LUX-MATTER

1640T/1660T

INSTRUCTION MANUAL

AND

PARTS LISTS

CONTENTS

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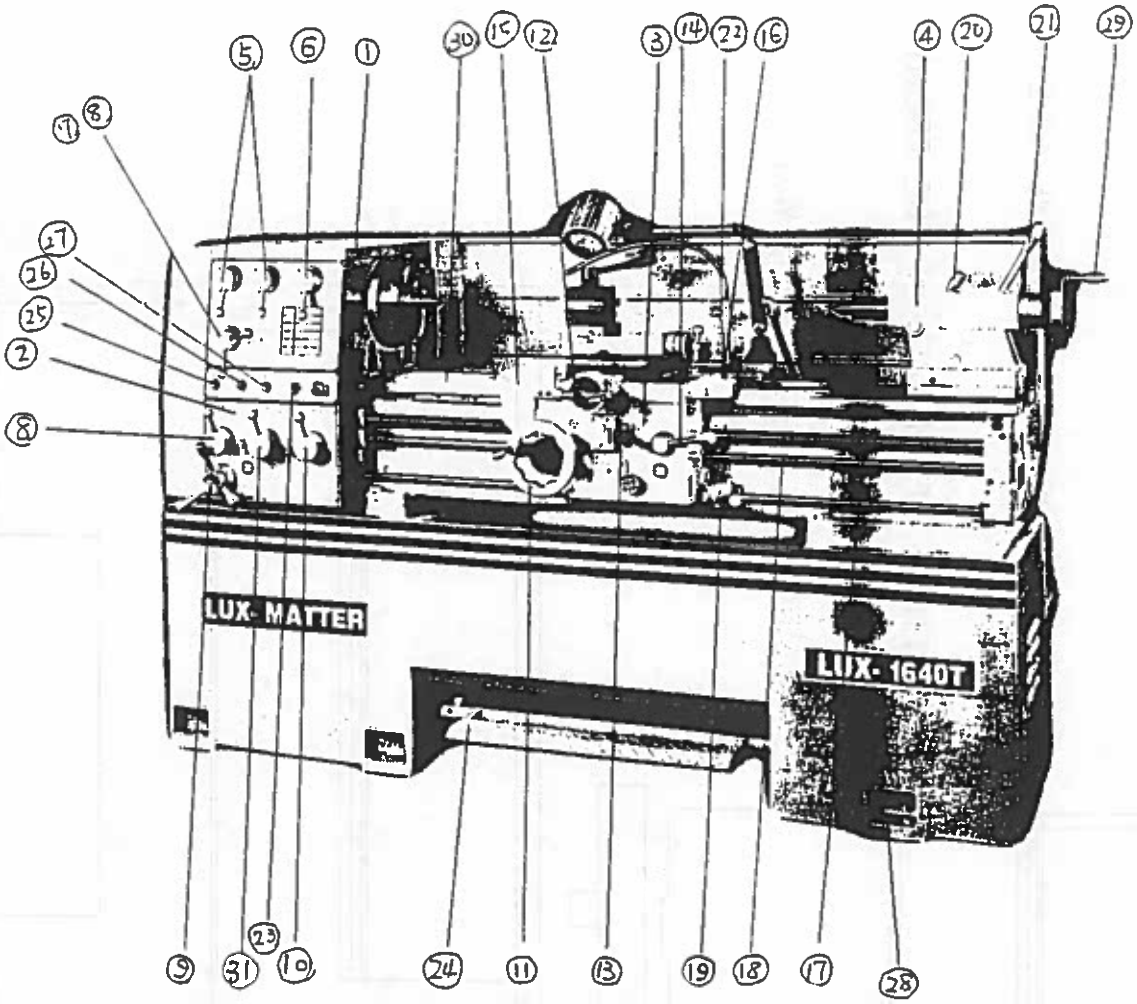
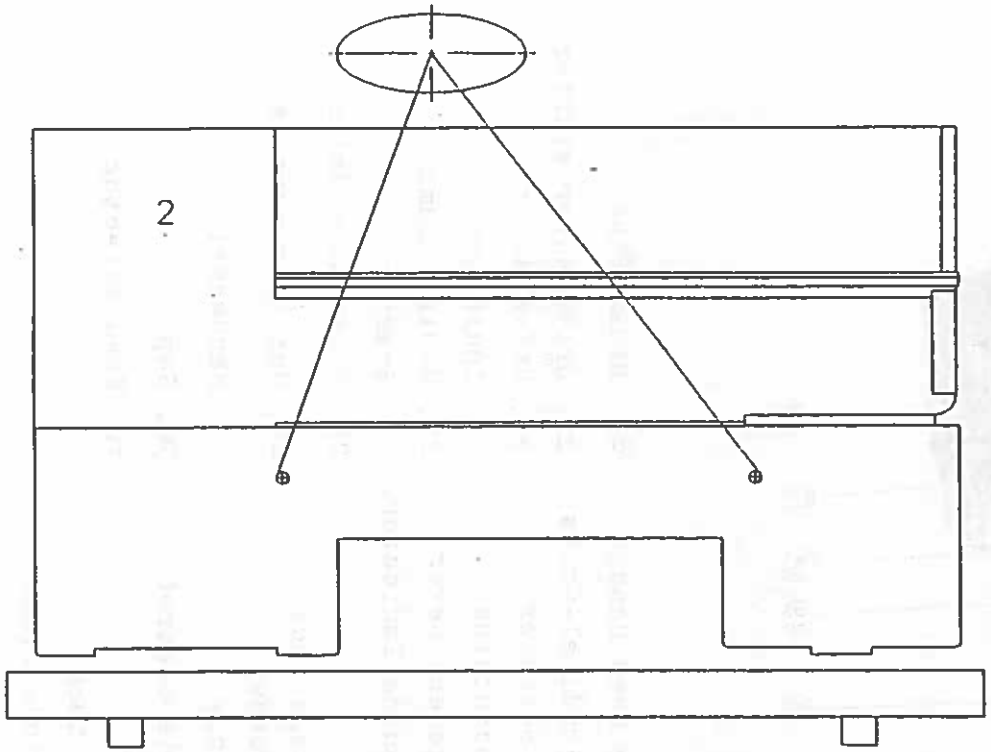
Description



1. Headstock
2. Feed Gear Box
3. Apron
4. Tailstock
5. Spindle Speed selector
6. High-Low Speed Selector
7. Feed Direction Selector
8. Feed Selector
9. Feed Selector Dial
10. Feed-Threading selector
11. Longitudinal Transverse Handwheel
12. Cross Feed Handle
13. Longitudinal-Cross Feed Selector
14. Threadcutting Engagement Lever
15. Threading Indicator Dial
16. Carriage Lock
17. Leadscrew
18. Feed Bar
19. Spindle Control Lever
20. Quill Lock
21. Tailstock Clamp
22. Coolant Pipe
23. Jogging Switch
24. Brake Pedal
25. Drive Motor starter
26. Drive Motor Indicator
27. Coolant pump Starter
28. Foundation Bolts
29. Quill Transverse Handwheel
30. Gap
31. Feed Selector

Installation

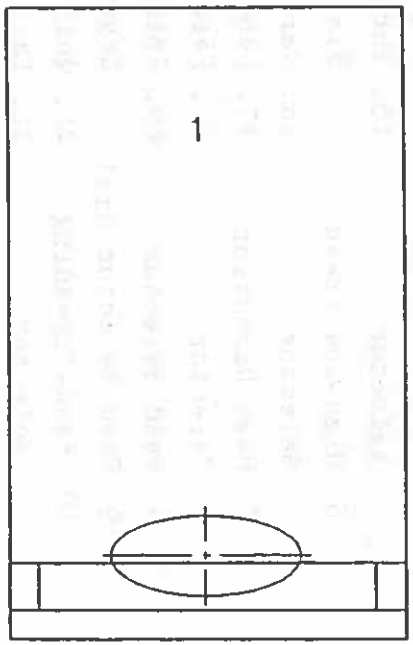
2-1 HAND AND INSTALLATION WAY

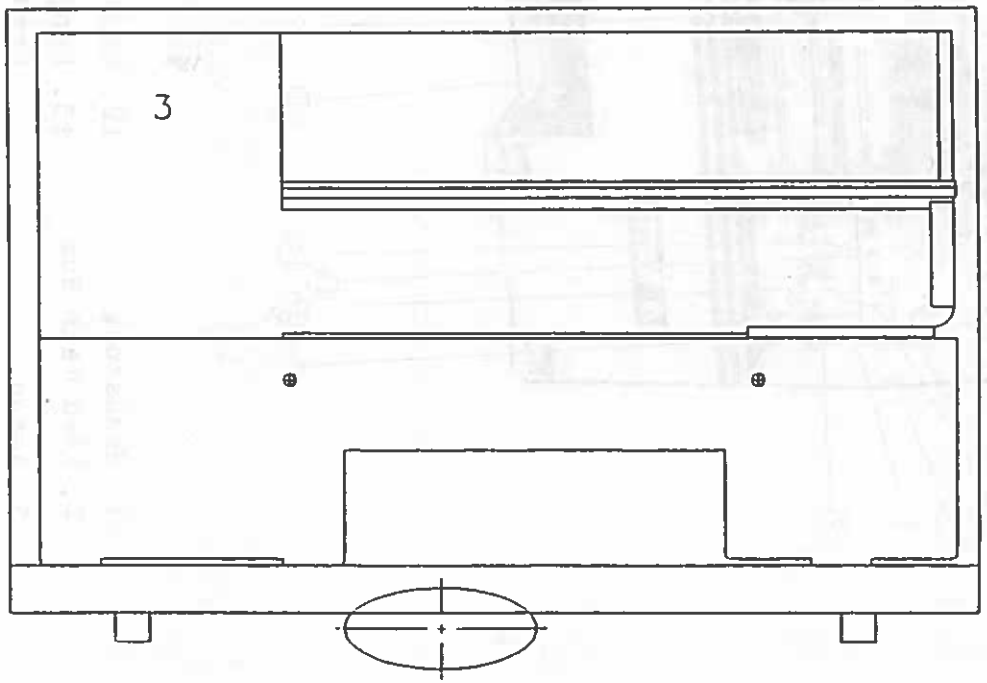


1 : CENTER OF GRAVITY AT THE SIDE

2 : CENTER OF GRAVITY AT THE FRONT

3 : HANG AND INSTALLATION WAY





2-2 FOUNDATION WORK

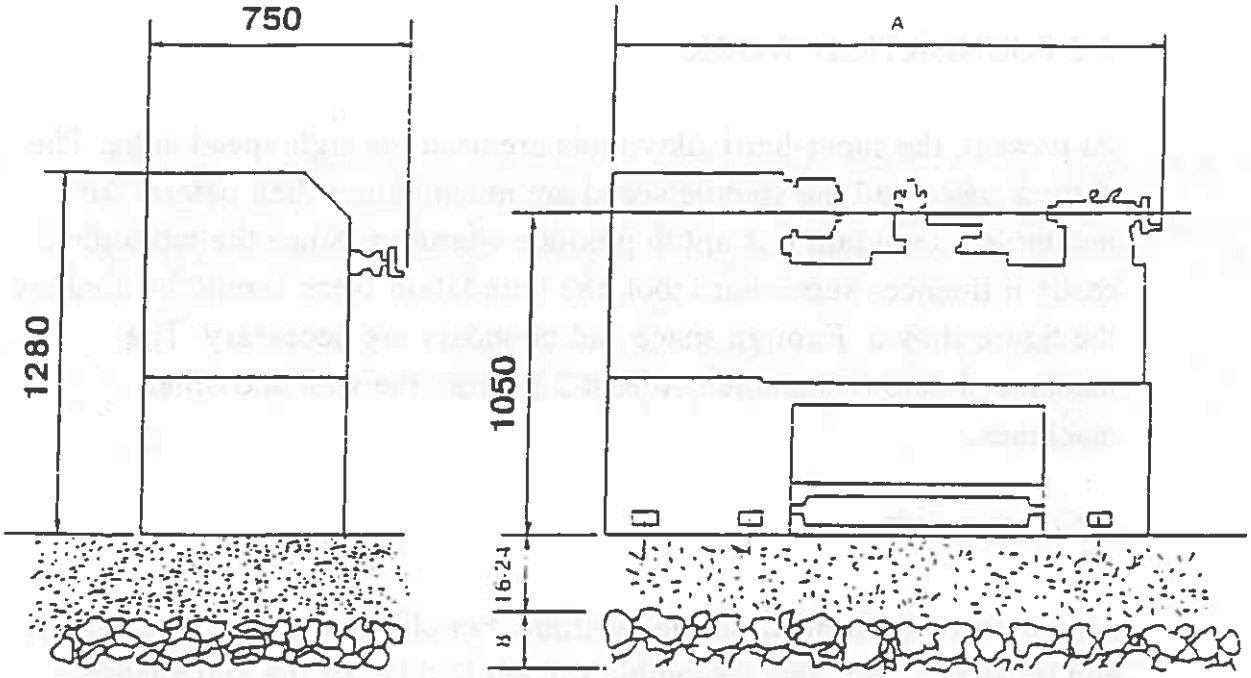
At present, the super-hard alloy tools are used for high-speed lathe. The cutting speed and the spindle speed are much higher then before. An incomplete foundation is apt to produce vibration. Since the vibration easily influences super-hard tool, the foundation work should be done as the figure shown. Enough space and boundary are necessary. The machine should be installed at least 2 ft. from the wall and other machines.

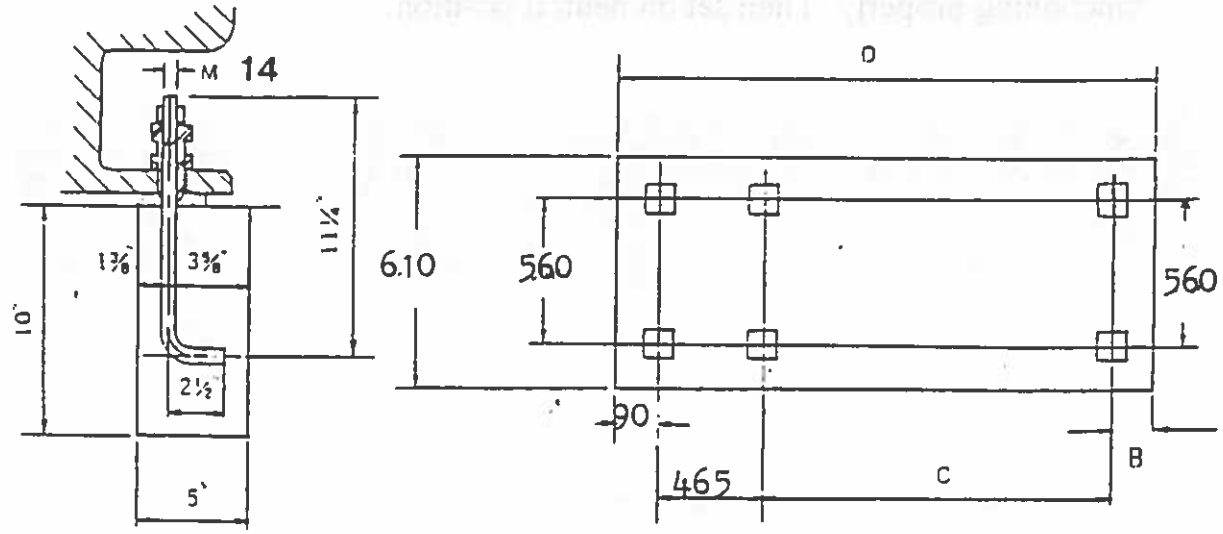
2-3 CLEAN UP

Anticorrosive is applied on the machine. For cleaning up the bed, slides, and leadscrew, etc., use dissoluble solvent to take off the anticorrosive. Do not use lacquerthinner or gasoline. Apply machine oil to all the necessary positions. Check all the handles and levers to see if it is functioning properly. Then set on neutral position.

FOUNDATION DIAGRAM

Fig. 3-1





unit:mm

ITEM / TYPE	A	B	C	D
1640T	**2000**	675	740	1970
1660T	**2508**	675	1248	2478

2-4 LEVEL OF LATHE

Anchor bolts and installation blocks must be fixed steadily to the cement.

For Alignment of the machine, place spirit level which has sensitivity Better than 0.02 mm/1000mm, on guideways of bed, adjust the level of the bed-way from left to right, then adjust the level of saddle, both front and rear, make sure the sensitivity is within 0.04mm/1000mm.

After the adjustment of level, fasten the nuts, if flatness is deviated by fastening nuts, adjust it again untill no deviation is found.

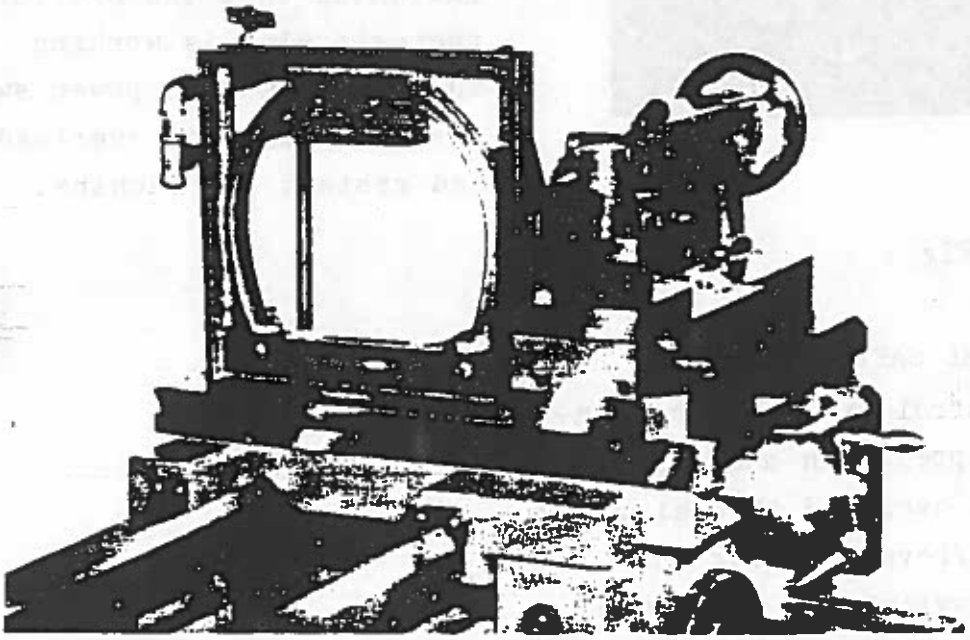


Fig 3

3-1 POWER SOURCE WIRING

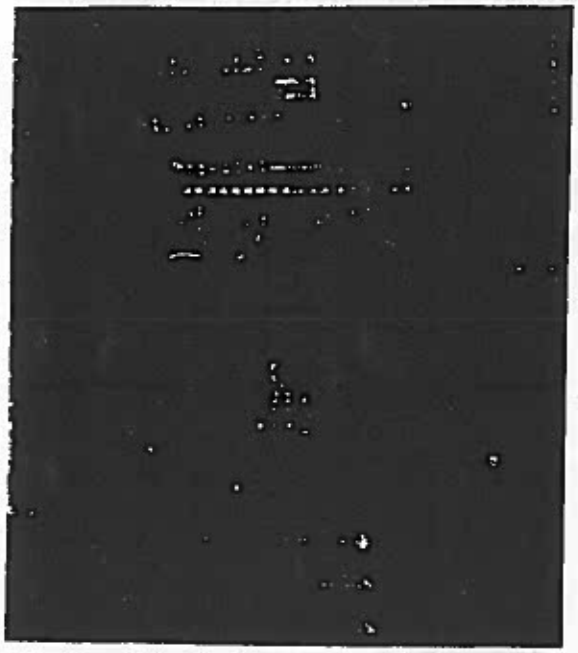


Fig 4

3-2 ELECTRICAL SAFETY FEATURES

1) The control panel of this machine is equipped with magnetic contactor and overload thermal relay.

2) Forward/reverse lever and limited microswitch are connected.

3) Pedal brake device is connected to limited microswitch.

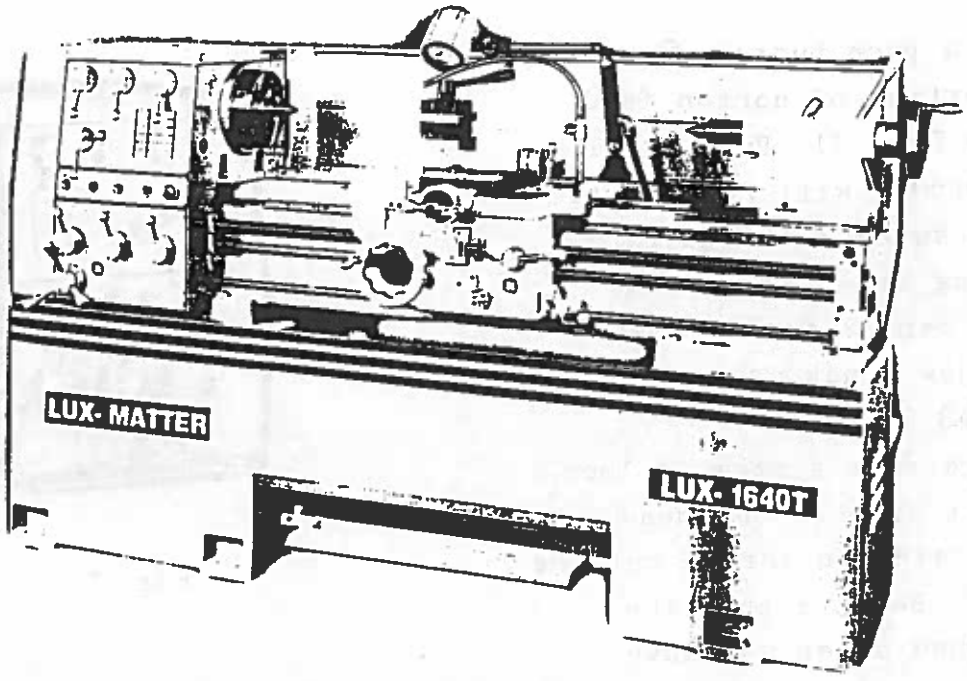
4. There is a jogging switch push botton in the higher right hand side of norton feed gear box.

3-3 CAUTION

After wiring, check the spindle rotating direction. Turn on the power source switch and push the jogging switch button.

If it rotates counterclockwise, it is the correct wiring. If not, replace two of the three wires (R.S.T.). Then check the rotation again.

The overload thermal relay is connected to the magnetic contactor to protect from motor overload. If the spindle speed drops to zero during normal operation, but the pilot light is still on, it indicates that the overload thermal relay is working. Please turn off the main power switch, reset the thermal overload relay and restart the machine.



4-1 SPINDLE ROTATION, STOP AND RESTART

1) Turn on power source switch.
2) Set lever ⑦ at neutral position (Middle Position).
3) Set the spindle speed lever ⑤ to the needed speed. Then set ⑥ High/Low speed control lever to either high or low position and pole change switch to either ⊕ or ⊖ position according to the speed chart shown in Table-1.
4) Push forward/Reverse control lever to the Right and lift if up or push it down toge the forward or reverse revolution.
5) To stop the spindle rotation by using your foot to push the brake pedal.
6) To restart the spindle rotation, use the same Forward/Reverse control lever as before you stop. Then move it to neutral position and repeat step 4).

CAUTIONS !!!

1) Stop spindle rotation before changing spindle speed. Otherwise, the headstock gear will be damaged.
2) If it is hard to set the lever on position when change the speed, push the jogging switch push button, then set the change gear lever again.

ME	930	86
MD	2000	183
MK	1333	123
NE	282	26
ND	602	55
NK	405	36

TWO SPEED MOTOR

ME	465	43
MD	1000	91
MK	666	61
NE	141	13
ND	301	27
NK	202	18

Table 1

4-2 OPERATION OF JOGGING SWITCH PUSH BOTTON

There is a push button ㉓ in the higher portion of norton feed gear box (see Fig. 7). Push it slightly. The spindle will run positively and stop automatically. This is for changing speed easier and adjusting the center for raw material when a 4-jaw chuck is used.

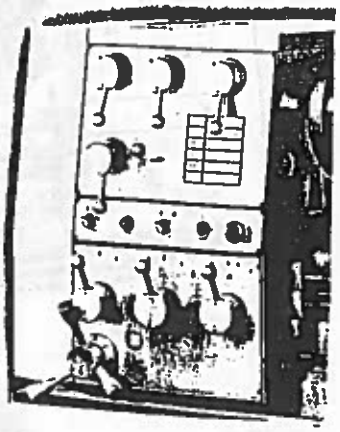


Fig 7

4-3 CHANGE GEAR SYSTEM

The change gear system is located at the left side of the headstock. please refer to thread cutting chart, table 2, Be sure that the gears are aligned after you have changed them.

Caution. Don't attempt to change gears while spindle is rotating.

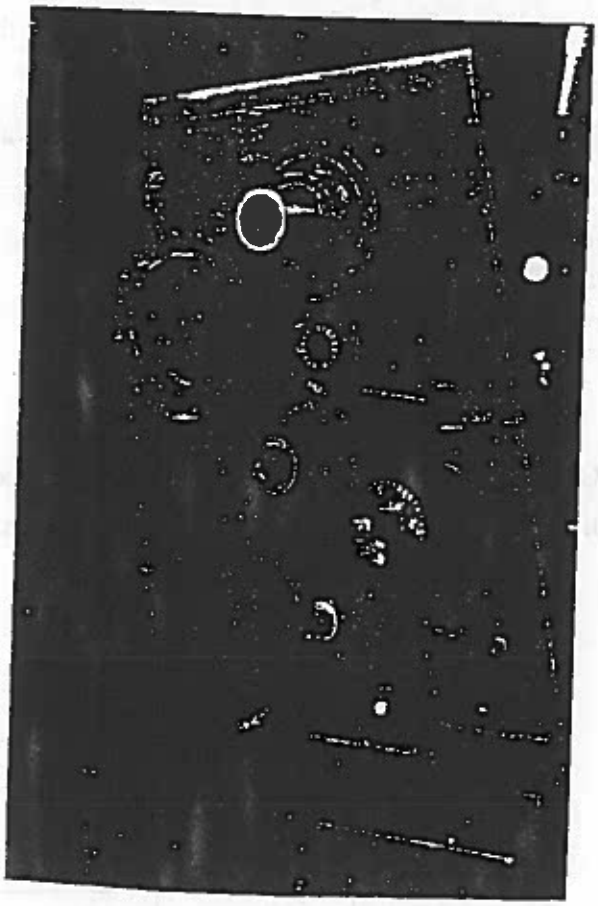


Fig 6

DON'T CHANGE SPEED WHILE ROTATION

PITCH 6mm

28 · 55 · 54 · 64

mm — C

0.2	LT7Y	3	LR4Z
0.225	LT3Y	3.5	HT8Z
0.25	LT1Y	4	HS7Z
0.3	LT4Y	4.5	HS3Z
0.35	LT2Y	5	HS1Z
0.4	LS7Y	5.5	HS5Z
0.45	LS3Y	6	HS4Z
0.5	LS1Y	6.5	HS6Z
0.6	LS4Y	7	HS2Z
0.7	LS2Y	8	HR7Z
0.75	LT4Z	9	HR3Z
0.8	LR7Y	10	HR1Z
.9	LR3Y	11	HR5Z
1	LS7Z	12	HR4Z
1.1	LR5Y	13	HR6Z
1.2	LR4Y	14	HR2Z
1.25	LS1Z		
1.3	LR6Y		
1.4	LR2Y		
1.5	LS4Z		
1.75	LS2Z		
2	LR7Z		
2.5	LR1Z		
2.75	LR5Z		

ins — X

72	LA4R	12	LB4T
60	LA1R	11 ½	LB8T
56	LB2R	11	LB5T
54	LA3R	10	LB1T
48	LB4R	9	LB3T
44	LB5R	8	LB7T
40	LB1R	7 ½	HA1S
36	LB3R	7	HB2S
32	LB7R	6	HB4S
30	LA1S	5	HB1S
28	LB2S	4 ½	HB3S
27	LA3S	4	HB7S
26	LB6S	3 ¾	HA1T
24	LB4S	3 ½	HB2T
23	LB8S	3 ¼	HB6T
22	LB5S	3	HB4T
20	LB1S	2 ⅞	HB8T
19	LC1S	2 ¾	HB5T
18	LB3S	2 ½	HB1T
16	LB7S	2 ¼	HB3T
15	LA1T	2	HB7T
14	LB2T		
13 ½	LA3T		
13	LB6T		

PITCH 6mm

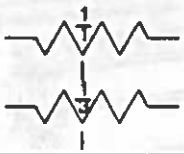
22 · 55 · 54 · 64

mod. C — d.p. W

0.3	HT4Y	44	HB5R
0.4	HS7Y	40	HB1R
0.5	HS1Y	36	HB3R
0.6	HS4Y	32	HB7R
0.7	HS2Y	30	HA1S
0.8	HR7Y	28	HB2S
0.9	HR3Y	26	HB6S
1	HS7Z	24	HB4S
1.25	HS1Z	22	HB5S
1.5	HS4Z	20	HB1S
1.75	HS2Z	19	HC1T
2	HR7Z	18	HB3S
2.25	HR3Z	16	HB7S
2.5	HR1Z	15	HA1T
2.75	HR5Z	14	HB2T
3	HR4Z	13	HB6T
3.25	HR6Z	12	HB4T
3.5	HR2Z	11	HB5T
		10	HB1T
		9	HB3T
		8	HB7T

mm W ins

0.04	LCT7	0.0015
0.05	LCT3	0.002
0.06	LCT5	0.0025
0.07	LCT6	0.0028
0.08	LCS7	0.003
0.1	LCS3	0.004
0.12	LCS4	0.005
0.15	LCR7	0.006
0.2	LCR1	0.008
0.25	LCR4	0.01
0.3	LCR8	0.012
0.4	HCS3	0.016
0.5	HCS4	0.02
0.6	HCS2	0.024
0.7	HCR7	0.028
0.8	HCR3	0.03
1.0	HCR4	0.04
1.2	HCR2	0.047



4 T.P.I.

24 · 44 · 56 · 57

mm — C

0.2	LT7Y	3	LR4Z
0.225	LT3Y	3.5	HT8Z
0.25	LT1Y	4	HS7Z
0.3	LT4Y	4.5	HS3Z
0.35	LT2Y	5	HS1Z
0.4	LS7Y	5.5	HS5Z
0.45	LS3Y	6	HS4Z
0.5	LS1Y	6.5	HS6Z
0.6	LS4Y	7	HS2Z
0.7	LS2Y	8	HR7Z
0.75	LT4Z	9	HR3Z
0.8	LR7Y	10	HR1Z
.9	LR3Y	11	HR5Z
1	LS7Z	12	HR4Z
1.1	LR5Y	13	HR6Z
1.2	LR4Y	14	HR2Z
1.25	LS1Z		
1.3	LR6Y		
1.4	LR2Y		
1.5	LS4Z		
1.75	LS2Z		
2	LR7Z		
2.5	LR1Z		
2.75	LR5Z		

ins — X

72	LA4R	12	LB4T
60	LA1R	11 ½	LB8T
56	LB2R	11	LB5T
54	LA3R	10	LB1T
48	LB4R	9	LB3T
44	LB5R	8	LB7T
40	LB1R	7 ½	HA1S
36	LB3R	7	HB2S
32	LB7R	6	HB4S
30	LA1S	5	HB1S
28	LB2S	4 ½	HB3S
27	LA3S	4	HB7S
26	LB6S	3 ¾	HA1T
24	LB4S	3 ½	HB2T
23	LB8S	3 ¼	HB6T
22	LB5S	3	HB4T
20	LB1S	2 ⅞	HB8T
19	LC1S	2 ¾	HB5T
18	LB3S	2 ½	HB1T
16	LB7S	2 ¼	HB3T
15	LA1T	2	HB7T
14	LB2T		
13 ½	LA3T		
13	LB6T		

4 T.P.I.

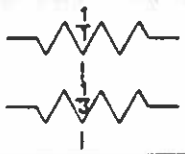
24 · 44 · 56 · 57

mod. C — d.p. W

0.3	HT4Y	44	HB5R
0.4	HS7Y	40	HB1R
0.5	HS1Y	36	HB3R
0.6	HS4Y	32	HB7R
0.7	HS2Y	30	HA1S
0.8	HR7Y	28	HB2S
0.9	HR3Y	26	HB6S
1	HS7Z	24	HB4S
1.25	HS1Z	22	HB5S
1.5	HS4Z	20	HB1S
1.75	HS2Z	19	HC1T
2	HR7Z	18	HB3S
2.25	HR3Z	16	HB7S
2.5	HR1Z	15	HA1T
2.75	HR5Z	14	HB2T
3	HR4R	13	HB6T
3.25	HR6Z	12	HB4T
3.5	HR2Z	11	HB5T
		10	HB1T
		9	HB3T
		8	HB7T

mm W ins

0.04	LCT7	0.0015
0.05	LCT3	0.002
0.06	LCT5	0.0025
0.07	LCT6	0.0028
0.08	LCS7	0.003
0.1	LCS3	0.004
0.12	LCS4	0.005
0.15	LCR7	0.006
0.2	LCR1	0.008
0.25	LCR4	0.01
0.3	LCR8	0.012
0.4	HCS3	0.016
0.5	HCS4	0.02
0.6	HCS2	0.024
0.7	HCR7	0.028
0.8	HCR3	0.03
1.0	HCR4	0.04
1.2	HCR2	0.047



For longitudinal feed, push down lever ⑬. For Cross Feed, pull up lever ⑬. please refer to Table 2.

4-4 MANUAL FEED

Carriage moves longitudinally by turning hand wheel 11 (Be sure to set lever ⑦ and ⑬ at neutral position, and pull levers ⑭ up). one division of hand wheel dial is corresponding to 0.006"and its one turn corresponds to 0.72"travel of carriage.

4-5 AUTOMATIC FEED

Automatic feed is operated as Follows:

1) Choose feed direction by lever ⑦.
2) Set change gears and shift levers ⑧ & ⑨ & ㉛ to desired feed value.
3) Shift lever ⑩ to feed position.
4) Pull lever ⑭ up.
5) Feed Selector ⑬ to select eithther longitudinal feed or cross feed.
6) Shift lever ⑲ to select direction of spindle rotation.
7) Automatic feed starts when ㉜ lever is operated and stops when it is pulled up to neutral position.

4-6 SWIVEL SLIDE

Loose two capscrews before swiveling it. (as shown Fig. 8)

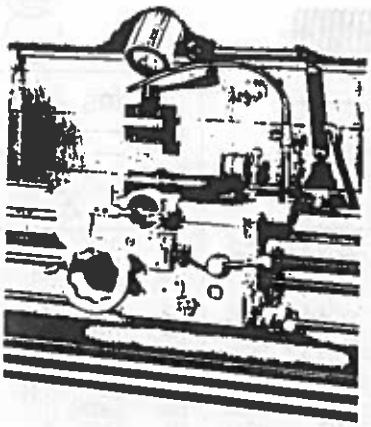
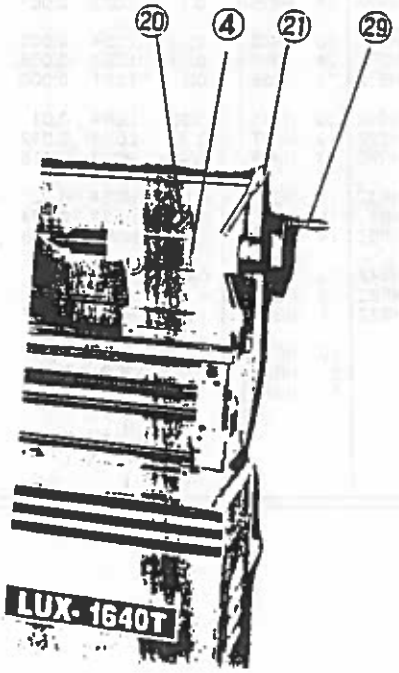


Fig 8

4-7 TAILSTOCK

Tailstock spindle moves out by turning hand wheel ㉙ Either the arbor of drill chuck or tailstock spindle center comes out by excess returning of tailstock spindle.

Tailstock Spindle is clamped by pushing lever ⑳ reverse to headstock. The tailstock is clamped by pulling lever ㉑ upward. One division of its hand wheel dial corresponds to 0.025" and its one turn corresponds to 0.125" travel of tailstock spindle.



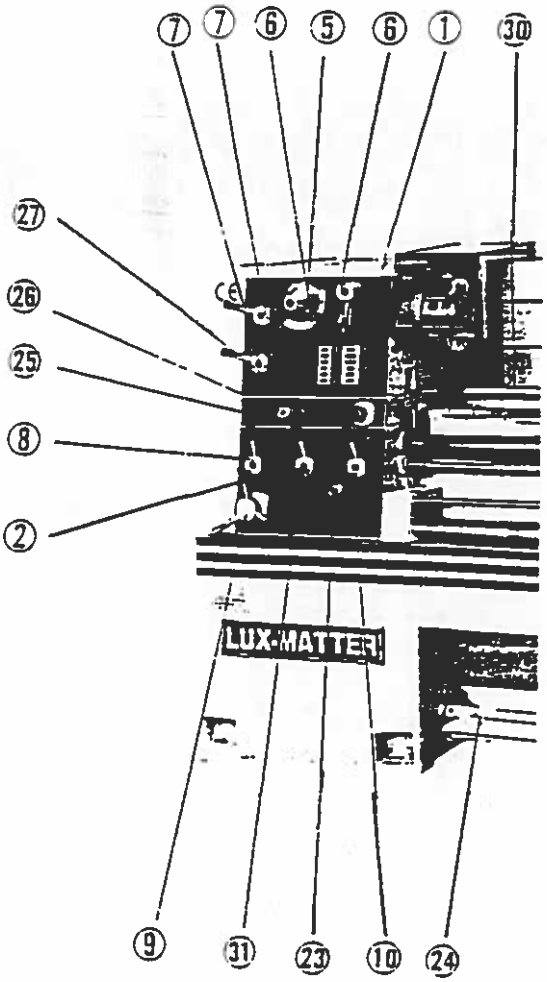
5-1 LEADSCREW OPERATION

Shift the lever ⑦ to the right or left, the leadscrew run forward or reverse rotation respectively.

5-2 INCH THREAD SYSTEM

The inch thread cutting is operated as follow:

1) The change gears are aligned according to the Table 3.
2) Then according to Table 4. shift levers ⑧ ¢ ⑩ & ㉛ to the desired position. Put lever ⑨ to one of 8 positions.
3) Shift lever ⑲ to select direction of spindle rotation.
4) Push lever ⑭ down (half nut engaged) to start threading.



5-3 THREAD CUTTING INDICATOR

The thread cutting indicator installed on the headstock tag which has eight graduations. For cutting inch thread, the thread cutting indicator is prepared for correct position of half nut engaging conveninently and quickly.

As to metric thread cutting, half nut should be engaged with lead-screw completely(When leadscrew is inch). Let tool post back up to starting position by reversing spindle rotation, then feed again.

INDICATOR TABLE

T.P.I.	SCALE	T.P.I.	SCALE	T.P.I.	SCALE
4	1-4	12	1-4	38	1 3 / 2 4
4 1/2	/	13	1	40	1-8
4 3/4	/	14	1 3 / 2 4	44	1-4
5	1	16	1-8	48	1-8
5 1/2	/	18	1 3 / 2 4	52	1-4
6	1 3 / 2 4	19	1	56	1-8
6 1/2	/	20	1-4	64	1-8
7	1-4	22	1 3 / 2 4	72	1-8
8	1-8	24	1-8	76	1-4
9	1	26	1 3 / 2 4	80	1-8
9 1/2	/	28	1-4	96	1-8
10	1 3 / 2 4	32	1-8	104	1-8
11	1	36	1 3 / 2 4	112	1-8

INCH

PITCH	WORM	
0.5 1.25 2.5 4.0 5.0	20T	
0.75 1.0 1.5 1.75 2.0 3.0 3.5 6.0 7.0	21T	

METRIC

Table 3

6-1 LUBRICATIONS

6-1-1 LUBRICATION IN HEADSTOCK & NORTON FEED GEAR BOX.

oil-bathed lubrication for both gear boxes. please be sure the oil no lower than min. Level of oil window.

6-1-2

Lubrication in Change gears (Transmission gears) Open the V-Belt cover, Lubricating with oil for daily maintenance.

6-1-3

LUBRICATION IN CARRIAGE

Carriage Slides and Cross Screw to be oiled by Hand pump.

6-1-4 LUBRICATION IN APRON

The oil cap in the right hand side of apron are for oiling. Be sure oil on proper height of oil windown. To change the oil in apron, the oil can be removed by taking off the drain plug at bottom of apron.

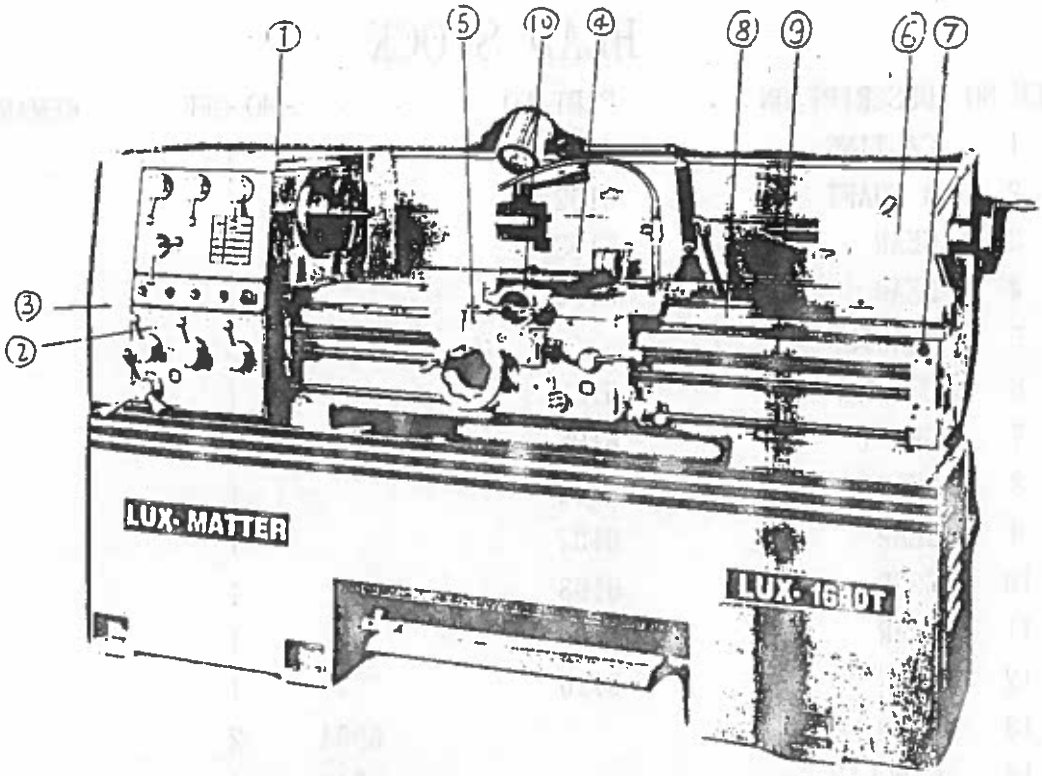
6-1-5 LUBRICATION IN BEDWAYS. LEADSCREW and Leadscrew Bracket Hand oiling is required from time to time.

6-1-6 Coolant for Cutting

The coolant pump control switch is Located top of Norton Feed gear box. The pump works while turn on.

TROUBLE SHOOTING CHART		
TROUBLE	PROBABLE CAUSE	CORRECTION
Vibration	Loose leveling screws	Set all screws so they bear evenly on leveling plates.
	Torn or mismatched vee belts	Replace vee belts with matched set, or adjust roll.
	Work or chuck out of balance operating at high spindle speed.	Balance chuck or reduce spindle speed.
	Motor out of balance	Contact local representative of motor manufacturer.
Chatter	Tool bit improperly ground or not on center	Regrind tool bit or adjust tool holder so that area of contact between tool bit and work is decreased. Avoid extreme negative rake angle.
	Tool overhang too great	Keep point of tool bit as close as possible to tool holder.
	Using improper surface feet	Recuce or increase spindle Speed.
	Feed rate too high or too low	Reduce or increase feed.
	Gibs of cross slide or pound rest loose	adjust gibs.
	Spindle bearings worn	Adjustspindle bearings.
Chatter (cont'd)	Work Imporoperly supported	Adjust tailstock center. Use steady rest or follow rest on long slender shafts. Minimize tailstock barrel extension.
	Vibration	See "Vibration" trouble above.
	Spindle bearing loose	Adjust spindle bearings.
Work not turned straight	Headstock and tailstock centers not aligned.	Align tailstock center.
	Work improperly supported	Use steady rest of follow rest.
		Reduce overhang from chuck.
	Bed not level	Relevel bed, using precision level.
	Tool not on center when using taper attachment	Put tool on center.
Work out of round	Work loose between centers or centers are excessively worn—work centers out of round	Adjust tailstock center. regrind centers. Lap work centers.
	Loose headstock spindle bearings	Adjust headstock spindle bearings.

TROUBLE SHOOTING CHART		
TROUBLE	PROBABLE CAUSE	CORRECTION
Cross slide or compount rest movement does not coincide with dial movement of respective adjusting screw.	Gib setting too tight or too loose	Adjust gibs.
	eork is too long and slender	Use steady rest or follow rest.



LUBRICATION DIAGRAM

No Inlet	Methods	Qty.	oil no.	Schedule	Oil change
1.Headstock	Open oil tank cover.		1	Gauge once a month of oil tank in Left stand.	New machine once a manth, later every other Month.
2. Feed Gear Box.					
3. Change Gears	Open the V-pully cover.	few	2	Daily	
4. Compound	Use gun oiler	few	2	Daily	
5. Apron	Open the cup, fill by gun oiler	few	2	Daily	
6. Tailstock	Use Gun Oiler	few	2	Daily	
7. Leadscrew	Fill with gun oiler	few	2	Daily	
8. Bed way	Fill with Hand Pump	few	2	Daily	
9. Leadscrew	Fill with gun oiler	few	2	Daily	
10. Carriage-screw	Fill with Hand Pump	few	2	Daily	

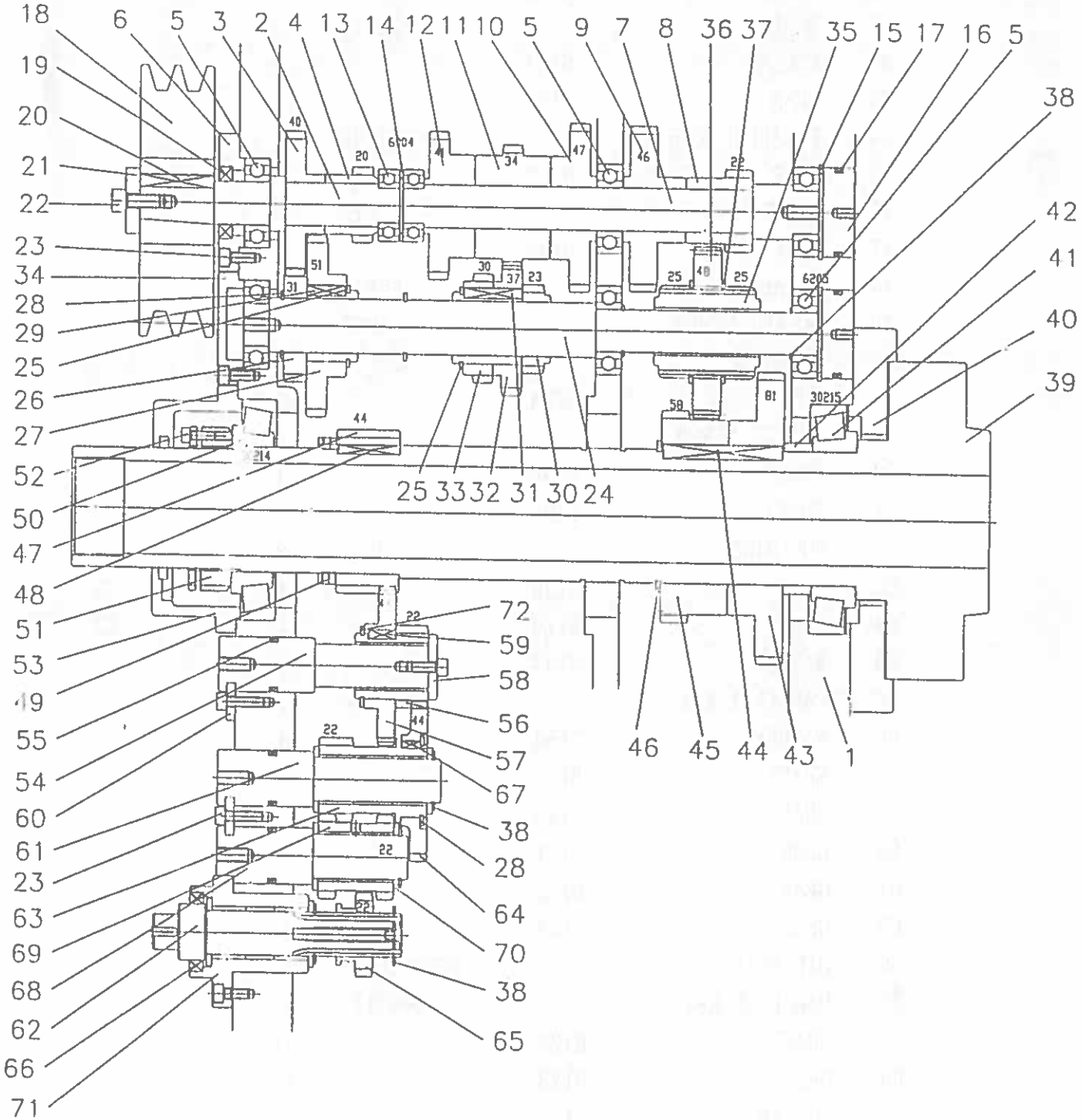
OIL NO.	MOBIL	ESSO	SHELL
1	D.T.E. Heavy Medium	Tellesso 52	Fellus 33
2	Vactra No.2	Febis K-55	Tonna Oil 27

HEAD STOCK

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
1	CASTING	6101		1	
2	A SHAFT	6102		1	
3	GEAR	6103		1	
4	GEAR	6104		1	
5	BEARING		6205	5	
6	COVER	6138		1	
7	SHAFT	6105		1	
8	GEAR	6106		1	
9	GEAR	6107		1	
10	GEAR	6108		1	
11	GEAR	6109		1	
12	GEAR	6110		1	
13	BEARING		6004	2	
14	CIRCLIP		R42	1	
15	CIRCLIP		R52	2	
16	PLUG	6140		2	
17	"O" RING		P46	2	
18	PULLEY	6139		1	
19	OIL SEAL		TC25*42*8	1	
20	PARALLEL KEY		8*7*44	1	
21	~~SHAFT~~ WASHER	~~8121~~ 8148		1	
22	SOCKET SCREW		M8*25	1	
23	SOCKET SCREW		M6*16	15	
24	SHAFT	6111		1	
25	CIRCLIP		S42	3	
26	GEAR	6112		1	
27	GEAR	6113		1	
28	CIRCLIP		S32	2	
29	PARALLEL KEY		6*6*22	1	
30	GEAR	6114		1	
31	PARALLEL KEY		6*6*34	1	
32	GEAR	6115		1	
33	GEAR	6116		1	
34	COVER	6137		1	
35	GEAR	6117		1	
36	GEAR	6118		1	

HEAD STOCK

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
37	CIRCLIP		S54	2	
38	CIRCLIP		S25	6	
39	SPINDLE	6130		1	
40	COVER	6135		1	
41	BEARING		30215	1	
42	COLLAR	6141		1	
43	GEAR	6131		1	
44	PARALLEL KEY		8*7*68	1	
45	GEAR	6132		1	
46	CIRCLIP		S75	1	
47	GEAR	6133		1	
48	PARALLEL KEY		5*5*35	1	
49	SOCKET SCREW		M8*8	2	
50	BEARING		30214	1	
51	NUT	6134		1	
52	SOCKET SCREW		M5*16	2	
53	COVER	6136		1	
54	SHAFT	6128		1	
55	"O" RING		P26	3	
56	GEAR	6120		1	
57	GEAR	6119		1	
58	WASHER	8137		1	
59	PARALLEY KEY		5*5*15	1	
60	WASHER	7154		3	
61	SHAFT	6127		1	
62	SHAFT	6125		1	
63	GEAR	6121		1	
64	GEAR	6122		1	
65	GEAR	6124		1	
66	OIL SEAL		TC32*45*8	1	
67	PARALLEL KEY		4*4*11	1	
68	SHAFT	6126		1	
69	GEAR	6123		1	
70	COLLAR	7135		6	
71	KEEP ASSY	6129		1	
72	CIRCLIP		S38	1	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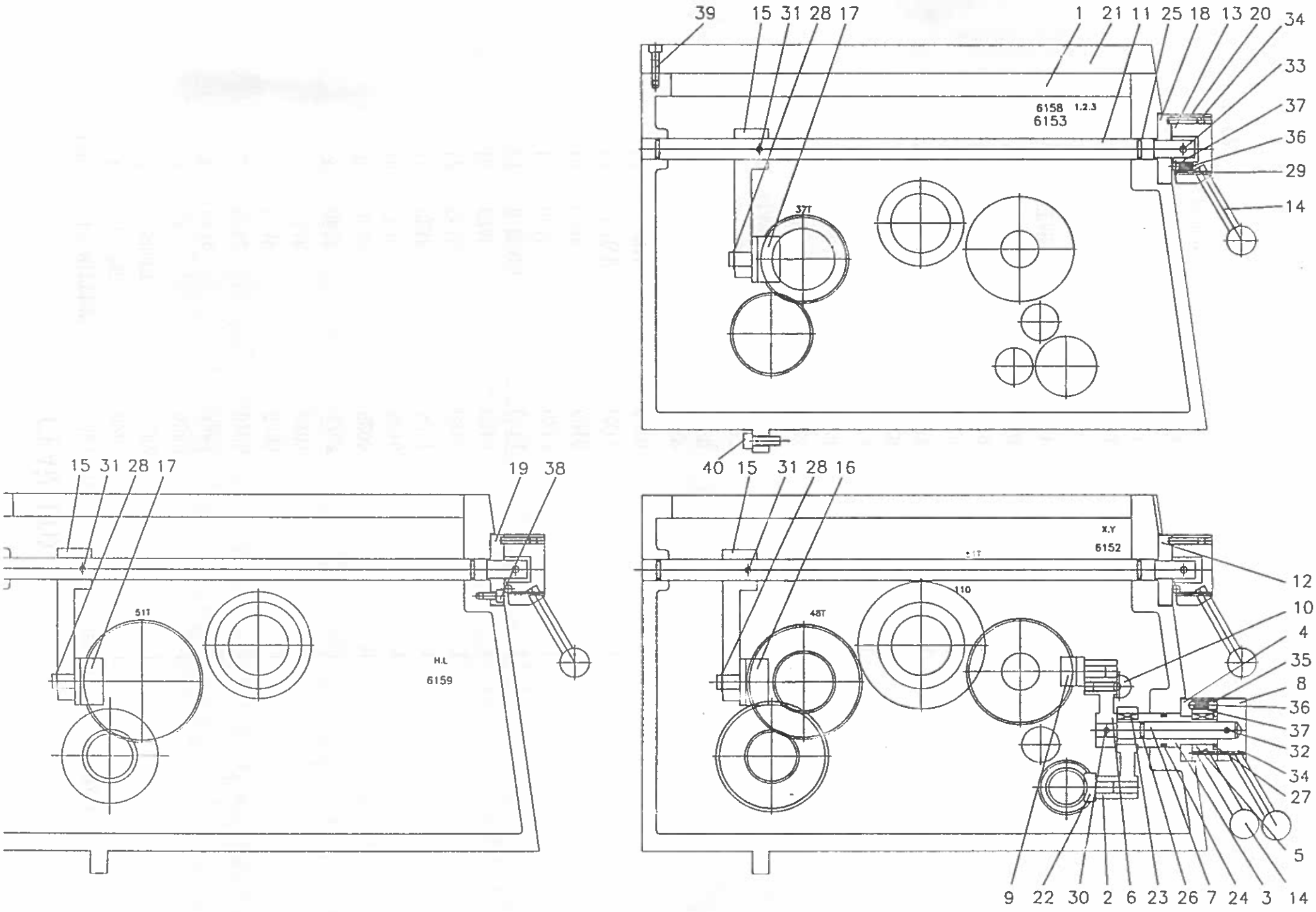
HEAD STOCK

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
1	CASTING	6101		1	
2	LEVER	6142		1	
3	SHAFT	6143		1	
4	BLOCK	6144		1	
5	KEEP ASSY	6145		1	
6	LEVER	6146		1	
7	SHAFT	6147		1	
8	KEEP ASSY	6148		1	
9	FORK	6149		1	
10	SHAFT	6150		1	
11	SHAFT	6151		3	
12	BLOCK	6152		1	
13	KEEP ASSY	6153		3	
14	HANDLE	6154		5	
15	LEVER	6155		3	
16	FORK	6156		1	
17	FORK	6157		2	
18	BLOCK	6158		1	
19	BLOCK	6159		1	
20	FIX SCREW	6160	M6*20	3	
21	COVER	6161		1	
22	FORK	7152		1	
23	PARALLEL KEY		4*4*18	2	
24	"O" RING		P24	1	
25	"O" RING		P14	6	
26	"O" RING		P11	1	
27	CIRCLIP		S25	1	
28	CIRCLIP		S12	3	
29	SPRING PIN		ϕ3*120L	5	
30	SPRING PIN		ϕ5*30L	1	
31	SPRING PIN		ϕ5*35L	3	
32	SPRING PIN		ϕ5*55L	1	
33	SPRING PIN		ϕ5*60L	3	
34	SET SCREW		M6*6	3	
35	SET SCREW		M8*6	2	
36	SPRING		ϕ6.0*d1.0	5	

HEAD STOCK

ITEM NO.	DESCRIPTION	PART NO.	NO. OFF	REMARK
37	STEEL BALL	1/4"	5	
38	SOCKET SCREW	M6*12	8	
39	SOCKET SCREW	M6*25	8	
40	SOCKET SCREW	M8*25	4	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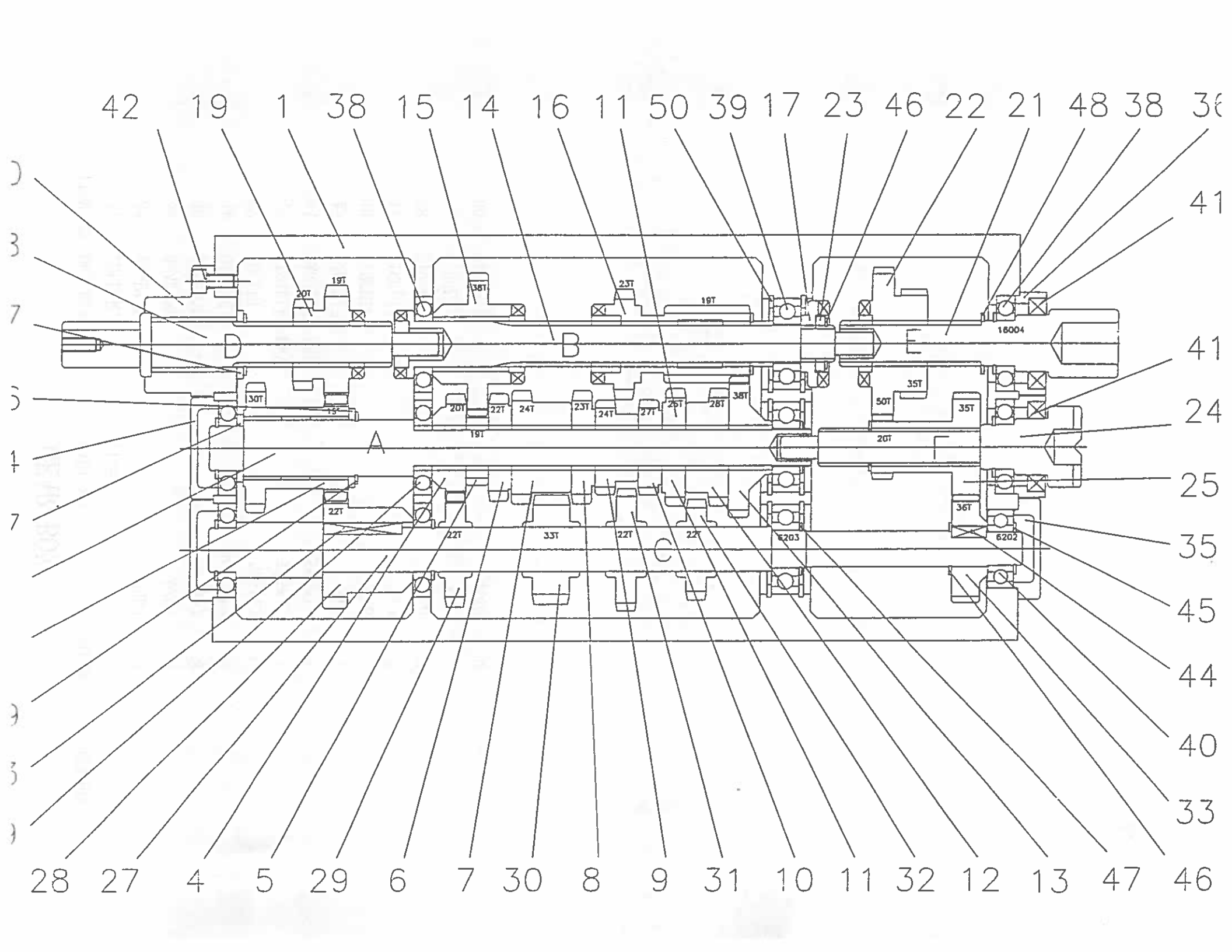
GEAR BOX

ITEM NO.	DESCRIPTION	PART NO.	NO. OFF	REMARK
1	CASTING	6201	1	
2	A SHAFT	6202	1	
3	GEAR	6203	1	
4	GEAR	6204	1	
5	GEAR	6205	1	
6	GEAR	6206	1	
7	GEAR	6207	1	
8	GEAR	6208	1	
9	GEAR	6209	1	
10	GEAR	6210	1	
11	GEAR	6211	1	
12	GEAR	6212	1	
13	GEAR	6213	1	
14	B SHAFT	6214	1	
15	GEAR	6215	1	
16	GEAR	6216	1	
17	CLUTCH	6217	1	
18	D SHAFT	6218	1	
19	GEAR	6219	1	
20	COVER	6220	1	
21	E SHAFT	6221	1	
22	GEAR	6222	1	
23	COLLAR	6223	1	
24	F SHAFT	6224	1	
25	GEAR	6225	1	
26	COLLAR	6226	1	
27	C SHAFT	6227	1	
28	GEAR	6228	1	
29	GEAR	6229	1	
30	GEAR	6230	1	
31	GEAR	6231	1	
32	GEAR	6232	1	
33	GEAR	6233	1	
34	COVER	6334	2	
35	COVER	6235	1	
36	COVER	6236	2	

GEAR BOX

ITEM NO.	DESCRIPTION	PART NO.	NO. OFF	REMARK
37	COLLAR	7155	2	
38	BEARING	6004	7	
39	BEARING	6203	3	
40	BEARING	6202	8	
41	OIL SEAL	40*25*8	2	
42	SOCKET	M6*12	13	
43	PARALLEL KEY	5*5*35	1	
44	PARALLEL KEY	5*5*15	1	
45	CIRCLIP	S15	1	
46	CIRCLIP	S16	2	
47	CIRCLIP	S17	3	
48	CIRCLIP	S20	8	
49	CIRCLIP	S25	1	
50	CIRCLIP	R40	6	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GEAR BOX

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
1	CASTING	6201		1	
2	FORK	6237		3	
3	FORK	6238		1	
4	SHAFT	6239		2	
5	PILLAR	6240		4	
6	COLLAR	6241		1	
7	CAM	6242		1	
8	SHAFT	6243		1	
9	SHAFT	6244		1	
10	COVER	6245		1	
11	FORK	6246		1	
12	FORK	6247		1	
13	SHAFT	6248		3	
14	KEEP ASSY	6249		1	
15	KEEP ASSY	6250		1	
16	KEEP ASSY	6251		1	
17	KEEP ASSY	6252		1	
18	LEVER	1002066		1	
19	LEVER	7250		2	
20	KEEP ASSY	6153		3	
21	HANDLE	6154		3	
22	SCREW	6260	M6*20	3	
23	COLLAR	1002048		2	
24	COLLAR	1002051		1	
25	PLUG	1002052		4	
26	PLUG	1002053		2	
27	GEAR	1002054		2	
28	BLOCK	1002055		2	
29	BLOCK	1002057		1	
30	KEEP ASSY	1002058		1	
31	HANDLE	7246		3	
32	HANDLE	9184		3	
33	FORK	1002061		1	
34	SOCKET SCREW		M5*12	2	
35	SOCKET SCREW		M6*12	6	
36	SOCKET SCREW		M6*16	2	

GEAR BOX

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
37	SET SCREW		M6*6	5	
38	SET SCREW		M8*8	2	
39	"O" RING		P14	7	
40	"O" RING		P16	1	
41	"O" RING		P24	2	
42	SPRING PIN		ϕ 3*20	7	
43	SPRING PIN		ϕ 5*25	7	
44	SPRING PIN		ϕ 5*50	1	
45	SPRING PIN		ϕ 5*60	3	
46	STEEL BALL		1/4"	4	
47	SPRING		ϕ 6* ϕ 1.0	4	
48	PARALLEL KEY		5*5*15	3	
49	SOCKET SCREW		M8*35	2	
50	SOCKET SCREW		M8*45	2	

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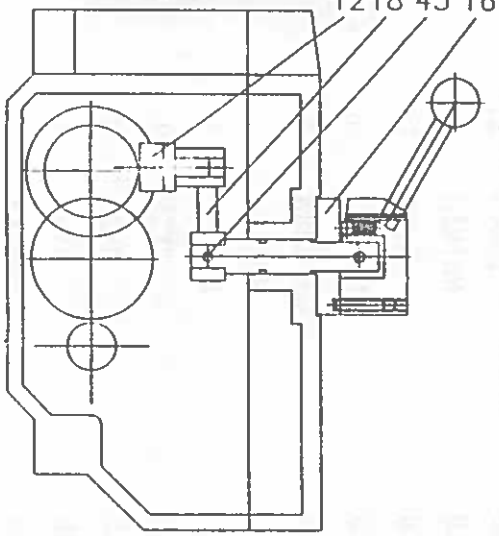

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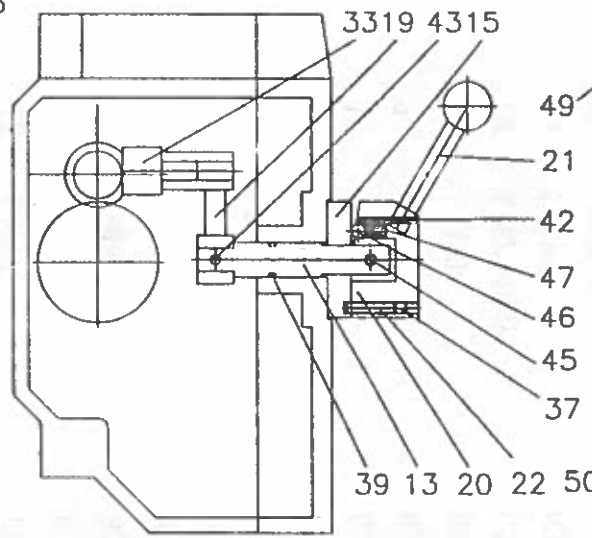

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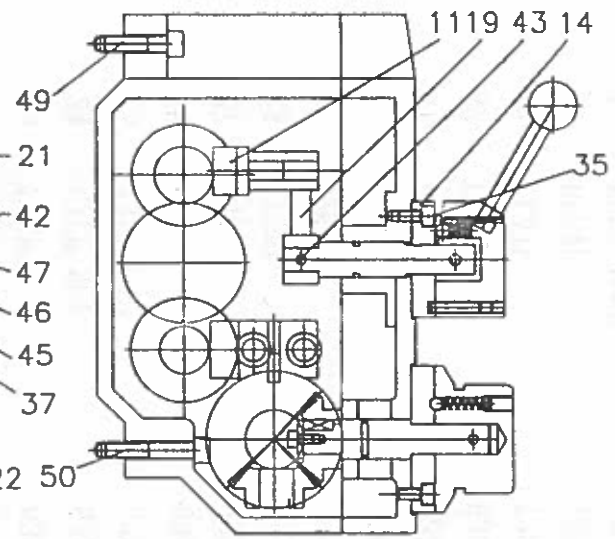
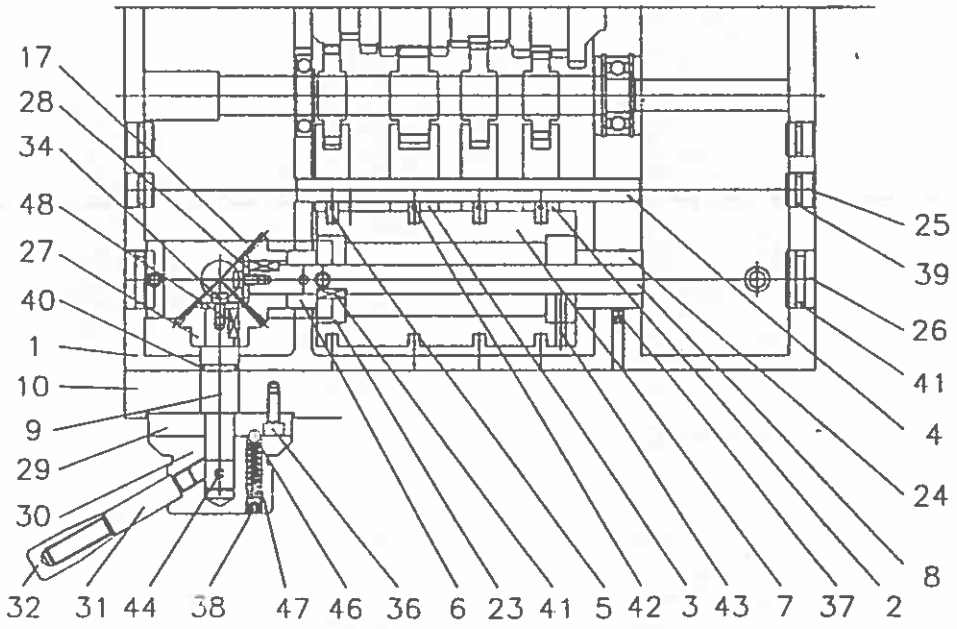




APRON

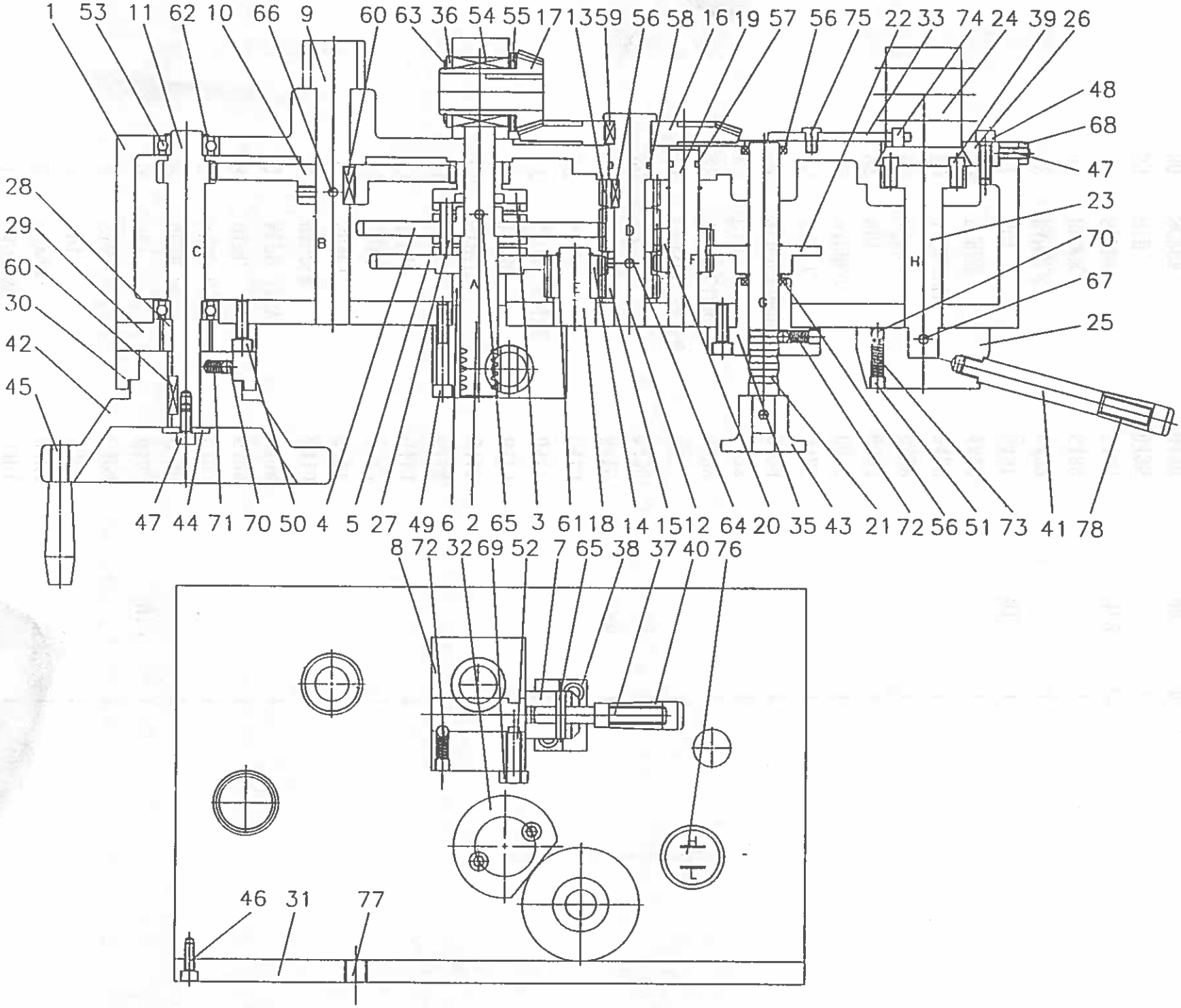
ITEM NO.	DESCRIPTION	PART NO.	NO. OFF	REMARK
1	CASTING	6301	1	
2	PINION	6302	1	
3	GEAR	6303	1	
4	GEAR	6304	1	
5	GEAR	6305	1	
6	COLLAR	6306	1	
7	PINION	6307	1	
8	KEEP ASSY	6308	1	
9	PINION	6309	1	
10	GEAR	6310	1	
11	PINION	6311	1	
12	SHAFT	6312	1	
13	GEAR	6313	1	
14	GEAR	6314	1	
15	GEAR	6315	1	
16	GEAR	6316	1	
17	GEAR	6317	1	
18	SHAFT	6318	1	
19	SHAFT	6319	1	
20	GEAR	6320	1	
21	SHAFT	6321	1	
22	KEEP ASSY	6322	1	
23	SHAFT	6323	1	
24	HALF-NUT	6324	1	
25	AXLE CAP	6325	1	
26	GIB	6326	1	
27	PILLAR	6327	3	
28	COVER	6328	1	
29	COLLAR	6329	1	
30	DIAL	6330	1	
31	COVER	6331	1	
32	COVER	6332	1	
33	PLATE	7333	1	
34	PLATE	7334	1	
35	KEEP ASSY	6335	1	
36	COLLAR	7135	1	

APRON

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
37	HANDLE	7319		1	
38	PLATE	7321		1	
39	PIN	7324		2	
40	HANDLE	7263	3/8"-16NC	1	
41	HANDLE	10318		1	
42	HAND WHEEL	10336		1	
43	HANDLE	9315		1	
44	WASHER	7610		1	
45	HANDLE	9306		1	
46	SOCKET SCREW		M5*16	8	
47	SOCKET SCREW		M6*12	5	
48	SOCKET SCREW		M6*20	6	
49	SOCKET SCREW		M6*45	3	
50	SET SCREW		M6*16	2	
51	SET SCREW		M8*6	3	
52	SET SCREW		M8*30	1	
53	BEARING		6003ZZ	2	
54	BEARING		RNA6904	1	
55	THRUST BEARING		AS/NTB2542	1	
56	OIL SEAL		TC16*24*4	2	
57	"O" RING		P12	1	
58	"O" RING		P18	1	
59	PARALLEL KEY		4*4*15	1	
60	PARALLEL KEY		5*5*20L	2	
61	CIRCLIP		S16	5	
62	CIRCLIP		S17	1	
63	CIRCLIP		S25	1	
64	SPRING PIN		ϕ5*22L	1	
65	SPRING PIN		ϕ5*25L	2	
66	SPRING PIN		ϕ5*36L	1	
67	SPRING PIN		ϕ5*60L	1	
68	NUT		M6	2	
69	NUT		M8	1	
70	STEEL BALL		1/4"	4	
71	SPRING		ϕ6*ϕ1.0*8L	1	
72	SPRING		ϕ6*ϕ1.0*12L	2	

APRON

ITEM NO.	DESCRIPTION	PART NO.	NO. OFF	REMARK
73	SPRING	φ6*φ1.0*18L	1	
74	SCREW	7315	1	
75	SCREW	7332	1	
76	OIL SIGHT	φ29*φ34	1	
77	PLUG	PT 1/8"	1	
78	HANDLE	9184	1	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8 72 32 69 52 7 65 38 37 40 76
46 31 77

SADDLE AND TOP-SLIDE

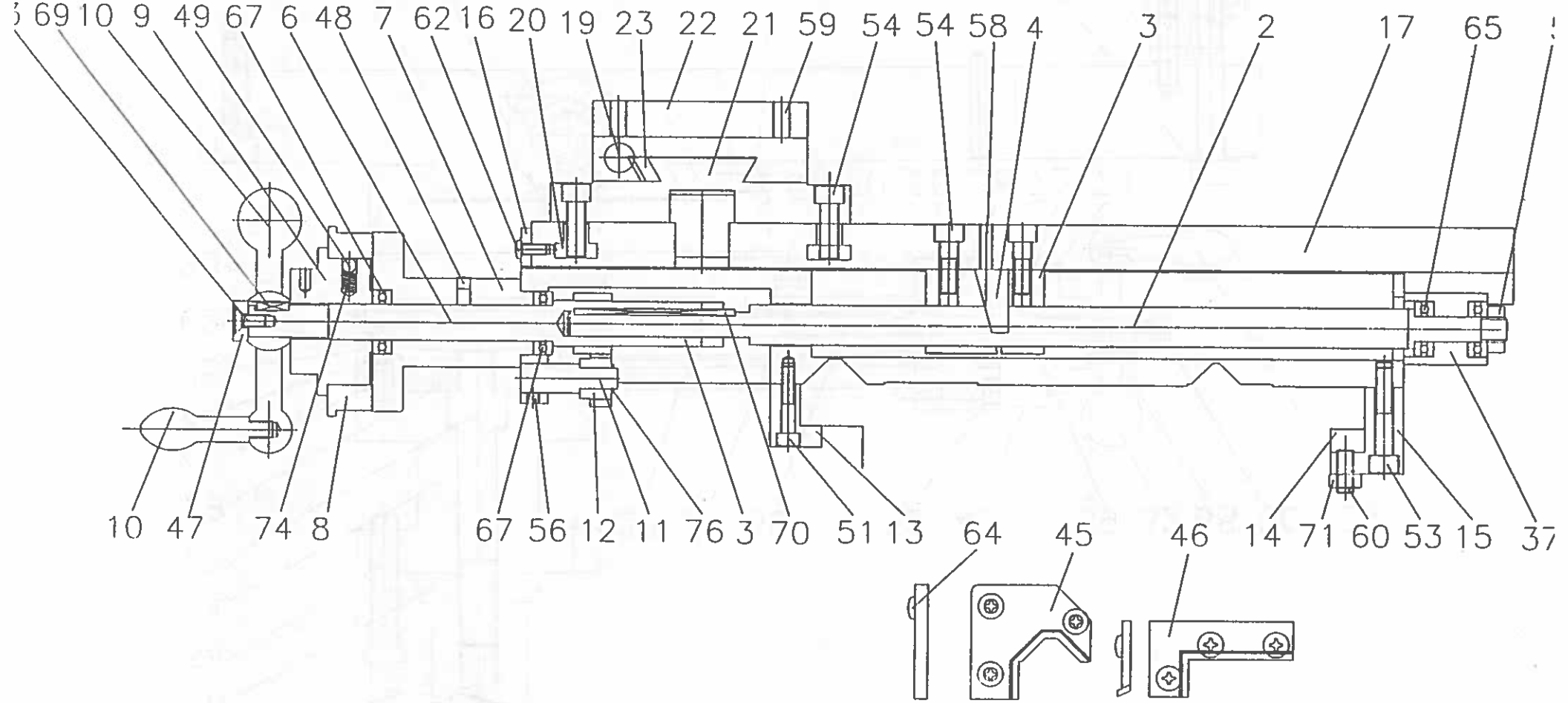
ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
1	CASTING	6401		1	
2	SCREW	6402		1	
3	NUT	6403		1	
4	GIB	6404		1	
5	NUT	6405	M12	1	
6	GEAR	6406		1	
7	KEEP ASSY	6407		1	
8	DIAL	6408		1	
9	KEEP ASSY	6409		1	
10	HANDLE	6410		1	
11	SHAFT	6411		1	
12	GEAR	6412		1	
13	STRIP	6413		2	
14	GIB	6414		1	
15	STRIP	6415		1	
16	WIPER	6416		1	
17	CROSS SLIDE	6417		1	
18	GIB	6418		1	
19	SCREW	6419	M6	1	
20	NUT	6420	M8	2	
21	SWIVEL SLIDE	6421		1	
22	TOP-SLIDE	6422		1	
,23	GIB	6423		1	
24	TURRET BODY	6424		1	
25	SHAFT	6425		1	
26	WASHER	6426		1	
27	NUT	6427		1	
28	WIPER	6428		1	
29	T-SLOTTED	6429		1	
30	SCREW	6430		1	
31	NUT	6431	M12	1	
32	HANDLE	6432		1	
33	BLOCK	6433		1	
34	SCREW	6434	M12	12	
35	GIB	6435		1	
36	SCREW	6436	M8	6	

SADDLE AND TOP-SLIDE

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
37	KEEP ASSY	8414		1	
38	KEEP ASSY	8423		1	
39	KEEP ASSY	8425		1	
40	DIAL	8426		1	
41	HANDLE	8435		1	
42	NUT ASSY	8440		1	
43	BUSH	8441		1	
44	PILLAR	8442		1	
45	WIPER		7033	1	
46	WIPER		7053	1	
47	WASHER	1002062		1	
48	OIL BALL		1/4"	8	
49	STEEL BALL		1/4"	2	
50	SOCKET SCREW		M6	1	
51	SOCKET SCREW		M6*35	4	
52	SOCKET SCREW		M6*40	2	
53	SOCKET SCREW		M8*45	4	
54	SOCKET SCREW		M8*25	2	
55	SOCKET SCREW		M10*75	1	
56	SET SCREW		M6*10	1	
57	SET SCREW		M6*16	1	
58	SET SCREW		M6*20	1	
59	SET SCREW		M8*16	2	
60	SET SCREW		M8*25	4	
61	SET SCREW		M8*30	1	
62	SOCKET BULT		M5*12	10	
63	SCREW		M6*12	1	
64	COUNTERSUNK SCREW		M6*12	8	
65	THRUST BEARING		51101	2	
66	THRUST BEARING		51102	2	
67	THRUST BEARING		51103	2	
68	PARALLEL KEY		3*3*10	1	
69	PARALLEL KEY		4*4*15	1	
70	PARALLEL KEY		3*3*75	1	
71	NUT		M6	1	
72	NUT		M8	5	

SADDLE AND TOP-SLIDE

ITEM NO.	DESCRIPTION	PART NO.	NO. OFF	REMARK
73	SPRING WASHER	ϕ10	1	
74	SPRING	ϕ6.0*d1.0	1	
75	SPRING	ϕ8.0*d1.0	1	
76	CIRCLIP	S10	1	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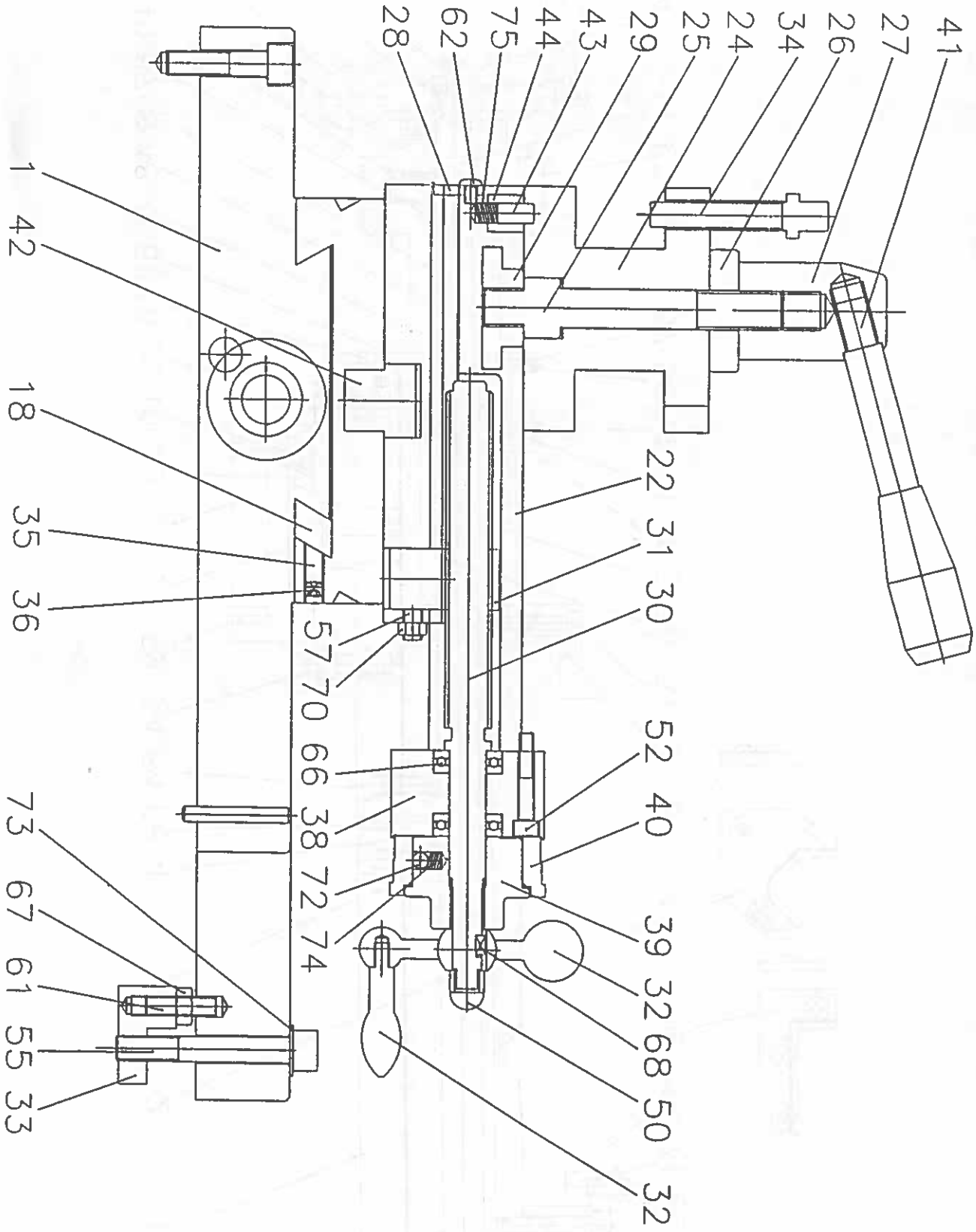
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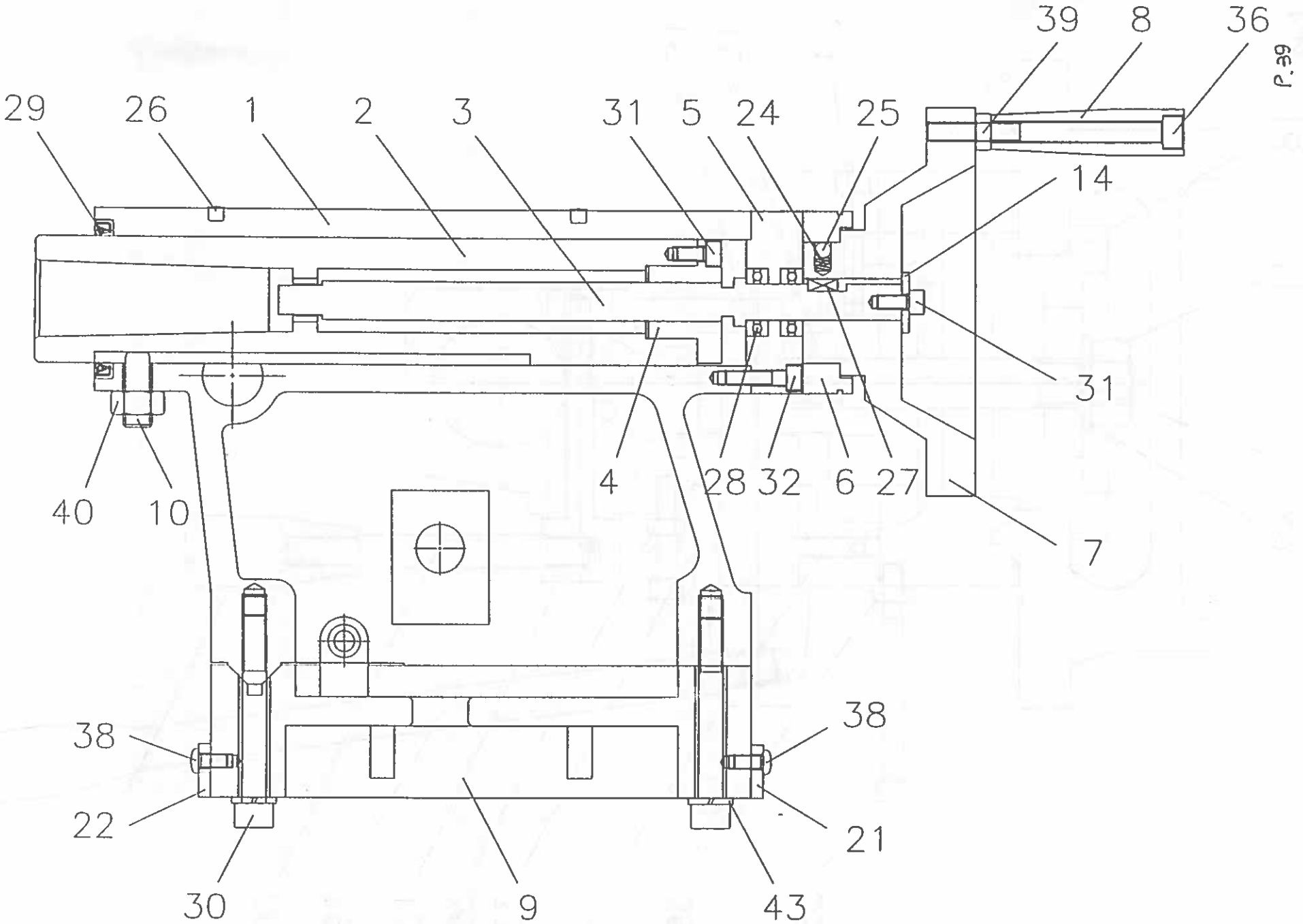
TAIL STOCK

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
1	CASTING	6501		1	
2	BARREL	158802		1	
3	SCREW	158803		1	
4	NUT	158804		1	
5	KEEY ASSY	158805		1	
6	DIAL	158806		1	
7	HANDLE WHEEL	158807		1	
8	HANDLE	9306		1	
9	BASE	6503		1	
10	SCREW	158810		1	M10*P1.5*20L
11	NUT	158811		1	
12	NUT	158812		1	
13	BOLT	158813		1	
14	WASHER	7610		1	
15	SHAFT	6502		1	
16	PIVOT BLOCK	158816		1	
17	BOLT	6504		1	
18	CLAMP PLATE	6505		1	
19	HANDLE	158819		1	
20	HANDLE	158820		1	
21	WIPER		7033	2	
22	WIPER		7053	2	
23	HANDLE	9184		1	
24	COMPRESSION SPRING		ϕ6.0*d1.0	1	
25	STEEL BALL		1/4"	1	
26	OIL BALL		1/4"	2	
27	PARALLEL KEY		5*5*15	1	
28	BEARING		51102	2	
29	OIL SEAL		TC52*65*9	1	
30	HEX SCREW		M10*65	2	
31	SOCKET SCREW		M6*12	3	
32	SOCKET SCREW		M6*25	2	
33	SOCKET SCREW		M8*30	1	
34	SOCKET SCREW		M8*50	2	
35	SOCKET SCREW		M8*80	1	
36	SOCKET SCREW		M8*95	1	

TAIL STOCK

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
37	SET SCREW		M8*30	1	
38	COUNTERSUNK SCREW		M6*12	8	
39	NUT		M8	2	
40	NUT		M12	1	
41	NUT		M20	1	
42	WASHER		ϕ 20	1	
43	WASHER		ϕ 10	2	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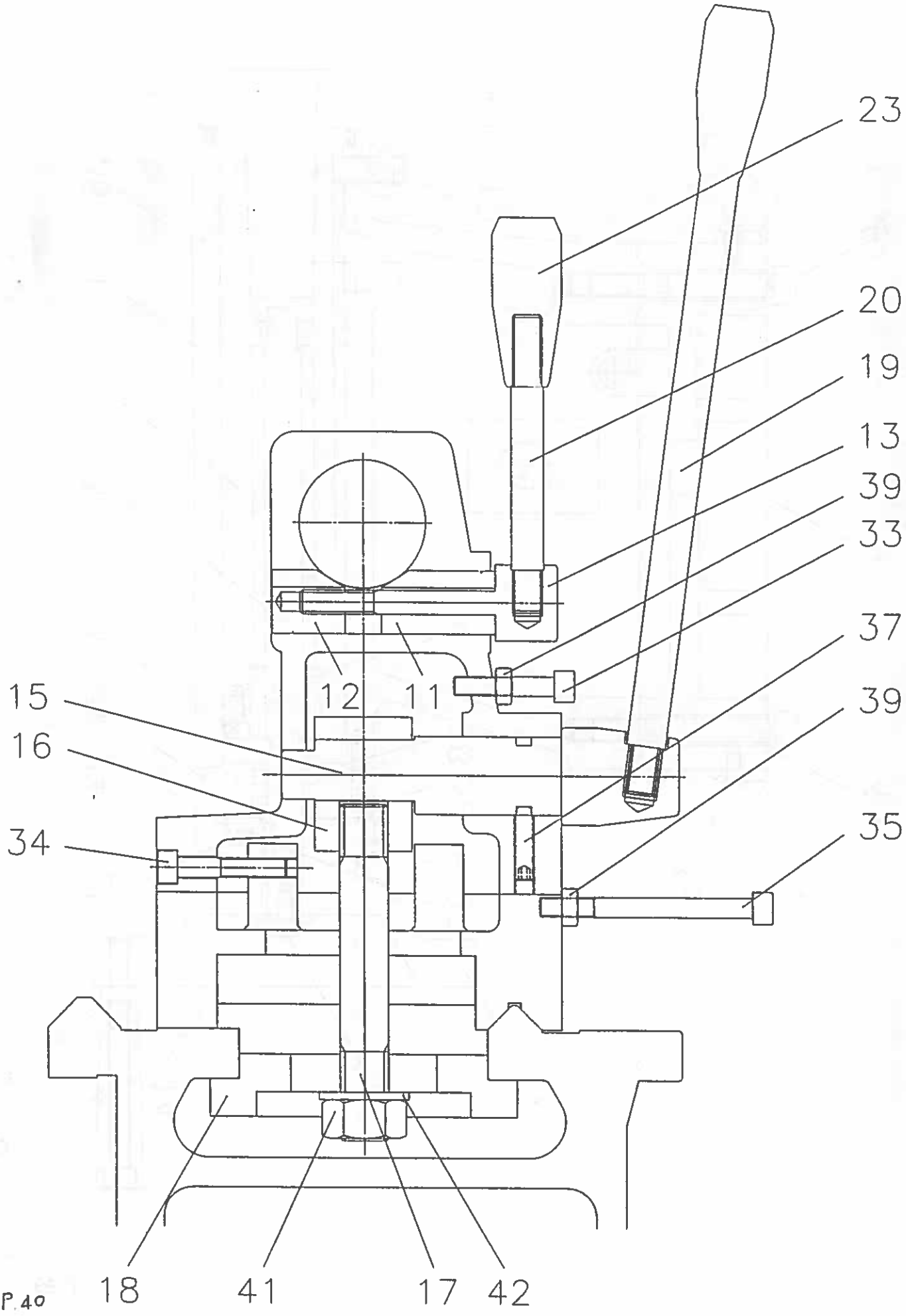
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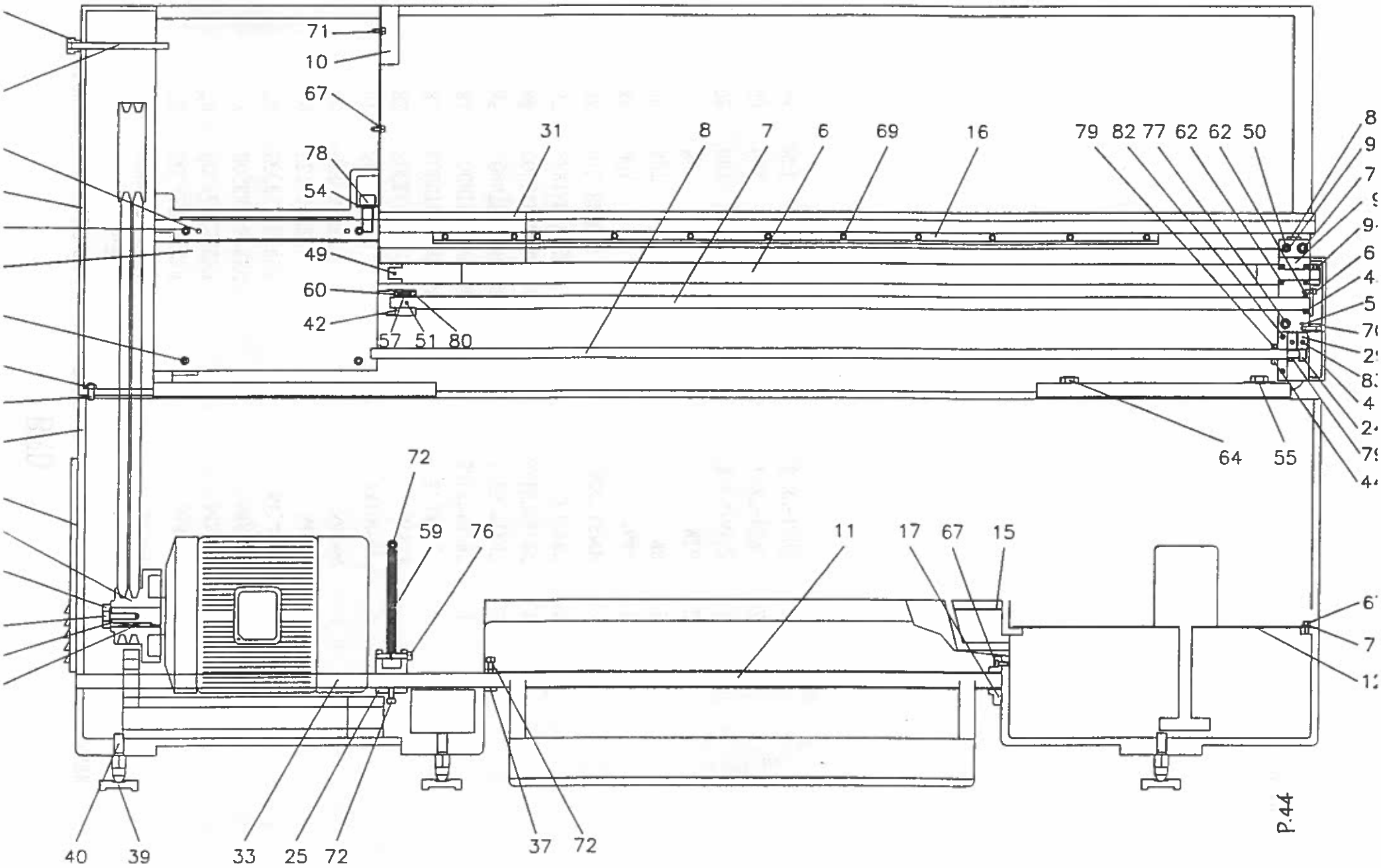
BED

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
37	BUSH	7627		1	
38	NUT	7612		2	
39	BLOCK	7633		6	
40	SCREW	7658		6	
41	COVER	9620		1	
42	SAFETY ASSY	7624		1	
43	COVER	7625		1	
44	BUSH	7626		1	
45	V-BELT		B76	2	
46	BRAKE LINING			1	
47	LEVER	9626		1	
48	SHAFT	9627		1	
49	TAPER PIN		3#*38	1	
50	TAPER PIN		7#*40	3	
51	SPRING PIN		ϕ5*40	1	
52	SPRING PIN		ϕ5*75	1	
53	SPRING WASHER		ϕ10	9	
54	SPRING WASHER		ϕ14	4	
55	SPRING WASHER		ϕ16	8	
56	CIRCLP		S30	1	
57	COMPRESSION SPRING		ϕ6.0*d1.0	4	
58	COMPRESSION SPRING		ϕ40*d5.0	1	
59	SPRING		ϕ14*d2.0	1	
60	STEEL BALL		1/4"	5	
61	PARALLEL KEY		7*7*40	1	
62	THRUST BEARING		51103	3	
63	HEX SCREW		M10*25	9	
64	HEX SCREW		M16*50	8	
65	SET SCREW		PT1/4"/19	3	
66	SOCKET SCREW		M5*12	2	
67	SOCKET SCREW		M6*12	12	
68	SOCKET SCREW		M6*16	2	
69	SOCKET SCREW		M6*25	11	
70	SOCKET SCREW		M6*30	3	
71	WASHER		M6	11	
72	SOCKET SCREW		M8*20	4	

BED

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
1	BED	6601		1	
2	FLOOR	6602		1	
3	END COVER	6603		1	
4	PULLEY	6610		1	
5	MOTOR PLATE	9611		1	
6	LEAD SCREW	6606		1	
7	FEED ROD	6607		1	
8	THIRD-ROD	6608		1	
9	BRACKET	6605		1	
10	SPLASH GUARD	6604		1	
11	FOOT BRAKE	8611		1	
12	POMPU COVER	8612		1	
13	COVER	8613		3	
14	HANDLE	9184		1	
15	OIL NET	8615		1	
16	ROCK	6609		1	
17	BRACKET	8617		1	
18	WASHER	8618		1	
19	BUSH	8619		1	
20	KEEP ASSY	8620		1	
21	BRACKET	8621		1	
22	PLUG	8622		2	
23	HANDLE	8623		1	
24	BLOCK	8624		1	
25	LEVER	8625		1	
26	BOLT	8626		1	
27	WASHER	8148		1	
28	ELECTRICAL BOX	6616		1	
29	COVER	8629		1	
30	COVER	6614		1	
31	GAP	6601-1		1	
32	LEVER	9625		1	
33	SHAFT	8633	ϕ3/4"*750L	1	
34	KEEP ASSY	8634		2	
35	SHAFT	9627-1		1	
36	SHAFT	8636	ϕ12*45L	1	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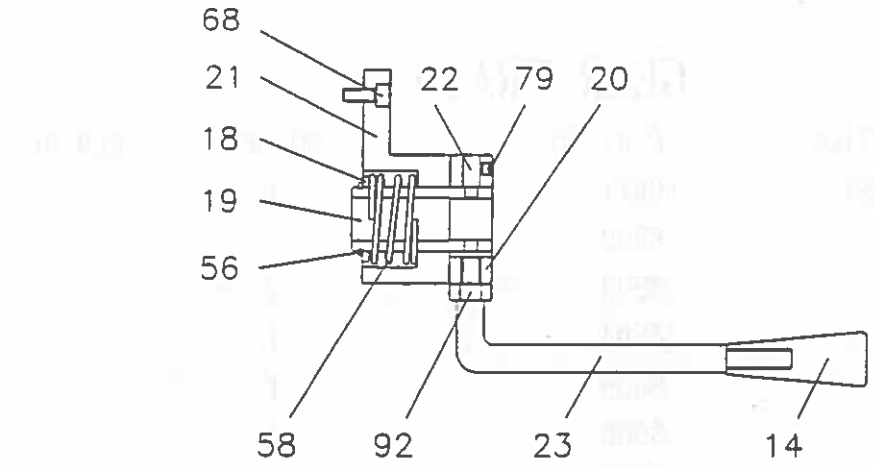
BED

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
73	SOCKET SCREW		M8*25	5	
74	SOCKET SCREW		M8*30	4	
75	SOCKET SCREW		M8*35	1	
76	SOCKET SCREW		M8*50	1	
77	SOCKET SCREW		M8*65	2	
78	SOCKET SCREW		M14*45	4	
79	SET SCREW		M6*6	5	
80	SET SCREW		M8*6	4	
81	SET SCREW	8627	M10*55	2	
82	SOCKET BULT		M5*8	2	
83	COUNTERSUNK BULT		5/32"*2"	2	
84	COUNTERSUNK BULT		3/16"*3/8"	1	
85	COUNTERSUNK BULT		3/16"*1/4"	2	
86	COUNTERSUNK BULT		3/16"*1/2"	2	
87	SPRING WASHER		ϕ 3/16"	2	
88	OIL PLUG		5/8"-18NF	3	
89	BOX		7644	1	
90	NUT		M8	1	
91	NUT		M10	2	
92	NUT		3/8"-16NC	1	
93	NUT		1/2"-12NC	2	
94	NUT		5/8"-18NF	1	

GEAR TRAIN

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
1	KEEP ASSY	6611		1	
2	GEAR	8502		1	
3	WASHER	8503		2	
4	GEAR	8504		1	
5	COLLAR	8505		1	
6	SHAFT	8506		1	
7	GEAR	8507		1	
8	SLEEVE	6612		1	
9	COLLAR	8509		1	
10	SHAFT	6613		1	
11	SOCKET SCREW		M6*12	2	
12	WASHER	8512		1	
13	PARALLEL KEY		6*6*15	1	
14	PARALLEL KEY		6*6*20	1	
15	NUT		M14	1	
16	NUT		M16	1	
17	SAFETY STUD	8517		1	
18	BEARING		6005ZZ	2	
19	CIRCLIP		R47	2	
20	SPRING PIN		3#*32L	1	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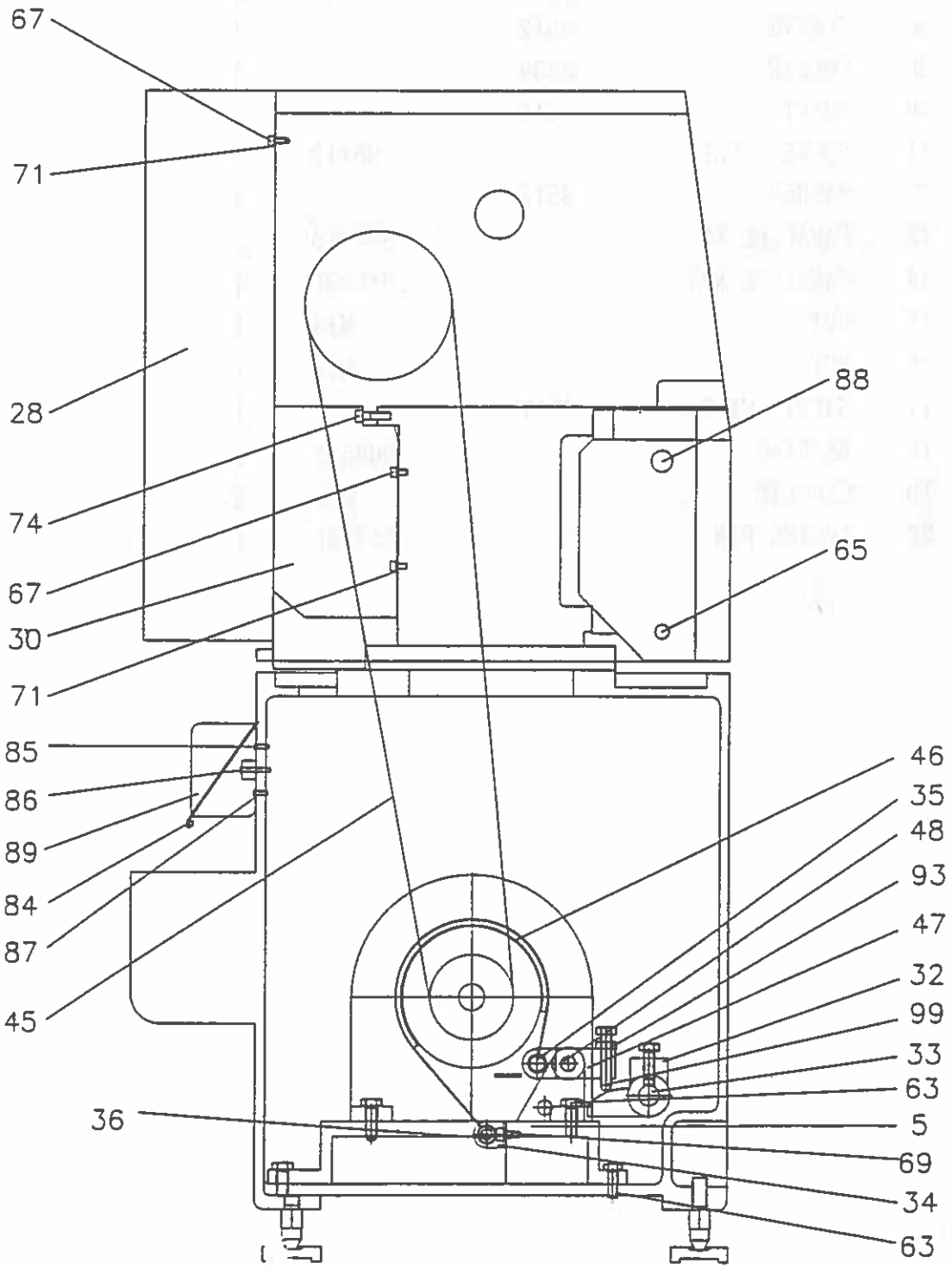
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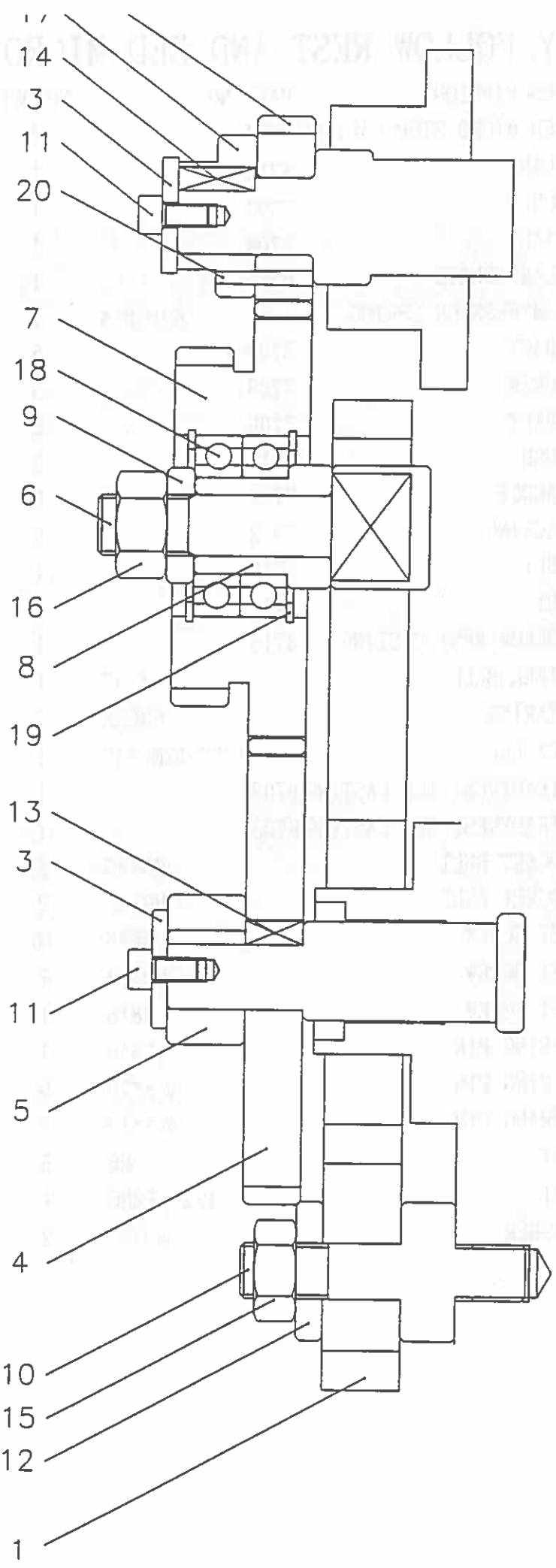
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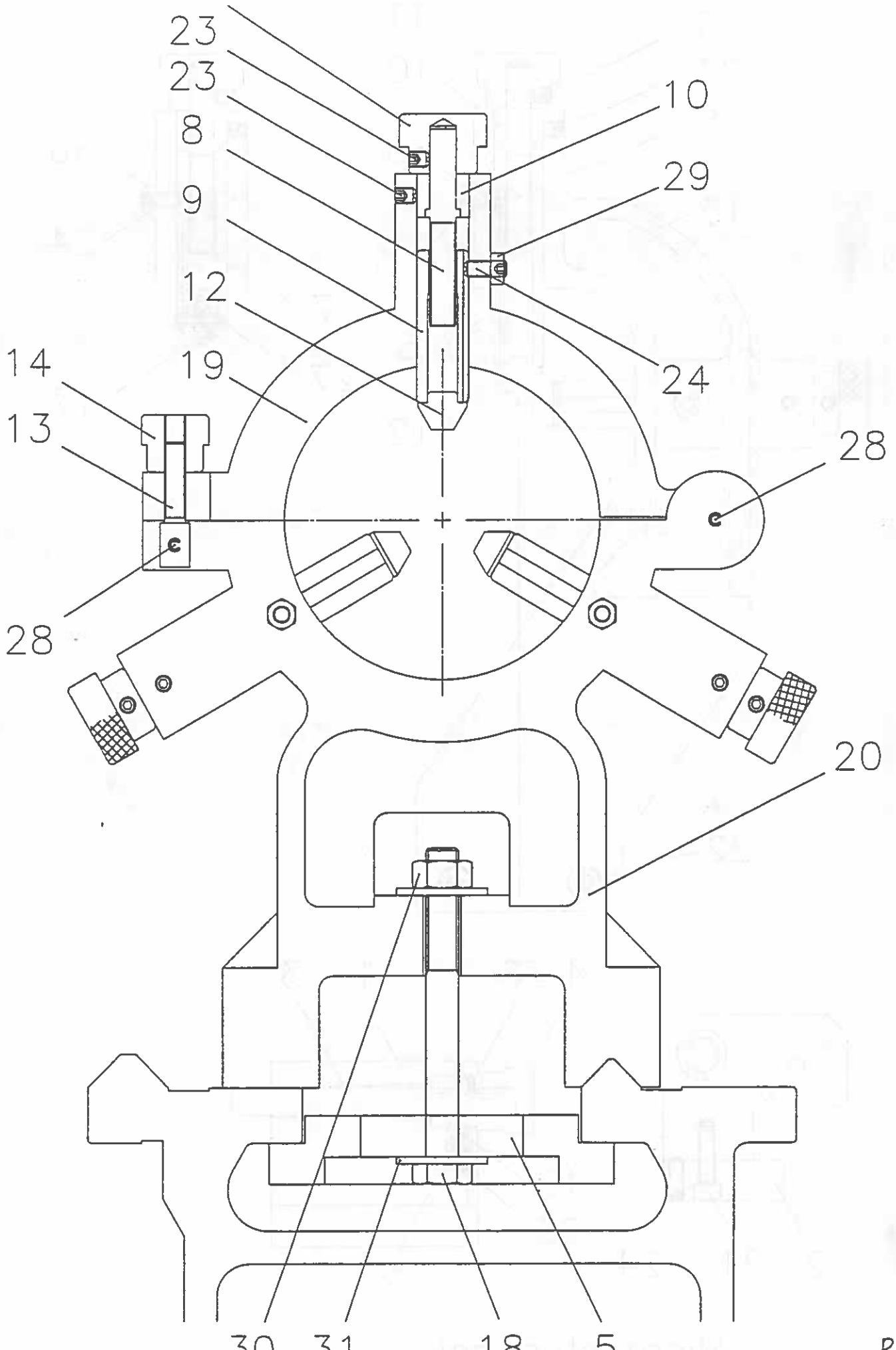
STEADY/FOLLOW REST AND BED MICRO STOP SET

ITEM NO.	DESCRIPTION	PART NO.		NO. OFF	REMARK
1	BED MICRO STOP CASTING	6704		1	
2	PLANK	8716		1	
3	SCREW	7703		1	
4	DIAL	7704		1	
5	CLAMP PLATE	6505		1	
6	COMPRESSION SPRING		6.0*d0.5	1	
7	SHAFT	7709-1		5	
8	SCREW	7708		5	
9	SHAFT	7709		5	
10	BUSH	7710		5	
11	HANDLE	7711		5	
12	PACKING	7712		5	
13	BULT	7713		1	
14	NUT	7714		1	
15	FOLLOW REST CASTING	8713		1	5130
16	STEEL BALL		1/4"	1	
17	BEARING		635ZZ	5	
18	HEX BULT		1/2"-12NC*4"	1	
19	STEADYREST TOP CASTING	6702		1	5129
20	STEADYREST SET CASTING	6703		1	
21	SOCKET BULT		M6*25	2	
22	SOCKET BULT		M8*35	2	
23	SET SCREW		M6*6	10	
24	SET SCREW		M6*16	7	
25	SET SCREW		M8*6	1	
26	SPRING PIN		ϕ 3*6	1	
27	SPRING PIN		ϕ 5*20	5	
28	SPRING PIN		ϕ 5*30	2	
29	NUT		M6	5	
30	NUT		1/2"-12NC	1	
31	WASHER		ϕ 1/2"	2	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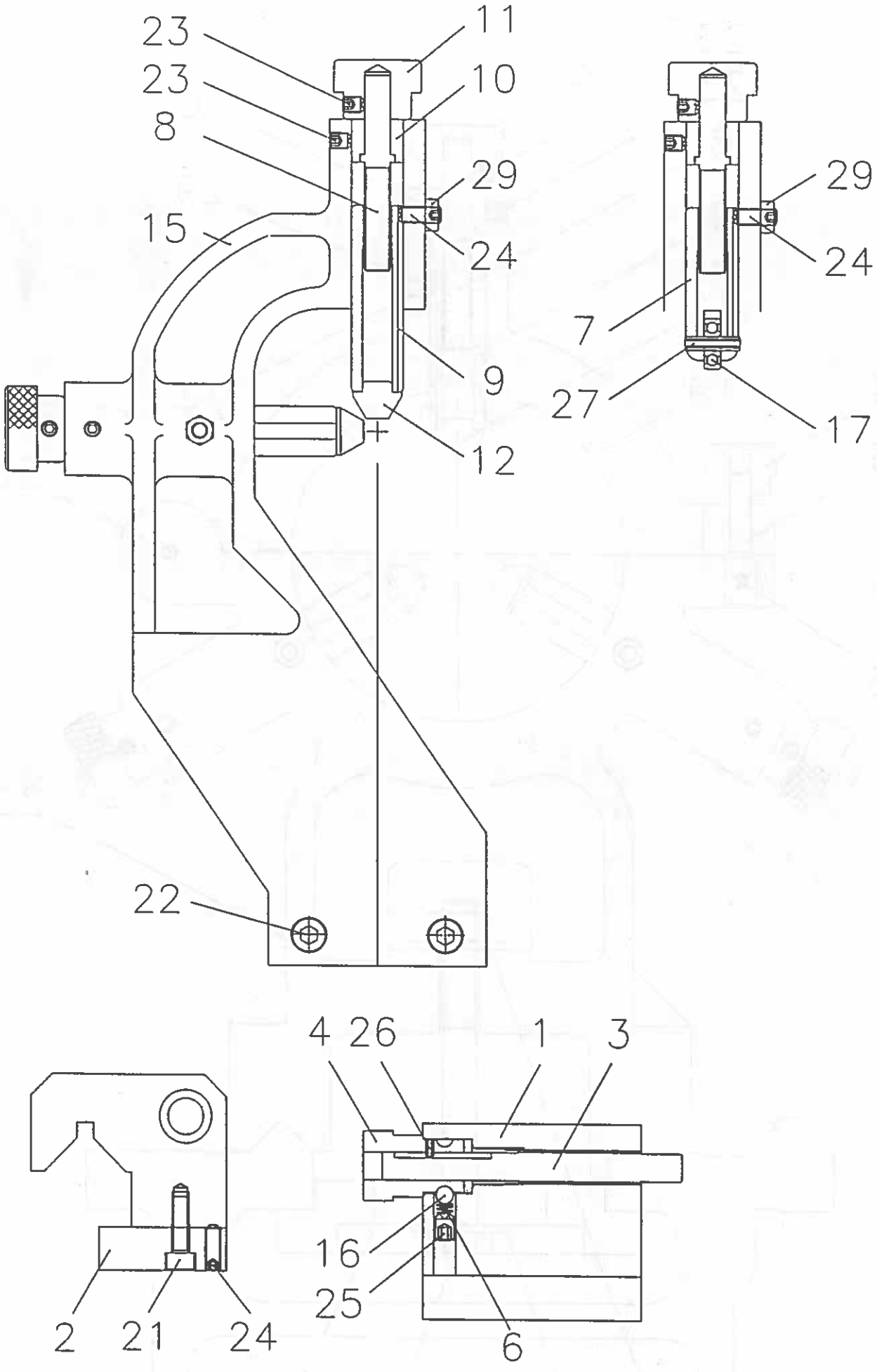
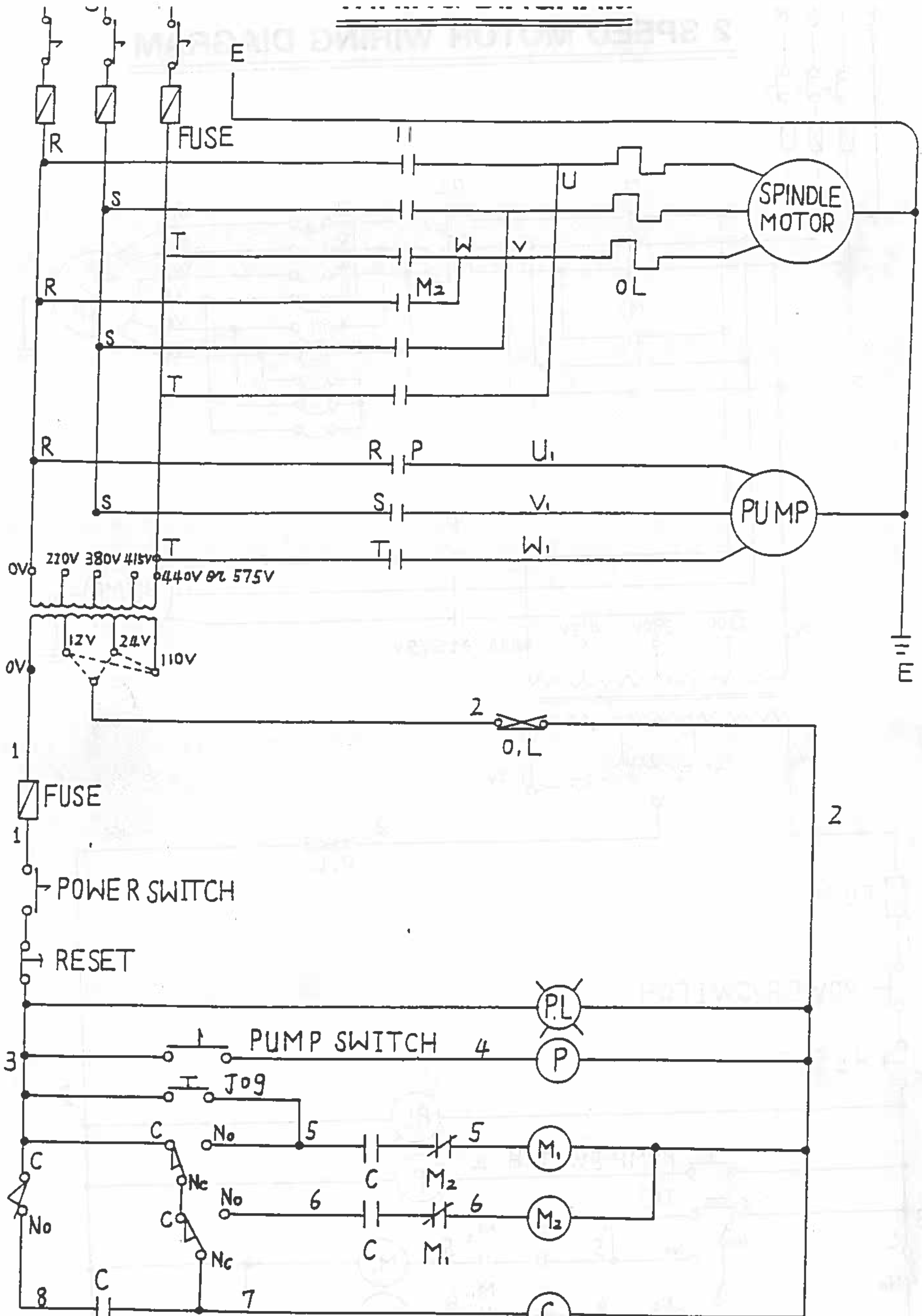


Micro stop set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PUMP
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12V 24V 110V
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POWER SWITCH
RESET
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PUMP SWITCH
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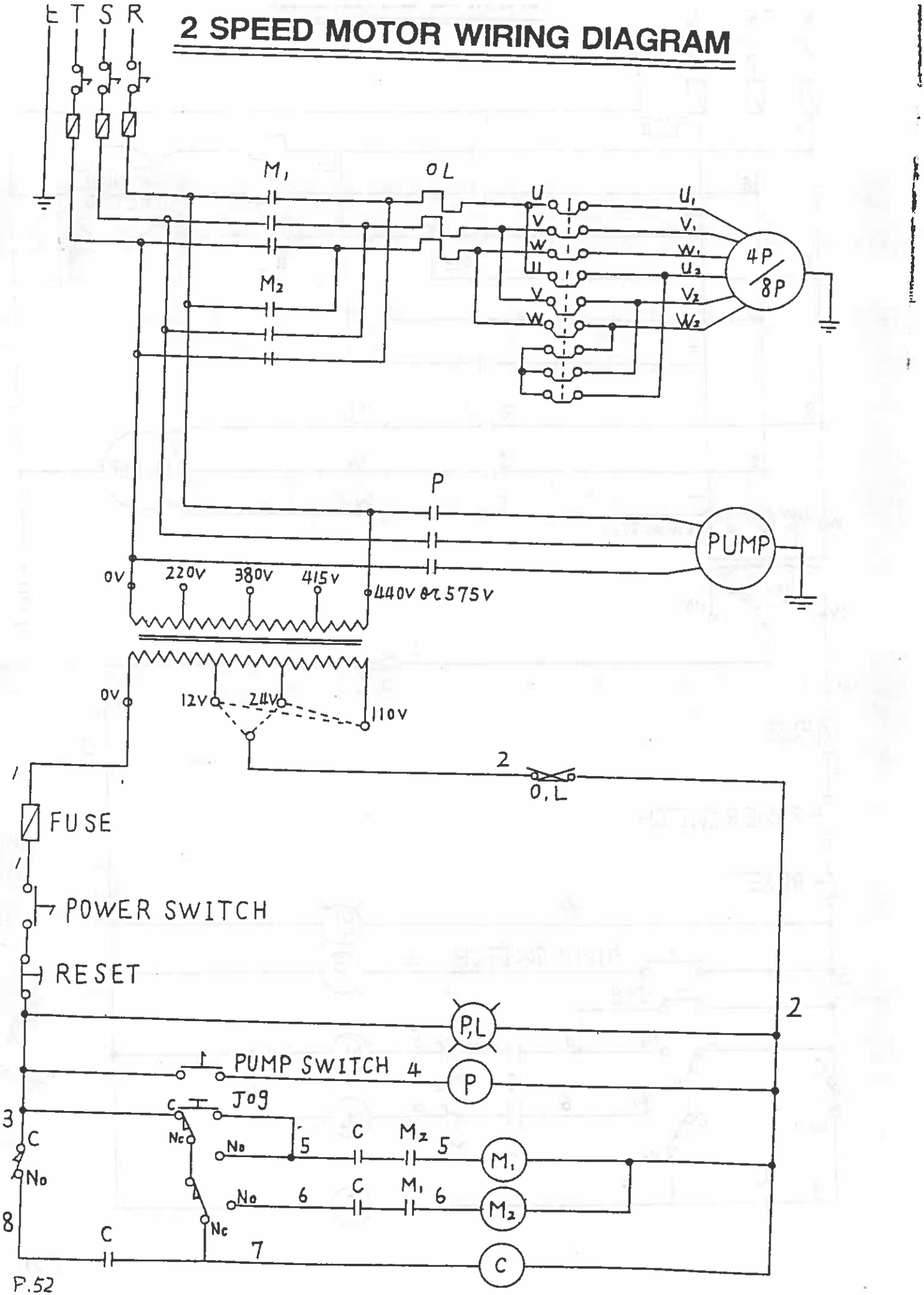
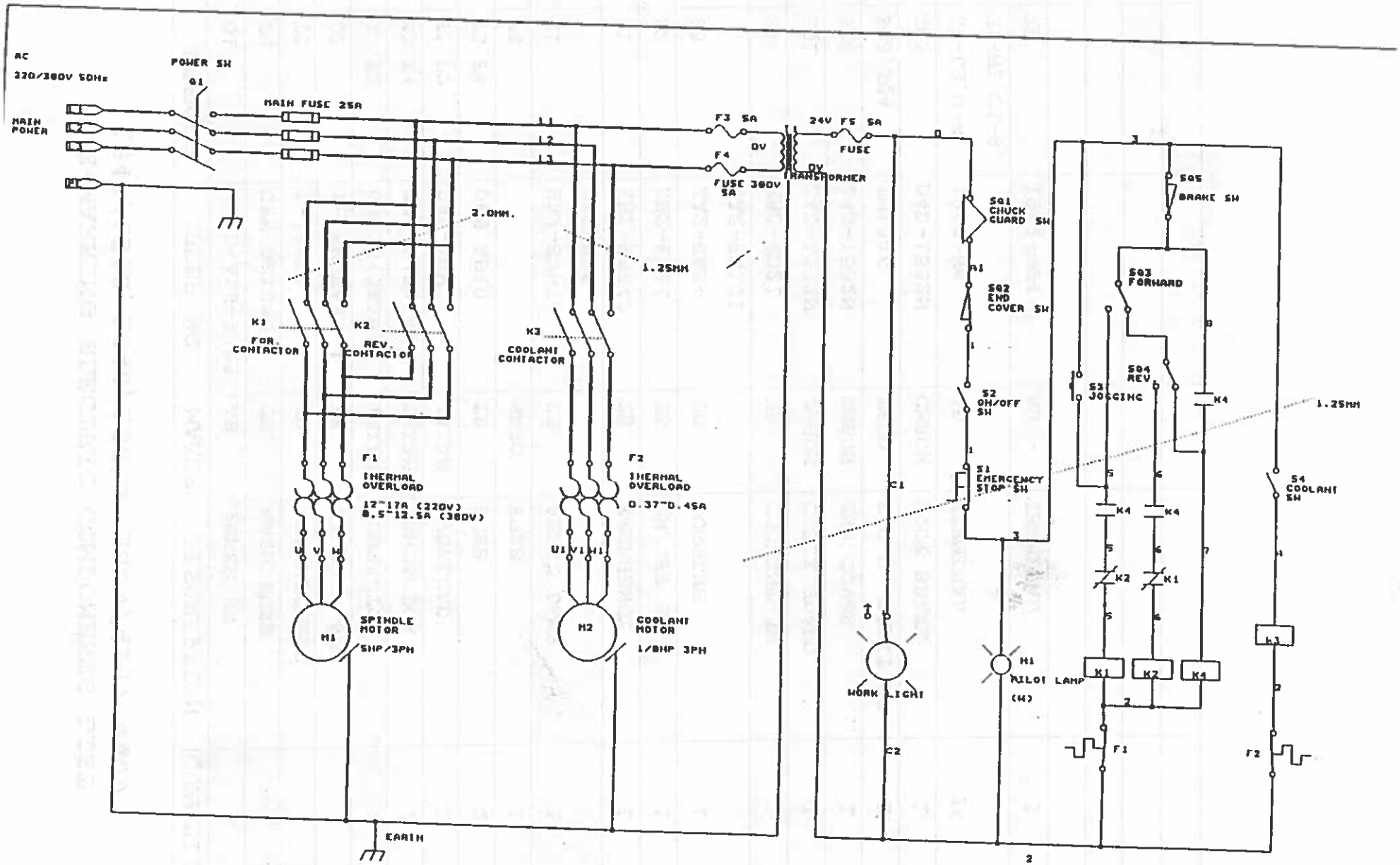
2 SPEED MOTOR WIRING DIAGRAM



CE-MARKING ELECTRIC COMPONENTS LIST
1540/1560/1640/1660G 380V/415V/440V

NO.	SYMBOLS	ORDER NO.	MAKER	DESCRIPTION	QUANTITY	REMARK
1	Q1	194L-A16-1753	AB	POWER SW.	1	
2	F0	DF6 AB10*3	TE.	MAIN FUSE	1	
3	T1	T-130VA	JD	TRANSFORMER	1	
4	Q2	T-16EXF64D-4	YK	HI.&LOW SW	1	OPTIONAI
5	K1,K2	CN-16(3A1b)	TAIAN	CONTACTOR	2	
6	K3,K4	CN-11(3A1a)	TAIAN	CONTACTOR	2	
7	F1,F2	RHN-10M	TAIAN	OVERLOAD	2	
8	F3,F4	DF6 AB10	TE.	FUSE	2	
9	F5		WAGO	FUSE	1	
10	H1	ZA2-BV07+ ZA2-BV6	TE.	PILOT LAMP	1	
11	S1	XB2-ES542	TE.	EMERGENCY	1	
12	S2	XB2-ED21	TE.	ON/OFF SW	1	
13	S3	ZA2-BA3+ ZA2-BZ101	TE.	JOGGING	1	
14	S4	XB2-ED21	TE.	COOLANT SW	1	
15	SQ1	D4D-1532N	OMRON	CHUCK GUARD	1	
16	SQ2	D4D-1532N	OMRON	END COVER	1	
17	SQ3,SQ4	TM1306	TEND	F.O.R. LIMIT SW	2	
18	SQ5	D4D-1532N	OMRON	FOOT BRAKE	1	
19	L1-L3,U-W, U1-W1,C1-8,	1942-W4	AB	TERMINAL	26	
20	PE	1942-WG4	AB	TERMINAL	3	

CE WIRING DIAGRAM



OUTPUT VOLTAGE	220V			SERIES NO.		999005					
HORSE POWER	5/	HP		PHASE	3	HZ	50		60	V	
SYSTEM	LEFT	V	RIGHT		MM		INCH	V	DUAL		
CONTROL VOLTAGE	24V			COLOR		WHITE/BLUE					
STEADY REST		V		3-JAW 8"						V	
FOLLOW REST		V		4-JAW 10"						V	
REAR TOOL POST				CE							
AMERICAN TOOL POST				CSA EQUIPMENT							
QUICK CHANGE TOOL POST				SINGLE MOTOR							
FACE PLATE D1-6 15"		V		TOOL KIT & BOX						V	
BACK PLATE D1-6 8"		V		DRILL CHUCK AND ARBOR							
BACK PLATE D1-6 10"		V									
SPLASH GUARD		V									
BED MICRO STOP SET											
COOLANT SYSTEM		V									
TAPER ATTACHMENT											
ROLLING CENTER MT#3											
5C COLLECT											
COLLECT CHUCK SETS											
WORKING LIGHT V W											
CHUCK GUARD											

INSPECTOR Tyson

JASHICO MACHINE [redacted] CO., LTD.

engine lathe

FINAL INSPECTION

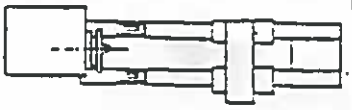
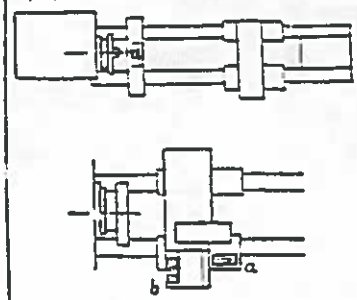
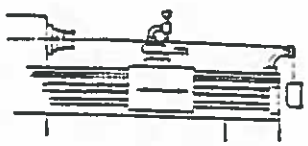
LATHE

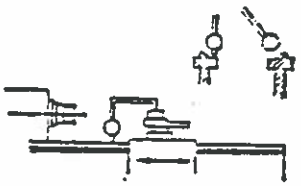
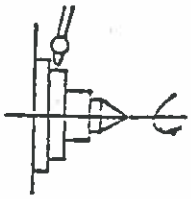
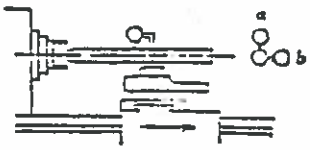
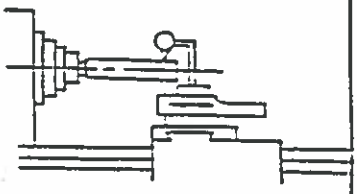
MODEL: # 41X-1660T

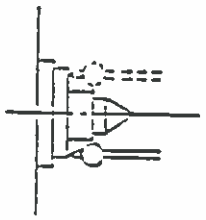
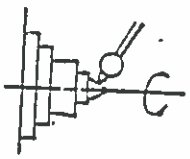
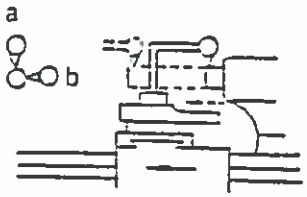
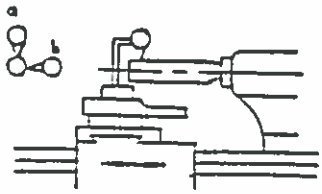
SERIAL: 999005

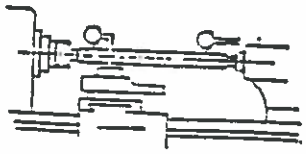
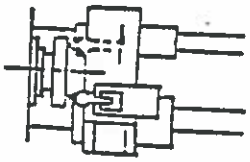
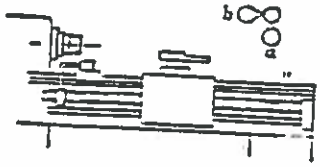
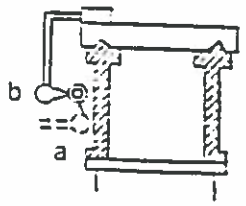
DATE 1999. 11/25

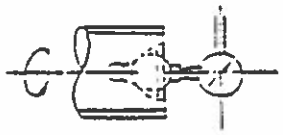
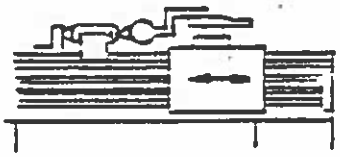
Unit : INCH

No.	Inspection item		Measuring method	Diagram of measuring method	Tolerance: Swing of engine lathe — Under 20	Tolerance: Swing of engine lathe — 20 and over and under 40	Measured Value
1	Straightness of bed slideways	a. Longitudinal direction (5) (in vertical plane)	Place a precision level on the slideway of the bed or on the straightedge placed crosswise over the ways at not less than three positions, the centre and each end. The maximum difference in readings of the level shall be the measurement value required. when it is not possible to follow the above method, fix the precision level on the carriage and take the reading of the level as the carriage is put at least to 3 positions of centre and two extreme positions of the travel. The maximum difference in readings of the level shall be the measurement value required.	(a)  Bed must not be sagging at central part (6)	.0016/40	.002/40	0.002/40
		b. Transverse direction(5) (in vertical plane)		(b) 	.0016/40	.002/40	0.0017/40
		c. Longitudinal direction (in horizontal plane)	For the swing over bed in excess of 20 stretch a steel wire over the slideway of the bed, and attach a micrometer microscope to the carriage so that observation from the top is possible. Slide the carriage and obtain readings of microscope along the full length of the way. The maximum difference in reading shall be the measurement value required (7)(8). For the swing over bed under 20 slide a test indicator fixed to the carriage along the test bar held between two centres. The maximum difference in readings of the indicator obtained shall be the measurement value required (9).	 	when centre distance does not exceed 40: .0004 / .0004		ok
					Centre distance exceeding 40 and under 80: .0008 / .0008		0.0008
					Centre distance exceeding 80: .0016 / .0016		

No.	Inspection item	Measuring method	Diagram of measuring method	Tolerance: Swing of engine lathe — Under 20	Tolerance: Swing of engine lathe — 20 and over and under 40	Measured Value
2	Parallelism of bed slideways	Apply a test indicator fixed to the carriage against the way of tailstock. Slide the carriage keeping in contact with slideway, and obtain reading of the indicator for the full length of the travelling of carriage. The maximum difference in reading shall be the measurement value required.		.0008	.0008	0.0008
3	Spindle nose runout	Apply a test indicator against the spindle nose. Rotate the spindle and obtain reading of the indicator. The maximum difference in reading shall be the measurement value required.		.0004	.0008	0.0008
4	Spindle taper hole runout	Fit a test bar to the main spindle and apply a test indicator against the fixed end and the free end. Rotate the spindle and obtain reading of the indicator. The maximum difference in reading shall be the measurement value required.		At fixed end of test bar: .0004	.0008	0.0007
				At point of 12: .0008	.0012	0.0008
5	Parallelism of centre line of main spindle to longitudinal motion of carriage — a. In vertical plane	Slide a test indicator fixed to the carriage along the test bar fitted to the main spindle. The maximum difference in reading of indicator obtained shall be the measurement value required (10)	Per 12 of test bar 	Test bar shall not be drooping at free end: .0004	.0008	0.0006
				Test bar shall not lean to further side: .0004	.0008	0.0006
	b. In horizontal plane					
6	Parallelism of centre line of main spindle to longitudinal motion of tool rest (in vertical plane)	Slide a test indicator fixed to the tool rest along the test bar fitted to the main spindle. The maximum difference in reading of the indicator obtained shall be the measurement value required (10)(11)	Per 6 	.0004	.0008	0.0007

No.	Inspection item		Measuring method	Diagram of measuring method	Tolerance: Swing of engine lathe — Under 20	Tolerance: Swing of engine lathe — 20 and over and under 40	Measured Value
7	Runout of flange end face of spindle		Apply a test indicator close to the periphery on the flange end face of main spindle. Rotate the spindle and find the maximum difference in reading of the indicator. Shift the point of indicator to the opposite face of flange and repeat the process. The larger of the two maximum differences shall be the measurement value required.		.0006	.0008	0.0008
8	Centre runout		apply a test indicator at right angle against the cone of the centre fitted to the main spindle. The maximum difference in reading of the indicator obtained while rotating the spindle shall be the measurement value required. The process prescribed shall be carried out on the centre of tailstock spindle as well.		.0006	.0008	0.0008
9	Parallelism of longitudinal motion of carriage to centre line of tailstock spindle	a. In vertical plane	Apply a test indicator fixed to the carriage against the top of tailstock spindle. Slide the carriage and obtain reading of the indicator when the spindle is shifted in and out. The difference between the two readings shall be the measurement value required (12).	Per 6 	No drooping of tailstock spindle at free end .0008	.0012	0.001
		b. In horizontal plane			Tailstock spindle shall not lean to further side. .0004	.0006	0.0005
10	Parallelism of longitudinal motion of carriage to centre line of tailstock spindle hole	a. In vertical plane	Apply a test indicator fixed to the carriage against the test bar fitted to the tailstock spindle hole. Slide the carriage and obtain reading of the indicator. The maximum difference in reading shall be the measurement value required.	Per 12 of test bar 	Test bar shall not droop at free end. .0008	.0012	0.001
		b. In horizontal plane			Test bar shall not lean to further side. .0008	.0012	0.0012

No.	Inspection item		Measuring method	Diagram of measuring method	Tolerance: Swing of engine lathe Under 20	Tolerance: Swing of engine lathe 20 and over and under 40	Measured Value
11	Difference in centre height between headstock and tailstock		Apply a test indicator fixed to the carriage against the each end of test bar held between the centres of main spindle and tail stock spindle. The difference between the two readings from each end of test bar, shall be the measurement value required (12)(13)		Tailstock side shall not be lower than headstock side. .0008	.0012	0.0009
12	Squareness of motion of cross slide with centre line of main spindle		Fit a face plate or a driving plate to the main spindle. Apply a test indicator fixed to the cross slide against a point on the plate given distance away from the centre. Obtain reading of the indicator on the horizontal line through the centre of spindle. Next, rotate the plate 180 degrees, traverse the cross slide and obtain another reading when the indicator is brought to the same point where previous reading has been taken. The difference between the two readings shall be the measurement value required.	Per 12 	Cross slide shall not move away from head stock when traversed forward. .0008	.0012	0.0011
13	Parallelism of centre line of lead screw end bearing to carriage slideways	a. In vertical plane	Put test indicator against the outside of the lead screw ends on the slideway (the measuring base) of the bed, and measure the deviation in upward and downward directions or in front and rear directions with test indicator The difference in readings shall be the measurement value required.		.004	.0045	0.004
		b. In horizontal plane			.004	.0045	0.0042
14	Deviations in alignment of centre line of lead screw end bearing with centre line of half nut	a. In vertical plane	Engage the half nut at mid-position on the lead screw. Next, put the test indicator on the slideway of the bed as the measuring base and apply the point of indicator to the central part and each end of the lead screw. Measure the distance in upward and downward directions or in front and rear directions from slideway The largest in difference of the reading shall be taken as the measurement value required.		.006	.008	0.007
		b. In horizontal plane			.006	.006	0.006

No.	Inspection item	Measuring method	Diagram of measuring method	Tolerance		Measured Value
				Swing of engine lathe		
				Under 20	20 and over and under 40	
15	Axial slip of lead screw	Apply a test indicator against a steel ball inserted into the centre hole of lead screw end. Rotate the screw with the half nut on, and traverse the carriage alternately to right and left. The largest difference in reading of the indicator obtained while rotating the lead screw shall be the measurement value required.		.0004	.0008	0.0006
16	Pitch error of lead screw	Rotate the lead screw with the half nut on. The difference between the theoretical distance and the actual distance of the carriage movement shall be measured by means of a measuring gage bar of certain length and a test indicator at not less than three positions, the centre and each end. However, when the lead screw has been tested prior to the assembly by means more stringent than the test specified, the test prescribed may be left out.	Per 12 	.0012	.0016	0.0013