BELENKOV, V.P.

The BZ-49 automatic machine for grinding reamers.   Biul.tekh.-ekon.
inform.   no.6:21-22   '60.   (MIRA 13:9)
                        (Grinding machines)

YEVSTAF'YEV, A.G., kand.tekhn.nauk; LEVIKOV, P.M.; KOTENKO, L.A.;
    BELENOV, Ye.A.

Characteristic process parameters of continuous washing of the fraction
boiling in the 140-145° range. Koks i khim. no. 5:39-41 '61.

(MIRA 14:4)

1. Moskovskiy institut khimicheskogo mashinostroyeniya (for Yevstaf'yev,
Belenov). 2. MKGZ (for Levikov). 3. TSentral'nyy nauchno-issledovatel'-
skiy institut kompleksnoy avtomatizatsii (for Kotenko).
        (Coke industry--By-products)   (Benzene)

BELENOV, Ye.A.; BOYARCHUK, P.G.; ZYKOV, D.D.

Method of calculating mass transfer coefficients. Khim. prom.
40 no.10:754-756 O '64.   (MIRA 18:3)

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Certain features of the mass transfer equations. Khim. prom.
40 no.10:762-763 O '64.
(MIRA 18:3)

Bejenkov, K.F.

Light-stable lithopone. D. M. Krasinskaya and K. F. Belenkov. Russ. 25,662, Mar. 31, 1933. $ZnSO_4$ is treated with a soln. of Na_2CrO_4 or $K_2Cr_2O_7$. The product is then treated in the usual manner to ppt. Fe and the filtrate is treated with Zn dust or metallic Zn.

SUKHAREV, N.; BULYCHEVA, O.; BELENKOV, E.

Rapid method for determining the moisture content of meat.
Mias. ind. SSSR 32 no.1:11-13 '61.   (MIRA 14:7)
                    (Meat—Drying)

Belenkova, Lyu.

Electrochemical method of improving the quality of electron-hole treatment in selenium rectifiers. L. Yu. Belenkova, I. Kh. Geller, D. N. Nasledov, and F. H. Tartakov-skaya. *Russia. ; Bulletin*. (, 1121-0(1969).—After recrystn. Se disks were placed in an electrolytic cell in such a manner that only this Se surface touched the electrolyte. The Al disks parallel to the Se served as the anode. Acetone satd. with H₂S, an acetone soln. of CdEt₂ or EtOH served as electrolytes. This novel treatment considerably improved elec. parameters, making them compatible to or better than those obtained by the standard sulfurization method.   A. P. Katisky

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cut-off layer in selenium elements." Min Higher Education
USSR. Leningrad Polytechnic Inst imeni M.I. Kalinin.
Leningrad, 1956
(Dissertation for the Degree of Candidate in Technical
Sciences)

So: Knizhnaya Letopis', No. 18, 1956

BELENKOVA, M.A.

Influence of lipocain on the course of acute and chronic dysentery
in children. Vop.okh.mat.i det. 2 no.3:27-30 My-Je '57. (MIRA 10:7)

1. Iz Sverdlovskoy 4-y detskoy infektsionnoy bol'nitsy (glavnyy
vrach M.N.Romanenko, nauchnyy rukovoditel' - doktor meditsinskikh
nauk V.S.Dubrova)
      (DYSENTERY)   (PANCREAS)

PSELENUKOUS, M.M.

13073* (Russian.) The Influence of the Cooling Rate in Thermomagnetic Treatment on the Magnetic Properties of Cold-Rolled Transformer Steel. Vliianie skorosti okhlazhdeniia pri termomagnitnoi obrabotke na magnitnye svoistva kholodnokatannoi transformatornoi stali. D. D. Mishin and M. M. Belenkova. Fizika Metallov i Metallovedenie. v. 2, no. 2, 1956, p. 370-374.

Determines the dependence of changes in the magnetization curve, magnetostriction, and coercive force on the cooling rate. The lower the rate, the stronger its effect. The effect of the thermomagnetic treatment is anisotropic.

URAL'SKIY gosudarstvennyy universitet im. A.M. Gor'kogo.
(Steel Magnetic properties)

SOV/126-6-4-9/34

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

TITLE: The Effect of Small Additions of Antimony and Beryllium
            on Ageing of the Copper-Silver Alloys (Part 1V. On the
            Problem of Causes of the Effects of Small Alloying
            Additions on the Kinetics of Ageing of Alloys)
            (O vliyanii malykh primesey sur'my i berilliya na
            stareniye splavov med' - serebro (k voprosu o
            prichinakh vliyaniya malykh primesey na kinetiku
            stareniya splavov. 1V))

ABSTRACT: In his previous work (Ref.1-3) the result of which
            indicated that small additions of horophilic elements
            (elements showing preference for the grain boundaries)
            present in a supersaturated solid solution could affect
            the kinetics of its decompositon by the mechanism of
            adsorption enrichment of the structurally distorted
            zones linking the nuclei of decomposition with the solid
Card 1/11   solution matrix, Arkharov studied the effects of single

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the Effects of Small Alloying Additions on the Kinetics of Ageing
of Alloys)

additions. The object of the present investigation
was to study the simultaneous effect of two horophilic
additions. The experimental alloys whose detailed
chemical analysis is given in a table on p 633,
contained 6% Ag with 0.2 - 0.5% Sb and 0.02 - 0.3% Be
added either separately or jointly. The alloys were
melted in a H.F. induction furnace, in a graphite
crucible with borax used as the covering flux. The
cast ingots were heated under charcoal to 800°C, held
at the temperature for 2 hrs and cooled in the furnace.
They were then rolled to strip 5 mm thick which, after
a homogenising treatment consisting of 50 hours at
800°C was used for the preparation of the experimental
test pieces. The process of ageing was studied by
measuring the variation of hardness, magnetic
susceptibility and electrical resistance. The
Card 2/11 measurements of Rockwell hardness were taken at

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15-30 minute intervals on specimens solution treated
at 780 - 790°C and aged at 370°C. Magnetic
susceptibility was measured with the aid of a magnetic
balance at room temperature and at 370, 400 and 420°C.
The measurements were taken at 10-15 minute intervals
and in every case the value of relative magnetic
susceptibility was determined, i.e. the force acting
on the investigated specimen was compared with the force
acting on a standard nickel sulphate specimen placed in
an identical magnetic field. Electrical resistance was
measured by the comparison of potential drop method,
using a potentiometer and a sensitive galvanometer.
In this case, both the solution treatment and ageing
(at 370°C) were carried out in vacuum and the
measurements were taken at 15 minute intervals. From
the experimental data the average rate of ageing
Card 3/11   (v_{cm} = the ratio of the maximum increment of the studied

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The Effect of Small Additions of Antimony and Beryllium on Ageing of the Copper-Silver Alloys (Part IV. On the Problem of Causes of the Effects of Small Alloying Additions on the Kinetics of Ageing of Alloys)

property to the length of time required to effect this variation) was calculated for various investigated alloys and the results were reproduced graphically. Fig.1 shows how v_{cm} (assessed on the basis of hardness measurements) of alloys with a constant Sb content aged at $370^{\circ}C$ varied with increasing Be content. The variation of v_{cm} (calculated from the data on magnetic susceptibility) of alloys containing 0.2% Sb and aged at 370, 400 and 420° with increasing Be content is shown in Fig.2, while Fig.3 shows the effect of Be on v_{cm} (determined on the basis of electrical resistance measurements) of the 0.2% Sb alloy aged at $370^{\circ}C$. The effect of the Sb and Be additions on the course of the ageing process in its various stages was determined on the basis of the measurements of magnetic

Card 4/11   susceptibility, since this property could be measured

The Effect of Small Additions of Antimony and Beryllium on Ageing of the Copper-Silver Alloys (Part IV. On the Problem of Causes of the Effects of Small Alloying Additions on the Kinetics of Ageing of Alloys)

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

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The Effect of Small Additions of Antimony and Beryllium on Ageing
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the Effects of small Alloying Additions on the Kinetics of Ageing
of Alloys)

and the greater is the magnitude of the effect.)
The effect of 0.2% Sb on ageing of Cu-Ag alloys
containing 0.02 and 0.1% Be (Fig.5) is similar to its
effect on the binary Cu-Ag alloy. The same applies to
the effect of simultaneous additions of Sb and Be,
except that in this case the maximum value of Δ_χ
decreases with increasing Be content (Fig.6). The
effect of Be on kinetics of ageing of the Cu-Ag alloy
containing 0.2% Sb is much more complex. At small
concentrations (0.02%) beryllium accelerates ageing of
the Cu-Ag-Sb alloy (graph 1) in all stages of the
process, Δ_χ reaching its maximum after 1 hr. 0.1% Be
slows the process down in its initial stage and
accelerates it slightly in the final stage. When
present in larger quantities (0.2 - 0.3%) it slows
Card 6/11   down the ageing process of the Cu-Ag-Sb alloy at every

The Effect of Small Additions of Antimony and Beryllium on Ageing of the Copper-Silver Alloys. (Part IV. On the Problem of Causes of the Effects of Small Alloying Additions on the Kinetics of Ageing of Alloys)

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

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

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the Effects of Small Alloying Additions on the Kinetics of Ageing
of Alloys)

overall concentration of the additions present
simultaneously in the alloy: At a given Sb
concentration, beryllium - when present in small
quantities - is absorbed mainly in the form of complexes
with the result that the concentration of Sb in the
adsorption zone is increased and its accelerating effect
on the decomposition of the solid solution is multiplied.
On the other hand, when the Be content is high, it is
adsorbed in the form of single atoms which increases
its concentration in the adsorption zones with the
result that the rate of decomposition is slowed down.
The effects of Be and Sb on the course of the ageing
process are also non-additive. In the initial stages
of the process when formation of nuclei of decomposition
is the predominant factor affecting the kinetics of
decomposition, the effects of the alloying additions on
Card 9/11   nucleation due to local lattice distortions in the

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The Effect of Small Additions of Antimony and Beryllium on Ageing
of the Copper-Silver Alloys. (Part IV. On the Problem of Causes of
the Effects of Small Alloying Additions on the Kinetics of Ageing
of Alloys)

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

Card 10/11   of the decomposition nuclei the character and magnitude

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The Effect of Small Additions of Antimony and Beryllium on Ageing of the Copper-Silver Alloys. (Part 1V. On the Problem of Causes of the Effects of Small Alloying Additions on the Kinetics of Ageing of Alloys)

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

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

SUBMITTED: 18th December 1956.

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BELENKOVA, M.M.

SOV/3355

18(7)   PHASE I BOOK EXPLOITATION

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

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

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

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

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

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Boustern, S. Z., I. Oudkova, A. A. Zhukhovitskiy, and S. T. Kishkin. Effect of Stress and Strain on the Diffusion Process   158

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Postnikov V. S. Internal Friction of Pure Metals and Alloys

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AUTHOR: Belenkova, M.M.

TITLE: On the Influence of Hot Forming on the Magnetic
             Properties of Austenitic Steel

PERIODICAL: Akademiya nauk SSSR. Ural'skiy filial, Sverdlovsk.
             Institut fiziki metallov. Trudy, no.22, 1959, pp.73-75

TEXT: To improve the strength of austenitic steels, hot and
semi-hot work hardening is currently applied. Change in the
mechanical properties as a result of work hardening is due in the
first instance to structural transformations caused by deformation
and also by the subsequent long-run holding at elevated tempera-
tures. The basic difficulty in studying phase transformations in
austenitic steels is the fact that the quantity and dimensions of
the rejected phase are very small and cannot be detected by X-ray,
metallographic and other methods (Refs. 1 and 2). In view of the
pronounced differences in the magnetic properties of the para-
magnetic base, the carbides and the ferromagnetic α-phase,
preference should undoubtedly be given to magnetic metallography
and thermomagnetic analysis, i.e. to the study of the magnetic
susceptibility, its dependence on the magnetic field potential and
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E073/E535

On the Influence of Hot Forming on the Magnetic Properties of
Austenitic Steel

the temperature.   The author has investigated the susceptibility of
two grades of austenitic manganese steel. Determination of the
magnetic susceptibility reduces to measuring the mechanical force
acting on a specimen which is placed into a non-uniform magnetic
field.   The apparatus for measuring the magnetic susceptibility
consists essentially of magnetic scales as described by
V. I. Drozhzhina and R. I. Yanus (ZhETF, 1936, 6, No.3, 250).   A
specially selected shape of the pole-shoes of the electromagnet
enable obtaining a highly nonuniform magnetic field in the x-
direction.   The current in the electromagnet was varied between
0 and 8 A corresponding to a field potential between 0 and 4200 Oe.
The force acting on the specimen when placed between the poles of
the electromagnet was balanced by a pulling or pushing force from
the compensating coil of the permanent magnet.   The balancing force
was proportional to the current flowing through the compensation
coil at the instant of compensation.   In this case the following
relation is valid

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$$\chi_x = \frac{i_x}{P_x} \frac{P_c}{i_c} \chi_t = \frac{i_x}{P_x} C \quad \text{where} \quad C = \frac{P_c}{i_c} \chi_c = \text{const.}$$

and this constant is determined by preliminary calibration of the scales with a reference standard.   In these equations χ_x and χ_c are, respectively, the susceptibilities of the specimen under test and the standard. P_x and P_c are, respectively, the weights of the tested specimen and the standard. i_x and i_c are not defined. As a standard Mohr's salt was used, the susceptibility of which is

$$\chi_c = 9500 \cdot 10^{-6}/(T + 1) \text{ abs.units}$$

For measuring the magnetic susceptibility at various temperatures a bifilar wound electric heater was placed between the poles of the electromagnet.   The specimens were parallelepipeds 3 x 4 mm cross-section, 10 mm high.

Steel 60X3Г8Н8В (60Kh3G8N8V). Heat treatment, hot forming of the specimens and investigation of their mechanical properties were

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carried out in the Laboratory of Physical Metallurgy of the Institut fiziki metallov AN SSSR (Institute of Physics of Metals, AS, USSR); after forming, the specimens were dropped into cold water. The magnetic susceptibility of quenched undeformed specimens was 28 to 30 x 10^{-5} abs.units.   After deformation at room temperature, the susceptibility changed only slightly (within the range of measuring errors). Equally, deformation at the temperatures 500, 1000 and 1100°C did not produce any appreciable change in the susceptibility.   The temperature dependence of the magnetic susceptibility of this steel (after 22% reduction) is plotted in Fig.1 (magnetic susceptibility vs. deformation temperature, °C). The slight change in the susceptibility after deformation permits the conclusion that, for the given degree of deformation, the austenite remains stable, i.e. it does not decompose under the effect of cold (20°C) or hot working. The stability of the austenite is attributed to the chemical composition of this steel (0.58 to 0.71% C, 8% Ni).

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Steel 40X3Г18 (40Kh3G18)   Specimens of this steel were worked at
temperatures between 20 and 1100°C at steps of 100°C. The depen-
dence of the susceptibility on the deformation temperature (°C) is
plotted in Fig.2 (for specimens with 22% reduction). The suscepti-
bility of quenched undeformed specimens was 30 to 32 x 10^{-5} abs.
units; deformation at room temperature led to a sharp increase in
the magnetic susceptibility, to 300 x 10^{-5}. An increase in the
deformation temperature led to a reduction in the susceptibility;
at the deformation temperature of 100°C the susceptibility was
97 x 10^{-5}, at 200°C it was 33 x 10^{-5} and further increase in the
deformation temperature did not lead to any change in the suscepti-
bility except for the temperature range 550 to 600°C, where a
relatively small increase in the susceptibility of 47 x 10^{-5} was
observed. The considerable increase in susceptibility during cold
working indicates austenite decomposition with rejection of a
ferromagnetic α-phase. Austenite decomposes also at the deforma-
tion temperature of 100°C; the presence of a ferromagnetic phase in

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specimens deformed at 100°C is proved by the dependence of the
susceptibility on the magnetic field potential. At deformation
temperatures above 200°C austenite does not decompose. The slight
increase in the magnetic susceptibility in the temperature range
550 to 600°C can be attributed to processes of ageing, which are
accompanied by rejection of carbides and also of the α-phase. The
sharp change in the mechanical characteristics (σ_B, σ_s) observed
in some cases for slight changes in the deformation temperature
(200 to 220°C) are apparently due to the appearance of a ferro-
magnetic α-phase owing to the influence of the deformation at these
temperatures. The investigations described in this paper form part
of work carried out jointly by the Institute of Physics of Metals
AS USSR and the Ural'skiy zavod tyazhelogo mashinostroyeniya
(Ural Heavy Engineering Works). Acknowledgments are expressed to
M. N. Mikheyev for directing the work and to K. A. Malyshev for his
constant assistance. There are 2 figures and 4 Soviet references.

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On the Influence of Hot Forming on the Magnetic Properties of
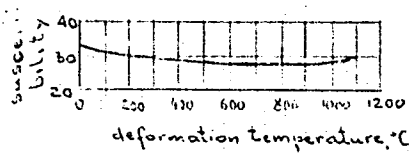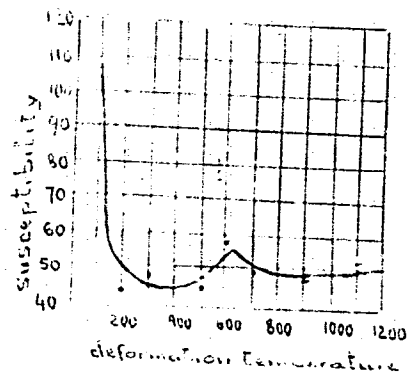Austenitic Steel

Fig.1

Fig.2

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BELENKOVA, M.M.

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S/126/60/010/01/013/019
E111/E335

AUTHORS: Belenkova, M.M., Kodlubik, I.I., Malyshev, K.A.,
Mikheyev, M.N., Sadovskiy, V.D. and Ustyugov, P.A.

TITLE: Influence of Deformation of Martensite on the Cold
Shortness of Austenitic Steels and Their Hardening
in Plastic Deformation

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10,
No. 1, pp. 122 - 130

TEXT: Investigation of a series of austenitic steels has shown
that some have a tendency to brittle fracture. The authors point
out that martensite formation during cold-shortness testing is
the probable cause and that liability of austenitic steels to
form martensite in plastic deformation depends on the position of
the deformation temperature relative to the martensite point
(Ref 2) and the temperature at which austenite and martensite
free energies are equal.   Their present work dealt with the
following steels (analysis in Table 1): 40G18, 40G18Kh4,
40G18Kh8, 40G18Kh4N4, 40G18Kh4N8, 40G18Kh4N8V, 50G18, 50G18Kh4,
50G18Kh4N8V, 50G18Kh4N4, covering the composition ranges (%):
0.40 - 0.55 C, 0-0.71 Si, 17.30-18.60 Mn, 0-8.0 Cr, 0-8.32 Ni,
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0-0.71 W, 0-0.010 S, 0-0.067 P. 60 mm long pieces were cut from 12 x 12 mm forged bars. The pieces were heated to 1150 °C and cooled in water. Magnetometric tests showed no martensite trans- formation on cooling to -196 °C. Standard notched test-pieces (2 mm deep notch, 1 mm radius of curvature) were used for impact tests from room to liquid-nitrogen temperature. Alpha-phase (deformation martensite) was found with great sensitivity by measuring magnetic susceptibility (Ref 3) of austenite on 3 x 4 x 9 mm pieces cut from the fracture region of impact speci- mens, Mohr's salt being used as the standard. In a second series of experiments the austenitic steels after quenching from 1150 °C were rolled at 20-600 °C to give 30% deformation. Figs. 1-3 show the toughness of the various steels as functions of test temperature, the effect of the various alloying elements being brought out; magnetic susceptibility as functions of test temperature being similarly shown in Figs. 4 and 5. Figs. 6 and 7 show deformation of martensite structures and Fig. 8 the fractures obtained at various temperatures. The dependence of

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tensile strength, yield point, toughness and magnetic susceptibility
on deformation temperature is shown in Figs. 9, 10, 11 and 12.
40G18 and 50G18 steels showed pronounced cold shortness, which
could be considerably reduced or completely eliminated by
additional alloying with chromium or nickel. The reason for the
cold shortness is deformation-martensite formation during low-
temperature impact testing. The good effect of alloying the
manganese steels with chromium and nickel is explained by the
increased austenite stability with respect to plastic-deformation
induced martensite transformation. Formation of such martensites
is the reason for the greater hardening of manganese austenitic
steels in cold compared with $200-300\ ^{\circ}C$ plastic deformation. In
stable austenitic steels, additionally alloyed with chromium and
nickel, hardening in cold and semi-hot work-hardening is pract-
ically the same. There are 12 figures, 3 tables and 5 Soviet
references.

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Influence of Deformation of Martensite on the Cold Shortness of
Austenitic Steels and Their Hardening in Plastic Deformation

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of
Physics of Metals of the Ac.Sc., USSR)
Ural'skiy zavod tyazhelogo mashinostroyeniya im.
S. Ordzhonikidze (Ural Heavy Engineering Works
imeni S. Ordzhonikidze)

SUBMITTED: February 23, 1960

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S/129/60/000/011/004/016
E073/E535

AUTHORS: Belenkova, M.M., Kostenko, A.V., Mikheyev, M.N.,
           Stoinskaya, E.E., Pogrebetskaya, T.M. and Yurgenson,A.A.,
           Engineers.

TITLE: Influence of Heat Treatment and Nitriding on the
           Mechanical Properties of Austenitic Steels

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov,
           1960, No.11, pp.16-20

TEXT: A nitrided layer of austenitic steel can be ferro-
magnetic, although the core of the component can remain paramagnetic.
By changing the preliminary heat treatment it is possible to obtain
an austenite with various degrees of alloying and various
compositions of the secondary phases.   Changes in the phase
composition during preliminary heat treatment of austenitic steel
may bring about changes in its magnetic properties due to formation
of δ-ferrite resulting from quenching at elevated temperatures. For
this reason, the authors considered it of interest to study the
influence of preliminary heat treatment and nitriding on the
mechanical properties of austenitic steel.   Two steels of the
following compositions were investigated: (in %)
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Influence of Heat Treatment and Nitriding on the Mechanical
Properties of Austenitic Steels

Steel	C	Si	Mn	Cr	Ni	W	Ti	S	P
ЭИ123 (EI123)	0.18	2.27	0.65	14.54	13.80	1.79	0.84	0.007	0.016
IХI8Н9Т (1Kh18N9T)	0.10	0.58	0.53	17.78	8.70	-	0.64	0.013	0.020

The magnetic properties were studied after preliminary heat treat-
ment followed by nitriding. The steel 1Kh18N9T was additionally
subjected to "wrong" nitriding: tinned specimens were charged into
a furnace simultaneously with the nitrided specimens of the same
steel. The magnetic properties of the steel EI123 were determined
after normalization annealing or after normalization annealing and
ageing.   The normalization temperature was 1150 and 1070°C. The
preliminary heat treatment of the steel 1Kh18N9T consisted in
quenching from 1150°C in water and subsequent ageing. Both steels

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S/129/60/000/011/004/016
E073/E535

Influence of Heat Treatment and Nitriding on the Mechanical
Properties of Austenitic Steels

were aged for 8 hours at 800°C. The specimens were in the form of
12 mm diameter, 5 mm long cylinders.   The magnetic susceptibility
of the steels EI123 and 1Kh18N9T in the paramagnetic state was
measured by means of magnetic scales at various field strengths so
as to determine the $\chi(H)$. For investigating the magnetic properties
of the nitrided steels, specimens in the form of tubes with an
external diameter of 8 mm, a length of 60 mm and a wall thickness of
0.5 mm were used.   The external surfaces of the specimens were ground
whilst the internal surfaces were machined by means of a reamer.
Prior to nitriding, the specimens were etched in a hydrochloric acid
solution at 70°C for 5 min and then nitrided in a laboratory furnace
at 600°C, with a holding time of 65 hours for the steel EI123 and
75 to 55 hours for the steel 1Kh18N9T.   The 75 hour holding time
corresponded to the maximum depth of the nitrided layer for specimens
with a wall thickness of 0.5 mm.   The magnetic properties of nitrided
specimens were measured ballistically in an open magnetic circuit.
On the basis of the obtained results, which are given, the following
conclusions are arrived at:
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S/129/60/000/011/004/016
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Influence of Heat Treatment and Nitriding on the Mechanical
Properties of Austenitic Steels

1)   Changing of the normalization annealing temperature of the
steel EI123 from 1070 to 1150°C and additional ageing for 8 hours at
800°C does not bring about a change in the susceptibility of this steel.
2) Nitriding changes to a considerable extent the magnetic permeability
of the investigated steels; the nitrided layers of both the
investigated steels were ferromagnetic and this is due to the formation
of nitrides, impoverishment in alloying elements of the austenite
and austenite decomposition.
3) As a result of nitriding, the magnetic permeability of the steel
EI123 increases considerably (by a factor of 3) as compared to the
steel 1Kh18N9T.
4) Increase in the depth of nitriding brings about an increase of
the maximum magnetic permeability; with increasing relative depth of
the nitrided layer of the steel EI123 from 23 to 48.5% the maximum
permeability increases by more than double. With increasing
relative depth of the nitrided layer of the steel 1Kh18N9T from 50
to 93.65%, its maximum permeability increases from 3.7 to 19.8
gauss/Oe.

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S/129/60/000/011/004/016
E073/E535

Influence of Heat Treatment and Nitriding on the Mechanical
Properties of Austenitic Steels

5). The results of the described investigations lead to the
conclusion that it is possible to monitor the depth of the
nitrided layer for a number of austenitic steels by means of an
electromagnetic method.   There are 1 figure, 5 tables and
5 references: all Soviet.

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S/126/62/013/004/019/022
E073/E135

/8.7500

AUTHORS: Belenkova, M.M., Mikheyev, M.N.,
            Pogrebetskaya, T.M., and Yurgenson, A.A.

TITLE: Magnetic properties of the steel 1Х18Н9 (1Kh18N9)
            after heat-treatment and nitriding

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.4, 1962,
            622-625

TEXT: The authors and their team found earlier that the
greater the content of elements forming stable nitrides, the more
will the austenite become impoverished of alloying elements
during nitriding and the more intensive will be its decomposition
and the rejection of the α-phase. The influence of nitriding on
the magnetic properties of steel similar to the previously tested
1Х18Н9Т (1Kh18N9T) steel but not containing titanium was
studied to verify this conclusion. The compositions of the two
steels studied were:
1Kh18N9: 0.14% C; 0,66% Si; 0.85% Mn; 17.68% Cr; 9.02% Ni,
         0.07% Ti; 0.016% S; 0.016% P.

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Magnetic properties of the steel... S/126/62/013/004/019/022
E073/E$_1$35

1Kh18N9T: 0.1% C; 0.58% Si; 0.53% Mn; 17.78% Cr; 8.70% Ni;
        0.64% Ti; 0.013% S; 0.02% P.
The magnetic properties were determined after heat-treatment
(quenching from 1150 °C in water, followed by ageing for 8 hours
at 800 °C). Both steels were paramagnetic in the quenched state
and their susceptibility values were nearly the same. After
ageing the susceptibility increased somewhat, the permeability of
both steels after quenching and ageing approached unity and did
not depend on the field strength. In the nitrided state the
maximum permeability of the steel without Ti was considerably
lower than in the steel with Ti. For a relative depth of the
nitrided layer of 57.4% the steel 1Kh18N9 had a maximum
permeability of 1.8 gauss/Oe, whilst for the steel 1Kh18N9T the
maximum permeability was 3.7 gauss/Oe for a relative depth of
the nitrided layer of 50%. The structures of the nitrided
layers of both steels were identical, consisting of austenite
and carbide grains in the heat-treated state; the structure of
the nitrided layer was reminiscent of sorbite, due to the
partial decomposition of the α-phase and the carbides during
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Magnetic properties of the steel.. S/126/62/013/004/019/022
                                     E073/E135

nitride-formation. The following conclusions are arrived at:
Nitriding changes considerably the magnetic properties of steels
1Kh18N9 and 1Kh18N9T; the ferromagnetic nature of the nitrided
layer is due to the formation of the α-phase during nitriding.
The steel 1Kh18N9T has a higher permeability in the nitrided
state than the steel 1Kh18N9, and the difference is attributed
to the presence of Ti in the former, which forms stable nitrides
and impoverishes considerably the γ-phase of Ti, reducing its
stability and bringing about rejection of α-phase. The stability
of the austenitic structure after nitriding was determined by the
concentration of admixtures required for forming uniform
austenite and by the ability of the components entering into the
austenite to form stable nitrides. The nitrided skin of
austenitic steel components should have low permeability values.
There are 4 tables.

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Magnetic properties of the steel..   S/126/62/013/004/019/022
                                       E073/E135

ASSOCIATION: Institut fiziki metallov AN SSSR
             (Institute of Physics of Metals, AS USSR)
             Ural'skiy turbomotornyy zavod
             (Ural Turboengines Works)

SUBMITTED: August 26, 1961

Card 4/4

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

Change of magnetic susceptibility and the behavior of small impurities
in the decomposition of an Ag - Cu solid solution. Izv. AN SSSR.
Ser. fiz. 28 no.1:148-151 Ja '64.   (MIRA 17:1)

1. Institut fiziki metallov AN SSSR.

ACC NR: AR6027503   SOURCE CODE: UR/0137/66/000/004/I019/I019

AUTHOR: Belenkova, M. M.; Mikheyev, M. N.; Malyshev, K. A.; Sadovskiy, V. D.;
Ustyugov, P. A.

TITLE: Phase transformations during the deformation and tempering of austenitic steel

SOURCE: Ref. zh. Metallurgiya, Abs. 4I127

REF SOURCE: [Tr.] In-ta fiz. metallov. AN SSSR, vyp. 24, 1965, 54-58

TOPIC TAGS: metal deformation, austenite steel, martensitic transformation, grain
size, magnetic susceptibility

TRANSLATION: A study was made of the magnetic, electrical and mechanical properties
of 60Kh318N8V austenitic band steel subjected to deformations of 10, 25, 31, and 43%
after quenching from 1050°C. For the same deformation conditions, a fuller decomposi-
tion of austenite occurred in large-grained samples as a result of the variation of
the position of the martensitic point for a change of grain size (the point of the ini-
tial martensitic transformation of large-grained samples was located higher than fine-
grained). Under the effect of deformation in the steel, a much greater amount of α-
phase formed than during tempering. A definite correlation was found between the na-
ture of the magnetic and electrical property changes on the one hand and the mechanical
properties on the other, as a function of tempering temperature. Thus, a drop in σ_b

UDC: 669.15'26'74'24.781.017.3:621.785.78

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ACC NR: AR6027503

and σ_s of samples deformed at 20°C was found beginning at 400-450°C; at these same temperatures the lowering of electrical resistivity was initiated. Magnetic susceptibility increased after 500°C, while ψ and a_k decreased. It was concluded that the changes in mechanical properties were caused by processes associated with the formation of α-phase during cold deformation. During tempering of the deformed samples, the α-phase of the original deformation is dissolved and some quantities of the ferromagnetic phase appear in separate portions owing to carbide formation. I. Tulupova.

SUB CODE: 11,13

Card 2/2

BELEN'KOVA, M.Ya., meditsinskaya sestra

Reinforcing bandage for the lower abdome. Med.sestra 19 no.8:34
Ag '60.   (MIRA 13:7)
                    (BANDAGES AND BANDAGING)

BELENKOV, N.Yu.; CHIRKOV, V.D.

Mechanism of the synchronization of neuron activity. Zhur. vys.
nerv. deiat. 15 no.1:128-139 Ja-F '65.

(MIRA 18:5)

1. Kafedra normal'noy fiziologii Gor'kovskogo meditsinskogo
instituta.

BELENKOV, N.Yu.; KALININA, T.Ye.

Distribution of primary responses to acoustic stimuli in the
cerebral cortex. Zhur. vys. nerv. deiat. 15 no.2:285-294 Mr-
Ap '65.   (MIRA 18:5)

1. Kafedra normal'noy fiziologii Gor'kovskogo meditsinskogo
instituta, Gor'kiy.

AUTHORS: Sattar-zade, I. S., Belenkova, R. M., Bayramova, R. M.

TITLE: Catalytic transformation of petrolatum over gumbrin

TEXT: The thermocatalytic decomposition of petrolatum (temperature of
solidification 56.9°C, n_D^{20} 1.4565, d_4^{20} 0.8551, mol.wt. 643, acid number
0.0) in the presence of unactivated or activated gumbrin has been in-
vestigated, using a ratio of the petrolatum to this catalyst of 2:1 at a
temperature of 350°C and at atmospheric pressure. The experiments were
performed in a three-necked flask connected to a condenser coil, with
continuous agitation, and lasted 6 - 12 h. It was proved that the
petrolatum is transformed almost identically whether an unactivated or an
activated catalyst is used, the products being 51 - 53% of liquid and
26 - 31% of solid hydrocarbons respectively. Investigation of the group
chemical composition of the fractions obtained showed that they are of

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Catalytic transformation of...

S/081/62/000/017/075/102
B156/B186

methane-naphthene-aromatic type. The gases formed during the transforma-
tion of the petrolatum consist mainly of saturated hydrocarbons. [Ab-
stracter's note: Complete translation.]

Card 2/2

NIKONETS, I.F.; BELENKOVA, T.A. (L'vov)

Effect of amidopyrine on immunogenesis and the prothrombin forming function of the liver. Vrach. delo no.3:20-21 Mr '64.

(MIRA 17:4)

1. Kafedra gigiyeny pitaniya (zav. - prof. A.I.Stolmakova) L'vovskogo meditsinskogo instituta.

BELENKOVA, T. G.

Belenkova, T. G. — "The functional condition of congested kidneys and its physiotherapy," (In the heading: T. D. Belenkova), Sbornik trudov (Tomskiy obl. nauch.-issled. in-t fiz. metodov lecheniya i kurortologii), Vol. VI, 1949, n. 158-82

SO: u5241, 17 December 1953, (Letopis 'zhurnal 'nykh Statey, No. 26, 1949).

GROMOVA, A.A.; BELENKOVA, Ye.G., starshaya svinarka; ZAYTSEV, V.S., red.;
TIKHONOVA, I.M., tekhn.red.

[You gave your word; keep it!] Dal slovo - sderzhi! Leningrad,
Lenizdat, 1959.   84 p.   (MIRA 13:4)

1. Sekretar' partiynoy organizatsii kolkhoza "Pervoye maya" Gat-
chinskogo rayona, delegam XXI s"yezda KPSS (for Gromova). 2. Agi-
tator kolkhoza imeni XXI parts"yezda Vsevolozhskogo rayona (for
Belenkova).
                    (Agriculture)

BASOV, N.G.; BELENOV, E.M.; LETOKHOV, V.S.

Synchronization of oscillations in a semiconductor laser with several p - n-junctions. Fiz. tver. tela 7 no.1:337-339 Ja '65.
(MIRA 18:3)

1. Fizicheskiy institut imeni Lebedeva AN SSSR, Moskva.

L 2530-66 EWA(k)/FBD/EWT(1)/EEC(k)-2/T/EWP(k)/EWA(m)-2/EWA(h) SCTB/IJP(c) WG
ACCESSION NR: AP5022875   UR/0051/65/019/003/0465/0467
                                                           621.375.9:535

50
8

AUTHOR: Belenov, E. M.; Letokhov, V. S.

TITLE: Generation of highly directional coherent radiation

SOURCE: Optika i spektroskopiya, v. 19, no. 3, 1965, 465-467

TOPIC TAGS: laser, coherent radiation, stimulated emission, laser array

ABSTRACT: Generation of highly directional coherent radiation by an array of coupled lasers is discussed. The two methods described are based on the interference in the far zone of 1) coherent beams from several synchronized lasers (an arrangement for two lasers is shown in Fig. 1 of the Enclosure), and 2) coherent beams from reflecting surfaces (Fig. 2) of a single laser. In the first case the following three operating regimes are possible: a) synchronized generation by two lasers, b) independent operation of two lasers, and c) generation by one laser with a cavity in the shape of Π. The results of an earlier paper (Akademiya nauk, SSSR. Doklady, v. 161, no. 3, 1965, p. 556) are used to obtain the criterion for the existence of the synchronized regime which can be achieved by using gas lasers. A similar analysis can also be conducted for more than two lasers. The coherent laser emission which interferes in

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L 2530-66
ACCESSION NR: AP5022875   O

the far zone forms highly directional maxima in certain directions. This is analogous
to diffraction of a plane wave by a plane grid. In the case of several reflecting
surfaces an analogous effect takes place in the far zone, except that the position
of the maxima depends on the oscillation frequency. For this case the authors also
give the criteria for directional stability. Orig. art. has: 4 formulas and
1 figure.   [CS]

ASSOCIATION: none

SUBMITTED: 02Nov64   ENCL: 02   SUB CODE: EC

NO REF SOV: 003   OTHER: 000   ATD PRESS: 4108

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L 2530-66
ACCESSION NR: AP5022875   ENCLOSURE: 01
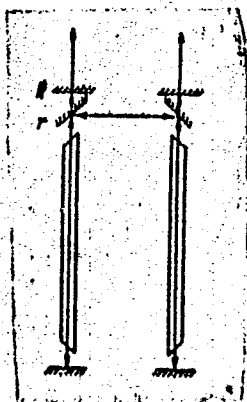
Fig. 1.   Synchronization of two lasers

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L 2530-66
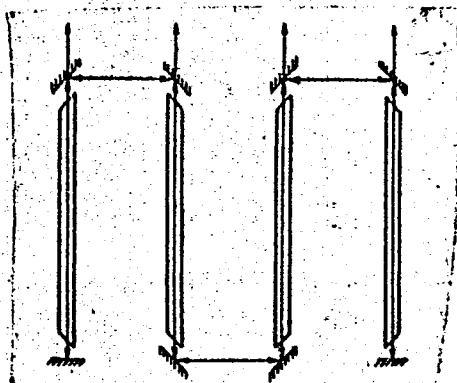ACCESSION NR: AP5022875   ENCLOSURE: 02

Fig. 2. Synchronization of a laser with
several reflecting surfaces

BASOV, N.G.; BELENOV, E.M.; LETOKHOV, V.S.

    Diffraction synchronization of lasers. Zhur. tekh. fiz. 35 no.6:1098-
    1105 Je '65.   (MIRA 18:7)

    1. Fizicheskiy institut imeni P.N.Lebedeva AN SSSR, Moskva.

BELENOV, E. M.; ORAYEVSKIY, A. N.

A maser with two series cavity resonators. Radiotekh. i
elektron. 8 no.1:158-161 Ja '63.   (MIRA 16:1)

(Masers)

L 13975-65   EWT(1)/EWA(h)   Peb   AFETR/ASD(a)-5/BSD/AFWL/SSD/ASD(d)/RAEM(a)/
ATGC(b)/ESD(dp)/ESD(gs)/ESD(t)

ACCESSION NR: AP4044102   S/0141/64/007/003/0479/0490

AUTHOR : Belenov, E. M.; Orayevskiy, A. N.   β

TITLE: Investigation of molecular generator with two resonators in
tandem   25

SOURCE: IVUZ. Radiofizika, v. 7, no. 3, 1964, 479-490

TOPIC TAGS: maser, maser theory, quantum generator, resonator,
resonator Q factor, molecular electronics

ABSTRACT: This article contains a more thorough theoretical analy-
sis than the first report by the authors (Radiotekhnika i elektroni-
ka, v. 8, 158, 1963). The equations for the maser oscillations are
applied to masers with two separated resonators with opposing mole-
cule beams and to a maser with closed circulation of the molecule
beam. The frequency shift due to the traveling wave effect is eval-
uated. The analysis shows that a maser with two resonators in tandem

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ACCESSION NR: AP4044102

can support an oscillation mode in which the line width is determined essentially by the time of flight between the resonators. This reduces noticeably the effect of the traveling wave on the oscillation frequency. The stability of various maser modes is analyzed. It is shown that if the Q of the first resonator exceeds that of the second, then oscillations at the frequency of the first resonator are always stable in the second. In the opposite case the oscillation frequency is determined at first only by the parameters of the second resonator, but as the number of incoming molecules is increased, harmonic oscillations are produced in the first until synchronization is attained. Orig. art. has: 5 figures and 44 formulas.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Physics Institute, AN SSSR)

SUBMITTED: 29Jul63   ENCL: 00

SUB CODE: EC   NO REF SOV: 009   OTHER: 003

Card 2/2

L 22577-65   EWG(j)/EWA(k)/FBD/EWT(1)/EEC(k)-2/EEC(-)/T/EEC(b)-2/EWP(k)/EWA(m)-2/
EWA(h)   Pn-4/Po-4/Pf-4/Peb/P1-4/P1-4   IJP(c) WG

ABSTRACT: A theoretical analysis is conducted of the mode of operation
of an injection laser consisting of an array of p-n junctions in which
oscillations are synchronized in order to obtain larger power output
and better directionality of laser emission. An electrodynamic model
of a p-n junction as a dielectric waveguide with a low critical fre-
quency in which there are only the lowest order standing waves E_{00}
and H_{00} is used in deriving a formula for the internal coupling of the
junction due to the penetration of the field. An expression is also
derived for the external diffraction coupling coefficient by a method
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L 22577-65
ACCESSION NR: AP5003477

developed by N. G. Basov et al which is described in a paper yet to be
published. External diffraction coupling of p-n junctions is obtained
by making a hole in the face of the semiconductor and using an external
mirror. The criteria for stability of the synchronized mode of opera-
tion are obtained by analyzing the oscillation equations of a system
similar to that of two interacting lasers. Numerical estimates for a
typical p-n junction show that synchronization of oscillations is more
favorable in the case of external coupling. Orig. art. has: 5 form-
ulas and 2 figures. [CS]

ASSOCIATION: Fizicheskiy institut imeni P. N. Lebedev (Physics
Institute)

SUBMITTED: 02Nov64   ENCL: 00   SUB CODE: EC,SS

NO REF SOV: 002   OTHER: 002   ATD PRESS: 3172

Card 2/2

BELENOV, E.M.; ORAYEVSKIY, A.N.

Molecular oscillator with two resonators arranged in succession. Izv.
vys. ucheb. zav.; radiofiz. 7 no.3:479-490 '64.   (MIRA 17:11)

1. Fizicheskiy institut im. P.N. Lebedeva AN SSSR.

L 49294-65   EWA(k)/FWD/EWG(r)/EWT(1)/EEC(k)-2/EWG(t)/T/EEC(b)-2/EWP(k)/EWA(m)-2/
EWA(c)   ~~, 17~-2/R~. 4/~r-4/Peb/Pi-4/Pi-4 S(b)/IJP(c)   WG

ACCESSION NR: AP5012614   UR/0051/65/018/005/0858/0865

AUTHOR: Belenov, E. M.; Orayevskiy, A. N.

TITLE: Kinetic processes in a gas laser

SOURCE: Optika i spektroskopiya, v. 18, no. 5, 1965, 858-865

TOPIC TAGS: gas laser, gas laser kinetic process, neon helium laser, laser output power

ABSTRACT: An investigation is made of the influence of various parameters of the active substance on the output power of a neon-helium laser. The calculations were made for a specific transition of $2p^5 4s{}^1P_1 - 2p^5 3p{}^3P_2$ with $\lambda = 1.152\ \mu$, although they can be applied to generation at other wavelengths. Proposals for ways of increasing the output power of a neon-helium laser are as follows: 1) addition of a buffer gas, which enhances the decay of metastables; 2) increase in the working gas temperature, which increases the energy of electrons; 3) pulsed excitation, which results in an advantageous population of the upper working level during the luminescence period; 4) increase in the resonator length, which results in more modes in the Doppler line width; 5) increase in the length of the discharge tube, which leads to a proportional rise in the output power; and 6) reduction in the characteristic size Λ of the discharge tube while maintaining or increasing

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L 48294-65

ACCESSION NR: AP5012614

the volume of the working gas (the power generated by a volume unit will increase as Λ^{-2}). These proposals can be implemented easily for a discharge tube with a rectangular cross-section. In the event that one side of the cross-section is much larger than the other, the characteristic size of the discharge tube will be determined by the smaller side. Here, as in the case of a circular cross-section tube, the smaller side will have an optimum value h_{opt}. However, in this case h_{opt} will be determined not by the changes of the generated power with the change in the working gas volume but by the rise of diffraction losses with decreased h. Orig. art. has: 2 figures and 8 formulas. [JA]

ASSOCIATION: none

SUBMITTED: 02Mar64   ENCL: 00   SUB CODE: EC

NO REF SOV: 017   OTHER: 008   ATD PRESS: 3250

Card 2/2

L 54772-65   EWA(k)/FBD/EWG(r)/ENT(1)/EEC(k)-2/EEC(t)/T/EEC(b)-2/EWP(k)/EWA(h)/
EWA(m)-2   Pm-4/Pn-4/Po-4/Pf-4/Peb/Pi-4/Pl-4   SCTB/IJP(c)   WG

ACCESSION NR: AP6015635   UR/0057/65/035/006/1098/1105

AUTHOR: Basov, N.G.; Belenov, E.M.; Letokhov, V.S.

TITLE: Diffraction synchronization of lasers

SOURCE: Zhurnal tekhnicheskoy fiziki, v.35, no.6, 1965, 1098-1105

TOPIC TAGS: laser, coupling constant, resonator, diffraction coupling

ABSTRACT: The authors calculate the diffraction coupling coefficient for two identical open resonators and derive conditions for the stable synchronous operation of diffraction coupled lasers. The calculations were undertaken because of their application to semiconductor lasers in which the working substance is deposited directly on the mirror and is separated into cells by absorbing partitions. The coupling coefficient for two open resonators with infinitely long reflectors of finite width operating in the TEM_{00} or TEM_{10} mode was calculated numerically for different values of the separation and the Fresnel number by the method of A.G.Fox and T.Li (BSTJ 40,453,1961). The results for

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L 54772-65
ACCESSION NR: AP5015635

Fresnel number 2.5 are presented graphically, and those for other Fresnel numbers are said to be similar. The coupling decreases so rapidly with increasing separation that in the case of many resonators it is only necessary to consider the coupling between nearest neighbors. Conditions for the stability of diffraction coupled lasers are deduced from the equations of A.N.Orayevskiy (Radiotekhnika i elektronika 4,718,1959) and V.M.Fayn (ZhETF 33,945,1957) by the method of Van der Pol. At some separations the stability conditions for both TEM_{00} and TEM_{10} oscillations are simultaneously satisfied. The present calculations do not show which is stable in this case. If resonators with Fresnel number 2.5 are separated by less than 4% of the width of the mirror, the TEM_{00} mode will be stable provided their lengths do not differ by more than approximately 2% of the wavelength. Orig.art.has: 23 formulas and 2 figures.

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L 54772-65

ACCESSION NR: AP5015635

ASSOCIATION: none

SUBMITTED: 24Aug64   ENCL: 00   SUB CODE: EC, EM

NR REF SOV: 010   OTHER: 002

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L 43120-65   EEC(b)-2/EWG(r)/EEC(k)-2/EWA(h)/EWA(k)/EWP(k)/EWT(1)/EEC(t)/
FBD/T/EWA(m)-2   Pf-4/Pi-4/Pl-4/Pm-4/Pn-4/Po-4/Peb   IJP(c)   WG
ACCESSION NR: AP5010571   UR/0020/65/161/003/0556/0559

AUTHOR: Basov, N. G. (Corresponding member AN SSSR); Belenov, E. M.;
Letokhov, V. S.

TITLE: Diffraction synchronization of lasers

SOURCE: AN SSSR, Doklady, v. 161, no. 3, 1965, 556-559

TOPIC TAGS: laser, semiconductor laser, laser cavity, stimulated
emission, laser array

ABSTRACT: A theoretical analysis is presented of the operation of a
laser consisting of a cavity in which the active substance (a semiconductor
tor film) is deposited directly on the reflectors. To suppress unde-
sired oscillations in the plane of the active substance, the layer is
split into separate isolated elements by absorbing partitions. The
analysis is limited to the most desirable mode of operation, i. e.,
only the case of synchronized oscillations in the TEM_{00} and TEM_{10}
modes is considered. The coefficients of diffraction coupling of
open-cavity resonators are calculated, and the stability criteria for
such an operating regime are established. The losses in the TEM_{00}

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ACCESSION NR: AP5010571

and TEM_{10} modes were calculated by a numerical method developed by A. C. Fox and T. Lee. It is shown that when the diffraction coupling coefficient has negative values, coupled resonator cavity losses are smaller than the losses of an isolated cavity resonator. It is established that a stable mode of operation is that of the energetically most effective regime. Orig. art. has: 10 formulas and 1 figure. [CS]

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences, SSSR)

SUBMITTED: 06Aug64   ENCL: 00   SUB CODE:ECSS

NO REF SOV: 006   OTHER: 002   ATD PRESS: 3242

Card 2/2

AUTHOR: Basov, N. G. (Corresponding member AN SSSR); Belenov, E. M.; Letokhov, V. S.

TITLE: Maximum cross section of a laser beam

TOPIC TAGS: laser, ruby laser, Q modulated laser, laser beam, beam size, CW laser, pulsed laser

ABSTRACT: Limitations imposed on the cross section of a laser beam are discussed. In CW laser resonators with large transverse dimensions, the size of the emitted beam can be restricted, in principle, by delayed interaction of the remote areas of the laser, or by detuning of the natural frequencies of the individual parts of the resonator. The delay effect, however, imposes no restrictions on the size of the generation area. Thus, when $\lambda = 1\,\mu$ and $\delta L \approx 1\,\text{Å}$, $N_{max} \approx 800$, or when $L = 100\,\text{cm}$ the maximum width of the generation area was $\approx 5\,\text{cm}$. In pulsed (Q-modulated) lasers, the cross section is restricted when laser action occurs during a time of the same order as that required to set up modes in the resonator. The generation area in pulsed lasers can develop as the result of 1) the appearance and growth of separate, mutually-incoherent "streams" and 2) the confluence of adjacent

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ACCESSION NR: AP5010825   2

streams with the establishment of the coherence. Thus, in a Q-modulated pulsed
laser with $L = 50$ cm and $\lambda = 7 \cdot 10^{-5}$ cm, the generation area expanded in $\sim 10^{-8}$ sec
to ~ 6 mm. In the case of a Q-modulated pulsed ruby laser with identical parame-
ters, the area was 4 mm. Orig. art. has: 8 formulas. 15   [YK]

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics
Institute, Academy of Sciences, SSSR)

SUBMITTED: 24Nov64   ENCL: 00   SUB CODE: EC

NO REF SOV: 004   OTHER: 001   ATD PRESS: 3235

Card 2/2

L 23391-66 EEF(k)-2/EWA(h)/EWP(k)/EWT(1)/PBD/T IJP(c) WG

ACC NR: AT6009314   SOURCE CODE: UR/2504/65/031/000/0113/0138

AUTHORS: Basov, N. G.; Belenov, E. M.; Markin, Ye. P.;
Nikitin, V. V.; Orayevskiy, A. N.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSR
(Fizicheskiy institut Akademii nauk SSSR)

TITLE: Investigation of a gas-mixture laser

SOURCE: AN SSSR. Fizicheskiy institut. Trudy, v. 31, 1965.
Kvantovaya radiofizika (Quantum radio physics), 113-138

TOPIC TAGS: gas laser, laser r and d, laser beam, laser modulation

ABSTRACT: The purpose of this combined theoretical and experimental
investigation was to assess the possibility of increasing the power
of different gas lasers by choosing optimal operating conditions
(pressure of mixture, partial pressures of the individual components,
pump power, mirror transmission coefficient, diameter and length of
discharges). The divergence of the beam and the spectrum of the
generated radiation as functions of the outward power of the genera-

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L 23391-66

ACC NR: AT6009314   6

tor are also investigated. Using a neon helium mixture and a
special laser design, the authors obtained a power of 100 MW at
1.15 μ with an optimal tube radius of 8 mm and length 3 meters.
The angular modulation characteristics were measured as a function
of the output power. Reduction of the beam divergence by filtering
out certain modes is discussed. Rotating-laser apparatus construc-
ted for the measurement of the laser emission spectrum (a modifica-
tion of the Sagnac experiment) is described. The results show that
the output power of the laser can be increased by adding a buffer
gas to intensify the decay of the metastable neon, by increasing
the temperature of the working gas, by using pulsed excitation to
populate the upper working level, by increasing the resonator length
and the length of the discharge tube, and by decreasing the trans-
verse dimensions of the discharge tube. The authors thank Yu. P.
Trokhin, V. N. Lukanin, B. I. Prokopov, B. I. Belov, F. S. Titov,
and A. F. Suchkov for a discussion of the results and help with the
calculations. Orig. art. has: 16 figures and 13 formulas.

SUB CODE: 20/ ORIG REF: 022/ OTH REF: 020/ SUBM DATE: none

Card   2/2 Q0

L 20707-66   FBD/EWT(1)/EEC(k)-2/T/EWP(k)/EWA(h)   IJP(c)   WG
ACC NR: AP6011996
                                            SOURCE CODE: UR/0020/65/161/004/0799/0801

AUTHOR: Basov, N. G. (Corresponding member AN SSSR); Belenov, E. M.; Letokhov, V. S.

ORG: Physics Institut im P. N. Lebedev, AN SSSR (Fizicheskiy institut AN SSSR)

TITLE: Limiting cross-section of a laser beam

SOURCE: AN SSSR. Doklady, v. 161, no. 4, 1965, 799-801

TOPIC TAGS: laser beam, laser theory

ABSTRACT: In principle, beam cross-sections of continuously-operating lasers having large resonators can be limited owing to the delayed interaction of remote parts of the laser or mismatching of the natural frequencies of the various parts of the resonator. In Q-modulated pulse lasers the beam cross-section is limited because the pulse generation time is of the order of time required for the resonator oscillations to become established. Beams of both types of laser are considered. In the first case the problem is treated by splitting the laser into two coupled "sublasers" and then analyzing the interaction. In the second case, generation can occur in one of two modes: a) development of individual incoherent "streams", and b) confluence of adjacent "streams" with coherence becoming established due to diffraction field exchange. Under the given conditions the maximum cross-section of generation in case 1 is about 5 cm; in case 2 it is 6 and 4 mm respectively for the two modes. The authors thank V. N. Morozov for a series of useful discussions. Orig. art. has: 8 formulas. [JPRS]

SUB CODE: 20 / SUBM DATE: 24Nov64 / ORIG REF: 004 / OTH REF: 001

Card 1/1 PK

L 7708-66   EWA(k)/FBD/EWT(1)/EEC(k)-2/T/EWP(k)/EWA(m)-2/EWA(h)   SCTB/IJP(c)

ACC NR: AP5028331   SOURCE CODE: UR/0057/65/035/011/2126/2128

AUTHOR: Belenov, E. M.; Letokhov, V. S.

ORG: Physics Institute im. P. N. Lebedev, AN SSSR, Moscow (Fizicheskiy institut)

TITLE: On the theory of coupled lasers

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 11, 1965, 2126-2128

TOPIC TAGS: laser, laser synchronization, diffraction synchronization, laser coupling

ABSTRACT: Specific cases of the synchronization of several lasers and p-n junctions were described earlier by the authors with N. G. Basov (ZhTF, 25, 6, 1965; 25, 5, 1965, 809; FTT, 7, 337, 1965). In this letter to the editor of Zhurnal tekhnicheskoy fiziki, the authors report on the results of a theoretical investigation of a two-laser synchronization under more general conditions: different field amplitudes, delayed interaction, interaction through the active medium (apart from the resonator coupling), and permittivity dispersion. Orig. art. has: 10 formulas.   [YK]

SUB CODE: EC/ SUBM DATE: 13Mar65/ ORIG. REF: 003/ ATD PRESS: 4/42

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L 17985-66   FBD/EWT(1)/EEC(k)-2/T/EWP(k)/EWA(h)   IJP(c)   WG
ACC NR: AP6006804   SOURCE CODE: UR/0386/66/003/001/0054/0058

AUTHOR: Belenov, E. M.; Markin, Ye. P.; Morozov, V. N.; Orayevskiy, A. N.

ORG: Physics Institute im. P. N. Lebedev, Academy of Sciences SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Interaction between traveling waves in a ring laser

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 1; 1966, 54-58

TOPIC TAGS: gas laser, ring laser, helium neon laser, laser R and D, traveling wave interaction

ABSTRACT: An investigation of beat frequencies in traveling waves generated in a ring laser on a rotating platform may be used for highly accurate analysis of the spectral, statistical, and other characteristics of laser emission. However, frequency splitting Δ of the traveling waves takes place only at rates of rotation v greater than some critical velocity v_{cr} (or the corresponding quantity $\Delta_{cr} = 2kV_{cr}/\pi$, where v is the linear velocity of a resonator mirror, k is the wave vector). Coupling between traveling waves causes mutual synchronization at frequencies below the critical value which results in single-frequency conditions. The authors studied

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L 17985-66

ACC NR: AP6006804

the quantity Δ_{cr} as a function of the parameters of a ring laser. A helium-neon laser was used in this experiment ($\lambda = 3.39$ μ). A spectral analyzer was used for measuring the beat frequency Δ. The capture band Δ_{cr} was studied as a function of the coefficient of transmission for the output mirror. A reduction in transmission causes a sharp change in the capture band. Experiments were conducted on attenuation of the beam reflected from the external mirror by using a filter. Attenuation of this signal reduces the capture band. Various optical systems were used for passing the direct and reverse beams to the photoelectric mixer with a simultaneous reduction in the energy reflected into the resonator from the external mirrors. Figures are given showing two modifications of systems for reducing the capture band to 300 cps. The Q of the resonator was reduced for a further reduction of the band. This was done by replacing one of the opaque mirrors in the resonator with a semi-transparent mirror. The result was a reduction in the capture band from 300 to 50 cps at the same output power. The magnitude of the capture band is determined by the reverse reflection of energy from various elements in the resonator, scattering by nonhomogeneous media, and the nonlinear dependence of polarization on the field. "The authors are grateful to N. G. Basov for valuable consultation and interest in the work and to V. V. Gromov for assistance in carrying out the experiment!" Orig. art. has: 2 figures, 2 formulas.
[14]

SUB CODE: 20/ SUBM DATE: 23Nov65/ ORIG REF: 002/ OTH REF: 003/ ATD PRESS:
Card 2/2 ⌐⌐ 4213

BELENOV, E.M.; ORAYEVSKIY, A.N.

Kinetic processes in a gas laser. Opt. i spektr. 18 no.5:858-865
My '65.
(MIRA 18:10)

ACC NR: AP6011405

SOURCE CODE: UR/0057/66/036/003/0557/0560

AUTHOR: Belenov, E. M.; Orayevskiy, A. N.

ORG: Physics Institute im. P.N.Lebedev, Moscow (Fizicheskiy institut)

TITLE: Characteristics of a two-resonator molecular beam oscillator

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 3, 1966, 557-560

TOPIC TAGS: molecular beam, molecular electronics, resonant cavity, line width

ABSTRACT: In two earlier papers (Radiotekhnika i elektronika, 8, 158, 1963; Izv. vuzov, Radiofizika, 7, No. 3, 479, 1964 the authors have discussed molecular beam oscillators in which two cavity resonators are traversed successively by both of two oppositely directed molecular beams and have defined a characteristic time T* which determines the frequency distribution (line width) of the oscillations. Here they present results of a calculation of T*. The calculations were performed by techniques described in the references cited above and are not described in detail here; they involve solution of Schrödinger's equation for the beam molecules interacting with the resonator fields and Maxwell's equations for the resonator fields excited by the beam. Expressions are given for T* and for the difference between the generated frequency and the frequency of the molecular transition in terms of the frequency of the molecular transition, the resonant frequencies and Q factors of the resonators, the field strengths in the resonators, the matrix element of the molecular polarization for the

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ACC NR: AP6011405

transition concerned, the times spent by the molecules in the resonators and between them, and a factor that takes account of depolarization of the molecules during their flight between the resonators. The quantity T* is independent of the field strength in the resonators provided the resonator field strength is very high or very low, the molecules spend much more time in the resonators than between them, or the depolarizing factor is very low. When the ratio of the time spent by a molecule between the resonators to the time spent within a resonator exceeds 14, the frequency depends strongly on the field strength within the resonators and the oscillations may become unstable. The present calculations are valid only when the difference between the resonator frequency and the molecular transition frequency is small; when the detuning is considerable oscillation may take place at several frequencies. Orig. art. has: 7 formulas and 3 figures.

SUB CODE: 20   SUBM DATE: 28May65   ORIG.REF: 003

Card   2/2

BUROV, V.V.

Kinetics of tempering and determination of temporary temper tension:
Zhur. Tekh. Fiz. 22, no. 1, 1952

TONKEL, I., inzh.; BELENOV, I., inzh.; SEROKO, V., inzh.

How to protect the wood of birch from rot. Mast.lesa no.5:11
My '57.   (MIRA 10:10)

1.TSentral'nyy nauchno-issledovatel'skiy institut lesosplava.
          (Birch) (Wood--Preservation)

BELENOV, K.

Construction on the "Ideia Lenina" Collective Farm. Sel'. stroi.11
no.5:7 My '56.
(MLRA 9:9)

1.Predsedatel' kolkhoza "Ideya Lenina", Orlovskogo rayona, Orlovskoy
oblasti.
(Farm buildings)

BELENOV, M.

Mass forms of economic education. Vop.okon. no.5:116-119 My '61.
(MIRA 14:5)

1. Zaveduyushchiy otdelom propagandy i agitatsii TSentral'nogo
komiteta Kommunisticheskoy partii Kazakhstana, Alma-Ata.
(Kazakhstan—Economics—Study and teaching)
(Communist Party of the Soviet Union—Party Work)

SAPARGALIYEV, G.S., kand. yurid.nauk;PAL'GOV,N.N., akad.; BOGATYREV, A.S.;
AFANAS'YEV, A.V., prof.; BYKOV, B.A.; SHAKHMATOV, V.F., kand. istor.
nauk; POKROVSKIY, S.N., akad.; SAVOS'KO, V.K., kand. istor. nauk;
NUSUPBEKOV, A.N., kand. istor. nauk; BAISHEV, S.B., akad.; GOROKH-
VODATSKIY, I.S., kand. istor. nauk; AKHMETOV, A., kand. istor. nauk;
RAKHIMOV, A., kand. istor. nauk; PIVEN', N.F.; CHULANOV, G.Ch., doktor
ekonom. nauk; BOROVSKIY, V.A., kand. ekonom. nauk; SYDYKOV, A.S., kand.
pedagog. nauk; ZHANGEL'DIN, T., kand. filos. nauk; KARASAYEV, L.K.;
KANAPIN, A.K., kand. istor. nauk; BELENOV, M.D., kand. ekonom. nauk;
KARYNBAYEV, S.R., kand. med. nauk; AKHMETOV, K.A.,; SMIRNOVA, N.S.,
doktor filolog.nauk; SIL'CHENKO, M.S., doktor filolog. nauk; YERZA-
KOVICH, B.G., kand. iskusstvovedcheskikh nauk; RYBAKOVA, N.; MUKHTA-
ROV, A.I.; BOGATENKOVA, L.I.; KUNDAKBAYEV, B.; SIRANOV, K.S.; SHVYD-
KO, Z.A., red.; MAMTSOVA, L.B., red.; ZLOBIN, M.V., tekhn. red.

[The Soviet Kazakh Socialist Republic] Kazakhskaia Sovetskaia So-
tsialisticheskaia Respublika. Alma-Ata, Kazakhskoe gos. izd-vo,
1960. 477 p.   (MIRA 14:6)

1. Akademiya nauk Kaz.SSR (for Pal'gov, Pokrovskiy, Baishev)
2. Chlen-korrespondent Akademii nauk KazSSR (for Bykov, Smirnova,
Sil'chenko)
                         (Kazakhstan)

VINNICHENKO,A.V.,inzh.; LEBEDEVA, T.P., kand.tekhn.nauk; BELENOV, V.K., inzh.;
     KLIGMAN, V.V., kand.tekhn.nauk

Improving the technology of classification yards. Zhel.dor.transp.
44 no.3:36-41 Mr '62.   (MIRA 15:3)
                    (Railroads—Hump yards)

LEBEDEVA, T.P., kand.tekhn.nauk; BELENOV, V.K., inzh.; SUKHANOV, A.N., inzh.

Mechanize the car checking operations in stations. Vest. TSNII
MPS 20 no.5:45-47 '62.   (MIRA 15:8)
    (Railroads--Making up trains) (Railroads--Electronic equipment)

SADIKOV, P.P.; LEBEDEVA, T.P.; KORSH, V.B.; BELENOV, V.K.; PETRUNENKOV, A.Ya.;
TISHKOV, L.B.; ASHIKHMIN, A.K., inzh. retsenzent; PREDE, V.Yu.,
inzh., red.; VOROTNIKOVA, L.F., tekhn.red.

[Technological equipment of railroad stations] Tekhnicheskoe
osnashchenie stantsii. Moskva, Transzheldorizdat, 1963.
153 p.   (MIRA 16:6)
                        (Railroads—Stations)
                    (Railroads—Equipment and supplies)

LEBEDEVA, T.P.; STRAKOVSKIY, I.I.; TISHKOV, L.B.; LOMAKINA, N.N.;
    ZABELLO, M.L.; SADIKOV, P.P.; PETRUNENKOV, A.Ye.; BELENOV, V.K.;
    ARUTYUNOV, V.A., inzh., retsenzent; PETROVA, V.L., inzh., red.;
    BOBROVA, Ye.N., tekhn.red.

[Basic requirements related to the technical equipment of
classification yards] Osnovnye trebovaniia k tekhnicheskomu
osnashcheniiu sortirovochnykh stantsii. Moskva, Transzheldorizdat,
1963. 218 p. (Its TRUDY, no.270).   (MIRA 17:3)

L 56455-65
ACCESSION NR: AP5018632   UR/0153/64/007/004/0661/0664

AUTHOR: Belenov, Ye. A.; Zykov, D. D.

TITLE: Procedure for calculating the process of mass transfer in the rectification of binary mixtures

SOURCE: IVUZ. Khimiya i khimicheskaya tekhnologiya, v. 7, no. 4, 1964, 661-664

TOPIC TAGS: mass transfer

Abstract: A method is proposed for calculating the motive force of the process of mass transfer, considering the boundary conditions. It is proposed that the coefficient of mass transfer, which is independent of the slope of the equilibrium curve, be calculated. A method is proposed for separating the coefficient of mass transfer into particular coefficients of mass transfer, differing somewhat from existing ones. Experimental data are cited for the cyclohexanetolune system and compared with the calculated values, confirming the correctness of the proposed methods for calculating the motive force, coefficient of mass transfer, and the coefficients of mass transfer in the liquid and vapor phases. Orig. art. has 17 formulas, 1 graph, and 1 table.

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L 56455-65
ACCESSION NR: AP5018632

ASSOCIATION: Kafedra mashiny i apparaty zavodov po khimicheskoy pererabotke topliva, Moskovskiy institut khimicheskogo mashinostroyeniya (Department of Factory Machines and Apparatus for Chemical Preparation of Fuels, Moscow Institute of Chemical Machine Building)

SUBMITTED: 09Jan64   ENCL: 00   SUB CODE: GC

NO REF SOV: 004   OTHER: 000   JPRS

Card 2/2

BELENOVSKAYA, G.P

Oxidation-reduction systems for initiation of radical processes. I. Reversible systems with participation of diazol hydroperoxides and salts of metals with variable valence. G. P. Belenovskaya, B. A. Dolgoplosk, and E. I. Tinyakova (High Polymer Inst., Acad. Sci. U.S.S.R., Leningrad). *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1956, 1478-86.—The kinetic curves for reactions of dihydroxymaleic acid (I) and ascorbic acid (II) with Ph-CMe₂OOH are shown for reactions in O-free H₂O, under N. The reaction rate is considerably increased by addn. of salts of metals with variable valence. Mohr salt and CuSO₄ being the usual addends, with efficient acceleration being noted at −15° or −35°; at such temps. essentially no reaction takes place without such addends. The possible modes of radical reactions in the system are discussed. It was shown that such systems can be used to initiate the polymerization of butadiene, the system with II being the more effective of the two. Effective polymerization occurs at −15° with 0.03% Mohr salt; copolymerization of butadiene with PhCH:CH₂ in emulsion is also induced well at pH 3-11, with min. rate at pH 7, using I in the system, with Cu salts as catalysts being most effective in basic medium. II. Initiation of polymerization in aqueous emulsions under influence of reversible systems at temperatures below zero and a study of microstructure of polymer chains. *Ibid.* 1957, 65-9.—Polymerizations of butadiene are initiated by systems of the oxidation-reduction type with dihydroxymaleic acid, PhCMe₂OOH (or diisopropylbenzene hydroperoxide or p-tert-butylisopropylbenzene hydroperoxide), and Mohr salt components. The acid component was 0.3% of the substrate, hydroperoxide 0.5%, with Mohr salt 6- >15 mole %. The most effective hydroperoxide was that of p-tert-butylisopropylbenzene, although

Kolesnevskaya, G. P.

all these gave polymers and copolymers of butadiene with PhCH:CH₂. The polymers of butadiene and isoprene obtained with this system at the low temp. indicated (glycerol was added to the aq. medium as an antifreeze) were examd. structurally by infrared spectra. Butadiene with 83% trans-1,4 and 17% 1,2 links was obtained at −35°; with elevation of temp. the proportion of cis-1,4 links increased steadily. The polyisoprene at all temps. contained 7-8% 1,2 links, 4-6% 3,4 links, and mainly trans-1,4 links (at 60° the product contained 8% cis and 80% trans links). With lowering of polymerization temp. the polymers show increased tendency to crystallize even in the unstretched state.   G. M. Kosolapoff

KUZNETSOVA, G.A.; BELENOVSKAYA, L.M.

Separation of oxypeucedanin (prangol) hydrate from roots
of Prangos fedtschenkoi (Rgl et Schmal) Eug. Kor. Zhur.
prikl. khim. 38 no.5:1146-1148 My '65.   (MIRA 18:11)

KUZNETSOVA, G.A.; BELENOVSKAYA, L.M.

Chemical study of Prangos ornata Kuzm. roots. Khim. prirod. soed.
no.6:430 '65.   (MIRA 19:1)

1. Botanicheskiy institut imeni Komarova AN SSSR. Submitted July 5,
1965.

KUZNETSOVA, G.A.; BELENOVSKAYA, L.M.

> Furocoumarins obtained from the above the ground part of the
> Prangos fedtschenkoi (Rgl. et Schmal.) Eng. Kor. Zhur. prikl.
> khim. 38 no. 10:2368-2369 0 '65.   (MIRA 18:12)
>
> 1. Botanicheskiy institut imeni V.A.Komarova AN SSSR. Submitted
> July 25, 1964.

Belenovskiy, P. N.

ZAPOL'SKIY, N. V., kandidat tekhnicheskikh nauk; BELENOVSKIY, P.N., inzhener.

Results of laboratory investigation on the wear resistance of cast iron ship machinery parts. Trudy TSNIIRF no.28:73-92 '54.

(MLRA 9:1)

(Cast iron--Testing) (Mechanical wear)