"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, A. S.

Electromechanical correction attachment for two-position control instruments. Priborostroenie no.10:6-7 O '62. (MIRA 15:10)

(Electric controllers)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

ACCESSION NR: AP3000244 S/0119/63/000/005/0003/0006

AUTHOR: Klyuyev, A. S.

TITLE: Improving the quality of a two-position control

SOURCE: Priborostroyeniye, no. 5, 1963, 3-6

TOPIC TAGS: automatic control, two-position controller, RPT-100 relay, TS-100 thermal signal

ABSTRACT: It has been customary to improve the quality of a two-position automatic control by introducing a time-function correction irrespective of the controlled variable. A different method of anticipatory control, when the controller action takes place just before reaching the set point, is theoretically substantiated. The correcting device takes the form of an inexpensive relay-and-contacts attachment. The following advantages are claimed: (a) the controlled-variable variations are cut down to one-half or better; (b) stable operation of the automatic controller is ensured at greater disturbances and at considerable delays in the system. Orig. art. has: 16 formulas, 3 figures, and 2 tables.

ASSOCIATION: none

Card 1/2

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

ACCESSION NR: AP3000244

SUBMITTED: 00 DATE ACQ: 14Jun63 ENCL: 00

SUB CODE: IE NO REF SOV: 007 OTHER: 000

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, A.S.

Improving static and dynamic characteristics of hydraulic jet controllers with a secondary amplifier. Priborostroenie no.9: 6-8 S '63. (MIRA 16:9)

(Hydraulic control)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, A.S.

Study of automatic control systems with the aid of phase-amplitude criteria of the necessary stability with respect to modulus and phase. Izv.vys.ucheb.zav.; radiofiz. 8 no.1:203-206 '65. (MIRA 18:6)

1. Trest "Yuzhmontazhavtomatika".

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

L 14011-66 EWT(d)/EWP(v)/EWP(k)/EWP(h)/EWP(1)
ACC NR: AP6003402 SOURCE CODE: UR/0102/65/000/005/0035/0039

AUTHOR: Klyuyev, A. S. (Rostov-na-Donu)

ORG: none

34
B

TITLE: The determination of the stability boundary of automatic control systems from the phase amplitude characteristics of the object in the plane of control tuning parameters

SOURCE: Avtomatyka, no. 5, 1965, 35-39

TOPIC TAGS: control system stability, automatic control theory, automatic control system

ABSTRACT: The introduction of integrals or differentials into the control laws adds a vector (at 90°) to the phase-amplitude characteristic. Since the stability of automatic control systems is fixed by the point of intersection of the phase-amplitude characteristic of the system with the negative semiaxis, the stability limits within the plane of control tuning parameters can be determined by analytic graphs using circles with specified radii. Other appropriate circles (with specified radii) supply control tuning parameters which secure a sufficient stability band. In the case of known phase amplitude characteristics, the proposed method can considerably simplify the calculations of appropriate control

Card 1/2

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

L 14011-66
ACC NR: AP6003402

tuning parameters. Orig. art. has: 10 formulas and 2 figures.

SUB CODE: 13 / 09 / SUBM DATE: 31Mar64 / ORIG REF: 002

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

L 34733-66 EWT(m)/EWP(j) WW/JK/EW

ACC NR: AR6017233 SOURCE CODE: UR/0058/65/000/012/D032/D033

57
B

AUTHOR: Klyuyev, A. Yu.

TITLE: Effect of pressure on the absorption spectra of benzene in the near infrared

SOURCE: Ref. zh. Fizika, Abs. 12D269

REF SOURCE: Tr. Komis. po spektroskopii. AN SSSR, t. 3, vyp. 1, 1964, 280-287

TOPIC TAGS: ir spectrum, absorption spectrum, pressure effect, line shift, molecular interaction, BENZENE

ABSTRACT: When a mixture of powdered alkali-halide salt and benzene is compressed in a special cuvette (up to 20,000 atmospheres), all the absorption bands of the benzene spectrum are shifted, the intensity of some of the bands changes, and new bands induced by the pressure appear. The shift of the bands is interpreted as a result of a change in the intermolecular interaction forces. Experiments with different pressure-transferring media have made it possible to estimate the polarizing influence of the ionic salts on the intramolecular oscillations of the benzene. Probable hypotheses explaining the occurrence of the induced bands are discussed. [Translation of abstract]

SUB CODE: 20

Card 1/1 82

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, G.A.; KOROVIN, Ye.P., akademik, otv.red.; ITSKOVSKIY, M., red. izd-vva; GOR'KOVAYA, Z.P., tekhn.red.; BARTSEVA, V.P., tekhn.red.

[Cotton growing using only the natural water supply] Khlopchatnik v usloviiakh ogranichennogo vodosnabzheniia. Tashkent, Izd-vo Akad.nauk UzSSR, 1959. 148 p. (MIRA 13:3)

1. AN UzSSR (for Korovin).
(Cotton growing)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, G.A.

KANASH, S.S., akademik; MAL'TSEV, A.M.; VLASOVA, N.A.; PASHCHENKO, Z.M.; ROZHANOVSKIY, S.Yu.; MAUYER, F.M.; MOKEYEVA, Ye.A.; KLYUYEV, G.A.; BURYGIN, V.A.; SHLEYKHER, A.I.; RUMI, V.A.; ROMANOV, I.D.; AVTONOMOV, A.I., otv.red.; MUKHAMEDZHANOV, M.V., akademik, glavnyy red.; RYZHOV, S.N., akademik, zamestitel' glavnogo red.; ALIMOV, R.A., red.; DABADAYEV, A.D., akademik, red.; DZHALILOV, Kh.M., kand. ekon.nauk, red.; YEREMENKO, V.Ye., akademik, red.; ZAKIROV, K.Z., akademik, red.; MANNANOV, N.M., akademik, red.; NABIYEV, M.N., akademik, red.; SADYKOV, S.S., red.; TOGOYEV, I.N., kand.ekon.nauk, red.; YAKHONTOV, V.V., red.; KURANOVA, L.I., red.izd-va; RAKHMANOVA, M.D., red.izd-va; BARTSEVA, V.P., tekhn.red.

[Cotton] Khlopchatnik. Tashkent. Vol.3. [Structure and development of cotton] Stroenie i razvitie khlopchatnika. 1960. 402 p. (MIRA 13:10)

1. Akademiya nauk Uzbekskoy SSR, Tashkent. 2. Akademiki UzSSR (for Kanash, Mukhamedzhanov, Zakirov, Nabiyev). 3. Vsesoyuznaya akademiya sel'skokhozyaystvennykh nauk imeni V.I.Lenina (for Kanash). 4. Tsentral'naya selektsionnaya stantsiya Vsesoyuznogo nauchno-issledovatel'skogo instituta khlopkovodstva Uzbekskoy akademii sel'skokhozyaystvennykh nauk (for Kanash). 5. Tashkentskiy sel'skokhozyaystvennyy institut (for Mal'tsev, Shleykher). 6. Institut genetiki i fiziologii rasteniy AN UzSSR (for Vlasova, Mauyer, Klyuyev, Rumi, Romanov).

(Continued on next card)

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KANASH, S.S. --- (continued) Card 2.
7. Sredneaziatskiy gosudarstvennyy universitet (for Pashchenko).
8. Institut botaniki AN UzSSR (for Rozhanovskiy, Moksyeva, Burygin).
9. Chleny-korrespondenty AN UzSSR (for Avtonomov, Alimov, Yeremenko, Sadykov, Yakhontov). 10. Uzbekskaya Akademiya sel'skokhozyaystvennykh nauk (for Mukhamedzhanov, Ryzhov, Dadebayev, Yeremenko, Zakirov, Mannanov).

(Cotton)

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CR

1

[illegible] G. M. [illegible] (U. S. S. R.) 14, 176-84(1957). [illegible] N. M. Leitrester

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

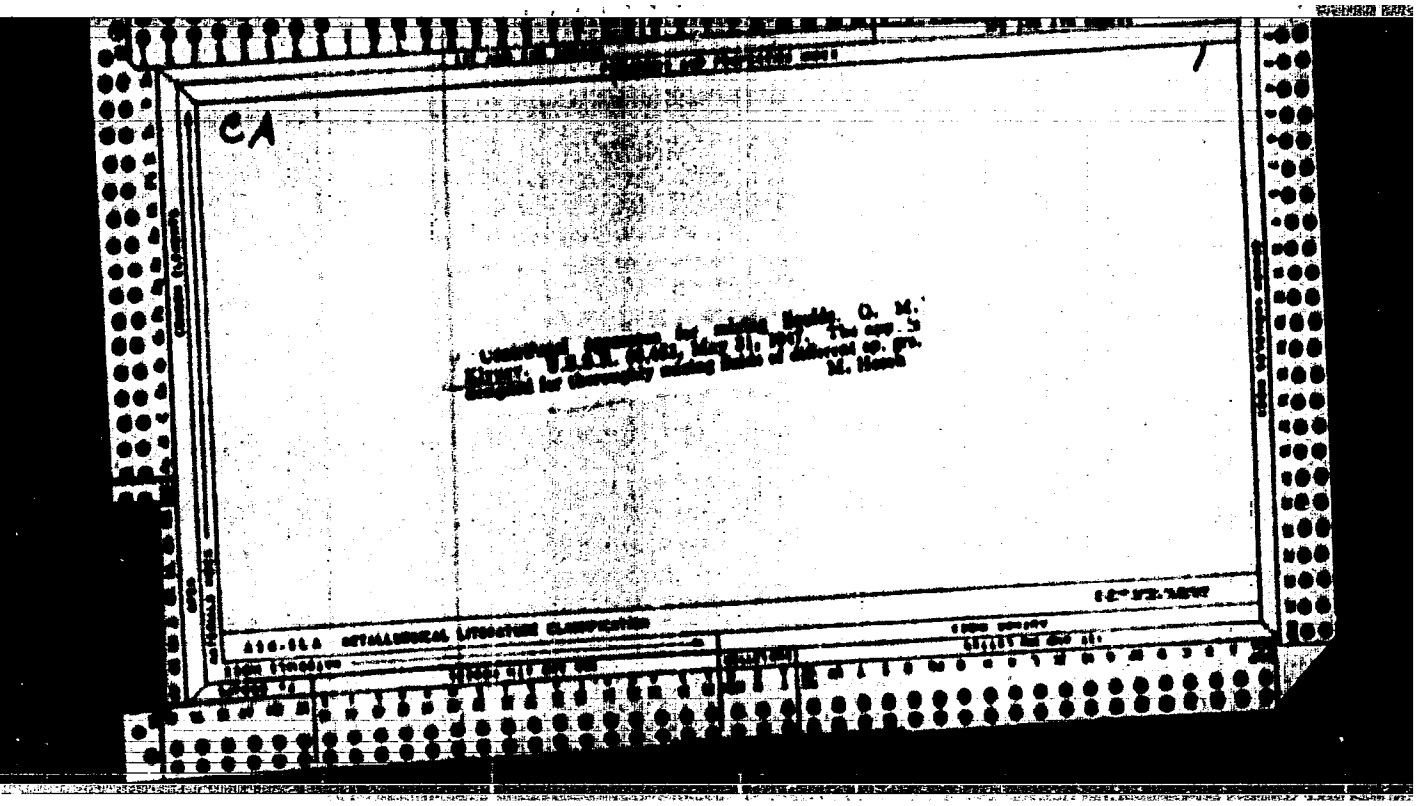
CA

Electric gas analyzer. G. M. Klyuev. U.S.S.R.
[illegible], Sept. 30, 1948. M. H.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7



APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, O., kandidat tekhnicheskikh nauk

Standard technical requirements for rubble processing plants. Stroi. mat., izdel. i konstr. 1 no.8:17-19 Ag'55. (MLRA 8:11)
(Stone, Crushed)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, G., kandidat tekhnicheskikh nauk.

Determining the productivity of mushroom-shaped crushing machines. Stroi.mat.izdel.i konstr. 1 no.9:27-28 S'55. (MLRA 9:1)
(Crushing machinery)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, O., kandidat tekhnicheskikh nauk.

Selecting equipment for stone crushing plants. Stroi.mat.,izdel.i konstr. 2 no.6:10 Je '56. (MLRA 9:8)
(Quarries and quarrying) (Crushing machinery)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KNAUS, O.M., insh.; KLYUYEV, O.M., insh.

Using chink sieves in screening sand-gravel mixes. Stroi. prom. 35 no.12:43-44 D '57. (MIRA 11:1)

(Sieves)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, G. M.

118-58-3-17/21

AUTHOR: Klyuyev, G.M., Candidate of Technical Sciences

TITLE: The Mechanical Screening of Crushed Stone in Quarries (O mekhanizirovannom otbore butovogo kamnya v kar'yerakh)

PERIODICAL: Mekhanizatsiya Trudoyemkikh i Tyazhelykh Rabot, 1958, # 3, pp 39-40 (USSR)

ABSTRACT: The screening of quarrystone by manual work restricts the introduction of complex mechanisation in quarries. The Laboratoriya drobleniya i grokhocheniya gornykh porod NII zhelezobetona (The Laboratory of NII Reinforced Concrete for the Crushing and Screening of Stone) has tested an immobile screening machine at the Drobil'no-sortirovochnyy zavod Gnivanskogo granitnogo kar'eroupravleniya (The Stone Crushing and Assorting Plant of the Grivan' Granite Quarry Administration). The screening machine assorts 325 tons of quarrystone per hour, the specific capacity is 60.6-ton sq m per hour, and the stones range in size from 0 to 460 mm.

There are 2 graphs.

AVAILABLE: Library of Congress

Card 1/1

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, O.M., kand. tekhn. nauk

Mechanized production of crushed stone using rocks composed of weak constituents. Prom. stroi. 37 no.7:49-51 Jl '59. (MIRA 12:10)

(Stone, Crushed)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, O.M., kand.tekhn.nauk; YUNITSKAYA, Ye.I., starshiy inzh.; RYAKOVA, E.Ya.; Prinimali uchastiye: PETROV, A.M.; SHISHKIN, A.F.; KNAUS, O.M.; RUSAKOVA, R.A.; STEPANOVA, L.G.; KALINKIN, V.F.; GOPKALOVA, N.K.; SACHKOV, V.P.; FROLOV, M.F.; LUKASHOVA, T.T.; SAVKIN, P.S.

Grain-size distribution in the material produced by crushing rock. Sbor. trud. NIIZHelezobetona no.3:69-90 '60. (MIRA 15:2)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut zhelezobetonnykh izdeliy, stroitel'nykh i nerudnykh materialov (for Petrov, Shishkin, Knaus, Rusakova, Stepanova, Kalinkin, Gopkalova, Sachkov, Frolov, Lukashova, Savkin).

(Stone, Crushed)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, G.P.

KLYUYEV, G.P., insh.; LAMIN, F.G.; LIPSKIY, M.V., insh. (stantsiya Zaless'ye Belorusskoy dorogi).

Laying reinforced concrete ties. Put' i put. khoz. no.1:15-17 Ja '58. (MIRA 11:1)

1. Glavnyy inshener putevoy mashinnoy stantsii No.71, stantsiya Zaless'ye Belorusskoy dorogi (for Lamin).
(Railroads--Ties, Concrete)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, I. A.

Nurses and Nursing

Forty years on a post of honor. Med. sestra. No. 7. 1952.

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

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, I.A.

Polytechnical instiruction, occupational training, and the relation to society of schools in sanatoria for osteotuberculosis patients. Probl.tub. 38 no.7:15-21 '60. (MIRA 14:1)

1. Zaveduyushchiy pedchast'yu Solotchinskogo detskogo kostno-tuberkuleznogo sanatoriya pamyati V.I. Lenina.
(TUBERCULOSIS--EDUCATION)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, I.I.; SHAVENZOVA, Ye.Z.; IZMAYLOV, O.A. (Mordovskaya ASSR, Saransk, 1-y Sovetskiy per., d.15)

Radical surgical treatment of elephantiasis of the lower extremities. Ortop., travm. i protez. 24 no.3:60-62 Mr '63. (MIRA 17:2)

1. Iz 1-go khirurgicheskogo otdeleniya Respublikanskoy bol'nitsy Mordovskoy ASSR.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

1. KLYUEV, M. A.

2. USSR (600)

4. Pharmacy

7. Pressing tasks of pharmaceutical establishments. Apt. delo no. 6, 1952

9. Monthly List of Russian Accessions. Library of Congress. March 1953. Unclassified.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, M.A., nachal'nik.

Measures for improvement in supplying therapeutic and disease-preventing organizations and the population with medicaments and medical equipment. Apt.delo 2 no.5:3-10 S-O '53. (MIRA 6:10)

1. Glavnoye aptechnoye upravleniye Ministerstva zdravookhraneniya SSSR. (Drugstores) (Pharmacy)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLJUYEV, M.A.

Some results of the work of pharmaceutical institutions in the fifth five-year plan, and ways for the further development of pharmaceutics. Apt.delo 5 no.3:3-7 My-Je '56. (MLRA 9:8)

1. Nachal'nik Glavnog aptechnogo upravleniya Ministerstva zdravookhraneniya SSSR
(DRUG INDUSTRY)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLIUYEV, M.A.; KUPRIYANOV, N.S.

Results of an inventory of drug supplies in drugstores. Apt. delo 9 no.3:10-14 My-Je '60. (MIRA 1413)

1. Glavnoye upravleniye meditsinskogo mezhrespublikanskogo snabzheniya i sbyta Ministerstva zdravookhraneniya SSSR.
(DRUGS)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, M.A.; STETSYUK, A.M.

Pharmacy in Norway. Apt.delo 12 no.3:76-80 My-Je '62. (MIRA 16:1)

(NORWAY--PHARMACY)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, M.A.

Improvement in the quality of medical articles, an important governmental problem. Med. prom. 17 no.6:3-6 Je'63 (MIRA 17:4)

1. Ministerstvo zdravookhraneniya SSSR.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, M.A.

Increase of the drug quality means improvement in the medicinal service to the population. Apt. delo 14 no.1:3-8 Ja-F '65. (MIRA 18:10)

1. Ministerstvo zdravookhraneniya SSSR.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

MURAV'YEV, I.A.; ALIYEV, R.K., prof.; KLYUYEV, M.A.

Fourth National Congress of Pharmacists of Yugoslavia.
Apt.delo 14 no.2:83-87 Mr-Ap '65.

(MIRA 19:1)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLIUYEV, M.G.

"Safety rules and labor protection at USSR industrial enterprises."

Report submitted to the Conf. on the Application of Science and Technology for the Benefit of the Less Developed Areas.
Geneva, Switzerland 4-20 February 1963

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

Translation from: Referativnyy zhurnal. Metallurgiya, 1958, Nr 12, p 18 (USSR) SOV/137-58-12-24045

AUTHORS: Filippov, S. I., Klyuyev, M. M., Simonov, V. I.

TITLE: Regularities of Steel refining Processes in a Current of Gaseous Oxidizer. I. The Kinetics of the Oxidation of Carbon (Zakonomernosti protsessov rafinirovaniya stali v potoke gazoobraznogo okislitelya. I. Kinetika okisleniya ugleroda)

PERIODICAL: Sb. Mosk. in-t stali, 1958, Vol 38, pp 64-78

ABSTRACT: The regularities governing oxidation of C in Fe-C melts under the influence of a gaseous oxidizer are studied by a dynamic method which eliminates the development of secondary reactions in the gas phase. The essence of the method lies in the forced delivery of CO_2 to the surface of the metal (Me), which is melted by induction heating in an alundum crucible mounted on a fixture in a quartz tube, and in measuring the gas flow rates at the system inlet and outlet by capillary rheometers. The actual amount of gas emitted (v_f) is calculated, with consideration of the viscosity of the gas-phase components, in accordance with the equation $v_f = 100\, v_r / (x + yK_{CO} + zK_{Ar})$, where v_r

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

Regularities of Steel-refining Processes in a Current of Gaseous Oxidizer. SOV/137-58-12-24045

is the quantity of gas measured by the rheometer; x, y, and z are the contents of CO_2, CO and Ar, respectively, in %; and K_{CO} and K_{Ar} are coefficients which account for the viscosities of CO and Ar. The rate of carbon removal from the Me, v_s, during various stages of the process is calculated from the equation $v_s = 0.000523 v_f J/m$, where m is the Me weight. As the result of the experiment it is established that v_s in the heat is determined by the oxidizing properties of the furnace atmosphere and is a constant at a given temperature and constant rate of delivery of oxidizer to the metal bath. When the bath is constantly supplied with oxidizer, v_s is not dependent upon [C] and increases with an increase in rate of oxidizer supply to the bath. However, as the intensity of delivery of oxidizer increases, the coefficient of utilization thereof diminishes. It is shown that the results obtained are explained by the previously suggested theory of the inhibiting oxygen link. According to that theory the case of development of the process in the region of diffusion reaction, which is of practical importance, is inhibited by the stage of delivery of the oxygen to the reaction zone. The existence of a critical point (~1500°C) in Fe-C melts, which corresponds to the temperature threshold of a sharp change in v_s due to a change in the chemical activity of the reacting C, is confirmed.

Card 2/2

V. M.

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

3

18.3200 1136, 1414, 1573

S/125/60/000/009/003/017
A161/A130

AUTHORS: Latash, Yu.V., Maksimovich, B.I., Medovar, B.I., Klyuyev, M.M., Topilin, V.V.

TITLE: Elimination of Non-Metallic Inclusions from Metal in the Electro-Slag Remelting Process

PERIODICAL: Avtomaticheskaya svarka, 1960, No. 9, pp. 17-23

TEXT: As known from previous works, treatment with slag in the electro-slag remelting process reduces the sulfur content (Ref. 5, 6), and the quantity of sulfide inclusions drastically decreases (Ref. 3, 4). Experiments have been carried out by the Electric Welding Institute at the "Dnepropetrovsk" Plant to investigate the effect of flux composition and properties in the electro-slag remelting of ball bearing steel grade ШХ15СГ (ShKh15SG). (The initial metal had been highly contaminated.) Three steel rods of 85 mm diameter each were joined into a bunch and melted as electrodes in a water-cooled copper ingot mold of 260 mm diameter. The composition of the three

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

S/125/60/000/009/003/017
A161/A130

Elimination of Non-Metallic Inclusions from Metal in the Electro-Slag Remelting Process

different fluxes used in the following:

		CaF_2 %	CaO %	Al_2O_3 %
АНФ-1П	(АНФ-1Р)	Bulk	5	-
АНФ-6	(АНФ-6)	65	5	30
АН-29	(АН-29)	-	45	55

Eleven ingots of 310 to 320 kg were cast. Due to the difference in conductivity of the flux grades (lowest in АН-29) the melting rate was different (Table 2). It is emphasized that in the case of the watched ingot diameter (260 mm), the growing melting speed is accompanied by a change of grain growth direction, and the axial growth is gradually replaced by radial growth. The degree of purification from sulfides increased in the order АНФ-1Р, АНФ-6, АН-29 flux, i.e., the highest purification was obtained with the АН-29 which had the highest CaO content. The better effect of АНФ-6 than of

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S/123/60/000/009/003/017
A161/A130

Elimination of Non-Metallic Inclusions from Metal in the Electro-Slag Remelting Process

ANF-1P is explained by its better desulfurizing capacity due to Al_2O_3 lowering the melting point of flux and raising the slag pool temperature.' The effect of ANF-1P and ANF-6 on the content of oxides, silicates and globular inclusions was equal, and of the AN-29 worker (Fig. 2). Non-metallic inclusions rose to the surface in the process, and the top portion of the ingots was contaminated more than the bottom, particularly by globules in remelting with AN-29 flux. The following conclusions were made:

1. It has been proven on the example of ball bearing steel ШХ15СГ that metal is purified from oxides, silicates and globules mainly due to the inclusions rising to the surface and the purification degree depends on the speed of the ingot formation, i.e., on the speed of the crystallization front motion, and the orientation of the crystal growth (axial or radial).
2. The desulfurization degree depends mainly on the desulfurizing capacity of the flux, and not on the speed of melting.). It can be stated that it

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A161/A130

Elimination of Non-Metallic Inclusions from Metal in the Electro-Slag Remelting Process

is possible to obtain ball bearing steel of a particularly high purity from non-metallic inclusions by using the electro-slag remelting process. Such steel is suitable for special small bearings in the most critical applications. Engineer S.A. Leybensen of "Dnepropetrovsk" took part in experiments. There are 3 figures and 12 Soviet references.

ASSOCIATIONS: Ordena Trudovogo Krasnogo Znameni institut elektrosvarki im. Ye.O. Patona AN USSR (Electric Welding Institute "Order of the Red Banner of Labor" im. Ye.O. Paton of the Academy of Sciences of the UkrSSR) - Ye.V. Latash, B.I. Maksimovich, B.B. Medovar; Ordena Lenina metallurgicheskiy zavod im. I.M. Tevosyana (Metallurgical Plant "Order of Lenin" im. I.M. Tevosyan) - M.M. Klyuyev and V.I. Vopilin

SUBMITTED: April 20, 1960

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, M.M.

1.2500 also 1045,

S/125/60/000/010/002/015
A161/A133

AUTHORS: Medevar, B.I., Maksimovich, B.I., Latash, Yu.V., Topilin, V.V., Klyuyev, M.M., Shiryayev, S.A.

TITLE: The Effect of Electro-Slag remelting on the Quality of Stainless OX18N9 (OKh18N9) and OX14N19B3S (1Kh14N19V3M)(JM851 (EI851)) Steel

PERIODICAL: Avtomaticheskaya svarka, 1960, No. 10, pp. 11-18

TEXT: The article contains information on experiments with electro-slag remelting process. The material used were bars of OX18N9 (OKh18N9) steel 100 mm in diameter, and JM851 (EI851) steel 85 mm in diameter joined into bundles of three and melted in an ingot mold of 250 mm diameter. Five 300 kg ingots were cast. Two ingots were reforged into a 25x175x515 mm billet, and two into a 95 mm diameter bar; one was investigated as cast. The results of metallographic investigation are presented. There were no streaks, nor nonmetallic inclusion accumulations, and the absolute content of slag inclusions was considerably lower than in the initial metal, which was also confirmed by

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A161/A133

The Effect of Electro Slag Remelting on the Quality of Stainless [illegible] (ОХ18Н9) and [illegible] (1Х14Н15В3Г) (ЭИ851 (ЕІ851)) Steel

electro-chemical solving. The total gas content was twice lower than in the initial metal; the nitrogen and oxygen contents were reduced more than the hydrogen content. Apparently, oxygen is being eliminated in the process with floating oxide inclusions, and nitrogen and hydrogen can separate with bubbles forming on the surface of the growing metal grains. Nitrogen separates from metal easily when the metal contains no components forming stable nitrides (titanium, niobium). Nitrides having a higher melting point and larger volume do not coagulate and stick more easily in interaxial spaces. This explains the different quantity of nitrogen eliminated from the two steel grades. The following conclusions are made: 1) The electro-slag process considerably reduces the gas content and nonmetallic inclusions in both steel grades. 2) It raises the ductility of austenitic stainless steel grade and considerably reduces the anisotropy of mechanical properties. 3) The ductility of the remelted metal at hot deformation temperature is 30-40% higher than that of the initial one. There are 8 figures, 5 tables and 5 Soviet-bloc references.

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A161/A133

The Effect of Electro-Slag Remelting on the Quality of Stainless Cr18N9 (OKh18N9) and 1Kh14N19S3C (1Kh14N19V3B) (DN851 (EI851)) Steel

ASSOCIATIONS: 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 UkrSSR Academy of Sciences) (B.I. Medovar, B.I. Maksimovich and Yu.V. Latash); Ordena Lenina elektrometallurgicheskiy zavod "Elektrostal'" im. I.F.Tevosyana ("Order of Lenin" Electro-Metallurgical "Elektrostal'" Plant im.I.F.Tevosyan) (V.V. Topilin, M.N. Klyuyev and N.A. Shiryayev)

SUBMITTED: May 5, 1960

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

S/125/61/000/001/008/016
A161/A133

AUTHORS: Vorob'yev, Yu.K., Doronin, V.M., Klyuyev, M.M., Topilin, V.V., Shiryayev, N.A., Voynovskiy, Ye.V., Medovar, B.I., Latash, Yu.V., Maksimovich, B.I.

TITLE: The effect of electro-slag remelting on th quality of chrome-nickel molybdenum ЭИ 847 (EI847) steel

PERIODICAL: Avtomaticheskaya svarka, no. 1, 1961, 52-56

TEXT: The authors present the results of experiments carried out with arc furnace, vacuum furnace, and electro-slag processes. The chemical composition of the EI847 grade steel is (%): 0.10-0.15 C, 14-17 Cr, 14-16 Ni, 2.5-3.5 Mo, 0.45-0.85 Nb, not over 0.8 Si, 0.8 Mn, 0.02 S and 0.03 P. It is austenitic, is used mainly for seamless pierced and rolled tubes, and the ductility at high temperature is of primary importance. The austenitic structure of this steel is not subjected to $\gamma \rightarrow \alpha$ transformation at high cold deformation or any heat treatment. The surplus component is carboni-

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tride. Cubic $Cr_{23}C_6$ carbide and the intermetallic $MoFe_2$ phase were revealed along with Nb carbonitride by X-ray analysis after long aging at 600-700°C. Aging for 500-7,000 hours at 550-700° does not cause any tendency to intercrystalline corrosion when EI847 steel is preliminarily hardened. The 100-hour strength limit for hardened EI847 steel is 25 kg/mm^2 at 650°, and 30 kg/mm^2 at 600°. In the tests electro-slag remelting was carried out in a Р-909 (R909) unit, in a 250 mm diameter crystallizer; the consumable electrodes were forged rods 140 mm in diameter, cleaned with emery wheel. No defects of any kind were found in ingots prepared by electro-slag remelting (Fig.2). Ingots produced by arc remelting in the vacuum were nearly as sound. The presence of globular inclusions is apparantly due to the high contamination of the initial metal before remelting. The steel produced by electro-slag and vacuum remelting had a higher ductility than steel melted by any arc furnace process (Fig.4); electro-slag remelted steel was less subject to overheating (its ductility remained at same level up to 1,300°C. Conclusions: 1) Purest (from nonmetallic inclusions) EI847 steel melted in arc furnaces was obtained in the process with a fresh charge with rimming and slag deoxidation by aluminum powder, and by employing Ni-Nb alloys, or ferroniobium with a low Si content. This process ensures the best ductility of the steel

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at high and ordinary temperatures. 2) If very high purity is required the EI847 steel must be melted using either the electro-slag or vacuum arc remelting with consumable electrodes. Both these methods result also in the highest technological ductility. 3) Ingots produced with the electro-slag process differ from ordinary ingots by a more dense structure, absence of pipes, loose center structure, segregation and other defects. 4) The ultimate strength of EI847 steel slightly decreases after electro-slag remelting, and the yield limit increases. The higher yield limit is due to a decreased dendritic heterogeneity owing to the particular crystallization conditions in water-cooled copper ingot molds. There are 4 figures.

ASSOCIATION: Ordena Lenina zavod "Elektrostal'" im.I.F.Tevosyana (Order of Lenin "Elektrostal" Plant im.I.F.Tevosyan) - Yu.K. Vorob'yev, V.M. Doronin, M.M. Klyuyev, V.V. Topilin, N.A. Shiryayev, Ye. V. Vyhovskiy; Ordena Trudovogo Krasnogo Znameni Institut elektrosvarki im.Ye.O.Patona ("Order of the Red Banner of Labor" Electric Welding Institute im.Ye.O.Paton AS UkrSSR) - B.I. Medovar, Yu.V. Latash and B.I. Maksimovich

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, M.

3

S/133/61/000/012/004/006
A054/A127

AUTHORS: Vorob'yev, Yu.K.; Voynovskiy, Ye.V.; Doronin, V.M.; Klyuyev, M. M.; Topilin, V.V.; Shiryayev, N.A.

TITLE: The effect of the production technology on the quality of 3H847 (EI847) steel

PERIODICAL: Stal', no. 12, 1961, 1,108 - 1,112

TEXT: Tests were carried out to establish the optimum technology for EI847 stainless steel smelted in 5-ton and 20-ton arc furnaces under various smelting conditions, applying also electroslag remelting and vacuum remelting. The EI847 steel contained 0.05 - 0.10% C, 14 - 17% Cr, 14 - 16% Ni, 2.5 - 3.5% Mo, 0.45 - 0.85% Nb, maximum 0.8% Si and Mn, maximum 0.02% S and maximum 0.03% P. This steel shows sufficient strength and a high ductility up to 700°C. In the various smelting processes soft iron, fresh ferro-alloys, carbon steel scrap [У7 - У12 (U7 - U12); 10 - 45], Armco iron, soft low-carbon iron, H-1 (N-1) nickel, Хр. 00000 (Khr. 00000) and Хр. 0000 (Khr. 0000) ferrochrome, molybdenum and manganese metal were used. Round 500-kg ingots were cast by bottom casting. To reduce the amount of nonmetallic inclusions in the metal and

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The effect of the production technology on the quality S/133/61/000/012/004/006 A054/A127

to improve its mechanical properties, the test steel was also subjected to electroslag remelting and vacuum-arc remelting. The former was carried out in the P-909 (R-909) type installation of the "Dneprospetsstal'" Plant with a 250-mm diameter mold under the following conditions:

Slag	АНФ-6 (ANF-6)	А (A)	АНФ-1П (ANF-1P)
Slag composition, %:			
CaF_2	70	40	95
CaO	—	30	5
Al_2O_3	30	30	—
Current density, amp/mm^2	0.20-0.34	0.23-0.29	0.21-0.31
Electric power consumption, kwh/ton	1,115	1,370	1,659
Output, kg/h	122.4	99.0	91.5

The ingots obtained by electroslag remelting are characterized by a compact structure and controlled solidification; the dendrite boundaries are less strongly marked than in ingots smelted under the standard conditions. The vacuum-arc remelting process was carried out in a furnace with a mold-diameter of 375 mm and a residual pressure of 10^{-1} - 10^{-2} mm Hg. 500-kg ingots were used

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The effect of the production technology on the.... S/133/61/000/012/004/006
AD54/A127

as consumable electrodes. This method proved less efficient than electroslag remelting. The ingots subjected to this process have to be roughed before forging, in the same way as the conventional ingots, while this is not necessary for ingots remelted by the electroslag process. The chemical composition of EI847 steel after vacuum remelting only changed in such a way that ... silicium, niobium and manganese cinder was formed, whereas after electroslag remelting there is some sulfur and silicium cinder. The silicium content decreased in the various heats by about 0.05 - 0.15%. The niobium-carbon ratio is at least 8 in the steel produced by the various methods tested and electroslag remelting. This ratio ensures a high resistance to intergranular corrosion when checked according to the AM(AM) method [ГОСТ 6032-58 (GOST 6032-58)]. As to nonmetallic inclusions the purest grade was obtained when smelting a fresh charge with rimming and deoxidizing with aluminum powder under white slag and by adding niobium in the form of a nickel-niobium master alloy or ferro-niobium with a low silicon content, followed by electroslag remelting. The amount of nonmetallic inclusions decreased in this way by a factor of 1.5 - 4. The technological ductility of EI847 steel increased when casting took place under the conditions described above. An additional reduction of the bath at the end of the refining period by metallic calcium increases the amount of brittle silicate

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The effect of the production technology on the B/133/61/000/012/004/006
A054/A127

and globular inclusions, but, at the same time also raises the steel ductility at high temperatures (this is contrary to the general opinion that inclusions lower the steel ductility). The highest degree of ductility in hot deformation (torsion) can be obtained in steel remelted with ANF-1F slag and a test slag containing 30% Al_2O_3, 30% CaO and 40% CaF_2. Vacuum-remelted steel is more ductile at 1,000 - 1,100°C than steel produced by electroslag remelting, at 1,150°C the ductility is about the same for both kinds of steel, while at higher temperatures the ductility of vacuum steels decreases and that of electroslag-remelted steels does not change up to 1,300°C. The electroslag remelting tests were carried out by S.A. Leybenzon, Engineer ("Dneprospetsstal'" Plant) and B. I. Medovar, Doctor of Technical Sciences, Yu.V. Latash, Candidate of Technical Sciences and B.I. Maksimovich, Engineer [Institut elektrosvarki im. Ye.O. Patona (Electric Welding Institute im. Ye.O. Paton)]. There are 5 figures, 4 tables and 3 Soviet-bloc references.

ASSOCIATION: Zavod "Elektrostal'" ("Elektrostal'" Plant)

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BELOVA, T.M.; KLYUYEV, M.M.

Metal pouring under laboratory conditions. Sbor.rats.predl. vnedr.v proizv. no.5:56 '60. (MIRA 14:8)

1. Zavod "Elektrostal'".
(Molding (Founding))

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VOROB'IEV, Yu.K.; VOYNOVSKIY, Ye.V.; DONONIN, V.M.; KLIUYEV, M.M.; TOPILIN, V.V.; SHIRYAYEV, N.A.

Effect of manufacture techniques of EI847 steel on its quality. Stal' 21 no.12:1108-1112 D '61. (MIRA 14:12)

1. Zavod "Elektrostal'".
(Steel, Stainless--Electrometallurgy)

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S/148/62/000/001/005/015
E111/E435

AUTHORS: Klyuyev, M.M., Topilin, V.V.

TITLE: Influence of electro-slag remelting of high-alloy steels and alloys on elimination of non-metallic inclusions

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no.1, 1962, 78-89

TEXT: A consumable electrode of the metal to be purified is melted in a bath of slag in a water-cooled mould. The main purifying factors are: the efficiency of slag/metal reaction when the metal is in the form of very fine droplets and the slag is at a high temperature (up to 2000°C); the upward crystallization of the ingot produced. Although a high degree of elimination of non-metallic inclusions has been claimed comparisons are difficult. It was therefore interesting to evaluate the elimination of non-metallic inclusions during remelting of various groups of grades of steel and alloys on the basis of results of electro-chemical solutions and analysis of gases in vacuum melting of specimens. The chemical composition of the steels treated is shown in Table 1;

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E111/E435

Influence of electro-slag ...

two nickel-base heat resisting alloys of unspecified composition were also treated. Depending on the type of steel, mould diameters were 150, 250, 300, 425 mm, giving ingot weights of 100, 350, 700 and 1300 kg, respectively. Slags used were: АНФ-6 (ANF-6) (30 to 40% Al_2O_3, 60 to 70% CaF_2); АНФ-1П (ANF-1P) (95% CaF_2, up to 5% CaO); CaF_2 (98% pure) and АН-29 (AN-29) (55% Al_2O_3, 45% CaO). The slag utilization coefficient (ratio of weight of metal remelted to weight of slag used) remained practically constant at 22 to 25.. In some experiments protection for the electrode tip and the slag surface was provided by a lid, with or without an inert-gas stream. The original and remelted materials in the forged or rolled state were subjected to metallographic investigation; deformed metal was also used to prepare specimens for electrochemical solution and gas analysis. Oxidation was found to be an important factor in the effectiveness of inclusion elimination, e.g. with type ЭП65 (EP65) and 200 mm electrode diameter, the original inclusion number was 1.62, the inclusion number after remelting without any protection,

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with protection by only a lid over the mould and with protection by a lid and nitrogen being 1.71, 1.25 and 1.08 respectively. The first effect of protection was found to be a decrease in contamination by globular inclusions of the metal easiest to oxidize by atmospheric oxygen. Re-use of slags, if their silica and iron-oxide contents are high, leads to an increase in globular inclusions and oxygen content in the remelted metal and reduced elimination of oxide inclusions: under such conditions oxygen can be transferred to the slag/metal boundary and this explains the increase in non-metallic inclusions up to the remelted ingot. When a heat-resisting alloy with 2% Ti was remelted the silica content decreased, that of titanium nitride increased. With the ЭИ (EI) steels the silica and iron-, chromium- and manganese-oxides contents increased, that of alumina decreased. With steels ОХ18Н9 (OKh18N9), ЭИ847 (EI847) and ЭИ851 (EI851), when there is very little oxidation of the electrode, purification with ANF-1P is greater than with ANF-6 slag. This is due to the different conditions for flotation of the non-metallic inclusions. [Abstractor's note: Details not given.] Slag composition was

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E111/E435

Influence of electro-slag ...

found also to affect the remelting rate: with OKh18N9 steel the rates with ANF-1P were 85 and 100 kg/hour (0.208 and 0.244 m/hour) the corresponding figures for EI847 being 90 and 112 (0.220 and 0.270) and for Ш Х 15 С Г (ShKh15SG) (according to previous work by the authors and others) 102 and 135 (0.246 and 0.326); for this last mentioned steel rates of 182 (0.440) were obtained with AN-29 slag. Engineers V.M.Doronin, D.P.Rozanov, Ye.V.Voynovskiy, L.N.Perepelitsa as well as Laboratory assistants I.N.Bystrokova and L.M.Babkina participated in the work. There are 5 figures, 5 tables and 11 Soviet-bloc references.

ASSOCIATION: Zavod "Elektrostal'" ("Elektrostal'" Works)

SUBMITTED: September 1, 1961

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34463
S/125/62/000/003/008/008
D040/D113

1.2300

AUTHORS: Klyuyev, M.M., Topilin, V.V., Voynovskiy, Ye.V., Rozanov, D.P., and Doronin, V.M.

TITLE: An investigation of optimum conditions for eliminating oxygen and oxide inclusions in electro-slag remelting.

PERIODICAL: Avtomaticheskaya svarka, no. 3, 1962, 86-87

TEXT: The effect of shielding of the slag pool and the end of the consumable electrode, the electrode surface state, and the use of fresh and spent slag on the elimination of oxygen and inclusions in electro-slag remelting, was studied on heat-resistant ЭП 65 (ЭИ 961Ф) [EP65 (EI961F)] steel. Ingots, 1200-1250 kg in weight and 425 mm in diameter, were cast in an Р -951 (R-951) unit. Remelting was tried with fresh and used АНФ -6 (ANF-6) fluxes, with scale-coated and scale-free electrodes. Shielding by nitrogen and carbon tetrachloride with and without a lid on the mold was also used. Best results were obtained with scale-free electrodes, fresh slag with a low con-

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tent of nondurable oxides (SiO_2, FeO, Cr_2O_3, MnO) and shielding of the slag pool. Best shielding results were obtained with a lid on the mold. The oxygen content was reduced from 0.005% in the electrode to an average of 0.003% in the ingot after remelting; the content of oxide and silicate inclusions dropped by slightly over 50%. Introductions of nitrogen under the shielding lid further reduced the oxygen content from 0.005 to 0.002%, and the content of inclusions dropped correspondingly. It was stated that the top of electro-slag ingots, consisting of metal solidified after the furnace has been switched off, contained more oxygen than the tail portion where the oxygen content was 2-2.5 times less than in the initial metal. The use of spent slags for remelting EP65 steel does not help to eliminate oxygen and results in more globular inclusions. The composition of nonmetallic inclusions in comparison to the initial metal and through the height of electro-slag ingots, is different due to increased content of silica, iron oxides, chromium and manganese, and reduced alumina content. Metal remelted by electro-slag process with the use of the investigated shielding methods has an improved plasticity and impact strength in tests of longitudinal and

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S/125/62/000/005/006/010
D040/D113

AUTHORS: Klyuyev, M.M., Topilin, V.V. and Voynovskiy, Ye.V.

TITLE: Drop transfer of electrode metal in electroslag remelting of heavy electrodes

PERIODICAL: Avtomaticheskaya svarka, no. 5, 1962, 44-48

TEXT: The article presents data of experiments at the "Elektrostal'" Plant with electroslag remelting of 90, 140 and 200 mm diameter electrodes of armco iron and several steel grades, with electromagnetic rotation of slag and metal bath in the mold and variations in the slag composition. Slags of the CaF_2-Al_2O_3 system were produced using АНФ-6 (ANF-6) and АНФ-1П (ANF-1P) fluxes with additions of Al_2O_3. Oscillograms clearly showed drop transfer, i.e. incontinuous flow of metal from the electrode, with one exception (oscillogram of process with electrode, 200 mm in diameter, and ANF-1P flux with 1% addition of Al_2O_3). The importance of drop transfer is stressed because the contact surface area of

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drops with molten slag is much greater than the contact surface area in arc steel furnaces. It appeared that electrodynamic forces (pinch effect) and surface tension have the strongest effect on drop transfer, and that these forces increase with increasing electrode diameter; this explains why the weight of drops only slightly depended on the slag bath depth. Drops were fixed on armco iron electrodes, 90 mm in diameter, and the content of Si and S was determined in the drops, the electrode and the remelted metal. It is assumed that Si may oxidize during drop formation, and that S separates from the metal later. Conslusions: (1) Metal drop transfer from electrodes of all diameters up to 200 mm and in all studied process variations was observed. (2) The drop size increased with increasing Al_2O_3 content in the flux of the CaF_2-Al_2O_3 system, as well as with electromagnetic rotation of the slag and metal bath, and it did not depend on the slag bath depth. There are 5 figures and 3 tables.

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

S/125/62/000/005/006/010
D040/D113

Drop transfer of electrode metal in electroslag....

ASSOCIATION: Ordena Lenina elektrometallurgicheskiy zavod "Elektrostal'" im. I.F. Tevosyana (Electrometallurgical "Order of Lenin" "Elektrostal'" Plant im. I.F. Tevosyan)

SUBMITTED: October 24, 1961

Card 3/3

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, M.M.; TOPILIN, V.V.; VOYNOVSKIY, Ye.V.

Drop transfer of the electrode metal during the electric slag melting of large diameter electrodes. Avtom.svar. 15 no.5: 44-48 My '62. (MIRA 15:4)

1. Ordena Lenina elektrometallurgicheskiy zavod "Elektrostal'" imeni I.F.Tevosyana.

(Electric welding)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, M.M.; TOPILIN, V.V.; VOYNOVSKIY, Ye.V.; ROZANOV, D.P.; DORONIN, V.M.

Studying optimal conditions for the removal of oxygen and oxide inclusions in electric slag remelting. Avtom. svar. 15 no.3: 86-87 Mr '62. (MIRA 15:2)

(Zone melting)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLIUEV, M.M. [Klyuyev, M.M.]; TOPILIN, V.V.

Influence of electric remelting in the slag of very richly-alloyed steels and alloys for the purpose of eliminating non-metallic inclusions. Analele metalurgie 16 no.4:64-74 O-D '62.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

PANIN, V.V.; KLYUYEV, M.M.; TOPILIN, V.V.; DRUZHININA, N.P.

Investigating temperature fields in electric slag ingots.
Izv. vys. ucheb. zav.; chern. met. 6 no.9:77-82 '63.(MIRA 16:11)

1. Zavod "Elektrostal'".

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

TOPILIN, V.V.; KLYUYEV, M.M.; VOYNOVSKIY, Ye.V.; DOROHIN, V.M.; ROZANOV, D.P.

Electric slag remelting of heat-resistant, stainless steels. Stal' 23 no.9:805-809 S '63. (MIRA 16:10)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

ACCESSION NR: AP4019806 S/0279/64/000/001/0045/0047

AUTHOR: Pridantsev, M. V. (Moscow); Stepanov, V. P. (Moscow); Topilin, V. V. (Moscow); Klyuyev, M. M. (Moscow)

TITLE: Effect of electroslag melting on the macrostructure of alloy KhN35VTYu

SOURCE: AN SSSR. Izv. Metallurgiya i gornoye delo, no. 1, 1964, 45-47

TOPIC TAGS: alloy KhN35VTYu, alloy macrostructure, spotted liquation, electroslag melting, slag ANF-6, slag AN291

ABSTRACT: This economical multi-component alloy on an Fe-Cr-Ni base, designated for use under extensive stress at high temperatures and representing an excellent substitute for similar Cr-Ni based systems, is limited in its applications by a tendency to spotty liquation. The authors investigated the effects of chemical composition and the quantity of slag ANF-6 (30-40% Al_2O_3, 60-70% CaF_2) or AN291 (39-43% Al_2O_3, 16-20% CaF_2, 22-26% CaO, 14-20% MgO), as well as of electrical current factors and electromagnetic stirring of the slag and metallic baths, on the macrostructure and surface quality of 1200-kg ingots of this alloy obtained by smelting cast or forged electrodes (200 mm) on the P-951 apparatus in a 425-mm diameter crystallizer. It is concluded that ingots of such size can be obtained free of spotty liquation when the build-up rate is held to 165-200 kg/hr (61.v,

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ACCESSION NR: AP4019806

5.5-6.5 ka). The slow build-up rate is the decisive factor in obtaining ingots with satisfactory macrostructure. "Ye. V. Voynovskiy, N. P. Druzhinina, N. K. Kernich, M. I. Pichugina, L. F. Chernyshova and A. F. Raskova also participated in this study". Orig. art. has: 6 illustrations and 1 table.

ASSOCIATION: none

SUBMITTED: 26Jul63 DATE ACQ: 31Mar64 ENCL: 00

SUB CODE: ML NO REF SOV: 004 OTHER: 001

Card 2/2

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[illegible] (Engineer); [illegible] (Engineer); [illegible]
[illegible] S. M. (Engineer)

[illegible] slag [illegible]

[illegible] maticheskaya svarka, [illegible]

[illegible] melting, [illegible] melting,

[illegible] effect of the [illegible] metal quality [illegible] on [illegible] steel, stainless austenitic [illegible] steel, stain- [illegible] resistant [illegible] resistant [illegible] flux [illegible] to the [illegible] of [illegible] content of

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

L 8906-65
ACCESSION NR: AP4045459 2

Si, Mn, Cr, and Fe oxides in the slag. In most cases, the amount of these oxides in deoxidized slags was close to the amount of the same [illegible] the initial flux, thus making [illegible] repeated use. [illegible] of the slag during electroslag melting promoted a more ef- [illegible] removal of nonmetallic inclusions, a more uniform distribution [illegible] alloying elements, [illegible] along the ingot [illegible] eliminated their [illegible] of in- [illegible] deoxidation of the slag during electroslag melting also im- [illegible] strength and ductility [illegible] alloy at [illegible] under a stress of [illegible] kg/mm² in- [illegible] and at [illegible] kg/mm², from [illegible] fig. art. [illegible]

[illegible] Elektrometallurgicheskiy zavod [illegible] (Elektro- [illegible] Electrometallurgical Plant)

[illegible]Apr63 [illegible]

[illegible] NO REF SOV [illegible] OTHER: 000

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

TOPIC TAGS: melting, flux drop transfer, drop formation, electric parameter,

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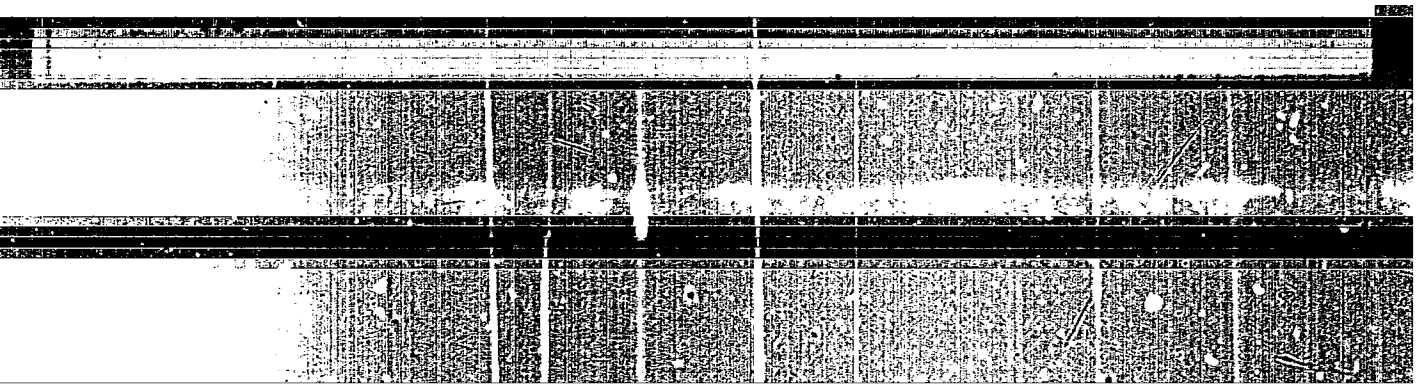

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and 36.2 V. The volume, [illegible]
P_0 although a discontinuity corresponding to the onset of arcing [illegible]

Card 1/2

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sensitive to the

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

ing constant current

"Elektrostal' " ("Elektrostal' " Plant)

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

L 35815-66 EWP(k)/EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6015246 (A) SOURCE CODE: UR/0125/66/000/005/0049/0052

31

AUTHOR: Kiyuyev, M. M.; Dedushev, L. A.

ORG: Elektrostal' Plant (Zavod "Elektrostal'")

TITLE: Processes of deoxidation during electroslag melting

SOURCE: Avtomaticheskaya svarka, no 5, 1966, pp 49-52

TOPIC TAGS: electroslag melting, redox reaction, synthetic slag, metal purification/ /ShKh15SG steel, EI481 steel, EP350 steel

ABSTRACT: Along with its definite advantages, electroslag melting has the disadvantage of resulting in the oxidation of slags owing to the presence of oxides of elements with a variable valence, the presence of scale on the electrode and the oxidation of the electrode during the melting, all of which leads to the accumulation of weak oxides in the slag, which reduces its refining power. This disadvantage is eliminated by performing the melting in an inert atmosphere or by deoxidizing the slag during the melting. In this connection, the authors present the results of an experimental investigation of the electroslag melting of ShKh15SG, EI481 and EP350 steels, demonstrating the possibility of additionally reducing the contamination of metal by deoxidizing the slag during the melting, given specified conditions. Deoxi-

UDC: 669.187.6 : 66.046.55

Card 1/2

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

L 35815-66

ACC NR: AP6015246

dation was performed by periodically adding alumocalcium or a mixture of alumocalcium and crushed electrodes. Findings: deoxidation of this kind contributes to removing oxide, silicate and globular inclusions from the metal, since the evolution in the slag of such an active deoxidizing agent as Ca contributes to reducing the oxidizing ability of the slag and hence also to a more thorough refining of the metal, while Al at the same time passes into the metal. It was also incidentally established that, despite the decrease in the silica content of slag, due to the passage of some Si into the metal, the $CaO:SiO_2$ ratio for the slag remained roughly constant; evidently the $CaO:SiO_2$ ratio is self-balancing when the slag used is based on a fluoride (CaF_2) and when Si-containing steels are melted. Orig. art. has: 7 figures, 2 tables.

SUB CODE: 13, 07, 11/ SUBM DATE: 22Jun65/ ORIG REF: 009/ OTH REF: 001

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

L 41073-66 EWT(m)/T/EWP(t)/ETI/EWP(k) IJP(c) JD/HW/WB/DJ

ACC NR: AP6027299 SOURCE CODE: UR/0133/66/000/008/0752/0755

56
54
B

AUTHOR: Doronin, V. M.; Smirnov, V. V.; Klyuyev, M. M.; Alekseyenko, M. F.; Orekhov, G. N.

ORG: none

TITLE: Stainless Heat-resistant 15Kh16N2M steel

SOURCE: Stal', no. 8, 1966, 752-755

TOPIC TAGS: CORROSION RESISTANT STEEL, stainless steel, martensitic ~~stainless~~ steel, ~~martensitic~~ heat resistant steel, SOLID mechanical property, ~~steel heat resistance, steel corrosion resistance~~/15Kh16N2M stainless steel

ABSTRACT: A new stainless and heat-resistant steel designated 15Kh16N2M has been developed for use in parts operating under stresses at elevated temperatures up to 500C in marine or tropical atmospheres. The steel is intended to replace previously used 1Kh12N2VMF, 13Kh14NVFRA, Kh17N2 and DI-1 steels. The two former are heat resistant at temperatures up to 500—600C but are susceptible to corrosion in marine and tropical atmospheres. The latter two have a high corrosion resistance but are not suitable for operation at temperatures over 400C. In addition, Kh17N2 steel has a poor forgeability owing to a two-phase structure with a delta-ferrite content of up to 40%. 15Kh16N2M steel has none of the above disadvantages. It contains 0.12—0.18% carbon, 15.0—16.5% chromium, 2.0—2.5% nickel, 1.2—1.5%

UDC: 669.14.018.45.8

Card 1/3

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L 41073-66

ACC NR: AP6027299

molybdenum, and 0.005—0.12% nitrogen. Steel austenitized at 1040—1050C (optimum temperature) and oil quenched has a martensitic structure with 5—10% deltaferrite. The best combination of strength and ductility (for elevated temperature service) is achieved by tempering at 500-550C or 660-680C (see Fig. 1) At 500C, steel

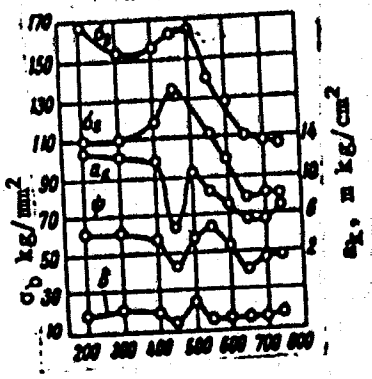

Fig. 1. Tempering temperature dependence of tensile strength (σ_b), yield strength (σ_s), elongation (δ), reduction of area (ψ), and notch toughness (a_k) of 15Kh16N2M steel, oil quenched from 1050C.

tempered at 580C had a 100 hr rupture strength of 45 kg/mm², a 500 hr rupture strength of 40 kg/mm², a creep strength of 27 kg/mm² (for 0.2% total creep in 100 hr) and a fatigue strength of 45 kg/mm² for smooth specimens and 26 kg/mm² for notched specimens. Conventionally arc-melted steel has a rather high anisotropy of

Card 2/3

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

L 41073-66

ACC NR: AP6027299

mechanical properties, which can be greatly reduced by electroslag melting. The corrosion resistance of 15Kh16N2M steel is close to that of Kh17N2 steel, but the former is not susceptible to pitting. Orig. art. has: 5 figures and 4 tables. [DV]

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 004/ OTH REF: 001/ ATD PRESS: 5057

Card 3/3 11b

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

L 44454-66 EWT(d)/EWT(m)/EWP(e)/EWP(v)/EWP(t)/ETI/EWP(k) IJP(c) JD

ACC NR: AP6018260 (N) SOURCE CODE: UR/0133/66/000/002/0135/0139

AUTHORS: Medovar, B. I.; Bondarenko, O. P.; Klyuyev, M. M.; Antuan, L.; Zhallas, P.; Bushe, P.; [illegible], Zh.; Valle, P. 39 B

ORG: [Medovar, Klyuyev, Bondarenko] Institute for Electrowelding im. Ye. O. Paton AN UkrSSR (Institut elektrosvarki AN UkrSSR)

TITLE: Experimental results obtained on the first electroslag furnace built in France according to a Soviet license

SOURCE: Stal', no. 2, 1966, 135-139

TOPIC TAGS: steel alloy, steel industry, steel microstructure, steel impurity, austenitic steel

ABSTRACT: The performance of the first Soviet-built electroslag steel furnace in France is described. The performance of the furnace was tested on a number of alloy and austenitic steels. The chemical composition, the usual mechanical properties, microstructure, and the distribution of nonmetallic impurities in the steel ingots were determined. The experimental results are presented in graphs and tables (see Fig. 1). It is concluded from the experimental results that the furnace performance was highly satisfactory and that the electroslag method of steel smelting seems to be very promising indeed.

Card 1/2 UDC: 669.187.26

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

L 43826-66 EWT(d)/EWT(m)/EWP(v)/T/EWP(t)/ETI/EWP(k)/EWP(h)/EWP(1) IJP(c)
ACC NR: AP6030265 (N) JD/HM/HW SOURCE CODE: UR/0125/66/000/008/0001/0005

62
61
B

AUTHOR: Paton, B. Ye.; Lakomskiy, V. I.; Dudko, D. A.; Zabarilo, O. S.; Pryanishnikov, I. S.; Topilin, V. V.; Klyuyev, M. M.

ORG: [Paton; Lakomskiy; Dudko; Zabarilo] Electric Welding Institute im. Ye. O. Paton, AN UkrSSR (Institut elektrosvarki AN UkrSSR); [Pryanishnikov; Topilin; Klyuyev] Elektrostal' Plant im. I. F. Tevosyan (Zavod "Elektrostal'")

TITLE: Plasma arc melting of metals and alloys

SOURCE: Avtomaticheskaya svarka, no. 8, 1966, 1-5.

TOPIC TAGS: plasma arc, metal melting, plasma arc melting, plasma arc furnace

ABSTRACT: A plasma arc furnace (see Fig. 1) for melting metals and alloys has been designed and built. The furnace is equipped with a FDM-3 plasma gun operating with a power input of 5—50 kw at a working voltage of 40—80 v and an open circuit voltage of 120 v. Ingots are 50—100 mm in diameter and up to 600 mm long. Several metals and alloys were melted in this furnace. It was found that the surface quality of the ingots was very high, there were no shrinkage holes, and the content of gaseous impurities was reduced significantly. For instance, the oxygen content in an NP-3 nickel (99.3% Ni+Co) dropped from $1.77 \cdot 10^{-2}$% to $3-7 \cdot 10^{-4}$% and the density of the metal increased from 8.804 to 8.8424 g/cm³. The ingots were cold rolled from 75 mm to 0.10 mm with only one process annealing. In comparison with the original alloy, the formability improved 2—3 times, the rupture strength 40—60%, and elongation and

UDC: 621.791:669.187.6

Card 1/2

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"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

L 43826-66

ACC NR: AP6030265

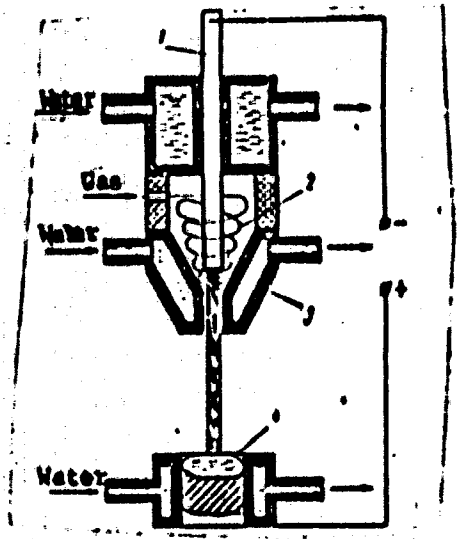

Fig. 1. Plasma furnace with direct action plasma gun

1 - Tungsten cathode; 2 - argon flow; 3 - water cooled nozzle; 4 - molten metal.

reduction of area 20—30%. Orig. art. has: 6 figures. [TD]

SUB CODE: 13/ SUBM DATE: 28Mar66/ ATD PRESS: 5072

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

ACC NR: AP7003870 (N) SOURCE CODE: UR/0133/67/000/001/0039/0041

AUTHOR: Fomicheva, N. P.; Klyuyev, M. M.; Topilin, V. V.; Tuchkevich, N. M.; Doronin, V. M.; Dzugutov, M. Ya.; Terekhov, K. I.; Mikhin, T. A.

ORG: none

TITLE: Electroslag remelting of EI481 chromium-manganese-nickel heat resistant steel

SOURCE: Stal', no. 1, 1967, 39-41

TOPIC TAGS: chromium manganese nickel steel, heat resistant steel, steel melting, electroslag melting, steel composition, steel mechanical property/EI481 steel

ABSTRACT:

Cast EI481 high-alloy heat-resistant steel (0.34—0.40% C, 7.5—9.5% Mn, 11.5—13.5% K, 7.0—9.0% Ni, 1.1—1.4% Mo, 0.25—0.45% Nb, 1.3—1.6% V, 0.3—0.8% Si) was electroslag remelted under four different slags and tested for chemical composition, nonmetallic inclusions and mechanical properties. The best results were obtained with the use of standard or with 10% lime No. 4 slag of the CaF_2-CaO system. In all cases, electroslag remelting changed only slightly the steel composition. It decreased the content of manganese by 0.04—0.20 abs.% and of vanadium by 0.08 abs.%; the sulfur content decreased by 20—40%, but no substantial decrease was observed in the hydrogen and oxygen contents. The electroslag remelting also decreased

Card 1/2

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ACC NR: AP7003870

the content of nonmetallic inclusions from 98.7 to 52.3·10⁻⁴% and resulted in more uniform distribution. No significant changes were observed in the mechanical properties of the electroslag remelted metal (all were above the technical requirements) but the anisotropy of the ductility characteristics decreased by 20—40%. In stress-rupture tests at 650C under a stress of 38 kg/mm^2, the steel remelted under No. 4 slag failed after 156 hr compared with 35 hr required for conventionally melted steel. Forged parts from electroslag remelted steel had a tensile strength of 112.0—104.0 kg/mm^2, a yield strength of 74.0—83.7 kg/mm^2, an elongation of 19.2—24.0%, a reduction of area of 31.2—43.9% and an impact toughness of 4.5—5.5 kg·m/cm^2. The corresponding figures for forgings of conventionally melted EI481 steel were 60 and 85 kg/mm^2, 15 and 20%, and 2.5 kg·m/cm^2. The electroslag remelting of EI481 steel can be recommended for increasing the service life of parts made from this steel. Orig. art. has: 2 tables. [MS]

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 002/ ATD PRESS: 5115

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, N.

Trolley suspension supports on balloon tires. Stroil truboprov. 9 no.5:34 My '64. (MIRA 17:9)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, N. A.

42336 KLYUYEV, N. A. - Avtotraktornaya tekhnologiya v stankostroyenii. V sb: Opyt novatorov mashinostroyeniya. Kuybyshev, 1948, s 141-48.

SO: Letopis' Zhurnal'nykh Statey, Vol. 47, 1948.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

KLYUYEV, N.F.; IVANUSHKO, M.D., red.

[Detection of impulse signals using discrete-action storage devices] Obnaruzhenie impul'snykh signalov s pomoshch'iu nakopitelei diskretnogo deistviia. Moskva, "Sovetskoe radio," 1963. 109 p. (MIRA 17:4)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000723310017-7

L 27394-65 EEO-2/FSS-2/EWT(1)/EEC(t)/EED-2 Pm-4/Pn-4/Pac-4/Pi-4/Pi-4/

Pk-4/Pl-4 WH

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pulse signals by sequential analysis — 71

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KLIUYEV, N.G., insh.

Mechanized light equipment. Stroi. i dor. mash. 9 no.4:32-33 Ap '64. (MIRA 18:1)

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ACC NR: AP6002543 (A) SOURCE CODE: UR/0286/65/000/023/0043/0043

AUTHORS: Klyuyev, N. G.; Yermolov, V. I.

ORG: none

19
B

TITLE: Strap grip. Class 35, No. 176668 [Announced by Special Construction Bureau Gazstroymashina (Spetsial'noye konstruktorskoye byruo gazstroymashina)]

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 23, 1965, 43

TOPIC TAGS: crane grip, gripping device, hoisting equipment, transportation equipment

ABSTRACT: This Author Certificate presents a strap grip for insulated pipes, consisting of a flexible member slipped through end loops onto rods mounted in supports on the transom. To mechanize the strap removal and to decrease insulation damage during placing of the pipes into ditches, the support of one rod on the transom consists of a hook which can be rotated from the cabin (see Fig. 1). When this occurs the rod loses one of its supports and permits the strap loop to slip off.

Card 1/2

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ACC NR: AP6002543

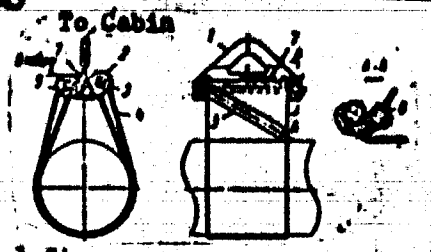

Fig. 1. 1 - transom; 2 - support; 3 - rod; 4 - strap; 5 - rotary hook; 6 - axis of hook rotation; 7 - hook control.

Orig. art. has: 1 figure.

SUB CODE: 13/ SUBM DATE: 21Apr64

Card 2/2 BK

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KLYUYEV, N.I.; OCHCHARDY, K.O.

Automatic pneumatic stopcocks for compressed air distributing systems. Prom.energ. 12 no.6:16 Je '57. (MIRA 10:7)
(Compressed air)

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KLYUYEV, N.K.

15

The effect of mulching podzol soils on the dynamics of soil processes and the yield of plants. N. K. Klyuyev. Uchenye Zapiski Leningrad. Pedagog. Inst. [illegible] 68-101; Abstr. Referat. Zhur. 4, No. 7-8, [illegible] (1941).—The effect of the mulch on the moisture content of the soil was favorable only in May. The pH value of the soil, the hydrolytic acidity and the absorption capacity remained unchanged after mulching. The ammonifying capacity of the soil increased slightly and the nitrifying capacity decreased.

W. R. Henn

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