BANNYKH, O.A.

18(7) PHASE I BOOK EXPLOITATION SOV/3355

Akademiya nauk SSSR. Institut metallurgii. Nauchnyy sovet po probleme zharoprochnykh splavov

Issledovaniya po zharoprochnym splavam, t. IV (Studies on Heat-resistant Alloys, vol. 4), Moscow, Izd-vo AN SSSR, 1959. 400 p. Errata slip inserted. 2,200 copies printed.

Ed. of Publishing House: V. A. Klimov; Tech. Ed.: A. P. Guseva; Editorial Board: I. P. Bardin, Academician; G. V. Kurdyumov, Academician; N. V. Ageyev; Corresponding Member, USSR Academy of Sciences; I. A. Oding, I. M. Pavlov, and I. F. Zudin, Candidate of Technical Sciences.

PURPOSE: This book is intended for metallurgists concerned with the structural metallurgy of alloys.

COVERAGE: This is a collection of specialized studies of various problems in the structural metallurgy of heat-resistant alloys. Some are concerned with theoretical principles, some with descriptions of new equipment and methods, others with properties of specific materials. Various phenomena occurring under specified conditions are studied and reported on. For details, see Table of Contents. The articles are accompanied by a number of references, both Soviet and non-Soviet.

Studies (Cont.) SOV/3355

Card 9/12

BANNYKH, O. A.

PHASE I BOOK EXPLOITATION SOV/3559

Akademiya nauk SSSR. Institut metallurgii. Nauchnyy sovet po probleme zharoprochnykh splavov

Issledovaniya po zharoprochnym splavam, t. 5 (Investigations of Heat-Resistant Alloys, Vol 5) Moscow, Izd-vo AN SSSR, 1959. 425 p. Errata slip inserted. 2,000 copies printed.

Ed. of Publishing House: V.A. Klimov; Tech. Ed.: I.F. Kuz'min; Editorial Board: I.P. Bardin, Academician, G.V. Kurdyumov, Academician, N.V. Ageyev, Corresponding Member, USSR Academy of Sciences (Resp. Ed.), I.A. Oding, I.M. Pavlov, and I.F. Zudin, Candidate of Technical Sciences.

PURPOSE: This book is intended for metallurgical engineers, research workers in metallurgy, and may also be of interest to students of advanced courses in metallurgy.

COVERAGE: This book, consisting of a number of papers, deals with the properties of heat-resisting metals and alloys. Each of the papers is devoted to the study of the factors which affect the properties and behavior of metals. The effects of various elements such as Cr, Mo, and V on the heat-resisting properties of various alloys are studied. Deformability and workability of certain metals as related to the thermal conditions are the object of another study described. The problems of hydrogen embrittlement, diffusion and the deposition of ceramic coatings on metal surfaces by means of electrophoresis are examined. One paper describes the apparatus and methods used for growing monocrystals of metals. Boron-base metals are critically examined and evaluated. Results are given of studies of interatomic bonds and the behavior of atoms in metal. Tests of turbine and compressor blades are described. No personalities are mentioned. References accompany most of the articles.

4/5

BANNYKH, O.A.

PHASE I BOOK EXPLOITATION SOV/4502

Akademiya nauk SSSR. Nauchnyy sovet po probleme zharoprochnykh splavov

Issledovaniya po zharoprochnym splavam, tom 6 (Investigations of Heat-Resistant Alloys, Vol. 6) Moscow, 1960. 319 p. Errata slip inserted. 3,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut metallurgii imeni A. A. Baykova. Nauchnyy sovet po probleme zharoprochnykh splavov.

Editorial Board: I. P. Bardin (Deceased) Academician, G. V. Kurdyumov, N. V. Ageyev, Corresponding Member, Academy of Sciences USSR (Resp. Ed.), I. A. Oding, I. M. Pavlov, and I. F. Zudin, Candidate of Technical Sciences; Ed. of Publishing House: V. A. Klimov; Tech. Ed.: S. G. Tikhomirova.

PURPOSE: This book is intended for research workers in the field of physics of metals and for metallurgists, particularly those working on heat-resistant alloys.

COVERAGE: This collection of 45 articles deals with various problems in the production of heat-resistant alloys. Special attention is paid to the mechanisms of deformation of such metals as aluminum, copper, iron, and nickel. Various defects and failures of metals are analyzed, and means for increasing the heat resistance and plasticity are described. Among the special problems discussed are: electrolytic conductivity of iron-aluminum alloys in the solid state; the mobility of atoms in nickel-iron alloys, depending upon defects of their crystalline structure; the kinetics of change in isolated pores; the irreversible thermal transformation of solid bodies, etc. No personalities are mentioned. References follow each article.

3

S/167/60/000/004/001/003
A006/A001

AUTHORS: Sharipkulov, R. S., Bannykh, O. A., Goncharov, I. Ye., Zudin, I. F., Linchevskiy, B. V., Prokoshkin, D. A.

TITLE: The Effect of Chromium and Manganese on Phase Transformations of Chrome-Manganese Steels

PERIODICAL: Izvestiya Akademii Nauk UzSSR, Seriya tekhnicheskikh nauk, 1960, No. 4, pp. 62-69

TEXT: In developing chrome-manganese stainless steels by replacing the nickel by manganese, investigations into structural phases had been carried out previously by A. V. Shultin, F. F. Khimushin, F. M. Becket (Ref. 1, 2, 7); G. V. Estulin (Ref. 3); A. T. Grigor'yev, D. L. Kudryavtsev (Ref. 4, 6) and foreign scientists (Ref. 8-10). In the present article information is given on the effect of manganese and chromium on phase transformations in steel. In a 12-kg induction furnace, 16 alloys with different chromium and manganese content and one chrome-nickel alloy containing Ti were melted. Changes in hardness after water quenching at 800, 900, 1,000, 1,100 and 1,200°C were studied. The dependence of the hardness on temperature is shown in Table 3. After quenching

Card 1/4

S/167/60/000/004/001/003
A006/A001

The Effect of Chromium and Manganese on Phase Transformations of Chrome-Manganese Steels

the specimens were subjected to an analysis of the microstructure. The steels were tempered at 650, 700, 750 and 800°C. Changes in H_{RB}, depending on the tempering time of steels with 17% Cr, quenched at 1,100°C are given in Table 4. The connection of a possible δ-phase formation and higher hardness was determined by investigating the magnetic properties of the steel. Specimens of all steel melts were analyzed on an M. S. Akulov type anisometer at 20°C, after tempering at 750°C for 10 hours. The amount of a ferromagnetic phase was determined for various steel grades. Dilatometrical analysis was made on chrome-manganese specimens quenched at 1,100°C with subsequent annealing at 750°C for 10 hours. Curves of temperature versus linear expansion for three grades of steel with 10% Cr were plotted (Fig. 2). A phase analysis was made of precipitates out of an electrolyte on saturated potassium chloride base with addition of 5 to 50 mg/l hydrochloric acid and 5 to 25 g/l critic acid at a current density of 0.6 - 1.0 amp/cm² and a temperature not over 20°C. A copper cylinder was used as a cathode. 9 to 12 mm specimens were placed into a collodion bag filled with 100 - 130 ml of the filtrated electrolyte. The precipitates were

Card 2/4

S/167/60/000/004/001/003
A006/A001

The Effect of Chromium and Manganese on Phase Transformations of Chrome-Manganese Steels

separated from the electrolyte, washed and dried at 100°C in hydrogen atmosphere for 20 to 30 minutes. Roentgenograms were taken of the dreid precipitates with a РКД (RKD) camera on Cr radiation without using a filter. Exposure time was 13 to 18 hours. A chemical analysis was made of precipitates separated out of 4 steel grades in an electrolyte composed of 250 g/l potassium chloride, 5 mg/l hydrochloric acid, 5 g/l citric acid, 0.6 - 0.8 amp/cm^2 current density and 18 - 22°C inside the collodion bag. The investigations performed yielded the following results: At a content of 11% Mn, independent of the chromium content, the steel contains in its structure austenite as well as ferrite. It is not possible to convert the steel into the austenitic state by heat treatment. Steel with 16 - 22% Mn and 8 - 10% Cr has a γ + ε-structure at temperatures below 140 - 210°C and an austenitic structure at a temperature over 210°C. The presence of the ε-phase was not observed in steel with 27% Mn. In steels with 13 and 17% Cr, independent of the manganese content, the structure is composed of ferrite and austenite after quench-hardening at a temperature over 900°C. The amount of ferrite in the steel group with 17% Cr is considerably higher than

Card 3/4

S/167/60/000/004/001/003
A006/A001

The Effect of Chromium and Manganese on Phase Transformations of Chrome-Manganese Steels

that of steels with 13% Cr. After heating to 600 - 900°C, the ferrite is decomposed and the δ-phase is formed (except Х13Г11 (Kh13G11) and Х17Г11 (Kh17G11) steels). Steels with 17 and 13% Cr contain carbide of the $Me_{23}C_6$ type which may be expressed by the formula $(Fe, Mn, Cr)_{23}C_6$. There are 5 tables, 2 figures and 11 references, 6 Soviet, 2 English and 3 German.

ASSOCIATION: Institut metallurgii AN SSSR (Institute of Metallurgy AS USSR) Gornyy otdel AN UzSSR (Mining Department of AS UzbekSSR)

SUBMITTED: December 23, 1959

Card 4/4

86076

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S/180/60/000/005/017/033
E111/E135

AUTHORS: Bannykh, O.A., Zudin, I.F., Kashin, V.I., and Prokoshkin, D.A. (Moscow)

TITLE: Some Properties of Iron-Aluminium Alloys Based on the α-Solid Solution

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, No.5, pp. 149-155

TEXT: The authors point to the advantageous properties (e.g. low density, high corrosion- and scaling-resistance) of iron-aluminium alloys, in spite of which comparatively little industrial use is made of them. For their own investigation of the strength and plasticity of such alloys the authors used the following range of compositions, %: 4.87-16.82 Al; 0.005-0.094 Mn; 0.013-0.100 Si; 0.02-0.05 S; 0.002-0.012 P; 0.018-0.020 C; 0.002-0.015 O; 0.004-0.011 N; (not all the S and P analyses were carried out). The alloys were melted in a vacuum induction furnace described by Kashin et al. (Ref.9) or in air from aluminium-deoxidized Armco iron and grade AB0000 (AV0000) aluminium. Fig.1 shows alloy density as a function of aluminium content. Impact strength as function of the test temperature is shown in

Card 1/3

86076
S/180/60/000/005/017/033
E111/E135

Some Properties of Iron-Aluminium Alloys Based on the α-Solid Solution

Fig.2 and the cold brittleness threshold (temperature at which the alloy acquired an impact strength of 2 kg/cm^2) as a function of aluminium content in Fig.3 (air-melted alloys represented by interrupted lines in both figures). For tensile testing at 20-700 °C a type ИМ-4Р machine was used. Tensile strength, yield point and relative elongations, as functions of aluminium content for various temperatures, are shown in Fig.4. Fig.5 shows relative elongation as a function of temperature for air- and vacuum-melted alloys (right- and left-hand graphs). Grain size as a function of holding time at 1100 °C for vacuum-melted alloys is shown in Fig.6. The influence of heating temperature on hardness for two alloys with 15% Al is shown in Fig.7 (air-melted, curve 1; vacuum-melted, curve 2): the hardness of both has a maximum at about 350-450 °C, but rises much more steeply and attains a higher value with vacuum melting. Vacuum melting also improves other high-temperature properties of Fe-Al alloys.

Card 2/3

86076

S/180/60/000/005/017/033
E111/E135

Some Properties of Iron-Aluminium Alloys Based on the α-Solid Solution

Increasing aluminium content to about 15% increases strength at 20-600 °C; at 700 °C it has little effect. Maximum strength and adequate plasticity are obtained at 400 °C; above 600 °C strength falls sharply while plasticity increases. There are 7 figures, 1 table and 16 references: 5 Soviet, 10 English and 1 German.

SUBMITTED: May 27, 1960

Card 3/3

BANNYKH, O.A.

PHASE I BOOK EXPLOITATION SOV/5947

Prokoshkin, Dmitriy Antonovich, Ivan Feofanovich Zudin, Rustan Salikhovich Sharipkulov, and Oleg Aleksandrovich Bannykh

Legirovaniye khromomargantsovistoy nerzhaveyushchey stali (Alloying Chromium-Manganese Stainless Steel) Moscow, Izd-vo AN SSSR, 1961. 74 p. Errata slip inserted. 3000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut metallurgii im. A.A. Baykova.

Resp. Ed.: N.N. Kurnakov, Professor, Doctor of Chemical Sciences; Ed. of Publishing House: A.N. Chernov; Tech. Ed.: V.Ye. Volkova.

PURPOSE: This book is intended for metallurgists and mechanical engineers.

COVERAGE: Problems connected with the effect of different alloying elements on the phase composition, transformation, and mechanical

Card 1/4

and corrosion properties of chromium-manganese stainless steels are discussed, with particular attention given to the alloying of steel containing 17 to 18% Cr and 12 to 15% Mn. The present work is based on results of investigations carried out at the Institute of Metallurgy, Academy of Sciences USSR, and on experimental data published in Soviet and non-Soviet literature. No personalities are mentioned. There are 53 references: 18 Soviet, 18 English, 16 German, and 1 Czech.

TABLE OF CONTENTS:

34529
S/659/61/007/000/016/044
D217/D303

18.1130

AUTHORS: Bannykh, O.A., and Zudin, I.F.

TITLE: Influence of quenching temperature on the formation of the σ-phase in chromium-manganese steel (18 % Cr, 14 % Mn)

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 7, 1961, 159 - 168

TEXT: Yu.I. Kiselev participated in the experimental work. A steel of the following chemical composition was studied: 0.07 % C, 0.53 % Si, 13.91 % Mn, 18.59 % Cr, 0.03 % N, 0.009 % S and 0.032 % P. This was melted in an induction furnace. The ingot (12 kg) was forged into cylindrical billets of 12 mm diameter. These were water quenched from 1100° and 1200°C. The quenched metal was tempered in the interval 500 - 900°C for period of 10 minutes to 130 hours. The change in hardness and microhardness of a steel containing the ferromagnetic phase, and the microstructures after tempering were studied; an X-ray analysis was also carried out. It was found, that af- X

Card 1/2

S/659/61/007/000/016/044
Influence of quenching temperature ... D217/D303

ter quenching from 1100°C, the σ-phase forms directly from the ferrite on tempering. In X-ray pictures taken of specimens after quenching from 1100°C and tempering for various periods of time, lines for ferrite, austenite and the FeCr-type σ-phase were obtained. The hardness of the steel is directly proportional to the quantity of decomposed ferrite. After quenching from 1200°C, the formation of σ-phase from ferrite during tempering passes through intermediate stages. In the first stage 'excess' austenite precipitates from the ferrite. The change in hardness of the steel is not directly proportional to the ferrite content. There are 6 figures, 2 tables and 12 references: 4 Soviet-bloc and 8 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: G.F. Tisinai, J.K. Stanley and C.A. Samans, J. Metals, February, 1956; R.P. Frerich and C.U. Clark, Trans. ASM, 46, 1954; A.L. Bindari, P.K. Koh and O. Zmeskal, Trans ASM, 43, 1951; W.D. Pearson and J.W. Christian, Acta, 5, 1952.

Card 2/2

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34550

S/659/61/007/000/039/044
D205/D303

18.1150

AUTHORS: Korneristyy, Yu.K., Bannykh, O.A., Zudin, I.F., and Prokoshkin, D.A.

TITLE: Influence of aluminum and carbon on properties of steel with 10 % Cr and 13 % Mn, at elevated temperatures

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 7, 1961, 317-328

TEXT: The influence of Al addition in the range of 2.35 - 4.67 % and of C in the range of 0.1 - 0.8 % was investigated in 10 % Cr and 13 % Mn steel in which the appearance of the σ-phase is excluded. The samples were prepared by smelting in a magnesite crucible, in an induction furnace, and consisted of Armco iron, Cr, Mn (96.5% pure) and Al metal. C was introduced by addition of synthetic cast iron. The ingots were forged into cylinders of 12 and 20 mm diameter, starting the forging at 1150° - 1200°C ending at 750°C. The samples were then hardened by quenching in water from 950°C for 2

X

Card 1/3

S/659/61/007/000/039/044
D205/D303

Influence of aluminum and carbon ...

hours prior to testing. The resulting structures were: Without Al and with 0.1 % (I), with 2.5 % Al, 0.4 % C (V) and with 2.5 % Al, 0.8 % C (VI). These steels were austenitic. With 2.35 % Al and 0.1% C (II) the structure was 65 % austenite 35 % ferrite; with 3.12 % Al, 0.1 % C (III) - 90 % ferrite; with 4.67 % Al, 0.1 % C (IV) - 100 % ferrite. The temperature dependence of strength and plasticity was examined, using an ИМ-4Р (IM-4R) machine. The hot hardness was examined at 700°, 800° and for samples V and VI also at 900°C, on the ВИМ-ИМ (VIM-IM) apparatus, using a sapphire identor. Resistance to creep was examined on the ИП-2 (IP-2) and IP-5 machines, using stresses of 9 kg/mm^2 in the temperature range of 550 - 750°C. Resistance to scaling was examined by the weight gain of samples heated for various times in muffle furnaces in the 900 - 1200°C temperature range. The austenite of the 10 % Cr, 13 % Mn and 0.1 %C steel is unstable and is transformed into martensite under the action of plastic deformation. Aluminum exerts a high ferrite-forming action and lowers the high-resistance characteristics. Exploiting the γ-forming ability of carbon, the austenitic structure can be achieved in steel containing aluminum. 0.4 % of C in the presence

X

Card 2/3

of 2.5 % Al gives a stable austenitic structure. The resistance of this steel (V) is higher than that of the other investigated steels. The resistance to scaling increases sharply with an increase of Al content. The increase of C up to 0.4 % lowers the resistance to scaling. Further increase of C to 0.8 % has little bearing in this respect. Steel (V) has good heat and scale resistances up to 700°C and can be used for durable service under stress up to 650°C, instead of Cr-Ni steel 1X18H9T (1Kh18N9T). There are 7 figures, 1 table and 12 references: 10 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: Brady and Baughner, Iron Age, 194, no. 7, 1959; A.J. Schmatz, Metal Progr. 76, no. 4, 1959.

X

KOVNERISTYY, Yu.K.; BANNYKH, O.A.; ZUDIN, I.F.; PROKOSHKIN, D.A.

Effect of aluminum and carbon on the properties of steel with 10 % Cr and 13 % Mn at high temperatures. Issl. po zharopr. splav. 7:319-328 '61. (MIRA 14:11)
(Steel alloys--Metallurgy) (Metals at high temperatures)

34554
S/659/61/007/000/043/044
D231/D303

18.1130

AUTHORS: Sharipkulov, R.S., and ~~Bannykh, O.A.~~

TITLE: Investigating the effect of alloying elements on the kinetics of decomposition of ferrite in chromium-manganese stainless steel

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zharoprochnym splavam, v. 7, 1961, 362 - 369

TEXT: The present work was carried out to investigate the effect of the following alloying elements: Mo (0.63; 1.52; 3.69), Ti (0.21 0.42; 0.69 %), Nb (0.06; 0.28; 0.84 %), Ni (0.89; 2.63; 3.65 %) and Cu (0.56; 0.81 %) on the rate of decomposition of ferrite in steels containing: 0.1 % C, 17 - 20 % Cr, 10 - 15 % Mn during tempering after quenching. A charge consisting of Armco iron, standard ferro-alloys, electrolytic copper and nickel was melted in an induction furnace. Castings (8 kg each) were shaped by forging to form specimens 12 mm in dia. The temperature at the beginning of forging was 1150 - 1200°C and at the end 800 - 900°C. After forging, the steel

X

Card 1/4

specimens were quenched from 1100°C then tempered at 650 and 750°C. The duration of tempering varied from 30 min. to 100 hrs. Investigated were: 1) Hardness of the steel in the quenched state and after tempering for different times. 2) Changes in the microstructure. 3) For several steel specimens only the predominating phases were electrolytically deposited and subjected to X-ray analysis. In order to have a better idea of the effect of the concentration of a particular alloying element on the stability of the ferrite during the tempering of quenched steels, relative (not absolute) changes of hardness were compared. For that purpose tempering at 750°C was carried out for a period from 0 to 50 hours and the change in hardness at 50 hours was taken as 100 %. The results obtained for the above-mentioned alloying elements were tabulated. Under these conditions of tempering Ti and Nb slowed down considerably the change in hardness of the steels. In case of Nb the retardation increased with its concentration whereas in the case of Ti 0.42 % slowed down and 0.69 % somewhat increased the change in hardness. Consequently, at a given concentration of Ti in the steel the rate of decomposition of ferrite reaches a minimum at a given temperature and at a X trations of an alloying element noticeable amounts of the intermetallic (the Laves type) phase are formed during tempering together with the σ-phase. If the rate of separation of this phase is higher than that of the σ-phase then the rate of decomposition of the ferrite measured by variation in hardness can increase with the amount of the alloying, ferrite-forming element. 3) The austenite-forming elements, Ni, and Cu, by decreasing the amount of the ferrite have practically no effect on its decomposition. There are 4 figures, 1 table and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: H. T. Shirley, J. Iron a. steel. Inst., 174, 1953.

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and α-solid solution to be investigated. The investigation consisting of two parts was carried out with the following steels: 1) 0 % Mo; 2) 1 % Mo; 3) 3 % Mo; 4) 5 % Mo (part I); 5) 3 % Mo + 0.001 % B; 6) 3 % Mo + 0.004 % B; 7) 3 % Mo + 0.008 % B (part II). Part I: Tests carried out were: 1) Dependence of the hardness of various steels on the quenching temperature; 2) Microstructure after quenching from 1000°C; 3) Dependence of the ultimate strength and corresponding elongation on temperature in the range 600 - 900°C; 4) Measurement of creep resistance at 700° and 750°C; 5) A steel quenched (from 1100°C) in water, then subjected to ageing (at 750°C) for 10 hours was investigated for strength and ductility when tested to fracture (20 - 900°C) also for temperature dependence of the impact strength, long-time thermal stability and long-time strength under a load. The results are fully discussed. Part II: According to S.M. Vinarov (Ref. 10: Trudy MAI, no. 123, Oborongiz, 1960) the ability of small amounts of B to increase the heat resistance of steels depends on the method of introducing B into the steel and the chemical composition of the latter. The steels chosen were those previously investigated in part I which showed small creep resistance. All the investigated steels after quenching (from 1150°C) X

Investigating some heat-resistant ... S/659/61/007/000/044/044
D231/D303

in eater then subjected to ageing at 700°C (for 10 hrs) had $\gamma + \sigma$ structure. In order to obtain maximum information on the effect of B at higher temperatures, the mechanical properties were investigated in the temperature range 20 - 700°C. Studied were: 1) Dependence of strength and ductility of steel with various additions of B on the temperature; 2) Impact strength (resilience);3) Creep resistance; 4) Heat resistance at 700°C. The authors concluded that steels 1 and 2 of the austenite structure possess a much higher heat resistance than other steels (3, 4, 5, 6, 7) having two-phase ($\gamma + \sigma$) structure. Molybdenum increases the heat resistance of steels of both austenitic and two-phase structure. Alloying with Mo in amounts which do not cause formation of the second phase is useful. The optimum amount of Mo is that near to the saturation limit for a given concentration of N in the steel. Additions of B improve the heat resistance of steel. Of the alloys investigated those containing 0.001 % B showed the best effect. There are 3 figures and 10 references: 9 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: J.T. Brown, Metal progr., 74, 2, 1958.

Card 3/3

SHARIPKULOV, R.S.; BANNYKH, O.A.

Investigating the effect of alloying elements on the kinetics of ferrite decomposition in chromium-manganese stainless steel. Issl. po zharopr. splav. 7:563-569 '61. (MIRA 14:11)
(Chromium-manganese steel--Metallography)

BANNYKH, ~~O.A.;~~ MODIN, S.; MODIN, Kh.

Growth of cementite particles during the tempering of hardened carbon steel with a eutectoid composition. Izv. AN SSSR. Otd. tekh. nauk. Met. i topl. no.2:71-77 Mr-Ap '62. (MIRA 15:4)
(Steel--Metallography) (Tempering)

BANNYKH, O.A., kand.tekhn.nauk; MODIN, Kh.; MODIN, S.

Structural changes during the tempering of eutectoid carbon steel. Metalloved. term. obr. met. no.9:17-19 S '62. (MIRA 16:4)

1. Institut metallurgii imeni A.A.Baykova i Metallograficheskiy institut v Stokgol'me.
(Steel—Metallography) (Tempering)

BANNYKH, O.A., kand.tekhn.nauk

Scientific and Technical Conference on Highly Resistant Metals, Steel, and Alloys. Metalloved. i term. obr. met. no.9:62-63 S '62. (MIRA 16:5)

(Metals—Congresses)

ACCESSION NR: AT4009495 S/2509/63/000/014/0068/0077

AUTHOR: Banny*kh, O. A.; Zudin, I. F.; Kashin, V. I.; Prokoshkin, D. A.; Samarin, A. M.

TITLE: Properties of ferrite aluminum-iron alloys

SOURCE: AN SSSR. Institut metallurgii. Trudy*, no. 14, 1963. Metallurgiya, metallovedeniye, fiziko-khimicheskiye metody* issledovaniya, 68-77

TOPIC TAGS: aluminum alloy, iron alloy, aluminum-iron alloy, ferrite alloy, melting, forging, heat treatment

ABSTRACT: Some properties of aluminum-iron alloys are of industrial importance, but they are not commonly used as construction materials. In the present work a number of these alloys were exposed to melting, forging and heat treatment, after which they were studied for specific gravity, impact strength, rupture strength and plasticity under various conditions. The chemical composition of the alloys used in the investigation is given in Table 1 of the Enclosure. Two series of alloys were melted: one group in air and the other in a vacuum. It was found that vacuum melting of the alloy improves the mechanical properties, especially under high-temperature conditions. Figure 1 of the

ACCESSION NR: AT4009495

Enclosure shows the dependence of the rupture strength and plasticity of the alloy on the aluminum content. The curves show that an increase in the aluminum content to about 15% increases the strength of the alloy between 20-600C; at 700C the strength does not depend on the aluminum content. The alloy has a maximum strength and satisfactory plasticity at 400C; the strength drops sharply and the plasticity simultaneously increases at temperatures over 600 C. Aluminum-iron alloys may thus be used under stress without adding a third element at temperatures below 600C. Figure 2 of the Enclosure shows that an increase in the aluminum content in the alloy increases grain size at 1,100C. Additional studies on the effect of admixtures (Ti, Zr, B, Ni, W) on the properties of the Al-Fe alloys shows that the introduction of titanium, zirconium, and boron into alloys with 10% Al does not change the strength of the alloy. Zirconium and boron lower the scaling resistance of the alloy while additions of nickel and tungsten to an alloy with 15% Al lowers the strength and plasticity of the alloy. Orig. art. has: 7 figures and 6 tables.

ASSOCIATION: Institut metallurgii, AN SSSR. (Metallurgical Institute, AN SSSR)

SUBMITTED: 00 DATE ACQ: 25Jan64 ENCL: 04

SUB CODE: MM NO REF SOV: 008 OTHER: 011

Card 2/6

ACCESSION NR: AT4009495

ENCLOSURE: 01

Alloy No.	Content % Al	Mn	Si	O	N
	Air-melted alloys				
1	4,87	0,023	0,032	0,0150	0,0048
2	9,80	0,004	0,065	0,0052	0,0090
7	8,70	0,010	0,047	0,0051	0,0040
8	12,70	0,005	0,046	0,0097	0,0090
9	15,00	0,018	0,013	0,0033	0,0090
	Vacuum-melted alloys				
3	10,36	<0,010	0,030	0,0031	0,0110
4	12,19	<0,010	0,100	0,0046	0,0070
5	14,92	<0,010	0,030	0,0028	0,0070
6	16,82	<0,010	0,030	0,0020	0,0040

TABLE 1 - Chemical composition of the alloys tested.

Card 3/6

ACCESSION NR: AT4009495

ENCLOSURE: 02

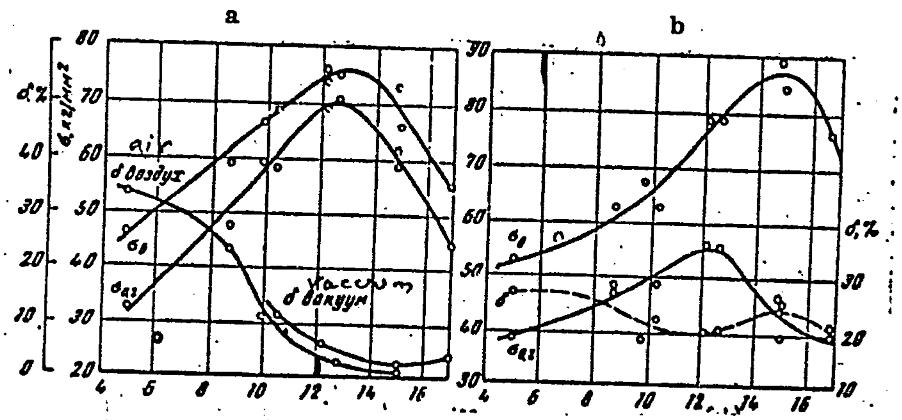


Fig. 1 - Dependence of rupture strength and plasticity of alloys on aluminum content
a - at 20C; b - at 400C; c - at 500C; d - at 600 and 700C

Card 4/6

ACCESSION NR: AT4009495 Fig. 1 (Continued) ENCLOSURE: 03

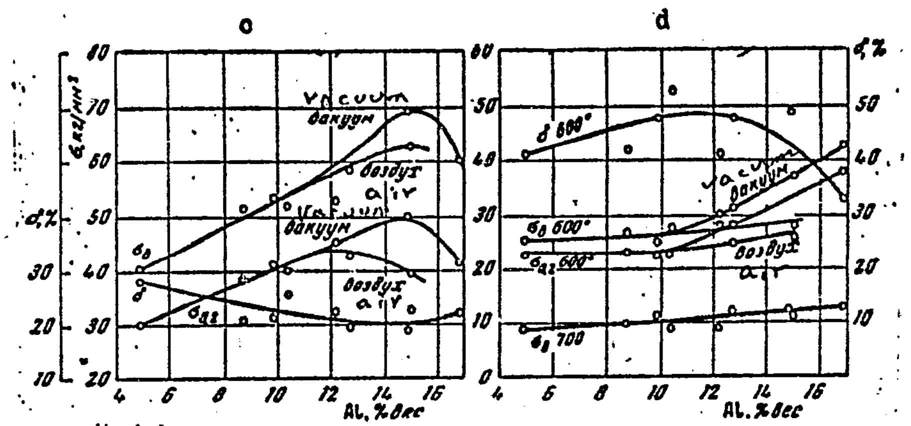


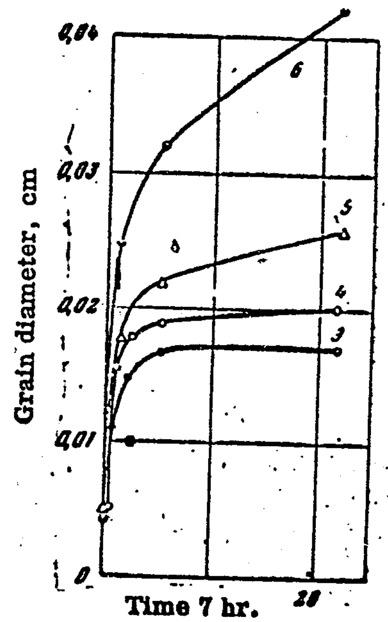
Fig. 1 - Dependence of rupture strength and plasticity of alloys on aluminum content
a - at 20C; b - at 400C; c - at 500C; d - at 600 and 700C

Card 5/6

ACCESSION NR: AT4009495

ENCLOSURE: 04

Fig. 2 - The dependence of the average grain size on the duration of treatment at 1,100C for vacuum-melted alloys 3-6 - alloy nos. (see Table 1 of the Enclosure)



Card 6/6

ACCESSION NR: AT4013939 S/2659/63/010/000/0138/0143

AUTHOR: Prokoshkin, D. A.; Banny*kh, O. A.; Kovneristy*y, Yu. K.; Zudin, I. F.

TITLE: Investigation of the phase composition of chromium-manganese-aluminum steel

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochny*m splavam, v. 10, 1963, 138-143

TOPIC TAGS: steel phase composition, steel, chromium alloy, manganese alloy, aluminum alloy, steel property carbon dependence

ABSTRACT: Chromium-nickel austenite steels are being replaced by chromium-manganese steels, both in the SSSR and in other countries. The influence of carbon (0.1-0.8%) and aluminum (3-7.5%) on the position of the α, $(\alpha+\gamma)$ and γ phases for steel with 10% Cr and 14% Mn was investigated at 800, 950, 1100 and 1250C. It was shown that the content of the ferro-magnetic phase in the steel increases in direct proportion to the aluminum concentration (for constant carbon content) and decreases as the carbon content increases (for a constant aluminum content). The top concentration of aluminum in the austenite rises together with an increase of carbon in the steel. The carbon concentration required for complete change of the α-crystalline lattice into γ

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000103410019-2"

ACCESSION NR: AT4013939

remains practically the same when the aluminum content in the steel changes. The effectiveness of aluminum for α-formation is lowered and that of carbon for α-formation increases as the temperature rises. Using metallographic analysis, it can be shown that the diffusion temperature of carbides rises with an increase in the aluminum and carbon content. Orig. art. has: 5 figures and 2 tables.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurigical Institute AN SSSR)

SUBMITTED: 00 DATE ACQ: 27Feb64 ENCL: 00

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

2/2

Card

BANNYKH, O.A.; MODIN, Kh.; MODIN, S.

[redacted]

Electron microscopy of carbon steel having an eutectoid constitution after hardening and quenching. Trudy Inst. met. no.12: 106-112 '63. (MIRA 16:6)

(Steel—Metallography)
(Electron microscopy)

BANNYKH, O.A.

Double etching as a method of preparing carbon steel specimens for electron microscopy. Trudy Inst. met. no.12:113-117 '63. (MIRA 16:6)

(Steel--Etching)
(Metallography--Equipment and supplies)
(Electron microscopy)

PROKOSHKIN, D.A.; BANNYKH, O.A.; KOVERNITSYY, Yu.K.; ZUDIN, I.F.

Investigating the phase constitution of chromium-manganese-aluminum steel. Issl. po zharoproch. splav. 10:138-143 '63.

Chromium-manganese-aluminum austenitic steel. Ibid.:144-148
(MIRA 17:2)

PROKOSHKIN, D.A.; MOLDAVSKIY, O.D.; BANNYKH, O.A.; KOVNERISTYY, Yu.K.

Effect of phosphorus and aluminum on the mechanical properties of austenitic chromium-manganese steel. Izv. vys. ucheb. zav.; chern. met. 6 no.12:147-151 '63. (MIRA 17:1)

ACCESSION NR: AT4013940 S/2659/63/010/000/0144/0148

AUTHOR: Prokoshkin, D. A.; Banny*kh, O. A.; Kovneristy*y, Yu. K.; Zudin, I. F.

TITLE: Chromium-manganese-aluminum austenite steel

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya po zharoprochny*m splavam, v. 10, 1963, 144-148

TOPIC TAGS: steel, austenite steel, chromium-manganese-aluminum steel, austenite steel magnetic property, steel strength carbon content dependence

ABSTRACT: Austenitic steels with an Fe-Cr-Mn base are finding an ever-widening range of industrial application. The authors point out that the alloying of chromium-manganese steel with carbon and aluminum yields a satisfactory complex of strength properties at both normal and high temperatures. This paper gives the results of a study of the mechanical properties, as well as certain other properties of chromium-manganese-aluminum steel. The study was based on an alloy of 9-10% Cr and 13-15% Mn, with a varying content of aluminum and carbon. Strength tests were made on IM-4P machines (tensile strength tests) and IP-5 machines (tests for creep and fatigue strength). The data obtained on short-term mechanical properties indicate that carbon definitely strengthens chromium-manganese-aluminum steel. An increase in plasticity results from increasing the amount of the plas-

ACCESSION NR: AT4013940

tic structural component (austenite) in the steel. The maximum is attained with a carbon concentration which provides for a 100% austenitic condition. An increase in the carbon content from 0.5 to 0.9% has no effect on the notch toughness of the steel, after annealing at temperatures of 1050-1150C. At temperatures of 700-750C, steel containing approximately 3% Al has reduced creep resistance when the carbon content is increased over the amount necessary for the creation of a stable austenitic structure. In the initial condition (after annealing), all the steels were non-magnetic. The long-term effect of temperature and stress led to the formation of up to 34-36% ferromagnetic phase in steel with 10% Cr, 14% Mn, and 0.1%C. When the aluminum concentration was increased from 3 to 6%, the authors noted a considerable rise in the ultimate strength value. This rise results from a certain strengthening of the austenite and from a considerable reduction of the grain that occurs with the appearance of small quantities of ferrite phase. In the fatigue-strength test, failure time was shortened drastically as the aluminum concentration was increased. A sample of austenitic steel with 3% Al did not fracture after 6000 hours of testing, and the total deformation was less than 1.1%. In the case of steel with 4.5% Al, the austenite partially decays under the influence of high temperature deformation. Although this steel was non-magnetic prior to the test, it was found to be about 35% magnetic after a failure time of 134 hours. The authors conclude that it is possible to obtain a metal with satisfactory heat resistance by the aluminum-alloying of Fe-Cr-Mn-C austenitic steel. However, the aluminum con-

Card 2/3

ACCESSION NR: AT4013940

tent must not exceed that which causes the appearance in the structure of a ferrite component, either in the initial (tempered) state, or after an extended exposure to high temperatures and stress. It was also noted that an addition of 6-8% aluminum reduces the density of Cr-Mn steel by about 10-12%. Orig. art. has: 5 figures and 4 tables.

ASSOCIATION: INSTITUT METALLURGII AN SSSR (Institute of Metallurgy, AN SSSR)

SUBMITTED: 00 DATE ACQ: 27Feb64 ENCL: 00

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

Card 3/3

BANNYKH, G.A.; ZUDIN, I.F.; KASHIN, V.I.; PROKOSHKIN, D.A.; SAMARIN A.M.

Properties of ferritic iron-aluminum alloys. Trudy Inst. met. no.14: 68-77 '63 (MIRA 17:8)

1. Chlen-korrespondent AN SSSR; otvetstvennyy redaktor zhurnala "Trudy Instituta metallurgii" (for Samarin).

BANNYKH, O.A.

Electron microscopy of the precipitation of carbides and the decomposition of ferrite in Kh18G14 steel at high temperatures. Metalloved. i term. obr. met. no.4:6-8 Ap '64. (MIRA 17:6)

1. Institut metallurgii im. A.A. Baykova.

ACCESSION NR: AT4043996

AUTHOR: [illegible], [illegible] A.; Kovalenko, O. I.

TITLE: [illegible] of austenitic-martensitic [illegible] molybdenum steel

SOURCE: AN SSSR. Institut metallurgii. Issledovaniya metallov v zhidkom i tverdom sostoyaniyakh (Research of metals in liquid and solid states). Moscow, Izd-vo Nauka, 1964, 202-206

TOPIC TAGS: chromium manganese molybdenum steel, austenitic martensitic steel, austenitic martensitic steel strengthening

[illegible] hot and cold working [illegible] chromium-manganese [illegible]

the thermomechanical treatment, some [illegible]

Card 1/2

L 14777-65

ACCESSION NR: AT4045996

-196C and rolling at -196C. All specimens were tempere[illegible] The best results were obtained with high-temperature [illegible] low-temperature (300C) thermomechanical treatment followed by rolling at -196C. In steel so treated, the tensile strength reached 170—190 kg/mm^2; the yield strength, 148—153 kg/mm^2; and the elongation, 8—10%. Orig. art. has: 4 tables.

ASSOCIATION: none

SUBMITTED: 18May64 ENCL: 00 SUB CODE: MM

NO REF SOV: 004 OTHER: 002

Card 2/2

AUTHOR: [illegible] D. A.; Kaynaristy[illegible]; Yu. K.; Banny[illegible]kh, O. [illegible]

[illegible] 100, and 300 hrs), tensile [illegible] mm^2 were investigated in 26 melts of [illegible]

Card 1/2

L 15197-65
ACCESSION NR: AT4046847

was found to possess a high impact toughness (16-22 ...2 ...

SUBMITTED: 16Jun64 ENCL: 00 SUB CODE: [illegible]

NO REF SOV: 006 OTHER: 000

Card 2/2

L 13053-65 EWT(m)/EWA(d)/EWP(t)/EWP(b) ASD(m)-3 JD/MLK

ACCESSION NR: AT4046848 S/0000/64/000/000/0236/0242

AUTHOR: Banny*kh, O. A., Zudin, I. F., Candidate of technical ... Ya., Doronin, V. M., Topilin, V. V.

TITLE: Investigation of the phase composition and properties of ...

SOURCE: AN SSSR. Nauchny*y sovet po probleme zharoprochny*kh splavov ... Studies in steels and alloys ...

TOPIC TAGS: steel structure, steel phase composition, alloy steel ...

... from 4 kg steel ingots ...

... The integral intensity of the austenitic ... line, and (419), (212), and (411) σ-phase lines were determined using ...

L 13053-65

ACCESSION NR: AT4046848

URS-50I apparatus for angles of 27-30° in samples quenched from 1100C [illegible] [illegible] during [illegible] [illegible] determined from weight gain by the [illegible] [illegible] results show that: 1) treatment [illegible] [illegible] excess of 18% results in brittleness [illegible] σ-phase; 2) steel with less than 18% chromium retains adequate plasticity after aging at 700C and 3) scale resistance at 900C is greater in samples with an [illegible] [illegible] additions at [illegible] [illegible] effect on scale resistance. Orig. [illegible] 4 figures and 1 formula.

ASSOCIATION: None

SUBMITTED: [illegible]

ENCL: 00

NO REF SOV: 005

OTHER: 001

Card 2/2

L 12046-[illegible] [illegible]/EWA(c)/EWP(t)/EWP(b) AFMDC/[illegible]

ACCESSION NR: [illegible]046850 S/0000/64/000/000/0247/025[illegible]

AUTHOR: Bann[illegible], O. A., Kovalenko, O. I.

TITLE: [illegible] carbon and manganese on the phase transformation [illegible] manganese steel

SOURCE: [illegible] po problemam zharoprochnost[illegible] [illegible] Studies on steels and alloys. [illegible] 247-25[illegible]

TOPIC TAGS: [illegible] chromium manganese steel, stainless steel [illegible] formation, carbon steel, steel hardness

ABSTRACT: Steel with a constant carbon content of 3%, chromium content of 10[illegible] and [illegible]

L 13044-65
ACCESSION NR:

the temperature of annealing. Manganese contents up to 4.5% did not shift the range of

ASSOCIATION: None

SUBMITTED: 16Jun64 ENCL: 00 SUB CODE: MM

NO REF SOV: OTHER: 003

Card

L 11309-65 EWT(m)/EWA(d)/EWP(t)/EWP(b) MJW/JD

ACCESSION NR: AP4040659 S/0129/64/000/[illegible]

AUTHOR: Bannykh, O. A.

TITLE: Electron microscope study of carbide precipitation [illegible]

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov [illegible]

TOPIC TAGS: [illegible] steel, carbide precipitation [illegible] structure, heat treatment

ABSTRACT: [illegible] structural transformations occurring in a steel [illegible]

[illegible]

Card 1/2

L 11309-65
ACCESSION NR: AP4030659

ume, and austenite after hardening from 1100C. Briefly holding the [illegible] steel with [illegible] Cr and 14% Mn at 600-800C leads to precipitation of carbide parti- cles ($Me_{23}C_6$) at the boundary between the α and γ phases. [illegible]

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Insti[illegible]

Card 2/2

L 44257-65 EPF(c)/EPR/EWP(t)/EWP(k)/EWA(c)/EWT(m)/EWP(b)/T/EWA(d)/EWP(z)/

TOPIC TAGS: heat resistant steel, metal deformation, metal scaling, metal physical analysis, aluminum containing alloy, chromium containing alloy, manganese alloy, Xray crystallography, phase composition, metal property, austenitic steel, ferritic steel, alloy phase diagram, allotropic transformation

PURPOSE AND COVERAGE: The book presents results of a study of heat resistant

by Xray diffraction analysis as a function of chemical composition,

Card 1/2

L 44557-65

ACCESSION NR AM5012700

engineers and technicians interested in heat resistant and scale resistant steel

TABLE OF CONTENTS (abridged):

[illegible]

SUB [illegible] [illegible]

NO REF [illegible] OTHER [illegible]

Card 2/2

L 54499-65 EWT(m)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c) JD

UR/0370/65/...

[illegible]

[illegible] Metally, no. [illegible]

TOPIC TAGS: martensitic transformation, low carbon steel

ABSTRACT: It was previously shown that low carbon steels with [illegible] show a hexagonal [illegible] phase after quenching. The aim of the present [illegible] effect of carbon (0.1- [illegible]%) and [illegible] martensite transformation and on the strength [illegible] Amounts of martensite and retained austenite were determined by the relative inten- [illegible] steel containing about 0.26% C, 10% Cr and 4% Mo increases with increasing Mn: from 7-10% for 3.59% Mn to 100% for 8.2% Mn (after quenching from 1100°C) and from 2-3% for 3.59% Mn to 100% for 9.0% Mn (after quenching from 900°C). The tempera- ture at which martensite transformation begins falls from 290°C at 3.59% Mn to 0°C

Card [illegible]

~~L 54499-65~~

ACCESSION NR: AP5013113

0

at 6.8% Mn after quenching from 1100°C. Increasing carbon content was found to sharply increase the amount of retained austenite in steel containing 6% Mn, 10% Cr and 4% Mo after quenching from 1100°C. The point at which martensite transformation begins falls [illegible] at 0.12% C to [illegible]°C at 0.38% C. Full suppr[illegible]

Card 2/2

L 56080-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(k)/EWP(z)/EWP( )/EW( ) Pf-4

AUTHOR: Ivanov, L. I.; Bannykh, O. A.

thermomechanically treated steel

SOURCE: Fizika metallov i metallovedenive, v. 19, no. 5,

TOPIC TAGS: electron irradiation, medium alloy steel, thermomechanical

crystallochemical process

accelerator, yield point, hardening, irradiated steel

irradiation

Card 1/3

L 56080-65

ACCESSION NRL: AP5013816

properties of a medium-alloy chrome-manganese steel toughened [illegible]

[illegible] 1050°C, [illegible]

a linear accelerator in the air, 24 hours following the irradiation the specimens were subjected to tensile tests. The irradiation [illegible]

[illegible] following the [illegible] of defects during the [illegible] merges [illegible] equilibrium state. Thus, the effect of the [illegible] same, [illegible] effect of low-temperature annealing [illegible]

Card 2/3

L 56030-65

ACCESSION NR: AP5013816

1 figure, 1 table.

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute

OTHER: 001

Card 3/3

BANNYKH, Oleg Aleksandrovich; KOVNERISTYY, Yuliy Konstantinovich; ~~ZUDIN, Ivan Feofanovich~~; PRIDANTSEV, M.V., prof. doktor tekhn. nauk otv.red.; CHERNOV, A.N., red.

[Heat-resistant chromium-manganese steel with aluminum] Khromomargantsovistye teploustoichivye stali s aliuminiem. Moskva, Nauka, 1965. 101 p. (MIRA 18:3)

SHAVRIN, S.V.; CHENTSOV, A.V.; ZAKHAROV, I.N.; PASHKEYEV, G.G.;
USHAKOV, D.I.; BANNYKH, S.S.; LEKONTSEV, Yu.A.

Blast furnace smelting of high basicity sinter. Stal' 24
no.8:680-684 Ag '64. (MIRA 17:9)

1. Institut metallurgiii v g. Sverdlovske i Chusovskoy
metallurgicheskiy zavod.

BANNYKH, V.F.; KHSHIVE, Ya.I.

Modernizing and putting into production new electromedical apparatus at the Sverdlovsk plant. Med.prom. 11 no.7:44-47 Jl '57. (MLRA 10:8)

(ELECTRIC APPARATUS AND APPLIANCES)

(MEDICAL INSTRUMENTS AND APPARATUS)

CA

18

BANNYKH, Z.S.

Vacuum evaporation of magnesium chloride solutions. YA. VILNYANSKII, Z. BANNIUH AND N. HAIDUKOV. *Kalii* (U. S. S. R.) 3, 15-19(1932). —The vapor-pressure curves of $MgCl_2$ solns. of concns. of 10-90 g. $MgCl_2$ in 100 cc. of H_2O and temp. range 10-180° were detd. Cold and hot methods of sepn. of $MgCl_2$-KCl-NaCl-H_2O system are given. Vacuum evapn. is more economical than open-pan evapn. The final product is $MgCl_2 \cdot 6H_2O + MgCl_2 \cdot 4H_2O$, contg. 55% $MgCl_2$. The product is pure enough to use in materials of construction and for producing metallic Mg. JAMES SORRES.

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

BANNYKH, Z. S.

18

CA

Graphic calculations of carnallite technology. YA. E. VILNYANSKII AND Z. S. BANNUIIL. *Kalii* (U. S. S. R.) No. 5-6, 42-9(1932).—A study in graphs of the equilibria of the $MgCl_2$-KCl-NaCl-H_2O system. JAMES SORREL

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

BANNYKH, Z. S.

2

Methods of Graphic Representation of Four-Component Systems. Ya. E. Vilnyanskii and Z. S. Bannuih (*Kalii*, 1933, (5), 23-35; *C. Abs.*, 1933, 27, 5625).—The construction of diagrams for the graphic representation of the system $MgCl_2$-KCl-NaCl-H_2O is discussed. Regular and right-angle tetrahedra are found best suited for the graphic solution of problems of a four-component system.—S. G.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

BANNYKH, Z. S.

CA

8

Microchemical investigation of the potassium chloride crystals obtained on treatment of sylvinite. Ya. E. Vil'nyanskii and Z. S. Bannuikh. *Kalii* (U. S. S. R.) 1935, No. 8, 19-24.—Photomicrographs of different intermediate products (vacuum salt, tower salt and dry salt) are reproduced. The manuf. of vacuum salt is recommended as a means to decrease the caking of KCl in storage.

A. Pestoff

COMMON ELEMENTS

MATERIALS INDEX

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

BANNYKH, Z. S.

"Obtaining Potash by the Magnesium Method." Sub 28 Feb 47, Sci Res Inst of Fertilizers and Insectofungicides.

Dissertations presented for degrees in science and engineering in Moscow in 1947.

SO: Sum. No. 457, 18 Apr 55

Cand. Tech. Sci

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000103410019-2"

SOV/137-58-9-18753

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 86 (USSR)

AUTHORS: Bannykh, Z.S., Sachko, A.P.

TITLE: The Quality of Metallic Potassium Obtained by the Thermal Process, and the Behavior of Certain Impurities Therein (O kachestve poluchayemogo termicheskim sposobom metalliche-skogo kaliya i povedenii nekotorykh yego primesey)

PERIODICAL: Tr. Ural'skogo n.-i. khim. in-ta, 1957 (1958), Nr 5, pp 25-35

ABSTRACT: The thermal method of producing metallic K consists of the reduction of KCl by Ca carbide at 950-1000°C in vacuo in accordance with the reaction $2KCl + CaC_2 = CaCl_2 + 2C + 2K$. When metallic K is produced in this manner, the required quality of metal (in terms of Na content, which should be $\leq$ 1.5-2%) is provided by the use of technical KCl not inferior to Grade 1. Removal of undissolved oxide compounds of KCl and other insoluble impurities will be facilitated by the separation of metal therefrom in the molten state by decantation.

1. Alkali metals--Production 2. Alkali metals--Impurities G.S.
3. Alkali metals--Quality control

Card 1/1

SOV/137-58-9-18876

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 102 (USSR)

AUTHORS: Bannykh, Z.S., Sachko, A.P.

TITLE: Distillation of Metal From Residues of Metallic-potassium Production (Distillyatsiya metalla iz otkhodov proizvodstva metallicheskogo kaliya)

PERIODICAL: Tr. Ural'skogo n.-i. khim. in-ta, 1957 (1958), Nr 5, pp 81-90

ABSTRACT: Laboratory and industrial investigations were conducted of the process of distilling metal from the residues of metallic-potassium production. A vertical vacuum furnace was employed in the investigations. The residues were charged into a retort which is immersed in the furnace. The total duration of the furnace-heating and metal-distillation process ranges from 1 hour 50 minutes to 2 hours 40 minutes depending upon the weight of the charge, the initial temperature in the furnace, and the duration of further heating at constant temperature after distillation of the main mass of metal. When the residues are charged into a furnace that has not been permitted to cool, the duration of the experiment is 1 hour 35 minutes. The

Card 1/2

SOV/137-58-9-18876

Distillation of Metal From Residues of Metallic-potassium Production

distillation of K from residues when the residual pressure in the furnace is 4 to 20 mm Hg proceeds at 415-490°C. During the distillation process the temperature is maintained approximately constant. The recovery of metal during this period is 5.5-6.8 g/cm^{2}hr. The yield of metal in terms of the weight of pure residue charged (without kerosene and paraffin) is ~40% upon practically complete distillation. The consumption of electrical energy per kg distilled metal is 19-25 kwh, of which 16-23 kwh goes to heat the furnace.

G.S.

1. Potassium--Production 2. Slags--Processing 3. Metals--Recovery

Card 2/2

BANNYY G.M.

AUTHOR: Bannyy, G.M. 130-10-10/18

TITLE: Rolling Mill Men of the Works (Prokatchiki zavoda)

PERIODICAL: Metallurg, 1957, No.10, p. 22 (USSR).

ABSTRACT: The author mentions some of the rolling-mill operators at the "Dneprospetsstal'" Works sho have distinguished themselves: Krylov, Makeyev, Sapronov, Yelizarov, Engineer Vasilyevich, Bondarenko, Fedchenko, Chernyak (photograph), Vereshchak, Udalov, Ryazantsev, Shvets, Manusov, Shalimov, Ukholin, Magda, Zhekhovanov, Loktionov, Yatsenko, Guba. He enumerates successes attained by the works and outlines measures taken to increase production. He states that of the 10 000 tons of high-quality rolled products which the rolling-mill staff undertook to produce over the 1957 target, 6 952 had already been produced in the first five months of the year.

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

AVAILABLE: Library of Congress.

Card 1/1

BANNYY, M., inzhener-pilot pervogo klassa

Mysteries of methods. Grazhd. av. 19 no.11:6-8 N '62.
(MIRA 16:1)

1. Nachal'nik Ul'yanovskoy shkoly vysshey letnoy podgotovki.

(Ul'yanovsk—Flight training)

BANNYY, N.P.

CA

PROCESSES AND PROPERTIES INDEX

Supply of homogeneous ore to the metallurgical plants of the south of the U.S.S.R. L. M. Tsylev and N. P. Bannyi. *Bull. acad. sci. U.R.S.S., Classe sci. tech.* 1945, 554-61(in Russian).—Due to varying compn. of the Krivorog Fe ores, the Robins system of homogenization is recommended. N. Thon

9

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

BANNYY, N. P.

CA

PROCESSES AND PROPERTIES INDEX

Rational utilization of manganese ores. L. M. Tsylev and N. P. Bannyi. *Bull. acad. sci. U.R.S.S., Classe sci. tech.* 1945, 800-12(in Russian).—Losses of Mn in the process of ore concn. can be reduced from the present 18% in the sludge to 7-11%. On the other hand, it is planned to utilize the sludge, contg. 25-35% Mn, by agglomeration. Particles of less than 5 mm. size in the agglomerate, depending on the process, constitute from 33.5 to 10.1%. Addn. of CaO favors reduction and prevents losses in slags; decompn. of the silicate takes place in the lower part of the furnace, following: $2MnO.SiO_2 + 2CaO + 2C = 2 Mn + Ca_2SiO_4 + 2CO$. The amt. of CaO should conform to $(CaO + MnO)/SiO_2 = 1.1$ to 1.2. Agglomeration will prevent losses in smokes amounting to 15-25% in smelting natural ore.

N. Thon

9

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

BANNYY, N.P.

CA

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

9

Production of a self-melting agglomerate of iron ores. L. M. Tsylev and N. P. Bannyi. *Bull. acad. sci. U.R.S.S., Classe sci. tech.* 1945, 1003-7.—The Krivoi Rog ores contain up to 60% of fines smaller than 10 mm. Proper agglomeration greatly improves the performance of the blast furnace. It allows a better contact of the slagging components thereby insuring a smooth run of the furnace; it reduces the vol. of the charge thereby enabling a better utilization of the furnace capacity; it reduces fuel consumption; it raises the CO concn. in the furnace (the CO_2 of the flux is driven out in the agglomeration process); and it reduces the loss of heat in the exhaust gas. The addn. of limestone to the agglomerated ore lowers the FeO content particularly the FeO assocd. with SiO_2. It raises the degree of indirect reduction of Fe ore and this in turn lowers the required quantity of coke. The addn. of limestone should be calcd. so that the ratio CaO.MgO: SiO_2 is 0.70-0.80. Since the limestone used in agglomeration should not exceed 5 mm. diam., it permits the utilization of quarry fines which otherwise are wasted. Care should be taken that the agglomerate contains no free CaO particles. For smelting bessemer pig iron magnesitic limestone should be used. MgO (5-6%) improves the phys. properties of the slag, the latter is more fluid, conserves heat better, and facilitates desulfurization. The use of self-melting agglomerate raises the furnace output by 5% and lowers the consumption of coke by 0.05 and that of limestone by 0.2 units per unit of pig iron. M. Hosch

COMMON ELEMENTS

MATERIALS INDEX

COMMON VARIABLES INDEX

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

BANNYY, N.P.

CA

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

21

Preparation of coke for blast furnaces. L. M. Tsylev and N. P. Bannyi (Inst. Metallurgii, Akad. Nauk S.S.S.R.). *Bull. acad. sci. U.R.S.S., Classe sci. tech.* 1946, 115-20.—The importance of proper prepn. of coke for a blast furnace and the quality of metal is discussed. To reduce the loss of coal in the tailings, coal washing should be combined with flotation. The coke should be fractionated into 0-40 and > 40-mm. fractions. The 0-40 mm. fraction should be further graded into 0-25 and 25-40 mm. fractions. The latter can be utilized in furnaces having a vol. below 1000 cu. m. When so used, it may make up approx. 10% of the wt. of the coke round. The most desirable fraction for blast furnaces is 40-80 mm. For clean pig iron the ash in the coke should not exceed 8, the S 0.9, and the P 0.008%.

M. Hosch

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

COMMON ELEMENTS

MATERIALS INDEX

COMMON VARIABLES INDEX

AUTHOR INDEX

BANNYY, N.P.

18

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

35

Chernaya Metallurgiya v Novoi Pyatiletke. (Ferrous Metallurgy in the New Five-Year Plan.) I. P. Bardin and N. P. Bannyi. 176 pages. 1947. Institute of Metallurgy, Academy of Sciences of the USSR, Moscow and Leningrad.

Comparatively reviews the present position of ferrous metallurgy in the USSR and in foreign countries. On the basis of available data on raw material reserves in different parts of the Soviet Union, the goal and the means of achievement of the new 5-year plan are indicated. Data concerning planned production of ferrous metal at the end of 1950 are indicated. Contains little concrete data concerning past performance.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PRIYMAK, I.A.; BANNYY, N.P., redaktor; PINEGIN, I.I., redaktor; VAYNSHTEYN, Ye.B., tekhnicheskiy redaktor.

[Establishing technical norms at iron and steel metallurgical enterprises] Tekhnicheskoe normirovanie na predpriiatiiakh chernoi metallurgii. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chenoi i tsvetnoi metallurgii, 1954. 78 p.
(Iron industry) (MLRA 7:10)

BANNYY, N.P.

ROYTBURD, Lazar' Nisonovich, kandidat ekonomicheskikh nauk, dotsent; BANNYY, N.P., redaktor; RAVDEL', P.G., retsenzant; AVRUTSKAYA, R.F., redaktor; EVENSON, I.M., tekhnicheskiy redaktor

[Development of ferrous metallurgy in the U.S.S.R.] Razvitie chernoi metallurgii SSSR. Moskva, Gos.nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1956. 123 p. (Russia--Metallurgy) (MIRA 9:3)

PRIYMAK, Ivan Andreyevich; RYABIN'KIY, Branislav Yakovlevich; MOSHKEVICH, Isay Yevseyevich; BAHNYY, N.P., redaktor; PINEGIN, I.I., redaktor izdatel'stva; SHPAK, Ye.G., tekhnicheskiy redaktor

[The organization of steel industry] Organizatsiia metallurgichesko-go proizvodstva. Pod nauchnoi red. I.A.Priimaka. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1956. 438 p. (MIRA 9:9)

(Steel industry)

BANNYY, N.P.

PRIYMAK, Ivan Andreyevich; [redacted]daktor; AVRUTSKAYA, R.F., redaktor izdatel'stva; EVENSON, I.M., tekhnicheskiy redaktor

[Principles in organizing continuous production and their application to open-hearth furnace plants]. Osnovy organizatsii proizvodstvennykh potokov i organizatsiia ikh v martenovskikh tsekhakh. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1957. 151 p. (MIRA 10:7)
(Open-hearth process)

BANNYY, N.P.

18(5) PHASE I BOOK EXPLOITATION SOV/2295

Moscow. Institut stali

Primeneniye kisloroda v staleplavil'nom proizvodstve (Use of Oxygen in Steelmaking) Moscow, Metallurgizdat, 1957. 415 p. (Series: Its: Sbornik, 37) Errata slip inserted. 3,500 copies printed.

Ed.: Ye. A. Borko; Ed. of Publishing House: Ya. D. Rozentsveyg; Tech. Ed.: Ye. B. Vaynshteyn; Editorial Board of the Institute: M.A. Glinkov, Doctor, Professor; R.N. Grigorash, Candidate of Technical Sciences, Docent; M.T. Gudtsov, Academician; V.P. Yelyutin, Doctor, Professor; A.A. Zhukhovitskiy, Doctor, Professor; I.N. Kidin, (Resp. Ed.) Doctor, Professor; B.G. Livshits, Doctor, Professor; A.P. Lyubimov, Doctor, Professor; I.N. Pavlov, Corresponding Member, Academy of Sciences, USSR; K.G. Trubin, Doctor, Professor; and A. N. Pokhvisnev, Doctor, Professor

PURPOSE: This collection of articles is intended for scientific, industrial, chemical, and metallurgical engineers, physicists and students.

COVERAGE: This book is a collection of scientific research papers on the utilizations of oxygen in steelmaking. The use of oxygen blast for the intensification of fuel combustion and the introduction of oxygen into liquid metal in order to oxidize admixtures are among the topics discussed. The use of oxygen in scrap-ore processes for making steel from pig iron with a high phosphorus content is also discussed. Several articles deal with the heating and processing fundamentals of steelmaking in a recirculation steel-melting furnace. Individual articles deal with the economics of steelmaking with oxygen-blast and the optimum conditions for effective utilization of oxygen. No personalities are mentioned. References follow each article.

Use of Oxygen in Steelmaking SOV/2295

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Card 9/9 10-12-59

18

SOV/137-58-7-14370

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 7, p 61 (USSR)

AUTHORS: Bannyy, N.P., Romenets, V.A.

TITLE: Technical and Economic Effectiveness of the Use of Oxygen in Open-hearth Production (Tekhniko-ekonomicheskaya effektivnost' primeneniya kisloroda v martenovskom proizvodstve)

PERIODICAL: Sb. Mosk. in-t stali, 1957, Vol 37, pp 124-137

ABSTRACT: The effect of use of O_2 in the production of St is expressed in a reduction of the duration of a heat by 12-18% and by a reduction in unit fuel consumption by 11-14%. As indicated by experimental heats, either of these indices may be raised to 40-50%, i.e., when the proper methods of procedure and process are applied, O_2 makes it possible to double the output of open hearths and halve the unit fuel consumption. Use of O_2 shortens the life of open hearths, but in the authors' opinion. this is made good by the reduction in heat time. Of the various types of heats explored, the most efficient is that employing a 30%-O_2 blow and delivery thereof in two ways: In the flame jet during the charging, heating, pig-iron addition, and melting periods, and in the bath during the working period.

Card 1/2

SOV/137-58-7-14370

Technical and Economic Effectiveness of the Use of Oxygen (cont.)

The employment of O_2 becomes economically unprofitable at establishments with low conversion indices and also in shops where the auxiliary shops (other than the furnace) are not operating smoothly. The technical and economic efficiency of O_2 employment will be furthered by a cheapening of O_2 and an increase in the output of oxygen-making units to 20,000 m^3/hr in the case of modern open hearths.

M.P.

1. Open hearth furnaces--Performance 2. Steel--Production 3. Oxygen--Thermal effects 4. Oxygen--Economic aspects

Card 2/2

SOV/137-58-8-16493

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 8, p 37 (USSR)

AUTHORS: Aleksandrova, A.I., Oyks, G.N., Bannyy, N.P.

TITLE: Manufacture of Steel From High-P Cast Iron (Proizvodstvo stali iz vysokofosforistogo chuguna)

PERIODICAL: Sb. Mosk. in-t stali, 1957, Vol 37, pp 281-304

ABSTRACT: An analysis of 120 experimental smeltings performed in metallurgical furnaces employing air with 25-30% of O_2. By employing O_2 the duration of the smelting process is reduced by 8% in the case of silica-brick furnace crowns (SC) and by 33% in the case of furnaces with basic crowns (BC); this reduction in time is accomplished primarily through a foreshortening of the melting and finishing stages. As the content of O_2 is increased from 25 to 30%, the duration of the smelting process diminishes continuously by 6.5-10.7% (in case of SC) and 14-36% (in the case of BC). Introduction of O_2 into the flame, increasing the amount of ore in the upper layers of friable ingredients, smelting procedures which allow slag to remain on the bottom of the hearth - all these measures speed up the processes of slag formation, dephosphorization, and

Card 1/2

Steel, Economics Orgn., Moscow Steel Inst. im I.V. Stalin

SOV/137-58-8-16493

Manufacture of Steel From High-P Cast Iron

saturation of slag with P_2O_5. Compared with smelting operations performed without oxygen in furnaces with SC's, the introduction of O_2 into the flame reduced the fuel consumption in furnaces with BC's by 15-18%. Annual output of furnaces employing O_2 increased by 5% in the case of SC furnaces and by 30.8% in the case of BC furnaces in comparison with BC furnaces employing no oxygen. The production cost of steel smelted in BC furnaces employing O_2 is less by 3 rubles than the cost of regular steel. Employment of phosphate slags will reduce the production costs by 17.6 rubles. Additional capital expenditures connected with the employment of O_2 can be recovered within approximately four years.

Ye.T.

1. Steel--Production 2. Furnaces--Operation 3. Cast iron--Properties 4. Phosphorus--Oxidation 5. Oxygen--Performance

Card 2/2

BANNYY, NIKOLAY PAVLOVICH

PHASE I BOOK EXPLOITATION 413

Bannyy, Nikolay Pavlovich

Tekhniko-ekonomicheskiye raschety v chernoy metallurgii (Technical and Economic Estimates in Ferrous Metallurgy) Moscow, Metallurgizdat, 1958. 162 p. 3,200 copies printed.

Ed.: Lebedev, A.I.; Ed. of Publishing House: Avrutskaya, R.F.; Tech. Ed.: Evenson, I.M.

PURPOSE: This book is for metallurgists and can be used as a manual for students in metallurgical vuzes.

COVERAGE: The author of this book points out that in solving technical problems, the extent of expenditures and capital investments constitutes the criterion for the economic effectiveness of technical improvements. With this criterion in view, he offers methods for evaluating economic effectiveness and gives comparative evaluations of various possible solutions of problems in fields of pig iron, crude steel, and rolled stock production. A few examples of

Card 1/2

solving general problems connected with the location of interrelated industries are also given. No personalities are mentioned. There are no references.

TABLE OF CONTENTS:

AVAILABLE: Library of Congress

Card 2/2

GO/ad
8-5-58

18(0) PHASE I BOOK EXPLOITATION SOV/2161

Bannyy, Nikolay Pavlovich

Effektivnost' primeneniya kisloroda v martenovskom proizvodstve (Effectiveness of Using Oxygen in Open-hearth Processes) Moscow, Metallurgizdat, 1959. 165 p. Errata slip inserted. 5,000 copies printed.

Eds.: A. I. Lebedev, and I. I. Pinegin; Tech. Ed.: V. V. Mikhaylova.

PURPOSE: This book is intended for engineering and technical personnel in ferrous metallurgy and may also be used by students of metallurgical and engineering and economics vuzes in the study of the economy of metals production.

COVERAGE: The book presents a technical and economic analysis of experimental investigations and industrial practices involving the use of oxygen in open-hearth production of steel by the scrap and scrap - ore processes. The author discusses the effect of using oxygen on the basic technical and economic characteristics of open-

Card 1/4

hearth furnace performance, the limiting conditions for the efficient application of oxygen, and steps being taken to improve efficiency. No personalities are mentioned. There are 6 references, all Soviet.

TABLE OF CONTENTS:

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000103410019-2"

Effectiveness of Using Oxygen (Cont.) SOV/2161

Card 3/4

AVAILABLE: Library of Congress

Card 4/4

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9-14-59

ROYTBURD, Lazar' Nisonovich; VERESHCHAGIN, I.K., prof., doktor ekon.nauk, retsenzent; BANNYY, N.P., dotsent, kand.ekon.nauk, red.; PINEGIN, I.I., red.; KLEYNMAN, M.R., tekhn.red.

[Outline of the economic aspects of ferrous metallurgy] Ocherki ekonomiki chernoi metallurgii. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1960. 564 p.
(MIRA 13:9)

(Steel industry--Finance)

BANNYY, Nikolay Pavlovich

Ekonomika chernoy metallurgii SSSR (by) N.P. Bannyy (i dr.) Moskva, Metallurgizdat, 1960.
566 p. charts, tables.
Bibliographical footnotes.

PHASE I BOOK EXPLOITATION SOV/5323

Bannyy, Nikolay Pavlovich, Viktor Borisovich Brodskiy, Iosif Grigor'yevich Gorelik, Yakov Antonovich Oblomskiy, Vyacheslav Viktorovich Rikman, and Lazar' Nisonovich Roytburd

Ekonomika chernoy metallurgii SSSR (Economics of Ferrous Metallurgy in the USSR) Moscow, Metallurgizdat, 1960. 566 p. Errata slip inserted. 5,700 copies printed.

Eds. (Title page): I. P. Bardin, Academician (Deceased), Ya. A. Oblomskiy, Docent, and V. V. Rikman, Docent. Ed. of Publishing House: Ye. S. Khutorskaya; Tech. Ed.: A. I. Karasev.

PURPOSE : This textbook is intended for students at metallurgical schools of higher education, in divisions of metallurgy at schools of higher technical education, and at engineering and economic schools of higher technical education. It may also be useful to engineering, technical, planning, and economic personnel in scientific, economic, and planning bodies, and in industry.

Card ~~1/16~~

Economics of Ferrous Metallurgy (Cont.) SOV/5323

COVERAGE: The book discusses the role of ferrous metallurgy in the Soviet national economy. Principal laws of the development of ferrous metallurgy, the organization of management, planning principles, and problems of raw-material and fuel-and-power supply bases are examined. Considerable attention is given to the problem of technical progress and its effect on the economics of blast-furnace, steelmaking, and rolling production. The development of ferrous metallurgy in the Soviet Union, capitalist countries, and People's Democracies is briefly decribed. The introduction and Chs. 13,14, and 15 were written by Ya. A. Oblomskiy, Candidate of Economic Sciences, Docent, Moskovskiy gosudarstvennyy ekonomicheskiy institut (Moscow State Institute of Economics); Chs. 1,2,3,4,11 (Sections 3,4, and 5), and 12, by I. G. Gorelik, Candidate of Economic Sciences, Docent, Moskovskiy inzhenerno-ekonomicheskiy institut (Moscow Institute of Engineering Economics); Chs. 5,20,21, and 22, by L. N. Roytburd, Doctor of Economic Sciences, Professor, Moscow Institute of Engineering Economics; and Chs. 6,9, 11 (Sections 1 and 2), 18, 19,23, and 24, by N. P. Bannyy, Candidate of Economic Sciences, Docent, Moskovskiy institut stali (Moscow

Card ~~2~~/16