Mikheyev, I.M.

PHASE I BOOK EXPLOITATION SOV/4164

Vsesoyuznoye soveshchaniye po splavam redkikh metallov. 1st, Moscow, 1957

Redkiye metally i splavy; trudy... (Rare Metals and Alloys; Transactions of the First All-Union Conference on Rare-Metal Alloys) Moscow, Metallurgizdat, 1960. 438 p. 3,150 copies printed.

Sponsoring Agencies: Akademiya nauk SSSR. Institut metallurgii, USSR Komissiya po redkim metallam pri nauchno-tekhnicheskom komitete.

Ed.: I.I. Shapovalov; Ed. of Publishing House: O.M. Kamayeva; Tech. Ed.: P.G. Islent'yeva.

PURPOSE: This collection of articles is intended for metallurgical engineers, physicists, and workers in the machine-building and radio-engineering industries. It may also be used by students of schools of higher education.

COVERAGE: The collection contains technical papers which were presented and discussed at the First All-Union Conference on Rare-Metal Alloys, held in the Institute of Metallurgy, Academy of Sciences USSR in November 1957. Results of investigations of rare-metal alloys, titanium, and copper-base alloys with additions of rare metals are presented and discussed along with investigations of rhenium, vanadium, niobium, and their alloys. The effect of rare-earth metals on properties of magnesium alloys and steels is analyzed. The uses of rhenium as a dehydrating catalyst, electroplating material, and material suitable for making plugs for automobile electrical systems are discussed. Also, the effect of the addition of certain elements on the properties of heat-resistant steel is examined and alloys with special physical properties (particularly semiconductive alloys) are discussed. No personalities are mentioned. Soviet and non-Soviet references accompany some of the articles.

PART II. TITANIUM, AND COPPER-BASE ALLOYS WITH RARE-METAL ADDITIONS

PART V. RARE METALS IN STEELS

FILINTSEV, G.P.; TARAYEVA, T.I.; ALESOVITSKIY, A.Ye.; MIKHEYEV, I.M.

Spray drying of ceramic suspensions. Stek.i ker. 17 no.7: 18-21 Jl '60. (MIRA 13:7)
(Ceramics--Drying)

18.1245 1416,1454 only

S/136/61/000/001/007/010
E021/E206

AUTHORS: Mikheyev, I. M. and Smirnova, Ye. I.

TITLE: Wrought Semi-fabricated Articles of the Magnesium Alloy MA10

PERIODICAL: Tsvetnyye metally, 1961, No. 1, pp. 79-82

TEXT: This article deals with the melting, ingot casting, extrusion, welding and corrosion resistance of the MA10 magnesium-base alloy, which contains aluminium, cadmium, silver and manganese (% content not specified). According to the authors, melting, ingot casting and extrusion procedures for this alloy do not differ markedly from those used for other magnesium alloys. Aluminium and manganese are added during melting, while cadmium and silver are added in the mixer. Ingots are cast by a semicontinuous process and then conditioned by machining. Round billets are 345 mm in diameter and 600-1100 mm long; flat billets are 160 x 540 x 700 mm. Bars, panels and strip were extruded on a horizontal press. Tubes were prepared from the bars on a vertical press. Forgings and stampings were also prepared from the bars. Extruding the bars, panels and strip at rates of flow greater than

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S/136/61/000/001/007/010
E021/E206

Wrought Semi-fabricated Articles of the Magnesium Alloy MA10

0.3 m/min., and tubes at greater than 0.5 m/min. resulted in transverse tears. Extruding at 350-400°C at lower rates of flow gave a good surface and a uniform fine grain. The forgings and stampings also had a good surface and a similar structure. Micro-investigations showed that the semi-fabricated articles consisted of complex solid solutions of cadmium, silver, aluminium and manganese in magnesium and chemical compounds of complex nature. The strength of the MA10 alloy at all temperatures up to 300°C is superior to all other magnesium alloys; at 250°C the strength of the alloy is equal to, and at 300°C superior to, that of the B95 (US7075) aluminium alloy. Alloy MA10 is recommended for short-time service at temperatures below 300°C. Data on the mechanical properties of this alloy are given in Table 1. Corrosion resistance of the alloy is somewhat lower than that of the MA8 alloy (a wrought magnesium alloy containing 1.5-2.5% manganese and 0.5 0.35% cerium).

Card 2/3

S/136/61/000/001/007/010
E021/E206

Wrought Semi-fabricated Articles of the Magnesium Alloy MA10

MA10 is also susceptible to stress corrosion. Corrosion resistance can be improved to the level of the MA8 alloy by oxidizing treatment, and susceptibility to stress corrosion can be reduced by metallizing and lacquer coating. Preheated to 300-350°C, the alloy can be welded with the argon-shielded arc. Final heat treatment must be done after welding. Strength of welded joint is 70% of that of the heat-treated weld metal. There are 3 tables and 3 figures.

Table 1

	Tensile strength, kg/mm^2	Yield strength, kg/mm^2	Elongation, %
As-extruded	33-39	24-28	8-15
Solution heat treated	36-39	22-26	8-14
Solution heat treated and aged	40-49	28-36	4-8

Card 3/3

MIKHEYEV, I.M.; SMIRNOVA, Ye.I.

Deformation of MA10 magnesium alloy ingots. TSvet. [illegible] no.1: 79-82 Ja '61. (MIRA 17:3)

L 58896-65 EPR/EWP(t)/EWP(b) Ps-4 IJP(c) JD/TCH/JT

ACCESSION NR: AP5019050 UR/0286/65/000/012/0077/0077

669.721.5

27
B

AUTHOR: Kovalev, I. G.; Mikheyev, I. M.; Dolgov, V. V.; Shpagin, B. V.; Mishkin, V. L.

TITLE: High-strength magnesium alloy. Class 40, No. 172050

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 12, 1965, 77

TOPIC TAGS: magnesium alloy, high strength alloy, high strength magnesium alloy, magnesium weldable alloy

ABSTRACT: This Author Certificate introduces a high-strength magnesium alloy containing zinc, cadmium, and zirconium. In order to improve mechanical properties and weldability, the alloy contains 2—4% zinc, 1—2% cadmium, 0.3—1% zirconium, 0.5—2% lanthanum, and the remainder is magnesium. [WW]

ASSOCIATION: Organizatsiya gosudarstvennogo komiteta po aviatsionnoy tekhnike SSSR (Organization of the State Committee on Aviation Engineering, SSSR)

SUBMITTED: 030ct63 ENCL: 00 SUB CODE: MM, AS
NO REF SOV: 000 OTHER: 000 ATD PRESS: 4051

Card 1/1

MIKHEYEV, I.N., student; STRELETS, M.N., dots., nauchnyy rukovoditel'

Heat factors in the design of crystallizers. Sbor. nauch. rab. stud. SMO DII no.2:119-139 '57. (MIRA 11:12)

1. Metallurgicheskiy fakul'tet Donetskogo industrial'nogo instituta im. N.S. Khrushcheva.
(Steel ingots) (Solidification)
(Heat exchangers)

MIKHEYEV, I.P.

Mikheev, I. P.: Pressmaterialy na osnove fenolo-formal'degidnykh smol (Molding Materials Based on Phenol-Formaldehyde Resins). Moscow: Gosudarst. Nauch.-Tekh. Izdatel. Khim. Lit. 1955. 122 pp.

GVERDTSITELI, I.M.; MIKHEYEV, I.P.; FIDLER, Kh.N.; ABASHIDZE, G.S.; KUBLASHVILI, M.V.; UGREKHELIDZE, D.Sh.

Technological processes for obtaining molding materials based on tung cake. Plast.massy no.11:49-50 '61. (MIRA 14:10)
(Tung nut) (Plastics)

L 39686-66 EWP(j)/EWT(m)/T IJP(c) RM/GD-2

ACC NR: AP6009533 (N) SOURCE CODE: UR/0413/66/000/005/0069/0069

INVENTOR: Pevzner, L. V.; Akutin, M. S.; Mikheyev, I. P.; Faydel', I. Ya.; Sokolov, A. D.; Timofeyev, A. V.

ORG: none

TITLE: Method for obtaining compacts. Class 39, No. 179466

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 5, 1966, 69

TOPIC TAGS: polyvinyl chloride, phenolformaldehyde, compact

ABSTRACT: An Author Certificate has been issued for a method of obtaining compacts by combining phenol resin with polyvinyl chloride in the filler, using a mechanochemical method. Phenol resins and aniline-phenolformaldehyde resins are used to obtain materials which are impervious to water, chemical, and tropical conditions. [NT]

SUB CODE: 11, 07/ SUBM DATE: 27Nov64/

Card 1/1 UDC: 678.632.743.22.067.023.32

MIKHEYEV, Ivan Petrovich

New rotary production line. Izobr.i rats. no.10:12-15 0'60. (MIRA 13:10)
(Machinery, Automatic)

MIKHEYEV, I.P.

All-Union conference on the secondary use of polymers in the economy held at the end of July 1964 in Kiev. Plast. massy no.12:65 '64.
(MIRA 18:3)

MIKHEYEV, I.S. (Moscow)

Physics tables for students. Fiz. v shkole 15 no.4:95-96 Jl-Ag '55. (MLRA 8:10)

(Physics--Tables, etc.)

LOVI, A.A., polkovnik; MININ, R.A., polkovnik; KAPUSTIN, V.Ya., podpolkovnik; KAPUSTIN, V.Ya., podpolkovnik; KASHANSKIY, B.R., podpolkovnik; MIKHEYEV, I.V., podpolkovrik; VIL'CHINSKIY, I.K., polkovnik, red.; SOKOLOVA, G.F., tekhn. red.

[Regulations for small arms fire] Pravila strel'by iz strelkovogo oruzhiia. Moskva, Voen. izd-vo M-va obor. SSSR, 1961. 118 p. (MIRA 14:7)

(Shooting, Military)

BONDARENKO, S.S.; KASHANSKIY, B.R.; KAPUSTIN, V.Ya.; KRAMARENKO, P.T.; LOVI, A.A.; MIKHEYEV, I.V.; POLETAYEV, A.S.; SELEZNEV, V.I; SUDAKOV, S.V.; polkovnik, red.; VIL'CHINSKIY, I.K., red.

[Instruction in firing at night from small arms and grenade launchers] Obuchenie strel'be noch'iu iz strelkovogo oruzhiia i granatometa. Moskva, Voenizdat, 1964. 214 p.
(MIRA 18:4)

1. NIKHEYEV, K. F.

2. USSR (600)

4. Turpentine

7. Purification of turpentine oleoresin by a "continuous settling" method, Der. i lesokhim. prom., 2, No. 5, 1953.

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

MIKHEYEV, K. P.

Cooling and loading of rosin. K. P. Mikheev (Rosin-Turpentine Plant, Gorki). *Gidroliz. i Lesokhim. Prom.* 8, No. 3, 18–19(1955).—A rapid cooling of rosin, which prevents its crystn., is done in revolving drums furnished with pipes through which runs cold water. The temp. of rosin is lowered from 155–160° to 75–80°. At this temp. the rosin is still in a molten state and can be emptied easily into trays from which it is filled in the barrels. For best results the temp. of the cooling water should be around 24° and the temp. of the rosin at 145–8°. The drums are made of Cu and are rotating at 4–6 r.p.m. T. Jurecic

MIKHEYEV, K.P.

Increase the selection of wood chemistry products. Gidroliz. i lesokhim. prom. 14 no.8:15-17 '61. (MIRA 16:11)

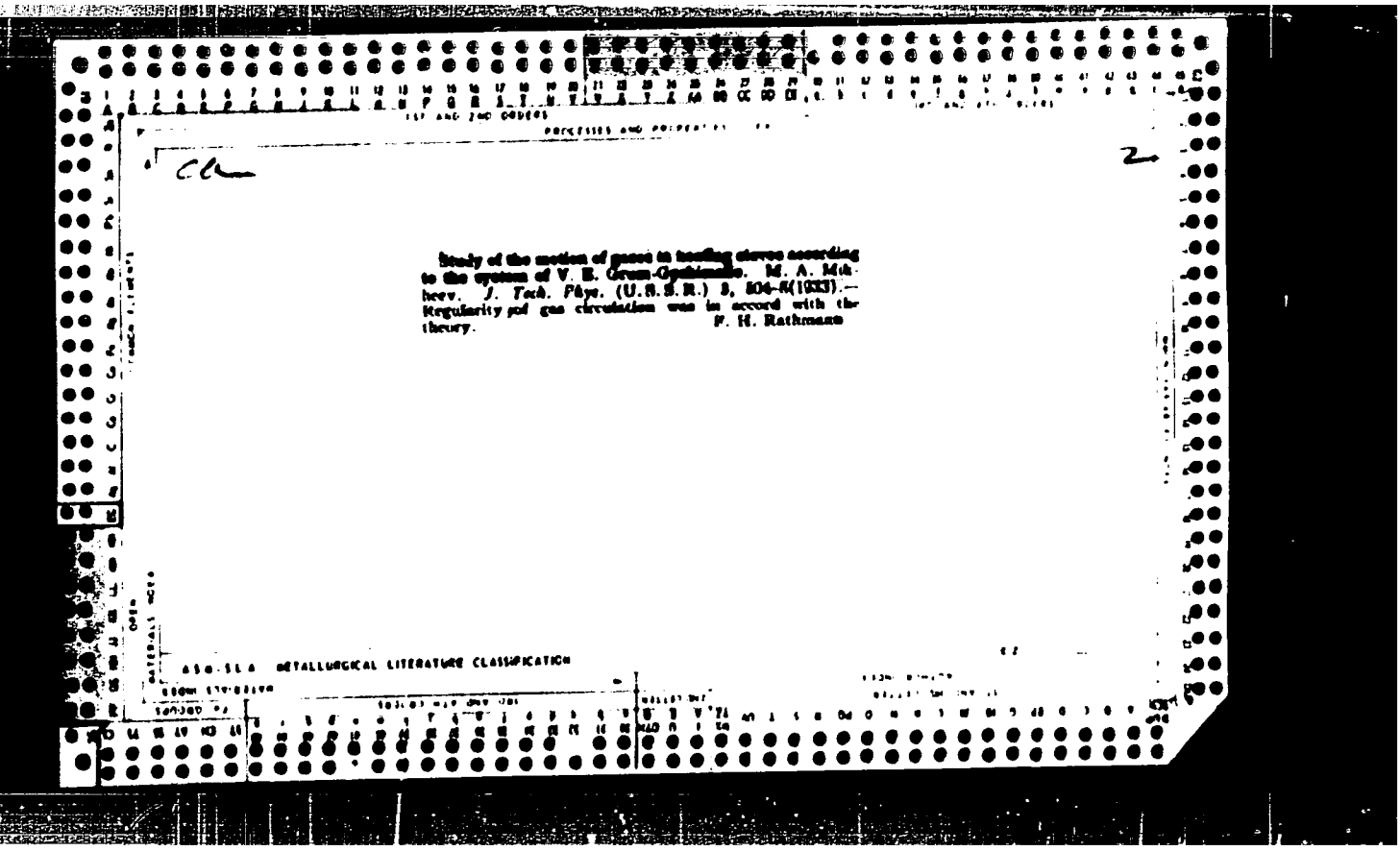
1. Gor'kovskiy kanifol'no-terpentinnyy zavod.

KUZ'MIN, G.P., inzh.; MIKHEYEV, L.Ye., inzh.; STEPANOV, Ye.A., inzh.; SHIROKOV, A.P., kand.tekhn.nauk

Automatic drive for coal saws. Mekh.i avtom.proizv. 18 no.3: 20-21 Mr '64. (MIRA 17:4)

BIKKENIN, I.Kh., inzh.; MIKHEYEV, M.A., master

Dispatcher control system for water-supply stations. Gor. khoz.Mosk. 34 no.4:31-33 Ap '60. (MIRA 13:8)
(Water-supply engineering)
(Remote control)



Study of the motion of gases in bending sleeves according to the system of V. E. Grum-Grshimailo. M. A. Mikheev. *J. Tech. Phys.* (U.S.S.R.) 3, 804-6(1933).—Regularity of gas circulation was in accord with the theory.
F. H. Rathmann

ASS-SLA METALLURGICAL LITERATURE CLASSIFICATION

MIKHEYEV, M. A.

"The Modeling of Thermal Installations," 1936

MIKHEYEV, MIKHAIL ALEKSANDROVICH

Technology

Fundamentals of heat transfer ~~(textbook)~~ for the power engineering schools. Moskva, ~~Gos. energ. izd-vo~~, 1947.

Monthly List of Russian Accessions, Library of Congress, June 1952 UNCLASSIFIED.

[illegible] V. M. A.

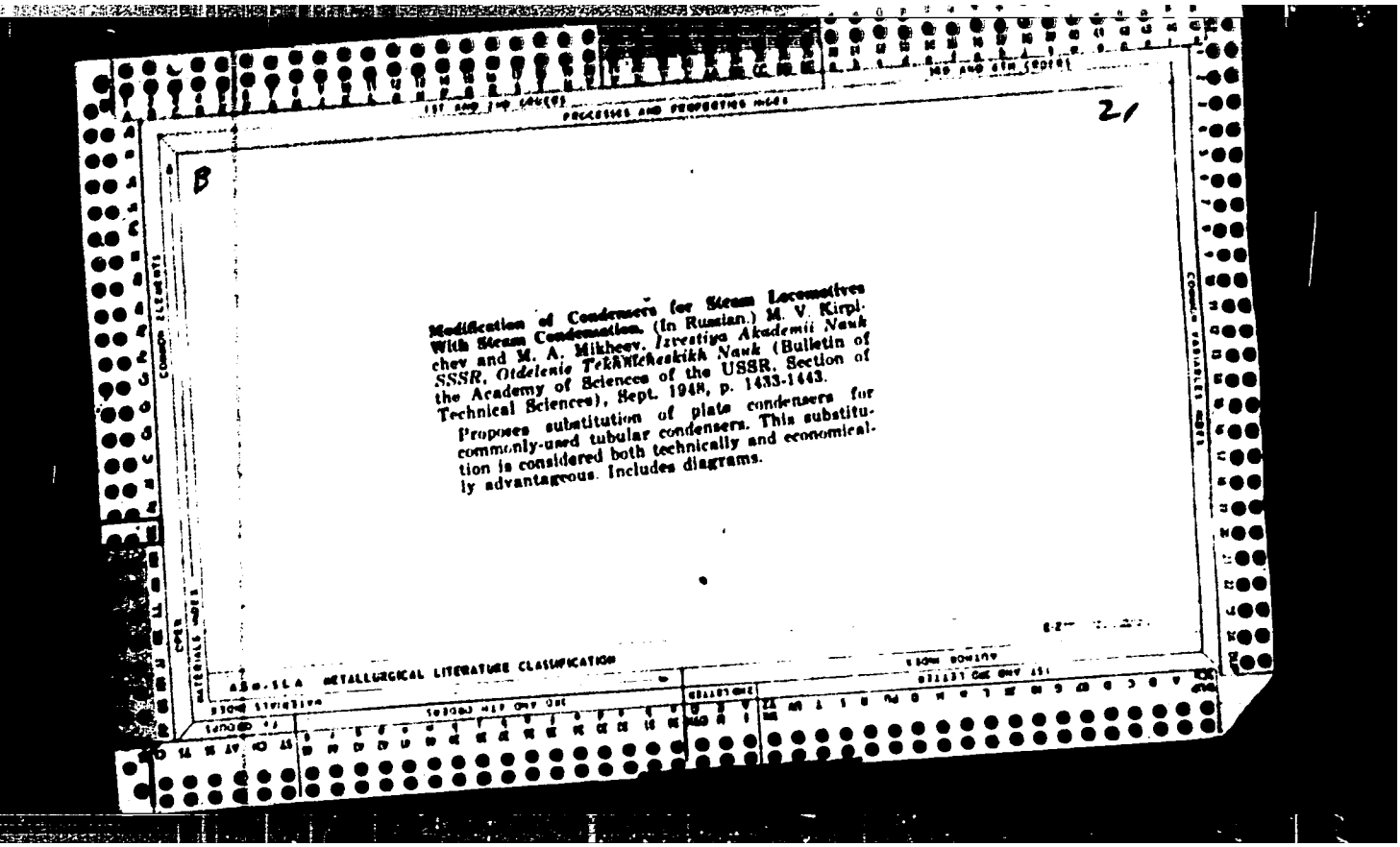
Osnovy teploperedachi...vchebnik dlia energeticheskikh [illegible], Leningrad, Gizlat, 1947. 411 p. diagrs.

Bibliography: p. (408)-409.

(Principles of heat transmission.)

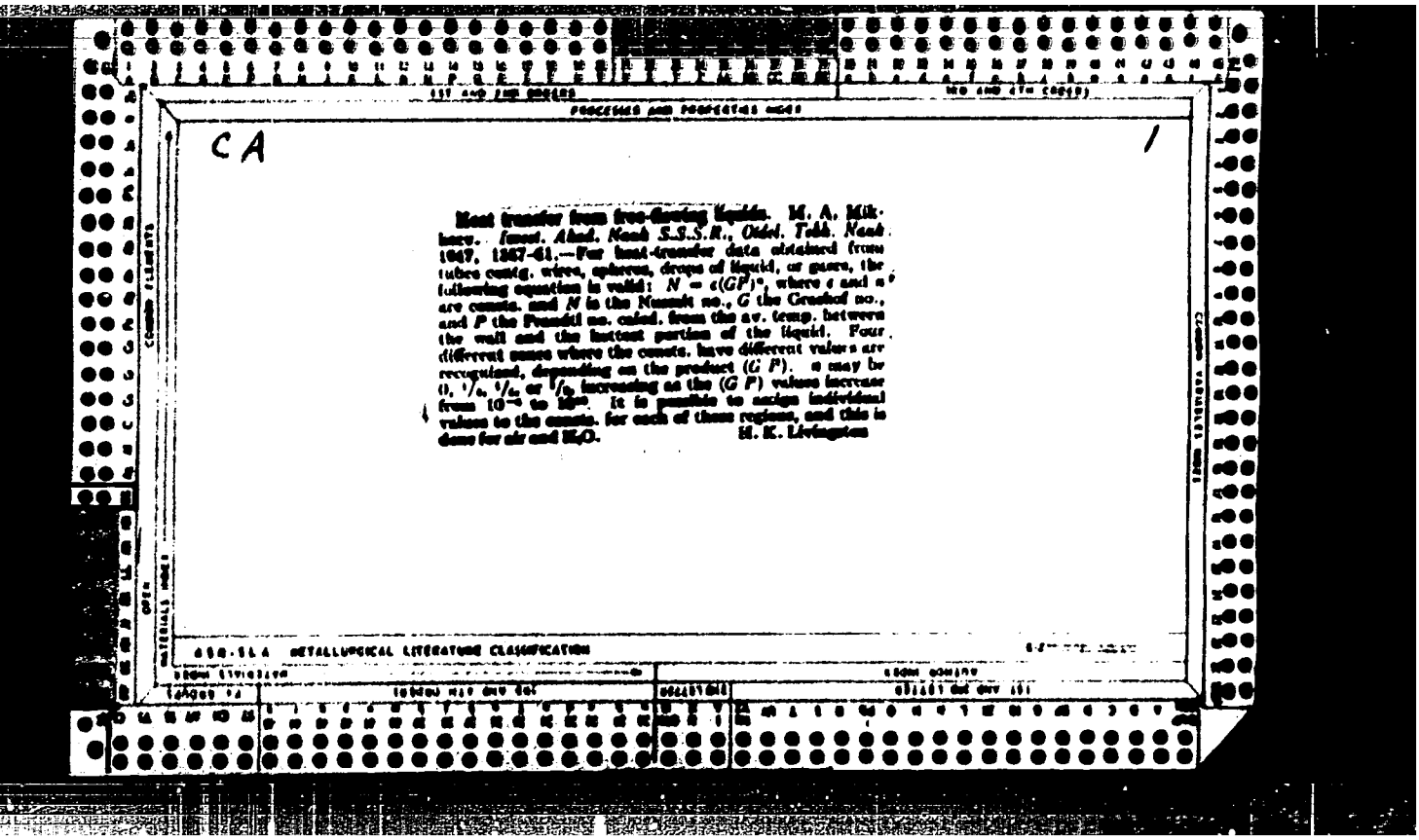
DLC: [illegible].M97

SC: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.



Modification of Condensers for Steam Locomotives With Steam Condensation. (In Russian.) M. V. Kirpichev and M. A. Mikheev. *Izvestiya Akademii Nauk SSSR, Otdelenie Tekhnicheskikh Nauk* (Bulletin of the Academy of Sciences of the USSR, Section of Technical Sciences), Sept. 1948, p. 1433-1443.

Proposes substitution of plate condensers for commonly-used tubular condensers. This substitution is considered both technically and economically advantageous. Includes diagrams.



CA 1

Heat transfer from free-flowing liquids. M. A. Mikheev. *Izvest. Akad. Nauk S.S.S.R., Otdel. Tekh. Nauk* 1947, 1267-81.—For heat-transfer data obtained from tubes contg. wires, spheres, drops of liquid, or gases, the following equation is valid: $N = c(GP)^n$, where c and n are consts. and N is the Nusselt no., G the Grashof no., and P the Prandtl no. calcd. from the av. temp. between the wall and the hottest portion of the liquid. Four different zones where the consts. have different values are recognized, depending on the product $(G\ P)$. n may be 0, $1/8$, $1/4$, or $1/3$, increasing as the $(G\ P)$ values increase from 10^{-3} to 10^{12}. It is possible to assign individual values to the consts. for each of these regions, and this is done for air and H_2O.

M. K. Livingston

METALLURGICAL LITERATURE CLASSIFICATION

MIKHEEV, M. A.

MIKHEEV, MIKHAIL ALEKSANDROVICH

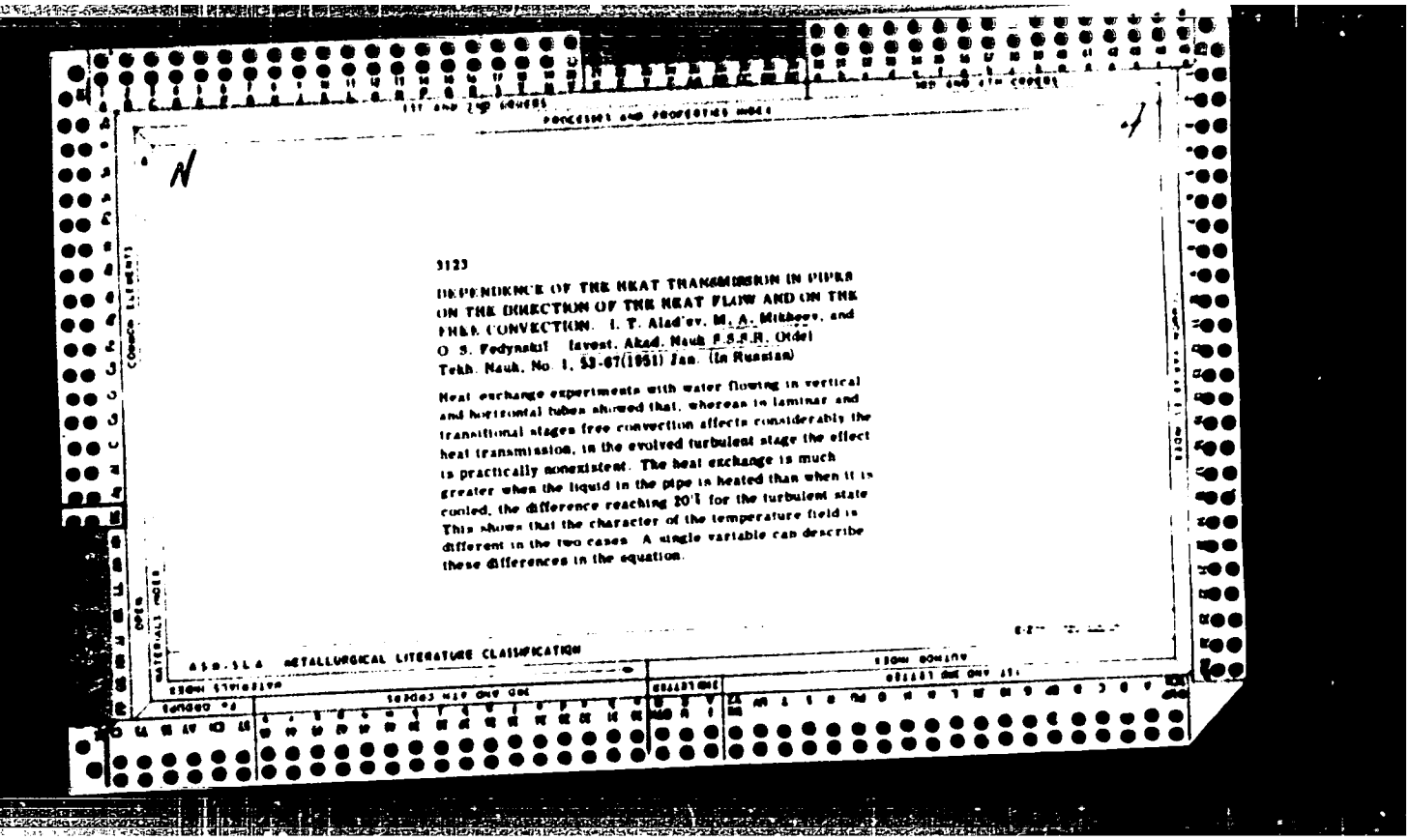
Osnovy teploperedachi. Izd. 2, zanovo perer. Dopushcheno v kachestve uchebnika dlia vysshikh ucheb. zavedenii. Moskva, Gos. energ. izd-vo, 1949. 396 p., diagrs.

Bibliography: p.289-393.

Title tr.: Fundamentals of heat transfer. Approved as a textbook for schools of higher learning.

QC320. M57 1949

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955



3123

DEPENDENCE OF THE HEAT TRANSMISSION IN PIPES ON THE DIRECTION OF THE HEAT FLOW AND ON THE FREE CONVECTION. I. T. Alad'ev, M. A. Mikheev, and O. S. Fedynskil Izvest. Akad. Nauk S.S.S.R. Otdel Tekh. Nauk, No. 1, 53-67(1951) Jan. (In Russian)

Heat exchange experiments with water flowing in vertical and horizontal tubes showed that, whereas in laminar and transitional stages free convection affects considerably the heat transmission, in the evolved turbulent stage the effect is practically nonexistent. The heat exchange is much greater when the liquid in the pipe is heated than when it is cooled, the difference reaching 20% for the turbulent state. This shows that the character of the temperature field is different in the two cases. A single variable can describe these differences in the equation.

MIKHEYEV, M. A.

PA 243T47

USSR/Engineering - Heat, Heat Transfer Oct 52

"Heat Transfer in Turbulent Flow of a Liquid Through Pipes," M. A. Mikheyev, Corr Mem, Acad Sci USSR

Iz Ak Nauk, Otdel Tekh Nauk No 10, pp 1448-1454

Analyzes experimental data for air, water, alcohol, acetone, benzene and mineral oils with wide range of change in their physical properties (Pr = 0.7 - 700), flow velocity (Re = 1.10^4-2.10^6 and M = 0.2 -0.97), temp pressure, and heat flow. Develops new formula for process of heat transmission in turbulent flow of fluids in straight pipes and channels. This formula is applicable for any cross-section shape, including slotted (a/b = 4-40) and annular (d_2/d = 1-2).

243T47

MIKHEYEV, M.A.; BAUM, V.A.; VOSKRESENSKIY, K.D.; FEDYNSKIY, O.S.

[Heat transfer in melted metals] Teplootdacha rasplavlennykh metallov. Moskva, 1955. 13 p. (MIRA 14:7)
(Heat—Transmission)

MIKHEYEV M.A.

124-11-12810

Translation from: Referativnyy Zhurnal, Mekhanika, 1957, Nr 11, p 72 (USSR)

AUTHOR: Mikheyev, M. A., Baum, V. A., Voskresenskiy, K. D., Fedynskiy, O. S.

TITLE: Heat Transfer by Molten Metals. (Teplootdacha rasplavlennykh metallov)

PERIODICAL: V sb.: Reaktorostroyeniye i teoriya reaktorov. Moscow, Izd-vo AN SSSR, 1955, pp 139-151 (Also, in English, Progr. Nuclear Energy. 1956, Ser. 4, No. I, pp 223-232)

ABSTRACT: Contains fundamental information of experimental installations, measuring techniques, and testing methods.

Investigated was the heat transfer by mercury, tin, lead, bismuth, sodium, and bismuth-lead and sodium-potassium alloys.

The flow velocities varied from 0.1 to 20 m/sec, the Reynolds number from 1×10^4 to 6.5×10^5, the Prandtl number from 4×10^{-3} to 3.2×10^{-2}, and the specific heat flux from 2×10^4 to 1×10^6 kg-cal/m^2.hr.

The Authors offer criteria for pure and oxidized surfaces based on 600 test points.

A comparison is made between the test data and existing theories.

Card 1/2

124-11-12810

Heat transfer by molten metals (continued).

From an evaluation of a variety of test data a new criterion is proposed in the form of a formula which applies to molten metals as well as to "common" liquids in which the Prandtl number exceeds 0.7.

Investigations were also performed on the heat transfer in conditions of natural convection on heated plates and tubes for heavy and alkaline molten metals and their alloys.

As a result of the evaluation of the test material, and also from available data on liquids exhibiting low heat conductivity, the Authors submit a single criterion formula for the heat transfer in large volumes, applicable over a wide range of Grashof and Prandtl numbers.

The data relative to the hydrodynamic resistance in the flow of liquid metals show that the general formulas of hydrodynamics are applicable.

(V. N. Krylov)

Card 2/2

D'YAKONOV, German Konstantinovich, doktor tekhnicheskikh nauk, zasluzhennyy deyatel' nauki i tekhniki; KIRPICHEV, M.V., akademik, redaktor (deceased) MIKHEYEV, M.A., akademik, redaktor; DERYUGIN, V.M., redaktor; BANKVICHER, A.L., redaktor; MAKUNI, Ye.V., tekhnicheskiy redaktor.

[Problems of the theory of similitude in the field of physicochemical processes] Voprosy teorii podobiia v oblasti fiziko-khimicheskikh protsessov. Moskva, Izd-vo Akademii nauk SSSR, 1956. 206 p. (MLRA 9:6)

1. Dekan mekhanicheskogo fakul'teta Kazanskogo khimiko-tekhnologicheskogo instituta (for D'yakonov).
(Dimensional analysis)

MIKHEYEV, Mikhail Aleksandrovich, akademik; KRUZHILIN, G.N., retsenzent; SKVORTSOV, S.A., redaktor; LARIONOV, G.Ye. tekhnicheskiy redaktor

[Principles of heat transmission] Osnovy teploperedachi. Izd. 3-e, perer. Moskva, Gos. energ. izd-vo, 1956. 392 p. (MLRA 9:8)

1. Chlen-korrespondent AN SSSR (for Kruzhilin).
(Heat--Transmission)

INAYATOV, A.Ya., kandidat tekhnicheskikh nauk; MIKHEYEV, M.A., akademik.

Heat transfer by water flowing along a pipe bank. Teploenergetika 4 no.3:48-50 Mr '57. (MLRA 10:3)

1. Energeticheskiy institut AN SSSR.
(Heat--Transmission)
(Hydraulics)

24(8) PHASE I BOOK EXPLOITATION SOV/3501

Akademiya nauk SSSR. Energeticheskiy institut

Voprosy teploobmena (Heat-Exchange Problems) Moscow, 1959. 237 p. Errata slip inserted. 2,800 copies printed.

Resp. Ed.: M.A. Mikheyev, Academician; Ed. of Publishing House: G.B. Gorshkov; Tech. Ed.: I.F. Kuz'min.

PURPOSE: This collection of articles is intended for scientific workers, engineers, and postgraduate students specializing in thermodynamics.

COVERAGE: The collection reviews problems of heat transfer and explores possibilities of intensifing heat exchange. The heat exchange theory is outlined, and Russian scientists who contributed to its development are mentioned. Thermophysical properties of some molten metals and alloys are analyzed, and methods used to determine them presented. Equipment used for measuring thermal conductivity, heat capacity, and kinetic viscosity of these metals are discussed. Results of experimental study of the intensified heat exchange for a water flow in an annular channel are analyzed and the instruments used along with the pilot plant for studying convection heat exchange in contacting nonmiscible fluids are described. Instruments and equipment used for determining the linear expansion

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of metals, the consumption of a liquid, and the absorption capacity of a surface are also described and illustrated. A number of equations for solving various thermodynamic problems are presented. Each article is accompanied by references, the majority of which are Soviet.

TABLE OF CONTENTS:

Heat-Exchange Problems

AVAILABLE: Library of Congress

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24(8) PHASE I BOOK EXPLOITATION SOV/1826

Akademiya nauk SSSR. Energeticheskiy institut

Teploperedacha i teplovoye modelirovaniye (Heat Transfer and Modeling of Heat Processes) Moscow, Izd-vo AN SSSR, 1959. 419 p. Errata slip inserted. 3,500 copies printed.

Resp. Ed.: M. A. Mikheyev, Academician; Ed. of Publishing House: D. A. Ivanova; Tech. Ed.: G. N. Shevchenko.

PURPOSE: The book is intended for scientists concerned with heat transfer, heat emission, and hydraulics of liquid metals, etc.

COVERAGE: This collection is dedicated to the memory of Academician M. V. Kirpichev who in the twenties initiated a systematic investigation of heat transfer processes and the efficiency of heat apparatus. Later he led the development of research work in this field. Two special collections devoted to works of Kirpichev's school have been published, one in 1938, Materialy soveshchaniya po modelirovaniyu (Materials of the Conference on Modeling) and in 1951, Teoriya podobiya i modelirovaniye (Theory of Similitude and Modeling). The present collection prepared in 1956 represents further development of the work of this school. This theory is fundamental for the analysis of many heat problems in the field of electrical and radio engineering. Of great importance are the first systematic investigations of heat transfer and the hydraulics of liquid metals which as a new kind of heat carrier may be used in the various branches of modern engineering. As a result of special investigations of some cases of convective heat transfer, a dependence of the process on the kind of liquid, temperature, pressure, direction of the heat flow, and other factors, was discovered and established. On the basis of a wide generalization of experimental data, new dependable recommendations for heat analysis of engineering equipment were developed. Of no less interest is the work on heat transmission in boiling liquids and the condensation of vapors. All investigations are based on the theory of similitude, the nature of which, according to M. V. Kirpichev, is that of "experimentation." Work on the theory of a regular regime applied to a system of bodies with an internal source of heat is of interest for the future.

Card 2/20

Mikheyev, M. A., O. S. Fedynskiy, V. M. Borishanskiy, V. I. Petrov. Heat Emission in the Flow of Metals in Pipes 69

This article gives results of the first most complete investigation of average heat emission in a turbulent flow of liquid metals through straight pipes. Supplementing the report of the International Conference on the Peaceful Use of Atomic Energy, this article provides more complete tables of values and descriptions of experiments. N. A. Vel'tishchev, A. V. Osipov, and G. M. Chizhevskaya cooperated with the authors in conducting experiments; N. A. Nikol'skiy, T. V. Klassen, A. N. Solov'yev, K. A. Kalakutskaya, and I. R. Pshelkin with the cooperation of V. A. Vel'tishcheva determined the physical properties of metals; data on the viscosity of lead, mercury, and sodium are taken from the works of Khalilov, Shvidkovskiy, and Chiong. There are 8 references: 4 Soviet, and 4 English.

Card 6/20

24(8) PHASE I BOOK EXPLOITATION SOV/1826

Akademiya nauk SSSR. Energeticheskiy institut

Teploperedacha i teplovoye modelirovaniye (Heat Transfer and Modeling of Heat Processes) Moscow, Izd-vo AN SSSR, 1959. 419 p. Errata slip inserted. 3,500 copies printed.

Resp. Ed.: M. A. Mikheyev, Academician; Ed. of Publishing House: D. A. Ivanova; Tech. Ed.: O. M. Shevchenko.

PURPOSE: The book is intended for scientists concerned with heat transfer, heat emission, and hydraulics of liquid metals, etc.

COVERAGE: This collection is dedicated to the memory of Academician M. V. Kirpichev who in the twenties initiated a systematic investigation of heat transfer processes and the efficiency of heat apparatus. Later he led the development of research work in this field. Two special collections devoted to works of Kirpichev's school have been published, one in 1938, Materialy soveshchaniya po modelirovaniyu (Materials of the Conference on Modeling) and in 1951, Teoriya podobiya i modelirovaniye (Theory of Similitude and Modeling). The present collection prepared in 1956 represents further development of the work of this school. This theory is fundamental for the analysis of many heat problems in the field of electrical and radio engineering. Of great importance are the first systematic investigations of heat transfer and the hydraulics of liquid metals which as a new kind of heat carrier may be used in the various branches of modern engineering. As a result of special investigations of some cases of convective heat transfer, a dependence of the process on the kind of liquid, temperature, pressure, direction of the heat flow, and other factors, was discovered and established. On the basis of a wide generalization of experimental data, new dependable recommendations for heat analysis of engineering equipment were developed. Of no less interest is the work on heat transmission in boiling liquids and the condensation of vapors. All investigations are based on the theory of similitude, the nature of which, according to M. V. Kirpichev, is that of "experimentation." Work on the theory of a regular regime applied to a system of bodies with an internal source of heat is of interest for the future.

Mikheyev, M. A. Average Heat Transfer in the Flow of Liquids and Pipes 122

As a result of the analysis and generalization of experimental data of the average heat-transfer in various liquids in turbulent motion ($Re > 1 \cdot 10^4$), in long pipes (length to diameter ratio $\frac{l}{d} \geq 50$), the following equation was established: $Nu_f = 0.021 Re_f^{0.8} Pr_f^{0.43} (Pr_f/Pr_w)^{0.25}$ in which the average temperature of the working fluid t_f is the determining temperature and the equivalent (hydraulic) diameter d eg. is the determining dimension. On a diagram in the form of the equation: $Nu_f Pr_f^{-0.43} (Pr_f/Pr_w)^{-0.25} = Ko = f(Re_f)$ the first equation was compared to recently published new data on heat transfer. Multiplying Ko by 05, 1, 2, 3, 4, 5, 6, and 8, the material was divided into 7 groups: 1) experimental data for gases and steam 2) true liquids in circular pipes 3) water, air, and steam in circular conduits 4) water and air in rectangular channels 5) air in conduits of trapezoidal, rectangular or triangular section 6) air in conduits composed of an outer conduit and 3 or 4 pipes inside 7) air and water in conduits composed of an outer conduit and 19 pipes inside. Experimental data confirm the values calculated by the proposed equation. There are 25 references: 17 Soviet, 4 English, and 4 German.

Averin, Ye. K., [illegible], Kondrat'yev, V. [illegible] (Deceased), [illegible] Mikheyev, and [illegible] Telyinskiy. Heat Transfer in Liquids Flowing in Annular and Slit Conduits 138

The article gives the results of a special investigation of an average heat transfer process in annular and slit conduits. Seven different experimental arrangements for testing heat transfer in a flow of water are described and diagrams of the arrangements are given. The experimental work was done at the Laboratoriya teploperedachi Energeticheskogo instituta AN SSSR (Laboratory of the Heat Transfer Institute, Academy of Science, USSR) under the guidance of M. A. Mikheyev. The tests were carried out by the authors of the article. Assisting in the experiments were Senior Engineer K. A. Vel'tishchev and Senior Mechanic N. I. Portnov. There are 7 references: 6 Soviet and 1 English.

APPROVED FOR RELEASE: 06/14/2000 CIA-RDP86-00513R001134120002-7"

MIKHEYEV, M.A.

Distr: 4E2c/4E2d(b) 2 cys/4E3b/4E3c 2 cys/4E3d
4E2b(v)

12
2 - BW (BW/JW)
1 - MJC (JD)
1 - MJC (JG)
1 - RS
8

Heat transfer to metals flowing through pipes. M. A. Mikheev, O. S. Fedynskii, V. M. Derrugin, and V. [illegible]. *Teploperedacha i Teplovoe Modelirovanie, Akad. Nauk S.S.R., Energet. Inst. im. G. M. Krzhizhanovskogo* 1959, 65-85.—Expts. were carried out using a steel pipe, coated electrolytically on the outside with Cu. Temps. were detd. by means of thermocouples mounted in the pipe wall. Drawings and a description of exptl. app. are given. The pipe was heated by either an elec. resistance heater, or by oil at a max. temp. of 320°. Tests were run under conditions of both heating and cooling. The velocity of the liquid metals was varied from 0.1 to 30 m./sec., the heat flux from 2×10^4 to $\sim 1 \times 10^6$ kcal./sq. m.-hr., Reynolds no. (Re) from 1×10^4 to 6.5×10^5, and Prandtl no. (Pr) from 4×10^{-2} to 3.2×10^{-2}. Extensive tables of the phys. properties of liquid Hg, Sn, Bi, Na, Bi (55.5%)-Zn(44.5%) eutectic, and K(75%)-Na(25%) eutectic are given. Extensive heat-transfer data for Hg, Bi-Pb eutectic, Bi, Sn, Na, and K-Na alloy are reported. All the exptl. data were correlated by relation $Nu = 5.3 + 0.014 (Pe)^{0.8}$, where Nu is the Nusselt no. and Pe = (Re) (Pr). Certain of the data, i.e. for Sn and for Na-K were better expressed by $Nu = 4.8 + 0.014 (Pe)^{0.8}$. H. J. Wagner

MIKHEYEV, Mikhail Aleksandrovich; MIKHEYEVA, Irina Mikhaylovna; SKVORTSOV, S.A., red.; BORUNOV, N.I., tekhn. red.

[Brief course in heat transfer] Kratkii kurs teploperedachi. Moskva, Gos.energ.izd-vo, 1960. 206 p. (MIRA 15:2)
(Heat—Transmission)

PHASE I BOOK EXPLOITATION SOV/4396

Akademiya nauk SSSR. Energeticheskiy institut

Konvektivnyy i luchistyy teploobmen (Convection and Radiation Heat Exchange) Moscow, Izd-vo AN SSSR, 1960. 254 p. Errata slip inserted. 3,200 copies printed.

Ed.: M.A. Mikheyev, Academician; Ed. of Publishing House: G.B. Gorshkov; Tech. Ed.: V.V. Bruzgul'.

PURPOSE: The book is intended for scientists and engineers working in various branches of science and industry concerned with thermodynamics and heat transfer problems.

COVERAGE: The book consists of 19 original articles on various problems in thermodynamics. The following subjects are discussed: mechanism of heat transfer processes, intensification of heat exchange, determination of thermophysical properties of operating media, heat transfer in supersonic flow of gas, and combustion chambers and nuclear reactors. Theory and experimental techniques are described. Each article describes the conditions of the experiment and tables of the experimental data obtained are given. The data may be used for calculations of heat transfer and heat exchangers, always taking account of

Card 1/ 5

the special experimental conditions under which the data were established. No personalities are mentioned. References follow most of the articles.

TABLE OF CONTENTS:

Convection and Radiation Heat Exchange

SOV/4396

AVAILABLE: Library of Congress

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AC/rm/sfm
10/20/60

MIKHEYEV, M.A., akademik, otv. red.; GORSHKOV, G.B., red. izd-va; GOLUB', S.P., tekhn. red.; MAKOGONOVA, I.A., tekhn. red.

[Heat transmission]Teploperedacha. Moskva, Izd-vo Akad. nauk SSSR, 1962. 144 p. (MIRA 15:10)

1. Akademiya nauk SSSR. Energeticheskiy institut.
(Heat—Transmission)

ACC NR: AP6034275 (N) SOURCE CODE: UR/0281/66/000/005/0096/0104

AUTHOR: Mikheyev, M. A. (Moscow)

ORG: None

TITLE: Empirical formulas for convective heat exchange

SOURCE: AN SSSR. Izvestiya. Energetika i transport, no. 5, 1966, 96- 04

TOPIC TAGS: convective heat transfer, heat transfer theory

ABSTRACT: The author presents a basis for the selection of the determining dimension. In the case of heat exchange in tubes, this dimension is assumed to be the working distance of the heat transfer surface instead of the diameter. It is shown that molten metals are commonly used heat transfer agents which conform to general heat transfer laws. Empirical heat exchange formulas are made more accurate for the following cases: heat exchange of a plate in a fluid stream; heat exchange during the flow of a fluid in a tube; the average heat exchange of a tube in a transverse flow; average heat exchange of a tube cluster in a transverse flow and heat exchange of bodies under conditions of free convection. Orig. art. has: 5 figures, 21 formulas.

SUB CODE: 20/ SUBM DATE: 17Jun66/ ORIG REF: 005

Card 1/1

UDC; 536.242.001.24

MIKHEYEV, M.I.

Protection network for the power supply of electric interlocking systems. Avtom., telem.i sviaz' 4 no.6:35 Je '60.
(MIRA 13:7)

1. Starshiy elektromekhanik ETs stantsii Vereshchagino Sverdlovskoy dorogi.
(Railroads--Signaling--Interlocking systems)
(Railroads--Electric equipment)

MIKHEYEV, Mikhail Ivanovich, doktor biol. nauk; LEONOVA, T.S., red.

[Tissue extracts in animal husbandry, dry tissue extracts in tablets] Tkanevye preparaty v zhivotnovodstve; o sukhikh tkanevykh preparatakh v tabletkakh. Moskva, Izd-vo "Znanie," 1964. 30 p. (Novoe v zhizni, nauke, tekhnike. V Seriia: Sel'skoe khoziaistvo, no.8) (MIRA 17:7)

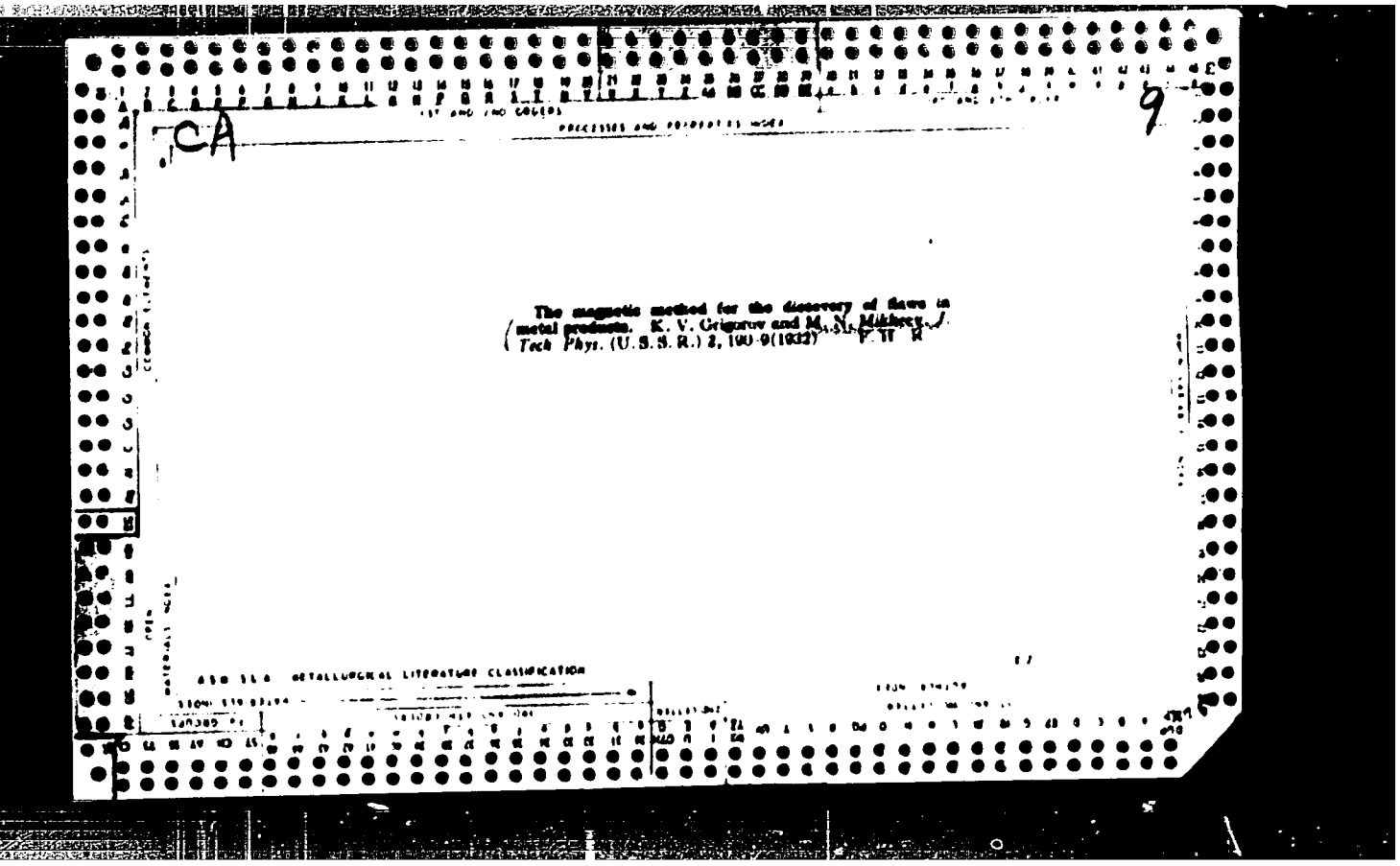
MIKHEEV, M. N.

MIKHEEV, M.-N.

Puti uskoreniia perevozok gruzov na rechnom transporte. [Ways of accelerating river shipping]. (Rechnoi transport, 1949, no. 3, p. 11-13).

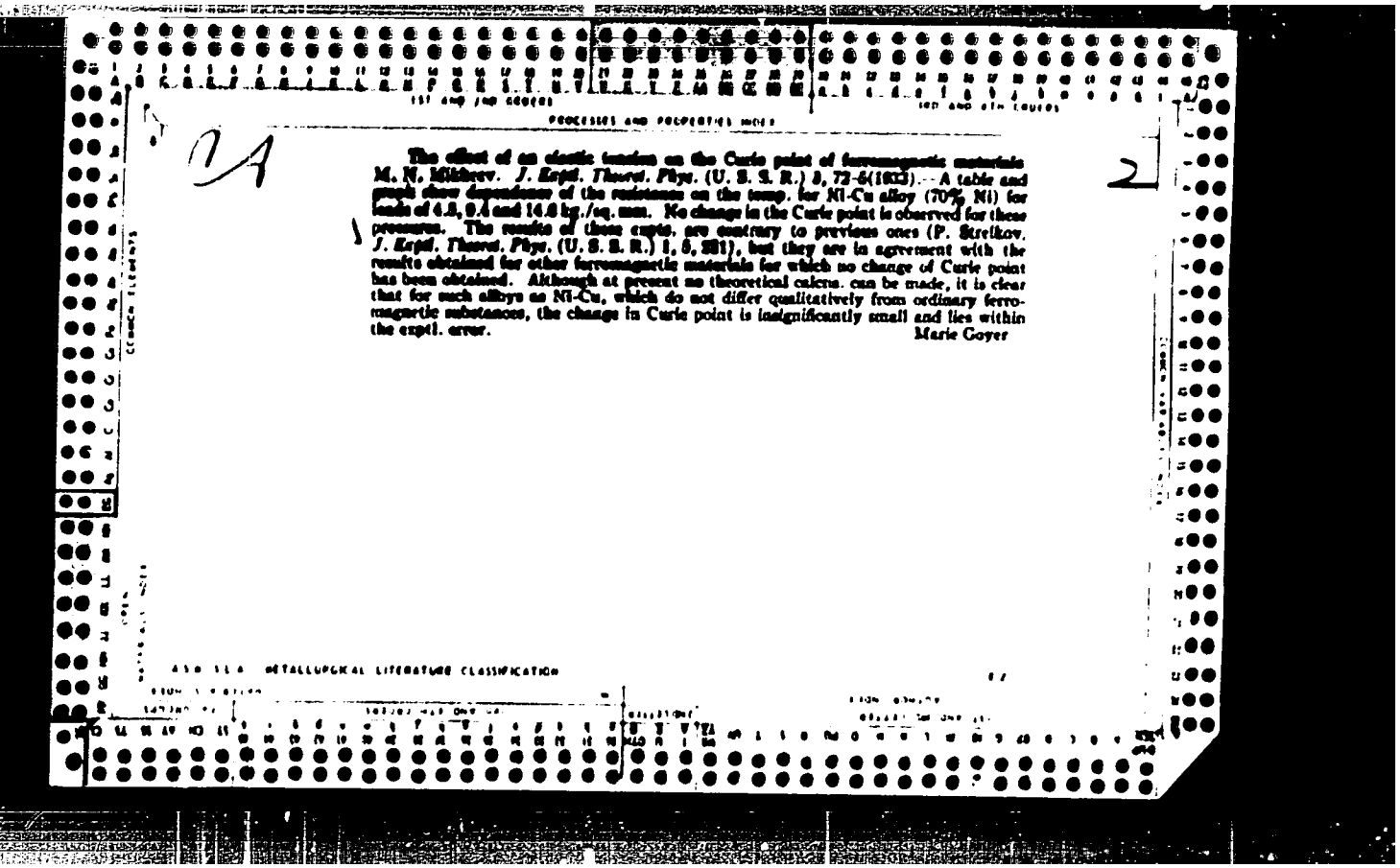
DLC: TC601.R4

SO: Soviet Transportation and Communications, A Bibliography, Library of Congress, Reference Department, Washington, 1952, Unclassified.


CA

9

The magnetic method for the discovery of flaws in metal products. K. V. Grigorov and M. N. Mikheev. *J. Tech. Phys. (U.S.S.R.)* 2, 100-9(1932)

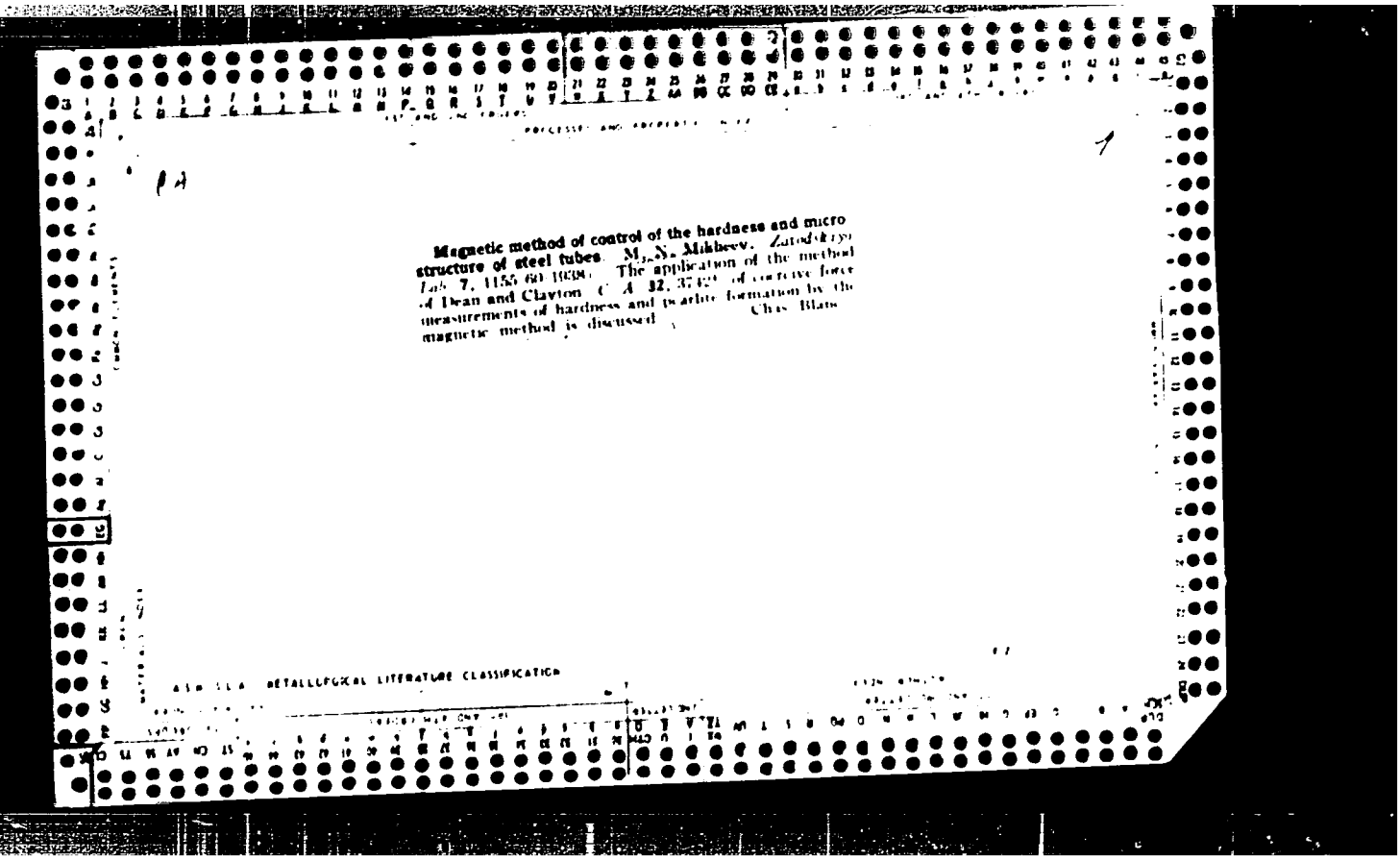


PROCESSES AND PROPERTIES INDEX

The effect of an elastic tension on the Curie point of ferromagnetic materials. M. N. Miliharev. *J. Exptl. Theoret. Phys.* (U. S. S. R.) 8, 73-6(1938).—A table and graph show dependence of the resistance on the temp. for Ni-Cu alloy (70% Ni) for loads of 4.8, 9.4 and 14.8 kg./sq. mm. No change in the Curie point is observed for these pressures. The results of these expts. are contrary to previous ones (P. Strelkov, *J. Exptl. Theoret. Phys.* (U. S. S. R.) 1, 5, 281), but they are in agreement with the results obtained for other ferromagnetic materials for which no change of Curie point has been obtained. Although at present no theoretical calcns. can be made, it is clear that for such alloys as Ni-Cu, which do not differ qualitatively from ordinary ferromagnetic substances, the change in Curie point is insignificantly small and lies within the exptl. error.

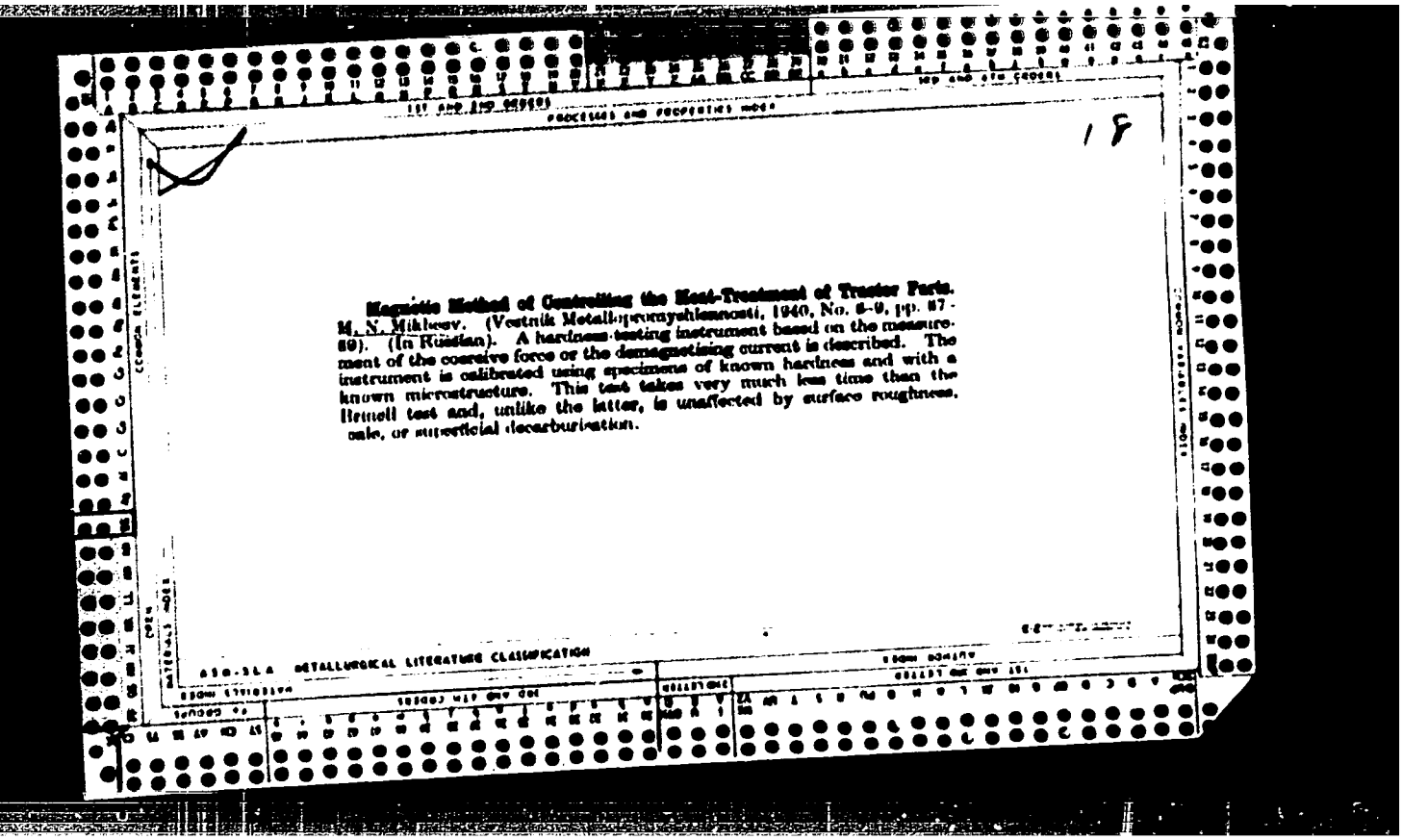
Marie Goyer

A 5 0 1 1 A METALLURGICAL LITERATURE CLASSIFICATION



Magnetic method of control of the hardness and micro structure of steel tubes. M. N. Mikheev. *Zavod. Lab.* 7, 1155-60 (1938). The application of the method of Dean and Clayton (*C. A.* 32, 3742[2]) of coercive force measurements of hardness and martensite formation by the magnetic method is discussed. Chas. Blatz

A1m 11-A METALLURGICAL LITERATURE CLASSIFICATION



Magnetic Method of Controlling the Heat-Treatment of Tractor Parts. M. N. Mikheev. (Vestnik Metallopromyshlennosti, 1940, No. 8-9, pp. 87-89). (In Russian). A hardness-testing instrument based on the measurement of the coercive force or the demagnetising current is described. The instrument is calibrated using specimens of known hardness and with a known microstructure. This test takes very much less time than the Herbell test and, unlike the latter, is unaffected by surface roughness, scale, or superficial decarburisation.

MIKHEYEV, M. N.

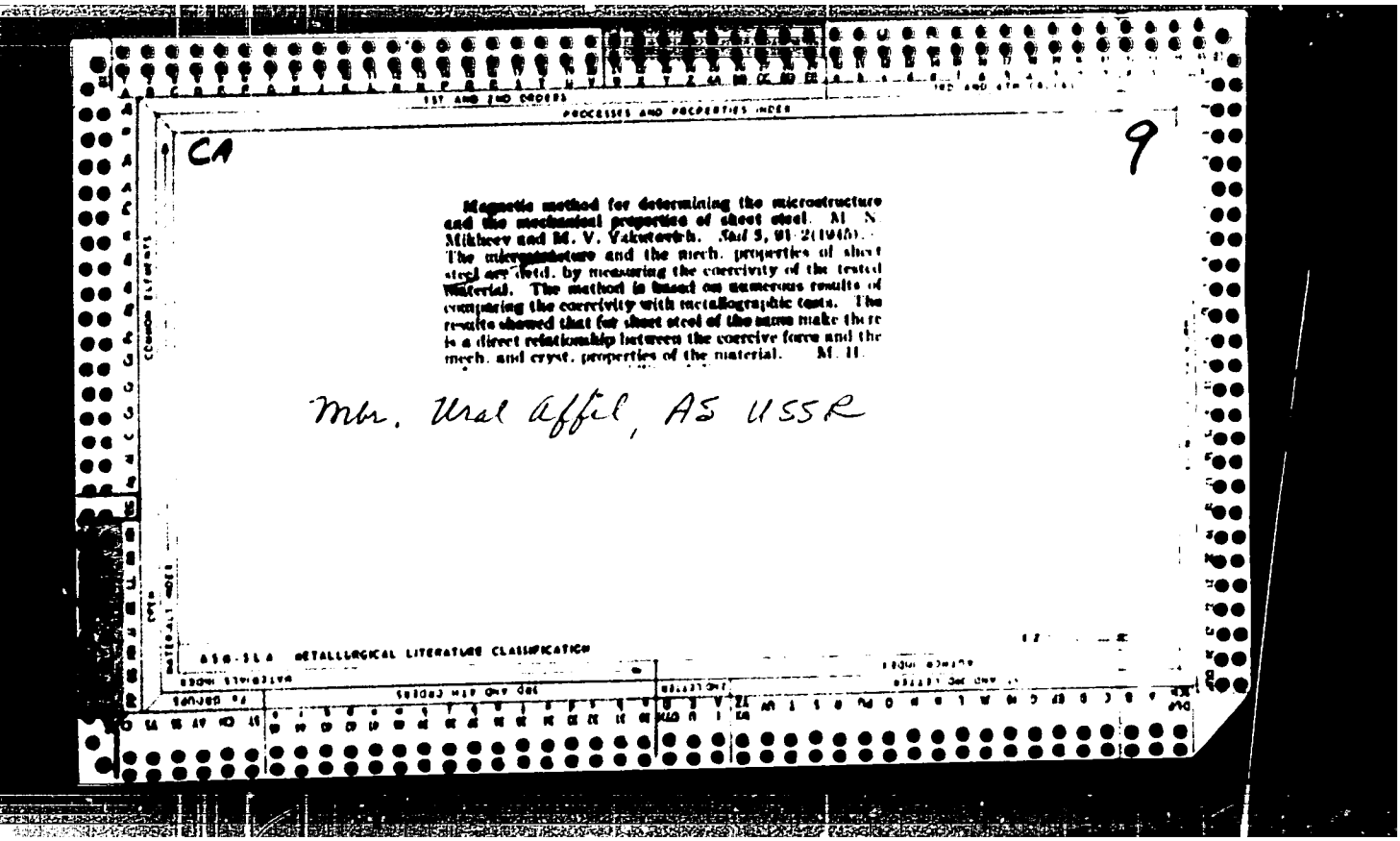
"Magnetic Method of Controlling the Heat Treatment of Steel Products," Novosti Tekh. No. 7, p. 21, 1941.

[redacted], N. A.

Mbr., Ural Affiliate of Acad Sci [redacted]

"Magnetic Method of Control [redacted] Thickness of Tempered Carburized, Nitrided and Decarbonized Layers in Steel Products," Iz. Ak Nauk SSSR, Otd. Tekh. Nauk, No. [redacted], 1943.

[redacted]



PROCESSES AND PROPERTIES INDEX

CA

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Magnetic method for determining the microstructure and the mechanical properties of sheet steel. M. N. Mikheev and M. V. Yakutovich. *Zavod. Lab.* 9, 91-2(1940). The microstructure and the mech. properties of sheet steel are detd. by measuring the coercivity of the tested material. The method is based on numerous results of comparing the coercivity with metallographic tests. The results showed that for sheet steel of the same make there is a direct relationship between the coercive force and the mech. and cryst. properties of the material. M. H.

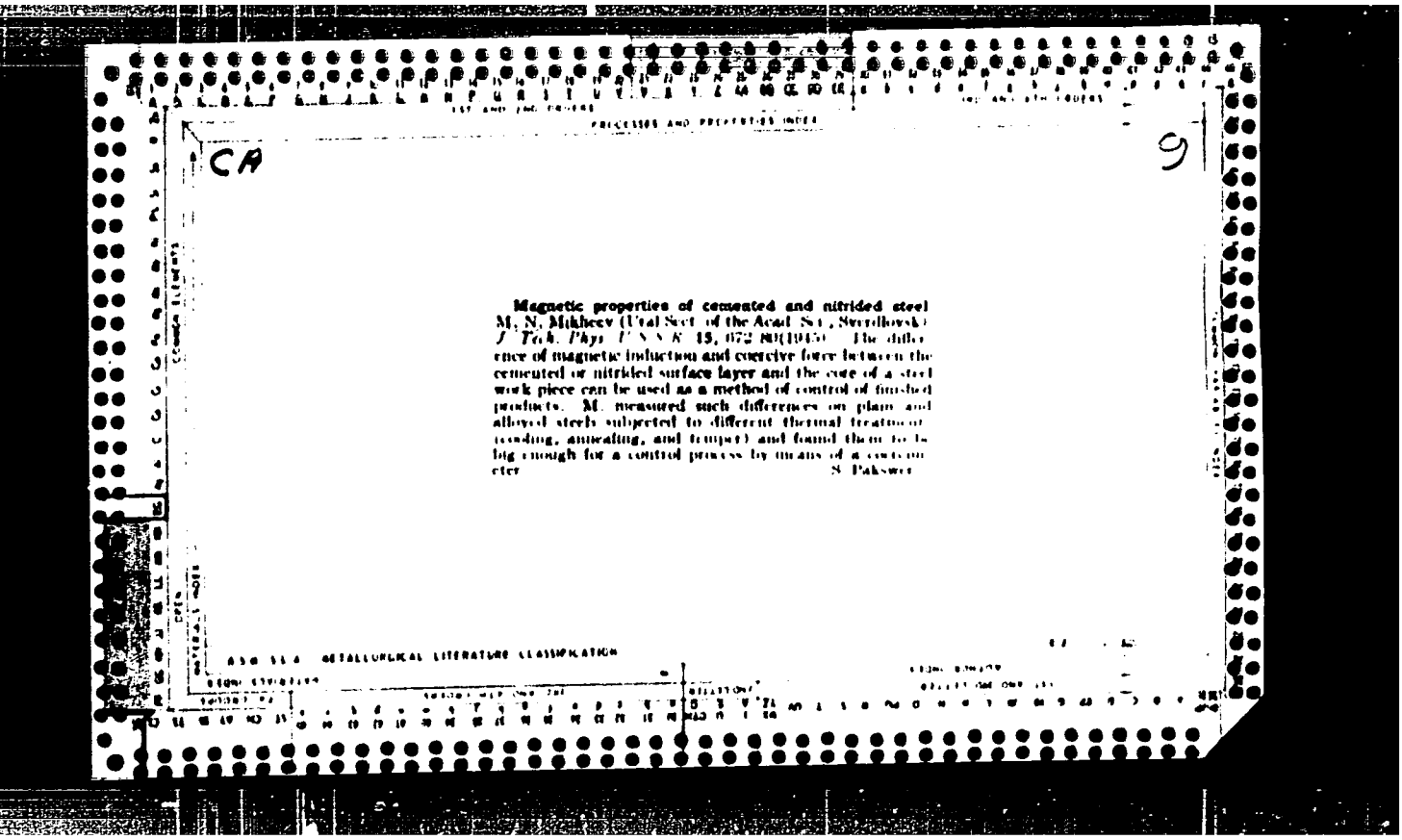
Mkh. Ural affil, AS USSR

METALLURGICAL LITERATURE CLASSIFICATION

MIKHEYEV,M. N.; ZIMNEV, P.N.; MILOSLAVSKIY, K. Ye.

Control with the Help of a Coercion Meter of the Case-hardening Depth and of the Quality of Heat-Treatment ofMotor Parts.

Vestnik Mashinostroysniya No.6-7, 70, 1945



CA

9

Magnetic properties of cemented and nitrided steel
M. N. Mikheev (Ural Sect. of the Acad. Sci., Sverdlovsk)
J. Tech. Phys. (USSR) 15, 672-80(1945). The difference of magnetic induction and coercive force between the cemented or nitrided surface layer and the core of a steel work piece can be used as a method of control of finished products. M. measured such differences on plain and alloyed steels subjected to different thermal treatments (tempering, annealing, and temper) and found them to be big enough for a control process by means of a coercimeter. S. Paksver

ASM 55 A METALLURGICAL LITERATURE CLASSIFICATION

MIKHEYEV, M.N.

PA 28/49T102

USSR/Metals
Steel, Chromium-Nickel Vanadium
Magnetism

Oct 48

"Magnetic Control of Quality of Heat Treatment of Articles Made From Chrome-Nickel Vanadium Steel," M. N. Mikheyev, P. N. Zhukova, A. P. Voroshilova, Inst Phys of Metals, Ural Affiliate, Acad Sci USSR, 7 pp

"Zavod Lab" Vol XIV, No 10 - pp. 1210-16

Studies relation of magnetic and electric properties of 20KhNFA and EKhTV chrome-nickel vanadium steel to temperature of annealing and tempering.

28/49T102

USSR/Metals (Contd)

Oct 48

Establishes possibility of control of the quality of annealing and tempering articles made from EKhTV chrome-nickel vanadium steel by measuring magnetic and electric properties.

28/49T102

MIKHEYEV, M. N.

3616l Magnitnyy Kontrol' Kachestva termicheskoy i termoKhimicheskoy obrabotki stal'nykh izdeliy pri pomoshchi Koertsitimetra s pristavnymi elektromagnitami. Trudy In-ta fiziki metallov, vyp. 12, 1949, S. 157-91--Bibliogr: 25 nazv.

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

MIKHEYEV, M. N.

USSR/Metals
Steel
Annealing

Feb 49

PA 54/49T93

"Automatic Coercive Force Meter for Control of the Thermic and Thermochemical Processing of Steel Products," M. N. Mikheyev, Inst of Phys, Ural Affiliate, Acad Sci USSR, 3 pp

"Zavod Lab" Vol XV, No 2 - pp. 173-5

Coercive force meter was developed by Ural Affiliate Acad Sci USSR, as a means for checking the depth of cementation and the quality of annealing of steel parts. It operates off a 220-volt AC circuit through a step-down transformer and a copper-oxide rectifier. Automatic version of this meter can check up to 900 small steel parts per hour. Includes circuit diagram and photograph of the completed assembly. Annealing Shop, Ural Turbomotor Factory, is using automatic coercive meters to check the quality of parts made from 18XHMA chrome-nickel-molybdenum steel.

54/49T93

MIKHEYEV, M. N., KUZNETSOV, I. A. TOMILOV, G. S., AND FILIPPOV, S. D.

Magnetic Control of the Depth of the Hardened Layer and of the Hardness of Steel Tools Hardened by High-Frequency Currents

A mobile coercivity meter of M. N. Mikheyev's design for magnetic control of the depth of the hardened layer, treated by high frequency currents, is described. Experiments proved that the depth of the hardened layer, its hardness as well as that of the core are in constant ratio with the readings of the coercivity meter. (RZhFiz, No. 8, 1955) Tr. in-ta Fiziki Metallov Uralsk Fil. AN SSSR, No. 14, 1954, 43-47.

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

MIKHEYEV, M. N., ZHUKOVA, P. N., AND TOMILOV, G. S.

Magnetic and Electric Properties of Alloyed Steels After Various Thermal Treatment

Coercive force, maximum magnetic permeability, saturation of magnetization, specific electric resistance, and hardness depending on thermal treatment of various steel alloys were studied for establishing best qualities of ready products. The causes of defects of steels 30 XGS, 41-34, 5 XBC, 40 CX were established. (RZhFiz, No. 8, 1955)
Tr. in-ta Fiziki Metallov Uralsk. Fil AN SSSR, No. 15, 1954, 90-102

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

MIKHEEV, M.N.

Magnetic properties of 1% C - 1.5% Cr steel after different heat-treatments. M. N. Mikheev, L. A. Kurnetsov, V. A. Kryukova, and B. M. Neizvestnaya. *Fiz. Metal. i Metalloved., Akad. Nauk S.S.R.* 3, 229-37(1956).—Diagrams showing magnetic and electric properties and hardness of the steel quenched at 750–1000° and tempered at 120–170° indicate that none of these characteristics is suitable for accurate detn. of the heat-treatment used. When the quenching temp. is raised, satn. and permeability first drop from the optimum values obtained on 830° quench and begin to rise at 900° reaching at 1150° the values of normally quenched samples. This effect is intensified by longer (1–30 min.) heating at the quenching temp. Small amounts of hetrophilic impurities (unidentified) dissolve on longer heating and at higher temp. and then diffuse to austenitic boundaries forming there a zone of increased concn. With slow cooling, this excess has chance to diffuse into the body of crystals, on quenching it precipitates to form a film of a solid soln. permeated by particles of the excess phase around austenitic grains. These particles facilitate the formation of α phase and create addnl. stresses, both helping the decompn. of austenite and reducing its residual percentage.

I. P. Gat

MIKHEYEV, M.N.; KOROZOVA, V.M.; TOMILOV, G.S.; TITOROV, B.D.; BOCHENKOV, V.S.

Magnetic control of the depth of the case-hardened layer of cold rolls. Zav.lab. 22 no.1:52-56 '56. (MLRA 9:5)

1. Ural'skiy filial Akademii nauk SSSR i Ural'skiy zavod tyazhelogo mashinostroyenia imeni S. Ordzhonikidze.
(Steel--Testing) (Magnetic testing)

MIKHEYEV, M.N.; TOMILOV, G.S.; POMUKHIN, M.F.; RZYANKIN, K.G.; UTKINA, V.A.

Magnetic control of the hardening and tempering of ball and roller bearing parts. Zav.lab. 22 no.5:549-555 '56. (MLRA 9:8)

1. Ural'skiy filial Akademii nauk SSSR i Sverdlovskiy gosudarstvennyy podshipnikovyy zavod.
(Steel--Heat Treatment) (Magnetic instruments) (Bearings (Machinery))

SOV/137-58-7-16088D

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 7, p 307 (USSR)

AUTHOR: Mikheyev, M. N.

TITLE: Magnetic Control of the Structure and Mechanical Properties of Steel Products (Magnitnyy kontrol' struktury i mekhanicheskikh svoystv stal'nykh izdeliy)

ABSTRACT: Bibliographic entry on the author's dissertation for the degree of Doctor of Technical Sciences, presented to the In-t metallurgii AN SSSR (Institute of Metallurgy, Academy of Sciences, USSR), Moscow, 1957

ASSOCIATION: In-t metallurgii AN SSSR (Institute of Metallurgy, Academy of Sciences, USSR), Moscow

1. Steel--Structural analysis 2. Steel--Magnetic factors

Card 1/1

MIKHEYEV, M. N.

AUTHOR: Mikheyev, M. N.

TITLE: On the selection of optimum geometrical dimensions of attachable electromagnets of coercivity meters designed for controlling the quality of heat and chemical-heat treatment of steel and iron components. (O vybore optimal'nykh geometricheskikh razmerov pristavnykh elektromagnitov koertsitimetra, prednaznachennogo dlya kontrolya kachestva termicheskoy i khimiko-termicheskoy obrabotki stal'nykh i chugunnykh izdeliy).

116-1-7/40

PERIODICAL: Fizika Metallov i Metallovedeniye, 1957, Vol.5, No.1, pp. 44-52 (USSR)

ABSTRACT: At present there are two basic methods of regulating the depth of magnetisation in components when measuring the average magnetic properties at a given depth from the surface and, consequently, two methods of designing magnetic control apparatus for determining the thickness of such surface layers in steel and iron components. A.C. operated magnetising systems of a suitable frequency can be used or d.c. operated magnetising systems with appropriately chosen geometrical sections (cross section of the poles, distance between the poles, etc.). The thickness values of the surface layers of steel and iron

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On the selection of optimum geometrical dimensions of attachable electromagnets of coercivity meters designed for controlling the quality of heat and chemical-heat treatment of steel and iron components.

components, which are of interest from the point of view of quality control after various types of chemical and heat treatment, are enumerated in a table on p.45. The author deals with magnetisation by means of d.c. fields, since in this case the depth of magnetisation of the checked specimens can be regulated to any desired value within the range enumerated in the table (up to 20 mm). Earlier experimental study (Ref.18) of the topography of magnetic induction in massive steel components magnetised by means of attachable electromagnets indicates that the depth of the surface layer which is magnetised to high induction values, depends on the geometrical dimensions of the magnet. The results of the distribution of magnetic induction with the depth from the surface of the component measured by a ballistic method is graphed in Fig.3 for various pole cross sections. Applying these or analogous experimental data for electromagnets with known geometrical dimensions, it is possible to determine by

 means of the analogy theory the dimensions of the electro-

On the selection of optimum geometrical dimensions of attachable electromagnets of coercivity meters designed for controlling the quality of heat and chemical-heat treatment of steel and iron components. 126-1-7/40

magnets which are necessary to ensure sufficiently high induction values to a given depth from the surface. By means of instruments of the given type, the average coercive force is measured for the same depth from the surface as the depth of high induction magnetisation. On the basis of this, conclusions can be made on the structure and the mechanical properties of the surface layer of the tested components, since there is a great difference between the magnetic properties of the surface layer and the core of the component. Information which is adequate for practical purposes of selecting the optimum geometrical dimensions of the attachable poles of coercivity meters (intended for magnetic quality control of heat treatment and for determining the thickness of carburised, nitrided, decarburised and hardened layers of steel components) can be obtained by means of the simplified investigation of the distribution of the magnetic flux in the components to be tested, presented in this paper. The depth of magnetisation to

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On the selection of optimum geometrical dimensions of attachable electromagnets of coercivity meters designed for controlling the quality of heat and chemical-heat treatment of steel and iron components.

values approaching saturation cannot be larger than the thickness of the pole d of the electromagnet even if the induction B in the pole reaches the saturation value and even if the lateral leakage of the magnetic flux is almost completely absent. On the basis of the calculations contained in the paper, the author formulates the following recommendations: the thickness d of the poles should be made equal to the thickness of the surface layer in which it is desired to determine the average coercive force; the width c of the poles when testing relatively thin layers (from 1 to 2 mm onwards) should, in the extreme case, be three times as large as the thickness d of the poles of the electromagnet; for quality control of thin layers (below 0.5 mm) the width c of the poles should not exceed their thickness d; the distance between the poles and the height b should in all cases be as small as possible, just large enough to accommodate the magnetising coils and the indicator equipment in the form of a moving

coil or any other indicating equipment. For magnetic control right through the heat treated components, the geometrical dimensions of the electromagnet poles should be selected on the basis of the same principles, namely, of characterising the components to be checked according to their magnetic properties at a certain depth from the surface if such defects as soft core, inadequate tempering, etc. are to be revealed and the influence of surface decarburisation on the readings of the coercivity meter are to be eliminated. In Fig.8, p.51, the photographs are reproduced of two electromagnets, one of which is intended for measuring the average coercive force at a depth of 8 to 10 mm, the other for a depth of 3 to 4 mm from the surface. These are intended respectively for checking the through heat treatment and the carburisation depth. In Fig.9 the dependence is graphed of the average coercive force (expressed in units of the demagnetisation current) on the thickness of the surface hardened layer.

Card 5/6

On the selection of optimum geometrical dimensions of attachable electromagnets of coercivity meters designed for controlling the quality of heat and chemical-heat treatment of steel and iron components. 126-1-7/40

There are 9 figures, 1 table and 22 references, 21 of which are Slavic.

SUBMITTED: January 8, 1957.

ASSOCIATION: Institute of Physics of Metals, Ural Branch of the Ac.Sc. USSR. (Institut Fiziki Metallov Ural'skogo Filiala AN SSSR).

AVAILABLE: Library of Congress.

Card 6/6

MIKHEYEV, M.N.; NEIZVESTNOV, B.M.; TURCHINSKIY, I.I.; KOSTENKOV, G.P.; IZOTOVA, T.K.

Magnetic control of the depth of the case-hardened layer and the hardness of mouldboards. Zav.lab. 23 no.2:208-211 '57. (MIRA 10:3)

1. Ural'skiy filial Akademii nauk SSSR i Vysokogorskiy mekhanicheskiy zavod.

(Magnetic measurements) (Cementation(Metallurgy)) (Plows)

Mikheyev M.N

AUTHORS: Vonsovskiy, S.V., Corresponding Member of the Academy of Sciences USSR, Mikheyev, M.N., Candidate of Technical Sciences 32-10-21/32

TITLE: Analysis of Magnetic Structure (Magnitnyy strukturnyy analiz)

PERIODICAL: Zavodskaya Laboratoriya, 1957, Vol 23, Nr 10, pp 1221-1226 (USSR)

ABSTRACT: The chapter of the paper: Development of the methods of analysis of magnetic structure begins by mentioning a series of Soviet, as well as American, German, and French scientists who contributed to the development of the method referred to in the title. Among them are: Arkad'yev, Frenkel, Dorfman, Akulov, Kondorskiy, Landau Lifshits and Yanus (USSR), further Bozort and Bitter (USA), Gerlach (Germany) and Neel (France). The elaborate studies of Soviet scientists in the field of magnetic control of the materials are declared to be of greatest importance, and that in the sense of their practical application in industrial enterprises. The most important studies in this field are mentioned here, most of them with the application of a powder in the control methods and finally a special method which is called here "magnetic metallography" with which the investigation of the structure of the phases is judged according to the picture of the deposit of the magnetic powder on the ground sections of the metals (according to Feremin, N. I.). In the following chapter: Ratio bet-

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Analysis of Magnetic Structure

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ween magnetic properties and structural state of substance the characteristic property of interaction of the electrons and positive ions of the crystalline lattice of the substance is taken as a basis for the investigation of this ratio. With this, it is also explained that the changes in the chemical and phase-structure of the substance and various states of their structure in their magnetic characteristic become effective and that they determine the belonging of the substance to one of the magnetic groups. (Diamagnetica, para-, or ferromagnetica). Taking account of the variations of saturation, or of the Curie point, with respect to the changes in chemical composition, the degree of order of the atoms in the alloy and disturbances in ... bonds, it therefore results a possibility of elaborating a measuring method for these variations in atomic structure of the substance. The same can be stated with respect to the structural dependence of magnetic parameters which are in proportion to the technical magnetization curve (original and maximum ..., coercive force, final magnetization, etc.). ... measuring instruments ... on these principles. There are ... references, ... of which are Soviet.

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1. Magnetic properties-Analysis

Mikheyev, M. N.

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Akademiya nauk SSSR. Ural'skiy filial. Institut fiziki metallov

Trudy, vyp. 20 (Transactions of the Institute of the Physics of Metals, Ural Branch, Academy of Sciences USSR, No. 20) Sverdlovsk, 1958. 402 p. Errata slip inserted. 1,000 copies printed.

Resp. Eds.: S.V. Vonsovskiy, Corresponding Member, Academy of Sciences USSR, and V I. Arkharov, Doctor of Technical Sciences.

PURPOSE: This book is intended for scientists working in the field of physical metallurgy.

COVERAGE: This is a collection of 28 articles written by members of the Institute of the Physics of Metals, Ural Branch of the Academy of Sciences USSR, on problems investigated at the Institute. Studies at the Institute have concentrated on two basic problems: 1) developing a theory of metals and alloys and finding ways to improve the

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properties of engineering materials; and 2) developing new physical methods for investigating and controlling the quality of materials and metal articles. In connection with these basic problems the articles in the collection treat the following subjects: problems of the multielectron quantum-mechanical theory of solids; the laws of distribution and diffusion of admixtures in various metallic alloys (internal adsorption theory); strength and plasticity of polycrystalline materials in relation to interatomic binding forces, distortions in the crystal lattice; structural theory of diffusion reaction, i.e. diffusion due to chemical reactions in solid phases; theory of the magnetic structure of ferromagnetic substances; theory of the heat treatment of steel; and the physical theory of magnetic measurements (magnetic flaw detection and structural analysis). The first article gives a description of the work being done by the Institute and a list of departments and laboratories along with their chief personnel. Several persons are cited for their work at the Institute. References accompany each article.

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SOV/126-6-4-9/34

AUTHOR: Arkharov, V.I., Belenkova, M.M., Mikheyev, M.N., Moiseyev, A.I. and Polikarpova, I.P.

TITLE: The Effect of Small Additions of Antimony and Beryllium on Ageing of the Copper-Silver Alloys (Part IV. On the Problem of Causes of the Effects of Small Alloying Additions on the Kinetics of Ageing of Alloys) (O vliyanii malykh primesey sur'my i berilliya na stareniye splavov med' - serebro (k voprosu o prichinakh vliyaniya malykh primesey na kinetiku stareniya splavov. IV))

PERIODICAL: Fizika metallov i metallovedeniye, 1958, Vol 6, Nr 4, pp 633-642 (USSR)

ABSTRACT: In his previous work (Ref.1-3) the result of which indicated that small additions of horophilic elements (elements showing preference for the grain boundaries) present in a supersaturated solid solution could affect the kinetics of its decompositon by the mechanism of adsorption enrichment of the structurally distorted zones linking the nuclei of decomposition with the solid solution matrix, Arkharov studied the effects of single

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additions. The object of the present investigation was to study the simultaneous effect of two horophilic additions. The experimental alloys whose detailed chemical analysis is given in a table on p 633, contained 6% Ag with 0.2 - 0.5% Sb and 0.02 - 0.3% Be added either separately or jointly. The alloys were melted in a H.F. induction furnace, in a graphite crucible with borax used as the covering flux. The cast ingots were heated under charcoal to 800°C, held at the temperature for 2 hrs and cooled in the furnace. They were then rolled to strip 5 mm thick which, after a homogenising treatment consisting of 50 hours at 800°C was used for the preparation of the experimental test pieces. The process of ageing was studied by measuring the variation of hardness, magnetic susceptibility and electrical resistance. The measurements of Rockwell hardness were taken at

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15-30 minute intervals on specimens solution treated at 780 - 790°C and aged at 370°C. Magnetic susceptibility was measured with the aid of a magnetic balance at room temperature and at 370, 400 and 420°C. The measurements were taken at 10-15 minute intervals and in every case the value of relative magnetic susceptibility was determined, i.e. the force acting on the investigated specimen was compared with the force acting on a standard nickel sulphate specimen placed in an identical magnetic field. Electrical resistance was measured by the comparison of potential drop method, using a potentiometer and a sensitive galvanometer. In this case, both the solution treatment and ageing (at 370°C) were carried out in vacuum and the measurements were taken at 15 minute intervals. From the experimental data the average rate of ageing (v_{cm} = the ratio of the maximum increment of the studied

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property to the length of time required to effect this variation) was calculated for various investigated alloys and the results were reproduced graphically. Fig1 shows how vcm (assessed on the basis of hardness measurements) of alloys with a constant Sb content aged at 370°C varied with increasing Be content. The variation of v_{cm} (calculated from the data on magnetic susceptibility) of alloys containing 0.2% Sb and aged at 370, 400 and 420° with increasing Be content is shown in Fig.2, while Fig.3 shows the effect of Be on v_{cm} (determined on the basis of electrical resistance measurements) of the 0.2% Sb alloy aged at 370°C. The effect of the Sb and Be additions on the course of the ageing process in its various stages was determined on the basis of the measurements of magnetic susceptibility, since this property could be measured

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with higher accuracy and without the necessity of interrupting the heat treatment. To this end, graphs showing the time-dependence of $\Delta\chi$ were constructed, $\Delta\chi$ being the difference between the values of the relative magnetic susceptibility of two alloys aged for a given period at 370°C: one with and the other without the addition(s), the effect of which was being examined. In this way the effect of Sb and Be (added separately) on the ageing process of the Cu-Ag alloy is shown on Fig.4. It can be seen that while antimony accelerates ageing at every stage of this process (this effect being most pronounced at t = 30 min) the effect of beryllium is quite different: In the first stages of the ageing treatment this addition accelerates ageing, but beginning from a certain moment, it slows the process down. (The higher the Be content the earlier is the moment at which its delaying effect comes into operation

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and the greater is the magnitude of the effect.)
The effect of 0.2% Sb on ageing of Cu-Ag alloys containing 0.02 and 0.1% Be (Fig.5) is similar to its effect on the binary Cu-Ag alloy. The same applies to the effect of simultaneous additions of Sb and Be, except that in this case the maximum value of Δx decreases with increasing Be content (Fig.6). The effect of Be on kinetics of ageing of the Cu-Ag alloy containing 0.2% Sb is much more complex. At small concentrations (0.02%) beryllium accelerates ageing of the Cu-Ag-Sb alloy (graph 1) in all stages of the process, Δx reaching its maximum after 1 hr. 0.1% Be slows the process down in its initial stage and accelerates it slightly in the final stage. When present in larger quantities (0.2 - 0.3%) it slows down the ageing process of the Cu-Ag-Sb alloy at every

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stage, its effect being most pronounced at t = 30 min. The following interpretation of the obtained results is offered by the present authors: The average rate, v_{cm}, of the isothermal decomposition of a super-saturated solid solution of silver in copper is markedly affected by small simultaneously present additions of Sb and Be, even when these elements are present in concentrations considerably lower than their respective solid solubility limits. When added separately, antimony accelerates and beryllium slows down the process of decomposition. However, these effects are not additive when Sb and Be are present simultaneously: At a given Sb concentration v_{cm} increases at first with the increasing Be content, reaches a maximum and then slowly decreases (Fig.1-3). The higher the content of antimony the higher are the values of v_{cm} for any given beryllium concentrations

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including those corresponding to the maximum values of v_{cm}. These effects can be explained on the basis of a hypothesis of internal adsorption of the Sb and Be atoms in structurally distorted zones linking the nuclei of decomposition with the solid solution matrix, it being postulated that the alloying elements can be adsorbed not only as separate atoms but also in the form of complexes containing atoms of both additions. As a result of the adsorption of complexes the free energy of the distorted zones is decreased in regions where - owing to the specific character of the distortion - it would not be decreased by adsorption of single atoms. The extent to which adsorption of complexes affects the kinetics of decomposition of the solid solution varies with time since, as a result of adsorption, the total concentration of both alloying elements in the adsorption zone is altered to a degree depending on the

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overall concentration of the additions present simultaneously in the alloy: At a given Sb concentration, beryllium - when present in small quantities - is absorbed mainly in the form of complexes with the result that the concentration of Sb in the adsorption zone is increased and its accelerating effect on the decomposition of the solid solution is multiplied. On the other hand, when the Be content is high, it is adsorbed in the form of single atoms which increases its concentration in the adsorption zones with the result that the rate of decomposition is slowed down. The effects of Be and Sb on the course of the ageing process are also non-additive. In the initial stages of the process when formation of nuclei of decomposition is the predominant factor affecting the kinetics of decomposition, the effects of the alloying additions on nucleation due to local lattice distortions in the

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vicinity of the solute atoms are non-additive because - owing to the fact that Be atoms are smaller and Sb atoms larger than the solvent atoms - the lattice distortions caused by the atoms of either element present separately are more severe than those caused by the complexes formed when the two alloying additions are present simultaneously. In the later stages of the ageing process when growth of the decomposition centres affected by the adsorption of the alloying elements in the surrounding zones is the predominating factor, the non-additive character of the effects of Sb and Be is evidently due to the fact that at first beryllium is preferentially adsorbed, while adsorption of antimony takes place mainly in the later stages. This time-lag in the adsorption activities of the two elements is probably associated with the fact that with the growth of the decomposition nuclei the character and magnitude

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of the lattice distortions in the zones connecting the nuclei with the solid solution matrix are correspondingly altered. There are 9 graphs, 1 table and 21 references of which 20 are Soviet and 1 English.

ASSOCIATION: Institut Fiziki Metallov Ural'skogo Filiala AN SSSR (Institute of Metal Physics, Ural Branch of the AS USSR)

SUBMITTED: 18th December 1956.

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ARKHAROV, V.I.; BELENKOVA, M.M.; MIKHEYEV, M.N.; MOISEYEV, A.I.; POLIKARPOVA, I.P.

Changes in the effectiveness of various additions at the various stages of the aging of alloys. Issl.po zharopr.splav. 4: 176-180 '59. (MIRA 13:5)
(Solutions, Solid--Analysis)

SOV/126-7-4-5/26

AUTHORS: Kuznetsov, I.A. and Mikheyev, M.A.

TITLE: Magnetic, Electrical and Mechanical Properties of Steels with High Chromium Content After Various Heat Treatments

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 7, Nr 4, pp 513-526 (USSR)

ABSTRACT: The first object of the investigation described in the present paper was to study the effect of various heat treatment procedures on hardness, H_{Rc} (Rockwell, C scale), coercive force, H_c(oersteds), maximum magnetic permeability, μ_{max} (gauss/oersteds), intensity of magnetisation, I_S (gauss), electrical resistivity, ρ (ohm cm), impact strength, a_k (kgm/cm^2) and the proportion of retained austenite, A(%), of two chromium steels Kh12M and Kh12F1 whose chemical analysis is given in Table 1. The second object was to establish which is the most reliable method of determining the proportion of retained austenite in heat treated specimens, this characteristic being of particular importance since it determines the dimensional stability of articles made of steels of this type. The experimental specimens,

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measuring 10 x 10 x 66 mm, were protected from decarburization at high heat treatment temperatures by a 15 - 20 microns thick layer of electro-deposited chromium which was removed after the heat treatment by grinding each face of the specimen to a depth of 1 mm. Quenching was done at room temperature either in oil or in a stream of air. The intensity of magnetization was measured in an electromagnet in a field of approximately 4500 gauss. For the sake of greater accuracy, the differential ballistic method of measurement was used, i.e. in each test two specimens (a standard specimen of known I_s, and the investigated specimen) were used. Fig 1 shows the circuit diagram of the apparatus used with the standard and investigated specimens denoted by) and x, respectively. The deflection, a, of the galvanometer is proportional to the difference between the magnetic fluxes in) and x. If the cross-section areas, $S_)$ and S_x, of the two specimens are nearly the same and if the difference between the magnetic fields $H_)$ and H_x is not large,