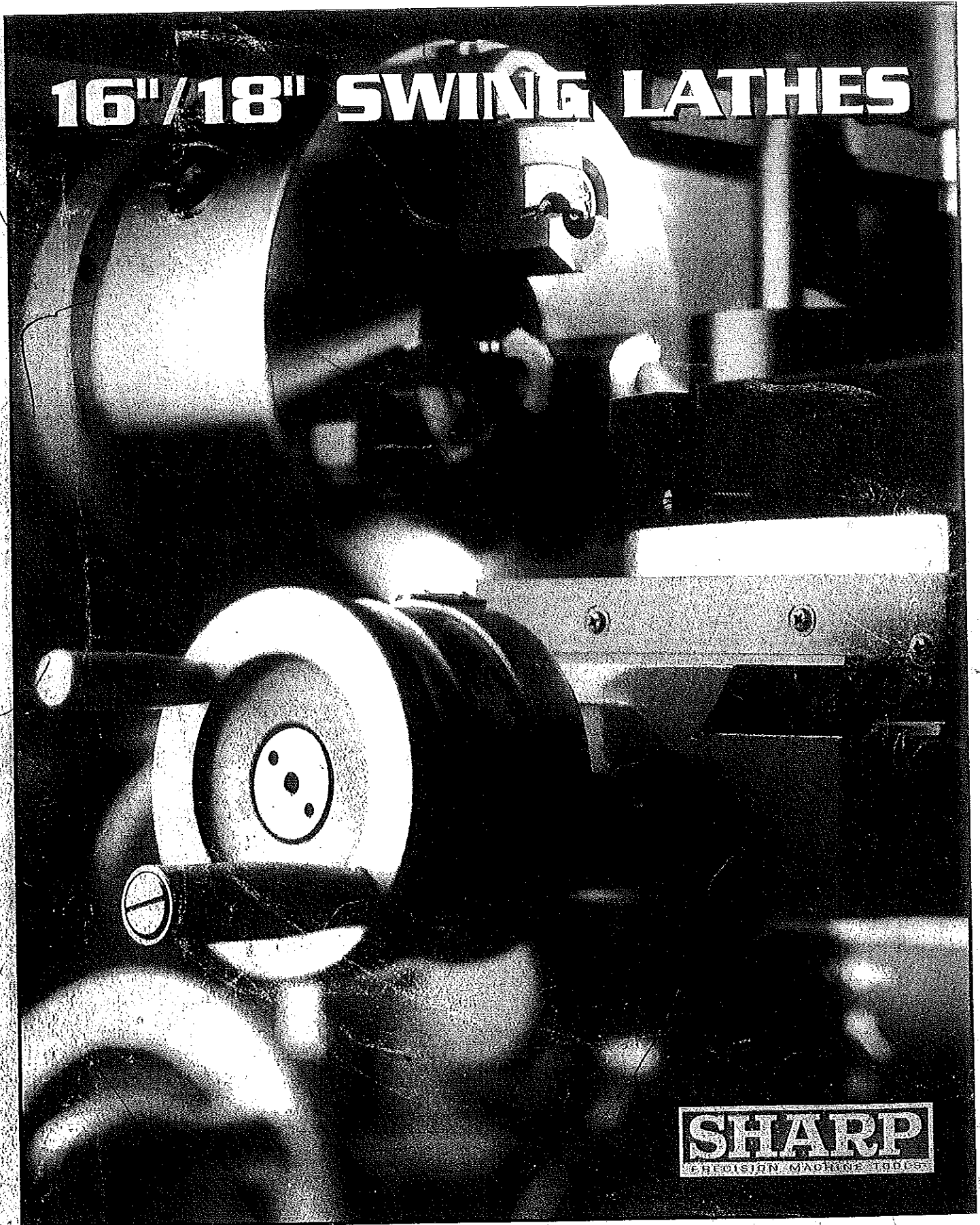


11600 K
1860C

OPERATION & PARTS MANUAL

16"/18" SWING LATHES



SHARP
CREATION MACHINE TOOLS

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**HIGH SPEED PRECISION
OPERATOR'S MANUAL
CONTENTS**

LATHE PREFACE.....3

1. SJ HIGH SPEED PRECISION LATHE

1-1 Machine assembly.....4

2. UNPACKING & MACHINE INSTALLATION

2-1 Unpacking6

2-2 Lifting6

2-3 Basic Foundation.....7

2-4 Cleaning.....7

2-5 Leveling.....7

3. ELECTRICAL CIRCUIT CONTROL

3-1 Electrical Wiring.....8

3-2 Electrical Equipment.....9

3-3 Electrical Cautions.....9

4. TESTING & OPERATION

4-1 Operation Symbols..... 10

4-2 Transmission & Spindle Operation.....11

4-3 Spindle Speed Selection.....11

4-4 Intermittent Operation of Spindle.....12

4-5 The Importance and Methods of Spindle Balancing.....13

4-6 Transmitting Power to the Gear Box.....13

4-7 Gear Box Operation.....14

4-8 Manual Operation.....14

4-9 Automatic Feed15

4-10 Automatic Feed Stop.....15

**HIGH SPEED PRECISION
OPERATOR'S MANUAL
CONTENTS**

4-11 4 Position Automatic Feed Stop.....	15
4-12 Tailstock Operation.....	16
5. THREADING	
5-1 Leadscrew Drive.....	16
5-2 Threading.....	16
5-3 Thread Dial Indicator.....	17
5-4 Thread & Feed Chart.....	18
5-5 Module & D.P. Thread Chart.....	24
6. LUBRICATION	
6-1 Headstock Lubrication.....	28
6-2 Gear Box & Apron Lubrication.....	28
6-3 Lubrication Charts	28
7. MAINTENANCE & ADJUSTMENT	
7-1 Headstock	29
7-2 Apron & Saddle.....	30
7-3 Gear Box.....	31
7-4 Tailstock Adjustment	31
7-5 Belt Tension Adjustment.....	33
7-6 Brake Belt Adjustment.....	33
7-7 Brake & Micro Switch Adjustment.....	34
7-8 Leadscrew Backlash Adjustment.....	34
7-9 Coolant Pump.....	35
8. Taper Attachment.....	35

PREFACE

Thank you for choosing Sharp as your choice for a high precision lathe. We at sharp take pride in the workmanship, durability and precision of our machines.

Read this manual in its entirety in order to get the best possible results from the machine and prolong its life, and become familiar with its operation, safety features and recommended maintenance.

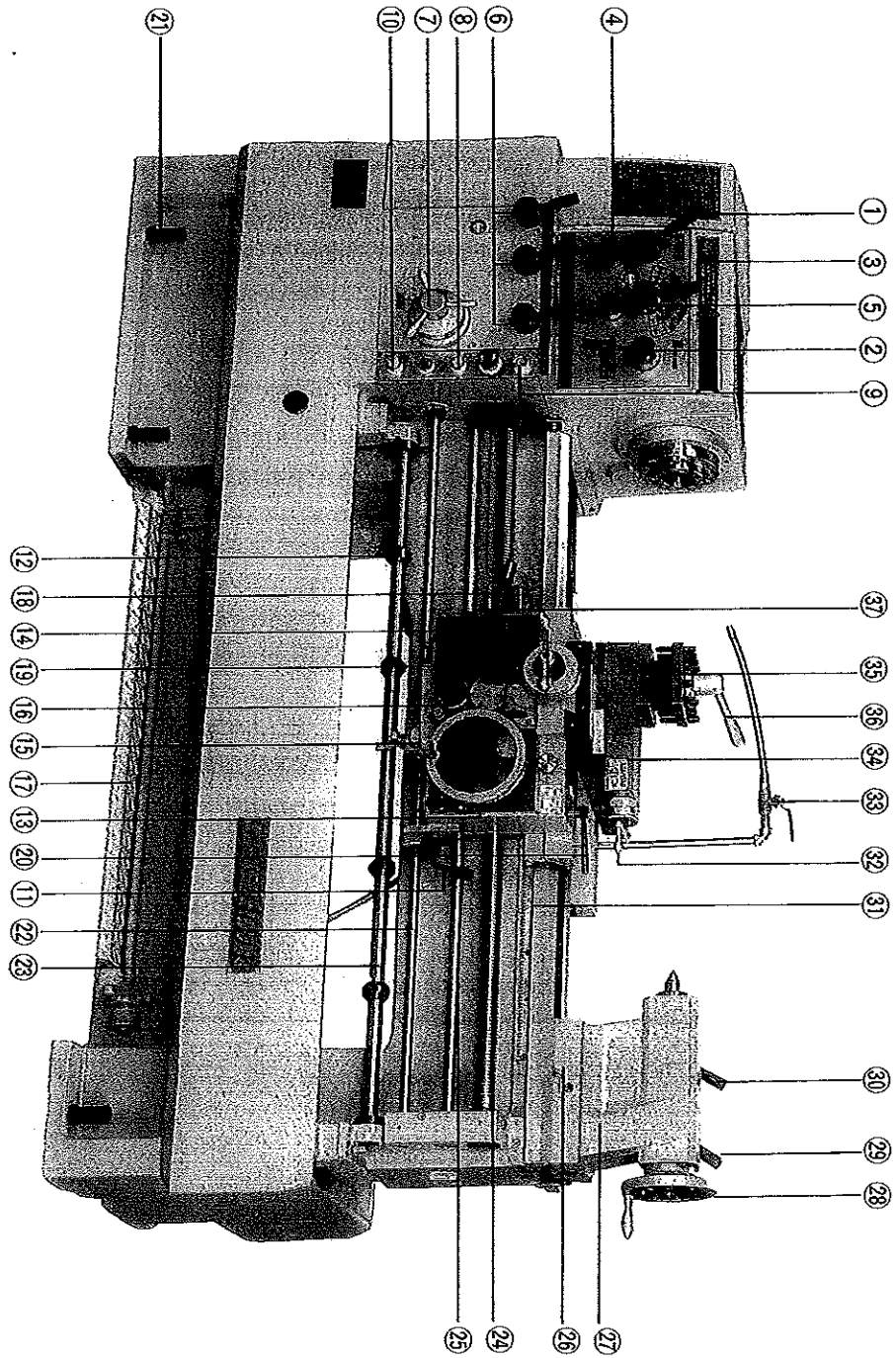
The 1 year warranty would be void if the machine was damaged due to improper use or disregard to any operational instruction contained in this manual.

Some precautions to be taken not listed later in this manual are:

1. Do **NOT** install the machine in direct sunlight or directly in front of any cooling system blowers.
2. Use only recommended lubricants.
3. Always keep machine clean
4. Should the ways become damaged do not move the carriage until they have been repaired.

1. SJ HIGH PRECISION LATHE

1 - 1 Machine Assembly



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	Spindle speed shifting lever	20	Carriage clamping lever
2	Spindle speed H/L shifting lever	21	Foundation adjusting bolt
3	Spindle speed shifting selection lever	22	Spindle operation control rod
4	Forward/Reverse shifting lever	23	4 position automatic feed stop selection rod
5	Thread/Feed selection lever	24	Leadscrew
6	Thread/Feed shifting lever	25	Auto-feeding rod
7	10-step feed selection dial	26	Tailstock set over adjusting screw
8	Power source switch (Main switch)	27	Tailstock body
9	Intermittent button	28	Tailstock handwheel
10	Coolant supply button	29	Tailstock body Clamping lever
11	Spindle operation control lever	30	Tailstock spindle locking lever
12	Adjustable trip dog	31	Rack
13	Longitudinal feed hand wheel	32	Compound rest handle
14	Cross slide handle	33	Coolant control valve
15	Trip plunger	34	Compound rest
16	Auto feeding engaged lever	35	Four way tool post
17	Foot brake pedal	36	Tool post clamping lever
18	Half nut engaged lever	37	Thread dial indicator
19	Feed axis selector		

2.UNPACKING & MACHINE INSTALLATION

2-1 Unpacking

When the machine arrives:

Check first to see if the crate or container is damaged.

Open the case and inspect for any damage to the machine or missing parts.

If you find any damage or missing parts, contact our company or the appropriate insurance company immediately.

Failure to report any discrepancies or damage immediately could result in a delay or the possibility of a claim being denied.

2-2 Lifting

Please refer to figure 2-2 for unloading and moving of machine.

1. Use two steel bars, 780mm long and 40mm in diameter. Lifting holes are provided in the bed. Appropriate steel cables should be used for lifting.
2. For best results a hook should be used.
3. Before lifting, be sure to move the apron and tailstock towards the end of the bed to balance the weight.
4. To insure machine accuracy, care should be taken not to jar the machine when it is placed on its foundation.
5. The back of the machine should be a minimum of 600mm from any wall or obstruction to allow sufficient space for wiring the electrical control box.

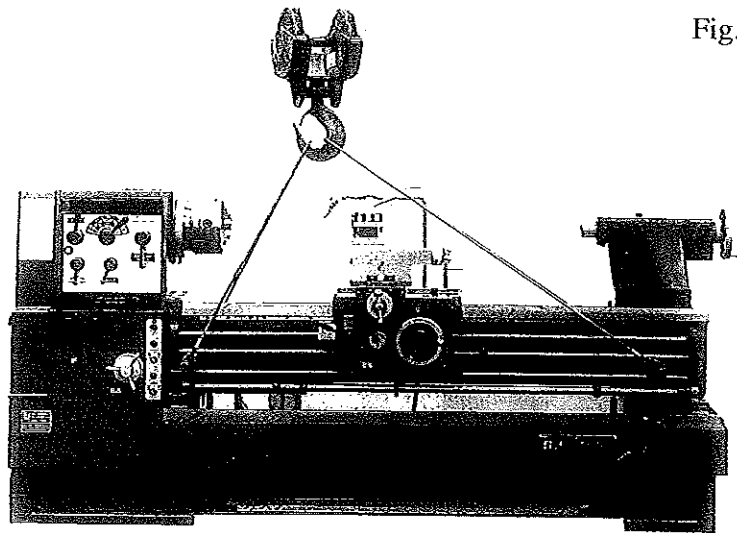
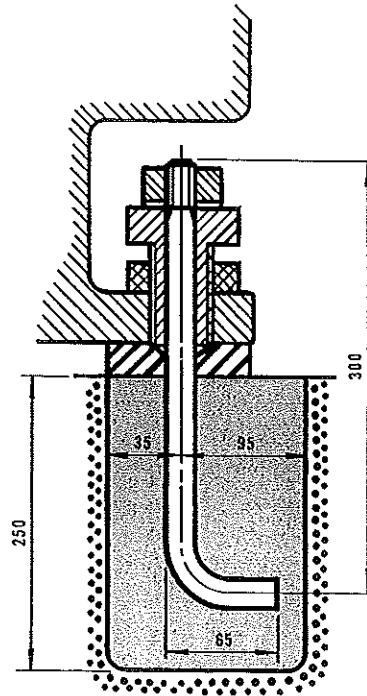


Fig. 2-2

2-3 Basic Foundation

With today's common use of tungsten carbide cutting tools, heavy cutting practices and higher spindle speeds, a good machine foundation is a must to avoid vibration. Please refer to fig 2-3 for recommended foundation.



UNIT-mm Fig 2-3

2-4 Cleaning

Before shipping, the machine is protected with a special anti-rust agent. Before operating the machine, this agent must be removed. This can be done using a soft brush/cloth soaked with cleaning solvent or kerosene. To avoid the danger of fire or explosion, do NOT use gasoline or cellulose solvent. After the anti-rust agent is removed, the machine should be properly lubricated and all moving parts be checked for proper operation.

2-5 Leveling

Once the machine is on its foundation it is time for leveling. A machinist level (accuracy 0.02mm/1000mm) should be used. Place level on bed to level machine for longitudinal and transverse leveling. Tighten foundation bolts, and recheck. If not level loosen foundation bolts and re-level machine. Tolerance should be within 0.04mm/1000mm.

(See Figure 2-5)

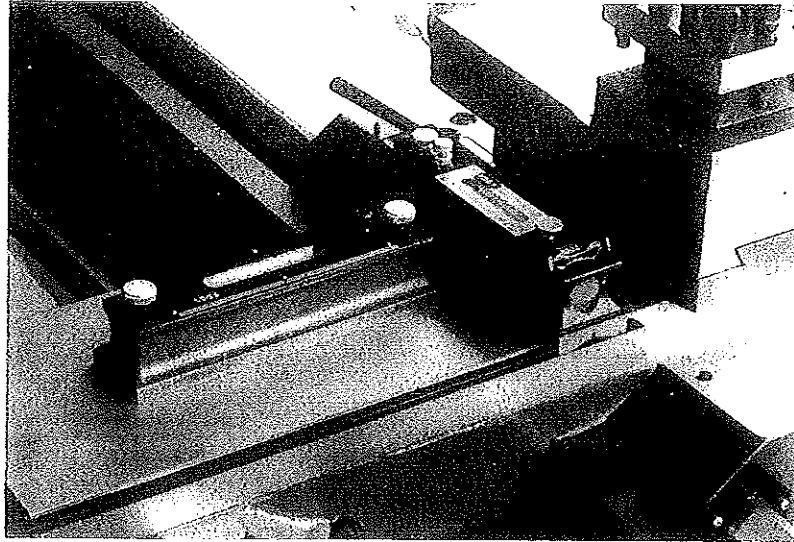


Fig 2-5

3. Electrical Circuit Control

3 -1. Electrical wiring

The electrical wiring can be found by opening the electrical control box located on the back of the machine. Connect the power source to the terminals labeled R.S.T. (For 16" & 18" use 8 gauge Wire, for 22" & 26" use 4 gauge wire).

The connection between the power source and the machine should be equipped with a safety fuse. Also make sure the machine is grounded.

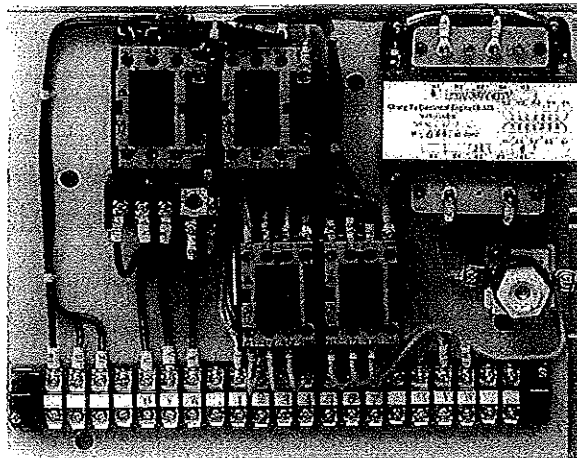


Fig 3-1

3-2 Electrical Equipment






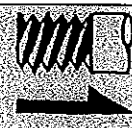

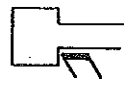

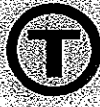



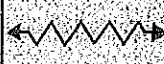

1. To protect the motor from burning out due to an overload, the electrical control box is equipped with an overload circuit breaker and magnetic contactor.
2. A micro switch protects the main switch.
3. The foot brake is connected to a micro switch. Stepping on the foot brake stops the lathe much faster than turning off the switch. After using the foot brake. The forward/reverse lever must be returned to neutral before the spindle can be operated.
4. The spindle will rotate continuously as long as the intermittent button (T) is depressed .

3-3 Electrical Cautions

After wiring, the rotation of the spindle must be checked. To do this, turn the main switch to "ON" and push the intermittent button (T), if the rotation is counter clockwise (looking from the tailstock, the rotation is correct. If the rotation is clockwise changing any two of the three wires, (R.S.T.)will correct the problem.

4. TESTING & OPERATION

4-1 Operation Symbols

1	HIGH	High speed revolution	11		Variable adjustment (pressure) (clockwise pressure increased; counterclockwise pressure decreased)
2	LOW	Low speed revolution	12		Electrical control box
3		Forward revolution	13	THREADS 	Imperial threads
4	N	Neutral gear	14		Metric threads
5		Reverse revolution	15	mm / 	Auto-feeding rate per revolution
6		Feeding	16		Pump
7		Intermittent button	17		Power switch-ON
8		Cross feeding	18		Power switch-OFF
9		Longitudinal feeding	19	OIL	Oil inlet (hole)
10		Cone clutch			

4-2 Transmission & Spindle Operation

After all the previously described procedures have been done, it is time to test the machine. Position the spindle H/L lever #(2) to "L", the spindle speed selection lever #(3) to the very left side and forward/reverse lever # (4) to the "N" position. Lift the spindle operation control lever (#(11) of item 1-1), and the spindle will rotate in the forward direction. To reverse spindle direction, push the lever down. To stop place lever in neutral. The foot brake is used for emergency stops. After using the foot brake, the forward/reverse lever must be returned to neutral before the spindle can be operated.

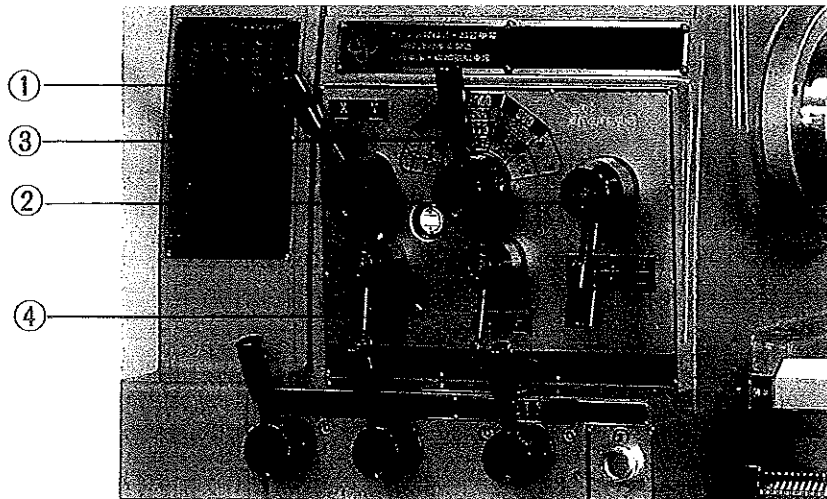


Fig 4-2

4-3 Spindle Speed Selection

There are three levers for selecting the desired spindle speed. (1) speed shifting lever, (2) H/L shifting lever and (3) speed selection lever, for a total of 12 speeds.

To rotate the spindle by hand, place the H/L lever to neutral. (Between "H" & "L").

For safety and to protect the gears from damage, only change speeds when the motor is completely stopped. If the gear does not engage easily, you can use the intermittent (T) button to jog the machine to engage gears. Be sure gears are properly engaged before starting lathe.

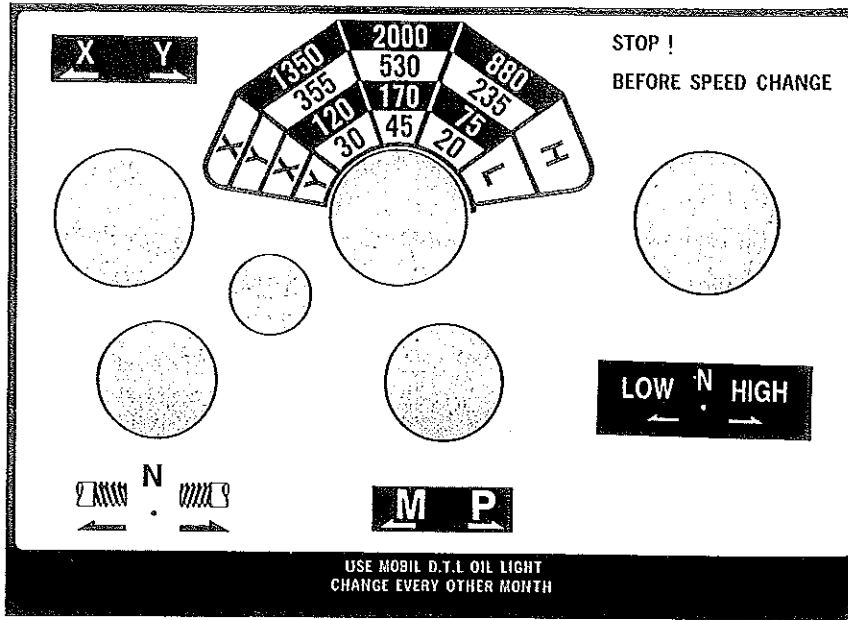
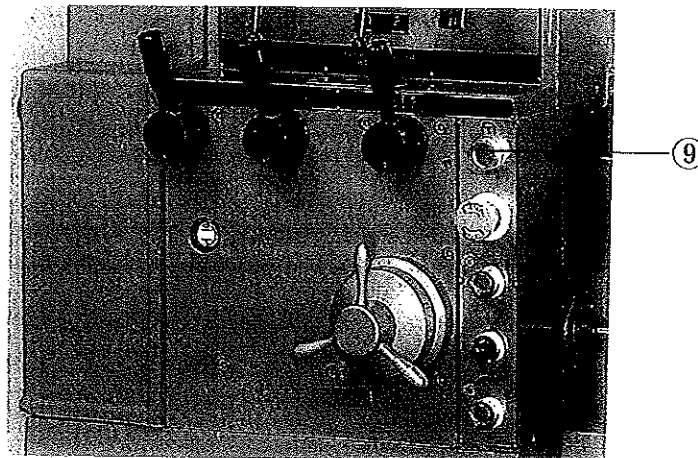


Fig 4-3

4-4 Intermittent Operation of Spindle

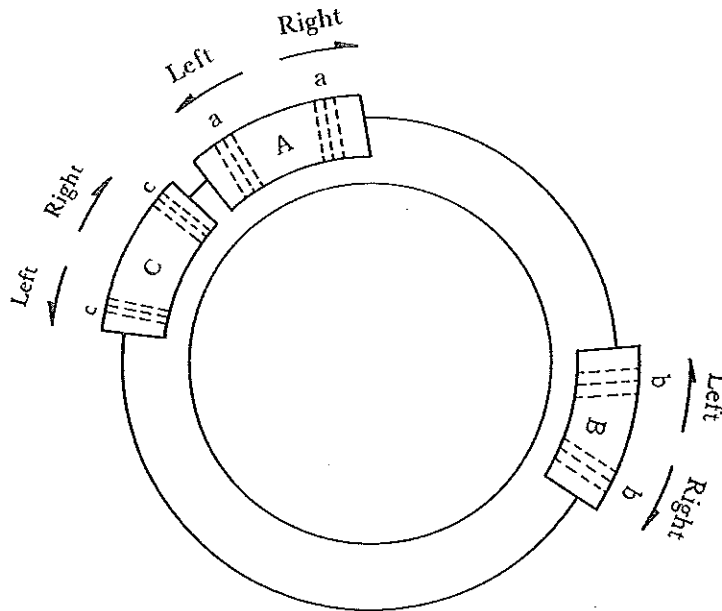
The lathe has been equipped with an intermittent button (#9) to simplify speed changes, check rotation and work piece centerline. This function only works in the forward direction.



4-5 The Importance and Method of Spindle Balancing

1. A lathe with a spindle that is out of balance can cause chatter and a poor finish on the workpiece. To ensure proper spindle balance Sharp lathes are equipped with balancing weights located on the locking ring at the rear of the spindle.

2. To properly balance the spindle, first run the lathe at 1350 r.p.m. Put the palm of your hand on the headstock and check for any vibration. Moving the balance weights left or right can eliminate any vibration detected.



4-6 Transmitting Power to the Gear Box

Lever #4 of item 1-1, controls the direction of the lead screw.

This lever has three positions. left, Right and Nutral.

4-7 Gear Box Operation

1. Threading:

With our special design, there is no need to re-arrange the back gears for threading. Please refer to the threading and feed tables for correct settings. The levers used for setting the feed rate or T.P.I. are: 1. Feed direction #4 of item 1-1, 2. Thread, feed lever #5 of item 1-1, Thread feed lever #6 of item 1-1 and 10 step feed selection dial #7 of item 1-1.

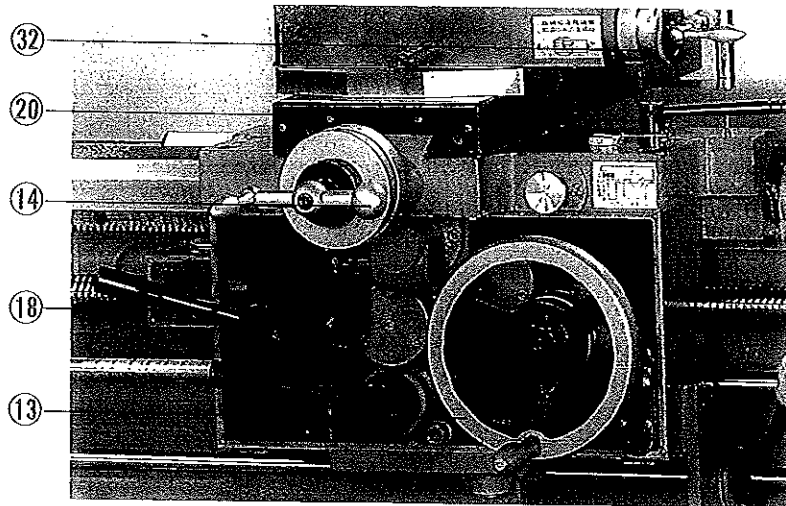
2. Auto feed:

After selecting the proper setting for either feed rate or threading you can use the appropriate lever for the desired operation. Auto feed #16 of item 1-1, or half nut engagement lever #18 of item 1-1.

4-8 Manual Operation

For manual operation, move both the half nut lever #18 and lever #4 of item 1-1 to neutral position. Hand wheel #13 Fig. 4-8 controls the apron movement, #14 controls the cross slide and #32 controls the compound. The graduations on all the dials are graduated in both metric and inch. Metric is 0.02 mm per graduation and inch is . 0.001" per graduation...

Fig. 4-8



4-9 Automatic feed

1. Position lever #4 of item 1-1 to the required position
2. Move lever #5 & #6 of item 1-1 to the desired feed rate or thread
3. For threading, use lever #18 of item 1-1. Be sure lever is fully engaged.
4. For cross feed, push the feed axis selector lever #19 of item 1-1 down.
5. To reverse the cross feed pull the feed axis selector lever #19 of item 1-1 up.

4-10 Automatic Feed Stop

The apron is equipped with an automatic stop device. To set this stop, loosen the setscrew on the top of the dog #12 fig. 4-10 and move to the desired location. with the dog in place and the top tip facing out tighten the setscrew. when the dog comes in contact with the trip plunger (#15 of item 1-1 located at the bottom of the apron) the carriage will stop always test the stop before you start machining to avoid damage to the lathe and or workpiece.

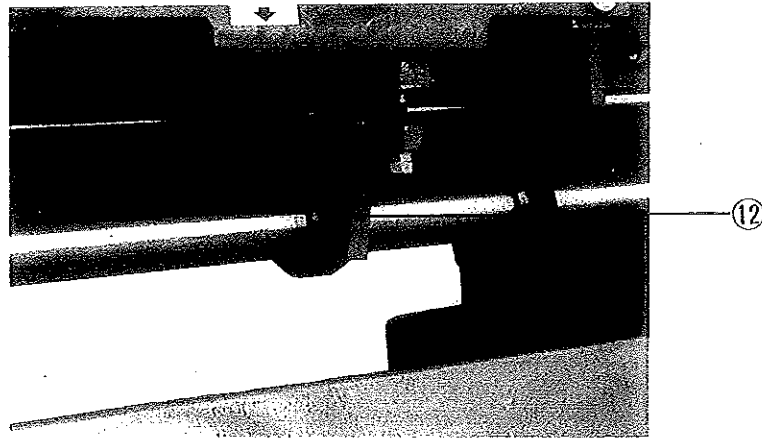


Fig. 4-10

4-11 4 Position Automatic Feed Stop

This feature gives you the option to set up to 4 stops. dogs are set individually and can be set to trip the plunger going in ether direction. If the dog is not needed, simply turn it so the top tip is facing inward and the plunger arm will pass by it.

4-12 Tailstock Operation

1. The tailstock handwheel dial is divided in .001" per graduation.
Rotating the handwheel clockwise moves the quill out, counter clockwise retracts the quill. Retracting quill will release the center or other tool being used.
2. To lock the quill push locking lever forward. (#30 Fig. 4-12).
3. The center line of the tailstock can be adjusted using set-over adjusting screw #26 Fig. 4-12. After adjusting be sure to tighten screws on both sides.

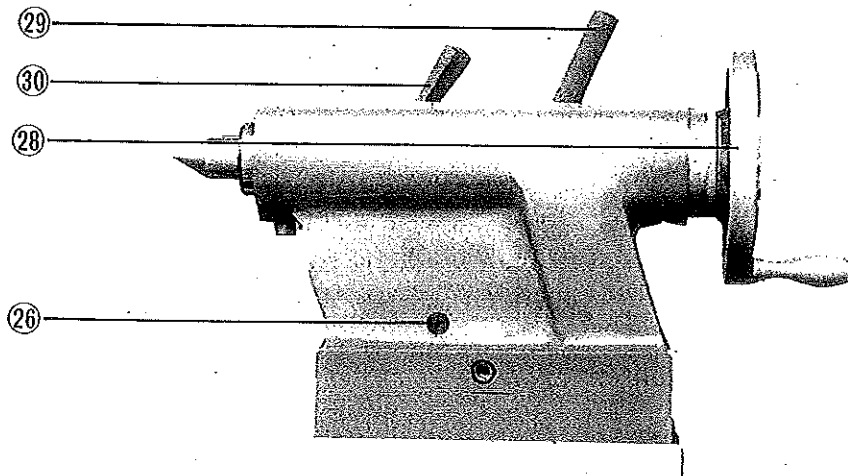


Fig 4-12

5. Threading

5-1 Leadscrew Drive.

Moving the forward/reverse lever (#4 item 1-1) to the right will cause the leadscrew to rotate backwards, moving the lever to the left the leadscrew will rotate forward and when lever is in neutral the leadscrew will stop.

5-2 Threading

1. After selecting the thread to be cut, set the following levers to the appropriate position: #5, #6 & #7 of item 1-1. (Example 18t.p.i. PAE2).
2. Turn of the lathe.
3. Engage the halfnut by pushing #18 of item 1-1 down, making sure it is fully engaged.

5-3 Thread Dial Indicator

1. Thread dial indicator for Imperial leadscrew

To cut even number threads the leadscrew can be engaged on any number or line. For odd number threads the leadscrew can be engaged on any number. Fractional threads (1/2, 1/4 etc) leadscrew can only be engaged on the same number or line.

Note: When cutting metric threads on a lathe with an Imperial leadscrew be sure the half nut is engaged at all times.

(If not the thread will not repeat).

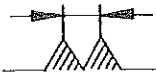





2. Thread dial indicator for Metric leadscrew for cutting metric threads.

There are two dials used for metric leadscrews, 2&7 divisions and 3&5 divisions. To cut threads with pitches of 1.25, 2.5, 5.0, 2.25, 4.5 use the 3&5 division dial, for the balance of threads use the 2&7 division dial. For cutting thread pitches of 0.5, 0.75, 1.0, 1.5, 2.0, 3.0, 4.0, and 6.0, use the 14T worm gear and the 2&7 division dial. The Maximum number of divisions on the dial are 7, however you can only engage the dial on 2 of these numbers.

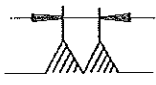



Gear Teeth	Pitch		Dial Division	Halfnuts Engaged Number
11 T	2.75	5.5	2	1
13 T	3.25	6.5	2	1
14 T	1.75	3.5	2	1,2
	7			
	0.5	0.75	7	1,2,3,4,5,6,7
	1	1.5		
	2	3		
	4	6		
15 T	1.25	2.5	3	1,2,3,
	5			
	2.25	4.5	5	1,2,3
18 T	6.75		2	1,2

5 - 4 Thread & Feed Chart

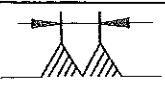
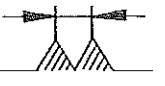

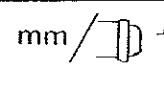
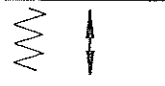
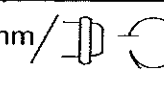
For Swing 16", 18", 20" (410mm, 460mm, 510mm) Series
while Metric Leadscrew & Metric Feed

 /in		LEAD SCREW-P=6mm					
R							
56	PAD10	32	PAD1	18	PAE2	9½	PAF3
54	PAD9	28	PAE10	16	PAE1	9	PAF2
52	PAD8	27	PAE9	14	PAF10	8	PAF1
48	PAD6	26	PAE8	13½	PAF9	7	PBF10
46	PAD6	24	PAE7	13	PAF8	6	PBF7
44	PAD5	23	PAE6	12	PAF7	5½	PBF5
40	PAD4	22	PAE5	11½	PAF6	5	PBF4
38	PAD3	20	PAE4	11	PAF5	4½	PBF2
36	PAD2	19	PAE3	10	PAF4	4	PBF1
 mm		LEAD SCREW-P=6mm					
C							
0.5	PSF1	1.75	PSE10	3.5	PSD10	6	PUD7
0.75	PSF7	2	PSD1	4	PUD1	7	PUD10
1	PSE1	2.25	PSD2	4.5	PUD2		
1.25	PSE4	2.5	PSD4	5	PUD4		
1.5	PSE7	3	PSD7	5.5	PUD5		
 mm/ϕ		 mm/ϕ		 mm/ϕ		 mm/ϕ	
C.T.		C.T.		C.T.		C.T.	
0.05	MF1	0.30	MD4	0.02	MF1	0.15	MD5
0.06	MF2	0.34	MD5	0.03	MF3	0.17	MD7
0.08	MF5	0.37	MD7	0.04	MF7	0.20	MD10
0.10	MF10	0.42	MD10	0.05	ME1	0.24	PD2
0.13	ME2	0.48	PD1	0.06	ME3	0.27	PD4
0.17	ME5	0.54	PD2	0.07	ME5	0.30	PD5
0.21	ME10	0.60	PD4	0.08	ME7	0.34	PD7
0.24	MD1	0.74	PD7	0.1	MD1	0.40	PD10
0.27	MD2	0.82	PD10	0.12	MD2		

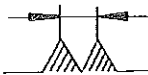
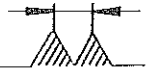




For Swing 16", 18", 20" (410mm, 460mm, 510mm) Series,
while Imperial Leadscrew & Imperial Feed.

 in LEAD SCREW-4TPI R							
56	PAD10	32	PAD1	18	PAE2	9½	PAF3
54	PAD9	28	PAE10	16	PAE1	9	PAF2
52	PAD8	27	PAE9	14	PAF10	8	PAF1
48	PAD7	26	PAE8	13½	PAF9	7	PBF10
46	PAD6	24	PAE7	13	PAF8	6	PBF7
44	PAD5	23	PAE6	12	PAF7	5½	PBF5
40	PAD4	22	PAE5	11½	PAF6	5	PBF4
38	PAD3	20	PAE4	11	PAF5	4½	PBF2
36	PAD2	19	PAE3	10	PAF4	4	PBF1
 mm LEAD SCREW-4TPI C							
0.5	PSF1	1.75	PSE10	3.5	PSD10	6	PUD7
0.75	PSF7	2	PSD1	4	PUD1	7	PUD10
1	PSE1	2.25	PSD2	4.5	PUD2		
1.25	PSE4	2.5	PSD4	5	PUD4		
1.5	PSE7	3	PSD7	5.5	PUD5		
 in/ϕ C.T.				 in/ϕ C.T.			
0.002	MF1	0.001	MD4	0.001	MF7	0.0043	MD8
0.0025	MF2	0.012	MD5	0.0012	MF10	0.0047	MD10
0.0031	MF5	0.014	MD7	0.0015	ME2	0.0052	PD1
0.0039	MF10	0.016	MD10	0.0017	ME4	0.0060	PD2
0.0051	ME2	0.018	PD1	0.002	ME7	0.0071	PD5
0.006	ME5	0.020	PD2	0.0023	ME10	0.0078	PD7
0.008	ME10	0.023	PD4	0.0026	MD1	0.0086	PD8
0.009	MD1	0.027	PD7	0.0030	MD2	0.0094	PD10
0.010	MD2	0.032	PD10	0.0036	MD5		

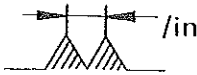
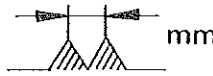

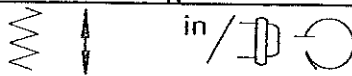
For Swing 16", 18", 20" (410mm, 460mm, 510mm) Series,
while Imperial Leadscrew but Metric Feed.

 /in		LEAD SCREW-4TPI					
R							
56	PAD10	32	PAD1	18	PAE2	9½	PAF3
54	PAD9	28	PAE10	16	PAE1	9	PAF2
52	PAD8	27	PAE9	14	PAF10	8	PAF1
48	PAD7	26	PAE8	13½	PAF9	7	PBF10
46	PAD6	24	PAE7	13	PAF8	6	PBF7
44	PAD5	23	PAE6	12	PAF7	5½	PBF5
40	PAD4	22	PAE5	11½	PAF6	5	PBF4
38	PAD3	20	PAE4	11	PAF5	4½	PBF2
36	PAD2	19	PAE3	10	PAF4	4	PBF1
 mm		LEAD SCREW-4TIP					
C							
0.5	PSF1	1.75	PSE10	3.5	PSD10	6	PUD7
0.75	PSF7	2	PSD1	4	PUD1	7	PUD10
1	PSE1	2.25	PSD2	4.5	PUD2		
1.25	PSE4	2.5	PSD4	5	PUD4		
1.5	PSE7	3	PSD7	5.5	PUD5		
 mm/ϕ		 mm/ϕ		 mm/ϕ		 mm/ϕ	
C.T.		C.T.		C.T.		C.T.	
0.05	MF1	0.29	MD4	0.02	MF1	0.14	MD5
0.06	MF2	0.32	MD5	0.03	MF3	0.16	MD7
0.08	MF5	0.35	MD7	0.04	MF7	0.18	MD10
0.10	MF10	0.40	MD10	0.05	ME1	0.2	PD1
0.13	ME2	0.45	PD1	0.06	ME3	0.24	PD2
0.16	ME5	0.52	PD2	0.07	ME5	0.28	PD5
0.20	ME10	0.58	PD4	0.08	ME7	0.32	PD7
0.23	MD1	0.70	PD7	0.1	MD1	0.36	PD10
0.26	MD2	0.80	PD10	0.12	MD2		

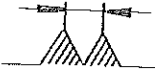


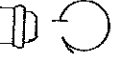

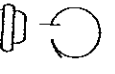
For Swing 22", 26" (560mm, 660mm) Series, while Metric Leadscrew & Metric Feed.

 /in		LEAD SCREW – P:6mm					
R							
56	KAD10	27	KAE9	13	KAF8	5	KBF4
54	KAD9	26	KAE8	12	KAF7	4½	KBF2
52	KAD8	24	KAE7	11½	KAF6	4	KBF1
48	KAD7	23	KAE6	11	KAF5	3½	JBF10
46	KAD6	22	KAE5	10	KAF4	3¼	JBF8
44	KAD5	20	KAE4	9½	KAF3	3	JBF7
40	KAD4	19	KAE3	9	KAF2	2-7/8	JBF6
38	KAD3	18	KAE2	8	KAF1	2¾	JBF5
36	KAD2	16	KAE1	7	KBF10	2½	JBF4
32	KAD1	14	KAF10	6	KBF7	2½	JBF2
28	KAE10	13½	KAF9	5½	KBF5	2	JBF1
 mm		LEAD SCREW – P=6mm					
C							
0.05	KSF1	2	KSD1	4.5	KUD2	9	JUD2
0.75	KSF7	2.25	KSD2	5	KUD4	10	JUD4
1	KSE1	2.5	KSD4	5.5	KUD5	11	JUD5
1.25	KSE4	3	KSD7	6	KUD7	12	JUD7
1.5	KSE7	3.5	KSD7	7	KUD10	13	JUD8
1.75	KSE10	4	KUD1	8	JUD1	14	JUD10
 mm/ϕ		 mm/ϕ		 mm/ϕ		 mm/ϕ	
C.T.		C.T.		C.T.		C.T.	
0.05	KF1	0.30	KD4	0.02	KF1	0.15	KD5
0.06	KF2	0.34	KD5	0.03	KF3	0.17	KD7
0.08	KF5	0.37	KD7	0.04	KF7	0.20	KD10
0.10	KF10	0.42	KD10	0.05	KE1	0.24	JD2
0.13	KE2	0.48	JD1	0.06	KE3	0.27	JD4
0.17	KE5	0.54	JD2	0.07	KE5	0.30	JD5
0.21	KE10	0.60	JD4	0.08	KE7	0.34	JD7
0.24	KD1	0.74	JD7	0.1	KD1	0.40	JD10
0.27	KD2	0.82	JD10	0.12	KD2		



For Swing 22", 26" (560mm, 660mm) Series, while Imperial Leadscrew & Imperial Feed.

 LEAD SCREW-4TPI R			
56	KAD10	27	KAE9
54	KAD9	26	KAE8
52	KAD8	24	KAE7
48	KAD7	23	KAE6
46	KAD6	22	KAE5
44	KAD5	20	KAE4
40	KAD4	19	KAE3
38	KAD3	18	KAE2
36	KAD2	16	KAE1
32	KAD1	14	KAF10
28	KAE10	13½	KAF9
13	KAF8	12	KAF7
11½	KAF6	11	KAF5
10	KAF4	9½	KAF3
9	KAF2	8	KAF1
7	KBF10	6	KBF7
5½	KBF5	5	KBF4
4½	KBF2	4	KBF1
3½	JBF10	3	JBF7
3¼	JBF8	2-7/8	JBF6
2½	JBF5	2½	JBF4
2¼	JBF2	2	JBF1
 LEAD SCREW-4TPI C			
0.5	KSF1	2	KSD1
0.75	KSF7	2.25	KSD2
1	KSE1	2.5	KSD4
1.25	KSE4	3	KSD7
1.5	KSE7	3.5	KSD10
1.75	KSE10	4	KUD1
4.5	KUD2	5	KUD4
5.5	KUD5	6	KUD7
7	KUD10	8	JUD1
9	JUD2	10	JUD4
11	JUD5	12	JUD7
13	JUD8	14	JUD10
 C.T.		 C.T.	
0.002	KF1	0.011	KD4
0.0025	KF2	0.012	KD5
0.0031	KF5	0.014	KD7
0.0039	KF10	0.016	KD10
0.0051	KE2	0.018	JD1
0.006	KE5	0.020	JD2
0.008	KE10	0.023	JD4
0.009	KD1	0.027	JD7
0.010	KD2	0.032	JD10
0.001	KF7	0.0012	KF10
0.0015	KE2	0.0017	KE4
0.002	KE7	0.0023	KE10
0.0026	KD1	0.0030	KD2
0.0043	KD8	0.0047	KD10
0.0052	JD1	0.0060	JD2
0.0071	JD5	0.0078	JD7
0.0086	JD8	0.0094	JD10
0.0036	KD5		

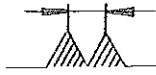
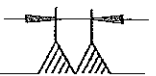
For Swing 22", 26" (560mm, 660mm) Series, while Imperial Leadscrew but Metric Feed.

 /in LEAD SCREW – 4TPI R			
56	KAD10	27	KAE9
54	KAD9	26	KAE8
52	KAD8	24	KAE7
48	KAD7	23	KAE6
46	KAD6	22	KAE5
44	KAD5	20	KAE4
40	KAD4	19	KAE3
38	KAD3	18	KAE2
36	KAD2	16	KAE1
32	KAD1	14	KAF10
28	KAE10	13½	KAF9
13	KAF8	10	KAF4
12	KAF7	9½	KAF3
11½	KAF6	9	KAF2
11	KAF5	8	KAF1
7	KBF10	7	KBF10
6	KBF7	6	KBF7
5½	KBF5	5½	KBF5
5	KBF4	4	KBF4
4½	KBF2	4	KBF1
3½	JBF10	3½	JBF10
3¼	JBF8	3¼	JBF8
3	JBF7	3	JBF7
2-7/8	JBF6	2-7/8	JBF6
2¼	JBF5	2¼	JBF5
2½	JBF4	2½	JBF4
2¼	JBF2	2¼	JBF2
2	JBF1	2	JBF1
 mm LEAD SCREW – 4TPI C			
0.5	KSF1	2	KSD1
0.75	KSF7	2.25	KSD2
1	KSE1	2.5	KSD4
1.25	KSE4	3	KSD7
1.5	KSE7	3.5	KSD10
1.75	KSE10	4	KUD1
4.5	KUD2	4.5	KUD2
5	KUD4	5	KUD4
5.5	KUD5	5.5	KUD5
6	KUD7	6	KUD7
7	KUD10	7	KUD10
8	JUD1	8	JUD1
9	JUD2	9	JUD2
10	JUD4	10	JUD4
11	JUD5	11	JUD5
12	JUD7	12	JUD7
13	JUD8	13	JUD8
14	JUD10	14	JUD10
 mm /  C.T.  mm /  C.T.			
0.05	KF1	0.29	KD4
0.06	KF2	0.32	KD5
0.08	KF5	0.35	KD7
0.10	KF10	0.40	KD10
0.13	KE2	0.45	JD1
0.16	KE5	0.52	JD2
0.20	KE10	0.58	JD4
0.23	KD1	0.70	JD7
0.26	KD2	0.80	JD10
0.02	KF1	0.02	KF1
0.03	KF3	0.03	KF3
0.04	KF7	0.04	KF7
0.05	KE1	0.05	KE1
0.06	KE3	0.06	KE3
0.07	KE5	0.07	KE5
0.08	KE7	0.08	KE7
0.1	KD1	0.1	KD1
0.12	KD2	0.12	KD2
0.14	KD5	0.14	KD5
0.16	KD7	0.16	KD7
0.18	KD10	0.18	KD10
0.2	JD1	0.2	JD1
0.24	JD2	0.24	JD2
0.28	JD5	0.28	JD5
0.32	JD7	0.32	JD7
0.36	JD10	0.36	JD10

For Swing 22", 26" (560mm, 660mm) Series, while
Metric Leadscrew.

		 $\pi/1''$						
		LEAD SCREW — P=6mm						
		R						
70T	56	KAD10	27	KAE9	13	KAF8	5	KBF4
	54	KAD9	26	KAE8	12	KAF7	4½	KBF2
	52	KAD8	24	KAE7	11½	KAF6	4	KBF1
	48	KAD7	23	KAE6	11	KAF5	3½	JBF10
	46	KAD6	22	KAE5	10	KAF4	3¼	JBF8
	44	KAD5	20	KAE4	9½	KAF3	3	JBF7
	40	KAD4	19	KAE3	9	KAF2	2-7/8	JBF6
	38	KAD3	18	KAE2	8	KAF1	2¾	JBF5
	36	KAD2	16	KAE1	7	KBF10	2½	JBF4
	32	KAD1	14	KAF10	6	KBF7	2¼	JBF2
28	KAE10	13½	KAF9	5½	KBF5	2	JBF1	
		 mm/π						
		LEAD SCREW — P=6mm						
		C						
50T	0.5	KSF1	2	KSD1	4.5	KUD2	9	JUD2
	0.75	KSF7	2.25	KSD2	5	KUD4	10	JUD4
	1	KSE1	2.5	KSD4	5.5	KUD5	11	JUD5
	1.25	KSE4	3	KSD7	6	KUD7	12	JUD7
	1.5	KSE7	3.5	KSD10	7	KUD10	13	JUD8
	1.75	KSE10	4	KUD1	8	JUD1	14	JUD10

For Swing 22", 26" (560mm, 660mm) Series, while Imperial Leadscrew.

		 $\pi / 1''$						
		LEAD SCREW - 4TPI						
		R						
41T	56	KAD10	27	KAE9	13	KAF8	5	KBF4
	54	KAD9	26	KAE8	12	KAF7	4½	KBF2
	52	KAD8	24	KAE7	11½	KAF6	4	KBF1
	48	KAD7	23	KAE6	11	KAF5	3½	JBF10
	46	KAD6	22	KAE5	10	KAF4	3¼	JBF8
	44	KAD5	20	KAE4	9½	KAF3	3	JBF7
	40	KAD4	19	KAE3	9	KAF2	2-7/8	JBF6
	38	KAD3	18	KAE2	8	KAF1	2¾	JBF5
	36	KAD2	16	KAE1	7	KBF10	2½	JBF4
	32	KAD1	14	KAF10	6	KBF7	2¼	JBF2
	28	KAE10	13½	KAF9	5½	KBF5	2	JBF1
		 mm / π						
		LEAD SCREW - 4TPI						
		C						
31T	0.5	KSF1	2	KSD1	4.5	KUD2	9	JUD2
	0.75	KSF7	2.25	KSD2	5	KUD4	10	JUD4
	1	KSE1	2.5	KSD4	5.5	KUD5	11	JUD5
	1.25	KSE4	3	KSD7	6	KUD7	12	JUD7
	1.5	KSE7	3.5	KSD10	7	KUD10	13	JUD8
	1.75	KSE10	4	KUD1	8	JUD1	14	JUD10

6. LUBRICATION

6-1 Headstock Lubrication

The headstock lubrication is of the splash injection type. Oil grooves have been provided around the headstock to provide lubrication to the spindle bearings and allow the oil to return to the oil reservoir. An oil plug has been provided on the headstock cover to simplify adding oil when needed. Oil level should be kept at the centerline of the sight glass. the oil drain is located on the right bottom side of the headstock.

NOTE:

Check oil level before operating lathe.

Change oil after one month of use and every two months thereafter.

Use Shell Tellus #32

6-2 Gear Box & Apron Lubrication

1. The gear box is a reservoir oil bath type. To ensure the long service life of the gear box and bedways, change the oil every six months.
2. The apron is also a reservoir oil bath type. Add oil as soon as the oil is lower than the center line of the sight glass.

6-3 Lubrication Charts

	Location	Methods	Quantity	Oil time	Exchange time
1.	Headstock	Loosen the oil input hole screw on the left top side of the headstock cover	L	Once per month	One month at the beginning, there-after once two months.
2.	Gear Box	Open the top cover and loosen the oil input hole screw	L	Once per month	Every six month
3.	Apron	Loosen the oil input hole screw	L	Once per month	
4.	Compound rest	Add oil with oil can	As required	Once per month	
5.	Auto Feeding rod	Add oil with oil can	As required	Once per month	
6.	Tailstock	Add oil with oil can	As required	Once per month	
7.	Leadscrew	Add oil with oil can	As required	Once per month	
8.	Bedway	Press the manual OIL PUMP	As required	Once per month	

7. MAINTENANCE & ADJUSTMENTS

7-1 Headstock

1. Headsrock cover leaks:

When the headstock cover is removed it is important to re-Install it properly to prevent leakage. To re-install, the connecting surfaces must be cleaned and coated with a thin layer of grease so it will seal properly.

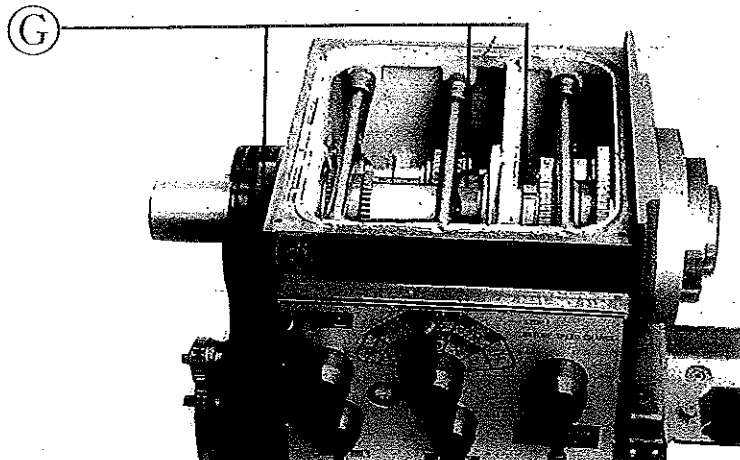
2. There are three possible causes for oil to leak from the spindle covers.

1. Reservoir over filled. (Correction: drain oil to proper level).
2. Wrong weight oil (Correction: Change to recommended lubricant)
3. Blocked oil return.(correction: Remove the headstock cover and while turning the spindle blow air through the small oil holes located in the top of the head.

3. Spindle bearing adjustment:

The front and center bearings on the spindle are precision taper roller type. To maintain the accuracy and proper operation, the bearings must have the proper preload. To adjust the bearings loosen the set screws on locking nut "G" (Fig. 7-1-3) and tighten locking nut "G" to get the proper pre-load do not over tighten. After adjusting be sure to re-tighten the set screws.

Fig 7-1.3



7-2 Apron & Saddle

1. The oil inlet is located on the right top side of the saddle base. (Plug marked "OIL")
2. The apron oil drain is located on the bottom of the apron. (See drawing)
3. Recommended lubricant is Shell Tellus No. 220 and changed every 6 months
4. Half nut adjustment: First remove the thread dial indicator, then find the 4 gib strip adjusting screw and loosen slightly. While pressing down on the half nut engagement lever adjust **gib** as needed. Re-tighten screws and replace the thread dial indicator.
5. If the manual oil pump fails it may need to be cleaned or repaired. To remove the pump, remove the pump body and loosen the plug lever to dismantle the unit. Use air to blow out the line. If the oil flow is too low the O-ring may need replacing. After replacing the O-ring, re-install pump and test.
6. The cone clutch in the center of the apron is an overload device. The safety overload weight limitation is 12Kg. This can be adjusted using the hexagon screw, located in the center of the apron. Turning the screw clockwise will increase the tension, counter clockwise will decrease the tension. This devise should automatically slip out if the overload is over 12Kg. When the auto-feed is engaged (Fig. 7-2.6) and the handwheel is held.

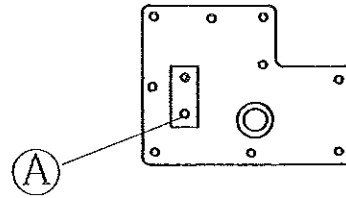
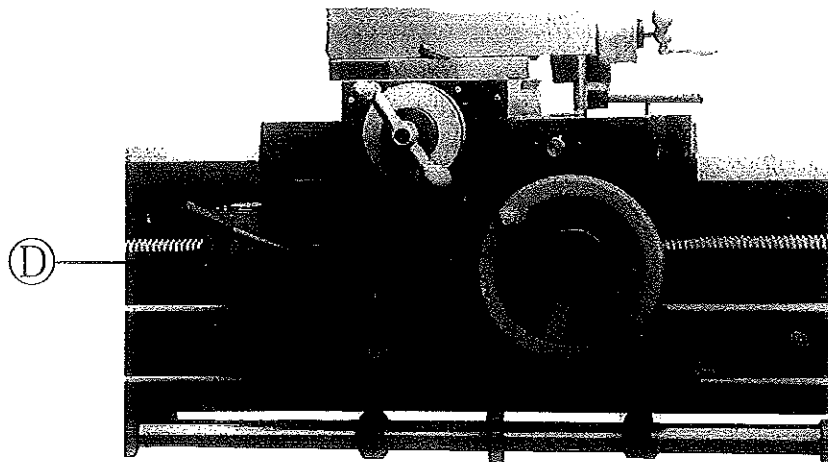


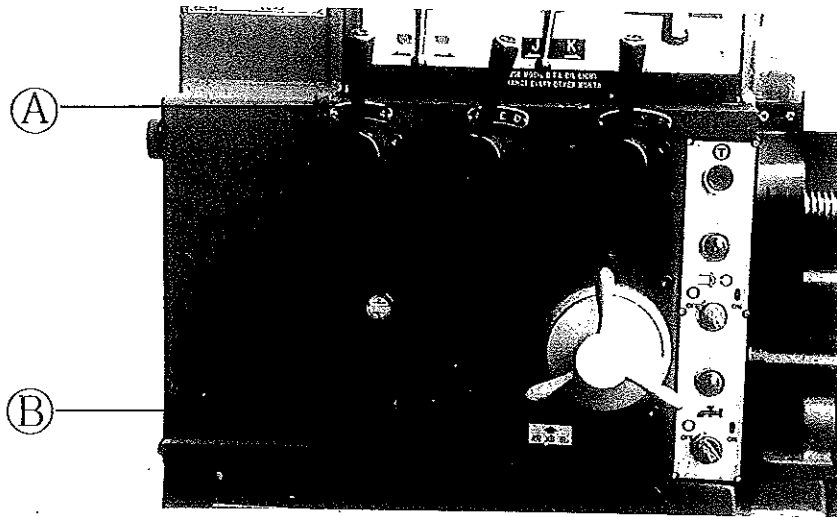
Fig 7-2.6



7-3 Gear Box

1. The oil inlet for the gear box is located under the cover on top of the gear box. (See Fig. 7-3A)
2. The drain is located on the left bottom side of the gear box near the 10 step feed selection dial as shown by arrow "B" Fig. 7-3.
3. Recommended lubricant is Shell Tellus No. 220 and should be changed ever 6 months.

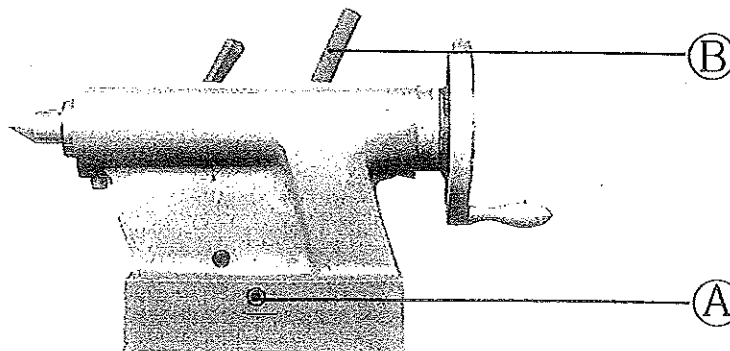
Fig 7-3



7-4 Tailstock Adjustment

1. Unclamp the tailstock – clamping lever
2. Loosen the 2 hexagon head screws (one on each side of tailstock)
3. Using a test bar between dead centers, make necessary adjustments using the slotted adjusting screws. (one on each side).
4. After adjusting re-tighten the two hexagon head screws and re-check for alignment.

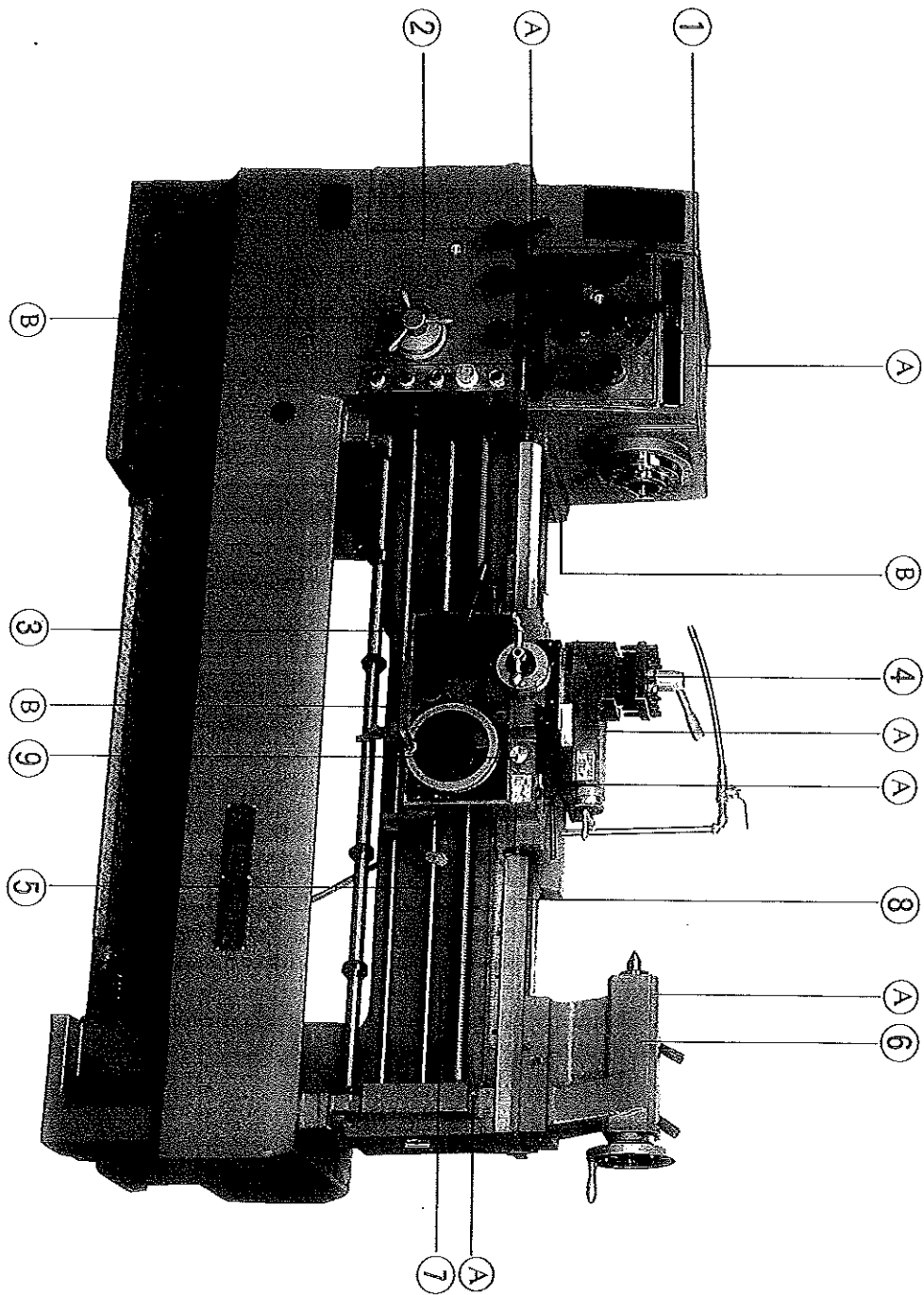
Fig 7-4



7 - 4 Lubrication Location

A: Oil input hole

B: Oil drain hole

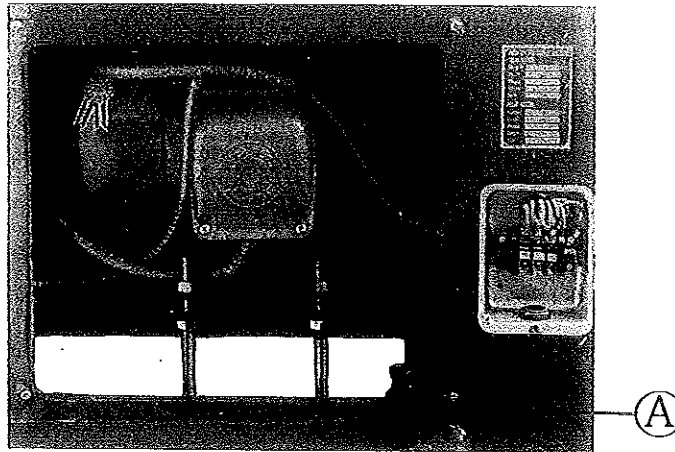


7-5 Belt Tension Adjustment

After prolonged use the belts will stretch and require adjustment. To adjust belts:

1. Take off the cover on the left back side of the lathe.
2. Loosen adjusting lock nut "A" Fig. 7-5 and adjust belt to proper tension.
3. After adjustment is made, re-tighten lock nut and replace the cover.

Fig 7-5



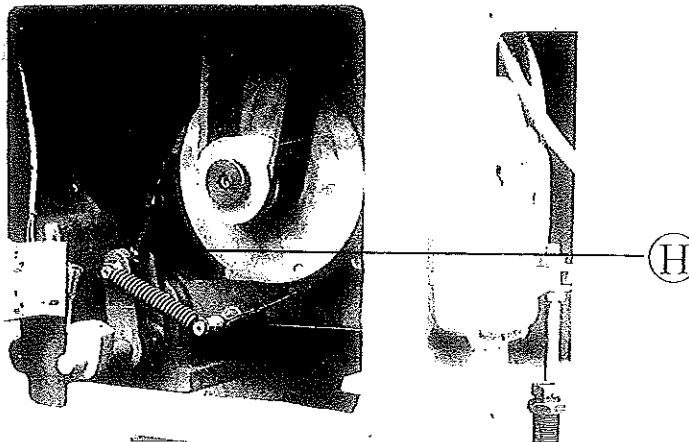
7-6 Brake Belt Adjustment

If the brake belt becomes worn or loose nut "H" Fig 7-6 on the brake band must be adjusted. This can be done by:

Remove the side rear cover.

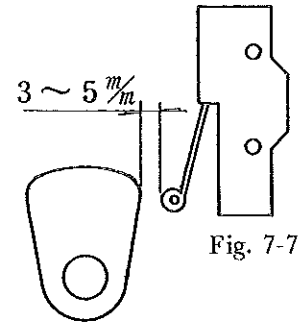
2. Loosen the nuts on the top and tighten the nuts on the bottom to the appropriate height.
3. Re-tighten the top nuts and replace the cover

Fig 7-6



7-7 Brake & Micro Switch Adjustment

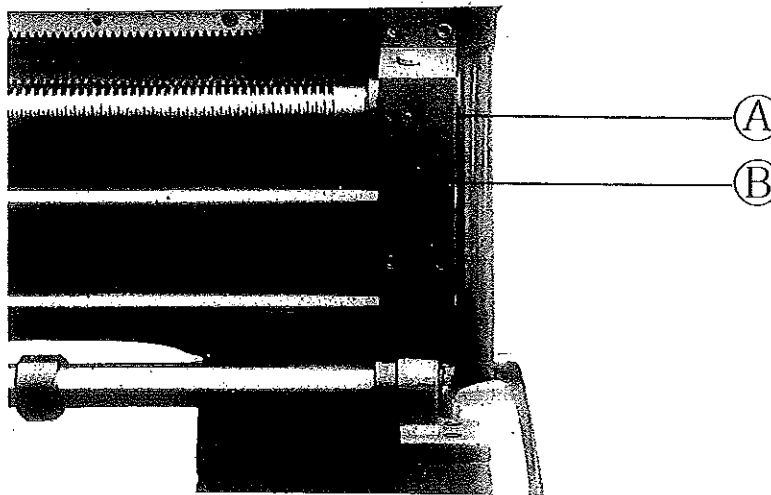
The foot brake is connected to a micro switch. there should be 0-1 mm end play between the brake arm and the head of the micro switch. (See Fig. 7-7). The proper function of the brake is to first, cut off the power and then engage the brake belt. After using the brake, it is necessary to use the control lever to re-start the lathe.



7-8 Leadscrew Backlash Adjustment

Should the threading not repeat, the cause is most likely the leadscrew backlash. To adjust the backlash, remove the plastic cover on the leadscrew bracket (Fig. 7-8), loosen nut "A" then tighten the left side nut "B". To check the backlash, engage the half nut and while observing the connecting section of the leadscrew to the gearbox move the apron handwheel back and forth. If the backlash is properly set there should be no movement in the shaft. After adjusting, re-tighten nut "A" and replace plastic cover.

Fig 7-8



7-9 Coolant Pump

Problem : No coolant flow

Solution :

1. Make sure the switch is on .
2. Check if the pump motor is working.
3. Check if coolant level.
4. Check for blocked lines.
5. If all the above are normal, change the pump.

8. Taper Attachment

Installation Taper Of Attachment :

STEP 1 :

Install taper attachment on the carriage using screws NO. ① via hole "A" (Don't tighten too tight using screw M10 x 40L and flat washer.)

STEP 2 :

Disengaged screw NO. ⑧

STEP 3 :

Adjust the position of NO. ① and let arc gage point is contacted the with NO. 206009.

STEP 4 :

Set a dial gage on the NO. ④ , and gage point is contacted the surface of bed.

Moving NO. ④ pointer has to be constant lift's not, adjusting the position of NO. ①

STEP 5 :

Disengaged screw NO.206010 then locked NO.206009 to NO. ⑦

STEP 6 :

Replaced screw NO. ⑧

STEP 7 :

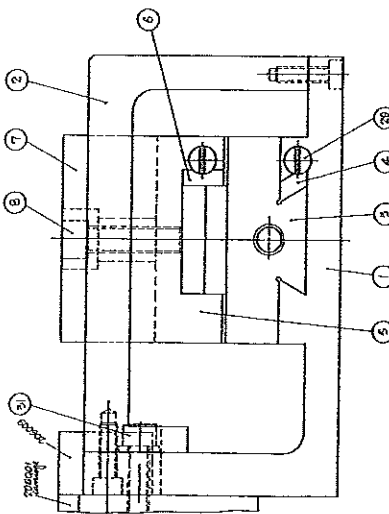
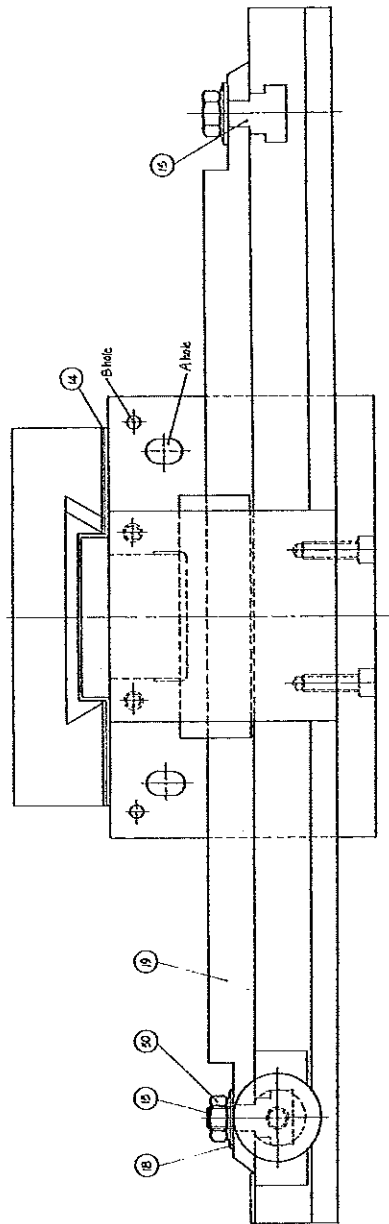
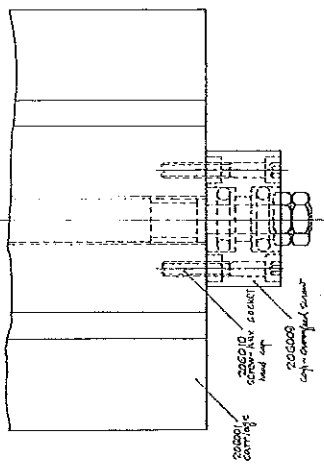
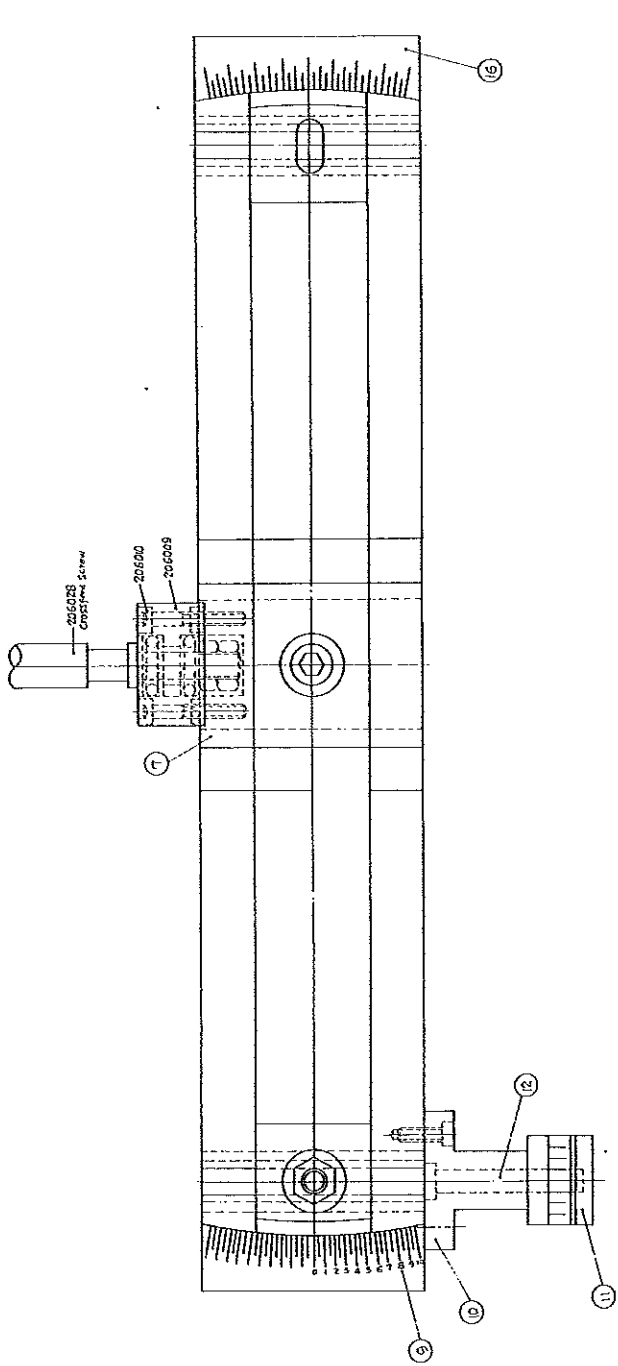
Drill B hole (Using ϕ 6 m/m driller)

STEP 8 :

Set straight pin (ϕ 6 x 451)

STEP 9 :

Install universal connected-rod



TROUBLESHOOTING THE "C" MODEL LATHE

The objective is to locate and isolate the problem

NOISE IN HEADSTOCK/GEARBOX:

Note: 85 % of noise normally comes from the output shaft pulley.

1. Run lathe with all controls in neutral to see if the problem is in the spindle.
 - a. If the problem is in the spindle and the finish is good the source is most likely in the rear bearing (Part #65). However if the finish is poor the problem could be the front bearings are either loose or damaged.
 - b. If the problem is not in the spindle continue by engaging one control at a time until the problem is found. (**Figure 1**)
 - c. If the problem is not in the headstock, and before you continue to the gear box, check the change gears (Part # 41, 78 & 89) located on the back of the headstock for proper backlash and alignment. (**Figure 2**) If these gears are found to be in good working order perform the same sequence as above on the gearbox. (engage one control at a time until the problem is located. (**Figure 3**)
 - d. Once you determine the problem is either in the gearbox or the headstock, that part of the machine must be opened up to inspect for possible worn or broken parts.
2. If the gearbox is in order and the feed or lead screws are not turning check the shear pins. (There are two shear pins on each shaft). (**Figure 4**)

Notes:

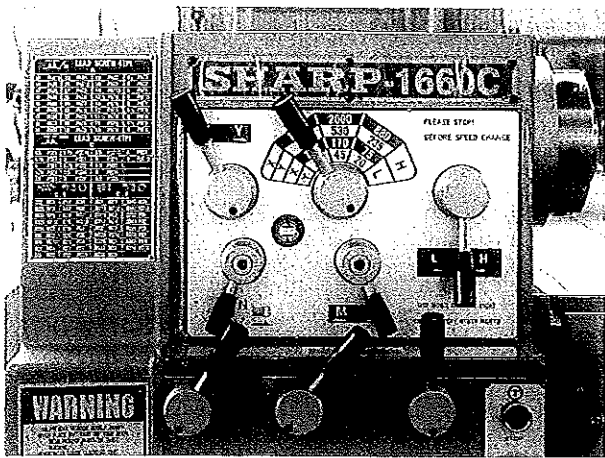


Figure 1

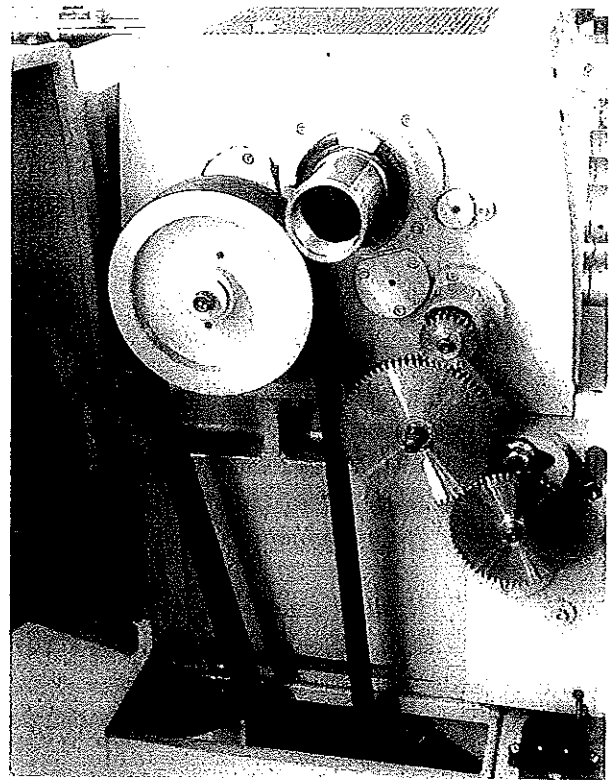


Figure 2

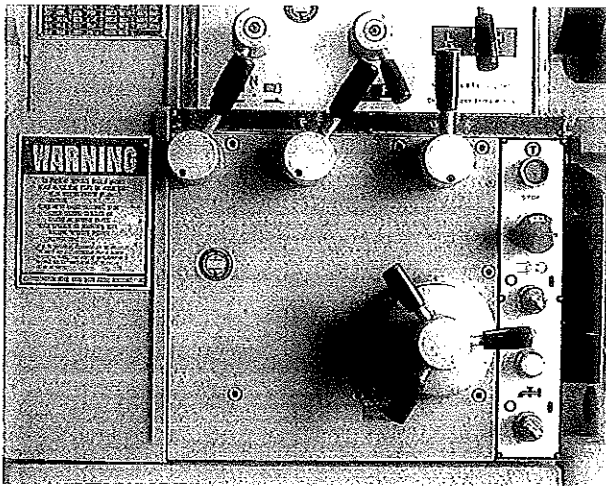


Figure 3

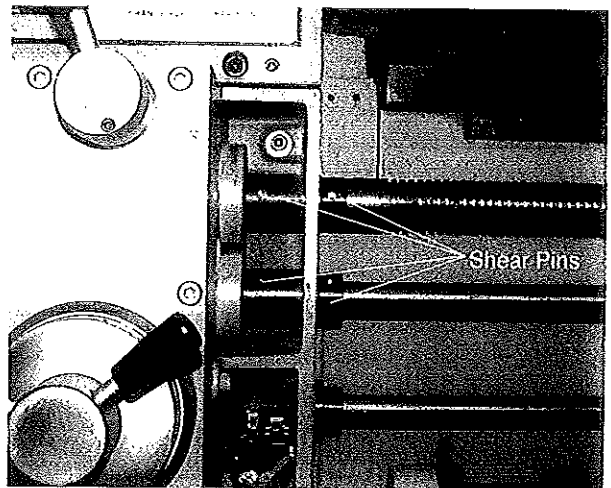


Figure 4

THREADING PROBLEMS:

Should there be a problem cutting **standard threads**:

- a. Check the chasing dial to see if it is loose from shaft.
- b. Check gear at bottom of shaft for tightness & proper fit against the lead screw.
- c. Check the half nut for proper fit.

Note: All Sharp Lathes are made to cut ASE (Inch) threads. To cut metric threads, make sure the half nuts are engaged at all times, because it is not a metric based machine, and therefore will not repeat according to the threading dials.

Notes:

CHATTER/VIBRATION PROBLEMS:

1. Spindle has excessive run out. (Figure 5)
2. Loose Compound, cross feed or saddle. (Figure 6)
3. Loose motor mount or motor not seated properly on base. (Figure 7)
4. Backlash on drive pulley shaft and key. (Figure 2)
5. New rack and old gear. (If machine has been crashed) (Figure 8)
6. Irregular power supply. (Not getting 3-phase)
7. Leveling bolts loose or lathe not properly leveled.
8. Defective live center. (On a long work piece chatter in the center & not on ends).

COOLANT PUMP NOT WORKING OR PRESSURE TOO LOW.

- a. Check coolant level.
- b. Check pump shaft for rotation. (Proper rotation is clockwise).
- c. Check for clogged line. (Both suction and discharge).

Notes:

ADJUSTMENTS AND REPAIRS:

ADJUSTING LEAD SCREW BACKLASH

- a. Remove plastic cover on the lead screw bracket.
- b. Loosen lock nut "A" under cover.
- c. Tighten left side nut "B" until backlash has been removed.
- d. Re-tighten lock nut "A" and replace plastic cover (Figure 9)

ADJUSTING SPINDLE BEARINGS:

The front and middle spindle bearings are precision taper roller bearings. To adjust:

- a. Loosen set screw (Part #60) on locking NUT (Part #62).
- b. Tighten locking nut (Part #62) to obtain proper preload. (Check by spinning chuck by hand. Chuck should rotate freely for at least 2 revolutions).
- c. Re-tighten set screw (Part #60) on lock nut. (Figure 10)

Notes:

ADJUSTING THE FEED OVERLOAD

This machine is equipped with a safety overload which can be adjusted by the set screw (Part # 73) located in the center of cover (Part # 75) which is located in the center of the apron. (To increase tension turn clockwise, to reduce tension turn counterclockwise).
(Figure 13)

ADJUSTING HALF NUTS

1. Remove chasing dial assembly
2. Loosen 3 screws
3. Adjust half nuts and re-tighten the 3 screws
4. Test movement before reassembling.

(Figure 17)

Notes:



Figure 5

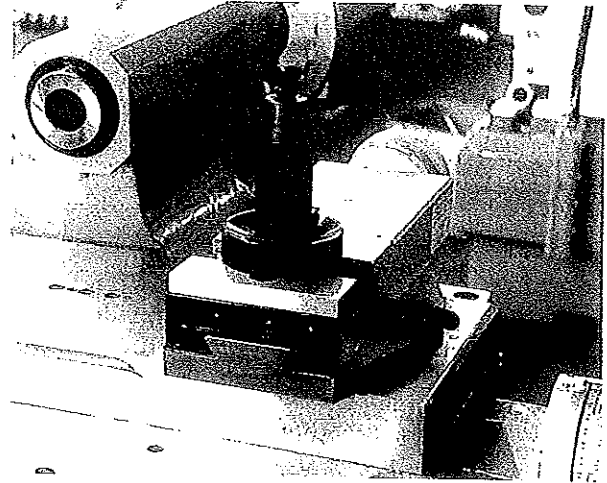


Figure 6

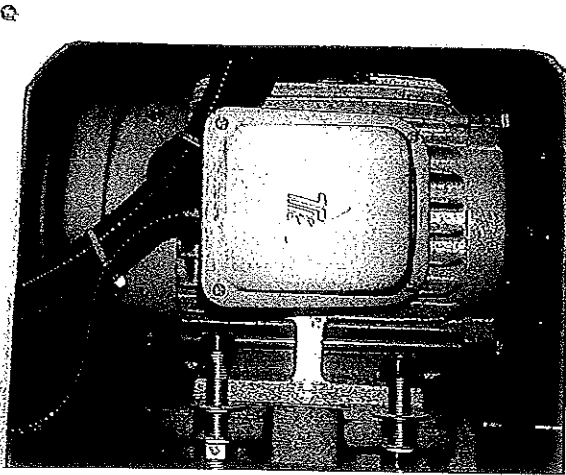


Figure 7

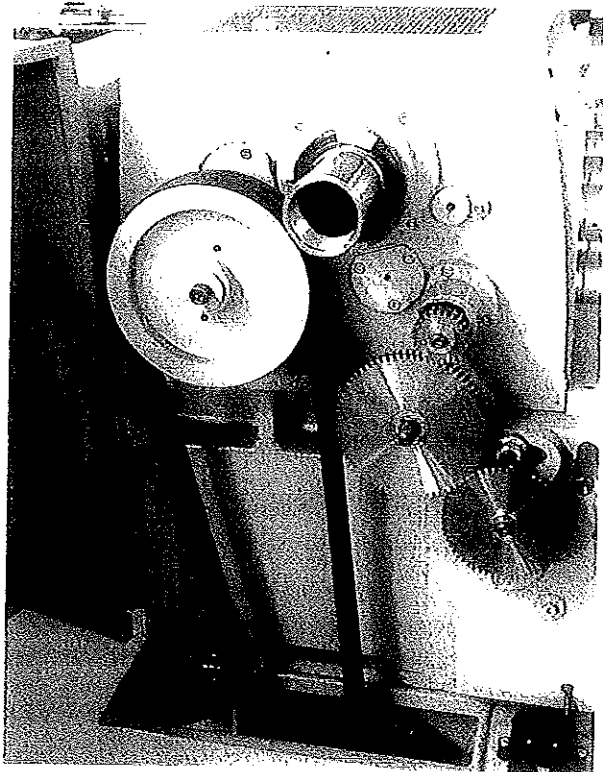


Figure 2

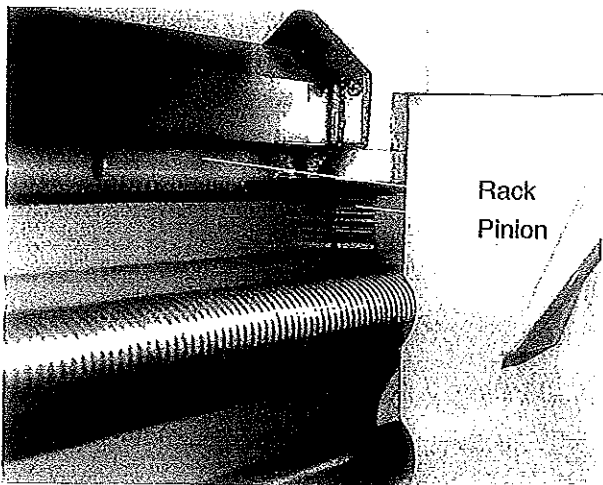


Figure 8

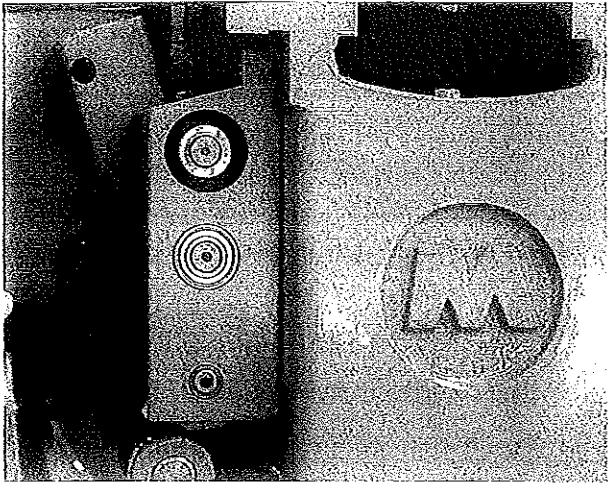


Figure 9

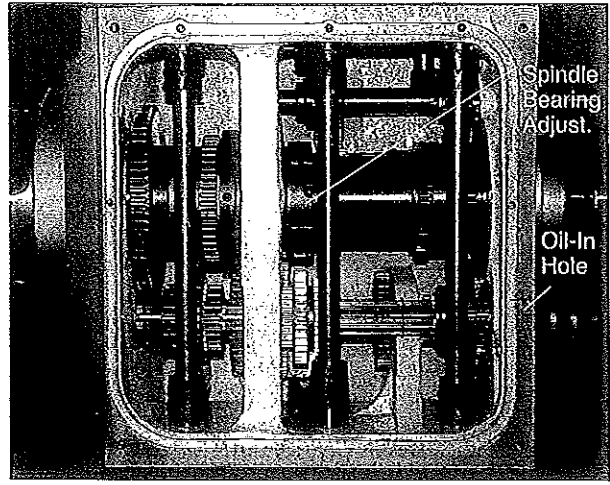


Figure 10

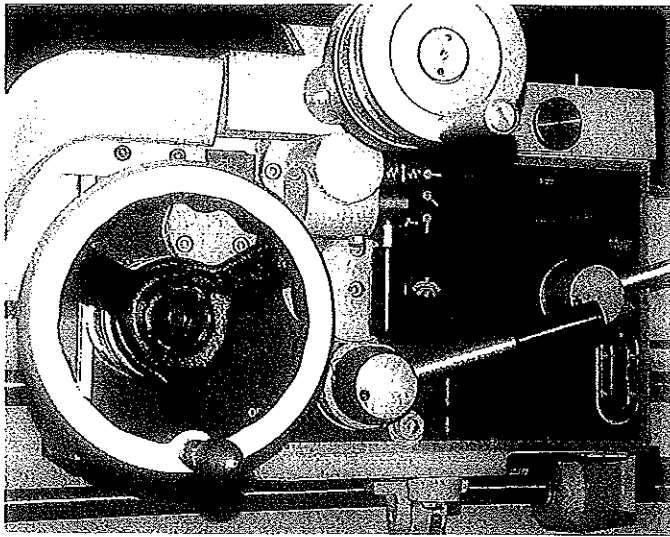


Figure 13

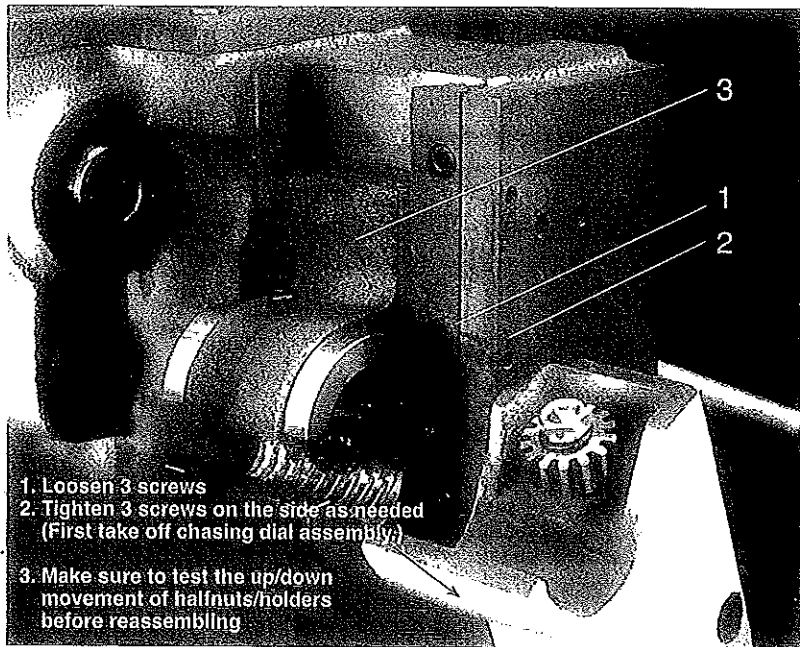


Figure 17

OIL LEAKS

Headstock top cover leak: Remove cover, clean all surfaces with a clean rag, apply a small coat of *grease* on the gasket surface and reinstall the cover.

Oil leak around the spindle is most likely caused by the oil level being too high or oil return hole over the spindle being blocked or restricted. Most of the time this oil inlet hole can be cleaned out by simply blowing air through the passage. (Figure 10)

*** *Note:* Make sure to use 10W Oil only! Higher viscosity will result in leak!

Oil leak at the rear of spindle:

1. Mark lock nut and spindle. (Figure 11)
2. Mark balance weights on lock nut (Figure 11)
3. Remove lock nut. (First remove set screw)
4. Remove cover
5. Clear oil return hole using air pressure. (Figure 12)

Note: Be sure cover is not obstructing return.

ALIGNING THE HEAD

A taper will most likely be created by the head being out of alignment. To align head:

1. Loosen bolts on base of head slightly. (3 in front and 3 in back) (Figure 5)
2. Make appropriate adjustment to correct problem.
 - a. "C" Model adjusting screws are in front of lathe.
 - b. "S" and "F" Models adjusting screws are in the back of the lathe.

Notes:

APRON REMOVAL

1. Remove dowel pins from lead screw and feed shaft (**Figure 4**)
2. Remove chasing dial assembly (**Figure 15**)
3. Remove rotation lever assembly (**Figure 15**)
4. Remove lead screw bracket and slide lead screw & lead shafts out of apron.
(**Figure 16**)
5. Removing 4 bolts will allow the apron to be removed. (Caution should be taken when removing, due to its weight).

Notes:

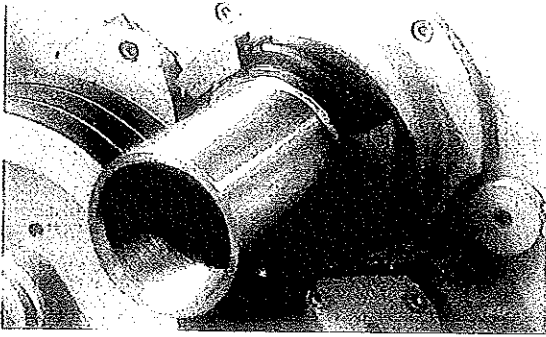


Figure 11

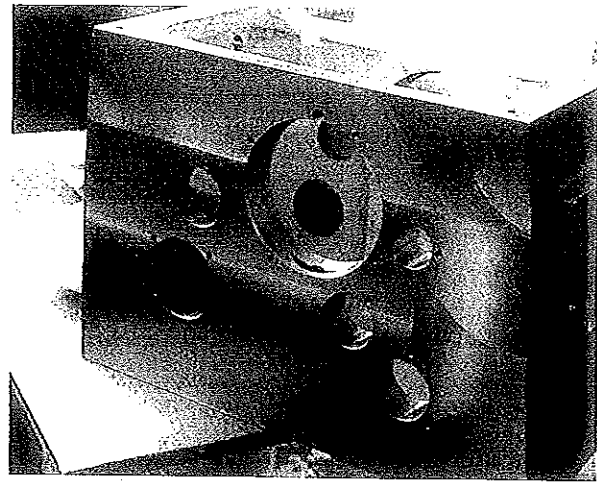


Figure 12

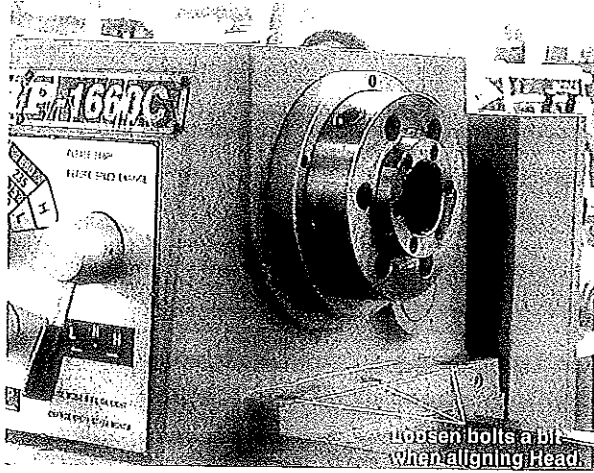


Figure 5

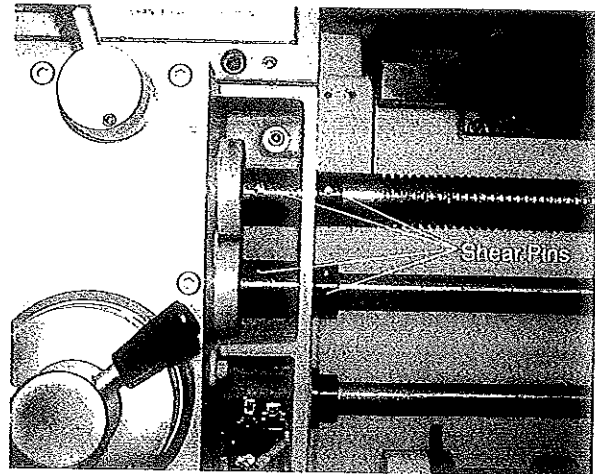


Figure 4

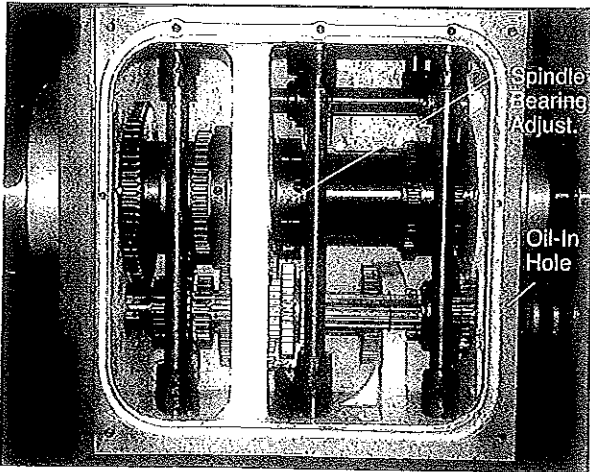
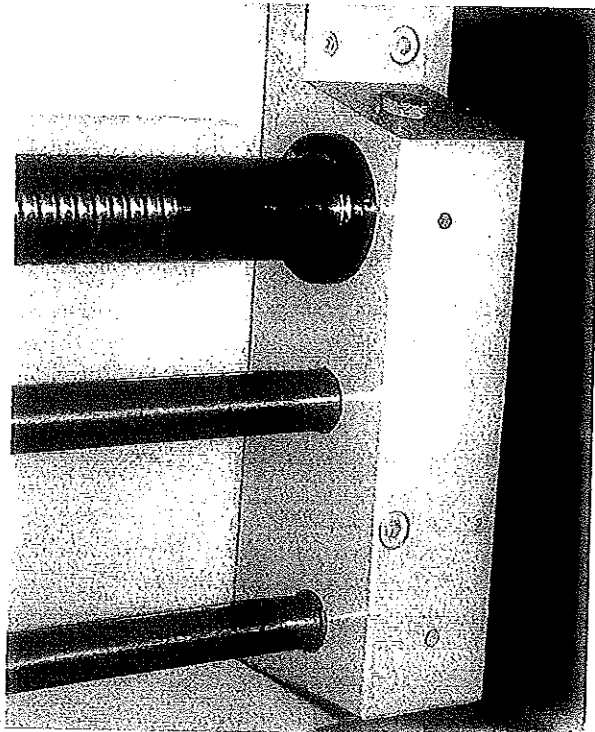


Figure 10



47 Figure 16

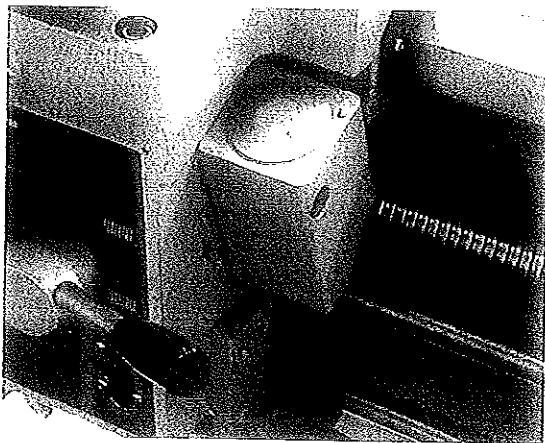
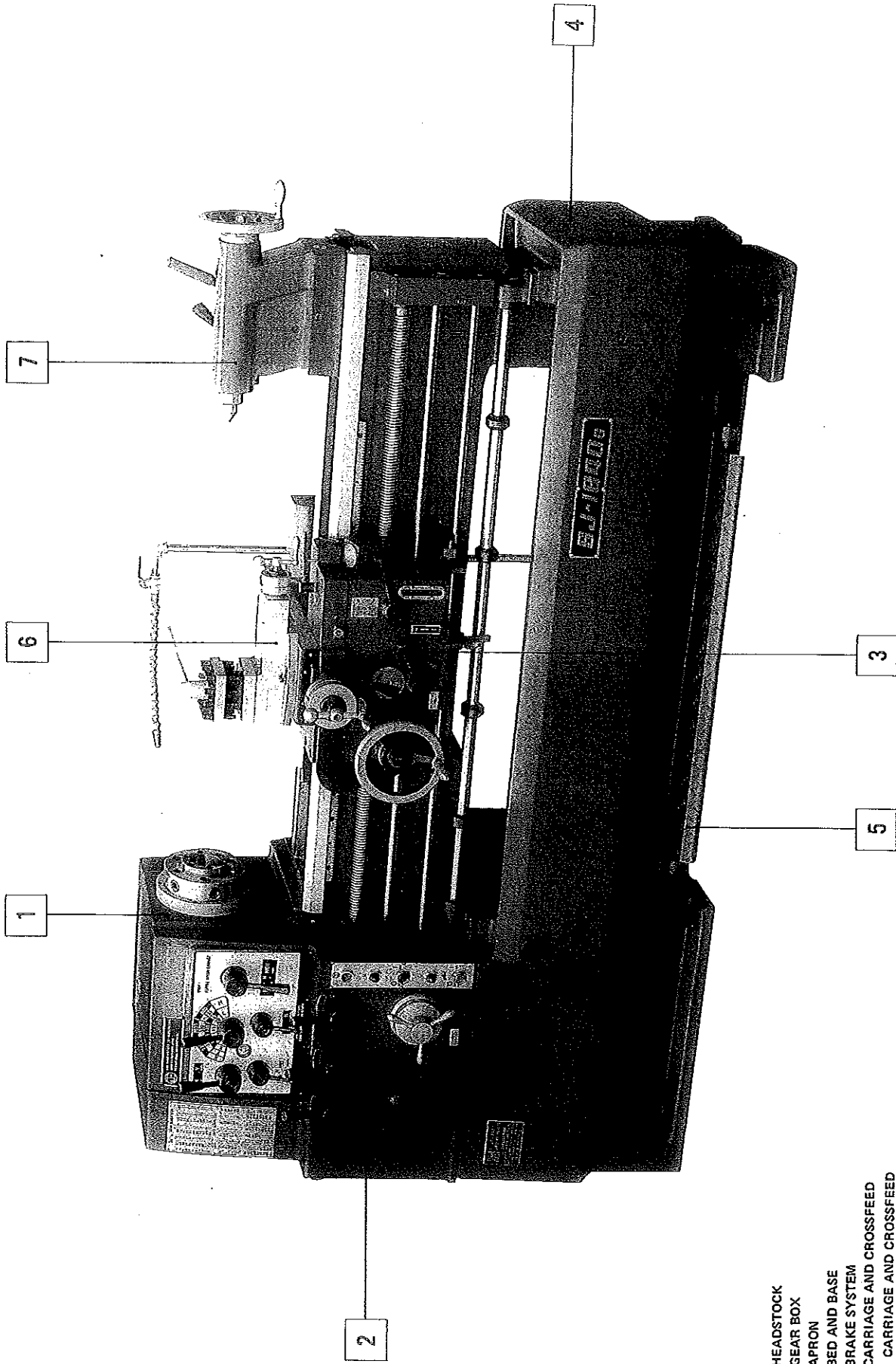


Figure 15

CONTENTS

9	SYSTEM IN EACH UNIT	1
9-1	HEADSTOCK.....	2
9-2	GEAR BOX	7
9-3	APRON	12
9-4	BED AND BASE.....	17
9-5	BRAKE SYSTEM.....	20
9-6	CARRIAGE AND CROSSFEED.....	22
9-6A	CARRIAGE AND CROSSFEED	22-1
9-7	TAILSTOCK.....	26
9-8	STEADY.....	29
9-9	FOLLOW REST ASSEMBLY	31
9-10	COOLANT SYSTEM ASSEMBLY	33

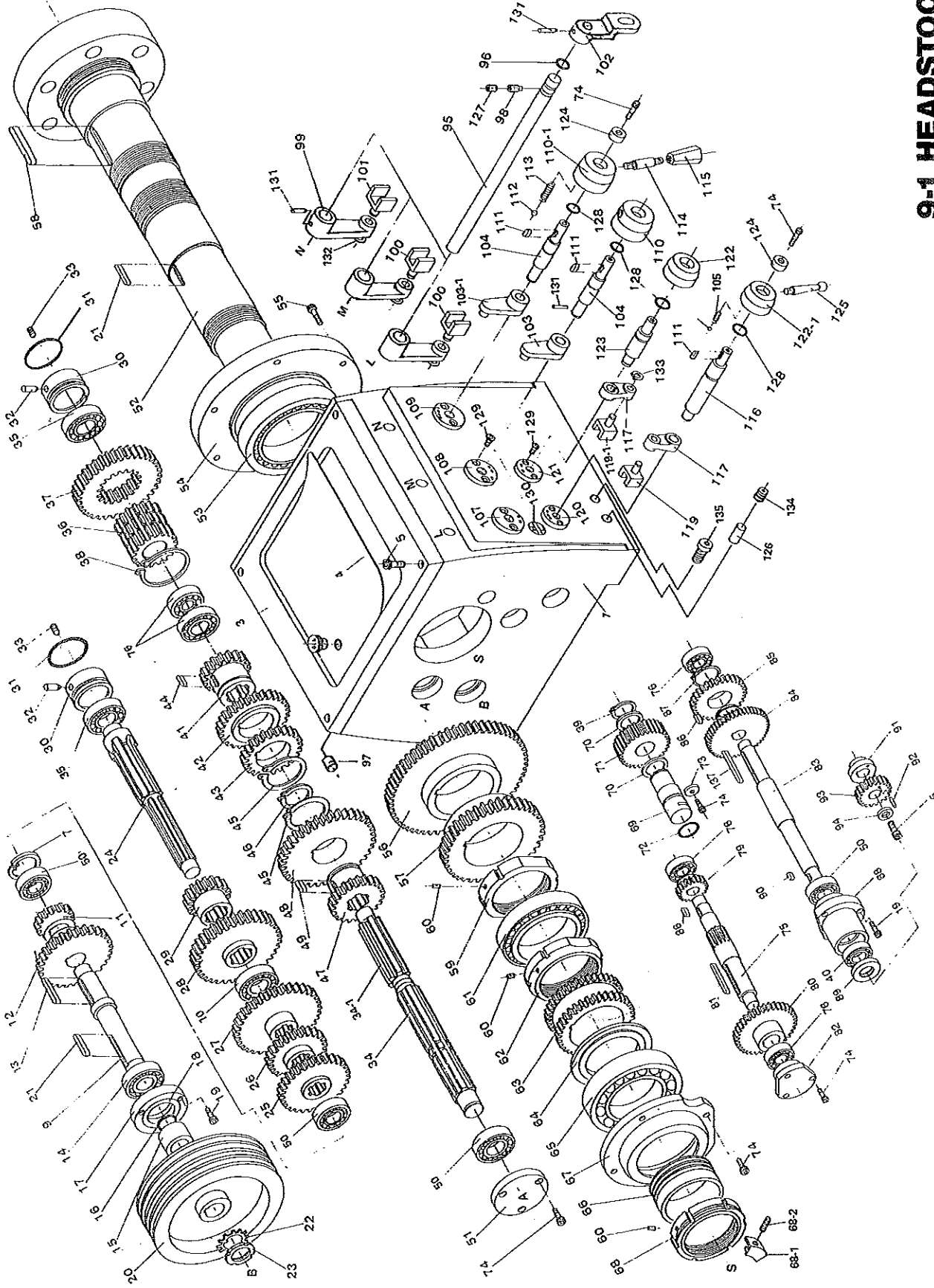




- 9-1 HEADSTOCK
- 9-2 GEAR BOX
- 9-3 APRON
- 9-4 BED AND BASE
- 9-5 BRAKE SYSTEM
- 9-6 CARRIAGE AND CROSSFEED
- 9-6A CARRIAGE AND CROSSFEED
- 9-7 TAILSTOCK

9 SYSTEM IN EACH UNIT

9-1 HEADSTOCK



HEADSTOCK ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
1	Head stock	1	1220200609	1220200207
2	Oil plug	1	1122103405	1122103405
3	Head stock cover	1	1120200509	1120200509
4	Blanket	1	1003501701	1003501701
5	Hexagon socket screw , M8xP1.25x35L	4	91110835	91110835
6	Hexagon socket screw , M8xP1.25x25L	1	91110825	91110825
7	Snap ring , R48	1		
9	Input-shaft	1	1120200607	1120200607
10	Ball bearing , 6206	1	91301021	91301021
11	Gear-i	1	1120200705	1120200705
12	Gear-g	1	1120200803	1120200803
13	Square key , 8x7x55L	1	91620804	91620804
14	Ball bearing , 6206	2	91301021	91301021
15	Collar	1	1120206501	1120206501
17	Housing	1	1120206903	1120206903
18	Oil-seal , TC30x50x8	1	91523001	91523001
19	Hexagon socket screw , M6xP1.0x25L	6		
20	Pulley	1	1120206305	1220200305
21	Square key , 8x7x45L	3	91403600000002	91403600000002
22	Hexagon socket screw, M12xP1.75x30L	1	91111230	91111230
23	Spring washer , 12	1		
24	Shaft-B	1	1120202503	1120202503
25	Gear-d	1	1120200901	1120200901
26	Gear-b	1	1120201006	1120201006
27	Gear-f	1	1120201104	1120201104
28	Gear-k	1	1120201202	1120201202
29	Gear-o	1	1120201300	1120201300
30	Plug-cover	2	1120202905	1120202905
31	O-ring , P55x3.5 - P- 55	2	9151P055	9151P055
32	Fixed pin	2	1120206707	1120206707
33	Set screw	2	1120206805	1120206805
34	Shaft-A	1	1120202601	1120202601
34-1	Shaft-L	1	1120208505	1120208505
35	Ball-bearing , 6305	2	91301029	91301029
36	Gear-l	1	1120201408	1120201408
37	Gear-m	1	1320200209	1320200209
38	Snap ring , S65	2		
39	Snap ring , S30	1	9171S030	9171S030
40	Ball bearing , 6005	3	91301010	91301010
41	Gear-e	1	1120201506	1120201506
42	Gear-a	1	1320200307	1320200307
43	Gear-c	1	1320200405	1320200405
44	Square key , 8x7x35L	1	91620802	91620802
45	Snap ring , S48	2		
46	Snap ring , S34	1	9171S034	9171S034

HEADSTOCK ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
47	Gear-h	1	1120201604	1120201604
48	Gear-j	1	1320200503	1320200503
49	Square key , 8x7x25L	1	91620801	91620801
50	Ball bearing , 6205	2	91301020	91301020
51	Cover	1	1120203108	1120203108
52	Spindle (A1-6)	1	1120200401	1120200401
	(D1-6)	1	1120200303	1120200303
53	Taper roller bearing , 32018	1	91302014	91302014
54	Cover (A1-6)	1	1120200107	1120200107
	(D1-6)	1	1120200205	1120200205
55	Hexagon socket screw , M6xP1.0x35L	6	91110635	91110635
56	Gear-p	1	1120201702	1120201702
57	Gear-n	1	1120201800	1120201800
58	Square key , 8x7x85L	1	91620806	91620806
59	Lock-nut	1	1120203206	1120203206
60	Set screw , M8xP1.25x8L	5	91120808	91120808
61	Taper roller bearing , 32017	1	91302013	91302013
62	Lock-nut	1	1120203304	1120203304
63	Gear	1	1120201908	1120201908
64	Collar	1	1120203402	1120203402
65	Ball bearing , 6215	1	91301024	91301024
66	Oil return collar	1	1120203500	1120203500
67	Cover	1	1120203608	1120203608
68	Lock nut	1	1120203706	1120203706
68-1	Balance piece	2	1120203804	1120203804
68-2	Set screw	4	1120207008	1120207008
69	Idle gear shaft	1	1120207508	1120207508
70	Spacer	2	1120206609	1120206609
71	Idle gear	1	1120202003	1120202003
72	O-ring , P29	1	9151P029	9151P029
73	Washer	1	1120207606	1120207606
74	Hexagon socket screw , M6xP1.0x16L	16	91110616	91110616
75	Gear shaft-C	1	1120202101	1120202101
76	Ball bearing , 6204	5	91301018	91301018
79	Gear	1	1120202209	1120202209
80	Gear	1	1120202307	1120202307
81	Square key , 6x6x65L	1		
82	Cover	1	1120203902	1120203902
83	Shaft-D	1	1120202807	1120202807
84	Gear	1	1120202405	1120202405
85	Gear	1	1320200601	1320200601
86	Square key , 6x6x18L	2	91610604	91610604
87	Snap ring , S40	1	9171S040	9171S040
88	Housing	1	1120204007	1120204007
89	Oil-seal , TC25x47x8L	1	91522501	91522501

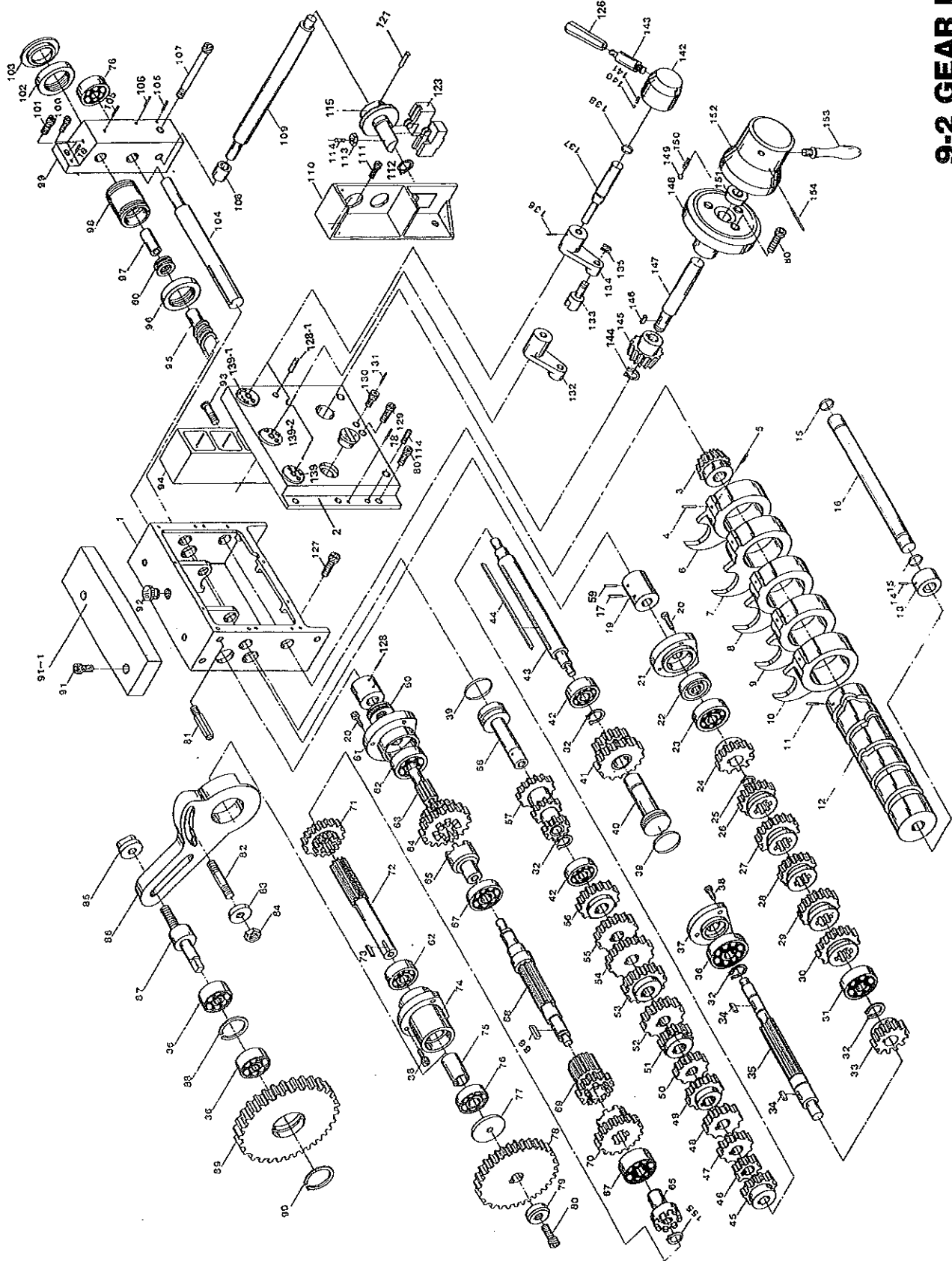
HEADSTOCK ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
90	Square key , 6x6x12L	1	91610601	91610601
91	Collar	1	1121602203	1121602203
92	Taper pin , 0#x25L	1	82010025	82010025
93	Gear (24T in)	1	1121600405	1121600405
	Gear (41T mm)	1	1121600307	1121600307
94	Washer	1		
95	Shifting shaft	3	1120204105	1120204105
96	O-ring , P16	6	9151P016	9151P016
97	Plug	3	1120207704	1120207704
98	Set screw	3	1120204203	1120204203
99	Shifting lever	3	1120204301	1120204301
100	Shifting fork	2	1120207802	1120207802
101	Shifting fork	1	1120204409	1120204409
102	Shifting lever	3	1120204507	1120204507
103	Shifting lever	2	1120204605	1120204605
103-1	Shifting lever	1	1120204703	1120204703
104	Shaft	3	1120204801	1120204801
105	Spring , D6xd0.8x25L	2	91901060102902 ²	91901060102902
106	Ball steel , ϕ 1/4"	2		
107	Detent plate	1	1120204909	1120204909
108	Detent plate	1	1120205004	1120205004
109	Detent plate	1	1120205102	1120205102
110	Hub	2	1120205200	1120205200
110-1	Hub	1	1120205308	1120205308
111	Square key , 5x5x15L	2	91610501	91610501
112	Ball steel , ϕ 5/16"	3		
113	Spring , D8xd0.8x25L	3		
114	Lever	3	1120207302	1120207302
115	Knob	3	1120207400	1120207400
116	Shaft	1	1120208309	1120208309
117	Shifting lever	2	1120205504	1120205504
118	Shifting fork	1	1120208005	1120208005
119	Shifting fork	1	1120205602	1120205602
119-1	Shifting fork	1	1120205602	1120205602
120	Detent plate	1	1120205700	1120205700
121	Detent plate	1	1120205808	1120205808
122	Knob	1	1120205906	1120205906
122-1	Knob	1	1120206001	1120206001
123	Shaft	1	1220200403	1220200403
124	Washer	5	1120206109	1120206109
125	Lever	2	1120207204	1120207204
126	Pin	2	1121600709	1121600709
127	Set screw , M8xP1.25x10L	3	91120810	91120810
128	O-ring , P18xP1.0x14L	5		
129	Screw , M6xP1.0x14L	10	91160614	91160614

HEADSTOCK ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
130	Lenz-oil , ϕ 28	1	93902003000004	93902003000004
131	Spring pin , ϕ 5x32L	9		
	Spring pin , ϕ 5x26L	2	92030526	92030526
132	Snap ring , S12	3	9171S012	9171S012
133	Snap ring , S10	2		
134	Set screw , M10xP1.5x20L	2	91121020	91121020
135	Hexagon socket screw , M10xP1.5x95L	2	91111095	91111095
136	Hexagon socket screw , M6xP1.0x40L	4	91110640	91110640
137	Square key , 6x6x70L	1	91610608	91610608

9-2 GEAR BOX



GEAR BOX ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
1	Gear box	1	1210300307	1210300307
2	Cover-gear box	1	1210300101	1210300101
3	Gear-driven bevel	1	1210300405	1210300405
4	Pin-fixed	5	1210300503	1210300503
5	Pin-split	5	92004000000014	92004000000014
6	Claw-shifter	1	1210300601	1210300601
7	Claw-shifter	1	1210300709	1210300709
8	Claw-shifter	1	1210300807	1210300807
9	Claw-shifter	1	1210300905	1210300905
10	Claw-shifter	1	1210301000	1210301000
11	Screw-hexa. socket headless set , M8xP1.25x8L	1	1210301108	1210301108
12	Cam-shifter	1	1210301206	1210301206
13	Collar	1	1210301304	1210301304
14	Set screw , M8x12	2	9111008012	9111008012
15	Ring-"O" , P18	2	9151P018	9151P018
16	Shaft-"A"	1	1210301402	1210301402
17	Pin-taper , 4x38	3	92010438	92010438
18	Pin-taper , 6x38	2	1210702301	1210702301
19	Collar-linkage	1	1210301500	1210301500
20	Screw-hexa. socket head cap , M6xP1.0x16L	6	91110616	91110616
21	Cap-right	1	1210301608	1210301608
22	Seal-oil , 20x40x10L	1	91522001	91522001
23	Bearing-ball , 6204	1	91301018	91301018
24	Gear-"B" shaft	1	1210301706	1210301706
25	Snap ring , S25	2	9171S025	9171S025
26	Gear-"B" shaft	1	1210301804	1210301804
27	Gear-"B" shaft	1	1210301902	1210301902
28	Gear-"B" shaft	1	1210302007	1210302007
29	Gear-"B" shaft	1	1210302105	1210302105
30	Gear-"B" shaft	1	1210302203	1210302203
31	Bearing-ball , 6004	1	91301006	91301006
32	Snap ring , S20	2	9171S020	9171S020
33	Gear-"B" shaft	1	1210302301	1210302301
34	Key-square , 6x6x20L	2	91610605	91610605
35	Shaft-"B"	1	1210302409	1210302409
36	Bearing-ball , 6003	3	91301005	91301005
37	Cap-left	1	1210302507	1210302507
38	Screw-hexa. socket head cap , M6xP1.0x12L	6	91110612	91110612
39	Ring-"O" , P36	2	9151P036	9151P036
40	Shaft-"C"	1	1210302605	1210302605
41	Gear-"C" shaft	1	1210302703	1210302703
42	Bearing , 6203	2	91301016	91301016
43	Shaft-"D"	1	1210302801	1210302801
44	Key-square , 6x6x146L	1		
45	Gear-"D" shaft	1	1210302909	1210302909

GEAR BOX ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
46	Gear-"D" shaft	1	1210303004	1210303004
47	Gear-"D" shaft	1	1210303102	1210303102
48	Gear-"D" shaft	1	1210303200	1210303200
49	Gear-"D" shaft	1	1210303308	1210303308
50	Gear-"D" shaft	1	1210303406	1210303406
51	Gear-"D" shaft	1	1210303504	1210303504
52	Gear-"D" shaft	1	1210303602	1210303602
53	Gear-"D" shaft	1	1210303700	1210303700
54	Gear-"D" shaft	1	1210303808	1210303808
55	Gear-"D" shaft	1	1210303906	1210303906
56	Gear-"D" shaft	1	1210304001	1210304001
57	Gear-"E" shaft	1	1210304109	1210304109
58	Shaft-"E"	1	1210304207	1210304207
59	Pin-taper , 3x38	1	1003502904	1003502904
60	Bearing-thrust , 51104	2	91303003	91303003
61	Cap	1	1210304305	1210304305
62	Bearing-ball , 6004V	2	91301008	91301008
63	Shaft-"F"	1	1210304403	1210304403
64	Gear-"F" shaft	1	1210304501	1210304501
65	Gear-"F" shaft (left)	1		
	(right)	1		
66	Square key , 4x4x20L	2	91610401	91610401
67	Bearing-ball , 6005	2	91301010	91301010
68	Shaft-"G"	1	1210304805	1210304805
69	Gear-"G" shaft	1	1210304903	1210304903
70	Gear-"G" shaft	1	1210305008	1210305008
71	Gear-"H" shaft	1	1210305106	1210305106
72	Shaft-"H"	1	1210300209	1210300209
73	Key-square , 6x6x13L	1	91610602	91610602
74	Cap-bearing	1	1210305204	1210305204
75	Bushing-"H" shaft	1	1210305302	1210305302
76	Bearing-ball , 6004Z	1	91301007	91301007
77	Spacer	1	1121600905	1121600905
78	Gear-drive shaft (57T in)	1	1121600601	1121600601
	(92T mm)	1	1121600503	1121600503
79	Washer	1	1121602105	1121602105
80	Screw-hexa. socket head cap , M8xP1.25x16L	1	91110816	91110816
81	Bolt-lock end cover	1	1122100208	1122100208
82	Stud	1	1121601108	1121601108
83	Washer , 1/2	1	1121602301	1121602301
84	Nut , W1/2	1	91210016	91210016
85	Nut-lock stud	1	1121601706	1121601706
86	Quadrat	1	1121601000	1121601000
87	Stud-gear	1	1121601206	1121601206
88	Snap ring , R35	1	9171R035	9171R035

APRON ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
41	Shaft-worm	1	1210903406	1210903406
42	Bearing-thrust , 2904	2		
43	Worm gear	1	1210902007	1210902007
44	Washer-lock , 20	1		
45	Nut	1		
46	Screw-hexa. socket head cap , M6xP1.0x12L	8	91110612	91110612
47	Spring , ϕ 1x10x60L (right)	1	1210905400	1210905400
	(left)	1	1210905508	1210905508
48	Block-safe device (right)	1	1210901000	1210901000
	(left)	1	1210900905	1210900905
49	Pin , 5x18L	2	92030525	92030525
50	Pin (right)	1	1210901206	1210901206
	(left)	1	1210901108	1210901108
51	Shaft-auto feed (right)	1	1210901206	1210901206
52	Collar (right)	1	1210901206	1210901206
53	Ring-O , P16	2	9151P016	9151P016
54	Cover	1	1210903602	1210903602
55	Hub (right)	1	1210901402	1210901402
	(left)	1	1210901304	1210901304
56	Spring washer , M8	1		
57	Screw-hexa. socket head cap , M8xP1.25x12L	1		
58	Snap ring , S10	1		
59	Lever	1	1210903700	1210903700
60	Spring washer , M12	1	91420012	91420012
61	Screw	1	1210903808	1210903808
62	Screw-hexa. socket head cap , M5xP0.8x20L	1		
63	Spring	1	1210905606	1210905606
64	Spacer	1	1210903906	1210903906
65	Bearing-ball , 6005V	1	91301012	91301012
66	Worm-wheel	1	1210902105	1210902105
67	Wheel-friction	1	1210902203	1210902203
68	Key-square , 7x7x12L	1		
69	Shaft-worm wheel	1	1210904001	1210904001
70	Pin	1	1210904109	1210904109
71	Spring-compressing	1	1210905302	1210905302
72	Washer	1	1210904207	1210904207
73	Screw-hexa. socket headless set	1		
74	Bearing-ball , 6204	1	91301018	91301018
75	Cover		1210904305	1210904305
76	Snap ring , S20	2	9171S020	9171S020
77	Gear	1	1210902301	1210902301
78	Shaft-cross feed	1	1210904403	1210904403
79	Set (right)	1	1210901608	1210901608
	(left)	1	1210901500	1210901500
80	Shaft-lever	1	1210904501	1210904501

APRON ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
81	Lever	1		
82	Sleeve-lever	1		
83	Screw-hexa. socket headless set , M4xP0.7x10L	1		
84	Pinion-rack	1	1210904707	1210904707
85	Key-square , 6x6x20L	1	91610605	91610605
86	Bearing-niddle , NK20/22	1	91311001	91311001
87	Screw-hexa. socket headless set , M6xP1.0x10L	1	91120610	91120610
88	Collar	1	1210904805	1210904805
89	Pin-spring , 6x36L	1	92030636	92030636
90	Gear	1	1210904903	1210904903
91	Bearing-ball , 6003	1	91301005	91301005
92	Cover	1	1210905008	1210905008
93	Pinion-handwheel		1210905106	1210905106
94	Key-square , 6x6x25L	1	91610605	91610605
95	Bearing-ball , 6004V	1	91301008	91301008
95-1	Bearing-ball , 6004Z	1	91301007	91301007
96	Seat		1210905204	1210905204
97	Screw-hexa. socket head cap , M6xP1.0x30L	4	91110630	91110630
99	Washer	1	1210701608	1210701608
100	Washer-wave type	1		
101	Dial-rack	1	1220900202	1220900202
102	Handwheel	1	1122101705	1122101705
103	Handle	1	1121102002	1121102002
104	Washer-lock	1	1122101901	1122101901
105	Screw-hexa. socket head cap , M8xP1.25x20L	1	91110820	91110820
106	Dial-thread chasing (in 4 parts)	1	1003514708	1003514708
	(mm 5 parts)	1	1003502404	1003502404
	(mm 7 parts)	1	1003514904	1003514904
107	Pin	1		
108	Seat-dial shaft	1	1003514502	1003514502
109	Screw-hexa. socket head cap , M10xP1.5x65L	1	91111065	91111065
110	Gear (in 16T)	1	1003514600	1003514600
	(mm 11T)	1	1003502502	1003502502
	(mm 13T)	1	1003502600	1003502600
	(mm 14T)	1	1003514806	1003514806
	(mm 15T)	1	1003502708	1003502708
	(mm 18T)	1	1003502806	1003502806
111	Washer-spring , 10	1		
112	Nut , M10xP1.5	1	91210010	91210010
113	Snap ring , S30	1	9171S030	9171S030
114	Seat-switch	1	1210701706	1210701706
115	Key-square , 6x8x25L	1	91610610	91610610
116	Screw-hexa. socket head cap , M8xP1.25x16L	2	91110816	91110816
117	Bracket	1	1210701804	1210701804

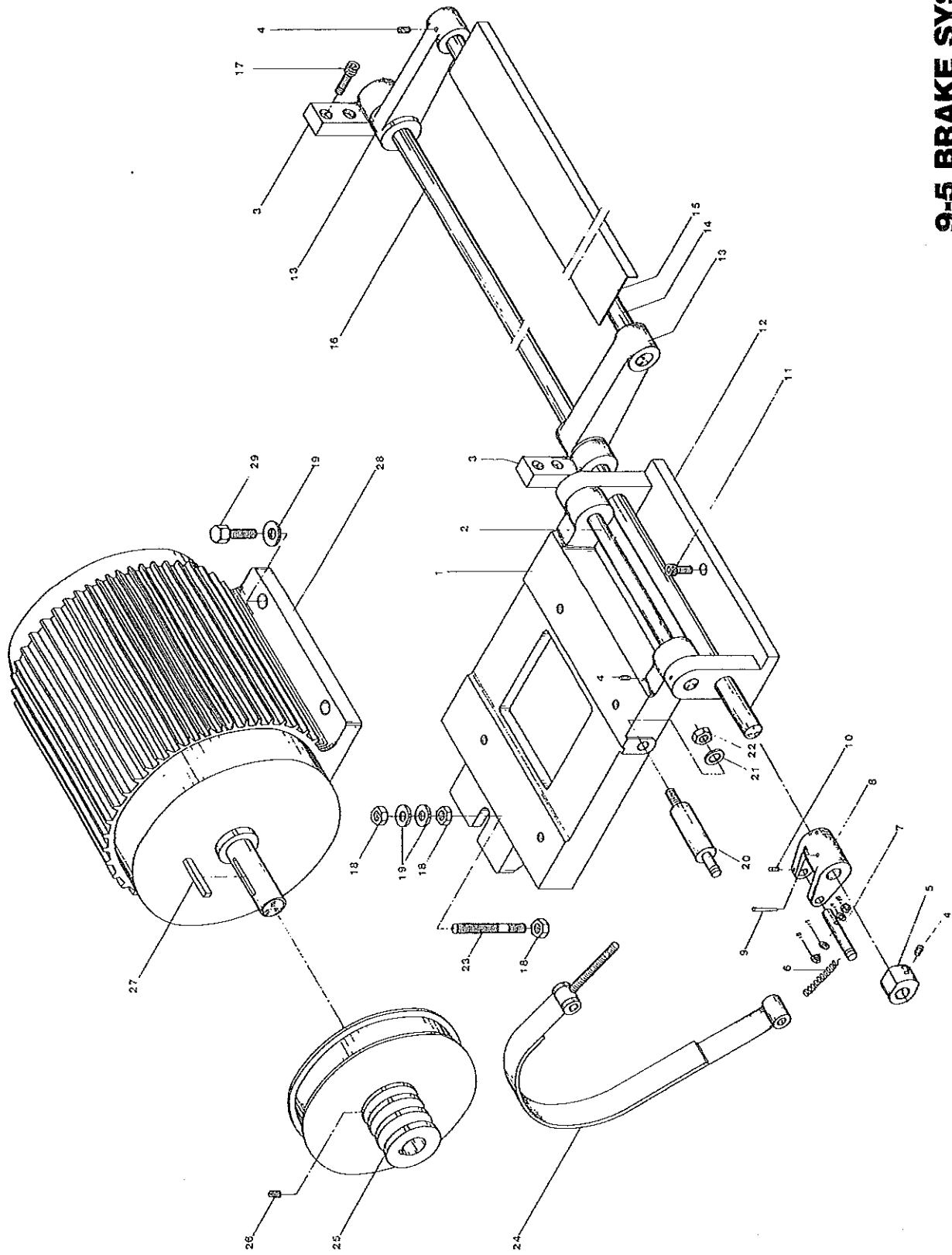
BED AND BASE ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
1	Cover-end	1	1221600201	1221600103
2	Screw-cross-recessed head , M6xP1.0x20L	12		
3	Cover-electric box	1	1122102006	1122102006
4	Screw-hexa. socket head cap , M6xP1.0x25L	10	91110625	91110625
5	Pin-taper , 6x36	2		
6	Rack (5 feet)	1	1210701000	1210701000
	(6 feet , right)	1	1220700604	1220700604
	(6 feet , left)	1	1220700506	1220700506
	(8 feet)	1	1230700509	1230700509
	(10 feet)	1	1240700502	1240700502
7	Bed (5 feet)	1	1210100101	1210100101
	(6 feet)	1	1220100104	1220100104
	(8 feet)	1	1230100107	1230100107
	(10 feet)	1	1240100100	1240100100
8	Pin-taper , 6x36	2	92030636	92030636
9	Screw-hexa. socket head cap , M16xP2.0x45L	4	91111645	91111645
10	Supporter-shaft	1	1122102104	1122102104
11	Screw-hexa. socket headless set , M6xP1.0x10L	2	91120610	91120610
12	Collar	1	1122102202	1122102202
13	Shoe-brass	4	1122102300	1122102300
14	Screw-hexa. socket headless set , M6xP1.0x6L	1		
15	Cam-auto feed stopping	4	1122102408	1122102408
16	Shaft-auto stopping (5 feet)	1	1212100109	1212100109
	(6 feet)	1	1222100308	1222100308
	(8 feet)	1	1232100105	1232100105
	(10 feet)	1	1242100108	1242100108
17	Screw-hexa. socket headless set , M8xP1.25x8L	1	91120808	91120808
18	Spring , 1x6x8L	1	91910610	91910610
19	Ball-steel , 1/4"	1	91820104	91820104
20	Lever-turning shaft	4	1122103807	1122103807
21	Collar	1	1122103905	1122103905
22	Screw-hexa. socket headless set , M8xP1.25x10L	1	91120810	91120810
23	Supporter-shaft	1	1122102604	1122102604
24	Screw-hexa. socket head cap , M8xP1.25x16L	4	91110816	91110816
25	Screw-hexa. socket head cap , M16xP2.0x55L	8	91111655	91111655
26	Plug	1	1122102702	1122102702
27	Bolt-lock	1		
28	Cover-motor seat	2	1122100806	1122100806
29	Bolt-set machine	6	1122102800	1122102800
30	Nut-lock	6	1122102800	1122102800
31	Block-leveling	6	1003501809	1003501809
32	Bolt-hexa. head , W1/4"x25	2		
33	Washer , W5/8"	2	91401051600003	91401051600003
34	Seat-coolant pump (5 - 6 feet)	1	1210100503	1210100503
	(8 feet)	1	123100509	123100509
	(10 feet)	1	1240100502	1240100502

BED AND BASE ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
35	Cover-coolant motor seat	1	1005000403	1005000403
36	Nut-lock , W1/4"	2		
37	Base (5 feet)	1	1210100209	1210100209
	(6 feet)	1	1220100202	1220100202
	(8 feet)	1	1230100205	1230100205
	(10 feet)	1	1246100208	1246100208

9-5 BRAKE SYSTEM



BRAKE SYSTEM ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
1	Seat-motor	1	1210400106	1210400106
2	Shaft-motor seat	1	1210400204	1210400204
3	Block	2	1210100601	1210100601
4	Screw-hexa. socket headless set , M6xP1.0x15L	4	91102060160003	91102060160003
5	Cam	1	1210400606	1210400606
6	Spring	1	1210400302	1210400302
7	Shaft-brake	1	1210400704	1210400704
8	Arm-brake	1	1210400802	1210400802
9	Pin-taper , 4"x38L	1		
10	Screw-hexa. socket , M6xP1.0x10L	1		
11	Screw-hexa. socket head cap , M10xP1.5x20L	3	91111020	91111020
12	Bracket-motor seat	1	1210100709	1210100709
13	Bracket-pedal	2	1210400900	1210400900
15	Pedal-brake (5 feet)	1	1210400508	1210400508
	(6 feet)	1	1220400109	1220400109
	(8 feet)	1	1230400102	1230400102
	(10 feet)	1	1240400105	1240400105
16	Shaft-pedal bracket (5 feet)	1	1210100405	1210100405
	(6 feet)	1	1220100300	1220100300
	(8 feet)	1	1230100401	1230100401
	(10 feet)	1	1240100404	1240100404
17	Screw-hexa. socket head cap , M8xP1.25x25L	4	91110825	91110825
18	Nut , M16	5	91210016	91210016
19	Washer , M16	8	91410016	91410016
20	Bolt-adjusting	1	1210401005	1210401005
21	Washer , M12	1	91410012	91410012
22	Nut , M12	1	91210012	91210012
23	Bolt-adjusting	1	1210400400	1210400400
24	Belt-brake (5HP , 15HP)	1	1003519605	1003519605
	(7.5HP , 10HP)	1	1003519703	1003519703
25	Belt pulley (5HP/60HZ)	1	1000400805	1000400403
	(7.5HP/60HZ)	1	1000400501	1000400109
	(5HP/50HZ)	1	1000400609	1000400207
	(7.5HP/50HZ)	1	1000400707	1000400305
26	Screw-hexa. socket headless set , M8xP1.25x8L	1	91120608	91120608
27	Key , 8x7.5x40 (5HP)	1		
	10x8x65 (7.5HP)	1		
	(10HP)	1		
	12x8x80 (15HP)	1		
28	Motor	1		
29	Bolt-hexa. head , M10x30L	4		

CARRIAGE AND CROSSFEED ASSEMBLY

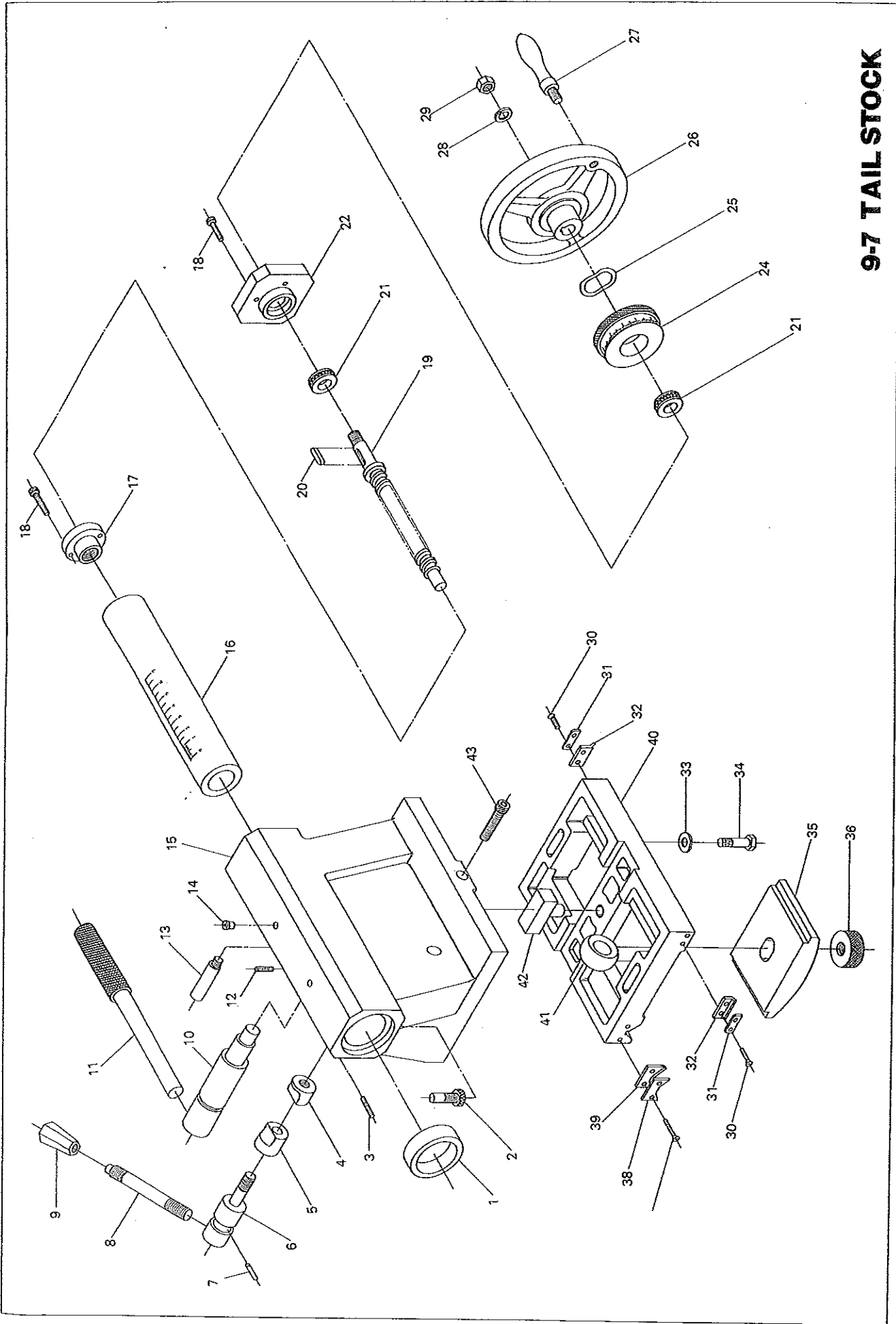
Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
1	Carriage	1	1220800109	1220800109
2	Nut-crossfeed	1		
3	Nut-crossfeed	1		
4	Spring , 0.3x5x15L	1		
5	Shim-crossfeed nut	1	1120800901	1120800901
6	Pipe-lubrication oil	1		
7	Nut-copper	1		
8	Conveyor-oil	1	1120801006	1120801006
9	Cap-crossfeed screw X	1	1120801104	1120801104
9-1	Nut-hexa. head , M12xP1.25	1		
10	Screw-hexa. socket head cap , M6xP1.0x10L	2	91110610	91110610
11	Wiper-rear	1	1122100100	1122100100
12	Case-wiper , rear	1	1122100306	1122100306
13	Screw-cross-recessed , M4xP0.7x10L	8	91140410	91140410
14	Pin	2		
15	Gib	1	1220800207	1220800207
16	Holder-gib	1	1220800403	1220800403
17	Screw-hexa. socket head cap , M8xP1.25x20L	2	91110820	91110820
18	Screw-hexa. socket headless set , M8xP1.25x20L	5	91120820	91120820
19	Nut , M8xP1.25	4		
20	Case-wiper , front	1	1122100404	1122100404
21	Wiper-front	1	1122100100	1122100100
22	Pin-taper , 6//x75L	2	1210700503	1210700503
23	Screw-hexa. socket head cap , M10xP1.5x70L	4		
24	Gib-left-front	1	1120801202	1120801202
25	Screw-hexa. socket head cap , M6xP1.0x20L	3	91120620	91120620
26	Clamp-carriage	1	1120801300	1120801300
27	Gib-right-front	1	1120801408	1120801408
28	Screw-crossfeed (10TPI , in)	1	1000800501	1000800501
	(4MM , mm)	1	1000800109	1000800109
29	Pin-spring , 5x30L	1	92030530	92030530
30	Pinion-crossfeed (local)	1		1220800501
	(export)	1		1220800609
31	Square key , 5x5x15L	1	91303001	91303001
32	Bracket	1	1120800107	1120800107
33	Bolt-hexa. socket , M8xP1.25x40L	2	91110840	91110840
34	Bearing-thrust , 6x6	2	91120606	91120606
35	Washer-wave type , 6210	2	91440001	91440001
36	Screw-hexa. socket head cap headless set , M6xP1.0x10	1	91120610	91120610
37	Clutch-dial	1	1120802807	1120802807
38	Dial-crossfeed (10TPI/left/export)	1	1000803502	1000803502
	(4MM/left/export)	1	1000802603	1000802603
39	Screw-hexa. socket headless set , M6xP1.0x15L	1		
40	Set screw	1	1120803000	1120803000

CARRIAGE AND CROSSFEED ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
41	Handle-wheel (local)	1	1120802601	1120802601
	(export)	1	1120802709	1120802709
42	Screw -adjusting , M6xP1.0x30L	1		
43	Knob-handle (local)	1	1120803206	1120803206
	(export)	1	1120803304	1120803304
43-1	Screw-handle (export)	1	1120803500	1120803500
43-2	Knob-handle	1	1120803402	1120803402
44	Plug-oil inlet	1	1122103405	1122103405
45	Lever	1	1120801506	1120801506
46	Screw-carriage clamp	1	1120800607	1120800607
47	Case-wiper	1		
48	Wiper	1	1222100102	1222100102
49	Screw-adjusting	1	1120801604	1120801604
50	Gib	1	1220800305	1220800305
51	Bolt	4	1120800509	1120800509
52	Cover-cross sliding	1	1430800802	1430800802
53	Shoe-clamp	1	1220800707	1220800707
54	Screw-hexa. socket headless cap , M6xP1.0x20L	1	91120620	91120620
55	Ball-steel , 1/4"	1		
56	Ball-steel , 1/4"	1		
57	Ball-steel , 1/4"	1		
58	Screw-hexa. socket head cap , M6xP1.0x3	3		
59	Screw-gib	2	112081702	112081702
60	Compound rest (local , mm)	1	1000804901	1000805300
	(export , in)	1	1000811504	1000805604
61	Gib-compound rest	1		
62	Shoe-clamp	1	1220800707	1220800707
63	Screw-clamp	1		
64	Screw-hexa. socket headless cap, M8xP1.25x10L	4		
65	Shaft-tool post	1		
65-1	Shaft-tool post	1		
66	Block-tee	1		
67	Spring , 1x8x20L	1		
68	Sleeve	1		
69	Button	1		
70	Tool post-square (in)	1	1003512802	1003512606
	(mm)	1	1003512704	1003512508
71	Screw-square head	1	1000804107	1000804107
72	Washer	1		
73	Knob-lever	1	1000810605	1000810605
74	Lever	1	1003521301	1003521301
75	Screw-gib , M8xP1.25x30L	1		
76	Screw-compound rest	1	1000803904	1000803904
77	Bearing-thrust , 51102	2		
78	Seat-compound rest screw	1		

CARRIAGE AND CROSSFEED ASSEMBLY

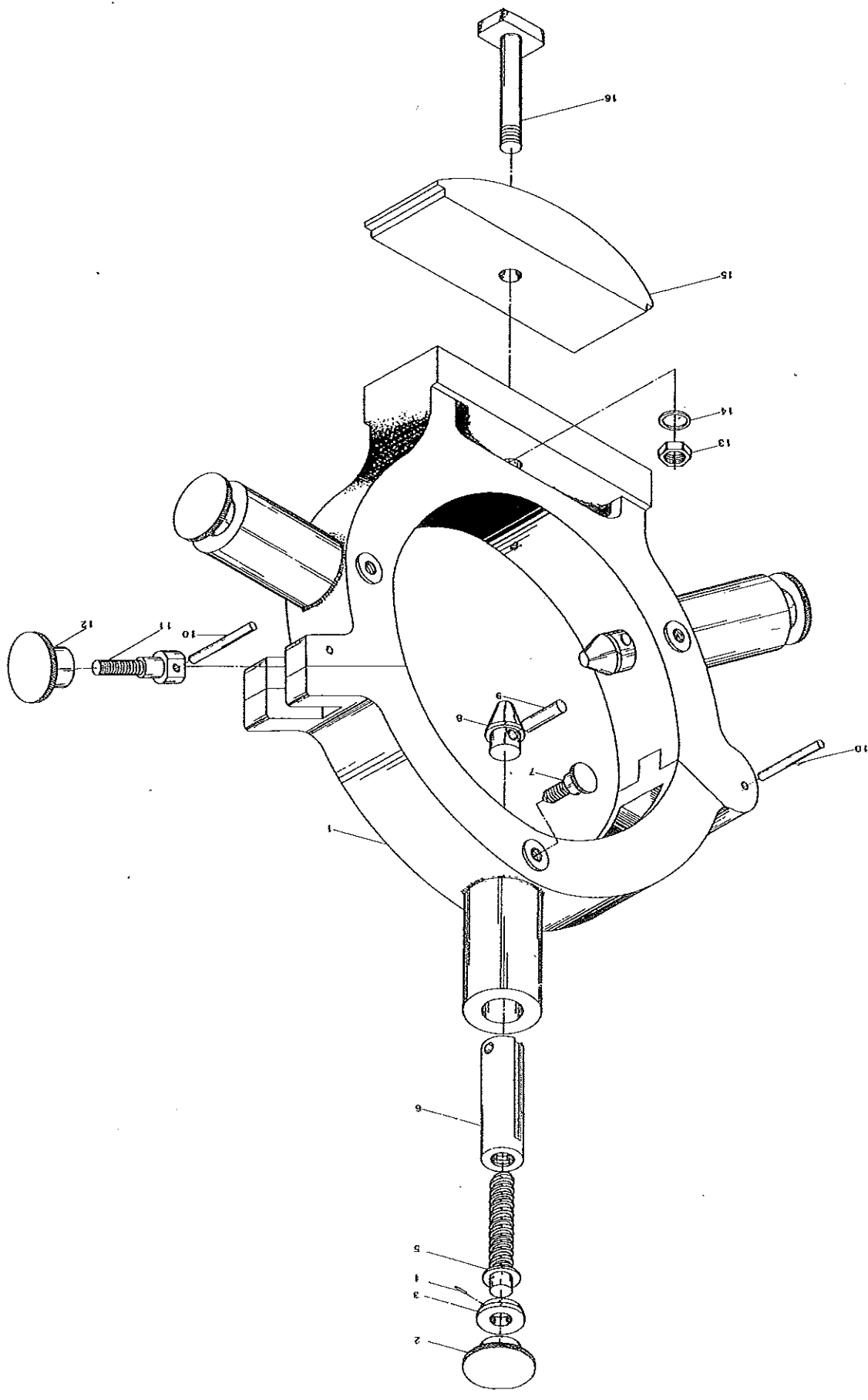
Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
79	Nut	1		
80	Collar	1		
81	Dial-compound rest	1	1000820003	1000820003
82	Washer-wave type	1		
83	Nut	1		
84	Handle	1		
85	Screw-hexa. socket head cap , M6xP1.0x16L	1	91110616	91110616
86	Knob-handle	1		
87	Nut , M10xP1.5	4		
88	Screw-hexa. socket headless set , M8xP1.25x8L	2		
89	Swivel	1		
90	Nut-compound rest screw	1		
91	Spring washer , M10	4		
101	Body-pump	1	1120801800	1120801800
102	Ring-O , P10	1		
103	Screw , M5xP0.8x12L	2		
104	Rod-pump	1	1120801908	1120801908
105	Stopper	1	1120802003	1120802003
106	Plug	1		1120802101
107	Spring-compressing , ϕ 1.2x10x63L	1		
108	Screw-hexa. socket head cap , M6xP1.0x16L	2	1120802209	1120802209



9-7 TAIL STOCK

TAILSTOCK ASSEMBLY

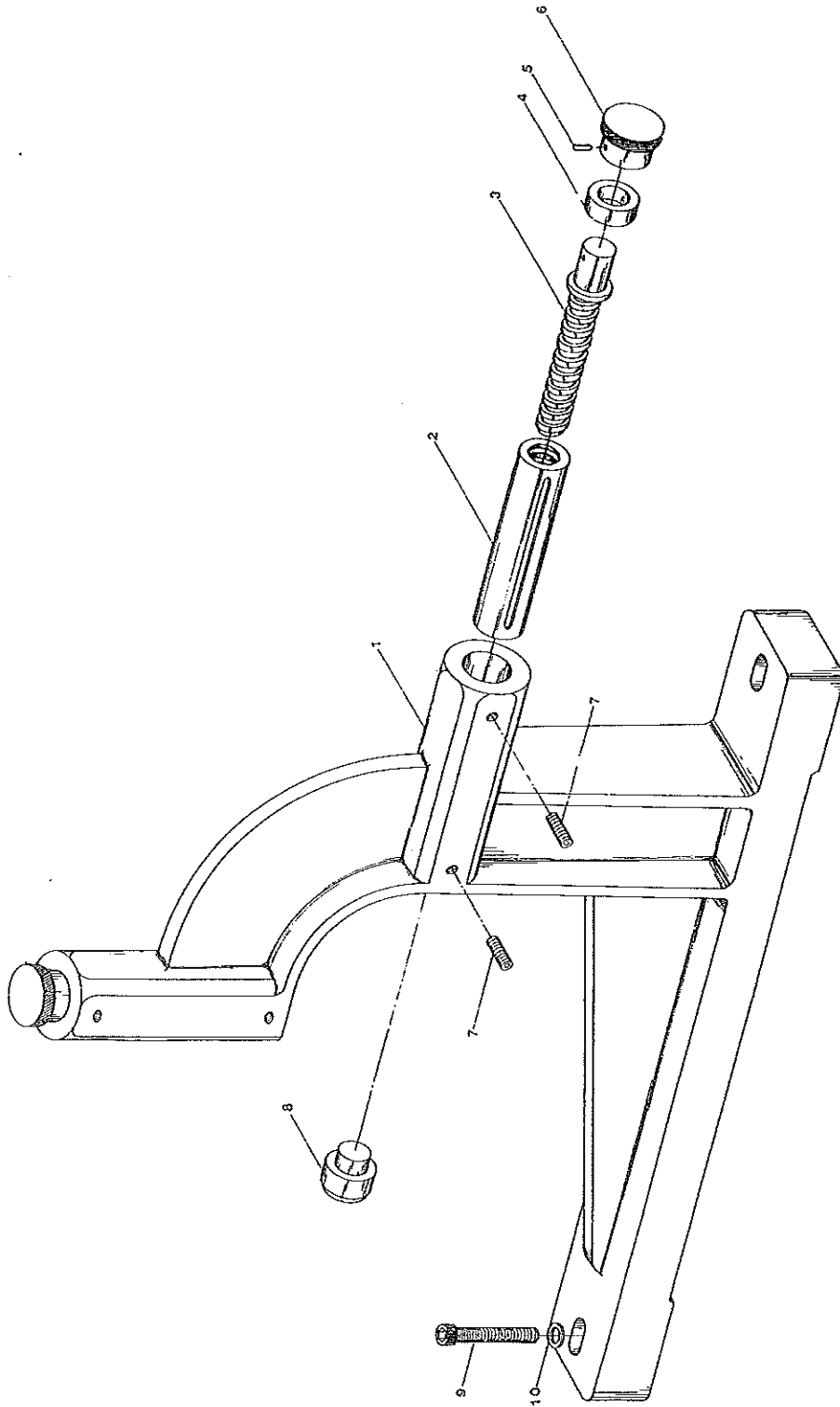
Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
1	Seal-oil , TC68x90x12	1	91526801	91526801
2	Screw-hexa. socket head cap , M8xP1.25x10L	1	1121100802	1121100802
3	Screw-hexa. socket headless set , M6xP1.0x10L	1	91120610	91120610
4	Block-clamp	1	1121101005	1221100706
5	Block-clamp	1	1121101005	1221100706
6	Shaft-clamp spindle	1	1121101103	1221100804
7	Pin , 5x12	1		
8	Lever	1	1121102100	1121102100
9	Sleeve-lever	1	1120207400	1120207400
10	Shaft-clamp bottom	1	1121101201	1221100902
11	Lever	1	1121101201	1221100902
12	Screw-hexa. socket , M6xP1.0x20L	1	91120620	91120620
13	Screw-brake	1	1121102306	1121102306
14	Plug-oil	3		
15	Body-tailstock	1	1121100106	1221100108
16	Spindle-tang slot	1	1121101309	1221101007
17	Cap-spindle	1		
18	Screw-hexa. socket head cap , M6xP1.0x12L	3	91110612	91110612
19	Screw-spindle feed (in)	1		1221100304
	(mm)	1		1221100402
20	Key-square , 6x6x25	1	91610606	91610606
21	Bearing-thrust , 51204	2		
22	Cap-body end	1	1121101407	1221101105
23	Screw-hexa. socket head cap , 96xP1.0x25L	4		
24	Dial-feed (in)	1	1121100508	1221100500
	(mm)	1	1121100606	1221100608
25	Washer-wave type , 6205	1	91440002	91440002
26	Handwheel	1	1121100900	1121100900
27	Knob	1	1121102002	1121102002
28	Washer , 1/2"	1	9141S001	9141S001
29	Nut , 1/2-20UNF	1	9125S001	9125S001
30	Screw-cross-recessed , M4xP0.7x12L	4		
31	Case-wiper	2		
32	Wiper	2		
33	Washer-flat , M10	2	91410010	91410010
34	Bolt-clamp , M10xP1.5x75L	2		
35	Clamp	1		
36	Washer	1		
38	Case	1		
39	Wiper	1		
40	Bottom-tailstock	1		
41	Bolt-clamp	1		
42	Block-adjusting	1		
43	Screw-hexa. socket , M10xP1.5x80L	2	91111080	91111080



9-8 STEADY REST

STEADY REST

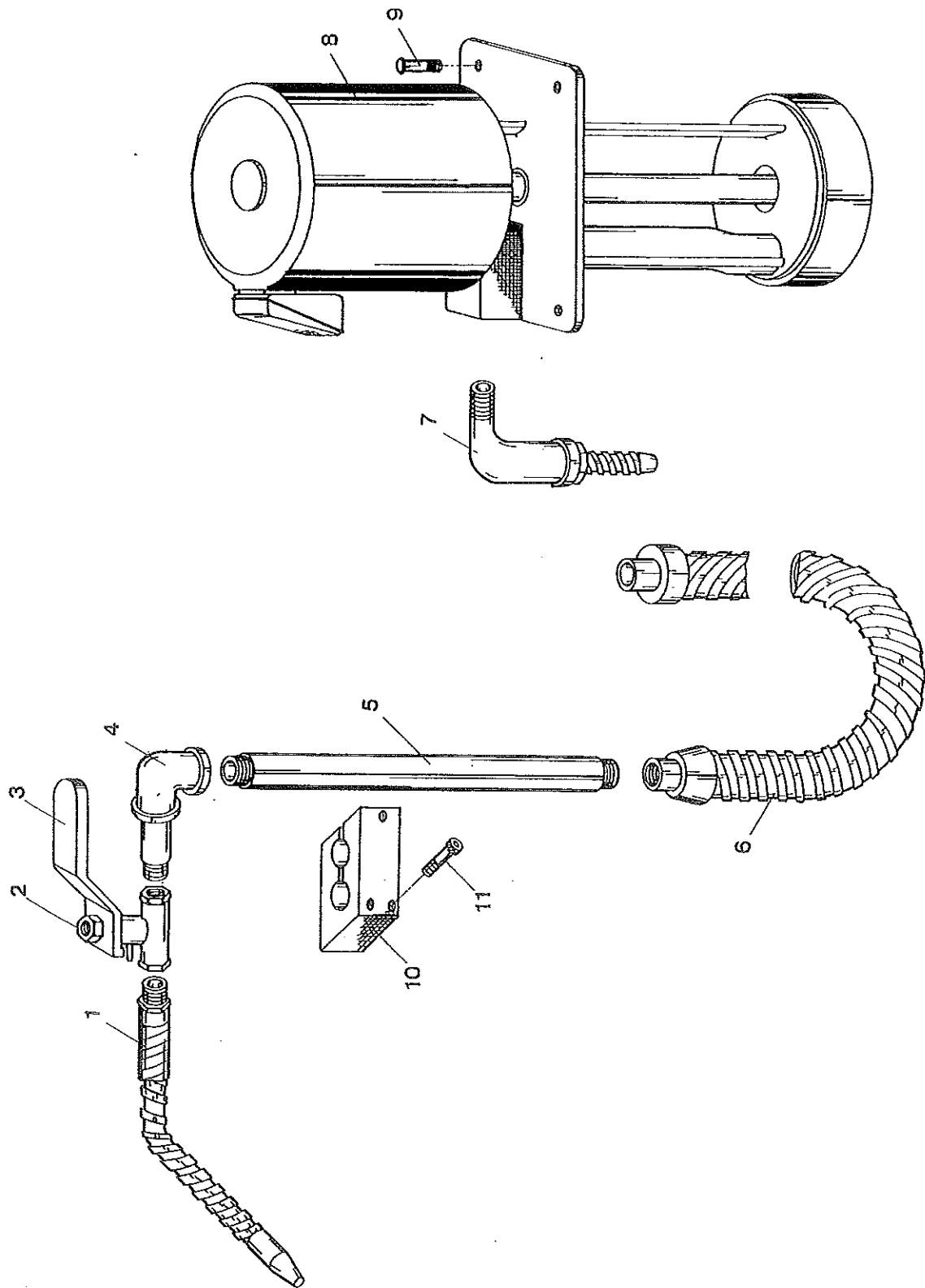
Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
1	Steady-rest	3		
2	Plug-lead screw	3		
3	Cap , 6x52L	12		
4	Pin	3		
5	Lead-screw	3		
6	Nut-lead screw	1		
7	Screw-fixed	3		
8	Jaw	3		
9	Pin-fixed	3		
10	Pin , 9x25L	2		
11	Screw	1		
12	Plug	1		
13	Nut , W5/8"	1		
14	Washer	1		
15	Block-clamp	1	1003500204	1003500204
16	Bolt	1	1003500400	1003500400
	(6" Sleeve)		1003519203	1003501103
	(6" Bearing)		1003519301	1003501201
	(9" Sleeve)			1003501309
	(9" Bearing)			1003501407



9-9 FOLLOW REST

FOLLOW REST ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
1	Body-follow rest	1		
2	Nut-lead screw	2		
3	Lead-screw	2		
4	Collar	2		
5	Pin , 4x25L	2		
6	Plug-lead screw	2		
7	Screw-hexa. socket headless cap , M8xP1.25x10L	4		
8	Shoe	2		
9	Screw-hexa. socket head cap , M10xP1.5x30L	2	91111030	91111030
10	Washer			
	(6" Sleeve)		10035019409	1003503107
	(6" Bearing)		100352700	100352710
	(9" Sleeve)			1003503107
	(9" Bearing)			100352710



9-10 COOLANT SYSTEM

COOLANT SYSTEM ASSEMBLY

Item No.	Part Name	Amt. Used	Type : 16 Part No.	Type : 18 Part No.
1	Nozzle	1		
2	Nut-lock	1		
3	Cock-lever	1		
4	Elbow	1		
5	Pump body	1		
6	Pipe (5, 6 feet)	1	92605002	92605002
	(8 feet)	1	92605003	92605003
	(10 feet)	1	92605001	92605001
7	Elbow	1		
8	Pump body	1		
9	Bolt-hex. head , M6xP1.0x12L	2		
10	Supporter-lock pipe	1		
11	Screw-hexa. socket head cap , M6xP1.10x20L	3	91110620	91110620

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OPERATION & PARTS MANUAL

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