MARKOV, A.A.

Indistinguishability by invariants in the theory of associative computations. Izv. AN SSSR. Ser mat. 27 no.4:907-936 Jl-Ag '63. (MIRA 16:8)

(Mathematical linguistics)

L 10609-63 EWT(d)/FCC(w)/BDS AFFTC IJP(C)
ACCESSION NR: AP3000734 S/0020/63/150/003/0477/0479

51

AUTHOR: Markov, A., Corr. member of AN SSSR

TITLE: The inversion complexity of a system of Boolean functions

SOURCE: AN SSSR. Doklady, v. 150, no. 3, 1963, 477-479

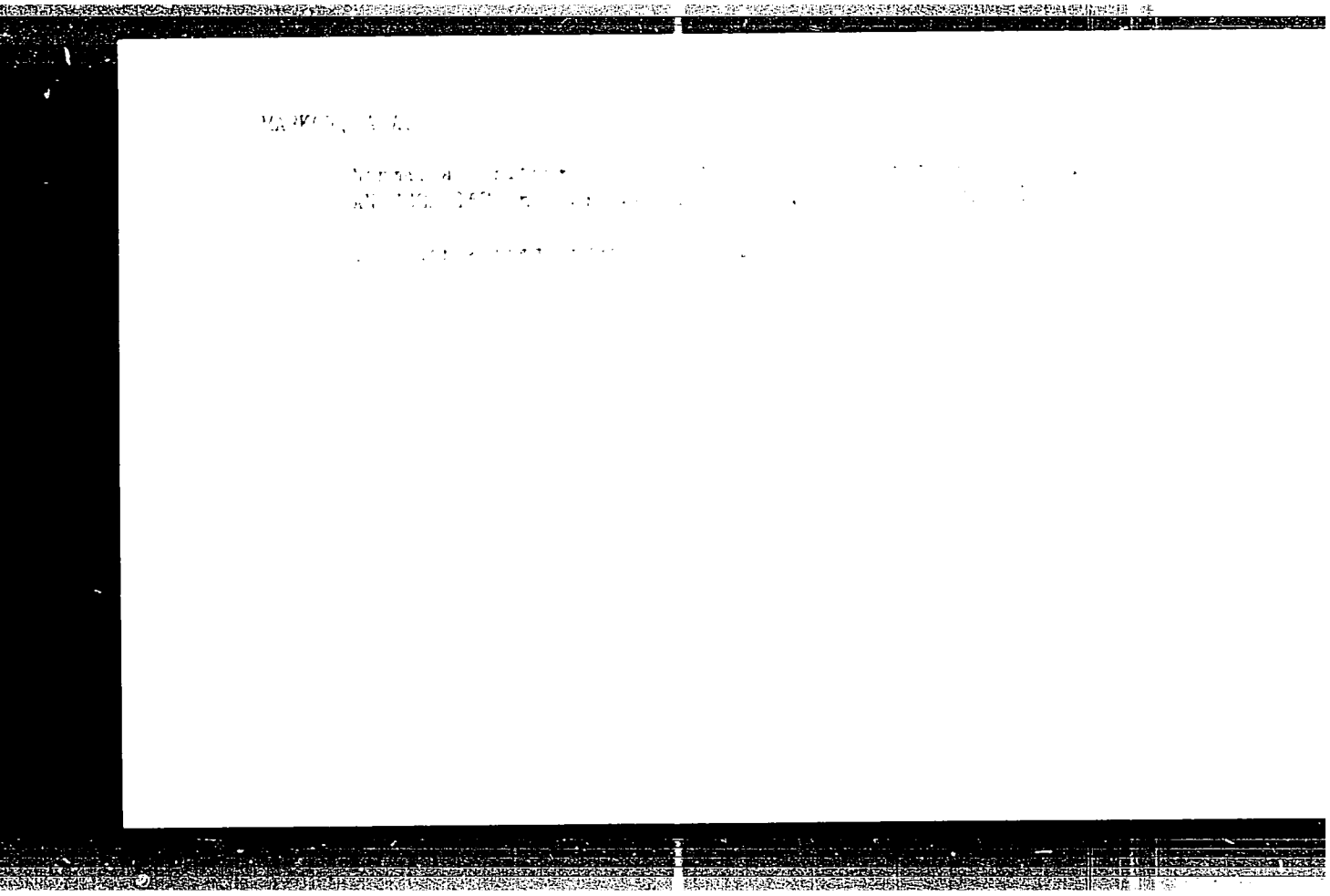
TOPIC TAGS: Boolean functions, Boolean vectors

ABSTRACT: The author generalizes some of his previous results to the case of a system of Boolean functions. Given an increasing sequence of n-place Boolean vectors A sub 1, ..., A sub r, and a system of Boolean functions f sub 1, . . ., f sub m, the number of pairs A sub i, A sub (i+1) for which f(A sub i) is greater than f(A sub (iii)) for at least 1 function of the system may be called the fall of the system on the sequence. The following result is obtained:

$$\text{Inv}(f_1, \ldots, f_m) = D(\text{Des}(f_1, \ldots, f_m)) \qquad (1)$$

where Inv (f sub 1, . . ., f sub m) is the inversion complexity of the system, and where Des (f sub 1, . . ., f sub m) is the maximum fall of the function system on all increasing n-place Boolean vectors. Orig. art. has: 14 equations.

Card 1/2



L 2089-65 EWT(d)/T Ph-4 IJP(c)/AFMD(p)/ASD(a)-5/AFTC(p)/ESD(dp)/RAEM(t)
ACCESSION NR: AP4048312 S/0020/64/157/002/0262/0264

20

AUTHOR: Markov, A. A. (Corresponding member AN SSSR)

TITLE: Normal algorithms for computing Boolean functions

SOURCE: AN SSSR. Doklady*, v. 157, no. 2, 1964, 262-264

TOPIC TAGS: algorithm, normal algorithm, Boolean function, Boolean algebra

ABSTRACT: A normal algorithm "computes" a Boolean function f of n arguments, provided $\mathfrak{A}(P) = f(P)$ for any n-dimensional Boolean vector (the author uses the term "Boolean vector" to refer to a word in alphabet 01; "n-dimensional Boolean vector" to refer to a Boolean vector of length n; and "Boolean function of n arguments" to refer to a function of an n-dimensional Boolean vector with permissible values 0 and 1). Seven theorems and nine corollaries relating to the algorithms and Boolean functions in question are developed. The author considers that these theorems may be extended in scope, as V. A. Kuz'min has actually done for two of them.

Card 1/2

L 2089-65
ACCESSION NR: AP4048312

ASSOCIATION: none

SUBMITTED: 07Apr64 ENCL: 00 SUB CODE: MA

NO REF SOV: 002 OTHER: 00 JPRS

Card 2/2

MARKOV, A.A.; CHUDOV, L.A. (Moscow)

"Higher approximations in asymptotic solutions for a viscous gas flow near the impermeable boundary and in the region of a diffused shock wave".

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 64.

ACC NR: AR6016000 SOURCE CODE: UR/0271/65/000/012/B038/B038

AUTHOR: Markov, A. A.

TITLE: Calibration and stabilization of the amplitude characteristic slope and its displacement

SOURCE: Ref. zh. Avtomatika, telemekhanika i vychislitel'naya tekhnika, Abs. 12B309

REF SOURCE: Tr. 6-y Nauchno-tekhn. konferentsii po yadern. radioelektron. T. 1. M., Atomizdat, 1964, 81-89

TOPIC TAGS: analog digital converter, computer input unit, analog digital conversion

ABSTRACT: Methods are investigated for the calibration and stabilization of the slope and the displacement of the amplitude characteristic of the voltage-to-number converters. It is noted that the reduction of the error in the linear amplifier during the calibration of its gain may be achieved by measuring the ratio of the incremental input and output increase. To stabilize the gain it is proposed that a voltage be applied to the auxilliary amplifier control input. This slowly varying voltage derived from the pulses by conversion represents the difference between the input and reference pulses. In the case of a linear amplitude discriminator whose characteristic is displaced from zero the stabilization of its displacement may be realized by introduction of a comparator circuit comparing the output voltage pulse with the reference. The stabilization of the characteristic slope may be accomplished by

Card 1/2 UDC: 681.142.621

ACC NR: AR6016000

including a subtractor circuit for the two output signals. The corresponding design relationships are presented. [Translation of abstract] G. K.

SUB CODE: 09

Card 2/2

L 37681-66 EWT(m)/T/EWP(t)/ETI DJ/JD

ACC NR: AP6011250 (N) SOURCE CODE: UR/0413/66/000/006/0093/0093

AUTHOR: Garkunov, D. N.; Markov, A. A.; Golikov, G. A.

ORG: none

TITLE: Determining antifriction properties of materials. Class 42, No. 179975

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 6, 1966, 93

TOPIC TAGS: antifriction property, friction pair

ABSTRACT: This Author Certificate introduces a method of determining the antifriction properties of materials. To achieve better selection of material for friction pairs, an inert metal such as gold is used as a standard for measuring the contact potential difference of each friction pair specimen; the standard and specimen are measured in various lubricants using a device for measuring the work function of capacitor electrons. Materials with the highest potential difference are selected. [LD]

SUB CODE: 11/ SUBM DATE: 21Sep64

Card 1/1 UDC: 620.178.162.2

MARKOV, Agei Ageyevich

[illegible] planning of industrial [illegible] organization [illegible] planning [illegible] Leningrad, [illegible]

16 [illegible]

AUTHOR: Markov, Al.A

TITLE: Alphabet Coding

PERIODICAL: Doklady Akademii nauk [illegible]SSR, 1960, Vol 132, No 3, pp [illegible]

TEXT: Let $\mathcal{A} = \{a_1, \ldots, a_m\}$ be an alphabet and $S(\mathcal{A})$ be the set of words with the letters of $\mathcal{A}$. To every $a_i \in \mathcal{A}$ there is adjoined a non-empty word u_i the letters of which belong to the alphabet $\mathcal{B} = \{b_1, \ldots, b_n\}$. Then to every word $a_{i_1} \ldots a_{i_p} \in S(\mathcal{A})$ there corresponds one and only one word $u_{i_1} \ldots u_{i_p} \in S(\mathcal{B})$. The system of words $u_1, \ldots, u_m$ generates a mapping of the set $S(\mathcal{A})$ into the set $S(\mathcal{B})$ which is called (Ref. 1) is denoted as the alphabet coding. Let $l(x)$ be the length of the word x; the dictionary consisting of all words $x(x)$ the lengths of which [illegible] $(u_1, u_2, \ldots, u_m)$ n. The author considers relations $u_{i_1} \ldots u_{i_k}$ with the property that $0 \leq l(x) - l(u_{i_1})$ (2 - non - empty word). Let the maximum of taken over all possible

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presentations of this kind for a Theorem 1 : The alphabet coding by the system $\mathcal{U}$ is biunique or not, simultaneously with the coding of the dictionary S^N by the same system

Here $N = \frac{(n-m)(K+1)}{2} - \delta(n-m)\frac{K-1}{2}$ and $\delta(p)$ is explained by the recursion relations $\delta(0) = 0$, $\delta(p+1) = 1 - \delta(p)$

Theorem 2 : Necessary and sufficient for the fact that $\mathcal{U}$ realizes a biunique coding, is

$$\sum_{l=1}^{T} [illegible] \neq 0,$$

where $|a_{i_1 \ldots i_k}| = \sum a_{k i_1} a_{l_1 l_2} \ldots a_{l_r l}$ (it is summed over all $l_1 l_2 \ldots l_r$, $r = 0, 1, \ldots, T$) is a 2 - quasi - minor of the matrix $\|$ compare (Ref 3)). There are 3 references : 2 Soviet and 1 American.

ASSOCIATION: Issledovatel'skiy fiziko-tekhnicheskiy institut Gor'kovskogo gosudarstvennogo universiteta imeni N.I. Lobachevskogo (Physical-Technical Research Institute of the Gor'kiy State University imeni N. I. Lobachevskiy)

PRESENTED: January 17, 1962, by V. Boldyrev, Member of the Academy
SUBMITTED: [illegible]

Card 2/2

25760
S/020/61/139/003/007/025
B104/B201

6.9500

AUTHOR: Markov, Al. A.

TITLE: Alphabetic coding

PERIODICAL: Akademiya nauk SSSR Doklady v. 139, no. 3, 1961 560 - 561

TEXT: In a previous paper (DAN, 132, no. 3, (1960)) the author had described a method for solving problems involved in the biunique alphabetic coding without memory. Results are offered here that display certain properties of a biunique alphabetic coding, by which the majority of such problems are solved as are formulated for the case of a dyadic coding of a variable length in the paper by E. N. Gilbert et al. (Bell Syst. Techn. J., 38, no. 4, 933 (1959)). The following definitions are introduced: $\mathcal{U} = \{u_1, u_2, \ldots, u_m\}$ is taken to be a system of words for coding in the alphabet $\mathcal{B} = \{b_1, b_2, \ldots, b_r\}$; $\sum_{i=1}^{m} l(u_i) = n$ and $\mathcal{L} = \max_{1 \le i \le m} \{l(u_i)\} - 1$. To each word u_i from $\mathcal{U}$ corresponds a letter a_i

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S/020/61/139/003/007/025
B104/B201

Alphabetic coding

from the alphabet $\mathfrak{A} = (a_1, \ldots, a_m)$ and by decoding one understands a restoration of the prototype of a given information which is a definite word in $\mathfrak{A}$ in the coding of $\mathfrak{A}$. When studying the coding process, the coding machine is assumed to receive a word by way of feeding of one letter after the other. The question as to wether or not the decoding device requires an end memory, is of interest in this connection. This memory is characterized by the number $T_{(\mathfrak{A})}$; $T_{(\mathfrak{A})}$ is defined such that the first t letters can be safely decoded for any t, provided the $t + T_{(\mathfrak{A})}$ first letters of the information are known. With reference to the abovementioned previous paper, the following theorems are established: Theorem 1: Insofar as the coding of the system $\mathfrak{A}$ has the property of a finite delay it is necessary and sufficient that the graph $G(\mathfrak{A})$ contains no closed contours. $G(\mathfrak{A})$ are the sources with finite states that have been defined in the previous paper. Theorem 2: If the coding of system $\mathfrak{A}$ has the property of a finite delay, then $T_{(\mathfrak{A})} \leq \mathfrak{L}(n-m+1)$. If $\mathfrak{R}$ is the class of information, the decoding of which has not been possible in the beginning until all information has been obtained, then theorem 3 will be valid:

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S/020/61/139/003/007/025
B104/B201

Alphabetic coding.

$\mathfrak{Q} = L\{G(\mathcal{U})\}$. If $\mathcal{U}$ has not the property of a finite delay, theorem 4 will be valid: $\mathfrak{Q}^{\infty} = L^{\infty}\{G(\mathcal{U})\}$. Theorem 5: To prevent the system $\mathcal{U}$ from admitting a larger number of basic information with the property of an infinite delay, it is necessary and sufficient that the graph $G(\mathcal{U})$ contains no coupled pairs of contours which, on the transition from one to another, produce different words in $\mathcal{U}$. Theorem 6: A code exists that has not the properties of a prefix, and is not the inverse for such codes as satisfy the condition $\sum_{i=1}^{m} r^{-l(u_i)} = 1$, where r is the base of the alphabet $\mathcal{U}$.

There are 4 references: 1 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Issledovatel'skiy fiziko-tekhnicheskiy institut pri Gor'kovskom gosudarstvennom universitete im. N. I. Lobachevskogo (Research Institute of Physics and Technology, Gor'kovskom State University imeni N. I. Lobachevskiy

PRESENTED: August 11, 1960, by S. I. Berg, Academician

Card 3/4

MARKOV, Al.A. (Gor'kiy)

Nonrecurrent feedback. Probl.kib. no.8:169-186 '62.
(MIRA 16:4)

(Information theory)
(Feedback (Electronics))

MARKEY, Al.A. (Donald)

[illegible]
332 1/3.

L 15617-63 EWT(d)/FCC(w)/EDS AFFTC IJP(C)

ACCESSION NR: AP3004857 S/0141/63/006/003/0644/0646

52
51

AUTHOR: Markov, Al. A.

TITLE: Error-correcting codes

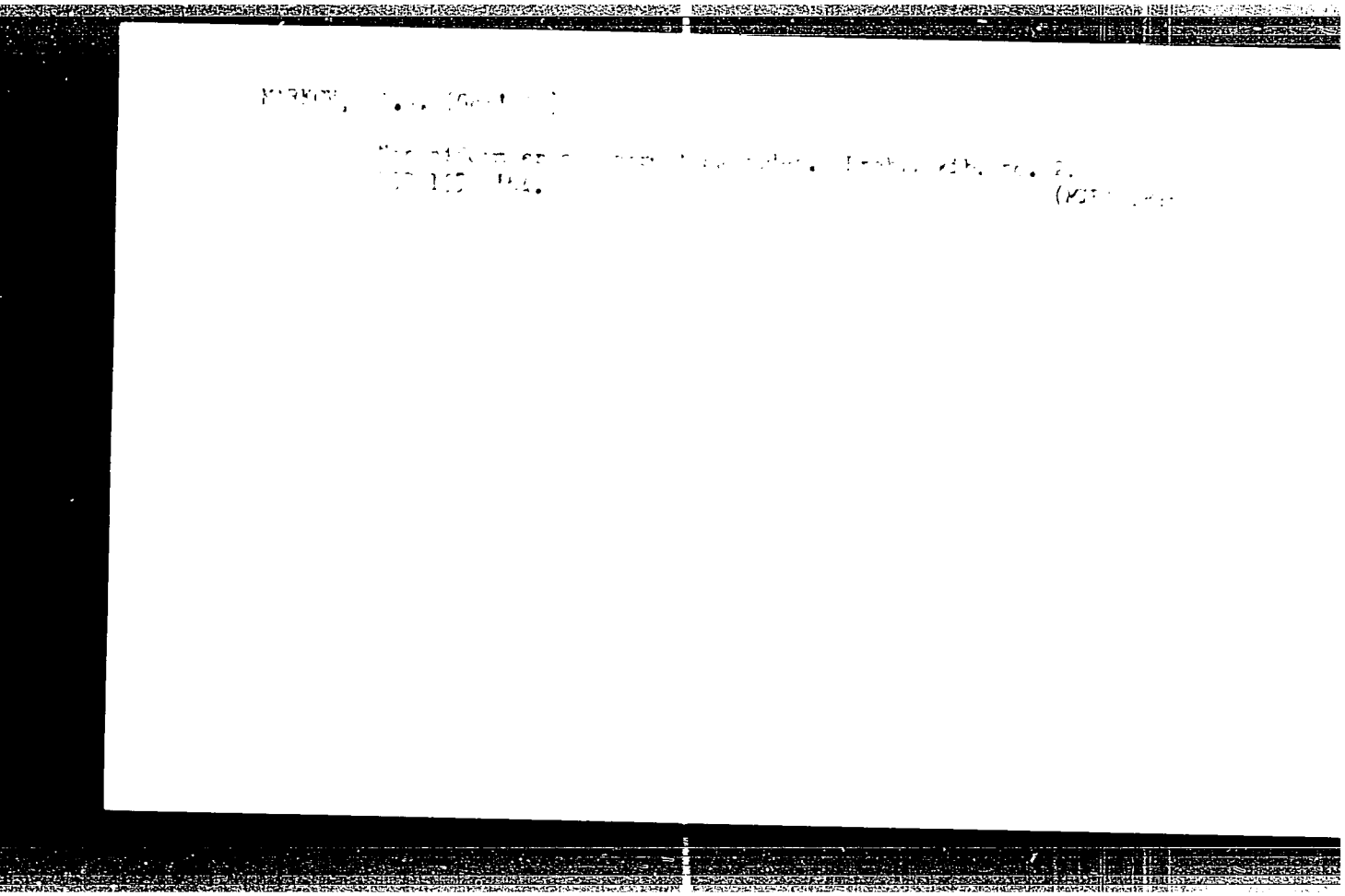
SOURCE: IVUZ. Radiofizika, v. 6, no. 3, 1963, 644-646

TOPIC TAGS: code, error-correcting code, nonuniform code

ABSTRACT: Some results are reported of an investigation of error-correcting nonuniform codes. Let words (communications) in an alphabet X be encoded as a different system of words in an alphabet U. In transmission, one or more letters in the X alphabet go wrong, and the decoder has to detect and correct the error. Conditions are investigated under which the U-word system permits the realization of a decoding in the form of a finite-determinate operator. Orig. art. has: 20 formulas.

Association: Scientific-Research Radiophysics Institute, Gor'kiy University

Card 1/2/



. .K.V, A. P.

Physical Nat re of the Different Zones of the Lunar Surf . .

report presented at the International Symposium on the moon, held at the Pulkovo Observatory, Leningrad, USSR, 2-9 Dec 1964.

SHVANOV, V.N.; MARKOV, A.B.

Graduation analysis of sandstone in thin sections. Izv. vys. ucheb. zav.; geol. i razv. 3 no.12:49-55 D '60. (MIRA 14:5)

1. Leningradskiy gosudarstvennyy universitet imeni A. A. Zhdanova.
(Sandstone--Analysis)
(Particle size determination)

SHVANOV, V.N.; MARKOV, A.B.

Correlation of the results of granulometric analyses of sand rocks in thin-sections, loose preparations, or by the use of the sieve method. Uch.zap. LGU no.310:68-80 '62. (MIRA 16:11)

[illegible], [illegible]Ya.; Mal'tsev, A.I.; [illegible]KSANOVA, E.M.

Investigating the method of chemical neutralization of poison gases during blasting operations conducted in Kuznetsk basin mines. Nauch. soob. VostNII no.3:57-64 '63. (MIRA 17:5)

[illegible]KOV, A. G.

30-13

Iz opyta [illegible] o vyvyedyeniyu novykh sortov [illegible]el'fini[illegible]ov.
Byulletyen' Glav. [illegible]n. sada. v[illegible]. [illegible] 1[illegible], s. [illegible]

[illegible]VSKIY, S. I. Za sovyetskiye sorta tsvyetochno-dyekorativnykh rastyeniy. Sr. [illegible]7

SO: LETOPIS' No. 34

BAZILEVSKAYA, N.A., prof.; OLISEVICH, G.P.; MARKOV, A.G.; RADISHCHEV, A.P.; NERONOVA, M.D., red.izd-va; SHLIKHT, A.A., tekhn.red.

[Outdoor perennial flowers; guide for the flower grower] Mnogoletnie tsvety otkrytogo grunta; spravochnik tsvetovoda. Pod obshchei red. N.A.Bazilevskoi. Moskva, Izd-vo M-va kommun. khoz.RSFSR, 1959. 438 p. (MIRA 15:5)
(Floriculture)

KRUTOV, Mikhail Illarionovich; MARKOV, A.G.; SAMODANOVA, Valentina Mikhaylovna; VYATKIN, S.V.; PESTRYAKOV, A.I., red.; GUREVICH, M.M., tekhn. red.

[Catalog of spate parts for the machinery used in the cultivation of sugar beets] Katalog zapasnykh chastei k mashinam po vozdelyvaniiu sakharnoi svekly. Moskva, Gos. izd-vo sel'khoz. lit-ry, 1959. 72 p. (MIRA 14:12)
(Sugar beets) (Agricultural machinery)

MARKOV, A.

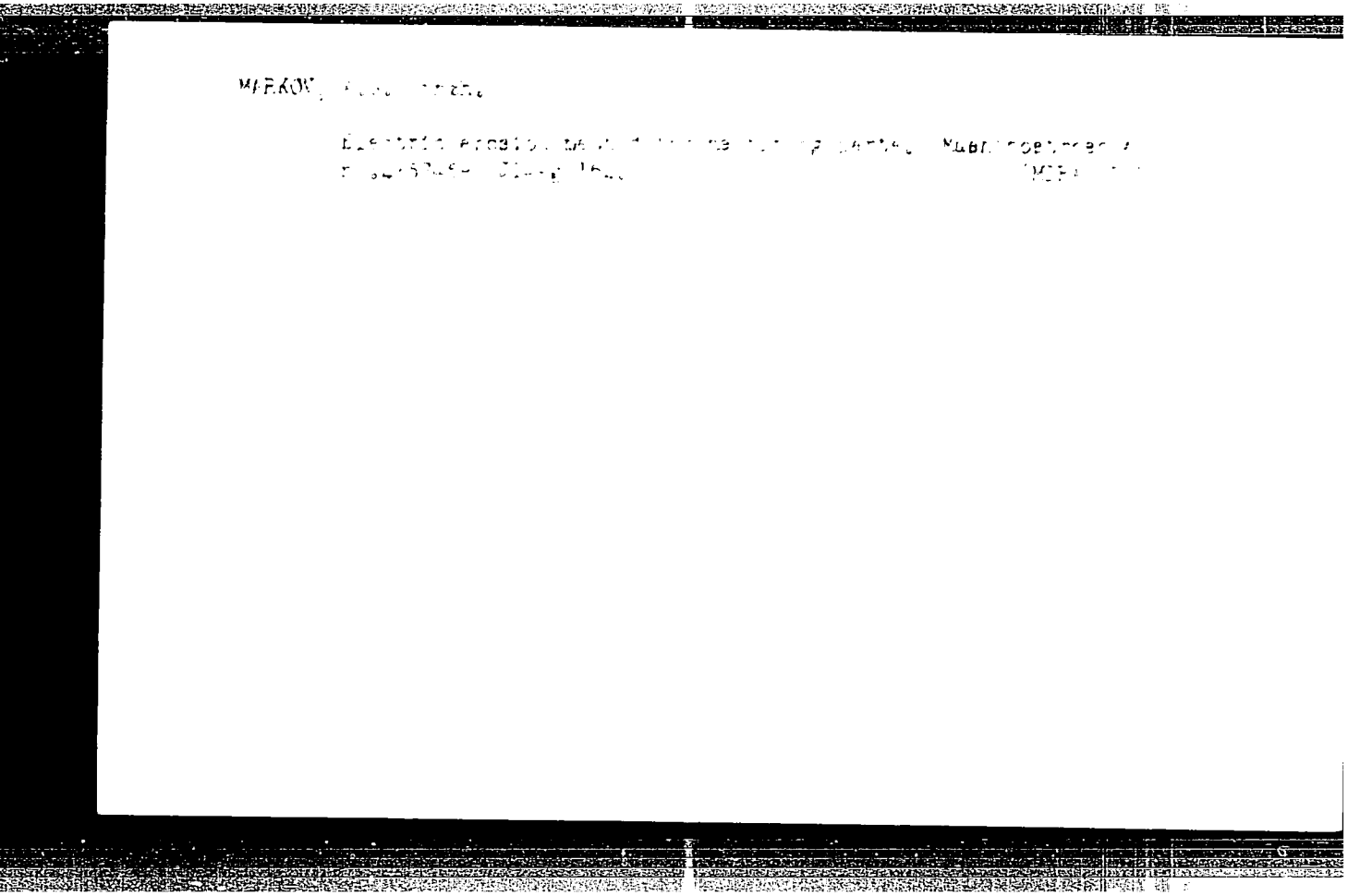
Machines remove the tops. Nauka i zhizn' 27 no.9:61 S '60.
(MIRA 13:9)
(Agricultural machinery)

LUK'YANOVA, N.D.; MARKOV, A.G.

Biactive electrodes. Vop.neirokhir. 22 no.6:51-53 N-D '58.
(MIRA 12:2)

1. TSentral'naya klinicheskaya psikhonevrologicheskaya i neyrokhirurgicheskaya bol'nitsa Ministerstva putey soobshcheniya.

(BRAIN, surgery,
bi-active electrodes (Rus))
(ELECTROCOAGULATION, appar. & instruments,
bi-active electrodes for brain surg. (Rus))



L 6638-65 EWT(d)/EWT(m)/EWP(k)/EWP(h)/EWP(q)/EWP(b) Pf-4 ASD(m)-3 JD
ACCESSION NR: AP4044282 S/0304/64/000/004/0057/0059

AUTHOR: Markov, A. G. (Engineer) 51 50

TITLE: Application of electroerosion treatment to parts

SOURCE: Mashinostroyeniye, no. 4, 1964, 57-59

TOPIC TAGS: electroerosion/ 4A722 electroerosion machine model, 473 electroerosion machine model, 4A722 ultrasonic machine model

ABSTRACT: Electroerosion on heavy duty electroimpulse machines 4A722 and 473 proved to be unsatisfactory due to the absence of a rotating spindle or table. This caused cylindrical surfaces to become oval. The difficulty was eliminated by adapting a table (see Fig. 1 on the Enclosure), the use of which reduced the ovaling effect and also the consumption of copper electrodes. As a test, 17 rough holes were produced in a die by using copper electrodes grouped in an adapter and guided by a special template. The initial penetration was accomplished to a depth of 6 mm from the smooth side of the die, using machine 4A722, solid copper electrodes, and a high-frequency lamp pulse generator (I_{sr} = 300 ma, f = 60 kcps). The die was then turned and the hole was again started from the other side. For the-

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final drilling and polishing of the hole an ultrasonic machine 4772 was used. A controlled diode in machine 4A722 increased the smoothness by 1.5 units. Recesses of complex shapes were produced in two operations by machine 473 with a pulse generator. This process was considerably faster than mechanical milling. It reduced production costs to two-fifths and machine time to one-fifth of that

reduced production costs to two-fifths and machine time to one-fifth of that required by the old method. Orig. art. has: 4 figures.

ASSOCIATION: Khar'kovskoy elektromekhanicheskoy zavod (Kharkov Electromechanical Plant)

SUBMITTED: 00 ENCL: 01

SUB CODE: IE NO REF SOV: 000 OTHER: 000

Card 2/3

L 6638-65
ACCESSION NR: AP4041282

ENCLOSURE: 01

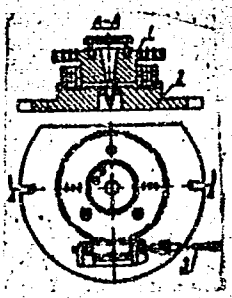

Fig. 1. Equipment with a rotating chuck:
1- gear table; 2- base; 3- drive shaft.

Card 3/3

MARKOV, A.I. (g. Polevskoy, Sverdlovskoy oblasti)

Experience in the organization of the proper feeding of children during the first months of life among women workers of the Severskiy metallurgical and the Polevskoy cryolite plants. Sov. zdrav. 19 no.6:42-44 '60. (MIRA 13:9)

1. Iz kafedry propedevtiki detskikh bolezney (zav. - dotsent T.E. Vogulkina) Sverdlovskogo meditsinskogo instituta.
(POLEVSKOY--INFANTS NUTRITION)

MARKOV, A.I.

Advanced training of physicians and feldshers at Polevskoy in Sverdlov Province. Zdrav. Ros. Feder. 5 no. 2:31-33 F '61. (MIRA 14:2)

1. Zaveduyushchiy Polevskim gorzdravotdelom.
(POLEVSKOY—MEDICINE—STUDY AND TEACHING)

MARKOV, A.I.; POGODA, A.S.

Console with "GS" supports for fixing the angle measuring instrument. Ugol' 37 no.5:47 My '62. (MIRA 15:6)

1. Shakhta "Proletarskaya-Glubokaya" tresta Makeyevugol'.
(Mine surveying—Equipment and supplies)

MARKOV, A.I., inzh.; BORISOVA, Ye.I., inzh.

Automatic measurement of cooking liquid level in a digester. Bum. prom. 36 no.7:19-20 Jl '61. (MIRA 14:9)

1. Priozerskiy tsellyuloznyy zavod.
(Woodpulp industry--Equipment and supplies)
(Liquid level indicators)

MARKOV, A. I.

FA 197T53

USSR/Engineering - Hydraulic Engineering, Equipment Apr 51

"Prevention of Cavitation Erosion in High-Power Propeller Pumps," A. I. Markov, Engr

"Gidrotekh Stroi" No 4, pp 17-19

Suggests application of plasticized wood for lining those portions of inner surface of runner chamber, which are affected by cavitation erosion. Describes several cases of protecting pumps this way with very satisfactory results. Operation of 1st machines with protective layers revealed possibility of repairing this layers

USSR/Engineering - Hydraulic Engineering, Equipment (Contd) Apr 51

without complete dismantlement of pump. Installation of protective layers of this type is considerably simpler and less expensive than those made of metal.

197T53

VORONIN, A. A.; MARKOV, A. I.

Influence of ultrasonic oscillations on the splintering process of refractory alloys. Metalurgia constr mas 13 no. 4: 359 Ap '61.

MARKOV, A. I.; KRIVOUKHOV, V. A.

"Bonding of Minerals- Ceramic and Carbide Tool Bits with Heat Resistant Glue," Stanki i Instrument, Vol 6, June 1952 pp 35-36.

Analysis B-85830, 26 May 55

ZAS:AVSLOU. Vo;' Izrail'yevich; KORSAKOV, Aleksandr Pavlovich; USvyatskiy, Yefim Abramovich; BRYANTSEVA, V.P., inzh., ved. red.; MARKOV, A.I., kand. tekhn. nauk, red.; PONOMAREV, V.A., tekhn. red.

[UZG-2 ultrasonic equipment for machining parts made of hard materials]Ul'trazvukovaia ustanovka UZG-2 dlia obrabotki detalei iz tverdykh materialov. Moskva, Filial Vses.in-ta nauchn. i tekhn.informatsii, 1958. 15 p. (Peredovoi nauchno-tekhnicheskii i proizvodstvennyi opyt. Tema 8. No.M-58-267/4) (MIRA 16:3)

(Ultrasonic metal cutting)

AUTHOR: Markov, A. I., Candidate of Technical Sciences

TITLE: Ultrasonic Machining of Hard Materials (Ul'trazvukovaya obrabotka tverdykh materialov)

PERIODICAL: Mashinostroitel', 1960, Nr 10, pp 10 - 12 (USSR)

ABSTRACT: Recent investigations showed that the ultrasonic method permits a considerable expansion of the technical possibilities of machining parts made of materials such as glass, ceramic, hard alloys, chilled steel, germanium, silicon, ferrite, diamond and others. The article presents the author's, Soviet and foreign data (table 1) and explains the process of ultrasonic machining of hard materials. There are 2 diagrams, 1 table and 6 references, 5 of which are Soviet.

Materials Machining 2. Ultrasonic radiation--Applications

Card 1/1

MARKOV, A.I., kand. tekhn. nauk, dots.

Technological problems in dimensional ultrasonic machining of hard materials. Izv. vys. ucheb. zav.; mashinostr. no.11/12: 191-197 '58. (MIRA 13:3)

1.Moskovskiy aviatsionnyy institut.
(Ultrasonic waves—Industrial applications)

SOV/122-58-12-16/32

AUTHOR: Markov, A.I., Candidate of Technical Sciences, Docent

TITLE: A New Method of Increasing the Output of Ultrasonic Machining (Novyy metod povysheniya proizvoditel'nosti ul'trazvukovoy obrabotki)

PERIODICAL: Vestnik Mashinostroyeniya, 1958, Nr 12, pp 46-47 (USSR)

ABSTRACT: The effectiveness of combined ultrasonic erosion and anodic solution etching is described. Ultrasonic erosion machining is most effective with brittle materials. Tough materials such as hardened steel or heat-resisting alloys can only be cut slowly (0.03 - 0.06 mm/min) by normal ultrasonic erosion, and the rate of wear of tools is high when cutting these materials. According to Ya.B. Fridman, tough materials are disrupted by tangential stresses and brittle materials by stresses normal to the surface. The action of ultrasonic erosion produces the latter type of stresses which are characteristic for brittle fracture. Anodic etching produces a brittle oxide film on the surface of the metal which is more easily removed by the abrasive ultrasonic erosion. As the surface is continually removed, the anodic passivation or etch can continue so long as current is supplied. A diagram is

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A New Method of Increasing the Output of Ultrasonic Machining

given which shows the basic electrical circuit for the combined process. Direct current at 6 to 18 volts is applied. The part being machined is connected to positive and the cutting tool to negative. A 20 to 40% solution of common salt is used as electrolite. The abrasive cutting powder is suspended in this electrolite solution. Comparitive machining rates for normal ultrasonic process and for the combined process are shown in the Table. Frequency and amplitude produced in the magnetostrictive generator were the same for both methods. The combined process gave 2½ to 3 times the cutting rate and a quarter to half the tool wear with the normal process. With anodizing current density 30 amps/cm^2, hardened steel was cut at 0.3 mm/min and heat resisting alloy at 0.08-0.25 mm/min, according to the type of alloy, and hard alloy at 0.2 mm/min. With current density 7.5 amp/cm^2, hard alloy was cut at 1 to 1.6 mm/min. An experiment was made in which the combined process was operated without abrasive powder in the electrolite. Very little cutting effect was obtained; this tends to disprove the hypothesis that

SOV/122-58-12-16/32

A New Method of Increasing the Output of Ultrasonic Machining

brittle surfaces can be disrupted by cavitation effects alone. Anodic surface embrittlement does, however, render the surface of hard or heat-resistant alloys more susceptible to erosion by abrasive particles in ultrasonic machining processes.

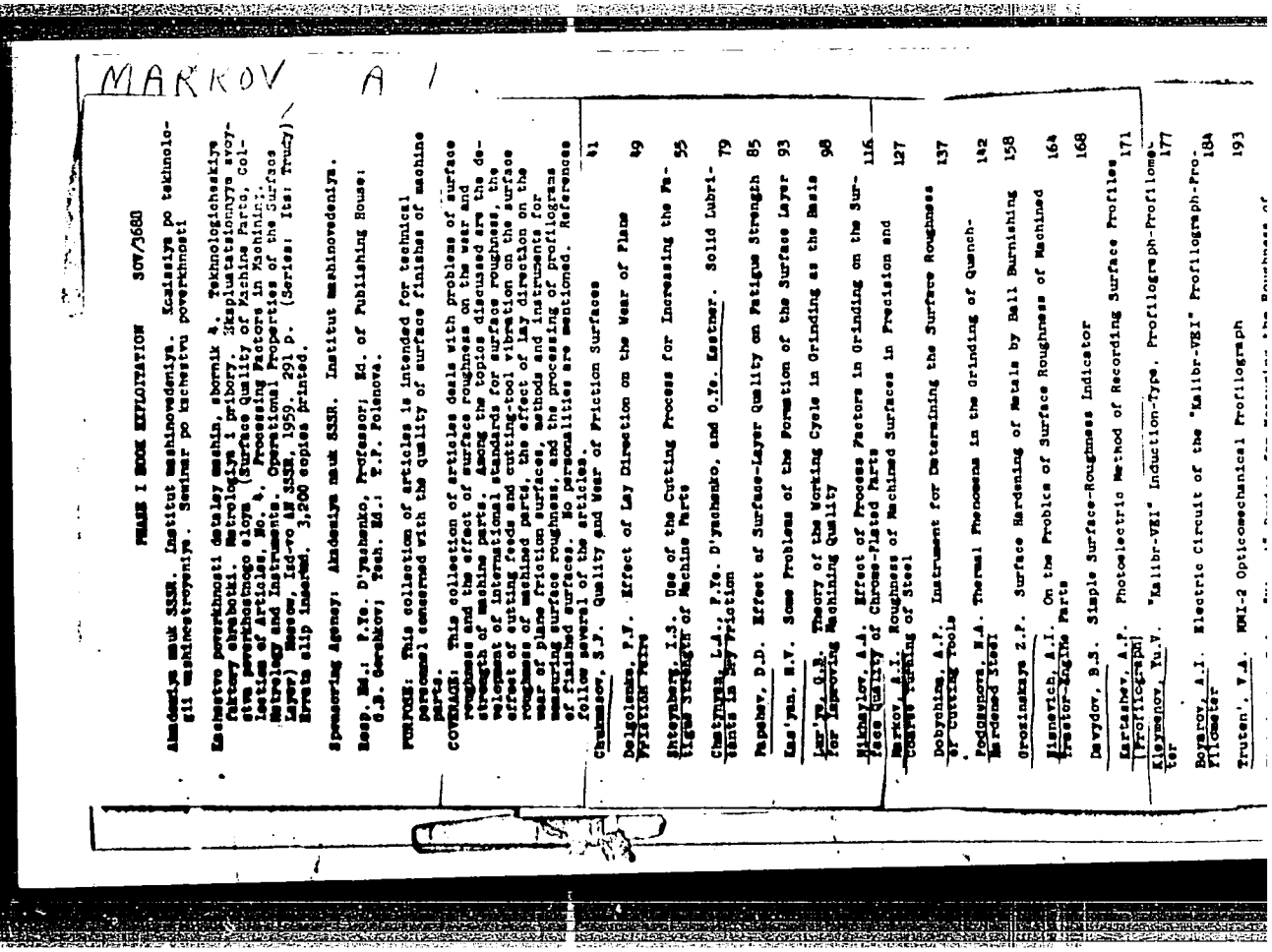
There are: 1 diagram, 1 table, and 6 references (all Soviet)

Card 3/3

KRIVOUKHOV, V.A.; MARKOV, A.I.

Investigating the characteristics of high-pressure cooling systems in cutting heat-resistant alloys. Stan.i instr. 29 no.6:14-15 Je '58. (MIRA 11:7)

(Metal cutting--Cooling)



MARKOV A I

PHASE I BOOK EXPLOITATION SOV/3680

Akademiya nauk SSSR. Institut mashinovedeniya. Kachestvo po tekhnologii mashinostroyeniya. Seminar po tekhnestvu powerkhnosti

Kachestvo poverkhnosti detaley mashin, sbornik 4. Tekhnologicheskiye faktory chistoty. Metrologiya i pribory. Ekspluatatsionnyye svoystva poverkhnostnogo sloya (Surface Quality of Machine Parts, Collection of Articles, No. 4, Processing Factors in Machining; Metrology and Instruments. Operational Properties of the Surface Layer) Moscow, Izd-vo AN SSSR, 1959. 291 p. (Series: Its: Trudy) Errata slip inserted. 3,200 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut mashinovedeniya.

Resp. Ed.: P.Ye. D'yachenko, Professor; Ed. of Publishing House: O.S. Gershkov; Tech. Ed.: T.P. Polenova.

PURPOSE: This collection of articles is intended for technical personnel concerned with the quality of surface finishes of machine parts.

COVERAGE: This collection of articles deals with problems of surface roughness and the effect of surface roughness on the wear and strength of machine parts. Among the topics discussed are the development of international standards for surface roughness, the effect of cutting feeds and cutting-tool vibration on the surface roughness of machined parts, the effect of lay direction on the wear of plane friction surfaces, methods and instruments for measuring surface roughness, and the processing of profilograms of finished surfaces. No personalities are mentioned. References follow several of the articles.

MARKOV A. I.

PHASE I BOOK EXPLOITATION SOV/3528

Moscow. Dom nauchno-tekhnicheskoy propagandy

Primeneniye ul'trazvuka v promyshlennosti; sbornik statey (Industrial Use of Ultrasound; Collection of Articles) Moscow, Mashgiz, 1959. 301 p. 8,000 copies printed.

Sponsoring Agency: Obshchestvo po rasprostraneniyu politicheskikh i nauchnykh znaniy RSFSR.

Ed. (Title page): V.F. Nozdrev, Doctor of Physical and Mathematical Sciences, Professor; Ed. (Inside book): O.P. Kochetova, Engineer; Tech. Ed.: V.D. El'kind; Managing Ed. for Literature on Machinery and Instrument Manufacturing (Mashgiz): N.V. Pokrovskiy, Engineer.

PURPOSE: This book is intended for engineers and technicians engaged in the application of ultrasonics in machinery manufacture and in other branches of industry.

COVERAGE: This is a collection of papers read at the first all-Union conference on the use of ultrasonics in industry. Attention is focused mainly on the description of ultrasonic equipment and on the use of ultrasound for the machining of hard materials and for flaw detection. The effect of ultrasound on metal-crystallization processes is also discussed. No personalities are mentioned. References accompany many of the papers.

MARKOV, A.I.

Smoothness of a steel surface machined with heavy feed on a fine turning lathe. Trudy Sem.po mach.poverkh. no.4:127-136 '59.
(MIRA 13:6)

(Surfaces (Technology))
(Turning)

69881

25.1000
24.1800

S/121/59/000/10/001/005

AUTHOR: Markov, A.I.

TITLE: The Kinematics of Dimensional Ultrasonic Machining

PERIODICAL: Stanki i Instrument, 1959, No 10, pp 15 - 18

TEXT: There are two kinds of ultrasonic machining: 1) machining with freely directed abrasives; 2) dimensional ultrasonic machining with abrasives, the grains of which receive energy from a special tool. Reference 1 gives a detailed description of the first-mentioned method. The author points out that dimensional ultrasonic machining ensures considerably greater possibilities in the manufacture of machine parts made of hard materials. The principal scheme of this kind of ultrasonic machining is shown in Figure 1. The tool oscillates with ultrasonic frequency ($f = 16 \div 30$ kc) and small amplitudes ($A = 0.01 \div 0.06$ mm). At present, mainly longitudinal oscillations of the tool are applied, although also other types of oscillations may be used (transverse, torsional), of which Ref 2 gives some details. The investigations carried out lately by the ENIMS [Ref 6], the Institute of Acoustics of the AS USSR and abroad [Ref 3] show that the tool plays the part of a hammer periodi-

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The Kinematics of Dimensional Ultrasonic Machining

cally hitting the abrasive grains and pricking out particles from the machined material, while cavitation phenomena play only an auxiliary rôle. Therefore, the wide-spread cavitation hypotheses have to be considered as unfounded. The author states that with dimensional ultrasonic machining, two motions have to be distinguished: the principal one is the longitudinal oscillation of the tool with ultrasonic frequency, imparting energy to the abrasive grains, while the feed motion has to be considered as auxiliary. The speed of the principal motion is determined by the formula: $v = \frac{4 f A}{1,000}$ m/sec.

The feed motion with ultrasonic machining can be of different character: longitudinal s_{long}, transverse s_{trans}, and circular s_{circ} (rotation of machine part or tool). Figure 2 shows the different machining operations which can be carried out by the dimensional ultrasonic method. The author states that, hitherto, ultrasonic planing and grinding have not been sufficiently studied. Also for threading operations ultrasonic machining has been employed only to a small extent, although this field of application ensures a high operating efficiency. In order to ensure the necessary continuity of the machining

The Kinematics of Dimensional Ultrasonic Machining

process, the two motions - the principal one and the feed motion - have to be coordinated in the same way as it is the case with ordinary metal cutting machine tools. This is achieved by creating between tool and blank a definite static pressure, the magnitude of which, as it is proved by the tests, depends mainly on the cross-section area of the tool and the properties of the material to be machined. Tests carried out by the author with dimensional ultrasonic machining of apertures as well as an analysis of numerous foreign investigations show that a relation exists between the magnitude of longitudinal feed s_{long} and the speed of principal motion v; an increase of the latter results in the growth of s_{long}. Figure 3 shows the function of themagnitude of longitudinal speed depending on the speed of principal motion, plotted as a result of a treatment of foreign test data [Ref 7]. As it can be seen from the Figures 3 and 4, the magnitude of longitudinal feed s_{long} is nearly directly proportional to the speed of principal motion v. The efficiency of ultrasonic machine tools is generally evaluated by two magnitudes: the magnitude of longitudinal feed s_{long} per minute (for a constant cross-section area of tool s_t) and the magnitude of metal volume removal per minute V, whic

The Kinematics of Dimensional Ultrasonic Machining

is often called rate of removal, $V = s_{long} s_t mm^3/min$. The author enumerates several deficiencies the ultrasonic method still possesses in spite of its great advantages: 1) A comparatively small machining area in producing apertures. The maximum possible machining area of the existing ultrasonic machine tools amounts to from 750 to 2,000 mm^2 in one operation. This can be increased by improving the layout of ultrasonic machining, the construction of vibrators and by developing new inexpensive magnetostrictive materials. 2) The machining depth of the ultrasonic method is not sufficient (not more than 25 - 40 mm at present). This can be improved by applying special methods of feeding the abrasive suspension to the working area and by reducing the effect of side removal. 3) The high power consumption of the ultrasonic process which can be expressed by the ratio of power consumed to the average volume removal of machined material. 4) The low efficiency and considerable wear of tool during the machining of hard-alloy parts or machine parts of hardened steel. In order to increase the efficiency of ultrasonic machining the author suggests to apply to a greater extent combined machining methods, i.e. ultrasonic,

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The Kinematics of Dimensional Ultrasonic Machining

electro-erosion and electrochemical processes, and points out that in the USSR and abroad positive results were obtained by such combinations [Refs 8 and 9].
Four graphs, 10 references, 5 of which are English, 3 Soviet, 1 German and 1 American.

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MARKOV, A.I., kand. tekhn. nauk; KATSMAN, A.B., red.; YAZLOVSKAYA, E.Sh., tekhn. red.

[Ultrasonic dimensional machining of hard and brittle materials] Razmernaia ul'trazvukovaia obrabotka tverdykh i khrupkikh materialov. Moskva, Vses. in-t nauchn. i tekhn. informatsii, 1960. 40 p. (MIRA 15:5)
(Ultrasonic metal cutting) (Grinding and polishing)

86163

S/121/60/000/011/007/013
A004/A001

1 5100

AUTHOR: Voronin, A. A., Markov, A. I.

TITLE: Effects of Ultrasonic Vibrations on Machining of Heat-Resistant Alloys

PERIODICAL: Stanki i Instrument, 1960, No. 11, pp. 15-17

TEXT: Investigations have been carried out to study the effect of ultrasonic vibrations on turning and surface grinding of heat-resistant alloys. Since the surface finish and tool life depend to a great extent on the contact-surface interaction of the cutting part of the tool and the material being machined, high sonic or ultrasonic vibrations of small amplitude are able to affect this interaction, while they do not show any effects

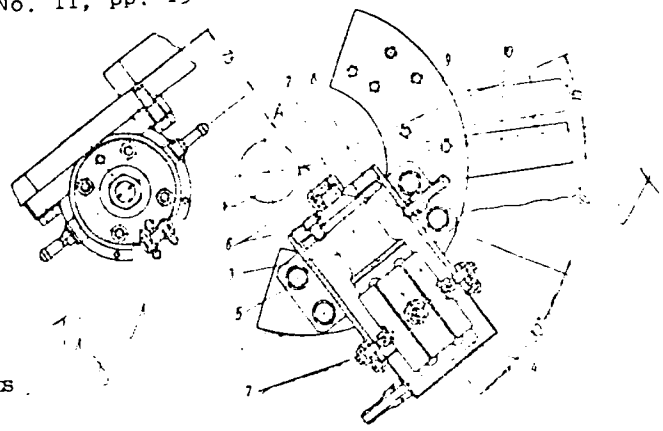

Figure 1:

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S/121/60/000/011/007/013
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Effects of Ultrasonic Vibrations on Machining of Heat-Resistant Alloys

on the dimensions and shape of the workpiece being tooled. Figure 1 shows the magnetostriction vibration head producing radial-tangential vibrations of the tool. Tool 1 by nut 2 is tightened to concentrator 3. The vibration system composed of block 4, concentrator 3 and tool 1 is fastened to body 8 by screws 6 and 7. The tool top is located in the zone near the translation antinode of the concentrator. With the aid of a flange, body 8 is screwed to connection plate 9 welded on to strip 10 which is clamped into the tool post of the machine tool. The vibration head can take four different positions on connection plate 9 which makes it possible to change the direction of ultrasonic vibrations in the radial-tangential direction. The [illegible]-5 (GUZ-5P) generator was used as the source of electric vibrations. Its maximum output power amounts to some 3.5 kw, while its frequency range is between 13 and 30 kc. The grinding tests established the effects of ultrasonic vibrations on the surface finish, quality of surface layer and grinding disk wear. Figure 3 shows the dependence of the rms-height of microroughness H_{rms} on the depth of cut t during the surface grinding of the heat-resistant steel grades [illegible] (EI437B) and [illegible]6 (ZhS6) with and without vibrations. Vibration frequency was 21 kc, double amplitude of vibration [illegible] = 0.015 ÷ 0.018 mm. Grinding was carried out by a [illegible] (EB60.[illegible]) grinding

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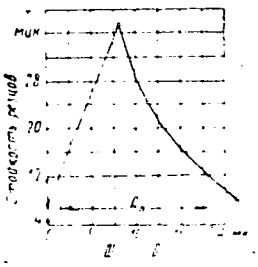
disk with cooling by a 5%-emulsion at the following grinding conditions: v_d = 21 ÷ 25 m/sec, s_{long} = 4.6 m/min, s_{trans} = 5 mm/double motion. As a result of the tests it was found that the use of high sonic or ultrasonic vibrations of small amplitude (double amplitude, 10-15) greatly improves the surface finish - surface roughness decreases by 1.5 - 2 times -, and also reduces the cutting forces and temperature. However, the grinding disk wear increases by approximately 1.5 times. In turning of heat-resistant alloys the effects of ultrasonic vibrations on the tool life, deformation of the layer being cut and finish of the machined surface were studied. Figure 4 shows the depencence of the tool life (P18 - R18 - grade steel) on the amplitude of ultrasonic vibrations of radial direction of 22 kc frequency. Heat-resistant EI437B alloy was machined under the following conditions: v = 10 m/min, s = 0.2 mm/rev, t = 0.5 mm, blunting criterion h_d = 0.6 mm. Figure 5 shows an analogous dependence obtained with radial-tangential vibrations of a R18 tool. Vibration amplitude in radial direction A_r = 0.97 A, in tangential direction A_t = 0.26 A, where A is the

Figure 4:



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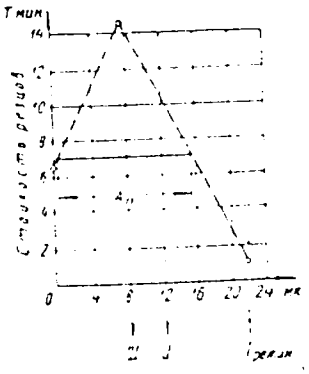
Effects of Ultrasonic Vibrations on Machining of Heat-Resistant Alloys

magnitude of the vibration amplitude of the tool top. The heat-treated EI437B alloy was machined at v = 12 m/min, s = 0.2 mm/rev, t = 0.5 mm. A_n in figures 4 and 5 marks the range of double amplitudes of tool vibrations which has a positive effect. Condition I means ultrasonic vibrations of great intensity (maximum output power of generator about 3.5 kw), condition II = vibrations of medium intensity (at a medium output power of about 2 kw) and condition III = vibrations of low intensity (at a minimum output power of the generator of about 1 kw). As a result of the tests carried out it was found, that the application of radial-tangential ultrasonic vibrations to high-speed cutting tools increase their wear resistance by three times or more, while showing a de decrease in the wear resistance of sintered carbide tools (in this case the VK8 (VK8) grade sintered carbide was tested). However, ultrasonic vibration turning practically does not affect the surface finish of the machined workpiece. Table 2 presents data on the surface finish of EI437B specimens machined with and without transverse ultra-

Figure 5:



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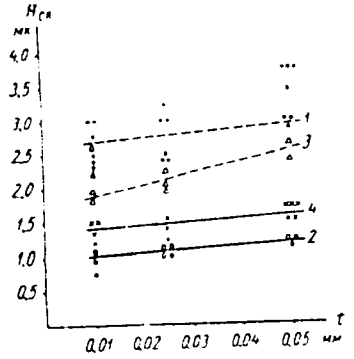
Effects of Ultrasonic Vibrations on Machining of Heat-Resistant Alloys

sonic vibrations at v = 8 m/min, t = 0.5 mm, s = 0.2 - 0.6 mm/rev with cooling. As the investigation results show, increased or lowered tool wear resistance depends also on the intensity of the ultrasonic vibrations.

Figure 3. The dependence of H_{rms} on t, grinding the EI437B alloy: 1 - without ultrasonics, 2 - with ultrasonics; grinding the ZhS6 alloy: 3 - without ultrasonics, 4 - with ultrasonics.



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A004/A001

Effects of Ultrasonic Vibrations on Machining of Heat-Resistant Alloys

Table 2:

Operation Conditions	Feed in mm/rev								
	0.2			0.4			0.6		
	Conditions								
	I	II	-	I	II	-	I	II	-
	H_{av} in								
Without Ultrasonic Vibration	-	-	14.0	-	-	10.6	-	-	[illegible]
With Ultrasonic Vibration	16.7	16.1	-	10.1	-	-	20.1	-	-

There are 6 figures, 2 tables and 2 references: 1 Soviet and 1 [illegible].

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S/194/62/000/010/049/084
A061/A126

AUTHOR: Markov, A.I.

TITLE: Effect of ultrasonic vibrations on the process of cutting heat-resisting alloys

PERIODICAL: Referativnyy zhurnal, Avtomatika i radioelektronika, no. 10, 1962, 22, abstract 10-5-44t (In collection: Prom. primeneniye ul'trazvuka. Kuybyshevsk. aviats. in-t, Kuybyshev, 1961, 84 - 96)

TEXT: This is a brief account of studies made on the use of ultrasound for improving the efficiency of common processes in cutting materials of poor workability, heat-resisting alloys in particular. The action of forced ultrasonic vibrations was studied in two operations: grinding heat-resisting alloys and sharpening high-speed and hard-alloy cutters. The source of ultrasonic vibrations was provided by magnetostriction vibrators and a ГУЗ -5П (GUZ-5P) generator. The frequency range was 13 - 30 kc, and the maximum output power was ~ 3.5 kw. The action of forced ultrasonic vibrations on the grinding process was found to be of a complex character, and both a positive and a negative effect could be

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Effect of ultrasonic vibrations on the process of .... S/194/62/[illegible] A061/A126

obtained depending on the intensity of the vibrations. The [illegible] for the vibrational process while grinding a heat-resisting alloy ensured [illegible] stability increase of high-speed cutters by 4 to 10 times. A significant [illegible] was established in all cases where h-f vibrations of small amplitude were applied in sharpening cutting tools. The stability of cutters made from steel R18 (R1[illegible] and hard alloy BK8 (VK8) was improved by 3 to 8 times in this connection.

[Abstracter's note: Complete translation] K[illegible]

Card 2/2

МАРКОВ, А.И.

PHASE I BOOK EXPLOITATION SOV/5788

Krivoukhov, V A , S V Yegorov, B. Ye Brushteyn, A. I. Markov, A. G. Chervyakov, P. D. Bespakhotnyy, A. I. Belousov, and A D Chubarov

Obrabatyvayemost' rezaniyem zharoprochnykh i titanovykh splavov (Machinability of Heat-Resistant and Titanium Alloys) Moscow, Mashgiz, 1961 243 p. Errata slip inserted 4500 copies printed

Ed. (Title page): V. A Krivoukhov; Reviewer: A. M Karatygin, Candidate of Technical Sciences; Ed. of Publishing House: N. A. Ivanova; Tech. Ed.: A. F. Uvarova; Managing Ed. for Literature on Cold Working of Metals and Machine-Tool Making: V. V. Rzhavinskiy, Engineer

PURPOSE. This book is intended for technical personnel concerned with the machining of metals It may also be useful to students at schools of higher education.

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COVERAGE: sic conditions for improving the machinability of heat-resistant and titanium alloys are examined. Results of investigations on the effect of various factors (e g , tool geometry, single-point tool wear, cutting regimes, lubricating coolants, heat treatment) on the machinability of alloys are presented. Recommendations are given for the selection of rational cutting regimes, effective lubricating coolants, and preliminary heat treatment. No personalities are mentioned There are 91 references: 61 Soviet, and 30 English.

TABLE OF CONTENTS [Abridged]:

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A207/A101

1100

AUTHORS: Voronin, A. A., Markov, A. I., Sherbakov, M. A.

TITLE: Ultrasonic vibrations in grinding cutting tools

PERIODICAL: Stanki i Instrument, Mashgiz, no. 2, 1961, 14 - 16

TEXT: Previous investigations of the authors (Ref. 1) have shown that excitation of low-amplitude high-frequency vibrations in flat grinding of heat-resistant alloys and tool steels improves considerably the quality of the surface. Further experiments were conducted to investigate the effect of forced ultrasonic vibrations in grinding on the wear-resistance of the cutting tools. High-speed R 18 (R-18) steel and BK 8 (VK8) sintered carbide plates were studied. The vibration parameters were: frequency, 22 kc, and double amplitude, 0.01 - 0.015 mm. The wear resistance was evaluated on a continuously turning heat-resistant alloy. The experiments showed that, in all cases, grinding with ultrasonic vibrations considerably improved the wear-resistance of the cutting tools. For the R18 steel cutters the greatest improvement was observed in the range of higher cutting speeds. Test data showed that the wear-resistance of the VK8 cutters (92% tungsten carbide, 8% cobalt) ground with ultrasonic vibrations was more than twice that of conventionally

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Ultrasonic vibrations in grinding cutting tools

ground cutters. The НЭЛ -IV (NEL-IV) type magnetostrictional vibrator-nickel block was used as the source of mechanical vibrations. The vibrational head was power supplied from a ГУЗ -5П (GUZ-5P) ultrasonic generator, with a maximum output power of about 3.5 kw. The ЭБ 60СМИК (EB60SMIK) sphere was used for the grinding of the fast-cutting plates, and the КЧ 60СМИК- (KCh60SMIK) sphere-for the sintered carbide plate. The cutting tool resistance in both cases was determined by taking the usual blunting criterion - the magnitude of wear along the back edge equal to h = 0.6 mm. Figure 5 shows the relationship between the cutting speed and the resistance for the R18 tools ground with and without vibrations. The following v-T relationships could be derived from these graphs: 1) when working with tools ground with ultrasonic vibrations: $v = \frac{15.3}{T^{0.16}}$ m/min; 2) when grinding with tools which are ground without vibrations: $v = \frac{9.7}{T^{0.06}}$ m/min(T - service time). The results of comparative experiments of the tool resistance with VK8 plates ground with and without vibrations is given by the table: the data show that the resistance of the cutters ground at ultrasonic vibrations exceeds those ground without vibrations by a factor of two. It is pointed out that an even greater effect can be expected when grinding the tools with cooling. The authors derive the following conclusions from experimental data: 1)

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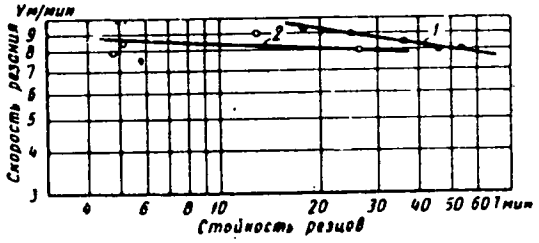
Ultrasonic vibrations in grinding cutting tools

It is expedient to grind the cutting tools made of various materials under conditions of relative vibrations (the tool-material system), of high or ultrasonic frequency and low amplitude (2A ≤ 0.01 ÷ 0.015 mm). The experiments showed that the tool resistance increases considerably in the latter case. 2) The experiments indicated further that at the present time, it is worth to develop experimental constructions of the simplest vibrating systems for grinding the cutting tools using relative vibrations of the gridning circle-blank system. There are 6 figures 1 table, 1 Soviet-bloc reference.

Figure 5:
1 - grinding using ultrasonic vibrations, 2 - grinding without vibrations



cutting speed

tool resistance

Card 3/4

PHASE I BOOK EXPLOITATION SOV/6042

Markov, Aleksey Ivanovich, Candidate of Technical Sciences, Docent

Rezaniye trudnoobrabatyvayemykh materialov pri pomoshchi ul'trazvukovykh i zvukovykh kolebaniy (Cutting of Hard-to-Machine Materials by Means of Ultrasonic and Sonic Vibrations) Moscow, Mashgiz, 1962. 330 p. Errata slip inserted. 8000 copies printed.

Reviewer: B. N. Mezhuyev, Candidate of Technical Sciences, Docent. Ed. of Publishing House: A. F. Balandin; Tech. Ed.: T. F. Sokolova; Managing Ed. for Literature on the Cold Working of Metals and Machine-Tool Making: V. V. Rzhavinskiy, Engineer.

PURPOSE: This book is intended for engineering personnel concerned with problems of the machining of hard-to-machine materials. It may also be used by students at schools of higher technical education who are specializing in the application of ultrasonic acoustics.

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Cutting of Hard-to-Machine Materials (Cont.) SOV 6042

COVERAGE: The book reviews the most important problems in the application of ultrasonic and sonic vibrations to the cutting of hard-to-machine materials. Considerable attention is given to the analysis and explanation of the dependence of technological characteristics of ultrasonic machining upon various factors. Basic data for the calculation and design of magnetostrictive acoustic heads are presented along with a description of modern types of universal and special ultrasonic machine tools developed in the Soviet Union and non-Soviet countries. Problems connected with sonic and ultrasonic vibrations applied to intensify the widely used processes for the cutting of hard-to-machine materials are discussed. No personalities are mentioned. There are 242 references, mostly Soviet.

TABLE OF CONTENTS:

Card 2/6

MARKOV, A.I., kand.tekhn.nauk

Use of ultrasonic techniques in the machinery industry [illegible] capitalist countries. Biul.tekn.-ekon.inform.Gos nauch. [illegible] inst.nauch.i tekh.inform. no.3:88-92 '62. (MIRA [illegible]
(Ultrasonic waves—Industrial applications)

L 13611-63 BDS/EWT(d)/EWT(m) WHM

ACCESSION NR: AP3002496 S/0193/63/000/005/0076/0079

AUTHOR: Markov, A. I. (Candidate of Technical Sciences) 52 51

TITLE: Application of ultrasonics to machine building in the People's Republics 14

SOURCE: Byulleten' tekhniko-ekonomicheskoy informatsii, no. 5, 1963, 76-79

TOPIC TAGS: ultrasonics, defectoscope, ultrasonic equipment, low energy oscillation, high energy oscillation

ABSTRACT: Industrial application of ultrasonics is widespread in the People's Republics. Low energy oscillations are used to measure, control, signal, find defects, and automate production. High energy oscillations are used to clean machine parts, weld metals and plastics, machine hard brittle materials, solder aluminum and its alloys, and emulsify and disperse substances. Defectoscopes (descriptions of models are given) are being mass produced in East Germany, Czechoslovakia, China, Bulgaria, and Poland. Ultrasonic equipment for washing ball bearings is manufactured in Czechoslovakia and ultrasonic generators and magnetostrictive transformers are produced in the

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L 13611-63

ACCESSION NR: AP3002496

Shanghai Institute of Electrical Instruments. In some of the Nanking plants, electron tube cathodes are cleaned exclusively by the ultrasonic method. In most of the Republics hard brittle materials are machined ultrasonically. Ultrasonic experiments to change the structure and mechanical properties of steel, to improve the quality of medicinal substances, to sterilize water, and for many other purposes are being conducted in the research institutes and plants of the People's Republics. Orig. art. has: None.

ASSOCIATION: None.

SUBMITTED: 00 DATE ACQ: 12Jul63 ENCL: 00

SUB CODE: SD, PH NO REF SOV: 001 OTHER: 010

Card 2/2

ACCESSION NR: AR4027698 S/0276/64/000/002/B008/B008

SOURCE: RZh. Tekhnologiya mashinostroyeniya, Abs. 2B30

AUTHOR: Markov, A. I.

TITLE: Mechanical treatment of materials with an electron beam and light beam (laser)

CITED SORCE: Byul. tekhn.-ekon. inform. Gos. Kom-t Sov. Min. RSFSR po koordinatsii nauchno-issled. rabot, no. 8, 1963, 88-92

TOPIC TAGS: precision treatment, electron beam, laser, heating, melting, evaporation, vacuum chamber, kinetic energy, pulse regime, quantum light generator

TRANSLATION: The article briefly describes two methods of precision treatment of a material similar in their thermal action on the materials (heating, melting and evaporation of materials). The electron-beam treatment is based on utilization of the ability of an electron beam focused and accelerated in a vacuum chamber to convert its kinetic energy into thermal under pulsed conditions

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Card

ACCESSION NR: AR4027698

(pulse length of 10^{-4} -- 10^{-6} sec, frequency of 50 -- 5,000 cycles, temperature in working zone of 6,100C). Treatment with a laser is based on exploitation of the internal energy of the atoms and molecules of certain substances and on the use of quantum light generators. Lasers also operate under a pulsed regime (pulse length of 0.2^{-6} -- 50^{-6} sec, frequency of 0.1--5 cycles, energy concentration in beam of 0.01--0.001 mm, diameter of 10--30 joules, which heats the material to many thousands of degrees). One illustration, 1 table, bibliography of 9 titles. L. Tsukerman.

DATE ACQ: 24Mar64 SUB CODE: GE ENCL: 00

Card 2/2

L 7991-66 EWT(d)/EWT(m)/EWP(v)/EWP(t)/EWP(k)/EWP(h)/EWP(b)/EWP(l)/ETC(m)
ACC NR: AP5026558 JD/WW/EM SOURCE CODE: UR/0286/65/000/019/0113/0113

AUTHOR: Markov, A. I.

ORG: none

TITLE: A method for damping harmful vibrations originating in an oscillating system (machine-fixture-tool-detail) during cutting of hard to work materials. Class 47, No. 175356

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 19, 1965, 113

TOPIC TAGS: vibration, vibration damping, ultrasonic vibration

ABSTRACT: This Author Certificate presents a method for damping harmful vibrations originating in an oscillating system (machine-fixture-tool-detail) during cutting of hard-to-work materials. To broaden the range of the damped vibrations, high frequency or ultrasonic vibrations are imparted to one of the units in the oscillating system. These vibrations are of a low amplitude, on the order of a few microns, and proceed in the direction of the main motion with a frequency neither equal to the frequency of vibrations nor to its multiple.

SUB CODE: IE/ SUBM DATE: 13Feb64

Card 1/1 nw UDC: 621.034.4-8

ACC NR: AP6033650 SOURCE CODE: UR/0145/66/000/008/0107/0111

AUTHORS: Markov, A. I. (Docent); Buyanova, T. L. (Senior lecturer)

ORG: none

TITLE: The effect of forced ultrasonic oscillations on the process of metal machining

SOURCE: IVUZ. Mashinostroyeniye, no. 8, 1966, 107-111

TOPIC TAGS: metalworking, metal machining, steel alloy, copper, ultrasonic cleaning/ EI437B alloy, VT5 alloy, St-20 steel, E steel

ABSTRACT: The effect of superimposed ultrasonic oscillations of small amplitude (A < 3 μ) on the process of machining alloy EI437B, VT5, copper, steel 20, and steel E was investigated. The effect of the ultrasound was determined in terms of the dimensionless parameter $\nu = \frac{v(t)}{v}$, where v is the angular velocity of the stock and v(t) is given by $v(t) = A\omega\cos\cos\omega t$. Here A is the amplitude and ω the angular frequency of the ultrasound. The dependence of the cutting forces on the rate of cutting, on the amplitude of the ultrasonic vibrations, and on the microroughness of the surface was investigated. The experimental results are shown graphically (see Fig. 1). It was found that best results were achieved at angular velocities of 1--20 m/min, at feed rate of s = 0.05--0.30 mm/revolution, and at small cutting depth of t = 0.2--2 mm.

UDC: 621.910.71

Card 1/2

ACC NR: AP6033650

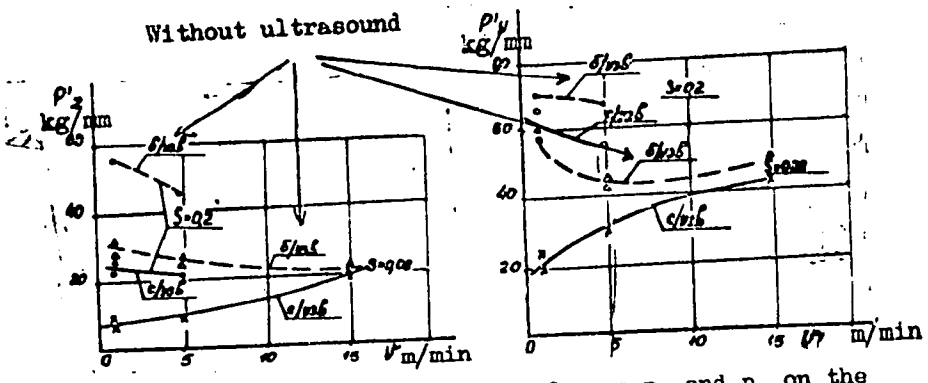


Fig. 1. Dependence of the cutting forces p_z and p_y on the cutting rate v and feed rate s during machining with applied ultrasonic oscillations (f = 15 kilocycles; 2A = 5--6 μ). Cutting tool VK8 $\gamma = 0^{\circ}$; titanium alloy VT5

This paper was presented by P. G. Petrukha, Moscow Aviation Institute, candidate of technical sciences. Orig. art. has: 1 table, 3 graphs and 2 equations.

SUB CODE: 13/ 11/ SUBM DATE: 14Apr65/ ORIG REF: 004

Card 2/2

L 11332-67 EWT(d)/EWT(l)/EWT(m)/EWP(k)/EWP(h)/EWP(l)/EWP(v)/EWP(t)/ETI IJP(c) JD/HW
ACC NR: AP6032529 SOURCE CODE: UR/0413/66/000/017/0129/0129

INVENTOR: Markov, A. I.

ORG: none

TITLE: Device for ultrasonic machining of hard to cut materials with poor machinability. Class 49, No. 185663 [announced by the Moscow Aviation Institute im. S. Ordzhonikidze (Moskovskiy aviatsionnyy institut)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 17, 1966, 129

TOPIC TAGS: metal machining, ultrasonic metal machining, ultrasonic machine tool, metal cutting machine tool, ultrasonic machining

ABSTRACT: This Author Certificate introduces a device (see Fig. 1) for ultrasonic machining of hard to cut materials based on the direct excitation of ultrasonic vibrations in the cutting tool by utilization of its magnetostrictive properties. The device consists of a stand, a tool (broach) and ultrasonic generator. To simplify the construction and improve the quality of work, the cutting tool is built up of

Card 1/2 UDC: 621.9.048

L 11332-67
ACC NR: AP6032529

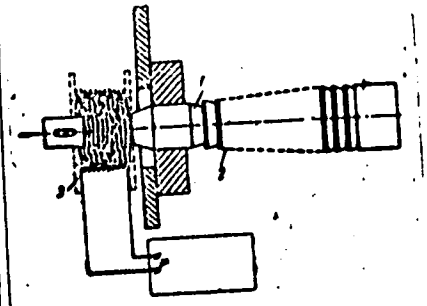


Fig. 1. Ultrasonic machining device

1 - Cutting tool;
2 - working part of the tool made of sections;
3 - exciting coil.

constant sections. To increase the amplitude of vibrations, a modified version of the above has its tool built up of variable sections. Orig. art. has: 1 figure.

SUB CODE: 13/ SUBM DATE: 12Mar65/

Card 2/2

GUKOVICH, N.P.; MARKOV, A.I.

They write to us. Transp. stroi. 12 no.11:62 N '62. (MIRA 15:12)

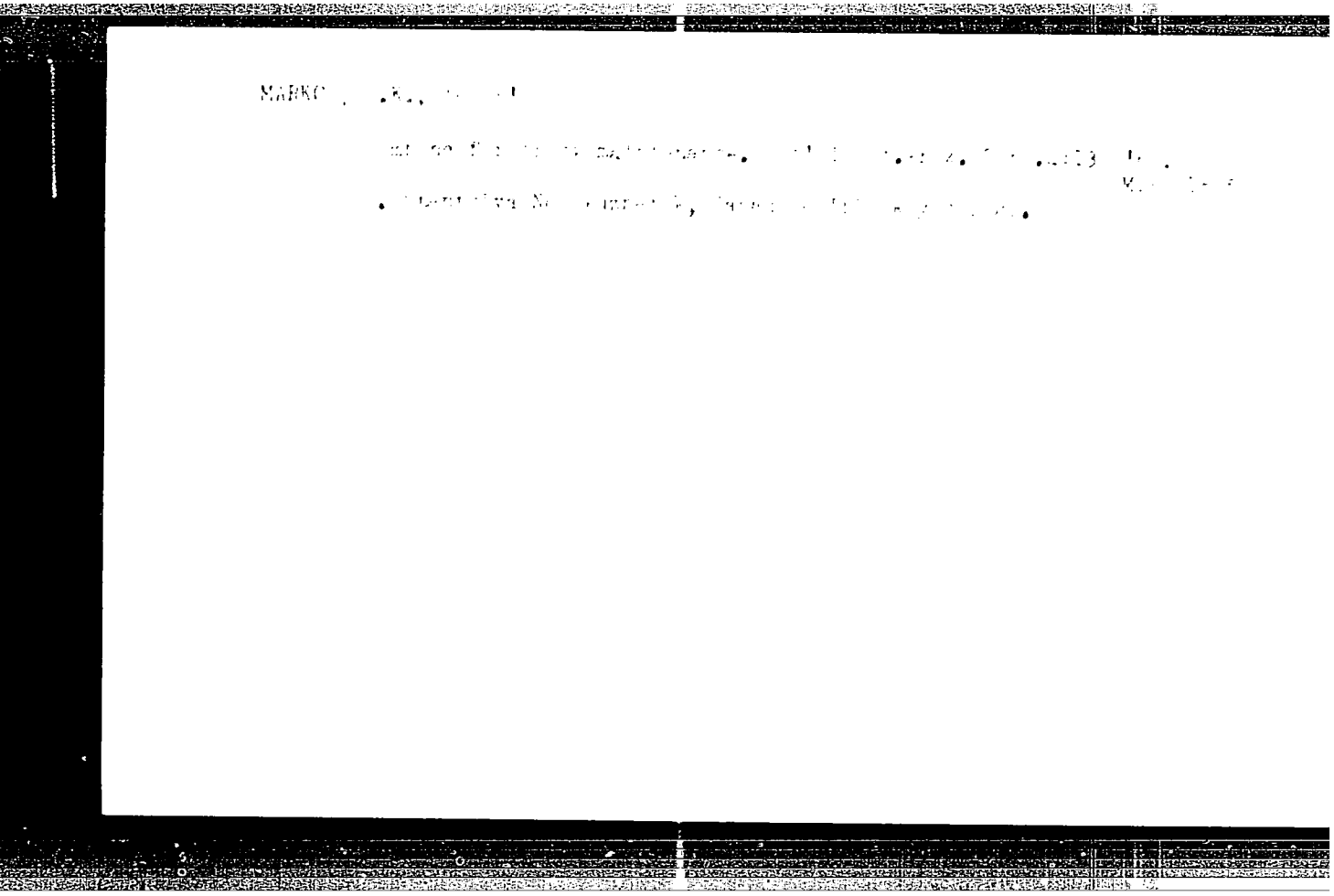
1. Rukovoditel' brigady Kiyevgiprotransa (for Gukovich). 2. Nachal'nik otdela tekhnicheskogo kontrolya Podstepnyanskogo (for Markov).
(Railroad engineering)

TARANOV, M.T., kand.biologicheskikh nauk; MEL'NIKOVA, T.S., kand. sel'skokhozyaystvennykh nauk; MARKOV, A.K.; AKSENOVA, L.N.; ZAYARKO, I.N.; ANIKEYEV, I.S.; PRIPUTNEV, V.S.

Chemical preservation of forage grain of high moisture content. Zemledelie 8 no.9:53-57 S '60. (MIRA 13:8)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut konevodstva (for Taranov). 2. Vsesoyuznyy institut zhivotnovodstva (for Mel'nikova). 3.Glavnyy agronom 98-go konnogo zavoda Ryazanskoy oblasti (for Markov). 4. Glavnyy vetvrach 98-go konnogo zavoda Ryazanskoy oblasti (for Aksenova). 5. Zaveduyyshchiy zernoskladami 98-go konnogo zavoda Ryazanskoy oblasti (for Zayarko). 6. Nachalnik elevatorno-skladskogo otdela Ryazanskogo upravleniya Khleboproduktov (for Anikeyev). 7. Direktor Rybnovskogo Khlebopriyemnogo punkta Ryazanskoy oblasti (for Priputnev).

(Grain--Storage) (Sodium pyrosulfite)



MARKOV, A.K. (Novokuznetsk)

Gross violation of regulations. Put' i put. khoz. 9 no.1 p.6 '64
(MIRA 17:2)

RYZHKOV, F.N.; MARKOV, A.L.; YAKSHINA, L.I.

Results of testing water stemming in a copper mine.
Gor. zhur. no.12:49-51 D '62. (MIRA 15:11)

1. Ural'skiy nauchno-issledovatel'skiy i proyektnyy institut mednoy promyshlennosti (for Ryzhkov, Markov).
2. Sverdlovskiy institut gigiyeny truda i professional'noy patologii (for Yakshina).
(Degtyarka region--Blasting--Equipment and supplies)

MARKOV, A. L.

Universal'nyi evoliventomer; rukovodstvo dlia zavodskikh laboratorii. Moskva, Mashgiz, 1948. 58 p. illus.

Universal evolvent meter; manual for factory laboratories.

DLC: TJ1313.M35

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

[illegible], ... L.

Izmerenie [illegible] zubchatykh kolës [illegible] wheels /. Moskva, Mashgiz, [illegible], 15 p.

Sc: Monthly List of Russian accessions, Vol. [illegible] No. [illegible] May [illegible]..

2516 SOV/1264

Mark[illegible] Kondyalov

Kontr[illegible] Moscow, Mashgiz,
[illegible] novatora, vyp. 9
Errata [illegible] printed.

Edito[illegible] (Chairman); I. Yu. Turets-
kiy [illegible] and N. I. Shavlyuga,
[illegible] Reviewers: F.P. Volosevich,
[illegible] Managing Ed. for Literature
[illegible] Machinery (Leningrad Division),
Masso[illegible] Ed. of Publishing House:
[illegible] Torskaya.

PURPOSE [illegible] drilled operators and setters
of g[illegible] and process engineers in
the g[illegible]

COVERAGE [illegible] methods of inspecting
spr[illegible] The methods are in accordance with

Card [illegible]

GOST [illegible] ... The selection ... kinematic and dimensional ... discussed. A. L. Markov ... wrote Chapter VI. ... references, all ...

TABLE [illegible]

Card 2/4

MARKOV, Arkadiy L'vovich; TYUMENTSEVA, S.T., inzh., red.; FREGER, D.P., tekhn.red.

[Introduction of new standards for precision in manufacturing gears] Vnedrenie v promyshlennost' novykh standartov na tochnost' izgotovleniia zubchatykh peredach. Leningrad, 1959. 30 p. (Leningradskii dom nauchno-tekhnicheskoi propagandy. Obmen peredovym opytom. Seriia: Kontrol' kachestva produktsii, vyp.10/11). (MIRA 13:3)

(Gear cutting--Standards)

25(2) PHASE I BOOK EXPLOITATION SOV/2348

Markov, Arkadiy L'vovich

Izmereniye tsilindricheskikh zubchatykh koles (Measurement of Spur Gears) 2nd ed., rev. and enl. Moscow, Mashgiz, 1959. 271 p. Errata slip inserted.

Reviewer: M. D. Zlotopol'skiy, Candidate of Technical Sciences, Docent; Ed.: I. S. Amosov, Candidate of Technical Sciences, Docent; Ed. of Publishing House: T. L. Leykina; Tech. Ed.: O. V. Speranskaya; Managing Ed. for Literature on Machine-Building Technology (Leningrad Division, Mashgiz): Ye. P. Naumov, Engineer.

PURPOSE: The book is intended for engineering inspection foremen, measurement laboratory workers in machine-building plants, and qualified gear cutters.

COVERAGE: The book contains information on methods and instruments used in industry for measuring spur and parallel helical gears. Basic concepts of the theory of spur gearing are given and formulas for determining elements of gears and de-

Card 1/5

Measurement of Spur Gears SOV/2348

viations according to Gost standards 1643-56 are quoted. The author states that the level of engineering measurements of toothed gears does not satisfy the requirements of the Soviet machine-building industry. Development of measuring instruments is the responsibility of TsNIITMASH (Central Scientific Research Institute of Technology and Machinery) and the Bureau for Interchangeability of the Committee on Standards in Measures and Measuring Instruments under the Council of Ministers of the USSR. Work on automation of the gear inspection process is in process. No personalities are mentioned. There are 22 references, all Soviet.

TABLE OF CONTENTS:

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AVAILABLE: Library of Congress (TJ 189.M3 1959)

GO-jb
10-27-59

Card 5/5

MARKOV, Arkadiy L'vovich; VOLOSEVICH, Fedor Pavlovich; ABADZHI, K.I., inzh., retsenzent; BRZHEZINSKIY, M.L., kand. tekhn. nauk, red.; CHERAS, M.A., red. izd-va; SOKOLOVA, T.Z., tekhn. red.

[Brief manual for inspectors and master workers of a machinery plant] Kratkii spravochnik kontrol'nogo mastera mashinostroitel'nogo zavoda. Moskva, Mashgiz, 1961. 287 p. (MIRA 15:2)

(Machinery industry) (Production control)

MARKOV, Arkadiy L'vovich; TYUMENEVA, S.T., inzh., red.; SHILLING, V.A., red.izd-va; GVIRTS, V.L., tekhn.red.

[Measurement of surface roughness in compliance with State Standard 2789-59] Izmerenie sherekhovatosti poverkhnosti po GOST 2789-59. Leningrad, 1962. 25 p. (Leningradskii dom nauchno-tekhnicheskoi propagandy. Obmen peredovym opytom. Seriia: Mekhanicheskaia obrabotka i kontrol' kachestva produktsii, no.20) (MIRA 15:12)
(Surfaces (Technology))—Measurement)