GOKHSHTEYN, B.Ya., kand. tekhn. nauk; TAMAZOV, A.I., inzh.

Three-core transformer for a.c. traction substations. Vest.
TSNII MPS 22 no.3:17-19 '63.   (MIRA 16:7)

(Electric transformers)
(Electric railroads—Substations)

TARASOV, Alexander

[Nonsymmetry of currents and voltages produced at single phase traction loads]

1965. 232 p.

L 14546-66   EWT(m)/EWP(v)/T/EWP(t)/ EWP(k)/EWP(b)   JD/HM

ACC NR: AP6005386   SOURCE CODE: UR/0413/66/000/001/0134/0134

INVENTOR: Sedykh, V. S.; Pashkov, P. O.; Kofman, A. P.; Gokhshteyn, B. Ye.;
Pavlov, A. I.; Likhachev, G. F.

ORG: none

TITLE: A method of producing three-layer metal plates. Class 49, No. 177759

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 1, 1966, 134

TOPIC TAGS: metal plate, three layer plate, clad plate, plate cladding, explosive
cladding

ABSTRACT: This Author Certificate introduces a method of producing three-layer metal
plates by explosive welding. Explosive charges are placed on the outer surface of
the plates to be welded. In order to increase productivity, both outer plates are
welded to the center plate simultaneously by a charge detonated at one point. In
order to improve the quality of the bond, a centering prism is set up on the upper
edges of the plates so that one edge of the prism faces the detonator. Orig. art.
has: 1 figure.
[WW]

SUB CODE: 11/ SUBM DATE: 23Mar64/ ATD PRESS: 4/97
           Cladding 18

Card   1/1   UDC: 621.791.044—419.5

GOKHSHTEYN, D., professor, doktor tekhnicheskikh nauk.

Working process theory of refrigerating plants. Khol.tekh. 30
no.4:58-62 O-D '53.   (MLRA 7:3)
                    (Refrigeration and refrigerating machinery)

MARTYNOVSKIY, V., professor, doktor tekhnicheskikh nauk· GOKHSHTEYN. D.,
        professor, doktor tekhnicheskikh nauk.

        "Techincal thermodynamics." M.P.Vukalovich, I.I.Novikov. Reviewed
        by V.Martynovskii, D.Gokhshtein. Khol.tekh. 30 no.4:76-77 O-D '53.
            (Thermodynamics) (Vukalovich, M.P.) (Novikov, I.I.)

GOLSHTEYN, D.Kh.

Treatment of heart diseases in Kislovodsk. Sovet. med. 16 no.4:12-
15 Apr 1952.   (CLML 22:1)

1. Professor.   2. Koslovdsk. 3. Use of mineral springs baths.

Halogen substituted hydrocarbons as a possible working
agent in binary heat installations   D. P. Hokhshtein

F

17

1689. REGENERATIVE STEAM POWER CYCLES. Gokhshtein, D.P. (Izvestiya Vsesoyuznogo Teplotekhnicheskogo Inst. (Bull. All Union Heat Engng Inst.), Dec. 1947, (12). 23-27). On the basis of an examination of the sources of degradation of energy, formulae are given for determining the efficiency of the regenerative cycle and comparisons are made between various theoretical schemes for making practical use of this cycle.

(L).

A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION

GOKHSHTEYN, L. P. Prof.   Dr. Tech. Sci.

"Application of the Second Law of Thermodynamics to the Analysis and
Computations of Central Heating," Vest. Inzhenerov i Tekhnikov, No.4, 1940.

Energetics Society

GOKHSHTEYN,, D.P. doktor tekhnicheskikh nauk; LITVIN, A.M., redaktor;
BABOCHKIN, S.N, tekhnicheskiy redaktor.

[Entropy method of calculating energy losses] Entropiinyi metod
rashcheta energeticheskikh poter'. Moskva, Gos.energ.izd-vo,
1951. 109 p.   (MLRA 8:11)
         (Heat engineering)

536.75

7319. The role of the increase of entropy in the analysis of thermal processes. D. P. GOKHSHTEIN. *Zh. Trkh. Fiz.*, 21, 1121-36 (*No. 9, 1951*) *In Russian.*

A method is developed of using the increase of entropy in an isolated system for analysing the completeness of thermal processes. It is shown that the degree of deviation of real processes from the ideal ones is more distinctly and objectively characterized by the ability of heat to do work and by the degradation of energy in an isolated system than by the idea of efficiency. The degradation of energy in an isolated system is strictly defined as the product of the increment of its entropy by the absolute temperature of the ambient medium. Owing to the additive nature of entropy, an equation characterizing the degree of perfection of the heat diagram and of the working process of a plant can be developed as a function of the sum of variables; this equation lends itself better to mathematical transformations than that of efficiency, which is a function of a product of variables.

F. LACHMAN

1.   GOKHSHTEYN, D. P.

2.   USSR (600)

4.   Steam, superheated

7.   On the problem of cycles of superheated steam, Energ. biul., No. 12, 1952.

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

GOKHSHTEYN, David Petrovich, RASSKAZOV, D.S., redaktor; SKVORTSOV, I.M.,
        tekhnicheskiy redaktor.

        [Using waste heat in heat pumps] Ispol'zovanie otkhodov tepla v
        teplovykh nasosakh. Moskva, Gos. energ. izd-vo, 1955. 79 p.
        (Heat pumps) (Waste heat)   (MLRA 9:5)

AID P - 1329

Subject   : USSR/Engineering

Card 1/1   Pub. 110-a - 11/19

Authors   : Gokhshteyn, D. P., Doc. of Tech. Sci. and Gorbis, E. R.,
                Kand. of Tech. Sci.

Title   : The prospects of applying combined steam-gas installations
                to direct heating

Periodical   : Teploenergetika, 2, 47-49, F 1955

Abstract   : Schemes of heat and power stations (TETs) working on gas-
                steam and on steam are compared. A thermodynamic and ec-
                onomic analyses show that the gas-steam scheme has no
                substantial advantages over steam, when high and super-
                high parameters of steam are utilized. Diagrams.

Institution : Odessa Technological Institute

Submitted   : No date

GOKHSTEYN, D., professor, doktor tekhnich akikh nauk

Concerning the article, "Degree of thermodynamic efficiency of heat transfer and refrigerating equipment."Khol.tekh. 32 no.1:45 Ja-Mr 1955.
(Thermodynamics)   (MIRA 8:7)

GOKHSHTEYN, DP

1767.   PROBLEMS OF THERMODYNAMIC ANALYSIS OF COMBINED GAS AND STEAM
CYCLES.   Gokhshteyn, D.P.   (Teploenergetika (Izmc For Engia, Moscow) Mb
1957, vol. 4, 42-45).   The expediency is demonstrated, from a thermodynamic
standpoint, of using combined gas and steam installations the upper stage of
which is served by a gas turbine unit in closed circuit and the lower by an
ordinary steam turbine unit.

AUTHOR: Gokhshteyn, D.P.

39 -1-17/18

TITLE: Atomic Energy Installations Thermic Cycle   (O teplovom tsikle atomnykh energeticheskikh ustanovok)

PERIODICAL: Physics and Thermotechniques of Reactors (Fizika i teplotekhnika reaktorov), Supplement Nr 1 to Atomnaya energiya, 1958 (USSR)

ABSTRACT: The following conclusions may be drawn from general considerations:
1.) The thermodynamical analysis of the cooling cycle of an atomic electric power plant shows that it is advisable to use low boiling media as heat carriers (Freon, etc.).
2.) In dependence on the initial conditions and the thermal stability of the low boiling medium either only one or also two cooling cycles can be used. In the inner part of the second cycle it is possible to use a gas (CO_2, He, etc.). In some cases it may, however, also be of advantage to use such low boiling media as are used in the external cycle. In this case each cycle has its own heat transfer to the condenser.
There are 7 figures, 2 tables, and 4 references, 1 of which is Slavic.

AVAILABLE: Library of Congress
Card 1/1

1. Atomic power plants-Heat transfer   2. Reactors-Heat transfer

GOKHSHTEYN, D.P.

Thermal cycle of atomic power plants. Atom. energ. Supplement no.1:
198-204 '58.   (MIRA 11:5)
          (Atomic power plants)   (Heat engineering)

96-58

AUTHOR: Gokhshteyn, D.P., Doctor of Technical Sciences

TITLE: Selection of the Optimum Pressures for Periodic Reheating
of Steam (Vybor optimal'nykh davleniy promezhutochnogo peregreva para)

PERIODICAL: Teploenergetika, 195 ,   ,   - 21 (USSR)

ABSTRACT: The maximum temperature of re-heat is mostly
      governed by operating conditions and boiler design features.
      The problem then arises of selecting the best re-heat
      pressures. This is a short theoretical article on the subject.
      It is based on consideration of the temperature/entropy
      diagram for a steam turbine installation in which the process
      of expansion in the turbine takes place at constant entropy;
      the process of regenerative feedwater heating is reversible
      and is represented on the T-S diagram by a vertical line.
      Formulae are derived for the best re-heat conditions and a
      procedure for making the calculations is recommended.
      There are 5 figures and 1 German reference.

ASSOCIATION: Odessa Technological Institute (Odesskiy tekhnologi-
              cheskiy institut)

AVAILABLE: Library of Congress

Card 1/1

1. Steam turbines-Pressures   2. Entropy

GOKHSHTEYN, D.P.

Quantitative characteristics of irreversible thermal processes.
Nauch. dokl. vys. shkoly; energ. no.2:153-155 '58. (MIRA 11:11)
(Thermodynamics)

GOKHSHTEYN, D. P. Odesskiy tekhnologicheskiy institut

"Problem of Increasing the Efficiency of Large Steam Power Stations Operating with Steam of Super-critical Parameters."

The Commission for High-paramter Steam of the Energeticheskiy institut (Power Institute) imeni G. M. Krzhizhanovskogo AN SSSR held a conference on May 16, 1958 devoted to new types of equipment for block-assembled power stations, operating at super-critical steam parameters. This paper was read at this conference.

Izv. Akad Nauk SSSR, Otdel Tekh nauk, 1958, No. 7, p. 152

Card 1/6

The Problem of Expanding Existing Power Plants

650°C. The efficiency of such a system, working on
natural gas (8533 Cal) with an initial gas temperature
of 700°C, is 38.3% with the VK-100-2 turbine and 34.2%
with the AK-50 turbine. The authors compared the
various possible superimposing and extension systems.
This comparison is shown in table 1. The authors ar-
rive at the following conclusions: 1) From the thermo-
dynamic viewpoint, only such a gas turbine extension
will be more effective at which the internal regenera-
tion of the gas cycle is highly developed. 2) In a
number of cases, a gas turbine extension will be more
profitable than steam superimposing of existing power
plants, provided liquid or gaseous fuel is available.
This peculiarity is especially obvious when superim-
posing power plants with initial steam parameters of
90 atmospheres and 480°C. 3) The lower the parameters
of the steam section of the existing power plant, the
relatively higher the superimposing of such power
plants will be. The efficiency of superimposed power
plants having lower steam parameters will exceed in.

Card 5/6

GOKHSHTEYN, D.P., doktor tekhn.nauk, prof.; KRASOTOV, A.I., kand.tekhn.nauk,
_____ dotsent

Aspects of regenerative feed-water heating in units with intermediate
superheating. Energomashinostroenie 4 no.4:26-31 Ap '58.
(MIRA 11:7)

(Steam turbines)

GOKHSHTEYN, D.P.,doktor tekhn.nauk

"Outlook for the development of steam and gas turbines for electric power plants" by S.A.Aksiutin. Reviewed by D.P. Gokhshtein. Elek.sta. 29 no.11:94-95 N '58. (MIRA 11:12)
(Turbines) (Aksiutin, S.A.)

SOV/96-59-5-6/19

AUTHORS: Gokhshteyn, D.P., Doctor of Technical Sciences   and
              Verkhivker, G.P., Engineer
TITLE: Some Methods of Reconstructing Steam Turbine Electric
              Power Stations Using Steam-Gas Circuits (Nekotoryye puti
              rekonstruktsii paroturbinnykh elektrostantsiy po
              parogazovym skhemam)

PERIODICAL: Teploenergetika, 1959, Nr 5, pp 33-37 (USSR)

ABSTRACT: As a number of steam-driven power stations become
              converted to natural gas fuel, it will be possible to
              make extensive use of open-cycle gas-turbine installations.
              A combined gas-steam cycle offers thermo-dynamic
              advantages. If the heat of the gas-turbine exhaust is
              used to heat feed-water for the steam cycle, the amount of
              steam tapped from the turbines for this purpose is reduced
              and the output for a given steam consumption can be
              increased by 20%. A combined gas-steam installation can
              quite easily be introduced into existing stations with
              quite small cost for equipment and structural alterations.
              The simplest steam-gas circuit for reconstructing existing
Card 1/7   installations with 100-MW condensing turbines type VK-100-2

Some Methods of Reconstructing Steam Turbine Electric Power Stations
Using Steam-Gas Circuits

is given in Fig 1. In this the turbine exhaust gases are
used first to heat the air entering the combustion chamber
and then to heat the feed-water of the steam cycle.
Table 1 gives the results of calculations of the effective
efficiency and output of a steam-gas installation using
the circuit of Fig 1 for various feed-water temperatures.
It is shown that the efficiency of the steam-gas
installation is increased by raising the feed-water
temperature after the water-gas heater. The increase in
efficiency is quite marked up to a feed-water temperature
of 220°C but beyond this it does not increase so rapidly
The circuit shown in Fig 2 considerably reduces the power
taken from the gas turbine part of the installation Here
the feed-water draws heat both from the turbine exhaust
gas that has already passed through an air regenerator and
from the air between the high and the low-pressure
compressors In this case the highest efficiency is
obtained if the feed-water is heated to a temperature of

Card 2/7   101.3°C in the water gas heat exchanger with subsequent

Some Methods of Reconstructing Steam Turbine Electric Power Stations
Using Steam-Gas Circuits

heating to 220 C in the regenerative heaters of the
turbine. With this circuit the increase in efficiency
is less than with circuit 1 because the output of the
gas turbine part of the installation is less. The results
of calculations on circuit 2 are given in Table 2 and it
is shown that in this case quite a small gas-turbine offers
an appreciable increase in efficiency as compared with a
straight steam cycle. A circuit with two stage fuel
consumption is shown in Fig 3 and the results of
calculations on this circuit are given in Table 3. It is
of interest to note the efficiencies with two stage
compression and two stage expansion of gas in the gas
turbine installation: they fall into a pattern similar
to that observed with single stage compression and single-
stage expansion. A schematic circuit for two stage
expansion and two stage fuel combustion with single stage
compression is shown in Fig 4   It increases the efficiency
of the steam-gas installation to 36.7% which is 13% higher

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Some Methods of Reconstructing Steam Turbine Electric Power Stations
Using Steam-Gas Circuits

than for the purely steam cycle. The total output of
the steam-gas installation is 136600 kW and the feed-water
temperature after the steam-gas heater is 220°C. The
improved performance of this circuit as compared with that
shown in Fig 1 results from the greatly increased output
of the gas-turbine part. An important disadvantage of
the circuits mentioned is that the gas air regenerators
and water-gas heaters are very big. In order to increase
the unit output of the gas turbine and to reduce the
size of the regenerators and water heaters there is some
point in using the semi-closed steam-gas-turbine cycle
illustrated in Fig 5. Here the main gas-turbine operates
against a back pressure, the exhaust gases pass through
an air regenerator and water heater before delivery to
the inlet part of the compressor. The part of the gas
needed to supply air to burn the fuel in the combustion
chamber of the main turbine passes into the combustion
chamber of the auxiliary turbine. The chamber also
receives air from the first stage of the auxiliary
compressor and fuel. The gas temperature at the chamber

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SOV/96-59-5-0/19

Some Methods of Reconstructing Steam Turbine Electric Power Stations Using Steam-Gas Circuits

outlet is 700°C as it is after the combustion chamber of the main turbine. The exhaust gases from the auxiliary turbine are passed to a regenerator where they heat up the air and gas supply to the combustion chamber and are then discharged to atmosphere. The auxiliary turbine drives the two stage compressor which delivers combustion air to the main system. With this arrangement the size of the different heat-exchangers can be much reduced. Semi-closed steam-gas cycles are better than closed ones for modernising existing power stations because there is no need to instal an air boiler, also the heating surfaces are smaller and the circuit is simpler and more efficient. Results of efficiency calculations for the circuit are given in Table 4. It is possible to use a circuit in which part of the turbine exhaust gas is used as air to maintain combustion in the boiler furnace. This circuit shown schematically in Fig 6, embodies the semi-closed

Card 5/7   part operating on the circuit already described but without

Some Methods of Reconstructing Steam Turbine Electric Power Stations
Using Steam-Gas Circuits

which burn blast furnace or coke oven gas as well as
solid fuel. For comparison the calculations were made on
a closed steam-gas cycle with single-stage compression
and two-stage heating operating under the same conditions
as the steam-gas semi-open cycle. The effective
efficiency of this installation is 34.7% and the increase
in effective efficiency of the closed steam-gas cycle
compared with the straight steam cycle is 8.05%. As the
ordinary gas-turbine installations developed by Soviet
factories are not the best ones for steam-gas circuits.
there is a need for special versions suited to operation
in combined installations. There are 6 figures 4 tables
and 3 references 2 of which are Soviet and 1 English.

ASSOCIATION: Odesskiy Tekhnologicheskiy Institut (The Odessa
Technological Institute)

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SOV/96-59-8-17/4

ATHOR: Gokhshteyn, D.P., Doctor of Technical Sciences

TITLE: The Influence of Reheat on the Fuel Consumption of a Heat
           and Electric Power Station

PERIODICAL: Teploenergetika 1959. Nr 8 pp 62 63 (USSR)

ABSTRACT: A number of investigations have shown that the use of
           reheat in a heat and electric power for district heating
           station results in considerably less fuel economy than it
           does in condensing stations and even leads to an increase
           in fuel consumption. In condensing sets with regenerative
           heating the use of reheat reduces the irreversibility of
           heat transfer from the combustion products to the working
           substance but increases the irreversibility of heat ex
           change between the heating steam bled from the turbine and
           the regeneratively heated feed water   In a district heating
           station with multi stage pass outs for heating the system
           water the steam is usually tapped from the same plates
           as that used for regenerative heating of the feed water.
           Therefore intermediate reheat in a district heating station
Card 1/4   increases the irreversibility of heat exchange. It results

The Influence of Reheat on the Fuel Consumption of a Heat and
Electric Power Station

to check the magnitude of this effect. The principal for
mulae required for the calculation are given and then the
particular steam circuits shown in Figs 3 and 4 are con
sidered. Both relate to a back out turbine type IVT C
with a steam consumption of 500 tons per hour. In the
of Fig 4 there is reheat and in that of Fig 3 there is
The heating and other conditions assumed are stated and
the data required in the calculations are given in the
Figures. The results of the calculations are tabulated and
show that the circuit with reheat gives 0.% more fuel
consumption than that without reheat. The results
are clearly seen from the table. reheat reduces the power
losses during heat exchange in the boiler by 0.% but
increases the losses of heat exhaust in the regenerative
heaters by 0.% and in the system heaters by 0.% In
addition because of the corresponding increase in the heat
drop in the turbine for the same fuel consumption the
power loss in the turbine increases by 0.1% and in the
condenser by 0.% A further important in the

Card 2/4

SOV/96 59 8 17/

The Influence of Reheat on the Fuel Consumption of a Heat and
Electric Power Station

increase in losses in the condenser is that when reheat is
used the steam entering the condenser is drier and so its
entropy is greater. The losses in the system heaters are
greater than in the regenerative heaters because the total
heat transfer is much greater. The most effective way of
improving the situation is to reduce the superheat of the
heating steam at the inlet to the water heaters so that
the mean temperature-difference of heat exchange in these
heaters is reduced. Fig. 5 shows a steam circuit diagram
designed with this object in mind. Steam taken from the
first two tappings after the gas superheater is cooled in
a regenerative super heater and in water heaters. It is
then used partly in the system heaters and partly in the
regenerative heaters. Data for this circuit are also
tabulated and it will be seen that the energy loss during
heat exchange in the boiler is reduced by 0.18. The
further reduction in the reheat of the heating steam
improves the losses in the regenerative heaters by 0.4
and in the system water heaters by 0.04. The quantity of

Card 3/4

The Influence of Remote on the Fuel Consumption of a Heat and
Electric Power Station

ASSOCIATION: Odessal Tekhnologicheskiy Institut (Odessa
               Technological Institute)

Card 4/4

GOKHSHTEYN, David Petrovich; VERKHIVKER, Grigoriy Petrovich; KURITS,
S.Ya., red.; SHIKIN, S.T., tekhn.red.; LARIONOV, G.Ye., tekhn.red.

[Problem of increasing the efficiency of steam power plants]
Problema povysheniia K.P.D. paroturbinnykh elektrostantsii.
Moskva, Gos.energ.izd-vo, 1960. 206 p.   (MIRA 13:11)
(Steam power plants)

SOV/96-60-2-22/24

AUTHOR: Gokhshteyn, D. P., Doctor of Technical Sciences

TITLE: A Conference on the Introduction of Gas Turbines and
           the Steam/Gas Cycle Into the Power Engineering System
           of the Ukraine

ABSTRACT: On the 21 to 24 September, 1959, a conference was held
           in Odessa on the introduction into the Ukraine of gas
           turbines and the steam/gas cycle. It was called by
           the Scientific Technical Commission of the Council of
           Ministers of the Ukrainian SSR and the Odessa District
           Directorate of the Scientific-Technical Society of the
           Power Industry. The Conference was attended by more
           than 130 representatives of turbine and boiler works,
           design organisations, power systems, and institutes.
           A report by Candidate of Technical Sciences G. B.
           Yakushi of Gosplan UkrSSR noted that the expansion of
           the Ukrainian Power system in the near future would
           result mainly from extension of existing stations, with
           the use of gas turbines of 25 and 50 MW. Acad. I. T.
Card 1/4   Shvets reviewed scientific research work on gas turbines.

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A Conference on the Introduction of gas Turbines and the Steam/Gas
Cycle Into the Power Engineering System of the Ukraine

gas-turbine cycle, with preliminary cooling of the working
substance. Candidate of Technical Sciences K. Y.
Olesevich of the Odessa Polytechnical Institute considered
the development of gas turbines working on solid fuel.
Corresponding Member of the Academy of Sciences Ukr.SSR
A. D. Kovalenko described an investigation at the
Institute of Structural Mechanics of the Academy of
Sciences UkrSSR on the strength of gas turbines.
Corresponding Member Academy of Sciences UkrSSR G. S.
Pisarenko reported the work of the Metallo-ceramic
Institute of the Academy of Sciences UkrSSR on the
development of metallo-ceramic heat-resistant materials
for gas turbine blades. V. S. Martynovskiy(Dr. of Tech. Sc.) of the
Refrigeration Institute described tests on eddy tubes
by which it is possible to approximate to adiabatic
temperature-drops. Candidate of Technical Sciences
Yu. M. Didusenko reported on the work of the Laboratory
of Hydraulic Machines of the Academy of Sciences UkrSSR
to determine the optimum conditions of gas-turbine

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A Conference on the Introduction of gas Turbines and the Steam/Gas
Cycle Into the Power Engineering System of the Ukraine

installations with regeneration of the exhaust-gas heat.
Candidate of Technical Sciences M. I. Korneyev described
the work of the Central Boiler Turbine Institute in
developing high efficiency steam/gas cycles with high-head
steam generators. Further reports were read by Engineer
L. N. Kudryashev, Doctor of Technical Sciences A. I.
Andryushchenko and Engineer V. N. Lapshov of the Saratov
Highway Institute, Candidate of Technical Sciences, A. R.
Gorbis, Engineer V. M. Yankelevich. Acad. I. T. Shvets
and Candidate of Technical Sciences Ye. P. Dyban
described the results of an investigation of the
temperature field of the rotor and casing of a gas turbine,
using analogue methods. Further reports were given by
Engineer D. M. Vaksman, Engineer T. S. Vishnevskiy,
Engineer A. B. Svichar, Engineer G. P. Verkhivker,
Engineer R. Ye. Fechennikov, Engineer A. D. Yaremenko,
Engineer G. Ye. Muratov, and Engineer V. S. Dubchak.
The Conference made recommendations for further work

Card 4/4   on the introduction of gas turbines into the Ukraine.

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E194/E484

26.3/60
26.3200

AUTHOR,   Gokhshteyn, D.P., Doctor of Technical Sciences

TITLE   On the Problem of Raising the Efficiency and Output
               of Gas Turbines

PERIODICAL: Teploenergetika, 1960, No. 12, pp 33-38

TEXT: An unfortunate feature of the gas turbine cycle is that
unlike the steam turbine cycle extraction of heat from the gas
necessarily occurs at a varying temperature so that transfer of
heat to the surrounding medium is accompanied by a large power
loss.   The problem of using the exhaust heat of internal
combustion engines and gas turbines for power generation has not
yet been satisfactorily solved, partly because of the low thermo-
dynamic efficiency of the process and partly because of the
expense of constructing the large surface heat exchangers.   The
mean temperature difference of heat exchange between the exhaust
gases and the steam that they heat may be reduced by using super-
critical steam conditions in the heat exchanger, but with existing
gas turbine exhaust temperatures this is clearly impossible.
Accordingly, the use of low boiling point substances such as freon.

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E194/E484

On the Problem of Raising the Efficiency and Output of Gas
Turbines

or sulphur hexafluoride, which have a low critical pressure,
should be considered for use in the heat exchangers   Accordingly
calculations were made for a number of binary cycles of which the
upper stage is a gas turbine type ГТ-100-750 (GT-100-750) and the
lower stage is an installation working on Freon 12.   The binary
cycle diagram is given in Fig.2 and a block diagram of the
arrangement of the equipment is given in Fig 3.   The efficiency
of the gas turbine alone is 38% and that of the binary set under
the conditions given 43,9%,   Comparative data for the gas
turbine alone and for the binary set are tabulated.   The inclusion
of the Freon stage reduces the power loss by heat exchange to the
surrounding medium by 9,36% whilst the loss due to heat exchange
with the Freon is increased by 1,91%   Previous articles have
considered the idea of developing a cycle having all the heat
regeneration features characteristic of the gas turbine cycle but
with condensation of the working substance as the heat is extracted
from it.   In this case the working substance must, of course
Card 2/5

On the Problem of Raising the Efficiency and Output of Gas
Turbines

have a low boiling point and carbon dioxide has been considered
A carbon dioxide cycle which has been recommended hitherto is
shown in Fig.4.   Cycle characteristics are assumed and
efficiencies are worked out and the heat balance characteristics
of the carbon dioxide set are tabulated.   It is concluded that the
power losses due to irreversibility of heat exchange in the
regenerator for the carbon dioxide set are eight times greater than
the corresponding losses for the gas freon set.   The losses in the
carbon dioxide heat exchanger are 1.13 times greater than those in
the combustion chamber of the gas-freon set.   Curves of heat
exchange in the regenerator of the carbon dioxide set are plotted in
Fig.5 and are discussed.   The possibility of increasing the degree
of regeneration in cycles with low boiling substances by using
combined heat regeneration is discussed and a corresponding carbon
dioxide cycle is shown in Fig.6   A block diagram of the
corresponding plant layout is shown in Fig.7   Comparison of energy
balances shows that the combined regeneration of heat used in the
Card 3/5

S/096/60/000/012/005/008
E194/E484

On the Problem of Raising the Efficiency and Output of Gas Turbines

circuit of Fig.6 reduces the power losses due to irreversible regenerative heat exchange by a factor of almost 3.5 as compared with the usual regenerative cycle of Fig.4. This is the main reason for the corresponding fuel economy of 25%. With a simple circuit, a carbon dioxide installation may have high unit powers of the order of 500 MW per exhaust. The high efficiency of the installation makes it particularly suitable for regions with solid fuels. In conclusion the case is considered of using the exhaust gas heat of a gas turbine to heat the feed water of a steam installation with supercritical initial steam conditions. Fig.8 shows a block diagram of the equipment for such an installation which combines the gas turbine set type GT-100-750 with a steam set type СКК-300 (SKK-300). The main difference between the circuit of Fig.8 and the usual circuits with high pressure steam generator consists in the use of steam at super-critical initial conditions. Curves of heat exchange between gas and steam in this circuit are plotted in Fig.9. It is shown that the use of this cycle increases the output of the steam-gas installation from 300 to 430 MW. It is concluded that the use of combined heat

Card 4/5

86082

S/096/60/000/012/005/008
E194/E484

On the Problem of Raising the Efficiency and Output of Gas
Turbines

regeneration in carbon dioxide power sets makes them very
promising for medium and large outputs   the possibility of
obtaining some hundreds of megawatts per exhaust makes them
particularly attractive.   There are 9 figures 1 table and
8 references 6 Soviet, 1 Czech and 1 German.

ASSOCIATION   Odesskiy tekhnologicheskiy institut
               (Odessa Technological Institute)

Card 5/5

S/096/62/000/003/005/008
E194/E455

AUTHOR: Gokhshteyn, D.P., Doctor of Technical Sciences,
                                                    Professor

TITLE: A thermodynamic analysis of the thermal circuit of a
             magnetohydrodynamic generator

PERIODICAL: Teploenergetika, no.3, 1962, 51-56

TEXT: In a recent American proposal for a magnetohydrodynamic
generator (Ref.1: "Power", v.103, no.11, 1959, 62-65; Ref.2:
"Engineering, I, 1960, 116) thermally-ionized combustion products
pass through a magnetic field so that an electric field is set up
in the combustion products.   Interaction between the magnetic and
electric fields retards the gas flow and electrons pass to the
electrodes.   This article gives a thermo-dynamic analysis of the
circuit described in Ref.1,2 and compares it with steam/gas cycles.
In the published work there seems to be some error in the
temperatures of the combustion products and compressed air before
and after the regenerator and, accordingly, the temperatures are
recalculated.   The steam turbine part of the circuit was taken to
be a ЛМЗ (LMZ) type K-300-240 turbine without the regenerators.
Card 1/4

S/096/62/000/003/005/008
E194/E455

A thermo-dynamic analysis ...

The combustion products are assumed to have the properties of air
and the weight of the fuel is ignored.   A temperature/entropy
diagram of the cycle is given.   Thermodynamically the cycle is
equivalent to an ordinary steam cycle in which part of the heat of
the exhaust is is used for regenerative heating of compressed air
and part is used to produce steam, whilst a small part is
transmitted direct to the surrounding medium.   Energy balances of
two magnetohydrodynamic generators are worked out and tabulated.
The magnetothermodynamic generator is compared with a steam turbine
type K-300-300 which uses a stop-valve temperature of 650°C with
two reheats to 505°C, and has an electrical efficiency of about
44%, i.e. about 11% lower than the expected efficiency of the
magnetohydrodynamic generator.   The difference in efficiency is
due to the difference in energy losses.   In the American cycle,
the initial temperature is very high but its main disadvantage is
that the steam loss is high so that not all the advantages of the
high initial temperature are used.   This is confirmed by
considering the simpler steam/gas circuit of OTИ-1030.
(OTI-Yuza) (Ref.?: D.P.Gokhshteyn, G.P.Verkhivker.   Problems of
Card 3/4

S/096/62/000/003/005/00'
E194/E455

A thermo-dynamic analysis ...

raising the efficiency of steam turbine power stations.
Gosenergoizdat, 1960), which is briefly described here.   The
initial temperature is 1205°C and the total efficiency is 0.53%,
although these are not the optimum conditions for the CTI-Yuza
circuit.   The reason why the Cii-Yuza circuit with a maximum cycle
temperature of 1205°C has an efficiency approaching that of the
magnetohydrodynamic generator with a maximum temperature of
3100°C is explained by comparing the energy balances of the two
cycles.   One of the difficult problems in making a magneto-
hydrodynamic generator is that of ensuring high-temperature
regenerative heating of compressed air.   It would be difficult to
do this in regenerative heat exchangers and it is considered that
it will be simpler to construct regenerators using a flowing solid
heat-transfer medium such as sand.   A circuit of this kind is
described and analysed and it is shown that the efficiency can be
increased by raising the temperature at the end of the
regenerative heating of the compressed air to 2200°C.   Such a
temperature could not be reached with a regenerative heat exchanger.
The use of such high temperatures might delay the development of
Card 3/4

A thermo-dynamic analysis ...

S/000/62/000/003/005/008
E194/E455

the magnetohydrodynamic generator but the prospects of designing
an equipment without metallic heat-exchange surfaces, with a
considerable gain in efficiency is very attractive.   There are
5 figures, 4 tables and 9 references: 5 Soviet-bloc and
4 non-Soviet-bloc.   The four references to English language
publications read as follows: Ref.1, Ref.2 - as quoted in text;
Ref.7: Transaction of ASME, no.6, 1950, 781;
Ref.8: "NBS Circular", 1955, 564.

ASSOCIATION: Odesskiy tekhnologicheskiy institut
             (Odessa Technological Institute)

Card 4/5

GOKHSHTEYN, D.P., doktor tekhn.nauk, prof.

Efficient diagram of a trubine installation for the electric
power system of a district heating plant. Energomashinostroenie
8 no.2:12-14 F '62.   (MIRA 15.2)
        (Heating from central stations) (Steam turbines)

GOKHSHTEYN, D.P., doktor tekhn.nauk

Some means for creating large, highly efficient thermal power
systems. Elek. sta. 33 no.4:4-10 Ap '62.   (MIRA 15:7)
                    (Electric power plants)

BARTEN, David J.   Jilt: A ....: D.S., red.; IX BE(O, J,le.,
        tabh: .d.

        [Will the universe clock ... stop? A popular exposition of
        the theory of entropy] cat oviatnic li .lnosga chasy: Fepu-
        liamne Hil-Chais ndenir eb entropii. T'slna, Gorentrpe-
        irnat, 1 .... 'z' j. (FE-H.2 da teplotchie 'In, no.11)
                                                            (FLA 14:13)
                (Serioge')

GOKHSHTEYN, David Petrovich; KARGAEV, B.S., red.; FRIDKIN, L.M., tekhn. red.

[Entropy method for calculating energy losses] Entropiinyi metod rascheta energeticheskikh poter'. Izd.2., perer. Moskva, Gosenergoizdat, 1963. 109 p.   (MIRA 16:6)
(Heat engineering) (Thermodynamics)
(Refrigeration and refrigerating machinery)

L 33542-65

S/0114/64/000/011/0020/0022

ACCESSION NR: AP5009157

AUTHOR: Gokhshteyn, D. P.(Doctor of technical sciences); Dekhtyaruk, V. L. (Candidate of technical sciences); Tishchenko, B. S. (Engineer); Olesevich, Ye. K. (Engineer); Khalaydzhi, V. N.(Engineer); Ryabova, A. S. (Engineer); Brilov, Y. N. (Engineer); Kozorez, A. I. (Engineer)

TITLE: Medium power carbon dioxide power installation

SOURCE: Energomashinostroyeniye, no.11, 1964, 20-22

TOPIC TAGS: electric power plant, carbon dioxide, electric power source

ABSTRACT: Theoretical principles for carbon dioxide power installations worked out at the Odessa Technological Institute imeni M. V. Lomonosov have shown the possibility for building high power compact units which are more economical than steam and gas turbines. Results of research on an installation of this type with a power of 50 Mw, the UKSU-50, show that the efficiency advantage of the carbon dioxide installation over steam units increases with a transition from high to medium power.

Card 1/3

L 33542-65

ACCESSION NR: AP5009157

Following is the efficiency of the installation and its elements:

Generator power of the installation N, Mw   50.0
Consumption of carbon dioxide G, kg/sec   269.0
Efficiency, %:
    of the compressor, n_c 0.89
    of the pump, n_p 0.80

    of the turbines, n_t 0.90
    of the boiler, n_b 0.92
    of the generator, n_g 0.985
    mechanical, n_m 0.99
    of the thermal flow, n_{tf} 0.90
    of internal requirements, n_{ir} 0.97
    electrical efficiency of the engine room, n_e 44.1
    net, n_{net} 39.0

Card 2/3

L 31542-65

ACCESSION NR: AP5009157

In spite of the low starting temperature of 565°, the 39% efficiency of the carbon dioxide installation exceeds that of gas turbine units with a starting temperature of 675° and higher. Orig. art. has 1 table, 5 figures.

ASSOCIATION: none

SUBMITTED: 00   ENCL: 00   SUB CODE: EM

NO REF SOV: 008   OTHER: 000   JPRS

Card 3/3

GOROBINETS, B.F., doktor tekhn. nauk; LEVCHIN, B.Ya., inzh.

Carbonic acid power system. Energ. stroi. no.41:42

L 33022-66   EWT(l)/EWT(m)/EWP(j)   WW/JW/RM

ACC NR: AP6014394   (N)   SOURCE CODE: UR/0096/66/000/001/0020/0024

AUTHOR: Gokhshteyn, D. P. (Doctor of technical sciences, Professor); 52
Smirov, G. F. (Engineer); Kirov, V. S. (Engineer)   51
                                                      13

ORG: Odessa Technological Institute (Odesskiy tekhnologicheskiy
institut)

TITLE: Characteristics of steam-gas systems with non-aqueous vapors

TOPIC TAGS: steam power plant, thermodynamic analysis, carbon dioxide

ABSTRACT: The article considers the question of the thermodynamic
characteristics of low-boiling substances in steam-gas plants. The main
characteristics are the following: there is no limit to raising the
upper temperature of the working body, which makes it possible to attain
high efficiency; intermediate heating is eliminated; it is possible to
attain a power of the order of 1 million kilowatts at each discharge of
a gas turbine, due to the higher density of the working body compared
with water vapor; and, condensation takes place at the residual pressure.
The article gives flow sheets of systems employing carbon dioxide as the
working body, and two tables give experimental data obtained in such

Card 1/2   UDC: 621.165+621.438.001.13

ACC NR: AP6014394

/

mixed systems. Conclusions are as follows: 1) use of low-boiling
substances in the vapor cycle of a steam-gas plant lowers the specific
fuel consumption by from 3-10% compared to a high pressure turbine
system and by 12-21% compared to a steam power plant operating at the
same temperature; 2) the efficiency of the application of low-boiling
substances increased on going to higher initial temperatures; 3) among
the substances investigated, C_4F_8 gave the highest efficiency. This
means that the most advantageous thermochemical substance should be
sought in the range of critical temperatures from 100-150°C. Orig. art.
has: 6 figures and 2 tables.

SUB CODE: 10/ SUBM DATE: none/ ORIG REF: 010

Card 2/2

ACC NR: AP6021427   SOURCE CODE: UR/0413/66/000/011/0025/0025

INVENTORS: Gokhshteyn, D. P.; Kirov, V. S.

ORG: none

TITLE: Working method of a closed steam turbine system using low boiling matter.
Class 14, No. 182179

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 11, 1966, 25

TOPIC TAGS: steam turbine, carbonic acid, steam condensor, heat source,

ABSTRACT: This Author Certificate presents a working method of a closed steam turbine
system using low boiling matter, such as carbonic acid, and regenerating the heat in
several heaters. The system contains a turbine, a condensor, and pumps for carrying
the working medium in its liquid state (see Fig. 1). To increase its efficiency and
to lower the temperature at the entrance to the condensor, the working medium, after
being condensed, is compressed in stages to its initial pressure by several pumps.
After each pump, it is heated in the regenerating heaters.

Card 1/2   UDC: 621.438-176.2

ACC NR:
AP6021427

Fig. 1.   P - regenerating heaters; T - turbine;
          K - condenser; H - pumps
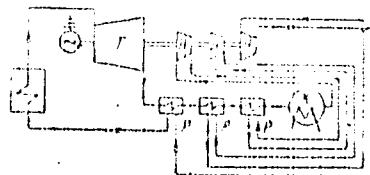
Orig. art. has: 1 figure.

SUB CODE: 21, 13/ SUBM DATE: 18Jan65

Card 2/2

The influence of heat treatment on the structure and
mechanical properties of the tin-containing brasses
"LM-62." V. O. Cogen-Lern and M. B. Bekhshtein.
Metallurg 13, No. 5, 45-48 (1938). — 1939.
I, 1040-1. Alloys with different Sn and Cu content were
subjected to heat treatment to improve their structure
and mech. properties. Quenching treatment gave especially good results; this treatment prevented formation
of the brittle γ-phase in the structure. A subsequent annealing at 400° showed that the γ-phase and
change in structure, the γ-phase being replaced by the
α-phase with some of the excess tin [...]
of the γ-phase [...] with the original composition
being retained. The annealing treatment improved the
mech. properties but the changes were not of [...]
importance.   M. G. Moore

*Relations Between Temperature Distribution and Zonal Development of Dendritic Crystals in Aluminium Castings. V O [...] and M [...] Gokhshtein (Metallurg, 1940, 15, (10), 11–17; *Chem. Zentr., 1941, 112, II, 2186; *Ph., 1944, 38, 1717). [In Russian.] A study of aluminium castings showed that the growth of dendritic crystals in solidifying metal ingots can take place without temperature change in the liquid metal. The moment of interruption in the growth is not directly dependent on the time of temperature equalization in the remaining liquid, nor does it depend on the formation of gaps between the mould and the ingot.

GOKHSHTEYN, M.V., kand.tekh.nauk.

Effect of overheating the melt on the crystallization of aluminum
and its alloys. TSvet.met.27 no.3:42-50 My-Je '54. (MIRA 10:10)

1. Vsesoyuznyy alyuminiyevo-magniyevyy institut.
        (Aluminum--Metallography)   (Crystallization)

ALEKSEYEV, N.S.; BELYAYEV, A.P.; BUGAREV, L.A.; BUTOMO, D.G.; VASIL'YEV,Z.V.;
    VERIGIN, V.N.; VOROB'YEV, G.M.; GAYLIT, A.A.; GOL'SHTEYN, P.M.;
    GOKHSHTEYN, M.B.; ZHOLOBOV, V.V.; ZEDIN, N.N.; IVANOV-SKOBLIKOV, B.I.;
    KUTEPOV, Ya.V.; LANDIKHOV, A.D.; MARAYEV, S.Ye.; MILLER, L.Ye.;
    OL'KHOV, N.P.; PERLIN, I.L.; POSTNIKOV, N.N.; ROZOV, M.N.; CHERNYAK,S.N.;
    CHUPRAKOV, V.Ya.; TSENTER, Ya.A.

    Vladimir Oskarovich Gagen-Torn; obituary. TSvet.met. 27 no.5:67-68
    S-O '54.   (MIRA 10:10)
                    (Gagen-Torn, Vladimir Oskarovich, 1898-1954)

SOV/147-5- - -18742

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 4, p (USSR)

AUTHORS: Belyayev, A.P., Gokhshteyn, M.B., Tsenter, Ya.A.

TITLE: Improvements in the Procedure for Cleaning Raw Aluminum
and for Processing it to Commercial Semimanufactures at
Aluminum Plants (Usovershenstvovaniye tekhnologii ochistki
alyuminiya-syrtsa i pererabotki yego na tovarnyye polufab-
rikaty na alyuminiyevykh zavodakh)

PERIODICAL: V sb.: Legkiye metally. Nr 4, Leningrad, 1957, pp 61-

ABSTRACT: A review is presented of measures carried out in the USSR
and introduced into production to improve the procedures for
cleaning raw Al and for casting it into ingots. It is noted that
raw Al is now cleaned by chlorination in the ladle for 10-15
minutes, ~0.5 kg Cl₂/t Al being used, followed by settling for
up to 1.5 hour in ladles or mixers. Semicontinuous casting of
Al has been introduced. Ideas are presented on the further
improvement of raw Al refining and casting procedures and on
the advisability of organizing the production of Al alloys at new
aluminum plants.   1. Aluminum-- -- -- 2. Aluminum--
3. Aluminum--Purification

Card 1/1   Y.Z.

AUTHOR: Belyaev A.P., and Gokshteyn, M.B., Candidates of Technical Sciences.

136-5-4/14

TITLE: Improvement in the quality of aluminium over the 25-years existence of the aluminium industry. (Uluchshenie kachestva alyuminiya za 25 let sushchestvovaniya alyuminevoy promyshlennosti.)

PERIODICAL: "Tsvetnye Metally" (Non-ferrous Metals) 1957, No. 5, pp. 24 - 29 (U.S.S.R.)

ABSTRACT: After brief notes on the improvements which have occurred in the last 25 years in the production technology of aluminium, the purity of the product is considered in more detail. From the original manual methods for the removal from the electro-lyzer of metal, the industry has by now passed to the use of vacuum-ladles. Refining from non-metallic impurities is carr-ied out by chlorination, electrolytic refining producing the following grades: ABO - 99.93%; ABOO - 99.97%; ABOOO - 99.99% and ABOOOO - 99.996%. Metal is now cast on to casting machines sometimes first passing through the mixer. Mixers are used for casting ingots for wire, a semi-continuous method being used which has appreciably reduced production costs. For wire, ingots of type AO and A1 are used according to ГOCT 4004 - 53. The production of high-purity aluminium has always

Card 1/2

Improvement in the quality of aluminium over the 15-years
existence of the aluminium industry. (Cont.)   136-5-4/14

been a characteristic of the industry and this is embodied in
the latest standard specification (ГOCТ 3549 - 55) which,
unlike the international standard includes four types of alum-
inium with a purity exceeding 99.8% Al (already mentioned).
The new standard includes a specification Si:Fe≤1 for semi-
continuous and continuous casting. The new standard specifi-
cation also requires the oxide and gas contents of pig alumin-
ium to be determined. Determinations by the All-Union Alumin-
ium-magnesium Institute and by works staff have shown that gas
contents are in fact insignificant (0.05 - 0.25 cm^3/100 g for
types A00, A0, A1 and A2 and 0.35 cm^3/100 g for AB000 type
aluminium). In 1956 analyses were carried out by the Institute
of most types of Soviet aluminium for accompanying impurities,
and the results are tabulated in the present article. Although
a high quality has been attained further improvements in
quality, leading ultimately to the production of 99.9999-%Al is
recommended, together with increased mechanisation and auto-
mation of production processes.

Card 2/2

There are 4 Slavic references.

ASSOCIATION: All-Union Aluminium-magnesium Institute. (VAMI)
AVAILABLE:

GOKHSHTEYN, M.B.

      Quality of primary aluminum. Alium. splavy no.1:73-79 '63.
                                    (MIRA 16:11)

L 53966-65   EEO-2/EWT(m)/EWP(w)/EPF(c)/EPF(n)-2/EWA(d)/EPR/T/EWP(t)/EWP(b)/EBL-2
Fs-4/Fs-4   IJP(c)   JD/WW/JG/WB

ACCESSION NR: AP5013604   UR/0136/65/000/005/0082/0085
                                            669.71: 621.315.55

AUTHOR: Krupotkin, Ya. M.; Gokhshteyn, M. B.

TITLE: Effect of niobium, beryllium, and cerium on the mechanical properties
and electrical conductivity of aluminum

SOURCE: Tsvetnyye metally, no. 5, 1965, 82-85

TOPIC TAGS: aluminum conductor, electrical transmission line, aldrey, niobium
additive, beryllium additive, cerium additive, graphite crucible furnace,
corrosion resistance, electrical conductivity, mechanical strength, aluminum
alloy wire

ABSTRACT: The principal shortcoming of aluminum as a conductor material for
electrical transmission lines is its low mechanical strength, which neces-
sitates reducing the distance between the line poles. As for the aldrey type
aluminum-base conductor alloys, they do have a high mechanical strength, but
their electrical conductivity is lower and they involve a complicated
manufacturing process. This applies more or less equally to steel-aluminum
wire. Therefore, the authors investigated the effect of the addition of

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L 53966-65
ACCESSION NR: AP5013604

small amounts of pure Nb, Be and Ce on the strength characteristics and electrical conductivity of aluminum. These elements were added to molten aluminum in the form of corresponding master alloys with 3.06% Nb, 5.3% Be, and 6.24% Ce. The smelting was performed in graphite-crucible furnaces under a bed of a fluxing agent consisting of 75% $CaCl_2$ and 25% technical cryolite. The obtained cylindrical ingots (diameter 26 mm, height 230 mm) were drawn out into wire of 1.96 mm diameter which was then cut into specimens 1.1 m long. Part of the specimens was investigated in cold-drawn state and the other part, following their 4 hr annealing in a muffle furnace at 375±5°C. Electrical conductivity was measured with a DC potentiometer and a mirror galvanometer at 20°C. Corrosion resistance was determined on the basis of weight losses in a solution of 3% NaCl + 0.1% H_2O_2 over a ten-day period. These tests, as well as an investigation of the constitution diagrams Al-Nb, Al-Be, and Al-Ce, showed that niobium is unsuitable since it insignificantly enhances the strength of aluminum and does not easily fuse with this metal. Beryllium may be a useful additive at up to 0.5%; above that amount, e.g., at 1.1%, it reduces the corrosion resistance of aluminum. Cerium increases the strength while at the same time it hardly increases electrical conductivity of the aluminum

Card   2/3

L 53966-65

ACCESSION NR: AP5013604

alloy and preserver the alloy's plasticity; an alloy containing 0.27% Ce has
a relative elongation of 45% in annealed state and 22% in cold-drawn state.
Further, cerium increases the corrosion resistance of the aluminum grains.
Therefore, cerium in small quantities -- up to 0.3% -- is a useful additive for
hardening aluminum and improving its corrosion resistance and electrical
conductivity. Orig. art. has: 1 figure, 1 table.

ASSOCIATION: none

SUBMITTED: 000   ENCL: 00   SUB CODE: MM

MP REF SOV: 000   OTHER: 000

Card 3/3

L 04194-67   EWT(m)/EWP(w)/T/EWP(t)/ETI/EWP(k)   IJP(c)   JD/JG/JH

ACC NR: AP6028589   SOURCE CODE: UR/0129/66/000/008/0060/0062

AUTHOR: Krupotkin, Ya. M.; Gokhshteyn, M. B.

ORG: none

TITLE: Effect of small additions of cerium, iron, nickel and cobalt on the mechanical properties and electroconductivity of aluminum

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 8, 1966, 60-62

TOPIC TAGS: transmission line, electric conductivity, mechanical property, alloying, intermetallic compound, cerium, corrosion resistance

ABSTRACT: The effect of small additions of pure cerium (0.05 to 0.2%), iron (0.25 and 0.5%), nickel (0.3 and 0.6%), and cobalt (0.25 and 0.5%) on the mechanical properties and electroconductivity of aluminum was studied. These elements have low solid solubilities in aluminum and form intermetallic compounds with aluminum. The corrosion resistance of these alloys was determined by weight loss in a 3% NaCl + 0.1% H_2O_2 solution after 10 days. Strength and ductility as a function of cerium content in conjunction with Fe, Ni, and Co additions after cold drawing 97% and after annealing are given. By increasing the cerium content to 0.09% at 0.25-0.5% Fe, the strength rose from 9 to 21 kg/mm² for the cold drawn wires and from 5 to 10 kg/mm² for annealed wires. No further changes in strength occurred after increasing the cerium content to 0.2%.

                                   UDC: 620.17:669.71

Card 1/2

L 04194-67
ACC NR: AP6028589

The electrical resistance decreased with increase in cerium content. By raising the
iron level from 0.24 to 0.52% at 0.09% Ce the specific electrical resistivity increas-
ed from 2.76 to 2.82 microhm-cm; analogous changes in strength and electrical resisti-
vity occurred for Ce-Co and Ce-Ni. With the increase in strength a corresponding
ductility loss was observed: from 30 to 5% elongation after increasing the cerium
content to 0.05% in cold drawn samples and from 60 to 30% in annealed samples. Ceri-
um increased while iron decreased the corrosion resistance of aluminum. In Ce-Co the
corrosion resistance was improved, but it was lowered for Ce-Ni additions. Orig. art.
has: 1 figure.

SUB CODE: 11,20/   SUBM DATE: none/   ORIG REF: 003

Card 2/2

OCHKUR(CHK), V.I.

Recent tectonic movements in the northeastern section of the Irtysh Valley, West. Alt Kazakh. Izv. no.2:76-85 My '61.

(MIRA 14:10)

GOKHSHTEYN, V.P., inzh.; SITNITSKIY, I.H., inzh.

New stonecutting units for working high terraces. Stroi.i dor.mashi-
nostr. 5 no.3:7-10 Mr '60.   (MIRA 13:6)
                (Quarries and quarrying--equipment and supplies)

PHASE I BOOK EXPLOITATION   SOV/4443

Akademiya nauk SSSR. Komissiya po analiticheskoy khimii

Metody opredeleniya primesey v chistykh metallakh (Methods of Determining Admix-
    tures In Pure Metals) Moscow, 1960. 411 p. (Series: Its Trudy, 12) 3,500
    copies printed.

Resp. Eds. A.P. Vinogradov, Academician, and D.I. Ryabchikov, Doctor of Chemical
    Sciences; Ed. of Publishing House: M.P. Volynets; Tech. Ed. T.V. Polyakova.

PURPOSE: This collection of articles is intended for chemists, metallurgists and
    engineers.

COVERAGE: The articles describe methods for detecting and determining various ad-
    mixtures and their traces in pure metals. Also discussed are many chemical,
    physicochemical, electrochemical, spectrochemical and luminescence methods of
    analyzing materials of high purity. The editors state that these methods have
    been developed within the last five or six years by various Soviet scientific
    institutes, and are now widely used in research and factory laboratories of the
    Soviet Union. No personalities are mentioned. References, mostly Soviet,
    accompany each article.

Card 1/9

Methods of Determining Admixtures(Cont.)   SOV/4445

TABLE OF CONTENTS

Card 2/9

Methods of Determining Admixtures (Cont.)   SOV/4443

Card 4/9

Methods of Determining Admixtures (Cont.)   SOV/4443

Card 5/9

Rare earths and thorium from monazite G. P. Aleksandrov and Ya. P. Gokhshtein. Russ. 39,684, Oct. 31, 1934. Monazite is extd. with H_2SO_4 or is chlorinated and extd. with water. The soln. is treated with $Mg(HSO_4)_2$ and the ppt. worked up in the usual way.

Separation of rare earth metals from loschottite. N.
P. Rakhshtein and F. S. Burk et al. Rare Earths, Min.
1935. Loschottite is decomposed with conc. HCl, and
the products of decomposition treated with 25 parts of 2 N
N HCl, or with 10 parts of water and neutralized to 2 N
HCl.

ASM S.L.A. METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

Precipitation of rare earths and thorium with magnesium bisulfite. G. P. Aleksandrov and Ya. P. Gokhshtein. *Redkie Metal.* 4, No. 6, 27-31 (1935). — Pptn. of Th and rare earths with $Mg(HSO_3)_2$ from sulfate and chloride solns. led to recoveries of 96-100 and 80-100%, resp.

H. W. Rathmann

A.S.M. S.L.A. — METALLURGICAL LITERATURE CLASSIFICATION

Polarographic analysis of commercial barium chloride.
Ya. P. Gokhshtein. *Zavodskaya Lab.* 5, 28-32 (1936).
Com. BaCl₂ was analyzed with the use of the Heyrovský
and Schikat polarograph with an accuracy of 1%. Fe and
2.5% BaCl₂. To det. insol. matter, dissolve 1 g. BaCl₂
in 15 cc. H₂O, filter, wash with a little hot H₂O and det.
as usual. To det. Fe, transfer the filtrate, not over 25
cc. vol.) into the electrolytic cell, treat the soln. with
H₂S (5 min.) and expel the excess of H₂S with H₂. Test
the soln. with KSCN for the absence of any Fe···, and
take the polarogram. On the same polarogram take the
curve of a standard soln. of Fe as a concn. of 10⁻⁵ to 5 ×
10⁻⁴ N at the galvanometer sensitiveness of 1:840.
Calc. by the formula ... Com. BaCl₂ ... To det. the Ba ion, dissolve 0.1 g. BaCl₂ in 100 cc. of
0.01 N LiCl, transfer 25 cc. of the soln. into the electrolytic
cell, pass H for 30 min., and take the polarogram. Com-
pare this with the polarogram of a standard soln. of BaCl₂
of 1 × 10⁻⁴ to 10⁻² N at the galvanometer sensitiveness
of 1:250, and calc. as above. An accuracy of 0.5% Ba
is obtained by titration of BaCl₂ with K₂Cr₂O₇ by the
method of Nazarenko (*C. A.* 29, 7844). C. B.

Polarographic analysis of commercial zinc chloride
Ya. P. Gokhshtein. Zavodskaya Lab. 5, 158-61 (1939).—
C. A. 30, 4430.—To det. Zn in com. $ZnCl_2$, dissolve 2 g. $ZnCl_2$ in 1 l. H_2O, pass SO_2 through the soln
and expel the excess SO_2 with H. Add 11 cc. of 0.1 N KCl
to 4 cc. of the soln., transfer the mixt. into an electrolytic
cell and take the polarogram. To det. combined H_2SO_4,
introduce into the cell 5 cc. of 10 g. $ZnCl_2$ in 1 l. H_2O, add
an excess of 0.001 N $BaCl_2$, let stand 2 hrs., introduce 2 cc. of
0.1 N LiCl and take the polarogram. The difference be-
tween the amts. of $BaCl_2$ used and polarographically detd.
(excess $BaCl_2$) gives the combined H_2SO_4. For joint detn.
of Al and Fe, treat 2 g. $ZnCl_2$ in H_2O with HNO_3, ppt.
with NH_4OH at 60-70°, filter off $Al(OH)_3 + Fe(OH)_3$,
dissolve the ppt. in dil. HCl, neutralize the soln. with
0.1 N NaOH to $p_H = 3$-4, dil. to 100 cc., pass in SO_2, expel
the excess SO_2 with H, withdraw 5 cc. of the soln., add
15 cc. of 0.1 N $CaCl_2$ and polarograph. The polarograms
of the added electrolytes (KCl, LiCl, $CaCl_2$) should be
previously detd.   Chas. Blanc

A.S.M. S.L.A. METALLURGICAL LITERATURE CLASSIFICATION

Polarographic determination of sulfate ion. III. Ya.
P. Hokhstein. Zavodskaya Lab. 5, 1444 (1936). cf.
C.A. 30, 4280. Accurate results were obtained by detg.
sulfate in Et₂NI or Me₄NI electrolyte in the air at the gal-
vanometer sensitiveness from 1:20 to 1:100 with the use of
the Heyrovsky and Berezicky polarograph (C.A. 23,
2684). Charge an electrolytic cell with 10 cc of 0.01
N Et₂NI, 0.1 N LiOH to pH = 10, add a definite vol. of
BaCl₂ of known concn. and 1 drop of methyl orange, and
proceed with the visual detn. of the approx. amt. of the sul-
fate soln., corresponding to the Ba⁺⁺ concn. in the ele-
trolyte. Take the polarogram of the soln. similarly
prepd., introduce 0.5 cc less of the sulfate soln. than was
used in the visual test and then add the balance dropwise
and det. the polarograph after each drop.   C. H.

ASM-SLA   METALLURGICAL LITERATURE CLASSIFICATION

Determination of lead. J. P. HOCHSTEIN (Zavod. Lab., 1937, 6, 269). Polemical, against Gaptschenko and Scheintzis (ibid., 1935, 4, 808, 1014). R. T.

Effect of concentration of an indifferent electrolyte on the rise of diffusion current of a given cation. Va. P. Hokhshtein. *J. Gen. Chem.* (U. S. S. R.) 7, 780-05 (1937). In a series of expts. made to det. the effect of concn. c' of the indifferent electrolyte, serving as the conducting medium, on the diffusion current i of a given cation, the concn. c of the cation in Euken's equation (*Jour.*

Chim. Tchecoslovaque 6, 453-67 (1934)), $i = \frac{2\pi R I F_i}{n k}$

(c'), c was kept const. while c' was varied. It was found that by increasing c' in the concn. interval up to $10^{-4} N$ the diffusion current i first decreases abruptly down to a min., depending on the concn. of the indifferent electrolyte and of the cation being investigated, then, passing into the range of moderate and high concns., i gradually increases. The cations of the following salts were investigated: $ZnCl_2$ in solns. of $LaCl_3$, $BaCl_2 \cdot 2H_2O$ and KI, $NiSO_4 \cdot 7H_2O$ in solns. of $LaCl_3$ and $BaCl_2 \cdot 2H_2O$; $FeSO_4$ in solns. of KCl and LiCl, $MnSO_4$ in solns. of LiCl.

S. I. Madorsky

Effect of concentration of cyanide ion on the magnitude
of potential of deposition of nickel on the mercury drop
cathode and on the height of diffusion wave of the latter

Polarographic determination of nitrate in the presence of sulfate ion Yu. P. Hokhshtein *J. Applied Chem.* (U. S. S. R.) 10, 521 7 in German 526 1937. An electrolyzer is filled with the following solns.: an unknown, a sufficient amt. of 0.01 N H_2O for the disappearance of red color caused by methyl orange, 1 2 cc. of N LaCl, and an excess of $BaCl_2$. After connecting the electrolyzer with the polarograph, the reduction of nitrate is observed visually by the usual polarographic procedure. The polarogram of the standard KNO_3 soln. is also taken. The calcn. is made by means of the equation $c_x = n_x \cdot c_s / h_s$, where h_x and h_s are the height of wave for the nitrate in the unknown and standard solns., and c_x and c_s the concn. of nitrate in the unknown and standard solns., resp. In the presence of LaCl the reduction of nitrate begins at 1.3 v. The LaCl concn. should be at least 50 times greater than that of the nitrate. The analysis is carried without a preliminary removal of O of the air.

N. A. Pulvens

Precipitation of rare earths from solutions of lovchorrite
Ya. P. Kokhshtein. *Sdkie Metal* 7, No. 1, 40 1 1938.
Pptn. of rare earths from sulfate solns. with $Mg \cdot HSO_4$
yielded recoveries of 88-91%. H. W. Rachmann

A S M S L A METALLURGICAL LITERATURE CLASSIFICATION

The effect of concentration of cyanide ion on the magnitude of the potential of deposition of nickel on a dropping mercury cathode and on the height of the diffusion curve of the latter. N. P. Hokhshtein and A. N. Frumkin. Zhur. Fiz. Khim. 11, 25-41. In dil. KCN soln the anodic potential is neg with respect to a calomel electrode taken as 0. At a KCN concn of 1 to 1.5, anodic potential becomes pos, at higher concns it approaches 0 and then again becomes neg. In the electrolysis of freshly prepd soln contg Ni salts and KCN the height of the diffusion curve for Ni increases continuously with the Ni. KCN is in excess of the amt containing with the Ni, column decreases. Increase of the concn of the column decreases Ni in effect the Ni.

Adsorption and reduction of oxygen of the air on the dropping mercury cathode in the presence of CN^- and S^{--}. Ya. P. Hokhshtein. *J. Gen. Chem.* (U. S. S. R.) 9, 2055-60(1939).—The "pos." O max. was changed to "neg." in the presence of small amts. of KCN (about 5×10^{-4} N) and at the same time the height of max. increased, but, with an increase of KCN concn., the max. became again "pos." with respect to the zero point. In the presence of small amts. of S^{--} (about 5×10^{-4} N) the O max. remained "pos." although approaching the zero point, an increase of the S^{--} concn. caused the max. to become more "pos." The depression of O max. by S^{--} was observed when the concn. of the S^{--} was $^1/_3$ that of CN^-. The diffusion waves for O, obtained in the Na₂S soln. were considerably smaller than those obtained in the presence of KCN.

A. A. Podgorny

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The influence of anions on the reduction of nitrate ion
at the dropping-mercury cathode. Ya. P. Hokhshtein.
J. Gen. Chem. (U. S. S. R.) 10, 1057-62, 1940. — When 1
ml. 1 N LaCl₃ is added to 1 ml. 0.01 N KNO₃ in an electrotitrating app., the curves show 2 waves, one due to
NO₃ reduction (height 31 mm.) appears at -1.4 v.
In the presence of 0.1 N CN, the height of the second
wave increases considerably. When the CN concn. increases, the height of the first wave continues to increase
slowly; at a KNO₃/KCN ratio of 1:1 the height of the
second wave is decreased. In the presence of 1 N SCN,
the height of NO₃ wave increases to 58.2 mm. and then
begins to decrease. — S. Kasarnoff

A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION

Depression of the maximum on the polarographic curves and the displacement of the reduction potentials of ions on the curve of current strength vs. tension. Ya. P. HOKHSHTEYN. J. Gen. Chem. (U. S. S. R.) 10, 1663-7 (1940).- The depression of the max. formed during the sepn. of Tl from Tl_2SO_4 solns. was investigated. The curves were plotted in the absence of air. The displacements on the polarographic curve of the potentials of the sepn. of cations are caused by surface-active substances. There is a relation between the displacement of the max. of the electrocapillary curve and the displacement of the potential of the sepn. of Tl cations on the polarographic curve. During the displacement of the potential of the sepn. of ions on the current strength-tension curve in the pos. direction the max. of the electrocapillary curve is displaced to the more neg. values of E (as in the presence of CN-), while during the displacement of the max. of the cation in the neg. direction the electrocapillary zero position is displaced in the direction of the more pos. values of E (as in the presence of Tl). The height of the max. on the polarographic curve depends on the distance between the max. position and the electrocapillary zero position. The depression of the pos. max. of Tl under the influence of Al ions and the decrease of the height of the neg. max. of Tl by PO_4^{---} can be explained by the theory of Frumkin about the nature of max. current strength. The max. of Tl are lowered in the presence of multivalent ions PO_4^{---} and Al^{+++} because of the formation of an adsorbed film which has a depressing effect on the motion of the surface of the Hg cathode. This decreases the mixing of the soln. and causes a drop of the max. of the current strength formed by the reduction of Tl^+. Similar phenomena are observed on adding fuchsin to solns. contg. Tl_2SO_4. Six references.

W. R. Henn

Reduction of molybdenum ions at a dropping-mercury cathode. Ya. P. Hokhshtein. *J. Gen. Chem.* (U. S. S. R.) 10, 1725–32(1940).—H. studied the effect of pH on the polarographic wave in the electrolysis of 0.1 N $Na_2MoO_4.2H_2O$ solns. in the absence and in the presence of PO_4 ion. Various quantities of 0.1 and 1.0 N HNO_3 in the first case, and 0.4407 N $HClO_4$ in the 2nd, were added. Beginning at pH 3.27, Mo ions are produced at the Hg cathode. From pH 1.44 the height of the wave increases rapidly. In the presence of PO_4 ion the reduction of ions begins at pH 3 and the wave is smaller than the 1st case. H. suggests that beginning at pH 4.5 the anion $(H_3Mo_8O_{11}.aH_2O)^{---}$ (I) is formed. It is adsorbed on the surface of the Hg drop. With $E = 0.45$ v., I is produced on the Hg cathode according to: $I + 2e \rightarrow (HMo_8O_{11}.aH_2O)^{----}$ $+ H_2$. Beginning at pH 1.8 and at stronger H-ion concns. the Mo ions are transformed into complex pos. ions of lower mol. wt. They have stronger diffusion qualities than I. Below pH = 0.9 only complex pos. ions are produced on the Hg cathode.　　　　R. Richman

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