HARE&FORBES MACHINERYHOUSE

Established 1930 ABN 96 000 286 957

OPERATION MANUAL

FOR GEAR HEAD LATHE

MODEL: AL-335F

1. Operator safety

These lathes are fast, powerful machines which can be dangerous if used under improper circumstances.

Read the following health and safety Guidance Notes and observer before and during the use of the machine.

Notes on traditional lathes

Because of the possibility of bodily contact and whipping , especially when small diameters of material are used, bar stock must not under any circumstances, be allowed to extend beyond the end of the headstock spindle without the use of special Guarding and adequate support.

Notes on variable speed drive lathes

Note that these machines are designed to allow fast and easy change of the spindle speeds; take care to ensure that the work piece is secure and the maximum safe speed for and operation is not exceeded.

Operating safety precautions

1. Are you properly trained personnel to use this lathe?
2. Read this guidance notes carefully before operation.
3. Ensure you know how to stop the lathe before starting it.
4. Ensure you are in good health and spirit to operate the lathe.
5. Keep all guard, covers and doors in place and closed.
6. Keep the lathe and work area neat. Clean and orderly.
7. Wear and utilize suitable protective clothing and equipment.
8. Do not wear rings, watches, ties or loose sleeved clothing.
9. Never lay anything on the working surface of the lathe.
10. Stop lathe immediately anything unexpected happens.
11. Do not touch or reach over rotating or moving parts.
12. Do not perform any set—up work while lathe is running.
13. Do not operate the lathe in excess of its rated capacity.
14. Do not interchange chucks or other spindle mounting items without checking for correct locking.
15. Do not use other work holding device without checking with its manufacturer.
16. Disconnect lathe from power source before performing any maintenance or changing tooling.
17. Isolate lathe when leaving it unattended.

Operating hazards

When using the lathe be fully aware of the following operating hazards detailed under the following instructions.

a) Metal cutting fluids

Cancer of the skin may be produced by continuous contact with oil; particularly with straight cutting oils, but also with soluble oils. The following precautions should be taken:

(1)Avoid unnecessary contact with oil.

(2)Wear protective clothing.

(3)Use protective shields and guards.

(4)Do not wear oil soaked or contaminated clothing.

(5)Dispose of oils correctly.

(6)Avoid mixing different types of oils.

(7)Change oils regularly.

(8)After work thoroughly wash all parts of the body that have come into contact with oils.

b) Safe operation of lathe chucks

Where details of operating speeds and of maximum recommended operating speeds are supplied these are intended only as a guide. Such details must be regarded as for general guidance only for the following reasons:

They apply only to chucks in sound condition.

If a chuck has sustained damage, high speeds may be dangerous. This applies particularly to chucks with grey cast iron bodies where in fractures may occur.

The gripping power required for any given application is not known in advance.

The actual gripping power being used for any given application is not known by the chuck manufacturer.

There is the possibility of the workpiece becoming insecurely gripped due to the influence of centrifugal force under certain conditions.

The factors involved include:

(1)Too high a speed for a particular application.

(2)Weight and type of gripping jaws if non-standard.

(3)Radius at which gripping jaws are operating.

(4)Condition of chuck-inadequate lubrication.

(5)State of balance.

(6)The gripping force applied to the workpiece in the static condition.

(7)Magnitude of the cutting forces involved.

(8)Whether the workpiece is gripping externally or internally.

Careful attention must be paid to these factors. As they vary with each particular application, a manufacturer cannot provide specific figures for general use, the factors involved being outside his control.

General principles concerning operator safety

(1) Do not grip a component with grease or oil on it.

Grip all components firmly.

Do not attempt to hold components that are too awkward or too difficult to hold.

Do not hold components that are too heavy for the machine.

Know how to hold components properly when lifting.

(2) Be sure to clean oil or grease from hand tools, levers and handles.

Be sure there id enough texture on the surface of the hand tool or lever handle for proper safe hand contact.

(3) Grip hand tools and lever handles firmly.

Always choose the proper hand tool and appropriate grip position on the lever handle.

Do not use hand tools or lever handles in an awkward position.

Do not apply excessive force.

(4) Always use the recommended gripping position to grasp hand tools and lever handles.

(5) Do not allow turning or hand tools to be caught in the chuck or other holding device.

(6) Do not use broken, chipped or defective tools

(7) Be sure work piece cannot move in chuck or other holding device

(8) Beware of irregular shaped work pieces.

(9) Beware of large burrs on work pieces

(10) Always select the correct tool for the job

(11) Do not run the machine unattended

(12) Do not use tools without handles

(13) Always support the work piece as necessary using chucks, steadies and centers.

(14) Correctly locate tool in socket heads and screw slots

(15) Beware of obstructions that prevent complete tightening of screws – ensure screw is tight.

(16) Do not rush work

(17) Never substitute the wrong size tools if the correct sized tool is not available or cannot be located in the shop.

(18) Do not move guards while lathe is under power.

(19) Do not place hand or body in path of moving objects.

Beware of moving lathe parts that can fall.

Beware of where you are moving your hand or body in relationship to the lathe.

Beware of holding a tool or other parts inserted in or attached at the chuck or work piece

Beware of hands or other parts of the body that may in position to be hit by a chuck or work piece

(20) Beware of accidentally moving levers or turning the power on

(21) Know the function of each and every control

(22) Never place hand on chuck or workpiece to stop rotation of the spindle

(23) Make sure power has been turned off when lathe id unused for sometime

(24) Allow chuck to stop before operating it

(25) Always check chuck area for chuck keys and loose items

(26) Never start spindle with chuck key in the chuck

(27) Do not allow distractions to interfere with lathe operations

Do not operate lather whilst talking.

(28) Beware of lathe dangers when attending to other aspects of lathe operation E g whilst operating tailstock.

(29) Beware of loose clothing near the rotating parts of the lathe

(30) Beware of loose hair near the rotating parts of the lathe.

(31) Beware of performing another operating while in close proximity to rotating parts on the lathe

(32) Always attend to filing and deburring operations.

Always pay attention to file or deburring tools close to the chuck, files and deburring tools may catch on chuck

(33) Be sure lathe is in neutral position when placing gauges or components gripped in the chuck

(34) Be sure motor is not running when using gauges on the machine

(35) Always wear protection before operating the lathe

Always wear the correct protection for even a short time when operating the lathe

Never remove protection for even a short time when operating the lathe

Wear protection devices correctly.

Know the correct way to wear protective devices

(36) Beware of material flying from the lathes

(37) Keep protective guards at the point of operation

Know how to set or attach protective guards properly

Never use the wrong protective guard

38. (a) When the chuck and workpiece are in motion never reach over, under or around a workpiece to make an adjustment

(b) Never reach over, under or around a workpiece to retrieve anything.

(c) Beware of there you leave your tools during set up

(d) Never reach over, under or around workpiece to move hand tool/lathe to another position.

(e) Never reach over, under or around the workpiece to tighten a lathe part.

(f) Never reach over, under or around workpiece to remove swarf.

(39) Know the proper procedure for applying loads.

Never apply force form an awkward position.

(40) Never mount a workpiece too large for the lathe.

(41) Never mount a workpiece too large for the operator to handle.

(42) Use the equipment necessary for handling workpiece.

(43) Never apply undue force on the accessory or control lever.

(44) Secure all workpiece.

(45) Secure all jaws, nuts, bolts and locks.

(46) Always use the excessive force in polishing, filling and deburring.

(47) Never take cuts beyond lathes capability.

(48) Never use excessive force in polishing, filling and deburring.

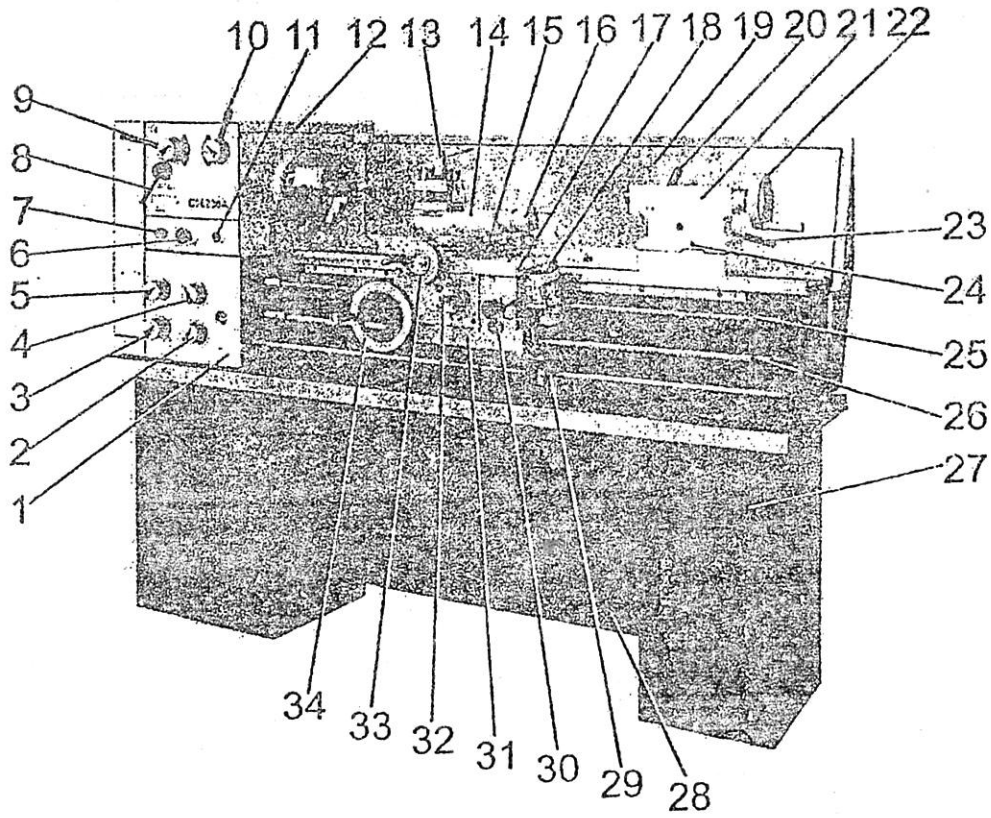
(49) Always use the proper hand tool to remover swarf. Never hurry to remove swarf bewares of swarf wrapped around the chuck or workpiece.

(50) Never change gears by moving them with your hands.

(51) Beware of tools/lathe parts falling on controls.

2. CONTENTS

3. Constructional Indication



1. Gear Box
2. Feed Selector Handle
3. Feed Selector Handle
4. Feed Selector Handle
5. Feed Selector Handle
6. Emergency Stop Switch
7. Power Indicator Light
8. Feed Direction Selector
9. Speed Selector Handle
10. Speed Selector Handle
11. Jog Switch
12. Headstock
13. Tool Post
14. Top Slide
15. Cross Slide
16. Compound Rest Traverse Handwheel
17 Carriage
18 Thread Dial Indicator
19 Guard Plate
20 Tailstock Quill Clamping Lever
21 Tailstock
22 Tailstock Quill Traverse Handwheel
23 Tailstock Clamping Lever
24 Tailstock Set-Over Screw
25 Leadscrew
26 Feed Rod
27 Mountain Feet
28 Front Plate
29. Forward/Reverse Lever
30 Half Nut Engage Lever
31 Apron
32 Feed Selector
33 Cross Traverse Handwheel
34 Longitudinal Traverse Handwheel

4. LATHE EXTERIOR CHART

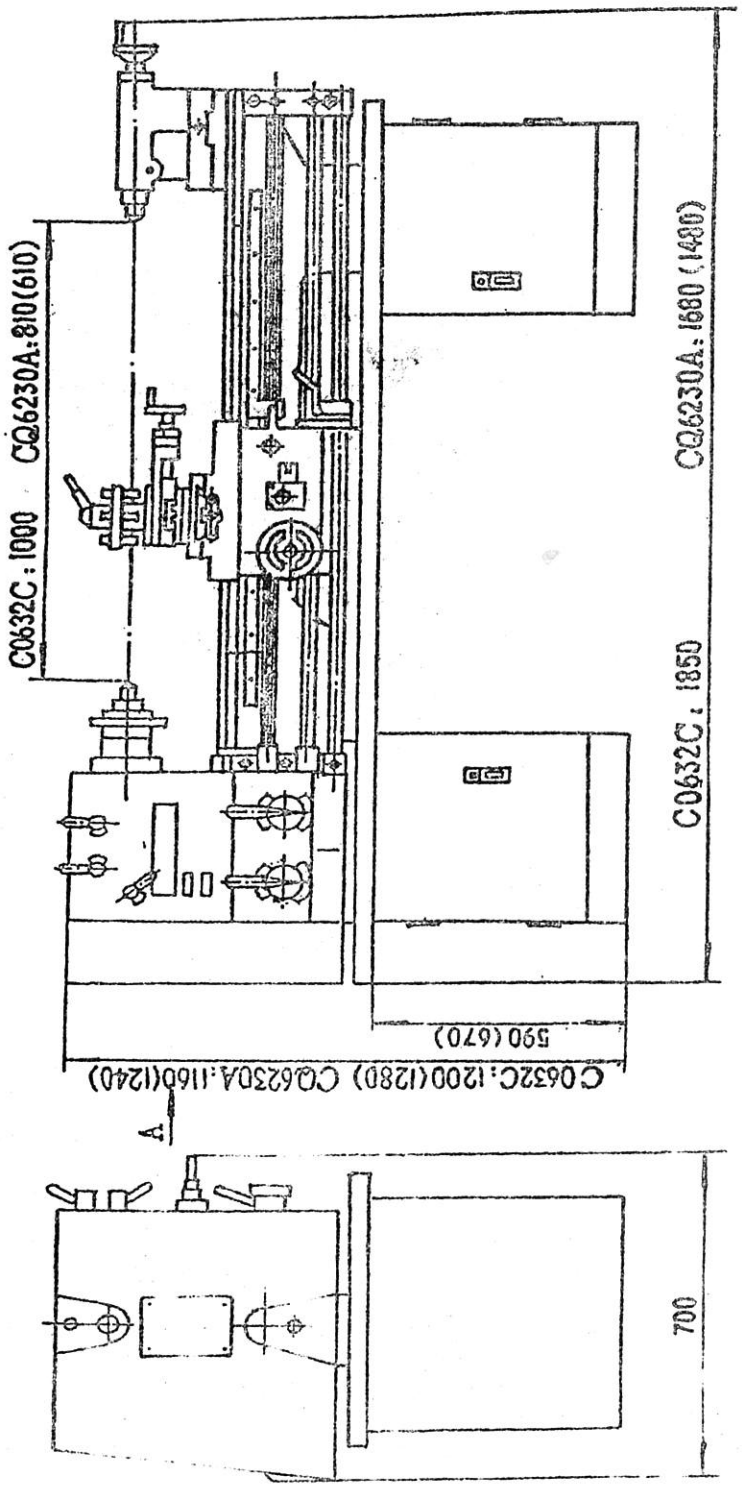


Fig. 1 Exterior chart

4. LATHE EXTERIOR CHART

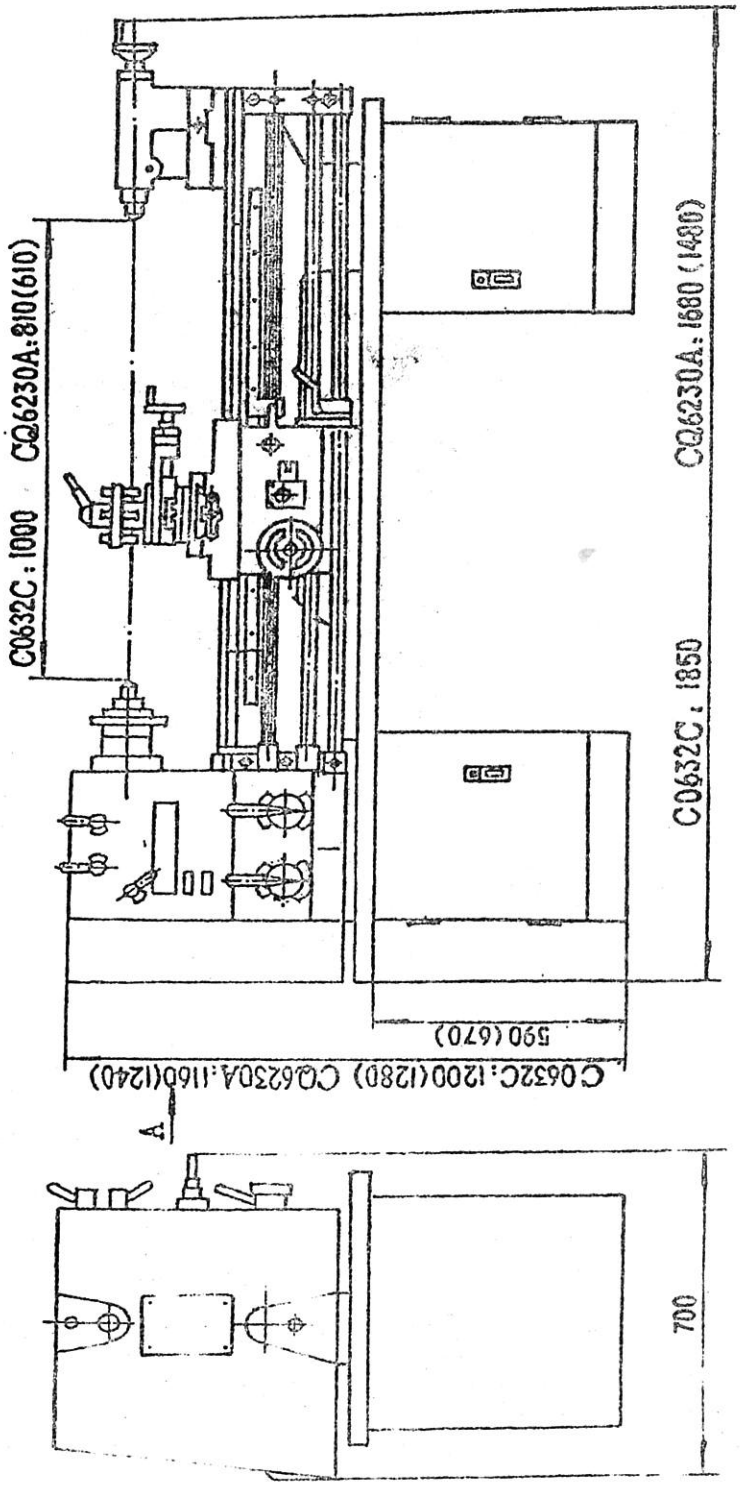


Fig. 1 Exterior chart

5、INSTRUCTIONS

This machine is a small-scale universal engine Lathe. It can perform various turning metric threads and English threads.

The machine is characterized by a simple construction, an easy operation , large spindle bore and small space occupation. It is used in the instrument industry and repairing workshops and is suitable for metal manufacturing in single piece, small and medium batch production.

6、 MAIN TECHNICAL SPECIFICATIONS

FROM.1

	CQ6230A-1	CO632C
Max swing over bed	300mm	320mm
Max swing in gap	430mm	450mm
Distance between centers	810mm CQ6230A×750(610mm)	1000mm
Threads which can be cut	imperial 36 kind 0.4-7 Metric 36 kinds 4-60TPI	
Longitudinal feed range perspindle revolution	32 kinds 0.079-1.291mm/rev or 0.003'-0.054'/rev	
Cross feed range per spindle revolution	32 kinds 0.01'-0.276mm/rev or 0.001'-0.012'/rev	
Saddle travel	760mm CQ6230A×750(560mm)	880mm
Max swing over apron	178mm	
Spindle bore	38mm	

Taper of spindle bore	M.T.NO.5
Range of spindle speeds(9steps or 18 steps)	75-1400r.p.m or 65-1810r.p.m
Lead serew pitch	8TPI 3mm
Cross screw pitch	10TPI2mm
Cross feed per division on its dial	0.001 " (0.025mm) or 0.001 " (0.02mm)
Tool post screw pitch	10TPI or 2mm
Tool post feed per division on its dial	0.001 " (0.02mm)
Max rotary angle of tool post	$\pm 90^{\circ}$
Tool slide travel	76mm
Saddle travel	130mm
Dia of tailstock quill	32mm
Taper of tailstock quill bore	M.T.NO.3
Max travel of tailstock quill	100mm
Motor frequency	50Hz or 60Hz
Motor power	1.1 or 1.5KW
Motor speed	1440R.P.M or 1720R.P.M
Motor voltage	380V three phase or 220V single phase

7、HOISTIG & INSTLLATION

7.1 Finish removing the wooden crate from around the lathe, check the accessories according to the Packing list.

7.2 Remove the protection paper from the unpainted side of the lathe. Clean all surfaces off anti-rust oil using a mild commercial solvent, kerosene or diesel fuel.

7.3 Sling lathe as shown in the hoisting Fig.2.When it is being transported.

7.4 The fixed dimension of the machine is shown in Fig.3. The lathe stand cabinets should be fixed firmly to the base.

7.5 It's important to keep the tracks level to get the main processing precision of the production. Please follow the steps below: To move the saddle to headstock until it reaches the end of the lathe tracks, put the level on the apron to form the right angle, loose the fixing bolts and adjust the end of lathe using shims, repeat the steps until the two ends of tracks in level condition and fix the bolts firmly. (along the length direction of the tracks, error $<$ 0.02/1000,and horizontal. direction, error$<$0.04/1000.)

7.6When transporting and opening the wooden crate, there may be some other things on the lathe, befdre the leading tracks are cleaned thoroughly, do not move the saddle and the tailstock.

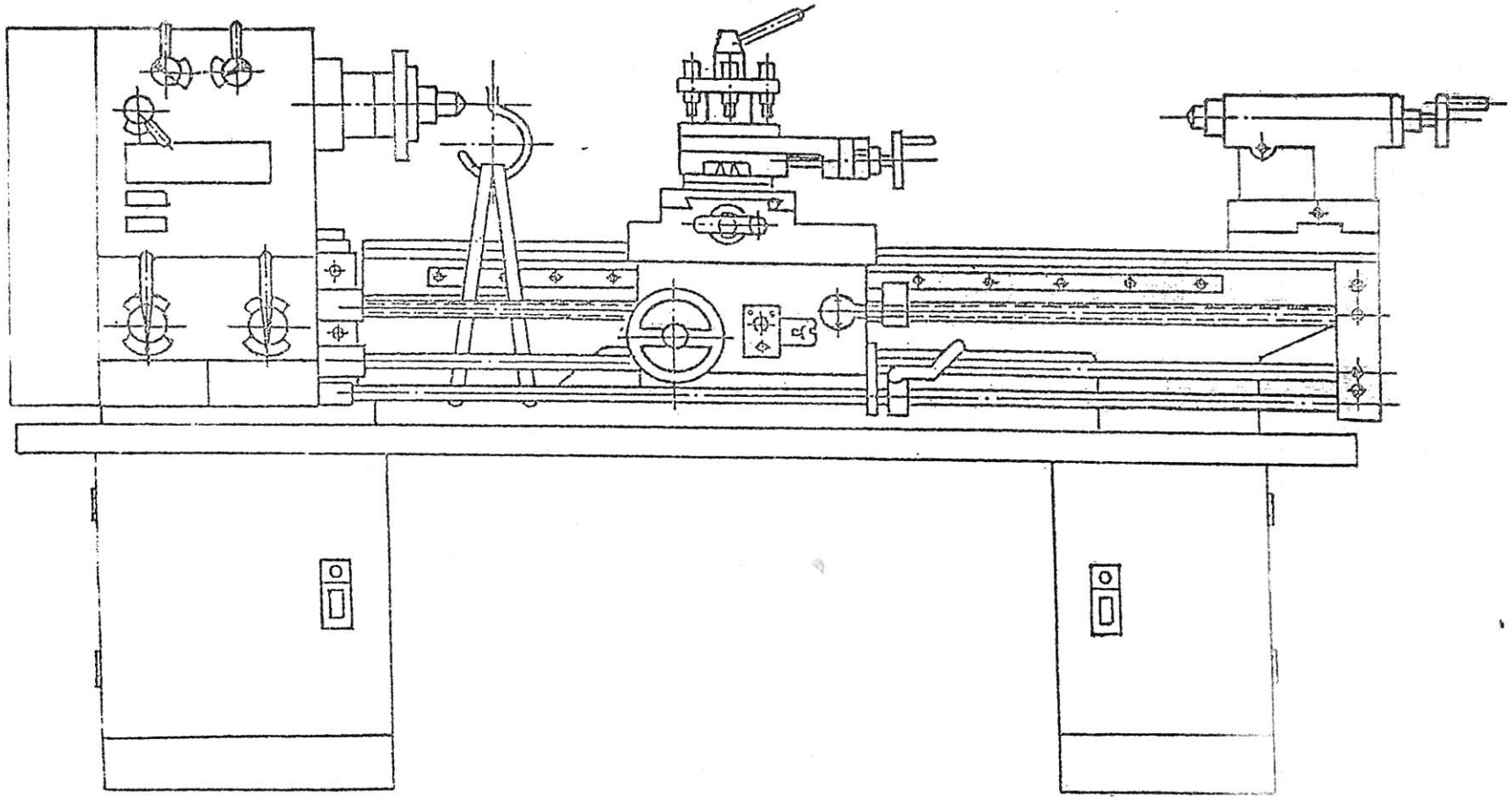


Fig. 2 position to hoist the lathe

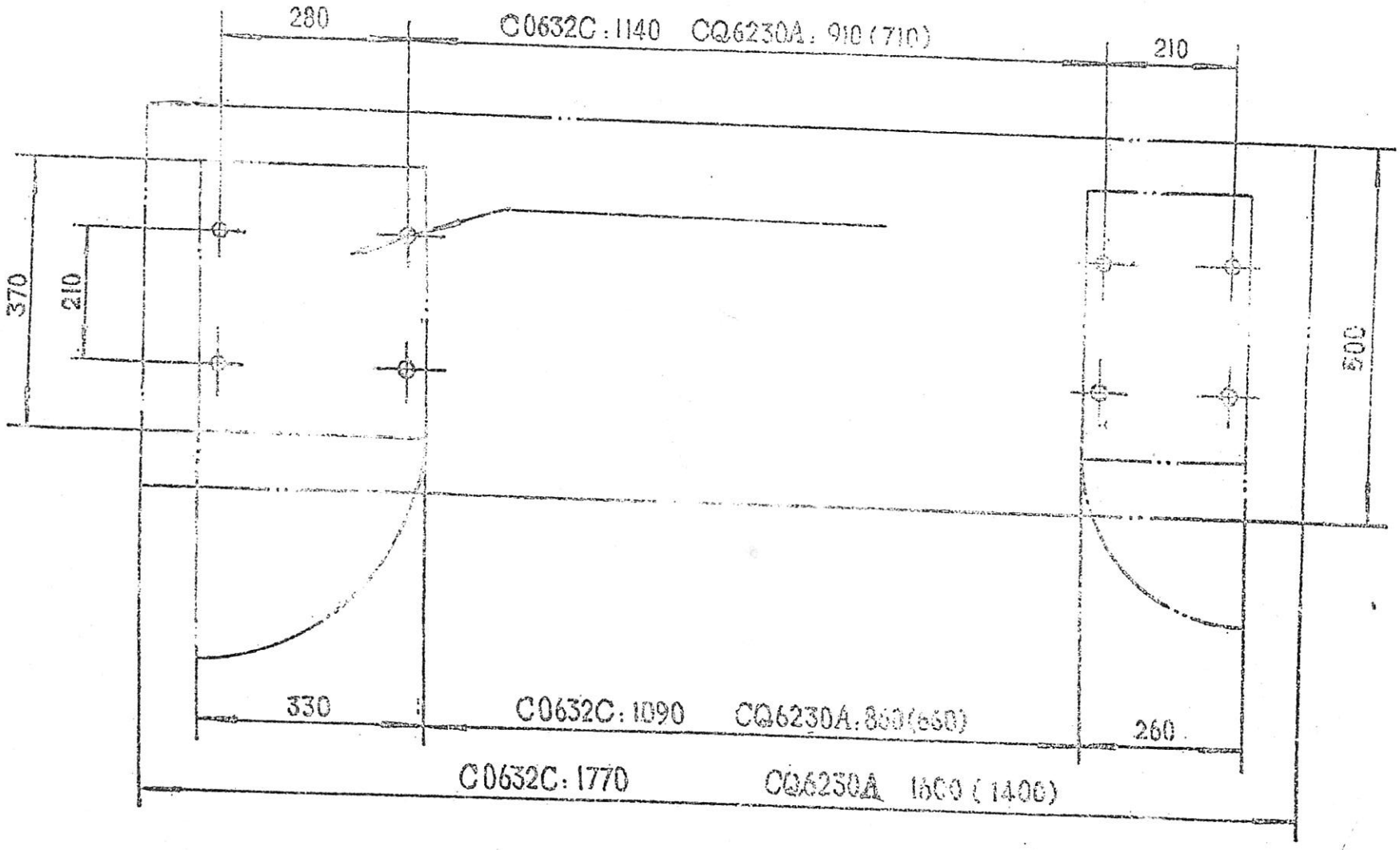


Fig. 3 Fixing dimensions for lath stand cabinets

8.TRANSMISSION SYSTEM&PARTS

CQ623A.CO623C Transmission system see Fig.4 From.2

parts	part No.	Kinds	No.of teeth of thread	Modulus Of pitch	Pressure angle	Material	Notes
Head-stock	1	Gear	42	M2	20°	45	
	2	Gear	23	M2	20°	45	
	3	Gear	47	M2	20°	45	
	4	Gear	36	M2	20°	45	
	5	Gear	55	M2	20°	45	
	6	Gear	31	M2	20°	45	
	7	Gear	45	M2	20°	45	
	8	Gear	58	M2	20°	45	
	9	Gear	21	M2	20°	45	
	10	Gear	45	M2	20°	45	
	11	Gear	59	M2	20°	45	
	12	Gear	46	M2	20°	45	
	13	Gear	83	M2	20°	45	
	14	pairde Gear	45	M2	20°	45	
			40	M2	20°	45	
	15	pairde Gear	40	M2	20°	45	
			45	M2	20°	45	

Continuing

Parts	Part No.	Kinds	No.of Teeth of thread	Modulus of pitch	Pressure angle	Material	Notes
Feed-box	16	Gear	24	M2.25	20°	45	
	17	Gear	16	M2.25	20°	45	
	18	Gear	18	M2.25	20°	45	
	19	Triplicate Gear	18	M2.25	20°	45	
			18	M2.25	20°	45	
			18	M2.25	20°	45	
	20	Gear	20	M2.25	20°	45	
	21	Gear	28	M2.25	20°	45	
	22	Gear	27	M2.25	20°	45	
	23	Gear	21	M2.25	20°	45	
	24	Gear	21	M2.25	20°	45	
	25	Gear	18	M2.25	20°	45	
	26	Paired Gear	30	M2.25	20°	45	
			22	M2.25	20°	45	
	27	Paired Gear	15	M2.25	20°	45	
			22	M2.25	20°	45	
	28	Gear	23	M2.25	20°	45	
	29	Gear	17	M2.25	20°	45	
	30	Gear	15	M2.25	20°	45	
Apron	31	Gear	11	M2.25	20°	45	
	32	Rack		M2.25	20°	45	
	33	Lead screw	Single thread	8T.P.Ior 3mm	29° or 30°	45	
	34	Half nut	Single thread			ZQSn6-6-3	
	35	Worm	Single thread	MS2	20°	45	
	36	Worm gear	24	MS2	20°	ZQSn6-6-3	

Continuing

Parts	Part No.	kinds	No.of teeth of thread	Modulus of pitch	Pressure angle	Material	Notes
Apron	37	Gear	15	M2	20°	45	
	38	Gear	50	M2	20°	ZQSn6-6-3	
	39	Gear	25	M2	20°	45	
	40	Nut	Single thread	10T.P.I、2mm		ZQSn6-6-3	Left hand tread
	41	Screw	Single thread	10T.P.I、2mm		45	
	42	Gear	14	M2	20°	45	
	43	Gear	51	M2	20°	45	
	44	Gear	43	M2	20°	45	
	45	Gear	25	M2	20°	45	
	46	Gear	48	M2	20°	45	
	47	screw	Single thread	10T.P.I、2mm		45	
	48	Nut	Single thread	10T.P.I、2mm		ZQSn6-6-3	
Tail-stock	49	Rod screw	Single thread	10T.P.I、2mm		45	Left hand tread
	50	Nut	Single thread	10T.P.I、2mm		ZQSn6-6-3	Left hand tread
Change gear		Gear	22	M1.25	20°		
		Gear	24	M1.25	20°	45	
		Gear	26	M1.25	20°	45	
		Gear	44	M1.25	20°	45	
		Gear	48	M1.25	20°	45	
		Gear	52	M1.25	20°	45	
		Gear	127(120)	M1.25	20°	45	Paired Gear

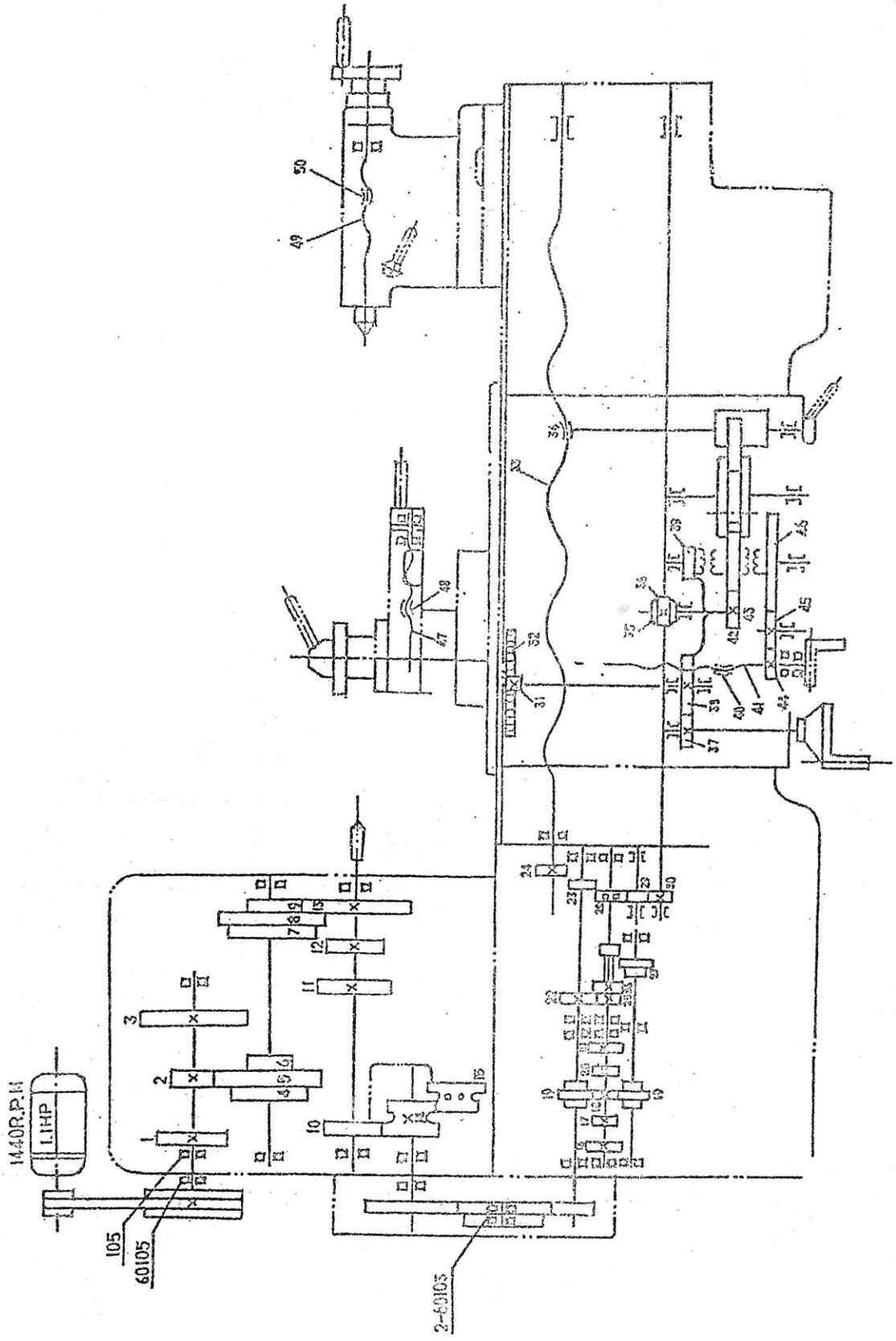


Fig.4 Transmission system

9 .BEARING DISTRIBUTION

CQ6230A、CQ632C Bearing list (see Fig.5) Form 3

TYPE	Name	Specification	Qty	Installation
60104	Ball bearing single row	20×42×12	1	Headstock
60105	Single row ball bearing with shield	25×47×12	1	
304	Singe row ball bearing with shield	20×52×15	1	
104	Single row ball bearing	20×42×12	2	
105	Single row ball bearing	25×17×12	2	
204	Single row ball bearing	20×47×14	1	
D7211	Single row taper roller bearing	55×100×22	1	
D7212	Single row taper roller bearing	60×110×22	1	
102	Single row ball bearing	15×32×9	3	Feedbox
103	Single row ball bearing	17×35×10	8	
7000103	Single row ball bearing	17×35×8	1	
8103	Single row pillow block bearing	17×32×8	1	
8104	Single row pillow block bearing	20×35×10	1	
8101	Single row pillow block bearing	12×26×9	2	Carriage
8102	Single row pillow block bearing	15×28×9	2	
8101	Single row pillow block bearing	12×26×8	1	Tail stock
60103	Single row ball bearing	17×35×10	2	Change gear

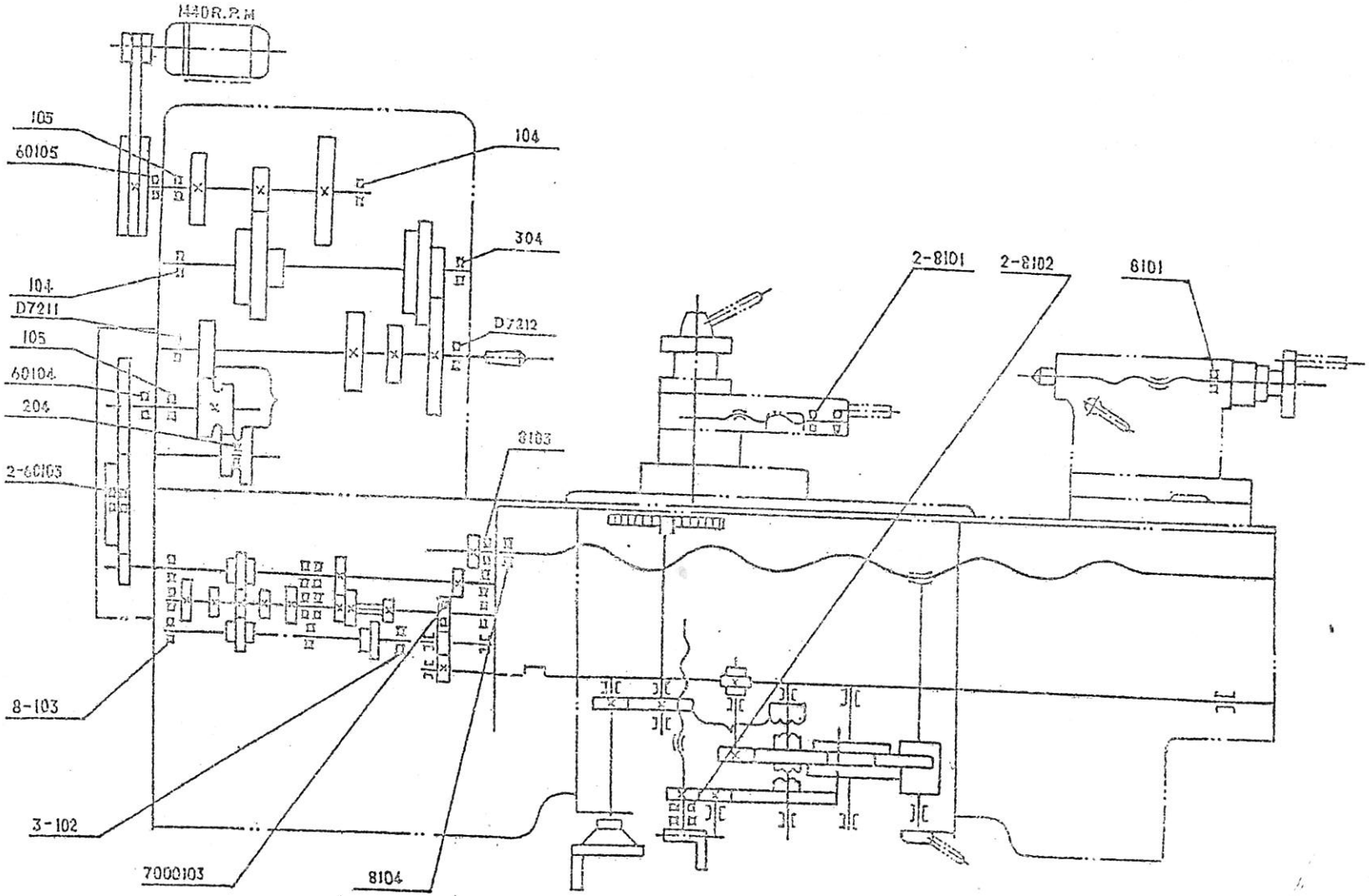


Fig. 5 Bearings Distribution

10. LUBRICATION SYSTEM

All the moving parts and sliding surface should be lubricated please consult Fig.6.

Oil cap is the cover of headstock. First Open the cover, Oil must be up to the indicator mark , normally change the oil after three months. To drain the whole waste oil by removing the drain plug, then rinse the headstock with the coal oil and refill the machine oil in the headstock.

Oil cap 2 to 11 are ball oilers (see Fig.6),except for filling the oil up to the indicator mark.at oil cap 2 & 6 ,other oil caps should be oiled twice a day by oil gun.

Oil cap 2 is the ball oilers for feed box .Oil cap 3 is for the chang gear , oil cap 4 for the saddle, oil cap 5 is headstock, feed box & apron. Oil cap 6(two ball oilers) for apron . Oil cap 7 for hand wheel. Oil cap 8(two ball oilers) for the support. Oil cap 9 for the stail stock. Oil cap 10 for the sliding cutting rest. Oil cap 11 for the sddle screw rod.

Other sliding surfaces including the swallow-tail-shape notch, half nut, lead screw rod, controlling rod , tailstock quill, etc. Before and after openration, these surfaces must be oiled.

Recommending lubrication oil: 20# machine oil.

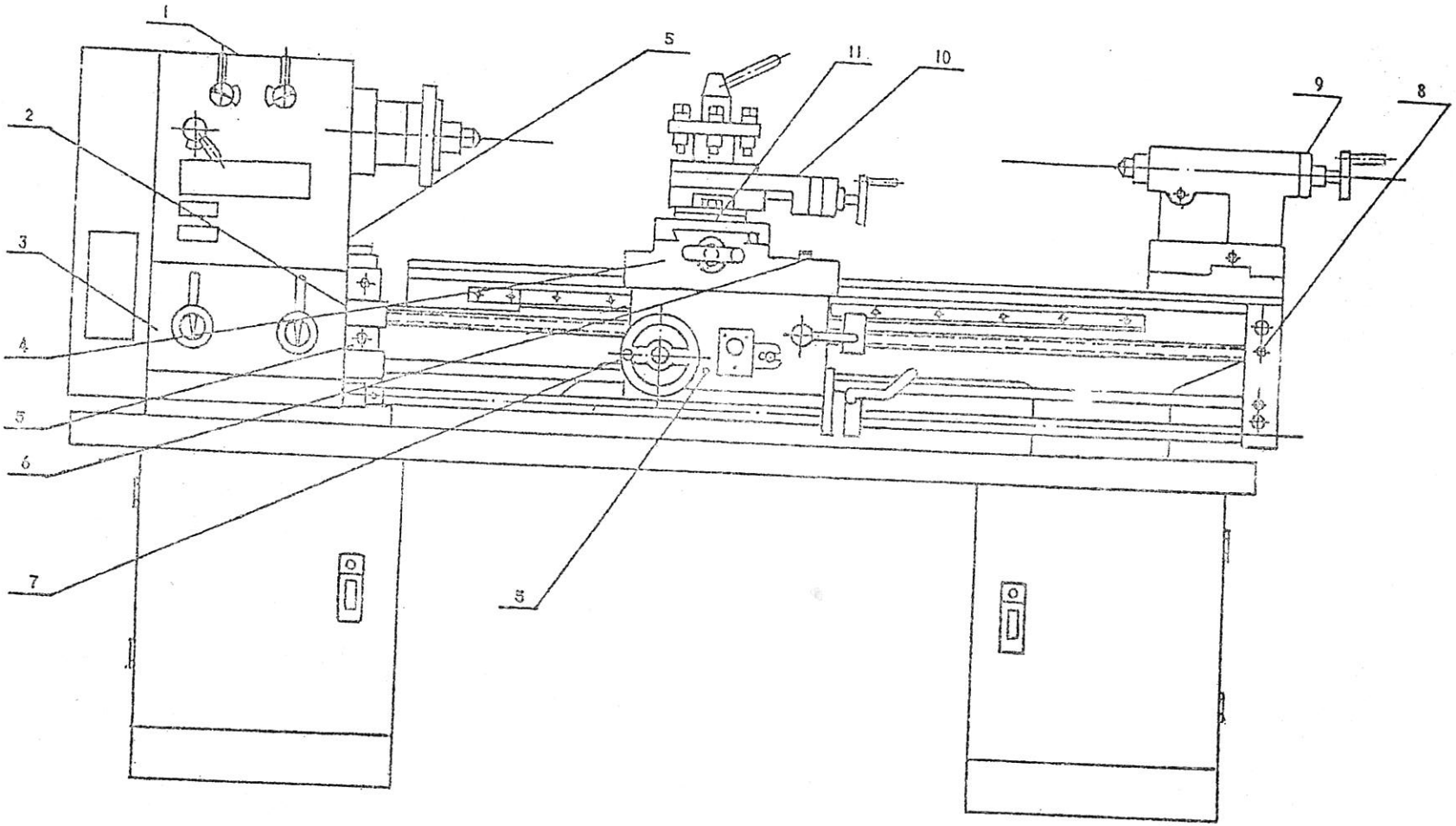


Fig. 6 Lubrication system

11. ELECTRICAL SYSTEMS

For the connection of the 220v/380v , three phase 50HZ standard lathes, see Fig.7 and the connection of 110v/220v, single phase 50HZ standard lathes, see fig.8.

If there is any changes on the connection , pease check the connection figure on the motor.

For the electrical connection, just connect the electric power lines with the leading end of the lathe, and the 15/30A fuse box must be connected on the power lines.

Electrical control box is located behing the headstock.

The controlling level should remain in the middle and also press down the switch to keep the electrical power off.

Push the controlling lever up, the spindle will turn clockwise, push the controlling lever down, the spindle will turn counter-clockwise. If not, switch off the power exchange the lines according to the connection figure on the motor.

Set the controlling lever in the middle, you can stop the lathe.

The machine must be connected to ground or ground wire.

The list of electrical components(three phase)

From.4

Code	Name	Type	Amount	Notes
M_1	Motor	Y90S4 380V1.1KW	1	
QF_1	Switch	DZ47-63 6A 3P 380V	1	
QF_2	Switch	DZ47-63 2A 3P 380V	1	
TC	Transformer	JBD5-63	1	
SB_1	Fast-stop Knob	LA38-11/207 red	1	
SB_2	Knob	LA38-11/207 black	1	
HL	Indicating light	AD188.8/21-8GZ white	1	
SQ_1SQ_2	Switch	LXW5-11G2/L	1	
SQ_3SQ_4	Switch	LXW5-11M/L	1	To switch off
KM_1KM_2	Contactor	LC_1-D1201 24V	1	
KM_3	Contactor	LC_1-D129	1	Used in coolant system
KA	Relay	32C4-4024V	1	
SA_1	Knob	LAI/310A black	1	Used for coolant system
SQ_5	Switch	LXW5-11N_1/L	1	Used for the break
EL	Light		1	Used for the light

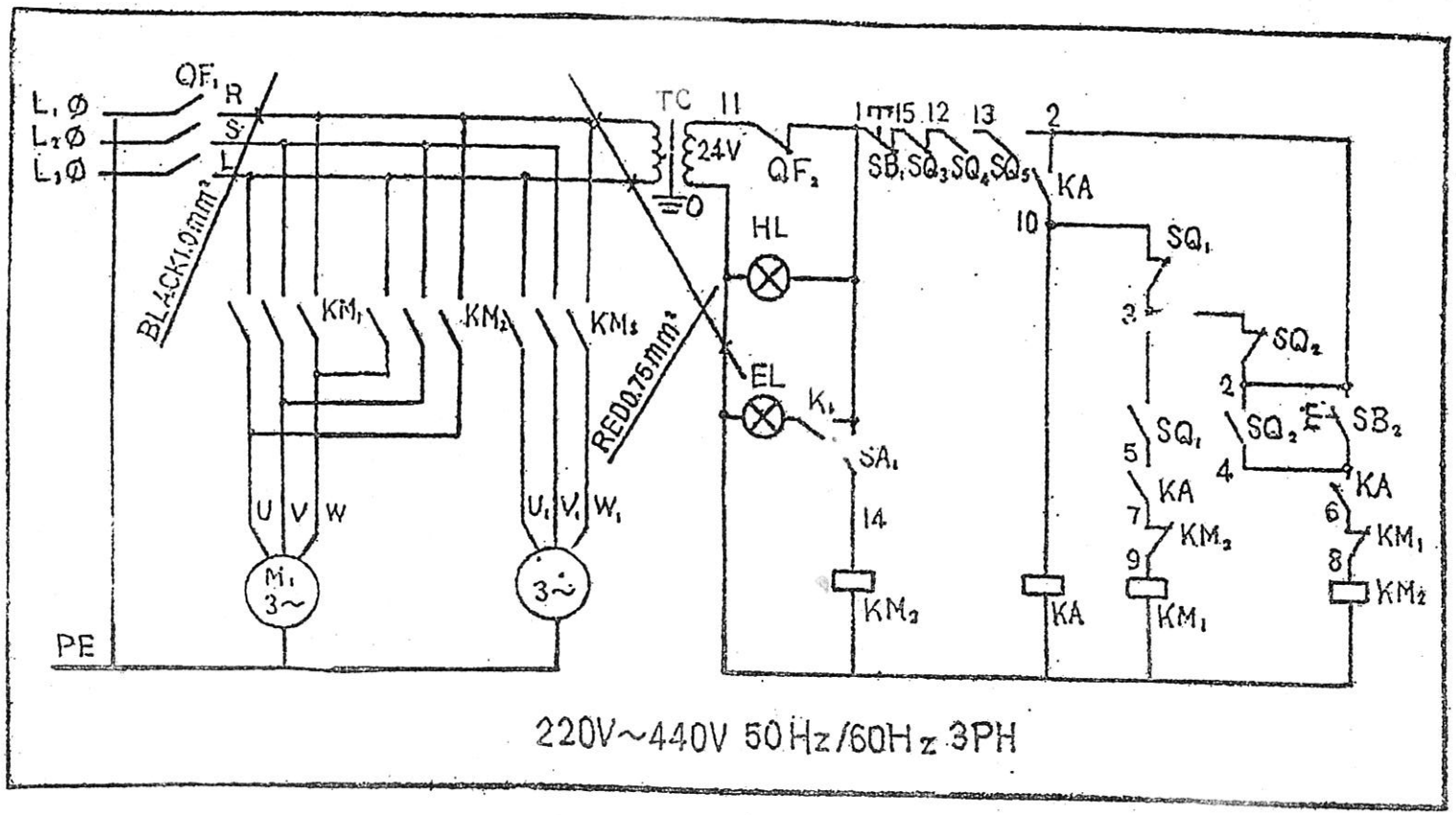
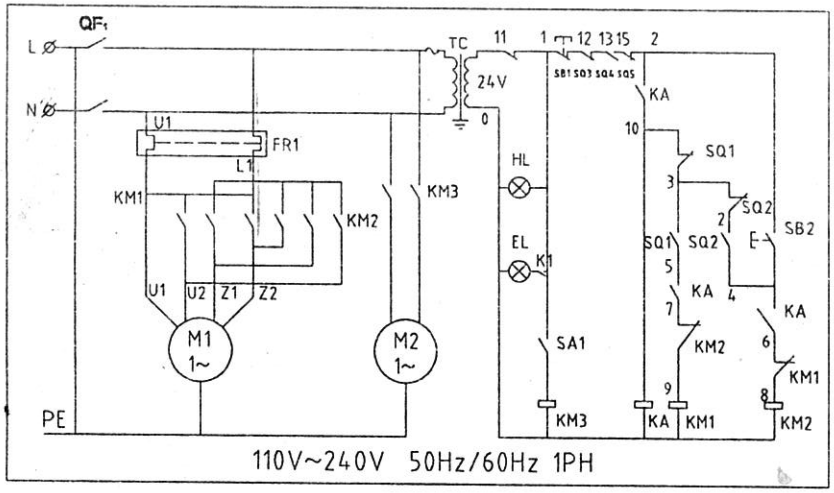


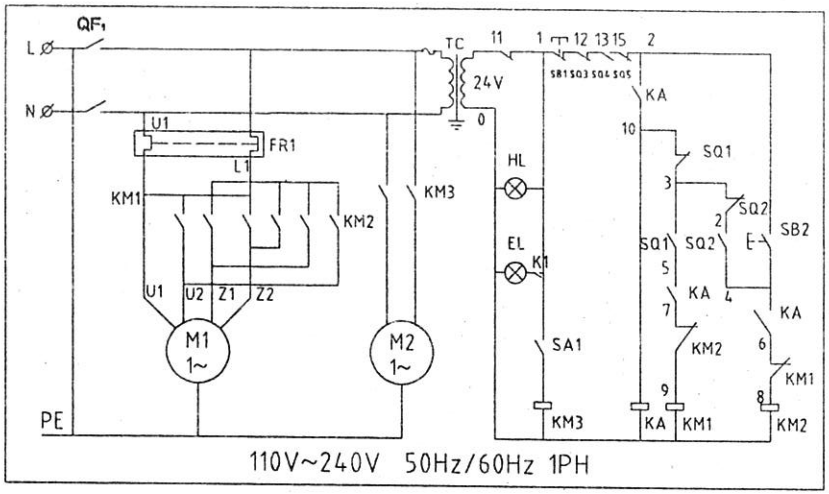
Fig.7 Electrical Principium(three phase)

The list of electrical components(single phas)

From. 5

Code	Name	Type	Amount	Notes
M1	Motor	$Y90L_2$-4 220v 1.5kw	1	
QF1	Switch	DZ47-63 2P 16A	1	
QF2	Switch	DZ47-63 2A 3P	1	
TC	Transformer	JBK5-63	1	
SB1	Fast-stop Knob	LA38-11/207red	1	
SB2	Knob	LA38-11/207 black	1	
HL	Indicating light	AD188.8/21-$8G_1$ white	1	
SQ_1SQ_2	Switch	LXW5-11G2/L	1	
SQ_3SQ_4	Switch	LXW5-11M/L	1	To switch off
KM1KM2	Contactor	LC_1-D259 24V	1	
KM3	Coniactor	LC_1-D129 24V	1	
KA	Relay	32C4-40 24V	1	
SA1	Knob	LAI/310A black	1	Used for coolant system
SQ5	Switch	LXW5-11N_3/L	1	Used for the break
EL	Light		1	Used for the light


QF1
L
N
PE
TC
24V
11
1
12 13 15
2
SB1 SQ3 SQ4 SQ5
KA
10
SQ1
3
SQ2
2
SB2
SQ1
SQ2
5
KA
4
KA
7
KM2
6
KM1
9
8
KM3
KA
KM1
KM2
HL
EL
K1
SA1
U1
FR1
L1
KM1
KM2
KM3
U1
U2
Z1
Z2
M1
1~
M2
1~
110V~240V 50Hz/60Hz 1PH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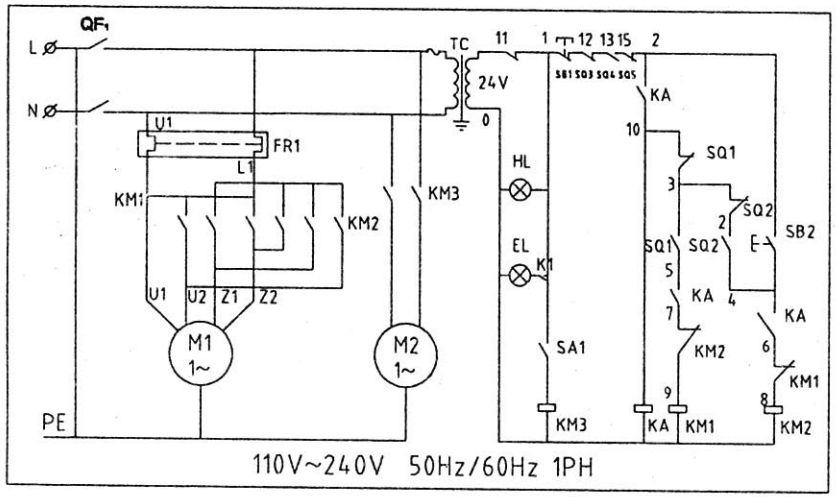
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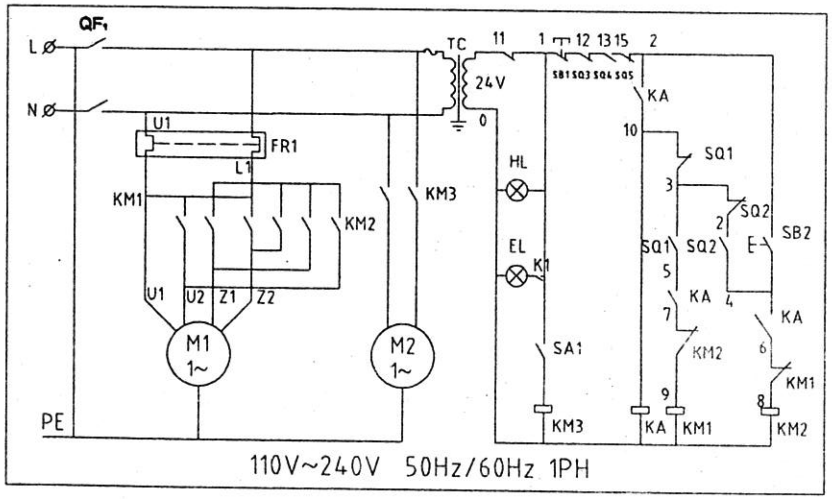
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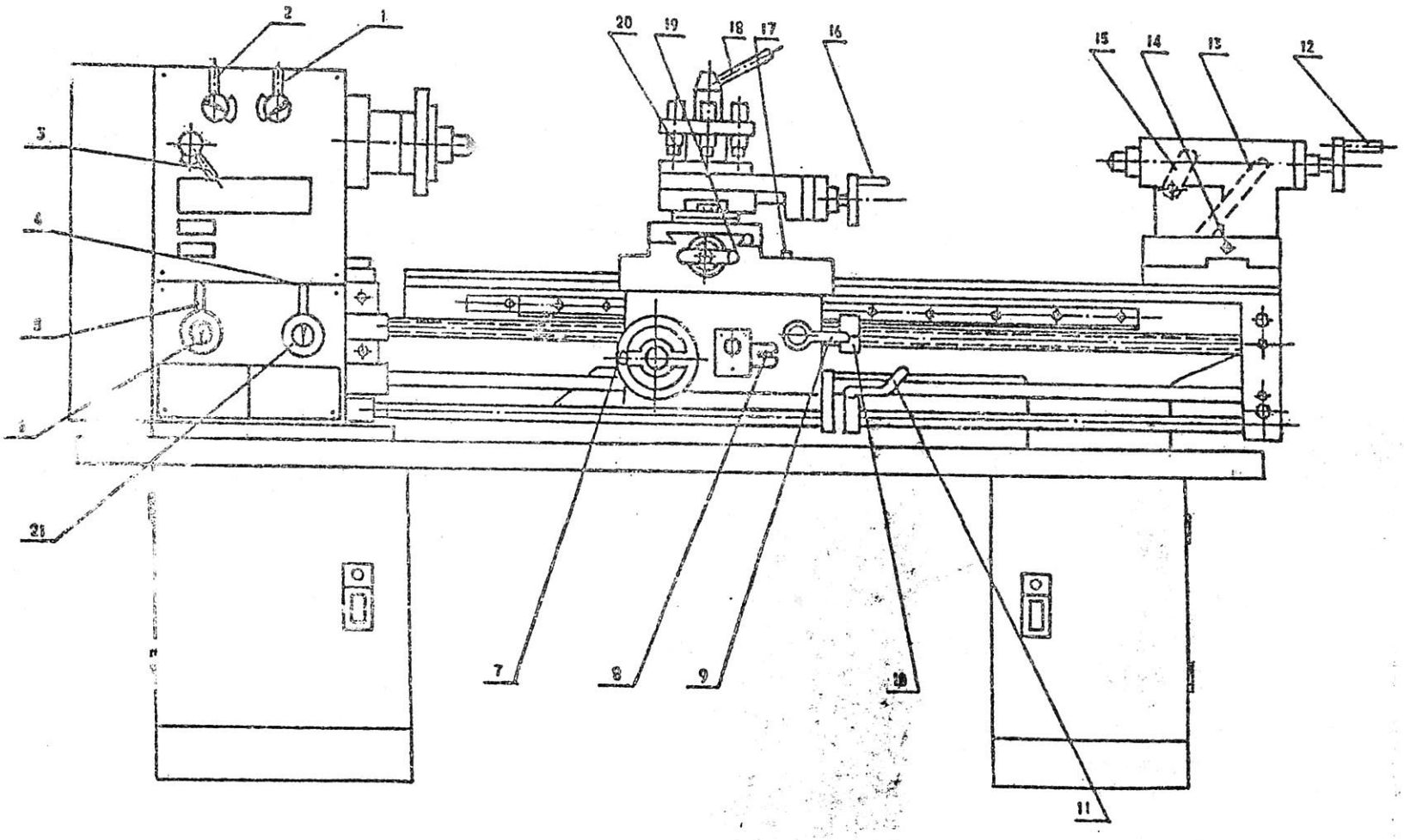

Fig. 9 Operation levers I type Feedbox

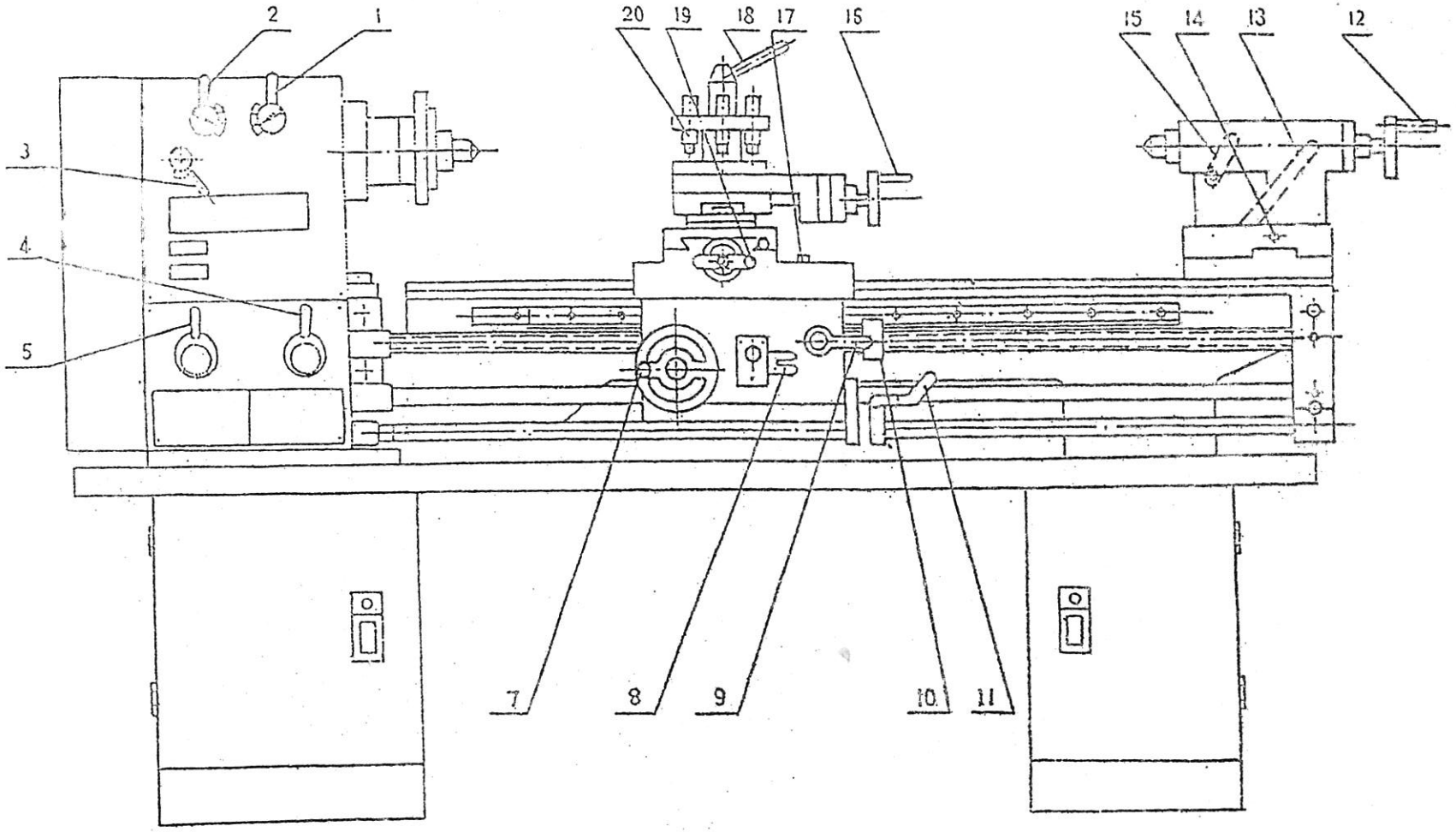

Fig. 10 Operation levers II type Feedbox

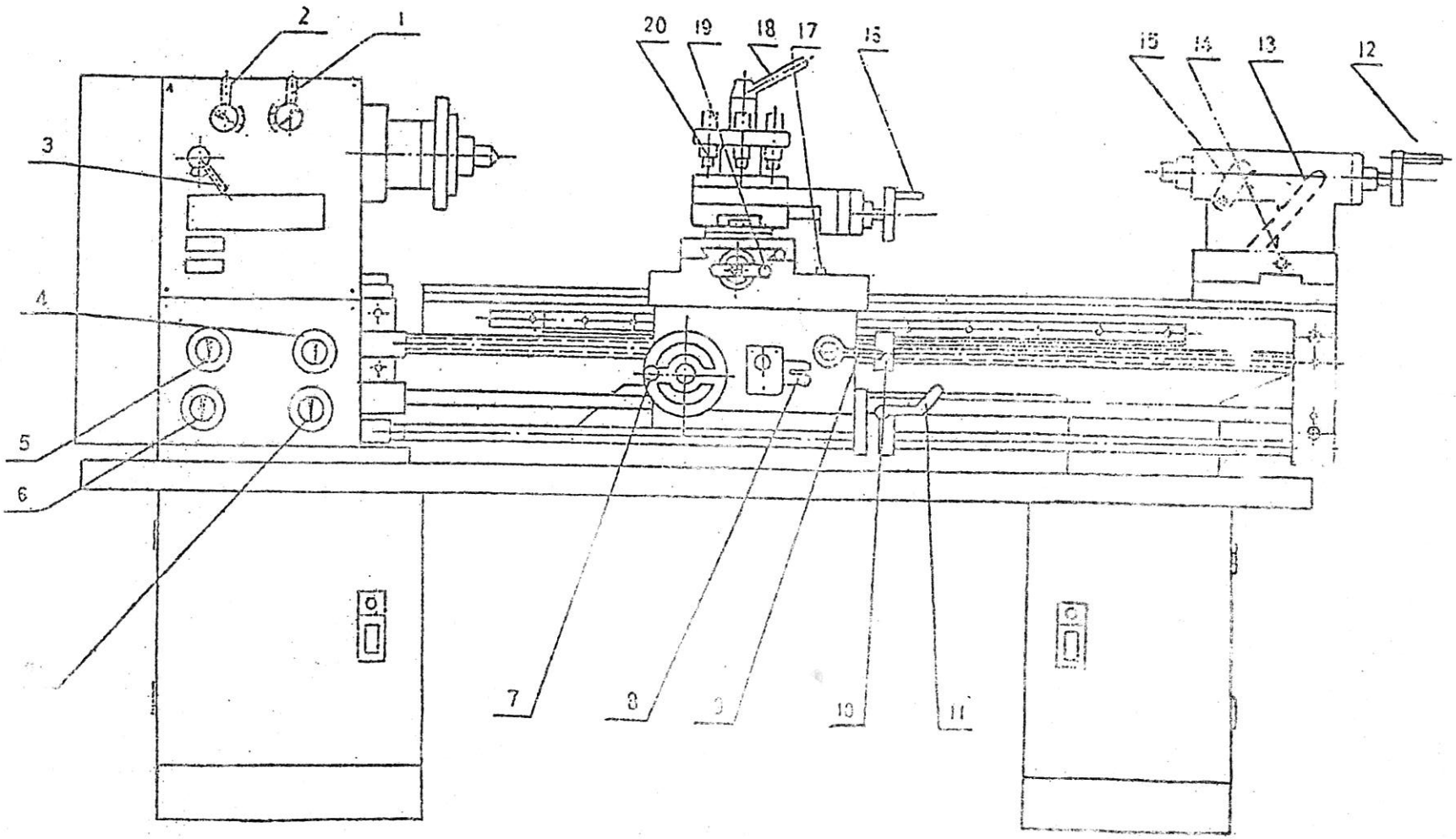

Fig. 11 Operation levers III type Feedbox

12 .INSTRUCTIONS ON TRIAL ADJUSTMENT & OPERATION

12.1 Before operation, read operation manual carefully, understand the request on adjustment, operation, upkeep and lubrication to the lathes.

12.2 From motor to the low speed wheels, there is one or two V-TYPE belt. Before switiching on the lathe, check the belt whether it's too tight or not. It's in normal condition that usually with finger you can press down lor 2 inches. Too tight belt will spoil the bearings, so the tight belt must be adjusted.

12.3 When tring the lathe, put the speed change lever in low speed position and keep the lathe running for 20 minutes, if it's normal, gradually change the speed of the spindle up to the fastest (set the feed selection lever in the moderate speed position, for the spindle, every grade running over 5 minutes)

Caution: The speed cannot be changed. Only after the motor completely stops running.

12.3 The lathe operation lever, see Fig.9.10.11.

12.4.1 Spindle

With the help of spindle 1、2 & V-Type belt, headstock can supply within the scope of 18 kinds and 9 kinds of speed from 65 to 1810r.p.m or 75 to 1400 r.p.m, you can see from the speed diagram on the headstock.

Move the starting lever 11 up, spindle will turn counter-clockwise, move the starting lever down, spindle will turn clock wise. Sometimes we'll adjust the moving direction according to customers' request.

12.4.2 I ,III type: Feedbox

Lever 4 is the selection lever for common cutting and threading. Lever 5,6,21 for controlling the speed of the feedbox. Lever 5 has 5 positions. lever 6 also has 5 positions. Lever 21 has 2 positions, moving the three levers to get all kings of feed rate listed in the diagram on the left of the headstock, also to be able to get the metric & imperial threadings listed in the diagram in the front if the feedbox.

II Type Feedbox

Push lever 4 inside to choose the common cutting and threading, left move for cutting shaft, right move for threading, drawing back to choose the left and right positions for controlling the feed rate and size of the threads. Lever 5 is pushed inside or drawn back to choose 5 positions for controlling the feed rate and the size of threads.

Caution: The spindle must be stopped running before moving any above levers.

12.4.3 Carriage:

Rotate hand wheel 7 to make the carriage moving along the leading tracks.

Cross feed selection lever 19 used for the saddle moving forward and back-ward by manual operation .

Compound fuction lever 16 is used to move the follow rest manually and adjust it to any angles to cut the threads and process the parts with angles.

When processing the threacls, operate half nut engage lever 9. Feed selection lever 8 is to adjust the feed rate/threading pitch horizontally and longitudinally, with a safety plug in the lever. When the lathe remains in a certain feeding state, it can prevent the unexpected combination, the lever has 3 positions:

①At neutral position or non-combination position ② Move it up to feed longitudinally.③ Move it down to feed horizontally. When the moving direction of the spindle is not changed, the feed rate selection 3 can change the direction of the feeding movement horizontally or longitudinally.

Thread disorder in stalation 10 is used for making the half nut and guides crew connect on the same thread which is just being cut , but please pay attention: When the guides crew turns a circle, the number of the thread on the product is integer the thread will be in order, but if the guides crew turns a circle, the number of the thread is not integer, thethread will be in disorder. In order to be convenient in processing threads, you can use the thread disorder installation, please see the meaning of the cocle on the thread disorder instalation.

Code	Explanation
1-8	Aline any number(1-8)press half nut lever, no disorder
1	Every time aline mark "1" press half nut lever down, no disorder.
1、5	Every time aline mark "1" or "5" press half nut lever down, no disorder.
1、3、5、7	Every time aline mark"1、3、5、7" press half nut lever down, no disorder.
	No need of thread disorder in spiration, press half nut down at any position, no disorder.

Clamping lever 18 is used to lock the follow rest and prevent it from loosening. Loosen the lever, you can turn the follow rest counter-clockwise to change the cutting tools.

12.4.4 Tailstock

Handwheel 12 is used to feed or withdraw the tailstock quill. Reverse the handwheel until it stops, you can withdraw the using tool automatically. Tailstock clamping on the guading tracks the lever remains upward when it is locked, the lever remains down ward when it is loosened. Quill clamping lever 13 is to prevent the quill from moving , before rotating the handwheel 12 , loosen the lever. At the right position you need, lock the quill tightly, The two bolts at the lateral sides of the tailstock are used to move the tailstock, when you adjust it to the right angle, tighten the two bolts.

8.5 Adjust the nut gap on the carriage case Fig.2. Rotate the peg 1 on the nut to the satisfied saddle moving and required travel.

II Type Feedbox

Push lever 4 inside to choose the common cutting and threading, left move for cutting shaft, right move for threading, drawing back to choose the left and right positions for controlling the feed rate and size of the threads. Lever 5 is pushed inside or drawn back to choose 5 positions for controlling the feed rate and the size of threads.

Caution: The spindle must be stopped running before moving any above levers.

12.4.3 Carriage:

Rotate hand wheel 7 to make the carriage moving along the leading tracks.

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Thread disorder in stalation 10 is used for making the half nut and guides crew connect on the same thread which is just being cut , but please pay attention: When the guides crew turns a circle, the number of the thread on the product is integer the thread will be in order, but if the guides crew turns a circle, the number of the thread is not integer, thethread will be in disorder. In order to be convenient in processing threads, you can use the thread disorder installation, please see the meaning of the cocle on the thread disorder instalation.

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1	Every time aline mark "1" press half nut lever down, no disorder
1、5	Every time aline mark "1" or "5" press half nut lever down, no disorder.
1、3、5、7	Every time aline mark"1、3、5、7" press half nut lever down, no disorder.
	No need of thread disorder in stalation, press half nut down at any position, no disorder.

Clamping lever 18 is used to lock the follow rest and prevent it from loosening. Loosen the lever, you can turn the follow rest counter-clockwise to change the cutting tools.

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8.5 Adjust the nut gap on the carriage case Fig.2. Rotate the peg 1 on the nut to the satisfied saddle moving and required travel.

12.6 Chuck and faceplate mounting see Fig.13. The connection between spindle and chuck or faceplate is made by D-Cam lock structure. When mounting, put the three pull pins of chuck or faceplate into the three holes on the spindle face end, The turn the three cams with the aid of square head wrench. When turning the cams clockwise, the chuck or faceplate will be locked. When turning the cams counter-clockwise to certain point, the chuck or faceplate can be detached.

13. MAINTENANCE

13.1 Before operation, check the oil indicator, refer to lubrication Fig6 and lubricate all sliding and rolling parts.

13.2 Avoid hurting from chips, every sliding surface should be cleaned, check the felts at every side of the carriage. If it's damaged or dirty, just change or clean it. After operation clean every part of the lathe, lubricate the sliding surface, feed rod, guidescrew to prevent from rusting.

13.3 Periodically wash headstock, feed box, apron and change lubrication oil.

13.4 Avoid oil leaking into motor and v-type belt, timely check and adjust v-type belt.

13.5 When rotating the spindle, never stir the speed change in order to prevent the gears from being damaged. If you can't move the speed chang lever, use hand to rotate the spindle.

13.6 The motor can turn clockwise and counter-clock wise to change the rotating direction of the spindle, but never change the motor rotating direction before stopping the running of the spindle.

13.7 When operating the sleady rest or follow test, the joint between sliding part and word part needs to be lubricated very often.

13.8 Avoid spindle bench sides, spindle taper & spindle bore from becoming unsmvoth, for that will effect the processing precision.

13.9 When something goes wrong with the lathe, maintain it in no time.

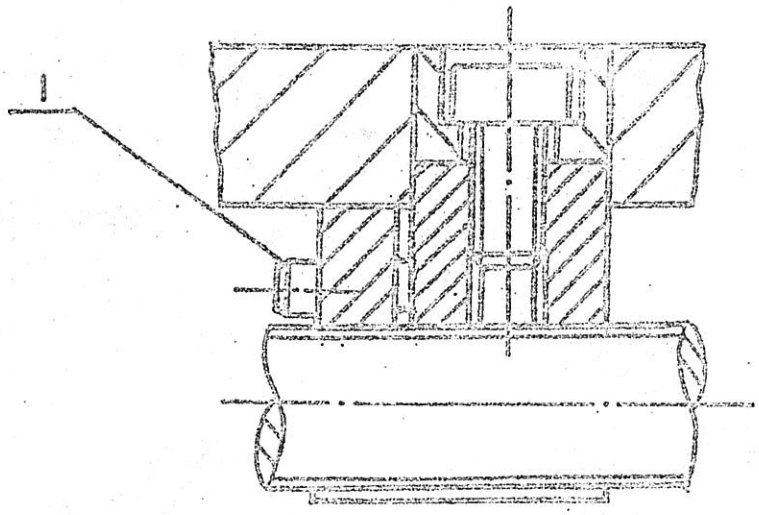


Fig12 Adjust the gap of horizontal feeding nut

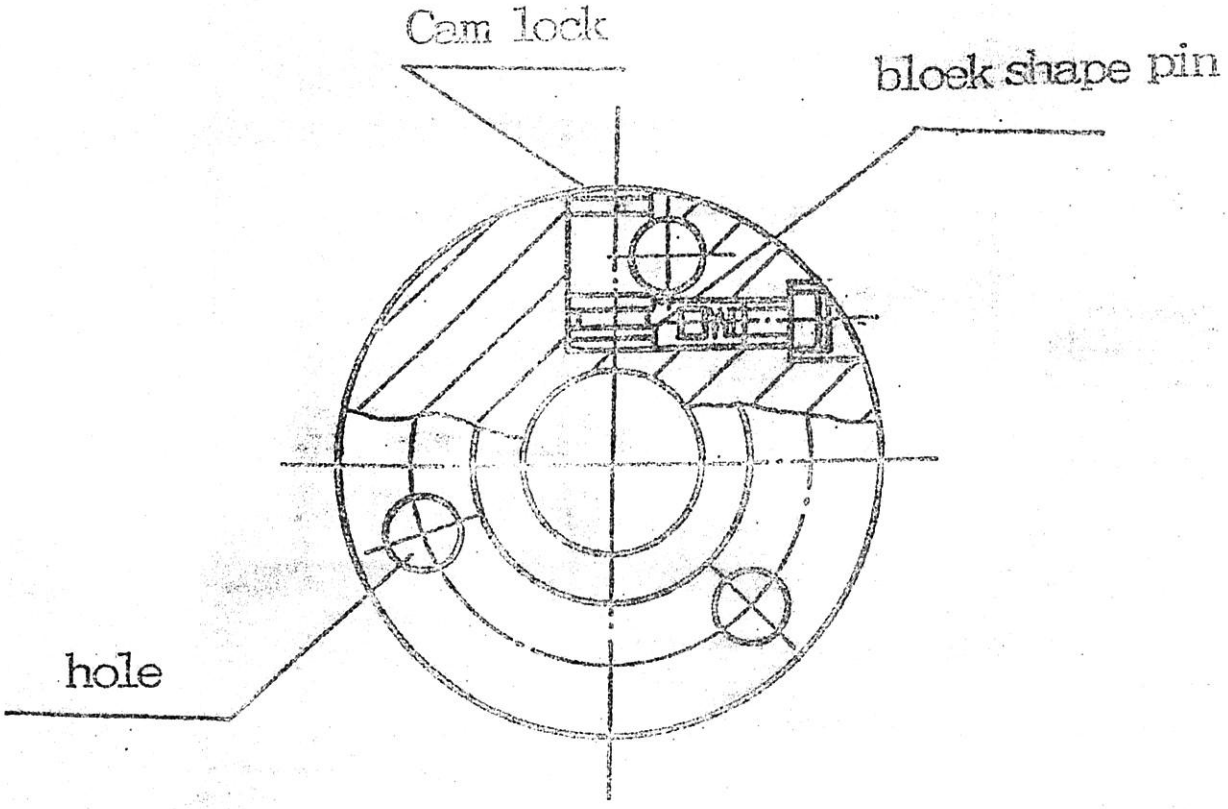
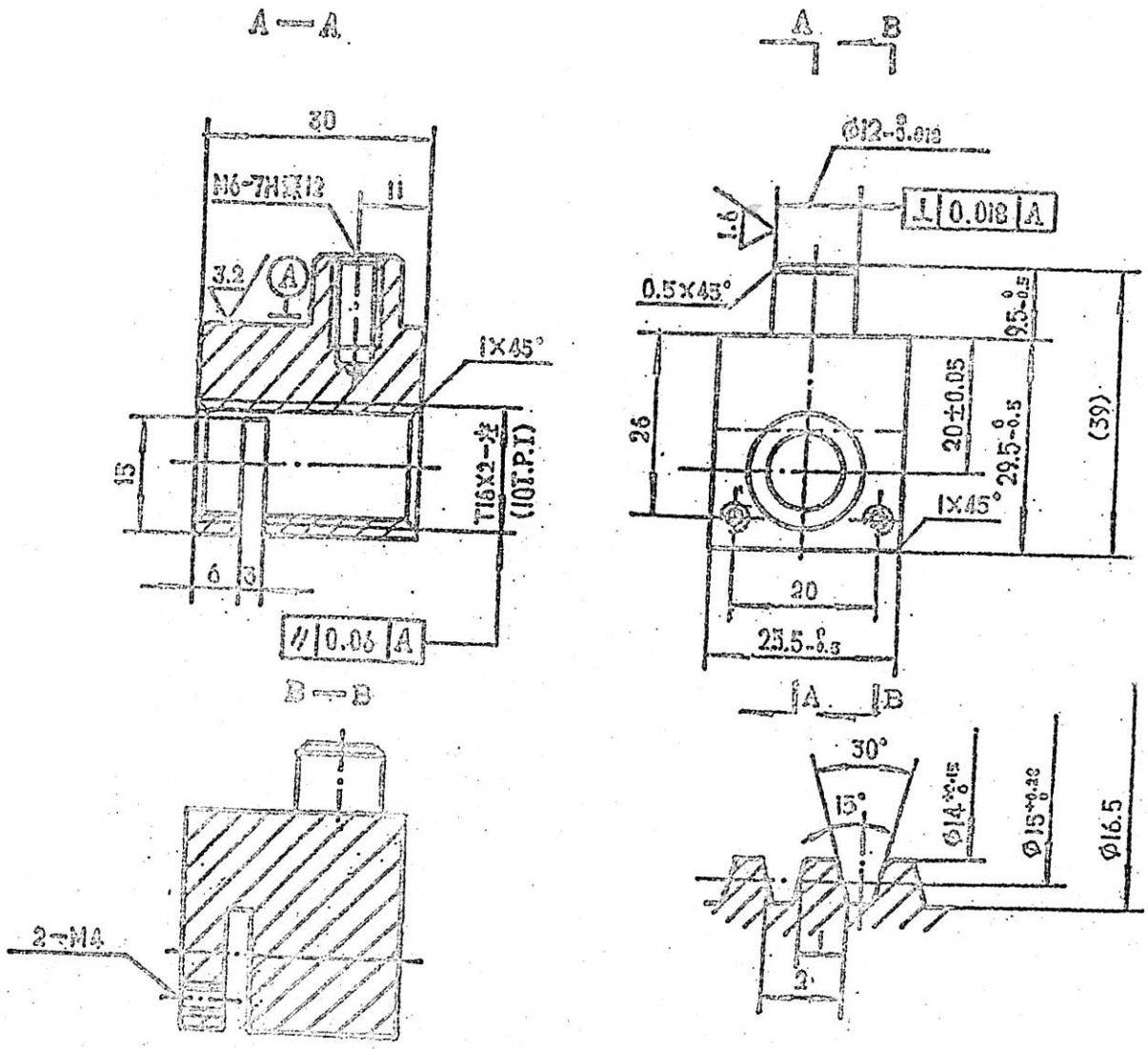


Fig13 Chuck or face plate lock structure

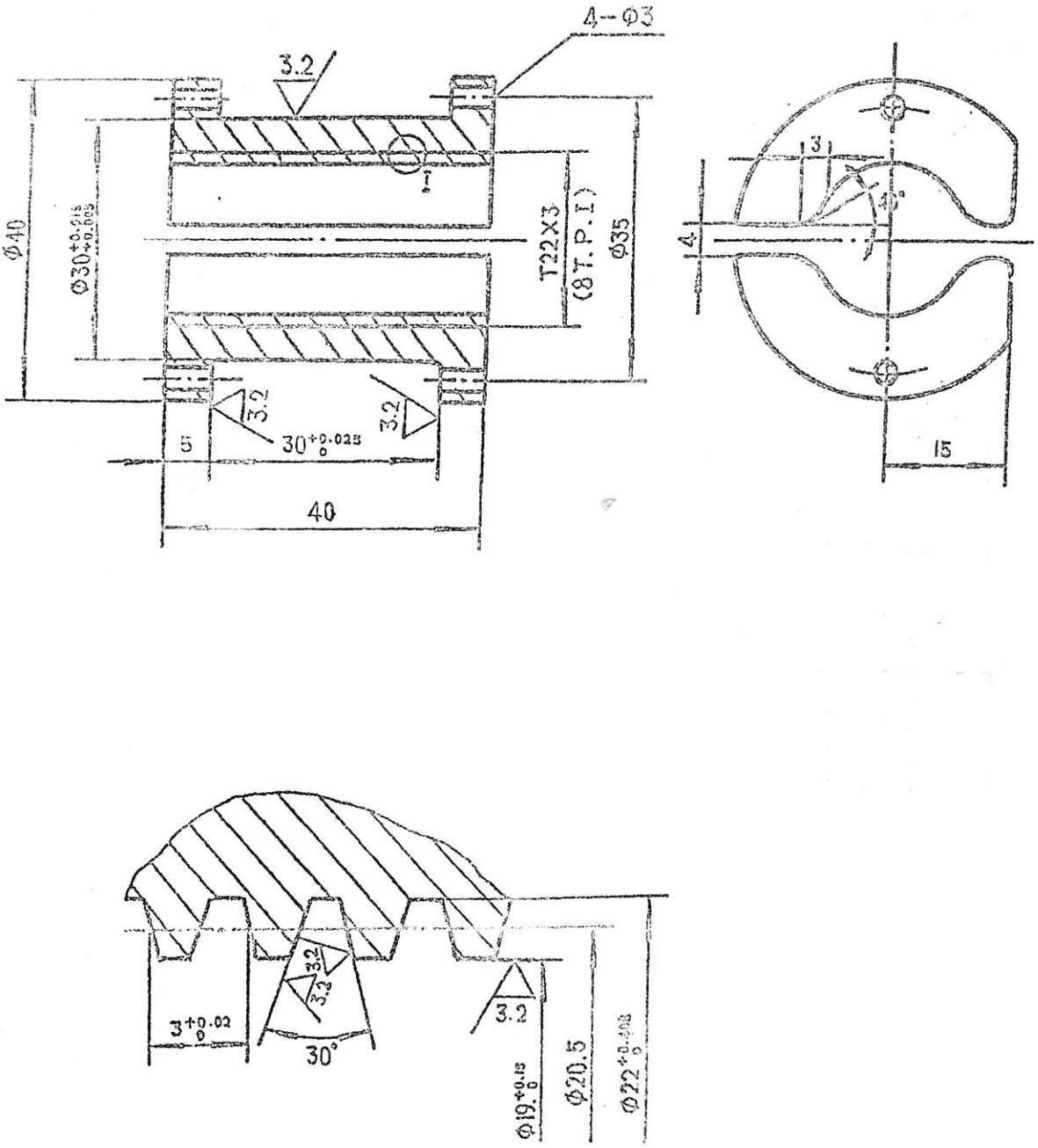
14.FRETTED PARTS

NO.	Name	Material	Mount	Note
1	Feeding nut	ZQSn6-6-3	1	CQ6230-5104
2	Half nut	ZQSn6-6-3	1	CQ6230-4003

其余 12.5



Additional Fig.1 ZQSn6-6-3



Additional Fig.2 Half Nut Material

15 .OPTIONAL ACCESSORIES

In order to meet the need of the customers, besides the standard accessories, we produce some optional accessories. Customers should mention the producer when offering orders so that we can arrange the production. The payment is extra.

Optional accessories see Fig 11

No.	Name	Amount	Note
1	Steady rest	1 Set	
2	Follow rest	1 Set	
3	4 jaw chrck	1 Set	
4	Faceplate	1 Set	
5	Coolant system	1 Set	
6	Safety chuck cover	1 Set	With switch
7	Live center M.T.No.3	1 Set	
8	Foot break	1 Set	

PARTS RAWING

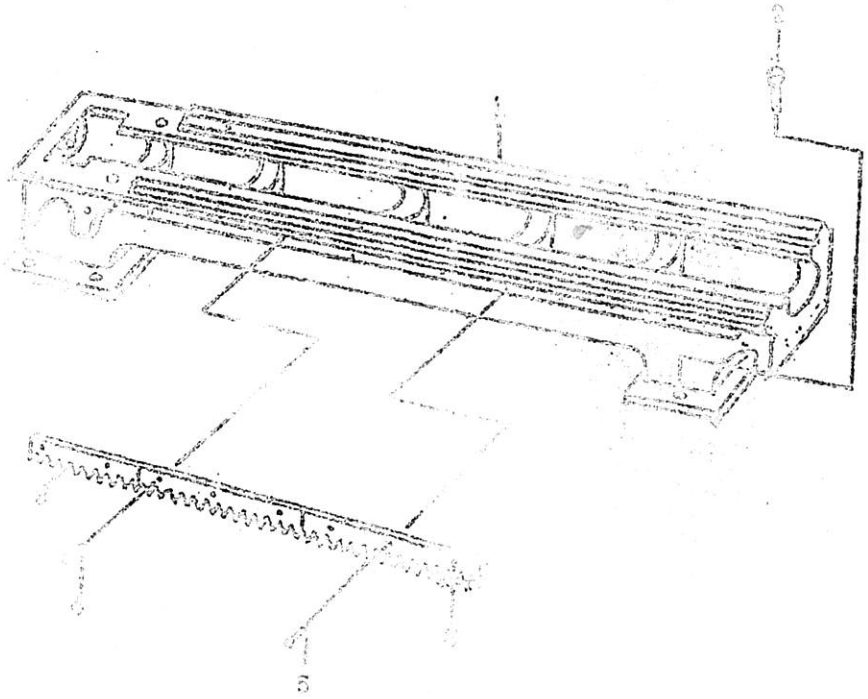
& PARTS LIST

BE SUBJECT TO ALTERATION WITHOUT NOTICE

EDITION DATE:6/9/2002

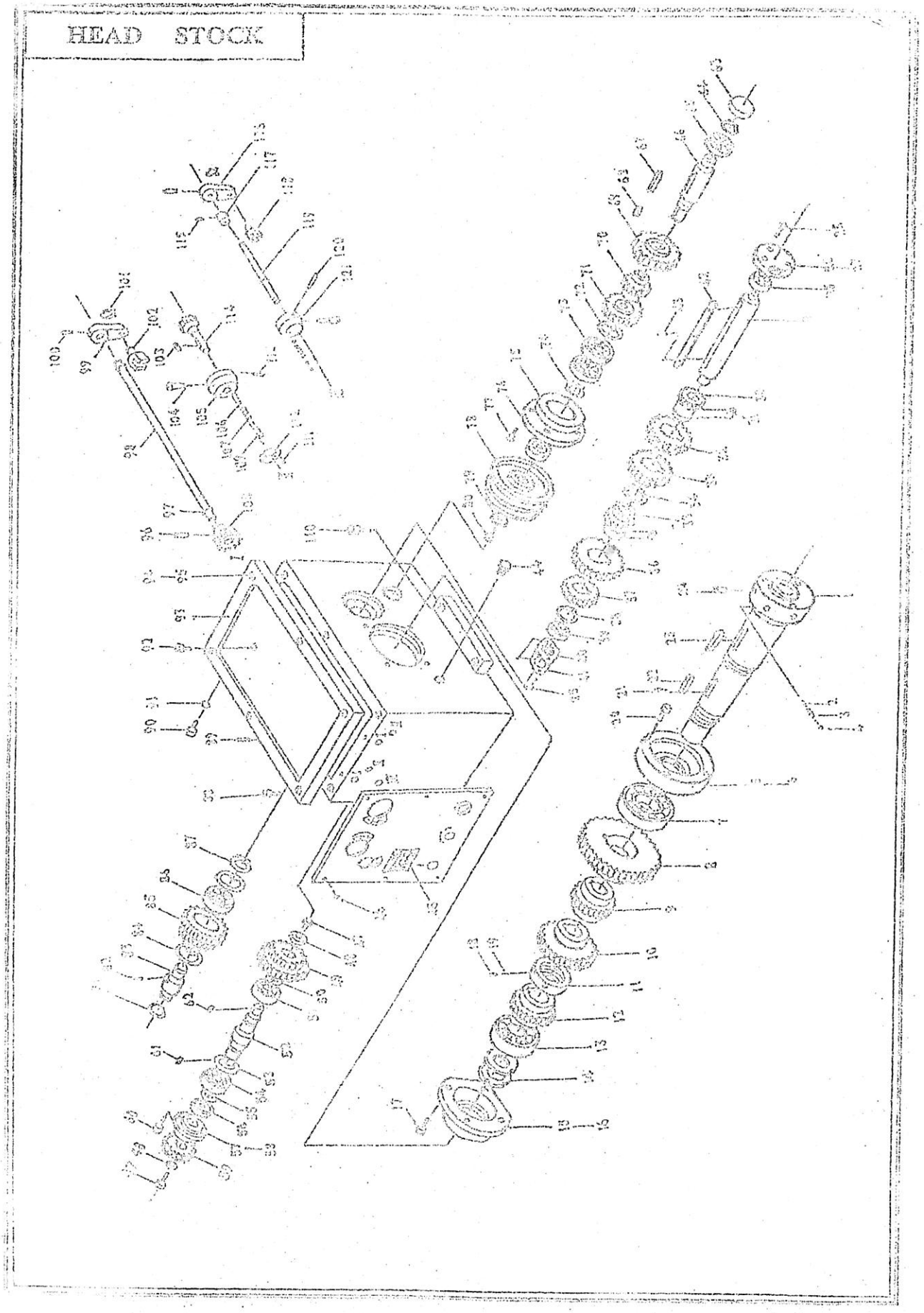
CONTENTS

ED ASSEMBLY



BED ASSEMBLY							
NO.	NAME	QTY.	NOTE	NO.	NAME	QTY	NOTE
1	Lathe bed	1	1004				
2	Screw	6	GB5783–86 M12 × 40				
3	Rack gear		1009				
4	Screw	6	GB70–85 M6 × 15				
5	Pin	6	GB879–860 5 × 20				
6	Rack gear	2	1011				

HEAD STOCK



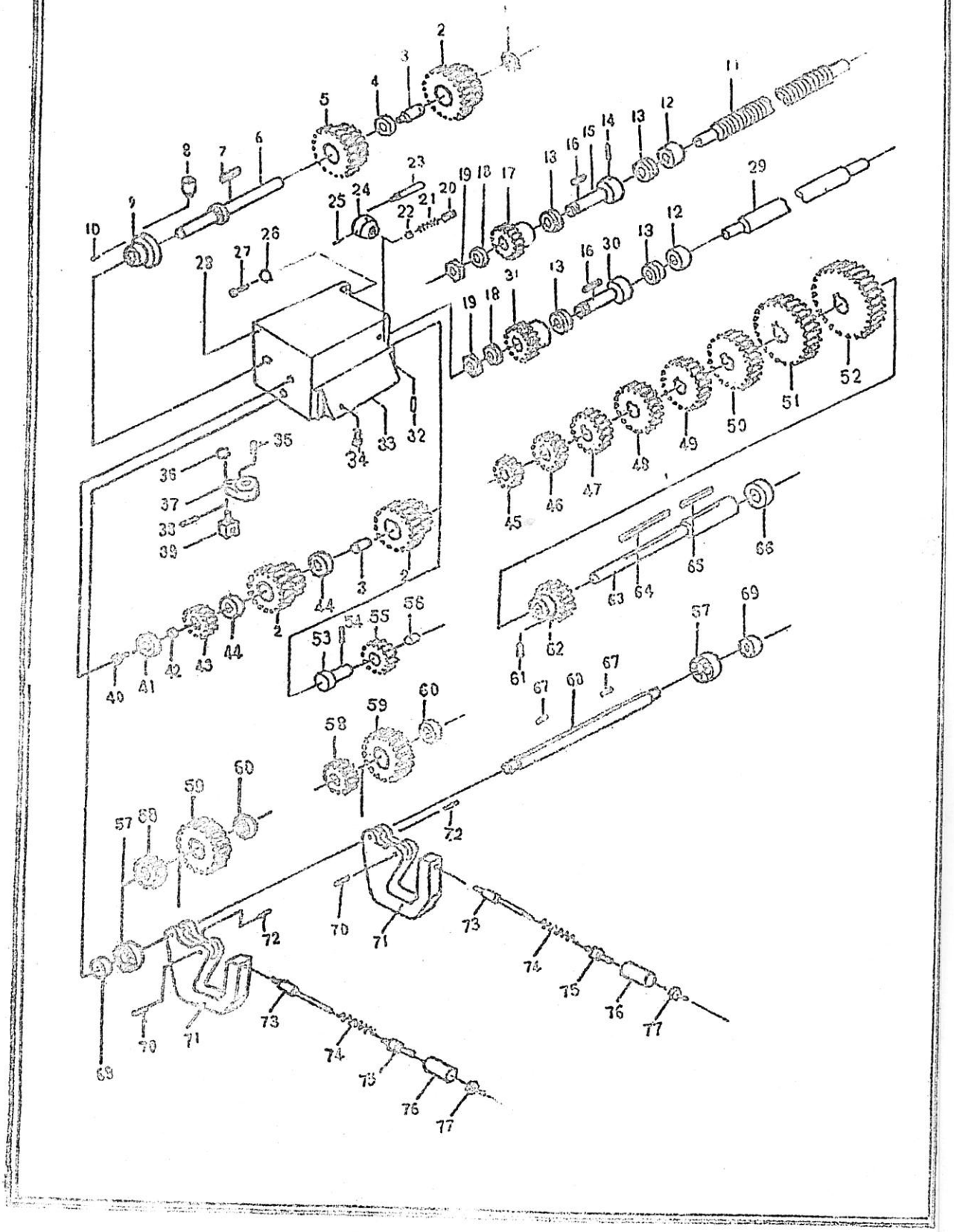
HEAD STOCK

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Spindle	1	2034	23	Key	1	GB1096-79 8 × 80
2	Lock pin	3	2035	24	Shaft	3	2037
3	Spring	3	GB2089-80 0.6 × 4 × 22	25	Screw	5	GB70-85 M6 × 12
4	Screw	3	GB70-85 M8 × 16	26	Cover	1	2040
5	Cover	1	2038	27	Oil seal	1	2028
6	Oil seal	1	2006	28	Bearing	1	GB276-79 304
7	Bearing	1	GB297-84 D7212	29	Shaft	1	2039
8	Gear	1	2031	30	Gear	1	2017
9	Gear	1	2030	31	Key	2	GB1096-79 5 × 18
10	Gear	1	2029	32	Gear	1	2015
11	Nut	1	2024	33	Gear	1	2016
12	Gear	1	2008	34	Circlip	1	GB894.1-86 36
13	Bearing	1	GB297-84 d7211	35	Gear	1	2022
14	Nut	2	2007	36	Gear	1	2020
15	Cover	1	2005A	37	Gear	1	2021
16	Oil seal	1	2023	38	Circlip	1	GB894.1-86 45
17	Screw	4	GB70-85 M8 × 16	39	Bearing	1	GB276-89 104
18	Screw	2	GB77-85 M8 × 8	40	Cover	1	2009
19	Collar	2	2025	41	Oil seal	1	2009A
20	Screw	4	GB70-85 M6 × 12	42	Key	1	GB1096-79 8 × 100
21	Screw	2	GB65-85 M3 × 8	43	Screw	2	GB65-85 M3 × 8
22	Key	1	GB1096-79 8 × 45	44	Oil window	1	GB1160.1-89 A10

NO	NAME	QTY	NOTE	NO	NAME	QTY	NOTE
45	Fascia	1	2055	67	Key	1	GB1096-79 5 × 80
46	Screw	6	GB818-86 M3 × 8	68	Key	1	GB1096-79 C5 × 24
47	Screwg	2	GB70-85 M6 × 12	69	Gear	1	2019
48	Washer	2	2003	70	Gear	1	2018
49	Gear	2	2026	71	Gear	1	2013
50	Circlip	1	GB894.1-86 25	72	Circlip	1	GB893.1-86 47
51	Bearing	1	GB276-89 105	73	Bearing	2	GB276-89 105
52	Shaft	1	2027a	74	Circlip	1	GB894.1-86 25
53	Circlip	1	GB893.1-86 42	75	Cover	1	2012B
54	Bearing	1	GB276-89 104	76	Oil seal	1	HC4-692-67 PD25 × 40 × 10
55	Circlip	1	GB894.1-86 20	77	Screw	4	GB5781-85 M6 × 20
56	Oil seal	1	HC4-692-67 D20 × 40 × 10	78	Pulley	1	2014
57	Cover	1	2004A	79	Washer	1	2011
58	Oil seal	2	2066	80	Screw	1	GB70-85 M8 × 20
59	Gear	1	2002B	81	Oil seal	1	GB34521-85 22 × 24
60	Screw	3	GB70-85 M6 × 15	82	Screw	1	GB78-85 M6 × 8
61	Key	1	GB1096-79 C5 × 8	83	Shaft	1	2001
62	Key	1	GB1096-79 C5 × 20	84	Circlip	2	GB893.1-86 47
63	Cover	1	2063	85	Gear	1	2032
64	Circlip	1	GB894.1-86 20	86	Bearing	1	GB276-89 204
65	Bearing	1	GB276-89 104	87	Circlip	1	GB894.1-86 20
66	Shaft	1	2010B	88	Screw	6	GB70-85 M6 × 30

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
89	Screw	2	GB78-85 M6 × 20	111	Screw	4	GB818-86 M3 × 6
90	Screw	1	JB1071-77 M16 × 1.5	112	Fascia	2	2060
91	Oil seal	1	GB34521-86 16 × 2.4	113	Screw	2	GB78-85 M6 × 20
92	Screw	1	JB1071-77 M16 × 1.5	114	Gear	2	2061
93	Cover	1	2044	115	Screw	1	GB78-85 M6 × 8
94	Oil seal	1	2062	116	Shift arm	1	2054A
95	Headstock	1	2033	117	Collar	1	2049
96	Pin	2	GB879-86 4 × 24	118	Shifter	1	2048
97	Oil seal	7	GB34521-86 16 × 2.4	119	Shaft	1	2052
98	Shaft	2	2046	120	Pin	1	GB879-86 5 × 40
99	Shaft arm	2	2042	121	Boss	1	2051
100	Pin	3	GB879-86 4 × 24				
101	Circlip	3	GB894.1-86 12				
102	Shifter	2	2041				
103	Key	2	GB1096-79 5 × 16				
104	Handle	3	2058				
105	Boss	2	2059				
106	Ball	4	GB308-89 6				
107	Spring	4	GB2089-80 1 × 6 × 20				
108	Gear	2	2047				
109	Screw	4	GB77-85 M8 × 8				
110	Screw	2	GB70-85 M12 × 25				

GEAR BOX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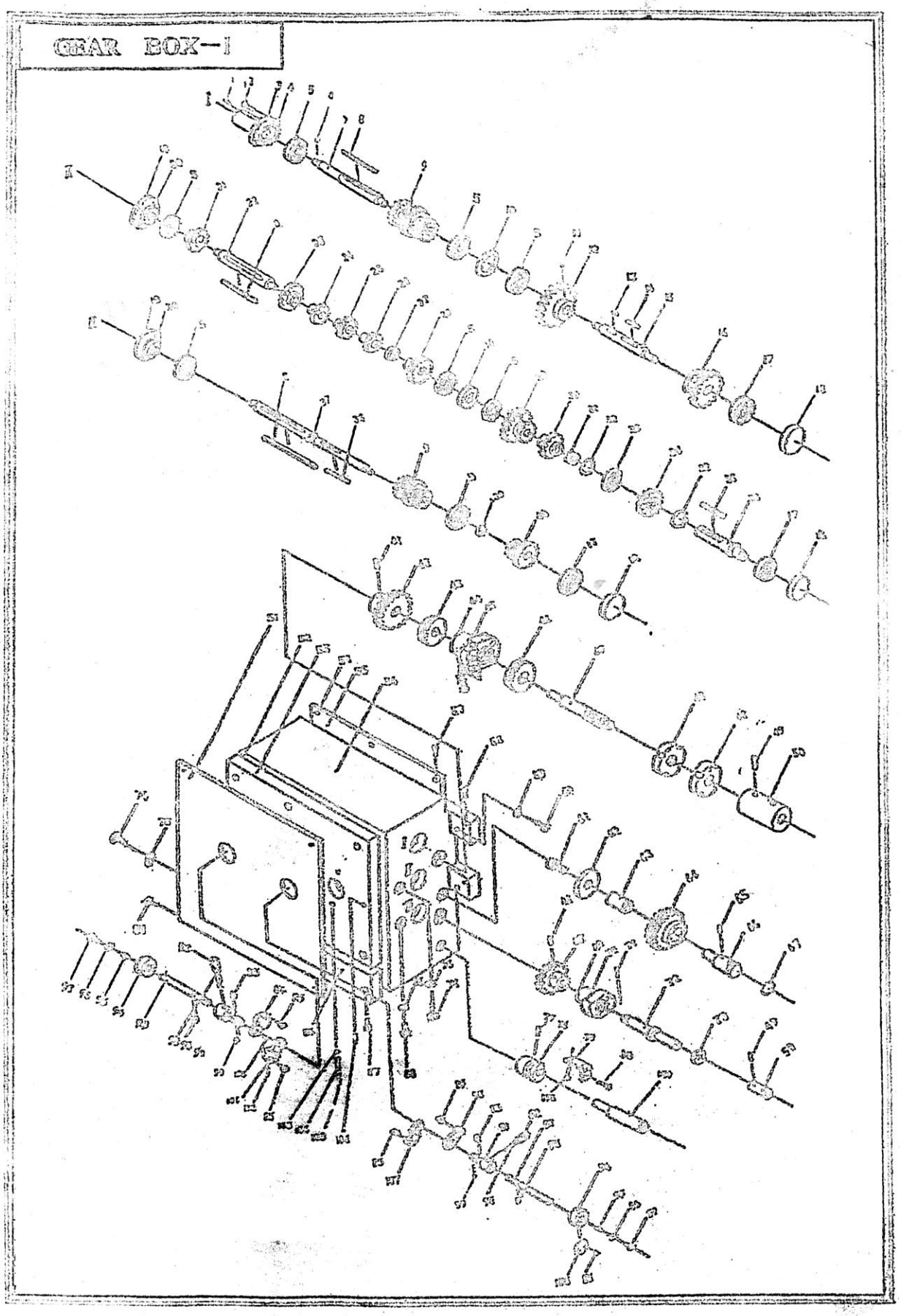
GEAR BOX							
NO.	DESCRIPIION	QTY	PART NO.	NO.	DESCRIPIION	QTY	PART NO.
1	Oil Cup	1	GB1155-79 6	21	Boss	1	2057
2	Circlip	1	GB294.1-86 16	22	Pin	1	GB879-86 5 × 40
3	Gear	3	3015	23	Gear Box	1	3001
4	Bushing	3	3016	24	Screw	3	GB77-85 M8 × 8
5	Washer	1	3024	25	Spring	2	GB2089-80 1 × 4.5 × 7
6	Gear	1	3023	26	Steel Ball	2	GB308-86 5
7	Shaft	1	3022	27	Screw	2	GB5738-85 M10 × 30
8	Key	1	GB1096-79 5 × 10	28	Spring washer	2	GB93-85 10
9	Cover	1	3031	29	Feed Rod	1	1006
10	Screw	3	GB70-86 M6 × 16	30	Shaft	1	3047
11	Guide Screw	1	1005	31	Gear	1	3004
12	Sheath	2	3084	32	Plate	1	3029
13	Bearing	4	GB301-84 8103	33	Screw	4	GB70-85 M6 × 16
14	Pin	2	GB879-86 5 × 35	34	Shaft	1	3039
15	Shaft	1	3028	35	Circlip	1	GB894.1-86 12
16	Key	2	GB1096-79 5 × 14	36	Shifter Arm	1	3040
17	Gear	1	3026	37	Pin	1	GB879-85 5 × 30
18	Nut	4	GB6172-86 M12	38	Shifter	1	3041
19	Washer	4	3025	39	Bushing	1	3019
20	Lever	1	6056	40	Screw	1	GB70-85 M6 × 12

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
41	Washer	1	3021	61	Pin	1	GB1096-79 3n6 × 6
42	Gear	2	3018	62	Gear	1	3027
43	Washer	2	3017	63	Shaft	1	3020
44	Gear	1	3012	64	Key	1	GB1096-79 5 × 75
45	Gear	1	3011	65	Key	1	3042
46	Gear	1	3010	66	Top	1	3043
47	Gear	1	3009	67	Key	2	3014
48	Gear	1	3008	68	Shaft	1	3003
49	Gear	1	3007	69	Pin	2	GB879-85 5 × 18
50	Gear	1	3006	70	Top	2	3002
51	Gear	1	3005	71	Screw	2	GB71-85 M6 × 5
52	Shaft	2	3044	72	Shaft	2	3051
53	Pin	4	GB119-86 6 × 25	73	Shaft	2	3054
54	Gear	2	3045	74	Spring	2	GB2089-80 1 × 8 × 47
55	Bushing	1	3046	75	Sleeve	2	2053
56	Bearing	2	GB279-89 102	76	Housing	2	3055
57	Gear	1	3013	77	Nut	2	GB928-86 M6
58	Gear	2	3049				
59	Bushing	2	3050				
60	Shifter Lever	2	3052				

GEAR BOX—1



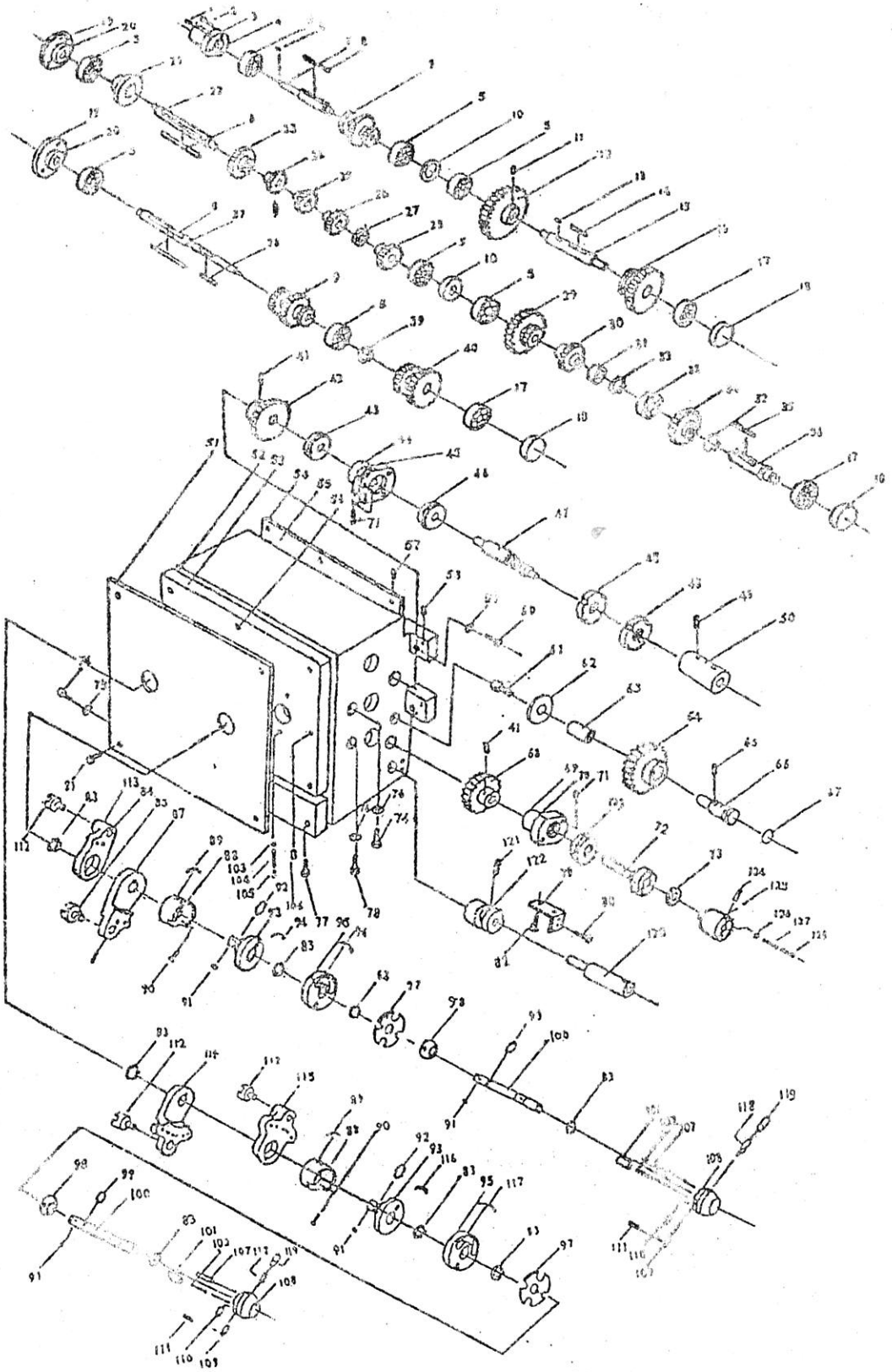
GEAR BOX-1

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Oil cup	1	GB1155-86 6	23	Gear	1	3029B
2	Screw	7	GB70-85 m6 × 12	24	Gear	1	3031B
3	Cover	1	3034B	25	Gear	1	3032B
4	Oil seal	1	3035C	26	Gear	1	3003B
5	Bearing	8	GB276-89 103	27	Washer	1	3030B
6	Key	1	GB1096-79 5 × 13	28	Gear	1	3002B
7	Shaft	1	3041B	29	Gear	1	3026C
8	Key	3	GB1096-79 6 × 90	30	Gear	1	3007C
9	Gear	2	3005B	31	Washer	1	3008C
10	Washer	2	3066B	32	Circlip	2	GB893.1-86 35
11	Screw	1	GB71-85 M6 X 8	33	Bearing	1	GB276-89 70001103
12	Gear	1	3027C	34	Gear	1	3009B
13	Key	1	GB1096-79 6 × 15	35	Key	1	GB1096-79 C5 × 40
14	Key	1	GB1096-79 6 × 35	36	Shaft	1	3019C
15	Shaft	1	3067B	37	Shaft	1	3004B
16	Gear	1	3025C	38	Key	1	GB1096-79 5 × 35
17	Bearing	3	GB276-89 102	39	Circlip	1	GB894.1-86 17
18	Cover	3	3017B	40	Gear	1	3006C
19	Cover	2	3044B	41	Pin	2	GB117-86 5 / 25
20	Oil seal	2	3046B	42	Gear	1	3018C
21	Washer	1	3045B	43	Bearing	1	GB301-86 8103
22	Shaft	1	3039B	44	Cover	1	3084D

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
45	Oil seal	1	3068D	67	Oil seal	1	GB3452.1-82 22 × 2.65
46	Bearing	1	GB301-84 8104	68	Gear	1	3014C
47	Shaft	1	3012C	69	Cover	1	3022F
48	Nut	2	GB812-88 M20 × 1.5	70	Oil seal	1	3086D
49	Pin	1	GB117-86 5 × 25	71	Screw	5	GB70-85 M6 × 25
50	Bushing	1	3020C	72	Shaft	1	3013E
51	Fasica	1	3060B	73	Oil seal	1	GB9877.1-89 25 × 40 × 10
52	Oil seal	1	3071B	74	Screw	2	GB1071-77 M16 × 1.5
53	Cover	1	3059B	75	Washer	1	GB97.1-86 16
54	Cover	1	3042C	76	Oil seal	2	GB3452.1-86 16 × 2.4
55	Oil sear	1	3070C	77	Screw	1	GB71-85 M6 × 10
56	Gear box	1	3001C	78	Position Piec	1	3012D
57	Screw	6	GB68-85 M6 × 12	79	Support	1	7003B
58	Pin	2	GB879-86 5 × 25	80	Screw	2	GB818-85 M4 × 20
59	Spring washer	2	GB93-87 10	81	Screw	6	GB34521-85 22 × 24
60	Screw	2	GB70-85 M10 × 30	82	Knob	2	GB1342-72 M8 × 40
61	Screw	1	GB70-85 M6 × 10	83	Oil seal	2	GB3452.1-82 25 × 2.65
62	Washer	1	GB892-86 6 × 32 × 5	84	Shifter Arm	1	3053B
63	Bushing	1	3024C	85	Shifter	3	3049B
64	Gear	1	3016C	86	Cover	1	3061B
65	Screw	1	GB71-85 M6 × 16	87	Screw	3	GB70-85 M8 × 15
66	Shaft	1	3015C	88	Oil widow	1	GB1160.1-89

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
89	Shifter	1	3062B				
90	Shifter Arm	1	3063B				
91	Boss	2	3057C				
92	Shaft	2	3056C				
93	Oil seal	2	GB3452.1-82 16 × 2.4				
94	Hand wheel	2	3054C				
95	Key	2	GB1096-79 5 × 8				
96	Washer	2	GB96-85 6				
97	Screw	2	GB67-85 M6 × 10				
98	Lever	2	3051C				
99	Key	2	GB1096-79 5 × 8				
100	Pin	2	GB879-86 4 × 40				
101	Shifter Arm	1	3058C				
102	Screw	4	GB72-88 M3 × 6				
103	Ball	4	GB308-80 ¢ 15				
104	Spring	4	GB2089-80 1 × 5 × 8				
105	Screw	4	GB77-85 M8 × 5				
106	Pin	2	GB879-85 M5 × 25				
107	Shifter Arm	2	3065C				
108	Siangboard	2	2060				
109	Shaft	1	3011D				
110	Screw	2	GB819-85 M4 × 40				

GEAR BOX - II

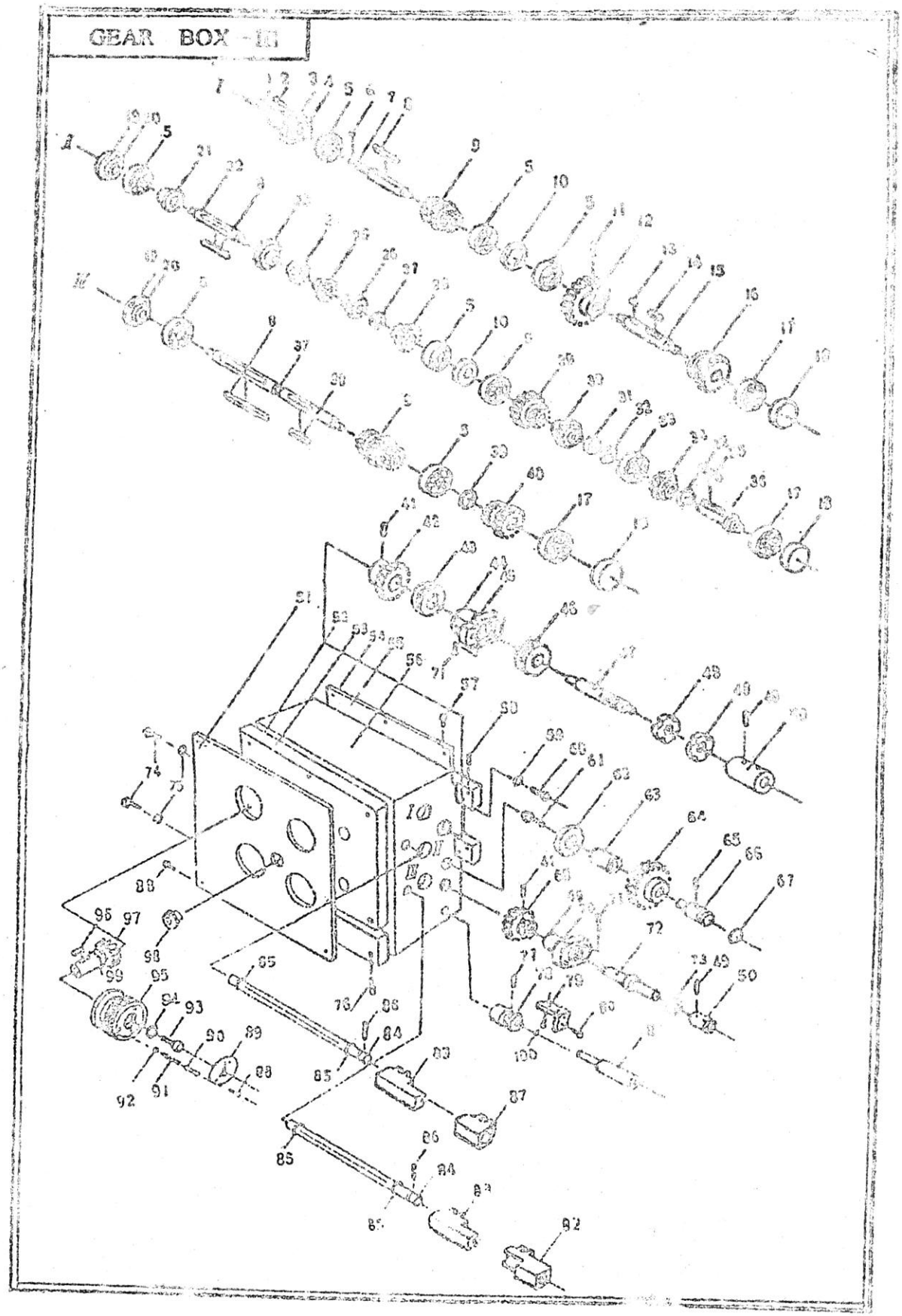


GEAR BOX-II

NO	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Oil cup	1	GB1155-86 6	23	Gear	1	3029B
2	Screw	7	GB70-85 M6 × 12	24	Gear	1	3031B
3	Cover	1	3034B	25	Gear	1	3032B
4	Oil seal	1	3035C	26	Gear	1	3003B
5	Bearing	8	GB276-89 103	27	Washer	1	3030B
6	Key	1	GB1096-79 5 × 13	28	Gear	1	3002B
7	Shaft	1	3041B	29	Gear	1	3026C
8	Key	3	GB1096-79 6 × 90	30	Gear	1	3007C
9	Gear	2	3005B	31	Washer	1	3008C
10	Washer	2	3066B	32	Circlip	2	GB893.1-86 35
11	Screw	1	GB71-85 M6 × 8	33	Bearing	1	GB276-89 70001103
12	Gear	1	3027C	34	Gear	1	3009B
13	Key	1	GB1096-79 6 × 15	35	Key	1	GB1096-79 C5 × 40
14	Key	1	GB1096-79 5 × 35	36	Shaft	1	3019C
15	Shaft	1	3047B	37	Shaft	1	3004B
16	Gear	1	3028C	38	Key	1	GB1096-79 5 × 35
17	Bearing	3	GB276-89 102	39	Circlip	1	GB894.1-86 17
18	Cover	1	3017B	40	Gear	1	3006C
19	Cover	2	3044B	41	Pin	2	GB117-86 5 × 25
20	Oil seal	2	3046B	42	Gear	1	3018C
21	Washer	1	3045B	43	Bearing	1	GB301-86 8103
22	Shaft	1	3033B	44	Cover	1	3084D

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
45	Oil seal	1	3068D	67	Oil seal	1	GB3452.1-82 22 × 2.65
46	Bearing	1	GB301-84 8104	68	Gear	1	3014C
47	Shaft	1	3021C	69	Cover	1	3022F
48	Nut	2	GB812-88 M20 × 1.5	70	Oil seal	1	3086D
49	Pin	1	GB117-86 5 × 25	71	Screw	5	GB70-85 M6 × 25
50	Bushing	1	3020C	72	Shaft	1	3013D
51	Fasica	1	3060B	73	Oil seal	1	GB9877.1-89 25 × 40 × 10
52	Oil seal	1	3071B	74	Screw	2	GB1071-77 M16 × 1.5
53	Cover	1	3059B	75	Washer	1	GB97.1-86 16
54	Cover	1	3042C	76	Oil seal	2	GB3452.1-86 16 × 2.4
55	Oil seal	1	3070C	77	Screw	1	3012C
56	Gear box	1	3001C	78	Screw	1	3072C
57	Screw	6	GB68-85 M6 × 12	79	Bracket	1	3011C
58	Pin	2	GB879-86 5 × 25	80	Screw	1	3073C
59	Spring washer	2	GB93-87 10	81	Screw	4	GB34521-85 22 × 24
60	Screw	2	GB70-85 M10 × 30	82	Screw	2	GB819-85 M4 × 40
61	Screw	1	GB70-85 M6 × 10	83	Circlip	8	GB94.1-86 12
62	Washer	1	GB892-86 6 × 32 × 5	84	Shifter arm	1	3063D
63	Bushing	1	3024C	85	Shifter	1	3049B
64	Gear	1	3016C	86	Cover	1	3061B
65	Screw	1	GB71-85 M6 × 16	87	Shifter arm	1	3065D
66	Shaft	1	3015C	88	Jacket	2	3050D

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
89	Transparent scale	4	3080D	111	Screw	4	GB71-85 M4 × 6
90	Screw	6	GB68-85 M4 × 10	112	Shifter	3	3062B
91	Key	4	GB1096-79 5 × 6	113	Spring	2	GB2089-80 0.8 × 5 × 14
92	Oil seal	2	GB3452.1-82 21.5 × 1.8	114	Shifter arm	1	3058D
93	Turn plate	2	3057D	115	Shifter arm	1	3053D
94	Tag	1	3071D	116	Tag	1	3064D
95	Channel plate	2	3054D	117	Tag	1	3069D
96	Tag	1	3074D	118	Handle	2	2058
97	Pad	2	3048D	119	Knob	2	GB1342-73 M8 × 40
98	Bulb	2	3052D	120	Switch rod	1	3011D
99	Oil seal	2	GB3452.1-82 8.5 × 1.8	121	Screw	1	GB71-85 M6 × 10
100	Shaft	2	3056D	122	Position block	1	3012D
101	Pin	2	3079D	123	Bearing	1	GB301-84 8103
102	Spring	2	0.8 × 4.5 × 14	124	Pin	1	GB117-86 5 × 40
103	Ball	4	GB308-80 15	125	Connection part	1	3020D
104	Spring	4	GB2089-80 1 × 5 × 8	126	Ball	2	GB308-77 ¢ 6
105	Screw	4	GB77-85 M8 × 5	127	Spring	2	GB2089-80 1 × 5 × 20
106	Pin	2	GB879-85 M5 × 25	128	Screw	2	GB77-85 M8 × 8
107	Pin	2	GB119-86 5 × 25				
108	Hand lever	2	3055D				
109	Pin	4	GB120-86 6 × 20				
110	Pin	2	GB119-86 5 × 18				


GEAR BOX - III

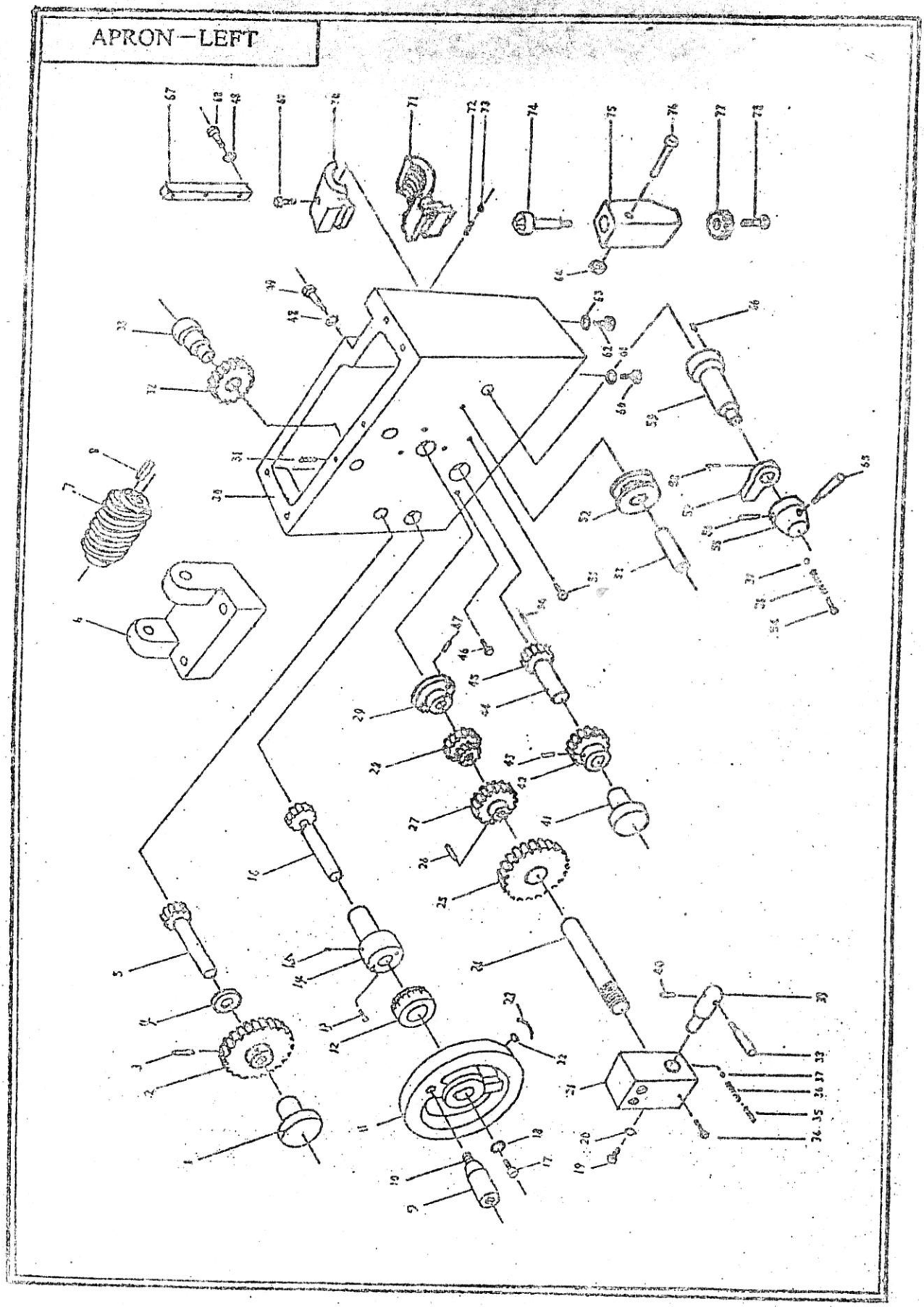
GEAR BOX-III

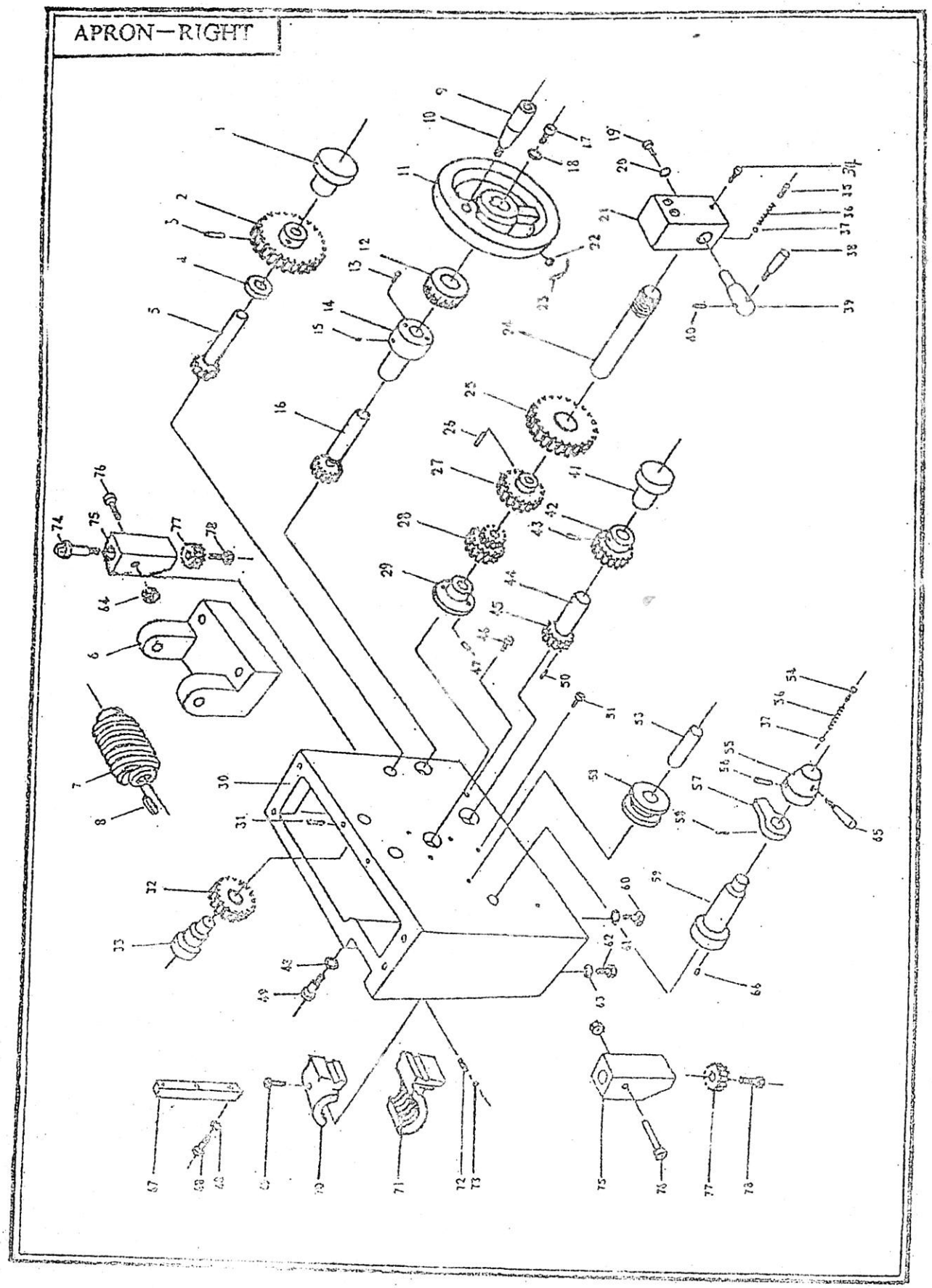
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Oil cup	1	GB1155-86 6	23	Gear	1	3029B
2	Screw	7	GB70-85 M6 × 12	24	Gear	1	3031B
3	Cover	1	3034B	25	Gear	1	3032B
4	Oil seal	1	3035C	26	Gear	1	3003B
5	Bearing	8	GB276-89 103	27	Washer	1	3030B
6	Key	1	GB1096-79 5 × 13	28	Gear	1	3002B
7	Shaft	1	3041B	29	Gear	1	3026C
8	Key	3	GB1096-79 6 × 90	30	Gear	1	3007C
9	Gear	2	3005B	31	Washer	1	3003C
10	Washer	2	3066B	32	Circlip	2	GB893.1-86 35
11	Screw	1	GB71-85 M6 × 8	33	Bearing	1	GB276-89 7000103
12	Gear	1	3027C	34	Gear	1	3009B
13	Key	1	GB1096-79 6 × 15	35	Key	1	GB1096-79 C5 × 40
14	Key	1	GB1096-79 6 × 35	36	Shaft	1	3019C
15	Shaft	1	3067B	37	Shaft	1	3004B
16	Gear	1	3025C	38	Key	1	GB1096-79 5 × 35
17	Bearing	3	GB276-89 102	39	Circlip	1	GB894.1-86 17
18	Cover	3	3017B	40	Gear	1	3006C
19	Cover	2	3044B	41	Pin	2	GB117-86 5 × 25
20	Oil seal	2	3046B	42	Gear	1	3018C
21	Washer	1	3045B	43	Bearing	1	GB301-86 8103
22	Shaft	1	3033B	44	Cover	1	3084D

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
45	Oil seal	1	3068D	67	Oil seal	1	GB3452.1-82 22 × 2.65
46	Bearing	1	GB301-84 8104	68	Gear	1	3014C
47	Shaft	1	3021C	69	Cover	1	3022F
48	Nut	2	GB812-88 M20 × 1.5	70	Oil seal	1	3086D
49	Pin	1	GB117-86 5 × 25	71	Screw	5	GB70-85 M6 × 25
50	Bushing	1	3020C	72	Shaft	1	3013E
51	Fasica	1	3060E	73	Oil seal	1	GB9877.1-89 18 × 30 × 10
52	Oil seal	1	3071B	74	Screw	2	GB1071-77 M16 × 1.5
53	Cover	1	3059B	75	Washer	2	GB97.1-86 16
54	Cover	1	3042C	76	Screw	8	GB70-85 M8 × 15
55	Oil sear	1	3070C	77	Screw	1	GB71-85 M6 × 10
56	Gear box	1	3001D	78	Position piec	1	3012D
57	Screw	6	GB68-85 M6 × 12	79	Support	1	7003B
58	Pin	2	GB879-86 5 × 25	80	Screw	2	GB818-85 M4 × 20
59	Spring washer	2	GB93-87 10	81	Shaft	1	3011D
60	Screw	2	GB70-85 M10 × 30	82	Gear rack	1	3050C
61	Screw	1	GB70-85 M6 × 10	83	Gear rack	2	3049C
62	Washer	1	GB892-86 6 × 32 × 5	84	Shaft	2	3089
63	Bushing	1	3024C	85	Oil seal	4	GB1235-85 12 × 1.8
64	Gear	1	3016C	86	Screw	2	GB75-85 M4 × 6
65	Screw	1	GB71-85 M6 × 16	87	Gear rack	1	3062C
66	Shaft	1	3015C	88	Screw	12	GB818-85 M3 × 6

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
89	Siang board	4	2060				
90	Screw	4	GB77-85 M8 × 6				
91	Spring	4	GB2089-80 1 × 5 × 25				
92	Steel ball	4	GB308-86 ø 5				
93	Screw	4	GB70-85 M6 × 10				
94	Washer	4	GB96-86 6				
95	Hand wheel	4	3054F				
96	Key	4	GB1096-79 5 × 8				
97	Gear	4	3088				
98	Oil window	1	GB1160.1-89 A12				
99	Oil seal	4	GB1235-86 16 × 24				

APRON—LEFT

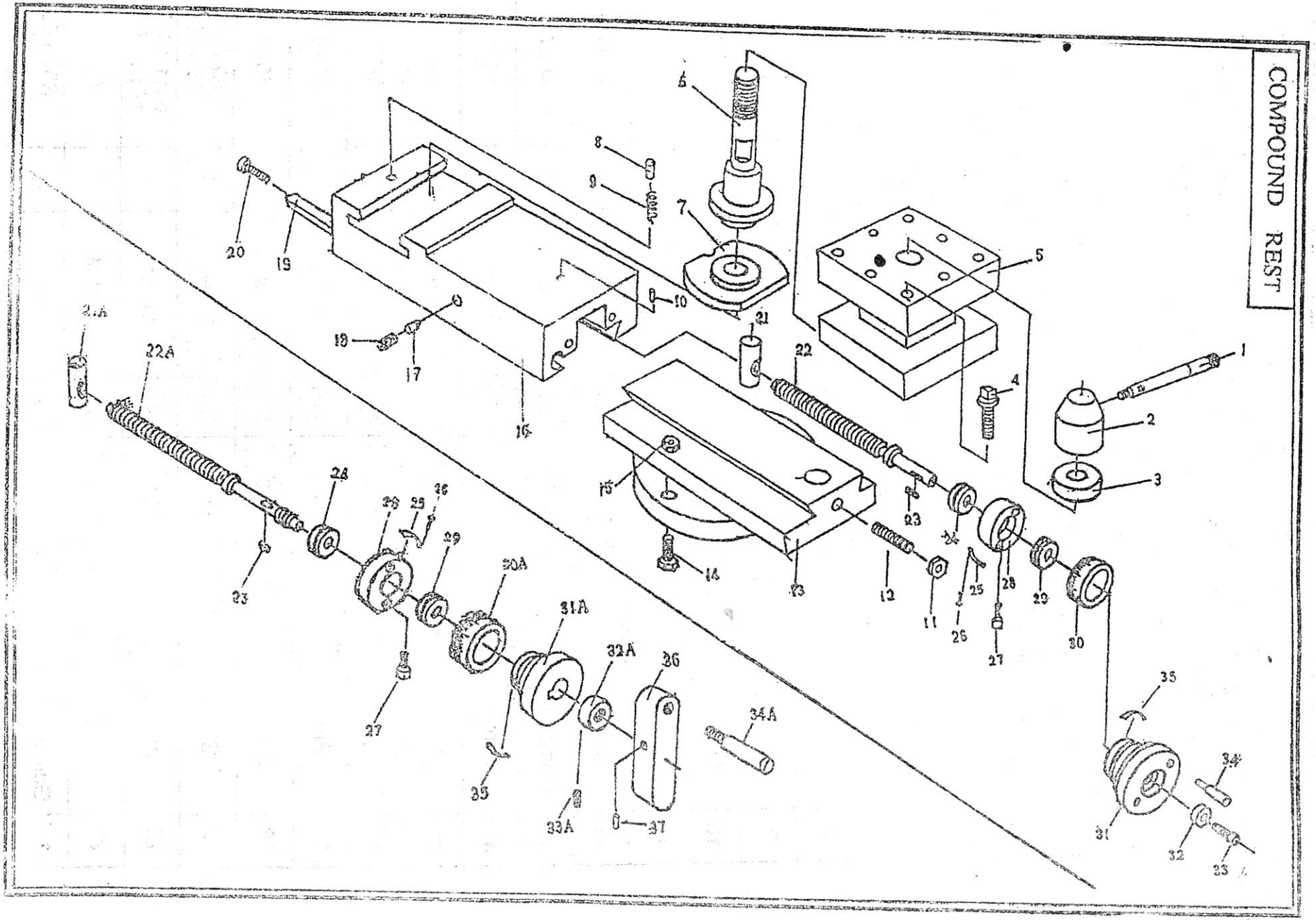



APRON—RIGHT

APRON-RIGHT OR APRON-LEFT							
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Bushing	1	4026	23	Leaf spring	1	4037
2	Gear	1	4029	24	Shaft	1	4015
3	Pin	1	GB879-86 5 × 30	25	Gear	1	4012
4	Space	1	4027	26	Pin	1	GB119-86 5 × 33
5	Gear shaft	1	4028	27	Gear	1	4013
6	Worm ame	1	4008	28	Gear	1	4014
7	Worm	1	4009	29	Bushing	1	4016
8	Flat key	1	GB1096-79 B5 × 36	30	Apron cse	1	4001
9	Handle	1	4032	31	Screw	1	GB78-85 M6 × 6
10	Lever	1	4033	32	Gear	1	4010
11	Hand wheel	1	4034	33	Shaft	1	4011
12	Index ring	1	4036	34	Screw	3	GB70-85 M6 × 45
13	Screw	1	GB70-85 M6 × 20	35	Screw	1	GB77-85 M8 × 8
14	Bracket	2	4031	36	Spring	2	GB2089-80 1 × 45 × 6
15	Oil cup	1	GB1155-79 6	37	Ball	2	GB308-89 6
16	Gear shaft	4	4030	38	Lever	1	4041
17	Screw	1	GB70-85 M6 × 12	39	Gear shaft	1	4042
18	Washer	1	4035	40	Pin	1	GB879-86 5 × 25
19	Screw	4	GB70-85 M6 × 10	41	Bushing	1	4020
20	Washer	1	4038	42	Gear	1	4019
21	Boss	1	4039	43	Pin	1	GB879-86 5 × 25
22	Key	1	GB1096-79 5 16	44	Shaft	1	4018

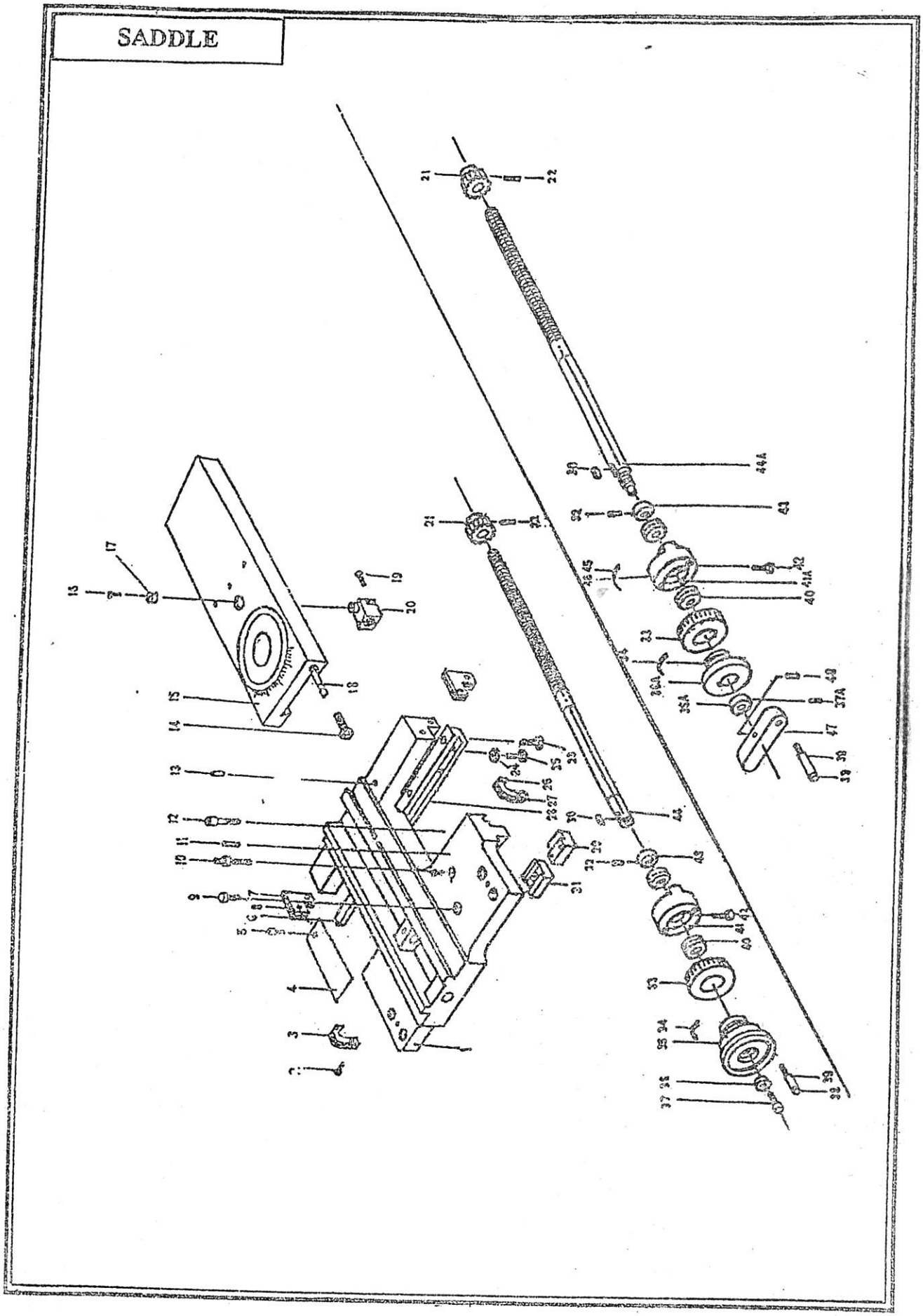
NO	NAME	QTY	NOTE	NO	NAME	QTY	NOTE
45	Worm gear	1	4017	67	Gib	1	3022
46	Oil window	1	GB1160.2-89 A12	68	Half nut house	2	GB5780-86 M6 × 25
47	Screw	2	GB818-85 M5 × 33	69	Screw	2	GB5786-85 M6 × 15
48	Washer	3	GB95-85 ø 6	70	Half nut	1	4002
49	Screw	1	GB5780-85 m6 × 10	71	Screw	1	4003A1
50	Screw	1	GB78-85 M6 × 6	72	Screw	2	GB77-85 M6 × 15
51	Limit block	1	4043	73	Nut	2	GB6170-86 M6
52	Safety shifter	2	4025	74	Thread dial	1	4006
53	Shaft	1	4024	75	Housing	1	4005
54	Screw	1	GB77-85 M8 × 8	76	Screw	1	GB70-85 M6 × 65
55	Boss	1	4045	77	Gear	1	4044
56	Pin	1	GB879-86 5 × 40	78	Screw	1	GB70-85 M6 × 15
57	Cam	1	4021				
58	Screw	1	GB71-85 M5 × 12				
59	Shaft	1	4023				
60	Screw	2	GB5780-86 M8 × 30				
61	Washer	2	GB95-85 ø 8				
62	Screw	1	Q/Z220.2-77 M10 × 1 × 20				
63	Washer	1	GB95-85 ø 10				
64	Slever	1	4007				
65	Lever	1	4044				
66	Pin	2	GB119-86 5 × 10				

COMPOUND REST



COMPOUND REST							
NO.	NAME	QTY	NOTE	NO	NAME	QTY	NOTE
1	Handle	1	5010	23	Key	1	GB1096-79 4 × 8
2	Boss	1	5009	24	Bearing	1	GB301-84 8101
3	Collar	1	5008	25	Scale	1	5026A2
4	Screw	8	GB83-88 M10 × 45	26	Rivet	2	GB827-86 2 × 4
5	Tool post	1	5005	27	Screw	2	GB70-85 M6 × 25
6	Shaft	1	5006	28	Bracket	1	5013
7	Nut	1	5003	29	Bearing	1	GB301-84 8101
8	Pin	1	5004	30	Index ring	1	5014A3
9	Spring	1	GB2089-80 1.2 × 4.8 × 8	31	Hand wheel	1	5016A
10	Oil cup	1	GB1155-86 6	32	Washer	1	5028
11	Nut	1	GB6170-85 M6	33	Screw	1	GB70-85 M6 × 12
12	Screw	1	GB73-85 M6 × 16	34	Lever	2	5031
13	Compound	1	5001	35	Leaf spring	1	4037
14	Screw	2	5107	21A	Nut	1	5012
15	Nut	2	GB6172-80 M10	22A	Guide screw	1	5011
16	Compound	1	5002	30A	Index ring	1	5014
17	Pin	1	5024	31A	Washer	1	5016
18	Screw	1	GB77-85 M6 × 8	32A	Nut	1	5025
19	Gib	1	5023	33A	Screw	1	GB77-85 M6 × 8
20	Screw	2	5021	34A	Lever	1	GB414.5-84 M8 × 63
21	Nut	1	5012A1	36	Bracket	1	5017
22	Guide screw	1	5011A3	37	Pin	1	GB879-86 3 × 16

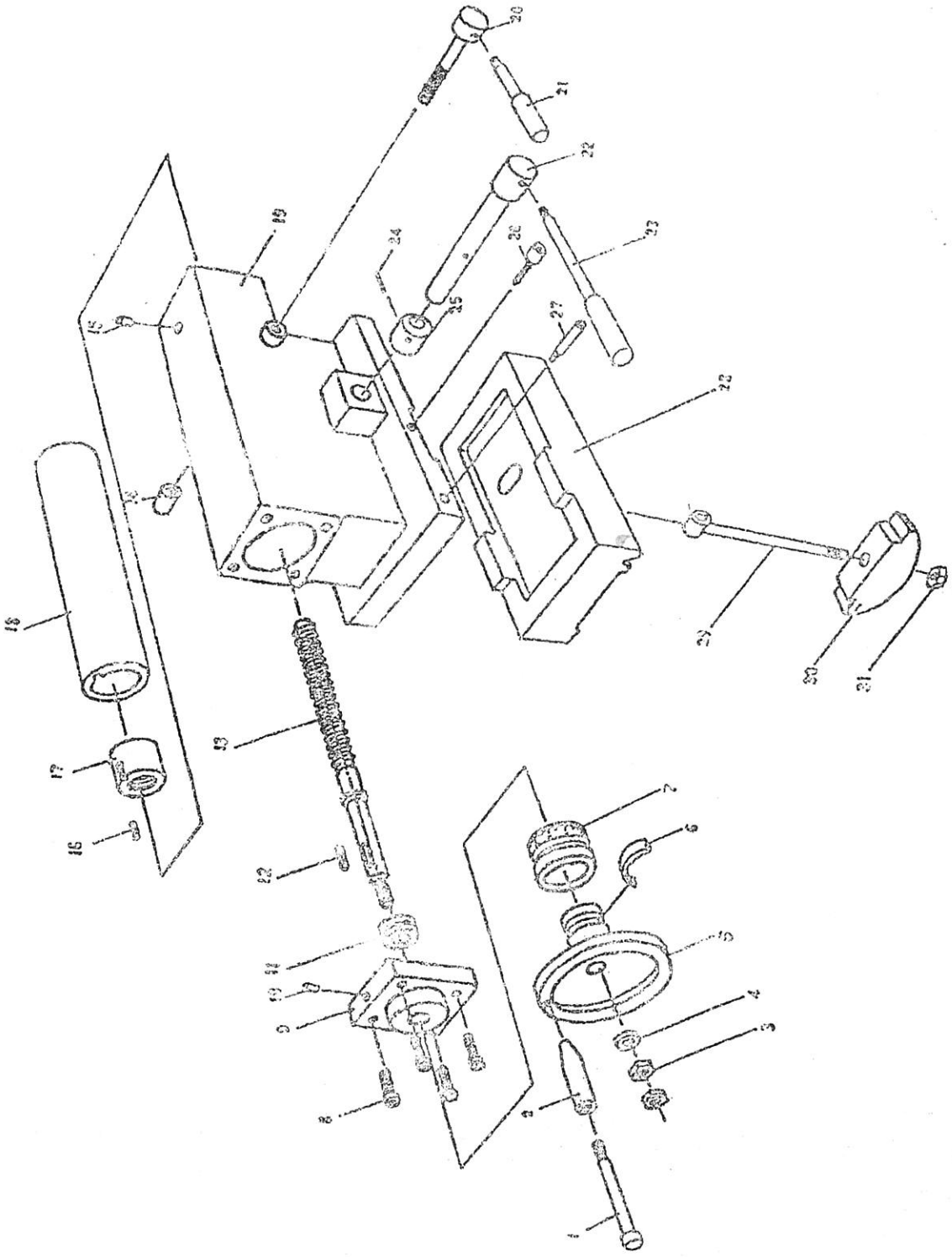
SADDLE



SADDLE							
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Saddle	1	5101	23	Screw	7	GB5781-86 M8 × 25
2	Screw	8	GB67-85 M5 × 12	24	Nut	4	GB41-86 M8
3	Wipper	1	5108	25	Screw	4	GB85-88 M8 × 25
4	Cover	1	5106	26	Press plate	2	5112
5	Screw	1	GB65-85 M3 × 8	27	Wipper	1	5111
6	Press plate	2	5130	28	Press plate	1	5131
7	Press plate	2	5110	29	Press plate	2	5116
8	Wipper	2	5109	30	Key	1	GB1096-79 5 × 20
9	Screw	1	5113	31	Press plate	1	5129
10	Screw	1	5128	32	Pin	1	GB879-86 3 × 20
11	Pin	2	GB118-86 6 × 45	33	Index ring	1	5124A3
12	Screw	4	GB70-85 M10 × 30	34	Leaf spring	1	5123
13	Oil cup	5	GB1155-86 6	35	Hand wheel	1	5122A
14	Screw	2	5115	36	Washer	1	5028
15	Tool post.	1	5102	37	Screw	1	GB70-85 M6 × 16
16	Screw	1	GB68-85 M6 × 12	38	Hand	1	4033
17	Bushing	1	5105	39	Lever	1	4032
18	Gib	1	5114	40	Bearing	1	GB301-86 8102
19	Screw	2	GB75-85 M4 × 12	41	Bracket	1	5125A
20	Nut	1	5104A2	42	Screw	2	GB70-85 M8 × 30
21	Gear	1	5127	43	Washer	1	5126
22	Screw	1	GB78-85 M6 × 8	44	Guide screw	1	5103A3

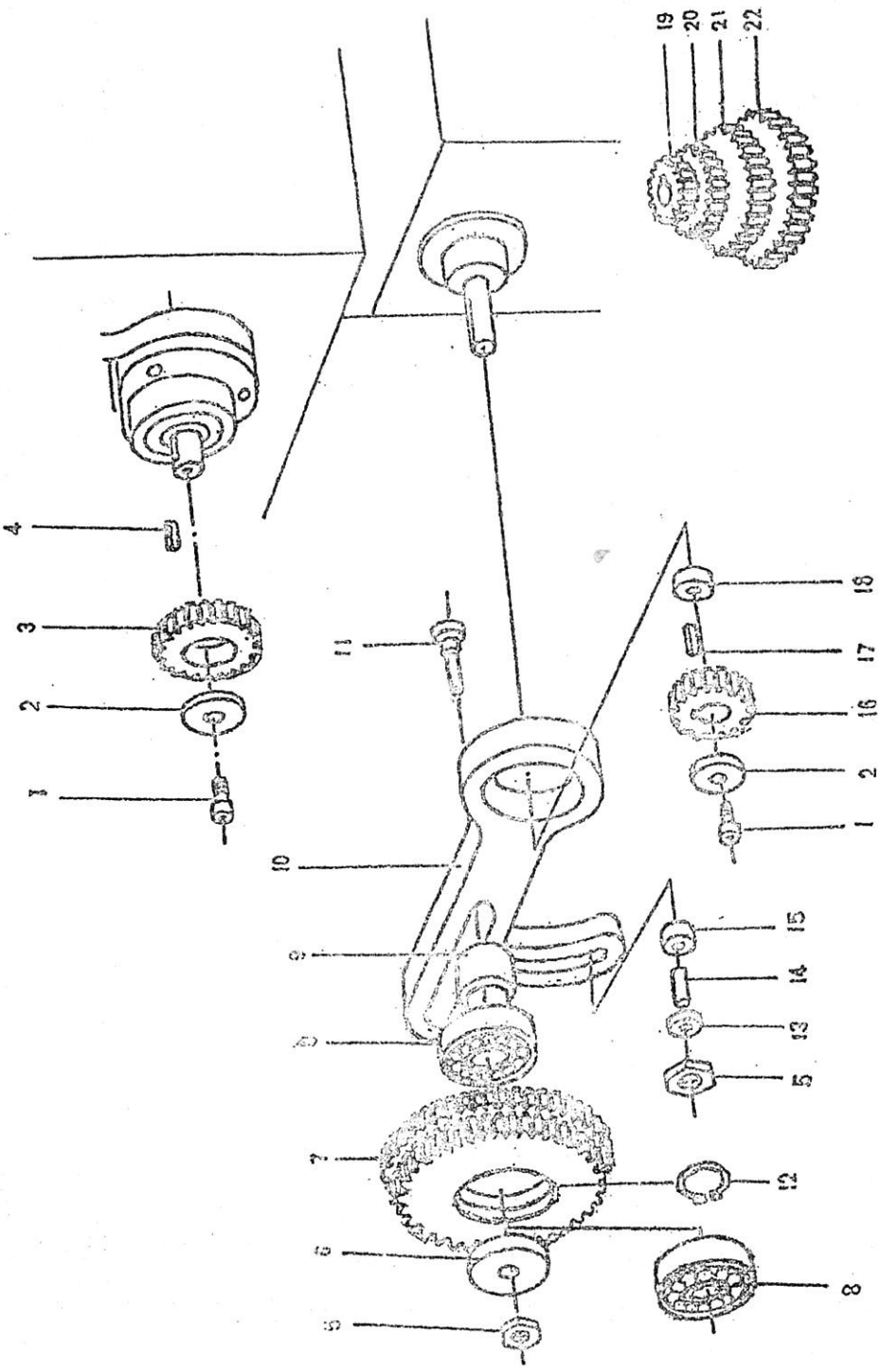
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
35A	Collar	1	5122				
36A	Nut	1	5121				
37A	Screw	1	GB77-85 M6 × 6				
41A	Bracket	1	5125A				
44A	Guide Screw	1	5103A2				
45	Rivet	2	GB827-86 2 × 4				
46	Scale	1	5133A2				
47	Bracket	1	5120				
48	Pin	1	GB879-86 4 × 20				

TAIL STOCK



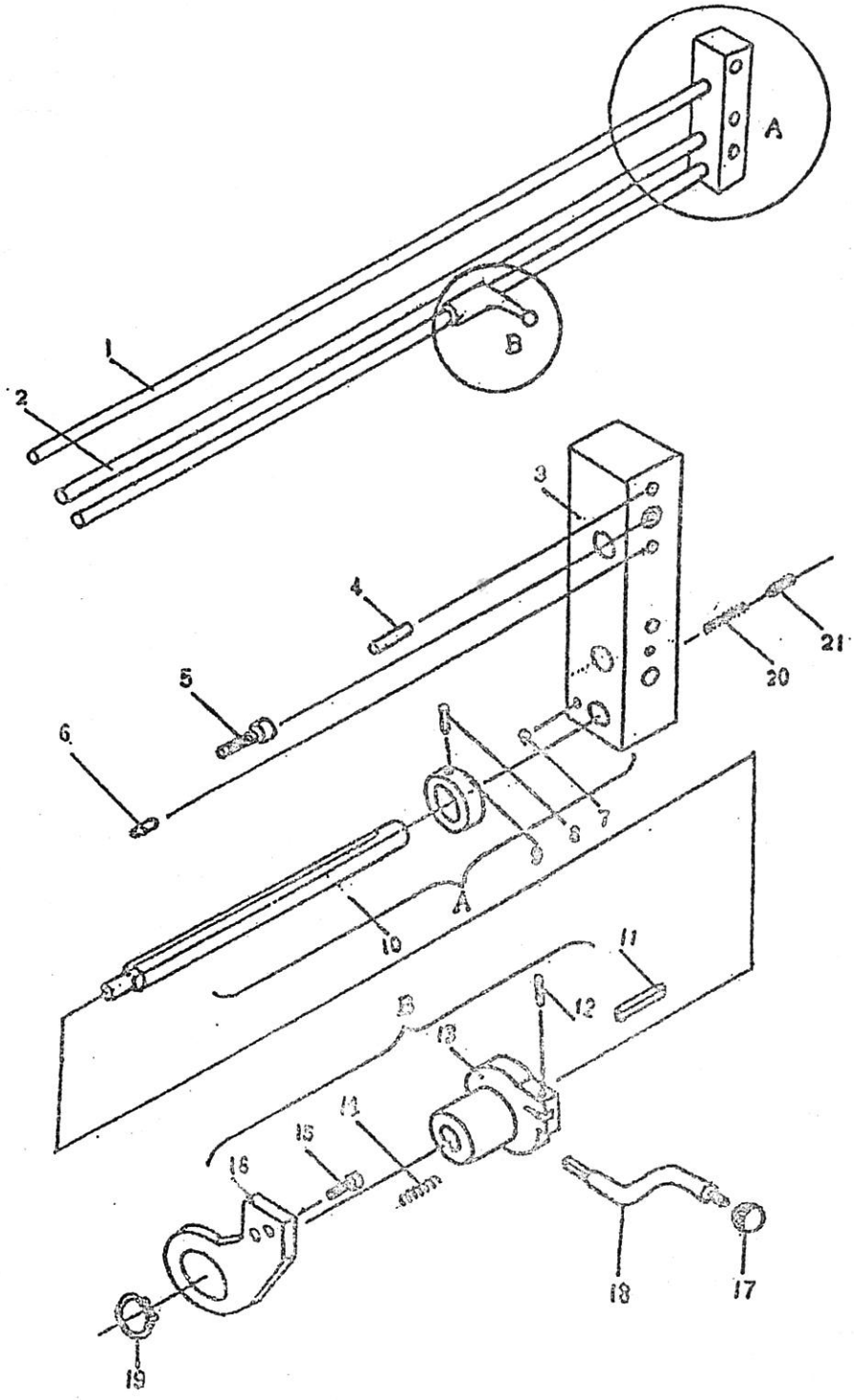
TAIL STOCK							
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Handle	1	4033	23	Handle	1	6004
2	Lever	1	4032	24	Pin	1	GB879-86 5 × 30
3	Nut	2	GB2172-86 M10	25	Collar	1	6018
4	Washer	1	GB97.1-85 A10	26	Screw	1	GB70-85 M10 × 50
5	Hand wheel	1	6005	27	Screw	1	6003
6	Leaf spring	1	4037	28	Base	1	6002
7	Index ring	2	6010	29	Shaft	1	6019
8	Screw	4	GB70-85 M6 × 16	30	Base shoe black	1	6020
9	Bracket	1	6011	31	Nut	1	GB6172-86 M12
10	Oil cup	1	GB1155-86 6				
11	Bearing	1	GB301-84 8101				
12	Key	1	GB1096-79 4 × 15				
13	Guide screw	1	6006				
14	Lock nut	1	6023				
15	Oil cup	1	GB1155-86 6				
16	Screw	2	GB77-85 M6 × 8				
17	Nut	1	6012				
18	Ouill	1	6013				
19	Tail stock	1	6001				
20	Lock screw	1	6022				
21	Handle	1	6021				
22	Shaft	1	6017				

CHANGE GEAR



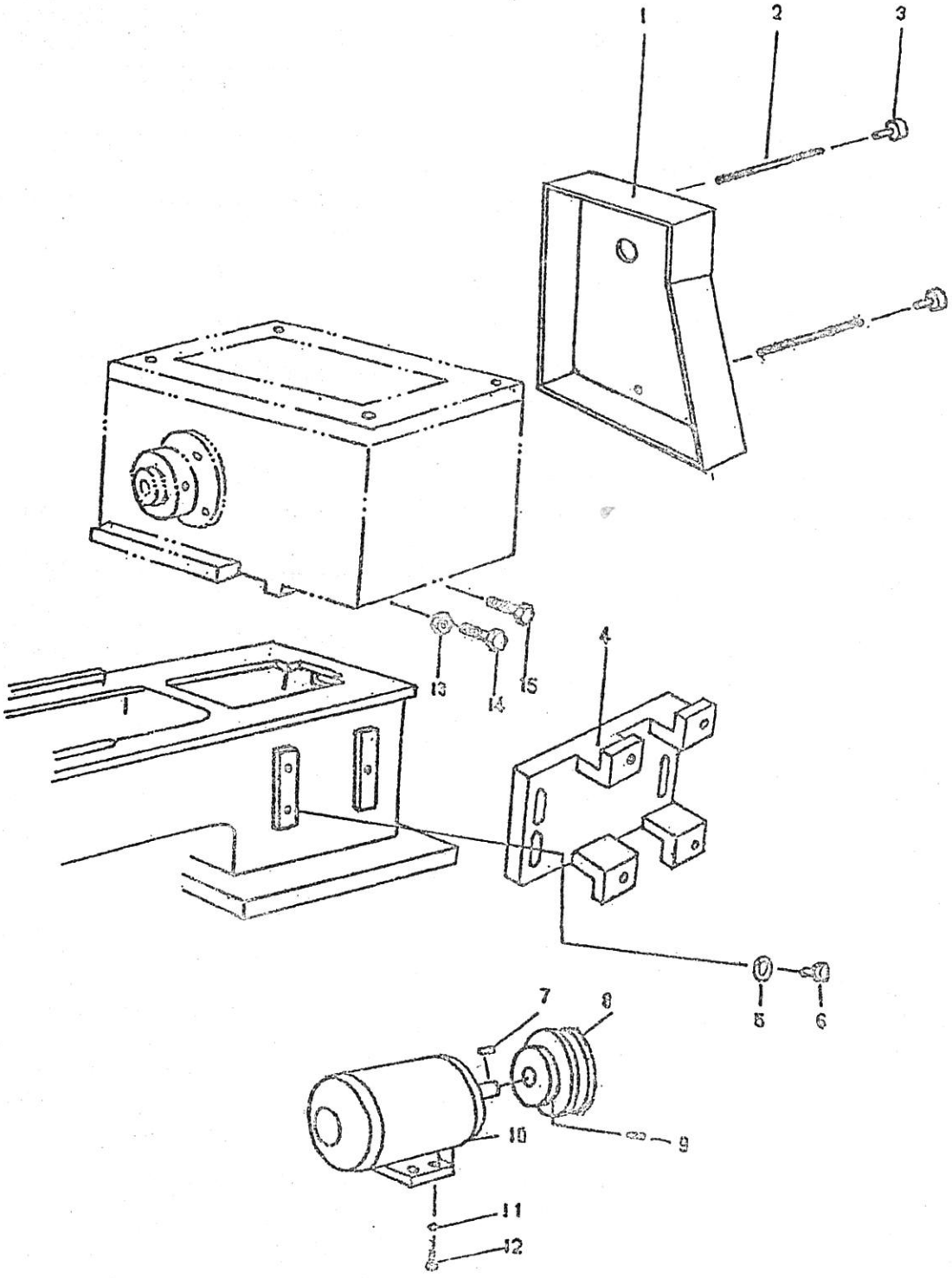
CHANGE GEAR							
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Screw	2	GB70-85 M6 × 12	12	Circlip	1	GB893.1-86 35
2	Washer	2	2003	13	Washer	1	GB97.1-85 10
3	Gear	1	2002B	14	Screw	1	GB73-85 M10 × 60
4	Key	1	GB1096-79 C5 × 8	15	Washer	1	3048B
5	Nut	2	GB41-85 M10	16	Gear	1	3039B
6	Washer	1	3036B	17	Key	1	GB1096-79 5 × 18
7	Gear	1	3038B	18	Washer	1	3040
8	Bearing	1	GB26-89 103	19	Change gear	1	3076C
9	Collar	1	3037B	20	Change gear	1	3075C
10	Qaudrant	1	3043B	21	Change gear	1	3077C
11	Screw	1	3035B	22	Change gear	1	3078C

CONTROL SWITCH ASSEMBLY



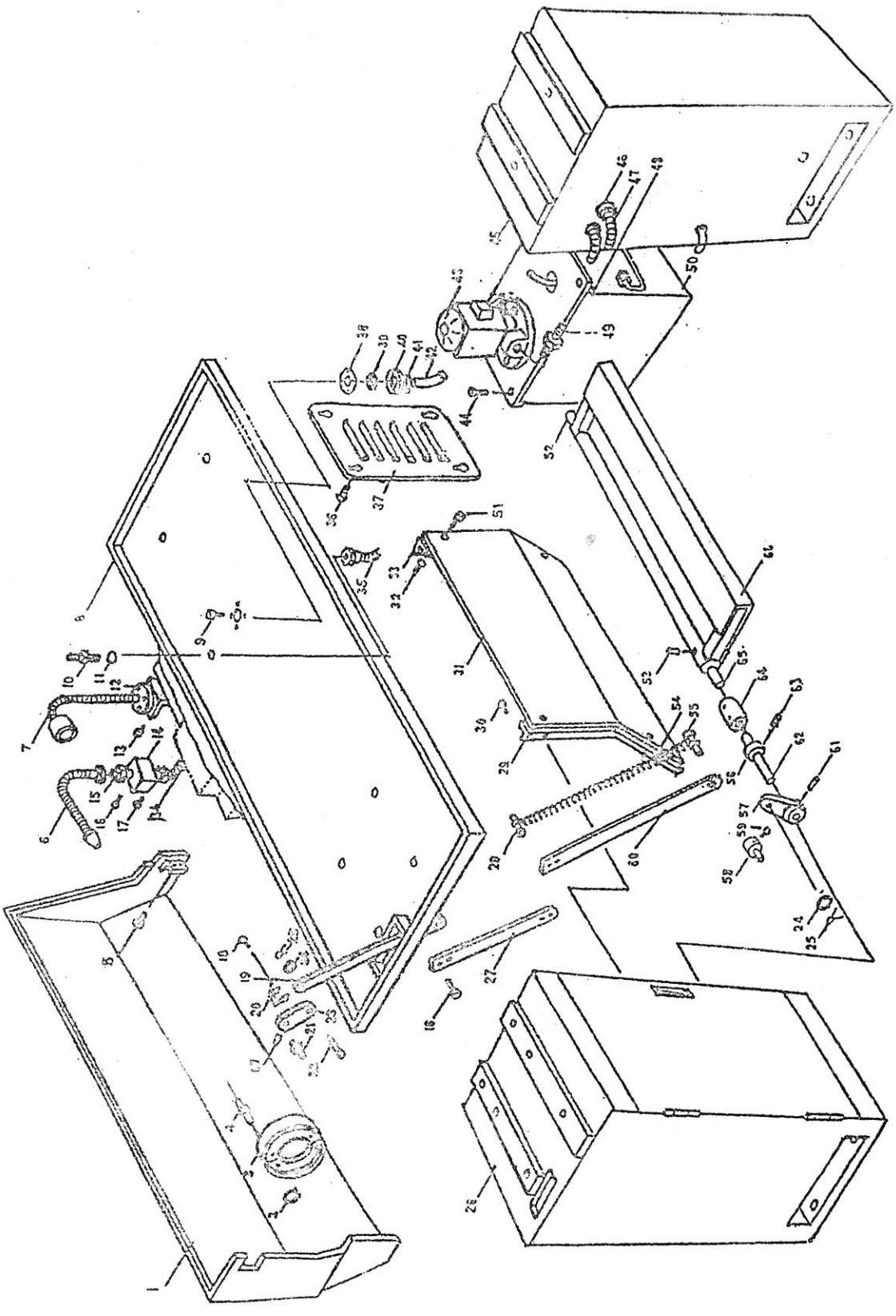
CONTROL SWITCH ASSEMBLY							
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Guide screw	1	1005B	11	Key	1	J31-3A 5 × 5 × 32
2	Rod	1	1006B	12	Pin	1	GB879-86 4 × 20
3	Bracket	1	1012	13	Bracket	1	1014
4	Pin	2	GB118-86 6 × 65	14	Spring	1	GB2089-80 1.2 × 8 × 10
5	Screw	2	GB70-85 M8 × 60	15	Screw	2	GB70-85 M6 × 15
6	Oil cup	2	GB1155-79 6	16	Bracket	1	1015
7	Ball	1	GB308-89 6	17	Handle ball	1	GB4141.11-84 M10 × 32
8	Pin	1	GB879-86 4 × 20	18	Handle	1	1016
9	Bushing	1	1035	19	Circlip	1	GB894.1-86 32
10	Feed rod	1	1010	20	Spring	1	GB2089-80 1 × 5 × 30
				21	Screw	1	GB71-85 M8 × 10

BED AND DRIVE ASSEMBLY



BED AND DRIVE ASSEMBLY							
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Cover	1	1021	11	Spacer	4	GB97.1-85 ¢ 8
2	Screw	2	1002	12	Screw	4	GB5783-86
3	Nut	2	1001	13	Nut	2	GB41-86 M6
4	Trestle	1	1024	14	Screw	2	GB5781-86 M8 × 45
5	Washer	3	1013	15	Screw	2	GB70-85 M8 × 30
6	Screw	3	GB5781-86				
7	Key	1	GB1096-79 8 × 40				
8	Pulley	1	1003A5				
9	Screw	1	GB78-85 M6 × 8				
10	Motor	1	Y90S-4TH				

SPECIAL ACCESSORIES



SPECIAL ACCESSORIES-BASE PART

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Chip guard	1	1023	31	Back plate	1	8601
5	Screw	4	GB70-85 M6 × 16	32	Nut	4	GB41-86 M6
8	Oil pan	1	1022	33	Right bracket	1	8603
26	Left cabinet	1	8400	45	Right cabinet	1	8500
29	Left bracket	1	8602	51	Screw	4	GB70-85 M6 × 16
30	Screw	4	GB70-85 M6 × 16				

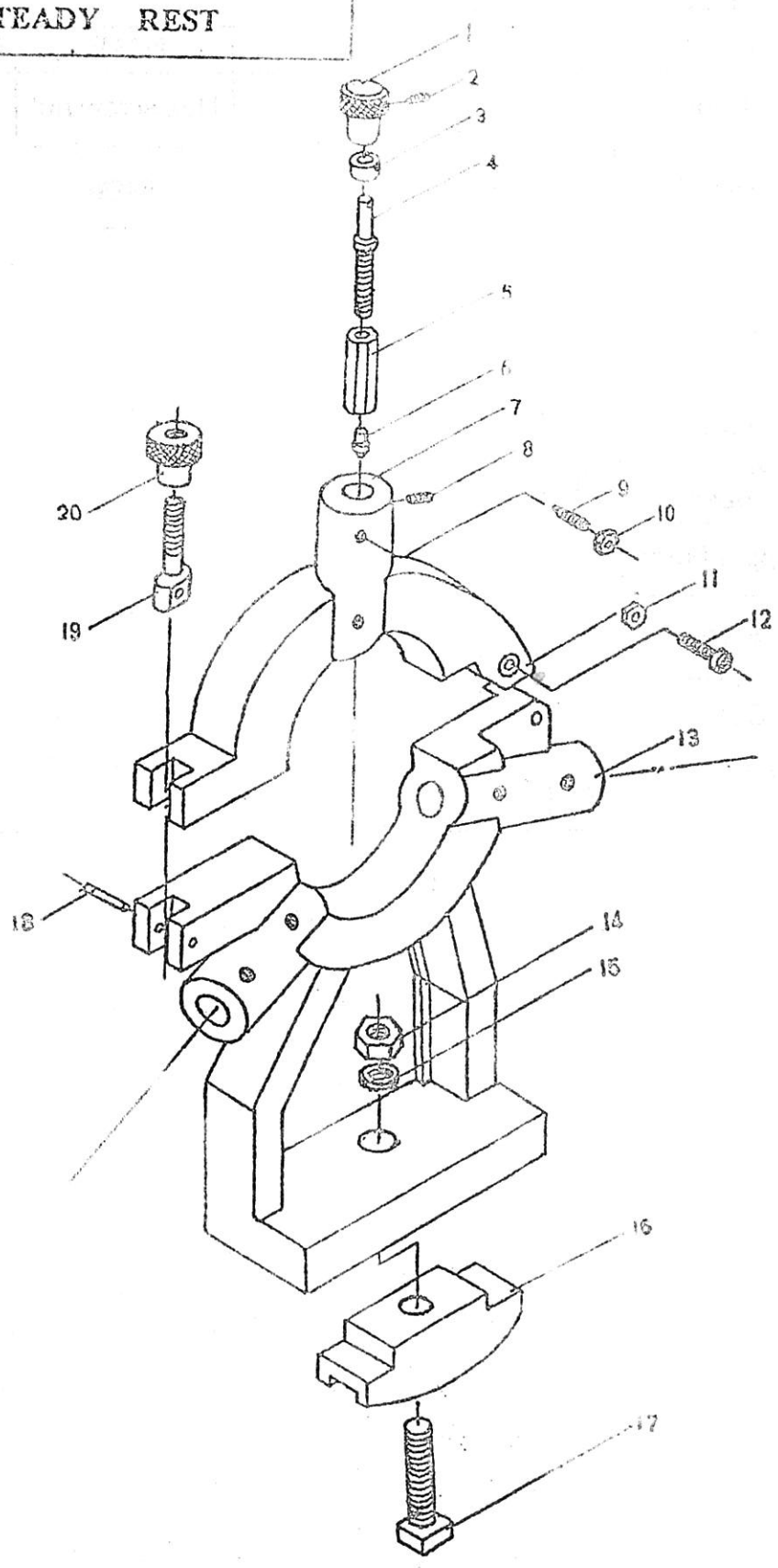
SPECIAL ACCESSORIES-BRAKE PART

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
2	Open circlip	1	GB894.1-86B	53	Spring pin	1	GB879-86 5 × 25
3	Brack block	1		54	Spring	1	1048
4	Shaft	1	1040	55	Shaft	1	1047
16	Screw	2	GB70-85 M6 × 12	56	Circlip	1	GB885 20
18	Screw	1	GB818-85 M4 × 10	57	Shifte r	1	1045
19	Draw rod	1	1043	58	Shaft	1	1052
20	Bracket	1	1053	59	Screw	1	GB70-85 M6 × 30
21	Pivot	1	1042	60	Draw rod	1	1054
22	Pin	1	GB882-67 8 × 20	61	Spring pin	1	GB879-86 5 × 40
23	Shirter	1	1041	62	Shaft	1	1049-1
24	Washer	2	GB97.1-858	63	Screw	1	GB79-88 M6 × 12
25	Open clip	2	GB91-86 2.5 × 16	64	Connecting sleeve	1	1049-3
27	Draw rod	1	1044	65	Shaft	1	1049-2
28	Screw	1	GB70-85 M10 × 30	66	Paddle	1	1050
52	Shaft	1	1051	67	Spring pin	1	GB879-86 4 × 25

SPECIAL ACCESSORIES--COOLING PART							
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
6	Coolant pipe	1	JB/GQ0435-89 G3"/8 × 300	39	Filter	1	9203
9	Screw	4	GB70-85 M5 × 12	40	Pipe	1	9204
10	pipe cennecting	1	9206	41	Hooping	1	2J51002-87 20
11	Washer	1	9207	42	Pine	1	SG79-75 16 × 1000
14	Bracket	1	9208	43	Coolant	1	GB-6B
15	Shaft	1	X6121-06011A	44	Screw	4	GB70-85 M5 × 10
17	Screw	2	GB70-85 M8 × 35	46	Pipe	1	M16 × 15
34	Coolant pipe	1	JB/GQ0435-89 G3"/8 × 800	47	Metal pipe	1	JBGQ0574-85 8 × 1800
35	Coolant pipe	1	JB/GQ0435-89 G3"/8 × 800	48	Cover	1	9210
36	Screw	4	GB818-86 M6 × 12	49	Pipe	1	9206
37	Cover	1	6201A	50	Coolant box	1	9209
38	Papet lining	1	9205				

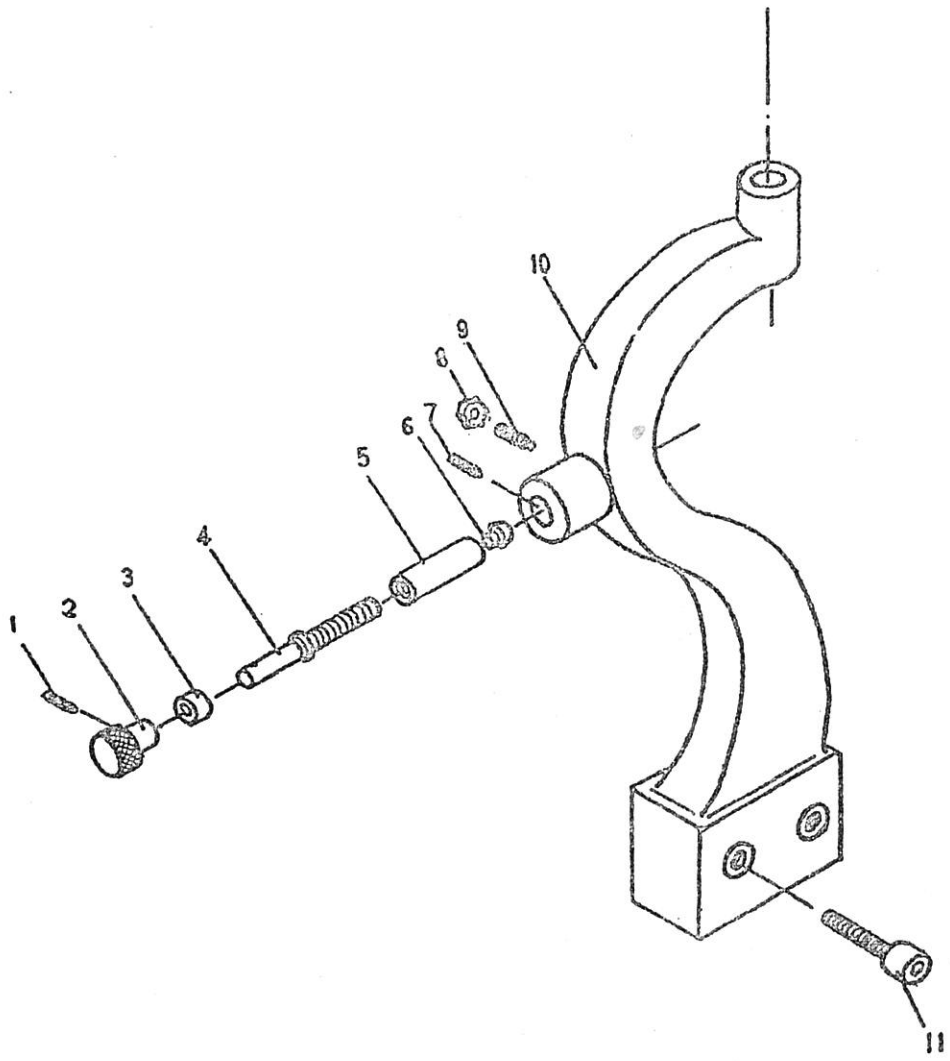
APECIAL ACCESSORIES--LIGHTING PART							
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
7	Working lamp	1		13	Screw	2	GB70-85 M5 × 12
12	Bracket	1	7015				

STEADY REST



STEADY REST							
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Knob	3	8205	11	Hex screw nut	1	GB41-86 M6
2	Screw	3	GB78-85 M6 × 8	12	Screw	1	GB65-85 M6 × 25
3	Collar	3	8207	13	B ase body	1	8201
4	Pressing lever	3	8206	14	Hex screw nut	1	GB41-86 M12
5	Pressing collar	3	8208	15	Washer	1	GB97 1-85 12
6	Pressing base	3	8209	16	Pressing plate	1	8210
7	Upper body	1	8202	17	Square ad bolt	1	GB80-88 M12 × 60
8	Screw	3	GB78-85 M6 × 10	18	Spring pin	1	GB879-85 4 × 25
9	Screw	3	GB79-85 M6 × 16	19	Locking lever	1	8203
10	Hex screw nut	3	GB41-86 M6	20	Locking screw nut	1	8204

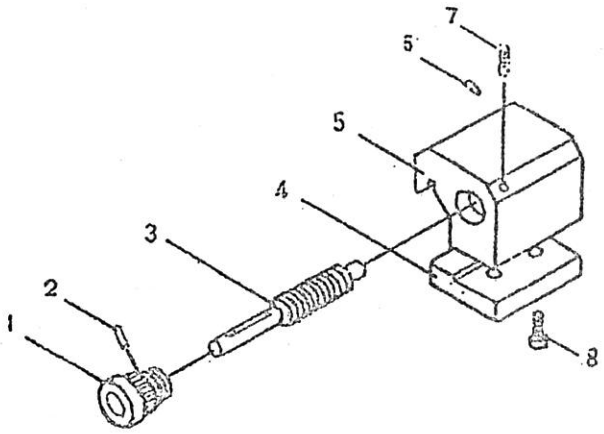
FOLLOW REST



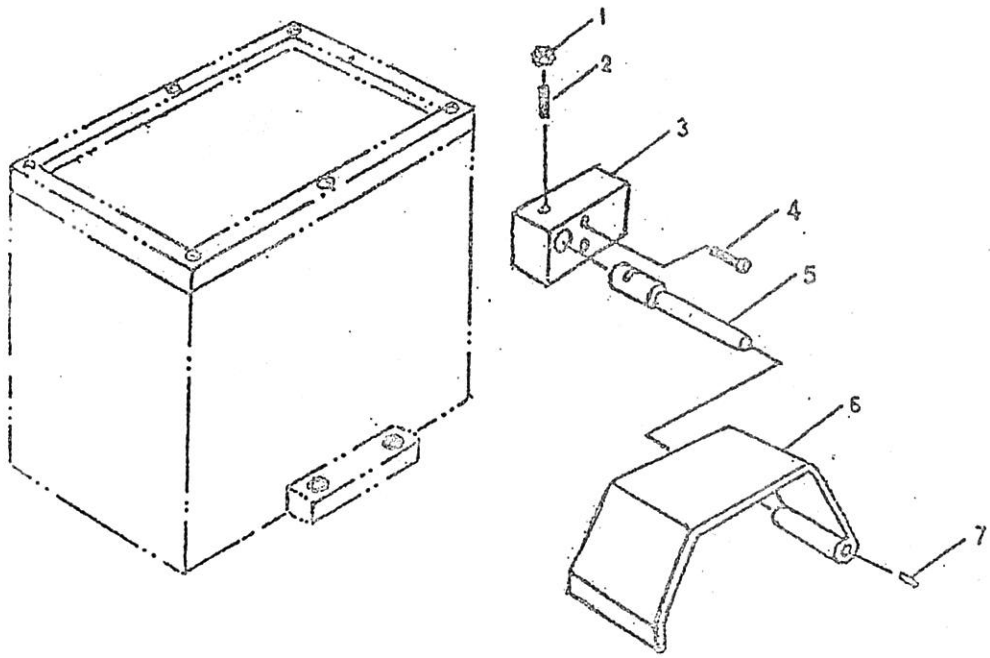
FOLLOW REST

NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Screw	2	GB78-85 M6 × 6				
2	Knob	2	8205				
3	Collar	2	8207				
4	Pressing lever	2	8206				
5	Pressing collar	2	8208				
6	Pressing base	2	8209				
7	Screw	2	GB78-85 M6 × 10				
8	Hex screw nut	2	GB41-86 M6				
9	Screw	2	GB79-85 M6 × 16				
10	Body	1	8201				
11	Bolt	2	GB70-85 M8 × 40				

POSITIONING DEVICE



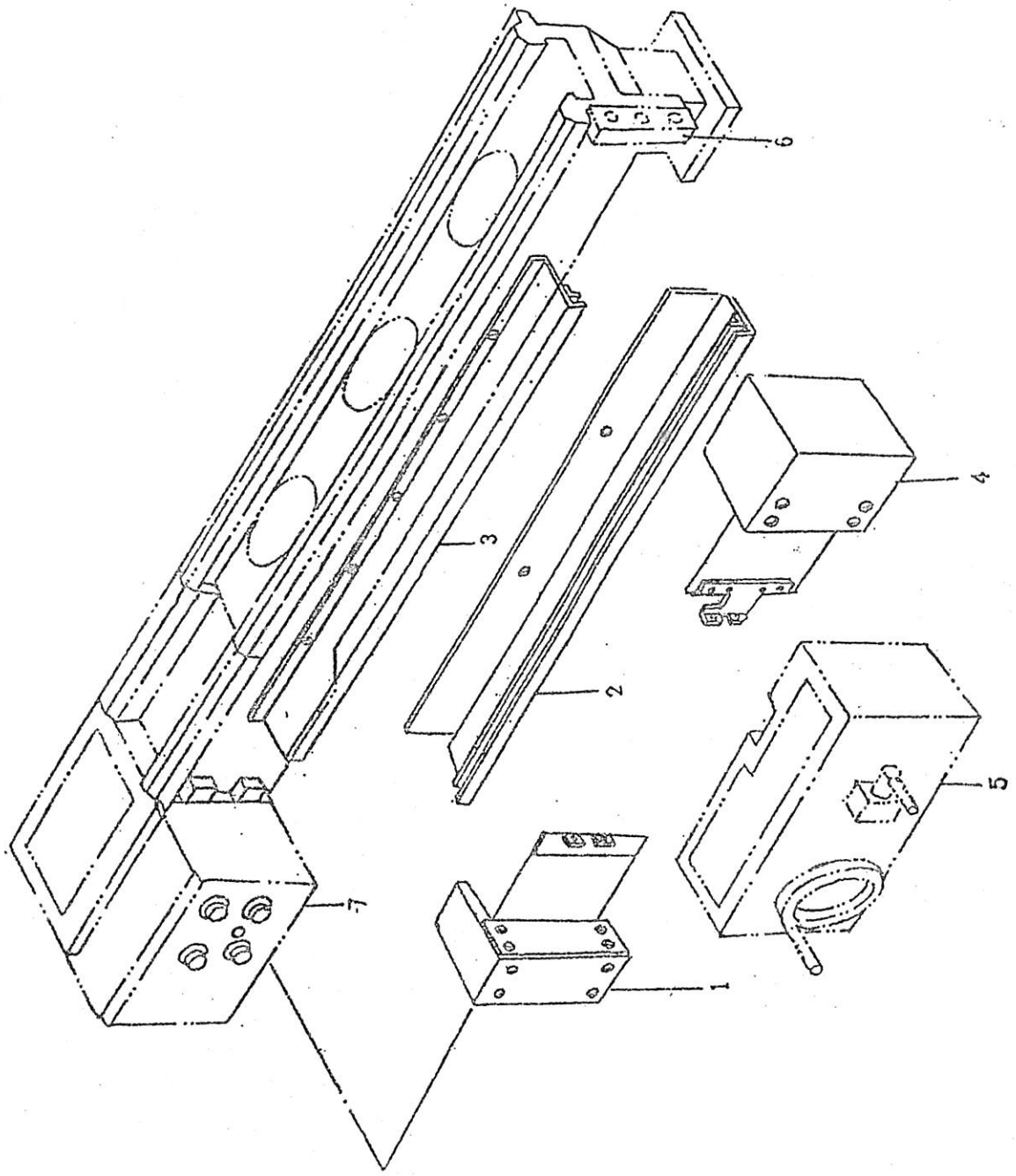
PRETECTING COVER



POSITIONING DEVECE							
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	knob	1	8705	5	Body	1	8703
2	Pin	1	GB879-86 3 × 6	6	Indictor	1	8707
3	Guide Screw	1	8706	7	Screw	1	GB79-85 M6 × 10
4	Pressing plate	1	8704	8	Screw	2	GB70-85 M6 × 12

PROTECTING COVER							
NO	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Nut	1	GB41-86 M6	5	Shaft	1	8902
2	Screw	1	GB75-85 M6 × 16	6	Pretecting cover	1	8903
3	Switch box	1	8901	7	Pin	1	GB79-86 4 × 12
4	Screw	2	GB70-85 M6 × 45				

GUARD



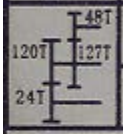
GUARD							
NO.	NAME	QTY	NOTE	NO.	NAME	QTY	NOTE
1	Left box	1	1120				
2	Down board	1	1118				
3	Up board	1	1117				
4	Right box	1	1110				
5	Apron	1	4000				
6	Bracket	1	1012				
7	Gear box	1	3000				

L681 AL335F Threading and Feed Chart 24-11-14

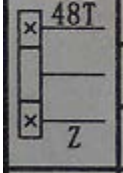
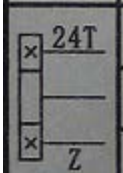
position			E2	E3	E4	B2	B3	C3	C4	A1
48T / 120T / 127T / 24T	SII	~	1.291	1.107	0.996	0.922	0.830	0.738	0.711	0.632
		≷	0.331	0.283	0.256	0.236	0.212	0.190	0.182	0.162
	SI	~	0.646	0.553	0.498	0.461	0.415	0.369	0.356	0.316
		≷	0.166	0.142	0.128	0.118	0.106	0.095	0.091	0.081
24T / 120T / 127T / 48T	SII	~	0.323	0.277	0.249	0.230	0.208	0.184	0.178	0.158
		≷	0.083	0.071	0.064	0.059	0.053	0.047	0.046	0.041
	SI	~	0.161	0.138	0.125	0.115	0.104	0.092	0.089	0.079
		≷	0.041	0.035	0.032	0.030	0.027	0.024	0.023	0.020

position			E2	E3	E4	B2	B3	C3	C4	A1
48T / 24T	SII	~	0.054	0.046	0.042	0.038	0.035	0.031	0.030	0.026
		≷	0.014	0.013	0.011	0.010	0.009	0.008	0.008	0.007
	SI	~	0.027	0.023	0.021	0.019	0.017	0.015	0.015	0.013
		≷	0.007	0.006	0.006	0.005	0.005	0.004	0.004	0.003
24T / 48T	SII	~	0.013	0.012	0.010	0.010	0.009	0.008	0.007	0.007
		≷	0.003	0.003	0.003	0.003	0.003	0.002	0.002	0.002
	SI	~	0.006	0.006	0.005	0.005	0.004	0.004	0.004	0.003
		≷	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001

THREADS METRIC PITCHES mm

position		D4	C4	C3	C2	A4	B2	E4	A2	E2
	MI	0.4	0.45	0.5	0.5625	0.6	0.625	0.7	0.75	0.875
	MII	0.8	0.9	1	1.125	1.2	1.25	1.4	1.5	1.75
	MI	1.6	1.8	2	2.25	2.4	2.5	2.8	3	3.5
	MII	3.2	3.6	4	4.5	4.8	5	5.6	6	7

THREADS IMPERIAL PITCHES 1/inch

position		A2	A3	C3	A4	C3	C3	C3	A1	D4
	Z	24	24	38	24	22	24	26	24	24
	MII	4	4½	9½	5	5½	6	6½	7	7½
	MI	8	9	19	10	11	12	13	14	15
	Z	48	48	38	48	44	48	52	48	48
	MII	16	18	19	20	22	24	26	28	30
	MI	32	36	38	40	44	48	52	56	60

INDICATOR TABLE

1/inch	4	4½	5	6	7
SCALE	1-8	1	1*5	1*3*5*7	1*5
1/inch	8	9	10	11	12
SCALE		1*5	1*3*5*7	1*5	1-8
1/inch	13	14	15	16	18
SCALE	1*5	1*3*5*7	1*5		1*3*5*7
1/inch	19	20	22	24	28
SCALE	1*5	1-8	1*3*5*7		1*3*5*7