MACHINE TOOL INDUSTRY WORKS 5269113-115.(439) (085)

ESZTERGOMI MILLING MACHINE FACTORY

MANUAL

MSU-250

MACHINE TOOL

08-00-1959

YEAR OF MANUFACTURE

MANUFACTURE NUMBER:

List of figures.

Drawing number	Designation.
414 - 0101	Line drawing
- 0102	Lifting the machine
- 0103	Foundation
- 0104	Main gear and spindle
- 0105	Advance and advance
- 0106	It would be in front of the main spindle sled
- 0107	Sled system
- 0108	Alapasztal
- 0109	Main gear oiling
- 0110	Power plan
- 0111	Electrical wiring diagram.
- 0112	Control elements
- 0113	Gear oiling
- 0114	Support bearing
- 0115	Lubrication board
- 0116	Kinematic sketch
- 0117	Gear seat beds /schematic sketch/
- 0118	Gear wheels /schematic sketch/
- 0119	Lifting spindle
- 0120	Hydraulic gate valve
411 - 0107	Speed calculator
411 - 0117	Feed gear quick-shift switch 6.

Table of contents.

1. Introduction.

When editing the manual, we strive to fully satisfy the requirements of the user plants. We provide all the technical data for the machine that are needed for operation planning and production. We provide a detailed description of the machine's structure in order to facilitate maintenance and possible repair work.

We recommend that you study the manual before putting the machine into operation in order to get to know your new machine as thoroughly as possible.

All machines are manufactured with the accuracy specified in the attached acceptance report. The final inspection is carried out with very careful and thorough measurements with reliable instruments. After commissioning, we can only guarantee the machining accuracy of the machine if it has been set up professionally. Long service life and reliable operation depend to a large extent on the careful handling of the machine. Overloading is harmful from the point of view of long-term accuracy and service life, so it is not allowed.

In the case of ordering spare parts or other inquiries, please always state the model number, production number and year of the machine. So that the identity of the necessary parts can be established without misunderstanding, it is recommended to provide the reference number of the part based on the diagrams in the engine manual. Where this is not possible, the most correct simple sketch with the most important data of the part can be sent.

Good luck with the operation of the gop

SZIM Esztergom Milling Machine Factory

2. General description of the machine.

MSU. 250. Universal tool milling machine plays an important role in the field of tool and device production as well as in the production of various machine parts. It can satisfy the most diverse needs of machining tasks with the help of a wide variety of standard and special accessories.

Due to its structure, handling the machine is very simple and easy to understand. The operating elements are positioned so that the person working on the machine can easily reach them in a comfortable body position.

The main and secondary gear are oiled centrally, the slide and piston pump , table system are oiled automatically with a manual and separate oiling heads. In order to ensure the safety of the operation of the machine, electrical locking and mechanical anti-break structures are installed.

The main spindle sled can be operated in both forward and backward directions with feed and rapid traverse. The slide-table system can also be operated in vertical and horizontal directions with mechanical feed and rapid traverse. The direction of movement of the table and sled can be controlled with a joystick. The fast travel button integrated in the handlebar also makes handling the machine easier. The main spindle slide and the slide-table system are also operated manually possible.

In order to achieve safe operation, the movements of the slide and the base table can be switched off with electric limit switches. At the limits of movement inside, the feeds are switched off by adjustable stops.

The movements of the main spindle slide can be limited with mechanical limit switches.

MSU.250

3. Main dimensions and technical data.

Designation		Size
Main dimensions:		
Base table width	mm	250
length	mm	800
The movement of the length of the base table is mechanical and manual	mm	410/420
vertical movement is mechanical and manual	mm	390/400
orso Milling center distance of the rigid table		
is the smallest of	mm	40
largest	mm	440
The transverse movement of the torsion sled is mechanical/manual	etc	190/200
Typical dimensions:		
Number of catch grooves on the base table	pcs	4
division of grooves	etc	56
size of grooves	etc	14 HZ
The center distance of the spindle is the sub-		
from the salt surface	mm	66
The face distance of the spindle from the support bearing	mm	275
Bar roller in the front bearing	etc	60
Hole through milling spindle p	etc	17
Dimensions of tools and connectors:		
Spindle thread adapter flange Ø	etc	88,882
Spindle head inner cup ISA		40
Production data:		
Florsó number of speed stages		18
Speed range in both directions	f/p	45-2240
Speed ratio is proportional		1.26
number of transfer steps		17
Feed range		
Base table lengthwise	mm/p	10-400
vertical	mm/p	10-400
Main spindle slide in transverse direction	mm/p	10-400
Walking tour:		
Base table lengthwise	mm/p	1000
in a vertical direction	mm/p	1.000
Main spindle slide in transverse direction	mm/p	1000

Designation		Size
Maximum permissible torque on the milling spindle	mkg	10
Largest applicable cutter ∅	mm	250
Drive motor performance	sq	2.8
Coolant engine performance	sq	0.12
Other data:		
The largest dimensions of the machine:		
length	mm	1452
width	etc	1259
height	etc	1670
The machine is dirty with normal accessories	kg	1350
Packing box dimensions:		
length	mm	1772
width	etc	1472
height	mm	1892

4. Included accessories.

Electrical equipment is complete

3 pcs Endless V-belt 13xWx1120 40° cord MSz 2531

3 endless V-belts 13x6x950 40° cord MSZ 2531

3 do. Built-in lubricating oil pump

1 pc Milling shaft p-27/complete/414-8500

1 pc Milling shaft bearing tray

1 square key 411-9001

146 Spanner M 58x80 KGMS 2532

3 pcs Double-sided open-end wrench MSz 1151 Mlo-11 M12-14; M17-191

4 hex keys No. 1156 5,6,8,10.

1 machine screwdriver MSs 1206 100/8

1 pc Manual oil press

1 workplace lighting lamp without burner/36v, max. 60watt

2 machine manuals

4 machine cards

5. Special accessories.

1./ Vertical milling head FES.250.
2./ Gyorsfuró marófej CMS.25 o.
3./ Scraping head VS.80
4./ Rigid pick-up table ALS.315
5./ Tiltable pick-up table ABS.250.
6./ Körasztal TkK 355
7. Distribution head OFS.100.
8./ Spiral milling equipment SMS.75.
9./ Turning head EFS.170.
10./ Rotating machine vice TGS. 160.
11./ Axle vice TS.100.
12./ Milling shaft with ISA cup 16 0 226 32 mm
13./ Router bit with ISA cap 616 0 22 0 32 mm
14./ Measuring shaft with a measuring length of 300 mm
15./ Transformation sleeves 1,2,3, More o 444-99100
16./ Clamping head clamping sleeves 6,8,10,12,16,20 mm
17./ Center clamping chuck for distributor head & 130 MSz, 5048
18./ Accessory cabinet.

6. Spare parts.

Group	Designation	Hajjs is closed
Gearbox	Switch fork	411-2224
	Switch fork	-2226
	Switch fork	-2227
my horse	Worm wheel hub	411-4028-3
	Worm wheel	-4029-3
	Switch fork	-4009
	Switch fork	-4024
	Claw pin	-4010
	Claw pin	-4040
	Worm shaft.	414-4003

Group	Designation Drawing no	s z
My advance	Claw switch	411 - 4063
	Pinion gear	- 4064
	Switch lever	- 4073
	Ring	21 0180-1
	Internal lamella	29 0008
	Outer lamella	29 0009
	Outer Lamella	29 0030-1
A bet	Gear	414 - 4113-1
	Gear	414 - 4105-1
	Star	414 - 4108-1
	Greek	414 - 4110-1
	Bush	414 - 4115
Sled system and tripod base	Lifting spindle	414 - 1005-1
	Maternal	414- 5029-1
	Bush	414 - 5059
	Bush	21 - 6211
	Bush	414 - 5060
	Bush	414 - 5061
	Gear	414 - 5042-1
	Cardan joint	FP16 MSz 6428
Alapasztal	Digging spindle	414 - 5405-1
	Maternal	414 - 5422-1
	Compensating mother	414 - 5423
	Bush	414 - 5403
	Flange bushing	414 - 5409-1
Spindle feed	Cardan joint	FP16 MSz 6428
	Vagina	414 - 4401
	Bush	414 - 4405
	- Bushing	414- 4402
	Bush	414 - 4426
Spindle sled	Threaded spindle	414 - 3123

7. Delivery and unpacking/414-0102/

The tool milling machine is delivered fully assembled. Reduction of the dimensions of the packing crate s The rear protective shield of the main spindle carriage and the knife wheels of the base table have been removed. The unpainted metal surfaces are coated with acid-free vaseline and covered with paraffin paper.

For export and sea transport, the machine is packed in a hermetically sealed, welded plastic film cover, in a solid wooden crate with waterproof lining. The machine is attached to the box with screws. The machine packaging box is equipped with a cautionary shipping warning sign and a conventional symbol.

When receiving the machine, it must be checked whether there is any damage on the crate or the machine. The carefully unpacked machine and its accessories must be subjected to quantitative acceptance according to the relevant regulations of the delivery note and the machine manual. If the machine has been damaged or the parts are missing, a report must be taken immediately. Subsequent up-

statements cannot be taken into account. The unpacked

machine must be lifted from the crate base with a crane, and it is recommended to transport it to the installation location with a crane as well. The suspension goes beyond the hemp rope included in the 414-0102. no. can

be done according to fig. The rope must be placed in such a way that it does not come into contact with the operator or easily damaged parts. In order to avoid damage to the machine, it is advisable to place a file or wooden inserts under the rope.

If a crane is not available, the machine can also be transported on steel pipe rollers. Such transport should be carried out carefully. The machine must be protected from shocks and overheating. In order to protect the accuracy of the machine, it must be set in a horizontal position on a flat surface even for short-term storage.

7.1. Removal of protective coating.

Before setting up and putting the machine into operation, the sliding and other shiny surfaces must be cleaned of the protective coating applied during transportation. Washing can also be done with terpene tinnel gasoline or petroleum. Light scraping tools or alcohol-containing cleaning agents should not be used, after washing, it is recommended to thinly coat the shiny and glossy surfaces with acid-free oil1.

8. Foundation and erection.

If the precision specified in the manual is required from the milling machine during operation, it must be placed on such a solid base that its vibration-free operation is ensured.

The milling machine can also be placed in an upstairs room if the load capacity and rigidity of the building allows it.

depends on the compactness and load-bearing capacity of the soil. The attached no. 414-0103 the minimum depth is indicated on the foundation drawing. If the depth shown in the figure does not reach the soil with the appropriate load-bearing capacity, it must be made deeper in accordance with local conditions. Before starting concreting, it is recommended to tamp the soil well.

Leave it in the concrete base for the clamping screws and the damaged cable lead. as shown in the figure, it creates a cavity

On the base, the machine must be placed in an exact horizontal position lengthwise and diagonally with the help of steel washers and wedges placed next to the base screws. At least 0.03/1000 min. use a water level meter with a high accuracy. After adjustment, the foundation screws can be poured with reger hig cement.

After the cement has solidified, the foundation screws can be tightened quickly, but in the meantime, the position of the frame level must be repeatedly checked.

The electric cable in steel armor tube for the machine csa

can be installed, and the protective ground wire must also be connected.

After the assembly is completed, the gaps between the machine and the concrete base must be carefully filled with concrete. After this has solidified, the machine can be operated.

9. Description of the structure of the machine.

Below, the main structural units of the milling machine are described in the following order:

9.1 Stand and base
9.2 Main engine
9.3 Forward gear and ballast
9.4 Spindle, spindle slide.
9.5 Bottom pusher chain of spindle sled
9.6 Sled system and stick control.
9.7 Alapasztal
9.8 Limit switches.
9.9 Central oiling and cooling equipment
9.10 Description and operation of electrical equipment
10.1 Gear data
10.2 Technical data of rolling bearings

9.1 Stand and base.

The base of the machine is gray cast iron, hollow inside, reinforced with ribs. Its interior is equipped with pito ribs to store the cooling water.

The machine stand is a gular-shaped cabinet casting with wide curved surfaces. For rigidity and vibration damping, its interior is heavily ribbed. In the front part of the stand, there is a wide dovetail-shaped prism wire for guiding the sled. In the upper part of the stand, the spindle slide fits into the prism wire parallel to the spindle,

The complete gearbox and advance gear can be — installed in the rack with a powder connection. The upper space of the stand is made up of oiling and hydraulic rapid travel the oil tank of the engine.

The main and electrical equipment is located in the lower space of the stand.

9.2. Main drive, /414-0104/

The gearbox structure of the main drive is a separate assembly unit, and it is located on the right side of the machine stand with flange mounting. Three-axis push wheel arrangement.

18 spindles are suitable for forming surface numbers. The direction of rotation of the Foorsó can be selected by pressing the appropriate button g

The speed steps can be adjusted with a switch lever during coasting or when the engine is at rest. An electric stepping button is used to facilitate the adjustment of the revolutions. The adjusted turning sled can be read from a rotating sled disc. The number of revolutions of the main spindle is 45-2240. within rpm limits, according to the 1.26 sequence ratio, they are chosen in accordance with the international standard

The calculator mounted on the gearbox is a useful tool for setting the torque. With the help of this, the speed to be adjusted can be easily stored, taking into account the diameter of the cutter, the cutting speed and the material of the workpiece and the tool. The handling of this is described in detail below.

The gears of the gearbox are case-hardened and ground. All the axes run in rolling bearings. The circulation central oiling of the gears and bearings is done automatically by the vane pump installed on the first axis of the gearbox.

9.3. Feed gear and ballast /414-0105/.

The advance cabinet and ballast are installed together in the machine stand. The task of the ballast is to ensure the unidirectional drive of the pusher when the motor rotates to the right or to the left. After the gear, a bevel gear and a worm gear rotate the gear. With the Meander line, 17 forward steps can be mapped, in addition to this, the fast travel operates at a constant speed. Switching to fast gear by deactivating the claw clutch in the forward gear and switching on the multi-plate clutch

automatically when the Kyorameneti push button on the steering wheel is pressed.

The 17 forward steps can be adjusted with a switch lever according to the dial that turns with the ve down. The handover cooling should take place in idle mode, that is, in the zero position of the stick rudder.

It is forbidden to switch when under load!

Drive the thrust gear and ballast from the main engine

With @kasiganjtásl, it is done through an electromagnetic reed clutch. By switching off the electromagnetic clutch, the operation of the feed mechanism can be paused. The protection of the feed gear against overload is solved with a safety shaft switch designed and built into the single-spindle hub.

9.4 Spindle, spindle slide. /414-0104/

The main spindle of the milling machine is made of high-strength alloy steel, case-hardened and ground. Its running accuracy and play-free adjustment are ensured by a special NN series double-row roller bearing, and two single-row angular ball bearings at the rear. The main spindle is made with a steep cone head according to MSz 3815 no. 2. with a steep taper, the spindle rim measures 688.882 h5.

The gear wheel for driving the accessory heads is placed on the main spindle. The main gear is unloaded from the point of view of the drive, and is therefore loaded with torque from the gearbox. The torque is transmitted using the ribbed part of the main spindle. The gear that transmits the rotary printer has a separate bearing, the bearing housing is attached to the stand with screws. The main spindle slide is a rigid casting, a

it is placed in it together with its bearings. It connects to the upper wire of the stand with its lower brush-shaped wires. On the right side, it is equipped with a sloping connecting strip. The roller sled can be fixed with square head clamping screws on the right side of the stand. The support wires of the accessory heads fit into the upper prismatic wires of the main ereo sled, on the right side there is a sloping connecting strip

Seeing.

9.5. Main spindle sled feed chain/414-0106/.

The main spindle sled receives its drive from the output of the feed gear through cardan joints, a front wheel-cup wheel-bevel gear pair and a rotating spindle nut. The feed spindle is connected to the support frame attached to the main spindle carriage, and is secured against rotation with a slotted lock. The feed values are the same as for the base table. The main spindle sled can be moved at high speed by pressing the high speed push button in the steering wheel. The advance is canceled by switching the switch lever in the upper right part of the stand to the "" position. It is also possible to switch the forward and backward movement of the main spindle slide here. The feed can be switched on and off while driving.

9.6. Sled system and stick steering control.

/414-0107/

Gray cast iron with cabinet design, strongly ribbed on the sides. On its right side, the joystick advance control structure is integrated, which is used to select the direction of the longitudinal movement of the base table and the vertical movement of the sled system. The joystick control is by definition, that is, when the joystick is turned to the left, the base table moves to the left, and when it is turned to the right, it moves to the right. The sled system moves upwards when tilted in a direction perpendicular to the base table, and downwards when tilted in the opposite direction, and a gimbal shaft for driving the base table is connected to the stick steering control structure, which transmits the torque to the base table via spur gears and a splined shaft, the splined sleeve it is mounted in the slide.

The oiling of the sled system is ensured with the built-in hand crank pump. Connect with the sled's wide prism wire to the machine stand. The flat table is connected to the horizontal front wire of the sled.

9.7. Alapasztal /414-ol08/.

Its vertical support plate, which is placed on the front horizontal wire of the sled, is used to mount the special accessories of the machine. It only has horizontal longitudinal feed, and the fast metallized base table receives its feed movement via a splined shaft front wheel and claw-type electromagnetic clutch. In the middle position of the stick, the clutch is automatically disengaged and the base table can be easily moved with the help of the handwheels. A separate gear wheel is built into the left bearing housing of the base table, which transfers the rotary movement to the special accessories that can be installed on the base table. This gear can be accessed after removing the plate cover on the front part. The lead screw is held in two cup roller bearings on the right side, and runs in a bronze bushing on the left side.

9.8. Limit switches.

The advance movement of the slide and base table can be limited electrically, and the advance movement of the main spindle slide can be limited by a mechanical limit switch in the appropriate vertical, horizontal and radial directions. The abutments are bounded by cylindrical pins in extreme positions, on which the groove nut abuts. The electric limit switches switch off the electromagnetic lamellar and claw shaft switches in a suitable way. By switching the stick steering in the opposite direction, the couplings can be brought back into operation, that is, the movement of the base table in the opposite direction can be switched on.

9.9. Central oiling and cooling system.

Professional lubrication is a prerequisite for reliable machine operation and lasting accuracy. However, the oiling of all working surfaces on the machine is automatically provided by a central pump system.

The lubrication system of the machine is structured according to the operating conditions and is divided into several units.

1. Forced oiling of the main gear and the main spindle is provided by the vane pump built into the gear. After filling the oil chamber, the oil is delivered automatically as long as the engine is switched on.

2. Oiling of the advance gear and the intermediate shafts and gears built into the advance is also carried out automatically by the gear pump built into the advance. The same pump delivers the pressure oil to operate the quick-shift shaft clutch.

3. The sliding surfaces of the table unit of the machine only work intermittently. They can be oiled with a self-operated piston pump built into the lower part of the slide.

4. Other structural elements that require a large amount of lubricating oil and operate only periodically, which must be oiled with the manual oil press supplied with the machine.

The storage space for the tool coolant is located in the machine base. From there, a vane pump integrated with an electric motor located in the lower part of the machine stand transports it to the tool through a flexible pipeline. The amount of liquid delivered is 5 Litres/minute.

The coolant flows back into the machine base through the filter and flexible tube located in the various accessories.

The capacity of the active substance container is approx. 40 liters.

9.10 Description and operation of electrical equipment.

9.11. Network information.

Mains voltage	380 V
I don't	3 phase alternating current
Period number	50 Hz
Control voltage	36 V
Nominal value of liquid primary insurance	15 amps. sluggish

9.12. The electrical equipment belongs to the master.

Mi Fomotor: VZ 223/4, 2.8 kw power, n=1420 rpm, 380/660 V voltage, 3-phase 50-period asynchronous motor with base, short-circuited rotor,

Maz Coolant pump: Dynamó SF 100 13/2 mark 120 watts, n=2800 rpm

Control device: Closedly installed in the lower right part of the machine stand.

Switchboard: Mounted on the door on the right side of the machine stand

9.13 Switching on and operation of electrical equipment

The circuit diagram of the equipment is shown in the attached diagram no. 414-0110.

The power cables must be connected to the RST series terminals located on the control board and equipped with a protective cover, and the protective ground wire 16 must be connected to the screw located at the back of the machine stand.

Before energizing the machine, make sure that:

1./ Are the manual switches, contactors and relays in their rest position?

2./ The fusible fuses must be undamaged and screwed in.

Connecting the Á network is correct if, after turning on the main switch, the machine's main spindle rotates to the right by pressing the green button marked hj on the control panel. Otherwise, two phases must be swapped at the RST terminals.

Main switch:

When the main switch marked F is switched from position 15 to position 15, the electrical equipment is energized, which is indicated by the red light marked Lm located above the main switch.

MH Pomotor: The fomotor is started by the corresponding start button is done by pressing When Nhj is pressed, the 1 SR relay pulls in, becomes self-sustaining, and at the same time switches the Kuj contactor. In the case of counter-clockwise rotation, the start is made directly, without a relay, with the Nhb push-button.

In order to eliminate the large current surges that occur during starting, the 16- motor is started in connection with the IR Signal time relay, the ah-Δ switching is performed automatically by the time relay. The NI push button (yellow color) is used for the momentary switching of the main motor, and since when pressed, the main motor's constant rotation to the right is not ensured by the auxiliary contact of the magnetic switch, therefore the main motor rotates only as long as the push button is held down.

Msz Refrigerant pump: Turn it on by switching the Faz switch located on the right side of the switchboard from position 0 to position 0. The fact that the pump motor is under voltage is shown by the green indicator light with the loose symbol.

MK, Electromagnetic lamellar clutch. Operated with direct current, the direct current is provided by the selenium cell group C. The MK, clutch is engaged with the Kbk-66 type switch marked FK, located on the right side of the switchboard. The MK is used to switch off the feed mechanism completely, in this case only the main spindle of the machine will rotate.

MK2 Electromagnetic claw clutch. It is also supplied with direct current from the C selenium cell group. The FMK2 signal is switched on and off by the Kbk-66 located on the left side of the switchboard. it is done with a type of clamp. The MK is used to switch the spindle of the basic table drive on and off. The MILTAC switches marked PMJ, PMB are in mechanical contact with the stick steering of the machine. In the middle position of the joystick, the MK axis switch will be disconnected automatically when any base table movement is switched on with the joystick.

9.14. Maintenance of electrical equipment.

Opening the door of the control device, carrying out any installation or repair work on the components of the device, including the motors, may only be done by a specialist with electrical qualifications.

The main switch is not suitable for completely de-energizing the machine or the equipment, because even when it is switched off, one side and the Res.T.jeld series terminals are still under voltage. Complete de-energization must be performed by unscrewing the main fuses at the mains distributor. A warning sign must be provided for the duration of this repair.

In the de-energized state, the control equipment must be cleaned of dust at least once a month. At the same time, the contacts of the switches and relays must also be examined. If they show burn-in or other malfunctions, they must be repaired by cleaning or replacing parts. Only a fine file should be used to clean the contacts, the use of abrasive paper is prohibited. The moving parts of the switches must be coated thinly with vaseline.

In the event of any malfunction of the electrical equipment, the main switch must be turned off immediately. No foreign materials or substances may be stored in the control equipment space. In the event that the fuses blow repeatedly or the thermocouples frequently trip, it is necessary to make sure that the fault was caused by a mechanical failure of one of the elements, or by the installation of an inappropriate fusible insert, or by possible overloading.

In each case, the machine manual states which mains voltage the machine is installed on. In the table below, we provide the setting values of the fuses and thermocouples for different mains voltages.

Network tension		3x220V	3x380V	3x420V	3x500
Plan sign	Designation	50 Hz	50 Hz	50 Hz	50 Hz
Nominal current or setting value					
Bf.	Main insurer	15.4 1 ohm	15 The sloth	15 The sloth	15 The sloth
Bsz.	Pump-2 tor safety	The fast	2 A gy or s	24 fast	2 A gy or s
Bm_1 Bm_2	transformer fuse	2 The fast	2A is fast	2 A gy or s	2A is fast
Vh.h	Drive motor protection element	10.7 settings litany 17.4~13A/	6.2 set. /4,5 ~ 8A/	5,6 be/11. /4,5~8A/	4,7 be /4,5~8

Gear data.

horse. Gear data.

Item numbers are MSU. according to a schematic diagram.

Co-port	Axis	Tooth	Drawing number	Number of teeth	Module etc	External mm	Wheelbase mm	Clutch 16th wheel item no.	Comment
support-here.	VI	1	414-1207-1	16	2.5	46.25	73,405		Bevel teeth β =90
		2	-1208-1	41	2.5	108.78	108.84	3	bet.edz. β =90
Forso	V	3	-3103-1	45	2.5	118.9	118.9	2	- " -
		4	-3105-1	36	3.5	133	126	10	- " -
		5	-3116	20	2	42,828		6	Woman, workout
		6	-3116	20	2	42,828		5	- " -
	ARC	7	-3129-1	18	3	60			- " -
		8	-3128-2	60	3	186,315	117	11	Pot-trained
		9	-3127-2	22	3.25	79.63	117	12	-"-/Krig
		10	-3126-2	36	3.5	133	126	4	- " -
Wound. changer	III	11	411 -2103-1	17	3	59.54	117	8	bet.edz. /Corrig
		12	-2104-1	50	3.25	167.36	117	9	Nominated NF age.
		13	-2107-1	50	2.5	131.18	99	18	- " -
		14	-2106-1	55	2.5	142.4	99	17	- " -
		15	-2105-1	46	2.5	119.78	99	16	- " -
	II	16	-2113-1	33	2.5	75	76/99	15	- " -
		17	-2112-1	24	2.5	69.58	76/99	14.22	- " -

	It goes on	To tel	Drawing number	Number of teeth	Mod	External mm	Wheelbase mrn	Capes. wheel item	Comment
Wound. changer	II	18	411-2110-1	28	2.5	76.65	99	21.13	Nemesitve NF edz. corrected dentition
		19	-2109-1	45	2.5	110.56	76	20	- " -
	I	20	-2116-1	18	2,5	51.44	76	19	- " -
		21	-2117-2	37	2.5	96,405	76	18	- " -
		22	-2118-1	26	2.5	72.78	76	17	- " -
41616t	the	25	414- 4113-1	24	2	52	43	28	Pot-trained
		26	-4105-1	30	2	64	60	30	- " -
		27	-4104-1	22	m_n= 2.372875	76.96		31	- " -
	e	28	-4116	19	2	42	43	25, 29	- " -
	f	29	-4118-2	24	2	52	43	28	- " -
		30	-4120-2	30	2	64	60	26	- " -
Bloating		31	-4012	16	2.372875	57.72		27	- " -
	I	32	411-4003-2	25	2	53	42	38	- " -
		33	-4042-1	22	2	48	40	34	- " -
	Sprocket	34	-4057-2	18	2	40	40	33	NF. train Noble.
		35	-4053	18	1.5.	27	24	36	Pot-trained
	pump	36	-4050	16	1.5	27	24	35	- " -

Parcels	Total	Reissued	Number of Teeth	Module	External m	Wheelbase	Connecting wheel space	Comment

120

Group	Axis	Item	Drawing number	Number of Teeth	Module cm	External m	Wheelbase	Kapcsolódó kerék tengely	Bog entry
		37	411-4030-2	46	2	96	63	53	Bet.trained.
	/III/	38	-4029-3	21	2.75	65.5	46.5	32	
		39	-4033-3	17	2	39	42	40	Bet.edzv.
	IV.	40	-4003-2	25	2	52	42	39	Bet.edzv./corrik
		41	-4004	21	2	46	42	42	- " -
	III.	42	-4008	21	2	46	42	43	- " -
	V.	43	-4015	24/19	2	52/42	43	42	- " -
	VI.	44	-4017	24	2	52	43	46	- " -
		45	-4015	24/19	2	52/42	43	46	- " -
	VII.	46	- 4008	21	2	46	42	45	- " -
	VIII.	47	- 4004	21	2	46	42	46	- " -
		48	- 4025	15	2	35,084	42	49	- " -
	/VII/	49	- 4064	27	2	56,916	42	48	NF.edz. Ennobled
		50	- 4060-2	20	2	44	60	52	Noble NF.ed.
		51	414-4006-2	21	2	46	61	54	Bet.trained
	V.	52	411-4038	40	2	84	60	50	- " -
		53	-4037	17	2	38	63	37	- " -
	XIV	54	414-4010	40	2	84	61	51;55	- " -
	g	55	414-4210-1	38	2	76	78	54	Bet.trained

Group	Axis	Item	Drawing number	Number of teeth	Module etc	External mm	Wheelbase mm	Karsvolódó wheel item no.	Comment
advance	g	56	414-4202	20	2	43,328		57	NF.edave. Ennobled
	h	57	-4213-1	30	2	62,218		56	- " -
	V	58	-4308	24	2	52	48	59	- " -
	z	59	-4304	24	2	52	48	58	- " -
		60	-4302	16	2	36,248		61	Corrected teeth zas Betét.edz.
	w	61	-4424	30	2	61.5		60	Ennobled by Korr-fos.
		62	-4422	35	2	70		63,64	Nemesitve NF.edz.
Main spindle	Q	63	-4407	42	2	84		62	- " -
		64	-4411	42	2	84		62	- " -
		65	-4416	40	2	80		66	Ennobled
	Y	66	-4427	20	2	43,577		65	- " -
Sled system	h	67	-5042-1	32	2	68	64	68	Bet.trained
	j	68	-5033-1	32	2	68	64	67	Nemesitve NFedz.
		69	-5035	28	2	59,328		70	- " -
	k	70	-5020-1	42	2	86,218		69	- " -
		71	-5014	35	2	74	70	72.77	- " -
	l	72	-5007	35	2	74	70	71	- " -
						74	70	77	- " -

Sled no | 1 | 72 | -5007 | 35 | 2 | 74 | 70 | 77
23 | -5008 | 35 | 2 | 74

Csoport	Axle Total		In Rajesh	Fogazan	Module mm	Külső Ø mm	Tengelytáv mm	Kapcsolódó kerék tételsz.	Megjegyzés
[illegible]	m	75	414-5031-1	30	2	62,828		74	Ny Ennobled. NF.eds.
	n	76	-5008	35	2	74	70	72	- " -
		77	-5007	35	2	74	70	71	- " -
	o	78	-5044	35	2	74	70	79	- " -
	p	79	-5045	35	2	74	70	78	- " -
Alapasztal	p	80	-5416	35	2	74	70	81	- " -
	r	81	-5412-1	35	2	74	70	80,82	- " -
	s	82	-5419-1	26	2	56	61	81	- " -

MSU-250

MSU 250

Technical data of rolling bearings

Item numbers according to the MSu.250.-principle sketch

cao-port	Ten-gel	Te-you are full no.	Pcs.	Designation Designation		Size
pregnancy changer	I	1o1	1	Deep groove ring ball bearing	63o4	2ox52x15
		1o2	1	- " -	6oo8	4ox68x15
	II	1o3	2	- " -	63o4	2ox52x15
	III	1o4	2	- " -	63o4	2ox52x15
okez jdrive	a	1o5	1	- " -	6oo8	4ox68x15
		1o5/a	1	- " -	63o6	3ox72x19
	c	1o6	2	- " -	62o3	17x4ox12
	b	1o7	1	- " -	62o4	2ox47x14
		1o8	1	- " -	63o5	25x62x17
		1o9	2	- " -	6o13	65 x floor 18
bloat	d	6666	2	- " -	6oo2	32x15x9
		112	2	- " -	6oo4	ø 42x2ox12
		113	1	Double-row slanting. ball bearing	32o6	ø 6ox3ox23,8
		114	1	Deep groove balls - овараду	6oo7	ø 62x35x14
	f	115	2	- " -	62o2	ø15x35x11
16th century	I	116	1	Two-row inclined tv. ball bearing	32o5	25x52x20.6
		119	1	Deep groove ring and ball bearing	63o3	17x47x14
	III	12o	1	Single row deep groove ball bearing	62o3	17x4ox12
	ARC	121	2	- " -	6oo3	17x35x1o
	/VII/	122	1	- " -	62o3	17x4ox12
		123	2	- " -	6oo3	17x35x1o
	VIII	124	2	- " -	6oo3	17x35x1o
	6	125	1	- " -	62o4	2ox47x14
		126	1	Double-row slanting. ball bearing	32o4	2ox47x2o,6
	III	12o/a	1	Double-row bevel bearing.. ball bearing	32o3	17x4ox17,5
	II	122/a	1	- " -	32o3	17x4ox17,5

Cao port	Axis	Tét tol sz.	Pcs. 82.	Designation	Notation	Size
Sled system er	h	127	1	Two-row bevel.v. ball bearing	3204	2ox47x2o,6
		128	2	Roller bearing	RNA 2$	RNA 25
	j	129	1	Késoru oblique force. ball bearing	3204	2ox47x2o,6
		129 THE	1	Ayhornyu ring ball bearing	6204	2ox47x14
	k	13oA	1	Two-row bevel. ball bearing	3204	2ox47x2o,6
		13o	1	gysoru deep groove ball bearing	6204	2ox47x2o,6
		131	1	- " -	6204	2ox47x2o,6
		132	1	- " -	6303	17x47x14
	l	133	1	- " -	6303	17x47x14
		134	1	- " -	6204	2ox47x14
		135	1	Two-row bevel. ball bearing	3204	2ox47x2o,6
	m	136	1	One-way disc-ball bearing	51110	5ox7ox14
		136 A	1	- " -	51110	5ox7ox14
	n	137	1	Deep groove ring ball bearing	6303	17x47x14
		138	1	- " -	6204	2ox47x14
Basic table	r	139	2	Cup roller bearing	3o2o5	25x52x16,5
Spindle feeds	V	14o	1	The annular ball bearing has a deep groove	6oo4	2ox42x12
		141	1	- " -	6302	15x42x13
	z	142	1	- " -	6303	17x47x14
		143	1	Two-row convertible. ball bearing	3204	2ox47x2o,6
	W	144	1	- " -	3205	25x52x20.6
		145	1	Deep groove ball bearing	6305	25x62x17
	q	146	1	Two rows can be slanted.v. ball bearing	3209	45x85x3o,2
Spindle	ARC	147	2	deep groove ring ball bearing	6305	25x62x17

MSU 250

Csoport	Tengely	Tő- from sb.	Db. sz.	He named it B	Notation	Size
	V	148	1	Double-row tapered roller bearing NN 3012 K/0- 182		60x95x26
		149	2	Mélyhornyu gyürüs golyóscsapágy	6012	60x95x18
		150	2	Bgysoru inclined bearing-7208/C lu shaft bearing	18	40x80x18
		151	1	Double-row angular contact ball bearing 3206		30x62x23.8
		152	1	Mélyhornyu gyürüs golyóscsapágy	6305	25x62x17

11. Instructions for use.

11.1. Commissioning the machine..

Before putting the milling machine into operation, we draw your attention to the following in order to operate the machine safely.

1. The machine must be carefully cleaned of rust protection materials. Coat shiny surfaces thinly with acid-free oil.

2. Check the correct grounding of the machine, its horizontal position, and the tightening of the base screws.
3. Check the wiring of electrical equipment, the correct connection of contact protection, and the correct direction of rotation of motors. /Detailed description, in point 9.14./
4. Before putting the machine into operation, the operating personnel should thoroughly familiarize themselves with all the operating elements of the machine and their operation.
5. Oil the machine according to the lubrication instructions and fill the oil spaces. In the beginning, the manually lubricated areas must be oiled more than once.
6. If necessary, the coolant space in the machine base is adequate must be filled with coolant.
8. Loosen the longitudinal and vertical manual fixing elements before starting the movement.
9. The operation of all moving parts of the machine must first be tested by hand.
10. Operate the machine in idle mode. Initially, the lowest speed and the smallest feed must be set, then kč. Gradually increase the spindle speed and feed rate every 5 minutes. Switching can only be done with the main spindle stationary.

After the idle test, check the machine one more time. If everything is fine, it can be operated even with load.

11.2. Machine operator and operation indicator elements.

Appointments at 414-0112. according to fig.

P-Main switch

- Im Red indicator light, to indicate the on position

Fsz - Coolant pump switch

Isz - Green indicator light, the pump motor is on to indicate

PMK, - Electromagnetic lamellar clutch on-off

FMK2- Electromagnetic claw clutch on/off switch

Nhj - Green button on the bag. indi clockwise rotation of its

- Nhb Green push button for dita. counter-clockwise rotation

Nhk NI - push-button to stop the spindle/main engine/ Instant start

Red - yellow push-button to facilitate setting the speed level.

Pi spindle lock

1 - Switch lever for setting the gears Dial for setting the spindle speed

2-

3- Switch lever for adjusting the feed steps

- 4 Dial for setting the advance value per minute

- Main spindle carriage hand-feed handwheel

5 6- Main spindle slide mechanical advance switch lever

7- Square shaft end for inserting the milling shaft

8 - Clamping screws for fastening the support wire

9 - Clamping screws for fixing the spindle carriage

10 Indicator clock holder

- 11 Measuring bar of a transverse measuring device

13 - Indicator clock holder

14 - Measuring bar of vertical measuring equipment

15.- Stick steering with the fast travel switch Ngy push button

16- Sled locking arm

17 Base table manual movement handwheel

18- Hand wheel of sled movement

19 Longitudinal limit switch stops

- 21 Indicator holder

22- Longitudinal measuring device measuring bar

- 23 Manual piston oil pump

24- Sealing cover of the gear that drives accessories

25 Vertical direction limit switch stops

26- Cooling pipe holder

27- Workplace lighting lamp

- 28 Stops of the main spindle slide advance limit switch

- 29 Main spindle slide advance limit switch lever

30- Coolant stopcock

- 31 Transmission oil pump function check window

32- Base table fixing nut

33- Rectangular shaft end for moving the support wire

35 - Fixing screw

37- Quick milling head electric motor connector

11.3 MSU. Operation of 250 universal tool milling machines.

By turning the main switch F to the right, Lm. red Indicator light lights up: the machine is in operational condition under voltage. All movements can be started by pressing the corresponding button on the control panel.

11.31. Setting speed levels. Setting the spindle speed can only be done with the main spindle stationary.

The rotary speeds that can be adjusted on the machine are engraved on the circular scale of the gearbox. The speed that is No. 2 is always switched on. falls in the direction of the dial. When setting the speed, make sure that the black dividing line of the red-white dial is in a vertical position. Because no. 1 when the switch lever is turned, the indicator disc also turns and only jumps back to its place if the switch lever is set correctly and the gears of the main drive are fully covered. If the 1. no. the NJ would then get stuck during switch lever adjustment. by momentarily pressing the push button, the gears of the gear unit turn and the setting can be continued. The switch lever can be turned in both directions, as the speeds can be switched in ascending or descending order.

11.32. Calculator 411-0107.az. abra./

Knowing the material of the object to be machined and the diameter of the milling tool, the required speed can be determined without any calculations with the help of the calculator.

The calculator shows the cutting speeds used for quick-cutting blades and carbide tools. The calculator shown in the figure consists of three parts:

1./ External circular scale with spindle revolutions

2. The middle part is the actual calculator. 3./ Internal circular scale with the diameters of the milling tool.

The central part of the calculator is colored: there are ring-shaped parts that indicate the quality of the material/see table. The numerical values of the cutting speeds are indicated at the edge of the calculator. If the two boundary lines of a ring part are extended radially in imagination, then the two the cutting speed range to be used for the respective material can be read in iv enclosed by the line.

For example, let's take the belt material 18 in the case of high-speed steel, the extension of the two boundary lines closes the cutting speeds of about 15-20 m/p.

With carbide tools, we do not store such a sharp edge, and the cutting speed in line with the indication of the material quality is taken as an average value. For example, for belt-18 approx. 80 m/p for öy-12 110 m/p; AC 50 has an average cutting speed of 190 m/p.

The outer and inner circular scales are rigidly connected to each other, and only the central calculator can be turned to any position.

The setting shown in the figure corresponds to the basic position of the calculator. Then the arrow indicating the cutter diameter points to the number 25 on the inner circular scale.

Turning the calculator to the right, the next in line is 20; 16; 12.5; ø 10; 8:6,3; The calculator arrow.eb cutter diameters are placed in the green field, the practical meaning of this is that by turning the calculator to the right from its initial position, the calculator part that falls into the green field band, as well as the 45, 56; 72; etc. RPMs must not be used until now. Because in the green field

milling cutter diameters and speeds contrary to this band give a value lower than 3.5 m/p cutting speed.

Continuing to rotate the calculator, setting the cutter diameter P=250 opposite to the arrow, we have already avoided the milling cutters placed in the green field à Calculation in a different way, then the Tog menni u.is revolutions opposite the white field of the inner circular scale and to the left of the arrow fall out of the therefore, from calculation, the translation of 2240 up to and including the revolutions 355, 450, 560, 710, 900, 1120, 1400, 1800, 2240, because with a cutter diameter of 250 these revolutions give a cutting speed greater than 225 m/p. Of course, the cutting speed can be increased, e.g. setting the speed of 355 when we get a cutting speed of 280 m/p. To set a higher cutting speed, refer to the table below.

Cutter diameters ∅ etc

Toru minute	40	50	63	80	100	125	157	200	250
355								225	280
450							225	280	360
560						225	280	360	450
710					225	280	360	450	
900				225	280	360	450		
1120			225	280	360	450			
1400		225	280	360	450				
1800	225	280	360	450					
2240	280	360	450						

cutting speed V=m/p

Example of setting with the calculator:

Given: Work piece material belt-18.
Cutter diameter 63, high speed steel

Setting:

1./ Turn the calculator until the arrow mark on the inner circular scale reaches 63

2./ Look for the black sine sector corresponding to belt-18, then you can see that opposite it is the speed of 90.

3./ Then we set the speed to 90, which in the given case gives a cutting speed of 18 m/p.

11.33. Setting of blotting levels.

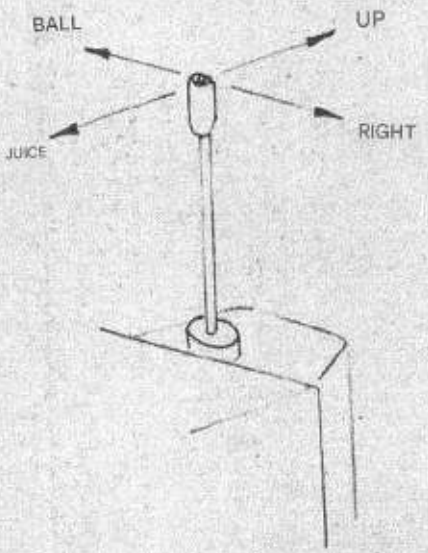
The adjustment of the feed rates is in the 3. no. is done with a switch lever. When the lever is turned, the dial also turns. The set advance value per minute can be read at the indicator pin located above the dial.

It is allowed to adjust the advance in the unloaded state of the advance gear at the center position of the stick rudder! The stages can be switched in ascending or descending order, but it is not possible to switch from the smallest advance per minute to the most right and vice versa.

11.34. Operation of sled and base table.

The table system of the machine works in the vertical and horizontal longitudinal direction with machine advance and rapid traverse, or with manual movement. The sled is the 16 no. It can be fixed with a carbon locking lever, and the base table is placed on the right and left side of the sled No. 32. with fixing nuts. The fastening must be released manually or manually before adjustment, and then in the adjusted position until it is necessary to move the base table or slide, the fasteners must be tightened.

The base table and slide can also be moved with handwheels 1. The degree of displacement can be read from a measuring disc divided in all three directions. Both can be used for manual movement in the center position of the stick. lengthwise and vertically



The sense of movement of the connections that can be made with the stick horn can be seen in the attached figure.

The mechanical feed and rapid traverse can be adjusted in both directions with stops /No. 19. and no. 25 buffers/ delimitable. After disconnecting the stop, the base table or sled can only be moved further with the handwheel, but the mechanical advance in the opposite direction can be switched on by switching the stick rudder.

The possibility of extreme adjustment of the stops is ensured by the screws placed in the groove.

Removing the stops can damage the machine, so they must be left in their fixed end position even when not in use.

11.35 a.m. Spindle sled operation.

The main spindle carriage can be operated by mechanical advance, rapid traverse or manual movement, henceforth the movement of the main spindle carriage is called transverse. The values of the transverse feed are the same as those of the basic table or slide, so 10~400 m/min. The forward-backward movement of the 6. can be switched on with the switch lever, in the "C" position of the lever, the main spindle slide can be operated by manual advance of the no. 5. with the help of a handwheel. It can be operated with high speed using the push button in the handlebar.

Gopi feed and fast travel can be limited by stops, after switching off the machine feed in the opposite direction is the 6. can be switched with a switch lever.

11.36. Support line setup.

The support line fits into the upper prism line of the main spindle slide and is used to hold the various accessory heads. Inside, there are two gears that drive the accessories.
from the main spindle.

accessory heads can be set at any vertical angle. according to the scale on the support wire. For their fixation in a given situation, no. 35 screws are used. The two extreme positions of the support wire have a rigid stop

is bounded. Its intermediate position is marked with the sign "Accessory drive" and marked "O", and the accessories can be operated in this position. The operation of the high-speed milling head is also possible in the extreme front position. Other intermediate locations

it is forbidden to operate it in

Before setting the support line to the rearmost position, the accessory head must be turned 90° (to the horizontal position) and then fixed in position. Then, the prism cover plate must be inserted into the exposed upper prism line.

11.37. Track beam and bearing.

The support beam and bearing can be fastened to the support line with screws. Since it can move on the main spindle slide, the position of the attached support beam and bearing can be easily changed in relation to the front surface of the main spindle as shown in Fig. 11.36. no. taking into account the provisions of In the set position, the support line is no. 8. can be fixed with clamping screws.

11.38. Measuring equipment.

In order to meet the requirements of exact size adjustment, the machine is equipped with measuring devices in the horizontal, cross and vertical directions. Dimensional adjustment according to the gauges gives fine-precision adjustment. The more accurate size adjustment can be done with indicator clocks and measuring rods. The deep groove running parallel to the measuring rod is used to position the measuring rods.

11.36. With milling coolant.

In the case of milling with coolant, the pump must be connected to the F.Sz. placed on the switchboard. can be started by turning on the co-switch. The switched-on status of the pump is indicated by the L.Sz. placed above the switch. it is indicated by the lighting of a green indicator light.

The required amount of liquid is the 30 no. placed on the pressure line on the side of the machine stand. it can be regulated by adjusting the shut-off pin, the largest amount is obtained in the lower position of the sleeve, the liquid amount decreases by gradually raising and turning it.

In order to ensure continuous liquid delivery, the tank must be filled as necessary. The filters and the drain channel must be cleaned every shift, and the storage tank at least every month.

In the case of cast iron milling, when coolant is not used, it is recommended to cover the filter plates, so that the small shavings do not clog the holes or the drain channel.

12. Lubrication instruction.

12.1 General lubrication rules.

The reliable operation and long service life of the machine largely depends on professional lubrication. As a result, it is recommended to follow the lubrication instructions exactly at all times.

Lubricant storage areas must be closed at all times to keep Also, during possible repair installations, make sure that no dirt gets in there. For this reason, a filter sieve must always be used when filling. Parts of the engines and the gop in general

the internal space should only be cleaned with a lint-free cleaning cloth. Cleaning cotton should not be used for this purpose.

It is a very important requirement to comply with the quality requirements of the lubricating oil. Make sure that the oil space of the rolling bearings and gears is filled strictly up to the center line of the level indicators. Avoid overcharging

remove it, because this can cause harmful heating, loss of performance and damage to the bed.

In the areas of central oiling, it is recommended for new machines to change the sulfur oil after 300 operating hours. It is enough to change the oil according to the table. If the oil level drops, top-up must be used.

The used lubricating oil must only be drained when it is at operating temperature. Before filling, the oil space and the gear unit must be flushed with benzene.

12.2 MSU.250. main drive and main spindle oiling 414-0109 Abra.

The automatic lubrication of these two important structural units is carried out by a vane pump. This is installed on the shaft of the main drive I., and its oil space is completely closed in the upper part of the machine stand. The pump runs as long as the gear no. 41 rotates. pump no. 42 sucks up the oil through a filter and delivers it to no. 43. distribution supply pipes are led to the lubrication points.

During operation, the operation of the oiling can be observed at the window 44.2.4- breakdown indicator. If there is no oil flow, the machine must be stopped in order to avoid malfunctions and can only be restarted after the fault has been eliminated.

The oil filling à 45 no. through an opening. The required oil name is No. 46. middle level of the oil level indicator. D It should be refilled after the level drops during operation.

The used lubricating oil is the 47. it can be lowered through the opening of the locking screw.

12.3. Advance gear oiling 414-0120 no. fig. No. 414-0113 fig

The gear pump installed in the gearbox ensures the lubrication of the pusher and ballast. The operation of the system is described in No. 414-0113. schematic diagram illustrates. The pump starts up when the electromagnetic lamellar clutch is switched on.

When the pusher is switched on, the entire amount of oil delivered by the pump is used for lubrication. When switching on the fast travel, as described for the electrical equipment, the Kgy. located on the left side of the stand. magnet mog-

huz and No. 60 located in the same place. toggle switch. At that time, the oil supplied by the pump is placed in No. 3 located in the pusher. by moving the piston of the working cylinder, it releases the claw switch of the advance, and then activates the multi-plate clutch of the high speed drive. A pressure of about 18 kg/cm² is required to operate the clutch. This can be adjusted from the outside with a ball valve that can be accessed after removing the closing screw on the cover of the pusher. This valve is also used to vent the system. By turning the valve clockwise with a screwdriver, the pressure increases.

No. 64 is on the left side of the stand. after removing the cover, you can access the Kgy. magnet and/or no. 60 for throttle valve. To the valve, the 3rd oil pipe is connected to the holes marked SZ, H and EK.

12.4. Oiling of slide and table system.

Oil of the working surfaces of the slide and table system. a manually operated piston pump is installed in the lower part of the slide. The handle of the pump must be pushed in forcefully 8~10 times a day. From the pump, the lubricating oil reaches the operating surfaces through the distributor located in the slide.

The oil space of the hand pump is the 71. it must be filled up to the upper level of the oil level indicator, through the opening made free by removing the side plate cover.

The oil field of the stick steering control is the 72. after unscrewing the cap screw, it can be filled to the center line of the oil level indicator - 18.

12.5. Oiling the support bearing Fig. 414-0113.

The inner cavity of the support bearing casting is designed as a clay storage space. The oil field is 75.3z. 7o.sz. can be loaded through the opening of the closing screw. to the middle level of the oil level indicator. From the tank, the lubricating oil reaches the inner surface of the slide bearing through a cotton string inserted into the pipe and a stopcock, No. 77. shut-off pin closes in the position indicated by "O", and opens gradually to position "1" when turned to the right. Thus, the amount of oil can be adjusted as needed. When changing the oil, the trailing bearing

in the relt state, the interior can be washed.

12.6. Lubrication of support line and accessory heads.

No. 414-0113 fig.

The gears and bearings in the support line are lubricated with oil supplied by the gear pump. From one branch of the T-branch at the main spindle rear bearing cover, the lubricant enters the oil pipe through a drilled hole with a "0" ring seal on the prismatic pipe line connected to the support line of the main spindle slide. It is led to the two ball bearings through a - branch in the support line, the same oil line connects to the front surface of the support line, from where the lubricant can then enter the accessory heads.

Fuel only enters the support pipe in a certain position of the support pipe, this is the position of the "Accessory drive" of the support pipe relative to the main spindle slide. 11

12.7. Other manually oiled lubrication points

/414-0115/

Lubrication of structural elements that require a smaller amount of lubricating oil and only work periodically is done by No. 414-0115. oiling diagram no. 12 according to the lubrication instruction table, it must be done with the manual oil press supplied with the machine.

The table summarizes the filling locations, required oil qualities, and filling frequency.

13. Maintenance and replacement of the machine,

The prerequisites for the constant accuracy and impeccable operation of the machine are professional handling, constant cleaning of the sliding surfaces, regular oiling, avoidance of impermissible stresses resulting from overloading, and periodic maintenance of certain operating elements of the machine.

When carrying out any assembly or adjustment work on the machine's structural units, the main switch must always be switched off in order to avoid accidents.

13.1 V-belt readjustment.

The center distance between the main motor and the double belt pulley can be easily adjusted since the motor is equipped with a tilting base. During tensioning, the lower support screw of the rocker base must be loosened after loosening the counter nut, then the V-belt can be tensioned to the required extent by tightening the upper support screw.

When loosening or removing jewelry, proceed in the opposite sense.

The shaft distance between the V-belt pulley driving the gearbox and the two idler pulleys is constant. The core tensioning can be done with the core tensioning roller, the adjustment of the roller can be done after loosening the screws fixing the support plate.

13.2. Adjusting the spindle bearings. /Figure 414-0104/

the bearing clearance of the drill is set to 0.005-0.010 mm during installation. If during operation the machine works in the low speed range, the minimum value of the bearing clearance is 5 microns, in a higher speed range it is no longer adequate, because the spindle overheats. In this set, it is recommended to keep the bearing clearance at 10 microns. Taking into account the above, before setting up,

as after that, the bearing clearance must be checked with a 0.001 mm dial gauge.

The radial bearing clearance of the milling spindle is NN 3012K/6182

can be adjusted by axially shifting the tapered bore bearing. If it is necessary to reduce the clearance, the inner ring of the above bearing must be shifted on the main spindle in the direction of the spindle head. In this case, the inner ring expands by pulling it onto the conical surface of the spindle, as a result of which the bearing clearance decreases, and when increasing the clearance, proceed in the opposite direction.

When adjusting the bearing clearance reduction, proceed as follows.

1./ Remove the support cable from the main spindle slide

2./ For the pea head, the 3132-Bz. remove the bearing cover

3./ Loosen the M 4x6 security screw

4./ No. 411-3103 turn the slotted nut to the right to loosen it to the extent that it does not hinder the tightening of the inner ring of the bearing.

5./ The 55. no. to lift the bent tongue of the securing plate from the slotted nut.

6./ Pull the bearing onto the cone of the spindle by turning the M55x2 slotted nut clockwise. In the meantime, check the bearing clearance.

After the adjustment, the bearing is 411-3103. by turning the slotted nut to the left, it must be propped up, and then the securing caterpillar screw listed above, the no. 55, must be tightened. to bend the securing plate again, and then reassemble the dismantled elements in their place.

Adjustment of axial bearing clearance.

The axial movement of the main spindle is determined by the clearance of two single-row ball bearings with an inclined line of action installed at the rear bearing. The factory-set values are 0.01~0.02 mm. If adjustment is necessary during the operation of the machine, it can be done as follows.

No. 1/3117 sleeve is complete

2./ No. 3113 No. 3116 at the end of the lead-in screw. to dismantle kuppers.

3./ Loosen M 6x15 caterpillar screw

4./3112-1 no. remove the bearing cover

5./ 40 no. pull out the tongue of the safety plate from the groove of the nut.

6./ Unscrew the M40x1.5 slotted nut
Pull off rings 7./3110, 3111
8./3121) no. remove rear shield
9./ 31061 no. remove the bearing sleeve together with the bearings by pulling it off the main spindle.
10./ After that, grind off one front surface of the sleeve 3109 as much as is necessary to adjust the bearing clearance. When machining, the parallelism tolerance of the front surface is compared to a diameter of 85. 0.005/85, i.e. 0.005 mm

After the adjustment has been made, reassemble the parts in the opposite direction to the above.

13.3. Replacement of support bearing/No. 414-0114. fig /

The support casting is located in a conical nest of the roller bearing with bronze insert for guiding the milling shaft in. The plain bearing is completely split open in one place, in addition, there are 5 more grooves on its shell, so that the internal cylindrical bore becomes smaller flexibly and circularly when it is pulled into the cone during re-adjustment.

The replacement is for the screw of the 32 0107 retaining ring after its dissolution, no. 32 0202 it is done by turning the nut with a cylindrical casing to the right. As a result of pulling in, the bearing clearance is reduced. In its adjusted position, the nut must be secured against rotation by tightening the screw above.

13.4. Adjustment of the main spindle sled driving /414-0104. fig.

The main spindle slide moves on the upper horizontal prismatic wire of the machine stand. Any gap that may occur in the wire is adjusted by moving the inclined insert slat. with a seam.

MSU. 250

13.5.4 utaallide of fungolage management of coal.

Fig. 414-107 ss.

In the vertical direction of the slide, the machine stand is a dovetail it moves on its prismatic wire. Any gap that may occur in the line can be adjusted by shifting the sloping insert. No. 5069 on the right side of the sled. scraper plate bottom cover must be removed after the 5076-1 no. and 411-6264 41 litho screws become accessible and the 5003-1 no. 16 can be set.

13.6. Dismantling the sled Fig. no. 414-0119/.

In major repairs or in other cases, it may become necessary to dismantle the slide, this can be done as follows without removing the machine base and main spindle.

1. Remove the back cover of the stand
2. / Remove the lower left cover of the stand, remove the hydraulic push button, V-belts, V-belt pulley with the lamellar shaft coupling, and then remove the feed unit from the stand

13.7 points/.

3.1 Disassemble Kapurd plates

4./ Remove the bottom covering plates of the sled /also from the base/.

5./ lol3. no. to remove the support bracket, pull it off the pin of the splined shaft.

6./ remove the plugs with the M8 extraction thread from the vertical wire of the stand and from the back wall.

8./ After moving the saw, remove the M12 socket head screws of the left-hand prism insert and the cap screws through the former opening.

7./ Then No. 1004-1 lifting spindle foot To assemble and lift with the intended lifting crane, screw the spindle in completely.

9./ Lower it to the intended lower position, pull out the prism insert strip and the slope strip upwards, then tilt the sled to the right below, it can be turned sideways from the tripod prism.

Attention: When disassembling, make sure that the lower pin of the splined shaft slides out of the splined sleeve of the slide. Otherwise, when removing the slide, the splined ten-

gely elgörbülhet!

13.7. Removal of advance gear and ballast Fig. 414-0105.

1./ Remove the stand back cover
2./ Remove the lower left cover of the stand, take out the pipes leading to the hydraulic valve and remove the valve together with its support box.
3./ Drain the oil from the oil chamber.
4./ To remove the carbon brush of the electromagnetic lamellar clutch. hold
5./ Completely disassemble the double V-belt pulley
6./ After that, by unscrewing the retaining screws of the sliding cabinet, the sliding door and front area can be completely removed from the stand.

13.71. Quick travel switch reset. /411-0117 no. fig.

To perform this adjustment, it is not necessary to remove the advance gear!

In the event that the moving part of the machine moves stuttering while operating the rapid traverse, one of the sources of error may be the rapid traverse switch. The replacement must be carried out in the following order:

1. No. 40 110-2 located in the upper left corner of the front panel of the advance gearbox cabinet. unscrew the locking screw.
2./ Selling the fuse M 5x15 caterpillar screw..
3./ Turn the adjusting nut 40 107-1 so that it moves to the left, hold the rapid gear after each turn, if the adjustment is correct, then fasten the nut, screw back the locking screw.

If the correct operation of the rapid traverse does not occur even after moving the nut by 3~4 turns, the error can be eliminated as described in the next point.

13.72. Multi-plate clutch adjustment. No. 414-0105 &ra

If the switched-on table part, slide, or main spindle slide stalls during the operation of the rapid traverse, and otherwise there is no jamming of the wires or drive spindles, and the error cannot be eliminated as described in the previous point 13.71, then the lamellar clutch must be re-adjusted is needed.

This clutch is the thrust gear VII. no. is installed on its shaft and is easily accessible after removing the cover of the removed gearbox.

Replacement can be done as follows.

The 2x54 no. remove the securing spring ring from the groove and unscrew the M 5x8 caterpillar screw, then the 411-4015562. turn the round nut to the right by 1-3 notches. Secure the set position with a caterpillar screw and fit the spring ring...

Too tight an adjustment should be avoided, as this may result in heating and possibly sticking of the switch lamellae during feed operation.

13.73. Fixing errors that occur during quick-shifting, setting the quick-shift switch.

Possible errors - How to fix them:

1./ There is no or little oil in the blaster - Fill it up

2./ Oil filter clogged - Clean.

3./ In the case of high-pressure oil lines, the connecting screw nut is loose and the oil escapes. Loosen the pressure line of the valve marked with number 2, start the machine, if the oil drain can be closed with the index finger, then the error above persists.

4./ Pipe cracking - See the previous point

5./ Displacement plate clutch slips - /See 13.72. point/

6./ The fast travel switch turns on but the fast travel does not start - adjust the appropriate spring pressure /IAssd point 13.71/ with the adjusting nut

Setting the quick travel switch.

If, for some reason, it becomes necessary to disassemble the feed gear, then after assembly, if everything else works properly, adjust the switch as follows:

1./According to point 13.71, unscrew the locking screw and loosen the securing caterpillar screw.

2./ Set the adjusting nut to the extreme left position to make sure that the quick travel switch is working.

3./ Then move the stop nut to the right until the quick travel stops working

4./ Then, by moving the stop nut to the left one revolution at a time, reach a position in which the quick travel is activated. Then, by moving it further by +1 turn, fasten the adjusting nut with the caterpillar screw and put the closing screw back.

Attention! The adjustment of the quick travel switch as described above prevents the machine from malfunctioning, because otherwise the switch lever and switch sleeve may seize up because there is a sliding frictional connection between them. If the stop nut is not set correctly, the total pressure exerted by the gear pump / 30~40 kg/cm²/ will reach the switch lever, this will lead to sticking!

13.8. Adjustment of the longitudinal guide of the base table./414-0108.sz.abra/

The base table can move longitudinally on the horizontal front guide of the slide. The unwanted gap that may occur in the cable is av 5402-1ąz. it can be eliminated by using a slope lock.

No. 411-6264 for replacement. a screw with a cylindrical head is placed on both sides of the slide, which, when turned, is pulled into the prism wire as a result, the gap is reduced. To achieve the correct setting, the table must be moved with the handwheel to set the correct gap.

13.81. Elimination of backlash in horizontal movement/414th figure.

To move the base table longitudinally, a two-part trapezoidal nut is built into the slide. The two nuts can be shifted axially in relation to each other, as a result of which the backlash between the threads of the spindle and the nuts can be eliminated.

To perform the adjustment, the standard central to remove the end bearings on both sides of the spindle. The size of the disassembly can be easily determined according to the drawing. THE adjust compensating nut as follows is happening :

The 45 no. remove the locking plate from the groove of the M 45x1.5 slotted nut, then turn the nut to the right, while turning the spindle by hand so that it can be rotated without jamming.

The adjustment can be checked by manually moving the spindle axially/not by turning it. If there is no axial movement and the spindle can rotate freely, then the setting is correct, then the 45 no. the safety plate is bent back into the groove of the nut.

Assembly must be carried out in the opposite sense and order to what is described.

Attention! Who-; and during installation, make sure that the carbon brush and slip ring of the electromagnetic clutch are not damaged!

13.9. Removing the main drive / no. 414-0104 fig

If, for some reason, it becomes necessary to remove the main drive gearbox unit, it can be done as follows
rint can be done.

1./ Remove the back cover of the machine stand
2. Disengage the heart roller
3.13 pcs. take off a short V-belt
4./ Remove the pulley on the pulley 2 pcs. number 8
there is a pull-down session!/

5./ Disassemble the bearing housing

6./ Remove the top cover on the left side of the pump stand, or remove the oil pump suction and pressure lines by unscrewing the two threaded connectors through the opening.

7. After the above is done, remove the wall mounting screws of the gearbox, and then the gearbox can be easily removed from the machine stand.

Further sub-assemblies can be carried out based on the figure. Installation takes place in reverse order.

1310. Assembly of spindle sled / no. 414-0104 fig..

The removal of the main spindle carriage is preceded by the removal of the gearbox unit, then the gear train on the 3125-1 shaft and then the 3104-13z. bearing housing M12x4o hex head screws and 2 pcs. The 5x40 internal thread cap nail must be removed. In addition, the main spindle slide can be removed by pushing the complete main spindle slide forward by removing the cap screws and cap screws of the rear shield of the main spindle slide and the support frame of the feed spindle, as well as the 88th screw of the protective plate 3134-2. The installation is carried out in reverse order.

13.20 Assembly of Ιδοτεο sled feed chain /414-0106,5 Abra./

The named feed line can be divided into four assembly units.

1./ No. 4301-1 After removing the retaining screws and dowel pins, the comp Mett can be removed from the stand together with the installed cast parts and gimbal sockets.

2./ No. 4419 shaft 2 pcs. with cup wheels. 3./ 4401 no. sleeve 3 pcs. with cup wheel, nail clip with lock and bearing.

4. The feed is switched on and off with the handwheel and vernier disc.

Necessary when installing the 2./68 3.1.installation unit lik the removal of the gearbox. When assembling the 1st/ assembly unit, the hydraulic thrust valve unit must be removed.

The 4./ mounting unit can be installed after removing the rear covers.

There is no need for additional adjustments in the advance of the main spindle slide, and thus the disassembly of the assembly units set by the manufacturing plant in this direction becomes unnecessary.

14. Accident prevention and safety equipment.

The operator of the machine and the safety of operation are protected by mechanical and electrical locking devices.
or insurance
Their removal or elimination in any other way is prohibited, as they aim to protect the physical health of those working on the machine and its surroundings.

1./ The electrical equipment is equipped with full contact protection. ar
At the mains connection, a screw that is in metal contact with the machine body is placed on the connection of the contact protection earth wire. The contact protection wire of the transformer mounted on the control board is connected to the board. The control panel and the electric motors are in metal contact with the machine body.

2./ Even after turning off the main switch, it remains energized do R.S.T. series terminals are protected by a cover.

3./ From a safety point of view, the correctness of the connection of the electrical network must be checked.

4./ The gop is equipped with zero-voltage protection. When the mains voltage goes out, the machine stops, when the voltage returns, no movement starts on the machine, even if the main switch is in the on position.

5./ The operating voltage is 36 Volts.

6./ In the event of a burr or other error, all movement on the machine, i.e. the rotation of the main spindle and machine feed, will stop immediately with a single movement of the Nak red push button, the main motor switch-off push button.

All movement can also be stopped by turning off the main switch marked F.

7./ It is impossible to operate the base table and slide by mechanical advance simultaneously with a mechanical locking. 8./ The movement of the base table, sled and main press sled by advance and fast-electric and threading is limited by mechanical limit switches/stops.

9./ The kinematic chain of the feed gear and the kinematics of the slide and base table is protected by mechanical anti-breakage ball couplings.

10./ The handwheels for moving the base table, slide and main spindle slide adjuster are equipped with a spring-loaded release mechanism.

15. Performance test..

We carry out demanding power milling on every new milling machine we make before delivery and accuracy testing. In addition to setting the material 1 quality and technological data of the machines specified below, the defined performance must be performed without remaining deformation or structural failure. The safety clutches of the forward gear must not be released. Harmful vibrations must not occur on the machine.

When milling, the fasteners of the slide and main spindle slide must be tightened. The surface is machined by longitudinal mechanical advancement of the pick-up table. Coolant must also be used when cutting steel material.

The maximum current consumption of the main motor is - 5.8 6.2 Amps.

15.1 Cutting data.

Milling tool: 2 pcs. disc grinder

ø 80x16 III. MSz 8528 Z=10 fog

Test block: A60.11 MSz 111

Milling width: 2 x 16 mm

It's a big dip

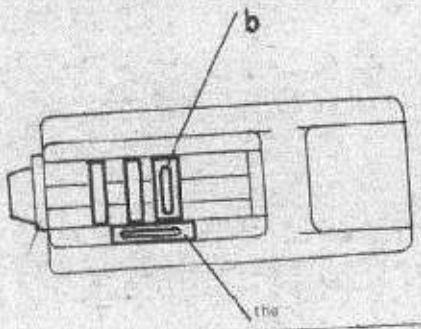
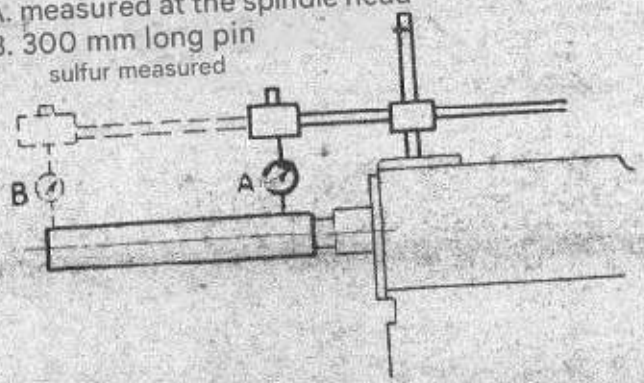
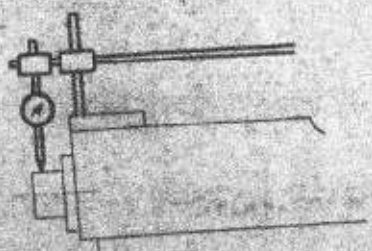
Spindle revolution: 140 f/pe=0.09 mm/tooth

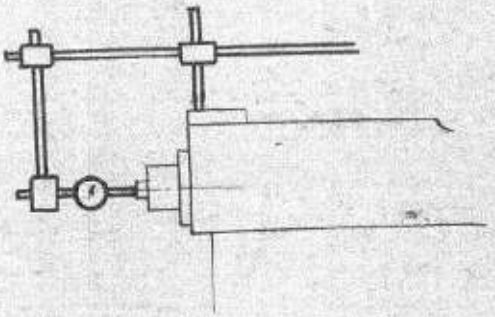
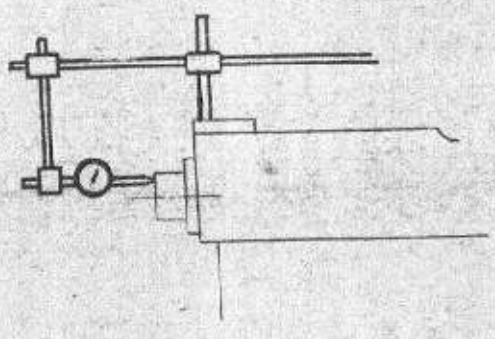
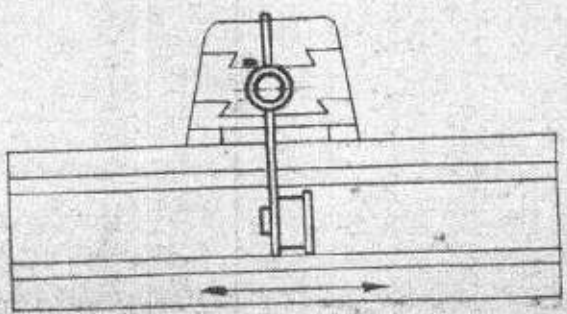
Advance : 125 mm/p

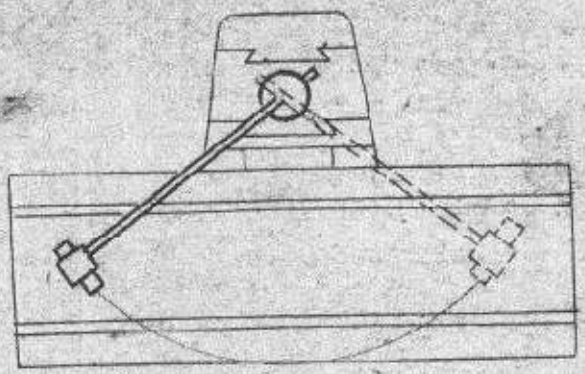
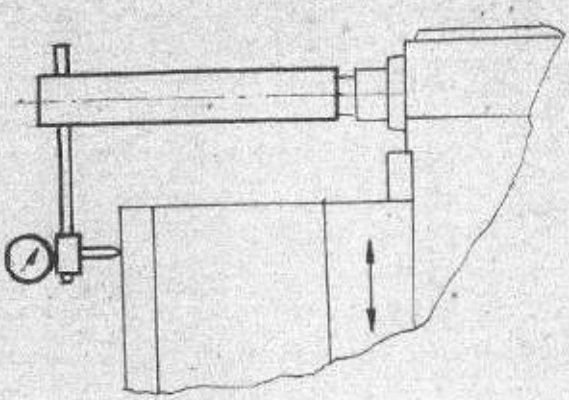
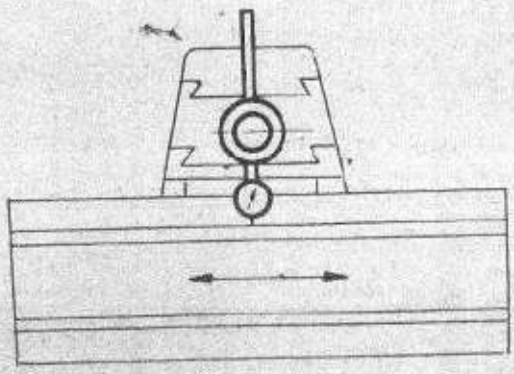
Grip depth: 4 mm

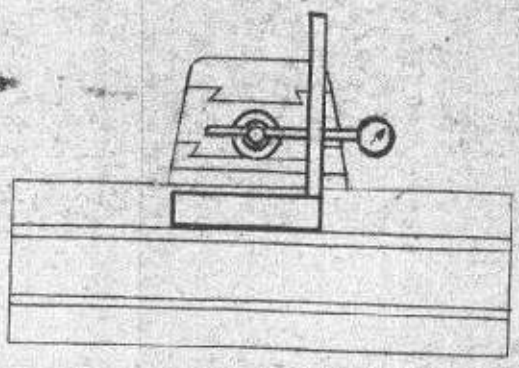
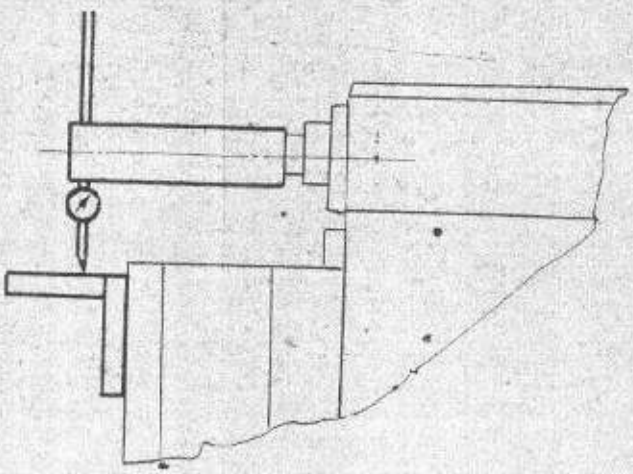
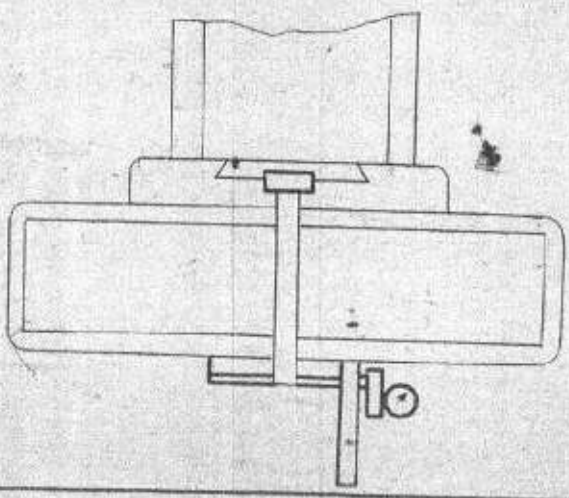
The load occurs at the critical rotation of the main spindle, n=140f/p. The maximum power that can be absorbed by the main motor together with mechanical advance is Nmax 2.6 kw.

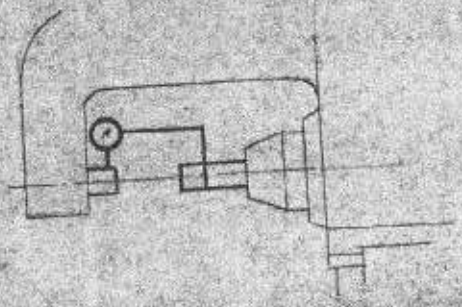
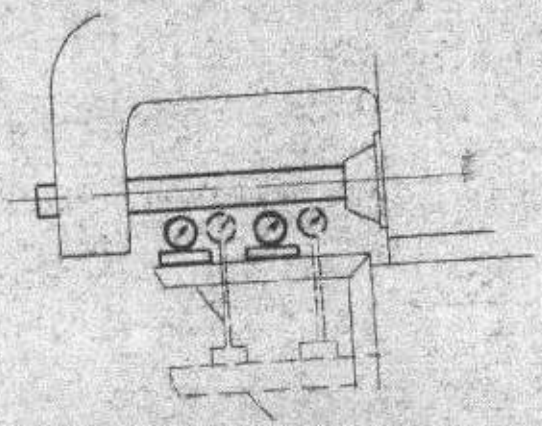
Universal tool mill basic gene accuracy specification.

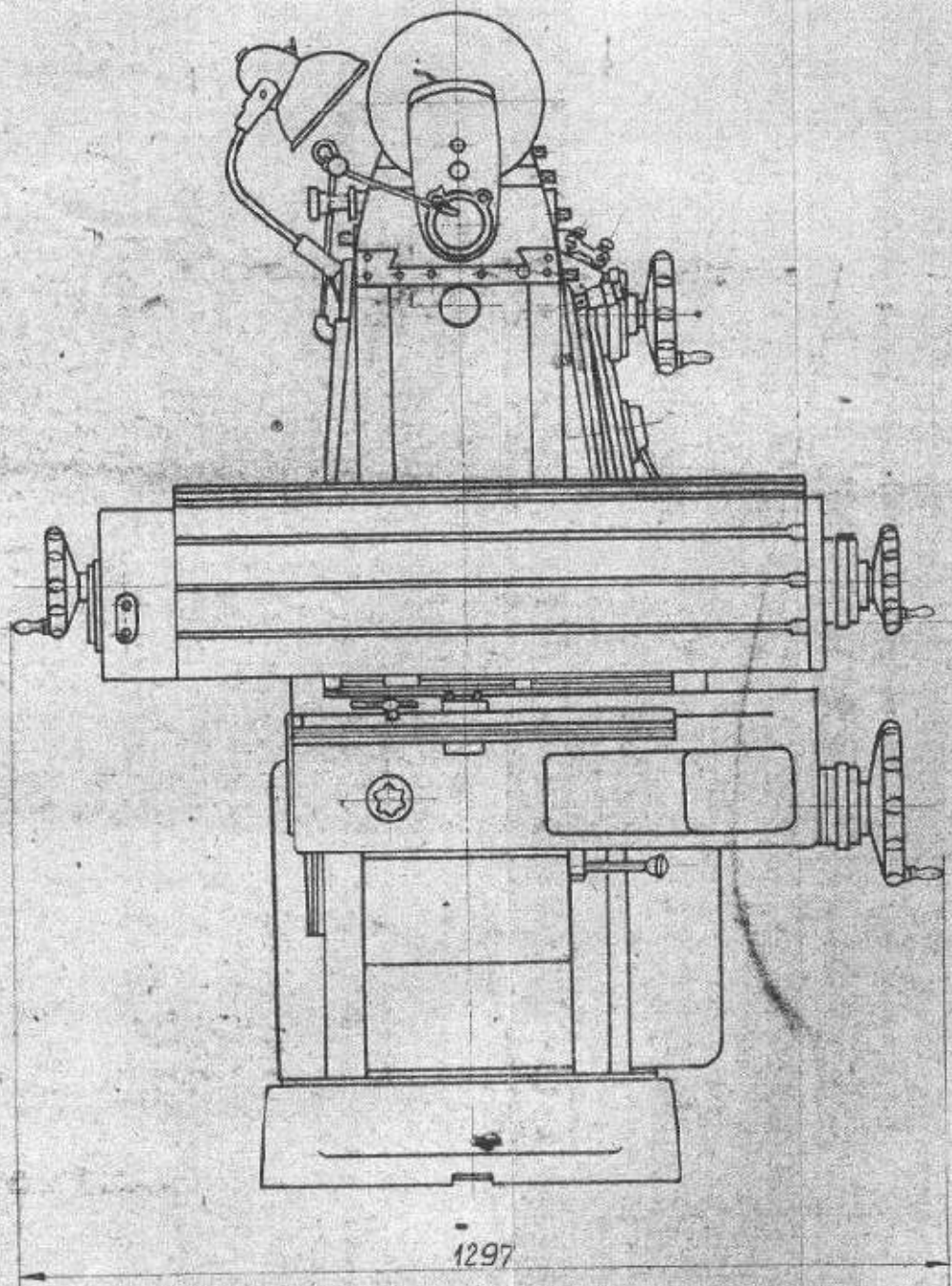
Line number	The subject of the investigation	Endurance Measured value
1.	The horizontality of the machine's installation on the upper prism wire of the Vaz spindle carriage viz measured with a level gauge/ A. parallel to the milling spindle B. in a plane perpendicular to the milling spindle. 	±0.04/1000
2.	The uniaxiality of the internal cup of the milling spindle /impact./ A. measured at the spindle head B. 300 mm long pin sulfur measured 	0,01 mm 0,02/300 mm
3.	Impact of the external cylindrical surface of the milling spindle. 	0,01 mm

Line number	The subject of the investigation	Patience	hi ba
	4. Movement in the direction of the tidal spindle axis. 	o,o2 mm	
5.	The perpendicularity of the end surface of the milling spindle to the axis of rotation. 	o,o25 mm	
6.	The parallelism of the receiving surface of the base table with the longitudinal movement of the base table. 	0.02/300	

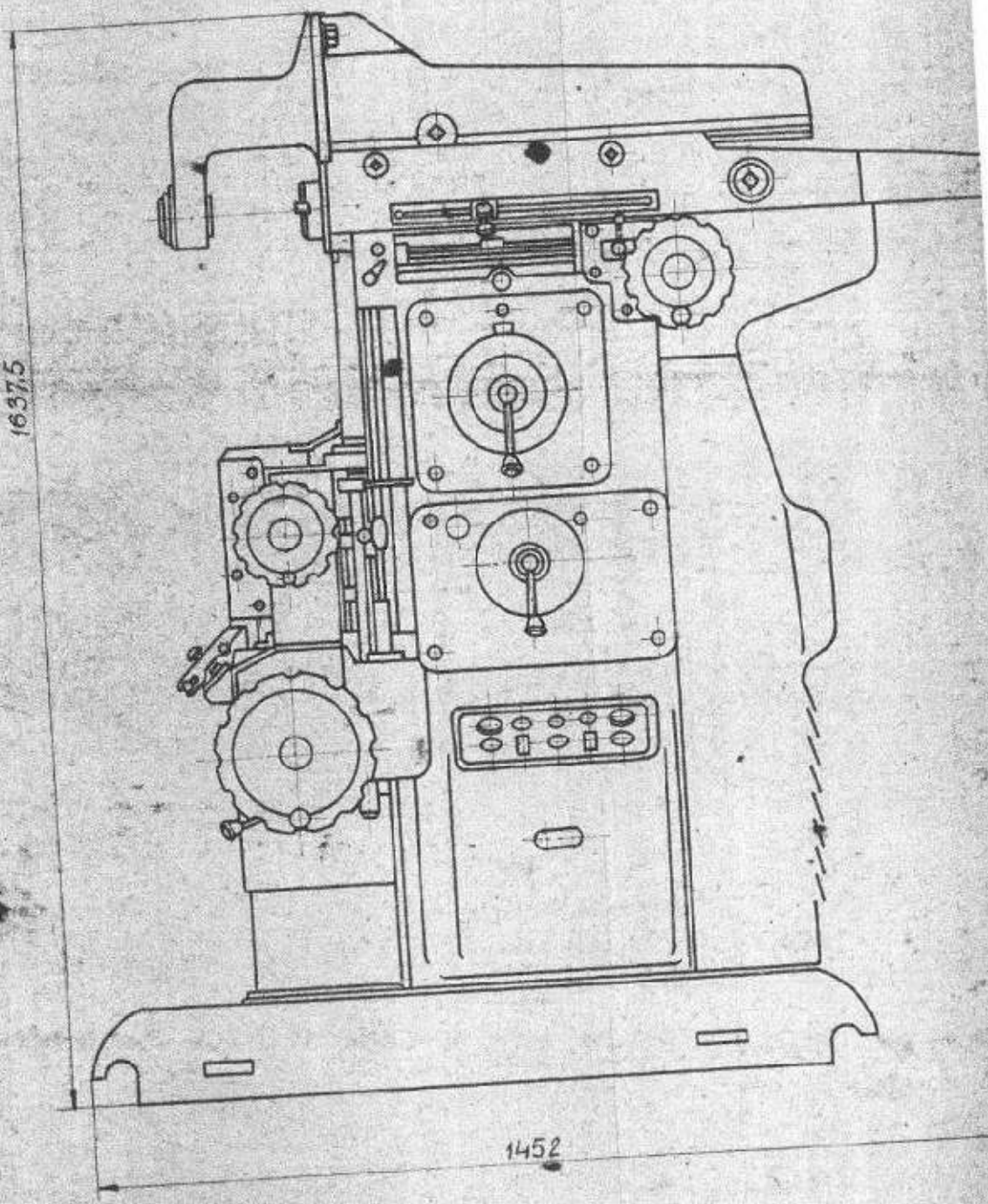
Line number	The subject of the investigation	Measure Turés	fault
7.	The perpendicularity of the receiving surface of the base table to the tidal spindle, in a vertical plane. 	0.02/300	
8.	The parallelism of the receiving surface of the base table with the movement in the vertical direction. 	0.02/300	
9.	Parallelism of the 2nd groove of the base table with the longitudinal movement of the table. 	0.02/300	

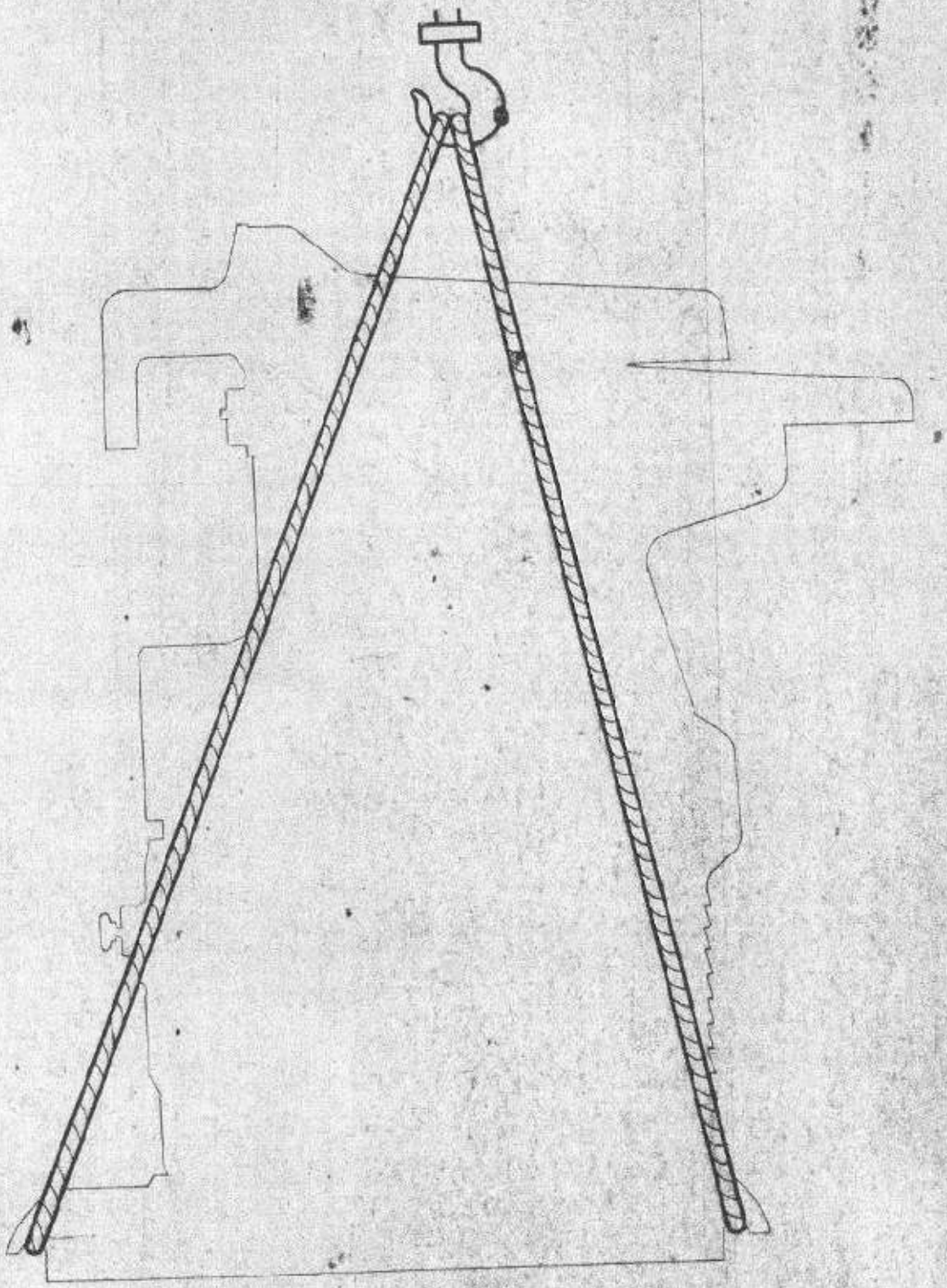
Line number	The subject of the investigation	Weird	Mort error
10.	The perpendicularity of the 2 grooves of the base table for the vertical movement of the table. 	0.02/300	
11.	The perpendicularity of the transverse movement of the spindle carriage to the receiving surface of the base table. / Vertical smoothness/ The upper part of the table surface can only lean towards the stand. 	0.02/200	
12.	Perpendicularity of the transverse movement of the main spindle slide to the receiving surface of the base table / Horizontal plane 	0.02/200	

Abra	The substance of the investigation	Tolerance	Size discrepancy.
	MSU. 25. Accuracy specification of counter-support.		
13	Alignment of the counter support hole with the milling spindle. When tight/	0.01/150	
			
14	Parallelism of the hole of the counter-support in a vertical plane with the receiving surface of the rigid table a./ in the upper position of the table b./ in the lower position of the table	0.02/300 0.02/300	
			

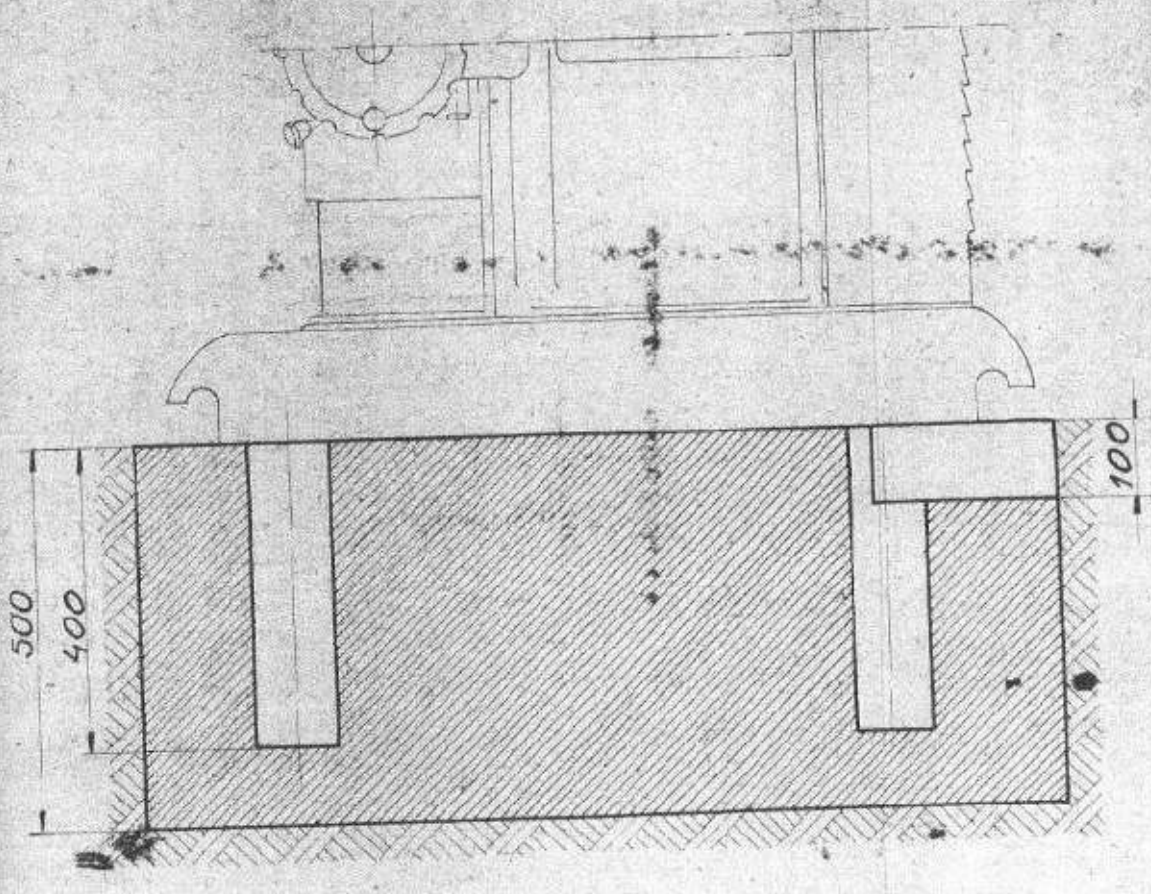


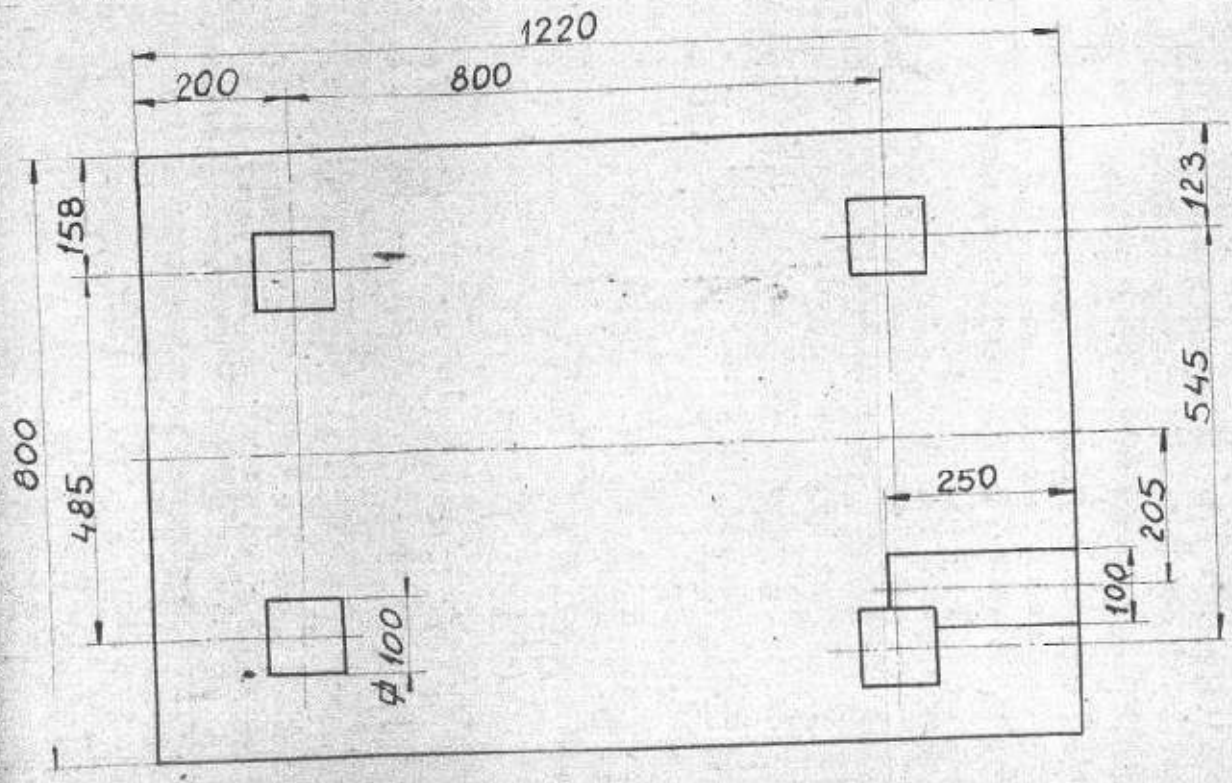
414-0101


1637,5
1452

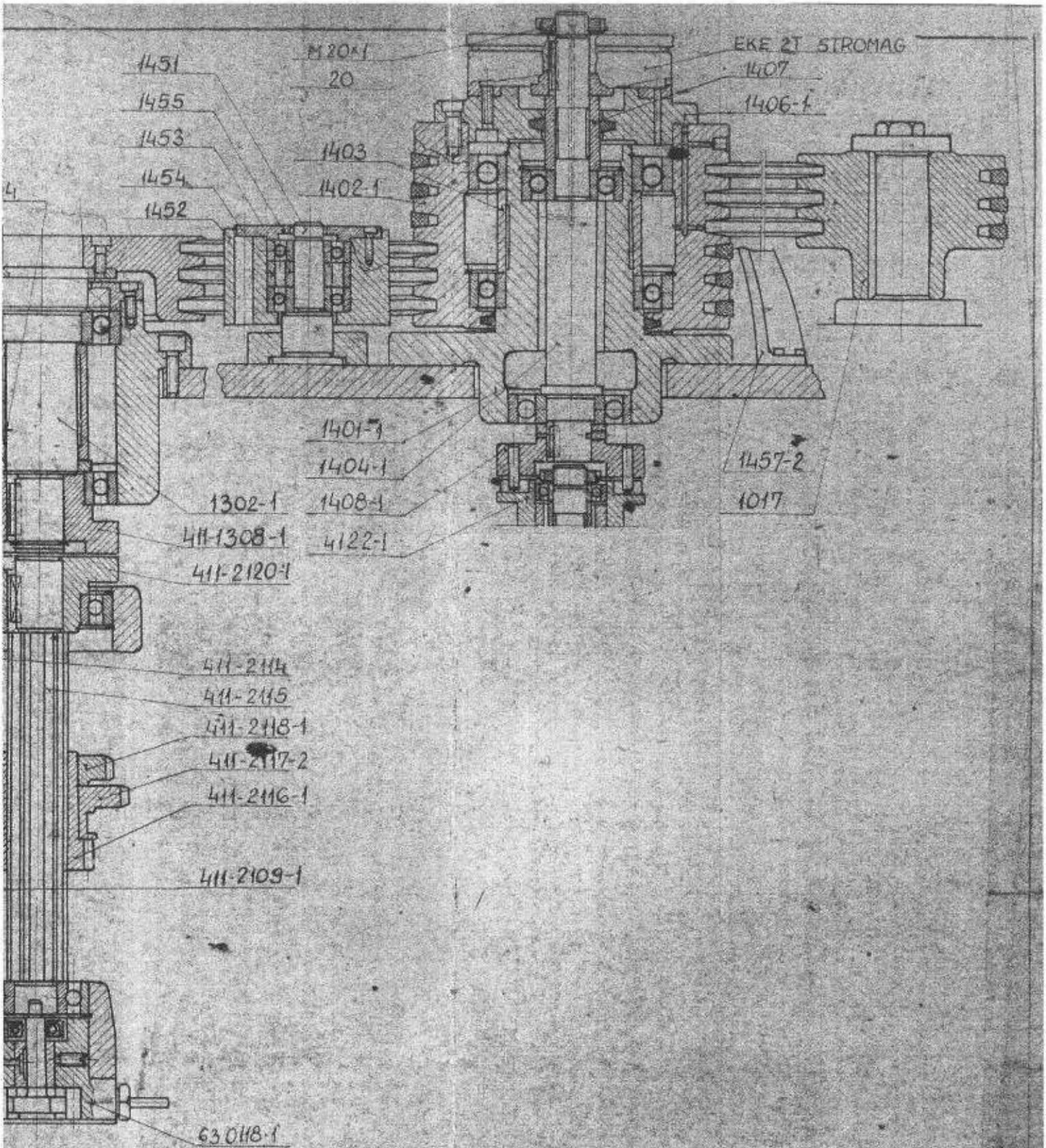


414-0102

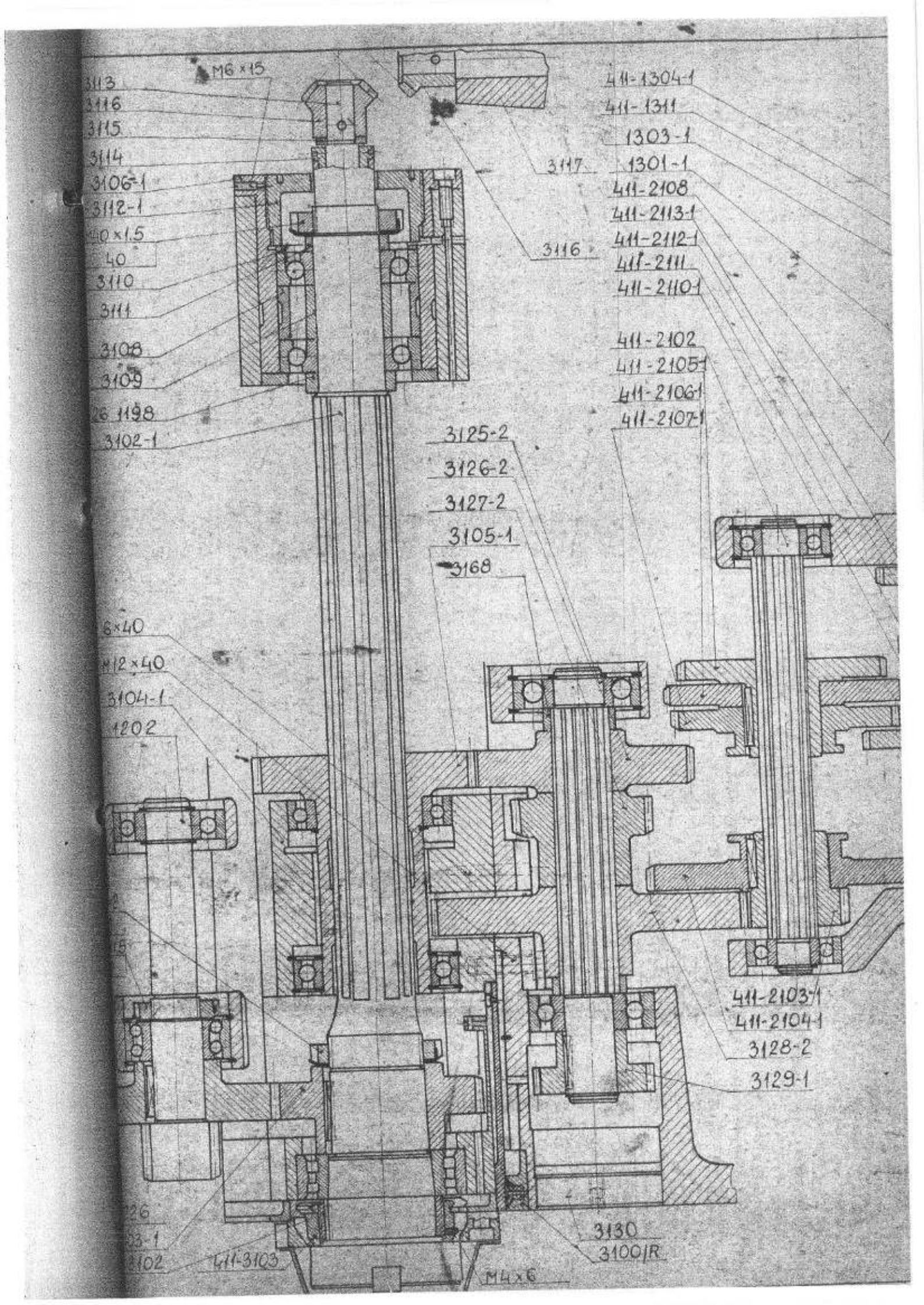


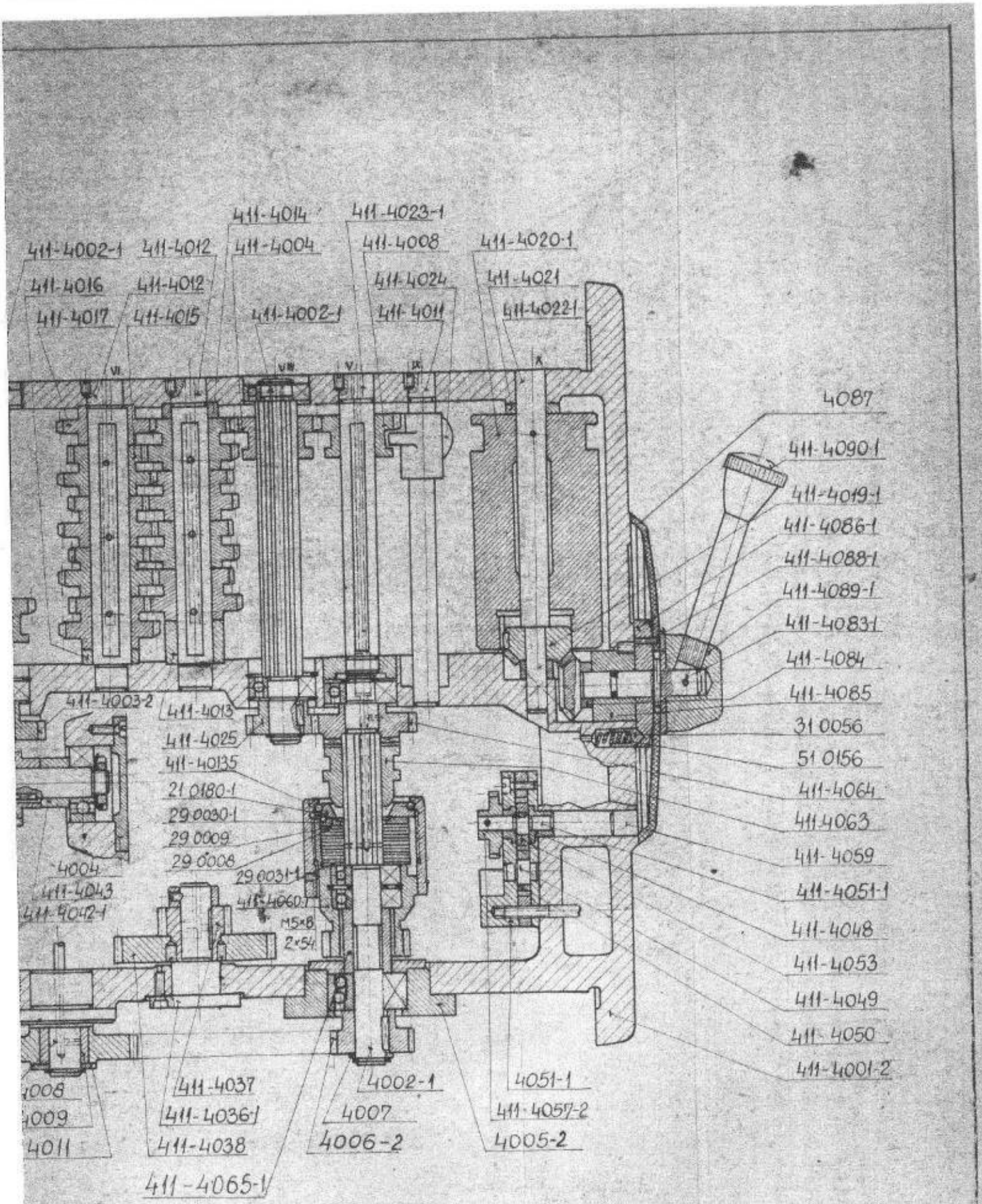


414-0103

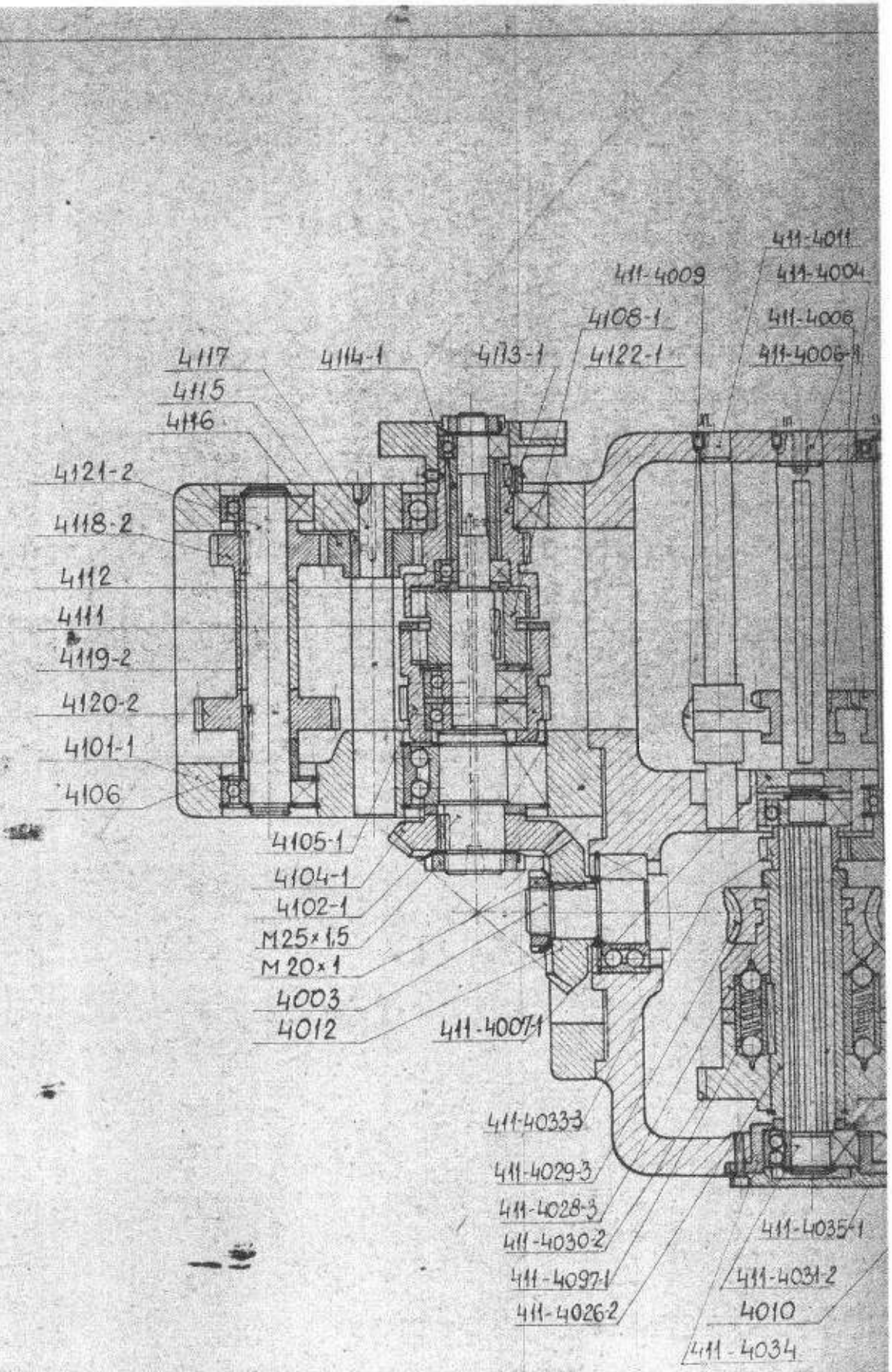

EKE 2T STROMAG
M20x1
20
1451
1455
1453
1454
1452
1403
1402-1
1407
1406-1
1401-1
1404-1
1408-1
4122-1
1457-2
1017
1302-1
411-1308-1
411-2120-1
411-2114
411-2115
411-2118-1
411-2117-2
411-2116-1
411-2109-1
63 0118-1

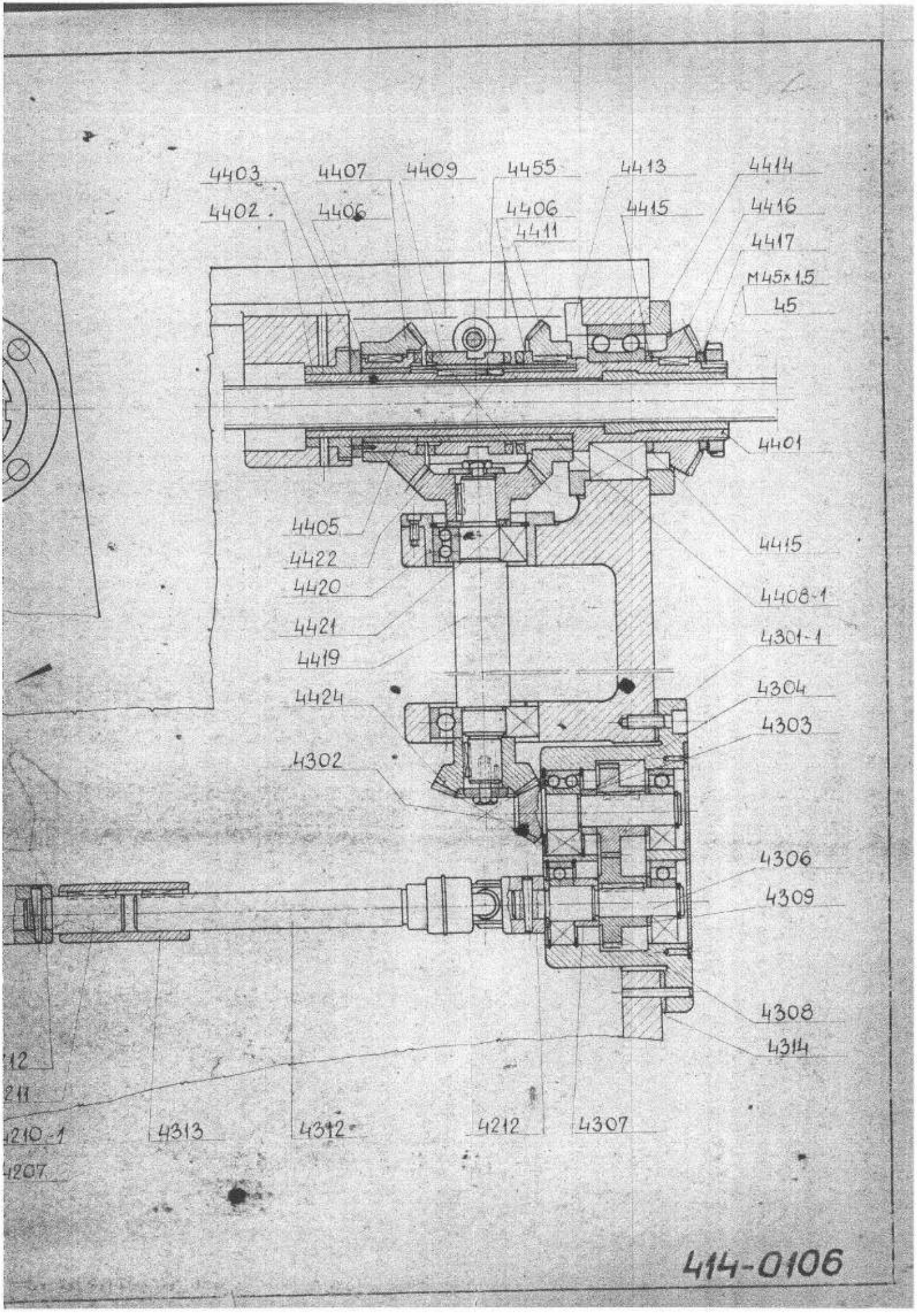
414-0104


M6×15
3113
3116
3115
3114
3106-1
3112-1
40×1.5
40
3110
3111
3108
3109
26 1198
3102-1
411-1304-1
411-1311
1303-1
3117
1301-1
411-2108
411-2113-1
3116
411-2112-1
411-2111
411-2110-1
411-2102
411-2105-1
411-2106-1
411-2107-1
3125-2
3126-2
3127-2
3105-1
3168
8×40
12×40
3104-1
1202
411-2103-1
411-2104-1
3128-2
3129-1
3130
3100/R
411-3103
M4×6

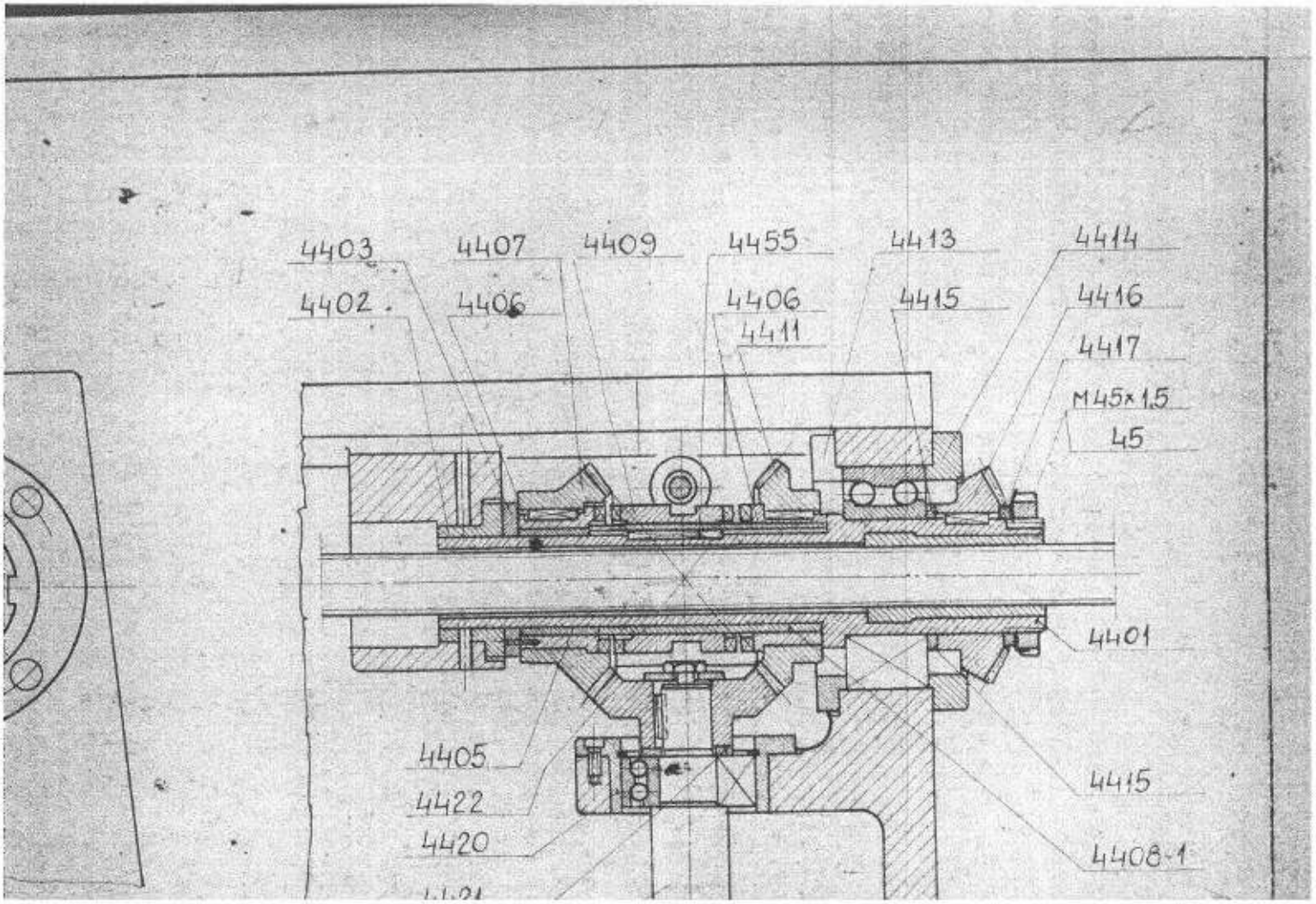

411-4002-1
411-4016
411-4017
411-4012
411-4012
411-4015
411-4014
411-4004
411-4002-1
411-4023-1
411-4008
411-4024
411-4011
411-4020-1
411-4021
411-40221
VII
VIII
VI
IX
X
4087
411-4090-1
411-4019-1
411-4086-1
411-4088-1
411-4089-1
411-4083-1
411-4084
411-4085
31 0056
51 0156
411-4064
411-4063
411-4059
411-4051-1
411-4048
411-4053
411-4049
411-4050
411-4001-2
411-4003-2
411-4013
411-4025
411-40135
21 0180-1
29 0030-1
29 0009
29 0008
29 0031-1
411-4060-1
M5×6
2×54
4004
411-4043
411-4042-1
4008
4009
4011
411-4037
411-4036-1
411-4038
411-4065-1
4002-1
4007
4006-2
4051-1
411-4057-2
4005-2

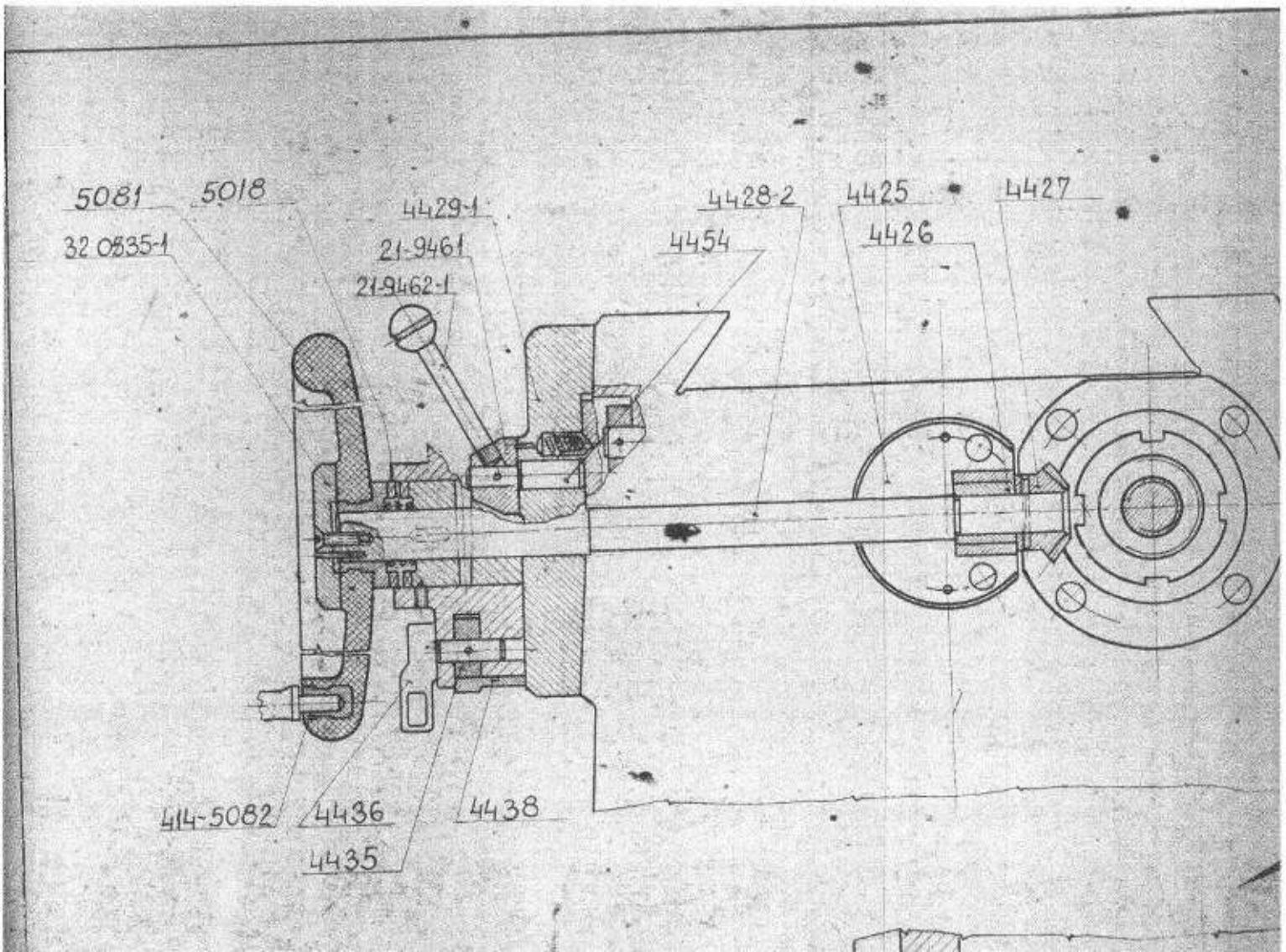
414-0105

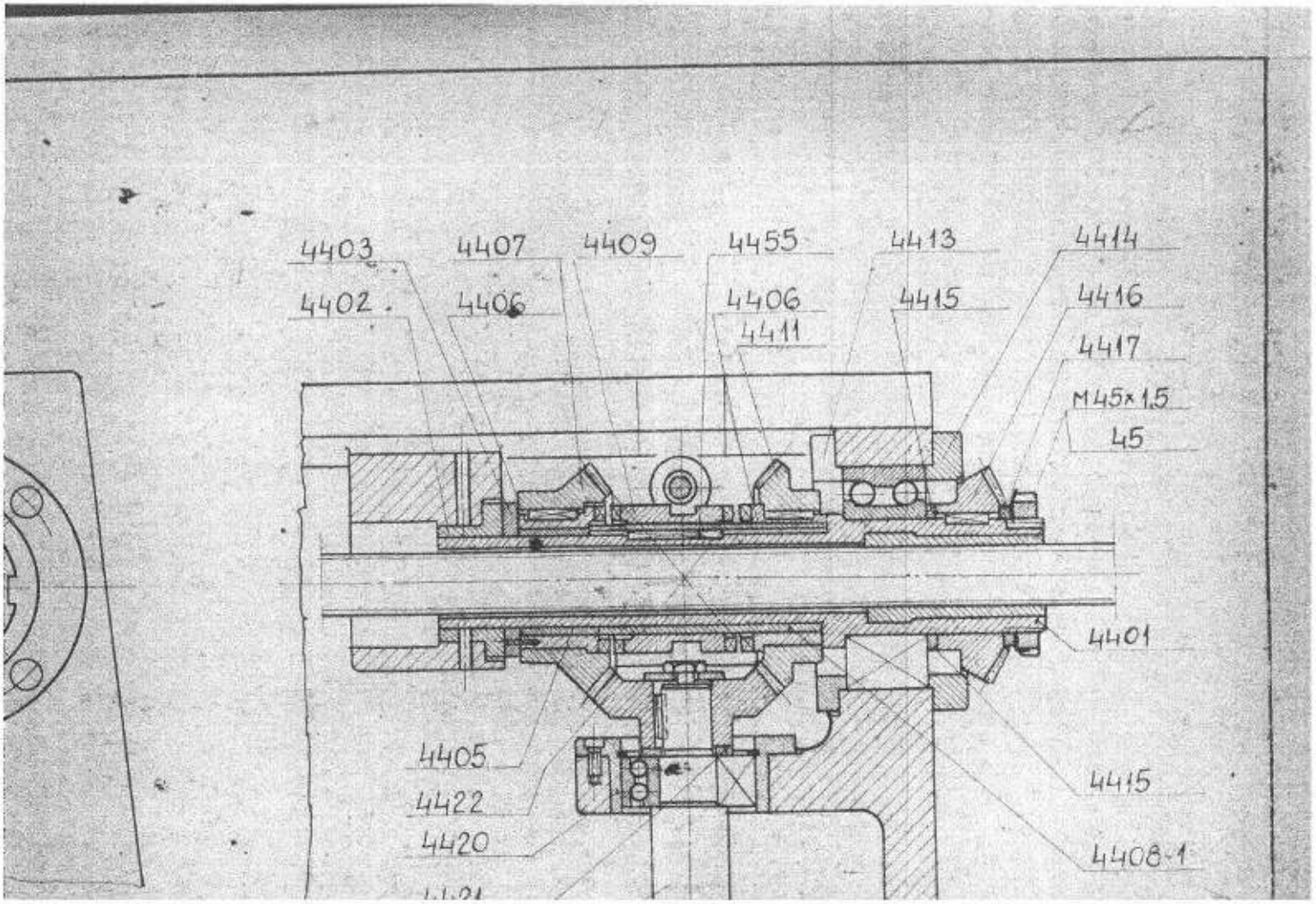

411-4011
411-4009
411-4004
4108-1
411-4006
4117
4114-1
4113-1
4122-1
411-4006-1
4115
4116
4121-2
4118-2
4112
4111
4119-2
4120-2
4101-1
4106
4105-1
4104-1
4102-1
M25×1,5
M20×1
4003
4012
411-4007-1
411-4033-3
411-4029-3
411-4028-3
411-4030-2
411-4097-1
411-4026-2
411-4035-1
411-4031-2
4010
411-4034

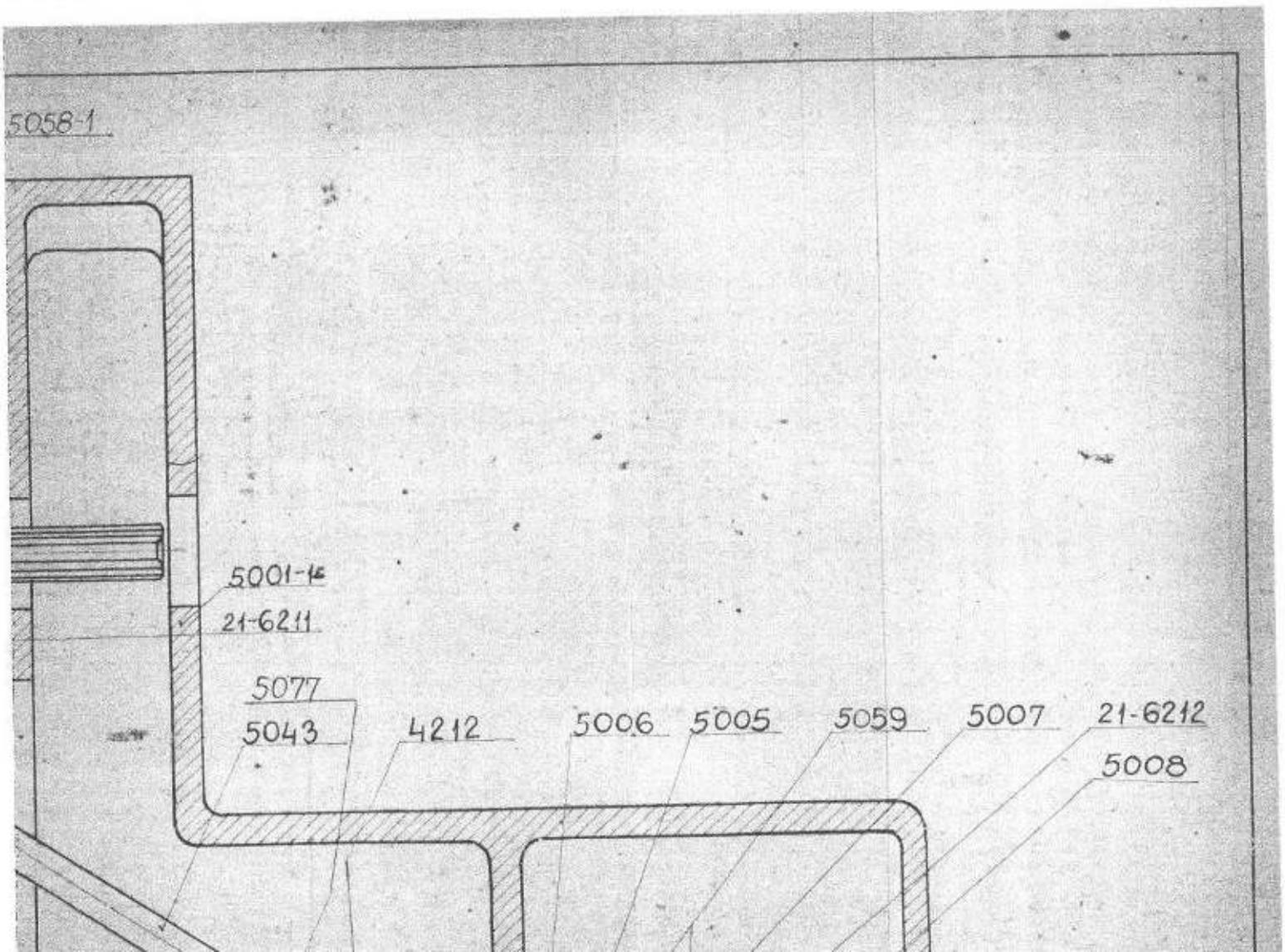

4403
4407
4409
4455
4413
4414
4402
4406
4406
4415
4416
4411
4417
M45×1.5
45
4401
4405
4422
4420
4421
4419
4424
4302
4415
4408-1
4301-1
4304
4303
4306
4309
4308
4314
4313
4312
4212
4307
4210-1
4207

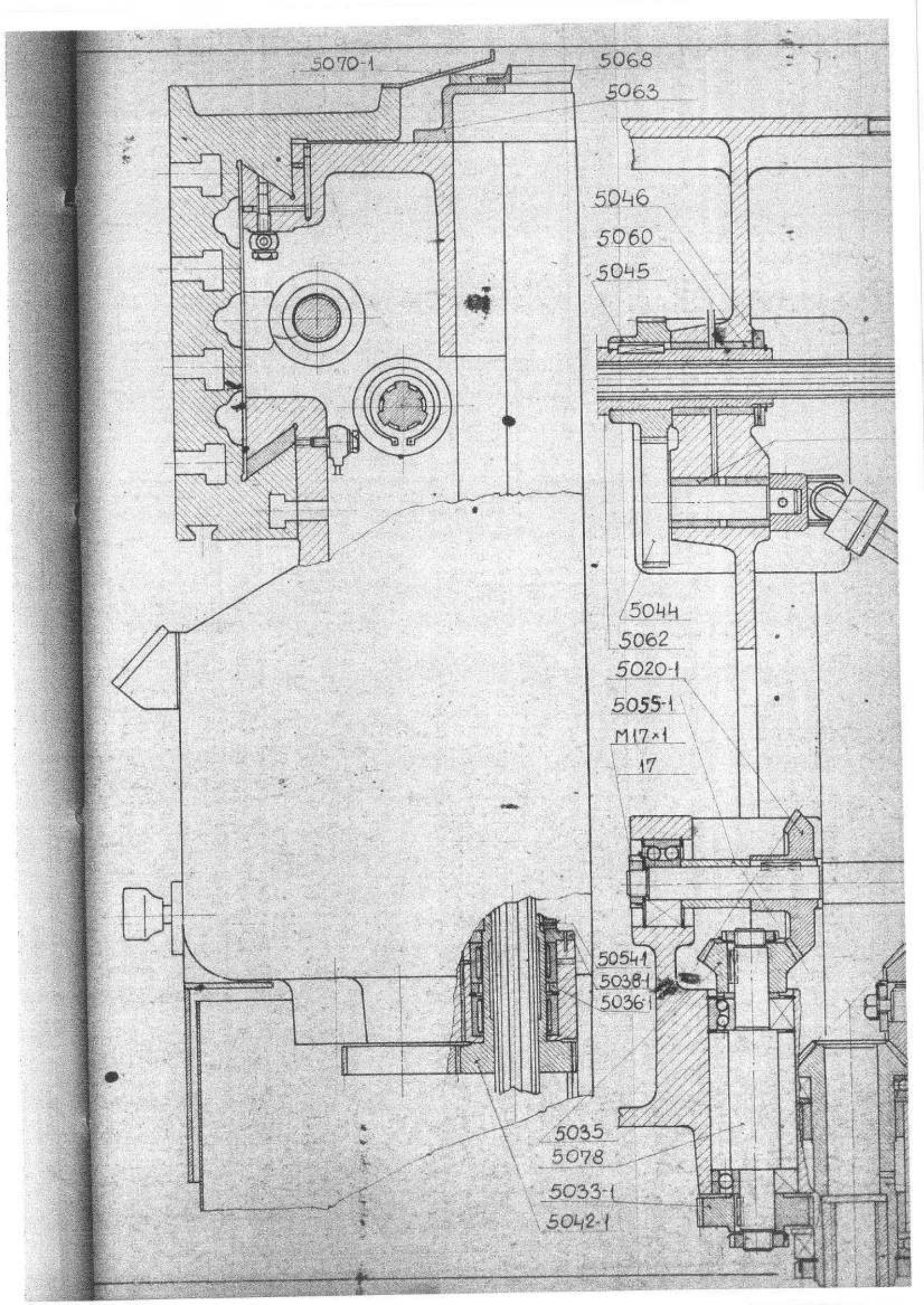
414-0106

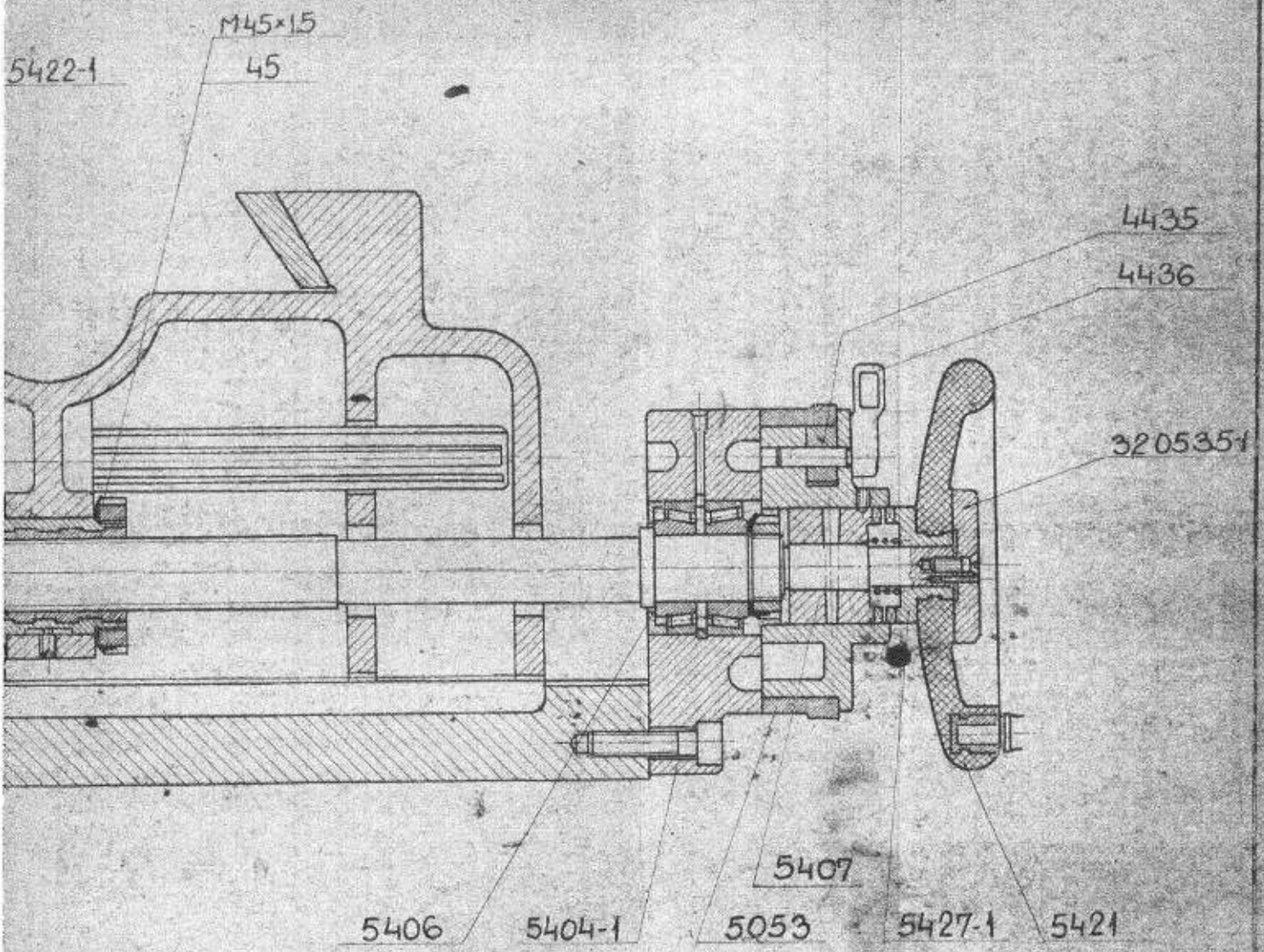

4403
4407
4409
4455
4413
4414
4402
4406
4406
4415
4416
4411
4417
M45×1.5
45
4401
4405
4422
4420
4415
4408-1

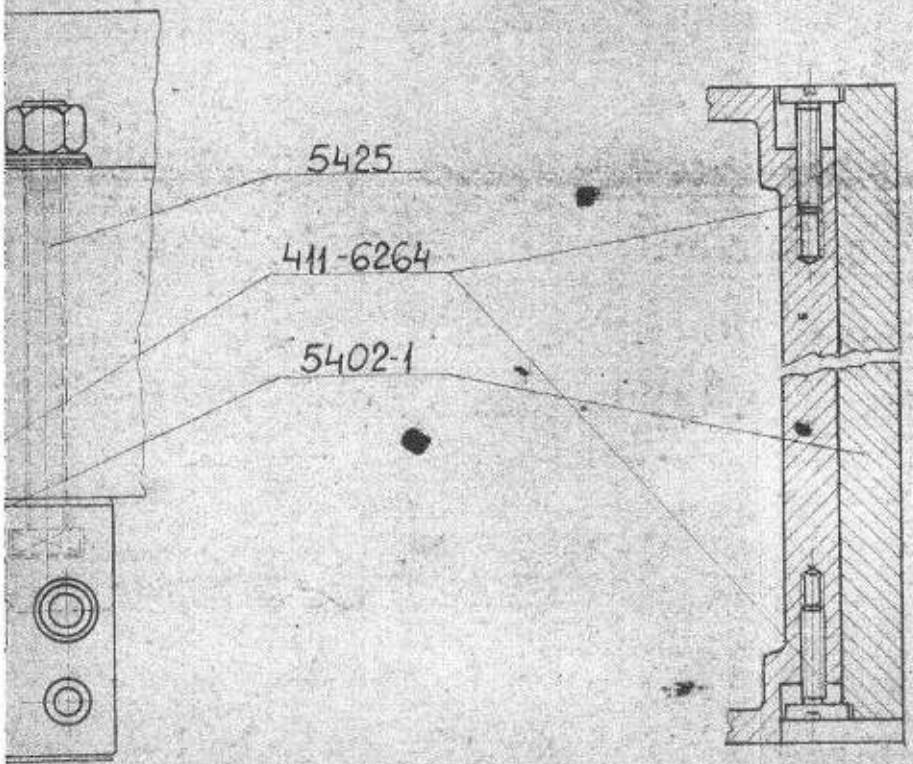

5081
5018
4429-1
4428-2
4425
4427
32 0835-1
21-9461
4454
4426
21-9462-1
414-5082
4436
4438
4435


4403
4407
4409
4455
4413
4414
4402
4406
4406
4415
4416
4411
4417
M45×1.5
45
4401
4405
4422
4420
4415
4408-1

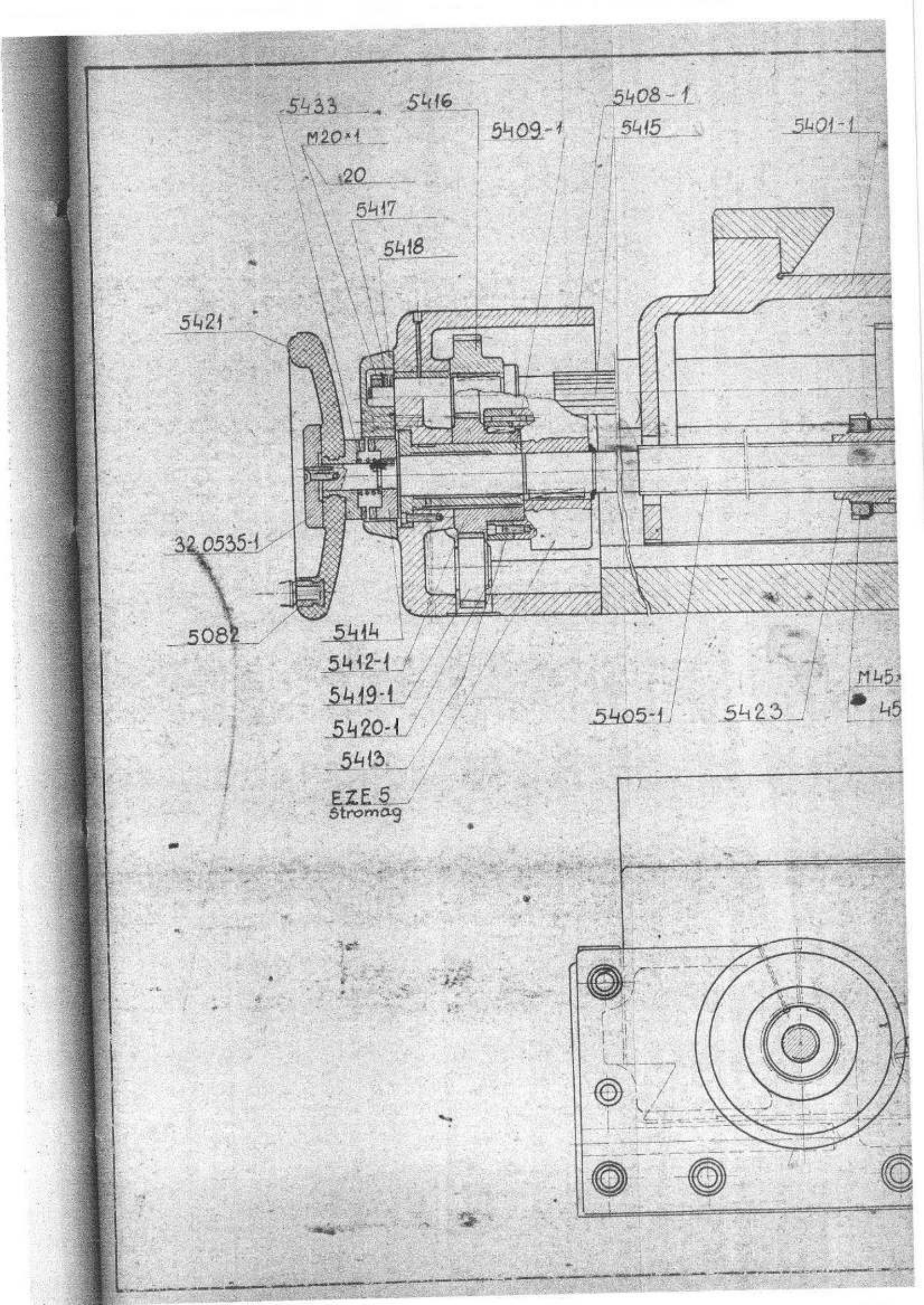

5058-1
5001-1
21-6211
5077
5043
4212
5006
5005
5059
5007
21-6212
5008

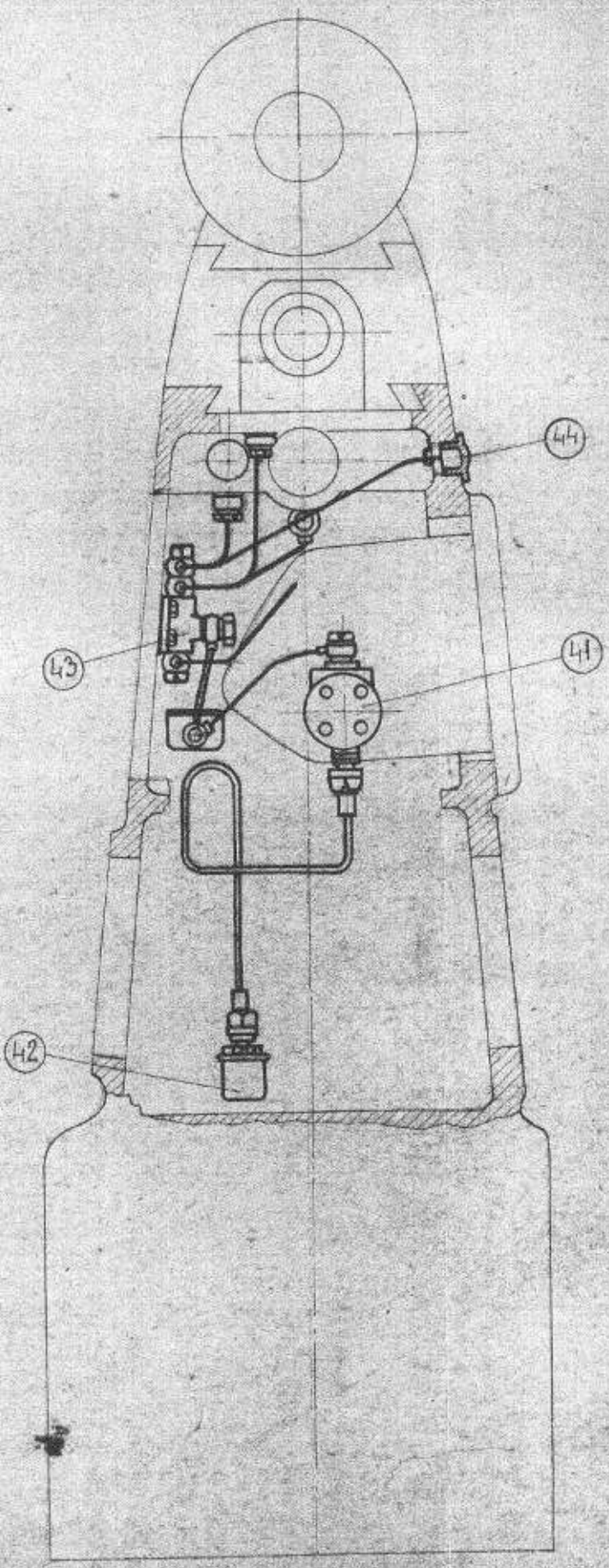

5070-1
5068
5063
5046
5060
5045
5044
5062
5020-1
5055-1
M17×1
17
5054-1
5038-1
5036-1
5035
5078
5033-1
5042-1


M45×1.5
45
5422-1
4435
4436
3205351
5407
5406
5404-1
5053
5427-1
5421

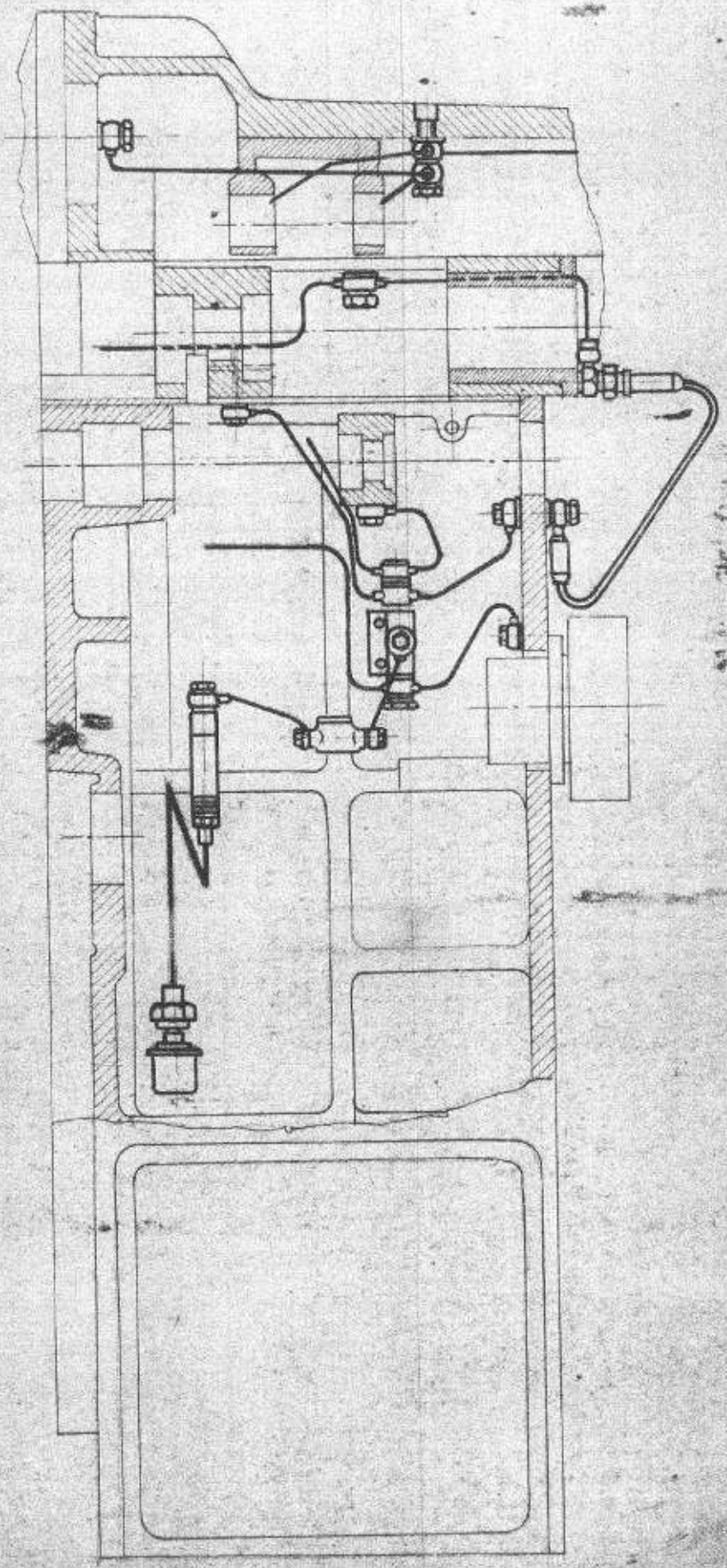

5425
411-6264
5402-1

414-0108


5433
M20×1
20
5416
5417
5418
5409-1
5408-1
5415
5401-1
5421
32 0535-1
5082
5414
5412-1
5419-1
5420-1
5413
EZE 5
Stromag
5405-1
5423
M45×
45



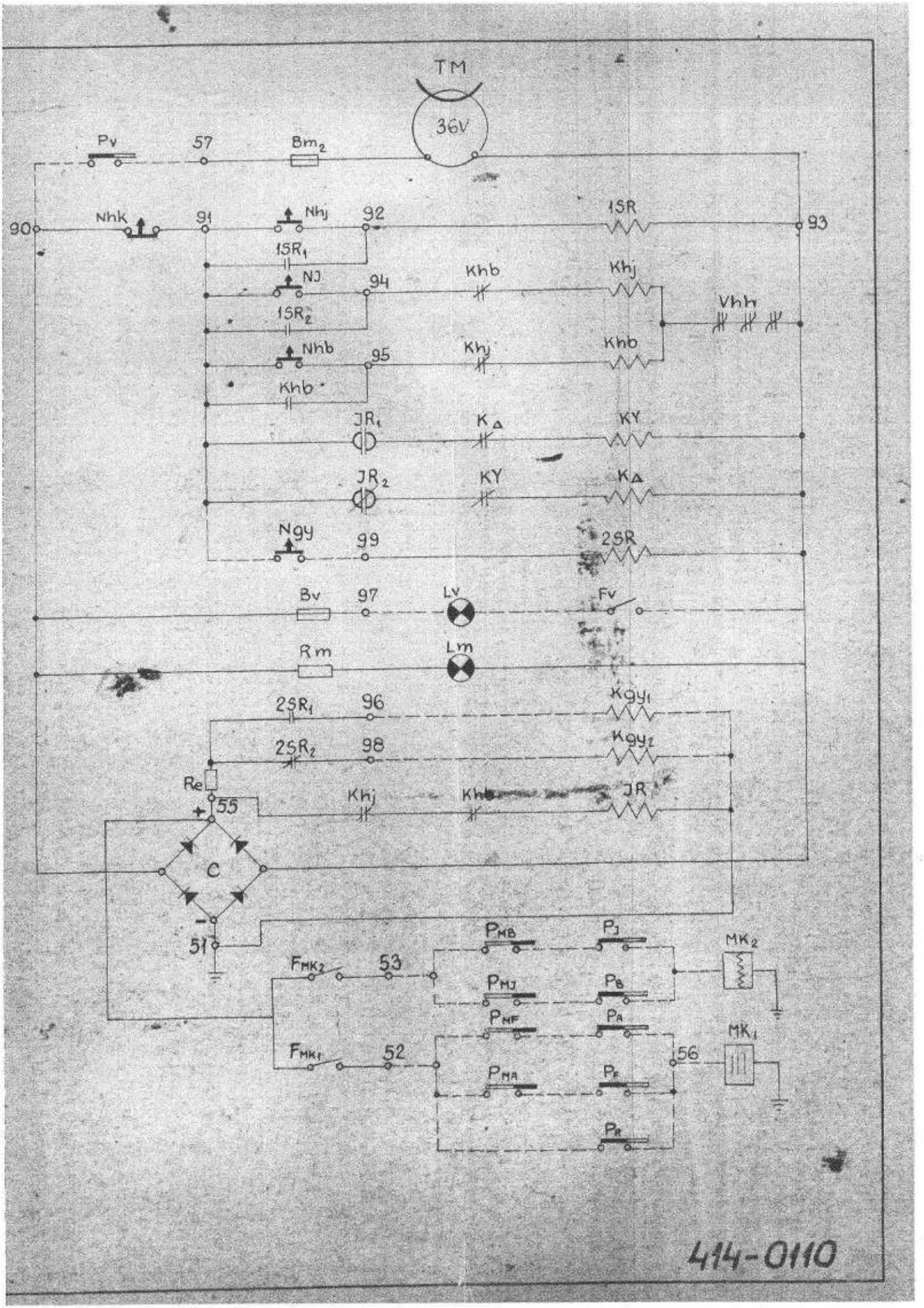
414-0109



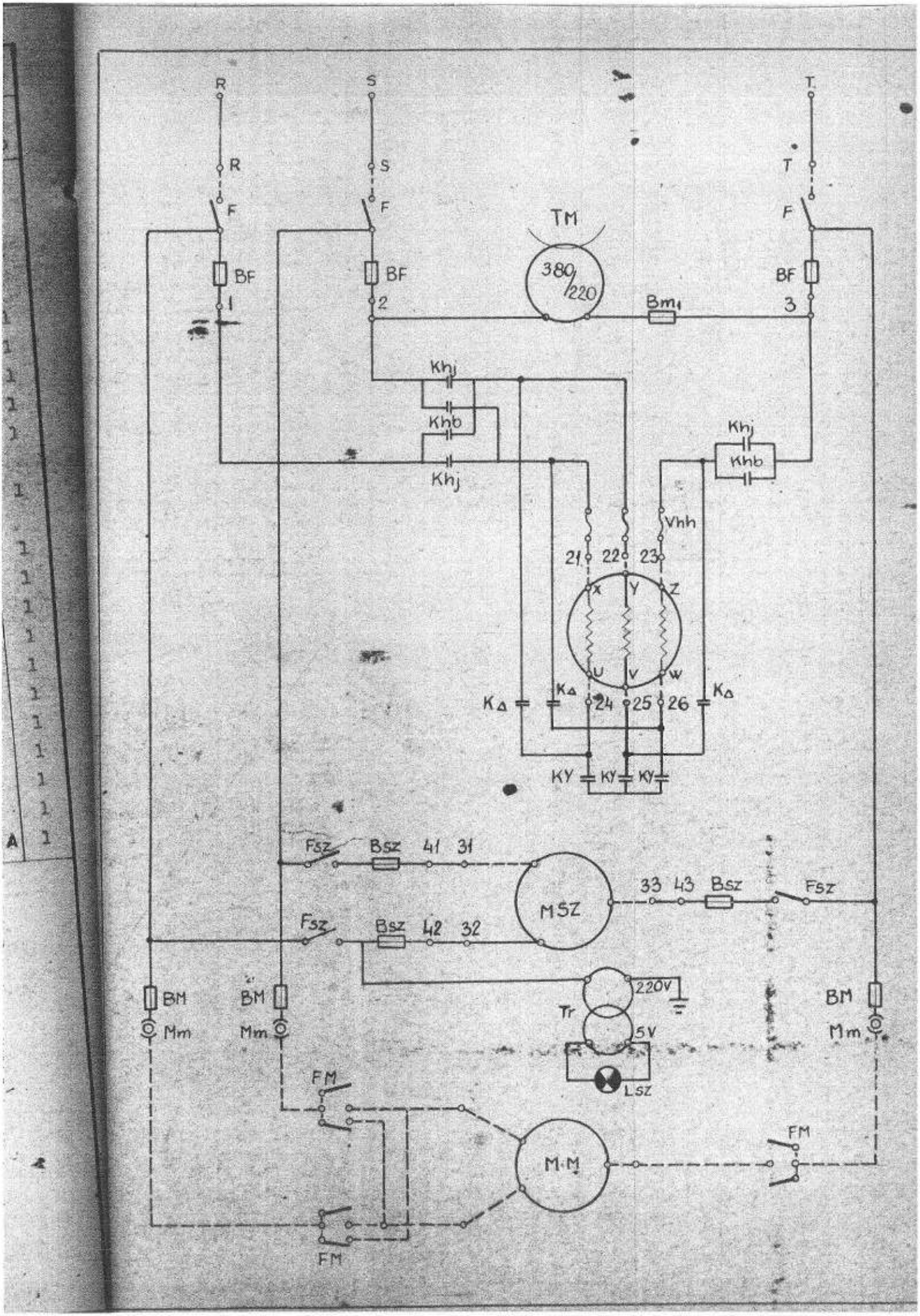
MSU. 050. elements of electrical equipment,

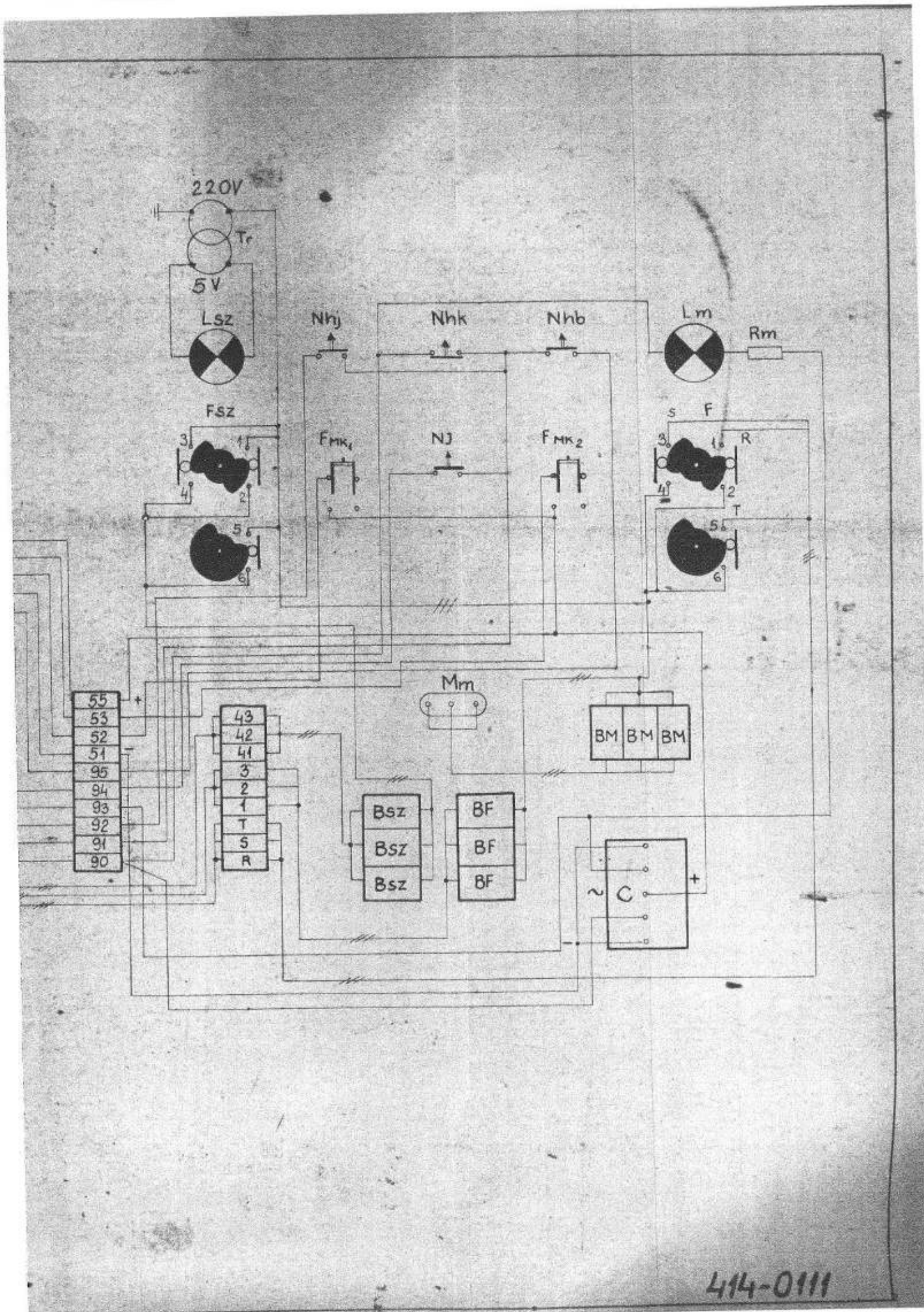
Plan sign	Naming	Type	Must. data	pcs
MH	Drive motor	VZ 223/4	2,8 Kw, 1420 1/p 660/380	1
MM	High-speed milling head drive motor	VX 7/2	0,45kw; 2850 1/p	1
MS	Pump drive motor	SF 100 13/2		1
F	Main switch	VGK 10		1
Fsz	Pump switch	VGK 10		1
FM	Quick milling head motor switch	VGK 10		1
Ex	Drive motor contactor	VM 10	36V, 2A+2R s.é.	1
etc	-"-	VM 10	-"-	1
KY	-"-	VM 10	-"-	1
K△	-"-	VM 10	-"-	1
IRISH	Time relay	FIR 3	24V	1
1SR	Auxiliary juice	VS -23-18	36V	1
2 SR	Auxiliary juice	VS-23-18	36 V	1
TM	Operating transformer	TR 200	200VA	1
			Pr 380/220/Sec.36V -	
Whh	Drive motor protection element	Tlo 4.5-84 6.2à adjustment		1
BF	His Highness	vDb substrate	vDol 15A; vDf	3
Bsz	Pump motor insurance	-"-	vDo 2A, vDf	3
BM	Quick milling head fuse	-"-	vDo 1,5A; vDf	3
Bm_1	Transf. primary insurance	-"-	vDo 2A, vDf	1
Bm_2	Transf. secondary insurance	-"-	vDo 2A, vDf	1
Ex	Workplace light protection	-"-	vDo 2A, vDf	1
Lv	Workplace lighting lamp	-"-	36 V; 40w	1
Lm	Operation indicator light	GJ 24V-5w	red	1
Lsz	Pump warning light	GJ 6 V-3w	green	1
Rm	Premise resistance	KRS01	56 Ω	1
Re	Premise resistance	KRS62	8 Ω 15W	1
Fv	Lighting switch		inserted into a lamp 1	
MK_1	Lamella tension switch	Kbk-66		1
MK_2	Nail clip. switch	Kbk-66		1
MK_2	Electromagnetic Körmös teng.k.	THIS IS 5	24V, 27w	1
		Stromag	1.13A	
MK_1	Electromagnetic lamella.teng. k.	PLOW 2T	24V, 30w	1
		Stromag	1,25A	

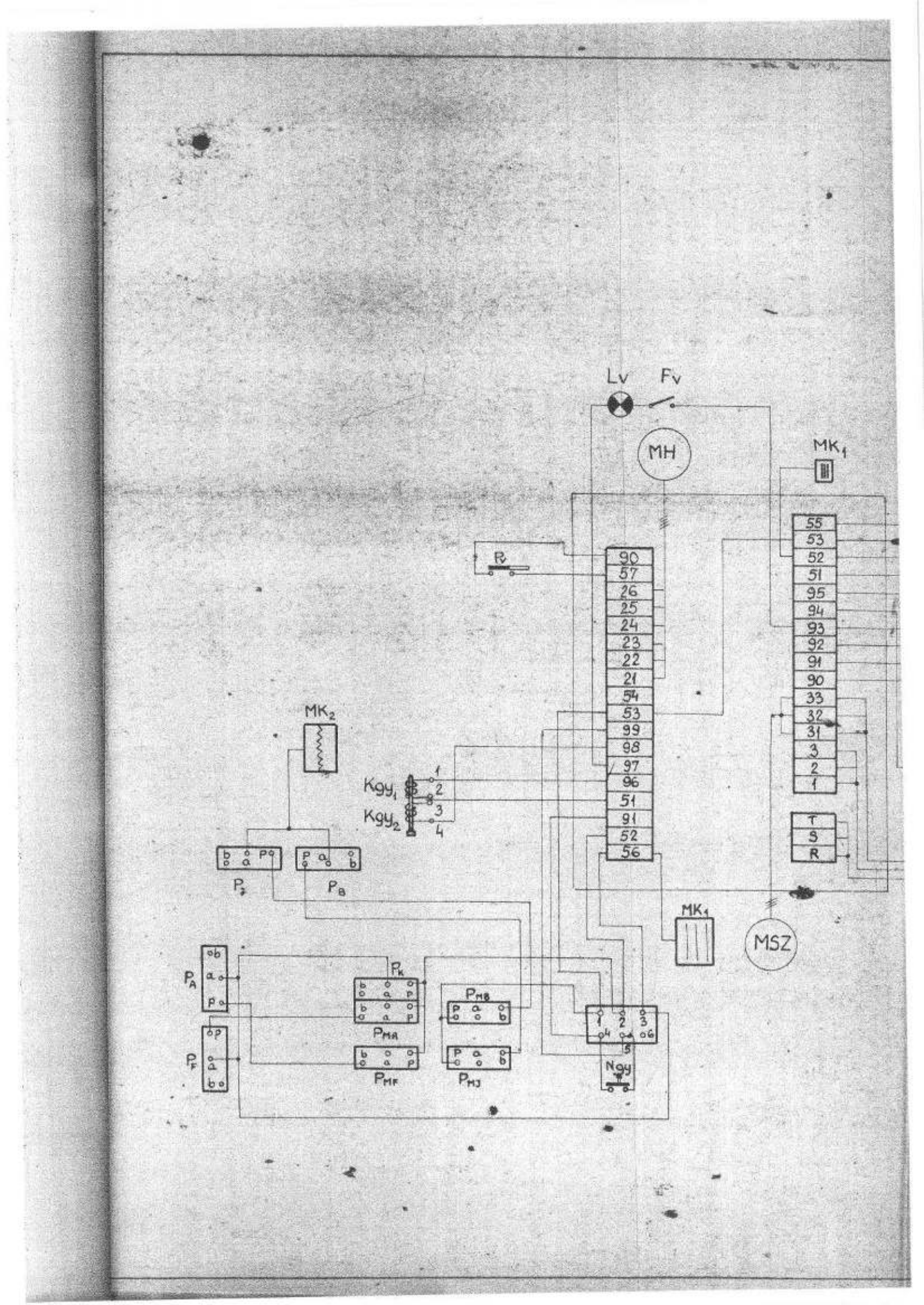
Plan sign	Designation	Тирив	Technical data	pcs
Dim	Quick milling head motor connector	Dir-103b fork-lift truck		1
		Subtype Dafn-103b		1
Nhj	Drive motor start push button	Dux 5o9o PT Ø 27	green	1
Nhb	Drive motor start push button	-"-	-"-	1
Nhk	Drive motor stop push button Momentary	-"-	red	1
NI	start push button.	-"-	yellow	1
Ng	Fast forward push button	TRIVAX		1
Kg	Gyoramonot tolattyumágnes	BINDER 41523-o5#	24 Sun	1
C.	Selenium cell column	1oox1oo etc 8 items	Graetz	1
Pvt	Spindle holder	DISA		1
P_{hB}	Limit switch ball	Marquardt	N° 92o	1
P_{LJ}	-"- Right	-"-	-"-	1
P_{LA}	-"- lower	-"-	-"-	1
P_{KF}	-"- upper	-"-	-"-	1
P_J	Limit switch right	-"-	-"-	1
P_B	-"- ball	-"-	-"-	1
P_A	-"- lower	-"-	-"-	1
P_E	-"- upper	-"-	-"-	1
P_M	Interlock switch	-"-	-"-	1
Tr	Pump indicator light transformer	univ.cs.ed. 110~220V,0.5A		1

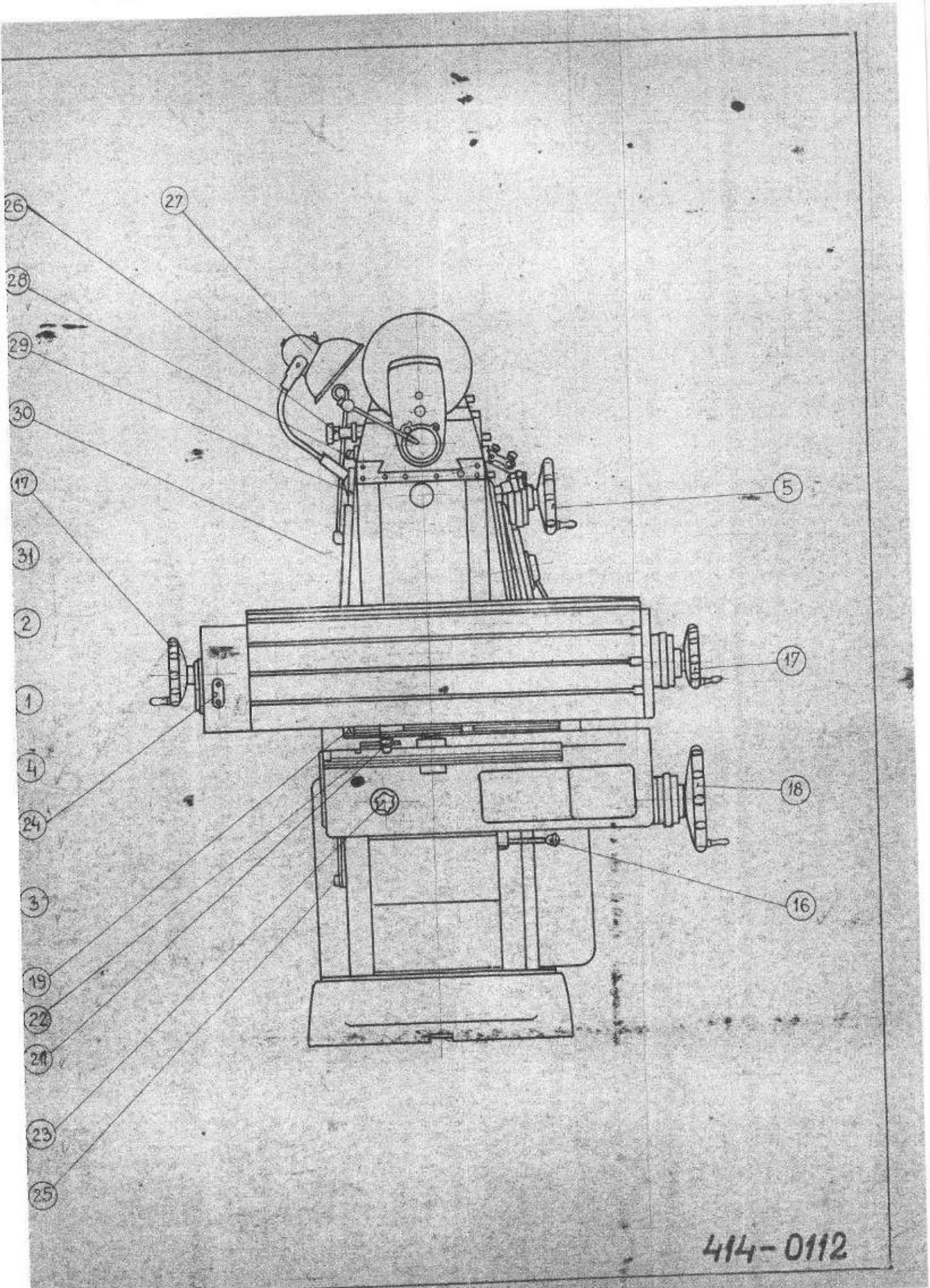

TM
36V
Pv
57
Bm2
90
Nhk
91
Nhj
92
1SR
93
1SR1
NJ
94
Khb
Khj
Vhh
1SR2
Nhb
95
Khj
Khb
Khb
JR1
KΔ
KY
JR2
KY
KΔ
Ngy
99
2SR
Bv
97
LV
Fv
Rm
Lm
2SR1
96
Kgy1
2SR2
98
Kgy2
Re
55
Khj
Khb
JR
C
51
PMB
PJ
MK2
FMK2
53
PMJ
PB
PMF
PA
MK1
FMK1
52
56
PMA
PF
PR

414-0110

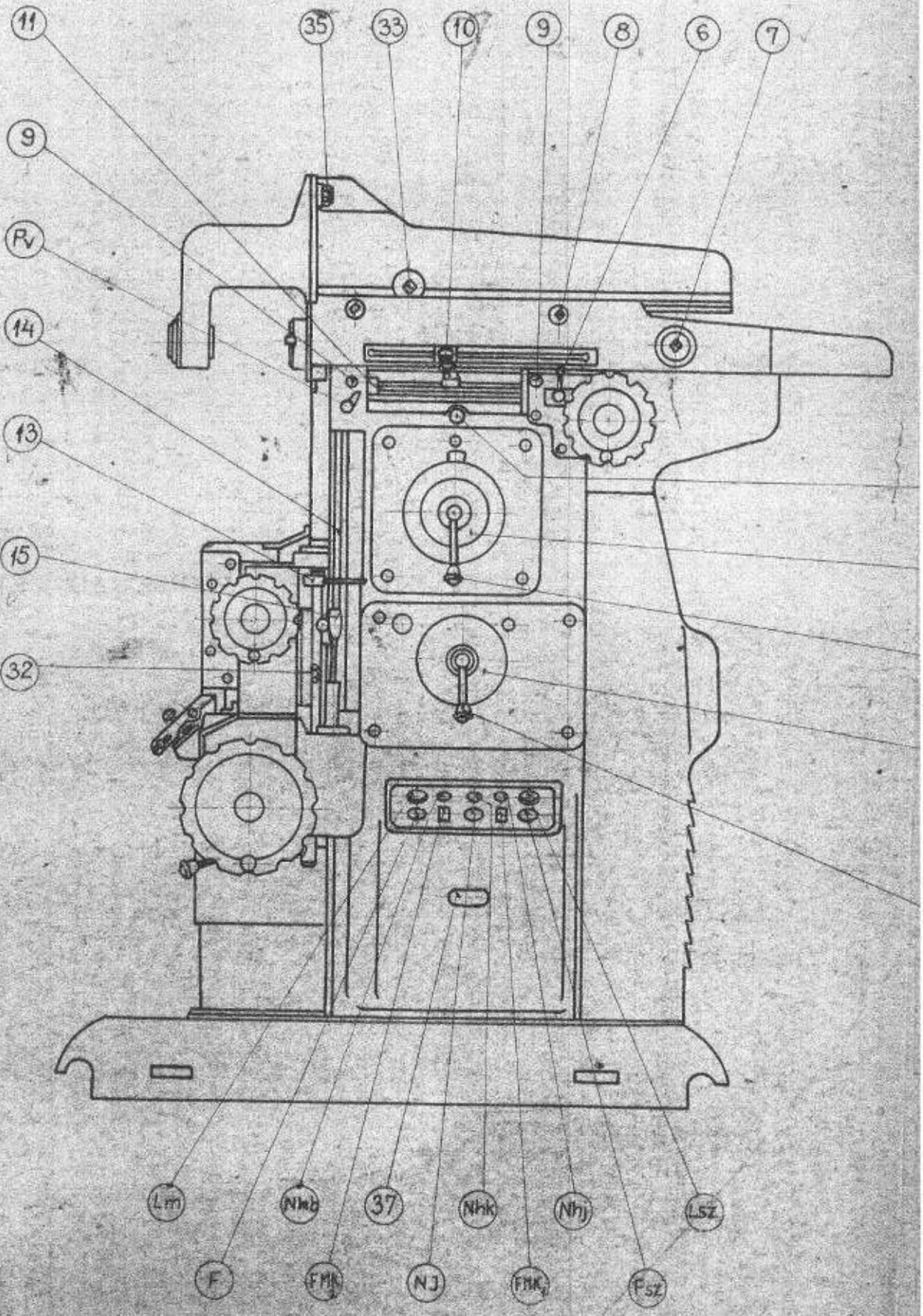

R
S
T
F
TM
380/220
BF
1
2
3
Bm1
Khj
Khb
Vhh
21
22
23
x
Y
Z
U
V
W
KΔ
24
25
26
KY
Fsz
Bsz
41
31
42
32
MSZ
33
43
220V
Tr
5V
LSZ
BM
Mm
FM
M·M

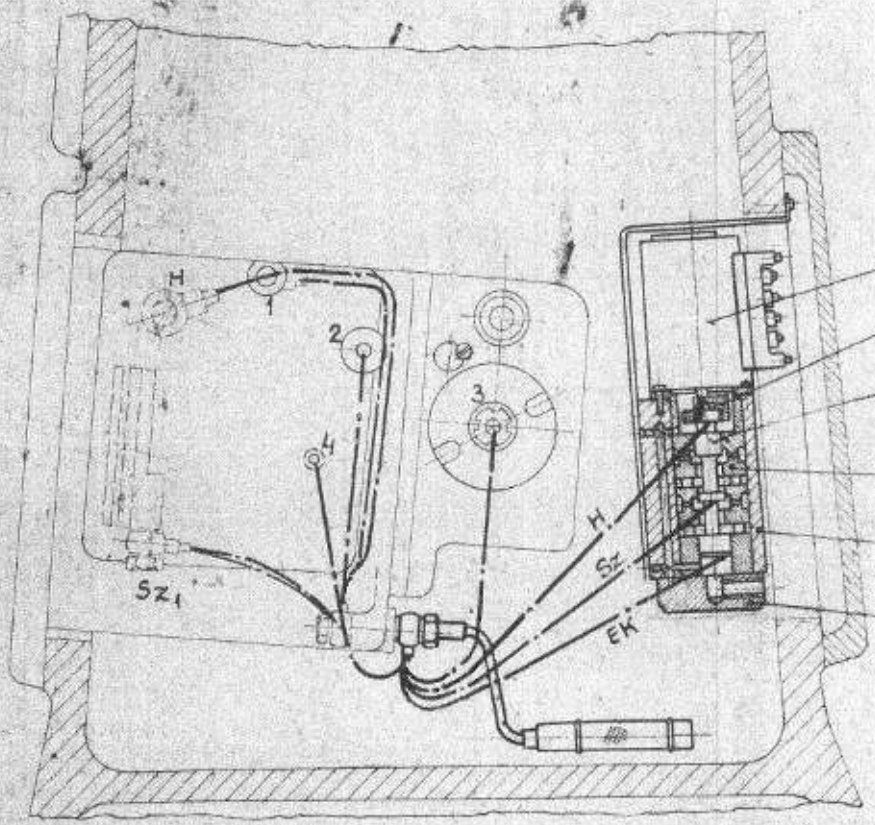

220V
Tr
5V
Lsz
Nhj
Nhk
Nhb
Lm
Rm
Fsz
FMK1
NJ
FMK2
F
R
T
S
Mm
BM
BM
BM
55
53
52
51
95
94
93
92
91
90
43
42
41
3
2
1
T
S
R
Bsz
Bsz
Bsz
BF
BF
BF
C
414-0111


Lv
Fv
MH
MK1
55
53
52
51
95
94
93
92
91
90
33
32
31
3
2
1
T
S
R
Rv
90
57
26
25
24
23
22
21
54
53
99
98
97
96
51
91
52
56
MK2
Kgy1
Kgy2
1
2
3
4
PB
PA
PK
PMB
PMA
PMF
PMJ
PF
1
2
3
4
5
6
Ngy
MK1
MSZ



414-0112


11
35
33
10
9
8
6
7
9
Rv
14
13
15
32
Lm
Nkb
37
Nhk
Nhj
LSz
F
FMk
NJ
FMk
FSz



BINDER

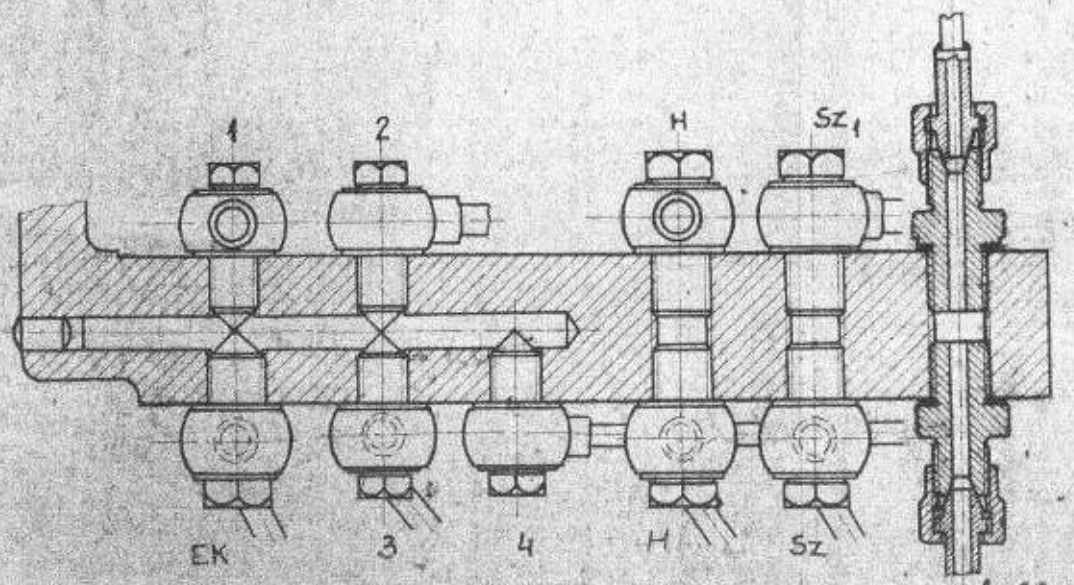
411-5046-2

411-5035-2

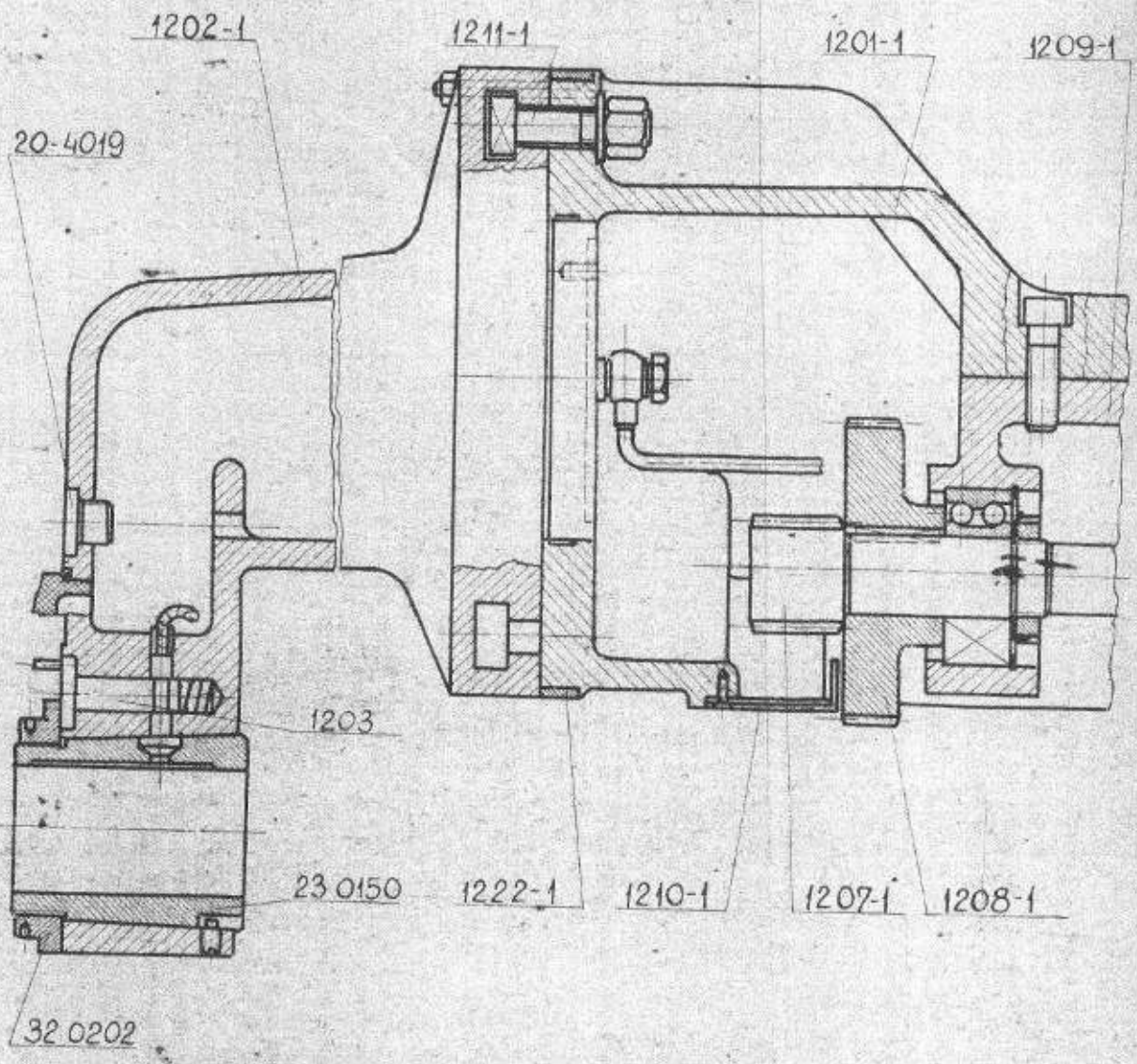
411-5031-2

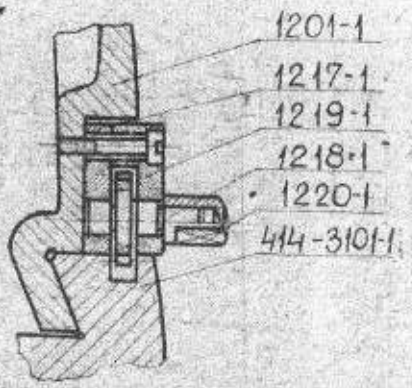
411-5028-3

411-5030-2



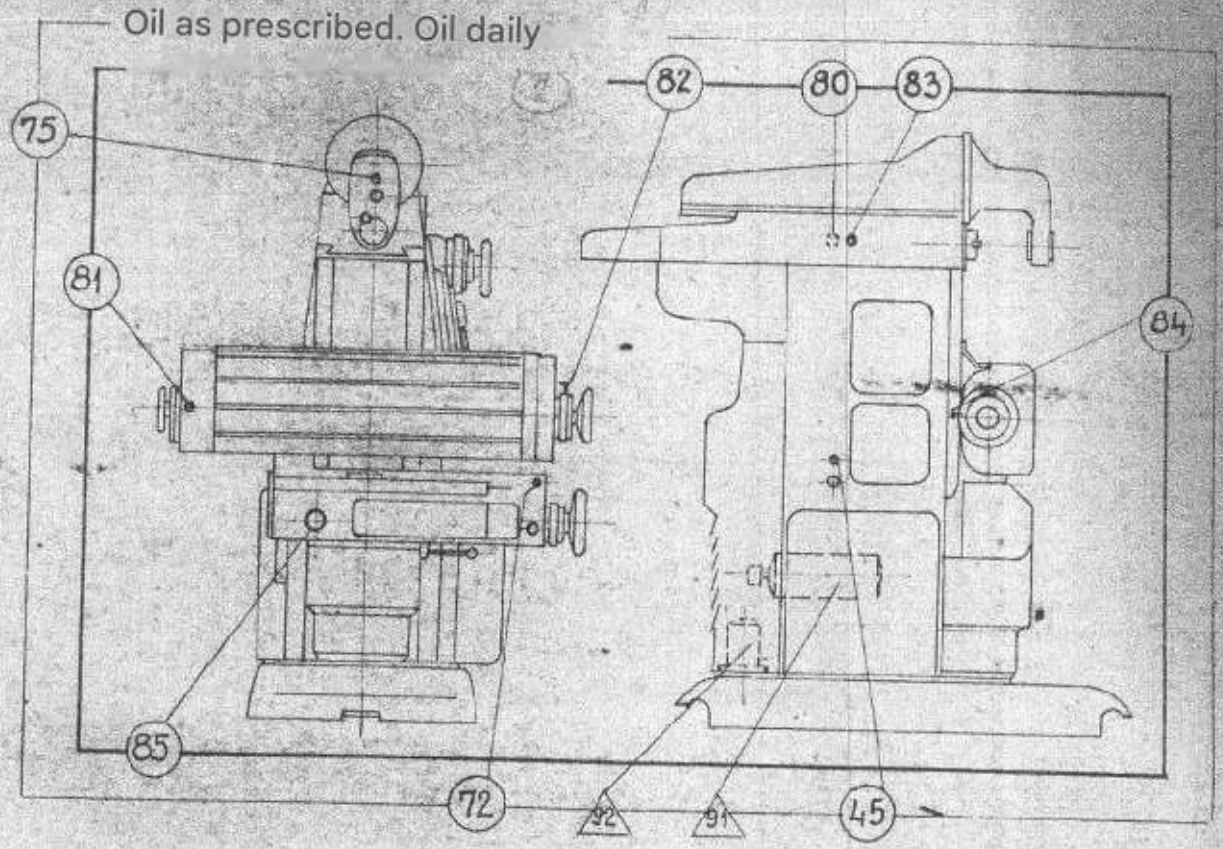
414-0113


1202-1
1211-1
1201-1
1209-1
20-4019
1203
23 0150
1222-1
1210-1
1207-1
1208-1
32 0202


1201-1
1217-1
1219-1
1218-1
1220-1
414-3101-1

414-0114

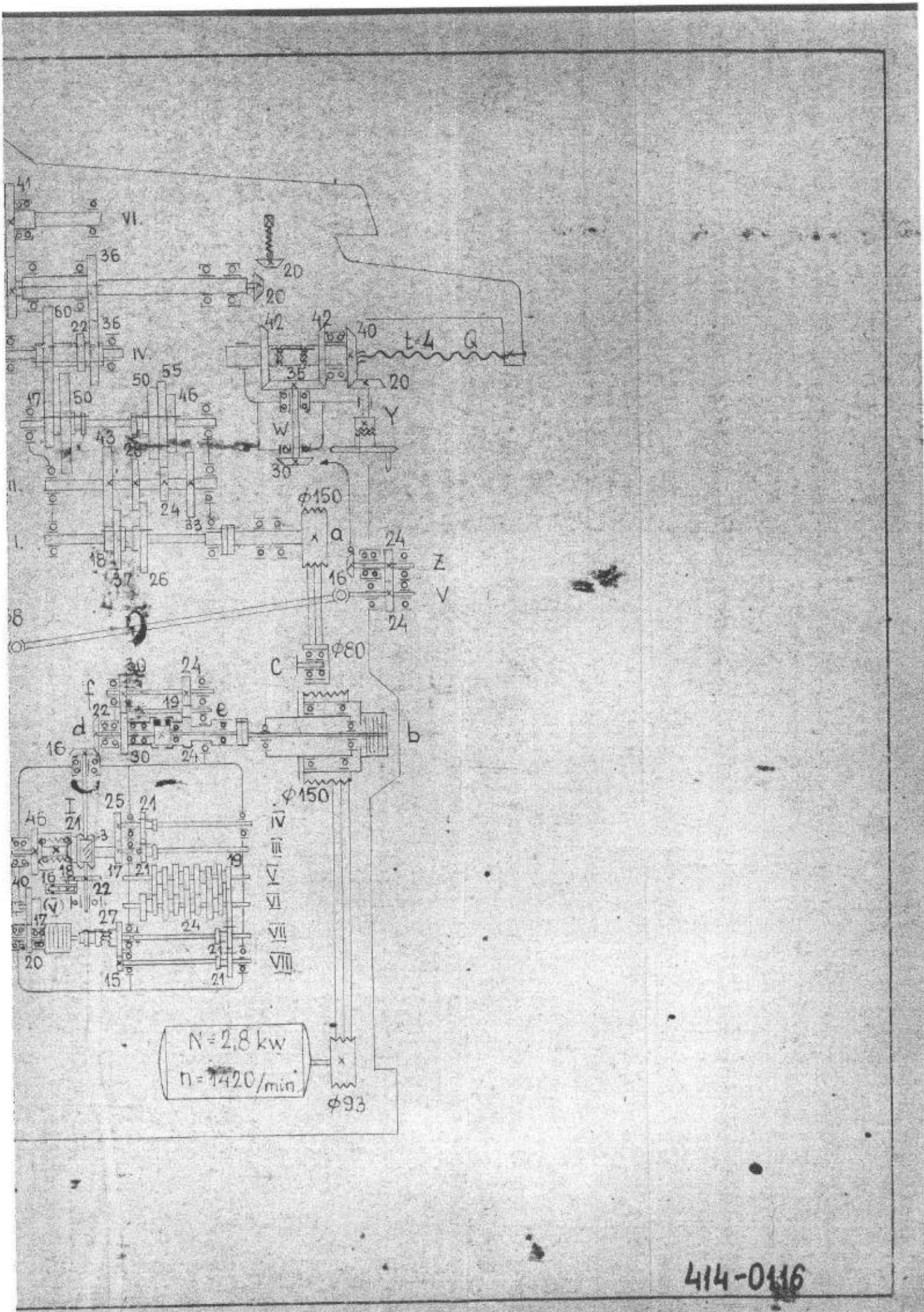
MSU 250



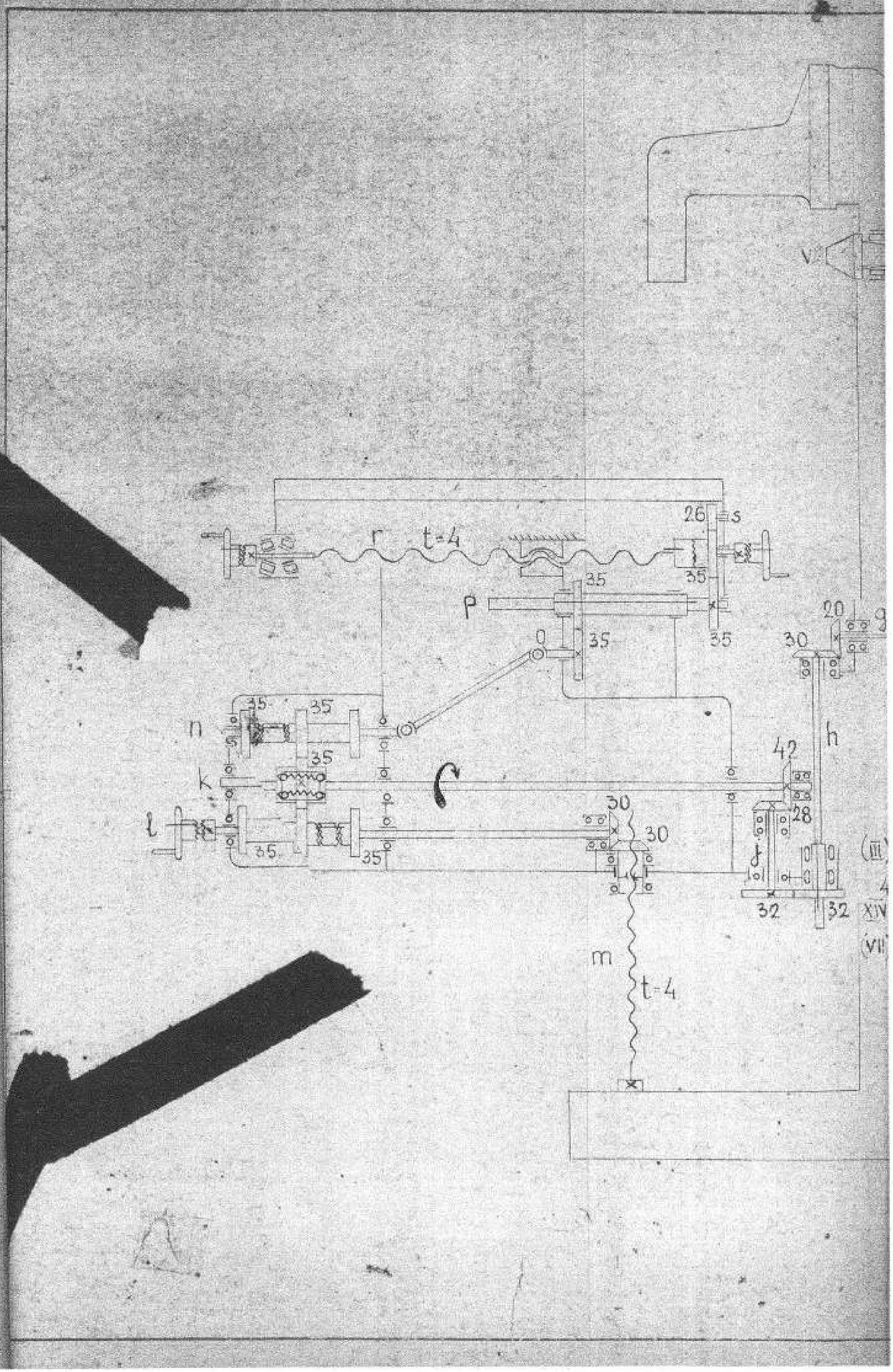
Lubrication instructions.

Lubrication period	Lubricating oil quantity	Loading place no. 2	Lubricating oil quality
Refills need to be replaced every 6 months	Oil level up to the indicator	45	Gas turbine oil T 30 M5z Viscos. 50° C 4-5 E
		72-75	Engine oil C 30 MSz 992 Visc.50°C 4-4.5 E Acid number mg. 0.20
daily	Manual oil press 6-8 strokes	80-85	
as a father	Fill bearing spaces with grease.	91-92	Za 05 rolling bearing grease MSz 13170 Dropping point 85° C

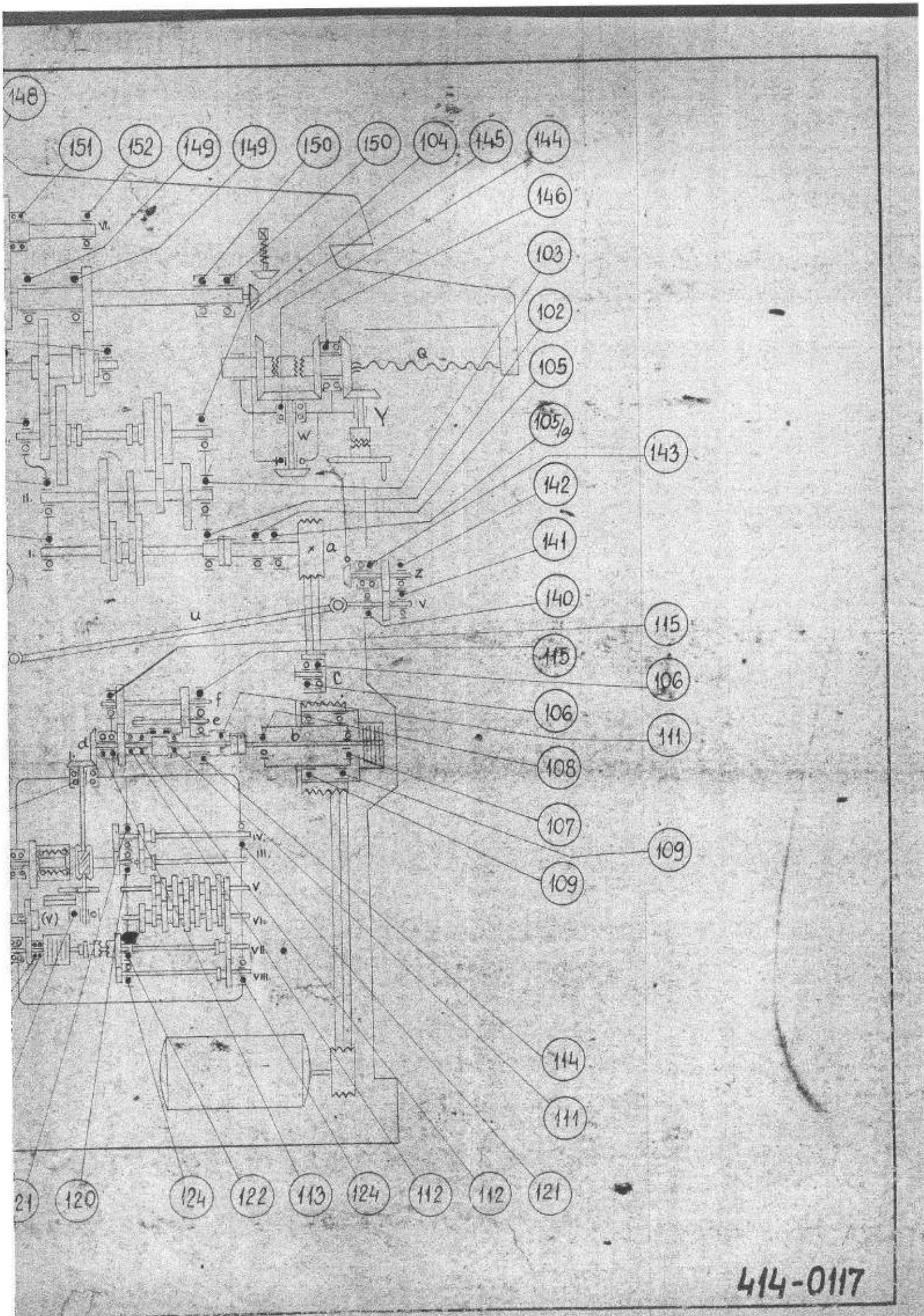
414-0115



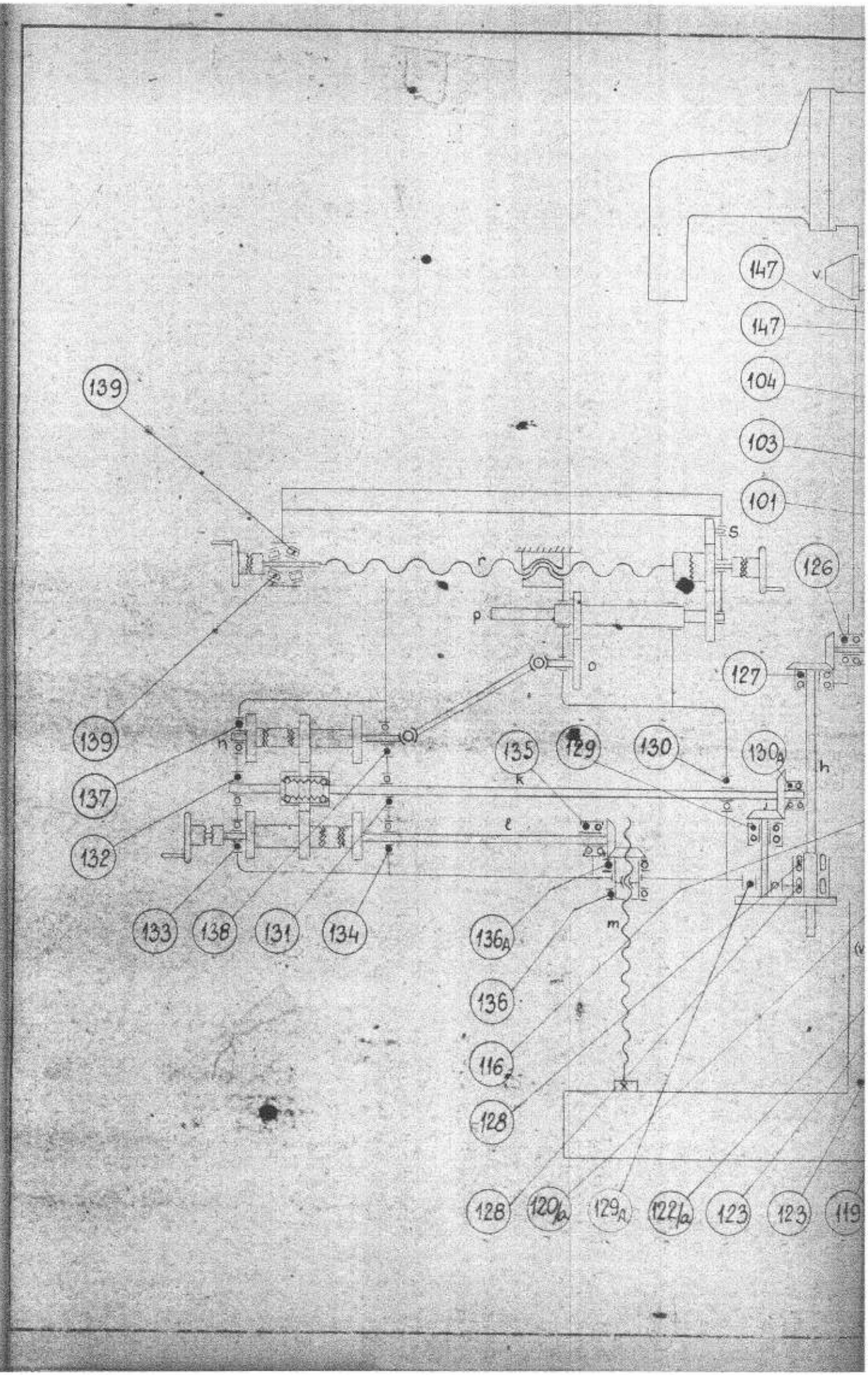
414-0116

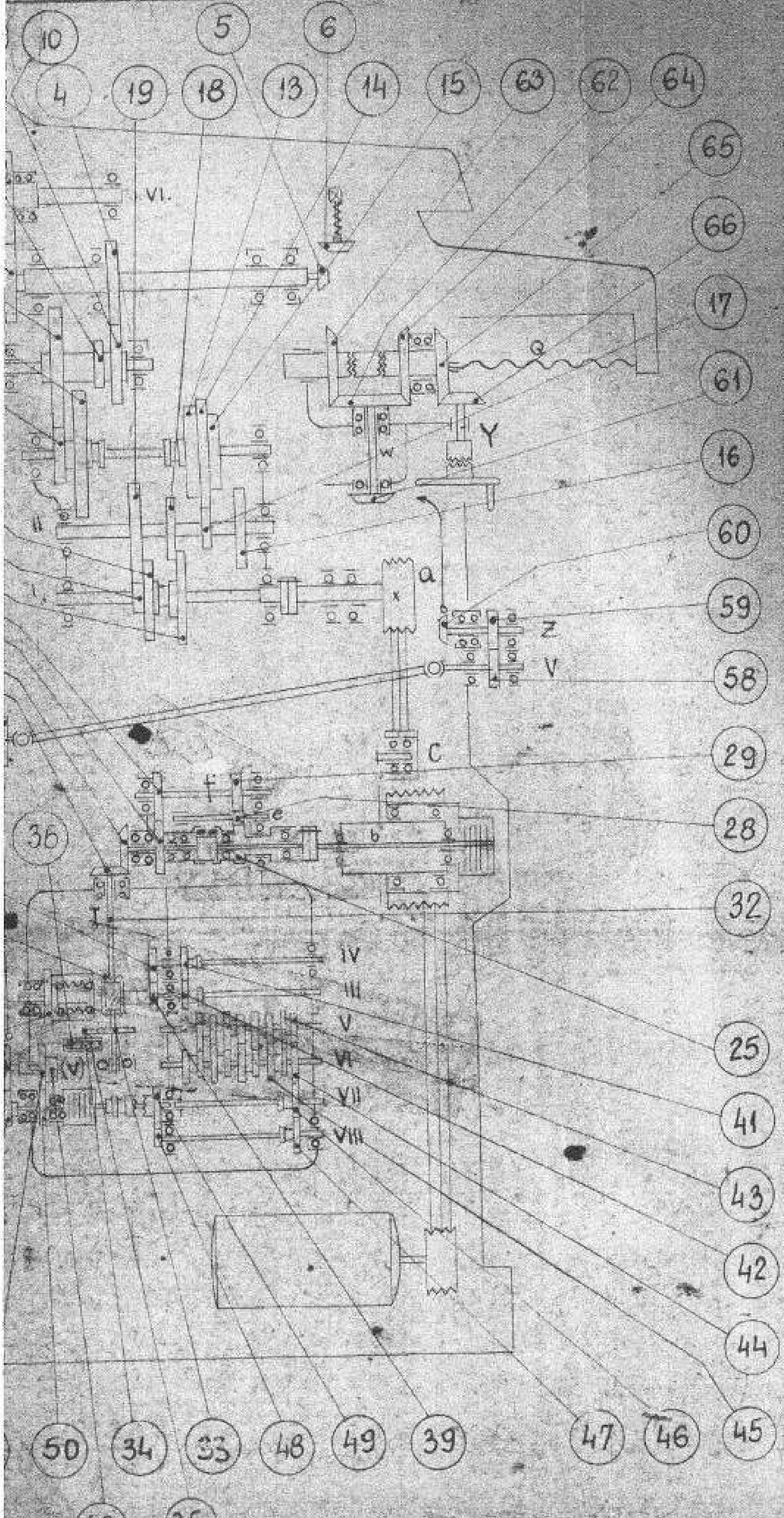


r
t=4
26
s
35
p
0
20
g
30
h
42
n
k
l
28
j
32
(III)
4
XIV
(VII)
m
t-4
v

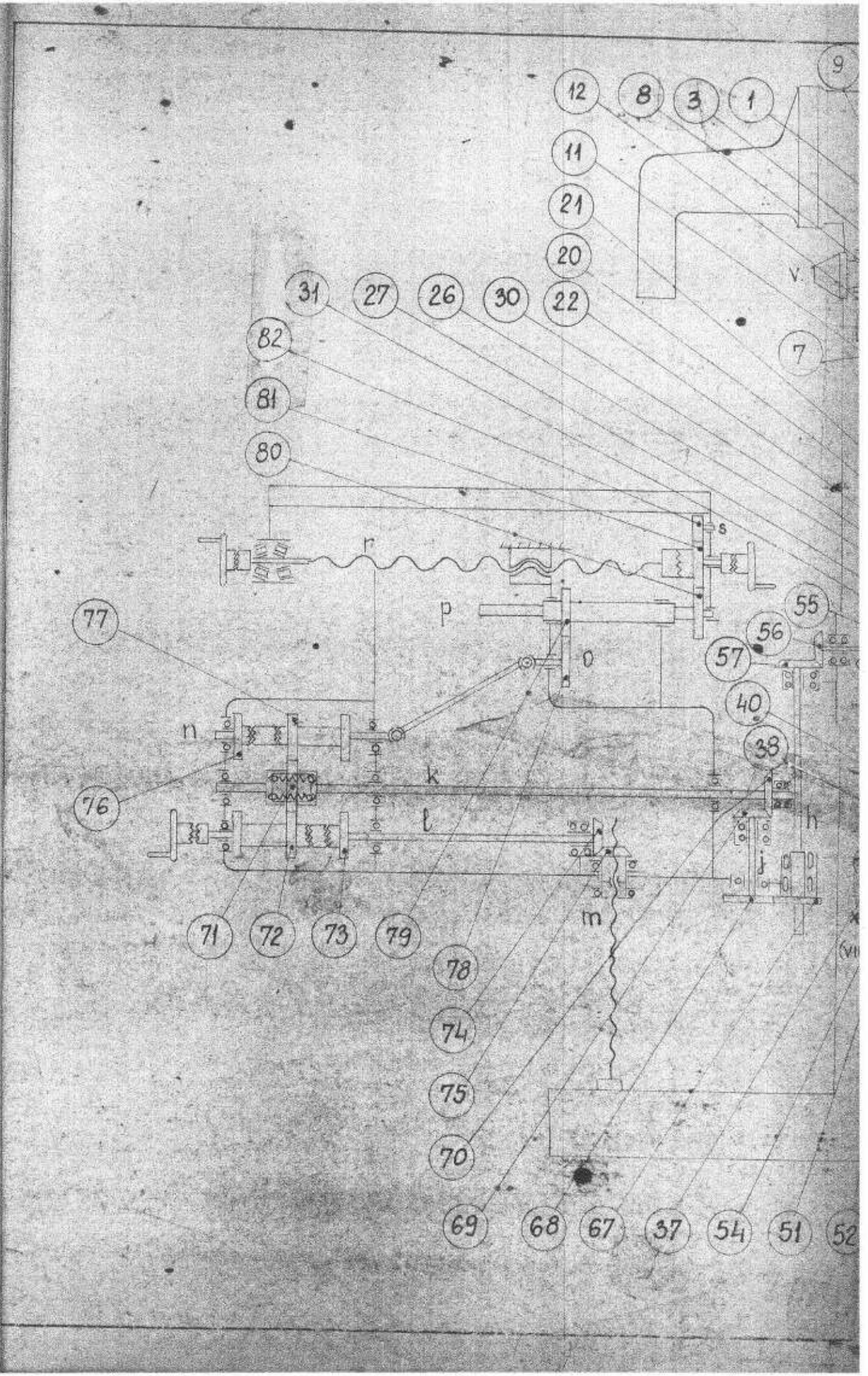

148
151
152
149
149
150
150
104
145
144
146
103
102
105
105/a
143
142
141
140
115
115
106
106
111
108
107
109
109
114
111
121
112
112
124
113
124
122
120
21
Q
Y
W
a
z
v
u
C
f
e
d
b
VI.
II.
I.
IV.
III.
V.
(V)
VI.
VII.
VIII.

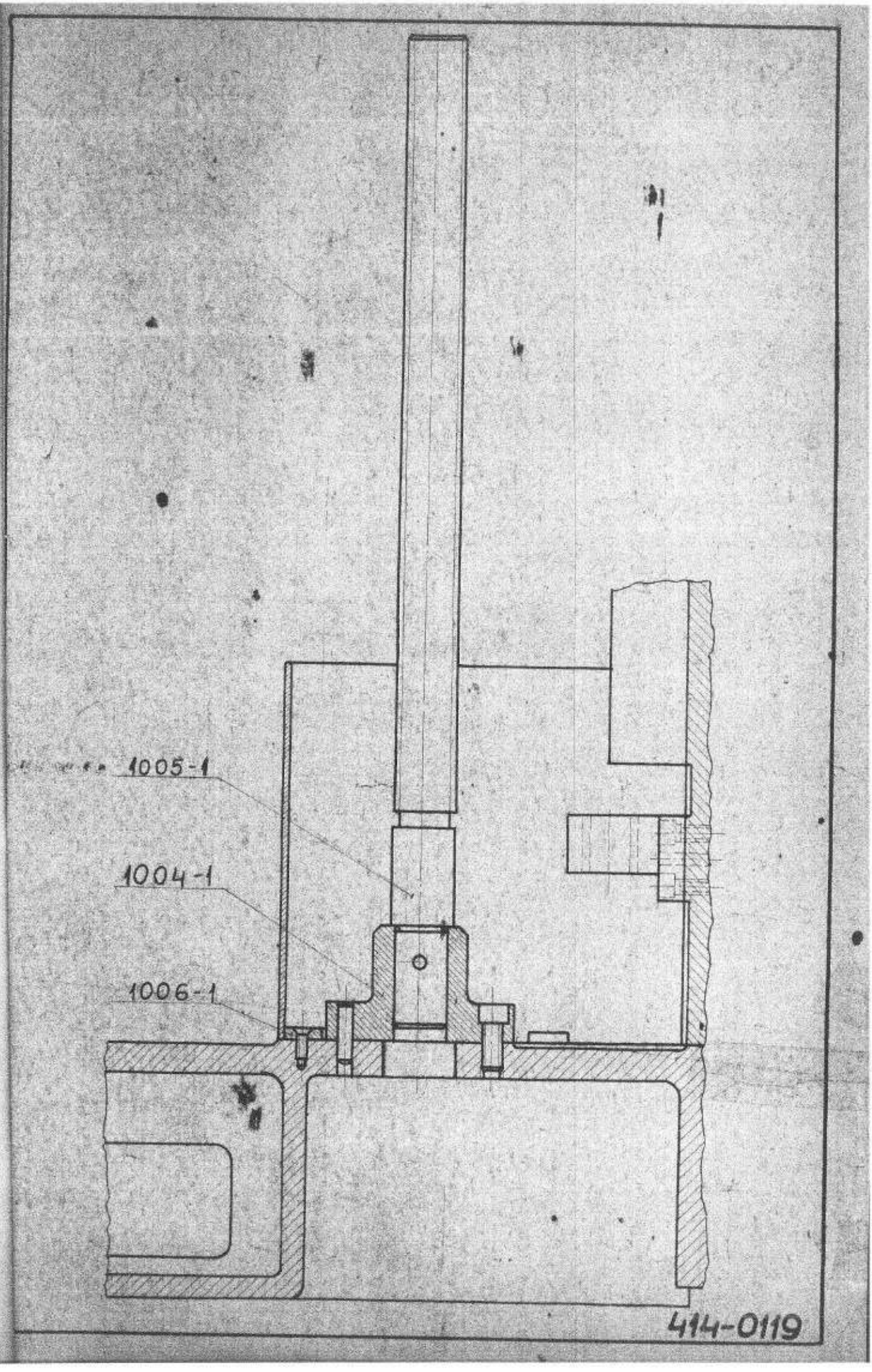
414-0117

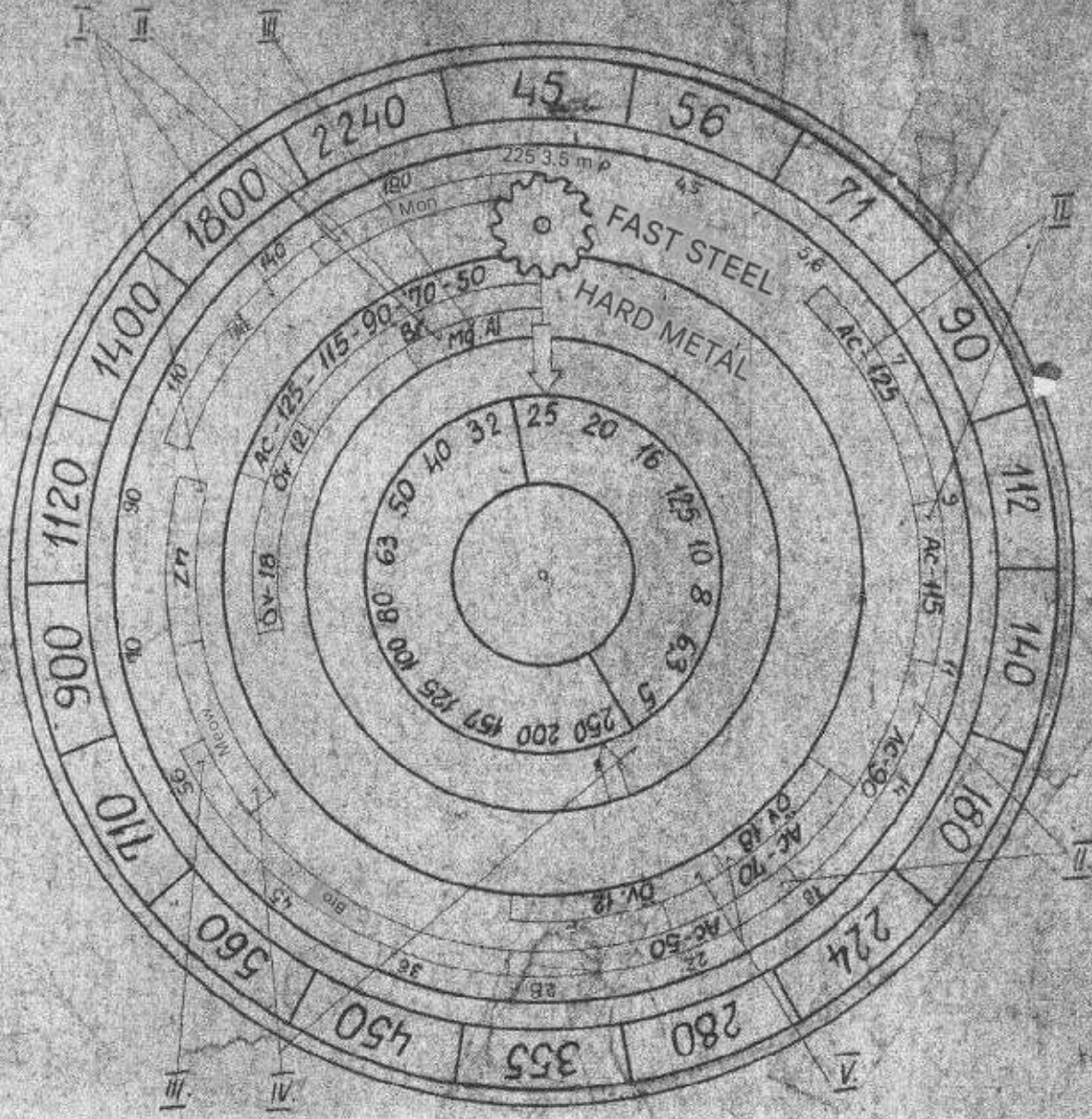

147
v
147
104
103
101
139
s
r
126
p
o
127
139
h
135
129
130
130A
137
k
132
l
133
138
131
134
136A
m
136
116
128
128
120/a
129A
122/a
123
123
119


10
5
6
4
19
18
13
14
15
63
62
64
65
66
17
61
16
60
59
58
29
28
32
25
41
43
42
44
45
36
50
34
33
48
49
39
47
46
53
35
VI.
Q
Y
W
Z
V
C
a
f
e
b
I
IV
III
V
VI
VII
VIII

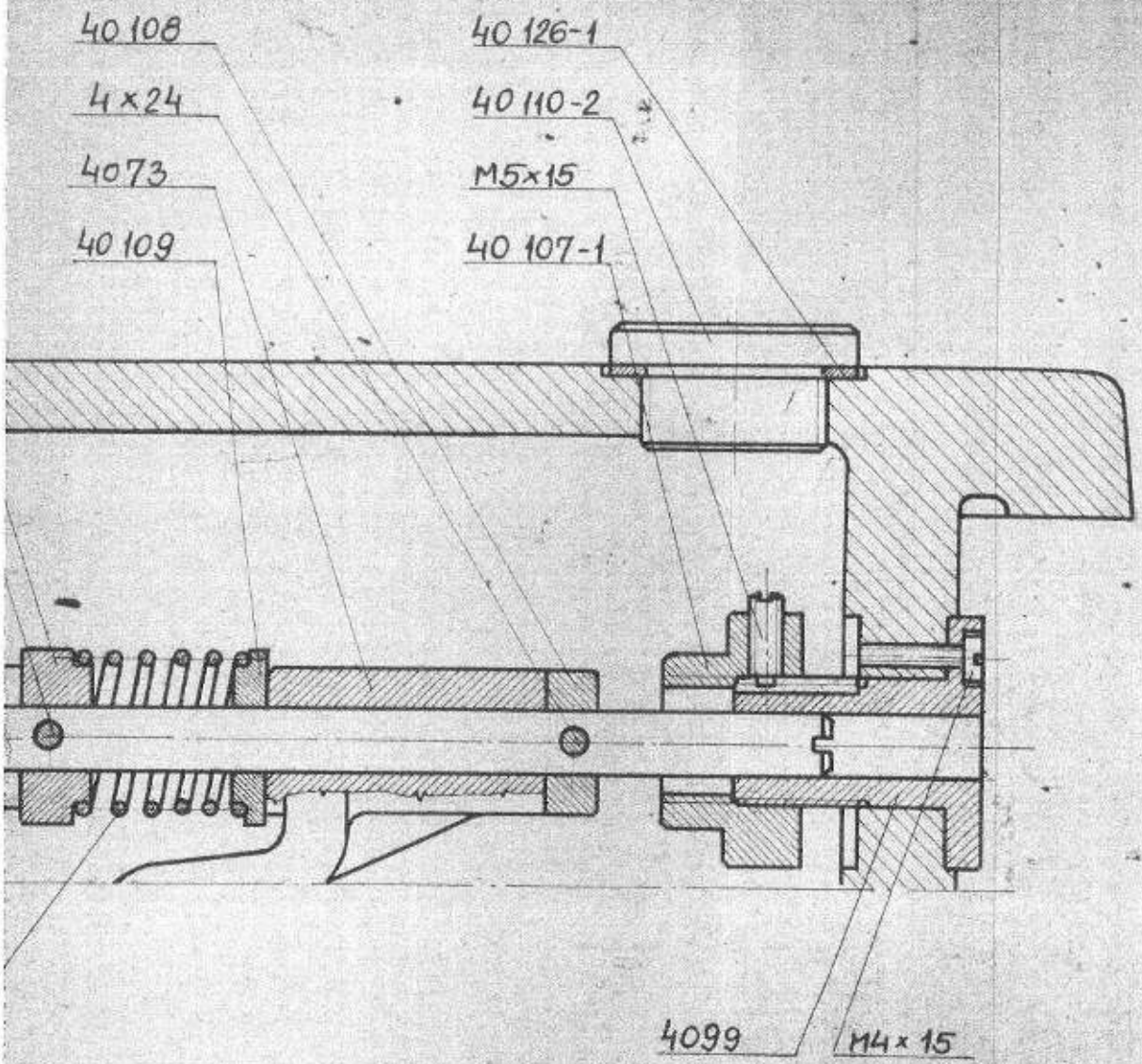
414-0118


9
12
8
3
1
11
21
20
V
31
27
26
30
22
7
82
81
80
s
r
p
77
55
56
57
o
40
n
38
k
76
l
h
j
m
71
72
73
79
78
74
75
70
69
68
67
37
54
51
52

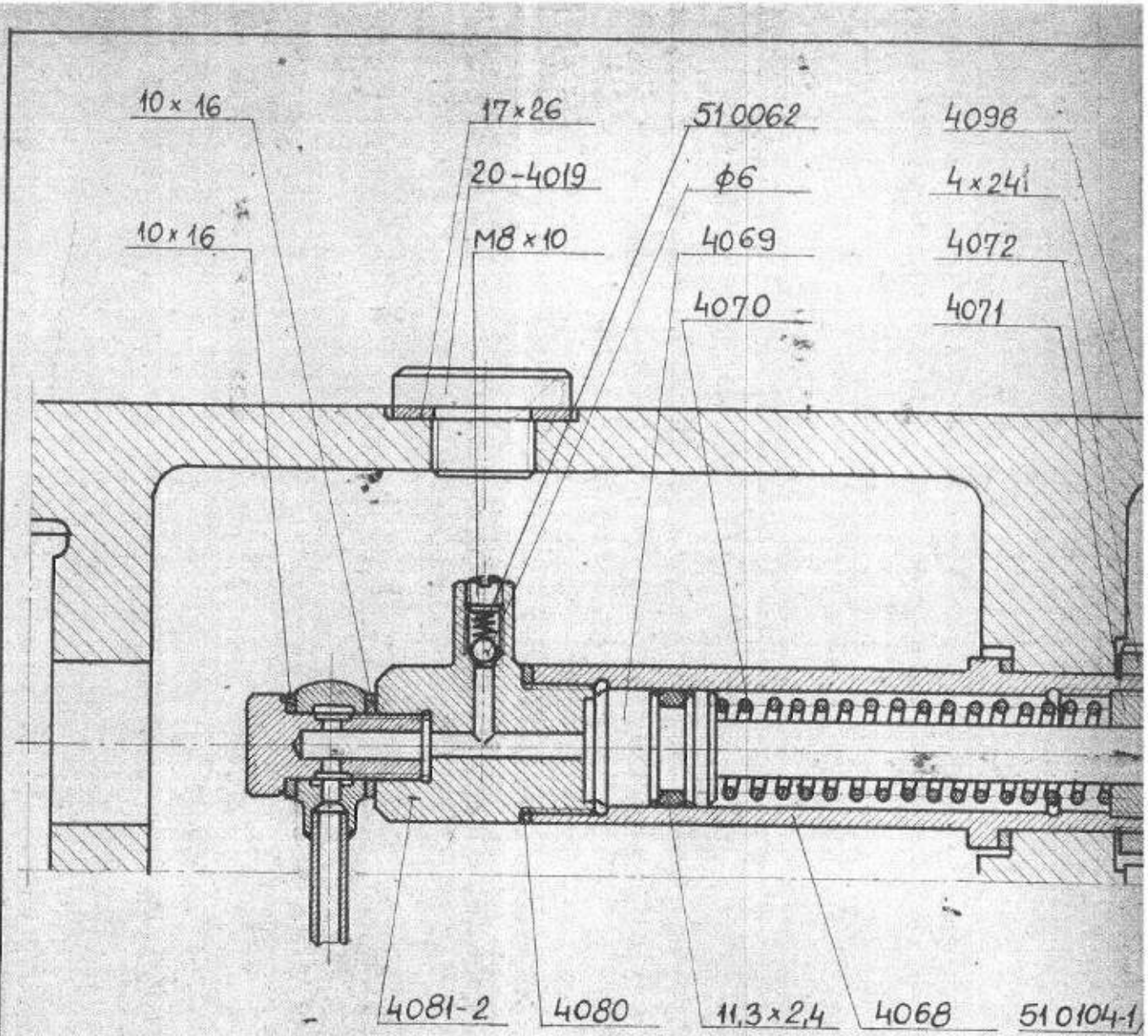

1005-1
1004-1
1006-1
414-0119



Hungarian	German	English	Russian
1. Cake	Blau	Blue	GOLUBOY
II. Red	Rot	Red	RED
III. Black	Schwarz	Black	BLACK
IV. Yellow	Yellow	Yellow	YELLOW
V. green	Green	Green	GREEN
FAST STEEL	SCHNELLSTAHL	SPEED STEEL	BYCTPOPEЖ. STEEL
HARD	HARD METAL	CARBIDE	ТВЁРДЫЙ СПЛАВ
Öv	Ge	GI	Ч
Ac	St.	St	СТ
Mg	Mg	Mg	МАГН. СПЛ.
Al	Al	Al	AL
Zn	Zn	Zn	Zn
Mü a	Kst	Plastics	PLASTIC
Bro	Bro	Bro	BRONZE


40 108
4 x 24
4073
40 109
40 126-1
40 110-2
M5x15
40 107-1
4099
M4 x 15

411-0117


10 x 16
10 x 16
17 x 26
20-4019
M8 x 10
510062
ϕ6
4069
4070
4098
4 x 24
4072
4071
4081-2
4080
11,3 x 2,4
4068
510104-1