25(1) SOV/25-59-11-21/38

AUTHOR: Yefimov, S.

TITLE: Vacuum Welding

PERIODICAL: Nauka i zhizn', 1959, Nr 11, p 65 - 66 and page 2 on centerfold (USSR)

ABSTRACT: The article contains particulars on the design, use and the advantages of the "SDVU-2" device for diffusion vacuum welding displayed at the Exhibition of the Achievements of the USSR National Economy. It will soon be used in the Pervyy gosudarstvennyy podshipnikovyy zavod (First State Bearing Plant) for manufacturing cutting tools and high-temperature bearings. The joining of the parts to be welded is carried out in a high vacuum ($10^{-5}$ - $10^{-6}$ mm Hg). With a vacuum of $10^{-4}$ mm Hg, the purity of the atmosphere surrounding the welding parts amounts to approximately 99.999987%. The welded parts preliminary rinsed in any organic solution ( to remove the fatty film), are brought into a close contact and then subjected

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Vacuum Welding

to a slight direct pressure, and are then heated by means of high-frequency currents to the required temperature. At this stage, atoms and molecules mutually diffuse and form a durable welding seam. This method might be applied for welding without smelting ceramics, metal-ceramics, heat-resistant and non-ferrous metals and alloys, steel and cast iron. Vacuum welding considerably improves the quality of the welding seam. There is no noticeable change of the physico-mechannical quality of the welded materials. The new method was suggested by N.F. Kazakov, Candidate of Technical Sciences, in 1953 and was adapted for use in 1958. With the "SDVU-2" device, 12 hard-alloy plates can be welded simultaneously with cutting tool holders in about 12 minutes. The author states that vacuum welding will cause a real technical revolution and save thousands of tons of non-ferrous metal. The new method is also used for manufacturing brake shoes for high-speed machines. It has been calculated that the manu-

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facture of brake shoes with the SDVU-2 device saves more than 10 million rubles annually. The laboratory for diffusion vacuum welding of the Moskovskiy tekhnologicheskiy institut myasnoy i molochnoy promyshlennosti (Moscow Technological Institute for the Meat and Milk Industry) headed by N.F. Kazakov, is continuously working on the improvement of the new welding method. A semi-automatic "SDVU-3" device has already been developed and serial production will be started in one of the Moscow machine building plants. A drawing shows the general view of the SDVU-2 device. A description of the various parts is also given. There is 1 photograph on page 2 of centerfold.

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YEFIMOV, S.; LEROV, E.

Members of the Communist Youth League of the "Kauchuk" Plant prepare to make the gift of a "saved day." Tekh.mol. 29 no.8: 6-8 '61. (MIRA 14:11)
(Rubber industry--Technological innovations)

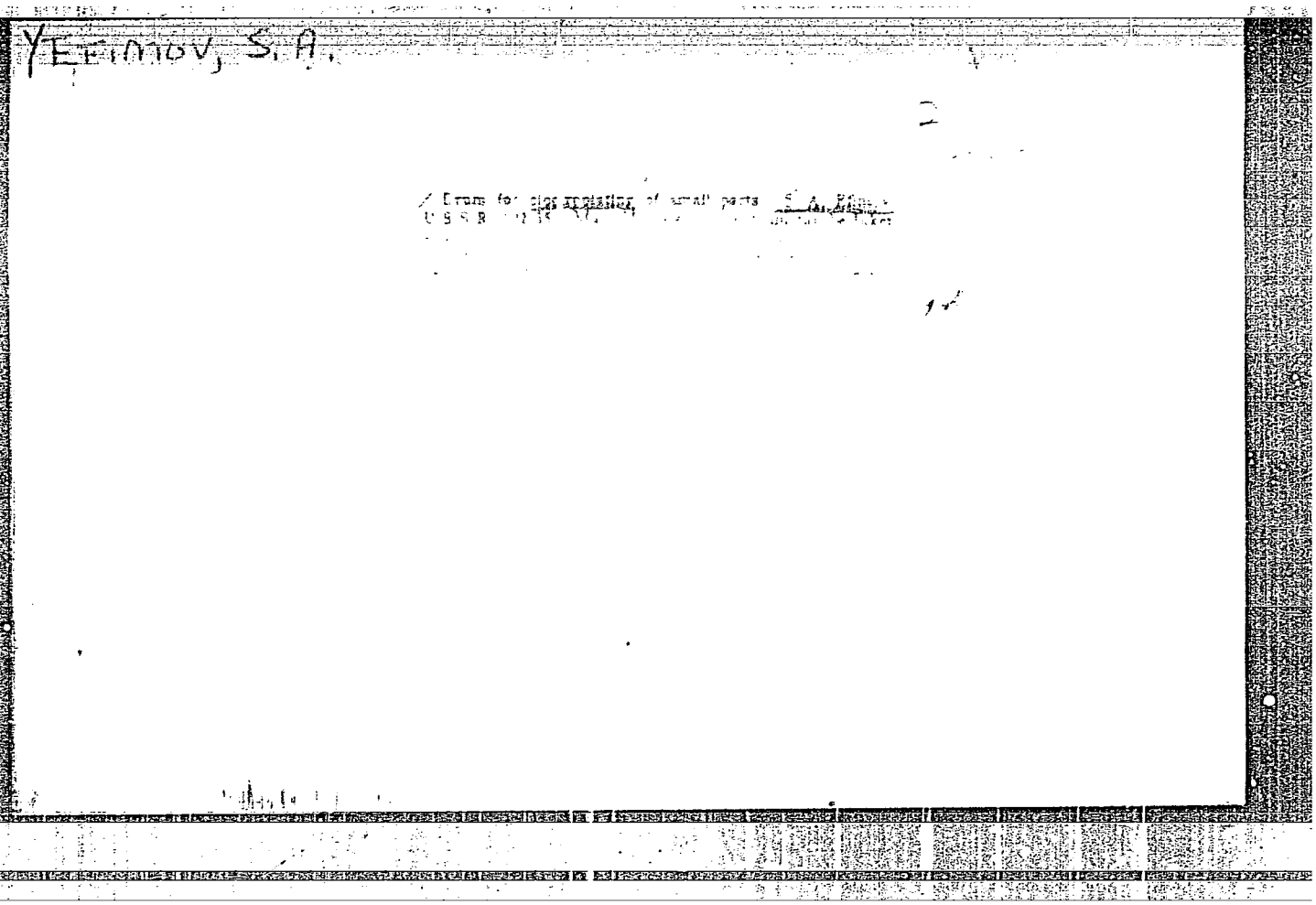
YEFIMOV, S.

Electronic exploration of a muscle. Nauka i zhizn' 28 no.9: 61-64 S '61. (MIRA 14:12)

(Muscle)
(Electronics in biology)

YEFIMOV, S., inzhener

Contribution of mathematics to the national economy. Nauka i zhizn' 29 no.2:20-24 F '62. (MIRA 15:3)
(Electronic calculating machines)



YEFIMOV, S.G., inzh.; DMITRIYEV, V.F., inzh.

Economic efficiency of the PK-3 and PKS-3 cutter-loaders. Stor. KuzNIUI no.10:348-353 '64. (MIRA 18:9)

YEFIMOV, S. G.

USSR/Hydrology - Irrigation Aug 51

"Construction of Small Alluvial Dams, Built of Bound Soil," S. G. Yefimov, Engr

"Gidrotekh i Meliorat" No 8, pp 45-54

Yefimov considers this project of great importance for achievement of large and stable crops in regions using systematic irrigation and dams. Compiles tables and graphs of granulometric compn of the pit in the building of alluvial dams.

189T51

FROLOV, Petr Terent'yevich, kand. tekhn. nauk, prof.; GINKEVICH, Petr Stepanovich, kand. tekhn. nauk, dots.; YEFIMOV, Sergey Grigor'yevich, kand. tekhn.nauk, dots.; BAUMAN, V.A., retsenzent; SHADRIN, I.A., prof., retsenzent; DUBINSKIY, P.F., doktor tekhn. nauk, prof., retsenzent; MONAKHOV, I.G., dots., retsenzent; FIITSUKOV, M.A., dots., retsenzent; CHERNYAKOV, L.M., dots., retsenzent; ANDREYEV, B.K., dots., retsenzent; SHADRINA, G.N., dots., retsenzent; VAYNSON, A.A., nauchnyy red.; SHAROVA, Ye.A., red. izd-va; VORONINA, R.K., tekhn. red.

[Principles of the mechanization construction work] Osnovy mekhanizatsii stroitel'nykh rabot. Moskva, Vysshaia shkola, 1962. 299 p. (MIRA 16:4)

1. Chlen-korrespondent Akademii stroitel'stva i arkhitektury SSSR (for Bauman). 2. Kafedra stroitel'nogo proizvodstva Moskovskogo instituta inzhenerov zheleznodorozhnogo transporta (for Dubinskiy, Monakhv, Fiitsukov, Chernyakov, Andreyev, Shadrina). 3. Zaveduyushchiy kafedroy stroitel'nogo proizvodstva Moskovskogo instituta inzhenerov zheleznodorozhnogo transporta (for Shadrin).

(Construction equipment) (Automatic control)

YEFIMOV, S.I.

Experience in the work with stationary cableway type machinery. Tekst.prom. 25 no.11:28-31 N '65.

(MIRA 18:12)

1. Nachal'nik tekhnicheskogo otdela fabriki "Kanat".

YEFIMOV, S.I.

Yeast propagation without using chemical antifoam agents. Gidrolis. i lesokhim.prom. 8 no.5:22 '55. (MLRA 9:1)

1.Nachal'nik Priozerskogo sul'fitno-spirtovogo zavoda.
(Yeast)

YEFIMOV, S.I. !

Improved system for yeast production. Gidroliz. i lesokhim. prom. 14 no.8:20-21 '61. (MIRA 16:11)

1. Priozerskiy sul'fitno-spirtovoy zavod.

YEFIMOV, S.L., inzh.

Using the gas analysis method in investigating gas exchange processes in two-cycle engines. Izv.vys.ucheb.zav.;mashinostr. no.5:118-125 '64. (MIRA 18:1)

1. Moskovskoye vysshaye tekhnicheskoy uchilishche imeni N.E.Baumana.

YEFIMOV, S.P.

Farm management system in the Moldavian S.S.R. Zemledelie 8 no.12: 3-10 D '60. (MIRA 13:11)

1. Ministr sel'skogo khozyaystva Moldavskoy SSR.
(Moldavia—Agriculture)

DEMEZYUK, Eduard Sil'vestrovich; YEMEL'YANOV, Nikolay Alekseyevich; KHOLDEYEV, P.I., inzh., retsenzent; YEFIMOV, S.K., prep., retsenzent; MINAYEV, B.I., prep., retsenzent; LUNIN, O.G., kand. tekhn. nauk, spets. red.; KRUGLOVA, G.I., red.; SOKOLOVA, I.A., tekhn. red.

[Heat engineering equipment for enterprises of the bakery and confectionery industry] Teplotekhnicheskoe oborudovanie predpriiatii khlebopekarnoi i konditerskoi promyshlennosti. Moskva, Pishchepromizdat, 1963. 341 p. (MIRA 17:3)

1. Moskovskiy mekhaniko-tekhnologicheskiy tekhnikum pishchevoy promyshlennosti (for Yefimov, Minayev).

YEFIMENKO, G.G., inzh.; VOYTANIK, S.T., inzh.; YEFIMOV, S.P., inzh.; MACHKOVSKIY, A.I., inzh.; RUDKOV, A.K., inzh.; RUDKOVSKIY, G.I., inzh.; Prinimali uchastiye: KOVALEV, D.A.; GOTOVTSEV, A.A.; VASIL'YEV, G.S.; ZEMLYANOY, A.A.; KUKUSHKIN, S.N.; MATYNA, M.G.; LOVCHANOVSKIY, V.A.; KRAMNIK, T.A.; NECHESOVA, N.I.; MARTYNENKO, V.A.; KURAKSIN, D.I.; LETYAGIN, N.L.

Intensifying the sintering process by the use of a special charge wetting device. Stal' 23 no.12:1061-1064 D '63. (MIRA 17:2)

1. Dnepropetrovskiy metallurgicheskiy institut, zavod im. Dzerzhinskogo i Yuzhnyy gornoobogatitel'nyy kombinat. 2. Dnepropetrovskiy metallurgicheskiy institut (for Kovalev, Gotovtsev, Vasil'yev, Zemlyanoy, Kukushkin). 3. Zavod im. Dzerzhinskogo (for Matyna, Lovchanskiy, Kramnik, Nechesova). 4. Yuzhnyy gornoobogatitel'nyy kombinat (for Martynenko, Kuraksin, Letyagin).

YEFIMOV, S.P.

Temperatures of sinter softening. Izv. vys. ucheb. zav.; chern. met. 7 no.7:36-42 '64 (MIRA 17:8)

YEFIMOV, S.P., otv. red.; KABLUCHKO, G.A., red.; PELYAKH, M.A., red.; UNGURYAN, P.N., red.; LUKASHEVICH, P.A., red.; TALITSKIY, V.I., red.

[Reports and communications delivered at the Plenum of the Section for Fruit Culture, Viticulture, and Subtropical Crops of the Moldavian Scientific Research Institute of Fruit Culture, Viticulture, and Wine Making] Doklady i soobshcheniia na plenume sektsii sadovodstva, vinogradarstva i subtropicheskikh kul'tur, 23-29 avgusta. Kishinev. No.2. [Viticulture] Vinogradarstvo. 1960. 255 p. (MIRA 17:2)

1. Kishinev. Moldavskiy nauchno-issledovatel'skiy institut sadovodstva, vinogradarstva i vinodeliya.

YEFIMOV, S.P., otv. red.; KABLUCHKO, G.A., red.; PELYAKH, M.A., red.; UNGURYAN, P.N., red.; LUKASHEVICH, [illegible].A., red.; TALITSKIY, V.I., red.

[Reports and communications delivered at the Plenum of the Section for Fruit Culture, Viticulture, and Subtropical Crops of the Moldavian Scientific Research Institute of Fruit Culture, Viticulture, and Wine Making] Doklady i soobshcheniia na plenume sektsii sadovodstva, vinogradarstva i subtropicheskikh kul'tur, 23-29 avgusta. Kishinev. No.2. [Viticulture] Vinogradarstvo. 1960. 255 p. (MIRA 17:2)

1. Kishinev. Moldavskiy nauchno-issledovatel'skiy institut sadovodstva, vinogradarstva i vinodeliya.

YEFIMOV, T.

How I select figures and facts for discussions. Blok.agit.vod. transp. no.24:17-23 D '56. (MLRA 10:1)

1. Agitator Leningradskogo morskogo porta.
(Adult education)

YEFIMOV, T.

YEFIMOV, T.

Long-distance radio system for three republics. Radio no.11:11-12 N '57. (MIRA 10:10)

(Radio relay systems)

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ACC NR: AM6000299 (N) Monograph UR/

Gittis, Vladimir Yul'yevich; Bondarenko, Vladimir Leonidovich; YEfimov, Teodor Petrovich; Polyakov, YUriy Gavrilovich; Churbanov, Boris Mikhaylovich

Theoretical principles of the operation of marine diesel engines (Teoreticheskiye osnovy ekspluatatsii sudovykh dizeley) Moscow [Izd-vo "Transport]" 1965. 375 p. illus., biblio. 3000 copies printed.

TOPIC TAGS: diesel engine, internal combustion engine, engine performance characteristic, shipbuilding engineering, marine engineering, marine engine

PURPOSE AND COVERAGE: This book is intended for engineers and technicians working with marine diesel power units, and may be used as a textbook by students and degree candidates in higher educational institutions and marine and shipbuilding institutes. The book attempts to relate the theory of internal-combustion engines, propellers, and hydraulic resistance to the actual operation of diesel-engine units. Problems involving fuel combustion and heat distribution in engines are reviewed along with the operating characteristics of diesels under shipboard conditions. The effect of use conditions on diesel operation and the monitoring of the quality of diesel operation under various ship running conditions are discussed. Recommendations are given for selecting diesel operating conditions, and methods are presented for plotting and using capacity charts for monitoring the propulsion gear (engine, screw, hull) of a vessel. The authors thank Doctor of Technical Sciences, Professor V. I. Nebesnov for his valuable remarks and suggestions.

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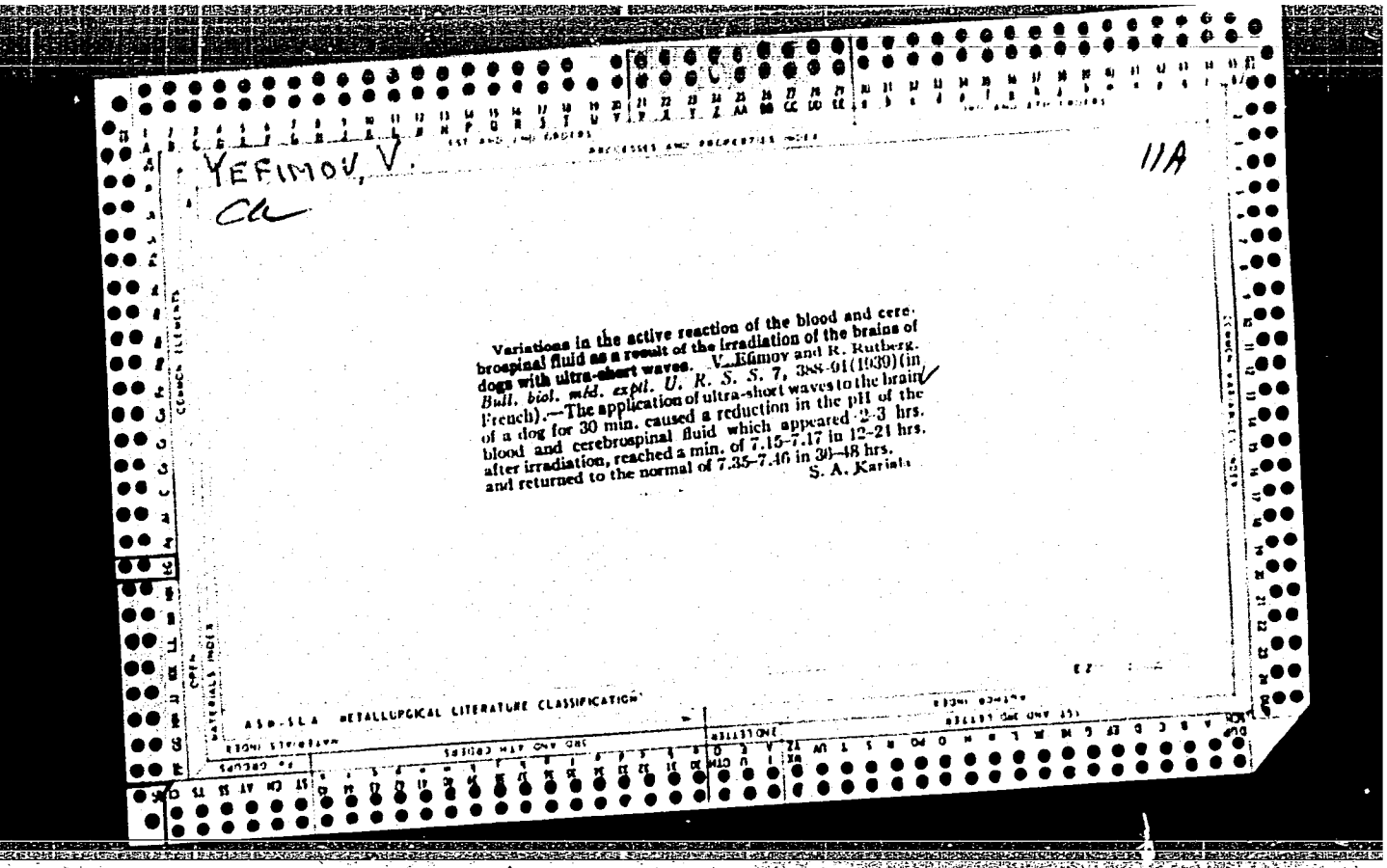

YEFIMOV, V.

11A

Variations in the active reaction of the blood and cerebrospinal fluid as a result of the irradiation of the brains of dogs with ultra-short waves. V. Efimov and R. Rutberg. *Bull. biol. méd. expl. U. R. S. S.* 7, 388-91 (1939) (in French).—The application of ultra-short waves to the brain of a dog for 30 min. caused a reduction in the pH of the blood and cerebrospinal fluid which appeared 2-3 hrs. after irradiation, reached a min. of 7.15-7.17 in 12-21 hrs. and returned to the normal of 7.35-7.46 in 30-48 hrs.
S. A. Kariaki

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

NOVIKOV, I.; YEFIMOV, V.; SEREBRENNIKOVA, A.

Equip every activist with the best practice in trade-union work. Sov. profsoiuzy 17 no.8:35-38 Ap '61. (MIRA 14:3)

1. Predsedatel' dorozhnogo komiteta profsoyuza rabotnikov zheleznodorozhnogo transporta Vostochno-Sibirskoy zheleznoy dorogi (for Novikov). 2. Direktor profsoyuznykh kursov Belorusskogo respublikanskogo soveta profsoyuzov (for Yefimov). 3. Direktor profsoyuznykh kursov Irkutskogo soveta profsoyuzov (for Serebrennikova).

( Trade unions)

YEFIMOV, V.

Moldboard with lateral blades. Stroitel' no.6:9 Je '61. (MIRA 14:7)

(Bulldozers--Equipment and supplies)

YEFIMOV, V.

Struggle of the party for an upsurge in the collective and state farm economy. Vop. ekon. no.12:16-24 D '62. (MIRA 16:1)

(Communist Party of the Soviet Union—Party work)
(Agricultural policy)

YEFIMOV, V. A. (Veterinarian)

30 years in veterinary profession.

SO: TABCON Veterinariya; 23; 5-6; May/June 1946, Unclassified

YEFIMOV, V. A.

Bovine leptospirosis (infectious jaundice). (Per material submitted to the editorial office.)

SO: TABCON Veterinariya; 23; (12); December 1946, Unclassified.

YEFIMOV V. A.

Finnoz sel'skokhozyaystvennykh zhivotnykh, opasnost' yego dlya cheloveka (Tapeworm of Farm Animals and Its Danger to Man) Moscow, Sel'khozgiz, 1959. 1.2 octavo.

The pamphlet describes ways and means of contaminating humans and animals with tapeworm, symptoms for recognizing it and measures to prevent it.

The pamphlet is preparde for workers on stock farms.

U-4258

YEFIMOV, V.A.

Novosibirsk Province veterinary bacteriological laboratory.
Veterinariia 32 no.10:31-34 O '55. (MLRA 8:12)
(NOVOSIBIRSK PROVINCE--VETERINARY LABORATORIES)

YEFIMOV, V.A.

Controlling murine rodents. Veterinariia 34 no.9:78-80 S '57.
(MLRA 10:9)

1. Glavnyy veterinarno-sanitarnyy inspektor upravleniya veterinarii Ministerstva sel'skogo khozyaystva RSFSR.
(Rats--Extermination)

BOYKO, Vasiliy Ivanovich, prepodavatel'; YEFIMOV, V.A., red.; GUREVICH, M.M., tekhn.red.; PEVZNER, V.I., tekhn.red.

[Laboratory exercises in the anatomy and physiology of farm animals] Laboratorno-prakticheskie zaniatiia po anatomii i fiziologii sel'skokhoziaistvennykh zhivotnykh. Moskva, Gos. izd-vo sel'khoz. lit-ry, 1958. 207 p. (MIRA 12:2)

1. Pisarevshchanskiy zooveterinarnyy tekhnikum (for Boyko).
(Veterinary anatomy--Laboratory manuals)
(Veterinary physiology--Laboratory manuals)

SPIROV, G.A.; YEFIMOV, V.A.

For the strengthening of measures in the control of zoonoses. Veterinariia 39 no.5:12-20 My '62 (MIRA 18:1)

1. Glavnyy veterinarnyy vrach Upravleniya veterinarii Ministerstva sel'skogo khozyaystva RSFSR (for Spirov). 2. Glavnyy veterinarno-sanitarnyy inspektor Upravleniya veterinarii Ministerstva sel'skogo khozyaystva RSFSR (for Yefimov).

SHISHKOV, V.Ye.; YEFIMOV, V.A.

Planning of veterinary and sanitary measures on demonstration farms. Veterinariia 39 no.6:58-61 Je '62 (MIRA 18:1)

1. Zamestitel' nachal'nika Upravleniya veterinarii Ministerstva proizvodstva i zagotovok sel'skokhozyaystvennykh produktov RSFSR (for Shishkov). 2. Glavnyy veterinarno-sanitarnyy inspektor Upravleniya veterinarii Ministerstva proizvodstva i zagotovok sel'skokhozyaystvennykh produktov RSFSR (for Yefimov).

YEFIMOV, V. A.

USSR/Cultivated Plants. Fruits. Berries. M

Abs Jour : Ref Zhur-Biol., No 15, 1958, 68352

Author : Yefimov, V. A.
Inst : Moscow Agricultural Academy imeni K. A. Timiryazev.
Title : The Dependence of Cherry Growth and Fertility upon the Relief.

Orig Pub : Dokl. Mosk., s.-kh. akad. im. K. A. Timiryazeva, 1957, No 28, 297-303

Abstract : Observations made at the Bogucharovo sovkhoz (Tula Oblast') demonstrated that when cherry trees are set out on a slope, the yields are higher on the upper and middle portions of the slope. The yields from one 8-10 year old tree of the Vladimirka or Lyubskaya strains

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varied from 20 kilograms on the upper and middle portions of the slope to 8-10 kilograms on the lower part. In severe winters, the temperature is lower on the lower part of the slope, and the flower buds freeze. In addition, water flowing down the slope collects at the bottom, making the soil more acid. Cherries develop better and bear more fruits on less acid soils. -- Ye. A. Zlotina

YEFIMOV, V.A., assistent

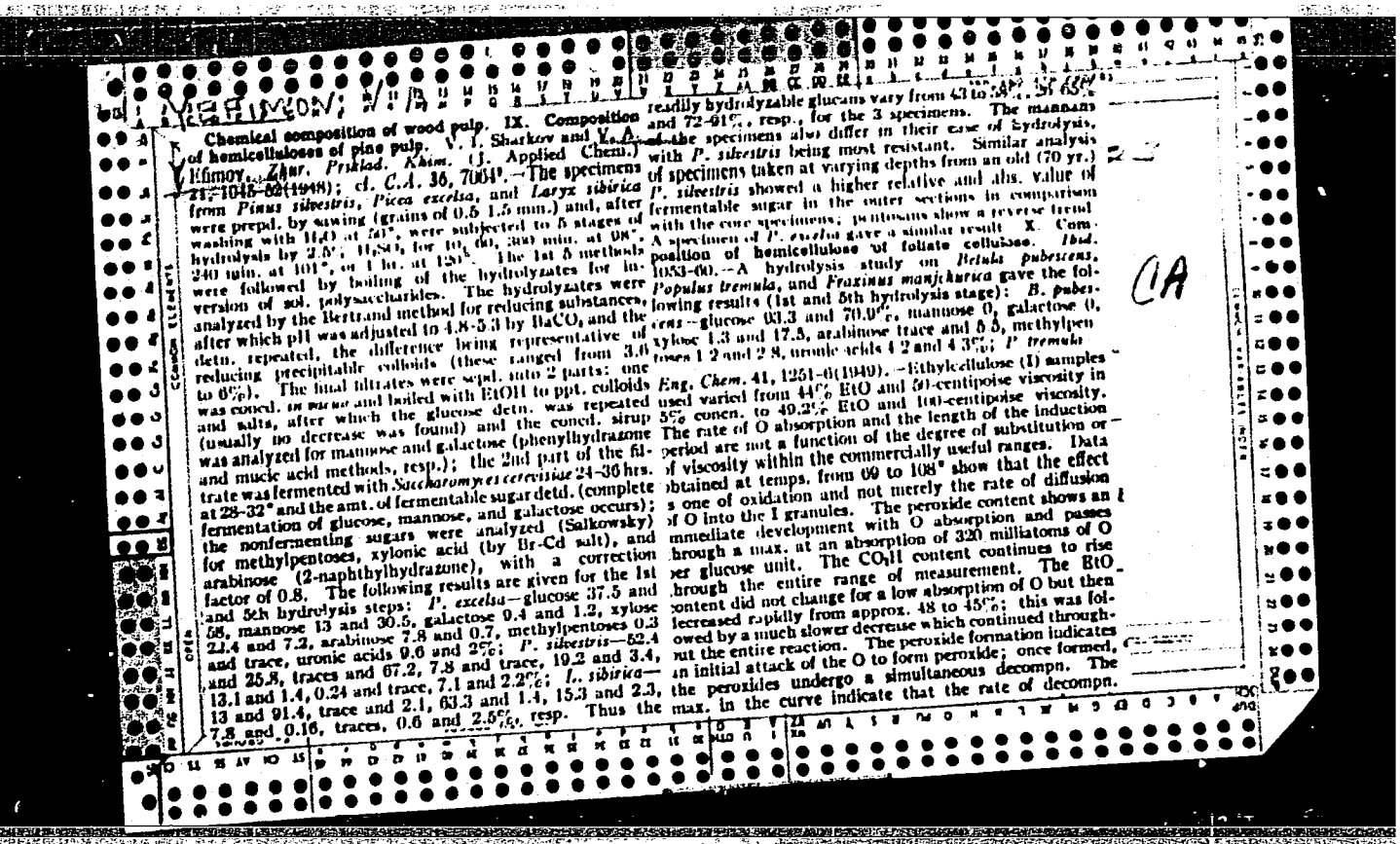
Cold injuries to cherry trees. Izv. TSKhA no.6:93-101 '60. (MIRA 13:12)

(Cherry) (Plants--Frost resistance)

YEFIMOV, V.A., starshiy nauchnyy sotrudnik

Flowering of sour cherries as related to air temperature [with summary in English]. Izv. TSKHA no.3:148-154 '63. (MIRA 16:9)

1. Plodovaya opytnaya stantsiya Timiryazevskoy sel'skokhozyaystvennoy akademii imeni Lenina.
(Plants, Effect of temperature on) (Plants, Flowering of)
(Moscow Province— Cherry)



Chemical composition of wood pulp. IX. Composition of hemicelluloses of pine pulp. V. I. Sharkov and V. A. [illegible]. Khimiya i Zhur. Prikład. Khim. (J. Applied Chem.) 21, 1048–62(1948); cf. C.A. 36, 7004⁹.—The specimens from *Pinus silvestris*, *Picea excelsa*, and *Laryx sibirica* were prepd. by sawing (grains of 0.5–1.5 mm.) and, after washing with $H_2O$ at 50°, were subjected to 5 stages of hydrolysis by 2.5% $H_2SO_4$ for 10, 60, 240 min. at 98°, 240 min. at 101°, or 1 hr. at 125°. The 1st 5 methods were followed by boiling of the hydrolyzates for inversion of sol. polysaccharides. The hydrolyzates were analyzed by the Bertrand method for reducing substances, after which pH was adjusted to 4.8–5.3 by $BaCO_3$ and the detn. repeated, the difference being representative of reducing precipitable colloids (these ranged from 3.6 to 6%). The final filtrates were septd. into 2 parts: one was concd. *in vacuo* and boiled with EtOH to ppt. colloids and salts, after which the glucose detn. was repeated (usually no decrease was found) and the concd. sirup was analyzed for mannose and galactose (phenylhydrazone and mucic acid methods, resp.); the 2nd part of the filtrate was fermented with *Saccharomyces cerevisiae* 24–36 hrs. at 28–32° and the amt. of fermentable sugar detd. (complete fermentation of glucose, mannose, and galactose occurs); the nonfermenting sugars were analyzed (Salkowsky) for methylpentoses, xylonic acid (by Br-Cd salt), and arabinose (2-naphthylhydrazone), with a correction factor of 0.8. The following results are given for the 1st and 5th hydrolysis steps: *P. excelsa*—glucose 37.5 and 58, mannose 13 and 30.5, galactose 9.4 and 1.2, xylose 21.4 and 7.2, arabinose 7.8 and 0.7, methylpentoses 0.3 and trace, uronic acids 9.6 and 2%; *P. silvestris*—52.4 and 25.8, traces and 67.2, 7.8 and trace, 19.2 and 3.4, 13.1 and 1.4, 0.24 and trace, 7.1 and 2.2%; *L. sibirica*—13 and 91.4, trace and 2.1, 63.3 and 1.4, 15.3 and 2.3, 7.8 and 0.16, traces, 0.6 and 2.5%, resp. Thus the readily hydrolyzable glucans vary from 43 to 58% and 72–91%, resp., for the 3 specimens. The mannans of the specimens also differ in their ease of hydrolysis, with *P. silvestris* being most resistant. Similar analysis of specimens taken at varying depths from an old (70 yr.) *P. silvestris* showed a higher relative and abs. value of fermentable sugar in the outer sections in comparison with the core specimens; pentosans show a reverse trend. A specimen of *P. excelsa* gave a similar result. X. Composition of hemicellulose of foliate cellulose. *Ibid.* 1053–60.—A hydrolysis study on *Betula pubescens*, *Populus tremula*, and *Fraxinus manjchurica* gave the following results (1st and 5th hydrolysis stage): *B. pubescens*—glucose 63.3 and 70.0%, mannose 0, galactose 0, xylose 1.3 and 17.5, arabinose trace and 5.5, methylpentoses 1.2 and 2.8, uronic acids 4.2 and 4.3%; *P. tremula* [illegible]

*Eng. Chem.* 41, 1251–6(1949).—Ethylcellulose (I) samples used varied from 44% EtO and 50-centipoise viscosity in 5% concn. to 49.2% EtO and 100-centipoise viscosity. The rate of O absorption and the length of the induction period are not a function of the degree of substitution or of viscosity within the commercially useful ranges. Data obtained at temps. from 60 to 108° show that the effect is one of oxidation and not merely the rate of diffusion of O into the I granules. The peroxide content shows an immediate development with O absorption and passes through a max. at an absorption of 320 milliatoms of O per glucose unit. The $CO_2H$ content continues to rise through the entire range of measurement. The EtO content did not change for a low absorption of O but then decreased rapidly from approx. 48 to 45%; this was followed by a much slower decrease which continued throughout the entire reaction. The peroxide formation indicates an initial attack of the O to form peroxide; once formed, the peroxides undergo a simultaneous decompn. The max. in the curve indicate that the rate of decompn.

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cotton, frozen to −60° 2.1, 7.2, 9.6. In the formation of hydrocellulose by partial hydrolysis, the easily hydrolyzable fraction is not removed completely; upon drying, it is again partially regenerated. Mercerized cellulose is hydrolyzed less readily than a similar specimen of cellulose hydrate, but cellulose hydrate regenerated from mercerized cellulose hydrate (viscose rayon) is hydrolyzed less readily than the original cellulose hydrate. The cellulose hydrate specimens (viscose or cuprammonium) vary in hydrolyzability because of variation in the extent of coagulation of the original structures resulting on sepn. of the macromols. from soln. All cellulose hydrate specimens hydrolyze slower than cellobiose because of formation of highly oriented aggregates at the moment of pptn. from soln. G. M. Kosolapoff

YEFIMOV, V. A.

USSR/Chemistry. - Wood
Chemistry - Cellulose

Oct 48

"Chemical Composition of Wood: X, Study of the Chemical Composition of Greenwood Hemicellulose," V. I. Sharkov, V. A. Yefimov, All-Union Sci Res Inst of Hydrol Ind, 8 pp

"Zhur Priklad Khim" Vol XXI, No 10

Studies chemical composition of the products of stepped hydrolysis of the hemicellulose of birch, aspen, Manchurian ash, and dogwood trees. Finds that uronic acid does not contain galacturonic acid but indicates presence of glucuronic acid. Does not detect mannane and galactane in these specimens. Determines percent of glucose, galactose, xylose, arabinose, methylpentose, and uronic acid in the products of hydrolysis. Submitted 12 Oct 47.

PA 43/49T24

YEFIMOV, V. A.

USSR.

The chemical heterogeneity of pine (Pinus silvestris) and spruce (Picea excelsa) wood as a function of location within the tree. V. I. Sharkov, V. A. Efimov, V. S. Muromtseva, and A. V. Tsalikova. *J. Appl. Chem. U.S.S.R.* 26, 679–89 (1953)(Engl. translation).—See *C.A.* 48, 9680e. H. L. H.

YEFIMOV, V A.

The chemical heterogeneity of pine (*Pinus silvestris*) and spruce (*Picea excelsa*) wood as a function of location within the tree. V. I. Sharkov, V. A. Efimov, V. S. Muromtseva, and A. V. Galikova. *Zhur. Prikład. Khim.* 26, 628–39 (1953).—Disks were cut from the *P. silvestris* (120 years old) at 25 cm. from the ground (*A*), 8 m. (*B*), 14 m. (*C*), and 20 m. (*D*), and from *P. excelsa*, (120 years old) at 25 cm. (*E*), 10 m. (*F*), 18 m. (*G*), 26 m. (*H*), and 34 m. (*J* series). Samples were selected for analysis from each disk from growth rings 0–17 (*a*), 24–34 (*b*), 42–53 (*c*), 74–90 (*d*), and 104–120 (*e*). All results are based on bone-dry, extd. wood. The % $Et_2O$ extractives in pine was for *A*, *a-e*: 7.55, 7.30, 7.05, 4.32, and 3.03; *B*, *a-d* 7.45, 7.40, 3.24, and 3.79; *C*, *a-c* 4.88, 4.71, and 3.77; *D*, *a* 4.29; in spruce for *E*, *a-e* 1.07, 1.02, 1.02, 1.01, and 3.98; *F*, *a-d* 1.75, 1.16, 0.95, and 1.05; *G*, *a-c* 1.57, 1.07, and 1.42; *H*, *a* 2.35. The % total volatile acids ($HCO_2H$ and AcOH) and % AcOH in pine was for: *A* *a-e* 1.40 and 1.37, 1.62 and —, 1.75 and 1.79, 2.00 and 1.94, 2.01 and 1.96; *B*, *a-d* 1.40 and 1.36, 1.55 and 1.52, 1.73 and 1.66, and 1.97 and 1.92; *C*, *a-c* 1.40 and 1.36, 1.67 and 1.64, and 1.78 and 1.75; *D*, *a* 1.40 and 1.36; in spruce for: *E*, *a-e* 1.54 and —, 1.65 and 1.63, 1.71 and 1.68, 1.82 and 1.78, and 1.93 and 1.90; *F*, *a-d*, 1.53 and 1.50, 1.62 and 1.59, 1.74 and 1.66, and 1.87 and 1.81; *G*, *a-c*, 1.54 and 1.50, 1.64 and 1.60, and 1.76 and 1.71; *H*, *a* 1.55 and 1.51; *J*, *a* 1.55 and 1.51. The % pentosans, Me pentosans, xylan, araban, and polyuronides were in pine for: *A*, *a* 11.8, 1.3, 1.45, 1.50, and 2.16; *A*, *b* 11.7, 0.80, 3.05, 1.50, and 2.04; *A*, *c* 10.9, 0.77, 3.63, 1.50, and 2.04; *A*, *d* 9.4, 1.18, 2.48, 1.50, and 1.99; *A*, *e* 8.26, 1.34, 2.19, 1.40, and 1.87; *B*, *a-d* 11.0, 1.25, 4.20, 2.12, and 1.85; *C* *a-d* 13.27, 0.88, 5.25, 1.88, and 1.34; in spruce the corresponding values were for: *E*, *a* —, —, 4.83, 1.40, and 2.01; *E*, *b* —, —, 4.32, 1.41, and 1.97; *E*, *c* —, —, 3.48, 1.41, and 2.01; *E*, *d* —, —, 3.60, 1.41, and 1.98; *E*, *e* —, —, 3.96, 1.46, and 2.05; *F*, *a-e* 11.22, 1.45, 4.64, 1.65, and 2.46; *G*, *a-c* 11.82, 1.24, 3.90, 1.71, and 2.50, *H*, *a* 12.41, 0.65, —.

—, and —. The following values were obtained on hydrolyzates obtained by refluxing wood 1 hr. with 5 fresh portions of 10% $H_2SO_4$. The various wood samples were refluxed 5 hrs. with 10% $H_2SO_4$ and the hydrolyzates analyzed for readily hydrolyzed reducing sugars (I) and mannose (II); the residues were further washed, dried, and let stand 1 hr. at 15° in 80% $H_2SO_4$, the mixts. dried and refluxed 5 hrs., and the hydrolyzates analyzed for reducing sugars (III) which are hydrolyzed with great difficultly and mannose (IV). In pine the % I was for: *A*, *a-c* 19.5, 21.6, 21.1, 21.9, and 22.9; *B*, *a-d* 20.6, 22.8, 20.2, and 23.0; *C*, *a-c* 22.6, 21.7, and 23.6; *D*, *a* 28.8; in spruce the % I was for *E*, *a-c* 22.0, 21.3, 19.3, 19.4, and 17.8; *F*, *a-d* 22.2, 20.5, 22.5, and 20.8; *G*, *a-c* 24.2, 24.1, and 21.7; *H*, *a* 23.1; *J*, *a* 20.5; corresponding values for % II were 6.2, 6.1, 9.7, 11.1, and 12.4; 6.1, 5.2, 7.2, and 8.5; 6.9, 6.5, and 9.4; and 7.7; 7.1, 7.4, 8.5, 8.3, and 8.7; 7.1, 7.0, 8.4, and 8.9; 7.5, 7.9, and 7.2; 7.4; and 6.3; for % III were 35.4, 39.6, 49.3, 48.1, and 46.7; 43.1, 41.9, 47.6, and 43.3; 43.2, 46.7, and 46.6; and 41.2; 45.1, 46.2, 45.9, 49.8, and 46.2; 43.4, 46.5, 49.1, and 52.6; 44.8, 44.2, and 48.8; 44.6; and 41.5; and for % IV were 1.0, 1.5, 2.6, 1.9, and 1.8; 1.6, 1.3, 1.8, and 1.6; 0.74, 1.2, and 0.74; and 0.26; 0.59, 0.88, 0.28, 0.95, and 2.8; 0.47 0.79, 0.79, and 1.95; 0.67, 0.70, and 2.00; 0.79; and 1.59. The % lignin in the pine varied from 26.2 to 28.7 and in spruce from 27.0 to 28.9, and the % MeO varied from 13.0 to 14.3 in the pine lignin and from 13.8, to 16.8 in the spruce lignin, but there was no correlation between these values and the location of the sample within the tree. All methods of analysis are given.

John Lake Keays

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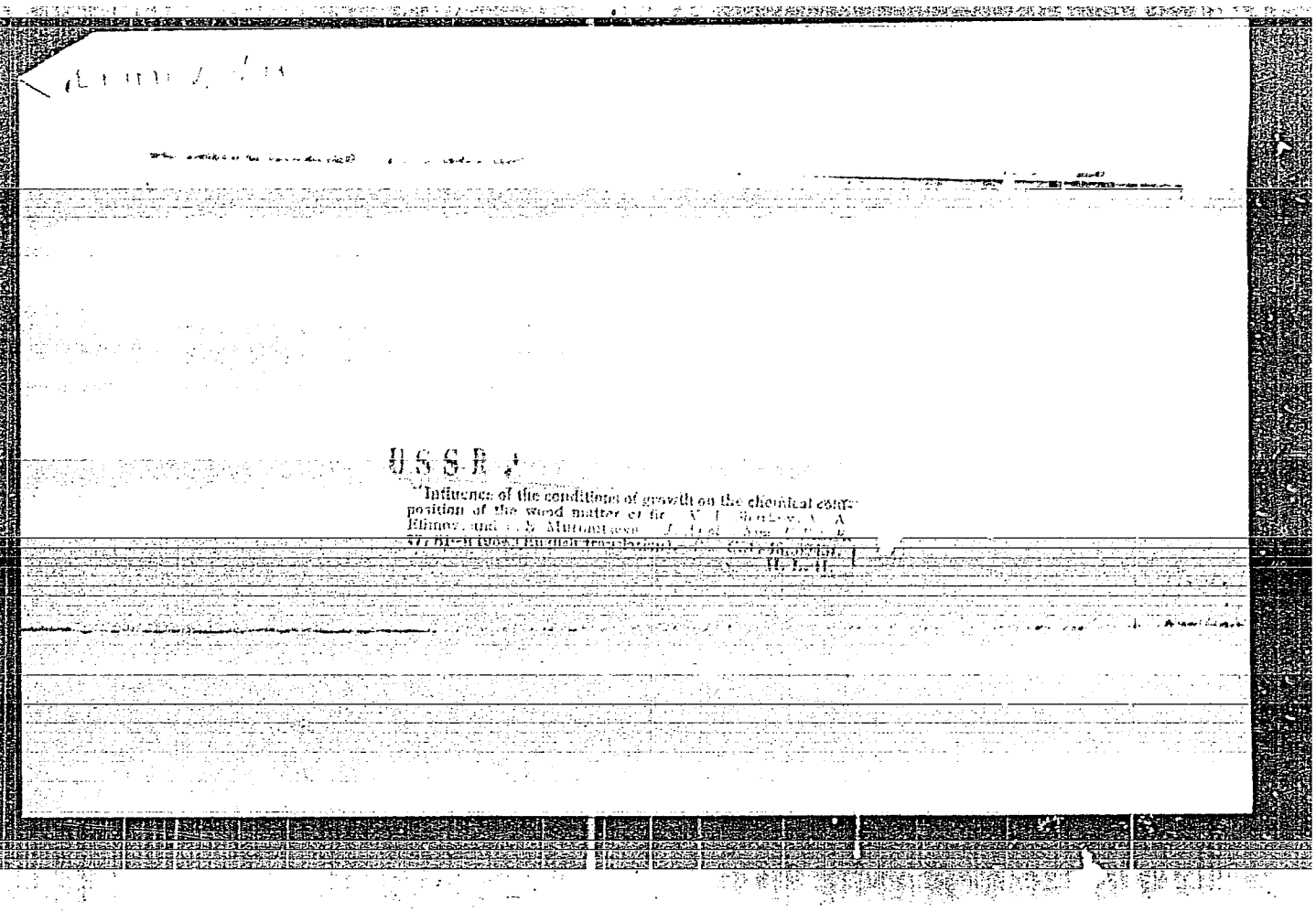
V. I. SHARKOV, ETC.



USSR

"Influence of the conditions of growth on the chemical composition of the wood matter of fir [illegible]

[illegible]

YEFIMOV, V.A.

Chemical Abstracts
May 25, 1954
Biological Chemistry

(3)

Influence of the conditions of growth on the chemical composition of the wood matter of fir. V. I. Sharkov, V. A. Efimov, and V. S. Muromtseva. *Zhur. Prikład. Khim.* 27, 92-6(1954).—Under all conditions of growth in respect to illumination by sunlight in forest conditions (much or little shade) the wood matter of the fir shows the same tendency of contg. less and less pentosans in specimens taken from the periphery of the trunk in comparison with the central sections. On the other hand the content of methylpentosans and mannan steadily rises as one passes from the center of the trunk to the periphery and from the base of the trunk to its top. The chem. compn. depends mainly on the time of formation of the annular ring and does not depend on the width of the ring. A similar regularity was found in specimens taken from a 300-year fir tree. G. M. Kosolapoff

YEFIMOV, V.A., kand.tekhn.nauk

Continuous hydrolyzes of vegetable raw material. Khim.nauka i prom. 2 no.4:475-480 '57. (MIRA 10:11)
(Chemical engineering--Equipment and supplies) (Hydrolysis)

YEFIMOV, V.A.

YEFIMOV, V.A.; MATUSYAK, B.I.; GANTSEVICH, A.I.

Semicontinuous process for the hydrolysis of wood. Gidroliz. i lesokhim. prom. 10 no.7:20-21 '57. (MIRA 10:12)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut gidroliznoy i sul'fitnospirtovoy promyshlennosti.
(Hydrolysis)

SHARKOV, V.I.; YEFIMOV, V.A.; MOLCHANOVA, M.N.

Continuous wood hydrolysis in a horizontal hydrolyzer. Gidroliz. i lesokhim. prom. 11 no.6:1-2 '58. (MIRA 11:10)

1.Vsesoyuznyy nauchno-issledovatel'skiy institut gidrolizney i sul'fitno-spirtovoy promyshlennosti.
(Hydrolysis)

YEFIMOV, V A.

MIRONOV,P.V., inzhener

Laying and installing signal, central control and block system cables. A.D.Kargashinskii, V.A.Efimov. Reviewed by P.V.Mironov, Tekh.zhel.dor.6 no.12:30-31 D'47. (MRA 8:12)
(Railroads--Signaling)

YEFIMOV, V.A., inzhener; KARGASHINSKIY, A.D., inzhener.

[Laying and assembling cables for signaling central control block systems] Prokladka i montazh kabelei STsB. Moskva, Gos. transp. zhel-dor. izd-vo, 1947. 219 p. (MLRA 7:4)
(Electric cables) (Railroads--Signaling)

GUREVICH, B.Ye.; NEMIROVSKIY, A.N.; YEFIMOV, V.A.; SHMAGIN, Ya.G.;
Prinimali uchastiye: Semenov, S.S., kand.tekhn.nauk; NIKOLAYEVA, A.I., tekhnik

Production of oil shale diesel fuel. Khim. i tekh. gor. slan. i prod. ikh perer. no.8:84-101 '60. (MIRA 15:2)
(Diesel fuels)
(Oil shales)

ALAD'YEV, I.T.; YEFIMOV, V.A.

Intensification of heat transfer in electric fields. Inzh.-fiz. zhur. 6 no.8:125-132 Ag '63. (MIRA 16:10)

1. Energeticheskiy institut im. G.M.Krzhizhanovskogo, Moskva.

ZELENIN, N.I.; PREYS, M.O.; FEOFILOV, Ye.Ye.; CHERNYSHEVA, K.B.; YEFIMOV, V.A.; TSIPEROVICH, M.V.; YEVTUSHENKO, V.Ya.

Using methanol extract from the middle cut of shale tar in the flotation of coal. Khim. i tekh. gor. slan. i prod. ikh perer. no.8:102-116 '60. (MIRA 15:2)
(Methanol)
(Coal)
(Flotation)

YEFIMOV, V.A.

Investigation of teeming processes of dead-melted steel varieties. Trudy Inst.chern.met.AN URSR 7:65-101 '53. (MLRA 8:5)
(Steel ingots)

YEFIMOV, V.A.

Effect of Crystallization Conditions of the Steel on Ingot Defects due to Cracks. V. A. Efimov, V. I. Danilin and M. P. Lapshova. (*Stal'*, 1965, (7), 601-605). [In Russian] In the investigation described, the shrinkage conditions and the plastic properties of a wide range of killed steels during the solidification of a 6-ton ingot and the correlation between these conditions and ingot cracking were studied. —E. K.

YEFIMOV, V. A.

Influence of solidification conditions on cracking of ingots. V. A. Efimov, V. I. Danilin, and M. P. Lanshova (Inst. Ferrous Met., Acad. Sci. Ukr. S.S.R., Plant "Krasnyi Oktyabr'"). *Stal'* 15, 601-6(1955).—Detg. shrinkage of ingots in molds provided with suitable gages showed that the contraction of steel cast at the same temp. is a function of steel compn.; max. shrinkage was observed in 0.18–0.30% C and the least in 0.65% C steels, the former showing a max. cracking in rolling. Plastic properties of freezing steel are detd. by the ratio of solid and liquid phases in the interval of crystn., and its width is proportional to the C content. Plastic deformation of a solidifying skin is taken care of by the free motion of liquid metal among its dendrites. J. D. Gat

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YEFIMOV, V.A.

Controlling the plasticity of hot steel. Vop.proizv.stali no.3: 135-143 '56. (MLRA 9:11)

(Steel--Quality control)

YEFIMOV, V.A.; DANILIN, V.I.; LAPSHOVA, M.P.

Shrinkage and plasticity of 6-ton steel ingots in the process of solidification. Vop.proizv.stali no.3:144-160 '56. (MLRA 9:11)
(Steel ingots)

YEFIMOV, V.A.

Causes for the formation of surface defects on steel ingots. Vop. proizv.stali no.3:161-176 '56. (MLRA 9:11)
(Steel--Defects)

YEFIMOV, V.A.

Ways to improve bottom pouring of steel. Vop.proizv.stali no.3: 177-190 '56. (MLRA 9:11)

(Founding)

p.3

18(3); 18(5) PHASE I BOOK EXPLOITATION SOV/2452

Akademiya nauk Ukrainskoy SSR. Otdeleniye tekhnicheskikh nauk

Voprosy proizvodstva stali, vyp. 4 (Problems in Steelmaking; Nr. 4) Kiyev, Izd-vo AN Ukrainskoy SSR, 1956. 163 p. 3,000 copies printed.

Resp. Ed.: N. N. Dobrokhotov, Academician, UkrSSR Academy of Sciences; Ed.: B. A. Kazantsev; Tech. Ed.: A. D. Zhukovskiy.

PURPOSE: This book is intended for advanced students and for scientists and personnel in the metallurgical industry.

COVERAGE: The papers in this collection present information on recent Soviet technological developments stated to be of considerable theoretical and practical importance in the production and teeming of steel. A number of articles deal directly with matters of method (alloying, deoxidizing, top and bottom pouring, production of open-hearth and electric steel). Some are concerned with the investigation of phenomena such as change

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of hydrogen content during the production of steel. Others describe the effect of various factors on the final product (shape of ingot, pouring temperature, addition of aluminum, etc.). There is one book review. References follow some of the papers.

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Problems in Steelmaking; No. 4 SOV/2452

Steel) by A. N. Morozov and A. I. Stroganov 156

AVAILABLE: Library of Congress

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4. Materials--Quality control 5. Metals (Liquid)--Handling

SOV/137-58-9-18666

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 73 (USSR)

AUTHOR: Yefimov, V.A.

TITLE: Elimination of Surface Defects on Steel Ingots (Ustraneniye poverkhnostnykh defektov na stal'nykh slitkakh)

PERIODICAL: V sb.: Staleplavil'n. proiz-vo. Moscow, Metallurgizdat, 1958, pp 89-114

ABSTRACT: Surface defects make their appearance in the newly-formed thin skin of the freshly-solidified ingot. Longitudinal corner cracks, and most types of transverse cracks are capable of coming into being in sound skin segments if a local stress concentration develops. Transverse cracks develop not in the upper portion of the ingot where the skin is thin, but in places where thinner segments of skin are surrounded by thicker segments due to lack of uniformity in solidification. Cracks form owing to the effect of ferrostatic pressure and the shrinkage of the solidifying steel before the ingot has even separated from the walls of the mold. The lack of uniformity in the solidification of the skin is increased by the high speed of crystallization of steel in a metal mold. In top pouring, heat-insulating mold

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Elimination of Surface Defects on Steel Ingots

coatings may be employed to reduce solidification rate. In cases in which the thickness of the skin in the corners is equal to or greater than its thickness at the edge of the ingot, longitudinal corner cracks did not form, since in this situation the conditions for uniform shrinkage of the metal existed and no concentration of shrinkage stresses had developed. In order to eliminate longitudinal cracks, the radius of curvature of the mold corners should not be >10% of the diameter of the corresponding cross section of the ingot. Longitudinal cracks at the edges of a corrugated ingot develop for the same reason as corner cracks. An experimental check-out of molds of new cross section, having corrugated edges, for 6.45-t ingots showed that when steel was cast in such molds corner cracks are eliminated completely and only 40% as many edge cracks form. Deviation of the stream from the vertical in bottom pouring, which results in uneven solidification of the skin, may be avoided by using a cylindrical nozzle with a diameter 20% smaller than the diameter of the runner and, when round and polygonal ingots are poured, a king brick onto which the stream of metal is brought tangentially. To prevent the formation of skin at the surface of the metal in bottom pouring it is recommended that high center runners and a closed system thereof be used to assure varying pouring rates along the height of the ingot.

1. Steel--Castings 2. Castings--Surface properties 2. Steel L.K.
Card 2/2 --Crystallization

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SOV/137-59-5-9947

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Translation from: Referativnyy zhurnal, Metallurgiya, 1959, Nr 5, pp 71 - 72 (USSR)

AUTHORS: Yefimov, V.A., Sabiyev, M.P., Grebenyuk, V.P.

TITLE: Investigations on Improved Casting of Steel Into Large-Size Sheet Ingots

PERIODICAL: V sb.: Vopr. proiz-va stali, Nr 5, Kiyev, AS UkrSSR, 1958, pp 119 - 145

ABSTRACT: The authors investigated the connection between steel casting conditions and the development of cracks on the surface of sheet ingots of 12.8, 9.6 and 8.6 ton weight. It was established that the temperature was distributed most irregularly over the open metal surface during the filling of the mold. The crust temperature at the edges of the ingot was 40 - 80° lower than along the ingot axis. To obtain a normal ingot, the steel must have a high temperature and must be cast without a crust; eddy currents in the ingots during the pouring of the metal into the mold must be insignificant. The weight inflow of the steel into the mold

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Investigations on Improved Casting of Steel Into Large-Size Sheet Ingots

per unit of time must increase during the casting. The authors recommend a casting speed of 0.9 - 1.2 t/min for the lower part and a speed of 1.3 - 1.4 t/min for the upper part. Formulas are given to determine the optimum steel temperature at the moment of tapping. For casting 9.6 ton ingots it is: $t_{tap} = (t_l + t_{sol}) / 2 + 85 + 70/1.5$. W, where $t_{tap}$ is the steel temperature during tapping the furnace, $t_l$ is the temperature of liquidus, $t_{sol}$ is the temperature of solidus, W is the weight speed of teeming in t/min. Casting of steel with a smooth surface was carried out in experimental smelts at a tapping temperature of the steel of 1,620° - 1,650°C. It was established that the shape of the nozzle placed into the mold, had an effect on the formation of the crust on the surface of the metal ascending in the mold. It is recommended to use nozzles with rectangular or oval-shaped outlet cross-sections. The authors investigated heat flows from the ingot to the mold during casting. During the first minute the heat flows attain 20,000 to 25,000 kcal/min $m^2$; during the following 2 - 3 minutes they decrease to 7,000 - 6,000 kcal/min $m^2$. In high-speed casting of relatively cold metal heat flows at the mold walls were irregularly distributed over the ingot height. Mostly the heat flows occurred in the zone of intensified circulation

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Investigations on Improved Casting of Steel Into Large-Size Sheet Ingots

of the steel, at a height of 700 mm from the bottom part of the ingot. In low-speed casting of the lower part of the ingot and speeded-up casting of the upper part, heat flows were distributed uniformly over the mold height and their values were lower by 1.5 - 2.0 times than in high-speed steel casting. A high metal temperature and variable speed of filling the molds with liquid steel provide satisfactory conditions of the ingot surface. In casting low carbon steel sheet ingots of 8.6 - 15.3 t weight, from the top by a single flow directly from the ladle, longitudinal cracks are forming along the edges and angles of the ingot. In casting through an intermediate funnel with several apertures a smaller amount of the flow penetrates into the ingot and a lesser circulation takes place. Therefore, the crust, crystallizing on the mold walls, is not washed away, thus ensuring a satisfactory quality of the ingot surface.

Ye.K.

SOV/137-59-3-5359

Translation from: Referativnyy zhurnal. Metallurgiya,. 1959, Nr 3, p 62 (USSR)

AUTHOR: Yefimov, V. A.

TITLE: Crystallization and Deformation of the Outer Layers of Steel Ingots During Casting (Kristallizatsiya i deformatsiya naruzhnykh sloyev stal'nykh slitkov vo vremya ikh otlivki)

PERIODICAL: Sb. Vopr. proiz-va stali. Nr 5. Kiyev, AN UkrSSR, 1958, pp 146-162

ABSTRACT: The processes of shrinkage (S) and growth of stresses in the crust of solidifying top- or bottom-cast 6-ton steel ingots (I) were studied by means of special indicators and tensometers or strain gages built into the walls of the mold (M). It was established that in the lower portion of an M [lower-case letter "m" in Russian Text. Trans. Note] having straight walls the gap forms almost simultaneously on all the faces of the I. There is no separation of the I corners from the M during the first 10 min in the zone of steel circulation which begins when the M is being filled with the metal. This impedes the S of the crust on the I faces. In the upper part of an I having concave faces the S begins at the corners of the I and proceeds along its edges. The

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slowing down of the S of the I crust is explained by the welding of the crust onto the M surface, especially in the corners. When the metal is top cast this phenomenon develops throughout the height of the M. The most rapid S with either method of casting occurs on the edges in areas adjoining the corners of I. Most of the crack formation occurs in these areas, also. It was established that the stresses in I crust increase through ferrostatic pressure in the process of casting and during further crystallization through the slowing-down of the S on the I surface. The welding of individual portions of the I onto the M increases the development of stresses and contributes to the formation of inner and outer cracks. The stresses which take place in the crust located in the zone of steel circulation are greater in bottom casting than in top casting. Taking into consideration that the thickness of the crystallized crust and the susceptibility to crack formation are dependent on the temperature and rate of casting, steel casting at elevated temperatures is recommended in such a way that the lower part of the I be poured rather slowly and the upper part as rapidly as possible. Curves of the progress of shrinkage and deformation of I crust in the process of its solidification are adduced.

I. G.

YEFIMOV, V.A.; SABIYEV, M.P.; GRENBENYUK, V.P.

Effect of hydrodynamics of molten steel entering the mold on the quality of steel ingots. Vop.proizv.stali no.6:87-95 '58. (MIRA 12:3)

(Steel ingots)

18(5) PHASE I BOOK EXPLOITATION SOV/1907

Akademiya nauk Ukrainskoy SSR. Zapiski Odeleniya tekhnicheskikh nauk

Voprosy proizvodstva stali vyp.6 (Problems of Steel Production, No 6) Kiyev, Izd-vo AN Ukrainskoy SSR, 1958. 137 p. Errata slip inserted. 2,000 copies printed.

Resp. Ed.: N.N. Doborotskov, Academician, Ukr. SSR Academy of Sciences; Ed. of Publishing House: N.K. Labinova; Tech. Ed.: V.Z. Turchinskiy.

PURPOSE: This book is intended for engineers and scientific personnel in the field of steel production.

COVERAGE: This is a collection of articles dealing with various aspects of the production of steel, including the designing of open-hearth furnaces, thermal processes in the furnaces, thermodynamics of steel-making processes, technology of producing high-grade steel, and changes in the size and shape of ingots. Other topics discussed are the properties of chrome-manganese stainless steels, improvement of ball-bearing steel, ingot defects, ingot quality as determined by temperature of teeming and shape of mold, and certain aspects of steel rolling. Some of the articles are accompanied by references, both Soviet and non-Soviet.

YEFIMOV, V.A.; DANILIN, V.I.; LAPSHOVA, M.P.; GREBENYUK, V.P.; KISELEV, A.A.

Effect of the temperature of pouring and the mold shape on the quality of steel ingots. Vop.proizv.stali no.6:96-109 '58. (MIRA 12:3)
(Steel ingots) (Metallurgical plants--Quality control)

YEFIMOV, V.A.; SABIYEV, M.P.; OSIPOV, V.P.

Reducing top and tail cropping during ingot rolling. Vop.proizv.stali no.6:110-122 '58. (MIRA 12:3)
(Steel ingots) (Rolling (Metalwork))

YEFIMOV, V.A.; OSIPOV, V.P.; MELESHKO, A.M.

Studying conditions of rolling sheet slabs with undulated edges. Vop. proizv.stali no.6:123-129 '58. (MIRA 12:3)
(Rolling (Metalwork)) (Steel ingots)

YEFIMOV, V.A., kand.tekhn.nauk

Ways of improving steel ingot surfaces. Izv.vys.ucheb.zav.; chern.met. no.9:23-28 S '58. (MIRA 11:11)

1. Institut ispol'zovaniya gaza AN USSR.
(Steel ingots)

YEFIMOV, V. N.

25(1); 18(5) PHASE I BOOK EXPLOITATION SOV/2859

Akademiya nauk SSSR. Institut metallurgii

Goryachiye treshchiny v svarnykh soyedineniyakh slitkakh i otlivkakh (Hot Cracks in Welds, Ingots, and Castings) Moscow, Izd-vo AN SSSR, 1959. 163 p. 2,700 copies printed.

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

PURPOSE: This book is intended for metallurgists and welding engineers.

COVERAGE: This is a collection of scientific papers dealing with the formation of hot cracks in ingots, castings, and welded products. Some papers are concerned mainly with the nature or mechanism of the phenomenon; others examine the effect of factors such as steelmaking procedure. Sufficient evidence is presented to identify some of the causes of hot cracks. Various means of investigating and preventing the phenomenon are described. A number of references, both Soviet and non-Soviet, accompany the papers. For further coverage see the Table of Contents.

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the most important factors in crack development. Filling the molds with steel at the temperature of the liquidus or below should be avoided. A direct relationship between crack resistance and linear shrinkage, fluidity, and gas liberation was established. Increasing the fluidity of the mushy stage by changing the composition or the conditions helps to increase the crack resistance. Sulfur, hydrogen, and methane decrease the crack resistance of steel. Additions of manganese, molybdenum, and vanadium to carbon steel or low alloy steel increase the crack resistance. The manganese content should be held at a maximum so as to assure a ratio of Mn/S $\leq$ 13.

Gulyayev, B. B., I. I. Lupyrev, and L. M. Postnov. Formation of Hot Cracks in Steel Castings 51

The author recommends the following measures for controlling hot cracks in steel castings: 1) decreasing the size of the casting and eliminating projections by casting in several pieces with subsequent welding of the components; 2) Equalization of the cooling rates of various parts of the casting and elimination of conjugate parts through a rational determination of the thickness of their elements; 3) increasing fillet radii; 4) rejection of X-shaped designs and conjugate walls at angles of less than 90°; 5) increasing the pliancy of molds through the use of more pliable molding media and by

pitting the molds; 6) strengthening weak spots through the use of chills and ribbing; 7) regulating the metal composition, insofar as possible, and the pouring conditions so as to reduce the probability of crack development. Consistent application of these measures, the author states, will effectively prevent hot cracks from development. Consistent application of these measures, the author states, will effectively prevent hot cracks from developing.

welding and casting processes, accompanied by development of computational methods of determining deformations and their concentration at high temperatures; 2) study of the mechanical properties of metals during crystallization and cooling; 3) development of a single working hypothesis of intergranular strength of metals which would guide investigators and manufacturers in solving theoretical and practical problems connected with hot-crack formation (in this connection the author suggests the utility of his own hypothesis, based on a comparison of the numerical values of the deformation and plasticity of metals within a definite temperature range of brittleness); development of unified methods of testing metals for susceptibility to hot-crack formation in welding and casting; 5) development of quantitative methods of determining the effect of the shape of the product, as required by manufacturing and constructional considerations, on intergranular strength of welded and cast products; 6) systematic adoption of new scientific methods by manufacturers.

Lashko-Avakyan, S. V., and N. F. Lashko. Intergranular Crystallization Cracks in the Casting and Welding of Aluminum Alloys 131

According to the author, certain alloys ordinarily subject to the formation of cystallization cracks after welding can be

rendered resistant to such cracks by the use of an added metal (alloy) which satisfies the following conditions: (a) the weld metal must not be subject to crack formation after welding; (b) the liquidus temperature of the weld metal must not be higher than that of the parent metal; (c) the weld metal must not contain components that in penetrating the base metal along the boundaries of fused grains in the heat-affected zone would form alloys with significantly lower eutectic temperatures than that of the base metal.

Petrov, G. L. New Methods of Determining the Susceptibility of Weld Metal to Hot-Crack Formation 147

The article describes new methods developed by N. O. Okerblom and associates, Welding Department, Leningrad Polytechnic Institute. The methods make it possible to determine the effect of various welding materials and basic welding parameters on the development of hot cracks in weld metal.

Hot Cracks in Welds (cont.) SOV/2859

Resolution of the Conference on the Problem of Hot Cracks in Welds Castings, and Ingots [Held at the Institute of Metallurgy, USSR Academy of Sciences, June 9 11, 1955] 162

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PHASE I BOOK EXPLOITATION SOV/4885

Yefimov, Viktor Alekseyevich

Teoreticheskiye osnovy razlivki stali (Theoretical Principles of Steel ~~Teeming~~ Casting)
Kiyev, Izd-vo UkrSSR, 1960. 179 p. 3,000 copies printed.

Resp. Ed.: N.N. Dobrokhotov, Academician of the Academy of Sciences UkrSSR; Ed. of Publishing House: N. M. Titova; Tech. Ed.: A.M. Lisovets.

PURPOSE: This book is intended for engineers and scientific workers concerned with improving steel-ingot production.

COVERAGE: The book deals with the thermophysical processes which occur during the teeming of steel and the solidification of ingots. The author describes in detail the influence of the turbulent flow of liquid steel in the mold on the solidification of surface layers and the formation of skin defects. The shrinkage of steel in the mold is analyzed and its effect on the quality of steel ingots is determined. Certain rational shapes of molds are developed on the basis of data obtained and from the analysis of the distribution of stresses in the skin of

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ingots. These mold shapes are said to be responsible for a better quality of metal and a decrease of defects in ingots. The author analyzes the influence of temperature and speed in teeming of steel on the formation of ingots, and makes recommendations for the selection of these parameters. No personalities are mentioned. There are 87 references: 63 Soviet, 19 English, 3 German, and 2 French.

TABLE OF CONTENTS:

YEFIMOV, V.A.

Thermophysical processes during steel pouring. Vop.proizv.stali no.7:117-134 '60. (MIRA 13:8)
(Steel ingots) (Solidification)

YEFIMOV, V.A.; SABIYEV, M.P.; GREBENYUK, V.P.; OSIPOV, V.P.

Steel shrinkage and deformation of the mold during the casting of sheet ingots. Vop.proizv.stali no.7:135-140 '60. (MIRA 13:8)

(Steel ingots)
(Ingot molds)

PHASE I BOOK EXPLOITATION SOV/5254

Yefimov, Viktor Alekseyevich

Stal'noy slitok; razlivka stali i formirovaniye slitka (Steel Ingot: Steel Teeming and Ingot Molding) Moscow, Metallurgizdat, 1961. 356 p. Errata slip inserted. 5,300 copies printed.

Ed. (Title page): N.N. Dobrokhotov, Academician of the Academy of Sciences UkrSSR. Ed. of Publishing House: N.D. Gromov; Tech. Ed.: Ye.B. Vaynshteyn.

PURPOSE: This book is intended for technical personnel in metallurgical and machine-building plants, scientific research workers, and senior students in allied fields.

COVERAGE: The author discusses the steel teeming process, the occurrence of defects in steel ingots (including the effect of shrinkage), mold design, the hydrodynamics of the mold-filling process, and pouring rate. Existing teeming methods are reviewed, and practical recommendations are given concerning the selection of optimum temperature and pouring rate, the calculation of mold shape, efficient metal flow, and other teeming parameters which contribute to improving the quality of steel ingots. Practical measures are suggested for preventing

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mold-to-ingot welding, folding of the skin, and other defect-causing phenomena. The author thanks N.N. Dobrokhotov, Academician, for his editorial assistance and V.I. Lapitskiy, Doctor of Technical Sciences, Professor, Yu.N. Yakovlev, Candidate of Technical Sciences, and V.I. Danilin, Director of the Central Industrial Laboratory at the Krasnyy Oktyabr' Plant, for their valuable advice. There are 149 references: 115 Soviet, 30 English, 2 French, and 2 German.

TABLE OF CONTENTS:

YEFIMOV, V. A., Dr. Tech. Sci. (diss) "Investigation and Improvement of Processes of Pouring Dead Melt Steel, "Moscow, 1961, 39 pp. (Inst. of Metallurgy im A. A. Baykov) 150 copies (KL Supp 12-61, 260).

YEFIMOV, Viktor Alekseyevich; LAPITSKIY, V.I., prof., doktor tekhn.nauk, retsenzent; YAKOVLEV, Yu.N., kand.tekhn.nauk, retsenzent; DANILIN, V.I., retsenzent; DOBROKHOTOV, N.N., akademik, red.; GROMOV, N.D., red.izd-va; VAYNSHTEYN, Ye.B., tekhn.red.

[Steel ingots; casting and formation of the ingot] Stal'noi slitok; razlivka stali i formirovanie slitka. Pod red. N.N.Dobrokhotova. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1961. 356 p. (MIRA 14:3)

1. AN USSR (for Dobrokhotov). 2. Nachal'nik TSentral'noy zavodskoy laboratorii zavoda "Krasnyy Oktyabr'" (for Danilin).
(Steel ingots)



S/133/61/000/005/004/009
A054/A133

AUTHORS: Osipov, V.P., Engineer; Yefimov, V.A., Candidate of Technical Sciences; Matevosyan, P.A., Engineer; Danilin, V.I., Engineer; Lapshova, M.P., Engineer; Selivanov, V.M., Engineer; Lisov, I.V., Engineer

TITLE: Pouring of high-alloy steels

PERIODICAL: Stal', no. 5, 1961, 415 - 418

TEXT: When stainless steel is poured, the surface layers of the ingot are deteriorated by folds, blisters and pock marks, which are mainly the result of oxides and gases in the metal. To avoid such defects, tests were carried out with pouring low-melting synthetic slags on the metal surface in the ingot mold. The hot- liquid slag decreases heat losses through radiation and checks the oxidation of the metal. The main purpose of the tests was to determine the effect of various factors on the formation of defects and the most suitable composition of synthetic slags to be used in this process. The slags were melted in a 20-ton single-phase arc furnace with conductive graphite bottom. The low-melting constituents (fluorite, cryolithe) were charged at first, on the bottom, next the

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Pouring of high-alloy steels

other materials. The melting of a 50-kg batch of synthetic slag took 1 - 1 1/2 h. The slag was poured into a ladle and from this into the mold. When the metal level in the mold had risen to about 150 - 200 mm, about 15 - 16 kg slag was poured on its surface. In the tests X23H18 (Kh23N18) and 1X18H9T (1Kh18N9T) steel was bottom-cast into 4.1-ton ingots. Simultaneously with pouring into uncoated molds with synthetic slag, metal was also poured into lacquer-coated molds for comparison. Four types of slags were used with the following composition:

| group | $CaF_2$ | $Na_3AlF_6$ | $SiO_2$ | $Al_2O_3$ | CaO | MgO | MnO |
|---|---|---|---|---|---|---|---|
| I | 35—40 | — | 35—40 | 10—15 | 10—15 | — | — |
| II | 33,3 | 33,3 | — | — | 33,3 | — | — |
| III | — | — | 50 | — | 20 | 15 | 15 |
| IV | — | 75 | — | — | 25 | — | — |

The best results were obtained with Group-I slags which are light grey-bluish when solid; when liquid, they humidify the metal very thoroughly. During smelting Kh18N9T steel, the slag composition changed as follows (numerator: composition before smelting; denominator: after smelting):

| $SiO_2$ | CaO | MnO | $TiO_2$ | $Cr_2O_3$ | FeO | $Al_2O_3$ | F | Na |
|---|---|---|---|---|---|---|---|---|
| 35,4 / 32.72 | 37,12 / 35.99 | 0,31 / 1.50 | 0,35 / 6.17 | 0,48 / 1.74 | 0,11 / 0.97 | 11,42 / 13.16 | 14,30 / 13.40 | 2.12 / 1.00 |

It can be seen that synthetic slag adsorbs chrome and titanium oxides, which is promoted by the presence of CaO, moreover by $CaF_2$, $Na_3AlF_6$ (cryolithe) and $Na_2SiO_3$

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soluble glass). The adsorption of chrome and titanium oxides takes place also very rapidly. When 1Kh18N9T steel is poured into the mold to half its capacity, the titanium oxide content of slag increased from 0.6 to 2.5%, the chrome oxide content from 0.03 to 0.8%, while, when pouring was finished, the content of the above oxides increased to 3 and 1%, respectively. No folds were observed in the ingots which were poured under Group-I slags. The ingot surface was covered with a thin slag layer (like "enamel"), the thickness of which between ingot and mold-wall on the edges was 0.3 - 0.5 mm, on the angles 3 mm. The test ingots had a flawless, smooth surface, while in the check-ingots the usual folds in the upper part and blisters in the lower part were found. Due to the synthetic slag layer, the intensity of heat removal from the ingot surface decreased 1.4 times; the shrinkage stresses in the ingot case also became lower. The intensity of shrink-age decreased and, moreover, the liquid slag flowed into the pores of the mold, hereby eliminating the delay of shrinkage and promoting the contraction of the ingot along the mold wall. The mechanical properties of synthetic slag-treated steels are partly equal to those of the conventional steels (strength limit and relative elongation), in some respects they are even better. In the test-speci-mens of synthetic slag-treated 1Kh18N9T and X18H12M2T (Kh18N12M2T) steels no in-tercrystalline corrosion could be observed during the tests. There are 2 figures,

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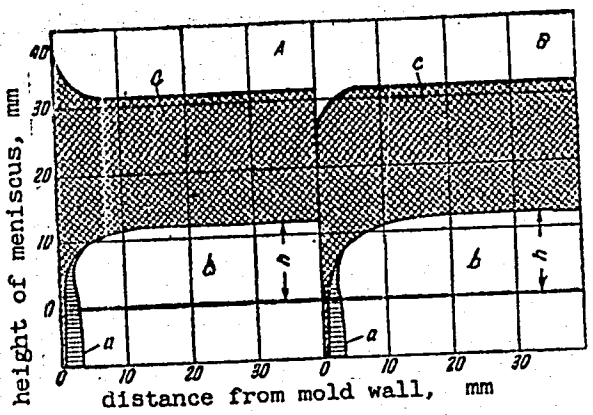
2 tables and 3 Soviet-bloc references.

Figure 2: Effect of coating on the forming of the external ingot surface when pouring under synthetic slag. A - without coating; B - the mold is graphite-coated (a - solidifying steel; 2 - liquid steel; 3 - liquid slag).

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AUTHORS: Grebenyuk, V.P.; Yefimov, V.A.; Sapko, V.N.

TITLE: Formation and elimination of cracks in steel castings

PERIODICAL: Liteynoye proizvodstvo, no. 4, 1962, 31 - 33

TEXT: The authors point out that the main defects of steel ingots are longitudinal and transverse cracks. Among the forces affecting the formation of cracks, the authors mention in the first place the force originating owing to a deceleration of shrinkage of the primary skin. They present formulae for calculating the stresses originating in the ingot skin for the cases of a uniform and nonuniform skin thickness and stress the point that the quantity of sulfur and hydrogen impurities in the steel affect the tendency of steel to hot-crack formation to a considerable extent. It is stated that large additions of aluminum localize the harmful effects of sulfur. Apart from the effect on the modulus of elasticity, the steel composition affects the magnitude of the coefficient of linear shrinkage, which decreases with an increase of the carbon content. Therefore, steel with a C-content of some 0.2% possesses the greatest tendency to crack formation. It is stated that a nonuniform formation of the clearance be-

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Formation and elimination of cracks in ....

tween the crystallizing ingot and the mold and the washing away of the crystallizing skin by the circulating flow of liquid steel contributes to a local thinning of the skin and thereby to the formation of cracks. It was found that the clearance between ingot and mold is formed in the first place at the ingot corners and, to eliminate corner cracks, the rounding-off radius at the ingot corners should amount to 0.1 of the length of the shorter ingot side, or less. According to data obtained by G.P. Ivantsov the heat-transfer coefficient from the ingot to the mold decreases by a factor of 4 - 5 after the formation of the clearance. After the complete or partial separation of the ingot from the mold walls, the destroying action of the hydrostatic pressure force of the liquid metal of the ingot core affects the skin of the solidifying metal. Calculations have revealed that the magnitude of bending moments arising under the effect of hydrostatic pressure forces are the lower, the more points of the ingot skin are pressed against the mold wall. The authors point out that, to create favorable conditions for the crystallization and shrinkage of the ingot, the inner surface of the ingot mold should have a wavy profile. They present details on the most expedient wave shape and state that the most dangerous stresses depend on the cooling intensity of the ingot surface. The use of heat-insulating coatings of the mold makes it possible to reduce the cooling intensity of the ingot surface by a fac-