24 (3) SOV/112-57-5-11477

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1957, Nr 5, p 279 (USSR)

AUTHOR: Vakhnin, V. M.

TITLE: Physical Meaning of the Anomalous Law of Changing Attenuation With Frequency for Mode H_0 Waves in a Round Waveguide
(Fizicheskiy smysl anomal'nogo zakona izmeneniya zatukhaniya s chastotoy dlya voln tipa H_0 v kruglom volnovode)

PERIODICAL: Tr. Mosk. energ. in-ta, 1956, Nr 21, pp 58-61

ABSTRACT: It is well known that, at variance with the increase of resistive losses with frequency common for all wave modes, resistive losses decrease with increase in frequency for mode H_{om} waves in axially symmetrical round waveguides. The physical meaning of this effect is associated with the fact that at $\omega \rightarrow \infty$ the losses of the current component oriented along the waveguide axis are proportional to $\omega^{1/2}$, while the losses associated with the transverse component, $\omega^{-3/2}$. As longitudinal current components are absent in mode H_{om} waves (unlike in all other modes), the losses decrease with increase in frequency.

K.B.Ye.

Card 1/1

VAKHNIN, V.

107-57-6-19/57

AUTHOR: Vakhnin, V.

TITLE: Artificial Satellites of the Earth (memo for radio amateur monitors) (Iskusstvennyye sputniki zemli. Spravka dlya radiolyubiteley-nablyudateley)

PERIODICAL: Radio, 1957, Nr 6, pp 14-17 (USSR)

ABSTRACT: The article presents information necessary for radio amateurs about artificial Earth satellites and also some data about the influence of satellite flight on the nature of signals received from it. The conditions of launching of a satellite, the orbit, and the elements of orbit, including perigee, apogee, orbit inclination, etc., are explained in some detail. The belt of radio observation of a satellite is discussed. The Soviet satellite is expected to make about sixteen circles around the Earth in 24 hours. Its orbit orientation is such that practically any radio monitor living in a populated area of the Earth will be able to observe the satellite twice or at least once a day. The satellite will rotate around its own axis at the rate of a few revolutions per minute. These rotations may cause fading because sometimes, the plane of the satellite antennas may happen to be perpendicular to the direction of polarization of a receiving antenna. Ordinary fading due to multipath arrival of radio waves to the receiver will also take place. There will be, also, a special fading caused

Card 1/2

107-57-6-19/57

Artificial Satellites of the Earth (memo for radio amateur monitors)

by reflection of radio waves from the Earth's surface. Doppler effect is explained in detail. Satellite reappearance the next day may be shifted in time for one hour or more due to the geophysical shift of the inclined orbit. It is extremely important that radio amateurs record on tape signals from the satellite and also the precise time of the signal. The 40 MC signal is more important for orbit determination as it is less distorted in passing through the ionosphere.

There are nine figures.

AVAILABLE: Library of Congress

Card 2/2

AUTHORS: ~~Vakhnin, V. M.~~ and Shmaonov, T. A.

TITLE: Reduction of the Heating Time in Indirectly Heated Cathodes (Sokrashcheniye vremeni progreva katodov s kosvennym podogrevom)

PERIODICAL: Radiotekhnika i elektronika, 1958, Vol 3, Nr 7, pp 966-967 (USSR)

ABSTRACT: The process of heating the cathodes in thermionic tubes was speeded-up by switching-in heater voltages up to 3 times higher than the nominal supply. The duration of the over-voltage was of the order of 3-4 sec, after which the tubes were supplied with the normal current. It was found that by this method the tubes were fully switched on in about 15 to 20 sec. Some of the experimental results are illustrated in the oscillograms of Figs.1 and 2. Curve 1 in Fig.2 shows the heater voltage (12.6 and 6.3 V) as a function of time, Curve 2 represents the heater current and Curve 3 shows the anode current. Fig.2 shows the behaviour of a multivibrator and an audio-oscillator upon switching on the heater over-voltage and the normal voltage. It was found that the normal Soviet receiving tubes could be switched on (in the above manner) up to 1500 times without impairing their performance. The majority of the tubes could stand 15 000 switchings on.

Reduction of the Heating Time in Indirectly Heated Cathodes

but some developed heater-cathode shorts after 5000 operations. The authors express their thanks to O. K. Dimitriyev and V. N. Orlov for carrying out the experiments.

SUBMITTED: September 5, 1957.

1. Cathodes (Electron tubes)--Heating 2. Electron tube heaters--Performance

VAKHNIN, V.M.; BELETSKIY, V.V.

Using the anticipation method in observing an artificial satellite. Isk. sput. zem. no.3:47-53 '59. (MIRA 12:12)
(Artificial satellites)

S/020/60/135/006/010/037
B019/B056

9.3140
26.1410

AUTHORS: Vakhnin, V. M., and Skuridin, G. A.

TITLE: A Possible Trapping Mechanism of Charged Particles in a Magnetic Field

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 6, pp. 1354-1357

TEXT: The equation of motion for a charged particle moving in the equatorial plane of a magnetic dipole is given as: $\frac{\rho^2 + 2\rho'^2 - \rho\rho''}{(\rho^2 + \rho'^2)^{3/2}} = \frac{a^2}{\rho^3}$ (6). If the loss in kinetic energy of the particle is neglected, the coefficient $a = \sqrt{eM/mvc}$ (M - magnetic moment of the dipole) will be constant. When a particle travels in a magnetic field, however, a radiation occurs, which decreases the kinetic energy, and at low energy losses it may be assumed that $\Delta v/v \cong -2\Delta a/a$ (7). The authors analyze (6) and, for this purpose, go

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A Possible Trapping Mechanism of Charged Particles in a Magnetic Field

S/020/60/135/006/010/037
B019/B056

over to the phase space with the coordinates $w = \rho/a$ and $u = \frac{d\rho}{d\varphi}/a$. The differential equation $du/dw = \frac{w}{u} + 2\frac{u}{w} \mp \frac{\left\{1 + (u/w)^2\right\}^{3/2}}{uw}$ is obtained. An analysis of the phase curves with respect to the isoclinal lines of this differential equation is carried out. Schematical representations of the changes in the direction of motion of the phase point are shown. These changes are caused by the loss in kinetic energy. Herefrom, conclusions are drawn as to the motion of the particle. The authors briefly deal with the three-dimensional case in which a particle does not incide in the equatorial plane, but arbitrarily. In this case the phase space is four-dimensional: u, w, ϑ, $d\vartheta/d\varphi$, where ϑ is the meridian angle. From the investigation it follows that for any distance there exists a critical velocity at which the energy loss leads to the trapping of the particle. The authors finally state that this trapping mechanism is not the only one. There are 3 figures and 5 Soviet references.

PRESENTED: July 11, 1960, by A. Yu. Ishlinskiy, Academician

SUBMITTED: June 23, 1960

Card 2/2

h1906

S/560/62/000/013/001/009
I046/I242

6.4320
6.4700

AUTHOR: Vakhnin, V.N.

TITLE: Effects of the orbital motion of the earth on radio measurements of range and velocity in cosmic space

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki. Zemli. no.13. Moscow, 1962, 61-66

TEXT: In radio measurements over distances of several astronomical units, each observed object is located at some arbitrary point of "the ellipsoid of all allowed positions" of the object S_o defined by

$$L_o = L_1 + L_2 = v_c \tau = \text{const}$$

Card 1/3

Effects of the orbital motion of...

where L_1, L_2 are the paths of the radio signal from the transmitter to the object, and from the object to the receiver, respectively; L is the delay time required by the signal to cover the entire path L_0; v_c is the speed of propagation of the signal in interplanetary space, equal to the speed of light in vacuum. The semi-major axis of the ellipsoid of revolution S_0 is $a = \frac{L_1+L_2}{2} = \frac{L_0}{2}$ and the eccentricity is given by $e = v_E/v_c$, where v_E is the velocity of the earth in an inertial frame of reference with the sun at rest. The velocity of the cosmic object along the normal to S (all other components of the actual velocity remaining undetermined) is given by $V_1 = \frac{1}{2} V_c \frac{dL}{dt} \left(1 - \frac{v_0}{v_s}(\cos\vartheta)\right)/\left(1 - \frac{v_E}{v_c}\cos\eta\right) + v_E \cos\varepsilon + R\Omega_E \sin\zeta$, where η is the angle between $\vec{v}_E$ and L_2, ϑ-the angle between the actual velocity vector $\vec{v}_0$ and L_2, ε-the angle between $\vec{v}_E$ and the normal to S, R-the distance from the center of S to the object,

Card 2/3

S/560/62/000/013/001/009
I046/I246

Effects of the orbital motion of...

ζ -the angle between R and the normal to S_0, Ω_E-the angular velocity of the earth's annual motion. Here $0 \leq (R\Omega_E \sin\zeta) \leq 10^{-11}R$ is the correction for the curvilinear trajectory of the measuring station. The drivative $d\tau/dt$ is the quotient $(\tau_2-\tau_1)/\Delta t$, where τ_1, τ_2 are the delay times for signals separated by a small time interval Δt. The obvious approximate formulas for the range and the radial velocity of the object

$R_0 = L_0/2 = V_c\tau/2$ $\qquad V_R = dR/dt = \frac{V_c}{2}\frac{d\tau}{dt}$

differ from the exact formulas above by at most the relativistic correction $1/\sqrt{1-(V_E/V_c)^2}$ which is small and comparable with other inevitable errors, such as the inaccuracy in the speed of light in vacuum and failure to allow for the effects of the interplanetary medium on propagation of the signal. There are 3 figures.

SUBMITTED: March 29, 1961

Card 3/3

ACCESSION NR: AP4009624 S/0293/63/001/003/0414/0435

AUTHOR: Vakhnin, V. M.; Skuridin, G. A.; Shvachunov, I. N.

TITLE: The movement of charged particles in the field of a magnetic dipole, considering energy dissipation

SOURCE: Kosmicheskiye issledovaniya, v. 1, no. 3, 1963, 414-435

TOPIC TAGS: magnetic dipole, magnetism, charged particle, charged particle motion, magnetic field, energy dissipation

ABSTRACT: The authors have analyzed the movement of charged particles in a magnetic field by the phase plane method both in a conservative approximation and with consideration of losses of their kinetic energy due to radiation, thus providing a qualitative picture of the influence of kinetic energy losses on the particle trajectory. These losses were considered in the form of small dissipation perturbations of the conservative approximation. The authors succeeded in demonstrating the existence of certain critical trajectories, at which particle seizure by the magnetic field occurs at arbitrarily small energy losses. (It is obvious that at small, but finite, energy losses, seizure may also occur in the case of other trajectories, close to critical.) The phase plane method was found to be particularly convenient when studying the movement of the particle in a complex

Card 1/2

ACCESSION NR: AP4009624

field, containing a dipolar and homogeneous (external) component. The authors considered conservative approximations and their dissipation perturbations for three idealized situations: a) magnetic dipole with no external magnetic field present; b) magnetic dipole in space with uniform magnetic field parallel to the magnetization vector of the dipole's magnetic field and located in its equatorial plane; and c) magnetic dipole in space with uniform magnetic field antiparallel to the magnetization vector of the dipole's magnetic field and located in its equatorial plane. The analysis was conducted in the magnetic plane of the dipole. In the first case (movement of a charged particle in the field of a magnetic dipole in the absence of an external magnetic field), the differential equation for the "phase trajectory" of the motion of the charged particle was discussed. Following this, "isoclines" and a "field of directions" were constructed in the phase plane in a conservative approximation. Phase trajectory behavior was considered at large and small values of u and w, as well as the trajectories of charged particles in a magnetic field which correspond to the phase trajectories, both with and without consideration of energy dissipation. With few exceptions, this treatment was also followed in the case of the other two ideal hypotheses. Orig. art. has: 19 figures and 43 formulas.

ASSOCIATION: none

Card 2/3

ACCESSION NR: AP4034802 S/0293/64/002/002/0296/0303

AUTHOR: Vakhnin, V. M.

TITLE: Evolution of the circular orbit of a satellite of the terrestrial spheroid

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 2, 1964, 296-303

TOPIC TAGS: artificial satellite, artificial satellite circular orbit, artificial satellite orbit, artificial satellite orbital element

ABSTRACT: Circular orbits are desirable for certain types of artificial satellites, but such an orbit usually cannot be achieved in a noncentral gravitational field and the character of a circular satellite orbit has been insufficiently studied. In this paper, the author analyzes solutions of equations in osculating elements, determined by means of the small parameter (ε) method to find analytical relationships describing the perturbed motion of an artificial satellite under the influence of the second zonal spherical harmonic of the earth's gravitational potential. The derived equations are used for a qualitative investigation of the form and position of circular and almost circular osculating satellite orbits. The solutions can be of interest in computing the trajectories of perturbed motion of an artificial satellite. The paper consists of the following sections: 1 - Solution of equations in osculating elements by the small parameter method; 2 - Charac-

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ACCESSION NR: AP4034802

teristic orbital inclinations of satellite circular orbits; 3 - Properties of osculating orbits; 4 - Extremal satellite positions; 5 - Change in initial conditions. Influence of quasi-secular part; 6 - Osculating nearly circular satellite orbit. "The author wishes to thank M. D. Kislik, D. Ye. Okhotsimskiy and N. N. Moiseyev for discussions of the results and V. D. Siesareva, who made many of the computations. He also expresses thanks to A. A. Orlov and I. V. Babushkina who read the manuscript and made valuable comments". Orig. art. has: 30 formulas, 12 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 19Nov63 DATE ACQ: 20May64 ENCL: 00

SUB CODE: AA, SV NO REF SOV: 003 OTHER: 001

Card 2/2

EPA(a)/EWT(l) ... RIAAP/ESD/ASD(p)-3/SSD/AFMDC/ASD(a)-5/AFWL/AEDCA/
ESD ... S/0293/64/002/005/0773/0778

ACCESSION NR AP4046780

AUTHOR: Vakhnin, V. M.; I. N. Shvachunov

TITLE: Possibility of the trapping of charged particles by the field of a magnetic dipole accompanied by energy loss in radiation

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 5, 1964, 773-778

TOPIC TAGS: charged particle, magnetic dipole, particle trapping

ABSTRACT: The investigation of the possibility of trapping of charged particles ... earlier for a planar (two-dimensional) ... arbitrary three-dimensional movement, is ... method in four-dimensional phase space. ... movement of a particle. The ... It is shown that "critical" traj... also exist in three-dimensional movement. The authors ... possibility of trapping ... following system of differential equations for describing the ... four-dimensional phase space have ...

$$\frac{du}{dw} = \frac{\varepsilon}{u}\psi^2 + \ldots$$

[illegible]

Card 1/3

$$\frac{d\varphi}{dw} = \frac{\sin\theta\cos\theta}{\psi^2} + 2\psi^2 \operatorname{tg}\theta - \frac{1}{\psi u}\left[\frac{\partial u}{\partial \theta} - 2\sin\theta\cos\theta - \right.$$

$$\left. - 2\psi^2 \operatorname{tg}\theta \left(\cos^2\theta - \right)\frac{\partial u}{\partial \varphi} + \psi^2\right]$$

$$\frac{d\theta}{dw} = \frac{d\theta}{d\varphi}\frac{d\varphi}{dw} = \frac{\psi}{u}. \qquad (3)$$

The minus sign before the brackets in (1) corresponds to segments of trajectories with positive curvature, the plus sign corresponds to segments of trajectories in four-dimensional phase space in the plane (θ, ψ) [illegible] negative curvature. [illegible] from (3) and (4)

$$\frac{d\psi}{d\theta} = 2\psi \operatorname{tg}\theta - \frac{\sin\theta\cos\theta}{\psi^3} + \frac{1}{\psi u}\left[\frac{\partial u}{\partial \theta} - 2\sin\theta\cos\theta - 2\psi^2 \operatorname{tg}\theta\right] \times \qquad (4)$$

Card [illegible]

L 6654-65
ACCESSION NR: AP4046780

where w = const, u = const. Special cases are considered. It is shown that a point characterizing the motion of a charged particle along a path close to critical, as a result of energy loss by the particle in radiation, can intersect the three-dimensional hypersurfaces of separatrices and change from an "untrapped" to a "trapped" path. The process of intersection of the separatrices is similar to [illegible] Zakhair and G. A. Skuridin, [illegible] and I. N. Shvachunov, [illegible]

ASSOCIATION: None

SUBMITTED: 14Mar64 ENCL: 00 SUB CODE: EM,NP

NO REF SOV: 006 OTHER:

Card 1/1

L 10587-66 FBD/EWT(1) GW/WS-2

ACC NR: AP6000308 SOURCE CODE: UR/0293/65/003/006/0917/0926

AUTHORS: Vakhnin, V. M.; Lebedinskiy, A. I.

ORG: none

TITLE: On the nature of radio noise radiation from the surface of Venus

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 6, 1965, 917-926

TOPIC TAGS: Venus planet, cosmic radiation, cosmic radiation energy, gas discharge, radio astronomy

ABSTRACT: The increased level of radiowave radiation from Venus (600--700K) may be explained as "quiescent" or "glow" discharges in the upper atmosphere, creating a gain in radiated noise 200--300K above normal thermal radiation. Two hypotheses are advanced in explanation of the phenomenon: 1) the radiation comes from the surface of the planet which is heated by means of the "hotbed" effect in the atmosphere (see C. Sagan, Science, 133, No. 3456, 1961), and 2) the radiation is created by the motion of charged particles in heated and extremely rarefied layers of the Venusian ionosphere (C. Sagan, op. cit. and D. E. Jones. "Planet", Space Science 5, No. 2, 1961). A review of some of the literature pertaining to the study of the same problem is given. The authors present and discuss some of the data obtained during the operation of the Mariner-2 satellite. It is felt that the Mariner data are insufficient in detail. Several reasons are given in demonstrating that neither the hotbed nor the ionosphere

UDC: 523.42:523.164

Card 1/2

L 10587-66
ACC NR: AP6000308

hypothesis is completely sound on a theoretical basis. It is proposed that solar energy is transformed into radio noise by two means: ordinary hot body radiation and glow discharge radiation. The solar heat energy goes through a sequence of atmospheric flow energy, atmospheric electrical currents, and finally gaseous discharge radio noise. The surface temperature of Venus and the temperature characteristic of the radio noise are related in context with the authors' hypothesis. Supporting data on observed gas discharges from experiments are given. Orig. art. has: 3 figures and 10 equations.

SUB CODE: 03/ SUBM DATE: 26Feb65/ ORIG REF: 007/ OTH REF: 010

Card 2/2

ACC NR: AP6019461 (N) SOURCE CODE: UR/0384/66/000/001/0079/0081 81 B

AUTHOR: Vakhnin, V. M. (Candidate of physico-mathematical sciences); Lebedinskiy, A. I. (Professor)

ORG: none

TITLE: Radio noise and the temperature on Venus

SOURCE: Zemlya i vselennaya, no. 1, 1966, 79-81

TOPIC TAGS: radio noise, Venus probe, space temperature, glow discharge, rarefied gas

ABSTRACT: The use of radio signals emitted by Venus to study its surface temperature is discussed. A theoretical explanation of Venus' apparently high temperature surface (considering the "hot house effect", the ionospheric hypothesis and the contradiction of this hypothesis by the peculiarities of radio signals emitted from Venus) is presented. The electric glow discharge in rarefied gases in relation to the very slow speed with which the planet Venus rotates around its axis and the possible existence of high velocity global breezes which do not create disturbances are considered. It is proposed that the atmospheric current going through the upper layers of the atmosphere of the planet Venus creates a continuous glow discharge resulting in powerful radio noise and a low degree of luminescence. The proposed explanation is substantiated by experimental data and can be explained theoretically. If this interpretation is correct, then

Card 1/2

ACC NR: AP6019461

the surface temperature of Venus would be between 50-60°C. Orig. art. has: 3 figures.

SUB CODE: 22, 17/ SUBM DATE: none

Card 2/2

L 06165-67 EWT(1)/FSS-2 TT/GW

ACC NR: AP6032853 SOURCE CODE: UR/0020/66/170/003/0560/0560

AUTHOR: Vakhnin, V. M.; Zmiyevskaya, G.I.

ORG: none

TITLE: Stratified and faceted forms in panoramas obtained by the Luna-9 station

SOURCE: AN SSSR. Doklady, v. 170, no. 3, 1966, 560 and insert facing p. 560

TOPIC TAGS: lunar surface, moon, lunar study, lunar station/ Luna-9

ABSTRACT: The complicated structures of characteristic and repeated forms of the lunar surface on panoramic pictures obtained by the Soviet lunar station "Luna-9" are described. Among these are forms which can be characterized as complex polyhedrons consisting of small flat regions. In many places on photographs the boundary between the light and the shadow consists of straight lines cast by objects with straight and flat faces. The first figure in the text shows the blocked structure formed by polyhedrons. The second figure contains several stratified structures which are bordered by two parallel and nearly vertical faces of large dimensions. Both ends of these structures have an irregular shape, but in many cases show indented surfaces.

UDC: 550.2

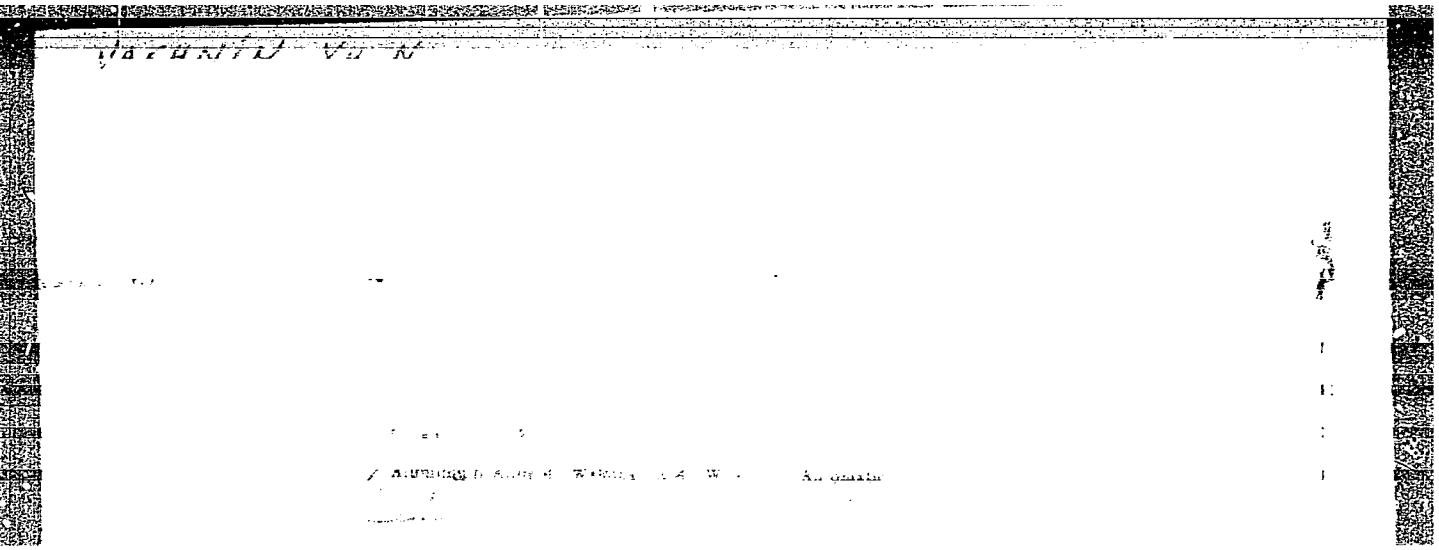
Card 1/2

L 06165-67
ACC NR: AP6032853

The strata were estimated to be 0.8--1.5 cm thick. The third figure shows a part of the first figure with a prominent rock having an indented surface and funnel-shaped pits. The other part of the fragment consists of rocks with indented surfaces and irregularly shaped sides. Based on the lunar photographs, it is concluded that the lunar surface consists of many stratified rocks. Orig. art. has: 3 figures.

SUB CODE: 03/ SUBM DATE: 14 Jun66/ ORIG REF: 001/ OTH REF: 000

Card 2/2 mfc



VAKHNIN, Yu.N.

AID P - 5413

Subject : USSR/Engineering

Card 1/1 Pub. 11 - 3/13

Authors : Kasatkin, B. S., N. I. Kakhovskiy, and Yu. N. Vakhnin

Title : Carbon dioxide welding of alloyed steels

Periodical : Avtom. svar., 5, 19-21, My 1956

Abstract : The authors describe the results of experiments in the development of suitable electrodes for carbon dioxide welding of alloyed steels and present data on the powdered electrode wires as most adaptable to the purpose. Three graphs and 1 table; 2 Russian references (1955) and 1 German reference (1956).

Institution : Electrowelding Institute im. Paton.

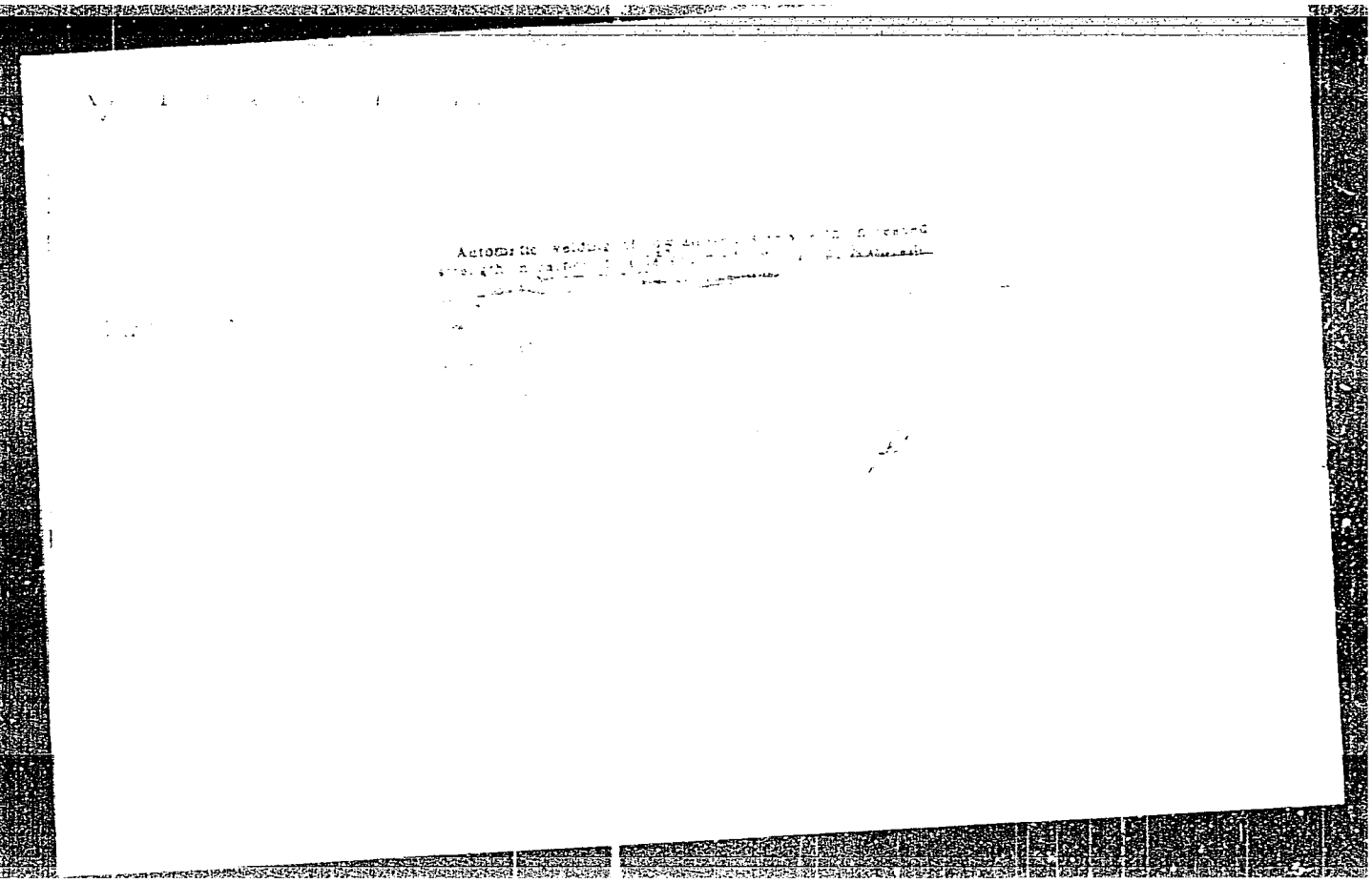
Submitted : No date

VAKHNIN, Yu. N.

KASATKIN, B.S., kand. tekhn. nauk; KAKHOVSKIY, N.I., kand. tekhn. nauk; VAKHNIN, Yu.N., insh.

Gas-electric welding of steam turbine diaphragms. Teploenergetika 4 no.12:42-47 D '57. (MLRA 10:11)

1. Institut elektrosvarki USSR.
(Steam turbines--Welding)



VAKHNIN, Yu. N.

KASATKIN, B.S., kandidat tekhnicheskikh nauk; KAKHOVSKIY, N.I., kandidat teknnicheskikh nauk; VAKHNIN, Yu.N., inzhener.

Automatic welding of 15KhMA heat resistant steel in an atmosphere of carbon dioxide. Avtom.svar. 10 no.3:28-38 My-Je '57. (MLRA 10:8)

1.Ordena Trudovogo Krasnogo Znameni Institut elektrosva ki imeni Ye.O. Patona Akademii nauk USSR.
(Heat-resistant alloys--Welding)
(Protective atmospheres)

AUTHORS: Kasatkin, B.S., and VAKHNIN, Ya.N. SOV 125-58-3-

TITLE: Welding Heat Resistant 20KhMF-Steel in Carbon Dioxide (Svarka v srede uglekislogo gaza teploustoychivoy stali 20 KhMF)

PERIODICAL: Avtomaticheskaya svarka, 11, Nr 3, 1958, pp 3-11 (USSR)

ABSTRACT: The described technology of welding 20KhMF steel in carbon dioxide was developed by the Institute of Electrowelding at the request of the Kharkovskiy Turbinnyy Zavod (Kharkov Turbine Plant) and the Bryanskiy Mashinostroitel'nyy Zavod (Bryansk Machine Building Plant). Information is presented on experiments and results of tests. The following conclusions were made: Welding of heat resistant 20KhMF steel in carbon dioxide can be successfully performed with special wires of the following composition: 1) powder wires containing up to 0.14% C, 1.7 to 2.0% Mn, 0.6 to 0.8% Si, 0.8 to 1.1% Cr, 0.5 to 0.6% Mo, 0.2 to 0.3% V, S and P not over 0.3% each; 2) metallic wires containing up to 0.10% C, 1.4 to 1.8% Mn, 0.6 to 0.8% Si, 0.8 to 1.1% Cr, 0.5 to 0.6% Mo, 0.2 to 0.3% V, S and P not over 0.03% each. The [illegible] of the heat treatment is also described.
The article contains 6 tables, 2 figures, 4 graphs and 5 Soviet references.

Card 1/2

SOV/125-58-12-2/13

AUTHORS: Kasatkin, B.S., Kareta, N.L., Vakhnin, Yu.N., and German, S.I.

TITLE: The "White" Band in "15KhlM1F" Grade Welded Joints ("Belaya" poloska v svarnykh soyedineniyakh iz stali 15KhlM1F)

PERIODICAL: Avtomaticheskaya svarka, 1958, Nr 12, pp 12-16 (USSR)

ABSTRACT: Tests were carried out for the purpose of determining the origin of the so-called "white" band in weld joints near seams which are subjected to various structural deformations, particularly noticeable in etching with nitric acid. It was stated that the white strip formation depends on residual plastic deformations in heat zones below the Ac_1 point. The white strip metal has a deformed crystalline lattice and an increased carbon and nitrogen content in the solid solution. The formation of the white band and ageing zone are of a similar nature, depending mainly on residual plastic deformation and not on the high cooling rate from temperatures below Ac_1.
There are 3 sets of microphotos, 2 tables and 6 Soviet references.

Card 1/2

The "White" Strip in "15KhlM1F" Grade Steel Joints SOV/125-58-12-2/13

ASSOCIATIONS: Institut elektrosvarki imeni Ye.O. Patona (Institute of Electric Welding imeni Ye.O. Paton). Khar'kovskiy turbinnyy zavod imeni Kirova (The Kharkov Turbine Plant imeni Kirov)

SUBMITTED: August 21, 1958

Card 2/2

VAKHNIN, Yu. N.

25(1) PHASE I BOOK EXPLOITATION SOV/3421

Akademiya nauk UkrSSR, Kiyev, Institut elektrosvarki imeni akademika Ye.O. Patona

Vnedreniye novykh sposobov svarki v promyshlennost', vyp. 2 (Introduction of New Welding Methods in Industry; Collection of Articles, No. 2) Kiyev, Gos. izd-vo tekhn. lit-ry Ukrainskoy SSR, 1959. 194 p. Errata slip inserted. 3,000 copies printed.

Ed.: V. Garkusha; Tech. Ed.: S. Matusevich.

PURPOSE: This book is intended for workers in the welding industry.

COVERAGE: The book contains a discussion of welding techniques and problems by groups of scientists and welders. Much attention is given to problems in the application of new methods of mechanized welding and electro-slag welding. This is the second collection of articles under the same title prepared and published by the Institut elektrosvarki imeni Ye.O. Patona (Institute of Electric Welding imeni Ye.O. Paton). The preface is written by B.Ye. Paton, Academician of the Ukrainian Academy of Sciences and Winner of the Lenin Prize. There are no references.

Kazimirov, A. A. [Candidate of Technical Sciences; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton)], and V. F. Zabotin [Chief Engineer; Khersonskiy sudostroitel'nyy zavod (Kherson Shipbuilding Plant)]. Automatic Welding in Shipbuilding 124

Vakhnin, Yu. N. [Engineer], B. S. Kasatkin [Candidate of Technical Sciences], M. I. Makhovskiy [Candidate of Technical Sciences], A. M. Ponizovtsev [Engineer; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton)], S. I. German [Candidate of Technical Sciences, Chief of Welding Laboratory; Khar'kovskiy turbinnyy zavod imeni S. M. Kirova (Khar'kov Turbine Plant imeni S. M. Kirov)], and Z. L. Klimovitskiy, Chief of Welding Section; Bryanskiy mashinostroitel'nyy zavod (Bryansk Machinery Plant)]. Carbon-dioxide Shielded Welding in Production of Steam Turbines 137

Zaruba, I. I. [Candidate of Technical Sciences], and A. G. Potap'yevskiy [Senior Engineer; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton)]. Introduction of Automatic and Semi-automatic Carbon-dioxide Shielded Welding 148

Medovar, B. I. [Candidate of Technical Sciences], A. G. Potap'yevskiy [Senior Engineer; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton)], F. A. Ratin [Senior Engineer], S. V. Yunger, Supervisor of the Welding Laboratory; Stalingradskiy filial Giproneftemash (Stalingrad Branch of State Design and Scientific Research Institute for Petroleum Machinery)], and S. A. Zandberg [Chief of Welding Office; Stalingradskiy mashinostroitel'nyy zavod imeni Petrova (Stalingrad Machinery Plant imeni Petrov)]. Development and Introduction of New Technique in Automatic Submerged-arc Welding of Two-ply Steel With Stainless Chromium Facing 157

[illegible] [Engineer]; [illegible] [Candidate of Technical Sciences; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton)], V. A. Verchenko, [Engineer; trest "Prodmontazh" (Production Assembly Trust)], and I. M. Mirgorodskiy [Chief Engineer; zavod "Bol'shevik" ("Bol'shevik" Plant)]. Experience Gained in Welding Containers Made of Aluminum and Its Alloys 173

Asnis, A. Ye. [Candidate of Technical Sciences; Institut elektrosvarki imeni Ye. O. Patona (Electric Welding Institute imeni Ye. O. Paton)], N. G. Gavrilenko [Engineer], A. V. Prokhorov [Engineer; Zhdanovskiy zavod imeni Il'icha (Plant imeni Il'ich in Zhdanov), and S. V. Yunger [Engineer; Stalingradskiy filial Giproneftemash (Stalingrad Branch of State Design and Scientific Research Institute for Petroleum Machinery)]. High-strength Steels for Weldments 183

AVAILABLE: Library of Congress (TS 227.A359)

VK/fal
5-4-60

Card 7/7

18(7) SOV/125-59-8-12/18

AUTHORS: Lakomskiy, V.I., and Vakhnin, Yu.N.

TITLE: The Influence of the Moisture Content of CO_2 on the Hydrogen Content in the Metal of a Seam

PERIODICAL: Avtomaticheskaya svarka, 1959, Nr 8, pp 85-89 (USSR)

ABSTRACT: This article deals with moisture in gas bags containing carbonic gas, and the effects of this moisture on the hydrogen content of seam metal welded with this gas. It is stated that gas bags with carbon dioxide often contain up to 400-500 g of water in a free state which remains in the bags due to insufficient emptying of them after washing. An experimental check has shown that the moisture of the (CO_2) gas increases more than 3 times for a change in pressure in the gas bag from 50 to 5 atmospheres (Table 1). Moisture of the gas was measured by the absorption method, described. Pouring off the water or using a drying agent (silica gel) produced similar results (Fig 1). For a sharp reduction in moisture of CO_2 the bags should be carefully dried out after washing, in which case the moisture of

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The Influence of the Moisture of CO_2 on the Hydrogen Content in the Metal of a Seam

the gas in the bag is insignificantly small, and is not a function of gas pressure. It has been shown /Refs 6 and 7/ that during gas-electric welding in a carbonic gas medium the hydrogen content of the seam is greater with an increase in the moisture of the gas; carbonic gas with a low dew point (low moisture content) is recommended. Samples for determination of hydrogen content were turned from a cylinder which was fused to a plate of Kh18N9T steel 10 mm thick using austenitic wire type Kh18N9T, 2 mm in diameter. Welding conditions: I (welding) = 240 A, E = 26-27 V, welding speed = 16 m/hr, using DC current, reverse polarity; the wire was fed at 228 m/hr, gas at 1000 l/hr. Hydrogen content was determined by a vacuum heating method at 800 degree. In the basic metal 5.5 ml/100 g, and in the wire 5.0 ml/100 g of hydrogen were detected. The influence of the moisture of the gas on the hydrogen content in the seam, established for austenitic steel type Kh18N9T, was checked by weld-

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The Influence of the Moisture of Carbonic Gas on the Hydrogen Content in the Metal of a Seam

ing low-carbon steel St.3 kp with Sv-10GS wire. Hydrogen content as a function of moisture was determined (Fig 2 and Table 2). It was found that hydrogen content in the seam metal with gas-electric welding is in direct relation to the moisture of the gas. To stimulate the formation of pores in the seam metal at an increased moisture level, experiments were carried out on angle seams under the following welding conditions: I (welding) = 320 A, E = 28-30 V, welding speed = 18 m/hr, using DC current, reverse polarity, and a gas flow rate of 1000 l/hr. At a moisture content (gas) of 1.92 g/m^3 and a hydrogen content of 4.7 ml/100 g, single pores were observed in the seam; with a moisture content of 15 g/m^3, corresponding to a hydrogen concentration of 5.5 ml/100 g, the seam was full of pores. In addition, the higher the concentration of hydrogen in the seam, the greater the area of macrocrystalline fracture. Experiments were carried out to determine the chemical composition of the gas phase

The Influence of the Moisture of Carbonic Gas on the Hydrogen Content in the Metal of a Seam

in the arc zone during gas-electric welding of Kh18N9T steel. A semi-micro-gas analyzer, constructed at the Institut elektrosvarki imeni Ye.O. Patona (Institute of Electric Welding imeni Ye.O. Paton), permitting analysis of gas samples of 1-3 ml, was used. Selected samples of steel, welded in a carbonic gas medium, dried by silica gel, contained 5-8% H_2, 58-65% CO, and 27-37% CO_2. With an increase in the moisture of the gas, the content of hydrogen in the atmosphere surrounding the arc increases. A single case was observed in which hydrogen reached 57%; a larger number of pores were found in the fused metal. In conclusion it is noted that silica gel is a sufficiently effective drying agent for carbonic gas, especially at low pressures. There are 2 graphs, 2 tables and 7 references, 6 of which are Soviet and 1 English.

SOV/125-59-8-12/18

The Influence of the Dampness of Carbonic Gas on the Hydrogen Content in the Metal of a Seam

ASSOCIATION: Ordena trudovogo krasnogo znameni - Institut elektrosvarki imeni Ye.O. Patona (Order of the Red Banner of Labor - Institute of Electric Welding imeni Ye.O. Paton) AN USSR (AS Ukr SSR)

SUBMITTED: May 7, 1959

Card 5/5

VAKHNIN Yu. N.

66567

SOV/125-59-11-2/22

~~18 (2, 3, 5)~~ 18.7200

AUTHORS: Kasatkin, B.S., Candidate of Technical Sciences, and Vakhnin, Yu.N., Engineer

TITLE: Automatic Carbon Dioxide Shielded Arc Welding of Steel 15Kh1M1F

PERIODICAL: Avtomaticheskaya svarka, 1959, Nr 11, pp 13-19 (USSR)

ABSTRACT: Chrome-molybdenum-vanadium steel 15Kh1M1F is widely used in steam-turbines. It has a high fluidity limit (33-32 kg/mm^2); its limit of lasting durability at 570°C during 100,000 hours is 8.6-9.2 kg/mm^2; creep limit - 5.0 kg/mm^2 at 570°C. When welding, it is recommended to preliminarily heat it up to 300°C, as the process of austenite decomposition in this steel takes a comparatively long period of time. In this article, carbon dioxide shielded arc welding applied to steel 15Kh1M1F is described. The welding was performed by reverse polarity direct current. Conditions of welding were: Current intensity - 320-350 amp; arc voltage - 28-30 volt; electrode feed speed - 18 m/

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Automatic Carbon Dioxide Shielded Arc Welding of Steel 15KhlMlF

hour. Experimental, powder wire electrodes of different chemical compositions were used. When selecting electrodes, the following scientific literature was consulted: [1] B.S. Kasatkin, N.I. Kakhovskiy, and Yu.N. Vakhnin "Automatic Welding of Heat-Resistant Steel 15KhMA in Carbon Dioxide Atmosphere", published in "Avtomaticheskaya svarka", Nr 3, 1957; [2] N.I. Kakhovskiy and A. M. Ponizovtsev "Automatic Welding of Heat-Resistant Steel 20KhMA in Carbon Dioxide Atmosphere", published in "Svarochnoye proizvodstvo", Nr 2, 1958; [3] B.S. Kasatkin and Yu.N. Vakhnin "Welding of Heat-Resistant Steel 20KhMF in Carbon Dioxide Atmosphere", published in "Avtomaticheskaya svarka", Nr 3, 1958; [4] B.S. Kasatkin, N.I. Kakhovskiy and Yu.N. Vakhnin " On the Question of Welding High-Alloy Steel in Carbon Dioxide Atmosphere", published in "Avtomaticheskaya svarka", Nr 5, 1956. Research of weld obtained on steel 15KhlMlF permitted establishing its optimum chemical composition: not over 0.1% C; 0.85-1% Mn; 0.3-0.4% Si; 1.3-

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Automatic Carbon Dioxide Shielded Arc Welding of Steel 15Kh1M1F

1.5% Cr; 0.9-1.2% Mo; 0.3-0.4% V; not over 0.03% of each S and P. Mechanical properties of weld metal are given in Table 1. On the basis of numerous experiments the following conclusions were drawn: 1) Welding heat-resistant perlite steel 15Kh1M1F can be done by carbon dioxide shielded arc with the application of special electrode wires; the welds obtained possess mechanical properties similar to those of the base metal; lasting durability and the creep limit of weld metal are not lower than those in steel 15Kh1M1F. 2) Welded joints have stable properties and structure at temperatures 570-620°C. There are 3 graphs, 5 tables, 4 photographs and 6 Soviet references.

ASSOCIATION: Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki imeni Ye.O. Patona AN USSR (Order of the Red Banner of Labor Institute of Electric Welding imeni Ye.O. Paton AS UkrSSR)

SUBMITTED: April 13, 1959

Card 3/3

S/125/60/000/011/011/016
A161/A133

1.2300

AUTHORS: Kasatkin, B.S., and Vakhnin, Yu.M.

TITLE: CO_2-shielded welding of 34KhM steel and its joints to EI415 steel

PERIODICAL: Avtomaticheskaya svarka, no. 11, 1960, 62-66

TEXT: The two steel grades 34ХМ (34KhM) and ЭИ415 (EI415) are often used for steam turbines. Their composition (in %) is:

Steel	C	Si	Mn	Cr	Mo	V	W	Ni	S (not above)	P (not above)
34KhM	0.30-0.40	0.17-0.37	0.40-0.70	0.90-1.30	0.20-0.30	-	-	≤0.5	0.035	0.030
EI415	0.16-0.24	≤0.4	0.25-0.60	2.4-3.3	0.35-0.55	0.60-0.85	0.30-0.50	≤0.5	0.030	0.035

The recommended heat treatment consists in quenching at 750-870°C and tempering at 630-640°C for 34KhM; annealing at 950-960°C, normalization at 1050-

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CO_2-shielded welding of 34KhM steel...

1100°C, quenching at 1020-1050°C in oil, and tempering in 660-680 C for EI-415. The Electric Welding Institute im.Paton has obtained welded joints with high mechanical properties in 24-26 mm deep base metal by preliminary and simultaneous heating to 350°C, welding in 10-12 passes with Св-08ХГСМФА (Sv-08KhGSMFA) welding wire of 2 mm diameter and 3 mm powder wire, 350-370 amp and 28-30 volt current, and 16 m/h welding speed. The hardness of the joints after tempering at 640° was 190-270 HB, and this tempering temperature was chosen for both kinds of joints. The fatigue strength of the weld metal was higher than required by the specifications and approached that of base metal. The endurance limit at 480° was 20 kg/mm^2 and met the requirements for34KhM steel. The following conclusions are made: 1) CO_2-shielded arc welding can be used for joints of 34KhM steel and unions of the 34KhM and EI415 steel grades. The new technology ensures properties near the 34KhM base metal in weld metal and welded joints. Welded joints have a high endurance limit at 480° and a high fatigue strength. 2) The Св-08ХГСМФА (Sv-08KhGSMFA) electrode wire according to ЧМТУ ЦНИИЧМ 166-59 (ChMTU-TsNIIChM 166-59) specifications is recommended for joints of 34KhM steel and unions between the 34KhM and EI415 steels. There are 3 figures and 5 Soviet references.

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CO_2-shielded welding of 34KhM steel...

ASSOCIATION: Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im.Ye. O.Patona AN USSR ("Order of the Red Banner of Labor" Electric Welding Institute im.Ye.O.Paton of the Academy of Sciences of the Ukrainskaya SSR

SUBMITTED: May 9, 1960

Card 3/3

VAKHNINA, A.S., et al.

Agriculture

Pasturing cattle. Syktyvkar, Komi-Gos. izd-vo, 1951.

Monthly List of Russian Accessions, Library of Congress, November 1952, Unclassified.

VAKHNINA, L.

Reporting on "Mosfilm." Znan.ta pratsia no.9:16-17 S '62. (MIRA 15:11)

(Motion-picture plays)

1. BELYY, N. L.; VAKHNINA, O. A. ; KOSHELENKO, L. P.

2. USSR (600)

4. Dneprodzerzhinsk - Pharmacy

7. Dneprodzerzhinsk Branch of the Dnepropetrovsk Province Section. Apt. delo. No. 5. 1952

9. Monthly List of Russian Accessions, Library of Congress, January 1953. Unclassified.

1. BELYY, N. L.; VAKHNINA, O. A.; KOSHELENKO, L. P.

2. USSR (600)

4. Pharmacy - Dneprodzerzhinsk

7. Dneprodzerzhinsk Branch of the Dneporpetrovsk Province Section. Apt.delo. no.5, 1952.

9. Monthly List of Russian Accessions, Library of Congress, January 1953. Unclassified.

SOV/19-58-6-399/685

AUTHOR: Vakhnina, V.V.

TITLE: An Input Device for a Radiospectroscope (Vkhodnoye ustroystvo radiospektroskopa)

PERIODICAL: Byulleten' izobreteniy, 1958, Nr 6, p 89 (USSR)

ABSTRACT: Class 42h, 20_{01}. Nr 113438 (574756 of 11 Jun 1957). Submitted to the Committee for Inventions and Discoveries at the Ministers Council of USSR. An input device increasing the sensitivity of a radiospectroscope, in the form of two resonators connected by an aperture in the dividing wall, the shape and the dimensions of the aperture so chosen that the oscillations of one resonator cannot excite oscillations in the other in the absence of the substance under examination absorbing high-frequency radiation and placed in one of the resonators near the aperture.

Card 1/1

VAKHNINA, V.V.

PHASE I BOOK EXPLOITATION SOV/5247

2,(1,8)

Moscow. Inzhenerno-fizicheskiy institut

Nekotoryye voprosy eksperimental'noy fiziki, vyp. 1 (Some Problems in Experimental Physics, Nr 1) Moscow, 1959. 85 p. 3,000 copies printed.

Sponsoring Agency: Ministerstvo vysshego i srednego spetsial'nogo obrazovaniya SSSR.

Ed.: V.F. Semenov, Candidate of Physical and Mathematical Sciences, Docent; Tech. Ed.: R.A. Negrimovskaya.

PURPOSE: This book is intended for physicists, chemists and other persons interested in general problems of nuclear physics and physical and chemical analyses.

COVERAGE: The collection contains 10 articles dealing with problems in elementary particle acceleration, radiography and crystal structure, physical and chemical analysis and instrumentation in these fields. References and mention of personalities accompany each article.

AVAILABLE: Library of Congress

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3-21-60

Card 3/3

VAKHNINA, V.V.

PHASE I BOOK EXPLOITATION SOV/3556

Moscow. Inzhenerno-fizicheskiy institut

Nekotoryye voprosy eksperimental'noy fiziki; [sbornik] vyp. 2 (Some Problems in Experimental Physics; Collection of Articles. Nr. 2) Moscow, Atomizdat, 1959. 123 p. 3,200 copies printed.

Sponsoring Agency: RSFSR. Ministerstvo vysshego i srednego spetsial'nogo obrazovaniya.

Ed.: B.M. Stepanov, Doctor of Physical and Mathematical Sciences, Professor; Tech. Ed.: S.M. Popova.

PURPOSE: This collection of articles is intended for graduate engineers and physicists engaged in the design of physics (laboratory) apparatus, and automatic and telemechanic equipment.

COVERAGE: This collection of articles on experimental physics was written by members of the Moscow Physics and Engineering Institute. Each article is accompanied by drawings and references.

SEMENOV, V.F.; VAKHNINA, V.V.

Signal-to-noise ratio of the radiospectroscope input. Mek. vop. eksp. fiz. no.1:45-52 '59. (MIRA 13:2)
(Radiofrequency spectroscopy)

VAKHNINA, V.V.; SEMENOV, V.F.

Balancing type design of an electronic paramagnetic resonance radiospectroscope. Nek.vop.eksp.fiz. no.2: 117-123 '59. (MIRA 13:2)
(Radiofrequency spectroscopy)
(Paramagnetic resonance and relaxation)

VAKHNITSKIY, A.S.

KARAPATA, A.P., kand.med.nauk; VAKHNITSKIY, A.S.

A case of Takayashi's disease (multiple obliterating panarteritis) (MIRA 10:12)
Sov.med.21 no.8:132-133 Ag '57.

1. Iz Krivorozhskogo nauchno-issledovatel'skogo instituta gigiyeny truda i professional'nykh zabolevaniy (dir. - kandidat meditsinskikh nauk Ye.I.Stezhenskaya)

(AORTA, dis.
aortic arch synd., Takayasu type (Rus))
(ARTERITIS
aortic arch synd., Takayasu type (Rus))

VAKHNITSKIY, A.S. (Krivoy Rog)

Pathology of the nervous system in acute leukemia. Vrach. delo no.4: 381-383 Ap '59. (MIRA 12:7)

1. Kafedra nervnykh bolezney (zav. - deyst. chlen AMN SSSR, prof. B.N. Man'kovskiy) Kiyevskogo meditsinskogo instituta, gematoterapevticheskaya klinika (rukovoditel' - dotsent A.A. Vakar) Kiyevskogo nauchno-issledovatel'skogo instituta perelivaniya krovi i neotlozhnoy khirurgii.
(LEUKEMIA) (NERVOUS SYSTEM--DISEASES)

VAKHNITSKIY, A. S.

Cand Med Sci - (diss) "Pathology of the nervous system in leucoses." Chernovtsy, 1960. 16 pp; (Chernovtsy Med Inst); 200 copies; price not given; (KL, 7-61 sup, 257)

VAKHNITSKIY, A.S. (Krivoy Rog)

Diseases of the nervous system in chronic leucoses. Vrach.delo no.5: 533-534 My '60. (MIRA 13:11)
(NERVOUS SYSTEM--DISEASES)

VAKHNITSKIY, A., kand.med.nauk

This illness could be conquered. Sov. profsoiuzy 19 no.12:30-31 Je '63. (MIRA 16:8)

(Vibration--Physiological effect)

VAKHNITSKIY, A.S.

Clinical aspects and pathology of lesions of the nervous system in leukemia. Trudy Kiev. nauch.-issl. inst. perel. krovi i neotlozh. khir. 3:188-193 '61. (MIRA 17:10)

1. Kiyevskiy meditsinskiy institut imeni Bogomol'tsa i Kiyevskiy institut perelivaniya krovi.

VAKHNOVETSKIY, I. P.

Boots and Shoes - Trade and Manufacture

New process of series reproduction of models. Leg. prom. 12, no. 5, May 1952.

9. Monthly List of Russian Accessions, Library of Congress, August 1952. Unclassified.

VAKHNOVSKIY, S.S.; ZASTYRETS, M.V.; KULYAVTSEV, V.I.; REZNIK, A.F.; SLOBODINSKIY, Kh.Ya.

Assembly conveyer with driers. Leg.prom.17 no.9:41-42 S '57. (MIRA 10:12)

(Shoe industry) (Conveying machinery)

VAKHNOVSKIY, S.S.; ZASTYRETS, M.V.; KULYAVTSEV, V.I.; REZNIK, A.F.; SLOBODINSKIY, Kh.Ya.

New design of shoe drying stands. Leg. prom. 18 no.2:31-32 F '58. (MIRA 11:2)
(Shoe manufacture) (Drying apparatus)

SHUTYAK, V.M.; VAKHNOVSKIY, S.S. [Vakhnovs'kyi, S.S.]

Clicking shop of the "Progress" Shoe Factory in Lvov. Leh.prom. no.4:3-7 O-D '62. (MIRA 16:5)
(Lvov--Shoe industry)

VAKHOBOV, A.V.

Ash composition of the natural vegetation on dark Sierozems of the Gissar Valley. Dokl. AN Tadzh. SSR 6 no.4:28-32 '63.
(MIRA 17:4)

1. Tadzhikskiy nauchno-issledovatel'skiy institut pochvovedeniya Gosudarstvennogo komiteta po khlopkovodstvu Sredney Azii pri Gosplane SSSR. Predstavleno akademikom AN Tadzhikskoy SSR I.N.Antipovym-Karatayevym.

VAKHOBOV, A.V. (Moskva); BELYAYEV, A.I. (Moskva)

Effect of various saline components on the electric conductivity of the electrolyte in an aluminum electrolytic cell. Izv. AN SSSR. Met. i gor. delo no.4:80-86 Jl-Ag '64. (MIRA 17:9)

Vlasov, A.V.

Methods of measuring the electric conductivity of fused salts. Izv. vys. ucheb. zav.; tsvet. met. 8 no.4:111-116 '65. (MIRA 18:9)

1. Kafedra chistykh metallov i poluprovodnikovykh materialov Moskovskogo instituta stali i splavov.

VAKHOBOV, A.V.

Lithium fluoride is an indispensable component of the electrolyte in aluminum cells. TSvet. met. 38 no.12:56-57 D 65 (MIRA 19:1)

VAKHOL'SKIY, B.M.

VAKHOL'SKIY, B.M.

Testing students in electric engineering. Politekh.obuch. no.12:91-92 D '57. (MIRA 10:12)

1. Prepodavatel' elektrotekhniki Karagandinskogo pedagogicheskogo instituta.

(Electric engineering--Study and teaching)

STERLIN, R.N.; DUBOV, S.S.; LI VEY-GAN; VAKHOMCHIK, L.P.; KNUNYANTS, I.L.

Certain regularities in the series of perfluorovinyl derivatives of the elements of groups IV and V of the periodic table. Zhur.VKHO 6 no.1:110-111 '61. (MIRA 14:3)
(Vinyl compounds)

S/070/62/007/001/021/022
E073/E335

AUTHORS: Kolontsova, Ye.V., Krokhina, A.I. and Vakhomchik, L.P.

TITLE: Selective etchings of aluminium crystals

PERIODICAL: Kristallografiya, v. 7, no. 1, 1962, 152 - 153

TEXT: The concentration of chemically-produced etch patterns depends on the method of growing the crystal, its purity and the orientation of the etched surface of the crystal. According to Braun et al (Ref. 8: Philos. Mag., 3, 35, 1312-1317, 1958), the maximum is achieved for surfaces of the type {111}. Defects in the structure of the crystal, which arise during deformation, are not detected by this method of etching: the distribution of etch pits and their concentration is about equal on a polished surface of a crystal in the deformed and in the non-deformed states. On the basis of results of layer-by-layer etching and data published in the literature, it is concluded that without special ageing treatment of the investigated crystal the etching agent of Lacombe, Beaujard and Wyon will reveal distortions in the crystal structure which occurred during growth; accumulations of dislocations corresponding to

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S/070/62/007/001/021/022
E073/E335

Selective etchings of ....

boundaries of disorientated sections of the crystal can be reliably detected. Ageing undoubtedly changes the substructure of the investigated crystal and this is highly undesirable when studying the influence of deformation or irradiation on the structure of the crystal. Therefore, the authors have attempted to find methods of etching which will reveal "fresh" defects. Observations have shown that electrolytic and ion-bombardment etching reveal "fresh" dislocations arising in the crystal during the process of deformation by shear. This is illustrated in microphotographs of aluminium single crystals which show that the slip traces appear in specimens etched by means of an electrolyte as well as in repolished specimens that have been subsequently etched by ion bombardment. Details are given on the conditions of electrolytic and ion-bombardment etching in the applied experiments. There is 1 figure.

Card 2/3

Selective etchings of S/070/62/007/001/021/022
E073/E335

ASSOCIATION Moskovskiy gosudarstvennyy universitet
im. M.V. Lomonosova
(Moscow State University im. M.V. Lomonosov)

SUBMITTED: July 18, 1960 (initially)
September 9, 1961 (after revision)

Card 3/3

VAKHOMCHIK, V.P. (Moskva)

Analytical solution of the integral equation of stationary flow of thin airfoils in a cascade. Inzh. zhur. 5 no.3:556-560 '65. (MIRA 18:9)

VAKHOMCHIK, V. P. (Moskva)

Nonuniformity of a plane velocity field. Inzh. zhur. 2 no.4: 278-286 '62. (MIRA 16:1)

(Fluid dynamics)

TITLE: On the determination of aerostationary forces in a lattice of profiles

ABSTRACT: The author determines [illegible] from the aerodynamic lift and the

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ACCESSION NR: AP5006159

three terms that determine the forces and the moment of the

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figure and its formulae.

ASSOCIATION: None

SUBMITTED: [illegible] SUB CODE: AS, AC

NR REF SOV: 007 OTHER: 004

Card 3/3

ACC NR: AT6030110 SOURCE CODE: UR/0021/66/000/004/0059/0069

AUTHOR: Vakhomchik, V. P. (Moscow)

ORG: none

TITLE: General expressions for the unsteady state forces in a profile grid

SOURCE: AN SSSR. Izvestiya. Mekhanika zhidkosti i gaza, no. 4, 1966, 59-69

TOPIC TAGS: unsteady flow, fluid flow

ABSTRACT: The article derives general expressions for the unsteady lifting force and the moment acting on a grid moving in an incompressible liquid at a constant velocity U. These formulas are generalizations of known formulas for a single hydrofoil. The profiles of the grid are assumed to be thin and slightly curved and to vibrate out of phase with the vibrations between neighboring profiles. Solutions were obtained in closed form by the method of separation of characteristics. The coefficients for expansion of the complex velocity in a series were calculated as the derivatives of some function. An integral equation was derived with respect to the unknown tangential component in the wake, and its analytical solution is given. At $\alpha = 0$, the solution coincides with a solution given previously in the literature. The expressions obtained for the forces and the moment have four terms. The first two terms determine the force and the moment for motion with constant circulation, and the last two with variable

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L 09395-67
ACC NR: AP6030110

circulation. An expression was obtained in general form for the suction force appearing at the leading edges of the profiles. The article further considers the special cases of widely and closely spaced grids. Orig. art. has: 30 formulas and 5 figures.

SUB CODE: 20/ SUBM DATE: 03Feb66/ ORIG REF: 011/ OTH REF: 001

Card 2/2

VAKHOMSKIY, N.S

PHASE I BOOK EXPLOITATION SOV/5053

Vsesoyuznaya kon...rentsiya po treniyu i iznosu v mashinakh. 3d, 1958.

Iznos i iznosostoykost'. Antifriktsionnyye materialy (Wear and Wear Resistance. Antifriction Materials) Moscow, Izd-vo AN SSSR, 1960. 273 p. Errata slip inserted. 3,500 copies printed. (Series: Its: Trudy, v. 1)

Sponsoring Agency: Akademiya nauk SSSR. Institut mashinovedeniya. Resp. Ed.: M. M. Khrushchov, Professor; Eds. of Publishing House: M. Ya. Klebanov, and S. L. Orpik; Tech. Ed.: T. V. Polyakova.

PURPOSE: This collection of articles is intended for practicing engineers and research scientists.

COVERAGE: The collection, published by the Institut mashinovedeniya, AN SSSR (Institute of Science of Machines, Academy of Sciences USSR) contains papers presented at the III Vsesoyuznaya Konferentsiya po treniyu i iznosu v mashinakh (Third All-Union Conference on Friction and Wear in Machines) which was held April 9-15, 1958. Problems discussed were in 5 main areas: 1) Hydrodynamic Theory of Lubrication and Friction Bearings (Chairmen: Ye. M. Gut'yar, Doctor of Technical Sciences, and A. K. D'yachkov, Doctor of Technical Sciences); 2) Lubrication and Lubricant Materials (Chairman: G. V. Vinogradov, Doctor of Chemical Sciences); 3) Dry and Boundary Friction (Chairmen: B. V. Deryagin, Corresponding Member of the Academy of Sciences USSR, and I. V. Kragel'skiy, Doctor of Technical Sciences); 4) Wear and Wear Resistance (Chairman: M. M. Krushchov, Doctor of Technical Sciences); and 5) Friction and Antifriction Materials (Chairmen: I. V. Kragel'skiy, Doctor of Technical Sciences, and M. M. Krushchov, Doctor of Technical Sciences). Chairman of the general assembly (on the first and last day of the conference) was Academician A. A. Blagonravov. L. Yu. Pruzhanskiy, Candidate of Technical Sciences, was scientific secretary. The transactions of the conference were published in 3 volumes, of which the present volume is the first. This volume contains articles concerning the wear and wear resistance of antifriction materials. Among the topics covered are: modern developments in the theory and experimental science of wear resistance of materials, specific data on the wear resistance of various combinations of materials, methods for increasing the wear resistance of certain materials, the effects of friction and wear on the structure of materials, the mechanism of the seizing of metals, the effect of various types of lubricating materials on seizing, abrasive wear of a wide variety of materials and components under many different conditions, modern developments in antifriction materials, and the effects of finish machining on wear resistance. Many personalities are mentioned in the text. References accompany most of the articles.

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VAKHOMSKIY, N. S.

AID 359 - I

PHASE I TREASURE ISLAND BIBLIOGRAPHICAL REPORT

Call No.: TN672.V8

BOOK
Author: VAKHOMSKIY, N. S.
Full Title: WAYS OF INCREASING FATIGUE RESISTANCE OF SPRING STEELS
Transliterated Title: Puti povysheniya ustalostnoy prochnosti ressornykh staley

Publishing Data
Originating Agency: All-Union Scientific Engineering and Technical Society of Machine Builders. Urals Branch
Publishing House: State Scientific and Technical Publishing House of Machine Building Literature ("Mashgiz")
Date: 1950 No. pp.: 11 No. of copies: 3,000

Text Data
This is an article from the book: VSESOYUZNOYE NAUCHNOYE INZHENERNO-TEKHNICHESKOYE OBSHCHESTVO MASHINOSTROITELEY. URAL'SKOYE OTDELENIYE, THERMAL TREATMENT OF METALS - Symposium of Conference (Termicheskaya obrabotka metallov, materialy konferentsii) (p.313-323), see AID 223-II

Coverage: The significance of the fatigue of springs is outlined and various methods for the increase of resistance to cyclic stress are suggested, particularly blasting with cast-iron shots (pellets). 5 drawings, 3 tables.

Purpose: For scientific workers
Facilities: None
No. of Russian and Slavic References: 9 Russian (1932-49)
Available: Library of Congress.

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VAKHOMSKIY, N. S.

PHASE I TREASURE ISLAND BIBLIOGRAPHICAL REPORT AID 359 - I

Call No.: TN672.V8

BOOK
Author: VAKHOMSKIY, N. S.
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Date: 1950 No. pp.: 11 No. of copies: 3,000

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Coverage: The significance of the fatigue of springs is outlined and various methods for the increase of resistance to cyclic stress are suggested, particularly blasting with cast-iron shots (pellets). 5 drawings, 3 tables.

Purpose: For scientific workers
Facilities: None
No. of Russian and Slavic References: 9 Russian (1932-49)
Available: Library of Congress.

1/1

SVERDEL', I.S.; VAKHONIN, G.V.

Automatic loading of jaw crushers. Trudy Uralmekhanobra no.5:3-10 '59. (MIRA 15:1)

(Crushing machinery)
(Automatic control)

ITKIN, B.Z.; LIBERMAN, D.Kh., inzh., retsenzent; VAKHONIN, L.N., inzh., red.

[Potentials of improvement in the manufacture of beds] Rezervy krovatnogo proizvodstva. Sverdlovsk, TSentr.biuro tekhn.informatsii, 1959. 32 p. (MIRA 14:4)

1. Russia (1917- R.S.F.S.R.) Sverdlovskiy ekonomicheskiy administrativnyy rayon. Sovet narodnogo khozyaystva.
(Beds and bedsteads) (Metalwork)

DANILOV, I.N.; YEVSTEFEYEV, L.F.; KRAVCHUK, N.J.; VAKHONIN, L.S.

Experience in the work with IT9-2 and It9-6 units equipped with DP-6C electronic knockmeters. Khim. i tekh. topl. i masel 10 no.7:60-62 Jl '65. (MIRA 18:9)

1. Bashkirskiy nauchno-issledovatel'skiy institut po pererabotke nefti.

SMIRNOV, G.Ya.; VAKHONIN, V.A., nauchnyy red.; PAKHOMOVA, M.A., red. izd-va; TEYKHMAN, T.M., tekhn.red.

[Mechanic and assembly foreman I.I.Khudiakov] Brigadir slesarei-montazhnikov I.I.Khudiakov. Moskva, Gos.izd-vo lit-ry po stroit. i arkhit., 1958. 35 p. (MIRA 12:10)
(Khudiakov, Ivan Ivanovich) (Cranes, derricks, etc.)

VAKHONIN, V.N., inzh.

Safety devices preventing driving away of bridge cranes at the Ural Machine Plant. Bezop. truda v prom. 2 no.11:12-14 N '58. (MIRA 11:11)
(Sverdlovsk--Cranes, derricks, etc.--Brakes)

VAKHONINA, T. V.

VAKHONINA, T. V.: "The effect of fodder protein on the meat productivity of young turkeys." All-Union Sci Res Inst of Animal Husbandry. Laboratory of Protein Biochemistry. Moscow, 1956. (Dissertation for the Degree of Candidate in Biological Sciences).

SO: Knizhnaya Letopis', No 23, 1956

VAKhotin, A.M.

PHASE I BOOK EXPLOITATION SOV/3850

SOV/9-M-8(11)

Akademiya nauk SSSR. Institut geokhimii i analiticheskoy khimii imeni V. I. Vernadskogo. Komissiya po analiticheskoy khimii

Spektrofotometricheskiye i kolorimetricheskiye metody analiza (Spectrophotometric and Colorimetric Methods of Analysis) Moscow, 1958. [illegible] p. (Series: Its: Trudy, tom. 8 (11) Errata slip inserted. 3,000 copies printed.

Resp. Ed.: I. P. Alimarin, Corresponding Member, Academy of Sciences USSR; Ed. of Publishing House: V. M. Pashkova; Tech. Ed.: N. I. [illegible]

PURPOSE: The publication is intended for chemists, particularly analytical chemists and geochemists.

COVERAGE: This collection of 29 articles is published as Volume VIII (XI) of the Transactions of the Committee on Analytical Chemistry at the Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy, [illegible] of Sciences USSR. The general subject of the volume is the [illegible] spectrophotometric and colorimetric analysis. Individual articles on the following topics may deserve special attention: the present state of light absorption analysis, the sensitivity of the colorimetric [illegible] of inorganic analysis, the basic variations of the kinetic method of analysis, spectrophotometric investigation of heteropolyacids of [illegible], a new colorimetric method of determining small quantities of [illegible], a fluorimetric method of determining uranium, spectro-photometric investigation of the behavior of oxidation-reduction indicators, a phasometric optical-acoustical method of gas analysis, and a description of an automatic spectrophotometric gas analyzer. No personalities are mentioned. References are given at the end of each article.

TABLE OF CONTENTS:

AVAILABLE: Library of Congress

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(22)

VAKHOV, A.

The nine fearless ones Leningrad Leningradskoe gazetno-zhur-nal'noe i knizhnoe izd-vo, 1944. 166 p. Biblioteka molodezhi

Cyr.4 D192

1. VAKHOV, A.

2. USSR (600)

4. Crab Fisheries - Okhotsk Sea

7. Carb fishers. Vokrug sveta, no. 1, 1952.

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

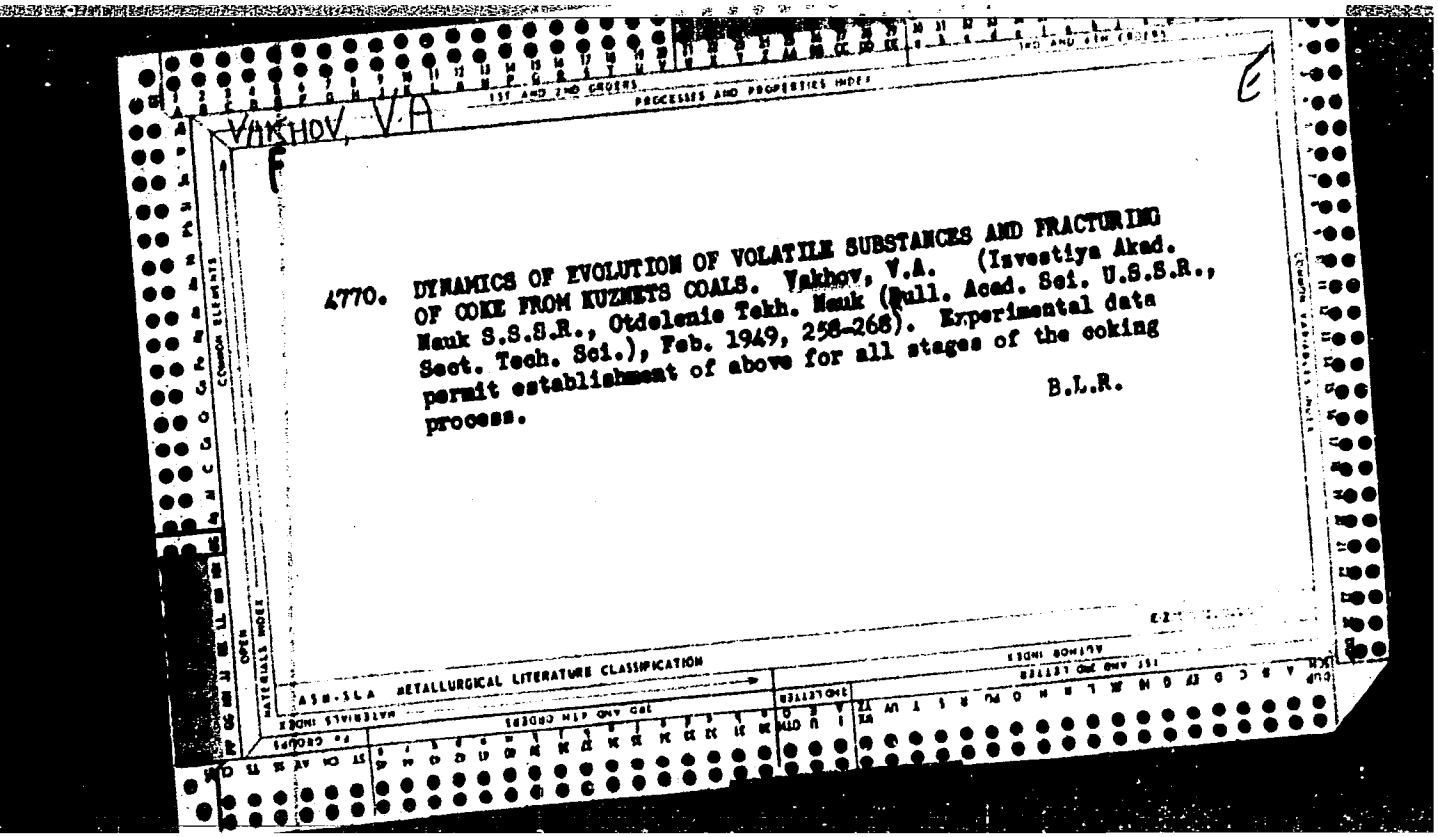
1. VAKHOV, A.

2. USSR 600

4. Okhotsk Sea - Crab Fisheries

7. Crab fishers, Vokrug sveta, No. 1, 1953.

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



VAKHOV, V.A

4770. DYNAMICS OF EVOLUTION OF VOLATILE SUBSTANCES AND FRACTURING OF COKE FROM KUZNETS COALS. Vakhov, V.A. (Izvestiya Akad. Nauk S.S.S.R., Otdelenie Tekh. Nauk (Bull. Acad. Sci. U.S.S.R., Sect. Tech. Sci.), Feb. 1949, 258-268). Experimental data permit establishment of above for all stages of the coking process.

B.L.R.

VAKHOVSKAYA, M. R.

CA

Methods of determination of the dispersity and specific surface area of powders of tungsten and tungsten carbide. G. S. Kreimer, M. R. Vakhovskaya, O. S. Ivanova, and R. K. Bogino. *Zavodskaya Lab.* 15, 189–97(1949).—Detns. of the rate of adsorption (r) of methylene blue (from 100 ml. of a 0.2 g./l. soln. per 5 g. powder), the equil. adsorption a (from the same soln., per 2 g.), the limiting max. equil. adsorption a_∞ (5 g. in soln. of increasing concn.), the oxidizability in concd. HNO_3, the rate of catalytic decompn. of H_2O_2, and the vol. contraction on sintering, were made on 4 samples of W powders designated W*2*, *5*, *6*, and *8*, of which W*2*, *5*, and *8* were produced by H_2 reduction of WO_3, W*6* from NH_4 paratungstate, at the reduction temps. of 950, 800, 800, and 700–50°, resp. (in the order W*2*, *5*, *6*, *8*) and 10 samples of WC, 9 of which were produced from the W specimens designated by the same numeral, at the following temps.: WC *5a* 1230, *5b* 1250, *6b* 1350, *6c* 1450, *6d* 1550, *8a* 1250, *8b* 1350, *8c* 1450, and *8d* 1550°; WC *10* was produced at 1450° from lampblack-reduced W. (1) Detns. of r, in % of the initial amt. of the dye adsorbed within 30 min., were made only on WC, and gave, for the series WC *8a*, *b*, *c*, and *d*, 68.7, 84.3, 70.1, and 68.2%, resp., i.e., roughly, an indication of lower dispersity with higher temp. of carbide formation, but the reverse relation holds within the series WC *6a*, *b*, *c*, and *d*, namely 5.3, 9.3, 10.0, and 7.5%, resp. (2) Detns. of a required 3 days to attain equil. and gave, for the series WC *6*, 14.0, 18.0, 25.0, and 7.0%, resp., i.e. the same order as that of r in the same series. (3) Detn. of a_∞ for the specimen WC *10*, plotted against the equil. concn. c of the dye, gives a sharp max. of 0.0084 millimole/g. at c = 1.23 millimole/l. The value of max. a_∞ undergoes only a slight change, to 0.0748 at c = 5.76, with the same specimen freshly reduced in H_2 at 900°. Taken by the Langmuir equation gives the close figure of 0.09. From the known dimensions of the methylene blue mol., this corresponds to a sp. surface area S of 29.7 or 13.5 sq.m./g., depending on whether the mol. is assumed to lie flat on the surface (cross section 70 sq. A.) or to be bound by its polar group (the Cl atom) and to be oriented perpendicularly to the surface (cross section 32 sq. A.); the true S must be comprised between these 2 limits. However, estn. of S from microscopic granulometry leads, for that specimen, to 0.77 sq.m./g., i.e. 17–40 times smaller. This may either mean an unusually high proportion of very fine particles, unobservable under the microscope, or high porosity and roughness of the grain surface. (4) Detns. of the oxidizability, in percentage of the original powder oxidized by boiling HNO_3 of d. 1.4 (100 ml. per 5 g. powder), gave for W*5* 18.77, W*5* 7.07, W*6* 1.81, W*8* 1.14, WC *6a* 18.40, *5a* 32.17, *8a* 99.21, *8b* 48.37, *8c* 40.60, *8d* 37.77, *10* 20.71%. If the oxidizability is taken as a measure of the dispersity, these figures check with the results of detns. of r. (5) Detns. of the rate of decompn. of H_2O_2 at 25°, by measurement of the vol. of O_2 evolved, indicate, at practically const. concn. of H_2O_2, a very rapid decrease of the catalytic activity of all 4 W specimens, falling almost to zero in 25 min.; with samples of WC, the activity decreases rapidly during the 1st 10–15 min., then remains const. For W*6*, the activation energy, between 20 and 35°, is 3811 cal. The av. amts. of O_2 evolved, at 25°, per min., during the 1st 25 min., per g. of powder, were: W*2* 50.03, W*5* 21.50, W*7* 14.00, W*8* 7.45 ml., and WC *6a* 2.000 (3.80), *5a* 0.500 (0.80), *8a* 0.952 (0.60), *8b* 0.897 (0.44), *8c* 1.250 (0.48), *8d* 1.040 (0.500), the figures in parentheses giving the rate of evolution in the const.-rate stage. For W, the order of the catalytic activities parallels that of the oxidizabilities, but no such relation holds for the WC samples. (6) The vol. contraction on compression under 500 kg./sq. cm., followed by sintering under H_2 at 1550°, is, for W*6* 1.21, W*8* 38.8, WC *6a* 20.0, *5a* 30.1, *8a* 39.6, *8b* 37.4, *8c* 33.6, *8d* 32.1%. $K = d_c(d_b - d_a)/d_a(d_b - d_c)$ and the coeff. of relative vol. contraction $R = d_c(d_b - d_a)/d_a(d_b - d_c)$ (where the subscripts *a*, *c*, and *b* refer to the d. of the compressed powder before and after sintering, and the d. of the compact material, resp.), for the above specimens of WC, 0.044, 0.300, 0.140, 0.150, 0.221, 0.207, resp.

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E021/E406

18.6100 1417

AUTHORS: Kreymer, G.S., Vakhovskaya, M.R. and Baranov, A.I.

TITLE: Strength, Toughness and Hardness of Two-Phased Cermet Titanium Carbide - Tungsten Carbide - Cobalt Hard Alloys

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.5, pp.698-709

TEXT: Alloys containing 4, 6, 9, 15, 20 and 25% cobalt and a titanium carbide - tungsten carbide ratio of 1 : 1 were prepared in three series with average grain sizes of 0.9, 2.6 and 5.6 microns. The bending strength was determined on a P-5 (R-5) machine (Ref.1) at 20, 200, 500, 800 and 1000°C. The impact strength and the Vickers hardness were also determined. Microstructures of the samples were examined. Fig.1 shows the relation between the bending strength and cobalt content at various temperatures. Differences were found from the results obtained on tungsten carbide - cobalt alloys (Ref.5). Increasing cobalt content up to 15% in TiC - WC - Co alloys had no effect on the strength at temperatures from 20 to 500°C. The cobalt content - bending strength curves passed through a maximum at a cobalt content greater

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E021/E406

Strength, Toughness and Hardness of Two-Phased Cermet Titanium Carbide - Tungsten Carbide - Cobalt Hard Alloys

than 15% at 20 to 500°C, and at approximately 15% at 800 and 1000°C. The alloys with a grain size of 5.6 microns, however, showed practically constant strength with increase in cobalt content at 800 and 1000°C; similar curves were obtained for the impact strength - cobalt content relationship. The fact that an increase in cobalt content up to 15% had no effect on the bending strength and impact strength in the region 20 to 500°C was explained by the poor wetting properties of cobalt on the TiC - WC grains. This formed a continuous network of carbide when less than 15% cobalt was present. Thus cracks which were nucleated could propagate, in the main, along the brittle carbide network (see Fig.3). With greater than 15% cobalt or at temperatures higher than 500°C, the cobalt phase retarded the development of the cracks. A linear relationship was found between the strength and $D^{-1/2}$ where D is the mean grain size of the TiC - WC solid solution. The hardness decreased with increase in cobalt content (Fig.9), increase in temperature (Fig.11) and decrease in the grain size of

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E021/E406

Strength, Toughness and Hardness of Two-Phased Cermet Titanium Carbide - Tungsten Carbide - Cobalt Hard Alloys

the carbide phase (Fig.10) because of an increase in plasticity. The difference in hardness of the samples with different grain sizes decreased with increase in temperature (Fig.11). There are 11 figures, 1 table and 15 references: 11 Soviet and 4 Non-Soviet.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut tverdykh splavov (All-Union Scientific Research Institute of Hard Alloys)

SUBMITTED: January 7, 1960 (initially)
June 24, 1960 (after revision)

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39763
S/126/62/013/006/010/018
E111/E352

15.2400

AUTHORS: Kreymer, G.S., Vakhovskaya, M.R., Tumanov, V.I. and Pavlova, Z.I.

TITLE: Main mechanical properties and structure of cermets

PERIODICAL: Fizika metallov i metallovedeniye, v. 13, no. 6, 1962, 901 - 911

TEXT: Experiments relating chief mechanical properties to composition, test temperature and carbide-grain size of three-phase TiC-WC-Co alloys. These consist of the following phases: TiC-WC solid solution, structurally free WC + Co with traces of dissolved Ti, W and C. The effect of Co was studied over 4-25 wt.% range with a constant TiC/WC ratio of 15/79, giving an average grain size of 3 μ for the TiC-WC phase and 1.8 μ for the WC phase; that of TiC was over 6-25 wt.% range with 9 wt.% Co, giving an average grain size of 3.7 μ and 2.5 μ for the TiC-WC and WC, respectively. The effec ot carbide-grain size on the mechanical properties was studied on alloys type T15K6 and T6K9 with fine, medium and coarse carbide grains in various combinations. In TiC-WC-Co the breakdown of cobalt

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Main mechanical properties ....

becomes so significant at temperatures over 500 °C that the increase in its content had little effect. The tensile strength of these alloys became independent of temperature (up to 500 °C) at TiC concentrations of 10 wt.% and over. The fracture mechanisms in WC-Co alloys were different from those in TiC-WC-Co. This difference affected both tensile and impact strengths. The latter was independent of temperature for the alloys BK10 (VK10), T50K9 and T15K6; for the first, this applied only to the 20-400 °C range, above which there was a steep linear growth; for TiC-WC-Co alloys with a virtually continuous carbide skeleton the range was 20 - 1 000 °C. The hardness of three-phase TiC-WC-Co alloys decreased approximately linearly with increasing Co content. The TiC-WC phase showed greatest softening with increasing temperature. There are 10 figures and 2 tables.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut tverdykh splavov (All-Union Scientific Research Institute for Hard Alloys)

SUBMITTED: April 17, 1961 (initially)
January 6, 1962 (after revision)

Card 2/2