LATHE
TOUR PARALLEL
DREHBANK

ТОКАРНЫЙ СТАНОК SN-320x750

TYPE SN 320X750

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1969

MACHINE BOOKLET

FOR THE

UNIVERSAL (NORMAL) LATHE 320

SN 320 Type

UZINA DE STRUNGURI — ARAD

Inspection Number:

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Owing to the continuous improvements of machine-tool design, following the general technical progress, the machine booklet can not correspond in every detail to the machine delivered and therefore purchasers are asked, when ordering spare parts, always to specify the inspection number of the lathe and also the number of the spare part, which is marked on it.

1 9 6 9

INTRODUCTION

These instructions, wicht we recommand to your careful consideration, are intended to get you familiar with the correct installation, servicing and starting of the machine. This goal would be missed however if the head of the workshop and those who use the machine would not fully acquaint themselves with their contents.

It is very important to know thoroughly the structure of the lathe before putting it into service and especially to give a particular care to its lubrication. If you will follow exactly the instructions provided in this booklet, you will save time and you will prevent break-downs.

Before starting the machine, study carefully all controls. The working accuracy of every machine is checked with high precision measuring instruments. The attention given to this check guarantees the precision prescribed under valid reception conditions.

Therefore it is necessary to pay attention to the transport and erection of the machine in order to prevent impairing its accuracy.

By following the instructions herein, you will certainly be satisfied with the precision and with the power of the machine.

We wish you success in your work and the best possible results with your machines.

Thank You!

UZINA DE STRUNGURI — ARAD

CONTENTS

CHARACTERISTICS AND SCOPE

The SN—320 type 320 lathe, is a universal lathe with a maximum working diameter of 320 mm, the distance between centers being 750 mm and the maximum speed of the main shaft of 1600 r.p.m.

The SN—320 lathe is a light lathe destined among others to mobile workshops, for single jobs with fixing in the universal chuck or between centers.

The kinematics and the desingn of the lathe allows for the following work:

— longitudinal turning, manual and mechanical;

— plane turning, manual and mechanical;

— drilling with hand or mechanical feed with the tool fixed in the tool-holder;

— threading, metric pitch, Whitworth, Module, Diametralpitch and pitch in inches;

— working in the universal chuck or between centers as also bar machining.

The universal lathe type SN—320, is classed as a light machine.

TECHNICAL CHARACTERISTICS

1. Main characteristics

— maximum working diameter above bed (mm)	Ø 320
— distance between centers (mm)	750
— maximum working diameter above slide (mm)	Ø 160
— maximum diameter of bar material (mm)	Ø 34
— maximum morking diameter with fixed steady	Ø 100
— maximum working diameter with mobile steady	Ø 80

2. Headstock

— Head of main shaft	I.O.—A.S.A. B.59—1960
— diameter of main shaft bore (mm)	Ø 36
— taper of main shaft bore	Morse No. 5
— number of direct drive steps	18
— interval between direct speeds (r.p.m.)	31.5—1600
— rate of geometric series	1.26
— steps of direct speeds (r.p.m.) 31,5; 40; 50; 63; 80; 100; 125; 160; 200; 250; 315; 400; 500; 630; 800; 1000; 1250 and 1600	
— number of reverse speed steps	18
— intervals between reverse speeds (r.p.m.)	31.5—1600
— input speed into the gear box (r.p.m.)	1420

3. Feed and thread box

— Number of longitudinal and cross feeds	36
— range of longitudinal feeds (mm/rev)	0.03—3 52
— range of cross feeds (mm/rev)	0.01—1.17
— number of metric threads	36
— pitch of metric threads	0.375—44
— number of Whitworth threads	36 (38)
— pitch of Whitworth threads (threads/inch)	88—$^{3}/_{4}$
— number of threads in inches	36
— pitch of threads in inches (inches)	3/128—$2^{3}/_{4}$
— number of module threads	36
— pitch of module threads (mm)	0.375—44
— number of diametral-pitch threads	36
— pitch of diametral-pitch thraeds (D.P.)	88—$^{3}/_{4}$

4. Slide and supports

— Vertical distance from center axis to the tool sitting base (mm)	20
— tool maximum cross section (sq. mm)	20x20
— angle of revolution of the tool-slide	± 180°
— dimensions of the multiple tool holder, intern. ext. (mm)	60x100
— number of tools in the holder	4
— pitch of screw of transversal slide (mm)	4
— one division of the graduated ring corresponds to a displacement of the transversal slide (mm)	0.02
— pitch of screw of the tool slide (mm)	3
— one division from the graduated ring corresponds to a displace of the tool slide of (mm)	0.02
— maximum travel of the tool slide (mm)	170
— maximum travel of the transversal slide (mm)	200
— maximum travel of the main slide (mm)	750
— one division on graduated ring corresponds to an advance of main slide of (mm)	0.25

5. Slide

— Pitch of the lead screw (mm)	6
— module of the rack (mm)	2
— width of the rack teeth (mm)	15

6. Tail stock

— Diameter of tail spindle (mm)	Ø 45
— center taper	Morse No. 3
— maximum travel of tail spindle (mm)	130
— transversal displacement of the tail spindle (mm)	± 10

TRANSPORT

The transport of the lathe in unpacked condition will take place according to the trarsport diagram shown in fig. 1.

During the transport care will be taken to avoid damaging the various external parts of the lathe or the painted surfaces, or else scratches, due to the contact with the ropes.

To this end, on the transport diagram (fig. 1) we recommend to use a metallic bar of 35 mm ∅ which will be bent in the middle, so that the contact surface between the bar and the motor flange be as large as possible.

Between the ropes, we also recommend to insert a board, in order to keep a good clearance between the 2 arms of the cable.

When the lathe is transported in a packed condition (in a case), due considerations should be paid to the indications provided on the packing case.

When handling the case containing the lathe, the former should not be tilted more than 15 degrees from the horizontal.

Knocking and jerking will be avoided when loading and unloadin the case. The same pregscriptions hold good also when the lathe is delivered only on wooden sleighs.

When opening the packing case, care will be taken to avoid damaging the lathe with the tools serving for unpacking. It is recommended to this end to take off the upper lid of the case first, then the rest of the packing can be dismantled.

FUNDATION AND LATHE INSTALLATION

The working accuracy of teh lathe is determined to a great extent by its correct installation on the foundation specially prepared.

The lathe must be placed on the foundation according to the drawing included in the machine booklet (fig. 2). To set the machine in a horizontal position in both planes, wedges made for the purpose are to be used.

The lathe should be fastened on the foundation with 4 M16 foundation bolts, specified on the foundation drawing and delivered with the machine.

No deviations are allowed. The tolerances admitted are indicated in the corresponding accuracy normes for lathes, Dr. Schlesinger.

The location of the lathe with regard to the surroundings will be in such a manner as to keep a distance of 1000 mm from the symmetry axis of the lathe to the object placed behind it.

This is essential in order to have access to the lathe from behind, should some revisions and repairs to the lubricating installation, the cooling installation, the slide, etc. become necessary.

The machine must be placed in a room where it should be fully protected from the weather. The works are not to be hold responsible for reductions in the working accuracy of the machine owing to large temperature changes.

Improper grounds (sand, slag) and those which are not evenly settled can change the horizontal position of the machine.

PUTTING INTO OPERATION

After having placed the lathe on foundation as shown on the foundation and mounting drawings, all surfaces protected with anticorrosive grease will be cleaned. This will be done with clean rags soaked with petrol or kerosene.

Surfaces washed will be wiped dry and then covered with oil according to the lubricating instructions, in order to prevent rusting and possible seizure.

Emery paper should not be used for cleaning the lathe.

The provisions of the lubrication diagram which relate to the oil make-up levels, should be observed.

The connection to the mains will be made after giving a careful study to the chapter on the electric drive and observing all the indications provided on the principle diagram (fig. 15).

Check the direction of rotation of the motors; it must correspond to the arrows indicated.

The controls and their functions will be identified from the diagram of controls (fig. 3). The proper operation of the controls will be checked manually (fig. 3).

Then connect electric control pannel to the mains, and operate the main switch, position 12 (fig. 3), the lathe being ready for working.

The farst start will be made at the minimu speed of the main shaft

During this time, check for the proper operation of all mechanisms and individual pumps. Then the machine will be made ready to begin work.

When first starting to work, the felt and the protecting devices from the slide ends should not be removed withous first lubricating the guiding surfaces of the machine.

Check the mains voltage to which the machine has been connected, to see if it corresponds the working voltage of the machine.

In order to avoid accidents which could take plece upon starting the lathe, the buyers should employ only qualified personnel, who has previously studied the machine booklet and has received the corresponding safety briefing specific to the branch where they work.

CONTROLS SPECIFICATION

(see table on figure 3)

1. Feed reversing
2. Change of main shaft speed
3. Change of main shaft speed
4. Feed multiplying
5. Changing the main shaft speed
6. Forward and backward clutching in and braking
7. Lead screw or feed spindle coupling
8. Threade change
9. Feed change
10. Feed change
11. Stop start button, prime mover
12. Main switch
13. Electric pump switch
14. Cooling tap
15. Fixing the tool-holder head
16. Cross feed
17. Slide movement
18. Longitudinal and cross feeds
19. Tool slide feed
20. Blocking the tail-stock spindle
21. Blacking the tail-stock on bed
22. Feed of tail-stock spindle
23. Coupling the lead screw
24. Feed coupling
25. Light switch

KINEMATICS OF LATHE

Speed of the main shaft

Nr. of steps	Ratio	Structural formula	Speeds r. p. m.
		$3_3 \times 3_1 \times 2_9$	31.5, 40, 50, 63, 80, 100, 125, 160, 200, 250. 315, 400, 500, 630, 800, 1000, 1200. 1600

FEEDS mm/rev

Longitudinally

Normal pitch			Increased pitch		
0,03	0,06	0,12	0,24	0,48	0,96
0,04	0,08	0,16	0,32	0,64	1.28
0,05	0,10	0,20	0,40	0,80	1.60
0,07	0,14	0,28	0,56	1,12	2,24
0,09	0,18	0,63	0,72	1,44	2,88
0,11	0,22	0,44	0,88	1,76	3,52

Transversally

Normal pitch			Increased pitch		
0,01	0,02	0,04	0,08	0,16	0,32
0,013	0,027	0,053	0,107	0,213	0,427
0,017	0,033	0,067	0,133	0,267	0,533
0,023	0,047	0,093	0,187	0,373	0,747
0,03	0,06	0,12	0,24	0,48	0,96
0,037	0,073	0,147	0,293	0,586	1,17

THREADS

Metric mm

Normal pitch			Increased pitch		
0,375	0,75	1,5	3	6	12
0,5	1	2	4	8	16
0,625	1,25	2,5	5	10	20
0,875	1,75	3,5	7	14	28
1,125	2,25	4,5	9	18	36
1,375	2,75	5,5	11	22	44

Module mm

Normal pitch			Increased pitch		
0,375	0,75	1,5	3	6	12
0,5	1	2	4	8	16
0,625	1,25	2,5	5	10	20
0,875	1,75	5,5	7	14	28
1,125	2,25	4,5	9	18	36
1,375	2,75	5,5	11	22	44

Whitworth pitch/inch

Normal pitch			Increased pitch		
24	12	6	3	$1^1/_2$	$^3/_4$
32	20	10	4	2	1
40	20	10	5	$2^1/_2$	$1^1/_4$
56	28	14	7	$3^1/_2$	$1^3/_4$
72	36	18	9	$4^1/_2$	$2^1/_4$
88	44	22	11	$5^1/_2$	$2^3/_4$

Pitch in inches, inches

Normal pitch			Increased pitch		
3/128	3/64	3/32	3/16	3/8	$^3/_4$
1/32	1/16	1/8	1/4	1/2	1
5/128	5/64	5/32	5/16	5/8	$1^1/_4$
7/128	7/64	7/32	7/16	7/8	$1^3/_4$
9/128	9/64	9/32	9/16	1 1/8	$2^1/_4$
11/128	11/64	11/32	11/16	1 3/8	$2^3/_4$

Diametral Pitch DP

Normal pitch			Increased pitch		
24	12	6	3	$1^1/_2$	$^3/_4$
32	20	10	4	2	1
40	20	10	5	$2^1/_2$	$1^1/_4$
56	28	14	7	$3^1/_2$	$1^3/_4$
72	36	18	9	$4^1/_2$	$2^1/_4$
88	44	22	11	$5^1/_2$	$2^3/_4$

The speeds of the main shaft are obtained according to the instructions given in the „speed plate", item 1500—10, mounted on the head-stock.

The feeds and the pitches are obtained from the „table of feeds and pitches", item 1500—16 A, mounted on the feed box front side; attention should be paid to the arrangement of the existing changes gears and to the kinematic diagram

LIST OF GEARS

(see figure 4)

Nr. on the diagram	Nr. of teeth or beginnings	Module or pitch, mm	Width mm	Meterial	Heat treatment	Hardness or resistance in kgf/sp mm	Correction mm	Item number	Subassembly
0	1	2	3	4	5	6	7	8	9
								conical	
1.	32	2	13	OLC 45	improved	65—75	—	10.148	
2.	32	2	13	OLC 45	improved	65—75	—	10.163	
3.	37	2,25	15	15 MoMC 12	Case harde-	HRC	—		
					ned	56—52	—	10.029	
4.	47	2,25	15	15 MoMC 12	"	"	—	10.325	
								— I	
5.	47	2,25	15	15 MoMC 12	"	"	—	10.077	
6.	80	2,25	24	15 MoMC 12	"	"	—	10.321	
								— I	
7.	32	2,25	24	15 MoMC 12	"	"	—	10.061	
8.	64	2	18	15 MoMC 12	"	"	—	10.059	
9.	20	2	68	15 MoMC 12	"	"	—	10.067	
10.	47	2	12	OLC 45	improved	65—75	—	10.326	
								— I	
11.	47	2	12	21 MoMC 12	Case	HRC	—		
					hardened	56—52	—	10.074	
12.	37	2	12	21 MoMC 12	"	"	—	10.082	GEAR BOX
13.	42	2	12	21 MoMC 12	"	"	—	10.073	
14.	42	2	12	21 MoMC 12	"	"	—	10.081	
15.	52	2	12	15 MoMC 12	"	"	—	10.072	
16.	32	2	12	21 MoMC 12	"	"	—	10.080	
17.	42	2	12	15 MoMC 12	"	"	—	10.087	
18.	42	2	12	21 MoMC 12	"	"	—	10.093	
19.	56	2	12	15 MoMC 12	"	"	—	10.088	
20.	28	2	12	21 MoMC 12	"	"	—	10.094	
21.	28	2	14	21 MoMC 12	"	"	—	10.085	
22.	56	2	12	15 MoMC 12	"	"	—	10.095	
23.	32	2	15	21 MoMC 12	"	"	—	10.137	
24.	52	2	12	15 MoMC 12	"	"	—	10.091	
25.	50	2	14	15 MoMC 12	Case	HRC			
					hardened	56—52	—	10.124	
26.	30	2	30	15 MoMC 12	"	"	—	10.120	
27.	30	2	10	15 MoMC 12	"	"	—	teeth	
					"	"	—	int	
					"	"	—	10.116	
28.	58	1,5	15	OL 50	"	"	—	10.181	
29.	110	1,5	15	Fc 20	"	"	—	13.16	
30.	10	3	15	OLC 45	improved	65—75	+0,40	13.24	Pump
					"	kgf/cm/	"		
31.	10	3	15	OLC 45	"	"	+0,40	13,22	
32.	47	2	12	OLC 45	"	"	+0,255	22.22	
33.	44	1,5	11	OLC 45	"	"	—	22.21	Revelsal Multiplier
34.	44	1,5	11	OLC 45	"	"	—	22.23	
35.	40	1,5	11	OLC 45	"	"	—	22.21	
36.	40	1,5	11	OLC 45	"	"	—	22.23	
37.	40	1,5	11	OLC 45	"	"	—	22.01	

0	1	2	3	4	5	6	7	8	9
38.	24	1,25	12	OLC 45	Improved	"	—	23.07A	
39.	80	1.25	12	OLC 45	"	"	—	23.09	
40.	80	1.25	12	OLC 45	"	"	—	23.09	
41.	96	1.25	12	OLC 45	"	"	—	23.10A	
42.	71	1.25	12	OLC 45	"	"	—	23.08	
43.	113	1.25	12	OLC 45	"	"	—	23.11	Change gears
44.	120	1.52	12	OLC 45	"	"	—	23.12	
45.	130	1.25	12	OLC 45	"	"	—	23.33A	
46.	114	1.25	12	OLC 45	"	"	—	23.33A	
47.	127	1,25	12	OLC 45	"	"	—	23.13	
48.	96	1,25	12	OLC 45	"	"	—	23.20	
49.	26	1,25	12	OLC 45	"	"	—	23.20	
50.	39	1,25	12	OLC 45	"	"	—	23.25	
51.	33	2.5	10	OLC 45	"	"	—0,134	21.018	
52.	18	2.5	10	OLC 45	"	"	+0,4	21.020	
53.	36	2	10	OLC 45	"	"	—0,23	21.020	
54.	30	2	10	OLC 45	"	"	—0.239	21.022	
55.	39	2	10	OLC 45	improved	65—75 kgf/cm²	—	21.022	
56.	26	2	10	OLC 45	"	"	—	21.024	
57.	39	2	10	OLC 45	"	"	—	21.024	
58.	26	2	10	OLC 45	"	"	—	21.025	
59.	28	2,5	10	OLC 45	"	"	—	21.025	
60.	24	2.5	10	OLC 45	"	"	—	21.026	
61.	34	2.5	10	OLC 45	"	"	+0,114	21.026	
62.	17	2,5	10	OLC 45	"	"	+0,42	21.030	Feed box
63.	26	2.5	10	OLC 45	"	"	—	21.036	
64.	26	2.5	10	OLC 45	"	"	—	21.041	
65.	34	2.5	10	OLC 45	"	"	+0,114	21.040	
66.	17	2.5	10	OLC 45	"	"	+0,42	21.042	
67.	17	2,5	10	OLC 45	"	"	+0,42	21.040	
68.	34	2.5	10	OLC 45	"	"	+0,114	21.042	
69.	26	2.5	10	OLC 45	"	"	—	21.044	
70.	26	2.5	10	OLC 45	"	"	—	21.042	
71.	26	2.5	10	OLC 45	"	"	—	21.048	
72.	26	2 5	10	OLC 45	"	"	—	21.061	
73.	42	2	10	OLC 45	"	"	—	conical 21.084	
74.	42	2	11	OLC 45	"	"	—	conical 21.090	
75.	14	2	12	OLC 45	"	"	+0,2	30.066A	
76.	44	2	12	OLC 45	"	"	—	30.002	
77.	14	2	12	OLC 45	"	"	+0,2	30.011	
78.	40	2	12	OLC 45	"	"	—	30.006	Carriage
79.	32	2	12	OLC 45	"	"	—	30.012	
80.	25	2	10	OLC 45	"	"	—	30.012	
81.	36	2	10	OLC 45	"	"	—	30.030	
82.	40	2,25	20	Bz8ZnT	"	"	—	30.013B	
83.	1	2,25	—	OLC 45	improved	65—75	—	30.110A	
84.	30	2	8	15 MoMC 12	Case hardened	HRC 56—52	+1,0	30.118	

0	1	2	3	4	5	6	7	8	9
85.	30	2	8	15 MoMC 12	"	"	+1,0	30.119	Carriage
86.	15	2	16	15 MoMC 12	"	"	+0,450	30.121A	
87.	22	2	12	OLC 45	improved	65—75	—	30.092	
88.	22	2	12	OLC 45	"	"	—	30.050	
89.	12	2	14	41 MoC 11	"	95—100	+0,35	30.005	
90.	15	2	10	OLC 45	"	65—75	—	4043A	Slide
91.	—	2	15	OLC 45	"	"	—	6009	Body

LIST OF BALL BEARING

(See figure 6)

Nr. on the diagram	Type nf bearing	Series as to STAS	d	A	b	Re-marks	Subas-sem bly where mounted
0	1	2	3	4	5	6	7
1.	Radial axial ball bearing	7211	55	100	21		
2.	Radial axial ball bearing	7211	55	100	21		
3.	Radial cylindrical roller-bearing	NN3014K	70	110	30		
4.	Radial ball bearing	6306	30	72	19		
5.	Radial ball bearing	6307	35	80	21		
6.	Radial ball bearing	6205	25	52	15		
7.	Radial ball bearing	6205	25	52	15		
8.	Radial ball bearing	6305	25	62	17		
9.	Radial ball bearing	6305	25	62	17		
10.	Radial ball bearing	6305	25	62	17		
11.	Radial ball bearing	6305	25	62	17		
12.	Radial ball bearing	6006	30	55	13		
13.	Radial ball bearing	6006	30	55	13		
14.	Radial ball bearing	6304	20	52	15		
15.	Radial ball bearing	6306	30	72	19		
16.	Radial ball bearing	6305	25	62	17		
17.	Radial ball bearing	6006	30	55	13		
18.	Radial ball bearing	6006	30	55	13		
19.	Radial ball bearing	6904	20	42	12		
20.	Radial ball bearing	6004	20	42	12		
21.	Radial ball bearing	6004	20	47	14		
22.	Radial ball bearing	6004	20	47	14		
23.	Radial ball bearing	6004	20	47	14		
24.	Radial ball bearing	6004	20	47	14		
25.	Radial ball bearing	6004	20	47	14		
26.	Radial ball bearing	6304	20	52	15		
27.	Radial ball bearing	6304	20	52	15		
28.	Radial ball bearing	6304	20	52	15		
29.	Radial ball bearing	6004	20	42	12		
30.	Radial ball bearing	6202	15	35	11		
31.	Radial ball bearing	6202	15	35	11		
32.	Radial ball bearing	6304	20	52	15		
33.	Radial ball bearing	6304	20	52	15		
34.	Radial ball bearing	6007	35	62	14		
35.	Radial ball bearing	6202	15	35	11		
36.	Radial ball bearing	6203	17	40	12		
37.	Axial ball bearing	51202	15	32	12	Carriage	
38.	Axial ball bearing	51202	15	32	12		
39.	Azial ball bearing	51106	30	47	11	Lead screw	
40.	Taper roller bearing	30203	17	40	13,5		

Head stock

Feed box

DESCRIPTION OF THE MACHINE

Type SN—320 lathe is built as a light universal lathe, destined among others, to mobile workshops for repairs; it contains the following subassemblies:

Crt. Nr.	Designation of the assembly	Subassembly item	Remarks
1.	Gear box	10.000	
2.	Clutch and brake control	1.100	
3.	Control of sliding gears	1.200	
4.	Pump	1.300 A	
5.	Filter	1.400	
6.	Tables	1.500	
7.	Feed-box	21.000	
8.	Reversal-multiplier	2.200	
9.	Lyre	2.300	
10.	Carriage	30.000	
11.	Slides	4.000	
12.	Tail stock	5.000	
13.	Body	6.000 A	
14.	Leg	6.100	
15.	Cooling installation	6.200 A	
16.	Fixed steady	7.100	
17.	Mobile stady	7.200	
18.	Cupboard	8.000	
19.	Driving flange	8.100	
22.	Accessories	8.200	
21.	Faceplate with four jaws	8.300	
22.	Accessoes	8.400	
23.	Electric installation	9.000	
24.	Threading indicator	9.200	
25.	Protecting screen	9.300	

1. Gear box

A characteristic of the lathe SN—320 design is that the gear box, the feed box and the front leg form a monoblock body. On this body is placed the bed of the lathe, fixed cantilevered with screws.

The gear box is driven by means of an elastic clutch from an electric motor, fixed on the body of the gear box with screws. From the motor the movement is transmitted to the main shaft by means of gears, whose lay-out from the kinematic point of view gives a range of 18 speed steps.

By tuning the handles 2 and 3 (figure 3) and by means of some levers, the displacement of the moving blocks 17—19—21 and 12—14—16 respectively (figure 4) is obtained; these displacements allow for the obtention of a new gear combination. If the wheel 5 (figure 4) is meshed and if the gear 26—25—24 is clutched (figure 4) then on the main shaft the 9 gearing combinations will be obtained thus realising the speed ranges between 250 and 1600 r.p.m. This is possible when handles 5 and 6 (figure 3) are in the position „top" and „to the left" respectively.

The range of reduced speeds, 31,5 ... 200 is obtained by placing handle 5 in the bottom position and handle 6 in the position to the rigth. In this case, by means of some spatial cams, the forks remove wheel 5 from mesh and bring into mesh the sliding gear 23—22 (figure 4). The reduction ratio of these two ranges is 1:8.

Handle 6 (figure 3) placed in the middle position realises the breaking by means of some levers.

All the gears of the gear box are made of alloy steel, heat treated. For all the grooved connections the centering is on the inner diameter of the spline shaft.

The fixing of the sliding blocks is obtained by rigidly locking the forks.

For centering and fixing the universal chuck, the main shaft is provided with a long tapered head.

The locking of the universal chuck is done by the nut on the main shaft specially destined for that purpose.

2. Reverser, multiplier

By turning handle 1 (figure 3) which controls the sliding gears 33—35 (figure 4) the reversal of the feeds is obtained. Thus, if handle 1 is placed in the left or right position, right or left hand threading is obtained.

By coupling handle 4 (which acts on wheel 32) from the 1:1 position, to the 8:1 position. a by 8 multiplication of the basic pitch is obtained in the case of low speeds (31,5—200) r.p.m.

3. The feed box

Receives its movement from the gear box by way of the multiplier and the change gear lyre.

The kinematic of the feed box is obtained by sliding blocks, controlled by mechanism with spatial cams and levers.

By means of the lead screw with the pitch of 6 mm at speeds from 31,5 to 1600 r.p.m. the following threads can be obtained:

— metric threads of 0,375 to 5,5 mm pitches;

— Whitworth threads of 3/4 to 88 pitches per ounce;

— module threads of module pitch from 0,375 to 5,5 mm;

— Diametral-pitch threads with 3/4 to 88 diametral pitch;

— threads of inch pitch from 3/128 up to 11/32.

By means of the multiplying mechanism at a speed of the shaft of 31,5 to 200 r.p.m. there can be obtained threads with the pitch increased 8 times as compared to the normal pitch.

The normal pitch is obtained by acting on the sliding wheels 52—53, 56—57 and 60—61 with the aid of handle 10 fixed in one of its six positions and also by acting on sliding wheel 66—68—70, with the aid of handle 9 fixed in one of positions A, B, or C.

By means of the feed spindle, the slide receives, whatever the speed of the main shaft, the longitudinal feed of 0,03 up to 0,44mm/revolution of the main shaft, the handle being in position 1:1 (figure 3).

By coupling handle 4 in the 8—1 position in the range of speeds of 31,5 up to 200 r.p.m., longitudinal feeds of 0,32 to 3,52 mm/rev. of the main shaft can be obtained, and transversal ones of 0,106 up to 1,17 mm/rev.

The choice of the type of thread and the coupling of the guide screw or of the feed spindle is made by handle 8 or handle 7 respectively (See figure 3), according to the indications on the table of pitches and feeds.

The material and the treatment of gears can be seen on the list of gears, and their centering on the grooved shafts is ensured by internal centering.

The axial thrust of the lead-screw is taken up by the axial ball bearings 39 and 40 mounted at the ends of the screw (figure 6).

3. Ghange gears

Through the multiplier, the change gears get the movement from the head-stock, by shaft XIV. and they transmit it to the feeed box through the shaft XVI. or XVIII.

The lathe is equipped with 10 change gears whose material and heat treatment are shown on the list of toothed wheels.

The mounting of the gears for obtaining the different pitches and feeds is provided both in the kinematic diagram (figure 4) and in the table of pitches and feeeds.

From the kinematic diagram (figure 4) it can be seen, that the entrance into the feed box for metric pitch, for module pitch and for inch pitch is obtained through shaft XVI.

For the pitch/inch and diametral pitch threads, the entrance is through shaft XVIII.

The mounting position of change gears will be observed for every category of pitch indicated on the kinematic diagram (figure 4) and also on the table of pitches and feeds.

For special threads of 13 pitches per inch and 19 pitches per inch there, 2 further change wheels have been provided, and namely the wheels with 130 and 114 cogs respectively.

To obtain the thread of 13 pitches/inch, the following couplings shall be made:

— Handle 1 (see figure 3) in the position for normal thread;

— handle 4 in the position 1:1;

— landle 10 in position 1;

— handle 8 in position W;

— landle 7 in the position „thread";

— handle 9 in position B.

Tho this thread corresponds the assembly (see figure 4) of the change wheels for the pitch per inch thread, with the folowing difference; instead of the wheel with 120 teeth there will be mounted the wheel 130 teeth, which is marked by an asterisk and also the thread of 13 pitches, on the table.

For the thread of 19 pitches per inch the same coupling is valid except that the handle 10 will be coupled in position 3 and in the place of the wheel with 120 cogs there will be mounted the one with 114 to which there correspond two asteriks on the change gears table.

In view of the restricted use of these threads the special change gears have been grouped in the category of special accessories

As a consequence, the buyers can obtain these change gears from the works by a special or der and with agreement of the works.

5. Carriage

The carriage is destined to transmit the movement from the feed spindle or from the lead screw to the slide. The moving and the control of the carriage is taking place as follows:

— whit the hand wheel 17, fig. 3, by way of gears 75—76 and 89—91 (fig. 4), the drive ot the manual longitudinal feed is obtained;

— by the handle 18, which acts on the moving cog 79—80 by means of a fork, the mechanical longitudinal feed or the mechanical transversal feed are achieved;

— with handle 23, which realizes the coupling of the lead screw for threading operations;

— with handle 24, which realizes by means of an eccentric the coupling of wheel 86 with the wheels 84—85, thus being obtained the coupling of the feeds.

The hand wheel 17 is provided with a graduated drum which makes one complete turn for a displacement of the carriage of 24 mm.

To avoid simultaneous coupling of feeds and threads, the carriage is provided with an interlocking mechanism.

Also by the decoupling mechanism which it comprises, it offers the possibility of working at the buffer, saving at the same time the elements of the carriage from possible overloands.

6. The slides

The slide assembly is made up of 5 main parts and namely:

1. the longitudinal slide
2. the transversal slide
3. the intermediary, rotating supoprt
4. the tool slide
5. the tool holder.

The longitudinal slide is fastened to the carriage by screws and fixed in position by taper pins; they are moved together by hand or mechanically on the prismatic guides at the front side and on the plane one, at the back of the body.

The transversal slide is moved on the guides of the longitudinal slide by manual or mechanical feed.

Operating handle 16 (fig. 3) is provided with a graduated drum which makes a complete turn for a 4 mm displacement of the transversal slide.

The intermediary support can turn to the right or to the left by 180 degrees, by loosening first the nuts fixing it to the transversal slide. After turning to the desired angle the nuts are tightened again.

The tool slide moves on the guides of the support only by hand. At a complete turn of the handle 19 (fig. 3) on the graduated drum the tool slide moves 3 mm. It carries the protecting screen.

The tool holder allows for the fixing of 4 tools of 20x20 maximum section and it is provided for indexing four mobile positions. The turning of the tool holder is done manually and the locking, with handle 15.

In this manner owing to the independent movements of all the principal parts, the tool can be given longitudinal and transversal movements and by turning the intermadiary support tapered turning is obtained.

7. The tail — stock

It is made in an usual construction. The locking of the tail-stock on the body by handle 21 (fig. 3) and the locking of the tail spindle by handle 20.

The movement of the tail spindle is done by hand, with the handwheel 22 (fig. 3).

The tail-stock is displaced longitudinally on the internal guides of the body.

For tapered turning the body of the tail-stock is moved transversally with adjusting screw 2, by means of nut 1 (fig. 17).

8. The body

The body is of a sturdy construction with the front part fixed in cantilever on the monoblock body made up by the gear box, the feed box and the large leg, the back part being fixed to the pedestal. The fixing at both ends is done by screws and the positioning by tapered pins.

Two sets of guides are provided:

— internal guides for guiding the tail-stock and the fixed steady.

The construction of the body allows for the mounting of a tool cupboard below it.

9. Cooling

The cooling emulsion tank is located in the riinght leg of the lathe. Behind that leg is situated the electrical pump from which a flexible pipe leads to the adjusting tap 14 (fig. 3), provided with a joint for directing the jet of the cooling liquid.

10. Accessories

The accessories are identified under twe headings:

— normal accessories which are delivered with the machine;

— special accessories which are delivered only on the demand of the buyer, and with the previous agreement of the maker.

The group of normal accessories comprises all that is necessary for a good normal functioning of the lathe, while the group of special accessories includes those which are not comprised in the price of the machine; but they broaden considerably the working possibilities of the machine, ensuring increased productivities and are to be ordered by the buyers according to the specific work to which the lathe is to be used.

Below is a list for each of these two categories of accessories.

ELECTRICAL DRIVE

1. Description of the installation

The lathe electrical installation is designed for a normal three-phase tension of 220/380 V and 50 cs frequency. Before connecting the lathe, it is to be verified if the voltage corresponifs. On request of the purchasers and with the previous agreement of the maker, lathes may be supplied with other voltages too.

The lathe shall be connected to the mains thorogh RSTO terminals. The protective mesh shall be connected in accordance with the safety rules in force.

The electrical controls are placed on the leg of the lathe, as follows:

— Green push-button: main drive motor start;

— Red push button: main drive motor stop;

— Rotary built-up switch of 10 A: disconnects the installation from the supply;

— Ditto, disconnects the supply of the coolant pump;

— Ditto, disconnects the lighting circuits.

The whole electrical installation is mounted in a single control panel.

For starting the lathe, proceed as follows:

— after the lathe is connected to the mains, switch the main switch „a 1" — energizing thus the control circuits,

— acting on the green push button „b 2" check for the correct sens of rotation (mandrel rotates toward the operator), if it is not the case, reverse between them two phases at the RST input,

— rotary built-up switch „a 2) starts the cooling pump motor and switch (a 3) cupplies for lighting.

The current for the control of the main motor as well of the lighting are taken from 24 V tension — so as no electrocution danger may occur.

The maker reserves all rights for change or modify the electric diagram of the machine.

The charasteristical features of the electrical items are according to the electrical principle wiring diagram inserted.

Electric motors shall be inspected at least twice times in a year. With this opportunity must inspect the bearings for wear. If they are not worn, renew the grease only before remounting; when they are badly worn — replace them. Proceed also to clean the motors windings, using a soft brush, avoiding the deteriation of the insulations also the short-circuting of the coils.

The electrical equipment shall be inspected monthly for the condition of the switches and contactors, contacts, they shall be found not corresponding — clean them with emery paper.

The motors and bearings shall be inspected on load for warm up. Should the windings temperature exceed by more then 65° C the environnement temperature, check the motor, or the lathe and remove the cause of the excessing heating. The temperature of the bearings should not exceed by more than 10—15° C the environnement temperature. Otherwise, the bearing must be replaced and the cause of the excessing warm-up shall be eliminated.

CAUTION: The motor may be owerloaded for tippings — 25% from his onminal power only.

3. Electric fault clearing

Deficiency	Probable cause
The lathe doesn't start:	— not all three phases of the main motor are energized; — no voltage in control loop; — the mechanical components of the lathe are in locked position.
The lathe is functioning of an abnormal speed:	— two phases supply only; — no prescribed freqvency; — voltage not corresponds.
The motor warms-up:	— two phases supply only; — short circuited winding; — runs in overload; — main motor fuse hurnt up.

ELECTRICAL EQUI

CHARACTERISTICS

rt nr.	Symbol as in electr. diagram	Item and type	Characteristics	Code nr
	e1, e2, e3	Fuse	LF 25 fusible 25 A	2031
	e1, e2, e3	Fuse	LF 25 fusible 20 A	2031
	e1, e2, e3	Fuse	LF 25 fusible 15 A	2031
	e4, e5, e6	Fuse	LF 25 fusible 4 A	1995
	e4, e5, e6	Micro-fuse	LF 25 fusible 2 A	1995
	e7, e8	Micro-fuse	LF 25 fusible 2 A	1995
	e9, e10	Micro-fuse	LF 25 fusible 4 A	1995
	c	Contactor Ac 3	10 A 24 V	3910
	e11	Thermal relay unit	10 A bimetal 10 A	3660
	e11	Thermal relay unit	10 A bimetal 7,5 A	3660
	e11	Thermal relay unit	10 A bimetal 5 A	3660
	b1, b2	Control button	2 A 380 V red	3770
	b1, b2	Control button	2 A 380 V green	3770
	a1, a2, a3	Rot. built-up switch	10 A 380 V	0584
	a1, a2, a3	Rot. puilt-up swit h	10 A 500 V	GW wm
	m3	Transformer	220/24 VA 50 cs	TMA 100
	m3	Transformer	380/24 VA 50 cs	TMA 100
	m3	Transformet	400/24 VA 50 cs	TMA 100
	m3	Transformer	[illegible] VA 50 cs	TMA 100
	m3	Transformer	450/24 VA 50 cs	TMA 100
	m3	Transformer	500/24 VA 50 cs	TMA 100

ELECTRICAL EQUIPMENT

CHARACTERISTICS

Item and type	Characteristics	Code nr	Maker	I	II	III	I
				Motor 2,2			
				220V	380V	400V	41
se	LF 25 fusible 25 A	2031	E. A.	3			
se	LF 25 fusible 20 A	2031	E. A.				
se	LF 25 fusible 15 A	2031	E. A.		3	3	
se	LF 25 fusible 4 A	1995	E. A.	3			
cro-fuse	LF 25 fusible 2 A	1995	E. A.		3	3	
cro-fuse	LF 25 fusible 2 A	1995	E. A.	2	2	2	
cro-fuse	LF 25 fusible 4 A	1995	E. A.	2	2	2	
ntactor Ac 3	10 A 24 V	3910	E. A.	1	1	1	
ermal relay unit	10 A bimetal 10 A	3660	E. A.	1			
ermal relay unit	10 A bimetal 7,5 A	3660	E. A.		1		
ermal relay unit	10 A bimetal 5 A	3660	E. A.			1	
ntrol button	2 A 380 V red	3770	E. A.	1	1	1	
ntrol button	2 A 380 V green	3770	E. A.	1	1	1	
. built-up switch	10 A 380 V	0584	E. A.	3	3		
. puilt-up swit h	10 A 500 V	GW wm	R.P.P.			3	
nsformer	220/24 VA 50 cs	TMA 100	E. T.	1			
nsformer	380/24 VA 50 cs	TMA 100	E. T.		1		
nsformet	400/24 VA 50 cs	TMA 100	E. T.				
nsformer	415/24 VA 50 cs	TMA 100	E. T.				
nsformer	450/24 VA 50 cs	TMA 100	E. T.				
nsformer	500/24 VA 50 cs	TMA 100	E. T.				

CTRICAL EQUIPMENT

CHARACTERISTICS

Code nr	Maker	Pieces per variant												Remarcs
		I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
		Motor 2,2 kw						Motor 3 kw						
		220V	380V	400V	415V	440V	500V	220V	380V	400V	415V	440V	500V	
2031	E. A.	3												
2031	E. A.								3	3	3	3		
2031	E. A.		3	3	3	3	3						3	
1995	E. A.	3												
1995	E. A.		3	3	3	3	3		3	3	3	3	3	
1995	E. A.	2	2	2	2	2	2		2	2	2	2	2	
1995	E. A.	2	2	2	2	2	2		2	2	2	2	2	
3910	E. A.	1	1	1	1	1	1		1	1	1	1	1	
3660	E. A.	1											1	
3660	E. A.		1						1	1	1	1	1	
3660	E. A.			1	1	1	1							
3770	E. A.	1	1	1	1	1	1		1	1	1	1	1	
3770	E. A.	1	1	1	1	1	1		1	1	1	1	1	
0584	E. A.	3	3			1	1		3					
GW wm	R.P.P.			3	3	3	3			3	3	3	3	
TMA 100	E. T.	1												
TMA 100	E. T.		1						1					
TMA 100	E. T.									1				
TMA 100	E. T.				1						1			
TMA 100	E. T.					1						1		
TMA 100	E. T.						1						1	

LUBRICATING CHART

FOR NORMAL LATHE TYPE SN-320

Lubrication place		Characteristics of lubricant					Indicator	
		Denomination of oil				Viscosity		
Place	Nr.	STAS	Mobil oil	Shell	DIN	°E	Symbol	Colour
Gear box	1	305 Stas 1195-56	Mobil Vactra oil Nr 2	Vitrea 33	51.501	5 6° E/50°C	△	Brown
Carrioge box	2	305 Stas 1195-59	Mobil Vactra oil Nr, 2	Vitrea 33	51.501	5 6° E/50°C	△	Brown
Tail stoek	3	108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/60°C	□	Black
Traverse and toolholder slide	4	108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/50°C	□	Black
Slide guides	5	108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/50°C	□	Blaek
Bed guides	6	108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/50°C	□	Black
Rear bearing of lead screw	7	108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/50°C	□	Black
Lead screw	8	108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/50°C	□	Blak
Water pump axle	9	108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/50°C	□	Blak

C_1 Upper oit level at gear box

C_2 Lower oit level at gear box

C_3 Oil level in slide box

C_4 Level of cooling liquid

C_5 Checking the operation of lubricating pump in gear box

LUBRICATING CHART

FOR NORMAL LATHE TYPE SN-320

Characteristics of lubricant					Indicator		Lubricating scheme		
Denomination of oil				Viscosity °E	Symbol	Colour	Frequency of lubricating	Amount of lubricant	Type of lubrication
STAS	Mobil oil	Shell	DIN						
305 Stas 1195-56	Mobil Vactra oil Nr 2	Vitrea 33	51.501	5 6° E/50°C	△	Brown	30 - 45 days	Filling to level C_1	Piston pomp
305 Stas 1195-59	Mobil Vactra oil Nr, 2	Vitrea 33	51.501	5 6° E/50°C	△	Brown	30 - 45 days	Filling to level C_1	Piston pomp
108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/60°C	□	Black	8 hours	6-8 drops	Oil can
108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/50°C	□	Black	8 hours	6-8 drops	Oil can
108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/50°C	□	Black	8 hours	6-8 drops	Oil can
108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/50°C	□	Black	8 hours	6-8 drops	Oil can
108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° F/50°C	□	Black	8 hours	6-8 drops	Oil can
108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/50°C	□	Blak	Daily	6-8 drops	Oil can
108 Stas 383-49	Rubrex 600	Vitrea 41	51.504	8 9,5° E/50°C	□	Blak	Daily	6-8 drops	Oil can

pump in gear box

MACHINE LUBRICATION

1. Gear and feed box lubrication

For lubrication purposes pour into the gear box oil 305 as to STAS 1195—56. checking the level of the oil by the sights C1, C2 (fig 13), the quantity of oil needed being of approximately 16—18 litres.

The gear box is provided with an oil filter, which is cleaned by turning the handle at the back of the gear box.

The change of oil from the gear box is done as follows: after the first 10 days of work. then after 20 days, and henceforth at 30...40 days intervals.

With every change of oil the gear box and the feed box will be well washed with clean petrol or kerosene. The oil will be poured through a sieve and after drying the petrol or the kerosene used to wash the machine.

2. Carriage box lubrication

For lubricating the slide box, remove the protecting lid, covering the transversal screw and pour oil 305 STAS 1195—56 into the slide box, checking the oil level through the check point C3 (figure 13).

The washing of the box and the change of oil will be done as in the case of the gear box.

3. Lubrication of other elements of the lathe

On the tail-stock, oil the screw, the screw bearing and the tail spindle; use oil 108 STAS 383—49 once every 8 hours through the corresponding ball greasers.

The guidings of the slides will be lubricated with the same oil, once every 8 hours.

The lubrication of the bed guides on which the carriage runs will be done in the same manner as above, once every 8 hours, through the greasers provided for this purpose on the carriage.

The lubrication of the back bearing of the lead screw and of the feed spindle will be done with the same oil as above, once every 8 hours.

The lead screw will be lubricated with oil (by can) on the whole length, at the beginning of each job.

MAINTENANCE AND SETTING OF LATHE

During the working of the lathe the following rules must be observed:

1. The change of speeds is not allowed while running, nor should the lathe be started at high speed Before starting, check if every handle is properly coupled and if their positioning is locked.

2. The provisions of the lubricating chart are to be strictly adhered to. The level of the cooling liquid is to be checked from time to time in the tank and the tank is to be cleaned of chips and impurities.

3. The oil filter must be washed periodically.

4. The guide spindle will be used only for cutting threads.

5. The use of the steadies imposes the need to lubricate the tenons resting on the material.

The organs of the lathe wich require setting are:

1. — The front bearing of the main shaft. This bearing constists of a double roller bearing (adjustable) whose inner ring is mounted on the tapered portion of the main shaft.

The setting of the bearing consists in adjusting the play between the inner ring mounted on the tapered portion of the main shaft and the outer ring. This is done as follows:

— Loosen the pins which lock nut 1 (fig. 7);

— Tighten nut 1 with a claw spanner until the corresponding play is obtained;

— Tighten again the safety pins.

2. — The back bearing of the main shaft. Thrust resulting from the cutting process are taken up by two radial-axial bearings mounted on the main shaft back bearing.

Adjust as follows:

— Check the pin which locks nut 2, the nut 2 (fig. 7) to see if they are not loose. If they are loose then nut 2 is tightened with a spanner provided with a claw, after which it is well locked with the safety pin.

— The screw securing the nut is loosened, after which nut 3 is tightened with a key with claw so thal all play is eliminated. Then the lock screw is well tightened (see fig. 7).

3. — Adjustment of the clutch and of the brake. The proper working of the lathe depends on the correct setting of the clutch and of the brake.

If the clutch is left slack, the disks will slip an one another, which leads to overheating and to premature wear of the disks. At the same time, the power of the motor can not be transmitted to the main shaft.

If the disks are tightened too much, then the main shaft cann cannot be stopped easily and the brake disks are exposed to premature wear.

The clutch and the brake are simultaneously controlled by the same lever 6 (fig. 3), so that upon taking out the clutch the brake is applied, and conversely upon letting in the clutch the brake is freed.

For setting the clutch, the procedure is as follows:

If the disks slip and cannot transmit the power of the motor, the clutch is set bv turning nut 1 (fig. 8) in order to tighten the package of thin sheets, after which the screw 2 is locked.

If the disks are too tightened the procedure is similar, the nut 1 being loosened.

The setting of the brake (fig. 9) is done by way of nut 1 and hook 2, by stretching spring 3, and by means of screw 4 and lock nut 5 for fixing the position.

When adjusting the clutch, care should be taken, so that the mark nut 1 of figure 8 should not lie with elasticity slot in the direction of the grooves where the lamellar ratchets move in the hub of the clutch.

Failing this, it is possible that the lamellar ratchets fall into the elasticity slot, which may result in their deterioration with the first operation.

4. — Adjustment of the overload coupling in the apron To secure the slide against accidental mechanical forces, which could determine a deterioration of the parts, the slide is provided with an adjustable mechanism, which uncouples the mechanical longitudinal or transversal feed, when the effort exceeds the prescribed value.

Thus the force provided by spring 1, can be set with screw 3, locked by nut 2 (fig. 10).

5. — Adjusting the axial play of the lead screw. The elimination of the axial play of the lead screw, is obtained by loosening the safety screw 2 (fig. 11) and turning nut 1, and also by acting on the nuts of the back bearing of the lead screw (fig. 12). After this, it is locked again.

In this way a minimum play is aimed at for a correct working of the bearings 39 and 40 (fig. 6).

6. — The play of the transversal slide screw. The dead stroke of the transversal slide screw, produced by the wear of the nut, can be eliminated by means of the setting screw (1) (see fig. 16), which tightens or loosens the elastic nut 2.

7. — Adjusting the coaxiality between the tail spindle and the main shaft (fig. 17),

It is done by means of screw (2) which turns in nut (1).

EXAMPLES OF SETTINGS FOR THREADS AND FEEDS

To obtain the feeds and the threads the table for feeds and pitches is used, which is attached the machine.

EXAMPLE 1. For a longitudinal feed of 0,14mm/revolution:

The following settings will be made:

— handle 10 in position 4;
— handle 4 in position 1:1;
— handle 7 in feed position;
— handle 8 in position M (metric);
— handle 9 in position B.

The arrangement of the change wheels is the one provided on the table, and namely the mountii in two planes: 24:80x80:96.

The speed of the main shaft will be between 31,5—1600 r.p.m. According to the working spee the handles 2, 3 and 5 will be set as shown in the speed table attached on the machine.

EXAMPLE 2. To obtain a metric 2,25 mm pitch thread, make the following settings:

— handle 10 in position 5;
— handle 4 in position 1:1;
— handle 7 in position „thread";
— handle 8 in position M (metric);
— handle 9 in position B.

The change wheels will be arranged in two planes: 24:80x80:96.

The speed of the main shaft will be between 31,5—1600 rev/min.

EXAMPLE 3. To obtain a 4 pitches per inch thread, make the following settings:

— handle 10 in position 2;
— handle 4 in position 8:1;
— handle 7 in position „thread";
— handle 8 in position „W" (Whitworth);
— handle 9 in position „A".

The change wheels will be in two planes: 24:120x127:96x26:39.

The speed of the main shaft will be comprised from 31,5 to 200 r.p.m.

EXAMPLE 4. To obtain a 36 mm module pitch thread, the following settings shall be made:

— handle 10 in position 5;
— handle 4 in position 8:1;
— handle 7 in position „thread";
— handle 8 in position „M" (metric);
— handle 9 in position „C".

The change wheels are mounted in two planes: 71:113x120:96.

The speed of the main shaft, from 31,5 to 200 r.p.m.

EXAMPLE 5. To obtain a diametral-pitch 20 thread, make the following settings:

— handle 10 in position 3;
— handle 4 in position 1:1;
— handle 7 in position „thread";
— handle 8 in position „W" (Whitworth);
— handle 9 in position „B".

The change wheels are to be mounted in two planes: 71:113x127:96x26:39.

The speed of the main shaft: between 31,5 and 1600 r.p.m.

EXAMPLE 6. To obtain a pitch of 7/32 inch-thread, make the following settings:

— handle 10 in position 4;
— handle 4 in position 1.1;
— handle 7 in position „thread";
— handle 8 in position „M" (metric);
— handle 9 in position „C".

The change wheels are to be assorted in one single plane: 24—[illegible]60.
The speed of the main shaft is ranging from 31,5 to 1600 r.p.m.
With the aid of handle 1 (fig 3) one may obtain a right or left hand thread whatever the type of the thread.

For checking the correct setting of the feed box for whitworth thread, the exact value of the table must be known: it is presented by the pitch-number of the corresponding thread per inch that is 25,4 mm. Thus, the pitch of $1^1/_2$ threads per inch has the value of a pitch of $25,4/1^1/_2$=16,93 mm; the pitch of 24 threads per inch has the value of a thread of 25,4/24=1,058 mm and the $^3/_4$ pitch has the value of a thread of $25,4/^3/_4$=33,866 mm.

For the Module threads the checking is done bearing in mind that the pitch in mm is equal to 3,14 times the value given on the table. Thus, the thread module 3 has the pitch 3x3,14=9,42 mm; the thread module 0,75 has the pitch 0,75x3,14=2,35 mm, and the thread module 20 has the pitch of 20x3,14=62,80 mm.

Fot the DP threads, the checking is done bearing in mind that one thread in mm is equal to:

$$\frac{\pi \cdot 1''}{''}$$

wheren is the value given on the pitch table. Thus, the pitch DP 3 has a thread of.

$$\frac{\pi \ . \ 25,4}{3} = \frac{79,79545}{3} = 26,59 \text{ mm;}$$

the pitch DP 24 has the thread of.

$$\frac{\pi \ . \ 25,4}{24} = \frac{79,79645}{24} = 3,31 \text{ mm;}$$

and the pith DP $^3/_4$ has the thread of.

$$\frac{\pi \ . \ 25,4}{3/4} = \frac{79,79645}{3/4} = 106,395 \text{ mm:}$$

INSTRUCTION FOR MOUNTING AND DISMOUNTING THE UNIVERSAL CHUCK

As accessories to the lathe, the works deliver the universal chuck O.D. 200 mm.

The universal chuck is of a classical cast iron type, the movement of the jaws taking place by a plane spiral (worm) situated on the tapered gear of the chuck.

The universal chuck comprises two types of jaws:

— for fastening from the outside;

— for fastening from the inside.

These are numbered with Arab figures 1, 2, and 3; whenever possible, they should be mounted in such an order, that the jaws move concentrically on the imaginary axis of the universal chuck.

On dismantling operations, the first jaw to be set free is jaw 3 and the second jaw is the second, the third being jaw 1. On mounting, the order is reversed. The plane spiral (worm) is rotated until it reaches groove 1, then the jaw is introduced, pushed and turned in such a manner that the teeth of the jaw should catch the crown. The crown is turned through 120 degrees and the procedure is the same for the second jaw and then for the third one.

If the toothing of the jaws is observed, it can be seen that the teeth length differ, it being greater for jaw 1; then follows jaw 2 and the shortest is that of jaw 3.

THE 4 JAW FACE-PLATE. Instruction for use

The 4 jaws face-plate, figure 19, is an accessory of the lathe used for pieces of great dimensions and varied shapes.

The job is fixed by clips which are radially disposed along the longitudinal outline of the face-plate.

Owing to the mass of the face-plate and of the work pieces fastened to it, carefully check for the followings:

1. The fixing of the face plate at the end of the main shaft. The nut on the body of the plate must be tightened in such a manner that the loosening would not be possible during the turning.

2. The maximum speed for the face plate is of 600 r.p.m.; this must be strictly adhered to, since any excess might lead to accidents.

SAFETY RULES

To prevent possible accidents during work,it is necessary that the operators should strictly observe the following instructions:

1. Check if the universal chucks or the face plates for fastening the work piece are well fastened to the main shaft;

2. The job must be well fixed in the universal chuck, in the face plate or between centers, perfectly centered, so as to be sure it will not be torn or thrown out during working;

3. The key of the universal chuck whould be taken out immediately after fixing the job.

4. When using the jaws universal chuck instead of using the centre of the tail stock, only short pieces $l < 3\,d$ will be turned, where:

l = length of job to be machined;

d = diameter of job to be machined.

5. The tool shall be fastened in its holder with at least, two screws, so that the point of the tool be at the height of the lathe axis, or that its position corresponds to the cutting process as given on the technological sheet.

6. On stop, the feed will be disconnected first, an then the rotation of the main shaft.

7. When strong vibrations ocour during turning, stop the lathe and take the necessary measures to prevent them.

8. When processing long pieces, bars which exceed the dimensions of the lathe, the part of the bar which projects uot beyond the main shaft must be protected by means of a tube or of a fender, cylindrical in shape and fastened on supports.

9. During the work the operator must not lean on the lathe.

10. Chips from eccentrically rotating work pieces shall be removed only after the lathe is stopped.

11. In front of every lathe a wooden grate should be provided on the floor for the workman to stand on during working.

12. Every lathe shall be provided with an adequate protecting screen, to avoid flying chips or cooling liquid being splashed over to the neighbouring machine.

13. The protecting screen of the lathe will be used during the whole work cycle; when working on the inner side of small work pieces, and also when working on non-ferrous metals (bronze, aluminium, etc.), goggles or masks for local protection should be also used.

14. The lathe shall be stopped in the following cases:
— for measuring the work pieces being machined;
— for changing the tools or the jigs;
— for checking the quality of the maching and;
— to remove the chips from the work piece being machined.

15. The machine will be compulsory stopped by disconnecting the motor in the following cases:
— when leaving the working place even for a short time;
— for every break-down in the power supply;
—when removing the chips or when lubricating the machine;
— when finding a fault in the normal operation of the machine.

16. For the cases given under 15) above, the main switch will be turned to 0 (nought).

17. Clearing the electric fault and the maintenance of the electric installation will be entrusted to personnel qualified in the domain.

18. Connection to ground shall be made according to instructions.

19. The fuses are not to be replaced by fortune made fuses of another kind.

NOTE:

The above description concerning the safety rules are by no means limitative; they will be improved — with due consideration given to the specific conditions prevailing at the working place — and also to keep pace with the new standards as they are published and put into force.

NORMAL ACCESSORIES

Crt. No.	Drawing number	Designation	Pieces	Remarks
1	2	3	4	5
1.	——	Spanner A 28—32 STAS 5652—57	1	
2.	——	A-Spanner 34—36 STAS 5652—57	1	
3.	——	A-Spanner 78—85 STAS 5652—57	1	
4.	——	A-Spanner 90—95 STAS 5652—57	1	
5.	——	A-Spanner 135—145 STAS 5652—57	1	
6.	——	Socket wrench C 10x12 STAS	1	
7.	——	Tightening rod 6	1	
8.	——	Socket wrench C 14x17 STAS 4885—60	1	
9.	——	Tightenig rod 9 STAS 4885—60 STAS 4885—60	1	
10.	——	Wrench for hexagonal recess 5 STAS 5183—56	1	
11.	——	Wrench for hexagonal recess 6 STAS 5183—56	1	
12.	——	Wrench for hexagonal recess 8 STAS 5183—56	1	
13.	——	Wrench for hexagonal recess 10 STAS 5183—56	1	
14.	——	Double spanner C 9x11 STAS 582—51	1	
15.	——	Double spanner C 10x12 STAS 582—51	1	
16.	——	Double spanner C 14x17 STAS 582—51	1	
17.	——	Double spanner C 19x22 STAS 582—51	1	
18.	——	Double spanner C 24x27 STAS 582—51	1	
19.	SN 320—8414	Square cosket wrench with crank 10	1	
20.	SN 320—8415	Square socket wrench 8	1	
21.	SN 320—8428	Square socket wrench 10	1	
22.	SN 320—8426	Morse taper reduction 5/3 STAS 2294—51	1	
23.	SN 320—8427	Morse center 3 STAS 2294—64	1	
24.	SN 320—8200	Buffer	1	
25.	SN 320—2307A	Change gear Z=24	1	Mounted on the lathe
26.	SN 320—2308	Change gear z=71	1	
27.	SN 320—2309	Change egar z=80	2	Mounted on the lathe
28.	SN 320—2310A	Change gear z=96	1	Mounted on the lathe
29.	SN 320—2311	Change gear z=113	1	
30.	SN 320—2312	Change gear z=120	1	
31.	SN 320—2313	Double change gear z=127	1	
32.	SN 320—2320	Double change gear z=96/25	1	
33.	SN 320—2325	Change gear z=39	1	Mounted on the lathe
34.	——	Universal chuck 200—2 STAS 1655—61	1	
35.	SN 320—81051	Flange for universal chuck	1	

Delivered with the lathe.

SPECIAL ACCESSORIES

Crt. No.	Drawing number	Designation	Pieces	Remarks
1.	SN 320—7100	Fixed steady	1	
2.	SN 320—7200	Mobile steady	1	
3.	SN 320—7300	Device for taper turning	1	
4.	SN 320—8400	Face plate with 4 jaws	1	
5.	——	Morse 3 rotating centre	1	
6.	SN 320—8100	Moving flange	1	
7.	SN 320—9200	Thread indicator	1	
8.	SN 320—9300	Protecting screen	1	

Delivered only on final order from buyer and with the previous agreement of the maker.

The maximum speed alowed with the face plate with 4 jaws is of 600 r.p.m., the dynamic testing being allowed at 630 r.p.m.

WEAR — PARTS

Below are given the positions of wear parts whose replacement may be necessary at overhaulings.

Crt No.	Item number	Designation
1.	SN 320—10 107	Outer clutch disk
2	SN 320—10 108	Inner clutch disk
3	SN 320—21 053B	Bushing of lead screw front bearing
4.	SN 320—21 063	Bushing of the feed spindle front bearing (outside)
5.	SN 320—21 066A	Bushing of the feed spindle front bearing (inside)
6.	SN 320—30 004	Bushing of the rack pinion of the carriage box
7.	SN 320—30 028A	Nut of the automatic feed lock screw
8	SN 320—30 013B	Worm wheel of the carriage box
9.	SN 320—30 059	Nut of the lead screw.

GUARANTEE

The guarantee is limited to the replacement of damaged pieces in case it is found that the shartcomings occured under normal working conditions and that thev are due to material or constructive faults.

The producer is not to be held responsible in any way for pieces which are used as manufactured by sub-constructors (for instance: the 3 kW electric motor, pump; the protection switch, the ball bearings), except when the latter have given guarantees for the products involved.

Also, no guarantee covers hidden flaws of the material received from other suppliers, if these flaws could not have been seen after the parts were finished.

The producer is not to be held responsible in any way for pieces which are used as manufactured by sub-constructors (for instance: the 3 kW electric motor, the electric pump; the protection switch, the ball bearings), except when the latter have given guarantees for the products involved.

Also the guarantee is maintained only during the normal use of the lathe, as regards its rational exploitation.

The producer guarantees the proper working of the machine during 6 months after starting, but not more than 8 months from delivery.

LIST OF DRAWINGS IN MACHINE BOOKLET

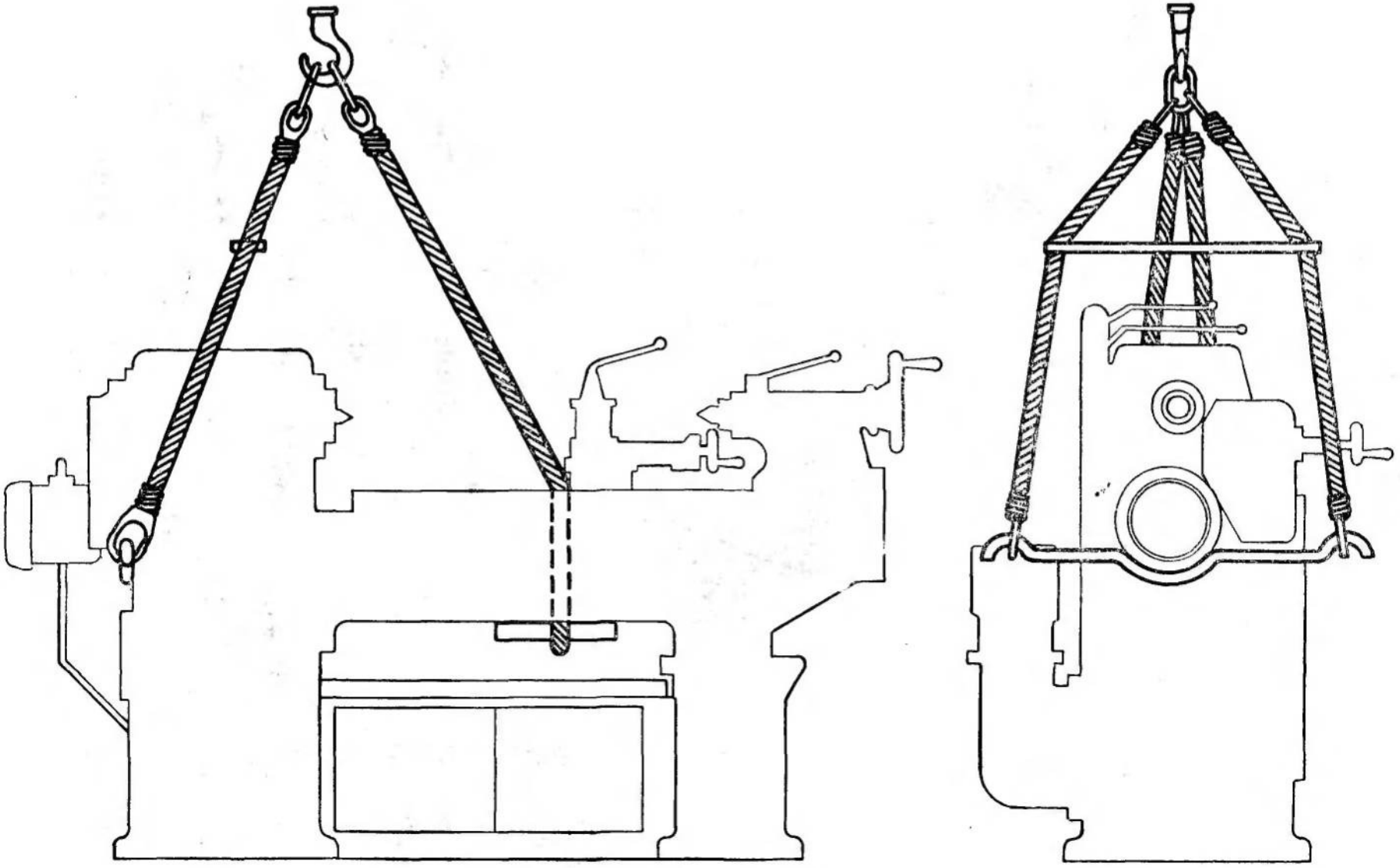
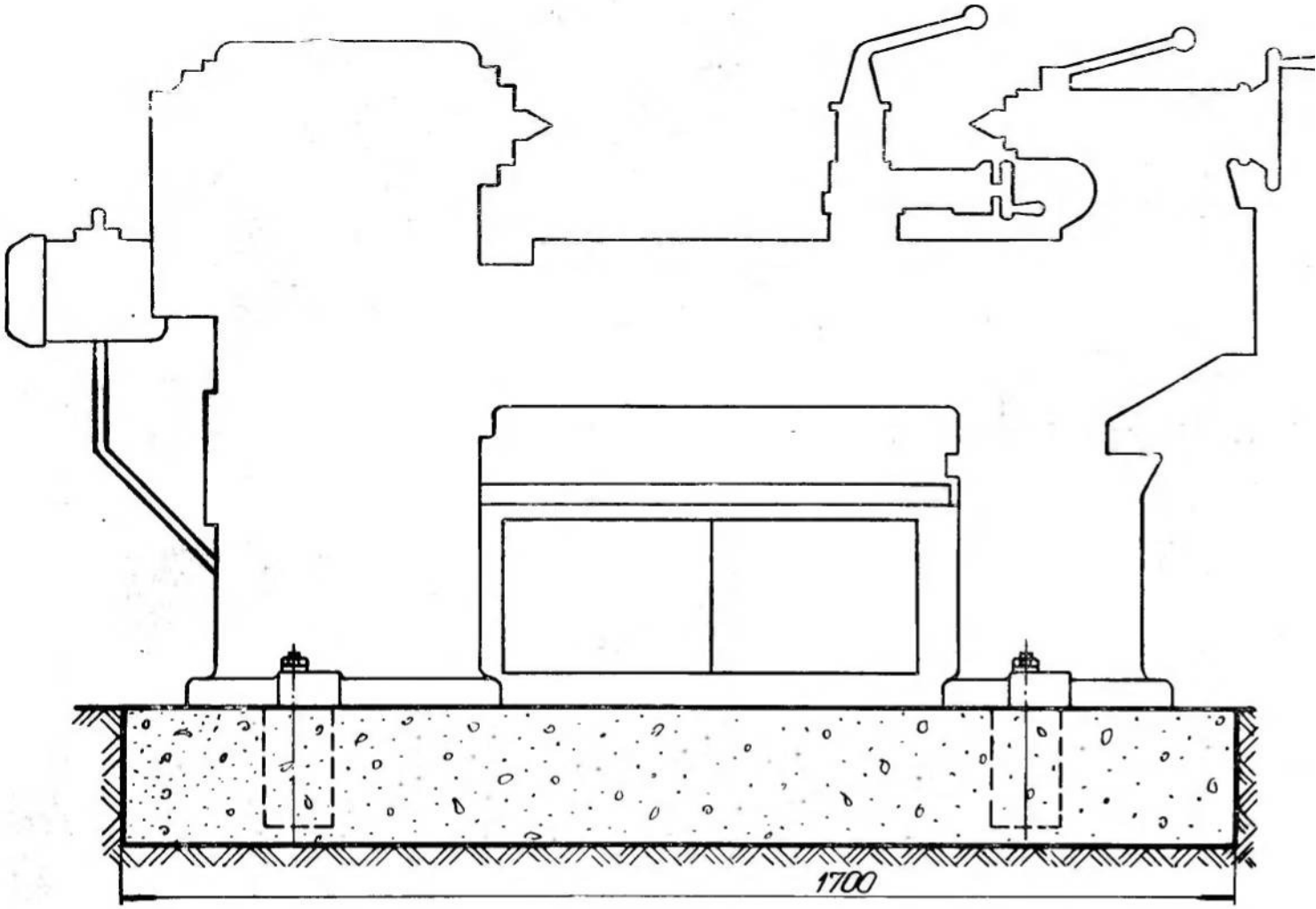
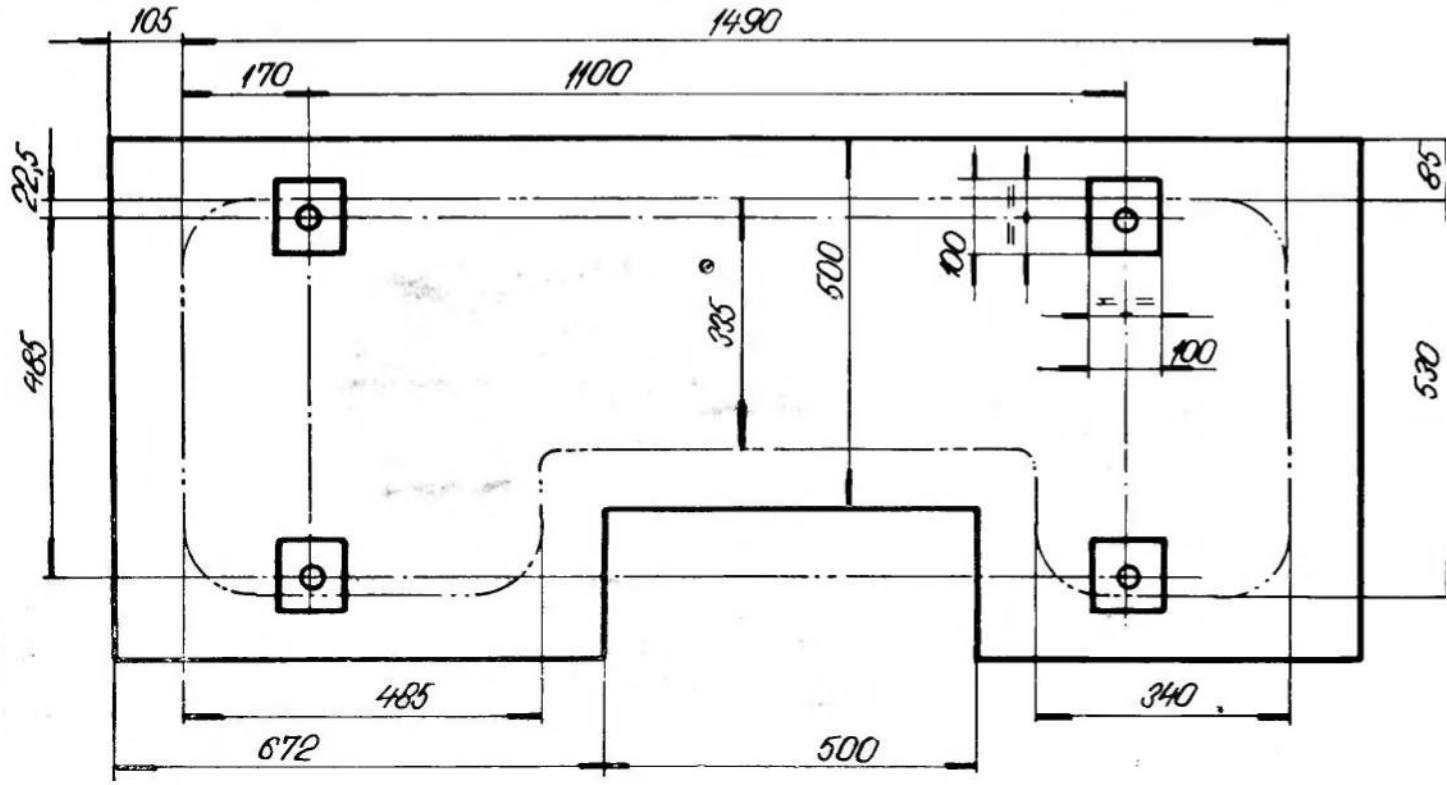
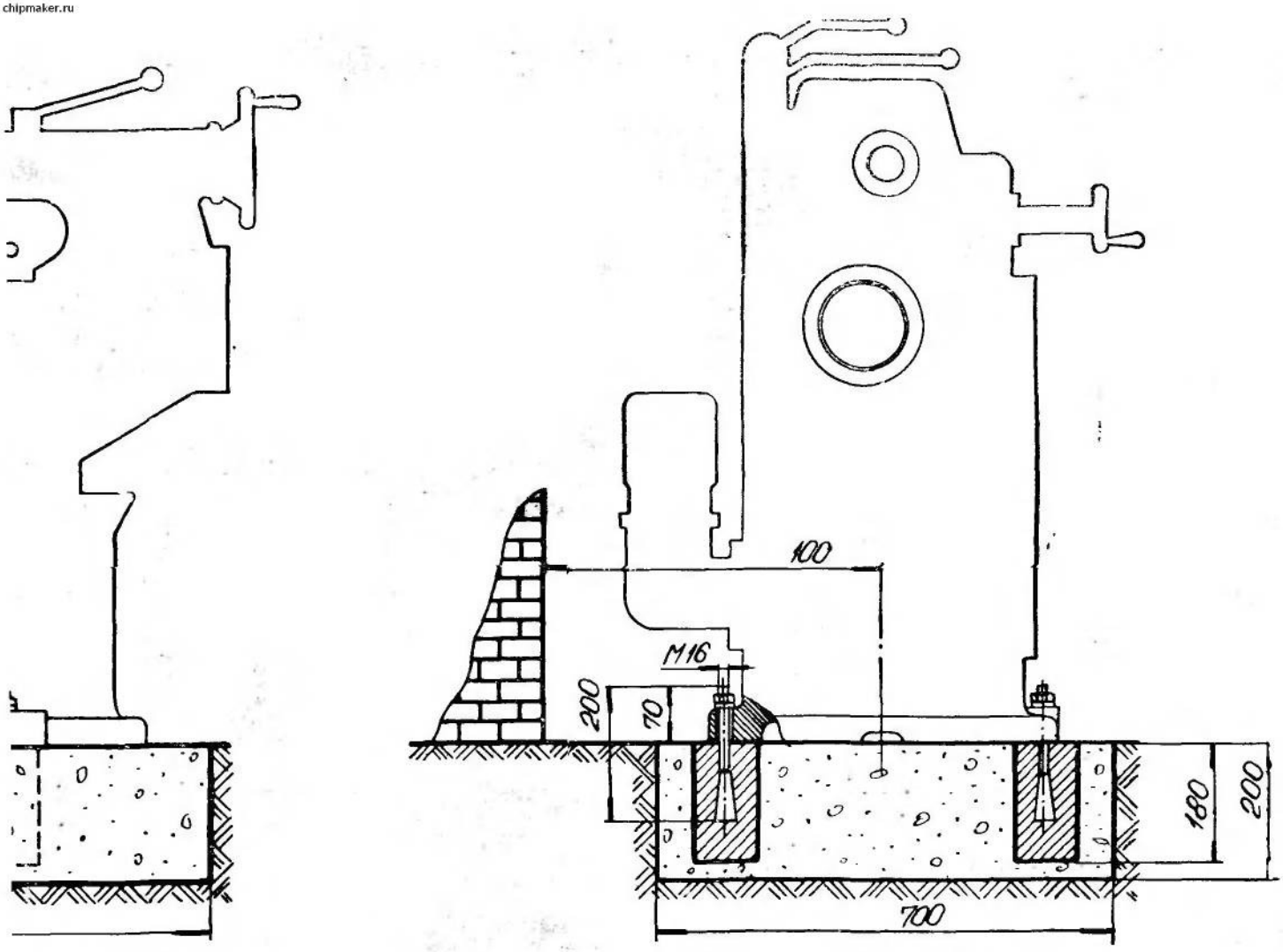


FIG.1







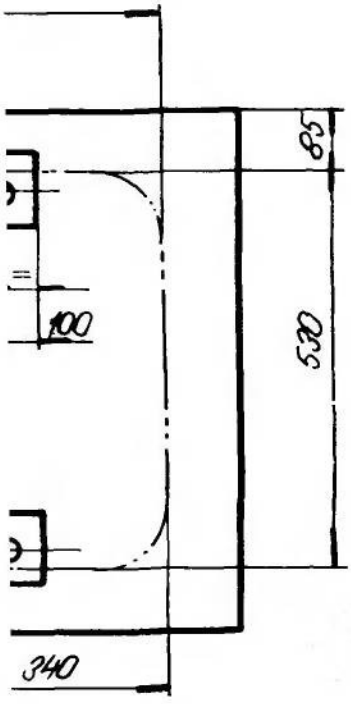
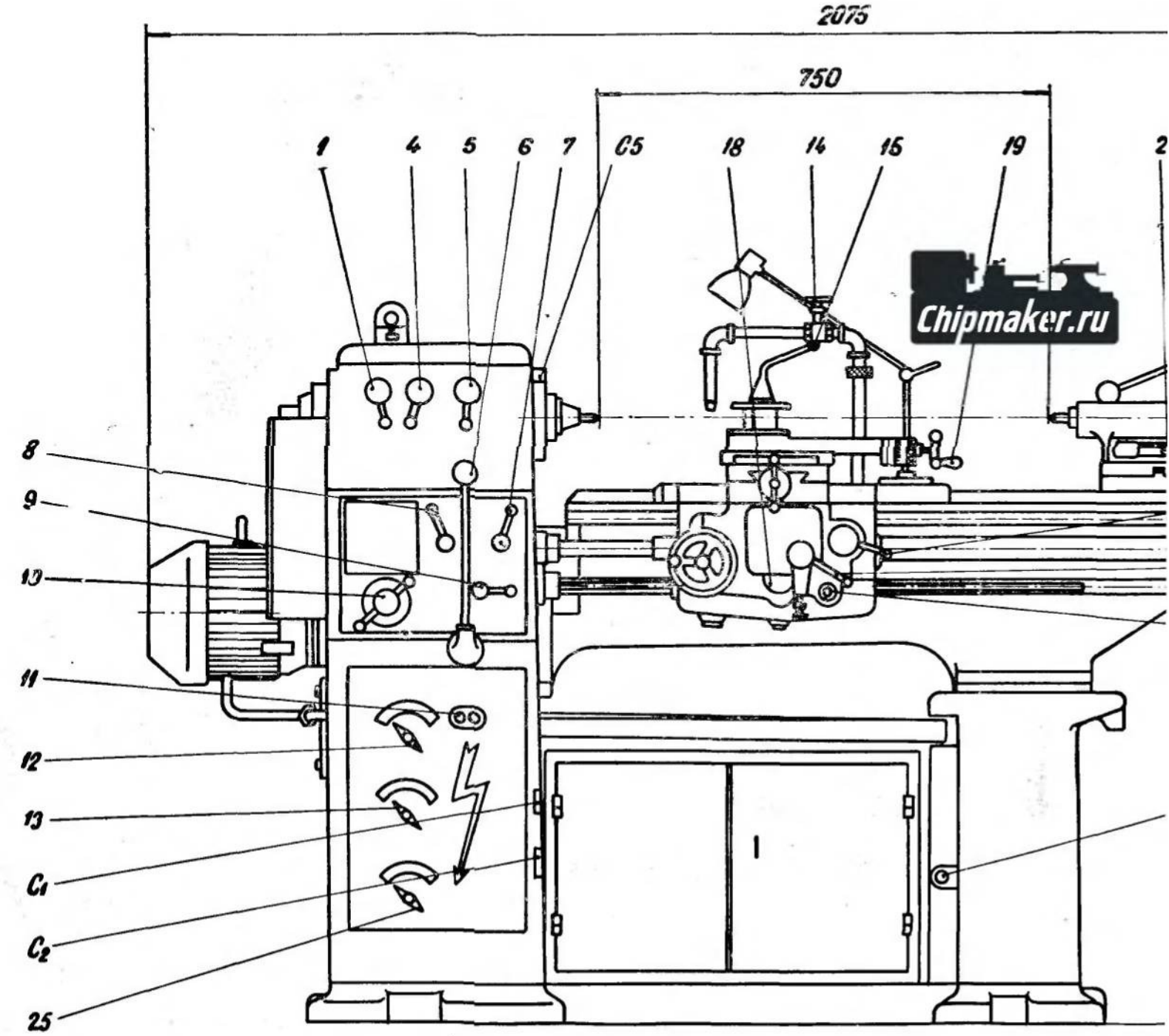


FIG. 2



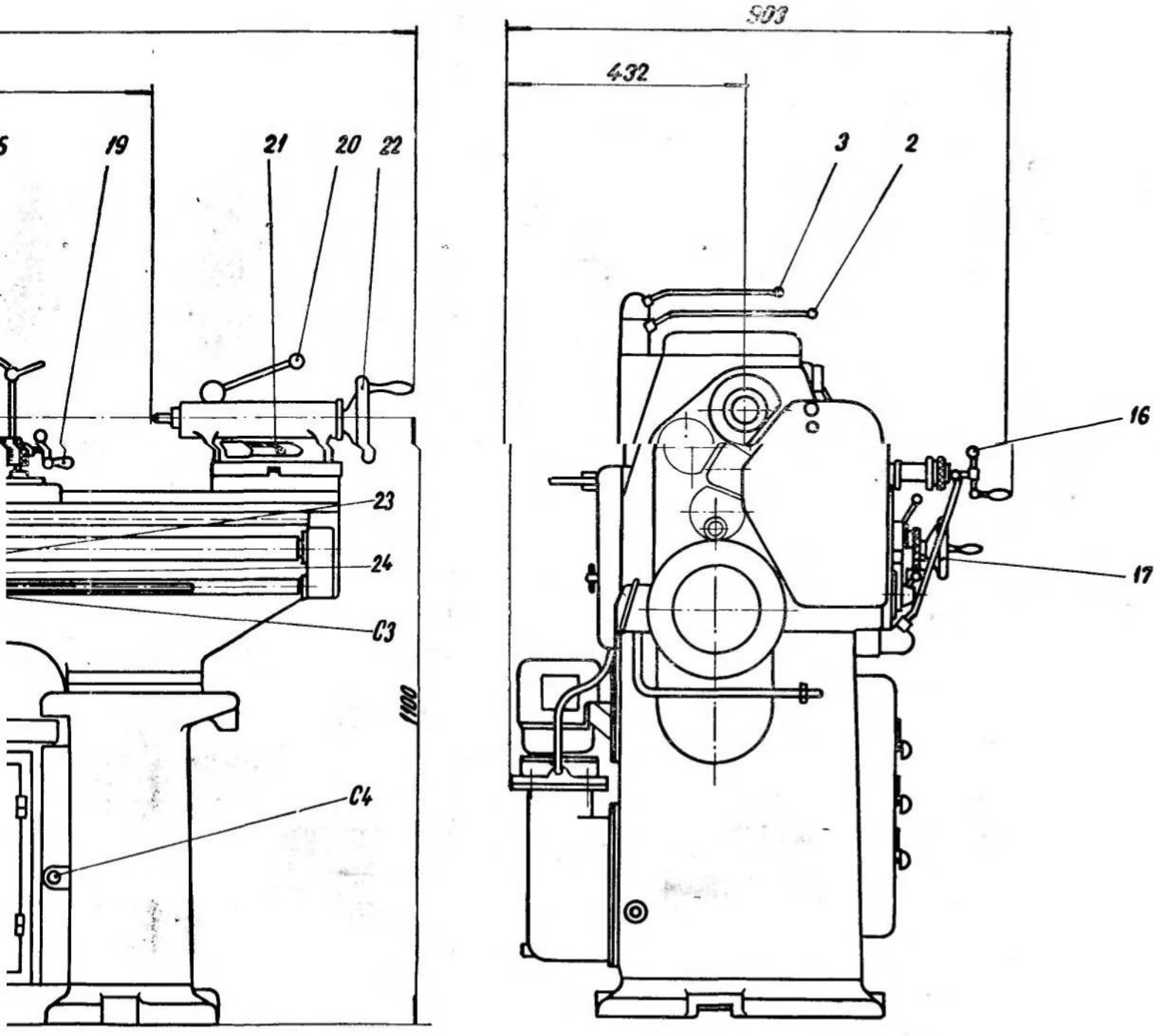
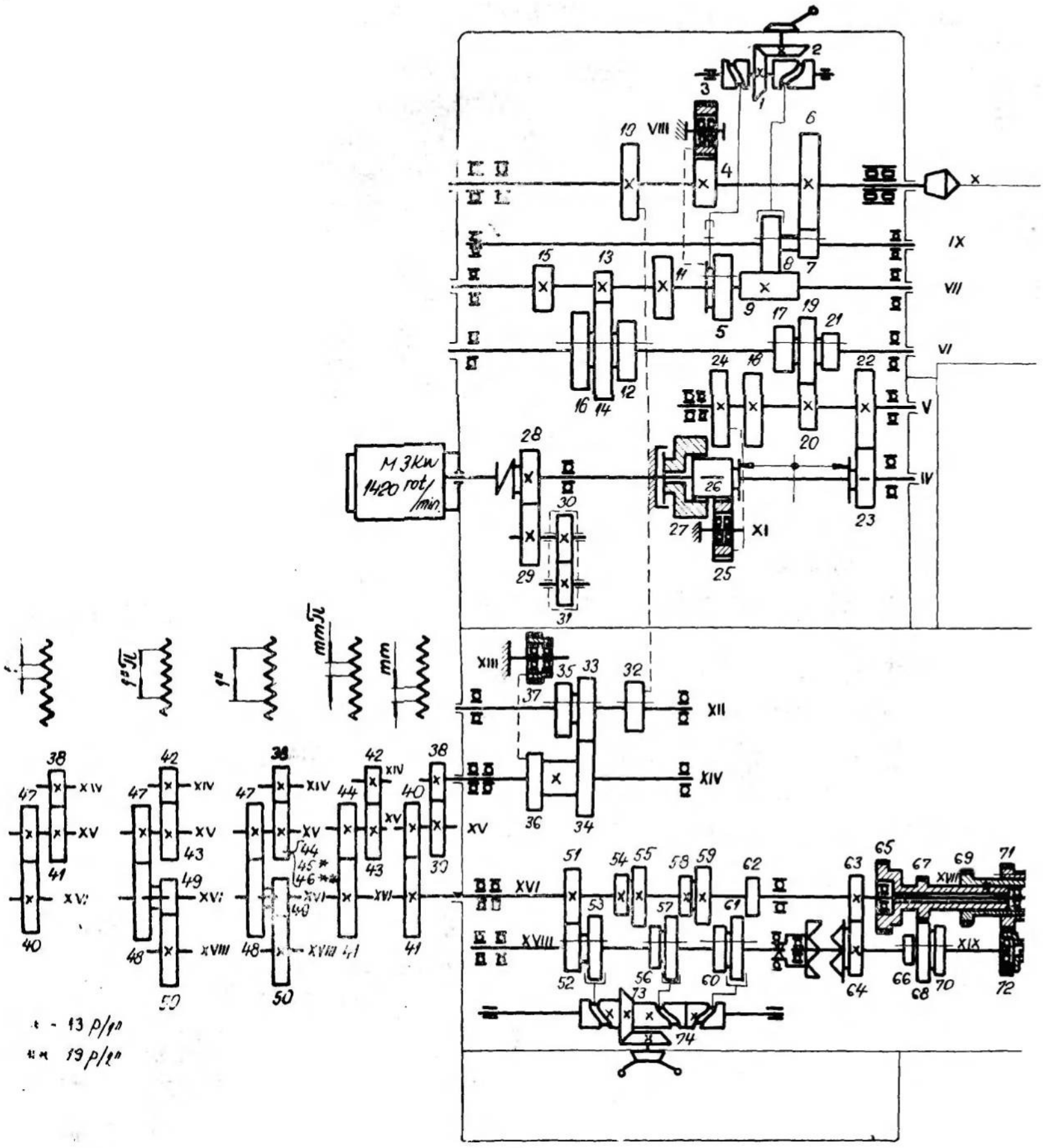


Fig. 3



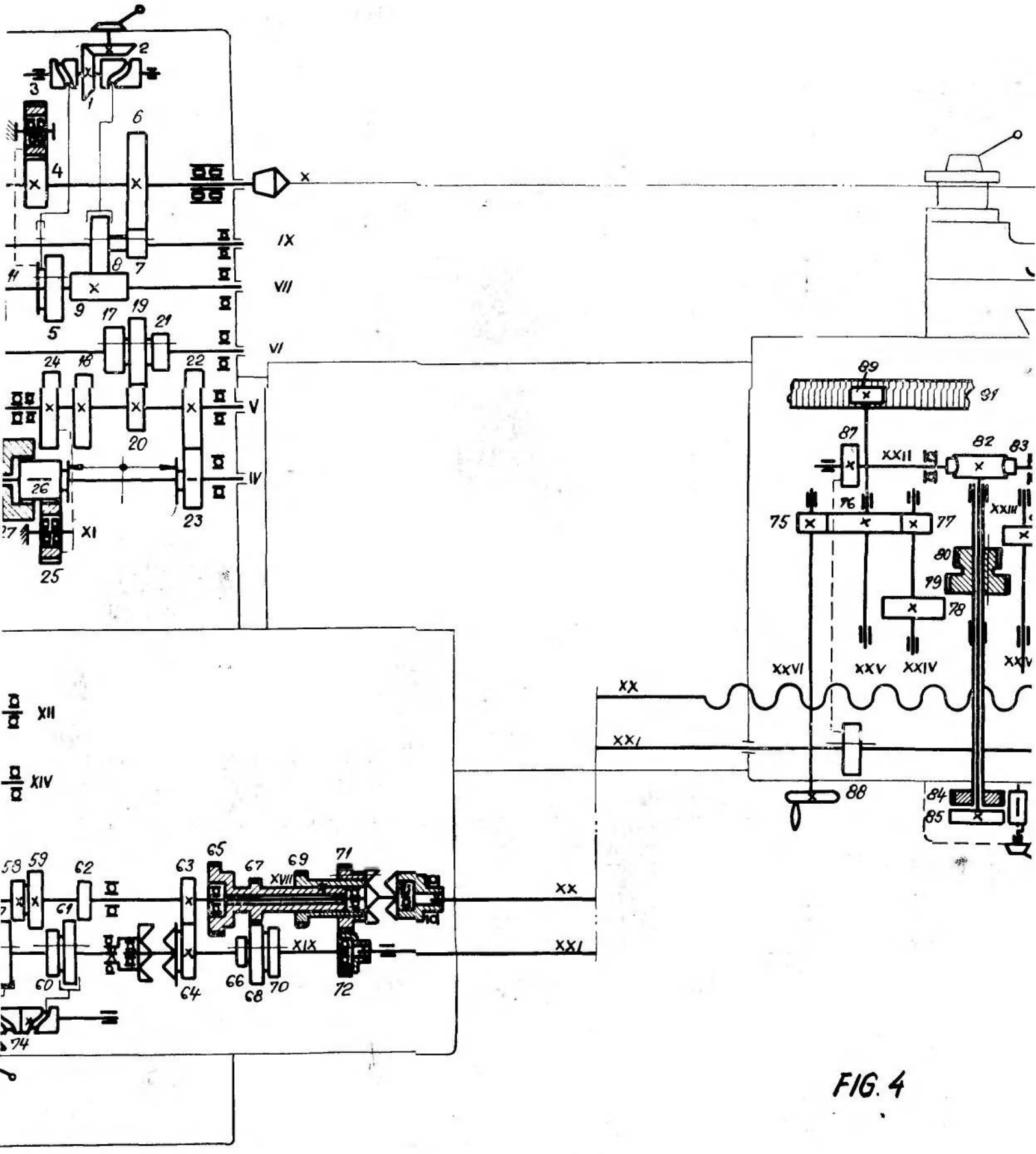


FIG. 4

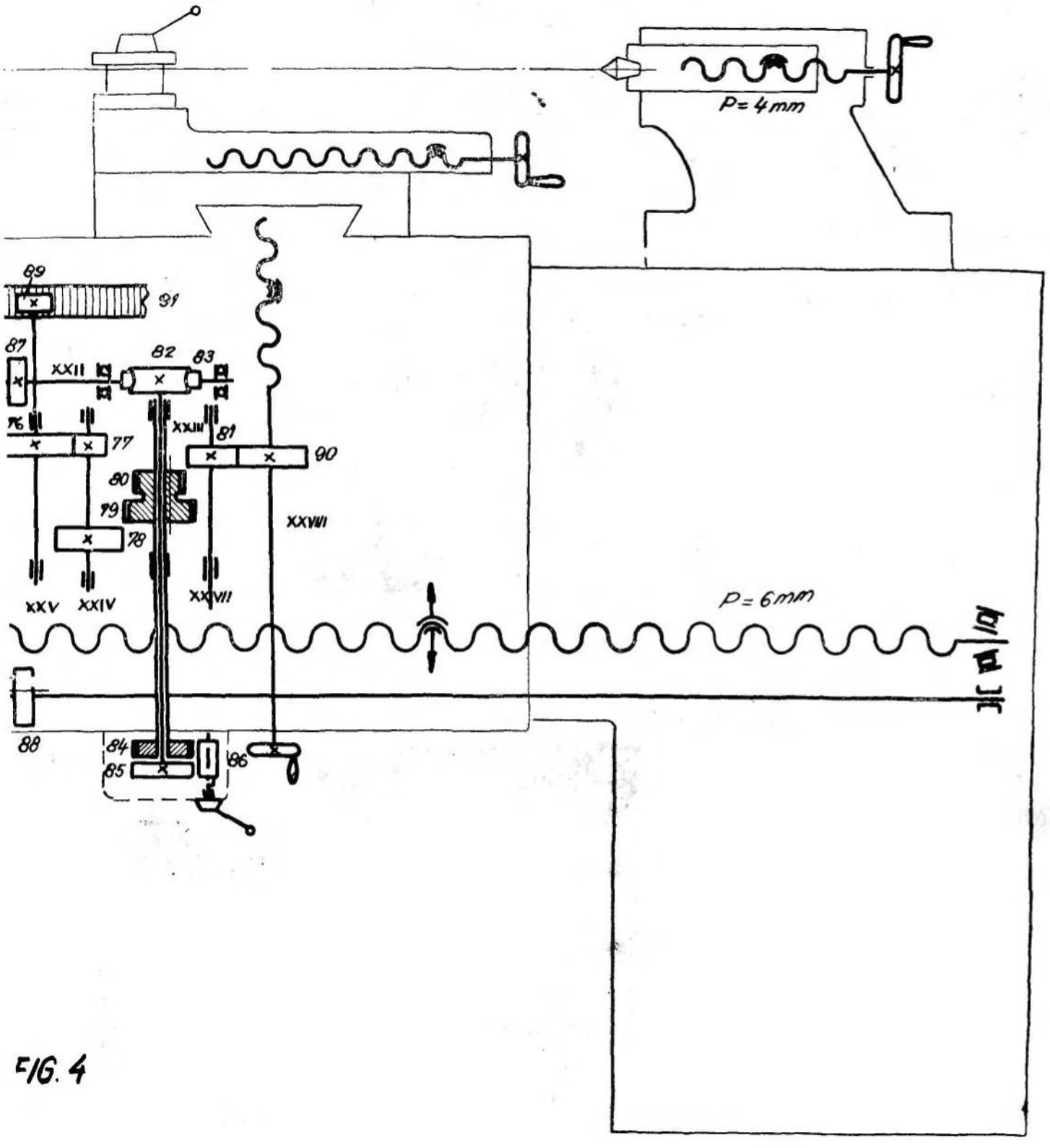


FIG. 4

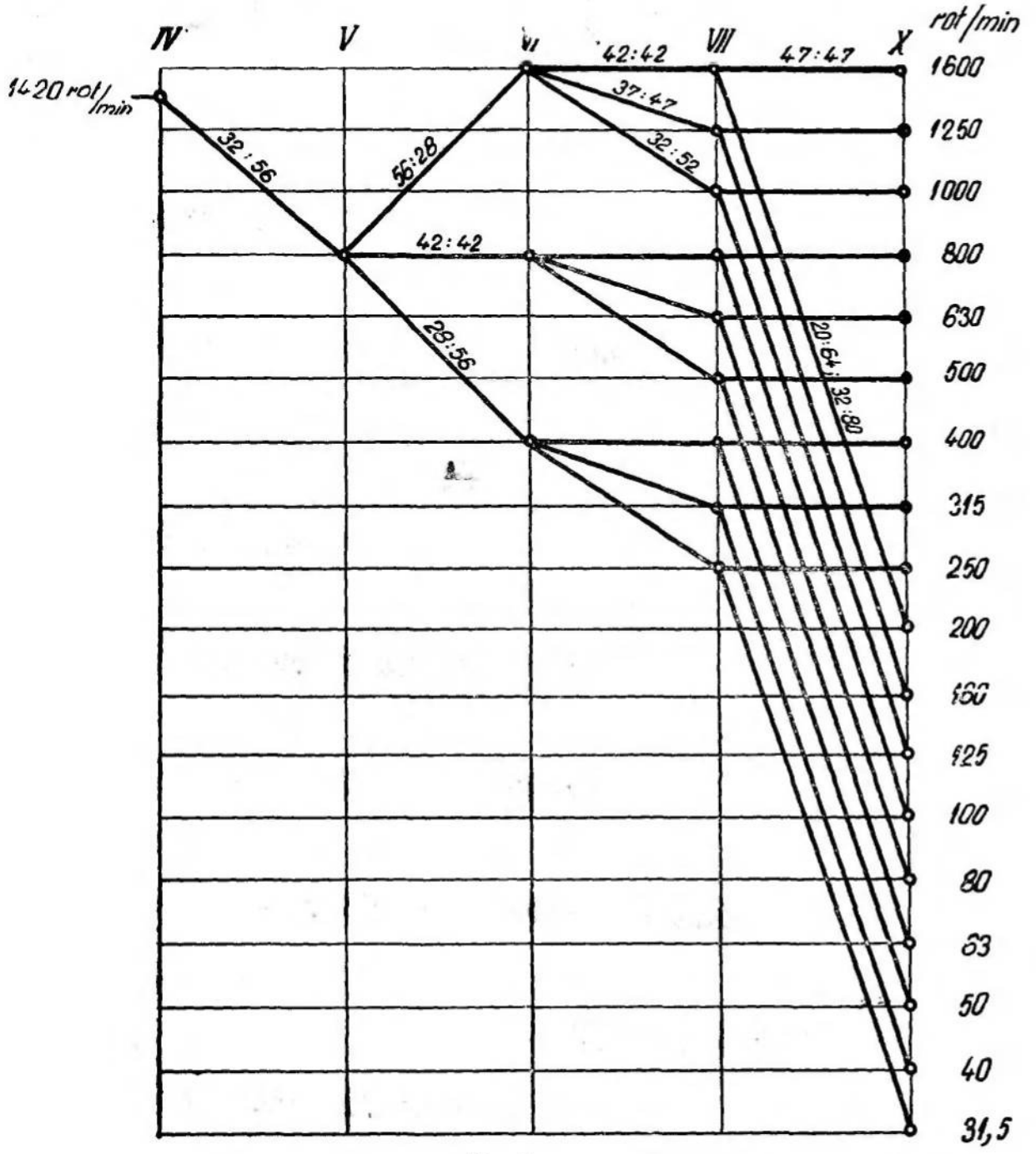
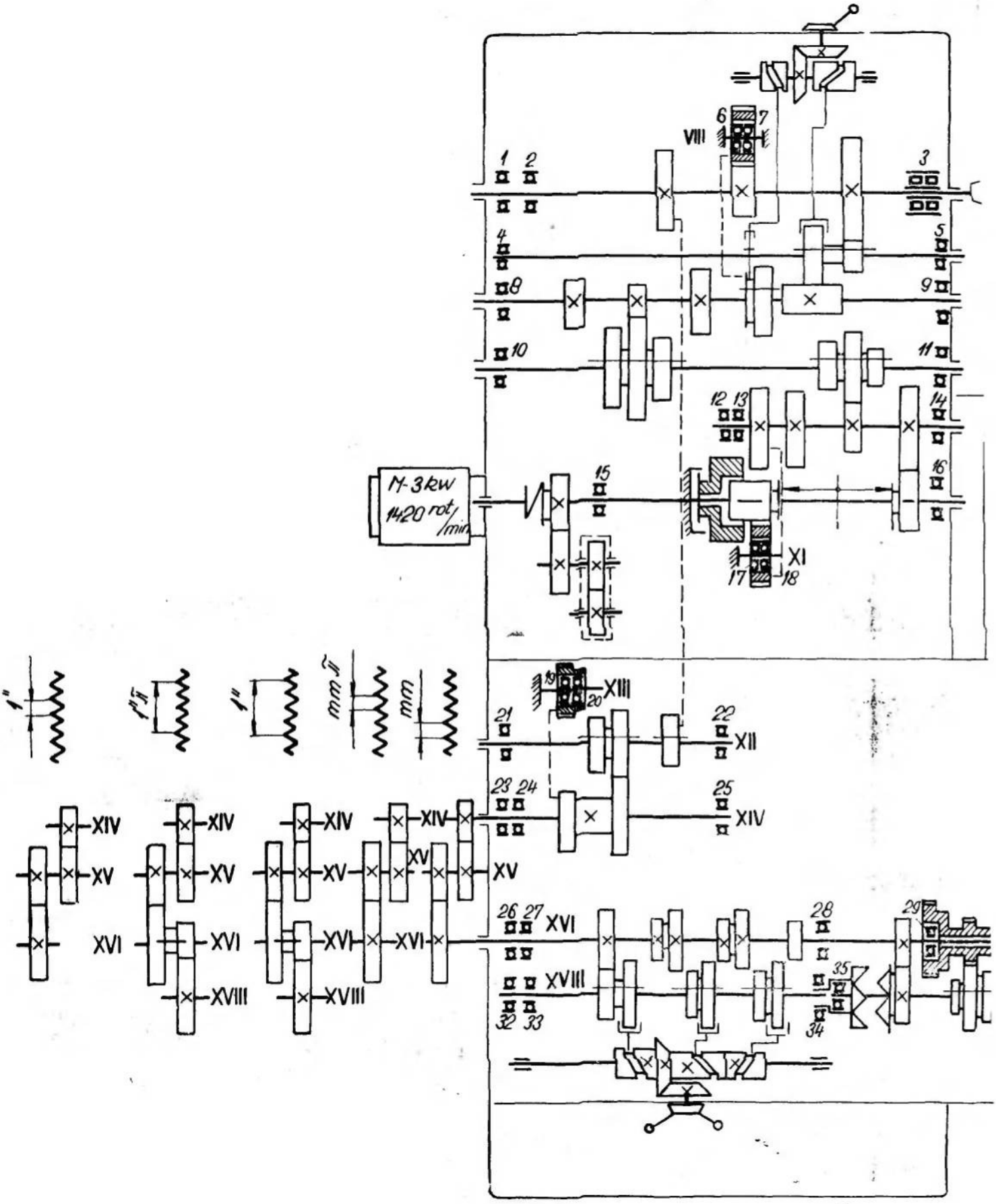

IV
V
VI
42:42
VII
47:47
X
rot/min
1420 rot/min
32:56
56:28
42:42
28:56
37:47
32:52
20:64
32:80
1600
1250
1000
800
630
500
400
315
250
200
160
125
100
80
63
50
40
31,5

Fig. 5



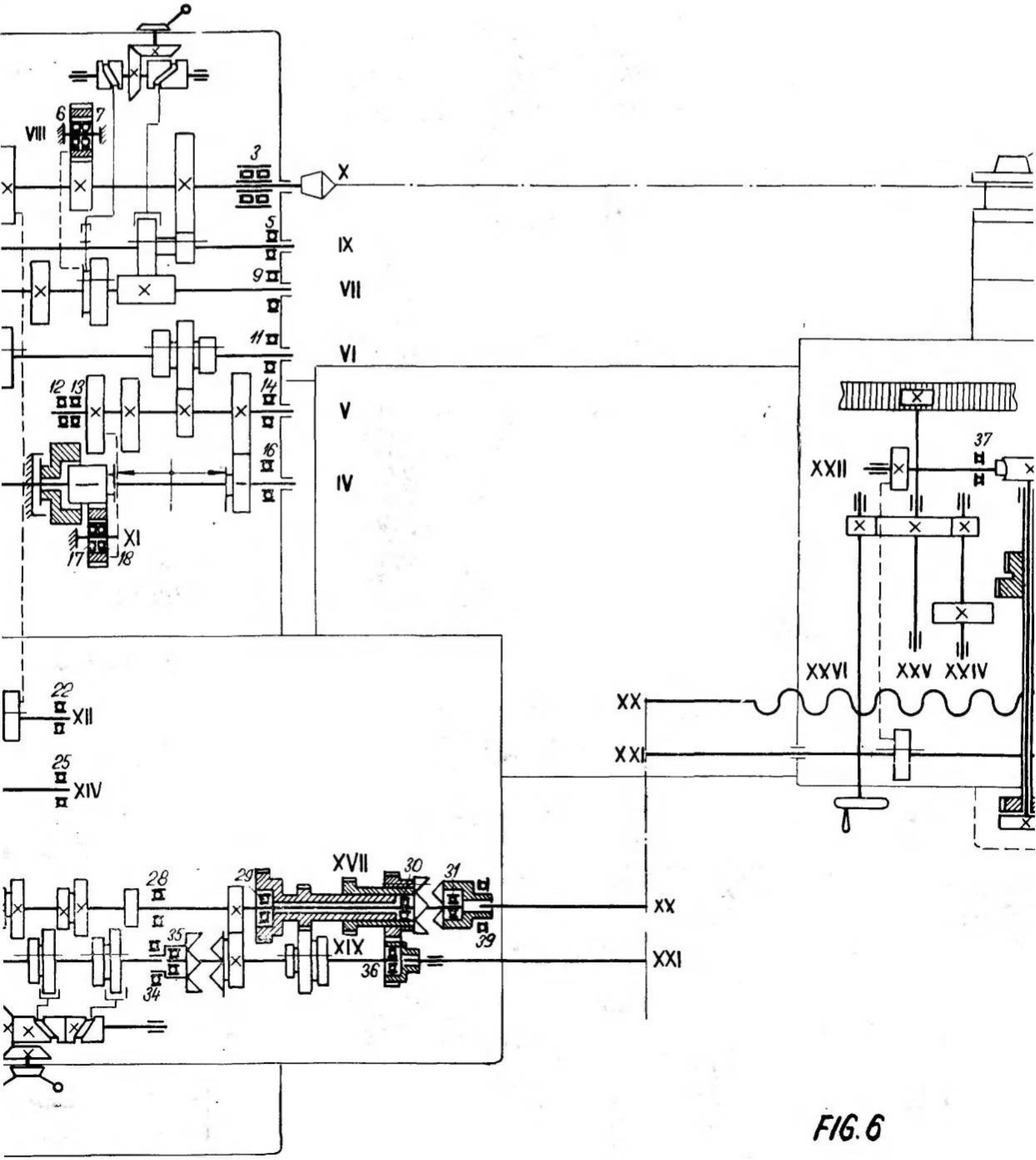
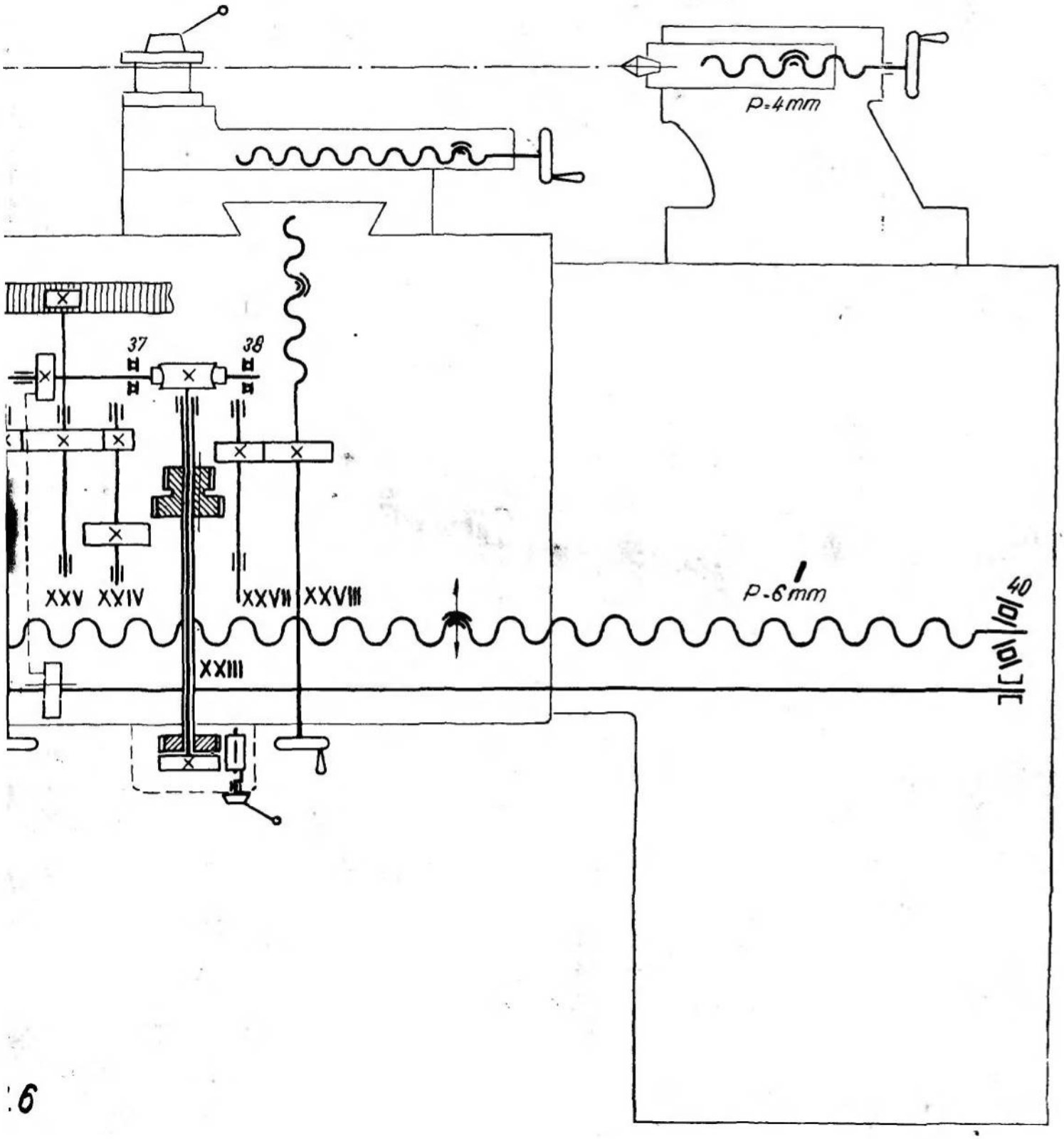


FIG. 6



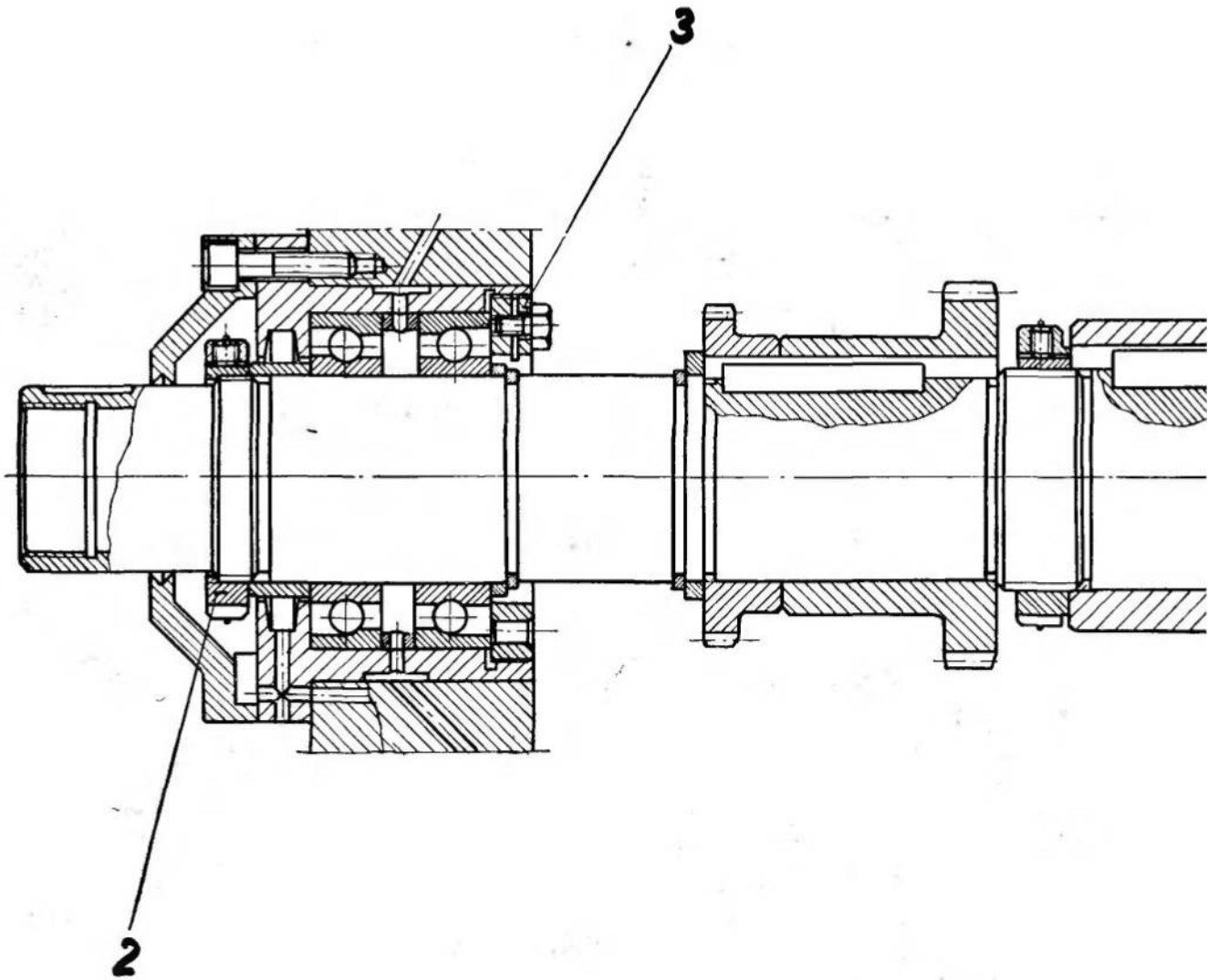


Fig. 7

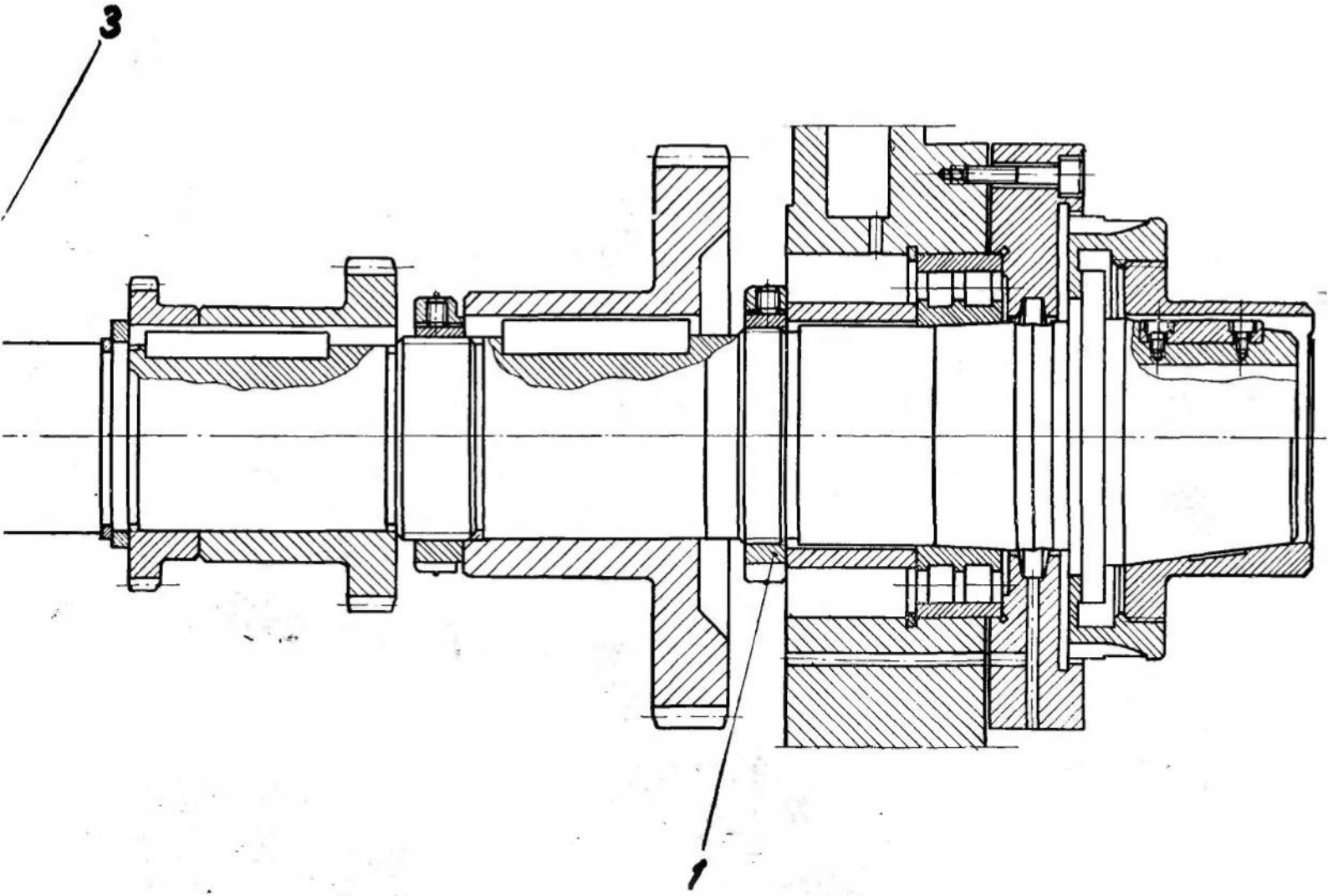


Fig. 7

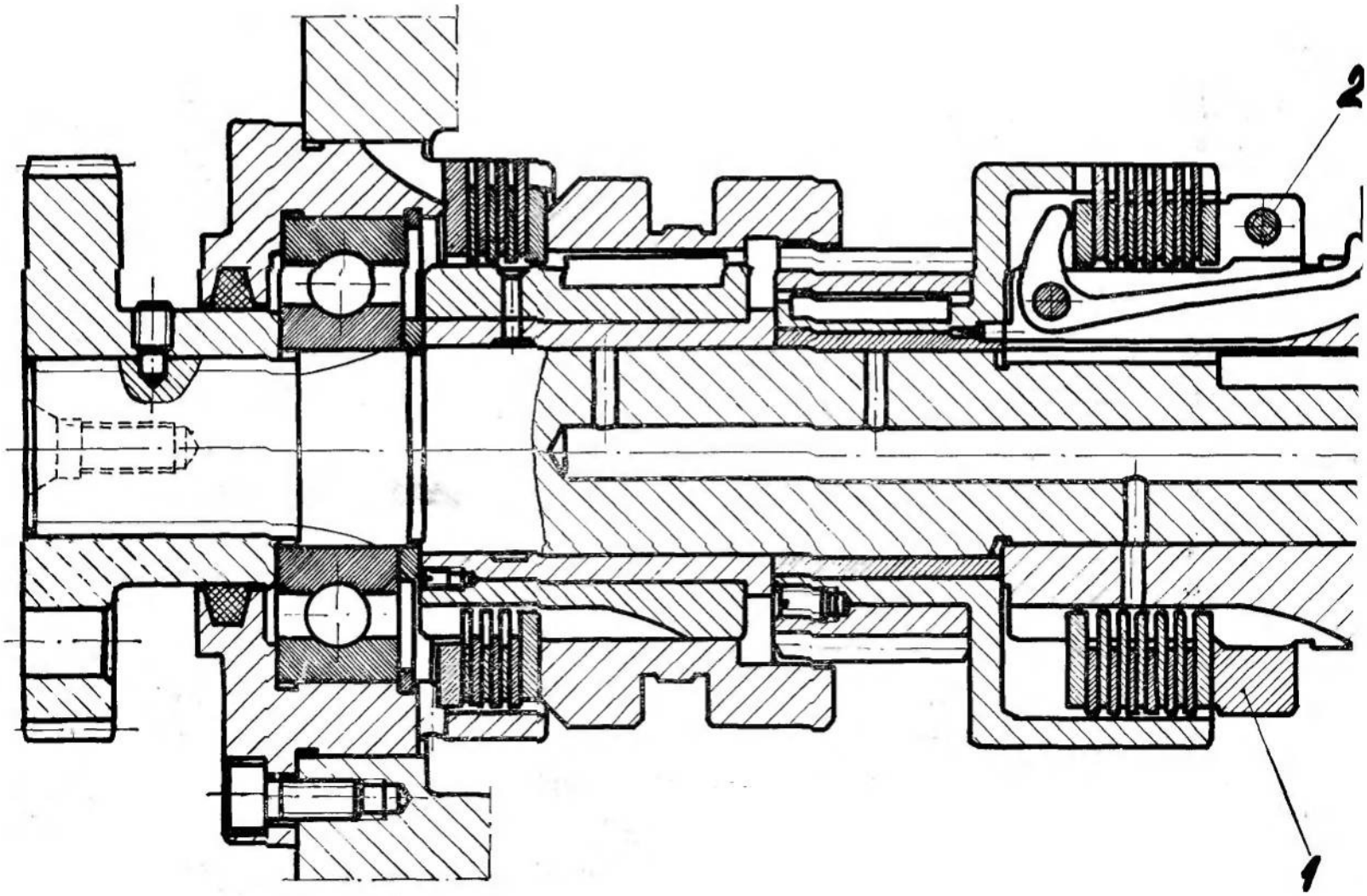
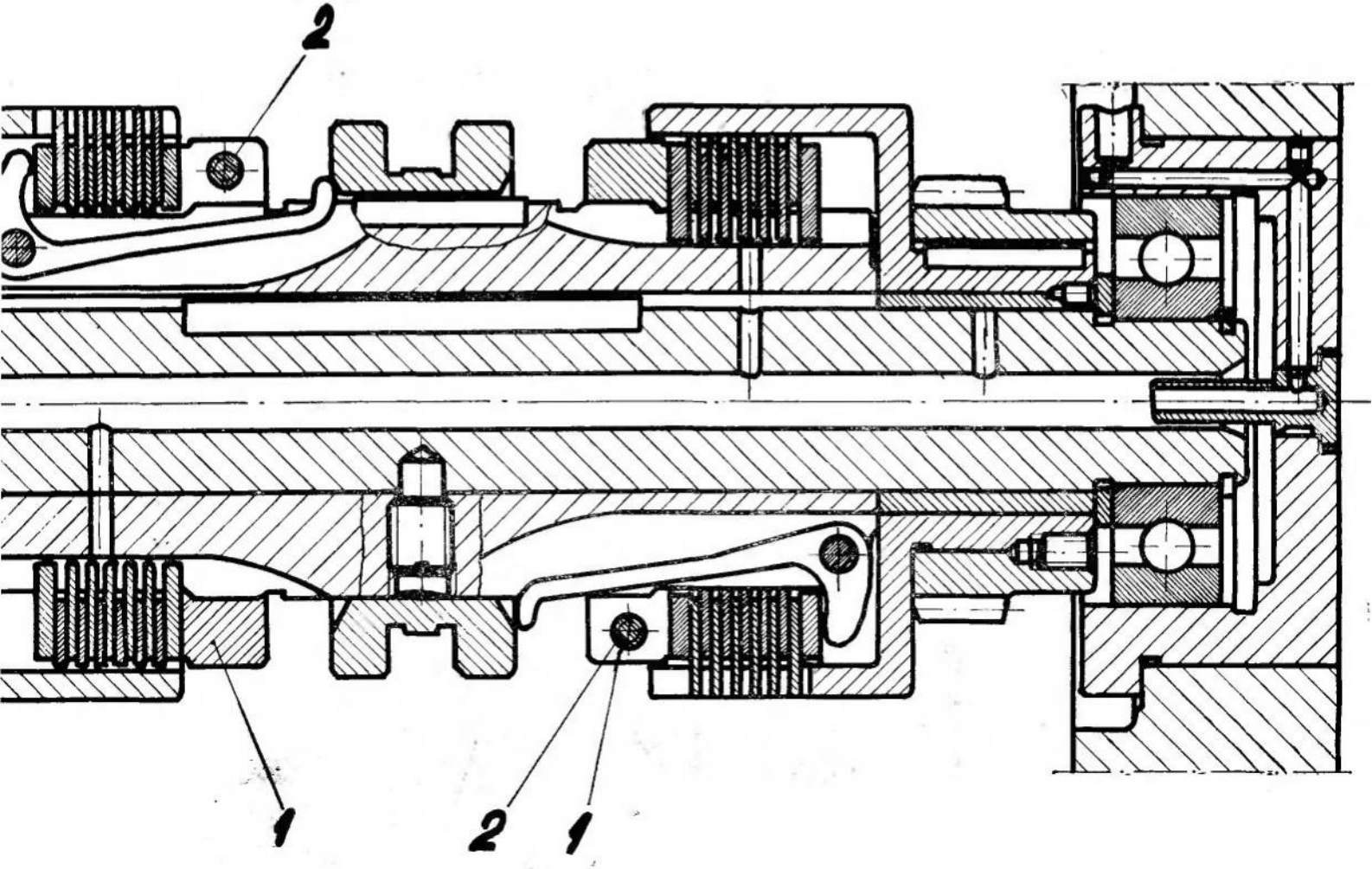
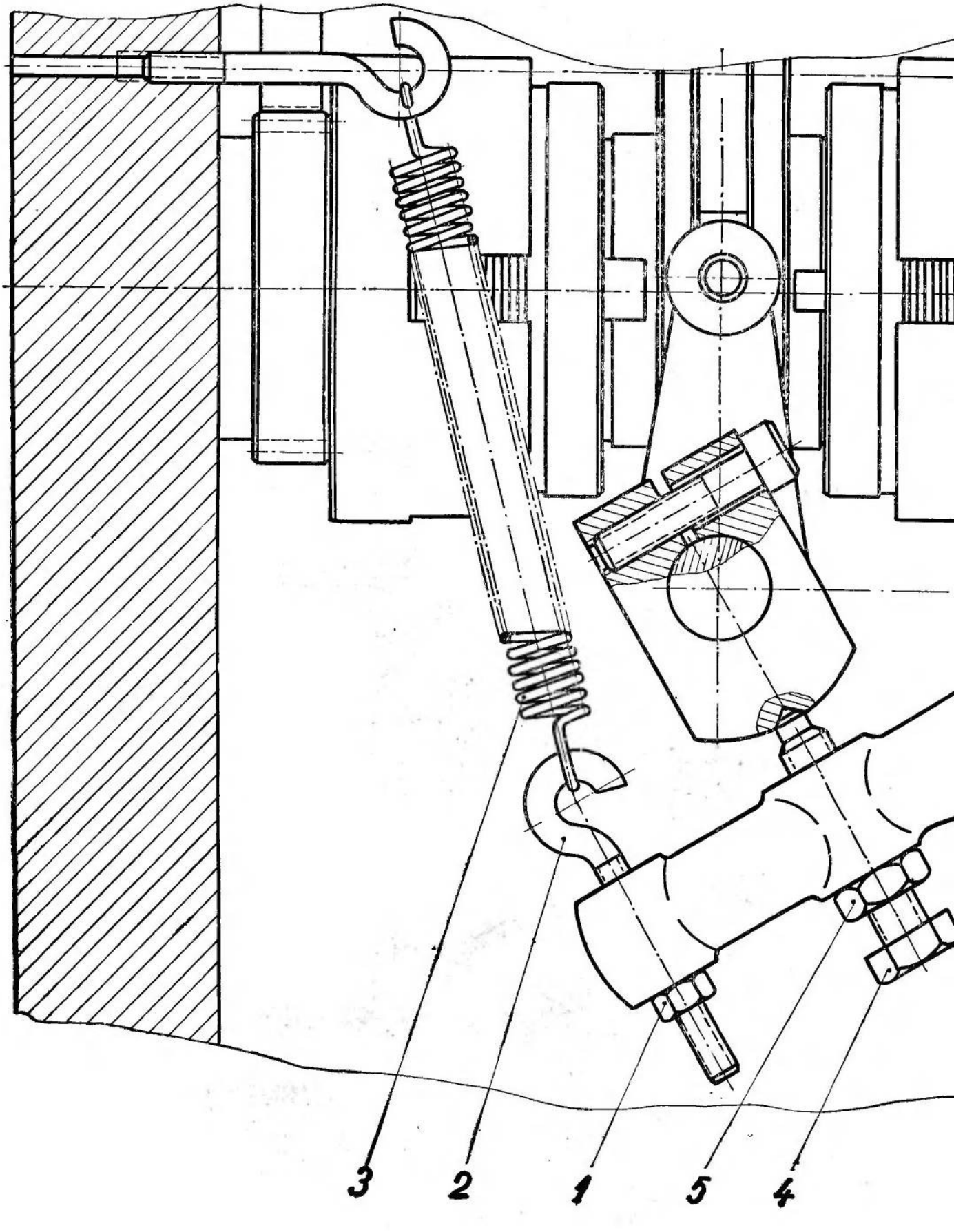


Fig. 8





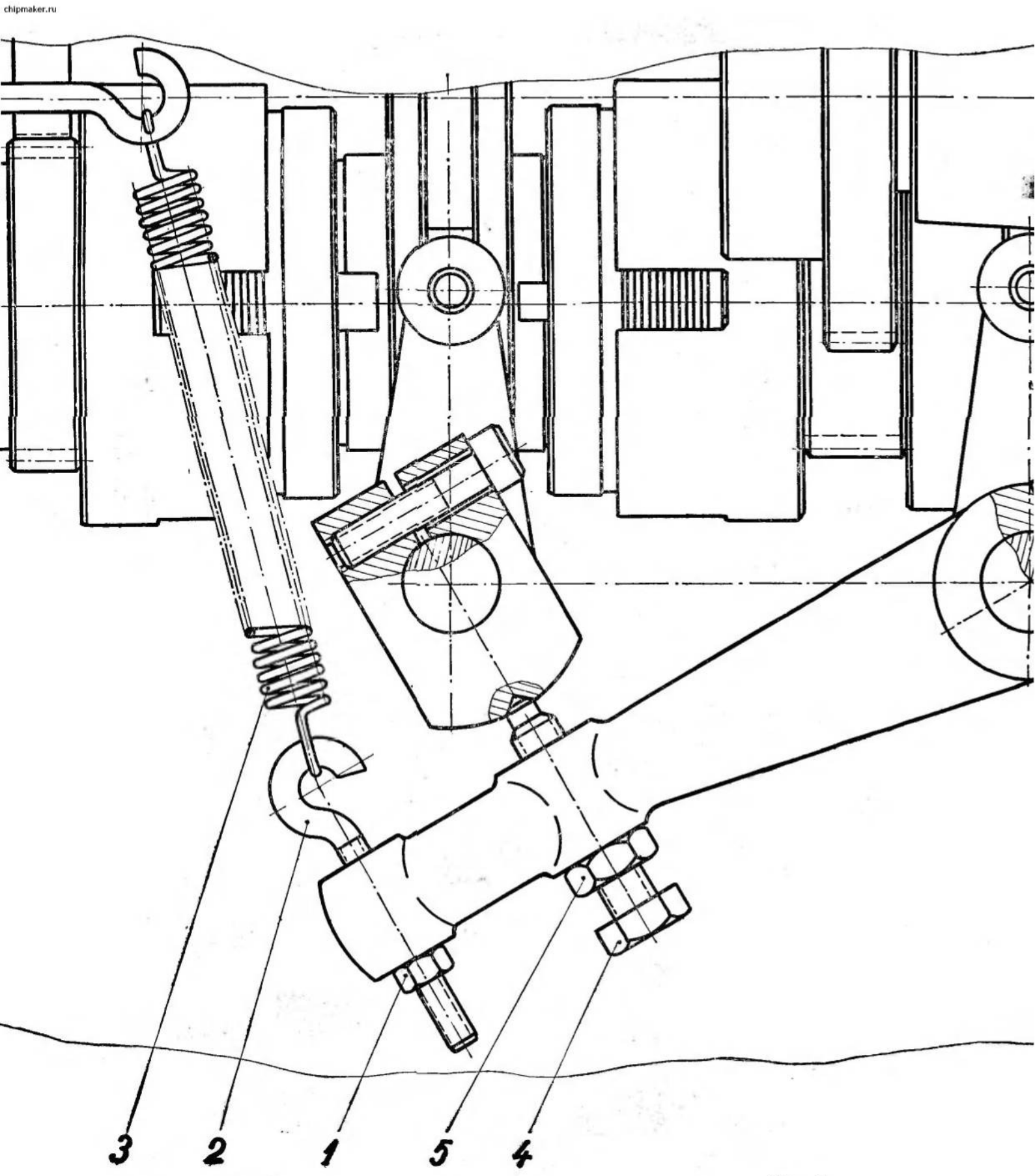


Fig. 9

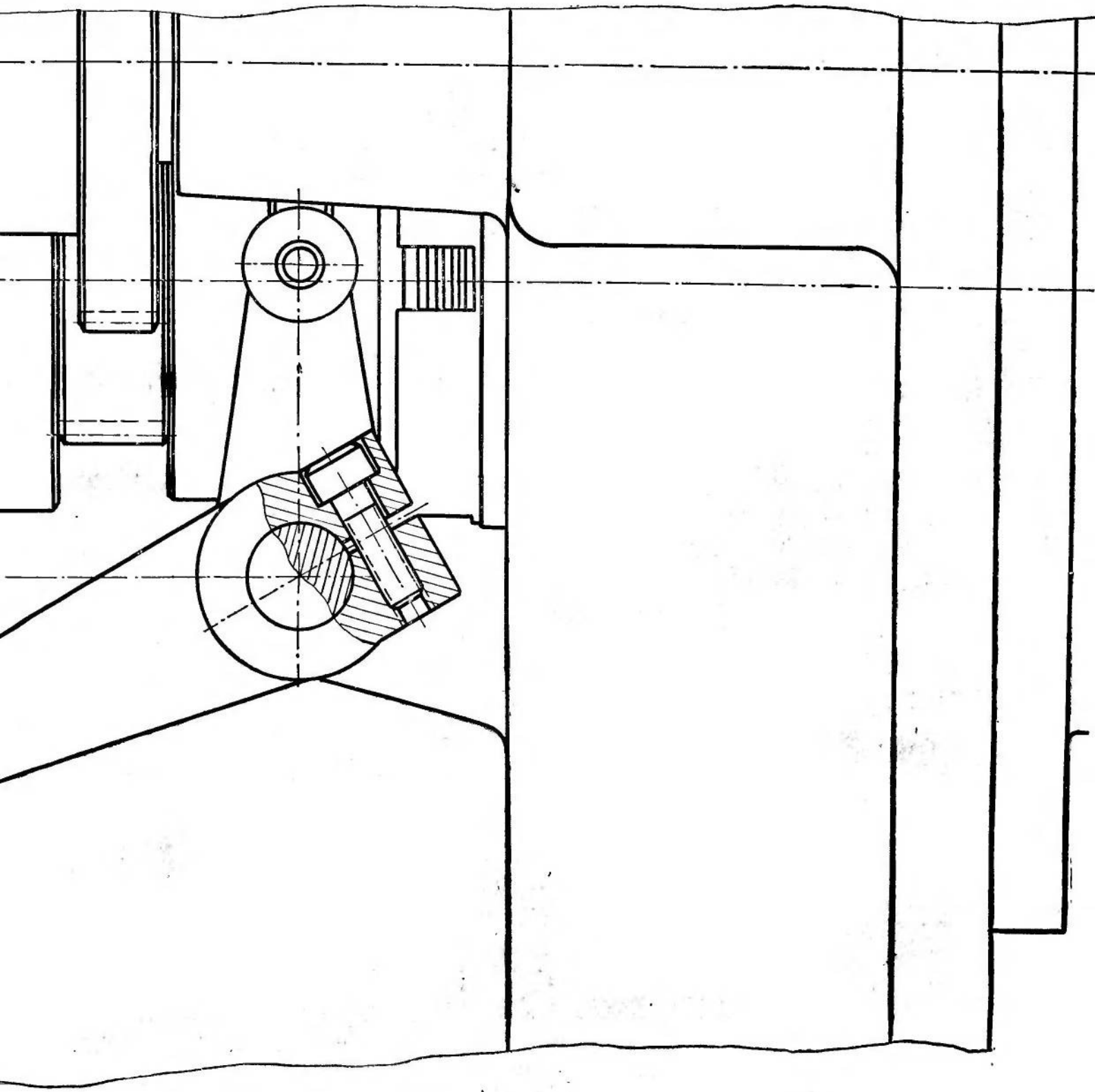


Fig. 9

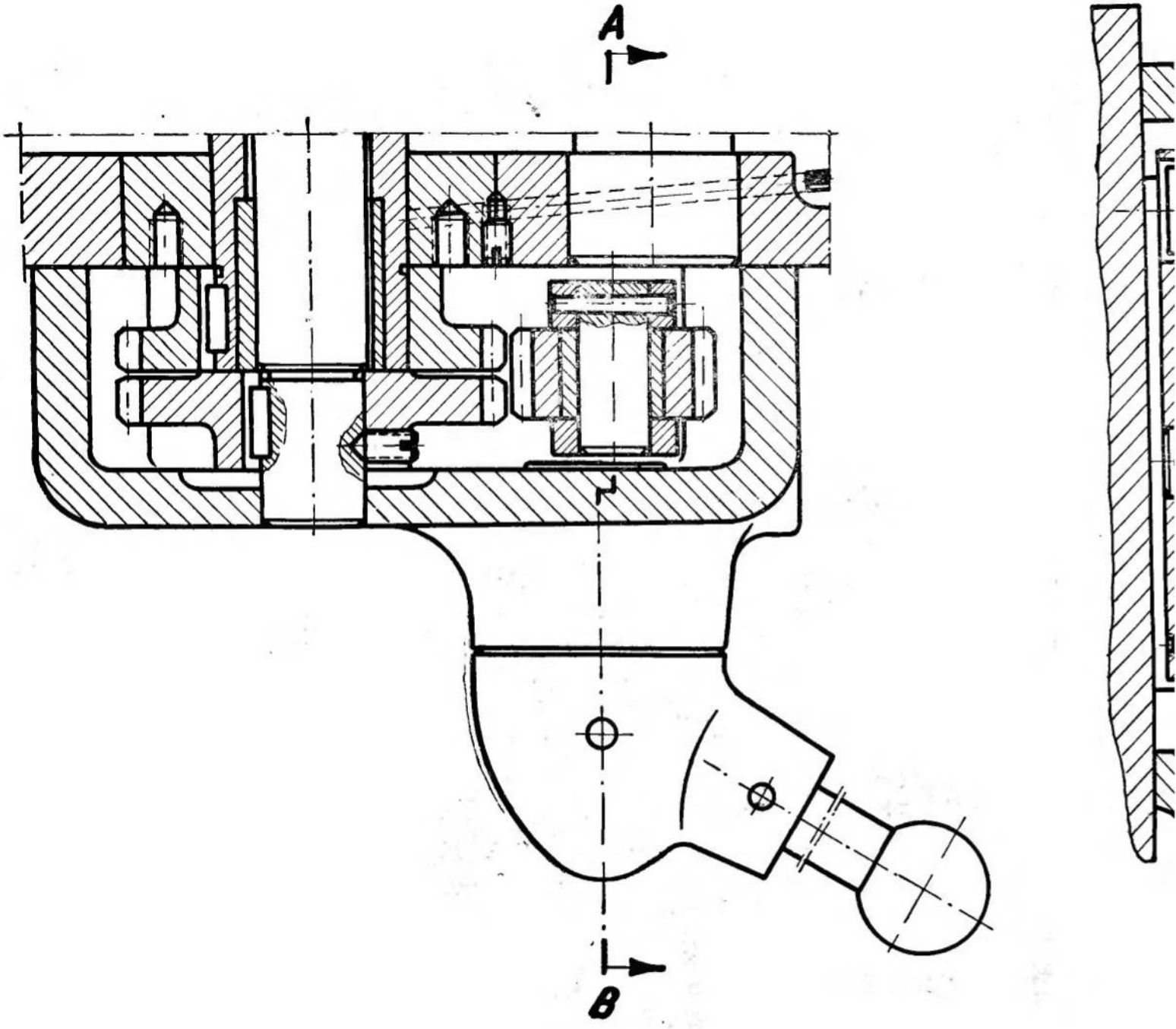


Fig. 10

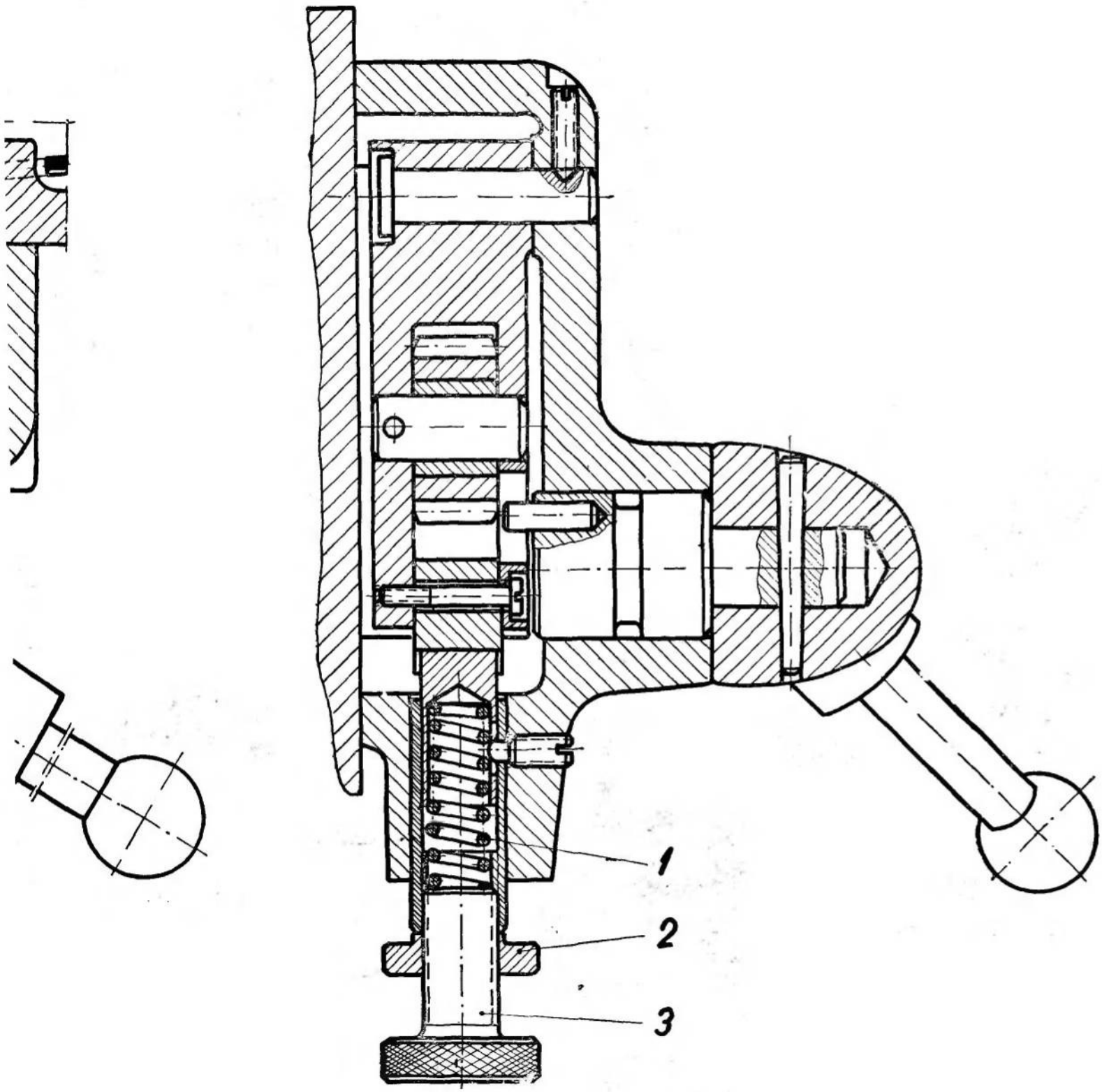


Fig. 10

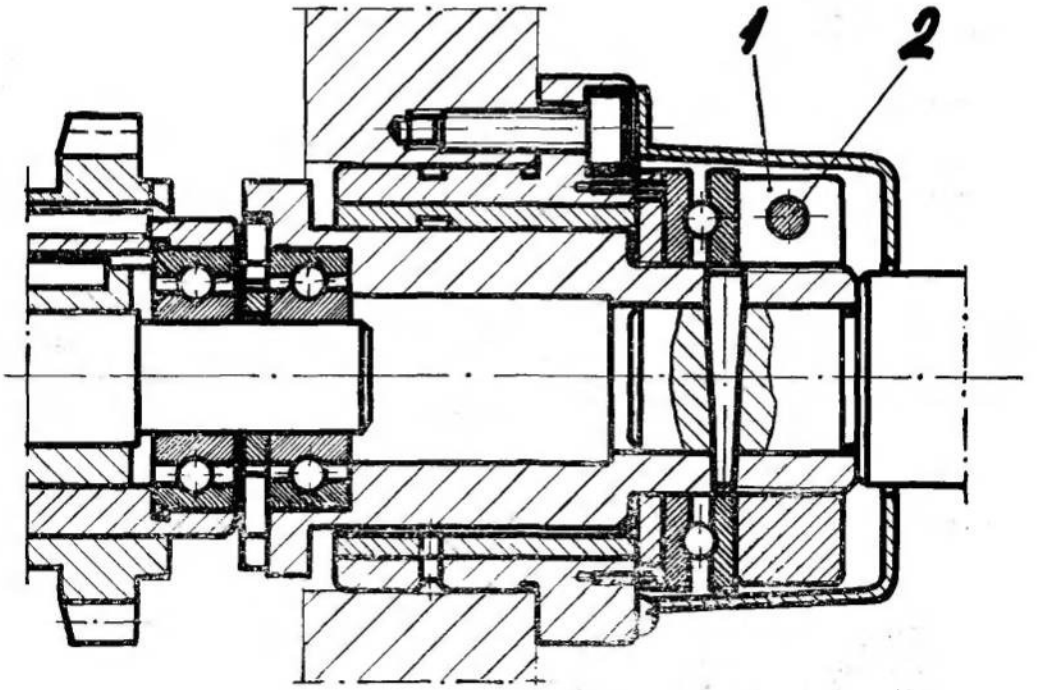


Fig. 11

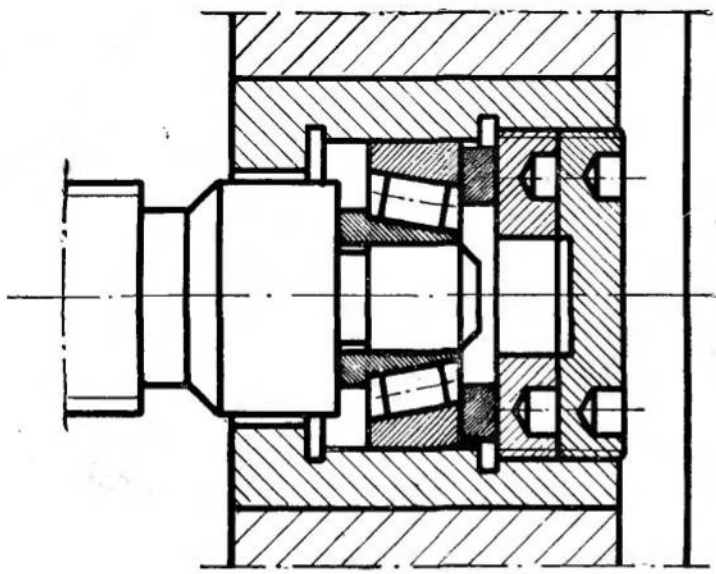


Fig. 12

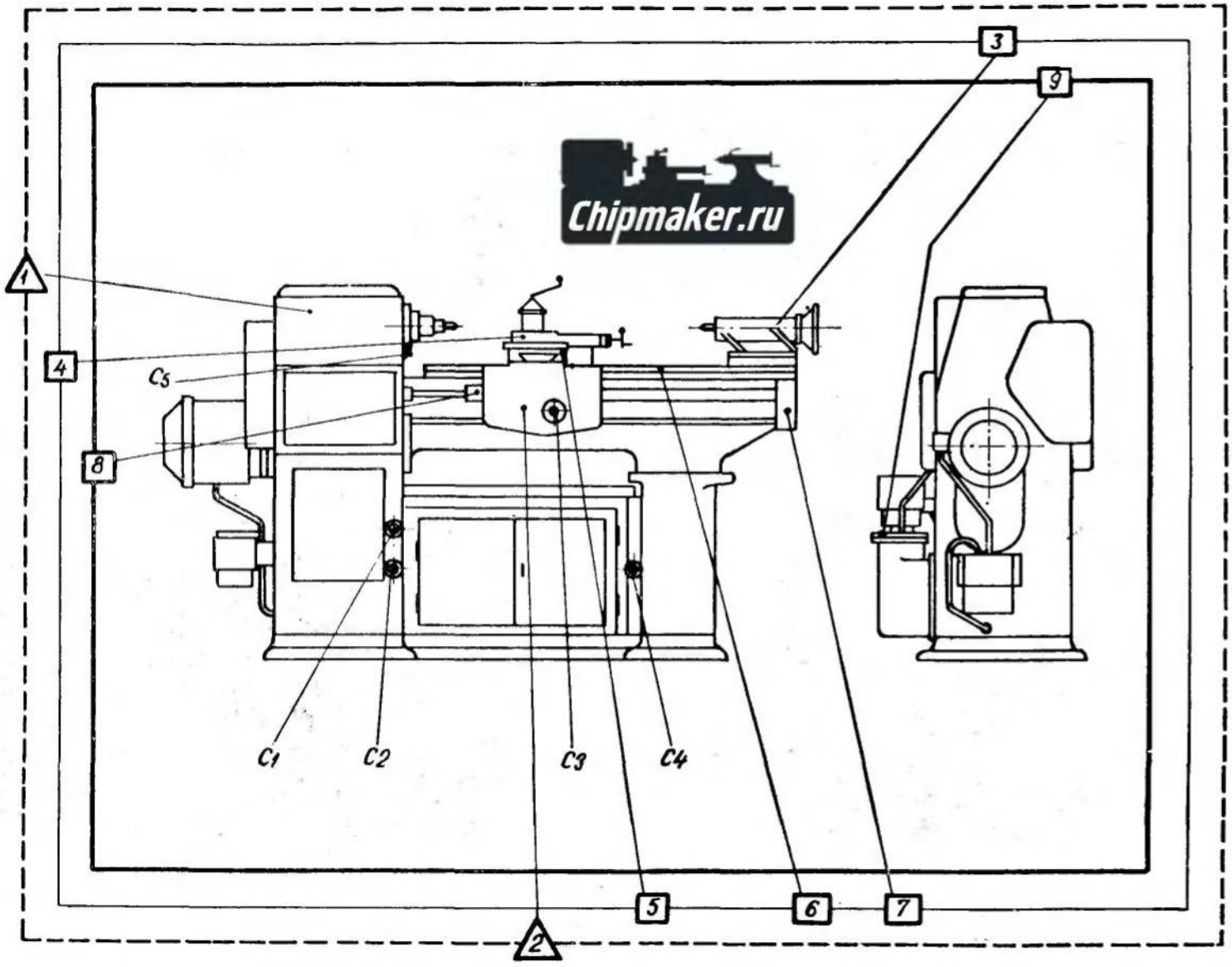


FIG. 13

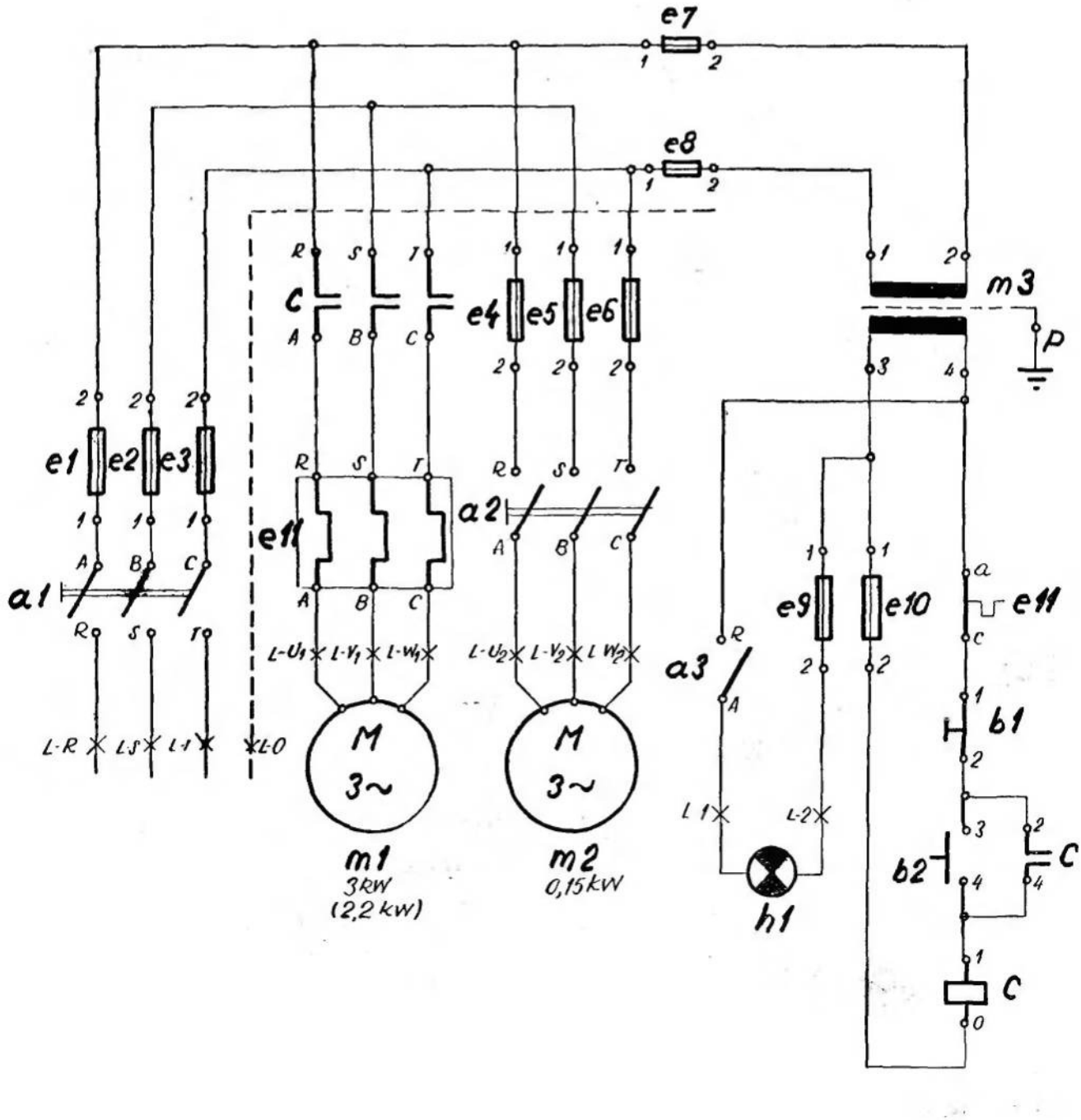


fig. 15

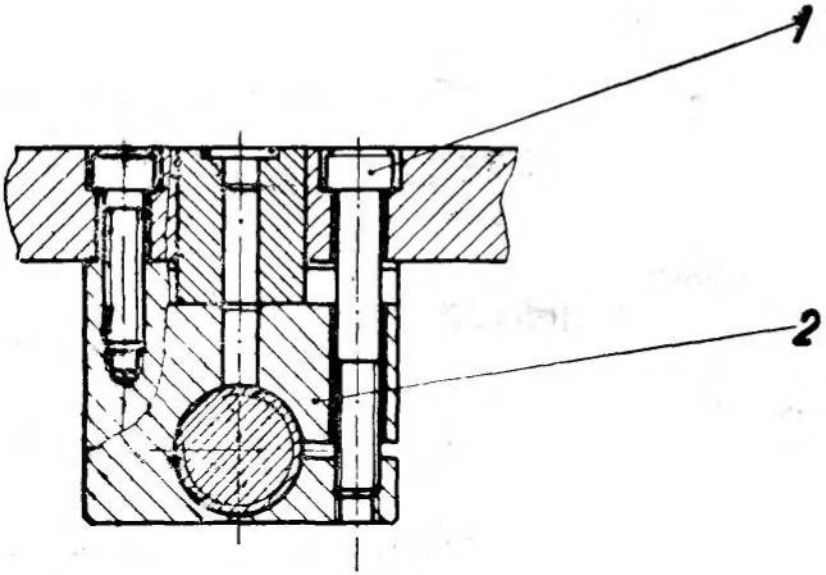


FIG. 16

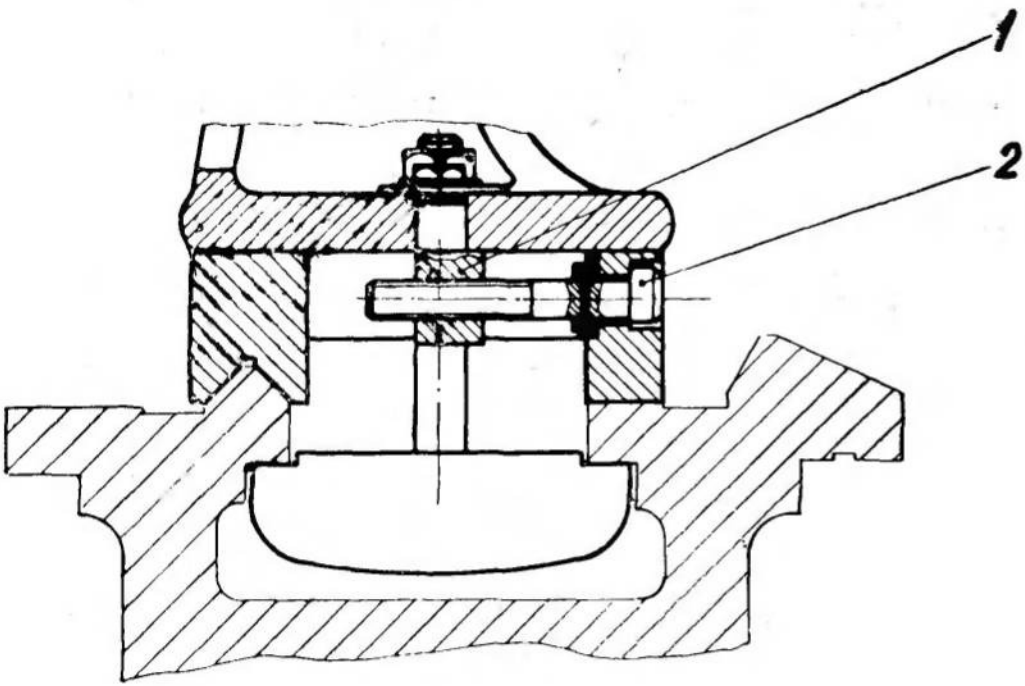


FIG. 17

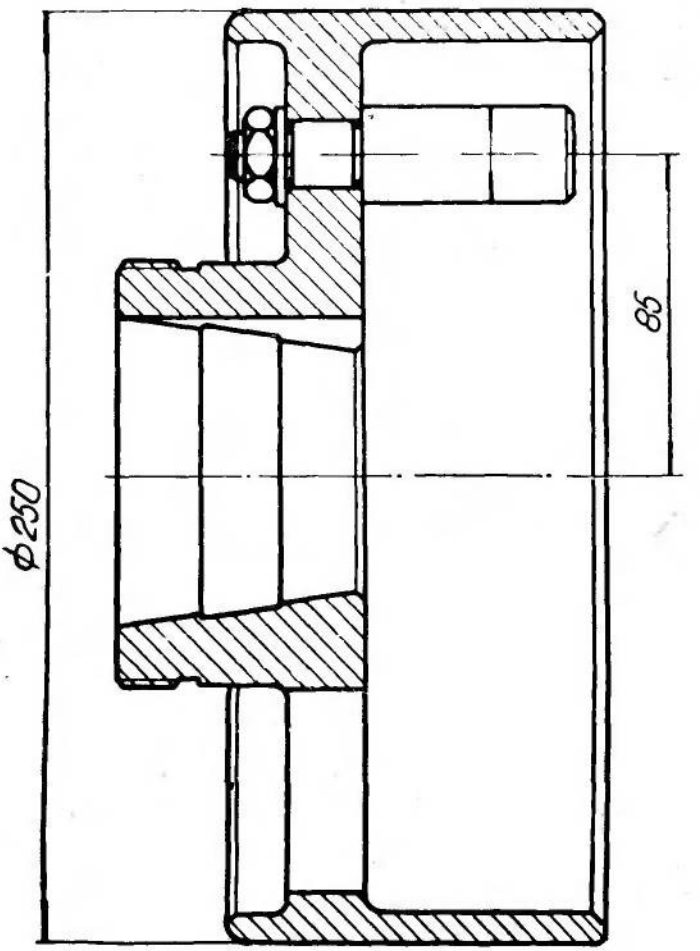


FIG. 18

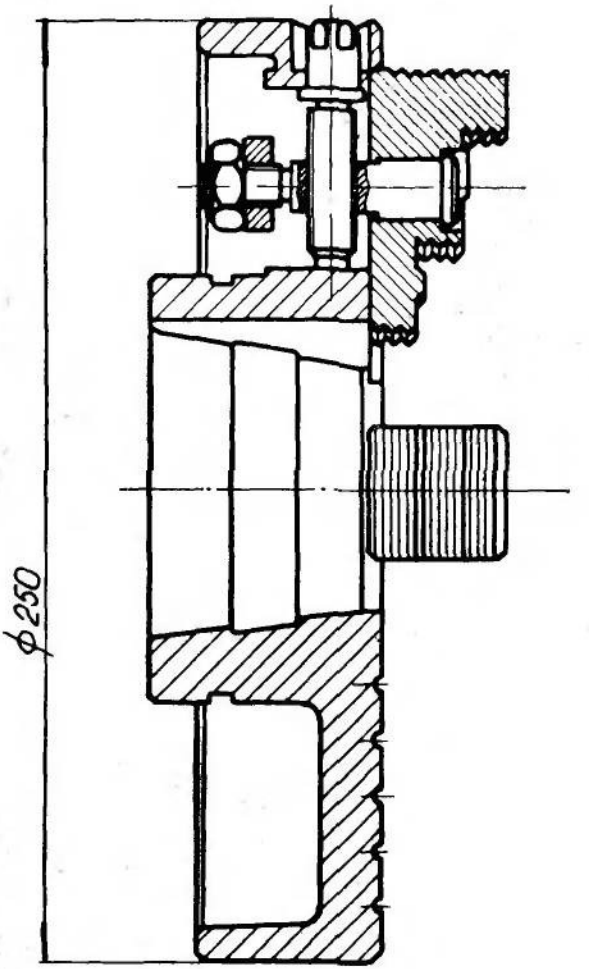


FIG. 19

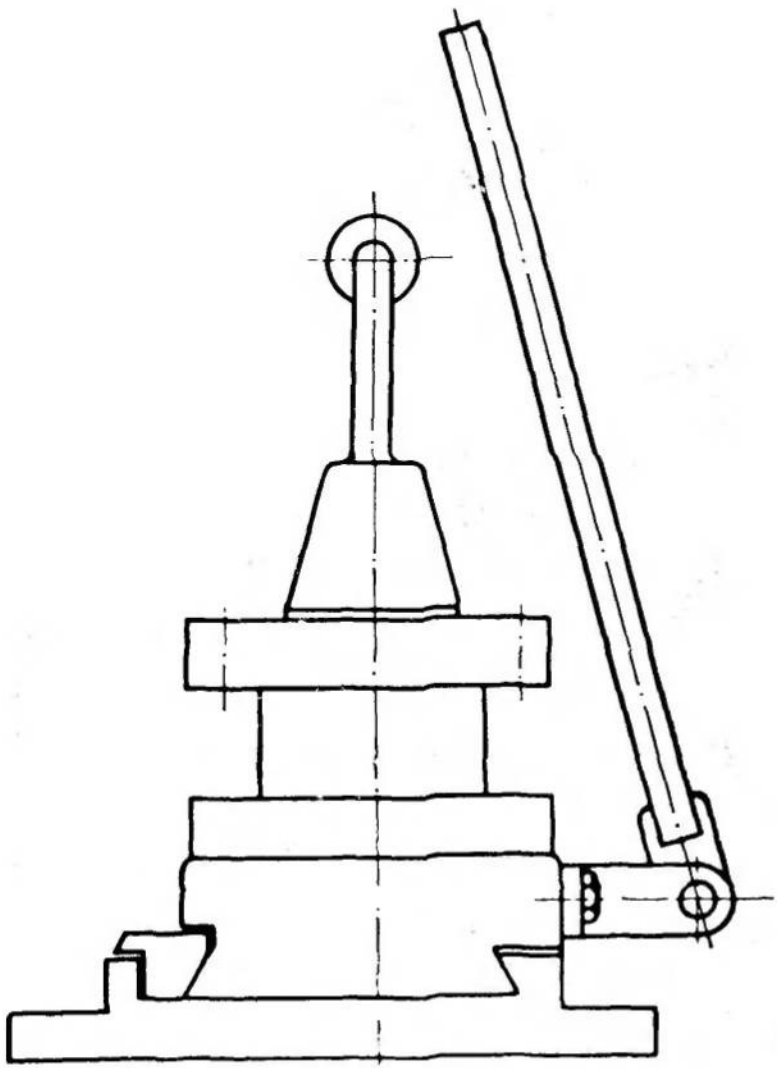


FIG. 20

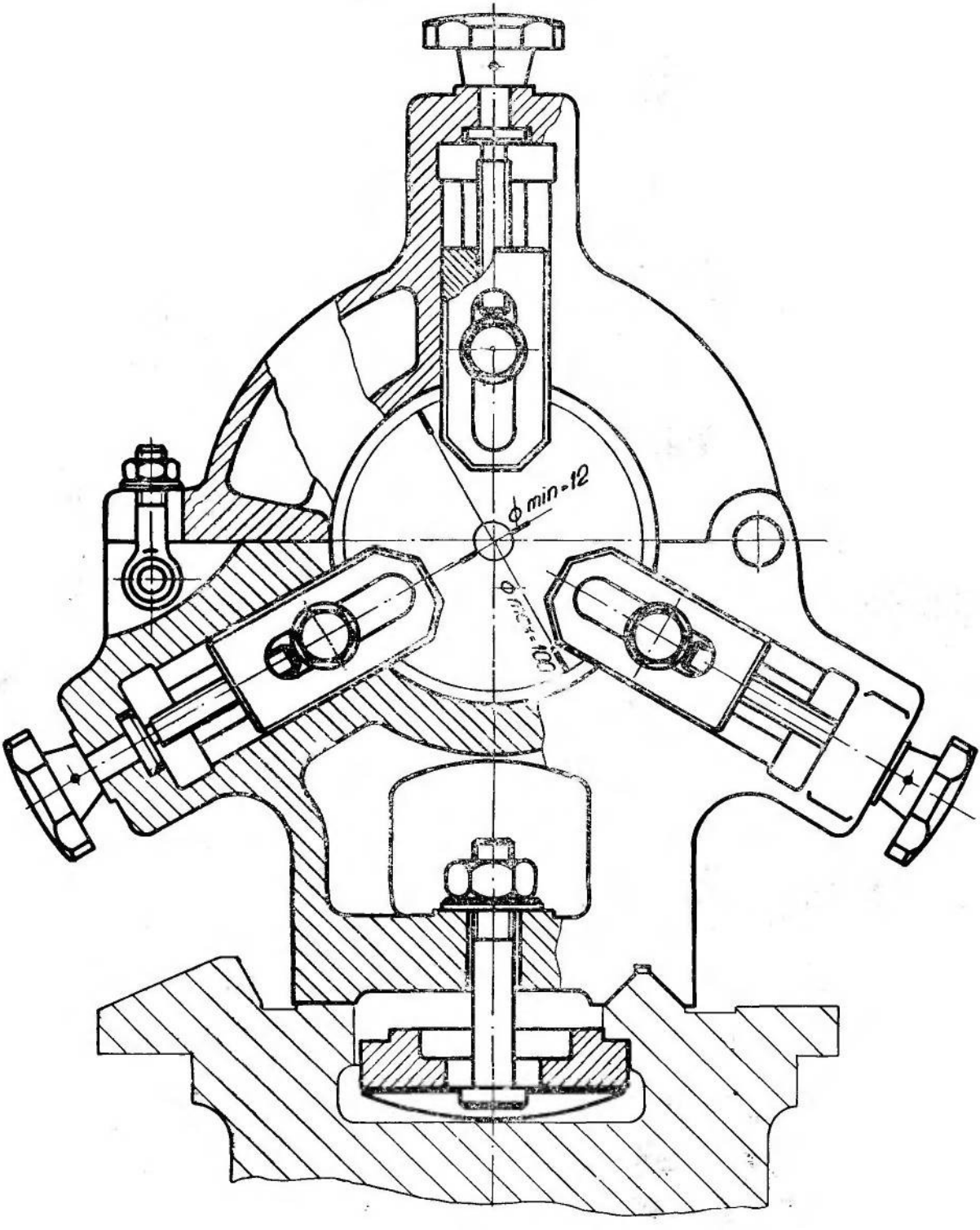


FIG. 21

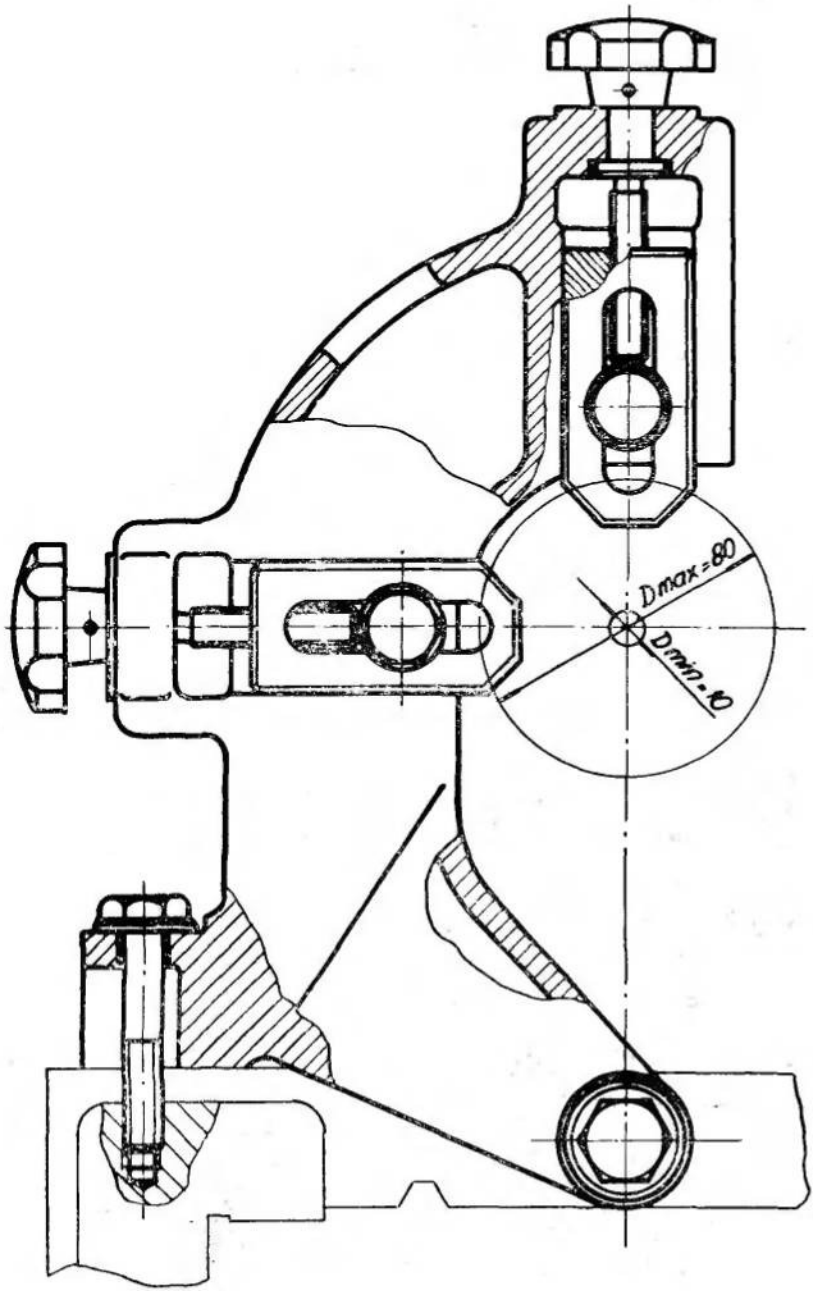


FIG. 22