YEFREMUSHKIN, G.G.

Effect of air ions on some aspects of the nervous activity in hypertension patients. Izv. AN Kazakh. SSR. Ser. med. nauk no.1:32-36 '63.

Changes in the vascular reactivity in hypertension patients under the influence of a single treatment with positively charged ions. 37-46 (MIRA 16:10)

MOSHKEVICH, V.S.; YEFREMUSHKIN, G.G.

On the interrelation of changes in the plethysmogram and the electroencephalogram in hypertension. Zh. vyssh. nerv. deiat. Pavlov 13 no.3:437-444 '63. (MIRA 17:9)

1. Institut krayevoy patologii AMN SSSR, Alma-Ata.
(HYPERTENSION) (ELECTROENCEPHALOGRAPHY)
(PLETHYSMOGRAPHY) (VENTRICULOGRAPHY)

YEFREMYCHEV,V.I.; PIL'MAN,N.E.

Conference in the Chief Administration of the Hydrometeorological Service on the quality of hydrometeorological instruments. Meteor.i gidrol. no.2:52-54 F '52. (MLRA 8:9)
(Meteorological instruments)

Yefremychev, V.I.

YEFREMYCHEV, V.I.

Naval bathythermograph. Trudy NIIGMP no.4:80-87 '57. (MIRA 11:2)
(Meteorology, Maritime--Measurements)

YEFREMYCHEV, V.I.; SKVORTSOV, S.B.

Resistance of a cable towed behind the ship. Trudy NIIGMP no.8:30-54 '59. (MIRA 13:4)
(Cables) (Hydrodynamics)

YEFREMYCHEV, V.I.

Oceanographic instruments of a new design developed for the hydrometeorological service. Biul. Okean. kom. no.4:28-33 '60.
(MIRA 13:7)
(Oceanographic instruments) (Meteorogical instruments)

DASHKEVICH, L.L.; SURAZHSKIY, D.Ya.; USOL'TSEV, V.A.; AZBEL', M.Ye.; BOZHEVIKOV, S.N.; VORZHENEVSKIY, N.S.; MANUYLOV, K.N.; GLAZOVA, Ye.F.; KARPUSHA, V.Ye.; PROTOPOPOV, N.G.; SHADRINA, Ye.N.; IGRUNOV, V.D.; MECHAYEV, I.N.; BESPALOV, D.P.; ILLARIONOV, V.I.; GLEBOV, F.A.; GLAZOVA, Ye.F.; KAULIN, N.Ya.; GORYSHIN, V.I.; GAVRILOV, V.A.; TIMOFEYEV, M.P., retsenzent; YEFREMYCHEV, V.I., retsenzent; KRASOVSKIY, V.B., retsenzent; V'YUNNIK, A.P., retsenzent; STERNZAT, M.S., otv. red.; RUSIN, N.P., otv. red.; YASNOGORODSKAYA, M.M., red.; VOLKOV, N.V., tekhn. red.

[Instructions to hydrometeorological stations and posts] Nastavlenie gidrometeorologicheskim stantsiiam i postam. Leningrad, Gidrometeoroizdat. No.3. Pt.3. [Meteorological instruments and observation methods used on a hydrometeorological network] Meteorologicheskie pribory i metody nablıudenii, primeniaemye na gidrometeorologicheskoi seti. 1962. 295 p. (MIRA 15:5)

(Continued on next card)

DASHKEVICH, L.L.--- (continued) Card 2.

1. Russia (1923- U.S.S.R.) Glavnoye upravleniye gidrometeorologicheskoy sluzhby. 2. Glavnaya geofizicheskaya observatoriya Nauchno-issledovatel'skogo instituta gidrometeorologicheskikh priborov i Gosudarstvennogo gidrologicheskogo instituta (for Dashkevich, Surazhskiy, Usol'tsev, Azbel', Bozhevikov, Vorzhenevskiy, Manuylov, Glazova, Karpusha, Protopopov, Shadrina, Igrunov, Nechayev, Bespalov, Illarionov, Glebov, Glazova, Kaulin, Gorysnin, Gavrilov). 3. Komissiya Glavnogo upravleniya gidrometeorologicheskoy sluzhby pri Sovete Ministrov SSSR (for Nechayev, Usol'tsev, Timofeyev, Yefremychev, Krasovskiy, V'yunnik)
(Meteorology)

SYYKO, A.A.; YEFREMYCHEV, V.I.

Ernst Teodorovich Krenkel'; on his 60th birthday and his 40th anniversary as an industrial researcher. Meteor. i gidrol. no. 2:62-63 F '64. (MIRA 17:5)

SKVORTSOV, S.B.; FILIPPOV, S.M.; YEFREMOVSKIY, V.I.

A miniature semiconductor converter for hydrometeorological telemetering systems. Trudy NIIGMP no.12:67-73 '64. (MIRA 18:4)

L 8134-66

ACC NR: AP5025057 SOURCE CODE: UR/0286/65/000/016/0098/0099

AUTHORS: Protopopov, N. G.; Sternzat, M. S.; Yefremychev, V. I.; Protopopova, B. I.

ORG: none

11
B

TITLE: Remote anemorhumbograph. Class 42, No. 173993

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 16, 1965, 98-99

TOPIC TAGS: wind direction instrument, wind velocity, wind meter

ABSTRACT: This Author Certificate presents a remote anemorhumbograph containing a wind sensor in the form of a four-bladed propeller fastened to the front part of a drop-shaped hull with an empennage as a wind vane, a tachometer-generator, and two selsyn-detectors (see Fig. 1). To record the average and instantaneous wind velocity on a common scale of the recorder tape, the wind sensor shaft is coupled to the tachometer-generator using bevel gears and to the selsyn-detector through a reductor. The number of revolutions of the wind sensor during a given time interval is transformed into the angular displacement of the selsyn rotor. To record the instantaneous wind velocity as the total velocity profile or as the excess over the average wind velocity, the average wind velocity recorder carriage is provided with a switching pin which lifts the pen with its passage through the average velocity line or limits

Card 1/3

UDC: 621-519:551.508.5

L 8134-66

ACC NR: AP5025057

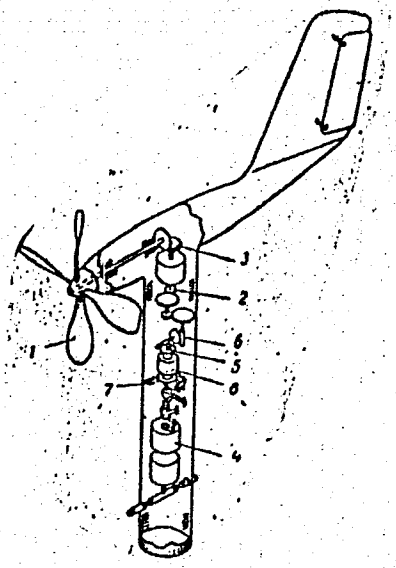


Fig. 1. 1- wind-sensor; 2- tachometer-generator; 3- bevel gears; 4- selsyn-detector; 5- reductor axle; 6- recorder; 7- catch; 8- differential

the pen motion up to this line. To protect the mechanism producing the average wind velocity from breakage with velocity values exceeding the upper measurement limit, the mechanism is provided with a limiting device which disconnects the selsyn-detector from the summing mechanism with a lever. The lever deflects a catch from

Card 2/3

L 8134-66
ACC NR: AP5025057 0

the differential ratchet wheel when the average wind velocity reaches the upper measurement limit. Orig. art. has: 1 diagram.

SUB CODE: ES/ SUBM DATE: 15Jan62

Card 3/3 gw

BARAMBOYM, N.K., doktor khimicheskikh nauk, prof.; YEFREMYCHEVA, Ye.A., inzh.

Comparative study of adhesive compositions with a base of synthetic latexes. Izv.vys.ucheb.zav.; tekh.leg.prom. 3:34-37 '62. (MIRA 15:6)

1. Moskovskiy tekhnologicheskiy institut legkoy promyshlennosti. Rekomendovana kafedroy fizicheskoy i kolloidnoy khimii.
(Adhesives—Testing)

TREGUBENKO, M.G., inzh.; YEFRETOV, L.N., inzh.

Changes in the design of the VAB-20-1500M switch. Elektrotekhnika 35 no.7:49-50 '64. (MIRA 17:11)

GRUSEVICH, S.I.; SHAPIRO, S.B.; YEFRETOVA, Ye.I.; BESKIND, A.A.; FARAFONOV, L.S.; TERENT'YEV, V.N.; VASIL'YEVA, L.S.; FARAFONOV, L.S., otv. red.; ULANOVSKAYA, N.M., red.; ROMANOVA, S.F., tekhn. red.

[New equipment and operating techniques of automatic telephone exchanges] Novaia tekhnika i metody ekspluatatsii ATS; informatsionnyi sbornik. Moskva, Sviaz'izdat, 1963. 151 p. (MIRA 16:12)

(Telephone)

ANDREYEV, Semen Ivanovich, kand. geol.-miner. nauk; YEFREYKIN, A.K., prof., doktor biol. nauk, red.; FIL'CHENKO, R.D., red.; DEOMIDOV, N.D., tekhn. red.

[Soil erosion control; manual for agricultural workers in the Chuvash A.S.S.R.]Bor'ba s eroziei pochv; rukovodstvo dlia rabotnikov sel'skogo khoziaistva Chuvashskoi ASSR. Cheboksary, Chuvashskoe knizhnoe izd-vo, 1962. 91 p. (MIRA 15:12)
(Chuvashia--Soil conservation)

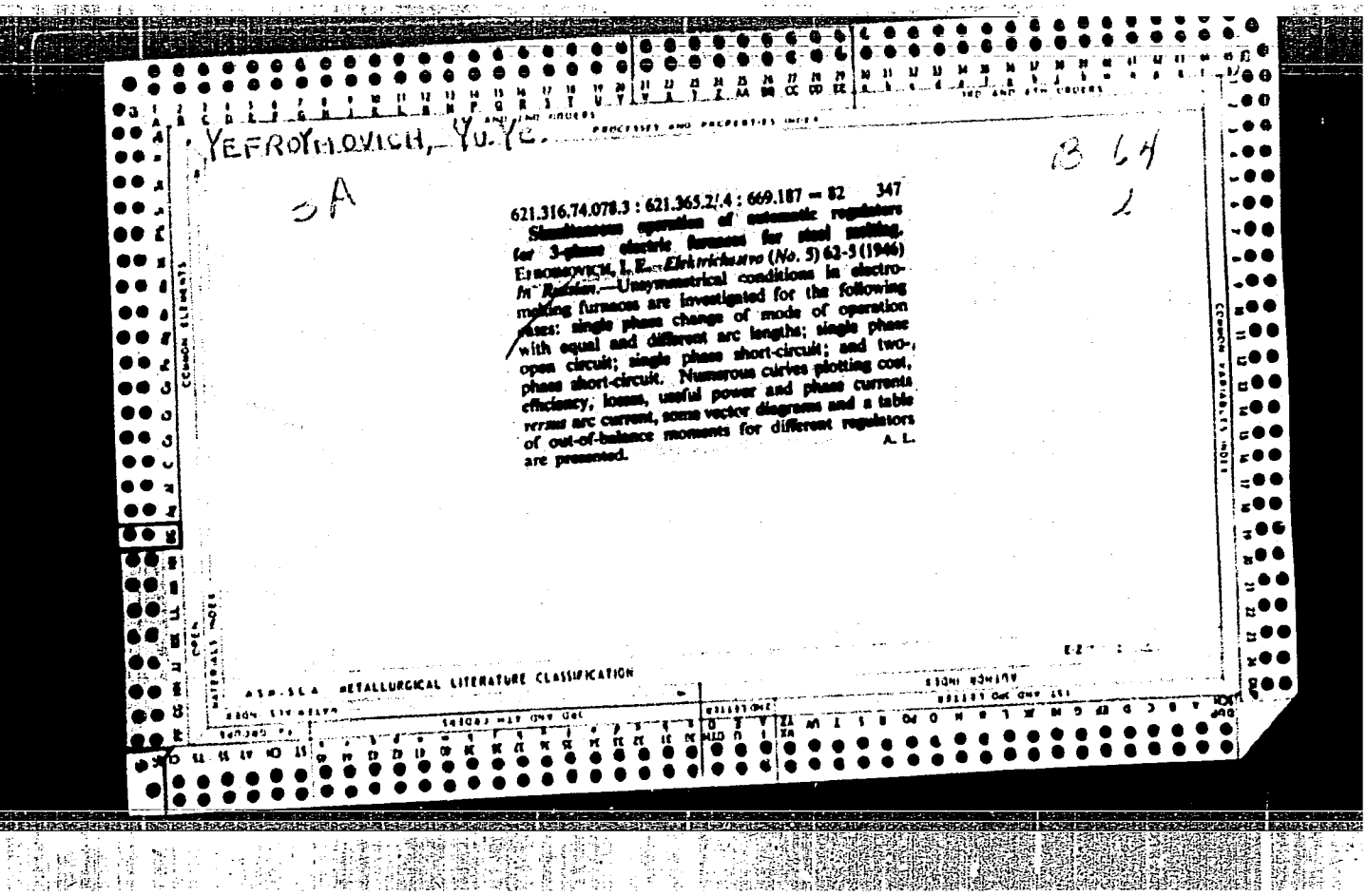
VAL'SHCHIKOV, N.M.; YEFRON, A.I.

Helicoidal surface of the cutting knives and disk sectors of chippers. Bumagodel. mash. no.12:30-36 '64. (MIRA 17:11)

LEBEDEV, P.A.; YEFRON, A.I.

Plane oscillations of a connecting rod with variable cross section and curvilinear axis of symmetry. Bul Inst Politeh 26 no.5:23-37 S-O '64

1. Leningrad Textile Institute.



YEFROYMOVICH, YU. YE.

3A

B 64

2

621.316.74.078.3 : 621.365.2/.4 : 669.187 — 82 347

Simultaneous operation of automatic regulators for 3-phase electric furnaces for steel melting. Efroimovich, I. E. *Elektrichestvo* (*No.* 5) 62-5 (1946) *In Russian.*—Unsymmetrical conditions in electro-melting furnaces are investigated for the following cases: single phase change of mode of operation with equal and different arc lengths; single phase open circuit; single phase short-circuit; and two-phase short-circuit. Numerous curves plotting cost, efficiency, losses, useful power and phase currents versus arc current, some vector diagrams and a table of out-of-balance moments for different regulators are presented. A. L.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PA 23T60

YEFROYMOVICH, YU. YE.

Apr 1947

USSR/Engineering
Regulators
Remote Control Systems

"Control Mechanisms IM-2/3 and IM-25/120 for Systems of Automatic Regulation and Remote Control," Yu. Ye. Yefroymovich, Central Laboratory of Automatic MChM, 2 pp

"Promyshlennaya Energetika" Vol IV, No 4

Both of these regulating machines are three-phase asynchronous flanged machines with short-circuit rotors type FAD-150/4. Voltage 380/220 volts, 100 watts, and a normal rate of operation of 1370 rpm.

23T60

YEFROYMOVICH, Yu.Ye., kandidat tekhnicheskikh nauk.

Modernization of automatic regulators in electric teel-smelting furnaces. Stal' 7 no.1:63-65 '47 (MLRA 9:1)

1.TSentral'naya laboratoriya avtomatiki Energochermeta.
(Steel--Electrometallurgy) (Electric furnaces)

YEFROIMOVICH, Yu. E.
EFREYMOVICH, ,YU E.

USSR/Metals Aug 1947
Smelting
Steel - Metallurgy

"Effect of the Fluctuations of Circuit Current on the Work of Automatic Electric Steel Smelting Furnaces," Yu. E. Efreymovich, 3 pp

"Elektrichestvo" No 8

States mathematical formula for the determination of work fluctuations resulting from fluctuations in the flow of current. The furnaces which have no automatic equipment fluctuate directly with the fluctuations of current. The use of automatic regulating equipment can account for circuit fluctuations of plus or minus 2.0%

22T83

USSR/Metals (Contd) Aug 1947
Smelting
Steel - Metallurgy

The author states that the dynamic constant of the system which he describes increases simultaneously with the load current and the reactive and active resistance of the feeder circuit.

22T83

USSR/Electricity May 1948
Furnaces, Electric Arc
Regulators, Current

"Automatic Control of a System of Arc Ore Heating Furnaces," Yu. Ye. Yefroymovich, Cand Tech Sci, Lab of Automatics, MChM, 3 pp

"Prom Energet" No 5

After general discussion of subject author describes installation devised by his laboratory. Gives a complete circuit diagram.

[redacted] 75T28

YEFROYMOVICH, YU. I.

PA 30/49T68

Sep 48

USSR/Engineering
Regulators, Automatic
Furnaces, Electric Arc

"Automatic Regulators for Arc Steel Melting Furnaces, Equipped With 'Regulex' Electromechanical Boosters," Yu. I. Yefroymovich, Cand Tech Sci, V. I. Feygin, Engr, Cen Lab of Automatics, Min of Ferrous Metals, 3 pp

"Prom Energet" No 9

Present trend in designing regulators for subject furnaces is to replace relay-contact circuits by electromachine automatic circuits. Research is being carried out in VEI (All-Union Electrotech Inst) and

30/49T68

[redacted]

Sep 48

USSR/Engineering (Contd)

TsLA (Cen Lab of Automatics). Existing regula-
tors are of rototrol or regulex type. Former
described in previous article (see 32T15). Here,
gives detailed account of construction and per-
formance of regulex type, with one circuit dia-
gram, and three graphs.

30/49T68

[redacted]

YEFROYMOVICH, Yu. Ye.

"Automatic Regulation of Arc Furnaces," Collection of Data of the Scientific and Technical Session on Electric Power Economy (Sbornik materialov nauchno-tekhnicheskoy sessii po ekonomii elektroenergii), No II, MONITOE, 1949, 139 pp.

All-Union Scientific and Technical Society of Power Engineers Moscow Division, Industrial Electrical Engineering Section.

W - 15368, 6 Dec 50

157T33

YEFROYMOVICH, Yu. Ye.

Jan 50

USSR/Electricity - Relays
Furnaces, Electric

"Use of Relay-Contact Regulators With Balanced Relays to Automatize Electric Ore Furnaces," Yu. Ye. Yefroymovich, Cand Tech Sci, Cen Automatics Lab, Min of Metallurgical Ind, 1½ pp

"Prom Energet" No 1

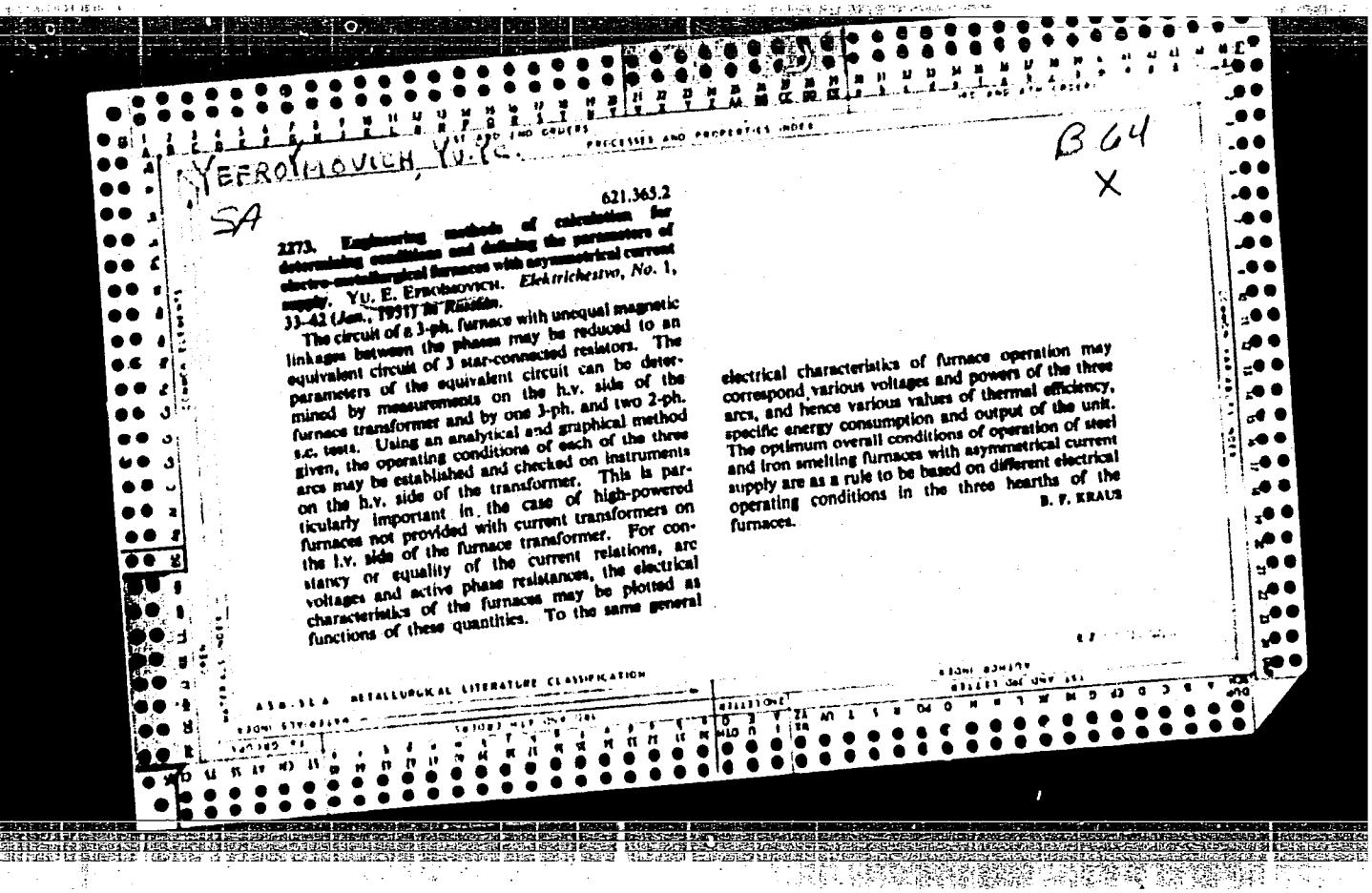
Describes how existing electrode regulators on six ferroalloy furnaces were modified to insure automatic operation of furnaces. Includes two diagrams.

157T33

YEFROYMOVICH, Yu. Ye.

Automatic control of arc-furnaces in metallurgy. Moskva, Gos. nauchno-tekhn. izd-vo lit-ryo chernoi i tsvetnoi metallurgii, 1951. 235 p. (51-34456)

TN687.E3



YEFROYMOVICH, Yu. E.

B 64
X

SA

621.365.2

2273. Engineering methods of calculation for determining conditions and defining the parameters of electro-metallurgical furnaces with asymmetrical current supply. YU. E. EFROIMOVICH. *Elektrichestvo*, No. 1, 33–42 (Jan., 1951) in Russian.

The circuit of a 3-ph. furnace with unequal magnetic linkages between the phases may be reduced to an equivalent circuit of 3 star-connected resistors. The parameters of the equivalent circuit can be determined by measurements on the h.v. side of the furnace transformer and by one 3-ph. and two 2-ph. s.c. tests. Using an analytical and graphical method given, the operating conditions of each of the three arcs may be established and checked on instruments on the h.v. side of the transformer. This is particularly important in the case of high-powered furnaces not provided with current transformers on the l.v. side of the furnace transformer. For constancy or equality of the current relations, arc voltages and active phase resistances, the electrical characteristics of the furnaces may be plotted as functions of these quantities. To the same general electrical characteristics of furnace operation may correspond various voltages and powers of the three arcs, and hence various values of thermal efficiency, specific energy consumption and output of the unit. The optimum overall conditions of operation of steel and iron smelting furnaces with asymmetrical current supply are as a rule to be based on different electrical operating conditions in the three hearths of the furnaces.

B. F. KRAUS

A5a-31A METALLURGICAL LITERATURE CLASSIFICATION

EFROYMOVICH, YU E

Avtomatika dugovykh metallurgicheskikh pechey (automatic operation of metallurgical arc furnaces) Moskva, Metallurgizdat, 1952.

221 P. illus., diagrs., tables.

"Literatura": P. (222)

YEFROYMOVICH, Yu.YE.

PHASE I Treasure Island Bibliographic Report

Call No.: TN686.T54 00000058

BOOK

Authors: EFROIMOVICH, Yu.E., Cand. of Tech. Sciences
KRICHEVSKIY, G.M., Engineer
LEVITANSKIY, B.A., Engineer
MALAYA, R.Yu., Cand. of Tech. Sciences, deceased.
NEIFAKH, G.M., Cand. of Tech. Sciences
POPOV, M.D.. Engineer
SMORODINSKIY, Ia. M., Cand. of Tech. Sciences
SOSUNOV, M.N., Engineer
STASYUK, V.N., Engineer
TAITS, A.A., Engineer
FEDOSEEV, L.M., Engineer
FEIGIN, V.I., Engineer
CHELYUSTKIN, A.B., Engineer
SHERENTSIS, A.N., Engineer

Full Title: A HANDBOOK FOR ELECTROTECHNICAL PERSONNEL IN FERROUS METALLURGICAL INDUSTRIES.

Transliterated Title: Spravochnik elektrika predpriyatii chernoi metallurgii

Publishing Data

Originating Agency: None.

Publishing House: State Publishing House of Scientific-Technical Literature on Ferrous and Nonferrous Metallurgy (Metallurgizdat). Moscow.

Date: 1952. No. pp.: 1167 No. copies: 14,000

Editorial Staff

Compiler: Tikhomirov, I.G., Engineer Technical Editor: None.

1/2

EFROIMOVICH, Yu. E.,

C0000058

Card 2/2

Call No.: TN686.T54

Full Title: A HANDBOOK FOR ELECTROTECHNICAL PERSONNEL IN FERROUS METALLURGICAL INDUSTRIES

Editors: Shalyapin, M.G.
Levitanskiy, B.A.

Appraiser: None.

Text Data

Coverage: A detailed handbook containing technical data on specifications, standards, design and operation of various types of electrical equipment in ferrous metallurgical industries: electric power supply plants and their distributing systems, transforming stations and transmission lines (high and low tension), blast furnace works, rolling mill plants, open-hearth plants, mines, electrical steel smelting and ferroalloy furnaces, sintering plants, coke plants, and electrical transport. Tables and diagrams. Subject index.

Purpose: A handbook for electrotechnical personnel, engineering technicians, machine operators, and planning personnel of metallurgical industries.

Facilities: None.

No. of Russian references: References listed at end of each chapter.

Available: Library of Congress.

EFROYMOVICH, Yu.E.

Calculation of the electrical conditions of steel-melting arc-furnaces taking into account the rectifying effect of the arc. Elektrichestvo '53, No.1, 42-3. (MLRA 6:2)
(EEA 56 no.670:4209 '53)

YEFROYMOVICH, Yu. Ye.

621.365.2 : 621.3.014.31 : 669.14

4254. **The a.c. power arc of steel-melting furnaces.** YU. E. EFROIMOVICH. *Elektrichestvo*, 1954, *No.* 3, 33–8 *In Russian.*

In arc furnaces, the p.d. between electrode and metal depends on arc length, electrode material, kind of steel melted, presence, composition and thickness of the slag layer, also on current and ambient temperature. Thus, the instantaneous value of the electrode to metal voltage does not remain constant during the half-period and depends mainly on the current. At the beginning of the half-period, when no or only a thin layer of slag exists, the arc-ignition is accompanied by voltage peaks. When the slag layer is formed and sufficiently thick, the arc and current tear off no longer and the voltage at the beginning and end of the half-period assumes values much below [illegible] arc has a one-way switching character, i.e. the voltage is higher during the half-period in which the electrode is the anode. The lower the transformer voltage and the shorter the open arc, and the thicker the slag layer, the more the electrode to metal voltage depends on the current and the less marked the one-way switching effect of the arc, the voltage peaks then disappearing. The voltage gradient in the electrode-voltage gap depends on the gap length. In the beginning of the melting process the arc temperature is very high, leading to liquefaction of the metal and additional power loss. The addition of lime to the charge may, owing to the low ionization potential of the lime, reduce the arc temperature and the loss of metal and improve furnace efficiency. The power required at the end of the refining period must be obtained without open arc, this improving the heat utilization and conserving the furnace linings.

B. F. KRAUS

YEFROYMOVICH, Yu. Ye., Doc of Tech Sci -- (diss) "Regulating the electrical system of arc steel alloy furnaces." Moscow, 1956, 40 pp (Moscow Power Engineering Institute im V. M. Molotov), 100 copies (KL, 37-57, 103)

YEFROYMOVICH, Yuriy Yefimovich; FEYGIN, V.I., redaktor; NEPOMNYASHCHIY, N.V., redaktor; ATTOPOVICH, M.K., tekhnicheskiy redaktor.

[Electric systems in arc furnaces for steel smelting] Elektricheskie rezhimy dugovykh staleplavil'nykh pechei. Moskva, Ges. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1956. 98 p. (Electric furnaces) (MLRA 9:5)

112-57-8-16805

Translation from: Referativnyy zhurnal, Elektrotekhnika, 1957, Nr 8, p 125 (USSR)

AUTHOR: Yefroymovich, Yu. Ye.

TITLE: An Improvement in the Regulation of Electrical and Thermal Conditions in Electric-Arc Steel-Melting Furnaces (Usovershenstvovaniye regulirovaniya elektricheskogo i teplovogo rezhimov dugovykh elektrostaleplavil'nykh pechey)

PERIODICAL: Tr. nauch.-tekhn. o-va chernoy metallurgii (Transactions of the Scientific and Engineering Society of Ferrous Metallurgy), 1956, Nr 9, pp 398-406

ABSTRACT: Electric parameters and regimes of arc steel-melting furnaces introduced ten to fifteen years ago were largely determined by the level of automatic-control art at that time. To meet modern needs, a type AR electromagnetic regulator was developed in 1949, and an improved type RMD regulator was developed in 1952, which allow operating the furnaces under more productive and economical conditions. The use of new regulators permits reconsidering the electrical parameters and regimes of existing furnaces. The most important productivity reserve of existing furnaces and reduction of per-unit power

Card 1/4

An Improvement in the Regulation of Electrical and Thermal Conditions in ....

consumption are associated with introduction of higher-capacity transformers and with stepping up voltages at the moment the metal is actually melting. To measure the temperature value closest to its mean value, the measurements should be made at a considerable depth in the bath (at present, the measurements are taken 100-200 mm from the surface), where the temperature gradient is relatively small and where the temperature is less dependent on the effects of chance momentary factors. For improving regulation of the electrical and thermal regimes of electric-arc steel-melting furnaces, the following steps should be taken: (1) At each plant, and for each brand of steel, the relationship between the metal quality and its temperature (in the ladle) should be determined by checking steel temperatures in the ladle. (2) The practice of measuring metal temperature during melting should be widely adopted. (3) The plants should be supplied with standard tungsten and molybdenum wires, thermocouple mountings, and electronic equipment for making these temperature measurements. (4) The furnace temperature fields should be studied to determine the measurement points that provide the best approximation of the

An Improvement in the Regulation of Electrical and Thermal Conditions in ....

mean metal temperature. The effect of the arc voltage (length of its open section) on the degree of the slag-versus-metal overheating and also heat losses should be studied with constant power in the arcs. (5) All new furnaces should be equipped for induction stirring of the bath. (6) Methods of continuous control for voltage, power, and power consumption by each arc in a high-power furnace should be developed. (7) New methods and principles of automatic control should be developed which would permit determination of the quantity of electric energy that must be consumed in each of the three arcs over a given time period. (8) The rate of temperature change and the optimum temperature values for melting all brands of steel should be investigated. The effect of various processing factors on the temperature change should be studied, and methods of stabilizing those factors developed. (9) Methods of quick evaluation of actual heat losses in a furnace should be developed. Methods of calculating the quantity of electric energy that should be supplied to the furnace to compensate for temperature deviation from a desirable value should be developed. (10) The most important tasks for the coming year are development

112-57-8-16805

An Improvement in the Regulation of Electrical and Thermal Conditions in ....

of a system for automatically measuring metal temperature during melting, and development of a complex automatic system for controlling the electrical and thermal regimes of the arc furnaces.

V.I.L.

Card 4/4

YEFROYMOVICH, Yu. Ye., KAGANOV, V. Yu., CHELYUSTKIN, A. B. and KOPAY-GORA, P. N.

"The Use of Computation Apparatus for the Control of Basic Objects in Metallurgy (furnaces, arc furnaces, rolling mills.)"

Cent. Lab for Automation

report presented at the Conference on Automation and Computation Engineering. Moscow, 5-8 March 1957. Organized by AU Sci. Eng. and Tech. Society for Apparatus Building.

Yefroymovich, Yu. Ye.

133-7- 9/28

AUTHOR: Yefroymovich, Yu.Ye., Candidate of Technical Sciences.

TITLE: Analogue Computers and Control Computers for Steel-smelting Arc Furnaces. (Modeliruyushchiye i reguliruyushchiye vychislitel'nyye ustroystva dlya dugovykh staleplavil'nykh pechey)

PERIODICAL: Stal', 1957, No.7, pp. 602 - 608 (USSR).

ABSTRACT: The electrical characteristics of operation of a 20-ton furnace during 10 heats is plotted in Fig.1, p.602. Analysis of the respective data indicates that the r.m.s. values of the phase current intensities vary between 87 and 121% of the nominal value, equalling 16 500 A, and there are also extensive fluctuations in the ratios of the phase currents between one heat and the next; the difference of the average (1 hour) values of the phase currents may reach 30%. The fluctuations of the total useful energy introduced in the furnace during the individual heats may amount to 21% of the basic value assumed at 5 400 kW. The fluctuations of the average, useful electric power from one heat to another amount to ± 15 to 20% of the basic value of 1 800 kW and the differences in the useful power of the individual phases may reach 30%. The fluctuations of the average values of the power factor for the various heats reached 0.042%. Analogous results were obtained on another 20-ton capacity arc furnace. Application of automated TsLA analogues (developed according to the theoretical circuit of the author jointly with A.N. Kotikov and B.N. Znamenskiy)

Card 1/4

Analogue Computers and Control Computers for Steel-smelting Arc Furnaces.

has enabled, for the first time, the control of the total values of the active and the reactive resistances of the sections of the short network located outside the furnace for a 20-ton furnace and, thereby, the control of the total reactance of each phase and the measurement of the voltage of each arc. By means of these devices, it is possible to determine periodically, in accordance with the progress of the smelting, the total ohmic resistance of the phases and the differences in the mutual inductance coefficients of the phases which characterise the possible electro-magnetic power transmission. The results of numerous measurements obtained during 10 heats enabled the elucidation of the importance of the above mentioned parameters and the possible ranges of their variation. The results show that the parameters of the short network outside the arc furnaces, the electric losses and the useful electric power of the individual phases change continuously and appreciably, both from one heat to the next and during each heat. Therefore, use of a continuous or periodic verification of these values during the smelting cycle enables better control of processes involved and also improvement and elimination of causes of appreciable increases in electric power. The developed mechanisms for

Analogue Computers and Control Computers for Steel-smelting Arc Furnaces.

remote measurement of the useful power of the individual phases permits changing over to automatic control of the electric energy fed in to the furnaces during the smelting. The problem can be solved, for instance, by introducing into existing electro-machine (amplidyne) regulators computer elements which would permit the control of the quantity of electricity fed into the furnace in accordance with the following relation:

$$\Delta W_{пол} = \int_0^t (P_{пол} - P_{пол.н}) \, dt \rightarrow 0 \qquad (4)$$

where $P_{пол}$ and $P_{пол.н}$ are respectively the instantaneous real and nominal values of the useful electric power; $\Delta W_{пол}$ is the instantaneous value of the excess consumption or the deficiency in the consumption which should be reduced to zero and t is time. The basic circuit of the electrical machine (amplidyne) regulator, incorporating computer elements, is given in Fig.2, p.605. Fig.3 shows the dynamics of the process of regulation during elimination of a disturbance. The circuit for

 simulating the low-voltage side of the electric steel-smelting

137-58-6-11460

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 30 (USSR)

AUTHOR: Yefroymovich, Yu.Ye., Vinogradov, V.M

TITLE: Refinement of a Method for Measuring the Temperature of Molten Steel in a Furnace (Usovershenstvovaniye metoda izmereniya temperatury zhidkoy stali v pechi)

PERIODICAL: Tr. Nauchno-tekhn. o-va chernoy metallurgii, 1957, Vol 18, pp 629-633

ABSTRACT: The temperature range within the bath of an electric steel foundry furnace may attain 40 or 50°C. Investigations conducted by the TsLA and the Elektrostal' Plant, in which 5- and 15-t furnaces are used, confirm the existence of a temperature gradient attaining 1.5 degree/cm. Rabbling reduces but does not eliminate the temperature differences. Improved accuracy in temperature measurement may be accomplished by refinement of the measuring devices and primarily by equalizing the temperature field of the bath, e.g., by the introduction of magnetic agitation. An experimental installation for the measurement of temperature that has been mounted on a 5-t furnace consists of a thermocouple with W-Mo electrodes (in a

137-58-6-11460

Refinement of a Method (cont.)

shielding shell containing a circulating inert gas), lowered into the furnace through a water-cooled aperture in the roof. The service life of the thermocouple has been brought to 15-20 hours.

V.T.

1. Furances--Performance 2. Steel--Temperature factors 3. Temperature--Measurement
4. Thermocouples--Applications

Card 2/2

137-58-6-11480

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 32 (USSR)

AUTHOR: Yefroymovich, Yu.Ye.

TITLE: New Developments in the Field of Compound Automation of Electric-arc Steelmaking Furnaces (Novyye razrabotki v oblasti kompleksnoy avtomatizatsii dugovykh staleplavil'nykh pechey)

PERIODICAL: Tr. Nauchno-tekh. o-va chernoy metallurgii, 1957, Vol 18, pp 652-664

ABSTRACT: Electromagnetic transfer of power from phase to phase, continuous and significant change in network voltage, secondary-circuit parameters, electric power losses, etc., during a heat and from heat to heat are the reasons for the unsatisfactory operation of all regulators having the purpose of providing specified amounts of power to the arc, as the available electric power varies approximately as the square of the relative magnitude of the line voltage, i.e., quite significantly. Tests of an amplidyne control with an electromechanical integrating unit and of a regulator with electronic computing attachment show that the parameters of these devices may be chosen to satisfy

Card 1/2

New Developments in the Field (cont.)

any required type of control and are capable of regulating to within 3% accuracy the mean weighted value of useful furnace power during any period of the heat. A TsLA analog-simulation device for remote measurement of the secondary-circuit parameters and the arc voltage is also described.

V.T.

1. Electric furnaces--Effectiveness 2. Electric furnaces--Control systems

PETROV, A.K.; SPERANSKIY, V.G.; KHIZHNICHENKO, A.M.; SHILYAYEV, B.A.; DANILOV, A.K.; BORODULIN, G.M.; ZAMOTAYEV, S.P.; MARKARYANTS, A.A.; SOLNTSEV, P.I.; SMIRNOV, Yu.D.; VAYNBERG, G.S.; OKOROKOV, N.V.; KOLOSOV, M.I.; SEL'KIN, G.S.; MEDOVAR, B.I.; LATASH, Yu.B.; YEFROYMOVICH, Yu.Ye.; VINOGRADOV, V.M.; SVEDE-SHVETS, N.N.; SKOROKHOD, S.D.; KATSEVICH, L.S.; SHTROMBERG, Ya.A.; MIKHAYLOV, O.A.; PATON, B.Ye.

Reports (brief annotations). Biul. TSNIICHM no.18/19:67-68 '57. (MIRA 11:4)

1. Zavod Dneprospetsstal' (for Speranskiy, Borodulin). 2. Chelyabinskiy metallurgicheskiy zavod (for Khizhnichenko). 3. Uralmashzavod (for Zamotayev). 4. Trest "Elektropech'" (for Vaynberg). 5. Moskovskiy institut stali (for Okorokov). 6. TSentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii (for Sel'kin, Svede-Shvets). 7. Institut elektrosvarki AN USSR (for Paton, Medovar, Latash). 8. TSentral'naya laboratoriya avtomatiki (for Yefroymovich, Vinogradov). 9. Gisogneupor (for Skorokhod). 10. Trest "Elektropech'" (for Katsevich). 11. Tbilisskiy nauchno-issledovatel'skiy institut okhrany truda Vsesoyuznogo tsentral'nogo soveta profsoyuzov (for Shtromberg).

(Steel--Metallurgy)

SOV/112-59-17-36911

Translation from: Referativnyy zhurnal. Elektrotekhnika, 1959, Nr 17, p 160 (USSR)

AUTHOR: Yefroymovich, Yu.Ye.

TITLE: Application of Computers for the Automation of Steel Melting Process in Arc Furnaces

PERIODICAL: V sb.: Avtomat. upravleniye i vychisl. tekhn. Moscow, Mashgiz, 1958, pp 321-339

ABSTRACT: The technical-economic efficiency of the complex automation of the process is discussed. A functional scheme of the complex automation and the operational principle of a regulator with the application of computers, developed by the Central Laboratory of Automation, are described. An automatic analog device for determining electrotechnical parameters of an installation is investigated. There are 13 illustrations.

N.M.F.

Card 1/1

105-58-3-5/31

AUTHOR: Yefroymovich, Yu. Ye., Candidate of Technical Sciences (Moscow)

TITLE: Modeling Devices for Remote Control of Electrical Quantities in Arc Furnaces (Modeliruyushchiye ustroystva dlya distantsionnogo kontrolya elektricheskikh velichin v dugovykh pechakh)

PERIODICAL: Elektrichestvo, 1958, Nr 3, pp. 22 - 27 (USSR)

ABSTRACT: Special modeling devices which connect electrically the mathematical model with the object to be modelled are investigated here. They serve for the remote control of the net parameters, of the arc voltage, and the electric net efficiency in each phase of the plant. The theory and the operation principle of the modeling devices are given and the investigations of an industrial furnace by means of such a device are described. On the strength of the investigation given the following is found: 1) The modeling devices worked out in the case of nonsinusoidal currents and of the transfer of the output from one phase to the other by electromagnetic way permit to telecontrol by hand or auto-

Card 1/3

Modeling Devices for Remote Control of Electrical Quantities in Arc Furnaces

matically the parameters of the strong current lines, the arc voltage, and the electric net efficiency in each phase of the plant. 2) In the case of normal operation mode of the plant the effective resistance, the inductivity of the low-voltage ranges of the current conductor outside the furnace, the total inductivity of the current conductor, the arc voltage, and the electric net efficiency can be controlled automatically and continuously in each phase. The effective resistance of the current conductor can be controlled automatically and periodically in each phase, as well as the difference of the phase mutual induction factors. 3) The experimental investigations carried out for the first time with the aid of modeling devices show that there exist essential reserves for a rise of output, for the decrease of the electric losses, and the specific consumption of electric energy, as well as for the increase of the power factor of the arc furnace. The application of the devices described here creates the conditions for the application of new regulation methods of the electric net efficiency of the plant using computing machines. (Ref 1). 4) The modeling methods described here can be also useful

105-58-3-5/31

Modeling Devices for Remote Control of Electrical Quantities in Arc Furnaces

for the measurement of parameters of industrial aggregates and technological processes which cannot be controlled directly. There are 6 figures and 5 Soviet references.

SUBMITTED: June 21, 1957

Card 3/3

AUTHORS: Yefroymovich, Yu. Ye., Candidate of Technical Sciences, Kotikov, A. N., Engineer, Stiop, Ya. I., Engineer, Genishta, Ye. S., Engineer, Tikhmenev, V. B., Engineer 105-58-5-1/28

TITLE: A Calculating Machine for Controlling Arc-Furnace Duty (Vychislitel'noye ustroystvo dlya upravleniya rezhimom dugovoy pechi)

PERIODICAL: Elektrichestvo, 1958, Nr 5, pp. 15-20 (USSR)

ABSTRACT: At first an analysis of the controlling method of the electric operation of arc-furnaces according to the ratio between amperage and voltage in the phase is given, which now is everywhere in use. It is shown that it is useful to abandon this method and to change over to the controlling method by means of calculating machines. In these the power of effective electric energy supplied to the furnace is controlled. This method is based on the maintainance of the equations (1), (2) and (3). A scheme for an electromechanical variant of a calculating machine for one of the furnace phases is given. By means of a

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diagram the controlling character in the absence and in the presence of the calculating devices is illustrated. The contradiction between the necessity of a quick removal of the produced deviation of power from the nominal value - and the necessity of a relatively slow compensation of the produced deficiency easily can be removed, when the employed electrodynamic controller is characterized by a maximum high-speed effect, whilst the velocity of the transients (determined by the effect of the calculating machine) is tuned in within the demanded limits at the expense of controlling the amplifier factor of the integrating member. The calculating device reacts to all excitations causing a deviation of the power from its given mean value. The practical experience with the calculating machine shows that during melting at T = 10 sec the variation of the real current caused by excitations does not exceed ± 10 % of the arc-current mean value. The one-year lasting test operation of the calculating machine showed that during complicated melting processes the machine guarantees an energy supply with an error not exceeding 2 %. By the aid of the

calculating machine it was possible to diminish the asymmetry of electroenergy distribution between the phases of a 20 t furnace by the 2,5-fold.
The following persons took part in creating the electron calculating machine: A. A. Fel'dbaum, Doctor of Technical Sciences, L. N. Fitsner, Candidate of Technical Sciences, Yu. M. Alyshev, Engineer, L. I. Shevchenko, Engineer. There are 5 figures and 5 references, which are Soviet.

ASSOCIATION: Tsentral'naya laboratoriya avtomatiki tresta "Energochermet". (Central Laboratory for Automation of the "Energochermet" Trust)

SUBMITTED: May 27, 1957

AVAILABLE: Library of Congress

1. Electric furnaces--Control systems 2. Mathematical computers--Applications

Yu.Ye. Yefroymovich

AUTHOR: None given SOV/133-58-6-17/33

TITLE: Review of the Book by Yu.Ye. Yefroymovich "Optimal Electrical Operating Conditions for Electric-arc Furnaces" (Retsenziya na knigu Yu.Ye. Yefroymovicha "Optimal'nyye elektricheskiye rezhimy dugovykh staleplavil'nykh pechey")

PERIODICAL: Stal', 1958, Nr 6, pp 529 - 531 (USSR)

ABSTRACT: The book was published by Metallurgizdat, Moscow, 1956. 99 pages. The review consists of two parts; the first part written by A.N. Sorolov, Candidate of Technical Sciences, Docent , is very favourable and the second part written by S.A. Morgulev and V.F. Ivan'ko, Engineers (TsNIIChM and "Dneprospetsstal'") points out numerous errors concluding that the book does not give an answer to many problems in calculating optimal electrical operating conditions of electric furnaces. There are 6 references, including 5 Soviet and 1 English.

Card 1/1 1. Electric furnaces--Electrical properties 2. Electric furnaces --Operation

YEFROYMOVICH, YU. YE

25-58-4-24/41

AUTHOR: Yefroymovich, Yu.Ye., Candidate of Technical Sciences

TITLE: "The Secret of the Black Box" (Tayna chërnogo yashchika)

PERIODICAL: Nauka i Zhizn', 1958, 25 Nr 4, page 66 (USSR)

ABSTRACT: A new device for measuring the power and voltage of electric arcs in electric steel smelting furnaces was recently designed and tested. A mathematical analog of the electric furnace is connected to the furnace by leads through which the voltages of the transformer terminals, current values in the electrodes, and the furnace shell potential are relayed to the analog. The regulation of induced power is carried out by computing devices. The furnace is also equipped with a device for continuously measuring the temperatures of the inner walls and the crown. There is 1 photograph.

AVAILABLE: Library of Congress

Card 1/1 1. Mathematical computers-Applications 2. Temperature-Measurement

SOV/133-59-5-12/31

AUTHORS: Yefroymovich, Yu.Ye., Candidate of Technical Sciences, Timoshenko, V.V. and Tsukanov, V.P., Engineers

TITLE: Rational Designs of Secondary Circuits for Arc Furnaces (Ratsional'nyye konstruktsii korotkikh setey dlya dugovykh pechey)

PERIODICAL: Stal', 1959, Nr 5, pp 421 - 424 (USSR)

ABSTRACT: High and non-equal in phases reactive resistances of secondary circuits of present designs considerably decrease technico-economic indices of electric furnaces. When operating with the present designs of the circuits, an increase in the nominal secondary voltage of the transformer permits improving furnace operation only during the first half of the melting period. For this reason, two new designs of secondary circuits for arc furnaces were proposed. In these, the inlet and outlet tappings of secondary windings (I, II, III) of the transformer are "lengthened", using busbar, flexible cables and copper, water-cooled tubes and lead in a bifilar manner (a - x, b - y, c - z) directly to electrode (1, 2, 3) on which the windings become

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Rational Designs of Secondary Circuits for Arc Furnaces

Δ connected (Figure 1). As a result, the linear current passes only through electrodes on all the remaining sectors of the secondary circuit only phase currents of the transformer pass. The proposed two schemes (A and B, Figure 1) differ in the positions of outlet trappings from winding III of the transformer. The above schemes were in 20 and 5 and 20 ton furnaces, respectively; the comparison of operating parameters of furnaces with the typical and new designs of the secondary circuits is given in Table 1. The use of secondary circuits of the proposed designs permits decreasing their reactive resistance by a factor of 1.5 - 2.5 and active resistance by about 10-15%. The secondary circuit according to Scheme B has a 15-20% lower reactance than that according to Scheme A. This enables equalising the arc capacities, speeding up the

Rational Designs of Secondary Circuits for Arc Furnaces

melting process, reducing specific power consumption and noticeably improving the power coefficient. There are 2 figures and 2 tables.

ASSOCIATIONS: TsLA and Zavod "Elektrostal'" ("Elektrostal'" Works)

8 (2)

AUTHOR: Yefroymovich, Yu. Ye., Candidate of Technical Sciences (Moscow) SOV/105-59-8-10/28

TITLE: Investigation of Arc-furnace Performance by Means of a Model System

PERIODICAL: Elektrichestvo, 1959, Nr 8, pp 45 - 51 (USSR)

ABSTRACT: Owing to the fact that in a steel/foundry arc-furnace the electromagnetic conditions are unsymmetrical and the leads have different lengths, the inductivities of the three phases differ considerably. Hence it would be desirable to operate furnaces with currents, voltages, and powers, which, even if not being absolutely equal, differ only little. For this purpose, methods must be developed which permit: (1) to calculate the performance of the arc-furnace for arbitrary values and ratios of the voltages across the arc, the currents, and the effective power consumptions of the phases. (2) It must be possible for the given economical system to select a limited number of combinations from a wide variety of such combinations of currents, voltages, and power consumptions of the phases which at different inequalities between the arc voltages and phase currents secure sufficiently good conditions of the re-distribution of power among the furnace

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phases. (3) Every one of the electric modes of operation must comply with thermal conditions and the technical and economical requirements of furnace operation. This paper gives the solutions of the two first-mentioned problems. The electric performance of an arc-furnace with unsymmetrical leads and a non-sinusoidal arc voltage is investigated. A mathematical model is described which permits a solution of very complicated problems and an investigation of arc-furnace performance, considering the distinctly marked non-linearity of the arc resistances for given effective phase powers, phase currents, and voltages. This model was developed by the author together with V. V. Stepanenko, V. G. Sirotkin, and E. G. Uderman. The principal circuit diagram for simulating the non-sinusoidal arc voltage is shown by figure 2. The external current-versus voltage curve of the arc is presented by figure 3. Figure 4 contains the circuit diagram of the model. The conditions of power distribution between the furnace phases are investigated, and conclusions are drawn herefrom. The model described in this paper was used to test the performance of a furnace of a novel design for equal currents, equal voltages, and equal power consumptions of the phases

(corresponding to the points I_I, E_E, and P_P on the diagram shown by figure 6). This new furnace has equal phase resistances (Ref 10), and it permits operation either with equal currents or equal arc voltages, the effective-power-difference not exceeding 2.5% between the phases. There are 6 figures and 10 references, 9 of which are Soviet.

SUBMITTED: February 11, 1959

Card 3/3

Yefroymovich, Yu. Ye.

report to be presented at the 1st Intl Congress of the Intl Federation of Automatic Control, 25 Jun-5 Jul 1960, Moscow, USSR.

VORONOV, A. A., YEFIMOV, E. L., and SOKOLOV, G. N. - "Some problems of the synthesis and analysis of digital analogues for automatic control"

YEFROYMOVICH, Yu. Ye. - "Complex automation of technological processes of smelting steel in arc furnaces"

ZAIMOVSKIY, L. A. - "Bases of the theory and calculation of elements of automatic pneumatic machines"

ZUKMAN, V. G., - "The problem of digital program control of metal-cutting machines"

Yefroymovich, Yu. Ye.

PHASE I BOOK EXPLOITATION SOV/5407

Afanas'yev, S.G., Candidate of Technical Sciences; B.S. Barskiy, Docent; Yu.Ye. Yefroymovich, Candidate of Technical Sciences; V.Yu. Kaganov, Candidate of Technical Sciences; B.N. Katomin, Engineer; V.Ye. Leykin, Engineer; I.N. Lur'ye, Engineer; O.A. Mikhaylov, Candidate of Technical Sciences; A.Ye. Netesin, Engineer; M.Ye. Orman, Engineer; V.S. Rutes, Candidate of Technical Sciences; and Ye.A. Shneyerov, Candidate of Technical Sciences.

Tekhnicheskiy progress v chernoy metallurgii SSSR; staleplavil'noye proizvodstvo (Technological Progress in Soviet Ferrous Metallurgy; Steelmaking Industry) Moscow, Metallurgizdat, 1961. 495 p. Errata slip inserted. 3,200 copies printed.

Sponsoring Agencies: Gosudarstvennyy nauchno-tekhnicheskiy komitet Soveta Ministrov SSSR. Tsentral'nyy institut informatsii chernoy metallurgii.

Ed. and Scientific Ed.: G.N. Oyks, Professor, Doctor of Technical Sciences; Director of the Central Institute for Information on Ferrous Metallurgy: N.B. Arutyunov; Chief Ed.: Ya.A. Gol'din; Ed. of the Central Institute for Information on Ferrous Metallurgy: L.I. Khoras; Ed. of Publishing House: V.I. Ptitsyna; Tech. Ed.: P.G. Islent'yeva.

Card 1/7

PURPOSE: This book is intended for technical and scientific personnel in the metallurgical and machine industries, and may also be used as a textbook by students in schools of higher education and tekhnikums.

COVERAGE: A review is made of the basic stages in the development of open-hearth, electric-hearth, electric-furnace, and converter steelmaking processes in the USSR. The present status of ferrous metallurgy and prospects for the future are examined. Present trends in the design, automation, and mechanization of steelmaking equipment are given. The state of the organization and mechanization of repairs in steelmaking plants, and methods of equipment maintenance are described. Problems in the process of steelmaking (the use of oxygen and vacuum, processing of phosphorus irons, improvement of the manufacture of individual types of steel, and steel casting) are discussed at length. No personalities are mentioned. There are 329 references: 317 Soviet, 9 English, 2 German, and 1 French.

TABLE OF CONTENTS:

YEFROYMOVICH, Yu. Ye.

S/569/61/006/000/006/008
D201/D303

AUTHOR: Yefroymovich, Yu. Ye. (USSR)

TITLE: Complex automation of the technological arc furnace steel smelting process

SOURCE: International Federation of Automatic Control. 1st Congress, Moscow, 1960. Trudy. v. 6. Avtomatizatisiya proisvodstvennykh protsessov; khimiya, neftepererabotka, teploenergetika, yadernaya energetika, metallurgiya. Moscow, 1961, 517-528

TEXT: Work on complex automatic control systems of arc furnace steel smelting started in the USSR in 1956. In the present paper the author describes several new devices for the control, regulation and analysis of the main technological parameters. The description and discussion of operation of some of the following is given: A mechanized mathematical analogue for telemetering of resistive and reactive resistances, voltages and powers of the arcs; a computer for controlling the process of introducing the electric en-

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ergy into the furnace; a composite electronic-electric control of optimum electrode spacing; a mathematical analogue for analysis of the electric states of arc furnaces with electromagnetic asymmetrical current supply and the effect of non-sinusoidal arcs; thermocouples for measuring the lining temperature; the arrangement for measurement and control of introduced oxygen; device for measuring the thermal losses; the digital computer arrangement for registering several process parameters. The use of the new control devices in arc furnaces made it possible to obtain in 1959 the following results: in 55% of smelting processes the required changes in the metal temperature were kept within + 20°C. Deviation of the metal temperature in the ladle from the optimum value was reduced by approximately a factor of two; duration of smelting was reduced by 6 - 10%; the average power requirement was reduced by 7%; the quality of the steel was improved. A new prototype of a fully automatic arc furnace, with a new triple-bifilar construction of power supply circuit, is being designed. There are 8 figures and 2 Soviet-bloc references.

S/131/61/000/004/003/003
B105/B202

AUTHORS: Yefroymovich, Yu. Ye., Vinogradov, V. M., Pirozhnikov, V. Ye., Danishevskiy, S. K.

TITLE: Application of refractory endpieces for controlling the lining temperature of electric arc furnaces by means of thermocouples

PERIODICAL: Ogneupory, no. 4, 1961, 181-184

TEXT: The authors describe thermocouples with refractory endpieces for measuring the temperature of liquid steel and of the refractory lining. The Tsentral'naya laboratoriya avtomatiki (TsLA) (Central Laboratory of Automation) and the zavod "Elektrostal'" (Works "Elektrostal'") are conducting comprehensive work for the automation of the steel melting process in electric arc furnaces. The following persons participate in this work: L. V. Vinogradova, N. I. Voronin, L. I. Gellis, I. A. Getman, V. V. Levchuk, T. Z. Malikova, O. M. Margulis, K. G. Romanchenko, and D. S. Rutman. Fig. 1 shows the arrangement of the thermocouples for continuous temperature measurement of the lining as well as of the

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Application of refractory endpieces ...

liquid steel temperature in the electric arc furnace. Thermocouples with tungsten-rhenium electrodes with a content of 5% and 20% of rhenium BP5/20 (VR5/20) which had been developed by the TsLA and the Moskovskiy elektrolampovyy zavod (Moscow Incandescent Lamps Factory) and tungsten-molybdenum electrodes with an addition of 0.5% aluminum, which were produced by the TsNIIChM (Tsentral'nyy nauchno-issledovatel-skiy institut chernoy metallurgii (Central Scientific Research Institute of Ferrous Metallurgy)) proved to be the most stable thermocouples for a continuous temperature control. The temperature of the lining is continuously recorded by a self-recording potentiometer. To select the most suitable endpieces the products obtained from ZrO_2, Al_2O_3, BeO, MgO were tested which had been produced by the VIO, UNIIO (Ukrainskiy nauchno-issledovatel'skiy institut ogneuporov (Ukraine Scientific Research Institute of Refractories)) as well as by the Podol'skiy zavod (Podol'sk Works). The experiments were made in a 20-t furnace operating with a 9000-kva transformer. Maximum stability was observed in high-alumina endpieces which had been produced by the Podol'sk Works of Refractories. The experimental results showed that endpieces with a wall

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thickness of more than 1.0 mm, are suited best for the continuous temperature measurement of the lining of walls and arcs during 4.5 hours (duration of melt) (Fig. 4). Endpieces with higher thermal stability are necessary for temperatures exceeding 1700°C. The duration of melting and thus also the overheating of the lining can be reduced by increasing the temperatures of the metal in the period of oxidation. Test melts of remolten ШХ15 (ShKh15) steel showed that with a reduction of the specific current consumption by 50-55 kwh on the average, the average duration of melt could be reduced by 33 and/or 17 min. The control of electrical and thermal conditions resulted in an increase of the average stability of walls and arcs of electric arc furnaces by approximately 3-5 melts. There are 4 figures, 2 tables, and 4 Soviet-bloc references.

ASSOCIATION: TsLA Glavproyektmontazhavtomatiki

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Application of refractory endpieces ...

Legend to Fig. 1:
I - immersion thermocouple; II - thermocouple in the arc; III - thermocouple in the wall; 1) metal tube; 2) graphite block; 3) refractory endpiece

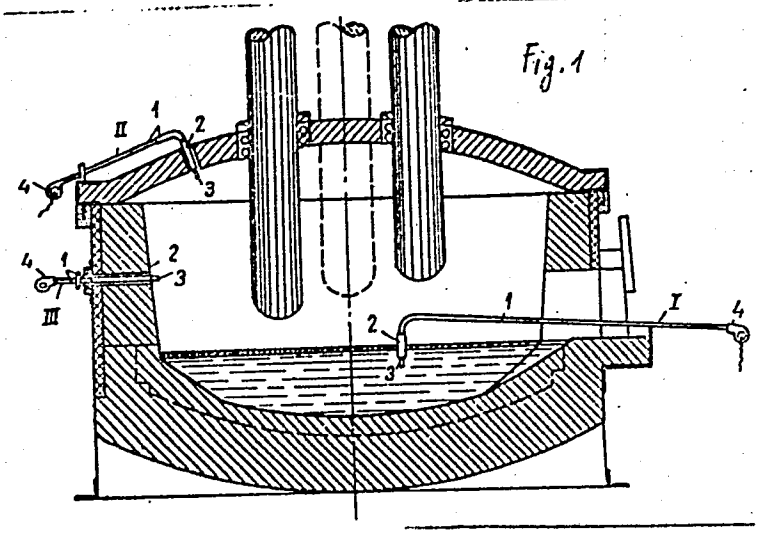

Fig. 1

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S/131/61/000/004/003/003
B105/B202

Legend to Fig. 4: durability of the endpieces as depending on their wall thickness when measuring the temperatures of electric arc furnaces.
a) durability, hr; b) wall thickness, mm.

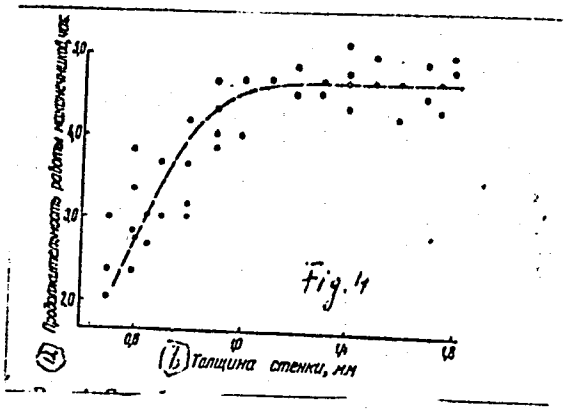

Fig. 4

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32252
S/103/61/022/012/009/016
D201/D305

16,8000 (1329, 1031, 1132)

AUTHOR: Yefroymovich, Yu. Ye. (Moscow)

TITLE: Determining an economically expedient degree of improvement of some automatic control systems

PERIODICAL: Avtomatika i telemekhanika, v. 22, no. 12, 1961, 1625-1637

TEXT: The author considers experimental methods which, given existing control arrangements of stationary technological processes, will permit determination of the maximum improvements in the technical and economical aspects of production by improving the automatic controller, by introducing devices for automatic control by stochastically varying the uncontrollable, but measurable quantity and by choosing the optimum regime of the controller. The analysis is limited to stationary, random processes, in which only one physical quantity is characterized by stochastic changes, since the changes in other quantities are not in practice reflected in the technical and economical indices of production. The following

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Determining an economically ...

problems are considered: a) Increasing output; b) achieving economics in raw materials; fuel, power, etc.; c) lowering the cost of the finished product unit. To do so, the idea of an ideal automatic controller (AC) is introduced, which has the same meaning as e.g. introducing 100% efficiency. The AC compensates for the deviations of the stochastic quantity x from its value for the best required production index $\Phi(x)$. From experimental evaluation of the probability distribution function $W(x)$, the mathematical expectation

$$M[x] = \int_{-\infty}^{\infty} x\, w(x)dx \qquad (3)$$

and the r.m.s. value of the controlled quantity

$$\bar{x}_{rms} = \sqrt{\int_{-\infty}^{\infty} x^2 w(x)dx} \qquad (4)$$

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Determining an economically ...

may be calculated. The variations of x produce changes of the quality index $\Phi(x)$. Experimental determination of $M[x]$, $M[\varphi]$ and of Φ_{ideal} in the case when the technical and economic efficiency (TEE) factor Φ is given by a stochastic change of one controlled or uncontrolled quantity x, with or without inertia - may be accomplished in various ways. It may be done experimentally from the knowledge of x and by means of arrangements which make it possible to measure

$$M[x] = \frac{1}{T}\int_0^T x\,dt \qquad (8)$$

and

$$M[\Phi] = \frac{1}{T}\int_0^T \Phi(x,t)\,dt \qquad (9)$$

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Determining an economically ...

where T = duration of the observation of the process. The maximum capital expenditure, required for the improvements in AC or the automatic control system, is evaluated as a function of two outputs, one with the non-improved and one with the improved automatic control system and hence an economically reasonable degree of improvement is determined. There are 7 figures and 2 Soviet-bloc references.

SUBMITTED: March 22, 1961

Card 4/4

S/130/62/000/006/001/003
A006/A101

AUTHORS: Vinogradov, V. M., Yefroymovich, Yu. Ye., Kablukovskiy, A. F., Simonov, V. I.

TITLE: Automated control and regulation of heat conditions of a steel-melting arc furnace

PERIODICAL: Metallurg, no. 6, 1962, 16-18

TEXT: To eliminate deficiencies in the use of immersion thermocouples, the Central Laboratory of Automation and the Elektrostal' Plant have designed a mechanized unit for multiple periodic measurement of the metal temperature in the pool of a steelmelting arc furnace and have developed an automatic method of regulating the heat conditions of the furnace. The temperature-measuring unit consists of a pneumatic force-mechanism, a trolley for moving the thermocouple, guides, a mechanism controlling the position of the thermocouple and a control board. The unit is fixed to the furnace portal and the tungsten-rhenium thermocouple is introduced into the furnace through a special hole. Between the measurements, this aperture is closed by a pneumatic-driven slide which operates the electro-pneumatic relay circuit of the thermocouple. An electronic potentio-

meter with a signal unit and automatic control of the completed measurement serves as a secondary registering device. The use of this device reduces errors in measuring the mean pool temperature; the temperature control can also be performed during smoke formation without switching-off the furnace. The metal temperature pulse can be used to produce a closed circuit for the automatic control of the furnace heat conditions. The metal temperature indicator is connected to the heat-condition control unit which operates the transformer-voltage step-switch and an automatic device regulating the power supply with the aid of a computer. Experiments made with the new and conventional units show that the temperature straggling of the metal in the pool and in the ladle can be reduced by a factor of 2.5 - 3.5. The efficiency of the furnace is raised by 7 - 9%; electric-power consumption decreases by 3.5 - 4.0%. There are 2 figures.

ASSOCIATIONS: TsLA (Central Laboratory of Automation); Zavod"Elektrostal'" (Elektrostal' Plant)

YEFROYMOVICH, Yu.Ye., kand.tekhn.nauk (Moskva)

Correlation between electrical and thermal processes in two steel smelting furnaces. Elektrichestvo no.9:72-77 S '62. (MIRA 15:9)

(Electric furnaces)

VINOGRADOV, V.M., inzh.; YEDNERAL, F.P., doktor tekhn.nauk; YEFROYMOVICH, Yu.Ye., kand.tekhn.nauk

Automation of the electric smelting process. Stal' 22 no.11: 1005-1007 N '62. (MIRA 15:11)

1. TSentral'naya laboratoriya avtomatiki i Moskovskiy vecherniy metallurgicheskiy institut.
(Steel--Electrometallurgy) (Automation)

40135

S/103/62/023/008/005/006
D409/D301

16.7000

AUTHOR: Yefroymovich, Yu.Ye (Moscow)

TITLE: Study of possible improvements in the technical and econimic efficiency of control systems of stationary technological processes

PERIODICAL: Avtomatika i telemekhanika, v. 23, no. 8, 1962, 1099 - 1107

TEXT: An experimental method is proposed for studying stationary technological processes, which permits determining the maximum possible rise in the technical-economic indexes of production (TEI), without disturbing the operation of the plant. The present investigation is an extension (to several output variables) of an earlier investigation by the author (in which the process depended on one output variable only). It is assumed that the linear (or nonlinear) dependence between input and output variables and the noises are unknown; this is also the case with the dependence between the current values of the TEI and the above variables. It is

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Study of possible improvements...

also assumed that the current values of the TEI are continuously measured (directly or indirectly). First, a technological process is considered, whose TEI depend on 2 random variables, (x_1, x_2). The current value of the index of production to be optimized, is denoted Φ; Φ may represent the production cost per unit, the productivity, etc., which would be obtained if the operating conditions, observed during the short interval under consideration, were to be sustained for a long period. It is assumed that the dependence of Φ on x_1 and x_2, in the case of an ideal controller, is described by a hemispherical surface (shown in a figure); this surface is denoted by Ω_{max}. If one of the variables is controlled by an ideal controller, and the other by an actual controller, then the mean of the TEI would be situated on the surface Ω_{x_2id} or Ω_{x_1id}, respectively; these surfaces are below Ω_{max}. It is shown how the various parts of these 3 surfaces can be experimentally studied, andhow to determine the optimum TEI, resulting from an improvement in the controller of the output variable x_1, and setting up a controller for the (hitherto uncontrolled) variable x_2 (the noise). Three functionals (for the mean of

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L 18066-63 EWT(d)/EWT(m)/EWP(q)/BDS AFFTC/ASD JD

ACCESSION NR: AP3001663 59 S/0130/63/000/006/0015/0018

AUTHORS: Vinogradov, V. M.; Yefroymovich, Yu, Ye.; Kablukovskiy, A. F.; Simonov, V. I.

TITLE: Automation and programming of steel melting in an electrical furnace

SOURCE: Metallurg, no. 6, 1963, 15-18

TOPIC TAGS: automation, programming, electrical furnace, melting

ABSTRACT: The automatic control which regulates the performance of an electrical furnace has been designed and tested at the plant "Electrostal'." The temperature variation required was determined automatically during the operation or was taken from a temperature graph plotted on the basis of results obtained in other steel melting operations. The program involved the electrical and thermal conditions, the length of melting intervals, the proper order of operations, and the average quantities of the materials used. With this type of control the temperature can be regulated to an accuracy up to + 10C, and the limits of temperature variation of metal in the hearth and in the ladle are decreased 2.5-3.5 times. The order and speed of the operations were sustained. Various deviations from the normal

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L 18066-63

ACCESSION NR: AP3001663

course of the melting process were avoided by regulating electrical power and the composition and quantity of aftercharges. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 00	DATE ACQ: 09Jul63	ENCL: 00
SUB CODE: ML	NO REF SOV: 000	OTHER: 000

Card 2/2

YEFROYMOVICH, Yu.Ye.; MARTYNUSHKIN, A.M.; TSUKANOV, V.P.; SHIKOV, I.P.; NIKONOV, A.V.; KABLUKOVSKIY, A.F.; KOTIKOV, A.N.; KOLCHANOV, V.A.; VINOGRADOV, V.M.; GENISHT, Ye.S.

VU-5086 computer and high-speed electronic automatic controller for regulating power supply to electric arc furnaces. Prom. energ. 18 no.7: 7-8 Jl '63. (MIRA 16:9)

(Electric furnaces)

YEFROYMOVICH, Yu.Ye.; PIROZHNIKOV, V.Ye.

Regularities of controlling thermal and electrical conditions in steel smelting arc furnaces. Stal' 24 no.1:40-44 Ja '64. (MIRA 17:2)

YEDNERAL, F.P., doktor tekhn.nauk; YFFROYMOVICH, Yu.Ye., kand.tekhn.nauk;
VINOGRADOV, V.M., kand.tekhn.nauk

Mechanization of electric steel smelting connection with its automation. Stal' 24 no.7:617-619 Jl '64.
(MIRA 18:1)

L 40743-65 EWG(j)/EWT(d)/EWP(e)/EPA(s)-2/EWT(m)/EPF(c)/EWP(i)/EPF(n)-2/EWA(d)/EWP(v)/
EPR/EWP(t) Pf-4/Pr-4/Ps-4/Pt-10/Peb/Pu-4 JD/WW,
ACCESSION NR: AP5007454 JG/WH S/0286/65/000/004/0075/0076

AUTHOR: Vinogradov, V. M.; Yefroymovich, Yu. Ye.; Kotikov, A. N.; Filin, O. G.; Pirozhnikov, V. Ye.; Shanturin, P. M.; Krechetova, A. M.; Katlukovskiy, A. F.; Nazarkin, I. A.; Konyashin, V. I.; Polunin, S. F.; Oleznyuk, B. A.; Lysenko, S. P.; Voronin, N. I.; Levchuk, V. V.; Koreshkov, M. Ye.; Laktionov, V. S.; Yuzefovich, V. R.; Vinogradova, L. V.; Rutman, M. Sh.; Angelevich, M. M.

TITLE: Automatic device for repeated measuring of the temperature of molten steel. Class 42, No. 168495

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 4, 1965, 75-76

TOPIC TAGS: temperature measuring, molten steel temperature

ABSTRACT: This Author Certificate introduces an automatic device for repeated measuring of molten steel temperature in an open hearth furnace. The device consists of a thermocouple, a driving mechanism, and a registering instrument. To improve the reliability and compactness of the device, the thermocouple carriage is connected to the

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L 40743-65

ACCESSION NR: AP5007454

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piston rod of the pneumatic cylinder by a pulley in such a way that the length of the carriage stroke exceeds that of the rod stroke by a preset value. The thermocouple location in the furnace is controlled by the regulator of the piston rod position, which is connected to the programming membrane and the reverse movement spring. To increase service life, the thermocouple junction is protected by a siliconized graphite tip which is fixed to the refractory thermocouple holder with aluminum-phosphate cement. The duration of the measurement is controlled by a polarized relay. The polarized relay is connected to the amplifier output circuit of the registering instrument which controls the air distributor of the carriage drive through a thermal and electropneumatic relay and determines the end of the measurement. Orig. art. has: 1 figure. [AZ]

ASSOCIATION: Tsentral'naya laboratoriya avtomatiki (Central Automation Laboratory)

SUBMITTED: 25Dec61 ENCL: 00 SUB CODE: TD, IE

NO REF SOV: 000 OTHER: 000 ATD PRESS: 3231

Card 2/2

YEFROYMOVICH, Yu.Ye.; KABLUKOVSKIY, A.F.; KOSYREV, L.K.; PIROZHNIKOV, V.Ye.

Mechanization of the steel making process in arc furnaces.
Metallurg 10 no.6:15-17 Je '65. (MIRA 18:6)

YEFROYMOVICH, Yu.Ye., kand.tekhn.nauk; PIROZHNIKOV, V.Ye., inzh.; IOFFE, Yu.S., inzh.

Mechanisms of arc glow and heat exchange in electric steel melting furnaces. Elektrotekhnika 36 no.1:26-31 Ja '65.
(MIRA 18:3)

L 40976-66 EWP(c)/EWP(k)/EWT(d)/EWT(m)/EWP(v)/EWP(t)/EWP(l)/ETI/EWP(h) BC/JD

ACC NR: AP6027288 SOURCE CODE: UR/0130/66/000/008/0023/0025 60 B

AUTHOR: Yefroymovich, Yu. Ye.; Pirozhnikov, V. Ye.; Kablukovskiy, A. F.; Vinogradov, V. M.

ORG: Central Laboratory of Automation (Tsentral'naya laboratoriya avtomatiki); Ministry of Ferrous Metallurgy SSSR (Ministerstvo chernoy metallurgii SSSR)

TITLE: System for programmed control of the electroslag melting process

SOURCE: Metallurg, no. 8, 1966, 23-25

TOPIC TAGS: metal melting, steel, ~~melting~~, electroslag melting, ~~electr~~ ~~troslag melting control~~, automatic control

ABSTRACT: The Central Laboratory of Automation, in cooperation with the Elektrostal' Plant, has developed a system for programmed control of the electroslag melting process which makes possible complete automation of the process. In this system the process is controlled by time and according to a preset program. The system automatically changes the secondary voltage of the furnace transformer, controls the current according to a preset program within 9—102% of the nominal value with an error not exceeding 3%, interrupts the process for a given time period either by lifting the electrode or by

Card 1/2 UDC: 669.187.6

L 40976-66

ACC NR: AP6027288

disconnecting the secondary circuit, changes the melting conditions to those of filling the shrinkage cavity, lifts the electrode and disconnects the power when melting is completed, and shows continuously the important conditions of the process. The system has been installed in three electroslag furnaces at the Elektrostal' Plant and has been in operation for two years. This year, the Central Laboratory of Automation will deliver a series of these systems to other metallurgical plants possessing electroslag furnaces. Orig. art. has: 3 figures. [DV]

SUB CODE: 13/ SUBM DATE: none/ ATD PRESS: 5058

Card 2/2

ACC NR: AP6029035 SOURCE CODE: UR/0413/66/000/014/0051/0052

INVENTORS: Kolchanov, V. A.; Yefroymovich, Yu. Ye.; Vinogradov, V. M.; Kotikov, A. N.; Pirozhnikov, V. Ye.; Malinenko, M. A.; Gunin, I. V.

ORG: none

TITLE: A device for controlling the electric system of an electric slag remelting installation. Class 21, No. 183047 [announced by Central Laboratory of Automation (Tsentral'naya laboratoriya avtomatiki)]

SOURCE: Izobret prom obraz tov zn, no. 14, 1966, 51-52

TOPIC TAGS: slag, smelting furnace, metallurgic furnace, electric equipment, automatic control system

ABSTRACT: This Author Certificate presents a device for controlling the electric system of an electric slag remelting installation based on the Author Certificate No. 139032. The design increases the reliability of the device because of the noncontact readout of the specification. The program mechanism includes a removable program matrix and a secondary matrix made from semiconductor diodes (see Fig. 1). These matrices are electrically connected through a comparison relay. The contacts of this relay are connected with the coil of the step scanner of the program matrix. The program matrix controls (through the relay system) the multiwinding current

UDC: 621.365.2.078

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ACC NR: AP6029035

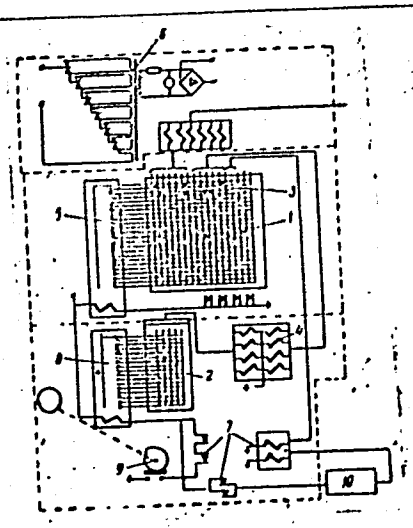

Fig. 1. 1 - removable program matrix; 2 - secondary matrix; 3 - semiconductor diodes; 4 - comparison relay; 5 - step scanner of the program matrix; 6 - multiwinding transformer; 7 - switch; 8 - step scanner of the secondary matrix; 9 - mechanism of the time readout; 10 - switch of the step voltage

transformer and a switch. The switch connects the coil of the step scanner of the secondary matrix either with the mechanism of the time readout or with the switch of the step voltage of the power transformer. Orig. art. has: 1 figure.

SUB CODE: 09, 13/ SUBM DATE: 25Feb65

Card 2/2

ACC NR: AP7008868 SOURCE CODE: UR/0105/66/000/008/0095/0095

AUTHOR: Abelishvili, L. G.; Al'tgauzen, A. P.; Baycher, M. Yu.; Gabashvili, N. V.; Dididze, M. S.; Yefroymovich, Yu. Ye.; Kotlyn, A. K.; Kupradze, G. D.; Kurdiani, I. S.; Natushil, A. V.; Nikol'skiy, L. Ye.; Razmadze, Sh. M.; Svenchanskiy, A. D.; Smelyanskiy, M. Ya.; Tkeshelashvili, G. K.

ORG: none

TITLE: Professor Grigoriy Artemyevich Sisoyan (on his 70th birthday)

SOURCE: Elektrichestvo, no. 8, 1966, 95

TOPIC TAGS: electric engineering personnel, electric furnace, academic personnel

SUB CODE: 09

ABSTRACT: G. A. Sisoyan graduated from the Moscow Power Engineering Institute in 1931. In 1932 he went to work at the Georgian Polytechnical Institute in the theoretical and general electrical engineering department. Sisoyan has worked and published many works in the area of electric furnaces. He has also worked in the area of investigation of electric spark action. He has published over 50 scientific works. He has also been active in university level teaching. Orig. art. has: 1 figure. [JPRS: 38,330]

UDC: 621.36

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YEFROYMSON, O. I.

Efroimson, O. I. - "Study of the heat energy of the TO 3-200 boiler unit operating on Moscow coal under conditions other than those calculated and planned," Trudy Studench. nauch.- tekhn. o-va (Mosk. energet. in-t im. Molotova), Issue 3, 1949 p. 45-49

SO: U-4355, 14 August 53, (Letopis 'Zhurnal 'nykh Statey, No. 15, 1949.)

YEFROYMSON, V. P.

"The segregation of recessive embryonic lethal factors in the inbreeding of bivalent selection strains of silkworms." Department of Genetics, (Chief: M. I. Slonim), Central Asian Institute of Sericulture, (Dir: E. B. Romanov), Tashkent. (p. 625) by Efroymson, V.P.; and Bylova, K. N.

SO: Biological Journal (Biologicheskii Zhurnal) Vol. V, 1936, No. 4