ACCESSION NR: AP4025935   S/0056/64/046/003/1033/1038

AUTHOR: Shelepin, L. A.

TITLE: On the symmetry of the Clebsch-Gordan coefficients

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 46, no. 3, 1964, 1033-1038

TOPIC TAGS: Clebsch-Gordan coefficient, Clebsch-Gordan coefficient symmetry, angular momentum theory, R symbol, Regge invariant notation, Regge symmetry transformation, Racah coefficient, transformation matrix, orthogonality relation

ABSTRACT: Some consequences of the new symmetry of the Clebsch-Gordan coefficients, discovered by Regge (Nuovo Cimento 10, 544, 1958) are considered. All the formulas of the theory of angular momentum are written in invariant form as relations between R-symbols. This (Regge-invariant) way of writing automatically includes all the

Card 1/3

ACCESSION NR: AP4025935

consequences of the new symmetry rules. By carrying out the Regge
symmetry transformation, a whole series of new relations is ob-
tained between the Clebsch-Gordan coefficients, the Racah coeffi-
cients, and the transformation matrices. Some examples of these
new formulas are orthogonality relations and recursion formulas for
the Clebsch-Gordan and Racah coefficients. The Racah coefficients
that depend on projections are considered in particular. A graphi-
cal interpretation of the Regge symmetry is given by means of a
trilinear plot. It is pointed out that the Regge symmetry rules are
of great importance not only for specific new formulas but primarily
from the point of view of general theoretical problems, and its
consequences have not yet been exhausted. Orig. art. has: 3 figures
and 19 formulas.

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR (Phy-
sics Institute, AN SSSR)

Card   2/3

L 27856-65   ARG/EEO-2/EWG(j)/EWA(k)/EWT(d)/FBD/FSF(h)/FSS-2/EWG(r)/EWT(1)/FBO/
EWP(m)/FS(v)-3/EPA(sp)-2/EEC(k)-2/EWG(s)-2/EWP(f)/EWG(v)/EWP(c)/EWG(m)/EPR/EPA(w)-2/
EEC(t)/T/EWG(a)/EWP(k)/EWP(h)/EPA(bb)-2/EWG(c)/FCS(k)/EWA(m)-2/EWA(h)   Pn-4/Pz-6/
Po-4/Pd-1/Pab-10/Pe-5/Pq-4/Pac-4/Pf-4/Ps-4/Pae-2/Peb/Pi-4/Pw-4/Pl-4   IJP(c)   JWA/
ACCESSION NR: AP5005445 WG/BW/TT/WW/AT/GW S/0293/65/003/001/0167/0168

AUTHOR: Gudzenko, L. I.; Shelepin, L. A.

TITLE: Use of a plasma laser as an engine for a photon rocket

SOURCE: Kosmicheskiye issledovaniya, v. 3, no. 1, 1965, 167-168

TOPIC TAGS: photon rocket, plasma laser, laser propulsion, photon
engine, plasma amplifier, hydrogen plasma laser

ABSTRACT: The proposed rocket, intended for interplanetary space-
flight at relativistic velocities, calls for a comparatively low-power
laser whose emission would provide, after amplification in a quantum
amplifier with a sufficiently high gain, the unidirectional stream of
photons necessary to achieve thrust. A plasma laser without feedback
(i.e., mirrorless) described by I. I. Gudzenko and L. A. Shelepin
(ZhETF, 45, 1445, 1963) can be used as the amplifier. The dimensions
of the amplifier can be comparatively small. The gain k in the in-
tensity of the photon current is an exponential function of the ef-
fective length of the amplifier ℓ and the linear gain of the active
medium $\varkappa$, i.e., $k = \exp(\varkappa\ell)$. Thus, at $k = 10^{10}$ and $\varkappa = 0.1$ cm^{-1},

Card 1/2

L 27856-65

ACCESSION NR: AP5005445

$\ell \approx 2.3$ m. The formula for the mean thrust is given, and the value of thrust from one gram of hydrogen plasma as an active medium is computed as 10^4 kg. The authors suggest that the use of a plasma amplifier would circumvent many problems associated with the development of photon rockets. However, one difficulty, namely that of the construction of a sufficiently light and powerful source (of the order of millions of kilowatts) is not likely to be overcome at the present. Orig. art. has: 1 formula.

[YK]

ASSOCIATION: none

SUBMITTED: 12Feb64   ENCL: 00   SUB CODE: EC, PR

NO REF SOV: 002   OTHER: 001   ATD PRESS: 3193

Card 2/2

L 31956-65   EWT(1)/EWP(m)/EWC(v)/T/EEC(t)   Po-4/Pq-4/Pe-5/Pae-2/Pg-4/Pi-4   IJP(c)   GW

ACCESSION NR: AP5004412   8/0056/65/048/001/0360/0367

AUTHOR: Shelepin, L. A.

TITLE: SU_n symmetry in the theory of Clebsch-Gordan coefficients

SOURCE: Zhurnal eksperimental'noy i teoriticheskoy fiziki, v. 48, no. 1, 1965, 360-367

TOPIC TAGS: group theory, Regge pole, Clebsch Gordan coefficient, field theory, symmetry group, fractional parentage coefficient

ABSTRACT: A theory is developed for the Clebsch-Gordan coefficients on the basis of their transformation properties relative to the SU_n group. It is demonstrated that unitary unimodular symmetry plays an important role in the thoery of the ordinary Clebsch-Gordan coefficients and their combination. The Regge relations for the Clebsch-Gordan coefficients are shown to be manifestations of SU_n symmetry. Some new types of combinations of Clebsch-Gordan coefficients are introduced, and the relation of the results to field theory is discussed. The approach used in the article can be applied to the analysis of the SU_n groups themselves, and also

Card 1/2

L 31956-65

ACCESSION NR: AP5004412

to studies of fractional parentage coefficients, in which case a complete set of quantum numbers can be enumerated in terms of successive SU_n groups. Orig. art. has: 23 formulas.

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

SUBMITTED: 18Jul64   ENCL: 00   SUB CODE: GP

NR REF SOV: 002   OTHER: 009

Card 2/2

coefficients.

'n5.   (MIRA 18:4)

GUDCENKO, L.I.; SHELEPIN, L.A.

Amplification in a recombination plasma. Dokl. AN SSSR 160 no.6:
1296-1299 F '65.   (MIRA 18:2)

1. Fizicheskiy institut im. P.N. Lebedeva AN SSSR. Submitted September 18, 1964.

L 36336-65   EWG(j)/EWA(k)/FBD/EWT(l)/EWT(m)/EPA(sp)-2/EPF(c)/EEC(k)-2/EPA(w)-2/
EEC(t)/T/EWP(t)/EEC(b)-2/EWP(k)/EWP(b)/EWA(m)-2/EWA(h)   Pr-4/Pz-6/Po-4/Pab-10/
ACCESSION NR: AP5007657   Pf-4/Pr-4/Pi-4/Peb/Pl-4   S/0020/65/160/006/1296/1299

IJP(c)   WG/JD/AT

AUTHOR: Gudzenko, L. I.; Shelepin, L. A.

TITLE: Amplification in a plasma as a result of recombination

SOURCE: AN SSSR. Doklady, v. 160, no. 6., 1965, 1296-1299

TOPIC TAGS: laser, plasma laser, plasma, population inversion, hydrogen laser

ABSTRACT: A qualitative analysis is made of processes occurring during the decay
of highly ionized optically thin hydrogen plasma with an inverted population. The
following three stages in plasma are considered: 1) strongly ionized plasma with
instantaneously cooled free electrons, when the lower levels are practically un-
populated; 2) considerably ionized plasma, in which an equilibrium relaxation rate
from overpopulated upper levels is established; and 3) weakly ionized plasma. On
the basis of an equation for the rate of population change, a general relaxation
scheme is discussed for plasma with an electron concentration between 10^{13} and
10^{16} cm^{-3} and free electron temperatures $kT_e \sim 0.1$—0.5 ev. The relaxation time
τ for the first stage was estimated to be 10^{-8}—10^{-7} sec. The average number of
electrons populating levels with the principal quantum number $n = 2, 3, 4, 5, 6$
during the second stage was calculated for $kT_e = 0.1, 0.2, 0.3,$ and 0.4 ev and for

Card 1/2

L 30336-5

ACCESSION NR: AP5007657

free electron densities of 10^{12}, 10^{13}, 10^{14}, and 10^{15} cm^{-3}. The coefficients of absorption corresponding to transitions n → m (n = 2, m = 5) were calculated for the first and second stages, and it was shown that population inversion sufficient for laser action is maintained throughout the whole second stage ($\tau_2 \sim 10^{-5}$ sec). It is pointed out that various effects not taken into account may become dominant during the third stage. These effects, such as the increased importance of meta-stable states, complicate the analysis of relaxation processes during the third stage. However, in contrast to the first two stages, it is relatively easy to maintain a stationary population inversion during the third stage. Because of the linear Stark effect, hydrogen is not considered to be the best medium for a plasma laser. The heating and cooling of free electrons in a gaseous discharge is also discussed. Orig. art. has: 3 formulas and 1 table.   [CS]

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

SUBMITTED: 03Sep64   ENCL: 00   SUB CODE: EC, ME

NO REF SOV: 003   OTHER: 004   ATD PRESS: 3219

Card 2/2

L 2091-66   EWA(k)/FBD/EWT(1)/EEC(k)-2/ETC/EPF(n)-2/EWG(m)/EPA(w)-2/T/EWP(k)/EWA(h)/
EWA(m)-2 SCTB/IJP(c)   WG/AT
ACCESSION NR: AP5024901   UR/0382/65/000/003/0054/0056
                                                          533.9.01:621.378.1

AUTHOR: Gudzenko, L. I.; Kolesnikov, V. N.; Sobolev, N. N.; Shelepin, L. A.

TITLE: Use of highly ionized plasma for fabrication of a laser

SOURCE: Magnitnaya gidrodinamika, no. 3, 1965, 54-56

TOPIC TAGS: plasma, laser, plasma laser, magnetohydrodynamics, energy conversion

ABSTRACT: The sudden cooling of the free electrons of a highly ionized low-tempera-
ture plasma (a condition necessary for the attainment of laser action in such a me-
dium) is discussed. Two methods are proposed: cooling the walls of the container,
and the use of heavy particles (ions and neutral atoms of the plasma) to cool the
free electrons. The second method is discussed in detail. In utilizing heavy par-
ticles for cooling, two conditions must be satisfied: 1) The electronic temperature
must be significantly greater than the temperature of the heavy particles ($T_e \gg T$).
The temperature T_e must be close to the temperature of the almost totally singly
ionized gas, and the temperatures T, to the final cooling temperature of free elec-
trons; and 2) the specific heat of the electrons must be significantly smaller than
that of the heavy particles ($C_e \ll C$). The first condition can be realized by heating

Card 1/2

L 2091-66

ACCESSION NR: AP5024901

the gas by means of an electric field. The second condition can be fulfilled only when the electronic density is small in comparison with the total density of the gas. This occurs at a practically total ionization of an easy-to-ionize compound of plasma which forms only a small percentage of the total density of a mixture of gases, or, in the case of gas consisting of one component, when the plasma is not ionized completely. In a plasma consisting of a mixture of gases, the hard-to-ionize components form the cooling system, the specific heat of which is high. In addition, the total density cannot be too high lest nonradiative transitions control the population of the discrete lower levels. It is shown that the various cooling methods used in magnetohydrodynamics could probably be used in developing a low-temperature highly ionized plasma laser.   [CS]

ASSOCIATION: none

SUBMITTED: 10Aug64   ENCL: 00   SUB CODE: ME, EC

NO REF SOV: 001   OTHER: 000   ATD PRESS: 4/17

Card 2/2

L 14226-66   EWT(1)/FPF(n)-2/ETC(F)/EWG(m)   LJP(c)   AT

ACC NR: AP5024902   UR/0382/65/000/003/0057/0060

AUTHOR: Gudzenko, L.I.; Shelepin, L.A.

ORG: None

TITLE: On the amplification of a collapsing plasma

SOURCE: Magnitnaya gidrodinamika, no.3, 1965, 57-60

TOPIC TAGS: unstable plasma, plasma radiation emission, plasma negative absorption plasma laser activity

ABSTRACT: The properties of non-equilibrium plasma as a medium amplifying electromagnetic radiation at frequencies of its discrete spectrum are discussed. Plasma collapse radiation phenomena are evaluated for the case of optically thin hydrogen plasma described by the equations (1):

$$N = N_e + \sum_n N_n,$$

$$\frac{dN_n}{dt} = -N_e N_n \sum_{m \neq n} V(n, m) - N_e N_n B_\varepsilon(n) - N_n \sum_{m < n} A(n, m) + $$

$$+ N_e \sum_{m \neq n} N_m V(m, n) + N_e^3 B'_\varepsilon(n) + N_e^2 A_\varepsilon(n) + \sum_{m > n} N_m A(m, n), \quad (1)$$

where N – complete number of (free, and bound) electrons per cm³, N_e – density of free electrons, N_n – density of electrons woth principal quantum number n. A(n,m)dt and A (n)dt are the spontaneous transition probabilities, radiative and recombinative, to

Card 1/2   UDC 533.901:621.378.1

L 14226-66

ACC NR: AP5024902

level n, during time dt; V(n,m) corresponds to non-radiative transitions n m, and B(n) - to collision ionization and recombination. Three stages of plasma collapse or relaxation are discussed: 1) highly ionized plasma with "instanteneously" cooled electrons 2) substantially ionized plasma with a "stationary downflow" from overpopulated levels and 3) weakly ionized plasma. The second stage is investigated quantitatively, using the results of computer-calculated population parameters governed by equations (1); and upper-half-levels electron distribution N_n - (2); and the negative absorption coefficient (3). An evaluation of $_{5,2}$ shows sufficient amplification to expect feasibility of laser activity (lasing) for stages one and two. It is also proposed that plasma lasing may occur in stellar atmospheres where large distances enhance the amplification effect. Authors thank A.T. Matachun for assistance in numerical computations and A.M. Prochorov, I.I. Sobelman and N.N. Sobolev for numerous discussions. Orig.art. has 1 table, 3 formulas.

$$\tilde{N}_n = n^2 N_e^2 \left(\frac{2\pi\hbar}{mkT_e}\right)^{3/2} \exp\left(\frac{E_n}{kT_e}\right) \qquad (2) \qquad \varkappa_{m,1} \simeq \frac{\lambda_{n.m}^2}{4\,\Gamma_{m,n}} A(n,m) \quad (N_n - N_m). \qquad (3)$$

SUB CODE: 20   SUBM DATE: 10Aug64/   ORIG REF: 003   OTH REF: 006

Card 2/2

ACC NR: AP6036054   SOURCE CODE: UR/0056/66/051/004/1115/1119

AUTHOR: Gudzenko, L. I.; Filippov, S. S.; Shelepin, L. A.

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

TITLE: Rapidly recombining plasma jets

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 51, no. 4, 1966, 1115-1119

TOPIC TAGS: plasmoid, ionized plasma, plasma decay, plasma jet, adiabatic process, plasma laser

ABSTRACT: The authors consider a plasma jet containing atoms or ions with several discrete levels, the populations of which are much smaller than those given by the Saha formula for a given free-electron density and temperature. They show that a plasma jet of this kind can be used to obtain a relatively dense gas stream with unpopulated lower levels. This is done by making use of the rapid recombination that takes place when the plasma is initially highly ionized and the temperature of the free electrons is abruptly reduced. In this case the populations in the lower levels cannot follow the transitions of the electrons to the upper discrete levels and the resultant nonequilibrium situation (if the free electrons are cooled rapidly enough) can lead to population inversion, thus making it possible to use this gas in a laser

Card 1/2

ACC NR: AP6036054

configuration. This calls for cooling the plasma within a time 10^{-7} -- 10^{-8} sec from 5×10^3 to 10^3 K at a free-electron density 10^{14} -- 3×10^{15} cm^{-3}. In the case of an unmagnetized plasma, analysis shows that, in view of the difficulty of three-dimensional expansion into vacuum under laboratory conditions, any practical utilization of adiabatic cooling for the purpose of producing a large amount of hydrogen with a nonequilibrium population inversion in the atomic levels is hardly realizable. In the case of a magnetized plasma, it is shown that by freezing-in a strong magnetic field in the plasma it is possible to increase greatly the initial plasma pressure and thus intensify the cooling accompanying the expansion into vacuum. However, the required rapid displacement of a strong magnetic field still makes such a procedure difficult. A proposed means of overcoming the difficulty is to produce a device in which a high-velocity magnetized jet of fully ionized hydrogen is introduced into a vacuum with a magnetic field that falls off with distance. Theoretical estimates of the initial-plasma density required for this purpose and possible means of accomplishing a sufficiently rapid decrease of the magnetic field are discussed. The authors thank V. S. Komel'kov, M. I. Pergament, S. B. Pikel'ner, S. I. Syrovatskiy, and S. S. Serevitinov for a discussion. Orig. art. has: 5 formulas.

SUB CODE: 20/ SUBM DATE: 05Mar66/ ORIG REF: 005/ OTH REF: 001/ ATD PRESS: 5106

Card 2/2

ACC NR: AP7000056   SOURCE CODE: UR/0207/66/000/005/0115/0117

AUTHOR: Gordiyets, B. F. (Moscow); Gudzenko, L. I. (Moscow); Shelepin, L. A. (Moscow)

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

TITLE: Amplification of radiation during the decay of extremely ionized plasma

SOURCE: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 5, 1966, 115-117

TOPIC TAGS: plasma decay, ionized plasma, plasma electromagnetic wave, plasma radiation

ABSTRACT: An investigation was made of the possibility of amplifying electromagnetic radiation at frequencies of the atomic spectrum in plasma undergoing pulse recombination. Since the rapid decay of plasma causes an inversion in level population, it is simpler to analyze the population distribution over discrete levels in ions of decaying plasma in which the majority of heavy particles are bare atomic nuclei of one of the elements (H^+, He^{++}, Li^{++}, etc.). In addition to investigating the relaxation of hydrogen-like ions, an analysis is also made of the population in atoms of alkali metals or alkali-like ions during the decay of their plasma. Numerical data are used in an evaluation of the amplifying properties of the decaying plasma of a chemical element with the atomic number Z. It is shown that at comparatively high densities of free electrons N_e there is a region of optimum temperatures at which the absolute inversion acquires the maximum value. Rapidly decaying plasma, which results in in-

Card   1/2

ACC NR: AP7000056

version of the level population, can also be obtained by other methods. e.g., by
isothermal compression. Orig. art. has: 1 formula and 1 figure. [WA-71]

SUB CODE: 20/ SUBM DATE: 10Jun66/ ORIG REF: 003/ OTH REF: 003/

Card   2/2

L 44263-66   EWT(m)

ACC NR: AP6020224   SOURCE CODE: UR/0056/66/050/006/1666/1673

AUTHOR: Shelepin, L. A.

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

TITLE: Theory of the Clebsch—Gordan coefficients for the SU_n groups

SOURCE: Zh eksper i teor fiz, v. 50, no. 6, 1966, 1666-1673

TOPIC TAGS: matrix function, atomic spectroscopy, nuclear spectroscopy

ABSTRACT: A theory of the Clebsch—Gordan coefficients for SU_n groups has been developed. The theory is based on the method of generating invariants proposed by the author. It has been shown that the Clebsch—Gordan coefficients of the SU_n groups and the corresponding Racah coefficients and other transformation matrixes for atomic and nuclear spectroscopy have been reduced to a set of n x n symbols introduced earlier (L. A. Shelepin, ZhETF, 48, 360, 1965). Expressions

Card 1/2

ACC NR: AP6020224

2

have been presented for the Wagner coefficient of the SU_3 and SU_4 groups and for the Racah coefficient of the SU_3 group.   The method proposed by the author simplifies the Clebsch—Gordan coefficients of the SU_2 group.   Orig. art. has: 25 formulas. [Based on author's abstract]   [NT]

SUB CODE: 20/ 18/   SUBM DATE: 25Jan66/   ORIG REF: 006/ OTH REF: 002/

Card 2/2

SHELEPIN, M.N.; PETROV, N.N.

Semiautomatic control stations in oil fields. Neftianik 1 no.9:31
S '56.   (MLRA 9:11)

1. Glavnyy inzhener Neftepromyslovogo upravleniya Malgobekneft'
for Shelepin). 2. Glavnyy energetick Neftepromyslovogo upravleniya
Malgobekneft' (for Petrov).
     (Oil fields--Equipment and supplies) (Automatic control)

SHELEPIN, M.N.; PAUK, M.Ya.; FUNTIKCV, V.Z.; VARLAMOV, S.S.; SLIN'KO, A.G.;
TOMLENOV, V.K.; ZAGNIYEV, V.M.

Saving of power in a compressor station. Prom.energ. 17 no.7:6
Jl '62.   (MIRA 15:7)
(Compressed air)   (Compressors)

5 (3)
AUTHORS: Zhdanov, Yu. A., Shelepin, O. Ye.   SOV/153-2-2-10/31

TITLE: Complex Compounds in the Series of Perinaphthindene
                (Kompleksnyye soyedineniya v ryadu perinaftindena)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya
                tekhnologiya, 1959, Vol 2, Nr 2, pp 200 - 203 (USSR)

ABSTRACT: Perinaphthindenone (I), like several other cyclic polynuclear
                ketones, forms molecular compounds with metal halides (Refs 1,
                2,4). The authors succeeded in finding that 2-bromine peri-
                naphthindenone-1 (II) forms firm nuclear compounds with strong
                aprotonic acids $(SbCl_5, SnCl_4)$. 2-J-perinaphthindenone-1 (III)
                forms an analogous complex with tin tetrachloride. $C_{13}H_7OBr$.
                $.SbCl_5$; $(C_{13}H_7Br)_2-SnCl_4$; $(C_{13}H_7OJ)_2.SnCl_4$ were isolated. In
                their crystalline state all complexes have precise melting tem-
                peratures and are easily soluble in CH_3COOH, in alcohol and in
                dioxane, but not easily soluble in ether and benzene; Their sol-
                ubility in petroleum ether is poor. When boiled in water, the
                hydrolysis destroys them completely, and they are completely
                hydrolyzed when boiled with water ammonia and weak acids (Ref

Card 1/2

Complex Compounds in the Series of Perinaphthindene   SOV/153-2-2-10/31

2). Perinaphthindenone hydrazone (IV) (Ref 3) also forms stable complex compounds with metal halides. They are all soluble in pyridine and dioxane, but their solubility in alcohol is poor. Hydrazone is regenerated with their hydrolysis. A stable complex is developed by a sublimate solution in absolute ether. Salts of bivalent mercury normally oxidize hydrazones down to diazone ethane derivatives (Ref 7). If mercury salts are superfluous, nitrogen separates and organic mercury compounds develop (Ref 8). In the experimental part the production of molecular compounds of halogen derivatives of perinaphthindenone and its hydrazone with halides of several metals are described, as well as the production of 2-J-perinaphthindenone-1 (III), not described up to now. There are 8 references, 5 of which are Soviet.

ASSOCIATION: Rostovskiy-na-Donu gosudarstvennyy universitet; Kafedra organicheskoy khimii (Rostov-na-Donu State University; Chair of Organic Chemistry)

SUBMITTED: January 28, 1958
Card 2/2

5 (4)
AUTHORS: Zhdanov, Yu. A., Osipov, O. A.,   SOV/20-128-4-23/65
                 Shelepin, O. Ye., Kogan, V. A.

TITLE: The Dipole Moments and Structure of Some Derivatives of
                 Perinaphthindenone

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 4, pp 719 - 721
                 (USSR)

ABSTRACT: Perinaphthindenone (I) and benzanthrone (IV) having weak or no
                 characteristic ketone properties (Refs 1,2) form very solid
                 complex compounds with protonic and aprotonic acids (Refs 2-4).
                 This suggests a considerable polarity of the C = O bond. The
                 instability of perinaphthindene and benzanthrene is expressed
                 by their tendency of passing over into a stable oxidized state.
                 The possible existence of a perinaphthindenyl cation, produced
                 recently as a complex salt (Ref 5), had been presumed earlier
                 (Ref 6) although the attempt at producing it had failed. The
                 calculations of the binding energies in the perinaphthindene
                 system by the method of molecular orbits showed that a cationoid
                 state with a 12π-electron assembly is energetically advantage-
                 ous for this system. The system is aromatic if it has this as-
                 sembly (Ref 7). Thus, an intraionic binding character of $^+C - ^-O$

Card 1/4

The Dipole Moments and Structure of Some Derivatives   SC7/2C-126-4-23/65
of Perinaphthindenone

can be assumed (according to Ref 8) for the carbonyl compounds
of the perinaphthindene series where the negative charge is
localized on the oxygen, while the positive one is distributed
over the entire carbon system. An extensive analogy of the
properties of tropone (II) and perinaphthindenone permits the
reduction of its structure to that of perinaphthindenyl oxide
(Ia), using also the analogy with tropil oxide (IIa) (see Dia-
gram). For perinaphthindenone, a considerable dipole moment
(in the magnitude of 4D) can be expected, all the more so as
tropone has a moment between 4.17 and 4.30 D (Ref 9). To clar-
ify this problem, the authors measured the dipole moments of
perinaphthindenone and some of its derivatives. Table 1 pre-
sents the results showing that the dipole moment in dioxane is
reduced by 0.72 D by the introduction of bromine into the
nucleus of perinaphthindenone, and in benzanthrone by 1.19 D.
The introduction of a benzonal nucleus reduces it by 0.5-0.6 D.
On the other hand, the dipole moment increases by the intro-
duction of an oxy group into position 7 of perinaphthindenone
(V). An intramolecular cycle with a hydrogen bond is formed.
Card 2/4   Thus, the negative charge of the carbonyl oxygen is stabilized,

The Dipole Moments and Structure of Some Derivatives   SOV/20-128-4-23/65
of Perinaphthindenone

and the C = O group is taken out of the conjugation with the
ground skeleton of the molecule due to intracyclic exchange
processes via the hydrogen bond. In contrast to the above, the
tropolone has a dipole moment much too low (3.7 D) as compared
with the tropone. The value of the dipole moment of the complex
$C_{13}H_8OSbCl_5$ (8.50 D) permits assumptions as to its structure:
cationoid structure of perinaphthindenylium with a transition
of the electron configuration of the antimony atom into the
state d^2sp^3 (similar to $HSbCl_6$). The oxygen atom effects a
peculiar binding between the cationoid radical of perinaph-
thindenylium and the antimony atom as one of the addenda of
the latter, participating in the coordination sphere with only
one of its valences. There are 1 table and 11 references, 6 of
which are Soviet.

ASSOCIATION: Rostovskiy-na-Donu gosudarstvennyy universitet (Rostov-na-Donu
Card 3/4   State University)

ZHDANOV, Yu.A.; SHELEPIN, O.Ye.

Complex compounds in the peri-naphthindene series. Izv.vys.ucheb.
zav.; khim.i khim.tekh. 3 no.6:1036-1039 '60.   (MIRA 14:4)

1. Rostovskiy-na-Donu gosudarstvennyy universitet, kafedra organicheskoy
khimii.
                    (Benzonaphthene)

ZHDANOV, Yu.A.; SHELEPIN, O.Ye.; EAGDASAROV, K.N.; BUDNYATSKAYA, N.I.

Study of the indicator properties of 2-oxy-peri-naphthindenone.
Dokl. AN SSSR 153 no.5:1073-1076   D '63.   (MIRA 17:1)

1. Rostovskiy-na-Donu gosudarstvennyy universitet. Pred-
stavleno akademikom A.P. Vinogradovym.

KAT, G.A., SHCHERBAK, L.A., BEREZOV, S.I., N.M.
SIMONOV, G.P.

Condensation of 1-methyl-2-phenyl-5,6,7,8-tetrahydroacridinium
perchlorate aldehydes the aromatic and heterocyclic series.
Zhur. ob. khim. 35 no. 20-574 Mr '65.

1. Rostovskiy-na-Donu gosudarstvennyy universitet

SHELEPIN, V. N.

USSR/ Miscellaneous - Tools

Card 1/1   : Pub. 103 - 21/29

Authors   : Shelepin, V. N., and Shcheglov, Yu. D.

Title   : Eccentric cotter-pin turner

Periodical   : Stan. i instr. 9, page 36, Sep 1954

Abstract   : A universal, eccentric cotter-pin setter and remover, developed by one
                of the Machine Construction Plants in Moscow, is briefly described.
                Drawing.

Institution   : ...

Submitted   : ...

Shelepin, V. N.

USSR/Engineering - Tools

Card 1/1   Pub. 103 - 23/29

Authors   : Shelepin, V. N., and Shcheglov, Yu. D.

Title   : \ gang tap for cutting threads on sleeve joints

Periodical : Stan. i instr. 10, page 35, Oct 1954

Abstract   : A short description is presented of a gang cutter (tap) for cutting inner threads on couplings and sleeve joints. Drawings.

Institution : ...

Submitted   : ...

KOTLYAREVSKIY, G.P., inzhener;SHELEPIN, V.M., inzhener; PREOBRAZHENSKIY, N.Ye., inzhener.

Increasing the durability of pump transmission shafts. Vest.mash. 36 no.11:50-52 N '56. (MIRA 10:1)
(Pumping machinery) (Shafts and shafting)

AUTHORS: Shelepin, Ye. I., Zafiyovskiy, M. A.

TITLE: A Contribution to the Calculation of the Sliding-friction Force (K
             voprosu o raschete sily treniya skol'zheniya)

PERIODICAL: Dokl. L'vovsk. politekhn. in-ta, 1955, Vol I, Nr 2, pp 51-54

ABSTRACT: Bibliographic entry

Card 1/1

BAYADIN, L.N.; LOBUSEV, A.F.; PROBINA, K.A.; SMIRNOVA, A.A.; SHELEPINA, L.A.

Experimental data on plastic arterial surgery in case of an
infected wound; preliminary report. Trudy 1-go MMI 16:139-140 '62.
(MIRA 16:6)

1. Iz kafedry operativnoy khirurgii i topograficheskoy anatomii
(zav. - chlen-korrespondent AMN SSSR prof. V.V.Kovanov) Pervogo
Moskovskogo ordena Lenina meditsinskogo instituta.
(ARTERIES—SURGERY)   (SURGERY, PLASTIC)

SHERSTNEV, A.V.; SHELEPOV, A.V.   (Buzuluk)

Clinicoroentgenological correlations in peptic ulcer in
elderly persons. Klin. med. 41 no.7:133-137 Jl'63
                                                (MIRA 16:12)

1. Iz Buzulukskoy mezhrayornoy bol'nitsy (glavnyy vrach S.B.
Kosinskiy).

MITEL'MAN, M.L., inzh.; SHELEPOV, V.A., inzh.

Redesigning of a turbogenerator ventilation system. Energetik. 13
no.10:17-18   O '65.   (MIRA 18:10)

USSR/Cultivated Plants - Grains.   M.

Abs Jour   : Ref Zhur - Biol., No 4, 1958, 15545

Author   : V.V. Shelepov

Inst   : Stavropol'sk Agricultural Institute.

Title   : The Effect of the Hardening of Seeds on the Corn Yield.
               (Vliyaniye zakalki semyan na urozhay kukuruzy).

Orig Pub   : Sb. nauchno-issled. rabot stud. Stavropol'sk. s.-kh. in-
               t, 1956, vyp. 4, 5-6.

Abstract   : The tests were made at the training farm of the
               Stavropol'sk Agricultural Institute. Pre-sowing hard-
               ening of the seeds raised the field germination of corn
               from 3 to 9% and the yield by about 30%. The best method
               of seed processing before sowing was hardening with one
               day soaking and then drying them off a little afterwards.

Card 1/1

1. SHALEPOV Ya.S.

2. USSR (600)

4. Sheep-Saratov Province

7. More attention to fine-wooled sheep breeding in Saratov Province, Sots.zhiv.
15. no.?, 1953.

9. Monthly Lists of Russian Accessions, Library of Congress, April 1953, unclass

SHELEPOV, YE. S.

"Methods of Improvement of Sheep on Commerical Farms of
Trans-Volga Kolkhozes of Saratov Oblast." Saratov Zootechnical and
Veterinarian Inst of the Min Higher Education USSR, Saratov, 1955.
(Dissertation for the Degree of Candidate in Agricultural Sciences)

SO: M-955, 16 Feb 56

YEFREMOV, P.V.; SHELEPOVA, G.S.

Accuracy of the calculation of the intensity of snow thawing.
Trudy TSIP no.134:77-84 '64   (MIRA 17:8)

SHELEPOVA, K. M.

TITLE: Conference on ...

PERIODICAL: Tsvetnyye metally, 1959, Nr 7, pp 84-85 (USSR)

ABSTRACT: On 25-26 February 1959 a conference was held in Moscow for summing-up and coordinating work on autoclave processes in the metallurgy of heavy, non-ferrous, rare and noble metals. The conference heard reports as follows:

D.M. Yukhtanov, Gintsvetmet, on progress throughout the world on the use of hydrometallurgical, particularly auto-clave, methods for non-ferrous and rare metal production; G. N. Dobrokhotov, Gipronikel', on nickel leaching practice at some Soviet works; N. I. Onuchkin and G. N. Dobrokhotov, on the thermodynamics and kinetics of the selective reduc-tion by hydrogen and carbon monoxide under pressure of nickel and cobalt from solution; I. Yu. Leshch and K. M. Shelepova, Gipronikel', on design decisions on the appli-cation of the flowsheets dealt with by G. N. Dobrokhotov at the Yuzhuralnikel' and Severonikel' Combines and the Uralsvelny (Ufa) Nickel Works; I. N. Masleditskiy, Leningradskiy Gornyy Institut (Leningrad Mining Institute), on the advantages of a combined flotation-autoclave method for nickel-electrolysis of slimes containing platinum-group metals; V. B. Zhilin, Severonikel' Combine, and S. I. Sobol', Gintsvetmet, on the essentials of the neutral method of oxidizing leaching of nickel concentrate from converter-matte flotation; S. I. Sobol' on preliminary investigations on the development of a sulphurous-sulphuric method for leaching nickel and cobalt from oxidized nickel ores; N. N. Masleditskiy, Mekhanobr, on

the main results of investigation of the autoclave-soda process for treating tungsten-ore beneficiation products; V. I. Papmukaylo Mekhanobr, and D. A. Malakhov, Skopin-skaya (Skopinak) TsOF, separately, on problems in the application of an autoclave-soda flowsheet to scheelite and wolframite raw material; K. A. Meyerson, M. Ya. Shapiro, N. N. Kharskiy, R. A. Pavlyuk and A. P. Nadol'skiy, Krasnoyarskiy Institut tsvetnykh metallov (Krasnoyarsk Non-Ferrous Metals Institute) on the treat-ment of tungsten concentrates in hermetica, heated ball-mills with soda or caustic alkalies; V. I. Shirtladze, S. I. Sobol', Ye. I. Gulyayeva, Z. L. Berlin, I. K. Meler and B. I. Rudenko, Gintsvetmet, on the treatment of prepared and unprepared sulphide molybdenum raw material by oxidizing autoclave alkaline leaching; I. N. Meleh and S. I. Sobol' on the kinetics of oxidizing autoclave leaching; A. N. Zelikman and Z. M. Lyapina, Krasnoyarsk Non-Ferrous Metals Institute, on the results of a study of conditions for the selective separation of lower oxides of tungsten and molybdenum from their salt solutions by hydrogen under pressure; N. V. Barbin, Gorno-metallurgicheskiy institut (Mining-Metallurgical Institute) of the Sovnarkhoz (economic council) of the Armyanskaya SSR (Armenian SSR), on his investigations of ammoniacal auto-clave leaching under oxygen pressure of molybdenum concen-trates; S. I. Sobol' on technical-economic factors of ammoniacal leaching; A. I. Sinel'nikova and I. N. Plaksin, Krasnoyarsk Non-Ferrous Metals Institute, on an oxidizing autoclave process for gold-containing raw material; N. G. Tyurin, Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute) on the behaviour of noble metals in oxidizing autoclave leaching in thiosulphate solutions; A. L. Tseft and D. A. Tazukin and A. Yu. Dadabayev, Institut Metallurgii i obogashcheniya AN KaS SSR (Metallurgy and Beneficiation Institute of the AS Kaz SSR) respectively, on the physicochemical fundamentals and on works-trials of autoclave salt leaching of polymetallic materials; I. Yu. Leshch, Gipronikel', on the unsuitability of autoclave leaching for lime-containing materials; V. A. Bersenteyev, VAMI, on industrial experience of a continuous autoclave leaching process for bauxites; Z. G. Frenev, IOKhN AN SSSR (IOKhN AS USSR, on compounds of some rare elements in various valency states under oxygen and hydrogen pressure in the presence of anhydrous ammonia; Z. L. Berlin, Gintsvetmet, on autoclave design and operation; P. G. Xakovlev, Giproniukel', and N. Ya. Vishnevskiy, VNII nadtsekhla, on model studies on autoclaves and the deve-lopment of mixers; M. A. Polyanov, E. B. Girshet, on the design of an experimental high-pressure pulp pump; G. L. Shvarts, NIKhIMMASH, on the selection of steel for acid leaching of cobalt matte, the antimite-flotation concentrate; Yu. I. Archakov, VNIIneftekhim, on corro-sion of types IKhl8N9T, l2KhGN, lOKhND and lOND steels in soda and alkaline solutions in the presence of metal salts and oxygen at 5 - 15 kg/cm2; V. I. Deryagina and N. N. Kulykina, VNIIneftekhim, separately, on mechanical properties of hydrogen-affected steels, the conversion

SHAMSHUR, P. I.

Avtomatizatsiya razlozheniye nastara P. V. Ivanovoy. (Chulochnaya fabrika im. Noginn. Moskva). Legkaya promst', 1949, No. 5, p. 11-12

SO: Knizhnaya Letopis', Vol. 7, 1949

L 26378-66   EWT(1)/T   IJP(c)   GW
ACC NR: AP6007686   (A)   SOURCE CODE: UR/0413/66/000/003/0067/0067

AUTHORS: Sheler, Khorst; Vaybrekht, Otto; Kheyrot, Aleksander; Khartvig, Khorst

ORG: none

TITLE: Device for differential transformation of aerial photographs. Class 42,
No. 178506

SOURCE: Izobreteriya, promyshlennyye obraztsy, tovarnyye znaki, no. 3, 1966, 67

TOPIC TAGS: aerial photography, optics, aerial photograph, photographic device

ABSTRACT: This Author Certificate presents a device for differential transforming
of aerial photographs. The device is used in conjunction with a photogrammetic
device for processing aerial photographs. It contains an inversor which acts on
the basic law of optics, and a photograph support and screen which may be posi-
tioned relative to one another in three mutually perpendicular planes. Accuracy in
scaling is facilitated by the inversor which features a reduction device for
control of the coefficient of aerophoto transformation with allowance made for
focal distance. This distance corresponds to the transform coordinates of the
current point of aerophoto slope on the horizontal aerial photograph. The inversor

Card 1/2 .   UDC: 528.722.31

L 26378-66

ACC NR: AP6007686   /

is made in the form of directional-controlled rods and connecting links attached to each rod, thus allowing rotation about the X-X axis and intersection of the directional at a point on the X-X axis. Electrical control of the coefficient of transformation is maintained by an electromoter circuit controlling the variation of distance from the objective to the photo and from the objective to the screen. This is an electrical bridge circuit for processing data coming from the photogrammetric device.

SUB CODE: 14/ SUBM DATE: 21Nov63

Card 2/2 CC

SIDOROV, N.N., dots., kand. tekhn. nauk; SHELESHKO, K.K., dots., kand.
tekhn. nauk (Leningrad)

New textbook for railroad technical schools ("Electric traction
systems" by E.D. Levashev, G.K. Astaf'ev, G.A. Al'tshuler.
Reviewed by N.N. Sidorov, K.K. Sheleshko) Zhel. dor. transp. 41
no.5:92-93 My '59.   (MIRA 12:7)
                    (Electric railroads)
                    (Levashev, E.D.) (Astaf'ev, G.K.) (G.A. Al'tshuler)

KOVAL'CHUK, N.R.; SHELESHKO, T.V.; SHALAYEV, G.I.; SHVETS, A.P.

Flooding the Borislav sandstones. Trudy VNIGNI   no.12:399-412   '58.
(MIRA 12:3)

(Borislav region—Petroleum engineering)

KLIMOVITSKIY, A.I.; VERBIN, G.I.; SHVETSENKO, T.V.

Field geological characteristics of the Chubovka gas field.
Trudy UkrNIGRI no.7:69-74 '61.
(MIRA 17:1)

SHELESHKO, V.; LEVITSKIY, B.

Introducing automatic steering gear on the diesel motorship
"Orel". Mor. flot 18 no.8:17-18 Ag '58.   (MIRA 11:9)

1. Starshiy inzhener gruppy operativnogo planirovaniya Dunayskogo
parokhodstva (for Sheleshko). 2. Nachal'nik konstruktorskogo
byuro Dunayskogo parokhodstva (for Levitskiy).
   (Automatic control) (Steering gear) (Motorships)

SHELESHKO, V.; ANAN'INA, V., assistent

Operating ships of the Danube Line in transporting ore on schedule. Mor.flot 19 no.4:24-27 Ap '59.   (MIRA 12:6)

1. Starshiy inzhener gruppy operativnogo planirovaniya Dunayskogo parokhodstva (for Sheleshko). 2. Odesskiy institut inzhenrov morskogo flota.
(Danube River---Navigation)
(Iron ores--Transportation)

232T64

USSR/Electricity - Electric Traction   Sep 52
Railways

"Conference-Seminar on Advanced Engineering on
Electrified Railroads," S. D. Volobrinskiy, K. K.
Sheleshkov, Candidates Tech Sci

"Elektrichestvo" No 9, pp 92, 93

More than 350 persons participated in the 2d con-
ference-seminar on this subject, held early in
May at the LIIZhT (Leningrad Inst of Railway
Transport Engineers imeni Obraztsov). M. R. Bar-
skiy (Riga Elec Mach-Bldg Plant) reported on the

232T64

results of tests of the VL-22m elec locomotive
series. A. Ye. Alekseyev (LIIZhT) and A. A.
Pogosov (Novocherkassk Elec Locomotive Construc-
tion Plant) reported on the plans for a new 8-
axle locomotive for trunk lines.

232T64

SIDOROV,N.N., kandidat tekhnicheskikh nauk, dotsent.; SHELESHKOV,K.K., kandidat tekhnicheskikh nauk; ANSBERG,G.A., inzhener; PLAKS,A.V., inzhener

Improving the electric circuits of direct current trunk line electric locomotives. Sbor. LIIZHT no.145:52-73 '53.
(Electric locomotives) (MLRA 8:10)

V

SHELESHKOV,K.K., kandidat tekhnicheskikh nauk

Non-steady processes in power circuit commutators of d-c electric
locomotives. Sbor. LIIZHT no.145:73-91 '53.   (MLRA 8:10)
(Electric locomotives)

GRIBANOV, A.F.; ZLOTIN, V.I.; OL'KHOV, Ye.N.; SHELESHKOV, K.I.; ORLOV,
     Ye.I., redaktor; SABITOV,A., tekhnicheskiy redaktor; PROZOROVSKAYA,
     V.L., tekhnicheskiy redaktor

[The repair of industrial electric trains] Remont promyshlennykh
elektrovozov. Moskva, Ugletekhizdat, 1954. 362 p.   (MIRA 8:4)
     (Railroads, Industrial)   (Electric railroads)

DUNENKOV, V.L.; NEKRASOV, V.I.; PLAKS, A.V.; SHELESHKOV, K.K.; YARCHUK, A.Ya.
(Leningrad)

Investigation of some parts of the electric equipment of N8
electric locomotives. Elek.i tepl.tiaga no.10:18-19 O '57.
(MIRA 10:11)
(Electric locomotives)

32(3)   SOV/112-59-5-9110

AUTHOR: Dunenkov, V. L., Nekrasov, V. I., Plaks, A. V., Sheleshkov, K. K.,
and Yarchuk, A. Ya.

TITLE: Investigation of Electrical Equipment of Type N8 Electric Locomotive

ABSTRACT: To introduce final corrections, the scheme of a type N8 electric
locomotive had been tested under various conditions before serial
manufacturing of the locomotive was started. Under regenerative braking
conditions, the current reached 2,000 amp. On the section where the sub-
stations had no inverter equipment, the contact-wire voltage reached 4,200 v,
with NB-406 traction motors operating normally. Investigation of the transients
accompanying the transition to series connection showed that sometimes, under
regenerative conditions, the residual EMF of traction motors is so combined
with the contact-wire voltage that voltages up to 5,100-6,000 v appear on the
motor brushes. This caused flashovers from energized motor parts and

Card 1/2

SOV/112-59-5-9110

Investigation of Electrical Equipment of Type N8 Electric Locomotive

equipment to ground.   To eliminate such overvoltages, it was suggested that
the motors next to ground be short-circuited.   To eliminate burning of contacts
of the braking switch under transient conditions, it was recommended that two
contactors be used for breaking the traction-motor field circuit when
regeneration is cut off.   Tests of a new laminated-core D-4 relay showed that
it provides a satisfactory differential protection of the power circuit.   Buffer
protection, under traction conditions, is realized by introducing starting
resistors; its operating time is 0.1-0.2 sec, the motor current being reduced
to one-third of its value.   Investigation of the functioning of the protective
system under regenerative conditions permitted setting a course for solving
this important problem.   Forced ventilation is recommended for improving the
operating conditions of "fekhral' resistors.   Detailed investigations of air
exchange within the locomotive body permitted providing some recommendations
on how to improve the ventilating system.   Bibliography: 3 items.

V.N.K.

Card 2/2

SHELESHKOV, K. K.

"On the Problem of the Experimental Investigation of Non-Steady Processes in Power
Current Circuits of D. C. Locomotives." Official opponents: A. Ye. Kaplyanskiy,
Professor, Doctor of Technical Sciences and Y. D. Levashov, Engineer.

Dissertation for the Degree of Candidate of Technical Sciences, defended at
Leningrad, Institute for Railraod Engineers im. Obrastzov, 5 July 1950
(Elektrichestvo, 1958, Nr. 5, pp. 91-91)

ZLOTIN, Vladimir Isaakovich; KAZHDAN, Shimon Mordukhovich; TUNKEL',
Naum Ruvimovich; SHELESHKOV, Konstantin Konstantinovich.
Prinimali uchastiye: GRIBANOV, A.F.; OL'KHOV, V.I.;
POTAPOV, M.G., kand. tekhn. nauk, retsenzent; NURMUKHAMEDOVA,
V.F., red. izd-va; OVSEYENKO, V.G., tekhn. red.

[Electric locomotive and dump car haulage in open pits] Elektrovozo-
dumpkarnoe khoziaistvo na kar'erakh. Moskva, Gos. nauchno-tekhn.
izd-vo lit-ry po gornomu delu, 1962. 309 p.   (MIRA 15:5)
     (Mine railroads)   (Strip mining)

SHELESTOVA, V.S., aspirant

    Leaf rollers in the south of the USSR. Zashch. rast. ot vred.
    i bol. 6 no.5:29-30 My '61.   (MIRA 15:6)

    1. Ukrainskiy institut zashchity rasteniy.
               (Russia, Southern--Leaf rollers)

SHELESHNEV, A.A.

USSR/ Engineering = Drawing dies

Card 1/1   Pub. 103 - 3/22

Authors   : Tsvirko, G. L., and Sheleshnev, A. A.

Title   : Working of splined cylinders

Periodical : Stan. i instr. 6, 8-11, June 1955

Abstract   : Methods of drawing external splines on spinning machine shafts by means of drawing the shaft through a special die made of 3Khl2M (Khl2T; Khl2Fl) construction steel. The die consists of two parts; a cylinder, and a press-fit (in hot state) ring with internal splines. The drawing of splines can be performed on vertical or horizontal presses and on drawing lathes, at pressures not exceeding 20 tons, and working feeds of from 550-600 mm. Drawings.

Institution : .....

Submitted   : .....

SHELESHNEV, M., predsedatel'.

Smelting metal above the plan. V pom.profaktivu 14 no.13:11-13 Jl '53.
(MLRA 6:5)

1. Komitet profsoyuza domennogo tsekha Novotul'skogo metallurgicheskogo
zavoda.   (Smelting)

SHELEST, A.N., doktor tekhn. nauk

Development of diesel-locomotive construction in the U.S.S.R.
Trudy Inst. ist. est. i tekh. 21:172-211 '59. (MIRA 13:3)
(Diesel locomotives--Construction)

SHELEST, A.P.

Improving the design of power presses with periodically rotating tables. Ogneupory 19 no.2:86-88 '54.   (MIRA 11:8)

1.Pervoural'skiy zavod.
        (Refractories industry--Equipment and supplies)

SHELEST, A.P.

Increasing the stability of crusher roll screens. Ogneupory 19
no.5:230-232 '54.   (MIRA 11:8)

1.Pervoural'skiy dinasovyy zavod.
          (Crushing machinery)

SHELEST, A.T., dotsent

Ways of working trenches depending on the rate of operations.
Izv.vys.ucheb.zav.;gor.zhur. 6 no.11:22-26 '63.   (MIRA 17:4)

1. Sverdlovskiy gornyy institut imeni V.V.Vakhrusheva.
Rekomendovana kafedroy otkrytykh gornykh rabot.

SHELEST, A.T., dotsent

Effect of the rate of mining on the economy of strip mining.
Izv. vys. ucheb. zav.; gor. zhur. no.8:49-53 '64   (MIRA 18:1)

1. Sverdlovskiy gornyy institut imeni V.V. Vakhrusheva. Rekomen-
dovana kafedroy otkrytykh gornykh rabot.

SHELEST, A.T., dotsent

Economic effectiveness of shortening the duration of trenching. Izv.vys.
ucheb.zav.;gor.zhur. 7 no.6:9-13 '64.   (MIRA 17:12)

1. Sverdlovskiy gornyy institut imeni V.V.Vakhrusheva. Rekomendovana
kafedroy otkrytykh gornykh rabot.

SHELEST, A.V.

    Interaction between a dynamic system and a statistical ensemble.
Ukr. fiz. zhur. 10 no.7:715-720 Jl '65.   (MIRA 18:8)

    1. Institut fiziki AN UkrSSR, Kiyev.

ACC NR: AT7004415   (N)   SOURCE CODE: UR/0000/66/000/000/0051/0055

AUTHOR: Pavlov, I. M.; Tarasevich, Yu. F.; Shelest, A. Ye.

ORG: none

TITLE: Deformations in the neck area of tensile-test specimens of certain titanium alloys

SOURCE: AN SSSR. Institut metallurgii. Napryazhennoye sostoyaniye i plastichnost' pri deformirovanii metallov (Stress condition and plasticity during metal deformation), Moscow, Izd-vo Nauka, 1966, 51-55.

TOPIC TAGS: titanium alloy, tensile testing machine, tensile test, crystal orientation/ OT4 titanium alloy, VT6 titanium alloy, VT14 titanium alloy, IM-12A tensile testing machine

ABSTRACT: The deformations at the site of the greatest reduction in area of Ti (VT1) and Ti-alloy (OT4, VT6, VT14) test specimens in two mutually perpendicular directions were compared in order to indirectly obtain information on the anisotropy of mechanical properties. An IM-12A tensile testing machine was employed and the specimens were previously subjected to various types of thermomechanical treatment (rolling at 500 to 1100°C through every 100°C with reduction of area amounting to 20, 40 and 60% and with subsequent cooling in water, air and under asbestos). The criterion used to estimate deformation in the neck in two mutually perpendicular directions was the

Card 1/2

BELOSEVICH, V.K.(Moskva); KALUGIN, V.F.(Moskva); KORNEYEV, N.I. (Moskva);
PAVLOV, I.M.(Moskva); SKUCHAREV, I.G.(Moskva); SHELEST, A.Ye.
(Moskva).

Investigaiting the conditions in rolling titanium alloys.Izv.AN
SSSR. Otd.tekh.nauk no.10:15-27 O '56.   (MIRA 10:1)
     (Rolling (Metalwork))   (Titanium alloys--Metallurgy)

SHELEST, A. Ye.: Master Tech Sci (diss) -- "Investigation of certain condi-
tions of hot-rolling of titanium and its alloys". Moscow, 1958. 22 pp (Acad
Sci USSR, Inst of Metallurgy im A. A. Baykov), 150 copies (KL, No 5, 1959, 152)

AUTHORS: Pavlov, I. M., Shelest, A. Ye.   SOV/163-58-3-27/49

TITLE: Investigation of the Resistance to Deformation in the Hot
                Punching of Titanium and Its Alloys (Issledovaniye sopro-
                tivleniya deformatsii titana i yego splavov pri goryachey
                prokatke)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958,
                Nr 3, pp 161   164 (USSR)

ABSTRACT: The present paper contains the results of the investigations
                of the resistance to deformation in the hot punching
                of titanium and titanium alloys. Titanium was produced
                by means of the calcium hydration method and powder
                metallurgy. The following samples were used IMP -1. VT-1D,
                and titanium alloy with aluminum, type VT-5D . Titanium
                and its alloys have technical properties similar to
                those of stainless steel. The investigations of the re-
                sistance to deformation of titanium samples and of
                steel samples of the type 1Kh18N9T were compared to each
                other. The resistance to deformation is determined by
Card 1/3   the following formula:

Investigation of the Resistance to Deformation in the   SOV/163-58-3-27/49
Hot Punching of Titanium and Its Alloys

$$ P = \frac{P_{gen}}{S_r} = \frac{P_{gen}}{\frac{B_1 + B_2'}{2} \cdot \ell_x} . $$

The dependence of the resistance to deformation on the temperature in the act of . . . of titanium samples **IMP-1** and the steel sample . . . . . . is graphically represented. From the investigations carried out may be concluded that the resistance to deformation of stainless steel in punching increases uniformly with the temperature. However, the resistance to deformation in titanium samples in the case of an increase of the stamping temperature to 950°C takes place non-uniformly. The resistance to deformation of titanium depends only little on the temperature and is 2-2.8 times smaller than the resistance to deformation of the steel sample **1Kh18N9T**. By dropping the punching temperature the resistance to deformation of titanium suddenly increases and at a temperature of 500° approaches the value of the resistance to deformation

C   2/3

Investigation of the Resistance to Deformation in the   SOV/163-58-3-27/49
Hot Punching of Titanium and Its Alloys

of the steel sample at this temperature. Elements alloyed
with titanium not only change their properties but also
their resistance to deformation in punching. It is recommended
to punch titanium alloys at a temperature where the β-modi-
fication of titanium exists, and to stop this treatment
at temperatures where the transition from β-titanium to α-
titanium takes place. There are 4 figures and 1 reference,
which is Soviet.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute) Institut
metallurgii AN SSSR (Institute of Metallurgy, AS USSR)

SUBMITTED: December 10, 1957

Card 3/3

18(0)

AUTHORS: Pavlov, I. M., Shelest, A. Ye.   SOV/163-58-4-24/47

TITLE: Investigation of the Initial Stage in Rolling and the
                Transition to the Stabilized Process (Issledovaniye nachal'noy
                stadii prokatki i perekhoda k ustanovivshemusya protsessu)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 4,
                pp 141-148 (USSR)

ABSTRACT: On account of the examination made here, the following is
                stated: 1) A comparison of different methods of determining
                the minimum length of the frontal outside strip end in rolling
                (Ref 3) shows that the easiest and sufficiently accurate method
                is the one basing on the measurement of the full pressure of
                the metal on the rolls and the recording on an oscillograph
                (Ref 4). 2) The increase of the full pressure after the filling
                of the roller opening may be explained by the supporting effect
                of the frontal outside strip end, leading to an increase of
                the metal deformation resistance. In rolling stainless steel,
                the supporting effect of the outside end is always greater
                than in rolling titanium. 3) The speed of the frontal strip
                end after gripping becomes constant after the discharge of the
Card 1/3   frontal end of a certain length (corresponding to the minimum

Investigation of the Initial Stage in Rolling and   SOV/163-58-4-24/47
the Transition to the Stabilized Process

length of the outside end) out of the rollers. 4) At the
moment of filling the roller opening with metal, the
critical angle is smaller than the critical angle of the
stabilized process stage. The latter angle is determined by the
lead. The critical angle becomes greater during the initial
process and the development of the lead zone at the expense
of the utilization of the reserve frictional forces. It
becomes the greater, the more the frictional coefficient of
the rolling metal increases. 5) The minimum length of the
frontal outside strip end may be determined by measuring
the width of strip throughout its length (Ref 3). In this
case, the frontal outside strip end may have either a
fan-shaped or a narrowing form. 6) Well comparable results
were obtained by all methods for determining the minimum
length of the frontal outside strip end in rolling (by
the general pressure, by the speed of the frontal end and
by the spreading). This confirms the correctness of theoretical
ideas as to the importance of the outside parts of the
deformed body ("theory of rigid ends") (between quotation
Card 2/3   marks in the Russian original), as to the concept of

Investigation of the Initial Stage in Rolling and   SOV/163-58-4-24/47
the Transition to the Stabilized Process

"minimum length" (between quotation marks in the Russian
original) of the outside parts, as to the limiting processes
from one rolling stage to another, etc. There are 5 figures,
2 tables, and 4 Soviet references.

ASSOCIATION: Moskovskiy institut stali i institut metallurgii AN SSSR
(Moscow Steel Institute and Institute of Metallurgy AS USSR)

SUBMITTED: January 29, 1958

Card 3/3

$SHELEST, A. Ye.$

Akademiya nauk SSSR. Institut nauchno-tekhnicheskoy informatsii

Metallurgiya i metallovedeniye; khimiya, metallovedeniye i obrabotka titana (Metallurgy and Metallography; Chemistry, Metallography, and Treatment of Titanium) Moscow, Izd-vo AN SSSR, 1959. 363 p. (Series: Itogi nauki; tekhnicheskiye nauki, 2) Errata slip inserted. 2,700 copies printed.

Ed.: N. V. Ageyev, Corresponding Member, Academy of Sciences, USSR; Ed. of Publishing House: V. S. Rzheznikov; Tech. Ed.: Yu. V. Rylina.

PURPOSE: This collection of articles is intended for metallurgists working with titanium and titanium alloys.

COVERAGE: The articles in this collection deal with the chemistry, metallurgy, and machining of titanium and titanium alloys. The articles are based on abstracts appearing in the Referativnyy zhurnal for chemistry and metallurgy from 1953 to 1955. For the most part the articles are based on non-Soviet material. No personalities are mentioned. References follow each article.

Savitskiy, Ye. M., and E. A. Tylkina. Properties of Titanium and Titanium Alloys   103

This is a survey of the physical and mechanical properties of titanium and titanium alloys. Data are given on the effect of oxygen, nitrogen, hydrogen, and carbon on the mechanical properties of titanium.

Gudtsov, N. T., and L. D. Mashtakova. Heat Treatment of Titanium and Titanium Alloys   163

The authors discuss work hardening, annealing, grain refining, and other heat-treating methods for titanium and titanium alloys. Also discussed are the effect of alloying elements on heat-treating characteristics, mechanical properties after heat treating, and structural changes at heat treating.

Arshanov, P. M. Thermochemical Treatment /Diffusion Coating/ of Titanium   187

This article deals with the nitriding, boronizing, and siliconizing of titanium.

Shelest, A. Ye., A. M. Danilchenko, and I. M. Pavlov. Forming of Titanium and Titanium Alloys   195

The authors discuss the special features of plastic deformation, general characteristics of cold and hot working, individual forming operations, preparatory and finishing operations, organization of production, and storage and utilization of waste.

Savitskiy, Ye. M., and M. A. Tylkina. Recrystallization of Titanium and Titanium Alloys   226

Recrystallization of magnesium-reduced and iodide titanium is discussed in reference to its occurrence after cold working, hot forging, annealing, tempering, and hardening. Data are also given on the effect of the annealing temperature on the properties of titanium and the effect of alloying additions on the recrystallization temperature.

Babareko, A. A. Deformation and Recrystallization Textures of Titanium and Titanium Alloys   247

The article deals with textures assumed by titanium and titanium alloys after different forming operations.

Shcherbakov, N. Khu, and G. V. Nazarov. Welding and Soldering of Titanium and Titanium Alloys   252

Welding characteristics of titanium are discussed. Data are given on welding and soldering methods.

Malentyev, B. N., and A. I. Ponomarev. Methods for /Chemical/ Analysis of Titanium and Titanium Products   285

Data are furnished on qualitative, volumetric, polarographic, and colorimetric methods of analysis. Phase analysis is also discussed.

Romanov, K. P. Theory and Practice of Machining Titanium Alloys

The following topics are discussed: determinating of machinability, causes of poor machinability, effect of cutting speed, and other factors on machinability, cutting of titanium alloys, titanium...

18(5), 18(6)   SOV/163-59-1-21/56
AUTHORS: Pavlov, I. M., Shelest, A. Ye.

TITLE: Investigation of the Friction Coefficient of Titanium and
                Its Alloys in Rolling (Issledovaniye koeffitsiyenta treniya
                pri prokatke titana i yego splavov)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1959,
                Nr 1, pp 105 - 112 (USSR)

ABSTRACT: At first the formulas (1), (2), and (3) are quoted from the
                papers cited by references 1,2, and 3, and the fact is
                pointed out that these formulas are insufficient. As an
                alternative formula (4) specifying the coefficient of
                friction according to the method of the roller torsion meter
                (Ref 4) is written down. The authors determined the friction
                coefficient in the hot rolling of titanium and its alloys
                according to this method which fully stood its test. The
                forward slip, the overall pressure, and the torque were
                measured. Two formulas, an accurate, and a simplified one
Card 1/ 3   were used to determine the friction coefficient. It was found

                                                          T 7/18

Investigation of the Friction Coefficient of Titanium   SOV/163-13-1-21/50
and Its Alloys in Rolling

that the curve representing the friction coefficient versus
temperature function in the hot rolling of titanium, its
alloys and stainless steel, takes a convex course, the
maximum being found in the region of 950 - 1050°. It was
further found that the friction coefficient in the rolling
of titanium of various types and of its alloys is smaller
by a factor of 1.5 than the friction coefficient in the
rolling of stainless steel of the type 1Kh18N9T. It is
shown that the allotropic transformation of the β-phase
into the α- phase which occurs during the cooling of titanium
and of its alloys is the cause of the jump-like change in
specific pressure, of torque, and of the specific force of
friction on the region of the $\beta - \alpha$ -transformation. There
are 6 figures and 5 Soviet references.

Card 2/3

Investigation of the Friction Coefficient of Titanium   SOV,1 -9-1- 1/5o
and Its Alloys in Rolling

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: May 31, 1953

Card 5/5

SHELEST, A.Ye.; DANIL'CHENKO, A.N.; PAVLOV, I.M.

Drop forging and rolling of titanium and its alloys. Itogi nauki:
Tekh. nauki no.2:195-225 '59.   (MIRA 12:9)
          (Titanium--Metallography) (Forging) (Rolling (Metalwork))

PAVLOV, I.M.; GANIN, N.P.; YEGOROV, B.V.; SHELEST, A.Ye.; SYUY TSUO-KHUA

Use of rotary bearings to investigate the rolling process. Izv. vys. ucheb. zav.: chern. met. no.1:84-87 '60.

(MIRA 13:1)

1. Institut metallurgii AN SSSR.
(Rolling (Metalwork))

22751
S/509/60/000/007/012/014
E194/E483

| |300   aGo o |4|54, |4|3

AUTHORS: Pavlov, I.M. and Shelest, A.Ye.

TITLE: Investigation of Basic Factors in Rolling Titanium
            Alloys With High Reductions

PERIODICAL: Akademiya nauk SSSR. Institut metallurgii. Trudy, No.7,
            Moscow, 1960. pp.110-114. Metallurgiya metallovedeniye,
            fiziko-khimicheskiy metody issledovaniya

TEXT: The authors have previously studied the hot rolling of
various titanium alloys at constant relative reductions of 20%.
They now describe corresponding studies on one of these alloys,
BT5 (VT5) and type 1X18H9T (1Kh18N9T) stainless steels at
reductions of up to 60%   A two-high mill with smooth 200 mm
diameter rolls fitted with ball bearings was used to roll
specimens 10 mm thick, 15 mm wide and 150 mm long.   Total rolling
pressure was measured with carbon load cells in the screw-down
gear.   Wire strain gauges on the shafts measured torque, their
output being amplified electronically and recorded, together with
total rolling pressure by means of an oscillograph.   Specimens
were preheated to 800 - 1200°C to give uniform temperature
distribution (Ref.1: V.K.Belosevich, V.F.Kalugin, H.I.Korneyev,
Card 1/5

22751
S/509/60/000/007/012/014
Investigation of Basic Factors ...   E194/E483

I.M.Pavlov, I.G.Skugarev, A.Ye.Shelest, "Isv. AN SSSR, OTN", 1956, No.10). Fig.1 shows specific pressure, kg/mm^2, as functions of rolling temperature by continuous and interrupted lines for the titanium alloy and stainless steel, respectively; curves 1, 2 and 3 refer to reductions of 60, 40 and 20%, respectively. The specific pressure was less than when the authors used 220 mm diameter rolls (Ref.3: I.M.Pavlov, A.Ye.Shelest. "Nauchnyye doklady vysshey shkoly (metallurgiya)", No.3, Izd-vo "Sovetskaya nauka", 1958), the difference rising with falling roll pressure. The ratio n of the contact angle α to the central angle φ, i.e. the angle between the radius through the point of application of the total metal pressure on the rolls (acting in the direction of the vertical axis) and the axial line, varies within the range 2 – 3 for both steel and alloy, first falling and then rising with increasing reduction. The authors note the importance of this parameter. Spread was measured by finding the change in distance between two points on the side of the specimen produced in rolling. The lateral spread is plotted as a function of temperature for 20% average reduction of type ВТ1Д (VT1D) titanium in Fig.2; for 1Kh18N9T the maximum lies at 1100 and for
Card 2/5

'22751
S/509/60/000/007/012/014
Investigation of Basic Factors ...   E194/E483

the alloy VT5 at 1000 - 1050°C, and for technical purity titanium
at 900 - 950°C.   Spread as a function of relative reduction is
shown for the steel and the alloy in Fig.3, left and right-hand
graphs respectively, at 800, 1000 and 1200°C.   The work has shown
that for VT5 alloy the specific pressure in the beta-phase region
is considerably less than in the alpha-phase region, the
transformation leading to an abrupt change.   The spread mechanism
in rolling titanium is mainly through barrel formation, while with
steel it is mainly through slip along the contact surface.   The
dependence of the index of spread on temperature is also affected
by the allotropic transformation, the index being lower for alpha
than for beta titanium: the narrower the temperature interval of
the transformation the sharper the change.   There are 3 figures,
1 table and 11 references: 10 Soviet-bloc and 1 non-Soviet-bloc.
The reference to the English language publication reads as
follows: C.W.Starling. "Sheet Metal Industries", 35, 1958, No.379..

Card 3/5

22751

S/509/60/000/007/012/014
E194/E483

Investigation of Basic Factors ...

Fig.1.

$a = \dfrac{\Delta B}{\Delta H}$
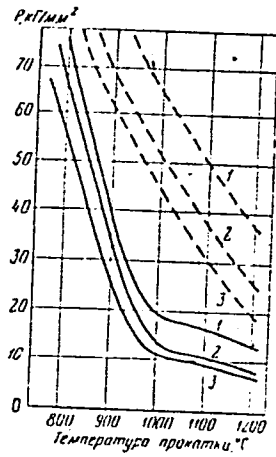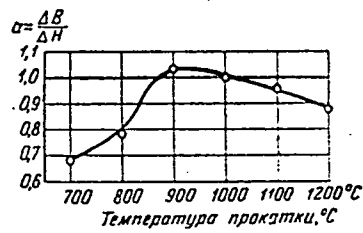
Fig.2.

Card 4/5

Investigation of Basic Factors ...

22751
S/509/60/C00/007/012/014
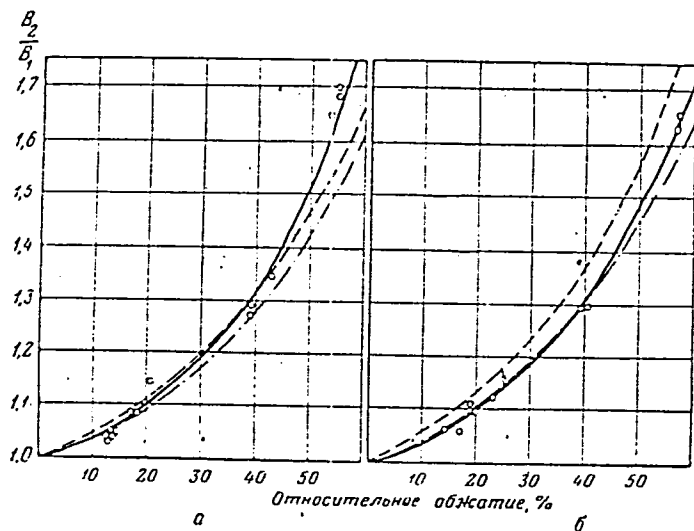E194/E483

Fig.3.

Card 5/5

20264

S/180/61/000/002/002/012
E073/E535

I.1300A

AUTHORS: Pavlov, I.M., Sigalov, Yu.M., Shelest, A.Ye.,
             Zubko, A.M. and Gurevich, Ya.B. (Moscow)

TITLE: Investigation of the Process of Hot Rolling of
             Aluminium in Vacuum and in Air

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh
             nauk, Metallurgiya i toplivo, 1961, No.2, pp.64-67

TEXT: The influence on the friction coefficient of scale or
an oxide film layer on the surface of a metal being rolled has been
the subject of numerous papers. However, no direct comparison was
made of the ordinary process of rolling aluminium in air and in
vacuum. Such a comparative study will permit direct elucidation
of the influence of oxide films on the conditions of rolling. The
authors investigated the power consumption, the speed and deforma-
tion conditions and the friction coefficient during hot rolling of
aluminium in vacuum and in air. The rolling was on TsNIIChermet
laboratory vacuum equipment permitting heating, rolling and
cooling of 15 x 20 mm, 200 mm long specimens in a vacuum down to
10^{-5} mm Hg. From a forged and annealed blank 150 x 10 x 12 mm

Card 1/5

20264

Investigation of the Process...   S/180/61/000/002/002/012
                                    E073/E535

specimens were cut. These were heated in a tubular electric
furnace. The heating temperature was maintained within $\pm 15°C$.
Rolling was at 400°C with reductions of 20 to 70% per pass. The
diameter of the rolls was 85 mm, the rolling speed 6.5 m/min. The
rolls were of steel ШХ-15 (ShKh-15) (hardness 55 R_c) and had a
polished surface. The pressure was measured by wire strain gauges.
Fig.1 shows a typical oscillogram in which 1 is the torque on the
top spindle, 2 and 5 - pressure measured by the strain gauges,
3 - recorded roll speed, 4 - recorded strip speed, 6 - torque on
the lower spindle, 7 - oscillation curve (500 c.p.s.). Fig.2
shows the dependence of the broadening $\psi = B_2/B_1$, % on the
relative reduction $\Delta B/\Delta h$, where H, B_1 and L_1 are respectively
the height, width and length of the specimens before rolling and
h, B_2 and L_2 are respectively the height, width and length after
rolling, $\Delta B = B_2 - B_1$ and $\Delta h = H - h$. (Here and in the
following plots the dashed line curve refers to results obtained in
vacuum and the continuous line curve refers to results obtained in
air). Fig.3 shows the lead S_h as a function of the broadening,

Card 2/5

20264

Investigation of the Process ...   S/180/61/000/002/002/012
                                     E073/E535

whereby

$$S_h = \frac{L_{strip} - L_{roll}}{L_{roll}} \tag{1}$$

where L_{strip} is the distance between the markings on the strip and L_{roll} is the distance between corresponding markings on the roll. Fig.4 shows the dependence of the specific pressure P, kg/mm^2 on the broadening ψ, . Fig.5 shows the friction coefficient f' as a function of ψ, . Fig.6 shows the torque M, kgm as a function of ψ, . It was found that the friction coefficient and the required force, which depends directly on the friction coefficient, for vacuum hot rolling of titanium, grade БТ-1 (VT-1), is considerably lower than for rolling in air, whilst for nickel and iron (C - 0.01%) it is higher in the same way as it is for Al. This again confirms the dependence of these quantities on the chemical composition of the rolled metal. The following conclusions are arrived at:
1. It was established that for Al the coefficient of friction
Card 3/5
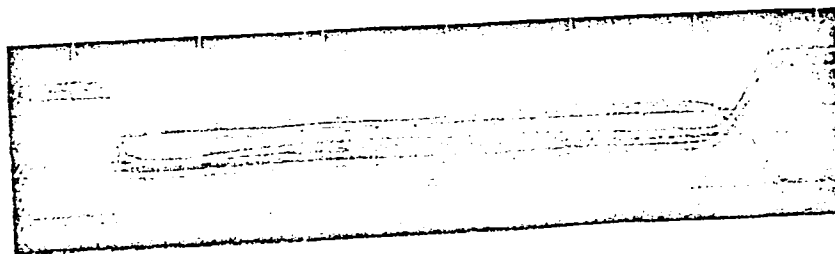
Investigation of the Process ...

! 20264
S/180/61/000/002/002/012
E073/E535

during rolling in vacuum is higher than for rolling in air, whereby the greatest difference (by a factor of about 1.4) was observed for smaller reductions;
2. it was confirmed that the friction coefficient during rolling decreases with increasing specific pressure both in air and in vacuum. There are 6 figures and 7 references: all Soviet.

SUBMITTED: August 8, 1960

Fig.1

Card 4/5

PAVLOV, I.M.; GANIN, N.P.; YEGOROV, B.V.; SHELEST, A.Ye.: SYUY TSUO-KHUA

Investigating the process of rolling with smooth rolls by the
method of rotating bearings. Izv.vys. ucheb. zav.; chern. met.
no.3:67-73 '61.   (MIRA 14:3)

1. Moskovskiy institut stali i institut metallurgii AN SSSR.
                (Rolling(Metalwork))

26582

| 1300   olo1496 1416 1413

S/148/61/000/006/006/013
E073/E535

AUTHORS: Pavlov, I.M., Sigalov, Yu. M., Shelest, A.Ye.,
Zubko, A.M. and Gurevich, Ya. B.

TITLE: Investigation of some conditions of hot rolling of
titanium in vacuum and in air

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya
metallurgiya, 1961, No.6, pp.106-110

TEXT: The authors investigated the force, velocity and
deformation conditions during the process of rolling of titanium in
vacuum and compared the results with similar results obtained for
rolling in air. This was done to elucidate the influence of the
scale on the friction coefficient, specific pressure and other
parameters of the rolling of commercially pure titanium. From a
pre-forged blank, specimens 15 x 20 mm, 200 mm long were cut.
Those specimens which were to be rolled in vacuum (3×10^{-5} mm Hg)
were heated in a small-chamber electric furnace with molybdenum
heater filaments; those to be rolled in air were heated in an
electric furnace with nichrome heater filaments. The specimens
were rolled in the temperature range $800-1200°C$ on a two-high mill

Card 1/6

26581
Investigation of some conditions of S/148/61/000/006/006/013
E073/E535

with rolls of 85 mm diameter. The average reduction was 20%, the speed of rolling was 6.5 m/min. The rolls had a ground surface with a hardness of 55 RC. The rolling parameters, i.e. the total pressure, the torque, the speed of the rolled strip and the circumferential speed of the rolls were recorded by means of an 8-loop oscillograph. Fig.3 shows the dependence of the friction coefficient f''' and of the specific friction force τ_s, kg/mm^2 on the rolling temperature, °C. Fig.4 shows the dependence of the friction coefficient f' and of the forward slip S_h on the rolling temperature, °C. Fig.5 shows the dependence of the specific pressure, kg/mm^2, on the rolling temperature, °C. Fig.6 gives the dependence of the specific pressure, kg/mm^2, and the friction coefficient f' on the reduction, %. In all these graphs the continuous line curves apply to rolling in air and the dashed line curves to rolling in vacuum. In the paper the authors apply three differing friction coefficients, one f''' determined according to the formula of S. I. Gubkin (Ref.12: Theory of shaping metals by pressure, Metallurgizdat, 1947), another f' determined on the basis of the theoretical formula for the torque, proposed by

Card 2/6

26582

Investigation of some conditions ...S/148/61/000/006/006/013
E073/E535

V. Bayukov and the third, f', determined from the value of the
forward slip. The following conclusions are arrived at:
1. In all cases of rolling in air the curve expressing the
dependence of the friction coefficient on the temperature has a
convex-shaped section with a maximum in the temperature range
1050-1150°C. If titanium is rolled in air at 800-1100°C, a dense
layer of titanium dioxide scale forms which leads to an increase
in sliding friction coefficient and spreading. At rolling
temperatures above 1100°C, a dense layer of scale of a fine grain
structure forms which peels off easily from the base metal and
leads to a reduction of the friction coefficient, the friction
coefficients f' and f" are similar and their values are very
near to each other. When rolling was performed in vacuum, the
friction coefficient was considerably lower and showed a tendency
to increase with increasing rolling temperature. This is
attributed to a drop in the specific pressure with a minimum
effect of other factors.
2. Changes in the specific pressure p and the specific friction
force τ_s were similar during rolling in vacuum and in air. The

Card 3/6

26582

Investigation of some conditions ... S/148/61/000/006/006/013
                                      E073/E535

values p and r_s and consequently also the torque, are affected
by the sudden α to β transformations and this explains the sharp
drop in the friction coefficient, forward slip and the slight
increase in spreading in the temperature range 850-950°C.
3. With increasing reduction an increase is observed in the
specific pressure and a decrease in the friction coefficient.
4. The experiments revealed considerable qualitative and quantita-
tive differences in the force, velocity and geometrical factors
pertaining to rolling titanium in vacuum and in air.
Experiments carried out earlier by some of the authors (Ref.14:
Stal', 1959, No.10, 929-931) yielded differing results, namely,
the coefficient of friction and the geometrical and force
conditions depending on it were considerably higher in vacuum
than in air in the case of rolling pure iron with a carbon content
of 0.01%. This clearly indicates that the investigated quantities
depend on the chemical composition of the rolled metal. There
are 6 figures and 14 references: 13 Soviet and 1 non-Soviet.

ASSOCIATION: Institut metallurgii imeni A.A. Baykova (Institute of
            Metallurgy imeni A. A. Baykov)

Card 4/6

PAVLOV, I.M.; YEGOROV, B.V.; SHELEST, A.Ye.; SYUY TSUO-KHUA

Investigating the process of rolling with smooth rolls with
the help of a split roll strain gauge. Izv.vys.ucheb.zav.;
chern.met. 4 no.9:87-94 '61.   (MIRA 14:10)

1. Moskovskiy institut stali i Institut metallurgii Akademii nauk
SSSR.
    (Rolls (Iron mills)--Testing) (Strain gauges)

38701

S/598/62/000/007/028/040
D217/D307

AUTHORS: Pavlov, I. M., Shelest, A. E., Tarasevich, Yu. F. and
            Shakhov, V. L.

TITLE: Investigation of rolling of certain titanium alloys

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego
            splavy. no. 7, Moscow, 1962. Metallokhimiya i novyye
            splavy, 204-212

TEXT: Hot and "warm" rolling of Ti alloys containing 1 - 2.5% Al
and 0.8 - 2% Mn (alloy 1), 2 - 3.5% Al and 0.8 - 2% Mn (alloy 2),
4 - 5.5% Al and 2 - 3% Sn (alloy 3) was studied and compared with
rolling of commercially pure Ti. Microstructure of the alloys, the
phenomena of gas saturation and scale formation and the hardness
of the alloys were also studied. It was found that commercially
pure Ti has a smaller tendency to oxidize than the alloys. Apart
from scale formation, the extent of gas saturation increases on
heating. Saturation of the surface layer of titanium with oxygen
and nitrogen leads to the stabilization of the α-phase. At the

Card 1/2