SMOLYAKOV, B., kand.tekhn.nauk

Selecting a grade of shipbuilding steel considering weight indices and hull costs. Rech. transp. 21 no.12:31-32 D '62. (MIRA 15:12)

(Shipbuilding materials)
(Plates, Iron and steel)

SMOLYAKOV, B.N., kand.tekhn.nauk

Designing lake craft hulls of light alloys. Sudostroenie 28 no.8:8-11 Ag '62. (MIRA 15:8)
(Hulls (Naval architecture)) (Shipbuilding materials)

DORMIDONTOV, Nikolay Konstantinovich, doktor tekhn. nauk, prof.; LYSENKO, Lavr Georgiyevich, kand. tekhn. nauk; PAVLOV, Aleksandr Ivanovich, dots., kand. tekhn. nauk; TERENT'YEV, Georgiy Borisovich, kand. tekhn. nauk; SHMUYLOV, Nikolay Leonidovich, st. prepod. inzh.; Prinimal uchastiye KUZNETSOV,V.P., kand.tekhn.nauk;dots.; SMOLYAKOV,B.N.,dots.,retsenzent;GRINBAUM,A.F., inzh.retsenzent;VARENOV,P.G.,inzh.,retsenzent;ASHIK,V.V.,red.;VOLCHOK, K.M., tekhn.red.

[Design and arrangement of ships for inland navigation]Konstruktsiia i ustroistvo sudov vnutrennego plavaniia. Pod obshchei red. N.K.Dormidontova. Leningrad, Izd-vo "Rechnoi transport," Pt.2. [Metal ships]Metallicheskie suda. 1962. 271 p. (MIRA 15:12)

1. Kafedra arkhitektury i proyektirovaniya korablya Leningradskogo instituta vodnogo transporta (for Dormidontov, Lysenko, Pavlov, Terent'yev, Shmuylov, Kuznetsov).
(Naval architecture)
(Ships, Iron and steel)

LUSNIKOV, Vladimir Fedorovich; SMOLYAKOV, B.N., retsenzent; LOPATIN, N.I., retsenzent; YEFREMOV, G.V., red.; SKOBELING, L.F., red. izd-va; KALMYKOVA, V.M., tekhn. red.

[Use of light alloys in shipbuilding] Primenenie legkikh splavov v sudostroenii. Moskva, Izd-vo "Rechnoi transport," 1963. 113 p. (MIRA 16:8)
(Light metals) (Shipbuilding)

L 16880-66 EWT(1)/EWA IW

ACC NR: AR6016287 SOURCE CODE: UR/0269/66/000/001/0046/0046

AUTHORS: Sidorov, V. V.; Andrianov, N. S.; Mikhaylov, B. K.; Pokrovskiy, G. B.; Smolyakov, B. P.

TITLE: Combined meteor station KGU-M2

SOURCE: Ref. zh. Astronomiya, Abs. 1.51.374

REF SOURCE: Sb. Meteorn. rasprostr. radiovoln. No. 2. Kazan', Kazansk. un-t, 1964, 3-19

TOPIC TAGS: meteor observation, meteor tracking, radio echo, upper atmosphere

ABSTRACT: A general discussion of the combined meteor station KGU-M2 developed at the Radio Astronomical Problems Laboratory KGU (Problemnaya radioastronomicheskaya laboratoriya KGU) is presented. The station is intended for studying the properties of the upper atmosphere by radio reflections from meteor tracks, the physics of meteoric ionization, and some problems of meteor astronomy. The main consideration is given to a description and analysis of noise prevention and station operation synchronization devices. Recommendations for its further improvement are given. Resume [Translation of abstract]

SUB CODE: 03

UDC: 523.164.8

Card 1/1

PAI CHEVSKIY, V.V., SMOLYAKOV, B.S.

Change in the electron absorption spectrum of the 2-hydroxy-1,4-naphthoquinone due to the addition of indifferent substances to the solution. Opt. i spektr. 17 no.4:515-521 O '64. (MIRA 17:12)

PAL'CHEVSKIY, V.V.; SMOLYAKOV, B.S.

Change of electronic absorption spectra under the effect of some indifferent substances added. Part 1: Spectra of solvated anions. Vest. LGU. 18 no.16:110-114 '63. (MIRA 16:11)

SHEVCHENKO, A.I.; AYZENBERG, L.G.; SMOL'YAKOV, I.K.; LEYZEROV, I.M.

Replenishment of the operating solution of sulfur-removing units with liquid potassium hydroxide. Koks i khim. no.4:42-43 '61. (MIRA 14:3)

1. Yasinovskiy koksokhimicheskiy zavod (for Shevchenko, Ayzenberg, Smol'yakov). 2. Makeyevskiy koksokhimicheskiy zovod (for Leyzerov).
(Coke industry—By-products) (Sulfur)

ZHOLNEROVICH, B.G., red.; SMOLYAKOV, M.I., red.; USHAKOVA, A.F., ved. red.; VORONOVA, V.V., tekhn. red.

[Unified time norms for bench repairing of boring machinery] Edinye normy vremeni na slesarnyi remont burovogo oborudovaniia. Moskva, Gostoptekhizdat, 1963. 178 p. (MIRA 16:8)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po voprosam truda i zarabotnoy platy.
(Boring machinery--Maintenance and repair)

NIKIFOROV, I.; MAKAROV, A.; SMOLYAKOV, N.; SIPER, E.; MOGILA, V.; LARIN, M.; FILIPPOV, K.; TOKMAKOV, V.; BARANOVSKIY, V.; CHETVERIKOV, K.; POZNANSKIY, A.; SHUTOV, M.; ROZENFEL'D, L.; RUD', A.

Mechanization of waterproofing operations. Stroitel' 8 no.11: 15-20 N '62. (MIRA 16:1)

(Waterproofing--Equipment and supplies)

Sov/68-59-10-13/24

AUTHORS: Fayngol'd, S.G., Candidate of Technical Sciences, and Smol'yakov, N.K.

TITLE: Operation of the Sulphur Purification Plant on the Yasinovka Coking Works

PERIODICAL: Koks i khimiya, 1959, Nr 10, pp 41-44 (USSR)

ABSTRACT: Purification of the coke oven gas from hydrogen sulphide on the Yasinovka Works is done by the vacuo-potash method. A comparison of the design on the actual average operating indices of the desulphurisation plant indicated that the required degree of desulphurisation (85%) was not obtained. This was due to an insufficient spraying density in the scrubber (2 litre/m^3 of the gas), and on increasing the rate of spraying to 2.7 litre/m^3 the desulphurisation process was sharply improved. Further deficiencies in the plant design were: 1) lack of provision for the removal of salts which accumulated in the regenerated absorption solution (the composition and quantities are given in table 2). For this purpose an evaporator followed by two crystallising troughs (externally water

Card 1/2

Operation of the Sulphur Purification Plant on the Yasinovka Coking Works

cooled) were added (fig 1), which cured this defect of the original design. 2) Electrostatic precipitators of the MVT-3.5 type of a rectangular cross section. It was found that when the acid penetrated between the lining and the cone, a deformation of the precipitator's body takes place due to the formation of ferrous sulphate. Replacement of these precipitators by ones of a circular cross section is recommended. There is 1 figure and 2 tables.

ASSOCIATION: Yasinovskiy koksokhimicheskiy zavod (Yasinovka Coking Works)

Foundry N.N

Production of Castings without Risers. N. N. Smelyakov. (*Liteinoe Proizvodstvo*, 1953, (2), 26-28). [In Russian]. The waste of metal in risers is exemplified and ways of producing castings without risers are considered.—S. K.

metal

1

SMOLYAKOV, P.T.

[Climate of Tartary] Klimat Tatarii. Kazan', Tatgosizdat, 1947. 107 p. (MLRA 9:3)

(Tatar A.S.S.R.--Climate)

SMOLYAKOV, P. T.

Smolyakov, P. T. On the reduction of the equations of motion in the atmosphere to ones integrable by quadratures. Izvestiya Kazan. Filial. Akad. Nauk SSSR. Ser. Fiz.-Mat. Tehn. Nauk **1**, 75–78 (1948). (Russian)

Il s'agit de résoudre les équations du mouvement dans le plan d'une particule d'air soumise aux forces de Coriolis et de viscosité, les accélérations étant supposées nulles. En introduisant une variable complexe $s=v-iu$ (u et v étant les composantes de la vitesse du vent), on est ramené à une équation différentielle linéaire du second ordre:

$$\frac{d^2s}{dz^2}+A\frac{ds}{dz}+Bs=C,$$

s étant l'altitude; A et B sont fonctions du coefficient de viscosité cinématique μ et de la densité ρ; C est fonction de μ et ρ et du gradient de pression. L'auteur introduit un changement des variables $\psi=\psi(z)$ de façon à rendre les coefficients A et B constants. On trouve aisément que ψ doit satisfaire à l'équation $\psi=m^{-1}\int(\rho/\mu)^{1/2}dz$ avec la condition $d(\mu\rho)^{1/2}/dz=n/m$ (m, n des constantes réelles). L'auteur étudie différents cas particuliers: (a) $\mu=$cte; (b) $\rho=$cte; et (c) $\rho=\rho_0e^{-2\alpha z}$.

M. Kiveliovitch (Paris).

Smolyakov, P. T. On the stationarity of a baric field. Izvestiya Kazan. Filial. Akad. Nauk SSSR. Ser. Fiz.-Mat. Tehn. Nauk **2**, 93–99 (1950). (Russian)

L'auteur étudie le mouvement d'une particule d'air en négligeant la composante verticale et dans l'hypothèse du vent géostrophique. En utilisant l'équation de I. A. Kibel', on voit que le mouvement est dans ce cas stationnaire et non divergent (voir au sujet des équations de Kibel' notre mémoire [J. Sci. Météorologie **1**, 72–74 (1949); ces Rev. **11**, 280]). L'auteur étudie en détail ce mouvement.

M. Kiveliovitch (Paris).

SCI [illegible] REVIEW (unclassified)
vol XIV, No 4, April 1953, pp 341-438

[illegible], I. [illegible].

Smolyakov, I. V. - "On determining the altitude of clouds on the basis of the moisture in the air above the earth", Izvestiya Kazanskogo filiala (Akad. nauk SSSR), Seriya fiz.-matem. i tekh. nauk, Issue 1, 1946, p. 79-83, - Bibliog: 6 items.

SO: U-3042, 11 March 53, (Letopis 'Zhurnal 'nykh Statey, No. 9, 1949).

SMOLYAKOV, P. T.

Smolyakov, P. T., and Hovanskiĭ, A. N. On the solution of algebraic equations of the 3rd degree. Izvestiya Kazan. Filial. Akad. Nauk SSSR. Ser. Fiz.-Mat. Tehn. Nauk **1**, 85–92 (1948). (Russian)

The general cubic is reduced to the form

$$y^3+Py+1=0,$$

and small table to two decimals gives one real root y as a function of P with $|P|\leqq 10$. Besides the table one may use truncated developments of y as a function of P. These are illustrated by examples. *D. H. Lehmer.*

MATHEMATICAL REVIEW (Unclassified)
XIV No 2, Feb 1953 PP 121-232

SMOLYAKOV, P.T.

36364 Polezashchitnyye lesonasazh-deniya v bor'be s zasukhoy. Les i Step,' 1949, No. 6, S. 20-31

SO: Letopis' Zhurnal' nykh Statey, No. 49, 1949

SMOLYAKOV, P. T.

Two-Dimensional Problem of the Stationary Movement in the Atmosphere for Complete or Partial Independence From Viscosity

By investigating the equations of the two-dimensional movement of a compressible fluid in the field of a Coriolis force, the author finds that terms taking into account the viscosity in the indicated equations are converted to zero if the movement is executed along certain second-order curves. Further, on the basis of the fact that the pressure field in the atmosphere can be represented by isobaric curves of the second order, the author asserts that the role of viscosity is not large in atmospheric movements. (RZhGeol, No. 4, 1955) Izv. Kazanskogo fil. AN SSSR, ser. fiz. -matem. i tekhn. n., No. 3, 1953, 54-58.

SO: Sum. No. 744, 8 Dec 55 - Supplementary Survey of Soviet Scientific Abstracts (17)

SMOL'YAKOV, R.

Plans for poultry farms. Sel'.stroi. 11 no.10:28-30 O '56.
(MLRA 9:12)

1. Zamestitel' glavnogo inzhenera "Rosgiprosovkhozstroya."
(Poultry houses and equipment)

Smol'yakov, R.

SMOL'YAKOV, R.

Remodeling swine houses to increase their capacity. Sel'.stroi. 12 no.12:12-14 D '57. (MIRA 10:12)

1. Zamestitel' glavnogo inzhenera instituta "Rosgiprosovkhozstroy."
(Swine houses and equipment)

VASSERMAN, Zus' Natanovich; SMOLYAKOV, Rimma Timofeyevich; SOKOLOVA, G.S., red.; BALAKIN, V.M., red.; LEVINA, L.G., tekhn.red.

[Economical and simple livestock buildings] Prosteishie i ekonomichnye zhivotnovodcheskie postroiki. Moskva, Izd-vo M-va sel'. khoz.RSFSR, 1961. 86 p. (MIRA 14:7)

(Farm buildings)

SHABALIN, A.A.; GANZHA, V.Ya., inzh.; NIKOL'SKIY, V.A. [deceased]; LAPINSKIY, L.G., inzh.; IVANKOV, A.G.; SOL'YAKOV, R.T.; TURYANSKIY, G.M.; SHMIDT, N.E.; GRIBTSOV, P.P., red.; MAKHOVA, N.N., tekhn. red.; BALLOD, A.I., tekhn. red.

[Handbook for the state farm construction worker] Spravochnik sovkhoznogo stroitelia. Moskva, Sel'khozizdat, 1962. 598 p. (MIRA 15:9)
(State farms) (Construction industry)

SMOLYAKOV, R., inzh.

New specifications for the design of agricultural enterprises. (MIRA 16:7)
Sel'. stroi. 17 no.4:29 Ap '63.

(Farm buildings---Design and construction)

YEVSEYUKOV, Aleksandr Ivanovich; MACHIN, Andrey Ivanovich; NIKOL'SKOV, Nima Timofeyevich; KAZINKO, P., red.

[Manual for rural builders] Spravochnik sel'skogo stroitelia. Moskva, Mosk. rabochii, 1964. 279 p. (MIRA 17:9)

KUZAKOV, V.D., inzh., red.; BOLKHOVITINOV, L.A., inzh., red.; SMOL'YAKOV, R.T., inzh., red.

[Construction specifications and regulations] Stroitel'nye normy i pravila. Moskva, Stroiizdat. Pt.2. Sec. N. ch.1. [General plans for agricultural enterprises; design specifications] General'nye plany sel'skokhoziaistvennykh predpriiatii; normy proektirovaniia (SNiP II-N. 1-62). 1964. 14 p. (MIRA 17:9)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy komitet po delam stroitel'stva. 2. Gosstroy SSSR (for Kuzakov). 3. Glavnoye upravleniye po proyektirovaniyu sel'skikh zdaniy i sooruzheniy pri Gosudarstvennom komitete po delam stroitel'stva(for Bolkhovitinov). 4. Gosudarstvennyy institut po proyektirovaniyu sel'skokhozyaystvennykh sooruzheniy (for Smol'yakov).

SHU[illegible], M. Ya., [illegible]

Cutting apertures in blast furnace foundations for the installation of a cooling system for the hearth bottom. Metallurg 10 no.3:8-9 Mr '65. (MIRA 18:5)

1. Kuznetskiy metallurgicheskiy kombinat.

L 28522-66 EWT(m)/ETC(f)/EWG(m) RM/DS
ACC NR: AP6012331 (A) SOURCE CODE: UR/0317/65/000/006/0054/0056

28
B

AUTHOR: Smolyakov, V. (Engineer, Captain)

ORG: None

TITLE: Mobile desalination [distillation] unit

SOURCE: Tekhnika i vooruzheniye, no. 6, 1965, 54-56

TOPIC TAGS: desalination, electric generator unit, motor vehicle, desalting equipment, electric power plant/KRAZ-214 motor vehicle, ESK-75-VS-230 electric power plant

ABSTRACT: A mobile desalination station consisting of a water desalting unit and an electric power plant is described. The water desalting equipment was mounted on the KRAZ-214 motor vehicle hauling a trailer with the ESD-75-VS/230 power plant. The plant can be replaced by any 220-v, 50-cps source of a minimum 75-kw capacity. A two-stage (evaporation and condensation) distillation system was employed. Its flow diagram was presented including the main pump, cloth and magnetic filters, heat exchangers, evaporator, condenser,

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ACC NR: AP6012331

feed water tank, etc. The circulation of the water in the system and the desalination process were described. The maintenance, cleaning, and removal of salt deposits were also outlined. The equipment must be cleaned every 200 hours in case of sea water and every 400 hours if ordinary water is purified. A photo shows a motor vehicle carrying the desalting equipment. Orig. art. has: 2 figures.

SUB CODE: 13 / SUBM DATE: None

SMOLYAKOV, V.F., KALINNIKOV, E.S., POTAPOV, V.P.

"Influence of Slag Composition on Ball-Bearing Steel Contamination by Non-Metallic Inclusions,"
lecture given at the Fourth Conference on Steelmaking, A.A. Baikov Institute of Metallurgy, Moscow, July 1-6, 1957

Smolyakov, V. F.

133-10-7/26

AUTHOR: Smolyakov, V. F., Malinnikov, Ye. S. and Potapov, V. D.

TITLE: Contamination of Ball Bearing Steel by Refining Slag. (Zagryazneniye Sharikopodshipnikovoy Stali Rafinirovochnym Shlakom).

PERIODICAL: Stal', 1957, No.10, pp. 893-898 (USSR).

ABSTRACT: Using the method of tagged atoms an attempt was made to establish the intensity of contamination of steel ШХ15 by refining slag and to determine the influence of exogennic inclusions formed by the emulsification of slag in metal on the metal quality. Steel ШХ15 was produced in basic arc furnaces operating with solid charge of 55-57 tons. During the oxidation period from 0.26 to 0.52% of carbon was usually removed with a velocity of 0.35%/hr. The metal was deoxidised with coke and then with ground 75% ferrosilicon. Before deoxidation slag contained not less than 2% of calcium carbide. 2.-3 min before tapping aluminium was added (0.4 kg/ton). The metal was tapped with slag containing not more than 0.8% of calcium carbide. After retention in the ladle, steel was bottom poured into 2.8 ton ingots. Teeming conditions are given in Table 1. Radioactive Ca^{45} in the form of CaO was introduced into

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Contamination of Ball Bearing Steel by Refining Slag.

slag 30-65 min before tapping. The consumption of Ca^{45} was 355-537 m.curie per heat. The uniformity of the distribution of Ca^{45} in slag was tested and found to be satisfactory (Table 2). Before tapping slag samples were taken for chemical analysis (Table 3) and determination of viscosity using a Nekhedzi-Samarin viscosimeter (depth of penetration of slag into a narrow channel). To check on the possibility of purification of steel during bottom pouring, samples of pouring refractories from some heats were taken for radiometric measurements. During teeming of metal of some heats samples from the rising surface of the metal in mould were frozen on to a steel rod. After rolling of the metal from experimental heats in to 120mm rounds or 140 x 140mm squares, templets were cut out corresponding to 80, 60, 40 and 2% of the ingot height (counting from the bottom). Templets were forged to squares 90 x 90mm from which specimens were cut out (as shown in Figure 1) for metallographic investigation, electrolytic separation of non-metallic inclusions and determination of the content of oxygen. Experimental results assembled in tables 4-6 and figures 2,3. indicated that the method used for the determination of exogennic inclusions (emulsification

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Contamination of Ball Bearing Steel by Refining Slag.

of refining slag during tapping) confirmed the possibility of contamination of steel by slag during tapping from an electric furnace. The content of slag inclusions in the rolled product reached in the individual cases 0.001% or about 10% of the total content of stable inclusions in steel ШХ15. A direct relationship between the content of exogennic inclusions and the total content of oxide inclusions was established. On tapping with a basic slag of increased viscosity the contamination of steel by non-metallic inclusions is lower than with a fluid slag of similar composition. A part of slag inclusions is removed during teeming in casting refractories and during the filling of ingot moulds. No differences were found in the content of oxide inclusions in steel either from different mould seats or on different levels of the ingot height. The following participated in the work: V.V. Kurganov, V. A. Kamardin, A. N. Porada, E. P. Moskalenko, L. B. Kissina, L. I. Khristoforova and V. I. Kirsanova. There are 6 tables, 3 figures and 6 references, 4 of which

Card 3/4 are Slavic.

Contamination of Ball Bearing Steel by Refining Slag. 133-10-7/26

ASSOCIATION: Oneprospetstal' Works and the Institute of Metallurgy of the Academy of Sciences of the USSR. (Zavod Oneprospetsstal' i Institut Metallurgii AN SSSR).

AVAILABLE: Library of Congress

Card 4/4

Electrometallurgy. Electroslag Remelting of Ball Bearing and Structural Chromium-Nickel-Tungsten Steels

[illegible]
SOV/[illegible]

Institute of Electric Welding imeni Ye. O. Paton (Institut elektrosvarki imeni Ye. O. Patona) and N. A. Stetsenko of the "Dneprospetsstal'" Plant (named "Dneprospetsstal'") participated in the work. For industrial testing of the new method of electroslag remelting, developed by the Institute of Electric Welding imeni Ye. O. Paton of the Academy of Sciences of the UkrSSR, a furnace, designed and built by the Institute, was transferred in May 1958, to the "Dneprospetsstal'" Plant. It was considered advisable to check the degree of purity of metal (the nonmetallic inclusions) on ball bearing steel and the mechanical properties on the structural 18KhNVA used for the most critical applications. All test melts were conducted on RShO9 installation. The inside diameter of crystallizer was 200 and 250 mm. The remelting was done using the 60-160 mm rods (electrodes). The weight of ingot

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Electrometallurgy. Electroslag Remelting of Ball Bearings and Structural Chromium-Nickel-Tungsten Steels

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SOV/133-60-1-14/30

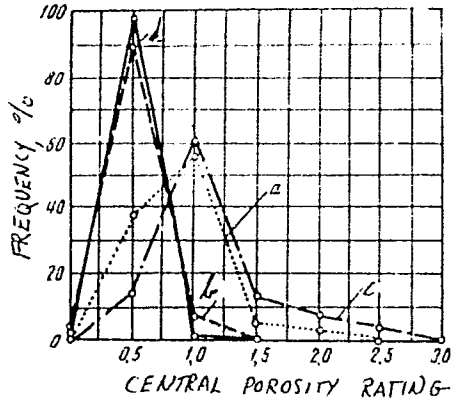

Fig. 3. Frequency diagram of distribution of melts according to the rating of central porosity. (a) Initial steel ShKh15; (b) ditto, electroslag steel; (c) initial steel ShKh15SG; (d) ditto, electroslag steel.

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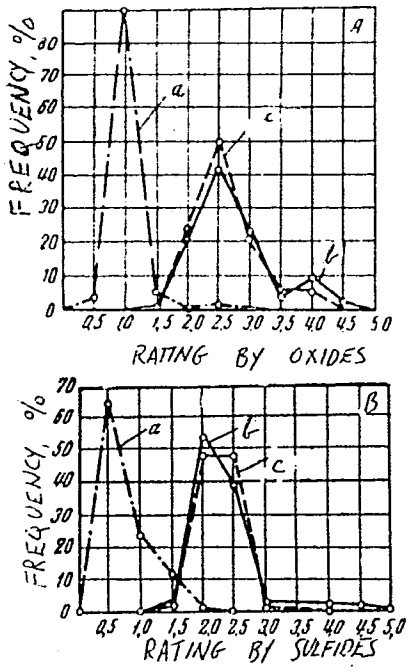

Fig. 5. Frequency curves of contamination by oxides (A) and sulfides (B) of electro-slag and ordinary melts of ShKh15 Steel. (a) Electro-slag; (b) ordinary melts in one group of furnaces; (c) ditto, in the other group of furnaces.

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recommended to continue the study of the basic parameters of the process regarding the improvement of crystallization conditions of ingots and the development of optimum composition of fluxes for additional increase of metal purity. There are 7 figures; 4 tables; and 3 Soviet references.

ASSOCIATION: Zaporozh'ye Machine Building Institute and "Dneprospetsstal'" Plant (Zaporozhskiy mashinostroyitel'nyy institut i zavod "Dneprospetsstal'")

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A054/A127

Nature of flaws in steel ingots produced by...

the ingot. As regards the smelting time, it was found that the first and the last periods produced the greatest number of defects. Metallographic study of faulty rods revealed sickle and spider-shaped cracks, lenticular inclusions, differing in colour from the flawless parts of the metal, in some templates occupying more than 50% of the total surface. In microhardness tests it was observed that in the impurified zones the hardness coefficients displayed a wide range of values. It could also be observed that the flaws penetrate fairly deeply, indicating that the factors impurifying the casting are active a long time (Fig. 5). Petrographic tests proved that the inclusions are similar to those forming in free crystallization and contain mainly calciumfluoride globules, needle-shaped corundum crystals, aluminum-calcium compounds. Among the impurities slag-inclusions, 1 - 2 mm in size, were found in irregular arrangement. Inclusions were present in the low-temperature zones of the metal, promoting the mixing of slag particles in the liquid metal. The lower the crystallization temperature, the more flaws were found. The viscosity of the metal increases due to intensive cooling and this promotes the capturing of slag particles. Based on the tests with the A-550 equipment the permissible minimum length of the

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Nature of flaws in steel ingots produced by...

bottom part of the ingot was defined. It was also possible to prevent the formation of impurities in the top of the ingot by ensuring stable electric operational conditions until the end of the process. The optimum power was obtained with 55 v instead of 40 and 6 ka. However, even the optimum electric parameters only yield flawless casting provided the power conditions are very stable throughout the entire process. By applying these new electrical parameters the impurities could be decreased from 31.6% to 0.7%. In some tests Ya. I. Spektor took part.

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S/032/61/027/004/008/028
B110/B215

AUTHORS: Shul'te, Yu. A., Garevskikh, I. A., Maksimenko, V. D., Leybenzon, S. A., Frantsov, V. P., Smolyakov, V. F., and Stetsenko, N. A.

TITLE: Scale for estimating nonmetallic inclusions in electroscoriaceous steel

PERIODICAL: Zavodskaya laboratoriya, v. 27, no. 4, 1961, 422-424

TEXT: A high-purity metal is obtained by the electroscoriaceous method of melting. Inclusions in electroscoriaceous steel differ from those in ordinary steel in kind and character of their distribution. Traditional scales, therefore, cannot be used for the correct estimation of impurities, especially oxidic inclusions. The examination of nonmetallic inclusions in a large number of melts of electroscoriaceous steel allowed the development of a new scale (Fig.) in which the total area of disoriented inclusions, their number within the field of vision, and the admissible dimensions of the individual inclusions are taken into account (Table 1). Oxidic and sulfidic inclusions are shown in the photographs

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Scale for estimating nonmetallic...

of the new scale. Large glocular, oxidic inclusions are measured with an eyepiece micrometer. The degree of impurities in the ground face is estimated according to the field of vision with the largest number of impurities. The authors tested the scale and controlled 682 specimens of 200 electroscoriaceous melts of ball-bearing steel types ШХ15 (ShKh 15) and ШХ15СГ (ShKh15SG). At the same time, the specimen was estimated by the traditional ГОСТ 801-47 (GOST 801-47) scale (Table 2). The indices of estimation by both scales differed but slightly, although the estimations of the individual melts differed largely from the control. Examinations of nonmetallic inclusions showed that the scale can also be used for other steels melted out by the electroscoriaceous method and for estimating melts in the vacuum arc containing the same type of inclusions. Ye. I. Boyko's collaboration is mentioned. [Abstracter's note: Complete translation]. There are 1 figure, 2 tables, and 2 Soviet-bloc references.

ASSOCIATION: Zaporozhskiy mashinostroitel'nyy institut (Zaporozh'ye Machine-building Institute); zavod "Dneprospetsstal'" ("Dneprospetsstal'" Plant)

Card ~~1/2~~

KHITRIK, S.I., doktor tekhn. nauk; KADINOV, Ye.I., inzh.; BORODULIN, G.M., inzh.; TREGUBENKO, A.F., inzh.; YATSKEVICH, I.S., inzh.; DEMIDOV, P.V., inzh.; FRANTSOV, V.P., inzh.; SMOLYAKOV, V.F., inzh.; MALIKOV, G.P., inzh.; DOVGIY, M.M., inzh.; MOSHKEVICH, Ye.I., inzh.; RABINOVICH, A.V., inzh.

Reducing chromium losses in the manufacture of acid-resistant and stainless steels in electric arc furnaces. Met. i gornorud. prom. no.1:17-20 Ja-F '62. (MIRA 16:6)
(Steel, Stainless--Electrometallurgy)

S/148/62/000/002/002/008
E111/E435

18.3400

AUTHORS: Smolyakov, V.F., Potapov, V.D.

TITLE: Influence of working flux on the contamination of ball-bearing steel in electro-slag remelting

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, no.2, 1962, 56-64

TEXT: In electro-slag remelting developed by the Institut elektrosvarki im. Ye.O.Patona (Institute of Electric Welding imeni Ye.O.Paton) a consumable electrode of the material is melted in a bath of slag in a water-cooled mould. The electrode is lowered automatically to keep pace with the melting process, the slag acting as a liquid resistance heater through which fine droplets of the metal fall. Although much reduced, non-metallic inclusions are still present in the remelted material. The function of the slag in this process has not been sufficiently studied. In the present work the authors give the results of their investigations on the influence of the type АНФ-6 (ANF-6) working flux and of other process factors on the contamination of types ШХ15СГ (ShKh15SG) and ШХ15 (ShKh15) steels with

Influence of working flux ...

of 50 to 56 V. The corresponding currents were 6.0 and 6.0 to 6.9 kA; durations were 185 min to 195 min and flux quantity 21.0 kg. Flux composition was varied over the following ranges: 0 to 3.0 SiO_2, 19.2 to 37.2% Al_2O_3, 0.14 to 0.17% FeO, 0.03 to 0.24 Fe_2O_3, 1.23 to 5.5% CaO, 0.3 to 0.97% MgO, 0.011 to 0.041% S, 57.4 to 76.2% CaF_2. A radioactive $Ca^{45}O$ preparation in a glass capsule was introduced when the process had reached a steady state. Slag samples for radiometric analysis were taken at intervals in two experiments and always at the conclusion of the process. Metal samples for checking the macrostructure and for microstructural, electrochemical and radiometric investigation of the amount and composition of non-metallic inclusions were taken for the initial electrodes and during forging of the experimental ingots. Metal quality was assessed using the ГОСТ 801-47 (GOST 801-47) scale. The residues from electrolytic solution of specimens were treated by a published method. Measurements of the activity of the test preparations were periodically checked with a cobalt standard. Errors were calculated using a published equation,

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Influence of working flux ...

measurements with over ± 50% error being rejected. The activity of each residue was compared with that of the same amount of slag taken from the level in the mould corresponding to 1 litre of the sample, or at the end of the remelting. The weight P (in g) of working slag present in the metal as inclusions was found from the equation

$$P = \frac{a_{Me_2O_3}}{a_s} B_{Me_2O_3} + \frac{a_{CaO}}{a_s} B_{CaO}$$

where a_{CaO}, a_s are the specific activities of a precipitated calcium and the working slag (imp/min); $a_{Me_2O_3}$ is that of trivalent-element hydroxides which on precipitation sorbed part of the mother liquor with its calcium ions; $B_{Me_2O_3}$ and B_{CaO} are the weights of the "sesquioxide" precipitate and the precipitated calcium, respectively. For the 250 mm diameter ingots of ShKh15SG steel, flux inclusions were found to be not over 4.8×10^{-5}% of the weight of metal or 1% of the total quantity of the inclusions determined by the electrochemical method. The 300 mm diameter ingots of ShKh15 steel contained no

flux inclusions although their total non-metallic inclusions content was double that of the 250 mm ingot. As the mould diameter and specific energy consumption rise, contamination of metal by non-metallic inclusions increases appreciably. Flux contamination of ball-bearing steel remelted in ANF-6 flux can be ignored, the main factors in contamination being the content and nature of non-metallic inclusions in the electrode, electrical conditions of the remelting process and composition and physico-chemical properties of the flux. The authors recommend that research should be concentrated on the study and improvement of these factors. There are 4 figures and 5 tables.

ASSOCIATION: Zaporozhskiy zavod "Dneprospetsstal'" im. A.N.Kuz'mina (Zaporozhe "Dneprospetsstal'" Works imeni A.N.Kuz'min)

SUBMITTED: May 22, 1961

S/133/62/000/009/002/009
A054/A127

AUTHORS: Frantsov, F.P., Moshkevich, Ye.M., Smolyakov, V.F.

TITLE: At the Elektrometallurgicheskiy zavod "Dneprospetsstal'" im. A.N. Kuz'mina (Electrometallurgical Plant "Dneprospetsstal'" imeni A.N. Kuz'min)

PERIODICAL: Stal', no. 9, 1962, 808

TEXT: Two versions of the smelting technology for stainless maximum 0.03% carbon-containing steel have been developed: a) by smelting soft iron (0.03% C) or vacuum-treated soft iron (0.01% C) with special highly refined ferrochrome and nickel in an acid 8-ton induction furnace; b) in a medium-capacity basic arc furnace on pure carbon charge with the application of oxygen. In the second version the metal is oxidized by oxygen in 25 - 35 minutes, until a 0.02% carbon content is obtained; the slag is then tapped, the metal is reduced by the sedimenting process with the addition of 0.35% Si, 0.5% Mn and 0.10% Al and 0.2% calcium silicate is added to the slag. Then highly refined ferrochrome and an increased amount of slag (4 - 5%) are added. Titanium metal is fed into

Card 1/2

S/133/62/000/009/004/009
A054/A127

AUTHORS: Frantsov, V.P., Moshkevich, Ye.I., Smolyakov, V.F.

TITLE: At the Elektrometallurgicheskiy zavod "Dneprospetsstal'" im. A.N. Kuz'mina (Electrometallurgical Plant "Dneprospetsstal'" im. A.N. Kuz'min)

PERIODICAL: Stal', no. 9, 1962, 812 - 813

TEXT: 1) Studies of industrial-scale heats of ЭИ962 (EI962) [10 Х 12 НВФМА (10Kh12NVFMA)] grades showed that the cracks in slabs depend on the chemical composition and mainly on the C-content. Heats containing 0.09 - 0.13% carbon could be given an index of 2.85 as to surface condition, but only 1.8 at a 0.13 - 0.18% C-content. The chemical composition affects the phase structure. If the C-content is increased beyond 0.13% the amount of ferrite phase decreases to 5 - 7% at rolling temperature. The metal then shows satisfactory ductility. Reducing the temperature in the ladle to 1,570 - 1,590°C and raising the temperature of slabs during placing them in the furnace have favorable effects. Blowing argon into the furnace did not change the metal ductility. The optimum C-content is 0.13 - 0.16%. 2) The use of single rotameters during the pouring of the ЭИ437Б (EI437B) grade alloy and the determination of the

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At the Elektrometallurgicheskiy....

optimum time of argon blowing into the mold improved the surface of ingots and reduced the marginal defects on the fracture surface from 6.8 to 3.8%. 3) The application of precipitation reduction of the metal by means of the AMC (AMS) alloy (3.5 kg/ton) and 45-% ferrosilicon lumps (to obtain a 0.1% Si-content), and the addition of ferrochrome before the formation of the refining slag were studied. The slag was reduced by coke and ferrosilicon powder. Refining time was shortened by 30 minutes, the slag composition was improved and the service life of furnace lining was prolonged. The ductility of the metal improved slightly. The quality of the metal at the fracture surface of hardened samples and in samples studied for gradual machining was also better. There was no change in the amount of nonmetallic inclusions. 4) Lacquers with various degrees of viscosity and containing diverse amounts of volatile matter were tested with the addition of 5 - 15% lacquer oil and 5 - 15% resin separately and with the addition 5 - 10% of both lacquer oil and resin. The larger amount of volatile matter, when coating at 100°C, promoted the edge formation of the metal. The lacquer used for coating ingot molds for structural steels should contain 0.5 - - 1.0% volatile matter at 50°, 1.5 - 2.5% at 70°, 3 - 5% at 90° and 6 - 15% at 100°C; its viscosity should be 2.8 - 3.2°E at 70°C. 5) To improve the macro-structure of stainless steel ingots under the riser-head, dozzles with a widened

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At the Elektrometallurgicheskiy....

average rate of decarburization for the ШХ15 (ShKh15) and Ст.3 (St.3) grades was 0.54 and 0.96% per hour. Upon obtaining the required C-content, the conventional technology was applied. When liquid charge is used the P-(0.015%) and S-content (0.009%) are lower than with solid charge. Moreover, the new technology requires less electric power (by 23.5%) and a shorter smelting time, it increases slightly the costs of the metal, however. 8) A new technology for casting stainless steel has been developed in cooperation with the Dnepropetrovskiy metallurgicheskiy institut (Dnepropetrovsk Metallurgical Institute). The new method restricts the feed of oxygen to a minimum during the smelting period; slag is reduced in advance by coke and silicon powder, the basicity of slag is raised to 1.5 - 1.6 by adding 60 - 70 kg/ton lime. The metal is reduced by the precipitation process after the bath has been blown through by oxygen; mixed reducing agents are used to obtain 0.5% Mn, 0.3 - 0.35% Si and 0.15% Al. The slag is reduced after addition of ferrochrome by 45- and 75-% pulverous ferrosilicon. When casting 1Х18Н9Т (1Kh18N9T) steel the new method saves 20 - 25 kg/ton ferrochrome. 9) In smelting 1Kh18N9T stainless steel, ferrotitanium is replaced by titanium metal scraps, processed in the form of briquetted powder and chips. Prior to feeding titanium into the furnace, the slag has to be removed completely. After addition of fresh slag (lime + spar), it is reduced by 3 - 4 kg/ton aluminum powder. When titanium is

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S/133/62/000/009/009/009
A054/A127

AUTHORS: Frantsov, V.P., Moshkevich, Ye.I., Smolyakov, V.F.

TITLE: At the Elektrometallurgicheskiy zavod "Dneprospetsstal'" im. A.N. Kuz'mina (Electrometallurgical Plant "Dneprospetsstal'" im. A.N. Kuz'min)

PERIODICAL: Stal', no. 9, 1962, 861

TEXT: 1) Tests of reducing the cropping at the top by 1% and at the bottom of ingots by 0.5% showed that for the 20 - 50 steels topping can be decreased to 1%, for the 12-20 ХН3А (12-20KhN3A), 12-20 Х2Н4А (12-20Kh2N4A) and 30 ХГСА(30KhGSA) grades to 16% and for the 18 ХНВА (18KhNVA) grade to 18%. Bottom cropping can be reduced for the "20-50" grades to 1%, for the 50 ХГСА (50KhGSA) grade, 9 ХС (9KhS), ШХ15 (ShKh15), 12-20Kh2N4A, 12-20KhN3A and 30KhGSA grades to 1.5%. 2) For better utilization of the heating elements the ShKh15 grade steel slabs are cut into pieces 5.8 m in length instead of 3.5 m; cutting to the standard size [ГОСТ 801-47 (GOST 801-47)] takes place before they become white hot. This measure increased the output of the heat treatment

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S/133/62/000/009/009/009
A054/A127

At the Elektrometallurgicheskiy....

parameter o the ferrite lattice. These changes are caused by the special conditions of crystallization of the external metal layers at the water-cooled ingot mold walls. Calcium fluoride was found in the skin of electro-remelted steel. The skin forms during the cooling of some parts of the molten metal due to CaF_2 particles being entrained while the metal passes through the slag layer. 6) The x-ray check of decarburization and carburization of steels has been considerably simplified by application of the ionizing effect. The new method uses УРС-55 (URS-55) type x-ray apparatus, a special camera, an МСТР-4 (MSTR-4) type counter, a БАМБУК (BAMBUK) type computer and an ЭПП-09 (EPP-09) type potentiometer.

Card 3/3

S/128/63/000/002/001/002
A054/A126

AUTHORS: Smolyakov, V. F., Moshkevich, Ye. I.

TITLE: Producing high quality 1Kh18N9T (1Kh18N9T) steel castings

PERIODICAL: Liteynoye proizvodstvo, no. 2, 1963, 7 - 8

TEXT: Tests proved that a more stable titanium content of the 1Kh18N9T grade is ensured if, instead of adding titanium to the furnace, it is introduced as spongy titanium (5 - 30 mm in size) into each ladle 20 - 30 sec prior to its being filled with metal from the furnace. Adding titanium to the ladle, however, affected the density and surface quality of the castings which displayed flaws, scales, slag inclusions, etc. Therefore, if titanium is added to the ladle, its amount must be decreased to obtain the required liquidity of the metal and a dense casting. The optimum casting conditions are ensured by lowering the metal's Ti-content to 0.3 - 0.4% and, proportionally, its C-content to 0.06 - 0.07%. As the use of Ti in the ladle depends to a great extent on the temperature of the metal poured from the furnace, it must be carefully controlled before tapping with the aid of immersion-type platinum-platinorhodium thermocouples.

Card 1/2

SMOLYAKOV, V. F.

AID Nr. 987-11 11 June

IMPROVING HOT DUCTILITY OF 23-18 STAINLESS STEELS (USSR)

Moshkevich, Yc. I., R. D. Mininzon, V. F. Smolyakov, and M. F. Sorokina.
Kuznechno-shtampovochnoye proizvodstvo, no. 4, Apr 1963, 18-19.
S/182/63/000/004/001/004

In an attempt to improve the hot ductility of 0Х23Н18 steel [0.10% C max, 1.0% Si max, 2% Mn max, 22-25% Cr, and 17-20% Ni] and of Х23Н18 steel [both AISI-310] several variants of deoxidizing and refining have been tested. The best results were obtained with addition of 0.5 kg/ton aluminum and 0.005% boron alloy introduced 5 to 10 min before tapping. One-ton ingots of steel so treated could be heated to 1220-1230°C (furnace temperature) and forged into billets 180 to 190 mm square without reheating. Ingots of conventional and other experimental heats which had been heated to temperatures over 1160°C (furnace temperature) cracked when forged. [ND]

Card 1/1

MOSHKEVICH, Ye.I.; MININZON, R.D.; SMOLYAKOV, V.F.; SOROKINA, M.F.

Increasing the plasticity of OKh23N18 and Kh23N18 steel ingots by hot deformation. Kuz.-shtam.proizv. 5 no.4:18-19 Ap '63. (MIRA 16:4)

(Steel ingots) (Plasticity)

BORODULIN, G.M., inzh.; SMOLYAKOV, V.F., inzh.; MOSHKEVICH, Ye.I., inzh.; SHAMIL', Yu.P., inzh.

Technology of the production of chromium-nickel stainless steel with a carbon content of not more than 0.03%. Stal' 23 no.1:27-29 Ja '63. (MIRA 16:2)

1. UkrNIISpetsstal' i Dnepropetrovskiy staleplavil'nyy zavod vysokokachestvennykh i spetsial'nykh staley.
(Chromium-nickel steel—Electrometallurgy)

SMOLYAKOV, V.F.; SHUL'TE, Yu.A.; MEDOVAR, B.I.; GAREVSKIKH, I.A.; LATASH, Yu.V.; TSIVIRKO, E.I.; ZABAIUYEV, Yu.I.; TOPCHIY, S.F.

Nonmetallic inclusions in electric slag refined 12Kh2N4A structural steel. Met. i gornorud. prom. no.4:35-37 Jl-Ag '64. (MIRA 18:7)

BABAKOV, A.A.; FEDOROVA, V.I.; SOLOV'YEV, L.L.; [illegible], V.N.; [illegible], L.I.; CHERKASHINA, N.P.; SHAMIL', Yu.P.; SMOLYAKOV, V.F.; BABKOV, T.M.; MOSHKEVICH, Ye.I.; PARADA, A.N.; REPESHKO-KRAVCHENKO, S.I.; ALEKSEYENKO, M.F.; KOROBKO, M.I.; KOROBKO, I.M.; [illegible], M.M.; MATOV, A.A.; MEGUTSKIY, L.R.

Inventions. Met. i gornorud. prom. no.4:83 Jl-Ag '64. (MIRA 18:7)

ACCESSION NR: AP4043489 S/0133/64/000/008/0738/0740

AUTHOR: Moshkevich, Ye. I. (Engineer); Mininzon, R. D. (Engineer); Smolyakov, V. F. (Engineer); Sorokina, M. F. (Engineer)

TITLE: Improving ductility of OKh23N18 and Kh23N18 steels

SOURCE: Stal', no. 8, 1964, 738-740

TOPIC TAGS: oxidation resistant steel, OKh23N18 steel, Kh23N18 steel, OKh23N18 steel ductility, boron, boron modified steel, boron modified Kh23N18 steel

ABSTRACT: The hot ductility of oxidation-resistant OKh23N18 and Kh23N18 steels can be improved by the addition of boron (0.005%) in the arc furnace shortly before tapping, followed by the addition of aluminum. The positive effect of boron is based on its ability to promote the precipitation of carbides in the form of coagulated particles on grain boundaries, instead of a continuous network. The improved ductility made it possible to forge ingots without reheating, which increased the efficiency of forging facilities by 40% and raised the yield by 1.75—4%. The forged billets had a clean surface without cracks. Orig. art. has: 1 figure.

Card 1/2

CHUYKO, N. M.; PEREVYAZKO, A. T.; MOSHKEVICH, Ye. I.; SMOLYAKOV, V. F.

Vacuum treatment of liquid steel in the ladle or while pouring. Izv. vys. ucheb. zav.; chern. met. 7 no.6:62-67 '64. (MIRA 17:7)

1. Dnepropetrovskiy metallurgicheskiy institut i zavod "Dneprospetsstal'".

SMOLYAKOV, V.F.; MOSHKEVICH, Ye.I.

Economical use of ferroalloys in steel smelting in electric furnaces. Metallurg 10 no.8:15-17 Ag '64. (MIRA 17:11)

1. Zavod "Dneprospetsstal'".

L 63975-65 EWT(m)/EWP(z)/EWP(b)/EWA(d)/EWP(t) MJW/JD

ACCESSION NR: AP5014242 UR/0383/65/000/002/0024/0026

669.187.6

AUTHOR: Zabaluyev, Yu. I.; Smolyakov, V. F.; Vul'fovich, M. S.; Kaganovskiy, G. P.; Stetsenko, N. A.; Yemel'yanenko, Yu. G.; Medovar, B. I. (Doctor of technical sciences); Latash, Yu. V. (Candidate of technical sciences)

TITLE: Improving the macrostructure of electroslag steels

SOURCE: Metallurgicheskaya i gornorudnaya promyshlennost', no. 2, 1965, 24-26

TOPIC TAGS: electroslag melting, steel

ABSTRACT: Crystallization bands (layers)--regions which are more resistant to etching than the base metal--are observed in the macrostructure of ball bearing and structural steels melted by the electroslag method using ANF-6 flux. In the ingot, these layers reproduce the contour of the bottom of the metal bath, and in rolled products they appear as rings. These crystallization layers are caused by sharp changes in the rate at which the crystallization front advances due to disturbance of the thermal balance between the metal and slag baths. The authors studied the effect of substituting AN-291 flux for ANF-6. 12Kh2N4A, 18Kh2N4A, ShKh15, ShKh15SG

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L 63975-65

ACCESSION NR: AP5014242

and 30KhGSNA steels were melted. The working current was reduced by 15-20% and rate of flux consumption was increased by 15-25% over that of ANF-6. The macrostructure of forged and rolled specimens (circular and square, 100-150 mm) was dense and uniform without traces of layered crystallization. Contamination by nonmetallic inclusions is about the same with both fluxes. The elimination of the crystallization layers when AN-291 flux is used is due to the higher electrical resistance of this flux which makes hotter smelting possible, increasing the heat content (enthalpy) and consequently the thermal inertia of the melting zone. This effect acts as a "choke" which smooths out fluctuations in electrical conditions and results in a more uniform ingot. Orig. art. has: 2 figures, 3 tables.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 002 OTHER: 000

Card 2/2

NIKITIN, B.M.; SMOLYAKOV, V.F.; MALINOVSKIY, Ye.I.; AKULOV, V.P.

Improving the quality of stainless steel ingot surfaces made by electric slag remelting. Met. i gornorud. prom. no.3:31-32 My-Je '65. (MIRA 18:11)

L 63561-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c) MJW/JD/HW

ACCESSION NR: AP5013229 UR/0133/65/000/005/0420/0422

669.187.2

AUTHOR: Moshkevich, Ye. I.; Smolyakov, V. F.; Babkov, T. M.; Shamil', Yu. P.

TITLE: Production of DI-6 (Kh13G14N3) steel

SOURCE: Stal', no. 5, 1965, 420-422

TOPIC TAGS: stainless steel, steel sheet, chromium-manganese-nickel steel

ABSTRACT: A new low-nickel stainless steel, DI-6, to replace Kh18N10T steel in equipment operating in moderately corrosive media is described. A ferrite content of 1-3% was found in samples at room temperature and also in samples heated to 1250°C, held for 2 hours and quenched. Basic mechanical properties, which meet specifications, are shown. Although the metal consumption coefficient for DI-6 is higher than that for Kh18N10T, it is believed that this will be corrected by future production improvements and increased demand for the product. Two methods, the new charge method and the remelt method, were used. Preference was given to the remelt method as it is more economical and requires less time. This method involves the use of stainless steel scrap, DI-6 scrap, carbon, silicon and ferrochrome scrap,

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L 63561-65

ACCESSION NR: AP5013229

oxygen injection, and slag deoxidation. Alloying with manganese and adjustment of the metal with chromium and nickel was begun at a temperature of 1650-1680°C. From the point of view of slab defects, a ladle temperature between 1500 and 1510°C and filling times of 140-200 seconds for 11-13-ton slabs were found to be optimal. Slabs had good surface characteristics with the introduction of flame cleaning as one means of obtaining a good surface. The cost of DI-6 slabs is found to be 30% lower per ton than that for Kh18N10T. Orig. art. has: 3 figures, 4 tables.

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

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 001 OTHER: 000

Card 2/2

L 2364-66 EWT(m)/EWA(d)/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c) MJW/JD/HW/
ACCESSION NR: AP5019947 UR/0133/65/000/008/0752/0753
669.187.26

55
53
B

AUTHORS: Yudovich, S. Z.; Abramov, V. V.; Gabuyev, G. Kh.; Frantsov, V. P.; Smolyakov, V. F.; Sypko, A. V.; Travinin, V. I.; Potapova, V. P.

TITLE: Effects of smelting and working methods on the properties of heat resistant stainless steel DI-1

SOURCE: Stal', no. 8, 1965, 752-753

TOPIC TAGS: stainless steel property, stainless steel smelting, hot rolling, forging/ DI 1 steel alloy, 20Kh15N3MA steel alloy

ABSTRACT: The effects of smelting and hot working methods on the properties of stainless steel DI-1 (20Kh15N3MA) were investigated. The metal was melted in 20-ton arc furnaces, poured into 2850 and 1000 kg ingots, part of which were hot rolled and part forged into 170- to 180-mm diameter rods. Part of the smelt was electroslag remelted and also forged or hot rolled into rods. During forging the ingots were heated to 1160-1180C, reduced to 200 x 200 mm blanks (850-900C), slowly cooled to 100-150C, reheated to 1160-1180C for final forging into rods (final temperature, 850-900C), and annealed at 660C. For hot rolling the blanks were placed at 750-800C in a recovery furnace. It was found that after remelting the oxide and sulfide

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L 2364-66
ACCESSION NR: AP5019947 2

content in DI-1 dropped from ball 4 and 2 (coarse scale) to ball 1.0-1.5 and 0.5 respectively. The α-phase content also decreased as did the O_2 (by a factor of 2-3) and H_2 (factor of 2) contents. The properties of the arc smelted (DI-1) and resmelted (DI-1Sh) steels after heat treatment were σ_B = 102.5 kg/mm^2, δ = 12%, a_K = 6.0 kgm/cm^2 and 107, 16.5, and 6.2 respectively. The type of hot working method (forging or hot rolling) had no appreciable effect on any of the properties, but in both cases plasticity dropped sharply for working temperatures above 1200C (because of increased α-phase formation). Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 000 OTHER: 000

BVK
Card 2/2

L 27254-66 EPF(n)-2/EWT(m)/EWP(t) IJP(c) WW/JD/JG

ACC NR: AP6009833 SOURCE CODE: UR/0413/66/000/004/0027/0028

58
B

AUTHOR: Kovalenko, A. M.; Murin, F. V.; Borodulin, G. M.; Yel'tsov, K. S.; Smolyakov, V. F.

ORG: none

TITLE: Method for vacuum degassing of liquid metals with simultaneous treatment with slag. Class 18, No. 178843 18 18 18

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 4, 1966, 27-28

TOPIC TAGS: metal, liquid metal, metal degassing, vacuum degassing

ABSTRACT: This Author Certificate presents a method for vacuum degassing and simultaneous refining of liquid metals by a slag treatment in a two-tube chamber. The metal is sucked into the chamber through one tube and, after vacuum degassing, is discharged through the other tube containing liquid slag which refines the metal.

SUB CODE: 11 / SUBM DATE: 05Sep64

2

UDC: 669.162.683-982

L 42322-66 EWT(m)/EWP(t)/ETI IJP(c) JD/JT

ACC NR: AP6029056 SOURCE CODE: UR/0413/66/000/014/0082/0082

INVENTOR: Averchenko, P. A.; Alekseyenko, M. F.; Babakov, A. A.; Babitskaya, A. N.; Batrakov, V. P.; Bondarenko, A. L.; Gabuyev, G. Kh.; Yel'tsov, K. S.; Kulygin, G. V.; Lola, V. N.; Orekhov, G. N.; Pridantsev, M. V.; Sklyarov, P. I.; Smolyakov, V. F.; Soroko, L. N.; Solov'yev, L. L.; Frantsov, V. P.; Shamil', Yu. P.; Moshkevich, Ye. I.; Natanov, B. S.

ORG: none

TITLE: Stainless steel. Class 40, No. 183947.

SOURCE: Izobret prom obraz tov zn, no. 14, 1966, 82

TOPIC TAGS: stainless steel, chromium titanium steel, molybdenum containing steel, nitrogen containing steel, titanium containing steel

ABSTRACT: This Author Certificate introduces a stainless steel containing chromium, molybdenum, and nitrogen. In order to improve weldability, the steel has the following composition: 0.08% C, up to 0.8% Mn, up to 0.8% Si, 15—18% Cr, 0.2—0.6% Mo, 0.04—0.15 N, 0.4—1.2% Ti, up to 0.035 S, and up to 0.030 P. [WW]

SUB CODE: 11/ SUBM DATE: 30Jan65/ ATD PRESS: 5065

UDC: 669.14.018.8: 669.15'26-194

L 10453-67 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6022506 SOURCE CODE: UR/0133/66/000/004/0323/0326

AUTHORS: Moshkevich, Ye. I. (Candidate of technical sciences); Gabuyev, G. Kh.; Smolyakov, V. F.; Frantsov, V. P.; Grayfer, Ye. Z.; Spektor, Ya. I.; Lavrent'yev, M. I. (Engineers); Yelinson, G. L. (Engineer)

ORG: none

TITLE: Manufacture of high-alloy steels with normalized phase composition

SOURCE: Stal', no. 4, 1966, 323-326

TOPIC TAGS: alloy steel, chromium steel alloy, high alloy steel / Kh16N9M2 alloy steel, OKh18N10 alloy steel, Kh18N9 alloy steel, O4Kh17N10M2 alloy steel

ABSTRACT: The possibility of obtaining stainless steels and intermediate type steels having a normalized phase composition (1 - 5% ferrite) under industrial conditions was studied. The experiments were carried out in electrical furnaces of 5—50 tons capacity, on charges consisting of fresh steel and scrap metal respectively. The α-phase content in the steels was maintained by chromium, nickel, and carbon additions. The phase composition was determined after the method of S. A. Iodkovskiy and N. N. Sashchin (Trudy TsNIITMASha No. 13 (Vyplavka stali i proizvodstvo stal'nykh otlivok), ONTI TsNIITMASh, 1960). The experimental results are presented in graphs and tables (see Fig. 1). It was found that alloying with

UDC: 669.187.2

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L 10453-67

ACC NR: AP6022506

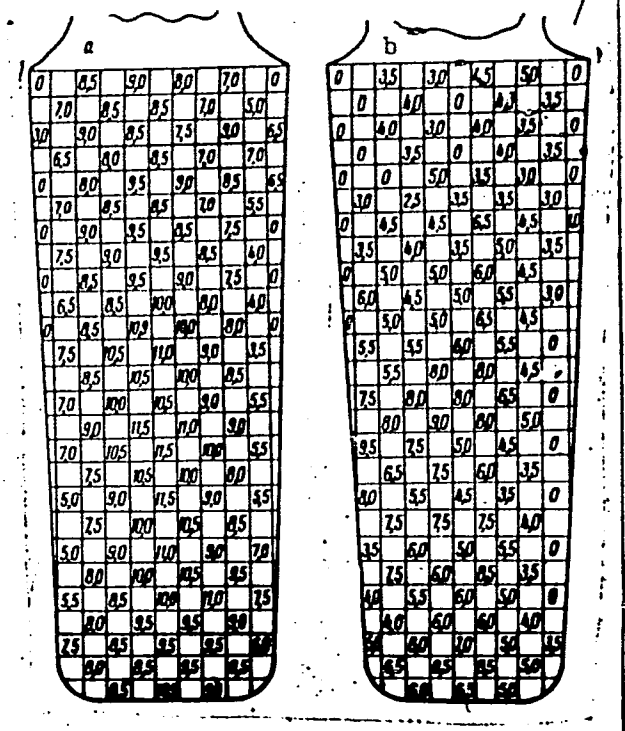

Fig. 1. Distribution of ferrite (9·) in 2.8-ton ingots a and b of steel OKh16N9M2. Initial composition of ingot (a) and (b) respectively: C - 0.06, 0.07%; Mn - 1.0, 1.24%; Si - 0.40, 0.18%; Cr - 15.46, 15.60%; Ni - 9.0, 9.04%

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L 10453-67

ACC NR: AP6022505

6

Al-Ni as recommended by P. I. Melikhov, A. N. Boyarinova, i dr. (Stal', 1964, No. 4) was unnecessary. All specimens smelted had satisfactory mechanical and technological properties. N. N. Sashchin, V. S. Dub, P. M. Grashchenkov, I. A. Barmotin, and others took part in the experiments. Orig. art. has: 2 tables and 1 graph.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 004

Card 3/3 4pp

12

ACCESSION NR: AP4041869 S/0133/64/000/007/0640/0642

AUTHOR: Gabuyev, G. Kh.; Yel'tsov, K. S.; Shul'te, Yu. A.; Mikhaylov, P. A.; Garevskikh, I. A.; Leybenzon, S. A.; Tsivirko, E. I.; Medovar, B. I.; Latash, Yu. V.; Frantsov, V. P.; Pakhomov, A. I.; Kaganovskiy, G. P.; Voinov, S. G.; Shalimov, A. G.; Kalinnikov, Ye. S.; Smolyakov, V. P.; Kosoy, L. F.

TITLE: Improvement of the quality of electroslag-melted ball-bearing steel

SOURCE: Stal', no. 7, 1964, 640-642

TOPIC TAGS: ball bearing steel, electroslag melted steel, high purity steel, steel electroslag melting

ABSTRACT: Several variants of electroslag melting have been tested in an attempt to improve the quality of ball-bearing steel. The analysis of electroslag-melted steel showed that nitrides and carbonitrides constitute the greatest part (up to 75%) of the nonmetallic inclusions present in the steel. These nitrides derive from the initial material. The electroslag process eliminates large nitrides over 20μ in diameter, but does not eliminate the smaller ones.

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ACCESSION NR: AP4041869

Therefore, the nitrogen and titanium contents of the initial metal must be reduced to a minimum. This can be done, for example, by refining the metal in the ladle with synthetic slag. Electroslag melting of open-hearth steel refined with synthetic slag eliminated all the inclusions larger than 10μ and reduced the number of smaller inclusions by more than 50% and the nitrogen and oxygen contents to 0.0053 and 0.0020%, respectively. To produce ultra-high purity ball-bearing steel, the double electroslag melting was applied with a combination of various fluxes. The use of ANF-6-ANF-6 fluxes in double electroslag melting or of AN-29-ANF-6 fluxes produced best results. Ultra-high purity steel, fully satisfying requirements for critical ball bearings, was obtained. Orig. art. has: 2 figures.

ASSOCIATION: Dneprospetsstal' (Dneprospetsstal' plant); Zaporozhskiy mashinostroitel'nyy institut (Zaporozh Machine-Building Institute); Institut elektrosvarki im Ye. O. Patona (Electric Welding Institute); TsNIIChM

Card 2/3

31620
S/207/61/000/006/005/025
A001/A101

26.2311

AUTHORS: Dautov, G.Yu., Zhukov, M.F., Smolyakov, V.Ya. (Novosibirsk)

TITLE: Investigation of the operation of plasmatron with air stabilization of arc

PERIODICAL: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 6, 1961, 29 - 35

TEXT: The present investigation deals with studying the steadiness of arc burning in plasmatrons at the given characteristics of the power source and external circuit. The method employed is investigation of volt-ampere characteristics of arc burning. The principle of this method is described and theoretically analyzed. As a result of this analysis a differential equation of the second order with respect to i, which designates the magnitude of small disturbance of current I_g of the arc, is derived. The roots r_1 and r_2 of the characteristical equation for i, being the solution of the differential equation, must be negative in order that i should tend to zero. The necessary conditions for this look as follows:
$L + (R - \varphi) CR^* > 0$; $R^* + (R - \varphi) > 0$ (18),
where L is inductance, C is capacitance, R is resistance, R^* is differential arc

33614
S/025/62/000/001/001/004
D254/D302

26.2311

AUTHOR Smolyakov, V.Ya.

TITLE Plasma generator

PERIODICAL: Nauka i zhizn', no. 1, 1962, 19

TEXT The author's Institute has been engaged since 1959 in studying plasma and the design and construction of "plasmatrons" (plasma generators) operated either by direct current or alternating (one- and three-phase) current. The author gives a short description of the working principle and the construction of a plasmatron. When the plasmatron is switched on an electric arc appears in a channel inside cylindrical copper electrodes. A gas chamber is situated between the electrodes. The gas which is the working substance is fed into the chamber at an angle. The gas flows around the electric arc, is heated and transformed into plasma which emerges through a cavity in the anode. Rotation of the ends of the arc, due to the gas flow prevents the concentration of heat at any particular spot of the electrodes. This rotation, combined with water and gas

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Plasma generator

cooling of the chamber, also prevents the melting or burn-out of the electrodes. In some cases, rotation of the arc ends is achieved by supplementary magnetic fields produced by solenoids. This method permits greater velocity of rotation than by gas eddies and improves operational conditions. Burn-out of the electrodes which does occur despite the preventive measures does not, however, stop the use of plasmatrons. Investigations have shown that when d.c. is used, the burn-out of electrodes is negligible and that the contamination of the gas flow by impurities does not exceed 0.2% (by weight). Contamination of the gas flow is even less when high voltage a.c. is used. The efficiency of converting electric energy into heat in a plasmatron does not exceed 50%. If air is used as the working gas, its temperature reaches 7000°C; for argon it can be increased to 12,000°C. The Institute is trying to increase the efficiency of plasmatrons by utilizing the heat carried away by the cooling liquid of the electrodes. The efficiency can be substantially increased if the gas flow is first passed over the electrode liners. There is 1 figure.

ASSOCIATION: Institut teoreticheskoy i prikladnoy mekhaniki SO AN SSSR

Card 2/3

33614

S/025/62/000/001/001/004
D254/D302

Plasma generator

(Institute of Theoretical and Applied Mechanics Siberian Branch of AS USSR)

Card 3/3

SMOLYAKOV, V.Ya. (Novosibirsk)

Some characteristics of the burning of an electric arc in a d-c plasmatron. PMTF no. 6:148-153 N-D '63. (MIRA 17:7)

ZHUKOV, M.F., [illegible]

Results of burning electric-arc jet drills (plasma drills). Fiz.-tekh. probl. razrab. pol. iskop. no.1:32-39 '65. (MIRA 18:10)

1. Institut teoreticheskoy i prikladnoy mekhaniki Sibirskogo otdeleniya AN SSSR i Institut gornogo dela Sibirskogo otdeleniya AN SSSR, Novosibirsk.

L 62547-65 EPF(n)-2/EED(b)-3/EWG(v)/EPA(w)-2/EWT(l)/EWA(c)/EWG(m)/T/EWA(d)/FSS-2
Pe-5/Pi-4/Po-4/Pz-6 IJP(c) AT

ACCESSION NR: AP5018198 UR/0207/65/000/003/0080/0084

AUTHORS: Kolonina, L. I. (Novosibirsk); Smolyakov, V. Ya. (Novosibirsk) 69 B

TITLE: Rotary motion and distribution characteristics of an arc column near the electrodes in a plasmatron with a gas vortex stabilization

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 3, 1965, 80-84

TOPIC TAGS: plasma arc, electrode, vortex, gas flow, electric arc, high speed photography / SKS 1M motion picture camera, SFR 1M motion picture camera, ZhS 17 light filter, SZS 22 light filter

ABSTRACT: The motion and distribution of an arc column in a vortex stabilized arc jet at constant current were investigated experimentally by means of high speed cameras. The details of the two arc jets used are shown in Fig. 1 on the Enclosure where 1a is a water-cooled electrode arc and 1b shows an uncooled arc. Motion pictures were taken 10-15 sec after striking the arc at a speed of 5000 and 125 000 frames per second through the transparent window 5 (see Fig. 1a). The photographs of the arc resemble a comma with the bulge towards the gas flow direction. These results show that in the pressure range 2-6 bar there is a jerky motion of the arc spot near the inside electrode with the radial part of

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L 62547-65
ACCESSION NR: AP5018198

the column on the electrode wall. Furthermore, the diameter of the arc near the axis is much larger than the diameter of the arc in the radial direction. This difference is explained by means of the peculiar distribution of the column in the exit electrode. The rotation rate of the arc was found to be quite steady, with a maximum deviation of 20%. From the brightness magnitude of the arc spot diameter the current density in the arc spot as well as the specific energy flow were estimated. At 5 bar pressure and 50-150 amp current the specific energy flow was estimated to be between 0.6×10^9 and 2.5×10^9 volts/m^2. Orig. art. has: 9 figures.

ASSOCIATION: none

SUBMITTED: 090ct64 ENCL: 01 SUB CODE: ME, EM

NO REF SOV: 002 OTHER: 000

Card 2/3

L 62547-65

ACCESSION NR: AP5018198 ENCLOSURE: 01

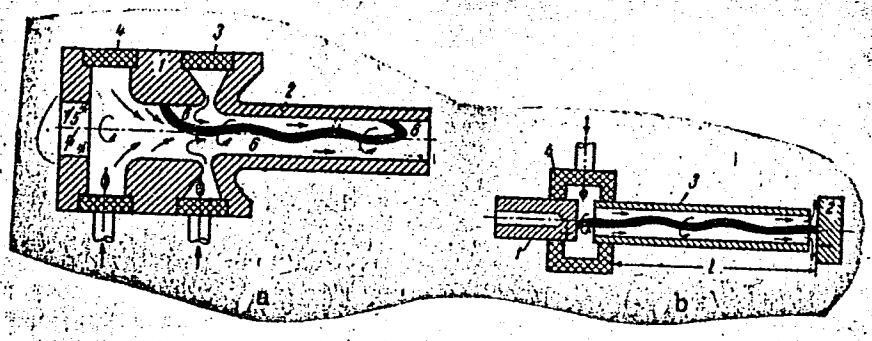

Fig. 1.

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166T51

SMOLYAKOVA, G. K.

USSR/Medicine - Horses, Diseases Sep 50
Antigens

"Immunogenic Properties of Salmonella Abortus Equi," G. K. Smolyakova, Cand Vet Sci, Kostroma Agr Inst

"Veterinariya" No 9, p 39

Reports production of whole antigen from causal agents of infectious abortion in mares which has well-expressed immunizing properties on experimental animals in the laboratory. Suggests possibility of creating immunity in horses by use of vaccines prepared from subject antigen.

166T51

SMOLYAKOVA, G.K.

Effect of different doses of chlorine upon the viability of dysentery bacteria in water. Gig.i san.no.4:43-44 Ap '54. (MLRA 7:4)

1. Iz kafedry mikrobiologii Yaroslavskogo meditsinskogo instituta.
(Chlorine) (Dysentery)

SMOLYANOVA, K. E. Cand Chem Sci -- "Thermal effect in certain topochemical reactions of the exchange type." Tomsk, 1960 (Tomsk Order of Labor Red Banner Polytechnic Inst im S. M. Kirov) (KL, 1-61, 135)

S/148/61/000/006/009/013
E111/E480

18 1210 2408 26585

AUTHORS: Tushinskiy, L.I., Tushinskaya, K.I., Smolyakova, L.G.

TITLE: Reducing the heterogeneity of eutectic alloys by modifying treatment

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, 1961, No.6, pp.125-127

TEXT: The mechanical properties of eutectic alloys may be adversely affected by the presence of large grains of the component phases. In the case of the Al-Si eutectic, its UTS can be reduced by 13 - 14 kg/mm^2 by the formation of large grains of brittle silicon. The formation of fine eutectic and the absence of large silicon grains can be ensured by the introduction of sodium (metallic or combined) in the melt. As a result of this modifying treatment, the UTS of the alloy increases to 16 - 17 kg/mm^2. However, a modified alloy of the nominally eutectic composition contains large primary grains of the α phase (Si-rich, Al-base solid solution). It would appear, therefore, that the modifying treatment does not in this case ensure homogenization of the alloy, since the elimination of coarse silicon grains is attained at the

Card 1/3

... ucing the heterogeneity ...

... of the appearance of the α primaries: the object of the investigation described in the present paper was to explore the possibilities of producing a modified Al-Si alloy with a truly eutectic structure and to study the effect of structure on the mechanical properties of the alloy. In preliminary experiments, the structure of alloys containing 11.7 to 16% Si and 0.12% Fe, modified with 0.1% Na, and cast into graphite or metal moulds under ... thermal temperature conditions was examined. The results indicated that, irrespective of the experimental conditions employed, the eutectic point of the modified Al-Si system is at 14% Si. In the next series of experiments, the industrial Al-Si alloy АЛ 2 (AL2) containing 11.7% Si was used as the basis of preparing a series of experimental alloys with varying Si content. The alloys were melted in an electric crucible furnace of 80 kg capacity, in the following manner: a predetermined quantity of the AL2 alloy was added to a molten Si-rich master alloy; the melt was allowed to ... to 700°C, purified by introducing 0.2% zinc chloride and modified with 0.1% Na; after holding for 10 minutes at 700°C, the alloy was cast into sand and metallic moulds. The results can be

Card 2/3

S/128/63/000/001/002/008
A004/A127

AUTHORS: Tushinskiy, L.I., Tushinskaya, K.I., Smolyakova, L.G.

TITLE: Modifying silumin in pressure casting

PERIODICAL: Liteynoye proizvodstvo, no. 1, 1963, 5 - 6

TEXT: Tests were carried out with the standard AJI 2 (AL2) alloy to find out whether the fine-grained structure obtained in pressure crystallization cannot be refined by modification with surface-active elements. The castings were produced on a type 512 machine at an operating pressure of 150 atm and a mold temperature of 195°C. The following modifiers were used: metallic sodium, its salts, 20% lithium alloy with calcium, aluminum-titantium foundry alloy with 12% Ti. The modifiers were fed into the distributing furnace at a constant temperature of 650°C. An investigation of the casting microstructure revealed the effectiveness of modifying silumin with various addition agents. Surface-active modifiers such as sodium, sodium salts, lithium, change the interrelation between aluminum and silicon. A special structure characterized by the spheroidal shape of crystals was obtained in modifying the alloy with a 0.05% Li-Ca foundry alloy.

Card 1/2

ACC NR: AT6028982 SOURCE CODE: UR/0000/66/000/000/0141/0143

AUTHORS: Pavlov, V. I.; Sirota, N. N.; Smolyakova, L. Ye.

ORG: None

TITLE: Magnetic properties of magnesium-manganese-zinc ferrites

SOURCE: Vsesoyuznoye soveshchaniye po ferritam. 4th, Minsk. Fizicheskiye i fiziko-khimicheskiye svoystva ferritov (Physical and physicochemical properties of ferrites); doklady soveshchaniya. Minsk, Nauka i tekhnika, 1966, 141-143

TOPIC TAGS: ferrite, magnetic permeability, hysteresis loop, magnesium compound, [illegible] compound

ABSTRACT: A systematic study of the static magnetic properties of ferrites of the triple system $MgFe_2O_4$-$MnFe_2O_4$ (having a stoichiometric composition) is described. The work was undertaken as a continuation of the earlier investigation of triple ferrites by N. N. Sirota and M. I. Danil'kevich (So. Ferrity i beskontaktnyye elementy. Izd. AN BSSR, Minsk 1963, str. 176--181). Using known ceramic techniques, specimens of 66 compositions of ferrites $Mg_xMn_{1-x-y}Zn_yFe_2O_4$ were prepared, with x and y varying by 0.1. Magnetic properties were measured on a ballistic instrument. The hysteresis loop was measured in a field of 20 oersted--the curve of initial magnetization, in fields up to 30 oersted. Variation of maximal magnetic permeability as a function of

Card 1/2

SMOLYAKOVA, N.M. [Smaliakova, N.M.],

A combine and its workers. Rab.i sial 37 no.11:2-3 N '61.
(MIRA 14:10)

1. Sekretar' partiynogo komiteta orshanskogo l'nokombinata.
(Orsha--Flax industry)

BURMISTROV, S.I.; SMOLYAKOVA, N.P.

Alkylation of aminophenols. Part 2: Synthesis of 4-amino-2,6-dicyclohexylphenol. Zhur.org.khim. 1 no.2:286-288 F '65. (MIRA 18:4)

1. Dnepropetrovskiy khimiko-tekhnologicheskiy institut.

GERSHKOVICH, G.M.; SMOLYAKOVA, O.A.

Some data on the detection of toxoplasmosis in women. Akush.i gin. 35 no.4:71-74 Jl-Ag '59. (MIRA 12:11)

1. Iz Krasnovodskogo gorodskogo rodil'nogo doma (glavnyy vrach G.M. Gershkovich, nauchnyy rukovoditel' - prof. A.B. Preysman).
(TOXOPLASMOSIS in pregn.)
(PREGNANCY, compl.)

SMOLYAKOVA, V., mladshiy nauchnyy sotrudnik.

Converting hayland into pasture. Zhivotnovodstvo 20 no.5:52-55 My '58. (MIRA 11:5)

1. Estonskiy nauchno-issledovatel'skiy institut zemledeliya i meliratsii.

(Estonia--Pastures and meadows)

MOSHKEVICH, Ye.I.; SMOLYAKOVA, V.F.; BABKOV, T.M.; SHAMIL', Yu.P.

Mastering the production of DI-6 (Kh13G14N3) steel. Stal' 25 no.5:420-422 My '65. (MIRA 18:6)

SMOLYAKOVA, Ye.V.

A case of dissecting the aneurysm of the aorta. Zdravookhraneniye 6 no.2:58-59 Mr-Ap'63. (MIRA 16:10)

1. Iz rayonnoy bol'nitsy g. Kagula (glavnyy vrach P.A. Mel'nicherko.

SMOLYAKOVA, Z. A.

DMITRIYEVA, L. V. - laborant i, KELLER, I. M. - kand. tekhn. nauk, SMOLYAKOVA, Z. A. - inzh. CHERTKOVA, A. N. - laborant, TROLLE, G. A. - laborant

Respublikanskiy nauchno-issledovatel'skiy institut mestnykh stroitel'nykh materialov (ROSNIIMS)

Razrabotka Metodiki Bybora Optimal'nogo Rezhima Sushkikirpicha Page 103

SO: Collection of Annotations of Scientific Research Work on Construction, completed in 1950, Moscow, 1951

BCS SMOLYAKOVA, Z.A.

1976. Methods of selecting optimum conditions in the drying of bricks.—I. M. KELLER and Z. A. SMOLYAKOVA (*Stek. Keram.*, **8**, No. 1, 14, 1951). Cracks are caused by the non-uniform distribution of moisture; this causes stresses and deformation which can exceed the limiting values. Stresses arise only as a result of the resistance to shrinkage; the physical property of a moist material to shrink causes no cracks. Cracks are caused by the prevented deformation of shear but not by the prevented linear deformation (compression and expansion). The limiting tensile stresses are much greater than the shear stresses. It is very difficult to reach such stresses during drying. Moreover, any expansion deformation is in practice accompanied by shear deformation, and it is this latter that causes cracks, since the uniformly distributed tensile stresses cannot give rise to cracks. These main principles of elastic-plastic deformations have been defined by A. V. Lykov, who suggested the following formula for calculating the max. permissible surface moisture gradient: $(\Delta U)_1=(1+\alpha U_i)P_m/\alpha E_1 A$, where U_i=the initial moisture content (%), α=coeff. of linear shrinkage (%), P_m=max. permissible shear stresses in kg/sq. cm, E_1=modulus of shear deformation, A=a const. having the dimension of length and depending on the geometrical dimensions of the brick. For a normal brick $A=l/1{\cdot}27$, where l is the length of the brick. This formula has been checked by the measurement of the limiting shear stress. P_m and shear modulus E_1, shrinkage and wt. loss of a Russian clay during drying were measured. The relationship between moisture content and shrinkage was linear: $l=l_0(1+\alpha W)$, where W=average moisture content (%), l_0=the intercept on the ordinate. It follows from this equation that the slope of the line is $\alpha=tg\ \phi/l_0$. The coeff. can be determined from 2 values l_1 and l_2 which correspond to the moistures W'_1 and W'_2 according to the following formula: $\alpha=(l_1-l_2)/l_2(W'_1-W'_2)$. For the Russian clay tested the coeff. of linear expansion $\alpha=0{\cdot}006$. From the values of P_m, E_1 and α, the critical surface moisture gradient was calculated according to the first equation; the values obtained were then checked by determining this gradient (ΔU) by expt. The results showed that the moisture distribution approximated to a parabola. The calculated surface moisture content agreed closely with the measured value. Both calculations showed that the max. permissible moisture gradient depends on

the surface moistness of the brick. At the beginning of drying the limiting surface gradient is at a minimum, but can be increased during later stages of drying. After determining from direct expts. the moisture gradient and the intensity of drying, the moisture conductivity coeff. can be calculated. The moisture conductivity coeff. increases with the temp. of the clay material. Minovich's relationship between the 2 factors is quoted and confirmed. It is possible to determine the dependence of the surface moisture gradient on the temp. of the medium, if the intensity of drying is known, by calculating the coeffs. of the moisture conductivity. To determine the relationship between the surface moisture gradient and the parameters of the heat carrier, the relationship between the intensity of the evaporation from the free surface and the intensity of drying the material must be established. The intensity of water evaporation from the free surface can be approximately calculated. A comparison of the intensity of drying (m), in the early stages with the intensity of evaporation (m_e) gives a ratio (m/m_e) of 0·64 for large size bricks and 1·58 for small sizes. There are various formulae for the evaporation area; nevertheless, the drying intensity is always unequal to the evaporation intensity so that even exact formulae need a correction factor for the size of the evaporation zone. The discrepancy between m_e and m is due to the fact that the brick surface during drying is not equal to the geometrical open surface, but is a certain zone. (6 figs., 1 table.)