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SOVIET MACHINE BUILDING

No. 20 (Our No 16)

SELECTED TRANSLATIONS

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Introduction

This is a serial publication containing selected translations on the machine building industry in the Soviet Union. This report consists of translations on subjects listed in the table of contents below.

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1. 120 Rolling Mill

/Following is a translation of an article by Ye. M. Bortunov in Byulleten' Tekhniko-Ekonomicheskoy Informatsii (Bulletin of Technical and Economic Information), No. 3, March 1960, pages 5-7./

The Metallurgical Plant imeni Dzerzhinskiy has put into operation a 120 rolling mill with an annual productivity of 70 thousand tons, designed for rolling round periodic shapes with diameters of from 40 to 120 mm and with a maximum bar length of 4,000 mm.

The shop for the 120 rolling mill was designed by the Dnepropetrovsk Affiliate of Gipromez /State Institute for the Designing of Metallurgical Plants/. The design of the mill and its auxiliary equipment was developed by the Central Scientific Research Institute for Technology and Machine-building (TSNIITMASH) and the machine-building plant in the city of Elektrostal'. Shears for the cold cutting of circular cross sections were designed and produced by the Starokramatorsk Machine-Building Plant, and high-frequency-current induction heaters, by the Leningrad Scientific Research Institute for High Frequency Current imeni Vologdin.

The rolling mill is fully automated; control of the mill is carried out with the assistance of a hydraulic system developed by TSNIITMASH and the Machine Building Plant in Elektrostal, and an electrical programming control system with a set of fixed coordinate points, developed and produced by the Leningrad Experimental-Designing Division of Tiazhpromelektroproekt Institute.

Round blanks are heated in an electric induction apparatus consisting of four two-stage heaters arranged in two parallel lines on either side of the main transporting conveyor. The heating installation is equipped with loading and unloading apparatus and mechanisms for pushing the blanks through the heaters.

In the first stage, heating is carried to a temperature of 700° by a current with a frequency of 50 hertz, and in the second stage, to 1,250° by a current with a frequency of 1,000 hertz. The duration of heating (designed) for blanks up to 58mm in diameter is 80-100 seconds; for blanks up to 100 mm in diameter -- 230-250 seconds, and for blanks up to 120 mm in diameter--260-290 seconds.

The 120 rolling mill has three forged rolls made of 5KHIM steel, placed at a 120° angle in relation to one

another, and inclined at a 45° angle to the rolling axis. The mill employs rolls of two sizes: The first size is for the rolling of finished shapes with diameters of 40 to 80 mm in their minimal cross section; the second size is for the rolling of finished shapes with diameters of 60 to 120 mm in their minimal cross section.

Each roll has an independent 180-kwt electric motor with transmission by means of geared couplings and connecting spindles. The number of revolutions of the electric motors can be regulated from zero to 1,100 per minute.

The initial blank enters in a cleaned state and is cut into lengths on special shears with shaped cutters and a pressure of 630 tons. The cut blanks are transported by a roller conveyor to the loading apparatus of the heaters. After heating, the blank is pushed through the heaters onto the unloading apparatus and is further transported by a roller conveyor to the receiving trough. A pneumatic pusher then pushes the blank through a conductor and the opened rolls into the clamp of the pulling carriage; thereafter the process of rolling begins. The exit speed of the bar from the rolls is up to 3.5-6.0 meters/min.

The bars rolled by the mill are transferred by a transporter to three Shlepper-type coolers. Three 500-ton shears are installed for trimming the ends and cutting the bars into short lengths.

The first months of the operation of the mill saw the mastering of several profiles of Carbon Steels 5 and 45, a tractor half-axle for the Chelyabinsk Tractor Plant, electric motor shafts for the "Vol'ta" Plant in Tallin and the Vladimir Electric Motor Plant, as well as other shapes.

2. Models P-803 and PA-803 40-Ton Capacity Hydraulic Presses

/Following is a translation of an article by B. Ya. Fikhman in Byulleten' Tekhniko-Ekonomicheskoy Informatsii (Bulletin of Technical and Economic Information), No. 3, March 1960, pages 9-12./

In 1959 the Odessa Press Plant designed and mastered the commercial production of special hydraulic presses models P-803 and PA-803 with electric heating for the hot pressing of hard-alloy powders. Both presses have the same purpose and work on analogous principles. The design described below applies equally to both models. Certain differences in the parameters of models P-803 and PA-803 are shown in the specifications of the presses....

Technical Specifications of the Presses

Parameters	Model P-803	Model PA-803
Operating pressure, tons	40	40
Slide-block stroke, mm	450	450
Table diameter, mm	600	600
Covered height of press, mm	800	800
Speed of working stroke, mm/sec	0.3	0.3
Speed (fast) of movable traverse, mm/sec	10	10
Capacity of heating installation, kva	80	240
Maximum heating current, ka	10	30
Initial voltage, v	380	380
Voltage between contact, plates, v	5.5	5.5
Dimensions (length x width x height), mm	2,150 x 2,835 x 2,680	2,800 x 2,700 x 3,835
Weight, tons	5.9	11

The press has a remote, push-button control. All the buttons are mounted on the control panel. The control panel also includes the control and measuring instruments for the heating installation and the hydraulic drive, as well as the height-measuring instrument together with "sel'sinom-priyemnikom."

The new hydraulic presses for the hot pressing of hard alloys have successfully passed testing in 1959, and their introduction is recommended.

3. Model K-471B Single-crank Double-action Press with 100/63 - ton Capacity

/Following is a translation of an article by S. A. Kunitsyn in Byulleten' Tekhniko-Ekonomicheskoy Informatsii (Bulletin of Technical and Economic Information), No. 3, March 1960, pages 12-13./

The Voronezh Forging and Pressing Equipment Plant imeni M. I. Kalinin in 1959 designed and produced a single-crank, double-sided, double-action press, Model K-471B, with a capacity of 100/63 tons. The press is intended for the cold stamping (requiring a relatively long slide-block stroke) and drawing of a variety of products from sheet or strip, and, if necessary, for simultaneous contour cutting.

The frame of the press consists of four cast-iron parts: a table, two uprights, and a traverse, fastened together by four clamping bolts (see figure)....

Technical Specifications of Press

Pressure of internal and external slide blocks	100 & 63 tons
Stroke of internal and external slide blocks	420 & 260 mm
Number of slide-block strokes per minute	15
Distanbe between table and internal slide-block in its lowest position	580 mm
Distance between table and external slide block in its lowest position	530 mm
Distance between guides (inside)	750 mm
Table dimensions;	
front to back	900 mm
left to right	900 mm
Internal slid-block dimensions:	
front to back	560 mm
left to right	560 mm
External slide-block dimensions	850 x 850 mm
Capacity of electric motor, type AB2-4	14 kwt
Height above floor level	4,900 mm
External dimensions of press:	
front to back	1,795 mm
left to right	1,670 mm
Weight	15, 328 kg

The plant has mastered the serial production of the Model K-471B press.

4. Models A-825, A-826S and A-827 Eight-position Automatic Presses

/Following is a translation of an article by A. F. Nistratov in Byulleten' Tekhniko-Ekonomicheskoy Informatsii (Bulletin of Technical and Economic Information), No. 3, March 1960, pages 14-15./

In 1958 and 1959, the Barnaul Mechanical Press Plant designed and produced the model A-825, A-826S, and A-827 presses, intended for the successive, multi-operational drawing from strip of such parts as the separators of roller bearings, electrical push-button housings, and certain parts of radios and television sets. The model A-827 press can also stamp larger parts (bicycle sprocket wheels, pulleys, etc.)....

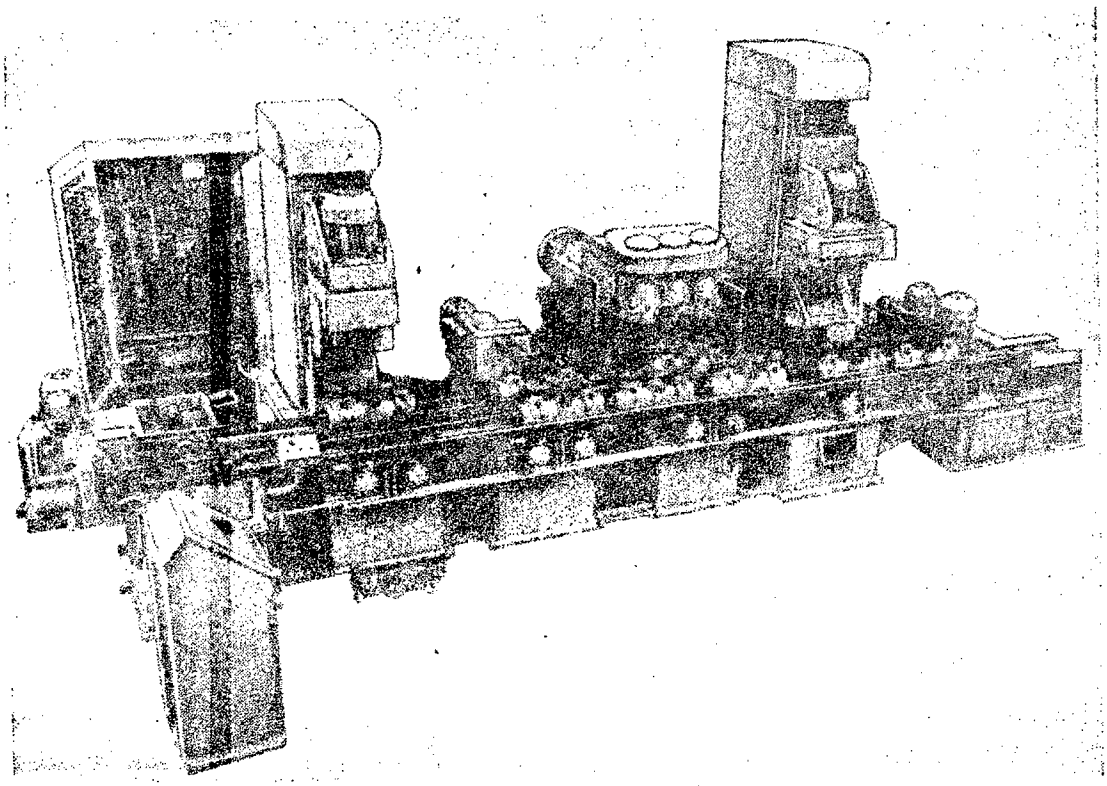
Technical Specifications of the Various Press Models

	A-825	A-826S	A-827
Nominal force, tone	160	250	400
Number of slide-block strokes per minute	30	25	20
Slide-block stroke, mm	200	200	300
Number of spindles	8	8	8
Distance between spindles' axes, mm	300	300	450
Spindle-height adjustability range, mm	80	80	100
Distance between table and slide block in its lowest position, mm	680	600	850
Maximum width of strip, mm	250	250	420
Maximum punch-out diameter, mm	220	220	400
Distance from table to strip feed level, mm	390	390	460
Distance from table to grab bar, mm	300	300	400
Electric motor:			
type	AS71-4	AS72-4	AS91-6
capacity, kwt	20	28	55
External dimensions, mm			
floor area of press	4600x2015	4600x2115	4945x2370
floor area of installation	4600x9000	4600x9000	4945x9195
Height of press, mm	5230	5150	5965

	A-825	A-826S	A-827
Weight, kg:			
press	34974	41379	59900
installation	38733	45259	64560

5. 1L80 Automatic Line

/Following is a translation of an article by V. K. Musatov in Byulleten' Tekhniko-Ekonomicheskoy Informatsii (Bulletin of Technical and Economic Information), No. 3, March 1960, pages 15-16./



The 1L80 automatic line for machining the exhaust manifold of the SMD1 engine

The 1L80 automatic machine-tool line, designed by the Special Designing Bureau No. 1 of the Moscow City Sivnarkhoz, was produced in 1959 at the Moscow Machine-tool Plant imeni Ordzhonikidze, and is intended for the complete machining of the exhaust manifold of the SMD1 engine.

The line (see figure) is composed of four machine tools. The first machine tool mills a flange; the second drills three holes with a diameter of 10.1 mm; the third mills three flanges and chamfers three holes; the fourth drills six holes 11 mm in diameter and cuts threads in three holes....

Data on the effectiveness of the automatic line are presented in the table.

Indicators	On the Automatic Line	On Aggregated Machine Tools
Number of machine tools	4	4
Number of operators in two-shift operation	2	8
Production floor space, m^2	23	60
Annual output of exhaust manifolds per one servicing worker	82,500	20,625

The productivity of the automatic line is 40 parts per hour with a load factor of 70.7 percent.

6. Model 7212 Double-sided Planer

/Following is a translation of an article by L. A. Manusevich in Byulleten' Tekhniko-Ekonomicheskoy Informatsii (Bulletin of Technical and Economic Information), No. 3, March 1960, pages 17-18./

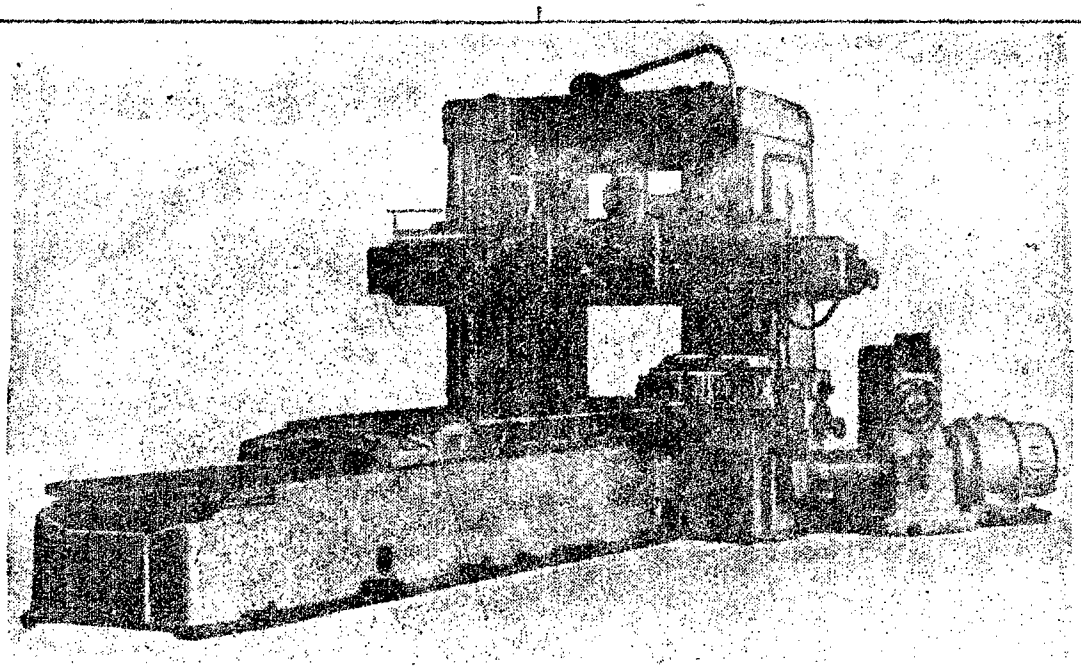
In 1959, the Minsk Machine-tool Plant produced the model 7212 double-sided planer, which is a general-purpose metal-cutting machine tool intended for the machining of linear surfaces of machinery parts by the planing method. The machine tool can simultaneously work the top and one side surface with two vertical supports and one right-hand side support.

The machine tool (see figure) is primarily designed for use in medium and heavy machine-building metal-working plants under conditions of unit-type and serial production, and also in repair shops and plants. The machine tool can perform rough planing at high cutting speeds, as well as clean and fine planing with wide cutters /yielding/ a high degree of smoothness and precision with a high productivity.

Using model 7212 machine tool as a basis, it is possible to produce the model 6610 four-spindle plano-miller and the model 3510 plano-grinder with unified basic parts (bed, uprights, crossbeam, etc.) and subassemblies (mechanisms for lifting and clamping the traverse, for lubrication, etc.).

Technical specifications of the machine tool

Maximum dimensions of machined parts (width x height)	1,250 x 1,120 mm
Dimensions of working surface of table (width x length)	1,120 x 4,000 mm
Speed limits of table, working travel, m/min:	
Range 1	7.5-75
Range 2	4.5-45
Speed limits of table, return travel, m/min:	
Range 1	20-75
Range 2	12-45
Length of feed of vertical supports, mm:	
horizontal	0.5-25
vertical	0.25-12.5



Model 7212 planer

Length of feed of side support, mm:	
horizontal	0.25-12.5
vertical	0.25-12.5
Maximum distance of travel of support slide block	300 mm
Support rotation angle	±60°
Capacity of main AC electric motor	55 kwt
Outside dimensions (length x width x height)	9,950 x 4,550 x 3,770 mm
Weight	35 tons

The prototype model of the machine tool was accepted by a commission of the Council of the National Economy BSSR. At present, the first series of the model 7212 machine has been produced, and the plant has received permission for the serial production of the model 7212 planer.

On special order, the machine tool can be supplied with a left-hand side support, a fixture for planing deep and T-shaped slots, and an apparatus for coolant feeding during fine planing.

7. Model 3A224 Aggregated Machine-tool for Machining Electric Motor Housings

/Following is a translation of an article by V. V. Gamberg in Byulleten' Tekhniko-Ekonomicheskoy Informatsii (Bulletin of Technical and Economic Information), No. 3, March 1960, pages 18-20./

The model 3A224 machine tool was built and passed its testing in 1959 at the Moscow Machine-tool Plant imeni S. Ordzhonikidze. The machine tool is designed to drill four mounting holes in the flanges of electric-motor housings, and to mill the mounting surface of the flanges (for technological purposes, two of the four mounting holes are reamed). The housings of six models of electric motors are processed on the machine tool.

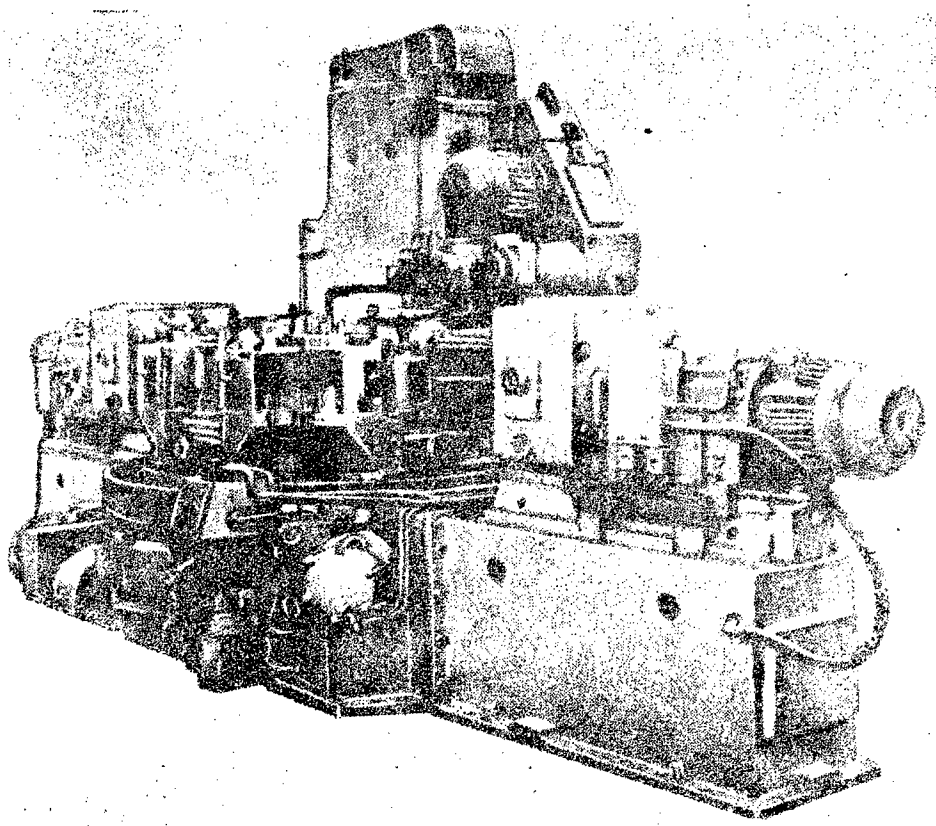
The machine tool (see figure) consists of unified subassemblies designed by Special Designing Bureau No. 1; it is composed of a four-position rotating table, two horizontal power heads on the bed, and a milling head which moves along vertical guides on the column. Four fixtures are mounted on the turntable.

The turntable is mechanical with an independent electric motor. The rotation of the table is effected by means of a Maltese mechanism.* After rotation, the table's

*At the present time, Special Designing Bureau No. 1 employs mainly hydraulic turntables.

faceplate is positioned and tightened by means of pneumatic cylinders. Air is distributed to the clamping cylinders of the fixtures attached to the table by an air distributor, which makes it possible to control each of the four fixtures on the turntable with the aid of a single valve located on the control panel. A pneumatic pressure relay ensures the presence of the proper air pressure in the clamping system and switches off the machine when pressure drops.

The machine tool operates on an automatic cycle. After starting the electric motors and loading and clamping the blank, the operator pushes the "Rotate Table" button, and all the remaining movements of the machine tool take place automatically. The removal of the finished part and the loading of the blank are accomplished during the period when parts are being worked in the other positions. If the operator does not succeed in loading the blank before the completion of the operation, the machine tool stops itself.



Model 3A224 aggregated machine-tool for machining electric motor housings

Technical specifications of the machine tool

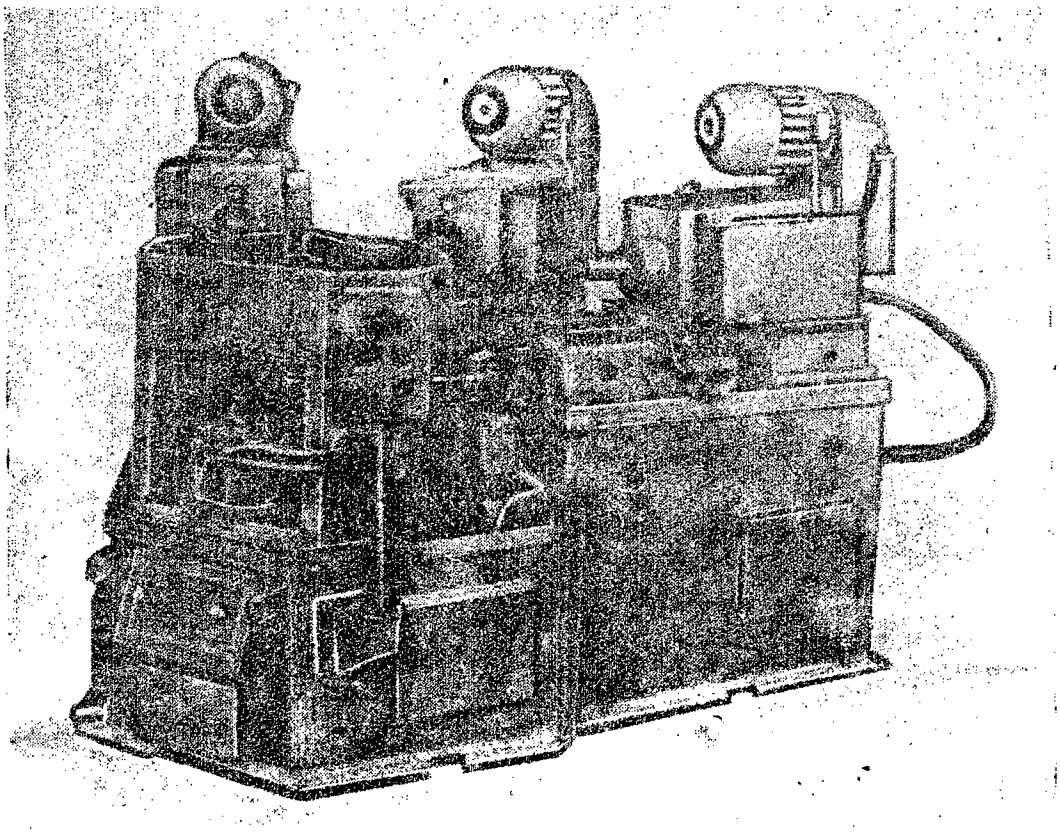
Productivity of the machine tool	25 parts/hr
Number of electric motors	5
Over-all capacity	20.8 kwt
Clearance dimensions (length x width x height)	4,990 x 2,640 x 2,710 mm
Weight	13 tons

The resetting of the machine tool for processing various housings consists in setting-up the fixtures again and engaging the left or the right power head.

8. Model 3A427 Three-way Horizontal Drilling Machine

/Following is a translation of an article by S. A. Bakhmet'ev in Byulleten' Tekhniko-Ekonomicheskoy Informatsii (Bulletin of Technical and Economic Information), No. 3, March 1960, pages 20-22./

The Model 3A427 aggregated machine tool, designed by Special Designing Bureau No. 1 and produced by the Moscow Machine-tool Plant imeni S. Ordzhonikidze, is intended for drilling deep lubrication channels in crankshafts for the engine of the Moscow Small-displacement Automobile Plant (MZMA). The material is steel 45, /with a/ hardness of Bhn = 170-207....



Model 3A427 three-way three-spindle horizontal drilling machine

Brief technical specifications of the machine tool

Productivity at 90% load factor	20 parts/hr
Number of spindles	3
Spindle rpm limits	82-1,250
Maximum permissible power-head feed force	950kg
Feed limits	25-900 mm/min
Number of electric motors	4
Total capacity	5.25 kwt
Clearance dimensions (length x width x height)	1,635 x 2,300 x 1,465 mm
Weight	5.5 tons

The machine tool has passed its production tests and is in operation at the MZMA.

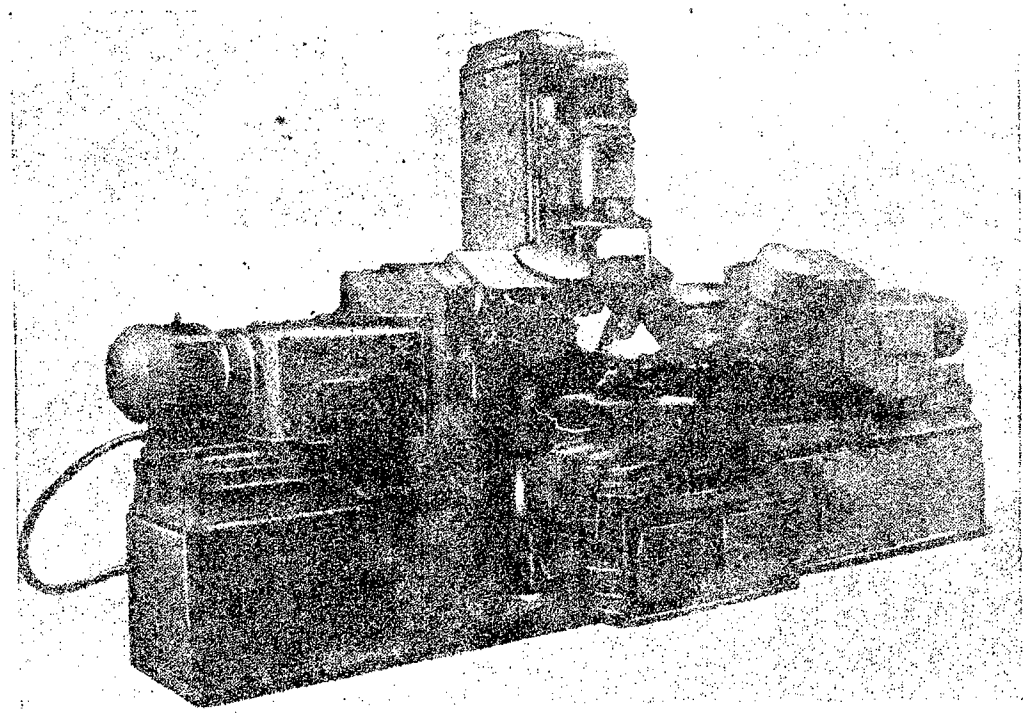
3

9. Model 3A377 Three-way Six-spindle Drilling and Milling Machine

/Following is a translation of an article by F. M. Berkovich in Byulleten' Tekhniko-Ekonomicheskoy Informatsii (Bulletin of Technical and Economic Information), No. 3, March 1960, pages 22-23./

The First Special Designing Bureau of the Moscow City Sovnarkhoz has designed, and the Machine-tool Plant imeni S. Ordzhonikidze has produced, the model 3A377 three-way six-spindle drilling and milling machine for machining cutting chisels. The machine mills four surfaces at angles of 120° and 27° 30', and drills two holes 20 mm in diameter with a 120° angle between them.

The machine tool (see figure) is comprised of



Model 3A377 six-spindle drilling and milling machine

special groups [of parts] and unified subassemblies designed by Special Designing Bureau No. 1. The unified subassemblies in the machine tool being described include: power heads, hydro-panels, guide-ways, feed cylinders, turntable, coolant feeder, control panel, and the electric and hydraulic control devices. The part being machined is positioned and held by fixtures installed on the four-position turntable. The first position is for loading, and the remaining ones are for machining.

Technical specifications of the machine tool

Number of power heads	3
Number of spindles	6
Drilling spindle rpm	295
Duration of machining cycle for one part	2 min
Productivity of the machine tool	30 parts/hr
Electric-motor capacity	27.25 kwt
Clearance dimensions (length x width x height)	5,530 x 2,275 x 3,350 mm
Weight	15 tons

10. Model 58A712 Four-spindle Diamond-bit Boring Machine

/Following is a translation of an article by V. I. Shekhter in Byulleten'Tekhniko-Ekonomicheskoy Informatsii (Bulletin of Technical and Economic Information), No. 3, March 1960, pages 23-25./

In 1958 the Odessa Radial Drilling Machine Plant, utilizing a design of the Designing Bureau No. 3, produced the model 58A712 special two-way four-spindle diamond-bit boring machine, intended for the boring of seven holes in the housing and cover-plate (assembled) of gear-boxes for hoisting and conveying mechanisms. With a proper setup, the machine tool can also machine analogous parts.

Supports with spindle heads are mounted on the rigid, box-shaped bed of the machine tool (see figure). The left-hand support carries one diamond-bit boring head for boring two holes 100 mm in diameter, while the right-hand support carries three heads for boring five holes (two--90mm in diameter, and three--160 mm in diameter)....

Technical specifications of the machine tool

Productivity of the machine tool	2 parts/hr
Cutting speed	100 m/min
Feed	0.07 mm/rev
Capacity of spindle-head electric motors, kwt:	
Left	1.7
Right	2.8
Clearance dimensions (length x width x height)	2,900 x 1,375 x 1,460 mm
Weight	6,200 kg

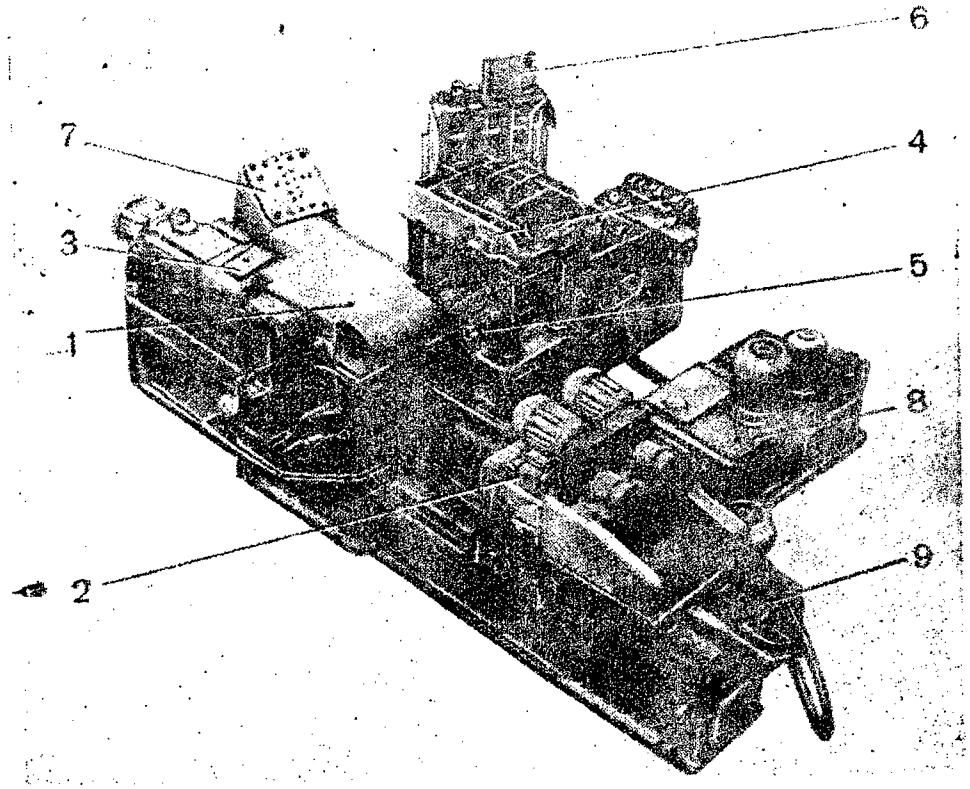
The machine tool is being built into a continuous-flow line, and represents a semiautomatic machine with an automatic work cycle.

Tests have demonstrated the machine tool's high level of precision and dependable performance. The productivity of model 58A712 is three times that of a general-purpose boring machine.

11. Model 1S229 Two-Way Four-Spindle Boring Machine

/Following is a translation of an article by V. G. Zhavoronkov in Byulleten' Tekhniko-Ekonomicheskoy Informatsii (Bulletin of Technical and Economic Information), No. 3, March 1960, pages 25-26./

In 1959, a special two-way four-spindle boring machine, model 1S229, was designed by the First Special Designing Bureau for machine-building of the Moscow City Sovnarkhoz, and built by the Machine-Tool Plant imeni S. Ordzhonikidze. The machine is designed for the finish boring of three crankshaft holes and three camshaft holes and for reaming two pin holes in the cylinder block of the "Moskvich" model 407 automobile /engine/.



Model 1S229 special two-way four-spindle boring machine: 1--fixture; 2--right boring head; 3--reaming head; 4--control device; 5--part conveyor; 6--signal panel; 7--control panel; 8--hydraulic station for clamping and transporting devices; 9--hydraulic station for right head feeding.

All the mechanisms of the machine tool are hydraulically operated and work in a pre-established order of succession.

Technical specifications of the machine tool

Number of spindles	4
Productivity of the machine tool at 80% load factor	25 parts/hr
Number of electric motors	6
Total electric-motor capacity	15.2 kwt
Clearance dimensions (length x width x height)	4,600 x 3,560 x 1,770 mm
Weight	11 tons

The machine tool achieves Class One precision in machined parts. The nonparallelism between the axes of the crankshaft hole and the camshaft hole does not exceed 0.05 mm, and the noncoaxiality of the crankshaft and camshaft holes is within the limits of 0.03 mm.

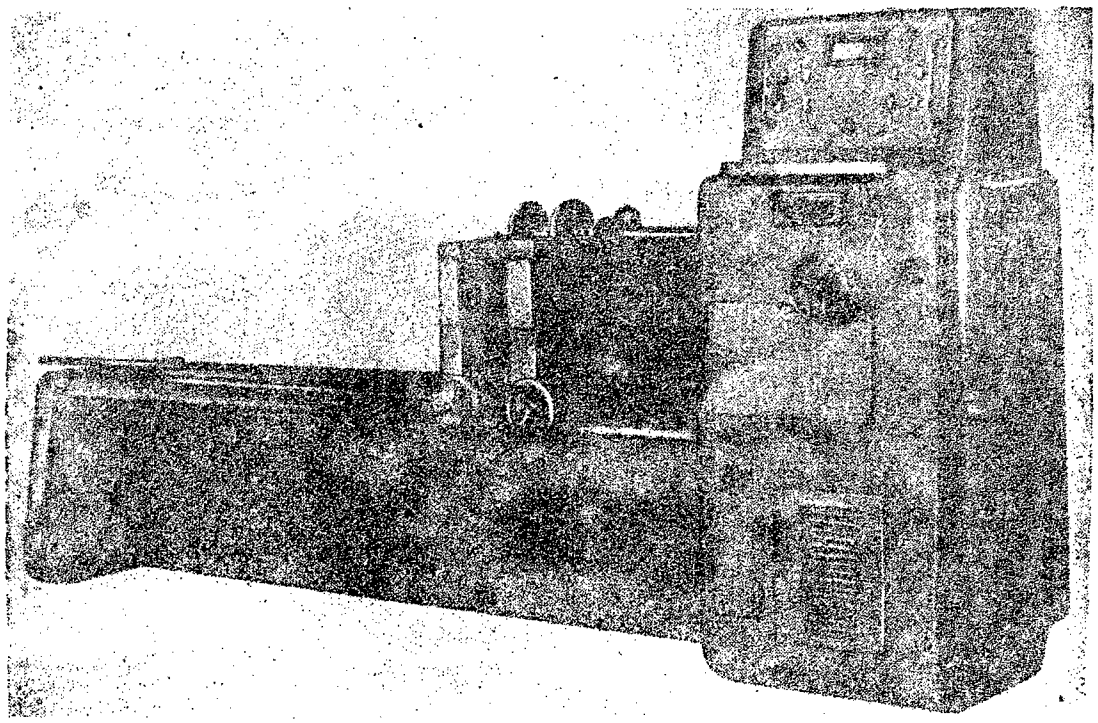
In contrast to the machine tool of the John Barnes firm, the model 1S229 machine has automatic loading and unloading of parts and automatic controls.

12. Model 9V725 Special Balancing Machine

[Following is a translation of an article by V. B. Pisarchik in Byulleten' Tekhniko-Ekonomicheskoy Informatsii (Bulletin of Technical and Economic Information), No. 3, March 1960, pages 27-28.]

In 1959 the Minsk Machine-Tool Plant imeni Voroshilov produced a special balancing machine, model 9V725, designed for the dynamic balancing of revolving parts weighing from 10 to 100 kg.

The machine (see figure) can balance parts that have revolving, sliding, and rocker bearings, e.g., electric-motor rotors, fans, turbines, spindles, drums, etc. With the aid of a measuring system, the machine determines the magnitude and the angle at which disbalance is located from a horizontal plane. Disequilibrium is eliminated by the attachment of balancing weights to the part, as well as by drilling out metal in spots provided by the design....



Model 9V725 balancing machine

Technical specifications of the machine

Distance between bearing centers	from 180 to 1,250 mm
Maximum diameter of part	800 mm
Maximum external diameter of bushing for antifriction bearing	150 mm
Maximum external diameter of bushing for journal bearing when balancing part at:	
900 rpm	130 mm
1,600 rpm	75 mm
Spindle speed	900-1,600 rpm
Residual disequilibrium (balancing imprecision)	1-6 grams/cm
Capacity of main-drive electric motor	1.7 kwt
Clearance dimensions (length x width x height)	2,485 x 870 x 1,575 mm
Weight	1,630 kg

The Minsk Machine-Tool Plant has produced special balancing machine models 9V725A and 9V725B equipped with drilling heads, using the model 9V725 as a base. The balancing and removal of excess material in spots provided by the design is accomplished directly on the machine. The drilling head has an electrical drive on model 9V725A, and a pneumatic drive on model 9V725B.

END