MOROZOVSKAYA, M.I.

MOROZOVSKAYA, M.I.; TISHCHENKO, O.D.; DEMCHENKO, I.A.; GORELYSHEVA, I.I.; BEL'SKAYA, M.K.; YEVLAKHOVA, V.F.; AGAFONOV, I.N.; BESPAMIL'NAYA, P.S.; CHERNENKO, Yu.P.

Antimalarial measures in the construction zone of the Kakhovka Hydroelectric Power Station. Med.paraz.i paraz.bol. no.1:61-66 Ja-Mr '54. (MLRA 7:3)

1. Iz Ukrainskogo nauchno-issledovatel'skogo instituta malyarii i meditsinskoy parazitologii im. professora V.Ya.Rubashkina (direktor instituta I.V.Demchenko) i Khersonskoy oblastnoy protivomalyariynoy stantsii (zaveduyushchiy stantsiyey I.A.Agafonov).
(Kakhovka region--Malarial fever)
(Malarial fever--Kakhovka region)

Translation M-760, 31 Aug 55

MOROZOVSKAYA, M.I.

Malaria control in the Ukraine. Med. paraz. i paraz. bol. no.2: 164-167 Ap-Je '54. (MLRA 7:8)

1. Iz Ukrainskogo nauchno-issledovatel'skogo instituta malyarii i meditsinskoy parazitologii imeni prof. V.Ya.Rubashkina (dir. instituta I.A.Demchenko)
(MALARIA, prevention and control,
*Russia)

KOROZOVSKAYA, M.I.; DEMCHENKO, I.A. TISHCHENKO, O.D.; GORELYSHEVA, I.I.; YEVLAKHOVA, V.F.; KADTOCHKIY, S.S.; GAL'PERIN, L.Yu; BELYY, Ya.M.; LAZEBNYY, N.V.; DREVENKO, V.I.; SERVINENKO, G.A.; SHEVCHUK, M.K.; D'YACHENKO, V.I.; AGAFONOV, N.I.; BESPAMIL'NAYA, P.S., CHERNENKO, Yu.L.

Preventive antimalaria measures for lumberjacks employed in clearing the bed of the future Kakhovka Reservoir. Med.paraz. i paraz.bol.24 no.3:207-208 Jl-S '55. (MLRA 8:12)

1. Iz Ukrainskogo nauchno-issledovatel'skogo instituta malyarii i meditsinskoy parazitologii imeni prof. V. Ya. Bubashkina (dir. instituta I.S.Demchenko) i Zaporozhskoy, Dnepropetrovskoy i Khersonskoy oblastnykh protivomalyariynykh stantsiy.
(MALARIA, prevention and control,
in Russia, in forest workers)

MOROZOVSKAYA, N.V., assistent, kand.tekhn.nauk

Conditions for the autonomy of two-stage automatic control systems. Trudy MIIT no.117:66-73 '60. (MIRA 13:10)
(Automatic control)

41798-65 EWT(l)/EEC(m)/EEC(k)-2/EWA(h) Po-4/Pq-4/Pg-4/Peb/Pi-4/Pl-4

CESSION NR: AR4039108 S/0274/64/000/003/A076/A076

32
B

SOURCE: Ref. sh. Radiotekhnika i elektrosvyaz', Abs. 3A448

AUTHOR: Morozovskaya, N. V.

TITLE: Choosing optimal parameters for resonance frequency meters 25

CITED SOURCE: Tr. Mosk. in-ta inzh. zh.-d. transp., vyp. 171, 1963, 68-78

TOPIC TAGS: frequency meter, radio frequency meter

TRANSLATION: Frequency is often measured by two resonant circuits slightly off the nominal frequency and by a differential rectifier whose output voltage is used to indicate the frequency deviation or to control the frequency by means of suitable final devices. The optimal detuning of such resonant circuits and their Q-factors are considered. The relations are found between the circuit detuning, its sensitivity, and the working bandwidth. The recommendations on choosing the circuit detuning, their Q-factors, and frequency-deviation bandwidth can be used in designing measuring devices which operate jointly with magnetic or electronic amplifiers and also in designing frequency meters based on the ratio meters. Bibliography: 5 titles

SUB CODE: EC ENCL: 00

Card 1/1 Ce

SOV/125-13-2-4/14

18(5)

AUTHOR: Morozovskaya, Ye.N., and Parfessa, G.I.

TITLE: The Influence of the Cooling Rate on the Structure of Smelted Metal Type 3Kh2V8 (Vliyaniye skorosti okhlazhdeniya na strukturu naplavlennogo metalla tipa 3Kh2V8)

PERIODICAL: Avtomaticheskaya svarka, 1959, Vol 13, Nr 2, pp 39-48 (USSR)

ABSTRACT: The article describes research into the structure of Metal 3Kh2V8 smelted at various temperatures in various conditions. It also studies the products of the disintegration of Austenite at cooling rates of 0.01 - 630° per second. At cooling rates of more than 150° a second a Martensite transformation of Austenite takes place at a temperature of 430°; at cooling rates of 15 - 1.10° a second disintegration takes place at about 450° with the formation of needle troostite and the discharge of surplus carbides; at cooling rates of less than 0.1° the disintegration of Austenite takes place at temperatures between 870-630° and perlite is formed. The mini-

Card 1/3

The Influence of the Cooling Rate on the Structure of Smelted Metal Type 3Kh2V8

mum stable temperature for Austenite is 720°. Experiments in smelting using various thermal cycles are described, the basic cycle being instantaneous cooling at the minimum stable temperature for Austenite. The methodology for the experiments is looked at, followed by the structure of the smelted metal. It is found that a reduction in the cooling speed reduces the quantity of Martensite, and in the final analysis the whole structure consists of sorbito-perlite. The authors then deal with with the mechanism of the formation of the structure, and also with surplus phases. A deposit of smelted metal cooled at 10° a second contained: Fe_3C, W_2C, Fe_3W_2C, Fe_6W_6. The chemical composition of deposit was: 2.55% Fe, 0.09% Cr, 1.1% W (the whole of the metal being 100%). The conclusions are that 3Kh2V8 when smelted has a number of valuable qualities determined by the microstructure of the smelted metal. This structure is determined by the initial temperature of the basic metal.

Card 2/3

The Influence of the Cooling Rate on the Structure of Smelted Metal SOV/125-12-1-4/14
Type 3Kh2V8

Secondly, at less than 200° a structure of Martensite is formed with reduced hardness and with insufficient durability. The best technological properties are possessed by metal smelted with preliminary heating of the basic metal to 300-600°; it has a structure of needle-form troostite and martensite which ensure stability and strength. In the smelted state of 3Kh2V8 the surplus phases which strengthen the matrix of the metal consist of alloyed cementite, very stable double carbide wolfram $(Fe\ W)_6\ C$, alloyed chrome and vanadium and wolframide Fe_3W_2C. There are 1 graph, 12 illustrations, 1 table and 3 references, 8 of which are Soviet and 1 German.

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 of the AS UkrSSR)

SUBMITTED: August 27, 1958
Card 3/3

MOROZOVSKAYA, YE.N.

PHASE I BOOK EXPLOITATION SOV/5975

International Institute of Welding

XII kongress Mezhdunarodnogo instituta svarki, 29 iyunya - 5 iyulya 1959 v g. Opatii (Twelfth Annual Assembly of the International Institute of Welding, Opatija, June 29 - July 5, 1959) Moscow, Mashgiz, 1961. 359 p. 3000 copies printed.

Sponsoring Agency: Natsional'nyy komitet SSSR po svarke.

Ed. (Title page): G. A. Maslov, Docent; Translated from English, French, and Serbo-Croatian by N. S. Aborenkova, K. N. Belyayev, E. P. Bogacheva, L. A. Borisova, K. V. Zvegintseva, V. S. Minavichev, and M. M. Shelechnik; Managing Ed. for Literature on the Hot-Working of Metals: S. Ya. Golovin, Engineer.

PURPOSE: This collection of articles is intended for welding specialists and the technical personnel of various production and repair shops.

Card 1/

Twelfth Annual Assembly (Cont.)

COVERAGE: The collection contains abridged reports presented at the Twelfth Annual Assembly of the International Institute of Welding. Reports deal with problems of welding and related processes used in repair work, repair techniques, and the problems arising in connection with the nature of the base and filler materials. Examples of repairing various parts are given, and the organization of repair operations in workshops and under field conditions is discussed. Economic aspects of welding and related processes as used in repair work are analyzed. No personalities are mentioned. There are no references.

TABLE OF CONTENTS [Only Soviet and Soviet-bloc reports are given here]

Foreword 5

PART I. THE STUDY OF REPAIR-WORK TECHNIQUES (PROCESSES, METHODS, PREPARATION, HEATING, AND OTHER TYPES OF PROCESSING CONTROL)

Myuntsner, L. (Czechoslovakia). Welding of Broken Crankshafts 36

Twelfth Annual Assembly (Cont.)

Tesar, A., and Yu. Lombardini (Czechoslovakia). Isothermal and Ultracold Welding of Hardenable Steels 42

Paton, B. Ye., G. Z. Voloshkevich, D. A. Didko, Yu. A. Sterenbogen, A. M. Makara, P. I. Sevbo, and D. O. Rozenberg (USSR). Electroslag Welding in Repairing Heavy Machines and Mechanisms 49

Frumin, I. I., A. Ye. Asnis, L. M. Gutman, G. V. Ksendzyk, V. A. Lapchenko, Ye. I. Leynachuk, Ye. N. Morozovskaya, I. K. Pokhodnya, V. P. Subbotovskiy, and F. A. Khomus'ko (USSR). Automatic Wear-Resistant Submerged-Arc Surfacing 60

Snegon, K. (Poland). Restoration of Rolling-Mill Rolls, Crane Rollers, Forging Dies, and Shears by Arc Welding 72

S/125/61/000/003/005/016
A161/A133

AUTHOR: Morozovskaya, Ye.N.

TITLE: Automatic build-up welding with austenitic high-manganese G13 steel

PERIODICAL: Avtomaticheskaya svarka, no. 3, 1961, 32 - 41

TEXT: The subject Г13 (G13) steel is the Soviet equivalent of a U.S. standard steel grade of extraordinary wear resistance (Table 1):

AWS - ASTM	% C	Mn	Ni	Cr	Mo	Si	P
EFeMn-A ...	0.5-0.9	11.0-16.0	2.75-5.0	≯0.50	-	0.3 - 1.3	0.07
EFeMn-B ...	0.5-0.9	11.0-16.0	-	≯0.50	0.6-1.4	0.3-1.3	0.07

(Ref. 1: American Society for Testing Materials, American Welding Society, Tentative Specification for Surfacing Welding Rods and Electrodes, A-399-56T, 1956) It has been only little used in the USSR, mainly for the filling of surface defects on castings and other repairs, since it is difficult to weld, develops hard and brittle segregated layers that cause crumbling and breaking off of the coated layer. Reference is made to two French works treating the properties of G13 and giving technological recommendations (Ref. 2: G. Collette, C. Crussard, A. Kohn,

Card 1/3

S/125/61/000/003/005/016
A161/A133

Automatic build-up welding with austenitic ....

I. Plateau, G. Pomeyet, M. Weiz, Contribution à letude des transformations des austenites à 12% Mn. Revue de Metallurgie, no. 6, 1957; Ref. 3: P. Danhier, La soudabilité des aciers austenitiques au manganese. Arcos, no. 126, July, 1952) The article gives information on ways of obtaining good G13 steel coatings: 1) Multi-electrode welding with an "A-513" or "A-348" welder fitted with a special three-electrode attachment. 2) Building up with cast G13 steel electrode band and a welder with adjustable electrode feed because of varying G13 band cross section area, and water cooling. 3) Using an additional electrode that is connected to the work so that the arc is burning between the main electrode and the work (the method is described in Ref. 5: Ya. Lukashek and K. Lebl', Sposob avtomaticheskoy naplavki vysokolegirovannykh staley i splavov pod flyusom. Avtomaticheskaya svarka, no. 12, 1959). 4) Build-up welding with electrode inclined 45° forward. Detailed information on all these methods can be obtained from the Electric Welding Institute im. Ye. O. Paton. A special dephosphorizing fused flux AH-16 (AN--16) developed for welding G13 steel is recommended (20 - 25% MnO, 30 - 35% CaO, 20 - 25% Al_2O_3, 15 - 20% CaF_2, up to 7.0% SiO_2, $\leq$ 0.02% P) and chemical composition for cast or powder electrode band (1.0 ÷ 1.2% C, 15 ÷ 18% Mn, up to 0.060% P and up to 0.2% Si). Twelve photographs illustrate the austenite in G13 coatings obtained in different heat-treatment processes. Conclusions: 1) The major cause

Card 2/3

Automatic build-up welding with austenitic....

of cracks in G13 type steel in building up and welding is the formation of intercrystalline layers containing P and Si. Steel with 0.8 - 1.1% C, 13 - 16% Mn, 0.030% P and 0.5% Si is not prone to cracking. 2) Automatic build-up welding by the submerged-arc process is possible when deposited G13 metal is slightly diluted with the base metal. 3) A new powder electrode band, TMT-13A (PPG-13A) and a cast electrode band have been developed for build-up welding. 4) A new AN-16 welding flux has been developed for the automatic build-up welding of G13 steel. The flux dephosphorizes the coating in the process. 5) Multilayer coating deposited automatically by the submerged-arc process has a purely austenitic structure. 6) An inter-layer of metal with gradually decreasing and Mn-contents forms in automatic coating of G13 steel on low-carbon or low-alloy steel. The depth of this layer and its properties depend on the build-up welding method. No brittle inter-layer forms in build-up welding using additional electrode. There are 11 figures, 5 tables and 5 references: 2 Soviet-bloc and 3 non-Soviet-bloc. The reference to the English-language publication reads as follows: American Society for testing materials, American Welding Society, Tentative Specification for Surfacing Welding Rods and Electrodes, A-399-56T, 1956.

Card 3/3

S/125/62/000/009/002/008
A006/A101

AUTHOR: Morozovskaya, Ye. N.

TITLE: АН-16 (AN-16) flux for hardfacing high-manganese Г13 (G13) steel

PERIODICAL: Avtomaticheskaya svarka, no. 9, 1962, 22 - 26

TEXT: Existing fluxes do not meet the requirements to the hardfacing of G13 grade steel. Therefore a special flux was developed, which transfers phosphorus and silicon from the metal into the slag and binds the hydrogen and oxygen in the arc atmosphere into non-soluble metal compounds. When this material was developed the following factors were taken into account: the flux should contain active oxygen in the form of Mn_2O_3; it should have high basicity and low ductility; it should contain Al_2O_3. The new AN-16 flux contains (in %): O 1.3 - 1.6, Al_2O_3 20-25, CaO 30 - 35, CaF_2 20 - 25, MnO 15 - 20, $SiO_2 \geqslant 7.0$; FeO $\geqslant 1.0$, S $\leqslant 0.15$, P $\geqslant 0.03$, C $\geqslant 0.03$. Hardfacing G13 steel with this new material produces weld deposits without pores, cracks and slag inclusions. A method was also developed of preparing AN-16 flux with a low phosphorus content by using Al-Fe addition alloy

Card 1/2

A H-16 (AN-16) flux for hardfacing high-manganese...

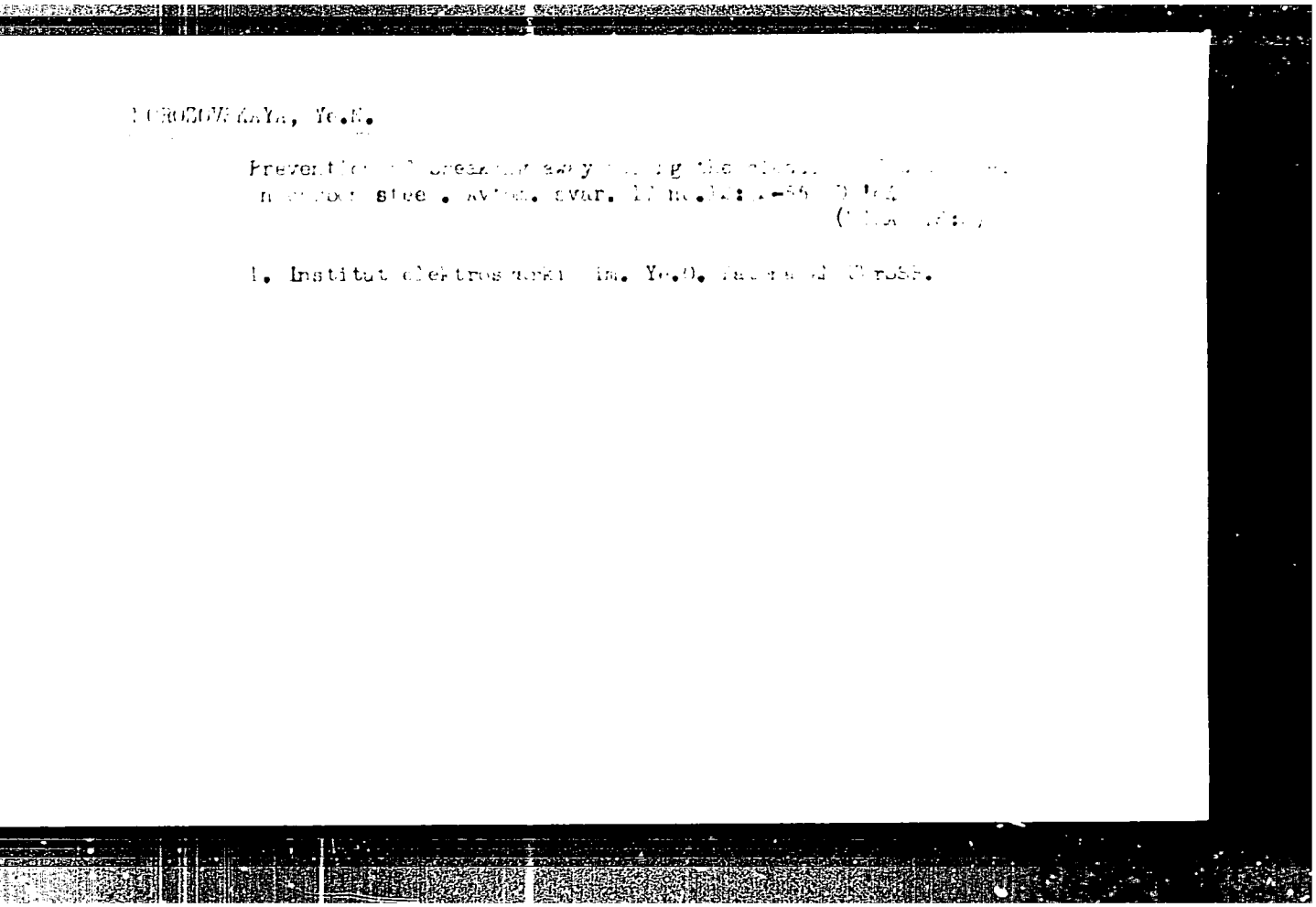
with (15% Fe) as a deoxidizer. The possibility is shown of obtaining melted flux containing Mn_2O_3 by roasting in air atmosphere at 650 - 700°C for 2 1/2 - 3 hours. The use of AN-16 flux with Mn_2O_3 does not cause the oxidation of liquid metal in the welding pool of grade G13 steel. It was found that the metal built-up with AN-16 flux contained 0.015 - 0.020% MnO which corresponds to least oxidation of the metal. The oxygen in high-manganese steel is mainly present in the form of manganous oxide, singled out along the grain boundaries. There are 4 tables.

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

SUBMITTED: December 8, 1961

MOROZOVSKAYA, Ye.N.

Mechanized hard facing of railroad frogs. Avtom. svar. 17 no.3:92 Mr '64. (MIRA 17:11)



L 57875-65 EWT(m)/EWA(d)/EWP(v)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c) Pf-4
JD/HM

ACCESSION NR: AP5016741 UR/0286/65/000/010/0051/0051
621.791.042

23
B

AUTHOR: Morozovskaya, Ye. N.

TITLE: Tubular electrode wire. Class 21, No. 171055

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 10, 1965, 51

TOPIC TAGS: welding, high manganese steel, steel welding, welding electrode, electrode wire, tubular wire

ABSTRACT: This Author Certificate introduces a tubular electrode wire for semi-automatic welding of high-manganese steel. To facilitate open-arc welding, the powder core of the wire contains ferroalloys, iron, and slag formers of the TiO_2-MgO-NaF system in the following amounts: 10.0% rutile, 8.0% magnesite, 7.0% cryolite, 44.0% manganese, 12.0% nickel, 15.0% iron powder, 1.5% ferrosilicon, and 2.5% graphite. [ND]

ASSOCIATION: none

SUBMITTED: 26Nov62 ENCL: 00 SUB CODE: IE, MM
NO REF SOV: 000 OTHER: 000 ATD PRESS: 4038
Card 1/1

L 26094-66 EWP(t)/EWT(m)/T/EWA(d)/EWP(w)/EWP(v)/EWP(t) IJP(c) JD/HM

ACC NR: AP6015037 (A, N) SOURCE CODE: UR/0125/66/000/004/0022/0025

AUTHOR: Morozovskaya, Ye. N.

ORG: Electric Welding Institute im. Ye. O. Paton AN SSSR (Institut elektrosvarki AN SSSR)

TITLE: The structure and properties of high-manganese metal deposited with a powder-core electrode

SOURCE: Avtomaticheskaya svarka, no. 4, 1966, 22-25

TOPIC TAGS: arc deposition, steel, high manganese steel, steel deposition, steel structure, steel property/G13 steel

ABSTRACT: High mechanical properties were obtained in G13 high-manganese austenitic steel (0.7%C, 14.58% Mn, 3.88% Ni) weld deposits. The metal was deposited with an open-arc PP-G13N4-0 tubular electrode with a rutile-containing core. The electrode casing was made from low-carbon cold-rolled steel. With a ratio of electrode-tube volume to powder and core volume of 34—38%, the deposited metal had a tensile strength of 58.9—63.6 kg/mm^2, a yield strength of 38.4—40.2 kg/mm^2, an elongation of 20.4—25.8%, and an impact toughness of 22—25 kg·m/cm^2. The deposit had a fine-grained disoriented structure. Chemical analysis showed that titanium is partially reduced during welding and is transferred from slag to metal in an amount of 0.03—0.06%, which apparently had a beneficial effect on mechanical properites of the deposit. A further

Card 1/2 UDC: 621.791.92.046

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ACC NR: AP6015037 0

improvement in the mechanical properties was obtained by depositing metal by two arcs in series, where the second arc deposited the metal onto the first layer when the latter had a temperature of about 850C: the tensile strength was 69.1— 76.9 kg/mm^2, the yield strength 44.1 kg/mm^2, the elongation 35.8%, and the impact toughness 24%. Orig. art. has: 2 figures and 3 tables. [MS]

SUB CODE: 11, 13/ SUBM DATE: 10Oct65/ ORIG REF: 007/ OTH REF: 002/ ATD PRESS: 4253

Card 2/2

MARGOLIN, S.S.; KOROZOVSKIY, B.I.

Laying veneer on boards by the hot method. Der.i lesokhim.prom. 2 no.12:26 D '53. (MLRA 6:11)

1. Rechitskiy mebel'nyy kombinat. (Veneers and veneering)

MOROZOVSKIY, B.I.

The design of a veneer repair mill. Der.prom.4 no.6:31 Je'55.
(MLRA 8:10)

1. Rechitskiy mebel'nyy kombinat
(Woodworking machinery)

MOROZOVSKIY, B. T., KULEBAKIN, B. S., and SINDEYEV, I. M.

Electrification of Aircraft published by the State Publishing House of the Defense Industry, 1956.

A translation of the Preface and the Table of Contents also forwarded.

SO: 1123980

MOROZOVSKIY, K. Kh., Cand Vet Sci -- "Certain ~~natural~~ laws of development of compensation-adaptation processes in animals after splenectomy under the conditions of suprapleural novocaine blockade and without it." Omsk, 1961. (Min of Agr RSFSR. Omsk Vet Inst) (KL, 8-61, 256)

MOROZOVSK Y, M. S.

Founding

Hopper for form mixtures. Liteishch. proizv. No. 2, 19 3.

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

MOROZOVSKIY, M.S.

USSR/Miscellaneous - Foundry processes

Card 1/1 : Pub. 61 - 7/23

Authors : Morozovskiy, M. S.

Title : Mechanization of the pouring part of boxless forms

Periodical : Lit. proizv. 3, page 15, May-June 1954

Abstract : The casting in boxless forms, where special metal jackets and weights are placed on the forms prior to pouring the hot melt and removed after chilling of the poured mass, is discussed. The mechanization of the hot-pouring process during casting with boxless forms is described. Drawings.

Institution : ...

Submitted : ...

KOROZOVSKIY, M.S.

Conveyer for returning excess metal to the mixing yard. Lit. proizv. no.4:29 Ap '55. (MLRA 8:6)
(Foundries) (Conveying machinery)

SOV-128-58-10-10/19

AUTHOR: Morozovskiy, M.S.

TITLE: A Swivel Bucket Hoist for Charging of Cupola Furnaces (Povorotnyy bad'yevoy pod"yëmnik dlya zagruzki vagranok)

PERIODICAL: Liteynoye proizvodstvo, 1958, Nr 10, pp 22 - 23 (USSR)

ABSTRACT: The charging skip used for blast furnaces adversely affected the process of smelt in cupolas, especially those with a large diameter of the charging shaft. This can be changed by the use of bucket hoists. A swivel type is preferable to a stationary type, which would be idle for periods of time, while the former is able to serve several cupolas. One such swivel type bucket hoist (fig. 1,, operating highly satisfactorily in the new foundry of the Khar'kovskiy traktornyy zavod (Khar'kov Tractor Plant) since 1956, is described. It has a useful load-lifting capacity of 2 tons with a lifting height of 13 m. A full operation cycle takes 2 minutes. It is operated by an a.c. electromotor of type MT-51/8 with a performance of 17.5 kwt and 728 rev /min. The over-all weight of the hoist is 20 tons. There is 1 diagram.

1. Furnaces--Equipment 2 Furnaces--Performance 3. Hoists --Applications

Card 1/1

AUTHORS: Lipovetskiy, G.Z., Morozovskiy, M.S. SOV/128-58-11-20/24

TITLE: A Vertical Shaft for the Cooling of Ingots (Vertikal'naya shakhta dlya okhlazhdeniya otlivok)

PERIODICAL: Liteynoye proizvodstvo, 1958, Nr 11, p 30 (USSR)

ABSTRACT: To improve the safety conditions for founders, the designing section of Giprotraktorsel'khozmash at Khar'kov developed a special shaft for the cooling of ingots. The new installation is of an improved design; the waste gas and heat are completely eliminated and the ingots are automatically charged and removed. The described shaft is now being installed at the Rostsel'mash.
There is 1 diagram and 1 table.

1. Foundries--Safety measures 2. Foundries--Equipment
3. Metals--Cooling 4. Gases--Disposal

Card 1/1

LIPOVETSKIY, G.Z.; MOROZOVSKIY, M.S.

Bucket hoists for the charging of cupolas. Lit. proizv. no.9:21-25 S '60. (MIRA 13:9)
(Foundries--Equipment and supplies) (Cupola furnaces)

MOROZOVSKIY, N., kand.tekhn.nauk

Submarine planer. Tekh.mol. 29 no.5:24-25 '61. (MIRA 14:5)
(Submarine boats)

MOROZOVSKIY, N., kand.tekhn.nauk

Submarine tracts. Znan. sila 36 no.12:5 D '61 (MIRA 15:1)
(Ocean currents) (Petroleum--Transportation)

ACC NR: AP6011842 (N) SOURCE CODE: UR/0029/65/000/011/0018/0021

AUTHOR: Morozovskiy, N. (Candidate of technical sciences)

ORG: None

TITLE: A wind through mountains

SOURCE: Tekhnika - molodezhi, no. 11, 1965, 18-21

TOPIC TAGS: wind, ~~atmosphere circulation~~, cyclone, wind velocity, storm, power generating station, electric power plant

ABSTRACT: The origin and formation of a cyclonic type storm in the Tsemesskaya Bay of the Black Sea, near Novorossiysk, are described, and the deflection of the North-East wind (called "bora") by means of mountain tunnels is suggested. The storms usually occur in the fall and winter periods bringing heavy damage to the Novorossiysk harbor. The wind velocity exceeds 40 m/sec and sometimes reaches 60 m/sec at temperatures falling to -20 C in the winter, causing weighty accumulations of snow and ice. The "bora" storm is a result of a formation of a high-pressure anticyclone behind the northern Varada mountain ridge (400 to 650 m high) and a low-pressure cyclone above the Black Sea. The ridge has a pass (Markhotskiy pereval) located 430 m above the Tsemesskaya Bay. Due to the differences in pressures and temperatures,

Card 1/2

L 39794-66

ACC NR: AP6011842

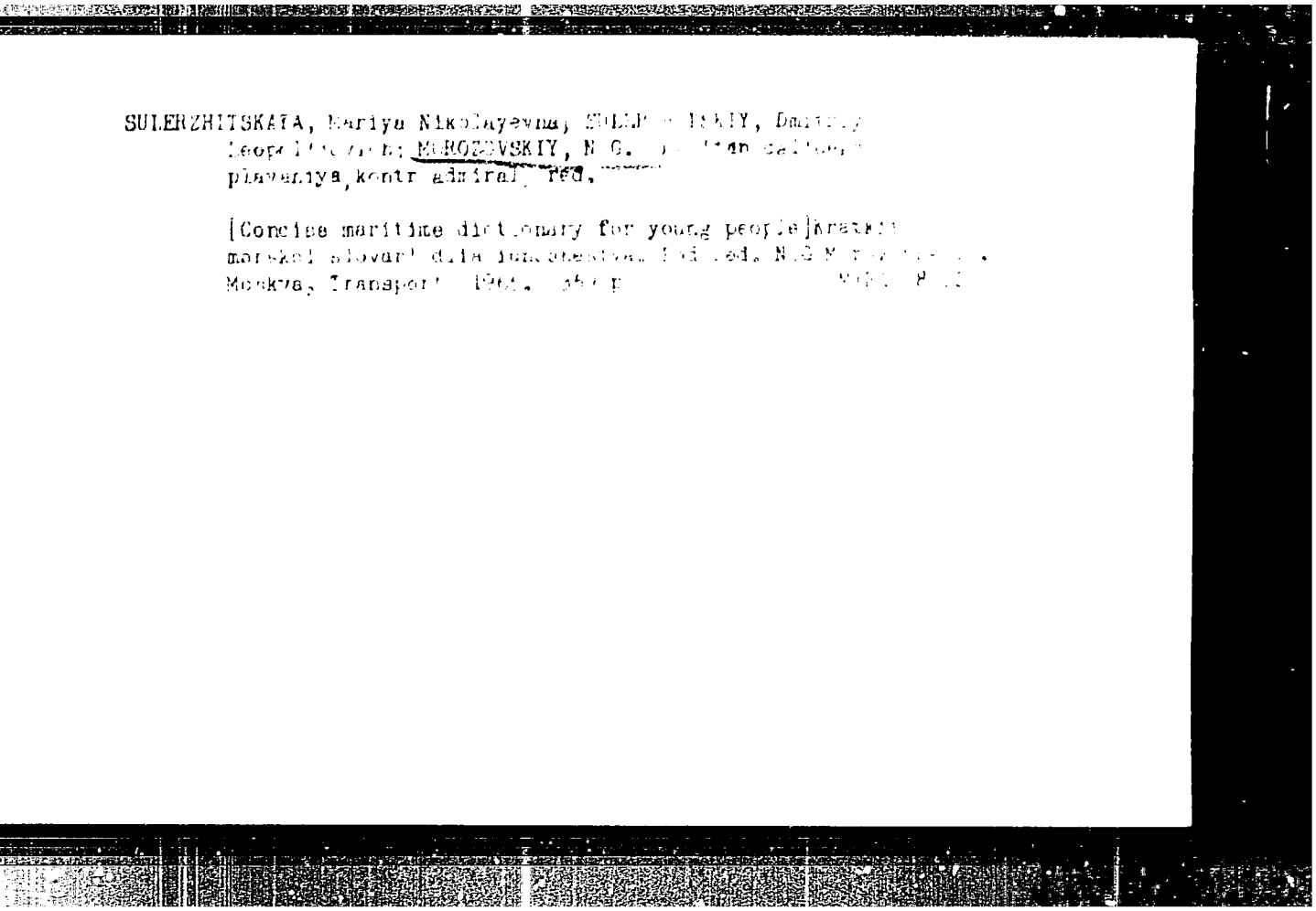
an intensive air flow is formed in the pass, and the bay and the city are hit by a violent storm. In order to deflect the air flow from the pass, the author proposed to dig three inclined tunnels under the pass with one common outlet located at 150 m above the sea level. (It was mentioned that a similar project had been proposed before the revolution by a group of British specialists). In the author's opinion, the accumulated air mass will be sucked into tunnels and funneled to the outlet where a turbine-generator unit can be installed for power production. The arrangement of tunnels and the power plant was illustrated. A chart showing the occurrence of "bora" storms between 1901 and 1954 was also presented.

SUB CODE: 04/ SUBM DATE: None / ORIG REF: 000 / OTH REF: 000

Card 2/2 mcp

MOROZOV, V., M.G., kontr-admiral zapasa

Collision course. Mor. sbor. 47 no.6,91-93 Je '64. (MIRA 18:7)



SULERZHITSKAYA, Mariya Nikolayevna; SOLEV [illegible] ISKIY, Dmitriy
Leonidovich; MOROZOVSKIY, N.G. [illegible] ed.

[Concise maritime dictionary for young people] Kratkiy morskoy slovar' dlya yunoshestva. 1st ed. N.G. Morozovskiy, ed. Moskva, Transport, 1964. 367 p. [illegible]

PHASE I BOOK EXPLOITATION POL/3440

Kulebakin, Viktor Sergeyevich, V. Morozovskiy, and I. Sindeyev

Lotnicze elektroenergetyczne urządzenia pokladowe (Electrical Equipment for Aircraft) Warszawa, Wyd-wo Min-wa obrony narodowej, 1958. 546 p. Errata slip inserted. 600 copies printed.

Eds.: Maria Kowalska, Master in Engineering, and Jerzy Domański, Engineer; Tech. Ed.: Helena Malczewska; Leslaw Będkowski, Master in Engineering; Józef Kruś, Master in Engineering, and Janusz Dombrowicki, Engineer; Reviewer: Józef Sienkiewicz, Master in Engineering.

PURPOSE: This book is a textbook for students and aircraft engineers and technicians.

COVERAGE: The book describes the design and operating principles of basic modern electrical power equipment of aircraft. It discusses theoretical principles of various operating processes

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of individual units and of the system as a whole. The book also describes the construction of electric power systems and lists technical requirements of the most widely used kinds of equipment. There are 43 references: 36 Soviet and 7 English.

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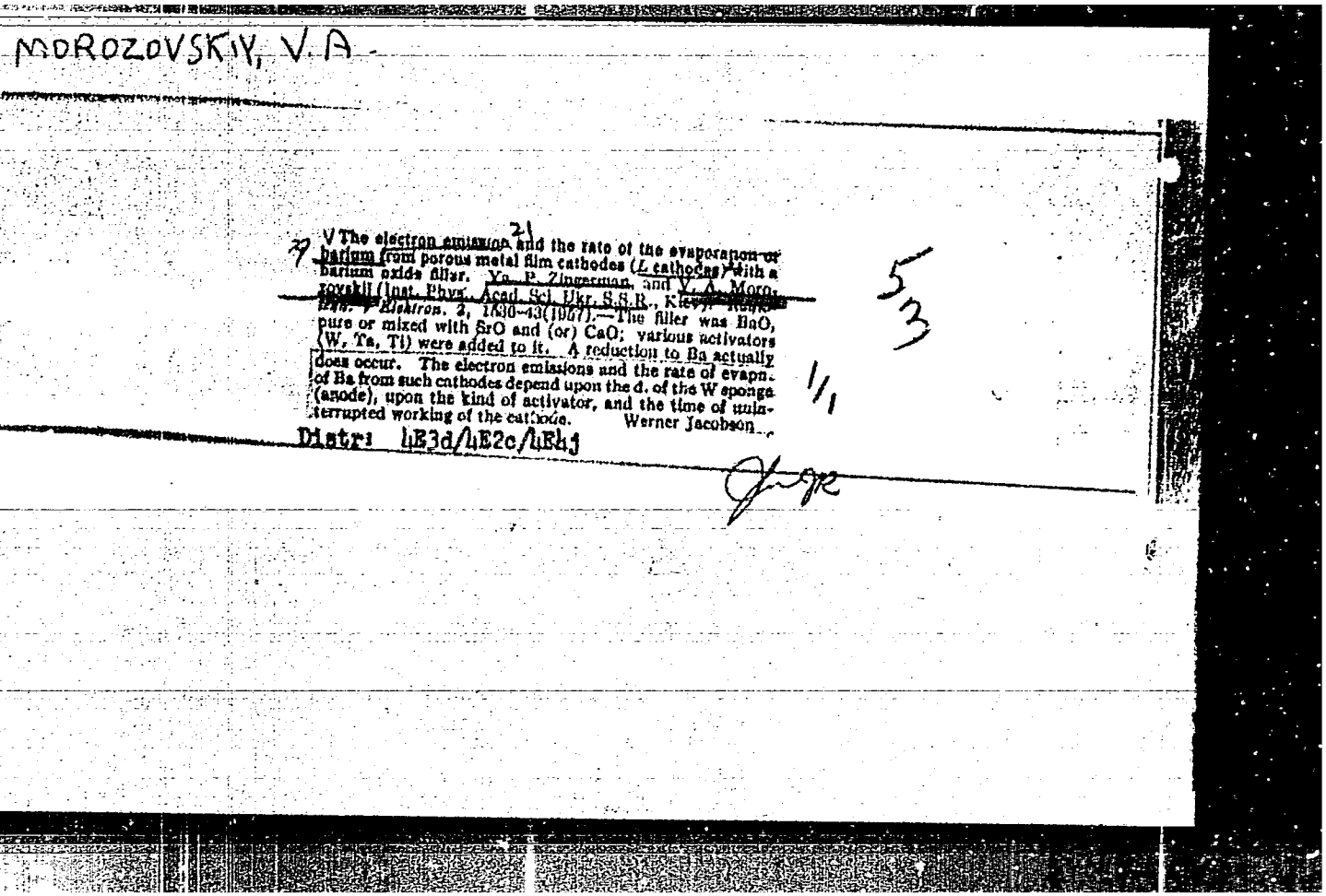
ZINGERMAN, Ya.P.; KOROZOVSKIY, V.A.

Investigating the nonuniformity of work junctions on metal surfaces.
Prib.i tekh.eksp.no.3:65-67 M-D '56. (MLRA 10:2)

1. Institut fiziki AN USSR.
(Electron emission) (Oscillators, Electron-tube)



MOROZOVSKIY, V. A.

21

The electron emission and the rate of the evaporation of barium from porous metal film cathodes (L cathodes) with a barium oxide filler. Ya. P. Zingerman, and V. A. Morozovskii (Inst. Phys., Acad. Sci. Ukr. S.S.R., Kiev). *Radiotekhnika i Elektron.* 2, 1430–43(1957).—The filler was BaO, pure or mixed with SrO and (or) CaO; various activators (W, Ta, Ti) were added to it. A reduction to Ba actually does occur. The electron emissions and the rate of evapn. of Ba from such cathodes depend upon the d. of the W sponge (anode), upon the kind of activator, and the time of uninterrupted working of the cathode. Werner Jacobson

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SOV/109-3-8-6/18

AUTHORS: Zingerman, Ya.P. and Morozovskiy, V.A.

TITLE: Investigation of the Process of the Penetration of Barium through the Porous Plug of an L-cathode (Issledovaniye protsessa prokhozhdeniya bariya skvoz' gubku poristogo metalloplenochnogo termokatoda)

PERIODICAL: Radiotekhnika i Elektronika, 1958, Vol 3, Nr 8, pp 1017 - 1023 (USSR)

ABSTRACT: Measurements were carried out by means of a special tube (Figure 1) which was in the form of a diode; this contained the investigated cathode A and the anode B. The anode was in the form of a movable tungsten plate which could be periodically cleaned inside the tube by raising its temperature up to 2 000 °C by means of the electron bombardment, provided from a tungsten helix. The cathode was fixed on movable supports and could be set in two different, fixed positions. In one of these positions (Figure 1a), the plug of the cathode was in front of the anode; the electron emission and the velocity of the evaporation of barium were measured in this position. In the second position (Figure 1b), the aperture of the cathode chamber was in front of the anode and the amount

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of barium issuing from the aperture was measured. The barium evaporation velocity from the plug and from the cathode chamber were determined by measuring the variation in the work function of the anode which was subjected to a bombardment by barium (issuing from the aperture in the cahmber the plug). This method of measurement was described in detail in an earlier work by the authors (Ref 2). The experimental tube of Figure 1 was also used to measure the electron emission of the cathode by using exponential voltage pulses at the anode. The pulses had a time constant of about 100 μsec and a repetition frequency of 1-2 pps. Three types of cathode were used; the chemical composition of these, their emission density and the evaporation velocity (in $\mu g/cm^2 h$) are shown in the table on p 1020. The dependence of the barium vapour pressure on the temperature for the cathode of the first type is illustrated in Figure 2; Curve 1 shows the pressure inside the cathode chamber, while Curve 2 gives the pressure above the cathode plug. Similar curves for the cathode of the third type (see the table) are shown in Figure 3.

Investigation of the Process of the Penetration of Barium through the Porous Plug of an L-cathode

The quantities p_K and p_r /in these figures represent the pressures/ inside the chamber and /above the cathode plug. The ratio of p_K/p_r as a function of temperature, for the cathode of the third type, is plotted in Figure 4. From the above investigation, it is concluded that the migration of barium through the plug can be explained by two processes. At low pressures, the mechanism of barium transfer can be explained by the migration of barium along the walls of the pores of the tungsten plug. On the other hand, at high barium-vapour pressures (inside the cathode chamber), the transfer is caused by the Knudsen-type leakage of the substance through the pores.

The authors make aknowledgement to Corresponding Member of the Ac.Sc.Ukrainian SSR N.D. Morgulis for his interest in this work and for valuable advice.

Investigation of the Process of the Penetration of Barium through the Porous Plug of an L-cathode SOV/109-3-8-6/18

There are 4 figures, 1 table and 10 references, 6 of which are Soviet and 4 English.

ASSOCIATION: Institut fiziki AN USSR, Kiyev (Institute of Physics of the Ac.Sc. Ukrainian SSR, Kiyev)

SUBMITTED: January 29, 1958

Card 4/4 1. Barium--Properties 2. Cathodes (Electron tube)--Performance
3. Barium--Vaporization 4. Thermionic emission

84089

S/181/60/002/009/032/036
B004/B056

9,3120 (1137, 1138, 1331)

AUTHORS: Zingerman, Ya. P., Ishchuk, V. A., Morozovskiy, V. A.

TITLE: The Electronic and Adsorption Properties of Films of Barium Atoms on Tungsten

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 9, pp. 2276-2286

TEXT: In an earlier paper (Ref. 1), the authors described a new method of studying the kinetics of adsorption processes. In the present work, this method was used for the adsorption of barium on tungsten surfaces. The experimental tube and the measuring methods are described in Ref. 1. A target made from a polished, 0.5 mm thick sheet of high-purity tungsten, whose surface was purified by electron bombardment at $T > 2600^{\circ}K$, was used. The target surface in this case had a microcrystalline structure (size of the microcrystals 50 - 100 μ). In individual cases, 20 μ thick tungsten sheets were used, and the microcrystals attained a size of 0.2 - 0.7 mm after the electron bombardment. "БАТИ" ("BATI") getter pills with 99% of Ba were used as a barium source. The investigations were carried out at $(1 - 2) \cdot 10^{-9}$ torr. The change in the work function of the tungsten during

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The Electronic and Adsorption Properties of Films of Barium Atcms on Tungsten

S/181/60/002/009/032/036
B004/B056

covering with barium atoms was measured by means of an electron beam. The dependence of $\Delta\varphi$ on the surface concentration n of Ba was determined by two methods: a) By measuring the desorption heat Q as a function of n; b) by measuring $\Delta\varphi$ as a function of the adsorption time t in a constant atom stream N_i. The experimental data are given in Fig. 1: Ion current recorded by an ЭПП-09 (EPP-09) potentiometer as a function of t and of the temperature of the W target (300 - 1650°K); Fig. 2: surface concentration n of the barium atoms as a function of time and temperature; Fig. 3: desorption heat Q and modification of the work function $\Delta\varphi$ as a function of n; Fig. 4: $\Delta\varphi$ as a function of t and temperature; Fig. 5: $\Delta\varphi$ as a function of t and temperature in a W target purified by heating; Fig. 6: dto. in a target purified by electron bombardment; Fig. 7: Q as a function of the coating degree ϑ. The dependence of $\Delta\varphi$ on temperature and on the manner of treating the target (occurrence of a minimum for $\Delta\varphi$ (n) at low temperatures), which was found in this paper, is explained by the change in the impurity content of the adsorbed barium film. The impurities are probably atoms of the residual gas whose stream is of the same order of magnitude also at 10^{-9} torr as the stream of barium atoms. This could be

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The Electronic and Adsorption Properties of Films of Barium Atoms on Tungsten

experimentally proven by the adsorption of Ba on a W target covered with an adsorbed residual gas film (Fig. 8). Electron bombardment leads to a lower durability of the residual gas on the target (Fig. 9) The change in $\Delta\varphi$ is related to the dipole effect p of the adsorbed atom The following relation is obtained from equation $\Delta\varphi = 4\pi pn$ (2): $n^{3/2} = (p_0/\alpha)(1/p)-1/\alpha$ (4), where α is the lattice constant. This interrelation was confirmed by experimental verification (Fig 10). The authors drew the following conclusions: The adsorption of the barium atoms on the tungsten surface is not activated. The condensation coefficient equals unity, and with a covering degree of from $\vartheta \geq 1$ to $\vartheta \geq 1.5$ it does not depend on the latter nor on temperature. In the adsorption of barium atoms on W bombarded with electrons, the value of $\Delta\varphi$ monotonically approaches a limit which is near the work function for compact Ba. This limit is attained in the case of monatomic covering $n \simeq (5 - 6)\cdot 10^{14}$ atom/cm^2. The authors thank I. M. Dykman, Candidate of Physical and Mathematical Sciences, for his assistance and discussions. There are 10 figures and 11 references: 6 Soviet, 2 US, 3 British, and 1 German.

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The Electronic and Adsorption Properties of Films of Barium Atoms on Tungsten

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ASSOCIATION: Institut fiziki AN USSR, Kiyev (Institute of Physics of the AS UkrSSR, Kiyev)

SUBMITTED: February 22, 1960

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89281

S/181/61/003/001/014/042
B006/B056

26.2312

AUTHORS: Zingerman, Ya. P. and Morozovskiy, V. A.

TITLE: An ionization method of investigating the kinetics of adsorption processes on the surface of solids

PERIODICAL: Fizika tverdogo tela, v. 3, no. 1, 1961, 123-131

TEXT: As the conventional methods of investigating the adsorption and desorption have several drawbacks, the authors have developed a new experimental method which is based upon measuring the intensity of atom beams by means of their ionization by electron impact. The fundamentals of this method, the method itself, and the experimental means are described in the present paper. The ionization method of investigating the kinetics of sorption processes, suggested by Zingerman, is described on the basis of Fig. 1. Fig. 1a schematically shows the main elements of the tube used for the experiments: 1) is the source of the atom or molecule beam, 2) is the diaphragm through which the latter passes, 3) is a recording and measuring device, 4) is an ionization chamber, and 5) is the target-adsorbent. The beam may be quickly shut of by 6) As 4) adjoins 5), not only the direct

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atom beam, but also the reflected and desorbed atoms (coming from the target surface) fly through the chamber. Therefore, the ion current in the collector circuit is due to ionizations by both direct and reversed atoms. These two intensity components for the atom fluxes N_1 and N_2 are given by $I_1=\alpha_1 N_1$ and $I_2=\alpha_2 I_2$; α_1 is related to the ion charge, the impact ionization cross section of the atom, the intensity and geometry of the bombarding electron beam, the flux intensity distribution in the ionization chamber and the temperature of the sources of N_1 and N_2. It is therefore possible, by measuring I_1 and I_2 and their dependence on time and temperature of the adsorbents, to obtain the entire complex of experimental data necessary for investigating the kinetics of sorption processes. The experimental realization of this idea met with a number of difficulties which are described in detail. Provided certain conditions are satisfied, they may be avoided. In compliance with these conditions, a tube was constructed, which is shown in Fig. 2. The target is a hot tantalum cylinder (I) which may be placed above the auxiliary tungsten electrode (V), above the ionization chamber (II), or above the electron gun (VI). The ionization chamber

An ionization method of...

is a three-electrode system (cathode, anode, collector). The entire system is surrounded by a cylindrical shield (electron reflector). The ionization chamber has an operating volume of only 0.5-0.6 cm^3. By means of a Ba beam the tube operated under the following conditions: V_{an} = 200 v, V_{cath}=-90 v I_e = 4 - 5 ma. The Ba ion flux was 10^{10} atoms/cm^2.sec, which corresponds to an ion current of $\approx 10^{-13}$ a. IV denotes the molecule gun (the electron gun, VI, serves for measuring the work function by the contact-potential method), and III is the shutter for shutting off the atom beam. Studies of the $\Delta I(t)$ and $n(t)$ curves by means of this tube are finally discussed. Fig. 4 shows ΔI as a function of the duration of adsorption of Be atoms on W; the dependence of the surface concentration of the Be atoms on the adsorption time was determined from these curves; Fig. 5 shows the $n(t)$ curves thus obtained. As the adsorption of Be on W does not essentially affect the work function of W, the determination of the adsorption properties of the system W-Be is practically impossible by the use of conventional methods (electron emission, contact-potential difference); by means of the method described here, however, this is well possible. The authors thank Professor N. D. Morgulis, Corresponding Member AS UkrSSR, for discussions.

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An ionization method of... S/181/61/003/001/014/042
B006/B056

Ya. M. Kucherov is mentioned. There are 5 figures and 6 references: 3 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATION: Institut fiziki AN USSR, g. Kiyev (Institute of Physics, AS UkrSSR, Kiyev)

SUBMITTED: February 22, 1960 (initially)
May 3, 1960 (after revision)

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An ionization method of...

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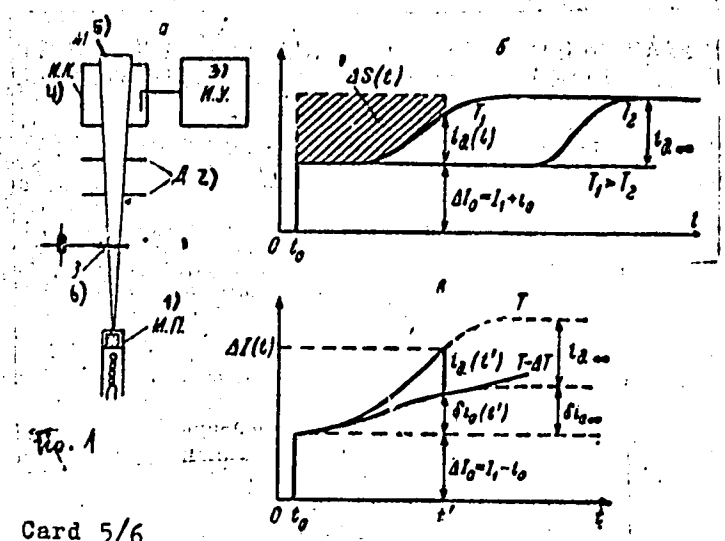

Fig. 1

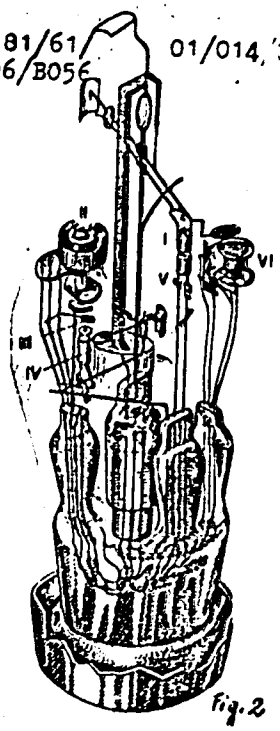

Fig. 2

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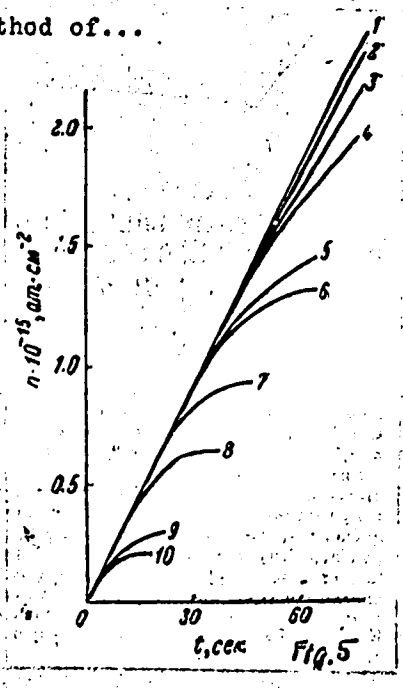

Fig. 5

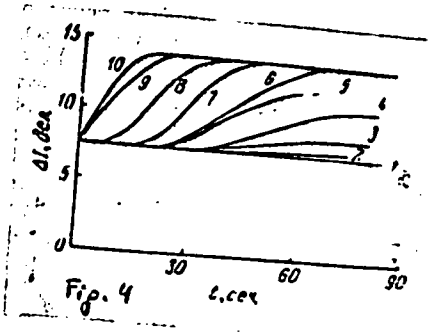

Fig. 4

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B114, B111

AUTHORS: Zingerman, Ya. I., Ishchuk, V. A., and Morozova, V. I.

TITLE: Adsorption of atoms of the alkaline-earth group on polycrystalline tungsten

PERIODICAL: Fizika tverdogo tela, v. 3, no. 4, 1961, 1104-1109

TEXT: With regard to the adsorption of alkaline earth by tungsten, the literature is still very incomplete and the published data diverge. Therefore, the authors planned an exhaustive investigation of the thermionic and adsorption properties of [illegible] of all alkaline earths on tungsten. The system W - Ba was already studied by [illegible] in a previous article (Ref. 1: FTT, II, 2, 2876, 1960) where, however, the method used was one newly developed by the authors. [illegible] called "ionization method for the investigation of [illegible] on surfaces of solid bodies" and is described in Ref. [illegible], 1960). The results of investigations relative to the adsorption of residual alkaline earth on tungsten are given in the present [illegible] ionization method was used to study the adsorption of [illegible] from

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adsorption of atoms ...

and Ca the simpler metho[illegible] of cont act potential differences was [illegible] is based on the measurement of the change in the work function [illegible] during isobaric adsorption. This latter method was proposed [illegible] in Ref. 4 (Yu. S. Vedula, V. M. Gavrilyuk, UFZh, 2, 632, [illegible]). metals Sr, Ca, and Mg were obtained from SrO, CaO, and MgO, respectively, by thermal reduction with tantalum. Be was obtained from purified chemically pure Be metal by evaporation. The tungsten target was optically polished tungsten plate of high purity, purified in vacuum electron bombardment at T > 2000°K. It had a polycrystalline structure in the final state with a crystallite size of 50-100 μ. The results of the investigations are illustrated in the form of diagrams, some of the typical ones being reproduced here. Numerical data are collected in a table. For example, Figs. 3 and 4 show the work function [illegible] as functions of the surface concentration n of the adsorbed atoms. The theoretical relations $\Delta\varphi = 4\pi p_0 n/(1+9an^{3/2})$; $n = n/9a\Delta\varphi - 1/9a$, and values of the values $\Delta\varphi_0$ and n_0 in the maximum of the curve $\Delta\varphi(n)$: $\Delta\varphi$ [illegible] and $n_0 = (9a/2)^{-2/3}$ are correctly reproduced by the results of the present,

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Adsorption of atoms ...

p_0 denotes the dipole moment for n = 0 and α the polarizability of the adsorbed atoms. The experimental results lead to the following conclusions: 1) The condensation coefficient of Ba, Mg, and Be on W in a large range of T and n equals one. If the flux of the atoms being adsorbed is constant, the rate of adsorption is constant, which indicates the mobility of the adsorbed atoms in the surface layer. 2) On adsorption of Be on W the adsorbed atom shows no marked dipole moment. The work function of a thin atomic layer of Be on W equals 4.53 ev. 3) The adsorption of Ba, Sr, Ca, and Mg on polycrystalline W which has been heated to remove gas impurities and subjected to electron bombardment, shows a monotonic decrease of $\Delta\varphi$ of W during the formation of a monatomic coating. Adsorption of the same atoms on a cold ($T \simeq 300^{\circ}K$) W surface leads to the usual maximum of the $\Delta\varphi(n)$ curve, which is a consequence of interaction of the adsorbed atoms with the residual gas on the W surface. 4) The change of $\Delta\varphi$ on adsorption of Ba, Sr, Ca, and Mg on W can be described theoretically if the dipole moment of the adsorbed atom at n = 0, its polarizability, and the surface concentration n_M of the adsorbed atoms in a monatomic layer are taken into consideration. 5) Desorption of

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Adsorption of atoms ...

alkaline earth from W is characterized by a linear decrease of the desorption heat Q with increasing n. This must be explained as due to the adsorption inhomogeneity of W, and not to a change in the interaction energy of the adsorbed atoms. The electrostatic binding between alkaline earth and W appears to be unimportant for adsorption. The authors thank Yu. G. Ptushinskiy, Candidate of Physical and Mathematical Sciences, and Engineer B. A. Chuykov for the mass-spectrometric analysis. There are 7 figures, 1 table, and 11 references: 7 Soviet-bloc and 4 non-Soviet-bloc.

ASSOCIATION: Institut fiziki AN USSR Kiyev (Institute of Physics AS UkrSSR, Kiyev)

SUBMITTED: May 24, 1960

Card 4/10

18 8310

36941
S/181/62/004/007/015/037
B102/B104

AUTHORS: Zingerman, Ya. P., and Morozovskiy, V. A.

TITLE: Interaction of molecular oxygen with the surface of tungsten

PERIODICAL: Fizika tverdogo tela, v. 4, no. 7, 1962, 1833-1840

TEXT: The adsorption of molecular oxygen on solid tungsten was investigated by a version of the ionization method used for investigating the kinetics of adsorption which the authors published in FTT, v.3, 123, 1961. Data relating to the kinetics of adsorption are derived from measurements of the time dependence of the ion current $I = I_1 + i_o + i_g + I_3$. The components of I are the currents of molecules striking the target, the currents of molecules elastically reflected from the target, the currents of molecules thermally desorbed by the target, and the currents of the residual gas molecules in the ionization chamber. Using the relations between current and flux: $I_1 = \alpha_1 N_1$, $i_o = \alpha_o \nu_o$, $i_g = \alpha_g \nu_g$, and $\Delta I = I_1 + i_o + i_g$ as well as the quantities illustrated in Fig. 3 it is possible to describe the surface concentration of adsorbed molecules by

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$$n(t)=\int_0^t (N_1-\nu_o-\nu_g)\,dt=\int_0^t\left[\frac{I_1}{\alpha_1}-\frac{i_0}{\alpha_0}-\frac{i_g}{\alpha_g}\right]dt. \qquad (6).$$

Since $N_1 = \nu_{o\infty} + \nu_{g\infty}$, it follows that

$$n(t)=\int_0^t\left[\frac{i_{o\infty}-i_o}{\alpha_o}+\frac{i_{g\infty}-i_g}{\alpha_g}\right]dt, \qquad (9).$$

If $\alpha_o = \alpha_g$, then $n(t) = \frac{1}{\alpha_g}\int_0^t (\Delta I_\infty - \Delta I)dt = S/\alpha_g$, and the reflection coefficient is given by $k(t) = i_o(t)/(i_{o\infty} + i_{g\infty})$. If N_1 is known, it is possible to calculate $\alpha_g = (i_{o\infty} + i_{g\infty})/N_1$. The validity of these relations is based on the experimental arrangement fulfilling certain conditions. This was carefully checked, the necessary linearity of $I_1(P_I)$ and $\Delta I_\infty(N_1)$ being verified. P_I denotes the oxygen pressure in

the source chamber. The apparatus proved suitable for work with molecular beams in a very high vacuum (up to $3\text{-}5\cdot10^{-10}$ mm Hg) and also for investigations on N_2, CO, etc. There are 6 figures.

ASSOCIATION: Institut fiziki AN USSR Kiyev (Institute of Physics AS UkrSSR Kiyev)

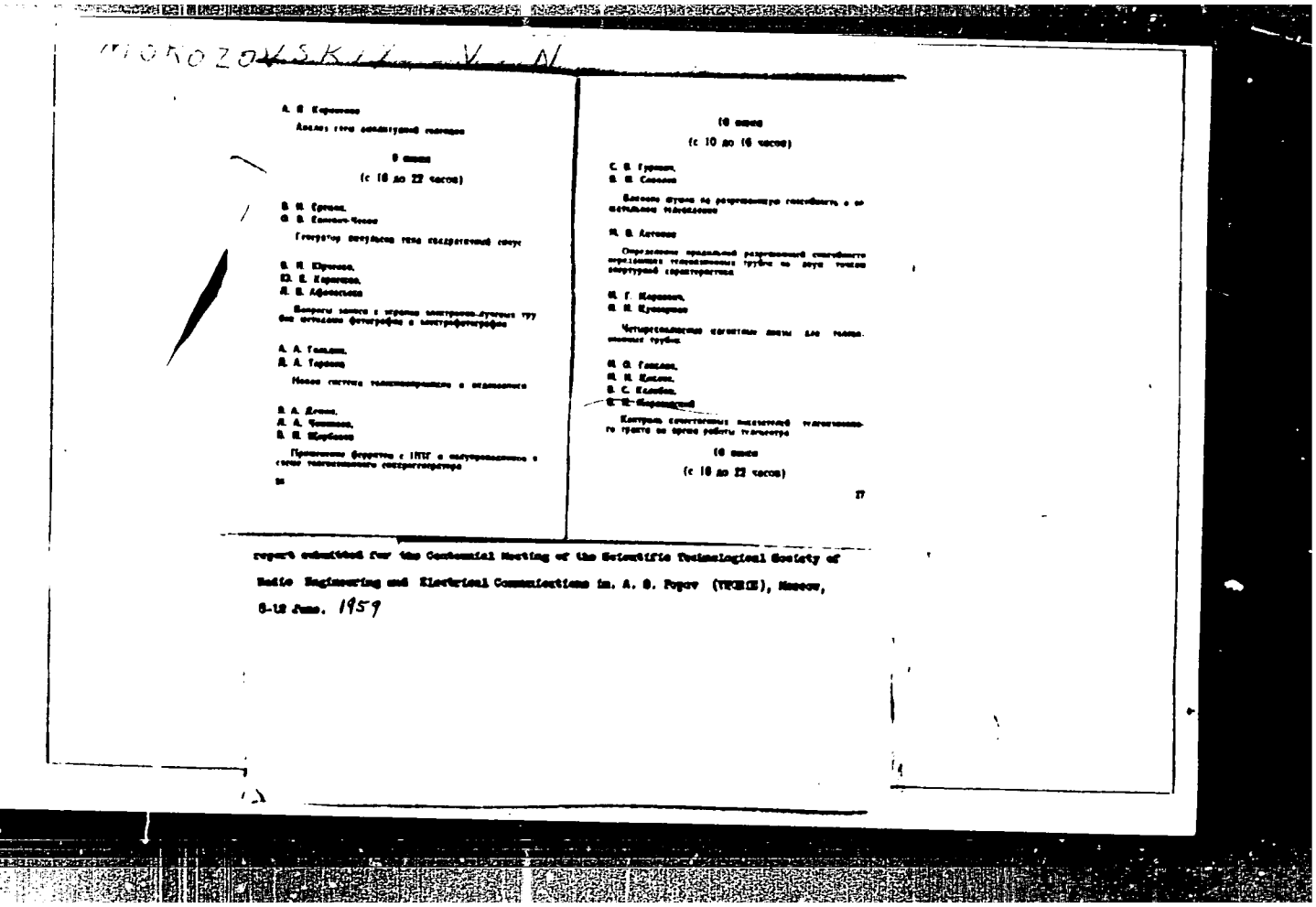
SUBMITTED: February 10, 1962

Card 3/3

DYKMAN, I.M.; ZINGERMAN, Ya.P.; ISHCHUK, V.A.; MOROZOVSKIY, V.A.

Nonequilibrium electron emission from a p - n-junction in silicon. Fiz. tver. tela 4 no.8:2015-2025 Ag '62. (MIRA 15:11)

1. Institut fiziki AN UkrSSR, Kiyev.
(Electrons--Emission) (Junction transistors)



MOROZOVSKIY, V. N.

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

MOROZOVSKIY, V.T.

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-40, 20 Feb - 3 Apr 1954)

Name	Title of Work	Nominated by
Kulebakin, V.S. Morozovskiy, V.T. Naporskiy, V.D. Sindeyev, I.N.	"Electrification of Aircraft"	Air Force Engineering Academy imeni Prof N.Ye. Zhukovskiy

SO: W-30604, 7 July 1954

KULEBAKIN, Viktor Sergeyevich; MOROZOVSKIY, Vladimir Tikhonovich; SINDEYEV, Igor' Mikhaylovich; LARIONOV, A.N., professor; SENKEVICH, A.M., kandidat tekhnicheskikh nauk, redaktor; BOGOKOLOVA, M.F., izdatel'skiy redaktor; ZUDAKIN, I.M., tekhnicheskiy redaktor

[Production, transformation and distribution of electric power in aircraft] Proizvodstvo, preobrazovanie i raspredelenie elektricheskoi energii na samoletakh. Moskva, Gos.izd-vo obor. promyshl., 1956. 479 p. (MLRA 9:11)

1. Zaveduyushchiy kafedroy elektrooborudovaniya samoletov i avtomobiley Moskovskogo energeticheskogo instituta imeni Molotova, chlen-korrespondent Akademii nauk SSSR (for Larionov)

(Electricity in aeronautics)

MOROZOVSKIY, V.T.

PHASE I BOOK EXPLOITATION SOV/4526

Soveshchaniye po teorii invariantnosti i yeye primeneniyu v avtomaticheskikh ustroystvakh. Kiyev, 1958

Teoriya invariantnosti i yeye primeneniye v avtomaticheskikh ustroystvakh; trudy soveshchaniya (Theory of Invariance and Its Applications to Automatic Devices; Transactions of the Conference Oct. 16-20, 1958) Moscow, 1959. 381 p. No. of copies printed not given.

Sponsoring Agency: Akademiya nauk Ukrainskoy SSR. Otdeleniye tekhnicheskikh nauk.

Resp. Ed.: V.S. Kulebakin, Academician; Editorial Commission: V.A. Bodner, Doctor of Technical Sciences, A.G. Ivakhnenko, Doctor of Technical Sciences, A.Yu. Ishlinskiy, Academician, Academy of Sciences UkrSSR, N.A. Kachanova, Candidate of Technical Sciences, P.I. Kuznetsov, Doctor of Physics and Mathematics, A.I. Kukhtenko, Doctor of Technical Sciences, B.N. Petrov, Corresponding Member, Academy of Sciences USSR, Ye.P. Popov, Doctor of Technical Sciences, G.M. Ulanov, Doctor of Technical Sciences, K.K. Khrenov, Academician, Academy of Sciences UkrSSR, P.I. Chinayev, Candidate of Technical Sciences, and N.M. Chumakov, Candidate of Technical Sciences; Tech. Ed.: G.V. Kruglov.

PURPOSE: This collection of papers is intended for engineers and other specialists working in various fields of automation.

COVERAGE: The collection includes reports and papers presented at the Conference on the Theory of Invariance and Its Applications to Automatic Devices, which was called by the Otdeleniye tekhnicheskikh nauk (Department of Technical Sciences) and the Institut elektrotekhniki (Institute of Electrical Engineering) of the Academy of Sciences of the Ukraine and convened in Kiyev October 16 - 20, 1958. The papers presented are concerned with high-quality automatic control systems designed on the basis of compensating for the effects of disturbances or maintaining the invariance of the quality to be regulated with respect to the disturbances acting on the system. The reports treat the physical and mathematical foundations of invariance in automatic control systems, they also consider methods for designing and calculating invariant systems and problems connected with specific cases of practical applications of compensation in various automatic systems. On the basis of these reports it was established by the Conference that, by utilization of the conditions of compensation and the principle of invariance, it is possible to produce automatic systems and various arrangements which are more perfect from the viewpoint of quality of the regulation and control process, stability, simplicity of construction, and reliability of operation. The following members of the Kiyev Seminar on Automatic Control are mentioned as organizers of the conference: A.I. Kukhtenko, A.G. Ivakhnenko, Yu.G. Kornilov, O.M. Kryzhanovskiy, N.M. Chumakov, N.A. Kachanova, and P.I. Chinayev. References accompany each article.

Section B. Regulation of Multiconnected and Other Systems

13. Nechiporenko, V.I. Combined Automatic Control Systems for Regulating Two Parameters 185

14. Sud-Kleshevskiy, A.I. Invariance in Systems With Several Adjustable Parameters 192

15. Morozovskiy, V.T. Selective Invariance in Coupled Systems of One Type 202

16. Chinayev, P.I. On the Synthesis of Combined Linear Control Systems 217

17. Tsukernik, L.V. Combined Control of the Excitation of Synchronous Machines 227

18. Kornilov, Yu.G. Independent Regulation for Parallel Operation of Boilers 238

Discussion [speeches by:]

A.I. Sud-Kleshevskiy 252

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SOV/24-59-2-12/30

AUTHOR: Morozovskiy, V. T. (Moscow)

TITLE: The Stability of Identical Synchronous Generators Operated in Parallel (Ob ustoychivosti parallel'noy raboty odnotipnykh sinkhronnykh generatorov)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1959, Nr 2, pp 77-86 (USSR)

ABSTRACT: The paper by the same author in issue Nr 10, 1958, of this journal, is reproduced virtually without change. The load is assumed constant, and the problem is treated in terms of the relative motion of the rotors. The only changes are Fig 4 (which is new), the text and unnumbered equations between Eqs (25) and (26), and the mathematical appendix in small type immediately above the references, which serves only to explain some of the quantities appearing in Eqs (19) to (24). The paper contains 6 figures and 4 Soviet references.

SUBMITTED: December 18, 1958.

Card 1/1

MOROZOVSKIY, V. T.

"Choice of Optimum Compensation Circuits for Autonomous Systmems of Automatic Control."

paper presented at the First International Congress of the International Federation On Automatic Control (IFAC(, Moscow, 27 June - 7 July 1960.

S/024/60/000/01/013/028
E194/E355

AUTHOR: Morozovskiy, V.T. (Moscow)

TITLE: The Influence of the Nature of the Load on the Stability of a Single Synchronous Alternator

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1960, Nr 1, pp 111-118 (USSR)

ABSTRACT: In practice, a single alternator often works on a complex load. The alternator usually has a voltage regulator and is driven by a prime mover of commensurate output. The nature of the transient processes of speed stabilisation in a set of this kind depends very much on the change in emf and reactance of the generator on change of speed. The region of stable operation of such a set has also been found to depend on the nature of the load.
The present article attempts to assess the influence of the nature of the load on the conditions of speed stability of such a set fitted with a governor on the prime mover and a voltage regulator on the alternator, with allowance for the emf and reactance of the alternator as a function of speed. Because of the short duration of the electromagnetic

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processes in the armature circuit, the aperiodic component of the stator current is neglected in this as in most other works. The differential equations of the generator may then be written for both instantaneous and r.m.s. values of current and voltage, so that the vector diagram of the machine may be used in formulating the differential equations, as has been done by other authors. With the usual types of prime mover the torque may be represented as a function of the speed, of a control parameter and of a parameter characterising the load on the prime mover. All equations are written in terms of relative increments, taking as a basis a given equilibrium condition. Eq (1) for the prime-mover torque is thus rewritten to the form of Eq (2); the equation for torque equilibrium on the prime mover shaft is expression (3). The load torque on the generator shaft is given by expression (4). Ignoring the ohmic resistance of the stator winding, the vector diagram and equivalent circuit of the generator are drawn in Figures 1 and 2,

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respectively. Expression (6) is written for the alternator field voltage and expression (7) for the alternator emf. The latter is solved and substituted into the expression for the field voltage to obtain expression (8). Finally, expressions (14) - (17) are derived and Figure 3 shows diagrammatically the way in which they are used to represent the set.

It is assumed that voltage and speed control are affected only in proportion to the deviation from the normal values and that the governors are inertia links. The characteristic equation of such a system is then of the form of Eq (20). Several particular cases are next considered. If there are no speed controllers and voltage regulators the characteristic equation is of the second order, Eq (21). Here, the condition of stability is given by expression (22) and the corresponding stability curves may be derived from Figure 4. If the set only has a voltage regulator, the characteristic equation is of

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the form of expression (23) and the condition of stability is given by expression (24). Comparison of expressions (22) and (24) shows that the voltage regulator reduces the region of stability.

Consideration is then given to the general case of a machine with a speed governor and a voltage regulator. Figure 5 shows a stability curve for the characteristic equation (20) for given values of the various time-constants of a 30 kVA alternator driven by a gas turbine. The curve shows that the inductive nature of the load extends the region of stable operation.

The influence of the nature of the load and of the voltage regulator on the region of stable operation is illustrated by Figure 6. The oscillograms show the change of speed (Curve 1) and of voltage (Curve 2) and the coordinates of the speed control element (Curve 3) for a synchronous alternator driven by a gas turbine of commensurate output. The three-phase 400 c/s alternator operated on resistive and resistive-reactive load both with and without a voltage

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regulator. The oscillograms of Figure 6a and b correspond to no-load, Figure 6a being taken with a voltage-regulator and 6b without. It will be seen that in the latter case the process of speed stabilisation is more stable. The next two oscillograms correspond to half and full resistive load. The bottom oscillogram relates to an application of reactive load to the alternator carrying half resistive load when provided with a voltage regulator. It will be seen that connection of reactive load promotes stabilisation of the system. This confirms the theoretical conclusions, namely, that the voltage controller impairs stability, that increasing the resistive load restricts the region of stability and increase of reactive load extends it. There are 6 figures and 4 Soviet references.

SUBMITTED: September 1, 1959

Card 5/5

24408

16.8000 (1031, 1121, 1344)

S/024/61/000/002/006/014
E061/E135

AUTHOR: Morozovskiy, V.T. (Moscow)

TITLE: On the rational choice of a structure of compensating cross-links in multi-variable systems of automatic regulation

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Energetika i avtomatika, 1961, No.2, pp.92-105

TEXT: Multi-variable coupled systems of automatic control are considered, in which the number of controlled variables is equal to the number of command inputs. In general there exist both direct and feedback cross-links between the controllers and the controlled plants. The cross-links between the controlled plants (or within a single controlled plant) are due to the properties of the plant; the controller cross-links are compensating, that is they may be chosen to obtain the desired properties of the system. It is stated that multi-variable control systems are best represented in matrix form. It is shown that in the general case a system with multiple inputs and outputs can be represented in the form:

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$$\varphi = H'(s)(\mu + q)$$

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where

$$H'(s) = \begin{bmatrix} h_{11} & h_{12} & h_{13} \cdots & h_{1n} \\ h_{21} & h_{22} & h_{23} \cdots & h_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ h_{n1} & h_{n2} & h_{n3} \cdots & h_{nn} \end{bmatrix}$$

The h terms are functions of the Laplace variable s and are determined by the cross-links with the system. φ, μ, q are column matrices, the elements of which are Laplace transforms of the outputs, command inputs and disturbances respectively. Such a system is then considered to be the controlled plant of the automatic control system shown in Fig.3, where R(s) is the controller. The controller can then be described like the controlled system by:

$$\mu = R(s)\ (\lambda - \varphi) \qquad (11)$$

where:

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$$R(s) = \begin{bmatrix} r_{11}(s) & r_{12}(s) & r_{13}(s) & \dots & r_{1n}(s) \\ r_{21}(s) & r_{22}(s) & r_{23}(s) & \dots & r_{2n}(s) \\ \dots & \dots & \dots & \dots & \dots \\ r_{n1}(s) & r_{n2}(s) & r_{n3}(s) & \dots & r_{nn}(s) \end{bmatrix}$$

and μ, λ and φ are column matrices, λ representing the command inputs. The above control system can be represented by:

$$\varphi = (1 + H(s)\,R(s))^{-1}\,(H(s)\,R(s)\,\lambda + H(s)q) = G_q(s)q + G_\lambda(s)\lambda \quad (12)$$

where $G_q(s)$ is the closed loop transfer matrix with respect to the disturbances, and $G_\lambda(s)$ the closed loop transfer matrix with respect to the command inputs. For the purposes of system synthesis it is advantageous to write down:

$$G_\lambda(s) = H(s)\,R(s) - H(s)\,R(s)\,G_\lambda(s) \quad (14)$$

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$$G_q(s) = H(s) - H(s)\, R(s)\, G_q(s) \qquad (15)$$

The matrix equations (14) and (15) are useful in the formulation of the transfer matrix of the system. They correspond to n^2 algebraic equations connecting the elements of the left and right matrices. In these equations the transfer matrix of the controlled plant is fixed and so may be diagonal elements of the controller matrix. By solving the equations one can determine the elements of the controller matrix which will ensure the required properties of the system. A control system is then considered having two inputs and two outputs in which the variables are coupled by two feedback cross-links which are determined by the internal properties of the system. The conditions of autonomy of such a system are studied for various systems of compensations which are given in Table 1. $W_{01}(s)$, $W_{02}(s)$ represent the plant transfer functions; $W_{p1}(s)$, $W_{p2}(s)$ the controller transfer functions; $L_{12}(s)$ and $L_{21}(s)$ the coupling transfer functions; and $K_{12}(s)$ and $K_{21}(s)$ the compensation transfer functions. The values of the compensating

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transfer functions which are required to ensure autonomy are tabulated. The conclusions drawn from the examination of the results of this tabulation are that the conditions of autonomy with respect to command input and disturbances are not in general identical, and that the best conditions of autonomy are achieved where compensating links can be connected between the same points as the internal coupling links. It is pointed out that not all the forms of compensation are equally achievable in practice and that each system must be considered separately. Further, it is stated that partial autonomy with respect to steady state conditions may be achieved by the use of links with simple gain only. A simple system with two inputs and two outputs is considered, in which:

$$W_{01} = W_{02} = \frac{1}{1+s}, \quad W_{p1} = W_{p2} = \frac{10}{1+0.05s}, \quad L_{12} = L_{21} = 0.5$$

in which the compensating links are $K_{12} = K_{21} = K$. The effects of a step increase of the command input in one channel on the output in the other is examined, and the results of an analogue simulation

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of the problem are quoted. It is concluded that for the particular system, the compensation scheme I of Table 1 is the best.
Acknowledgments are expressed to G.V. Privalov for his assistance.
There are 5 figures, 2 tables and 8 references: 7 Soviet and 1 English. The English language reference reads as follows:
Ref.1: M. Colomb, E. Usdin. A theory of multidimensional servosystem. J. Franklin Inst., 1952, V.253, No.1.

SUBMITTED: January 28, 1961

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6

L 30107-65

ACCESSION NR: AT5004124 S/0000/64/000/000/0283/0300

22
B+1

AUTHOR: Morozovskiy, V. T.

TITLE: Synthesis of autonomous multidimensional automatic control systems

SOURCE: Vsesoyuznoye soveshchaniye po teorii invariantnosti i yeye primeneniyu v avtomaticheskikh sistemakh. 2d, Kiev, 1962. Teoriya invariantnosti v sistemakh avtomaticheskogo upravleniya (Theory of invariance in automatic control systems); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1964, 283-300

TOPIC TAGS: automatic control system, servosystem, invariance theory, digital computer, differential equation, control system stability, multidimensional control system

ABSTRACT: The synthesis of autonomous multidimensional automatic control systems (ACS) is investigated. The article commences with a determination of the transmission matrices and block diagrams of multidimensional ACS. The author then introduces the autonomous multidimensional ACS, and shows how formulas are obtained which describe the autonomy of these systems. The synthesis of autonomous and partially autonomous multidimensional ACS is then determined by four different methods, using the transfer functions of the systems. Eight variants of the block

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ACCESSION NR: AT5004124

diagrams for compensation of the autonomy with respect to the controlling actions, and of the autonomy with respect to the perturbing actions, are determined. The author concludes that it is expedient to introduce the concept of normal groups of identical components in order to simplify the analysis and synthesis of multidemensional ACS. In addition, the author obtains results of calculations which can make it considerably easier to carry out engineering calculations of autonomous two-dimensional ACS. Orig. art. has: 9 figures, 2 tables, and 16 formulas.

ASSOCIATION: None

SUBMITTED: 24Sep64 ENCL: 00 SUB CODE: IE, DP

NO REF SOV: 006 OTHER: 002

Card 2/2

20749

S/103/61/[illegible]/004/008
B116/B138

16.9500 (1031,1121,1132)

AUTHOR: Morozovskiy, V. T. (Moscow)

TITLE: A theory of one-type coupled automatic control systems with symmetric cross couplings

PERIODICAL: Avtomatika i telemekhanika, v. 22, no. 7, 1961, 821-837

TEXT: The author of the present paper studies the principles of assembling single-circuit systems that are equivalent to systems with several equal channels of the automatic control, connected by equal cross couplings. A. A. Krasovskiy (Ref. 1: "O dvukhkanal'nykh sistemakh avtomaticheskogo regulirovaniya s antisimmetrichnymi svyazyami." ("Two-channel systems with antisymmetric couplings in automatic control"), Avtomatika i telemekhanika, v. 18, no. 2, 1957) introduced the terms of symmetrical and antisymmetrical couplings in such systems and developed a technique of examining one-type two-channel systems with antisymmetrical couplings by means of complex transfer functions. In the present paper, this technique is further developed and extended to a special kind of one-type multi-channel systems. These systems are distinguished by so-called synchronizing and averaging

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A theory of one-type coupled

cross couplings. A method of determining reduced disturbances is given. Fig. 1 shows the scheme of a one-type multi-channel system. For simplicity, two kinds of motion of the input and output coordinates of the identical units are introduced. 1) Averaged motion. Corresponding to the mean value of the coordinates at input and output of the identical units. n denotes the number of channels, m - the number of units in a channel. The coordinate mean value for i identical units is equal to

$$x_{i+} = \frac{1}{n} \sum_{k=1}^{n} x_{ik} \quad (1)$$

x_{i+} denotes the coordinate mean value of the i-th group of units, x_{ik} - the coordinate value of the i-th unit in the k-th channel. 2) Relative motions. Corresponding to the differences of input and output coordinates of the identical units. The equation $x_{ik-} = x_{i1} - x_{ik}$ (2) holds for the k-th channel. Since in reality the parameters can never be identical, the author discusses the problem as to whether an idealization is permissible. It is shown that the one-type linear multi-channel systems discussed here, are "coarse" in the sense of A. A. Andronov (not explained here) and that a slight deviation from

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the identity of the channels causes but a slight deviation of ... tion processes (from the processes corresponding to perfect ... of the channels). M. V. Meyerov is mentioned in this connection. Equivalent assembly schemes are established for a study ... and of the relative motion. The transfer function W_i (of ... equivalent unit of a one-type multi-channel system with direct ... cross couplings) for the averaged motion reads as follows: $W_{i+} = x_{i\ \text{output}} + / x_{i\ \text{input}} + = W_i + (n-1)L$ (4), that for ... with cross back coupling $W_{i+} = \frac{W_i}{1 - (n-1)W_{i-}}$ (7), and the transfer function for the relative motion $W_{i-} = \frac{W_i}{1 + W_{i-}}$ (8). L denotes the transfer function of direct cross coupling. Since in practice ... may occur in which the identical units are subjected to superimposed direct and cross back couplings, four varieties of such a superimposition are

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discussed: 1) The i-th identical units are subjected to direct as well as to cross back couplings (Fig. 2). For the equivalent transfer function, the equation

$$x_{ik\,max} - x_{ij\,max} = (W_1 - L_1)\frac{x_{ik\,ax} - x_{ij\,ax}}{1 - W_1 L_2},$$

$$W_{-} = \frac{x_{ik\,max} - x_{ij\,max}}{x_{ik\,ax} - x_{ij\,ax}} = \frac{W_1 - L_1}{1 + W_1 L_2}. \qquad (12)$$

is obtained for relative motion, and the equation

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... theory of one-type coupled ...

$$\sum_{k=1}^{n} x_{ik\,max} = \frac{W_i - L_1 + nL_1}{1 - (n-1)W_i L_2} \sum_{k=1}^{n} x_{ik\,ax},$$

$$W_{i+} = \frac{\sum_{k=1}^{n} x_{ik\,max}}{\sum_{k=1}^{n} x_{ik\,ax}} = \frac{W_i + (n-1)L_1}{1 - (n-1)W_i L_2} \quad (1),$$

for averaged motion. 2) The i-th identical units are subjected to direct and cross back couplings. The signals of cross back couplings are summed up after the point from which the signals of direct cross coupling are taken, the signals of direct cross coupling are summed up until that point from which the signals of cross back coupling are taken. 3) The direct cross couplings are located within the cross back couplings (Fig. 3):

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A theory of one-type coupled ...

$$(1 + W_i L_2 - L_1 L_2)(x_{ik\ вых} - x_{ij\ вых}) = (W_i - L_1)(x_{ik\ вх} - x_{ij\ вх}),$$

$$W_{i-} = \frac{x_{ik\ вых} - x_{ij\ вых}}{x_{ik\ вх} - x_{ij\ вх}} = \frac{W_i - L_1}{1 + W_i L_2 - L_1 L_2}. \qquad (15)$$

$$[1 - (n-1) W_i L_2 - L_1 L_2 - (n-2) n L_1 L_2] \sum_{k=1}^{n} x_{ik\ вых} =$$

$$= (W_i - L_1 + n L_1) \sum_{k=1}^{n} x_{ik\ вх}$$

$$W_{i+} = \frac{W_i + (n-1) L_1}{1 - (n-1) W_i L_2 - (n-1)^2 L_1 L_2}. \qquad (16)$$

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