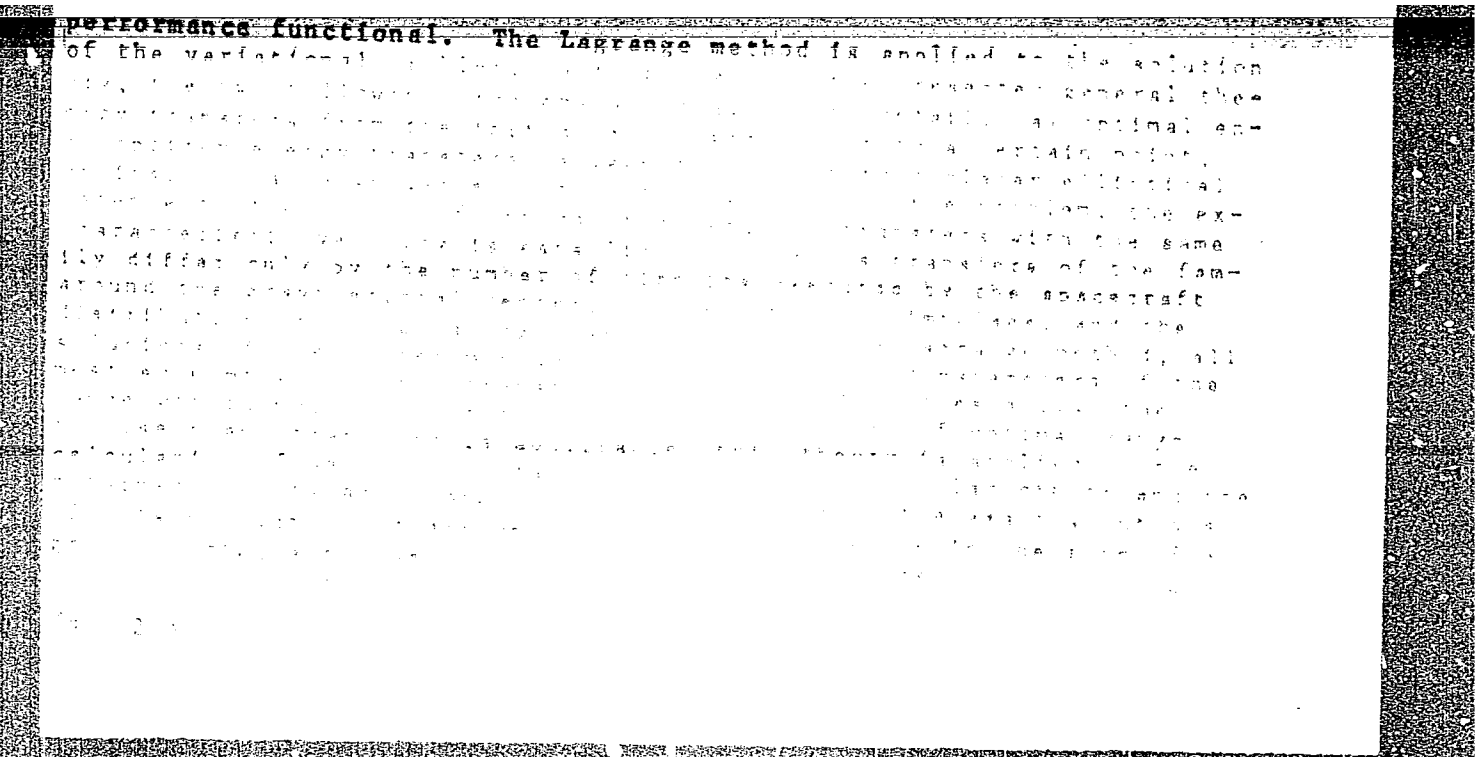
ASSOCIATION: None

SUBMITTED: 090ct63 DATE ACQ: 13May64 ENCL: 00

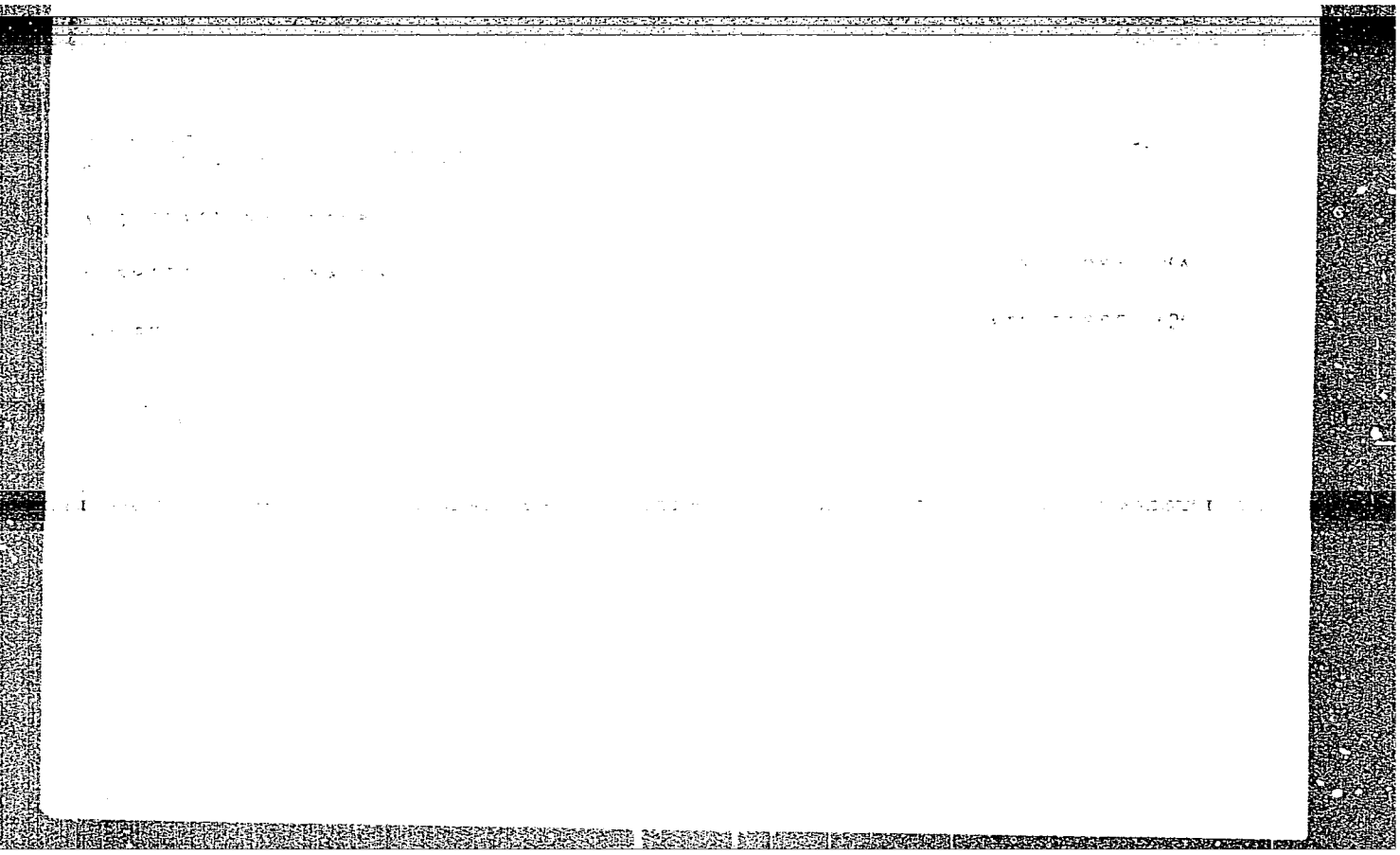
SUB CODE: DP NO REF SOV: 000 OTHER: 001

2/2





performance functional. The Lagrange method is applied to the solution
of the variational



KUZMAK, G. Ye.; YAROSHEVSKIY, V. A.

"Application of the Asymptotic Methods to Some Problems of the Re-entry Vehicles Dynamics."

Report presented to the 14th International Astronautics Congress, Paris, France, 25-Sept- 1 Oct 1963.

KUZ'MAK, I. M.

"Replacement in the azolidine ring", (Report 1): N.M. Turkevich and I.M. Kuz'mak, "The condensation of rhodanine with ketones". (Report 2): N. M. Turkevich, N. K. Ushenko, and I. M. Kuz'mak, "The character of individual atoms and of groups within the rhodanine molecule", Ukr. khim. zhurnal, Vol XIV, Issue 2, 1949, p. 122-30, Bibliog: p. 125, 130.

SO: U-4392, 19 August 53, (Letopis 'Zhurnal 'nykh Statey, No. 21, 1949).

GORYAINOV, P.I.; NIKONOV, N.N.; SALEY, P.I., kand.veterinarnykh nauk; IVANOVA, Z.S., mladshiy nauchnyy sotrudnik; GORBACH, Ya.S.; KUZ'MAK, V.M.; ZAYETS, U.I., veterinarnyy vrach

Use of antibiotics. Veterinariia 37 no.12:63-66 D '60. (MIRA 15:4)

1. Direktor Bryanskoy oblastnoy veterinarno-bakteriologicheskoy laboratorii (for Nikonov). 2. Voronezhskaya nauchno-issledovatel'skaya veterinarnaya stantsiya (for Saley, Ivanova). 3. Glavnyy veterinarnyy vrach sovkhoza "Metallist", Luganskoy oblasti (for Gorbach). 4. L'vovskaya ptitsefabrika (for Kuz'mak). 5. Khersonskaya oblastnaya veterinarno-bakteriologicheskaya laboratoriya (for Zayets).

(Antibiotics) (Veterinary medicine)

Kuz'man N. A.

В. В. Сестрорецкий,
А. А. Ромашов

Исследование диапазонных свойств Ш волновода

11 июня

(с 18 до 22 часов)

Н. А. Кузьмин

Скалярные потенциальные функции уравнений электродинамики в неортогональной криволинейной системе координат, метрика которых не зависит от одной координаты

Н. П. Керженцева

Оптимальная форма изгиба волновода в условиях многоволновости.

Ю. Н. Исаенко

Теоретическое исследование щелевого возбудителя волны H_{01} в волноводе круглого сечения.

Р. Б. Ваганов

Экспериментальный анализ электромагнитного поля после волноводных переходов, содержащих критическое сечение.

В. П. Шестопалов

Дисперсионные свойства и пространственный резонанс спирального волновода, помещенного в магнитодиэлектрическую среду.

Б. СЕКЦИЯ ПОЛУПРОВОДНИКОВЫХ ПРИБОРОВ

Руководитель Е. И. Гальперин

9 июня

(с 10 до 16 часов)

А. А. Мосин

Новые полупроводниковые приборы для радиоэлектронной аппаратуры

Р. Е. Смолянский,
Н. Н. Лукачевич

Новый полупроводниковый прибор на базе кремния — аналог тиратрона

Т. М. Агаханян,
Л. Н. Патрикеев

Работа дрейфового транзистора при большом сигнале.

Ю. Р. Бергунов

Переходный процесс запирания германиевых плоскостных диодов при больших токах.

9 июня

(с 18 до 22 часов)

report submitted for the Centennial Meeting of the Scientific Technological Society of Radio Engineering and Electrical Communications im. A. S. Popov (VNORIE), Moscow, 8-12 June. 1959

KUZ'MAN, P. A.

Kazan

Mathematics - Revolving Bodies Mar/Apr/52

"Supplement to V. A. Steklov's Case of Motion of a Heavy Solid Body Around a Motionless Point," P. A. Kuz'min, Kazan; "Prik Matemat i Mekh" Vol XVI, No 2, pp 243-245. Received 18 Dec 51

PA 209T71

KUZ'MAN, P.A. (Kazan').

Theory of the stability of motion. Prikl.mat.i mekh. 18 no.1: 125-127 Ja-F '54. (MLRA 7:1)

(Stability) (Motion)

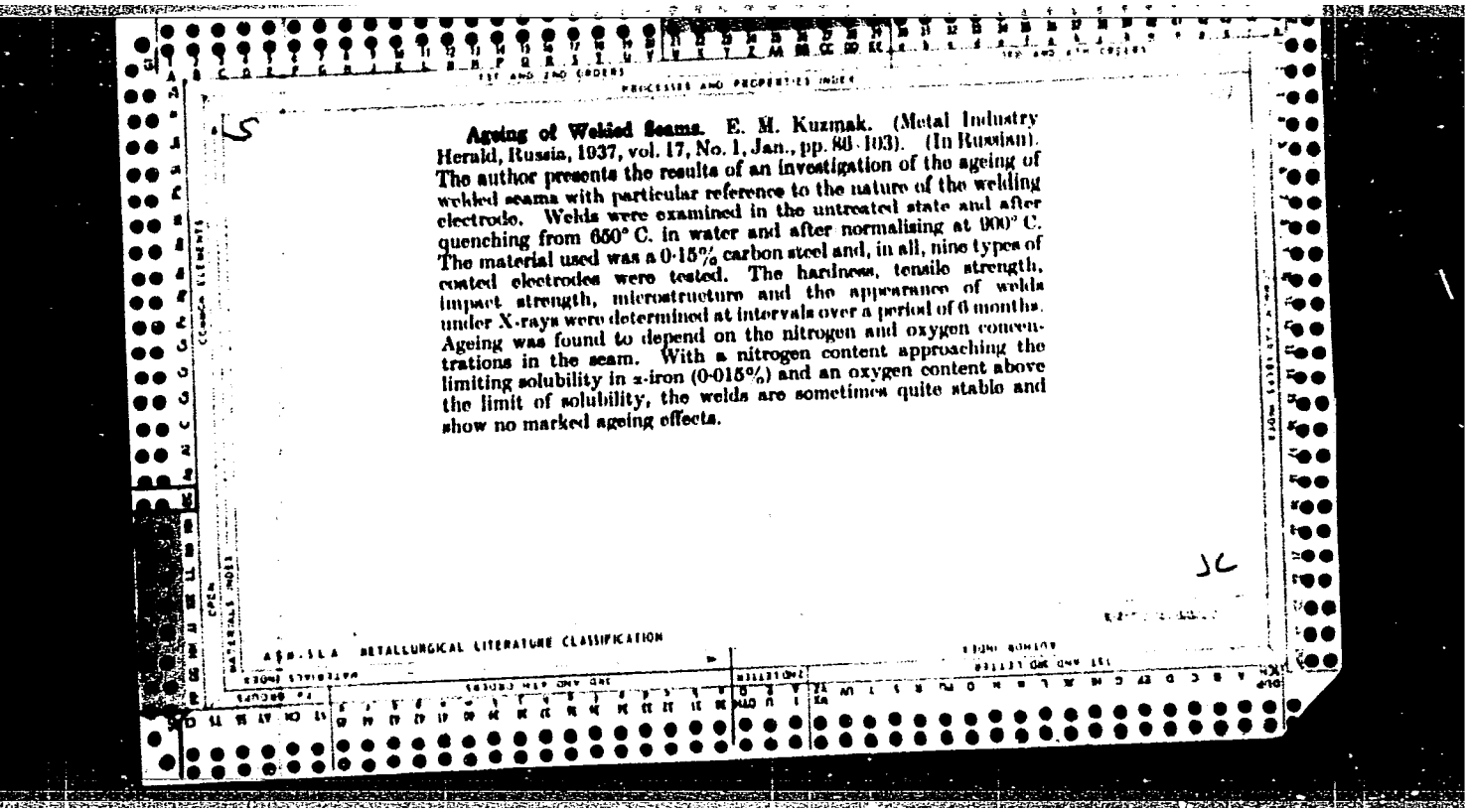
CA

9

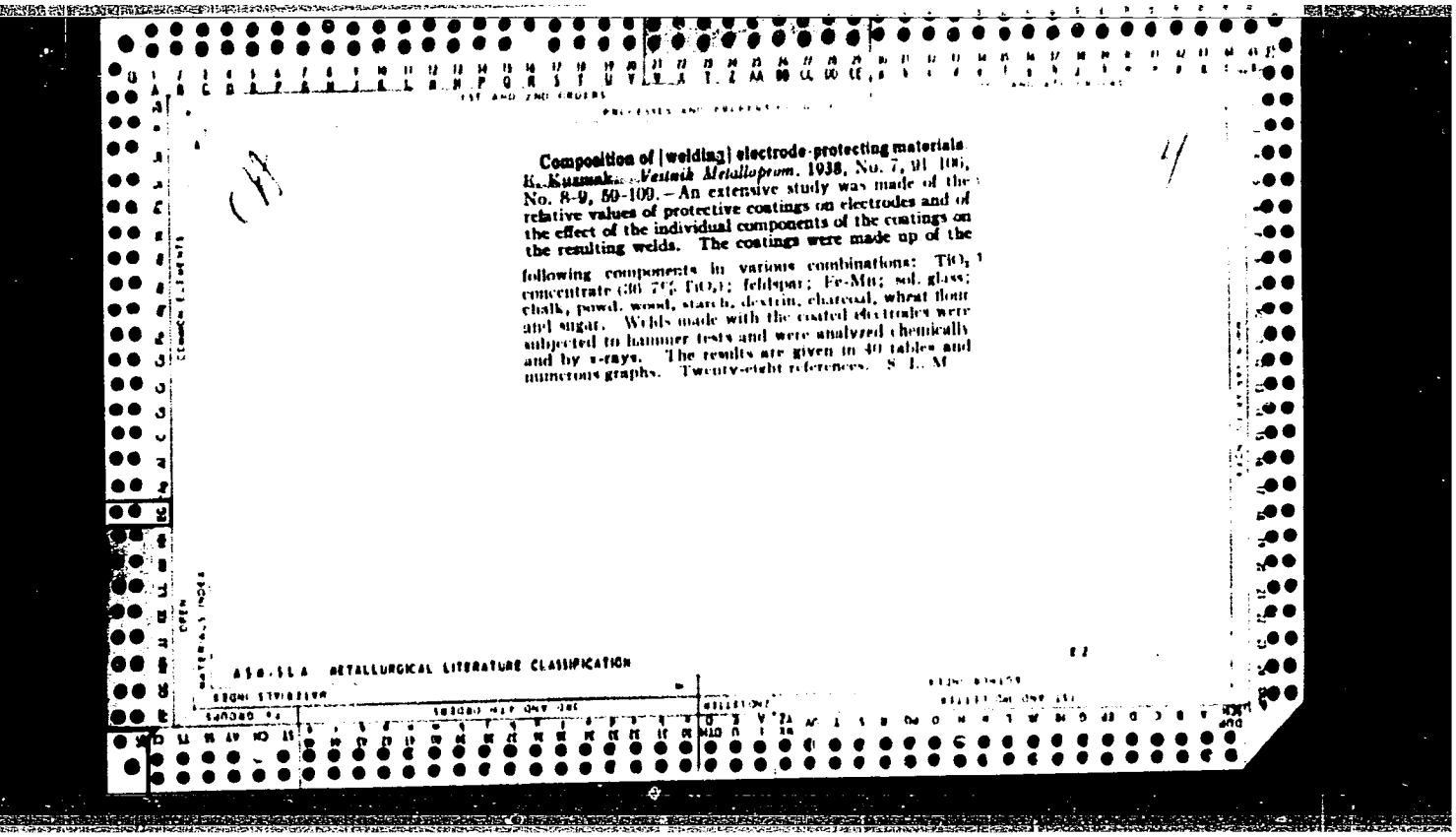
PROCESSES AND PROPERTIES INDEX

Corrosion of electric welds. E. M. Kuzmak and F. Slomyanskaya. *Avtogennoe Delo* (U. S. S. R.) 7, No. 2, 8-13(1936).—This investigation was concerned with the resistivity of welds to corrosion by 5 *N* H_2SO_4 and NaOH. Welded joints kept for a long time in alkalies were not corroded, regardless of whether bare or coated electrodes were used. Welded joints produced by coated electrodes were 2.5-3 times more resistant to H_2SO_4 corrosion than those produced by bare electrodes. I. Iacoveff

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

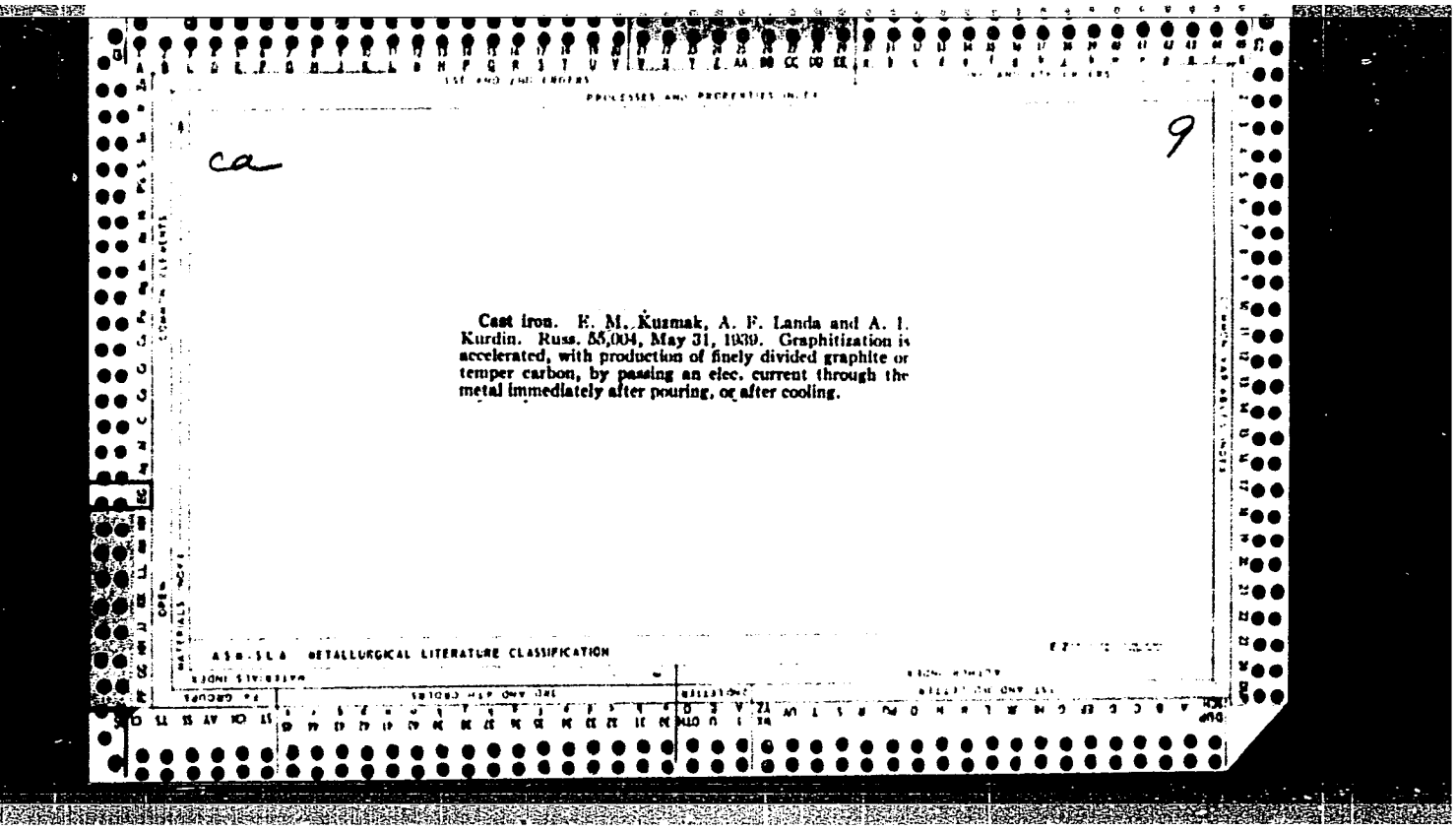


Ageing of Welded Seams. E. M. Kuzmak. (Metal Industry Herald, Russia, 1937, vol. 17, No. 1, Jan., pp. 80-103). (In Russian). The author presents the results of an investigation of the ageing of welded seams with particular reference to the nature of the welding electrode. Welds were examined in the untreated state and after quenching from 650° C. in water and after normalising at 900° C. The material used was a 0·15% carbon steel and, in all, nine types of coated electrodes were tested. The hardness, tensile strength, impact strength, microstructure and the appearance of welds under X-rays were determined at intervals over a period of 6 months. Ageing was found to depend on the nitrogen and oxygen concentrations in the seam. With a nitrogen content approaching the limiting solubility in α-iron (0·015%) and an oxygen content above the limit of solubility, the welds are sometimes quite stable and show no marked ageing effects.



Composition of [welding] electrode-protecting materials. K. Kuzmak. *Vestnik Metallopром.* 1938, No. 7, 91-106; No. 8-9, 50-109.—An extensive study was made of the relative values of protective coatings on electrodes and of the effect of the individual components of the coatings on the resulting welds. The coatings were made up of the following components in various combinations: TiO_2 concentrate (30.7% TiO_2); feldspar; Fe-Mn; sol. glass; chalk, powd. wood, starch, dextrin, charcoal, wheat flour and sugar. Welds made with the coated electrodes were subjected to hammer tests and were analyzed chemically and by x-rays. The results are given in 40 tables and numerous graphs. Twenty-eight references. S. L. M.

A50-51A METALLURGICAL LITERATURE CLASSIFICATION

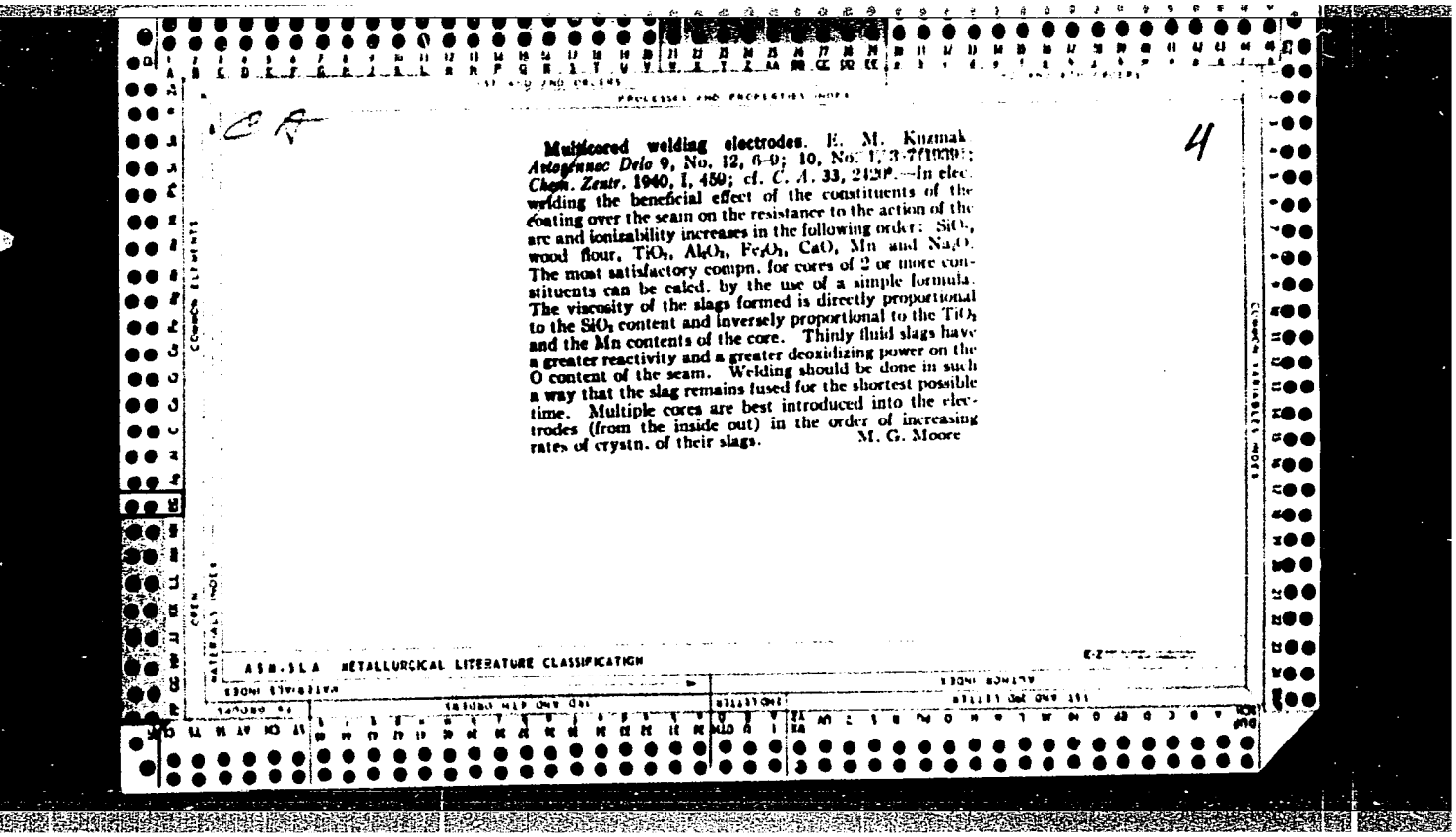


ca

9

Cast iron. E. M. Kuzmak, A. F. Landa and A. I. Kurdin. Russ. 55,004, May 31, 1939. Graphitization is accelerated, with production of finely divided graphite or temper carbon, by passing an elec. current through the metal immediately after pouring, or after cooling.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

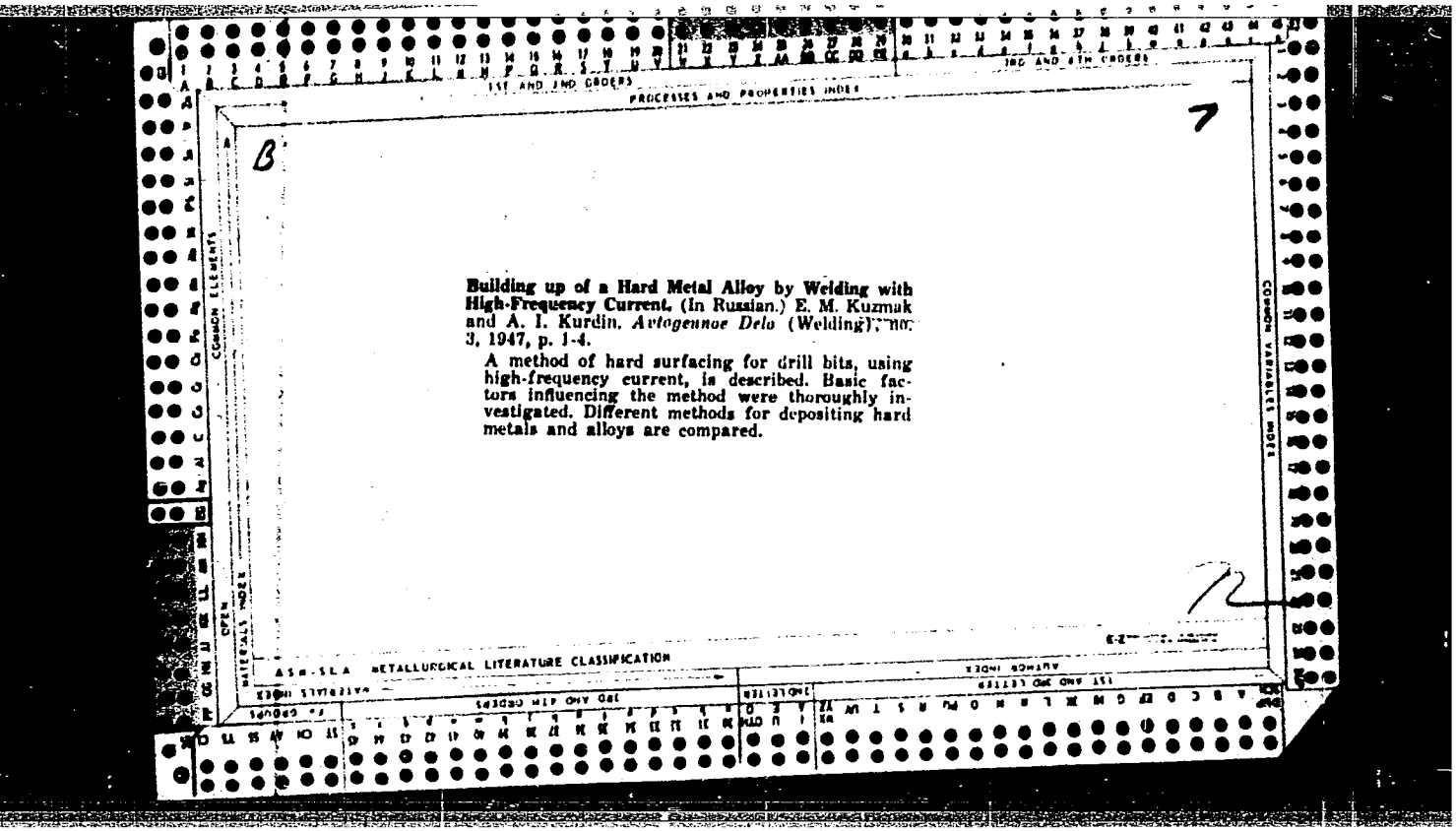


Multicored welding electrodes. E. M. Kuzmak. *Avtogennoe Delo* **9**, No. 12, 6–9; **10**, No. 1, 3–7 (1939); *Chem. Zentr.* **1940**, I, 459; cf. *C. A.* **33**, 2129⁸.—In elec. welding the beneficial effect of the constituents of the coating over the seam on the resistance to the action of the arc and ionizability increases in the following order: SiO_2, wood flour, TiO_2, Al_2O_3, Fe_2O_3, CaO, Mn and Na_2O. The most satisfactory compn. for cores of 2 or more constituents can be calcd. by the use of a simple formula. The viscosity of the slags formed is directly proportional to the SiO_2 content and inversely proportional to the TiO_2 and the Mn contents of the core. Thinly fluid slags have a greater reactivity and a greater deoxidizing power on the O content of the seam. Welding should be done in such a way that the slag remains fused for the shortest possible time. Multiple cores are best introduced into the electrodes (from the inside out) in the order of increasing rates of crystn. of their slags. M. G. Moore

KUZMAK, Evgeni Markovich

KUZMAK, Evgeni Markovich The principles of the technology of the petroleum equipment construction; a textbook, Moskva, Gos. nauch.-tekhn izd-vo neftianoi i gorno-toplivnoi lit-ry, 1947. 364 p. (48-27605)

TP690.K9



Building up of a Hard Metal Alloy by Welding with High-Frequency Current. (In Russian.) E. M. Kuzmak and A. I. Kurdin. *Avtogennoe Delo* (Welding), no. 3, 1947, p. 1-4.

A method of hard surfacing for drill bits, using high-frequency current, is described. Basic factors influencing the method were thoroughly investigated. Different methods for depositing hard metals and alloys are compared.

KUZNAK, Ye. M.

Petroleum Engineering

"The Technology of Constructing Apparatus for the Petroleum Industry", Gostoptekhizdat, 1948

Summary No. 60, 26 May 52; BR-52056899

KUZMAK, Ye. M. Prof

185T83

USSR/Metals - Steel, Welding Mar 51

"Testing Metal for Sensitivity to the Thermal Cycle of Welding," Prof Ye. M. Kuzmak, Dr Tech Sci

"Avtogen Delo" No 3, pp 9-11

Studied effect of thermal cycle close to that of welding process, for steel 12KhNVA (0.15% C, 1.8% Ni, 0.8% Cr). Used end-cooled method of testing for hardenability, giving data on relation between hardness and cooling rate, crit hardening rate and microstructure of metal for wide range of cooling rates, which could be realized by use of various cooling media and methods. Data

185T83

USSR/Metals - Steel, Welding (Contd) Mar 51

permits selection and control of thermal conditions for welding certain grades of structural steel.

185T83

KUZMAK, Ye.M., doktor tekhnicheskikh nauk, professor.

Testing metal for sensitivity to the welding thermal cycle (face bend test for weldability). Trudy MNI no.11:245-254 '51. (MLRA 10:3)

(Metals--Testing) (Welding--Testing)

BTR

7

·1215· **Test of Metals for Sensitivity to Thermal Cycles of Welding.** E. M. Kuzmak. *Avtogennoe Delo*, v. 22, Mar. 1951, p. 9-11.

Discusses the influence of different types of heating and various thermal cycles encountered in arc welding on structural changes of certain steels. Results are discussed and charted

SERDIY, A.G., redaktor;STEPANYANTS, A.K., professor, redaktor; TIKHO-MIROV, A.A., kandidat ekonomicheskikh nauk, redaktor; VINOGRADOV, V.N., redaktor; CHERNOZHUKOV, N.I., professor,redaktor; SHCHEL-KACHEV, V.N., professor, redaktor; CHARYGIN, M.M., professor, redaktor; DUNAYEV, F.F., professor, redaktor; KUZMAK,Ye.M., professor, redaktor; MURAV'YEV, I.M. professor, redaktor; GUREVICH, V.M., redaktor; MURATOVA, V.M., redaktor, POLOSINA, A.S., tekhnicheskiy redaktor.

[Sixth scientific and technical conference, 1951] Shestaia nauchno-tekhnicheskaia konferentsiia, 1951. Moskva, Gos.nauchno tekhn.izd-vo neftianoi i gorno-toplivnoi lit-ry, 1952, 214 p. (MLRA 8:10)

1. Moscow. Moskovskiy neftianoy institut. Nauchnoye studencheskoye obshchestvo.
(Petroleum geology)

SERDIY, A.G., redaktor; TIKHOMIROV, A.A., kandidat ekonomicheskikh nauk, redaktor; STEPANYANTS, A.K., professor, redaktor; VINOGRADOV, V.N. redaktor; CHERNOZHUKOV, N.I., professor, redaktor; SHCHELKACHEV V.N., professor, redaktor; CHARYGIN, M.M. professor, redaktor; KUZNAK, Ye.M., professor, redaktor; MURAV'YEV, I.M. professor, redaktor; GUREVICH, V.M., redaktor; MURATOVA, V.M., redaktor; TROFIMOV, A.V., tekhnicheskiy redaktor.

[Seventh scientific and technical conference, 1952] Sed'maia nauchno-tekhnicheskaia konferentsiia, 1952. Moskva, Gos.nauchno tekhn.izd-vo neftianoi i gorno-toplivnoi lit-ry, 1953. 171 p. (MLRA 8:10)

1. Moscow. Moskovskiy neftianoy institut. Nauchnoye studencheskoye obshchestvo.
(Petroleum Geology)

KUKMAK, Ye.M.; KURDIN, A.I.; CHESKIS, Kh.I.; YERSHOV, P.R., redaktor; POLOGINA, A.S., tekhnicheskiy redaktor

[Technology of using hard alloys for well-boring bits] Tekhnologiia osnashcheniia tverdymi splavami dolot dlia bureniia. Moskva, Gos. nauchno-tekhn. izd-vo neftianoi i gorno-toplivnoi lit-ry, 1954. 171 p. (Boring machinery) (MLRA 7:10)

KUZMAK, YE. M.

AID P - 1092

Subject : USSR/Engineering

Card 1/1 Pub. 78 - 3/21

Author : Kuzmak, Ye. M.

Title : Improvements of reinforced drilling bits

Periodical : Neft. khoz., v. 32, #10, 10-14, O 1954

Abstract : The wear and destruction of the reinforced surface of the bit are discussed in relation to the composition of the reinforced layer heat treatment and operating conditions. The use of tungsten-carbide, tungsten-cobalt, metal-ceramic and other alloys is analysed. Two Russian references (1912 and 1953).

Institution : None

Submitted : No date

ZHIGACH, K.F., professor, redaktor; STEPANYANTS, A.K., professor, redaktor; TIKHOMIROV, A.A., kandidat ekonomicheskikh nauk, redaktor; KARAPETYAN, R.O., kandidat filosoficheskikh nauk, redaktor; CHERNOZHUKOV, N.I., professor; YERSHOV, P.R., redaktor; GUREVICH, V.M., redaktor; MURAV'YEV, I.M., professor, redaktor; SHCHELKACHEV, V.N., professor, redaktor; CHARYGIN, M.M., professor, redaktor; DUMAYEV, F.F., professor, redaktor; KUZMAK, Ye.M., professor, redaktor; POLOSINA, A.S., tekhnicheskiy redaktor.

[Ninth scientific and technological conference of 1954]Devia-taia nauchno-tekhnicheskaia konferentsiia 1954. g. Moskva, Gos. nauchno-tekhn.izd-vo neftianoi i gorno-toplivnoi lit-ry. 1955. 205 p. [Microfilm] (MLRA 8:9)

1. Moscow. Moskovskiy neftianoy institut. Nauchnoye studencheskoye obshchestvo.
(Geology) (Petroleum)

KUZMAK, Ye. M.

BENUA, F.F., kandidat tekhnicheskikh nauk; VOL'PERT, G.D., inzhener,; YEMEL'YANOV, N.P., kandidat tekhnicheskikh nauk; KLEKOVKIN, G.P. inzhener; KUZMAK, Ye.M., doktor tekhnicheskikh nauk, professor; MILOVSKIY, I.A., laureat Stalinskoy premii;PANOV, B.N., inzhener; POKHODNYA, I.K., inzhener; FRUMIN, I.I., kandidat tekhnicheskikh nauk; FRUMIN, S.R., inzhener; ZVEGINTSEVA, K.V., inzhener, redaktor; GOLOVIN, S.Ya., inzhener, redaktor; MATVEYEVA, L.S., redaktor; SOKOLOVA, T.F., tekhnicheskiy redaktor.

[Automatic built-up welding with wear-resistant alloys] Avtomaticheskaia naplavka iznosoustoichivymi splavami. Moskva, Gos. nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1955. 244 p.(MLRA 8:11)
(Electric welding)

KUZMAK, Ye.M.

ZHIGACH, K.F., professor, otvetstvennyy redaktor; MURAV'YEV, I.M., professor, redaktor; TIKHOMIROV, A.A., kandidat ekonomicheskikh nauk, redaktor; YEGOROV, V.I., kandidat ekonomicheskikh nauk, redaktor; CHARYGIN, M.M., professor, redaktor; DUNAYEV, F.F., professor, redaktor; NAMETKIN, N.S., dotsent, redaktor; BIRYUKOV, V.I., dotsent, redaktor; YEGOROV, A.F., dotsent, redaktor; CHARNYY, I.A., professor, redaktor; CHERNOZHUKOV, P.I., professor, redaktor; KUZMAK, Ye.M., professor, redaktor; DOKHNOV, V.N., professor, redaktor; PANCHENKOV, G.M., professor, redaktor; ALMAZOV, N.A., dotsent, redaktor; TAGIYEV, M.I., redaktor; GUREVICH, redaktor; ZHIGACH, K.F., redaktor; DAYEV, G.A., vedushchiy redaktor; GENNAD'YEVA, I.M., tekhnicheskiy redaktor

[The tenth scientific and technical conference, 1955] Desiataia nauchno-tekhnicheskaia konferentsiia, 1955 g. Leningrad, Gos. nauchno-tekhn. izd-vo neftianoi i gorno-toplivnoi lit-ry, Leningradskoe otd-nie, 1956. 167 p. (MIRA 9:7)

1. Moscow. Moskovskiy neftyanoy institut. Nauchnoye studencheskoye obshchestvo
(Petroleum engineering) (Petroleum geology)

KUZMAK, YE. M.

SUBJECT: USSR/Welding 135-7-2/16

AUTHORS: Kuzmak, Ya.M., Professor, Doctor of Technical Sciences, and Karmazinov, N.P., Engineer.

TITLE: Investigation of Weldability and Welding Technology of Two-Layer Rolled Material. (Issledovaniye svarivayemosti i tekhnologii svarki dvukhsloynogo prokata).

PERIODICAL: "Svarochnoye Proizvodstvo", 1957, # 7, pp 5-9 (USSR)

ABSTRACT: The weldability and welding technology of two-layer rolled steel composed of grades "МСТ.3" and "08Х12", its reaction to the thermic cycle of the welding operation, the process of mixing during welding, the technology of controlling the amount of the base metal in the weld, and the technology of automatic-welding two layers were investigated. The tough-melting flux composed of 90 % magnesite, 8 % water glass, and 2 % water gave satisfactory results. The chemical composition of metals concerned "МСТ.3" "08Х12", "СВ-Х25Н20", "СВ-Х5Н13", and "СВ-0Х18Н9" are specified. The distribution of the elements under observation was investigated by the radiogram method, which shows the distribution over the entire cross section of the weld. Sulfur-35 has been used as radioactive isotope. The composition of the

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TITLE: Investigation of Weldability and Welding Technology of Two-Layer Rolled Material. (Issledovaniye svarivayemosti i tekhnologii svarki dvukhsloynogo prokata).

electrode wire and the structure of weld metal were determined by a graphical calculation method.

The following has been determined during the investigation:
1) The appearance of carbon rediffusion and redistribution which leads, in particular, to formation of zones of reduced corrosion-resistance.
2) The degree of weld metal homogeneity in automatic welding. The nature of inclusions under conditions of incomplete mixing and their quantitative relation to the welding current and the speed of welding, the relation between the initial chemical composition of base metal and chrome-nickel wire, and the final composition of weld metal which allow the use of calculating methods for technological projecting of welding processes.
3) The conditions of considerable reduction of the γ-phase, corresponding to application of chrome-nickel wires with different "austenitic reserves" when welding with alternating current.
4) The technological basis for automatic welding of two-layer rolled stock in two operations without a dividing layer was proven experimentally.

135-7-2/16

TITLE: Investigation of Weldability and Welding Technology of Two-Layer Rolled Material. (Issledovaniye svarivayemosti i tekhnologii svarki dvukhsloynogo prokata).

The article contains 5 diagrams, 6 photographs, 3 tables, and 9 bibliographic references (7 of which are Russian).

ASSOCIATION: Neftyanoy Institut imeni I.M. Gubkina (Petroleum Institute imeni I.M. Gubkina)

PRESENTED BY:

SUBMITTED:

AVAILABLE: At the Library of Congress.

Card 3/3

KUZMAK, Ye.M.; KURDIN, A.I.; TUCHKEVICH, N.M.

Using hard alloys for three-dimensional reinforcement of bit milling cutters. Neft.khoz. 35 no.1:31-35 Ja '57. (MLRA 10:2)

(Cutting tools)

KUZMAK, Ye.M., prof. doktor tekhn. nauk, red.; TARAN , V.D.,prof., doktor tekhn. nauk, red.; ZHIGACH, K.F., prof.,red.; MURAV'YEV, I.M., prof.,red.; TIKHOMIROV,A.A., kand. ekon. nauk, red.; YEGOROV, V.I., kand. ekon. nauk, red.; CHARYGIN, M.M., prof., red.; DUNAYEV, F.F., prof., red.; CHERNOZHUKOV, N.I., prof., red.; CHARNYY,I.A., prof., red.; PANCHENKOV, G.M., prof., red.; DAKHNOV, V.N., prof., NAMETKIN, N.S., doktor khim. nauk, red.; ALMAZOV, N.A., dots., VINOGRADOV, V.N., kand. tekhn. nauk, red.; BIRYUKOV, V.I., kand. tekhn. nauk, red.; TAGIYEV, E.I., red.; GUREVICH, V.M., red.; GOR'KOVA, A.A., ved. red.; FEDOTOVA, I.G., tekhn. red.

[Proceedings of the conference of technical schools on the problems of new equipment for the petroleum industry] Mezhvuzovskoe soveshchanie po voprosam novoi tekhniki v neftianoi promyshlennosti. 1958. materialy... Moskva, Gos. nauchno-tekhn. izd-vo neft. i gorno-toplivnoi lit-ry. Vol. 3. [Manufacture of petroleum industry equipment] Neftianoe mashinostroenie. 1958. 222 p. (MIRA 11:11)
(Petroleum industry--Equipment and supplies)

KUZMAK, Ye. M., (Dr. Tech. Sci., Prof.); KARMAZINOV, N. P. (Engr.) and KOSHELEV, N. N. (Engr.)

"Investigation of Welded Connections in Special Steel Petroleum Equipment using Radioactive Isotopes," p. 85 in book Reports of the Interuniversity Conference on Welding, 1956. Moscow, Mashgiz, 1958, 266pp.

CHERNOZHUKOV, N.I., prof., doktor tekhn.nauk, red.; ZHIGACH, K.F., prof., red.; MURAV'YEV, I.M., prof.,red.; TIKHOMIROV, A.A., kand.ekon. nauk, red.; YEGOROV, V.I., kand.ekon.nauk, red.; CHARYGIN, M.M., prof., red.; DUNAYEV, F.F., prof., red.; KUZMAK, Ye.M., prof., red.; CHARNYY, I.A., prof., red.; PANCHENKOV, G.M., prof., red.; DAKHNOV, V.N., prof., red.; NAMETKIN, N.S., doktor khim.nauk, red.; ALMAZOV, N.A., dotsent, red.; VINOGRADOV, V.N., kand.tekhn.nauk, red.; BIRYUKOV, V.I., kand.tekhn.nauk, red.; TAGIYEV, E.I., red.; GUREVICH, V.M., red.; ZAMARAYEVA, K.M., vedushchiy red.; MUKHINA, E.A., tekhn.red.

[Petroleum refining; articles] Pererabotka nefti; materialy. Moskva, Gos.nauchno-tekhn.izd-vo neft. i gorno-toplivnoi lit-ry. Vol.2. 1958. 289 p. (MIRA 12:1)

1. Mezhvuzovskoye soveshchaniye po voprosam novoi tekhniki v neftyanoy promyshlennosti, Moscow, 1956. 2. Moskovskiy neftyanoy institut (for Chernozhukov, Panchenkov).
(Petroleum--Refining)

ZHIGACH, K.F., prof, red.; MURAV'YEV, I.M., prof. doktor tekhn.nauk, red.; TIKHOMIROV, A.A., kand.ekon.nauk, red.; YEGOROV, V.I., kand.ekon. nauk, red.; CHARYGIN, M.M., prof., red.; DUNAYEV, F.F., prof., red.; CHERNOZHUKOV, N.I., prof., red.; KUZMAK, Ye.M., prof., red.; CHARNYY, I.A., prof., red.; PANCHENKOV, G.M., prof., red.; DAKHNOV, V.N., prof, doktor geologo-mineralogicheskikh nauk, red.; NAMETKIN, N.S., doktor khim.nauk, red.; ALMAZOV, N.A., dots., red.; VINOGRADOV, V.N., kand.tekhn.nauk, red.; BIRYUKOV, V.I., kand.tekhn.nauk, red.; TAGIYEV, B.I., red.; GUREVICH, V.M., red.; DORRYNINA, N.P., vedushchiy red.; MUKHINA, E.A., tekhn.red.

[Proceedings of an interschool conference on problems of new techniques in the petroleum industry] Materialy Mezhvuzovskogo soveshchaniya po voprosam novoy tekhniki v neftyanoy promyshlennosti. Moskva, Gos. nauchno-tekhn.izd-vo neft. i gorno-toplivnoi lit-ry. Vo.1. [Prospecting and exploitation of oil and gas fields] Razvedka i razrabotka neftianykh i gazovykh mestorozhdenii. 1958. 311 p. (MIRA 11:4)

1. Mezhvuzovskoye soveshchaniye po voprosam novoy tekhniki v neftyanoy promyshlennosti.

(Petroleum engineering) (Gas, Natural--Geology)

KUZMAK, Ye.M.

25(0) PHASE I BOOK EXPLOITATION SOV/1623

Kuzmak, Yevsey Markovich, Doctor of Technical Sciences, Professor (Moscow Petroleum Institute)

Osnovy tekhnologii neftyanogo apparatostroyeniya (Basic Principles of Petroleum Equipment Engineering) 2nd ed., rev. and enl. Moscow, Gostoptekhizdat, 1958. 419 p. 4,100 copies printed.

Reviewers: N. O. Okerblom, Professor, Doctor of Technical Sciences (Chair of Welding, Leningrad Polytechnic Institute), and A.S. Gel'man, Professor, Doctor of Technical Sciences (Chair of Welding, Leningrad Polytechnic Institute); Exec. Ed.: M.M.Novikova; Tech. Ed.: A.V. Trofimov

PURPOSE: This book is intended for students attending petroleum vuzes and schools which train specialists in machine building and in the manufacture of equipment used in the petroleum industry. The book might also be useful to students and engineers specializing in welding and manufacturing of welded structures.

COVERAGE: The author surveys the basic engineering principles applied to the manufacture of various petroleum equipment and apparatus built of metal sheets and tubes. He analyzes various phases of the manufacturing process and devotes a number of chapters to the planning of the process, layout and cutting techniques, calculation of allowances

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and tolerances, rimming, machining, bending, press forming, welding, heat treatment, types of material used, organization of work, etc. The author also describes the machinery used in manufacturing petroleum equipment and depicts numerous machines in sketches explaining in detail how they operate. The text contains numerous graphs, diagrams and tables. The author acknowledges the contribution of Doctor of Technical Sciences, Professor N.S. Okerblom, Doctor of Technical Sciences, A.S. Gel'man and Doctor of Technical Sciences, Professor A.D. Tomlenov, in compiling the work. There are 158 references of which 127 are Soviet.

TABLE OF CONTENTS:

AUTHORS: Kuzmak, Ye.M., Doctor of Technical Sciences, Professor, and Milanchev, V.S., Engineer

SOV-135-58-9-5/20

TITLE: On the Use of Low-Alloy Refined Steels in Welded Structures (O primenenii nizkolegirovannykh uluchshayemykh staley v svarnykh konstruktsiyakh)

PERIODICAL: Svarochnoye proizvodstvo, 1958, Nr 9, pp 11-14 (USSR)

ABSTRACT: Investigations on the weldability of steel refined by heat treatment were carried out at the Moscow Petroleum Institute imeni Academician I.M. Gubkin. Different grades of low alloy steels were investigated. Special tests were carried out on low-alloy "M" steel (type 09G2 of GOST Standard 5058-57 with addition of copper), recommended for structures which are subjected to temperature ranges of -70°C to +450°C, and an optimum technology for combined welding and heat treatment of this steel was suggested. The chosen technology was tested by hardening and annealing of "M"-steel plates. The tests provided a satisfactory quality of joints. It was stated that mechanical properties of the refined steel were higher than after normalization, in particular with regard to yield limits and toughness by 50% and 100% re-

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spectively. Relative elongation was slightly reduced but in a still admissible limit. There are 5 graphs, 3 tables and 9 references, 7 of which are Soviet and 2 English.

ASSOCIATION: Moskovskiy neftyanoy institut imeni akad. I.M. Gubkina (The Moscow Petroleum Institute imeni Academician I.M. Gubkin)

1. Alloy steel--Welding--Effectiveness

AUTHORS: Kuzmak, Ye.M. and Yefremova, K.P. SOV-125-58-9-2/14

TITLE: Probleme of Dissolving and Mixing Tungsten Carbides in Steel When Reinforcing Tools With a Granular Solid Alloy (K voprosu o rastvorenii i peremeshivanii karbidov vol'frama v stali pri armirovanii zernovym tverdym splavom)

PERIODICAL: Avtomaticheskaya svarka, 1958, Nr 9, pp 13-19 (USSR)

ABSTRACT: Information is presented on experimental investigations of processes occurring during the surface reinforcing of drilling tools with a solid alloy. Experiments were performed with "12KhNZ", "Khl2VF" and "Khl2Fl" steels and with a "VKZ" granular alloy. Porcesses of metal transfer during one- and multi-layer reinforcing were investigated with the aid of radioactive S^{35} and C^{14} isotopes at the welding laboratory of VNIIstroyneft'. The following conclusions were made: the dissolution amd mixing rate of tungsten carbides in reinforcing by high-frequency current depends linearly on the duration of the contact between the liquid steel and the grains of the solid alloy, as well as on the physical and chemical properties of the steel subjected to reinforcing and the solid alloy. The reinforced portion is formed with the uniform distribution of the macroscopic contact room.

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SOV-125-58-9-2/14

Problems of Dissolving and Mixing Tungsten Carbides in Steel When Reinforcing Tools With a Granular Solid Alloy

Alloy coefficients during one-and multilayer reinforcing and beading are determined. The obtained results can be applied in projecting technological reinforcing processes. There are 5 graphs, 3 micro-photos, and 4 Soviet references.

ASSOCIATION: Moskovskiy neftyanoy institut (Moscow Oil Institute)

SUBMITTED: March 31, 1958

1. Drills--Materials 2. Drills--Test results 3. Tungsten carbide--Applications 4. Radioisotopes--Applications

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KUZMAK, YE. M.

11(2,4) PHASE I BOOK EXPLOITATION SOV/2536

Moscow. Institut neftekhimicheskoy i gazovoy promyshlennosti.

Problemy nefti i gaza (Oil and Gas Problems) Moscow, Gostoptekhizdat, 1959. 362 p. (Series: Its: Trudy, vyp 24) Errata slip inserted. 2,000 copies printed.

Sponsoring Agency: Ministerstvo vysshego obrazovaniya SSSR.

Exec. Ed.: G. F. Morgunova; Tech. Ed.: I. G. Fedotova; Editorial Board: K. F. Zhigach, Professor (Resp. Ed.), I. M. Murav'yev, Professor, A. A. Tikhomirov, Candidate of Economic Sciences, V. N. Vinogradov, Candidate of Technical Sciences, M. M. Charygin, Professor, F. F. Dunayev, Professor, I. A. Charnyy, Professor, V. N. Dakhnov, Professor, G. M. Panchenkov, Professor,

PURPOSE: This collection of articles is intended for specialists in the petroleum and gas industry. It will also be of interest to scientific research institutes, teachers and students of vuzes.

COVERAGE: This collection of articles reviews problems connected with natural and synthetic gas production. A number of articles are devoted to the study of regional oil- and gas-bearing zones, the crystalline beds underlying the Volga-Urals petroliferous region, tectonics of the Caspian depression, seismic prospecting, oil well logging, development of oil and gas fields, petroleum-bearing formations and their physicochemical characteristics, and petroleum engineering. Other articles deal with gas turbine engines and their possible use in the oil and gas industry, the production of carboxymethylcellulose compounds, the application of ionic exchange tars to the organic catalysis, continuous coking of heavy petroleum residues, (fluidization), the improvement of lube oil production, and the influence of acid esters on properties of lubricating oil and grease. The book contains a number of photographs, tables, flow sheets, and diagrams, among which those relating to coal gasification and conversion of heavy petroleum residues over a fluidized bed catalyst deserve special attention. References accompany individual articles.

KUZMAK, Ye.M.; KURDIN, A.I.; YEFREMOVA, K.P.

Increasing the wear resistance of bits by hard facing. Trudy MINKHiGP no.24:156-169 '59. (MIRA 13:3)
(Boring machinery) (Hard facing)

KUZMAK, Ye.M.; KOSHELEV, N.N.

Corrosion resistance of welding equipment in petroleum refining. Khim.i tekh.topl.i masel 6 no.6:41-47 Je '61. (MIRA 14:7)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti im. akademika Gubkina.
(Steel—Welding) (Corrosion and anticorrosives)

KUZMAK, Ye.M.; KOSHELEV, N.N.

Some problems in welding various steels. Trudy MINKHiGP no.34:3-11 '61. (MIRA 14:12)

(Steel--Welding)

KUZMAK, Ye.M.; YEFREMOVA, K.P.

Hard facing slim bits. Trudy MINKHiGP no.35:81-95 '61.
(MIRA 14:11)
(Boring machinery) (Hard facing)

KOSHELEV, N.N.; KUZMAK, Ye.M., doktor tekhn. nauk, prof., red.;
NOGOVITSYN, V.N., red.; CHIZHEVSKIY, E.M., tekhn. red.

[New welding methods] Novye metody svarki; metodicheskoe posobie dlia studentov zaochnogo i vechernego fakul'tetov. n.p. Rosvuzizdat, 1962. 42 p. (MIRA 16:6)

1. Moscow. Institut neftekhimicheskoy i gazovoy promyshlennosti.
(Ultrasonic welding) (Plasma (Ionized gases))
(Electron beams)

S/095/62/000/001/001/001
I031/1231

AUTHOR: Kuzmak, Ye. M. Doctor of Physical Sciences, Milanchev, V. S., Candidate of Technical Sciences (MINKh and GP imeni Gubkin), Suvorova, V. I., Sergeyev, I. J., Baryshev, S. P., Engineers (Chel'yabinsk Pipe plant)

TITLE: Investigation of physical properties and weldability of heat-treated 19Г (19G) steel

PERIODICAL: Stroitel'stvo truboprovoslav, no. 1, 1962, 8

TEXT: An investigation was made to determine the effect of chemical composition on the physical properties and weldability of heat-trated 19Г (19G) steel.

The chemical composition of the mild and hard heated steel used was: (%)

	C	Mn	Si	Cr	Ni	Cu	S	P
Mild heat	— 0.16	0.70	0.24	0.03	0.10	0.13	0.030	0.012
Hard heat	— 0.22	1.01	0.27	0.04	0.11	0.14	0.037	0.020

Heat-treatment of 19G steel (heating for 25 minutes at 930°C, then water quenching and tempering at 600°C) increased the tensile strength, the yield point and the impact strength of specimens made from both

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mild and hard heats. Elongation decreased in both cases, however, an especially, drastic decrease being noted in hard steel specimens. The considerable fluctuations of physical properties in both the "as received" and heat-treated steels are due to the different chemical analyses of the steel.

In order to minimize the fluctuation in the physical properties, it is recommended to increase the strength of the mild steel by adjusting the temperature of tempering, raising the strength up to that of hard-heat steel.

Investigation of the physical properties of submerged-are-welded specimens showed that weldings equal in strength to the pipe base metal may be obtained if heat input of the welding does not exceed the value of 7500 cal/cm. run.

Preliminary heat treatment of 19G steel considerably improves the characteristics of the heat -affected zone in welding seams.

Heat treatment of 19G steel permits reduction of pipe wall thickness by 10 to 20 percent. There are 6 table and 3 figures.

KUZMAK, Ye.M.; MILANCHEV, V.S.; KARMAZINOV, N.P.

Reaction to the heat ranging of welding of improved low-alloy 19G and 14GN steels. Izv.vys.ucheb.zav.; neft' i gaz 5 no.2: 101-108 '62. (MIRA 15:7)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni akademika I.M. Gubkina.
(Steel—Welding)
(Metals, Effect of temperature on)

KUZMAK, Ye.M., doktor tekhn.nauk; MILANCHEV, V.S., kand.tekhn.nauk; KROSHKIN, V.A., inzh.; SUVOROVA, V.I., inzh.; SERGEYEV, S.I., inzh.; BARYSHEV, S.P., inzh.; Prinimali uchastiye: SHCHERBACHENKO, S.V., inzh.; PALATNIKOVA, Ye.S., inzh.

Testing 14GN steel for thermal strengthening and weldability. Stroi. truboprov. 7 no.12:13-14 D '62. (MIRA 16:1)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti im. akademika Gubkina (for Kuzmak, Milanchev, Kroshkin).
2. Chelyabinskiy truboprokatnyy zavod (for Suvorova, Sergeyev, Baryshev).

(Steel—Testing)

KUZMAK, Ye. M.; KROSHKIN, V. A.

Reaction of improved 12MKh and 12KhMF steels to the thermal cycle in welding. Avtom. svar. 15 no.11:44-50 N '62. (MIRA 15:10)

1. Institut neftekhimicheskoy i gazovoy promyshlennosti imeni I. M. Gubkina.

(Steel—Welding) (Thermal stresses)

KUZMAK, Ye.M.; YEFREMOVA, K.P.; FIRKOVICH, T.V.

Heat-resistance of drill bit edges reinforced by a hard alloy. Metalloved. i term. obr. met. no.12:46-48 D'63. (MIRA 17:2)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti.

KUZMAK, Ye.M.; KROSHKIN, V.A.

Long-term durability of 12MKh and 12Kh1MF tempered steel and welded joints. Trudy MINKHiGP 46:150-163 '64. (MIRA 17:6)

KUZMAK, Ye.M.; LOGVINOV, V.I.

Investigating the stress relief of heat hardened carbon and manganese steels in welding. Trudy MINKHiGP 46:164-181 '64.
(MIRA 17:6)

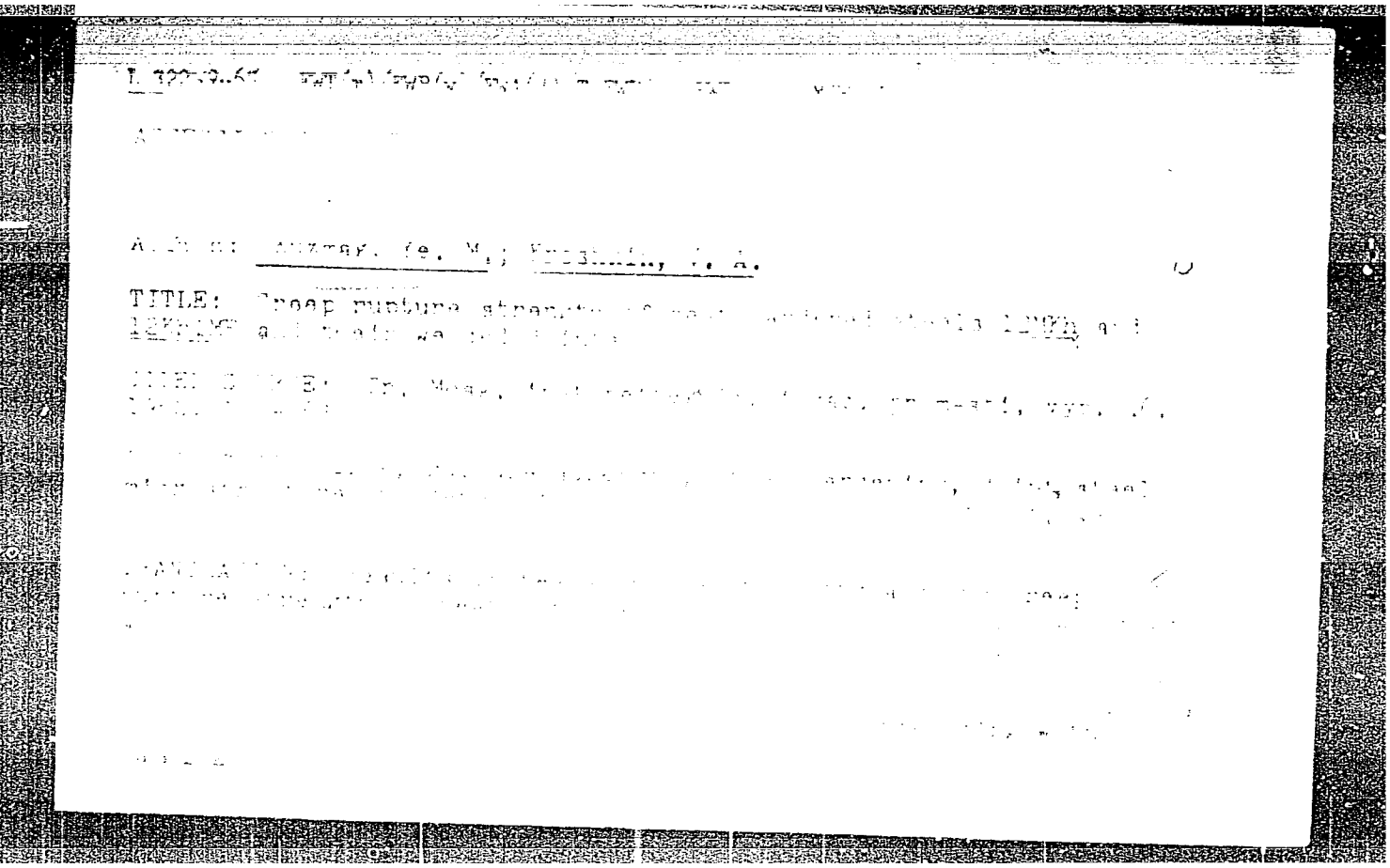
KUZMAK, Ye.M.; YEFREMOVA, K.P.; TURKIN, Yu.S.

Processes reducing the diffusion of a granular solid alloy (a tungsten carbide composition). Trudy MINKHiGP 46:197-206 '64. (MIRA 17:6)

KUZMAK, Ye.M.; YEFREMOVA, K.P.; FIRKOVICH, T.V.; TURKIN, Yu.S.

Engineering fundamentals of the hard-alloy reinforcement of rollers. Izv. vys. ucheb. zav.; neft' i gaz 6 no.7:107-113 '63. (MIRA 17:8)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni akademika I.M. Gubkina.



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tempering. At lower temperatures [illegible]

[illegible] a tendency toward local failures in the [illegible]

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KUZMAK, Ye.M., doktor tekhn.nauk

All-Union topical conference on the weldability of heat treated low alloy steel. Svar.proizv. no.5:45-46 My '65. (MIRA 18:6)

L 04721-67 EWT(d)/EWT(m)/EWP(c)/EWP(v)/EWP(t)/ETI/EWP(k)/EWP(l) IJP(c) JD/HM

ACC NR: AP6027442 SOURCE CODE: UR/0135/66/000/008/0014/0016

AUTHOR: Kuzmak, Ye. M. (Doctor of technical sciences); Shcheglov, B. A. (Candidate of technical sciences); Bakiyev, A. V. (Engineer)

ORG: none

TITLE: Strength of welded joints in heat hardened steels under conditions of biaxial stress

SOURCE: Svarochnoye proizvodstvo, no. 8, 1966, 14-16

TOPIC TAGS: arc welding, stress analysis, steel, sheet metal

ABSTRACT: The test method is illustrated by Fig. 1.

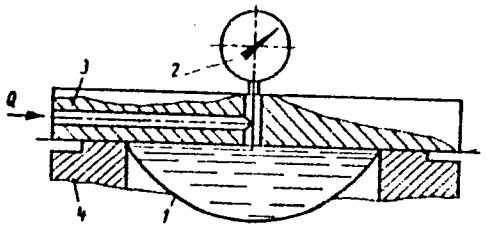

Fig. 1. Scheme for the hydrostatic testing of sheet metals: 1- sample; 2- manometer; 3- press; 4- matrix

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UDC: 621.791.052:539.4:669.15-194

The state of biaxial stress in the sample, pressed around the periphery, is created by its hydrostatic buckling into the round open matrix. The strength of welded joints under conditions of biaxial stress was determined from the relative buckling pressure, p:

$$p = \frac{Q_{max} D}{2t_0}, \qquad (1)$$

where Q_{max} is the greatest buckling pressure; D is the diameter of the opening in the matrix (400 mm); t_0 is the original thickness of the sample. Tests were carried out on low alloy steels 14GN, 16GN, and 16GS(3N), which are widely used for welded tubes working under the action of internal pressure. The nominal thickness of steels 14GN and 16GN was 8 mm, and that of steel 16GS(3N) was 10 mm. Experimental results are shown in detail in tabular and graphic form. On the basis of the results the following conclusions were drawn: 1) under biaxial stress, the failure of zones of welded joints in heat hardened steels had more effect on the strength than under monoaxial stress; 2) the critical values of the intensity of the stresses on all zones of the welded joints in hydrostatic tests were greater than with monoaxial stress; 3) the appearance of a state of volumetric stress with deformation of a weakened zone under conditions of monoaxial stress increases the strength of this zone, while under conditions of biaxial

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stress it leads to a decrease in its strength; 4) the hydrostatic method of testing is more sensitive to inhomogeneity in the mechanical properties of welded joints than with the method of monoaxial stress. It may therefore be used successfully for evaluation of the weldability of metals. Orig. art. has: 2 formulas, 5 figures, and 1 table.

SUB CODE: 13/ SUBM DATE: none/ ORIG REF: 009/ OTH REF: 001

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