OPERATION MANUAL
FOR

THREAD ROLLING MACHINES
Models THI-6R and -10R

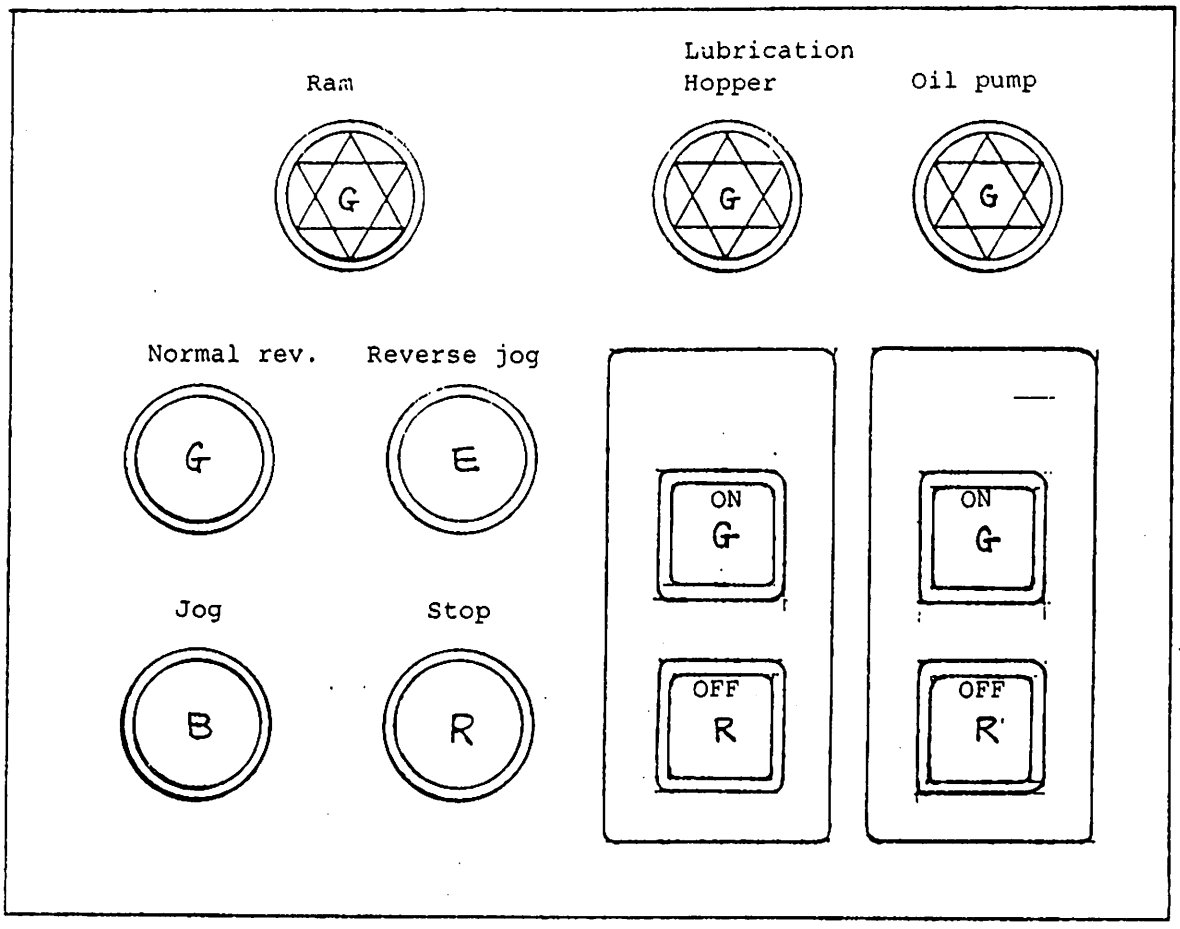
SANMEI WORKS CO., LTD.

CONTENTS

1. Specifications

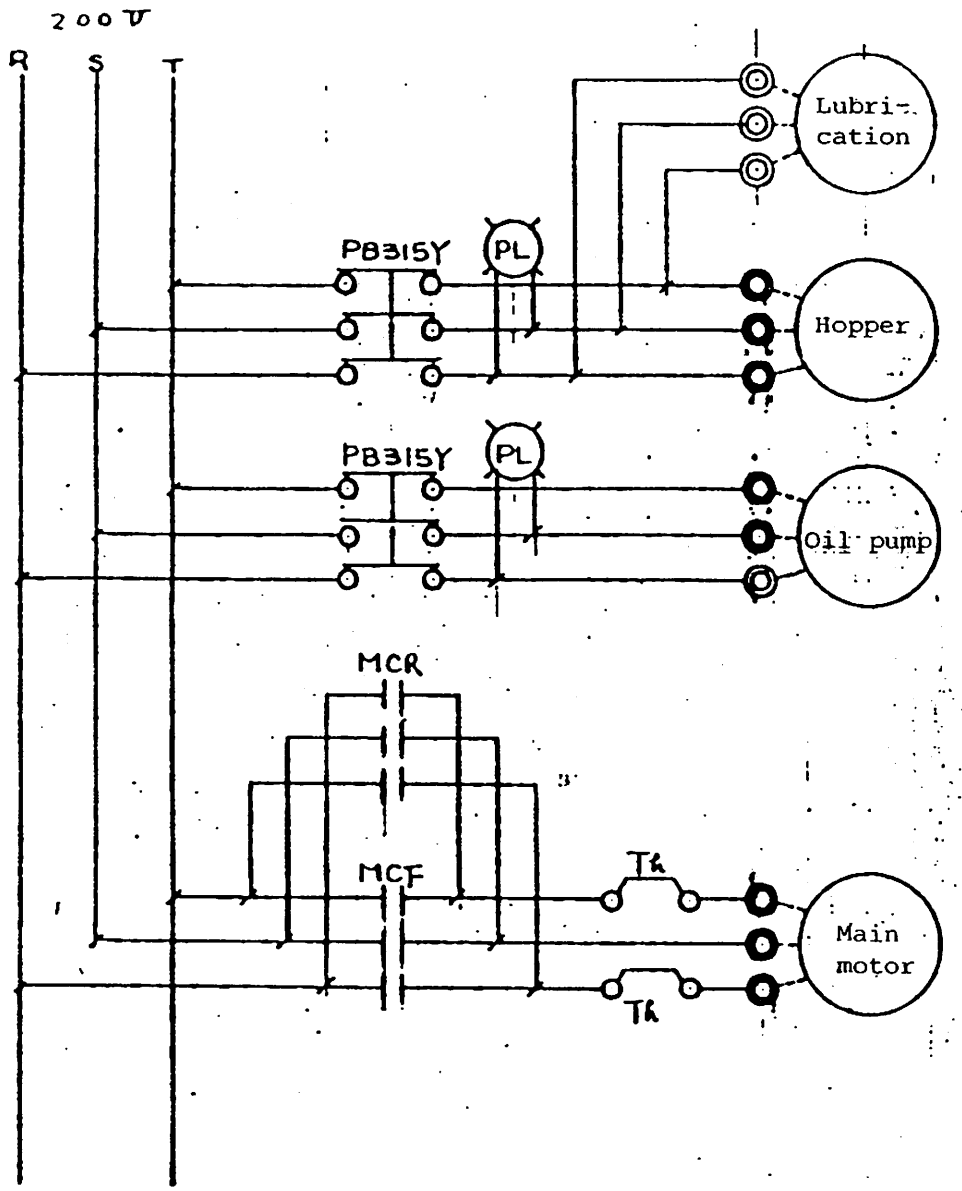
		TH1-6R	THI-10R
Max. threading dia.		M6	M10
Max. threading length		35 mm	40 mm
Max. shank length		50 mm	60 mm
Max. depth of die pocket		55 mm	75 mm
Output rate	50 Hz	100-220 pcs/min	100-215 pcs/min
	60 Hz	120-250 pcs/min	120-250 pcs/min
		(infintely variable)	
Ram stroke		210 mm	300 mm
Hopper		Drum type as standard	
Motors			
Main motor		4 P 3.7 kW	4 P 7.5 kW
Hopper motor		4 P 0.4 kW	4 P 0.4 kW
Coolant motor		2 P 0.04 kW	2 P 0.04 kW
Lubrication pump		0.01 kW	0.01 kW
Dimensions	Width	1,300 mm	1,400 mm
	Length	1,850 mm	2,100 mm
	Height	1,400 mm	1,700 mm
Weight		1,500 kg	2,700 kg

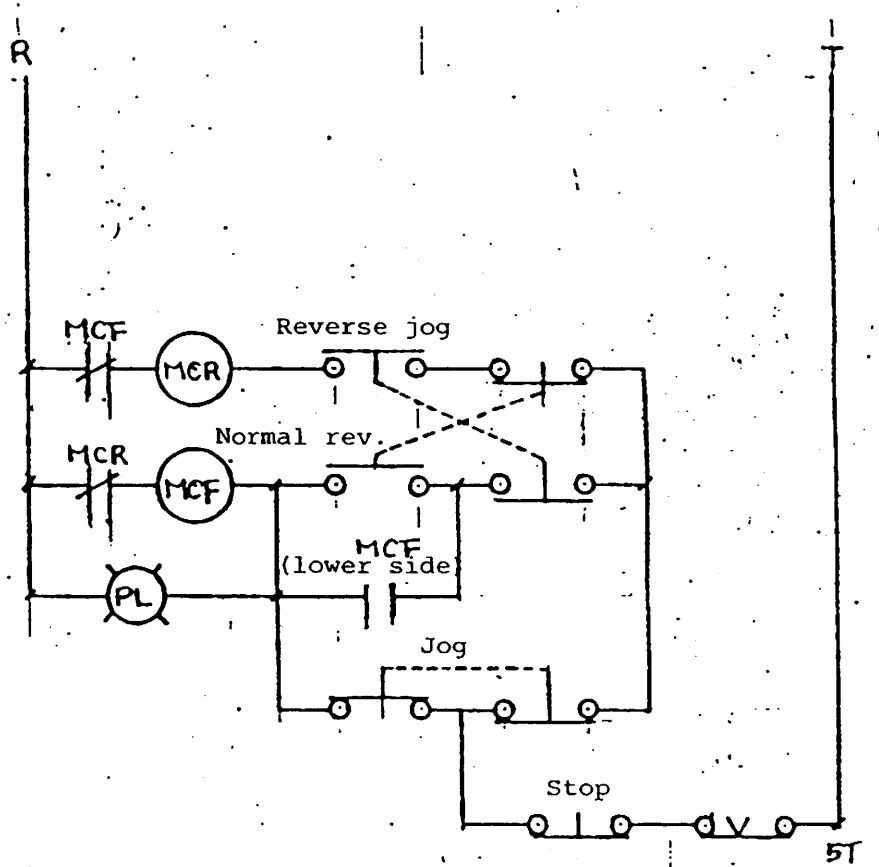
2. Operation board



Note: Letters on the switches and lamps represent the following colors:
G = green B = Black E = yellow R = red

Normal rev. : Puts the ram into continuous operation.
Jog : While the switch is pressed, the machine runs. When the switch is released, the machine stops.
Reverse jog : While the switch is pressed, the machine runs in reverse and when the switch is released, the machine stops.
Stop : The ram alone stops.
Lubrication/hopper: starts and stops the lubrication and hopper.
Oil pump : starts and stops the oil pump.

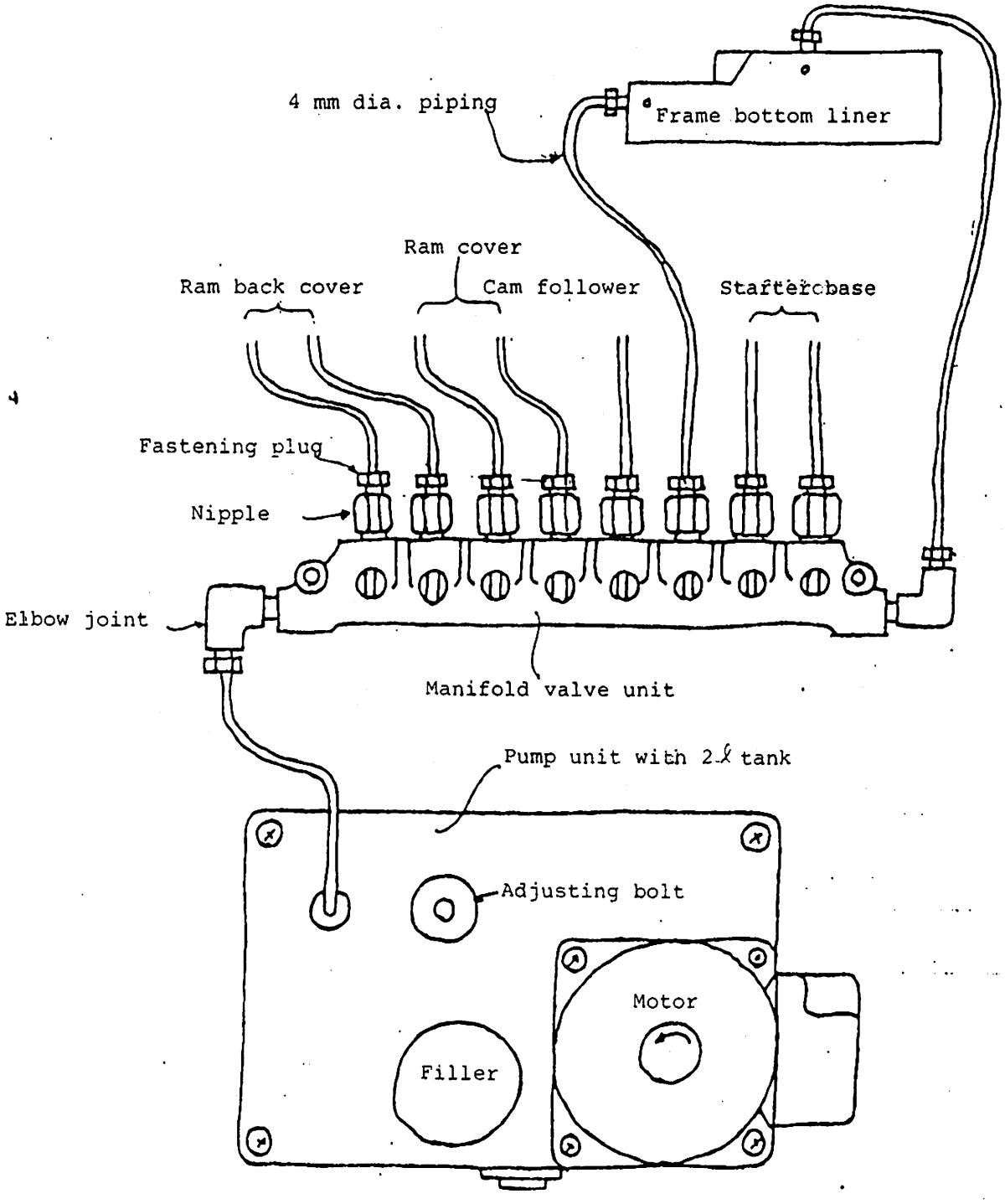

200 V
R
S
T
Lubri-
cation
PB315Y
PL
Hopper
PB315Y
PL
Oil pump
MCR
MCF
Th
Th
Main
motor


R
MCF
MCR
Reverse jog
MCR
MCF
Normal rev.
MCF
(lower side)
PL
Jog
Stop
ST

4. Lubrication

Lubricant is efficiently supplied by a Showa Uki brand cycle pump.

(1) Piping



(2) Model YMAS cycle pump

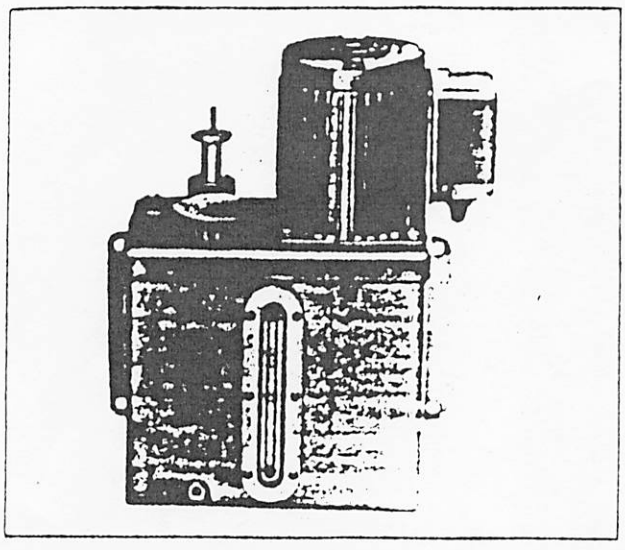
* Cycle time and discharge capacity

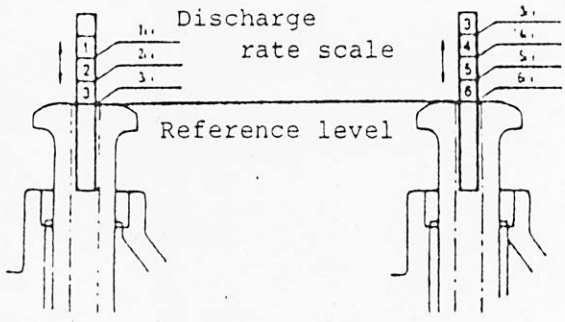
There are two series of pumps; with discharge rates of 3 cc/cycle (Type 3) and 6 cc/cycle (Type 6). A total of 9 kinds of pumps are available.

When ordering a pump, give the model and cycle time as in following model code: Model YMAS315

(It means a discharge rate of 3 cc/cycle and 15 minute cycle time.)

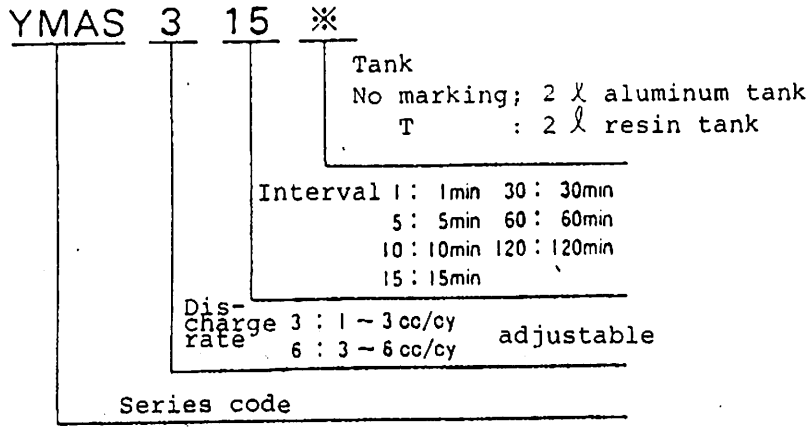
Discharge rate is easily adjusted by positioning the reference scale at rate number as shown in Fig. 2. The number corresponds to the rate of discharge. After adjustment, tightly fasten the lock screw. The scale is positioned at the number 2 for Type 3 and 5 for Type 6 at the time of shipment.





The pump is a motor driven type which intermittently delivers a set amount of lubricant by discharging the stored pressure. When the machine is started, the pump is automatically activated for continual lubrication.

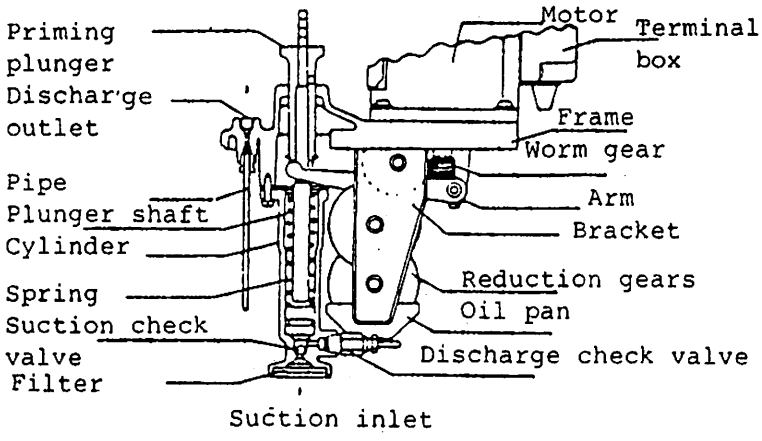
* Model code description



* Function

Motor revolution is transmitted through a group of reduction gears which are selected according to the required cycle time. The cam revolves at a reduced speed to elevate the arm, pull up the plunger and compress the spring. When the plunger is pulled up, lubricant pushs the suction check valve upward through the suction head and is stored in the cylinder for next interval discharge. Amount stored corresponds to the amount of cylinder stroke.

When the cam revolves further, the arm is released from the cam and the force generated by the compressed spring pushes the plunger to deliver the lubricant stored in the cylinder to the main pipe.

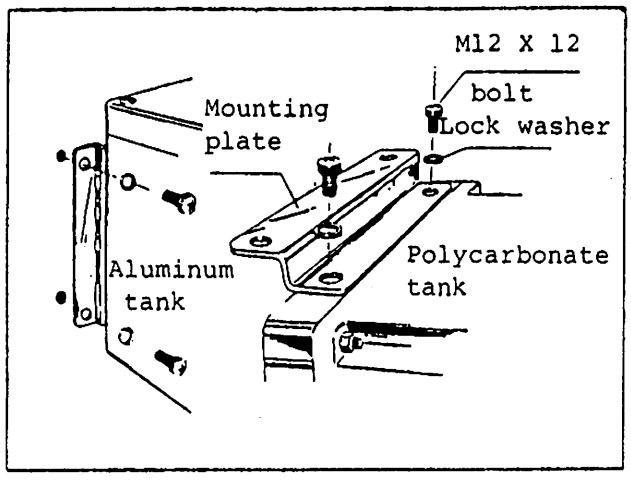


(3) Service description

* Installation

Mounting plate, bolts (M12 X 12), lock washers, etc are provided as an accessory set. So the tank can be installed on the side or bottom of the machine as required. The tank can be also directly installed without using the accessory set.

A transparent resin tank is also available for enhanced appearance and visual inspection of degree of lubricant cleanliness. The pump with the resin tank has the mounting plate for installing the tank on the pump frame.



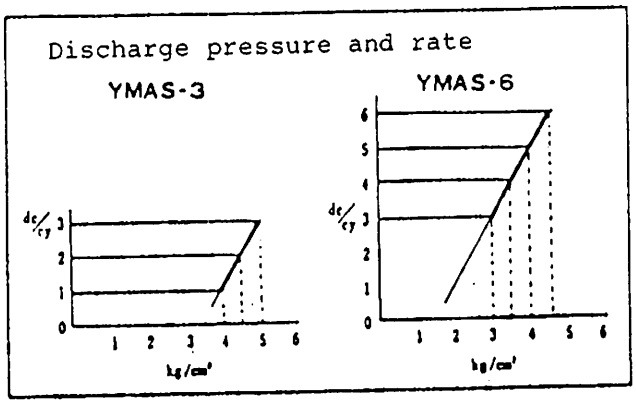
* Pump starting

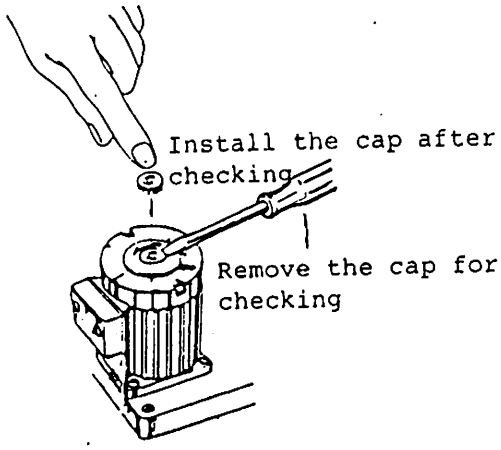
. Check the power source for 3 phase 200 V.

. With the motor cap removed, check that the motor rotates in the direction of the arrow.

. Even if oil level falls in the tank, the auxiliary oil pan is provided for sufficient lubrication of the gears. However, care should be taken to keep the oil level continuously above the red line on the tank. When refilling, pour clean lubricant through filter.

. After piping, expel entrapped air, chips, dirt, etc from the system. Before starting the pump, fill the system by pulling the priming plunger. (The pull may be slightly heavy. This does not affect function or performance.)



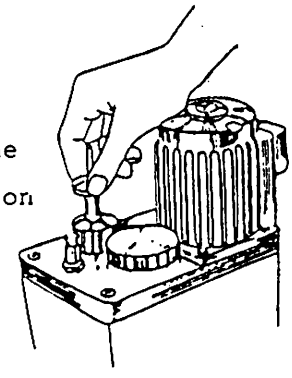


* Troubleshooting

. The motor rotating in reverse will not affect operating at first but will reduce pump life.

. Lack of discharge pressure may result from leakage in the piping, lower oil level, non-activation of intermittent motion, etc. If lubricant flows when the priming plunger is pulled up, there is no trouble.

When pulling with the the palm positioned on the motor side, the priming plunger is easily pulled.

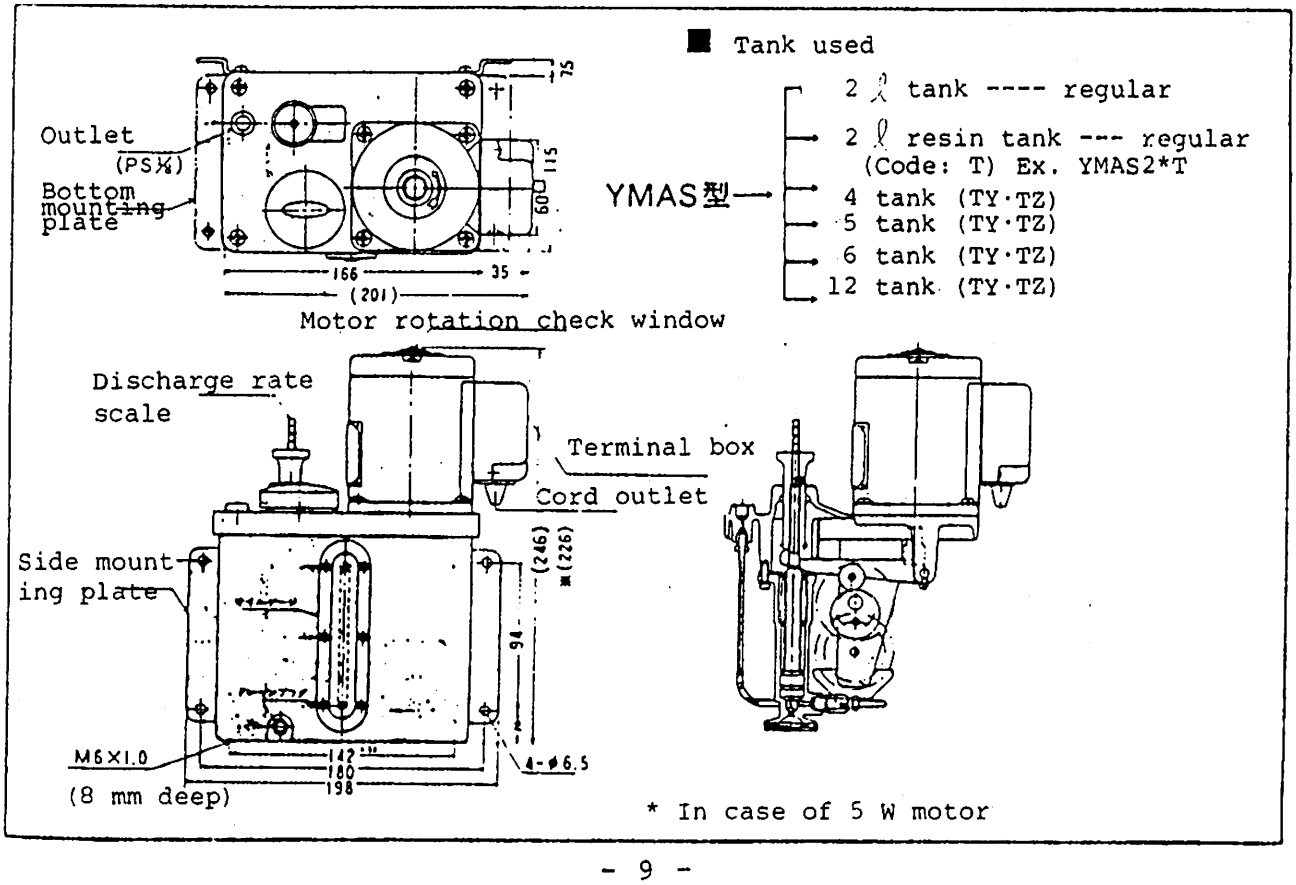


(4) Pump technical data

* Specifications

	Model	Cycle time (minute)	Max. discharge (cc)	Max. pressure (kg/cm²)	Hole size (PS)	Motor (W)	Tank (cc)	Effective capacity (cc)
Pump	YMAS31	1	3	5	1/8	10	2000	1500
	YMAS35	5						
	YMAS315	15						
	YMAS61	1	6	3				
	YMAS65	5						
	YMAS615	15						
	YMAS630	30						
	YMAS660	60						
	YMAS6120	120						

	Output (W)	10			5			15	
Motor	Freqcy. (Hz)	50	60		50	60		50	60
	Voltage (V)	200	200	220	200	200	220	100	100
	Current (A)	0.16	0.14	0.15	0.1	0.1	0.1	0.45	0.435
	Speed (rpm)	1250	1500	1600	1250	1500	1600	1250	1500



(5) Manifold valve unit

* Features

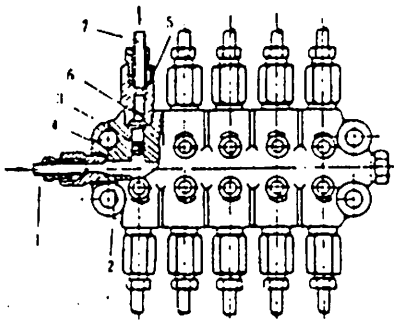
The valve assembly unit, an adjustable resistance type delivery manifold was developed for easier operation and more economy. Lubricant supplied by the pump is distributed through adjustable taper valves to the lubrication points in the precise amounts needed at each point.

The unit consists of the manifold block, distribution adjusting taper valves and check valves. In this unit, lubricant is supplied through one inlet and distributed through several outlets.

Flows for the outlets are separately adjusted by turning the taper valves with a wrench.

* Lubricant flow system

Lubricant is discharged to the main hole through the main pipe (1) by the pump and distributed to the branch holes (4). Lubricant is routed through the narrow groove of the taper valves (3) to the tip of the check valves. Lubricant resists the valve spring (5) and opens the internal valve (6) to enter the branch pipes (7). After lubricant is intermittently discharged, the valve (6) is returned by the springs to close the lubricant outlets, thus stopping counterflow of lubricant discharged to the branch pipes.



* Flow adjustment

Fig. 3 shows adjustment of the manifold valve and Fig. 2 shows the adjusting scale. Referring to the three scale lines (left, middle and right), lubricant flow is finely adjusted. For easier reference, the taper valve has the alignment groove A as shown in Fig. 1. Since the V groove B is provided on the middle part of the taper valve, lubricant flow does not stop even if the alignment groove A is improperly positioned outside the scaled range as shown in Fig. 2. Flow does not stop even if the taper valve is turned from 33 degrees to 90 degrees. When lubricant flow is not required, use the sealing plug (PG004 PG8 etc).

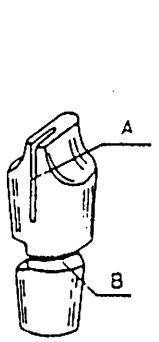


Fig. 1

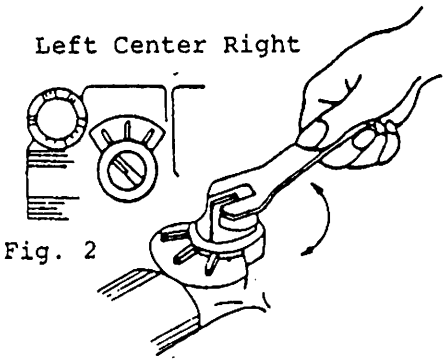


Fig. 2

Fig. 3

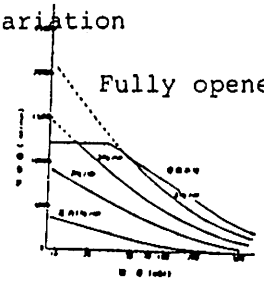
* Pump selection

Do not use the following pumps.

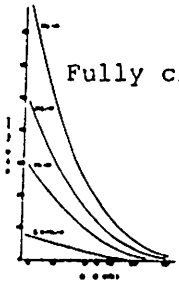
Pumps with the pressure release mechanism such as Models MLAS*W*, MLA*W*, LCA, LCB and LA*W*.

Flow table

Graph showing relation between discharge flow and viscosity variation

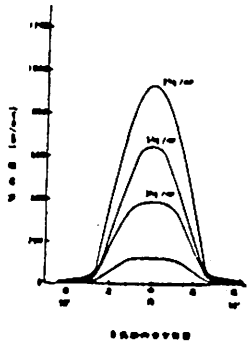


Fully opened



Fully closed

Discharge flow per outlet port dependent upon viscosity at a constant pressure



Oil: FBK32

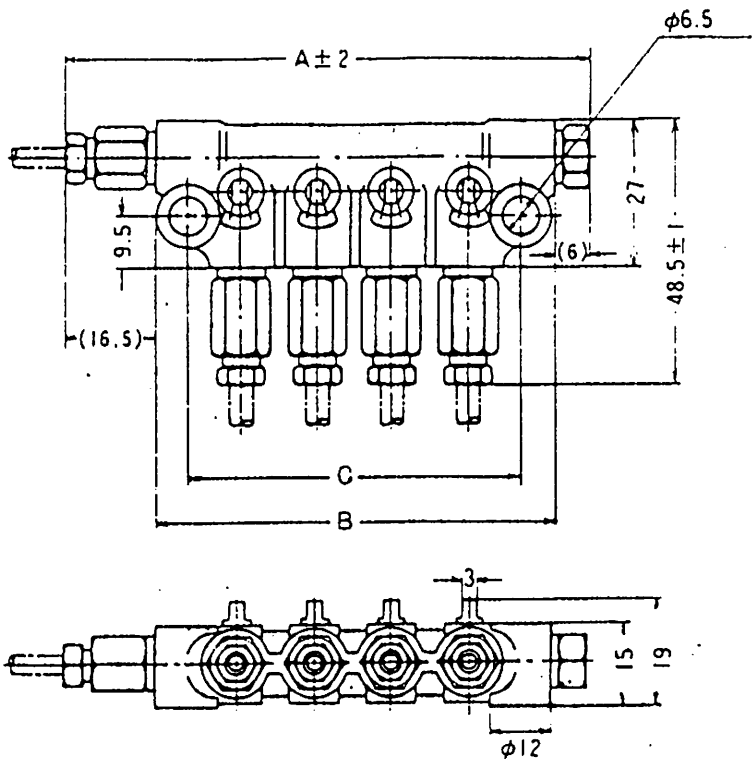
Temperature: 25 C

Viscosity: 60cST

(Pressure difference between inlet and outlet port)

Discharge flow per outlet port dependent on viscosity (pressure difference between inlet and outlet port)

(6) Dimensions



Type	Outlet No.	A	B	C
VB2	2	69.5	46	34
4	4	96.5	74	62
6	6	124.5	102	90
8	8	152.5	130	118

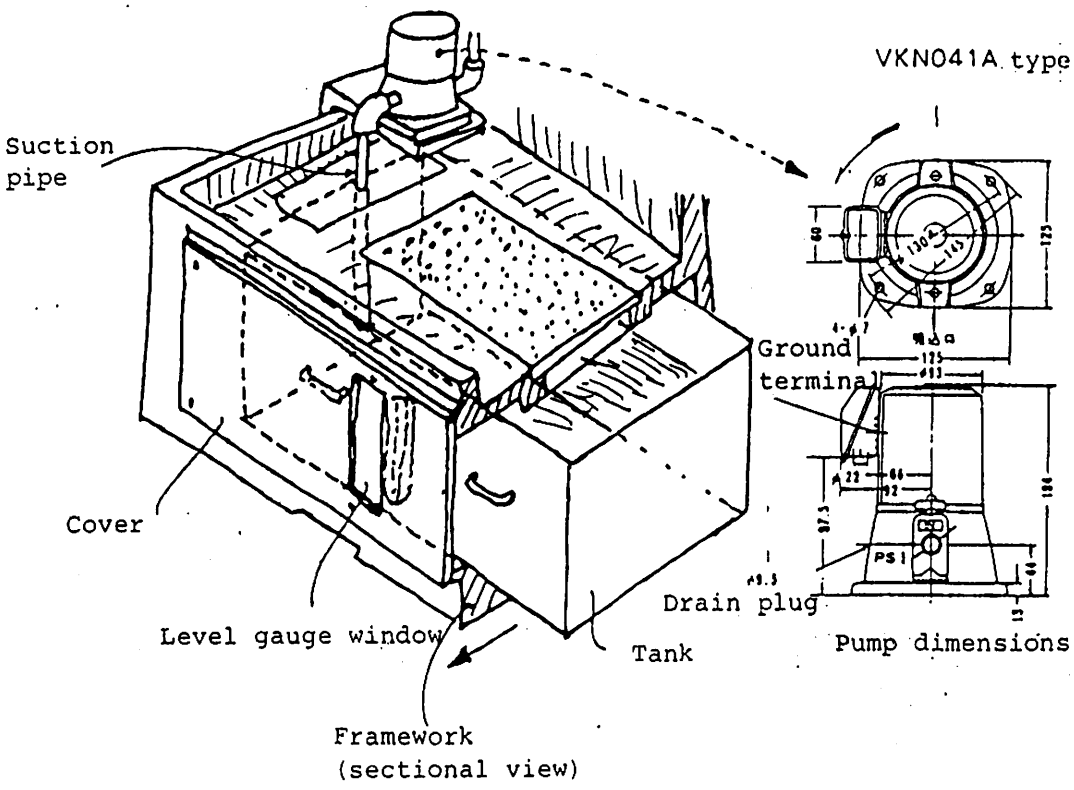
(7) Recommended lubricants

Nippon Oil	Uniway 68
Idemitsu Kosan	Multi-way 68
Kyodo Oil	Slidus 68
Mitsubishi Oil	Slideway 68
Marusen Oil	Swaway 68
Shell Oil	Tonaoil 68
Esso	
Mobile Oil	Vactra 68

5. Coolant (threading oil)

(1) Tank construction

Since the coolant tank is a drawer type as shown below, coolant replacement and tank cleaning are easily carried out.



(2) Removal of coolant tank

1) Remove the cover.
2) Turn the suction pipe with a wrench and remove the pipe.
3) Slowly draw out the coolant tank with the grips.

(3) Tank capacity

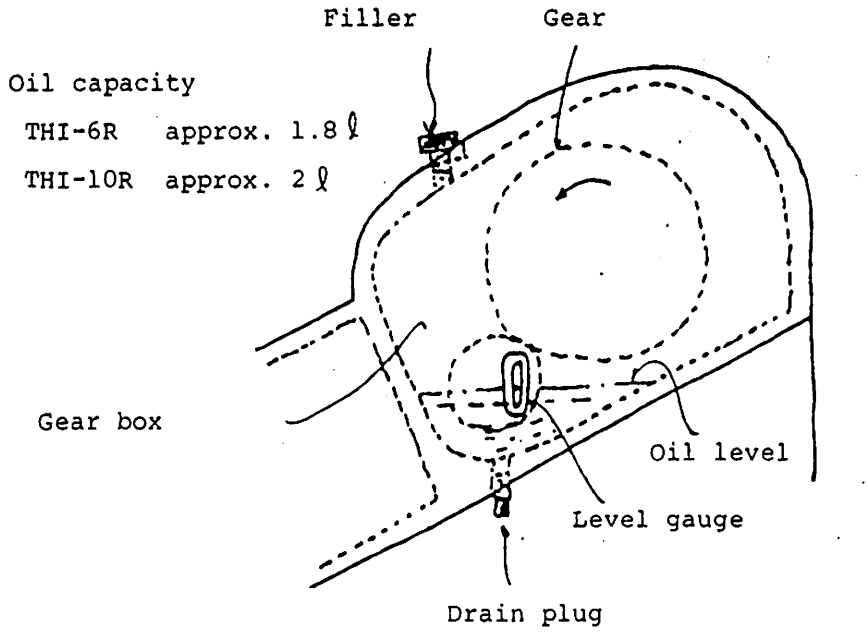
THI-6R	Approx. 20 ℓ
THI-10R	Approx. 33 ℓ

6. Gear oil

Gears are integrated in the box and lubrication is by oil bath. The drain plug is located just under the drive shaft which is accessible by opening the door on the pulley. When filling gear oil, remove the screw type filler cap on the upper side of the frame cover. Fill gear oil to the center of the sight gauge accessible from the turn buckle side of the ram.

Since gear oil also lubricates the bearings in the box, never neglect gear oil maintenance.

Gear oil should be replaced after the first six months and every year thereafter.



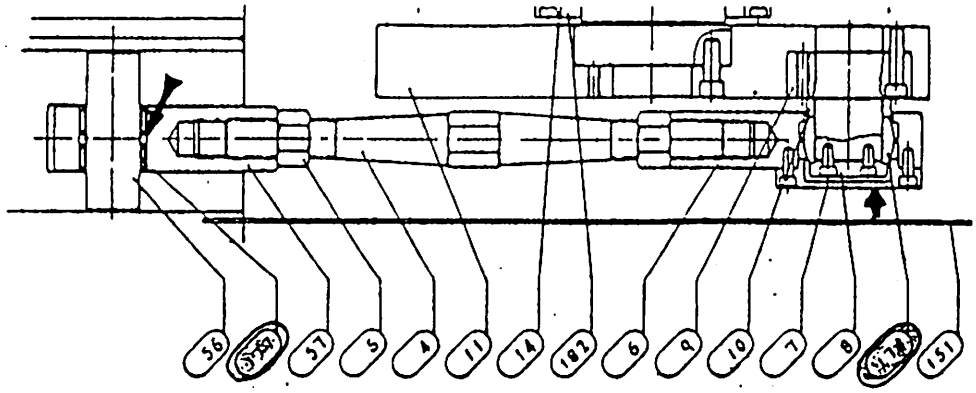
(1) Recommended gear oil

Nihon Oil	Bonock 150
Idemitsu Kosan	Compound 150
Kyodo Oil	Reducs 150
Mitsubishi Oil	Gearlub 150
Maruzen Oil	Swacol 150
Shell Oil	Omara 150
Esso	Spartan 150
Mobile Oil	Mobile compound 150

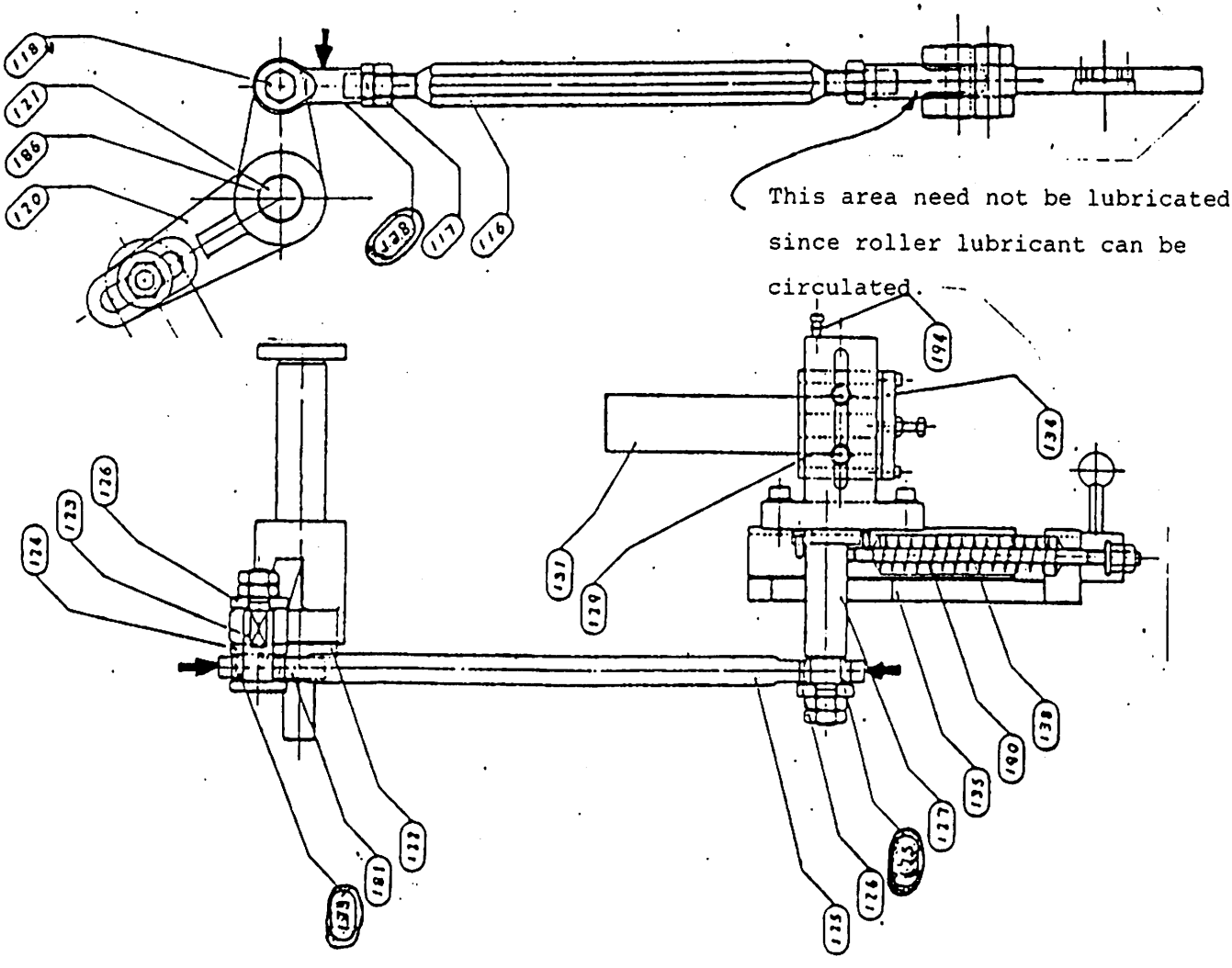
7. Grease lubrication (arrow marked points)

Grease should be filled at the 5 following points with the grease pump.

(1) Crank pin and ram pin



(2) Starter connecting area

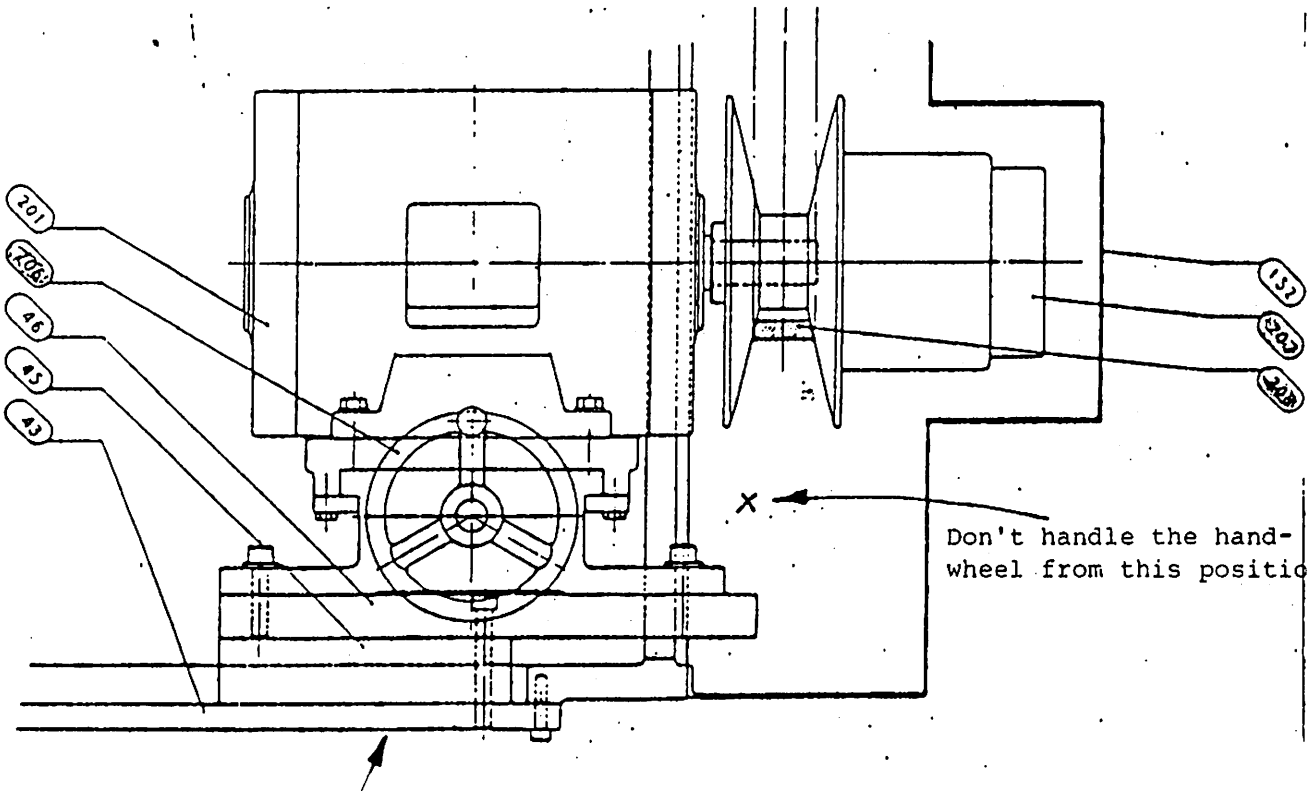


8. Speed adjuster

The speed adjustable pulley allows infinite variation of speed within the specified range. The speed is increased by lowering the motor with the handwheel and decreased by raising the motor. When handling the handwheel, the motor should not be stopped but running. The handwheel is accessible by removing the cover on the rear of the machine.

Since it is very dangerous, never access the handwheel from the flywheel side. Keeping the speed constant for a long time will result in difficulty in opening and closing the pulley.

Please use the handwheel to open and close the pulley at least once every week.



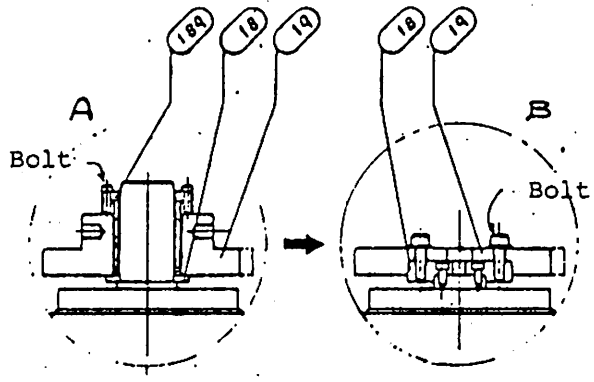
9. Pusher timing adjustment

Since the pusher cam is a round type, the timing can be easily adjusted as necessary.

(1) THI-6R

1) A type

Since the ETP-40 is used on the A type, loosening 6 M5 bolts as shown below makes the round cam ready for 360 degree rotating adjustment. In this case, the M5 bolts should not be removed but only loosened.

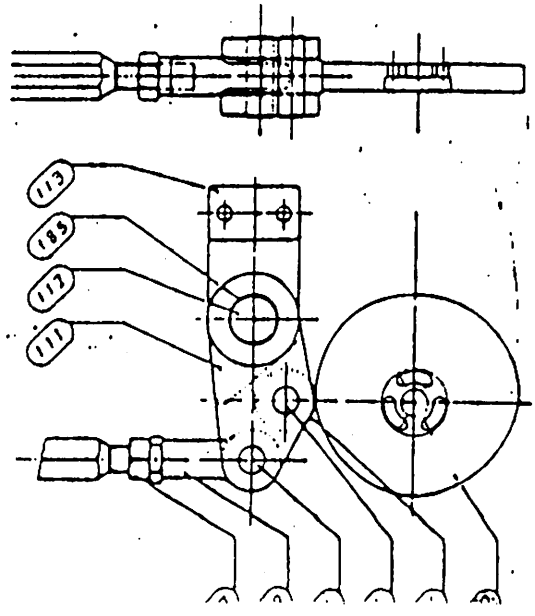


2) B type

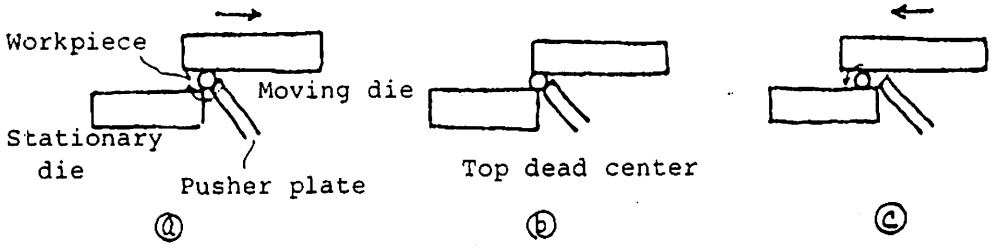
The cam is fastened with 3 bolts in the elongated holes. When the bolts are loosened, the cam can be rotated within 60 degrees. To rotate the cam beyond 60 degrees, remove the bolts and reposition them in the adjacent holes. For this adjustment, 6 tapped holes are provided on the No. 18 part.

(2) THI-10R

As shown in the right, the cam can be reposi-tioned in the same procedure as the B type of the THI-6R.



(3) Pusher plate timing

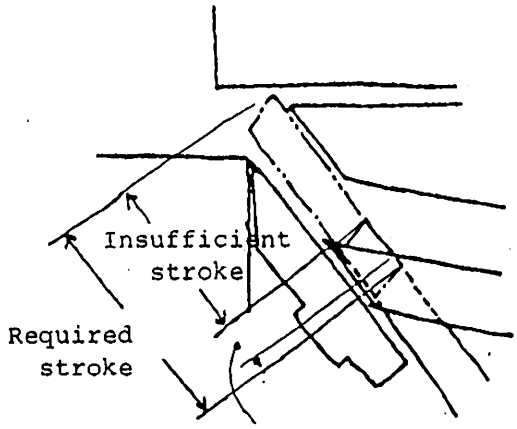


Timing of the pusher plate which operates synchronously with the ram is adjusted by repositioning the round cam as follows:

1) When the ram is positioned before the top dead center as shown in Fig. (a), forward motion of the pusher plate should be completed so that the workpiece rotates further about half a turn to the top dead center.
2) When the ram comes to the top dead center, the pusher plate should stay in the forward position and the workpiece should be completely inserted as shown in Fig. (b).
3) When the ram starts to move forward from the top dead center as shown in Fig. (c), the pusher plate should stay until the workpiece is completely released from the pusher plate.
   Then the pusher plate should be lowered.

10. Pusher plate adjustment

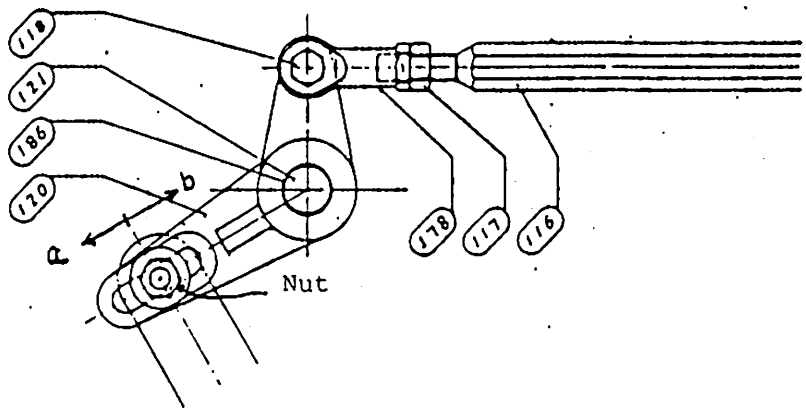
(1) Pushing stroke adjustment



Stroke remaining may cause irregular flow of workpieces.

When the pushing stroke is insufficient as shown above, workpieces do not flow properly.

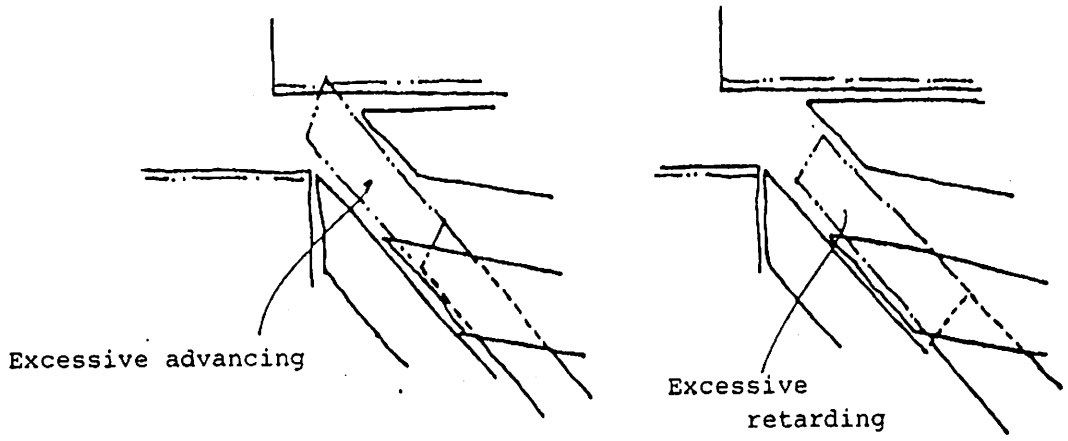
Adjust the stroke as follows:



1) Loosen the hex nut.
2) Shifting the pin in direction (a) increases the stroke. Shifting in direction (b) decreases the stroke.
3) Securely tighten the nut to prevent loosening while the machine is in operation.

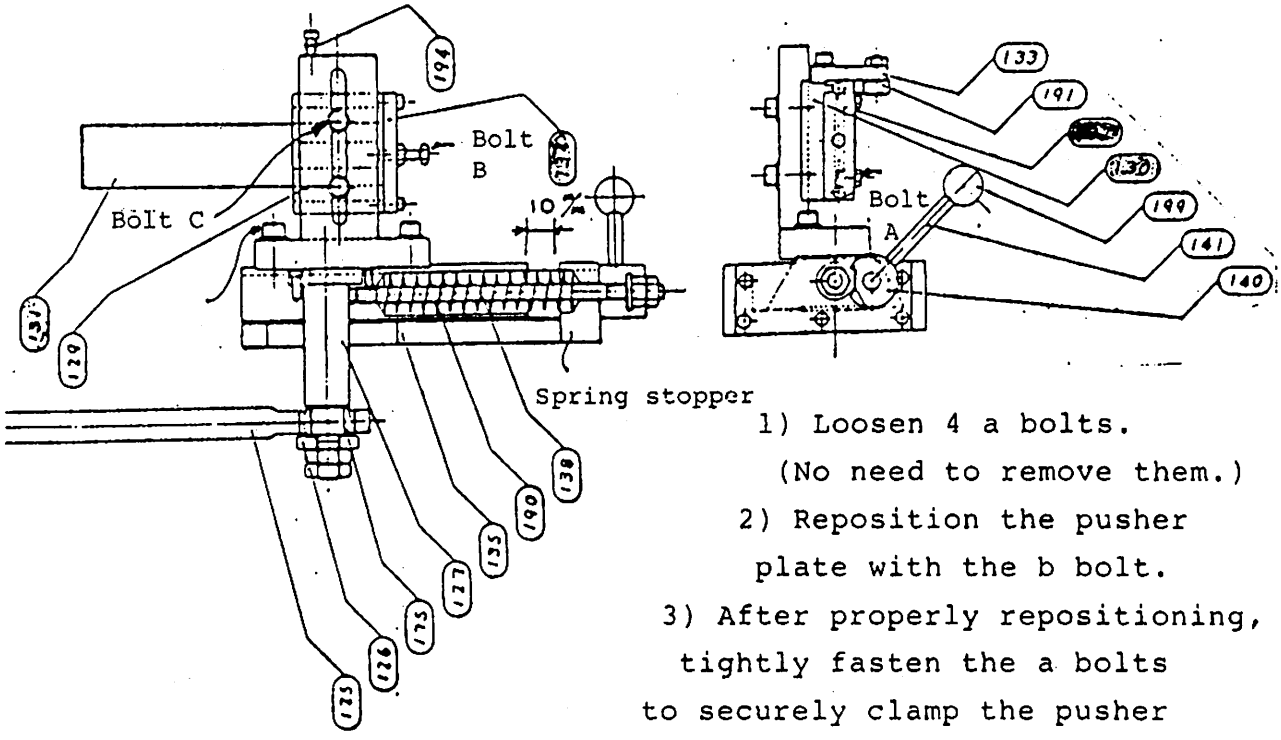
When the nut is not securely tightened even if the stroke is properly adjusted, long operation may make the pin move. This will cause insufficient stroke of the pusher plate.

11. Pusher plate positioning



As shown above, excessive advancing or retarding sometimes results even if the stroke is properly adjusted.
Position the pusher plate as follow:

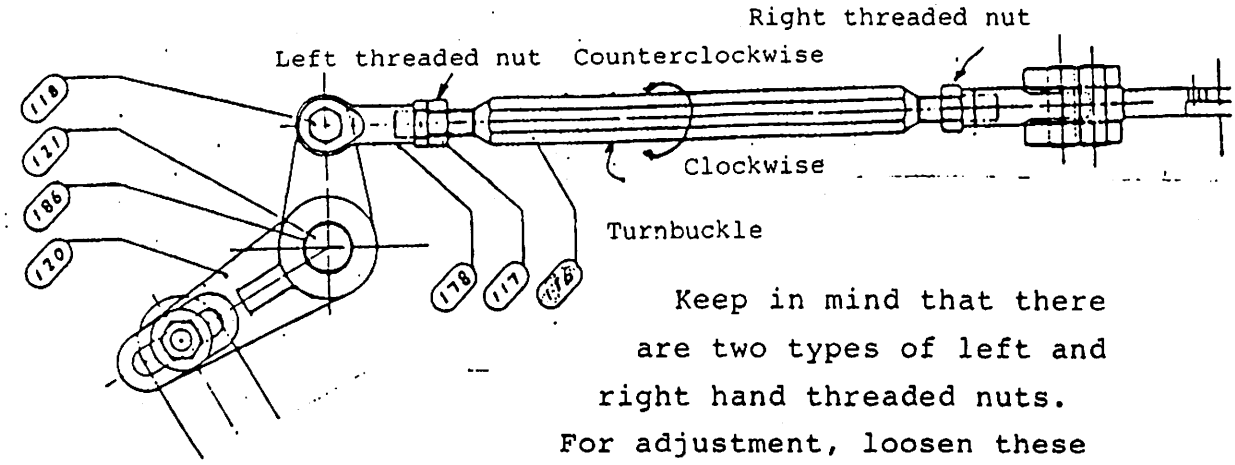
(1) Slight repositioning



1) Loosen 4 a bolts.
(No need to remove them.)
2) Reposition the pusher plate with the b bolt.
3) After properly repositioning, tightly fasten the a bolts to securely clamp the pusher plate with the No. 132 plate.

For removal of the pusher plate, fold the No. 134 plate and pull out the pusher plate toward the b bolt side.
(This procedure is used only for the straight pusher plate.)

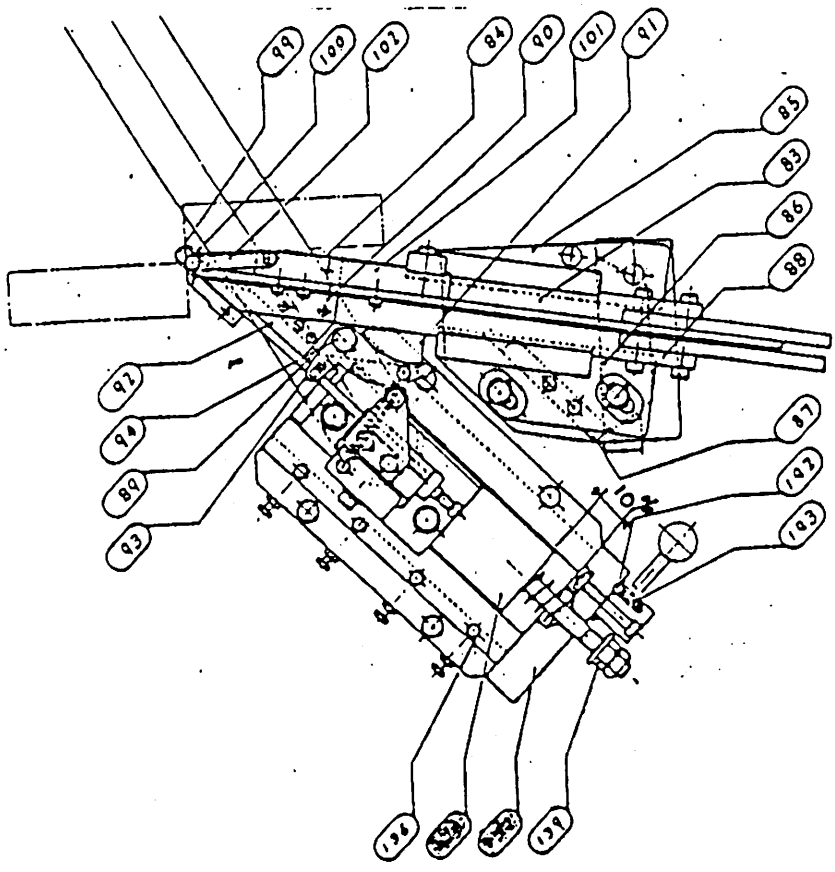
(2) Major repositioning



Keep in mind that there are two types of left and right hand threaded nuts. For adjustment, loosen these nuts and turn the turnbuckle.

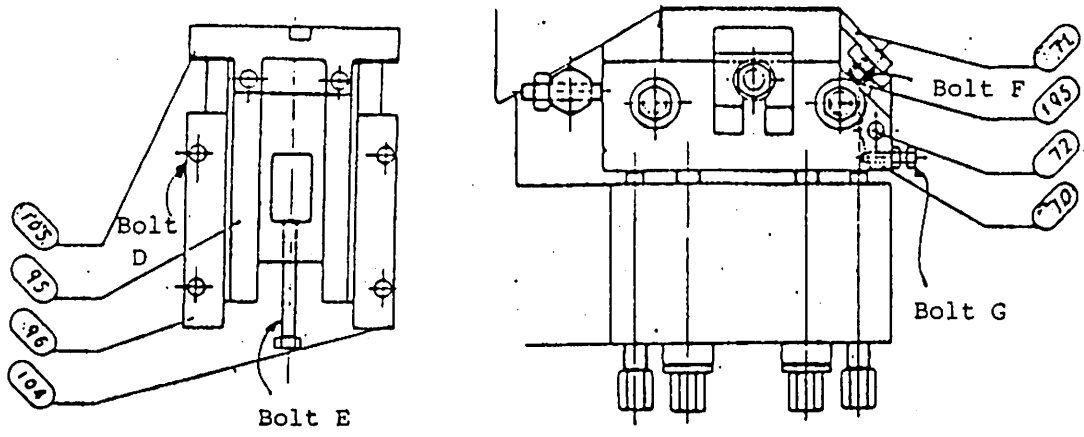
1) Clockwise turning of the turnbuckle moves the pusher plate forward in case of excessive retardation.
2) Counterclockwise turning moves the pusher plate backward in case of excessive advancement.
3) After adjusting, securely fasten the nuts to prevent loosening of the nuts over a long period of operation.

(3) Starter slide positioning



After procedures (1) and (2) are accomplished, the clearance between the No. 128 starter slide and the No. 137 spring stopper should be about 10 mm as shown below when the pusher plate is at the extreme downward position. This has an effect on the compression rate of the spring.

12. Positioning of chute, adjusting plate and pusher plate



(1) Chute

1) Loosen 2 D bolts. (No need to remove the bolts.)

2) Move the No. 105 part up or down with the E bolt.

All chute-related parts are mounted on the No. 105 part.

Do not handle any other parts for adjustment of the chute.

(2) Adjusting plate

1) Loosen the F bolts.

2) Turn the G bolt to adjust the tightness on workpieces.

(3) Pusher plate

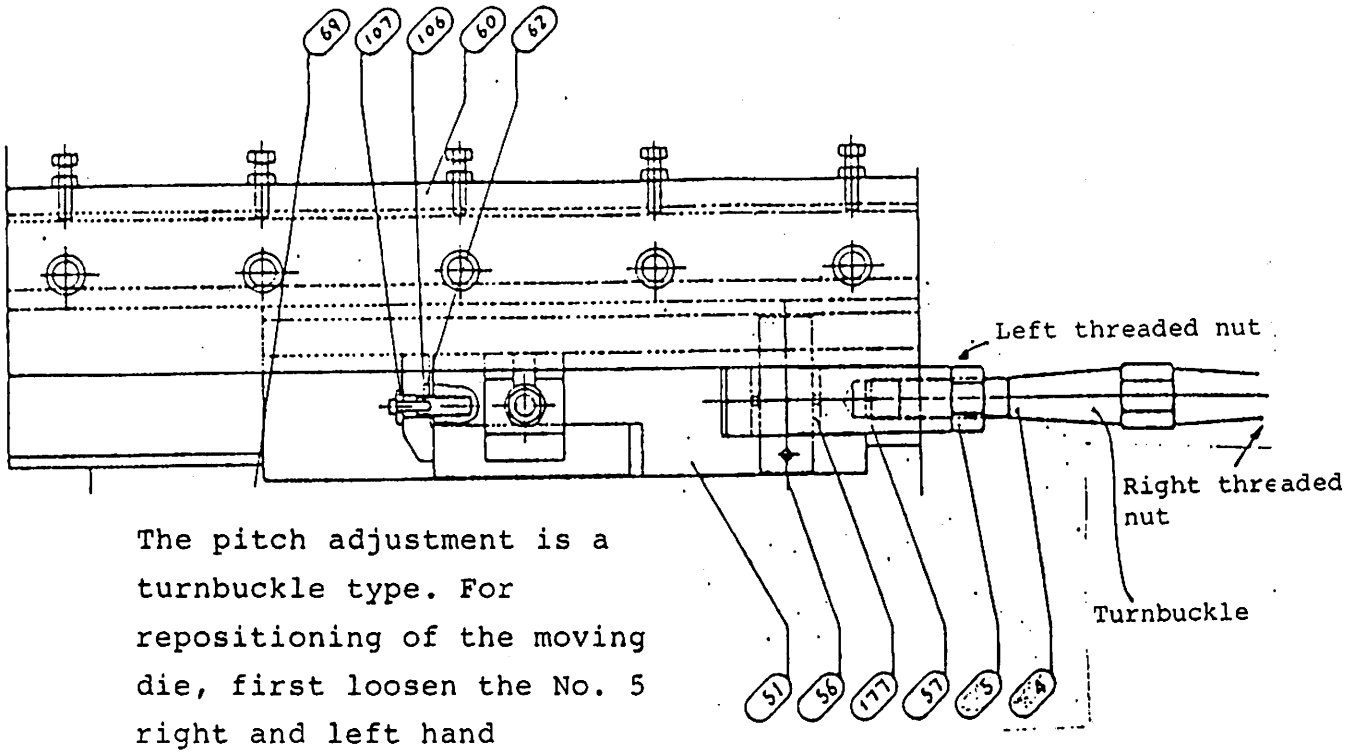
Refer to the illustrations on Page 20.

1) Loosen 2 c bolts. (No need to remove them.)

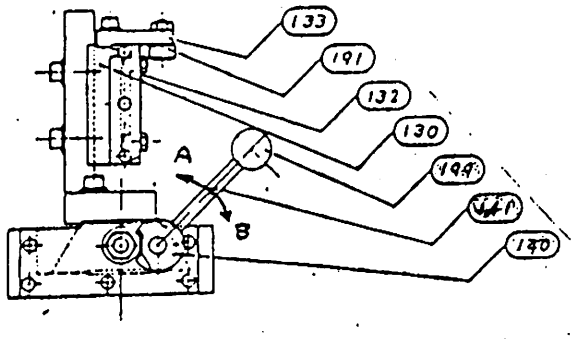
2) Move the No. 130 part up or down.
Since the pusher plate is mounted on the No. 130 plate, other parts are also moved up or down.

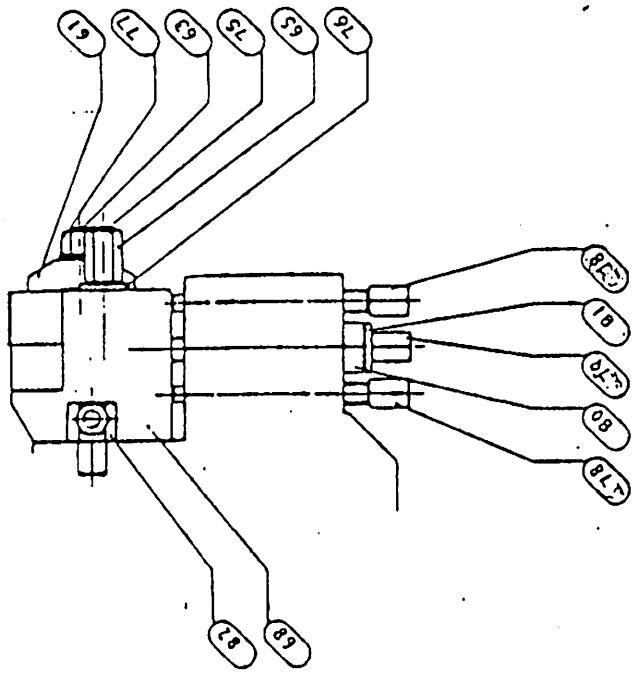
3) The H bolt is provided for right angle adjustment of the pusher plate.

13. Pitch adjustment



The pitch adjustment is a turnbuckle type. For repositioning of the moving die, first loosen the No. 5 right and left hand threaded nuts and turn the No. 4 turnbuckle. The No. 78 bolt is a pushing bolt for the stationary die and the No. 79 is a pulling bolt. These bolts adjust the clearance between the moving and stationary die.

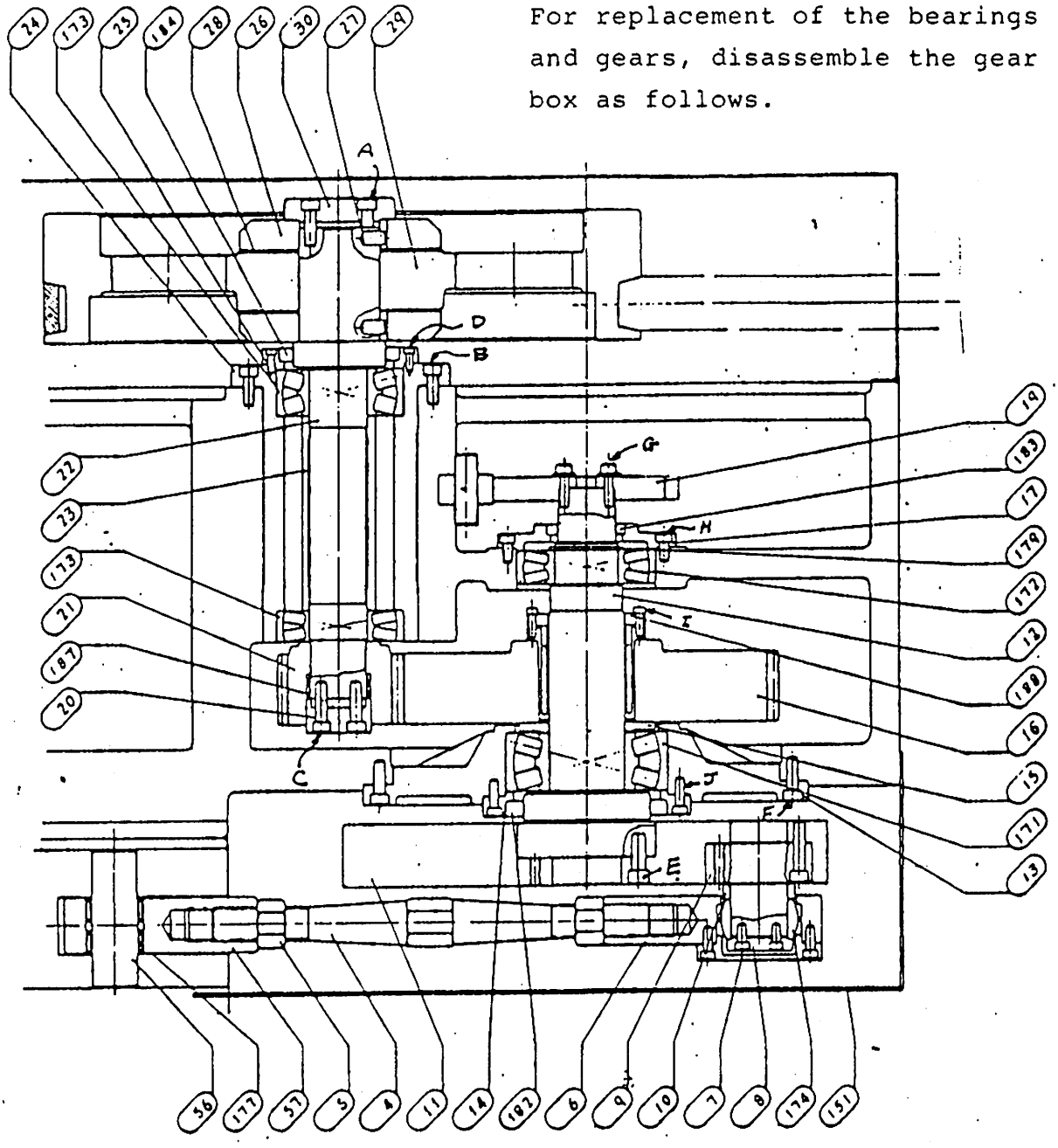




When the No. 140 stopper is turned in direction (B), the pusher plate is slightly moved backward to facilitate removal of a workpiece. Turning the stopper in direction (A) stops threading.

14. Gear box disassembly

For replacement of the bearings and gears, disassemble the gear box as follows.



(1) Disassembly of drive shaft area

1) Remove the belt.
2) Remove the A bolt and remove the No. 30 part.
3) Pull out the No. 26 part.
4) Pull out the No. 27 key pin and remove the No. 28 part.
5) Remove the No. 29 flywheel.
6) Remove the No. 26 and No. 28 parts.

7) Remove the No. 27 pin key as needed.
8) Remove the B bolt.
9) Remove the No. 24 case with the shaft, bearings, drive gears, etc assembled in the case.
When removing, inscribe alignment marks on the frame and case for easier reassembly before removing the B bolt. This is because there is a 1 mm eccentricity between the outer and inner diameter of the No. 24 case.
10) Remove the C bolt and remove the No. 20 part.
11) Apply a blow of a wooden hammer to the circumferece of the gear, and the No. 187 fixing rings and No. 21 drive gear will be removed. This is because the No. 21 drive gear is fixed with the No. 187 fixing rings.
12) Remove the No. 22 shaft from the gear side to the flywheel side.

(2) Main shaft disassembly
1) Stop advancing of the pusher plate with the No. 140 stop cam.
2) Remove the No. 151 safety cover.
3) To prevent the ram from falling, engage the stopper as follows:
Insert an allen wrench into the hole of the stop cap bolt on the bottom liner and place a wooden block as a stopper.
4) Loosen the No. 5 nuts and remove the No. 4 turnbuckle.
5) Remove the E bolt and remove the No. 11 cam plate.
6) Remove the G bolt and remove the No. 19 cam.
7) Remove the H bolt and remove the No. 17 bearing cover.
8) Remove the No. 179 shaft snap ring.
9) Remove the E bolt.
10) Hit the shaft with a hammer from the cam side and remove the shaft with other parts assembled on the shaft.

While this work is carried out, the shaft with the cam plate should be supported with a belt and suspended with a lift, etc.

11) Loosen the I bolt (never remove it) and remove the No. 16 gear.

12) Hit the shaft from the round cam side, and the No. 12 mainshaft will be removed.

For reassembly, reverse the above procedure.

15. Parts list

Transmission and brake section

Part No.	Part name	Remark	Quantity
1	Upper frame		1
2	Lower frame		1
3	Die block base		1
4	Turnbuckle		1
5	Nuts (left- and right-hand threaded)		1 set
6	Connecting end		1
7	Connecting end cover		1
8	Thrust flange		1
9	Crank pin		1
11	Camshaft hub		1
12	Camshaft		1
13	Bearing case		1
14	Bearing cap		1
15	Stopper plate		1
16	Helical gear (large)		1
	6R type 4M 65 teeths	Helix angle 15 degrees	
	10R type 4.5M 68 teeths	Helix angle 20 degrees	
17	Bearing cap		1
18	Stop collar		1
19	Starter cam		1
20	Thrust flange		1
21	Helical gear (small)		1
	6R type 4M 20 teeth	Helix angle 15 degrees	
	10R type 4.5M 21 teeth	Helix angle 20 degrees	
22	Drive shaft		1
23	Distance collar		1
24	Bearing case		1
25	Bearing cap		1
26	Friction plate		2
27	Friction key		2

Part No.	Part name	Remark	Quantity
28	Friction lining		2
29	Flywheel		1
30	Pusher plate		1
31	Brake lining base		1
32	Brake lining		1
33	Base pin		1
34	Brake lever		1
35	Hinge pin		1
36	Joints (left- and right-threaded)		1 set
37	Joint pin		2
38	Brake turnbuckle		1
39	Brake arm		1
40	Spring		1
41	Brake shaft		1
42	Foot pedal		1
43	Main motor mounting base		1
44	Gear oil filler cap		1
45	Distance plate		2
46	Mounting plate		2
151	Hub safety cover		1
152	Flywheel cover		1
171	Bearing	6R #22311	1
		10R #22313	1
172	Bearing	6R #21310	1
		10R #21311	1
173	Bearing	6R #21309	2
		10R #22310	1
		#21310	1
174		6R #7007	2
		10R #7009	2
179	Shaft snap ring	6R #50	1
		10R #55	1
180	Shaft snap ring	6R #28	1
		10R #30	1

Part No.	Part name	Remark	Quantity
182	Oil sealing	6R SB 10012513	1
		10R SB 11014014	1
183	Oil sealing	6R SB 45629	1
		10R SB 50689	1
184	Oil sealing	6R SB 7510013	1
		10R SB 8010513	1
187	Spann ring	6R 42488	2
		10R 485510	2
188	ETP bushing	6R ETP 55	1
		10R ETP 65	1
196	Brake lining		1
201	Main motor	6R 4P 3.7 kW	1
		10R 4P 7.5 kW	1
206	Main motor base	6R RK-50	1
		10R RK-100	1
207	Main pulley	6R PF-216	1
		10R PF-250	1
208	Main belt	6R #2322V No.721	1
		10R #2926V No.906	1

Ram, die holder and chute section

Part No.	Part name	Remark	Quantity
51	Ram		1
53	Ram bottom liner		1
54	Ram rear liner		1
55	Ram top liner		1
56	Ram pin		1
57	Connnecting end		1
58	Frame rear liner		1
59	Frame top liner		1
60	Ram top cover		1
61	Die clamp		2

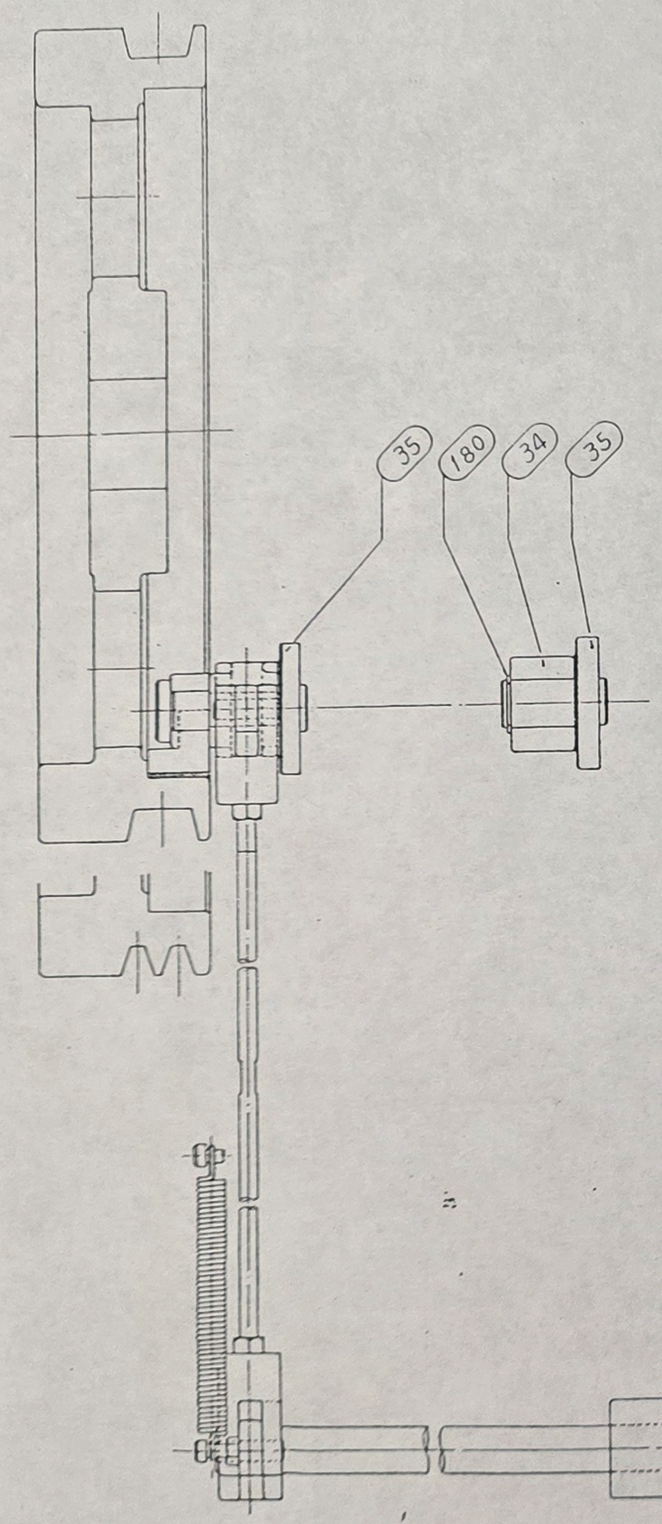
Part No.	Part name	Remark	Quantity
62	Die clamp		1
63	Stud bolt		2
64	Washer		2
65	Hex nut		2
68	Die holder		1
69	Die stopper		1
70	Adjusting plate holder		1
71	Adjusting plate		1
72	Hinge pin		1
75	Stud bolt		2
76	Washer		2
77	Hex nut		3
78	Pushing bolt		4
79	Pulling bolt		2
80	Recess washer		2
81	Projection washer		2
82	Stopper pin		1
83	Stationary chute		1
84	Chute end piece		1
85	Stationary chute support		1
86	Adjusting chute support		1
87	Guide plate		1
88	Adjusting chute		1
89	Workpiece stopper		1
90	Stopper cover		1
91	Stopper cover		1
92	Stopper sub cover		1
93	Stopper cam		1
94	Stopper hinge pin		1
95	Chute adjusting base		1
96	Clamp plate		1
99	Head retainer		1
100	Head retainer plate		1
101	Head retainer holder		1

Part No.	Part name	Remark	Quantity
102	Compression lever		1
103	Liner stopper		1
104	Fastening plate		1
105	Supporter base		1
106	Clamp stud		1
107	Washer		1
160	Oil drain cover		1
161	Liner cover		1
177	Needle bearing	6R #RNA 4905	2
		10R #RNA 49/32R	2
195	Spring		1

Starter section

Part No.	Part name	Remark	Quantity
111	Roller holder		1
112	Holder hinge pin		1
113	Holder support		1
114	Pin		2
116	Turnbuckle		1
117	Hex nuts (left- and right-threaded)		1 set
118	Hex bolt		1
120	Middle lever		1
121	Middle lever shaft		1
122	Thrust washer		1
123	Adjusting bolt		1
124	Washer		1
125	Connecting lever		1
126	Washer		2
127	Slider shaft		1
128	Starter slider		1
129	Bracket		1
130	Holder		1

Part No.	Part name	Remark		Quantity
131	Pusher			1
132	Clamper			1
133	Roller holder			1
134	Stopper plate			1
135	Slider base			1
136	Slide liner			1
137	Spring stopper			1
138	Stud			1
139	Flanged nut			1
140	Starter stopper			1
141	Handle lever			1
175	Spherical bushing	6R	#SA4-20B (SAR type)	2
		10R	#SA4-25B (SAR type)	2
176	Cam roller follower	6R	#NAST17ZZ(SAR type)	1
		10R	#NATV-20 (SAR type)	1
178	Pillow ball rod end	6R	#SFI-16 (SFRI-16)	1
			#SFIL-16(SFRIL-16)	1
		10R	#SFI-20 (SFRI-20)	1
			#SFIL-20(SFRIL-20)	1
181	Bearing nut	6R	#AN06	2
		10R	#AN06	2
185	Oilless bearing	6R	#701-11-3025	2
		10R	#701-11-3530	2
186	Oilless bearing	6R	#701-11-3240	2
		10R	#701-11-3550	2
190	Starter spring	6R	#9-1632-11	1
		10R	#9-2032-11	1
191	Cam follower	6R	#KR16	1
		10R	#KR19	1
192	Steel ball	5/16"		1
194	Extension spring			1
199	Grip ball	M10		1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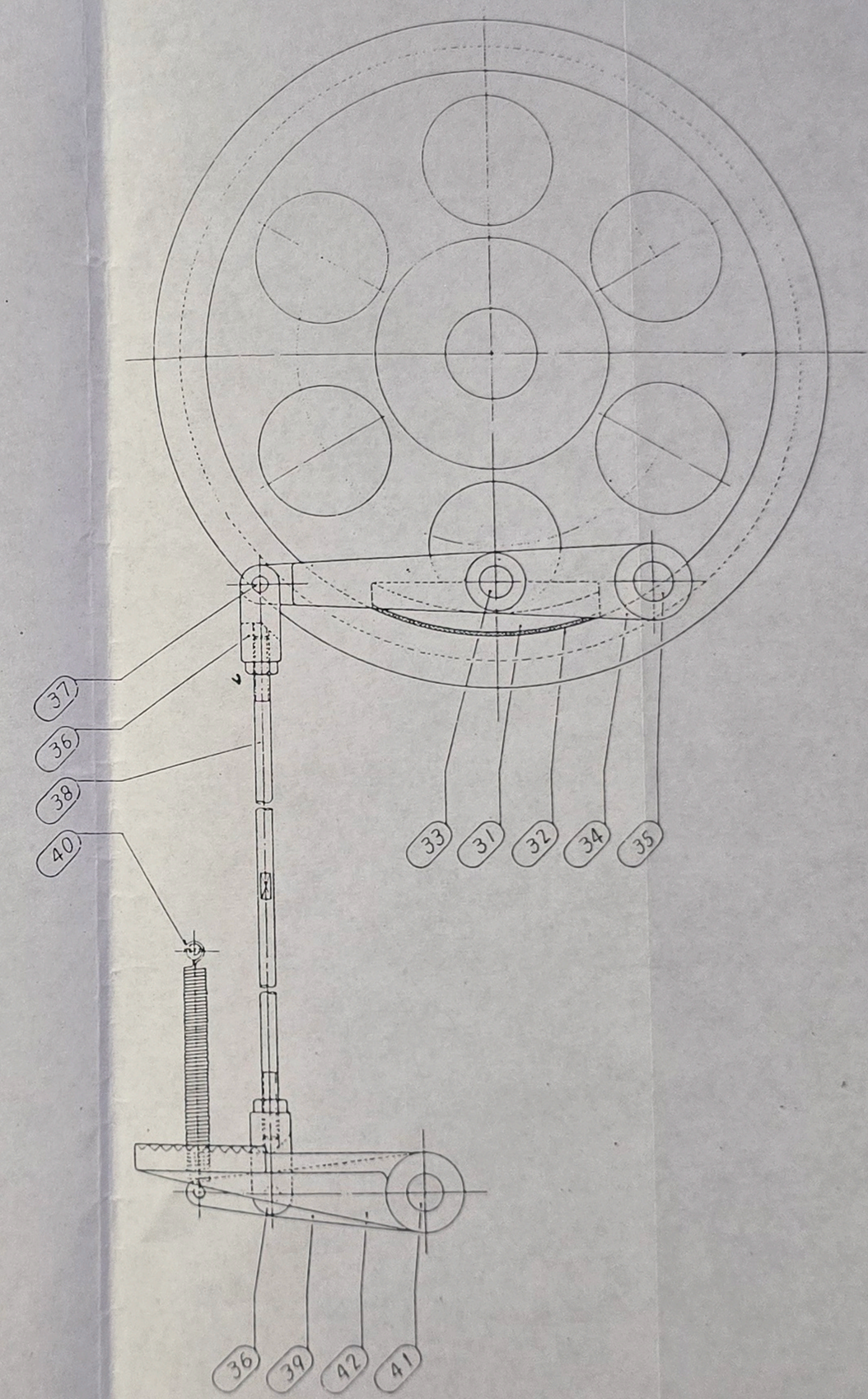
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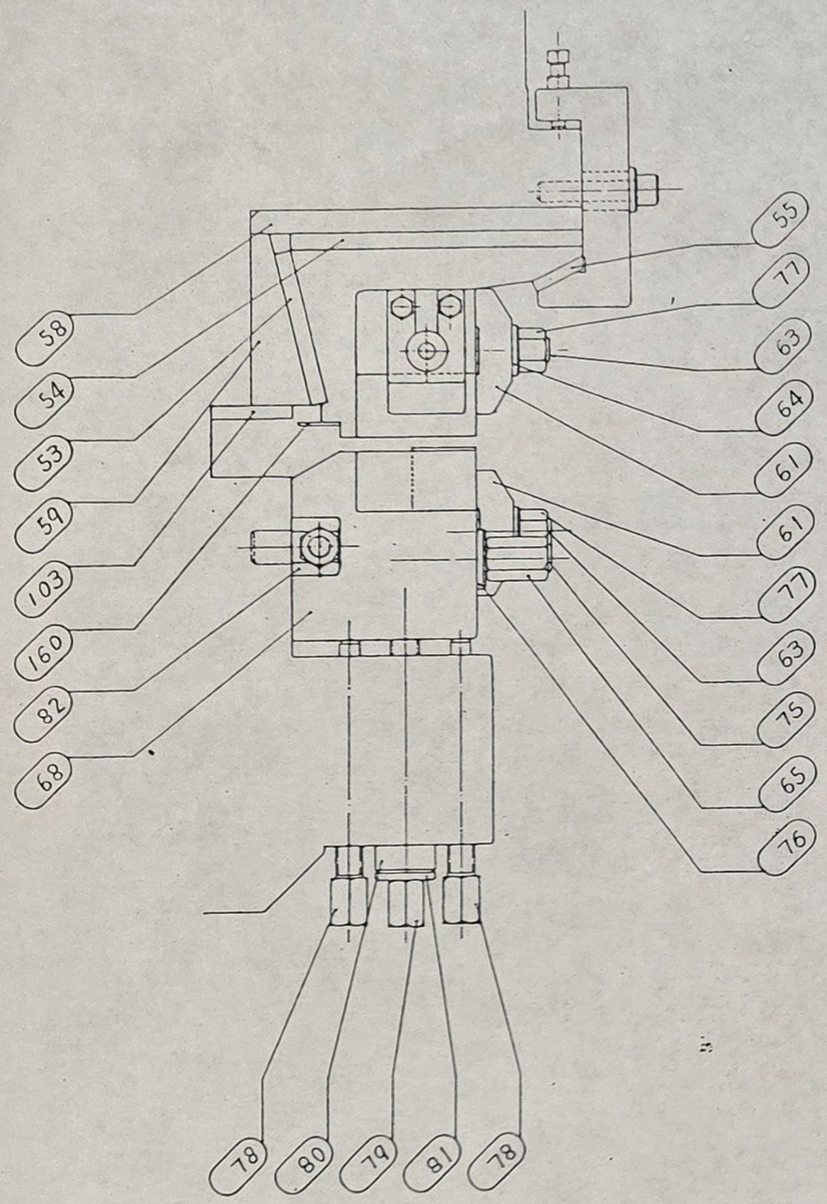
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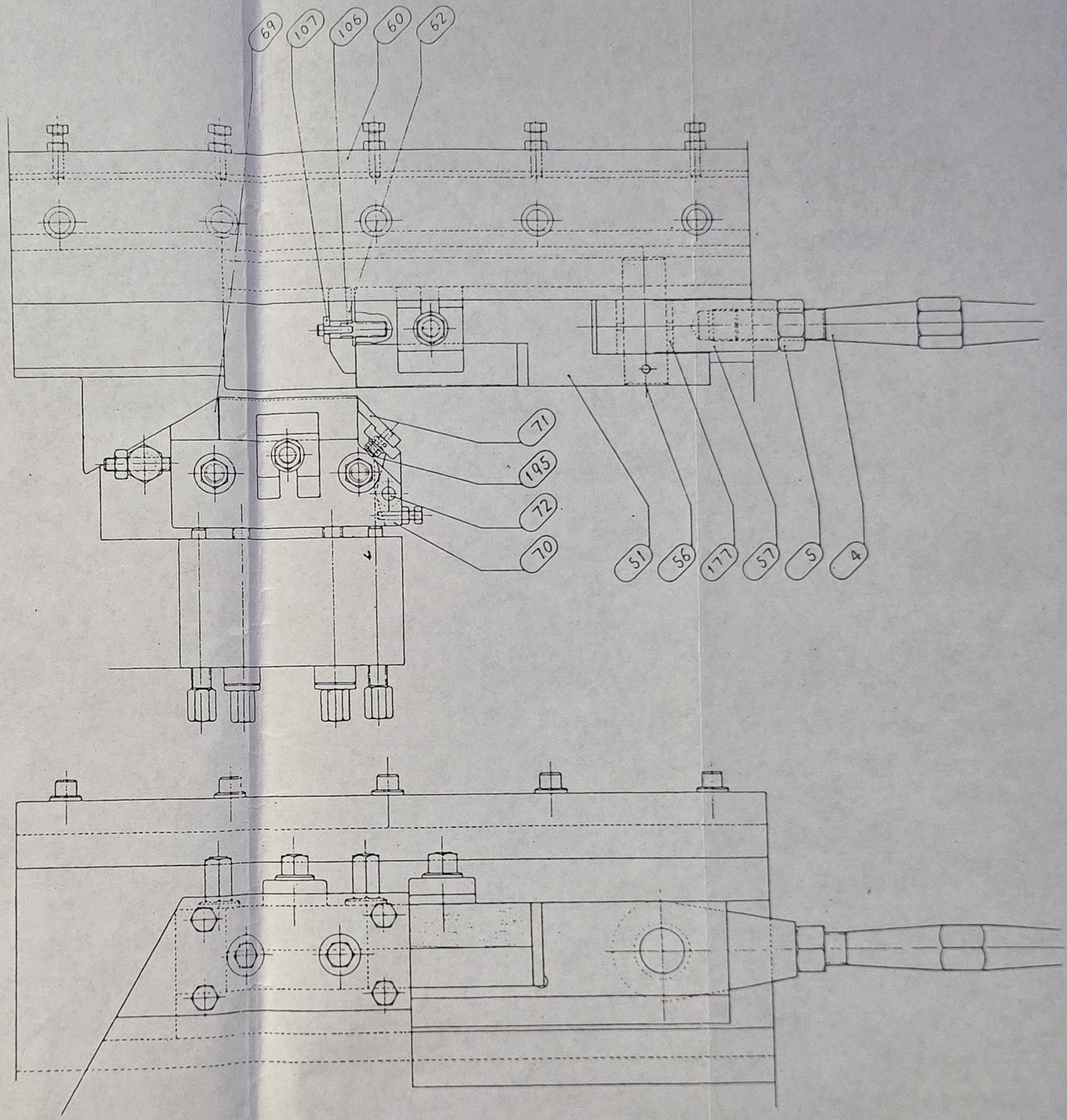
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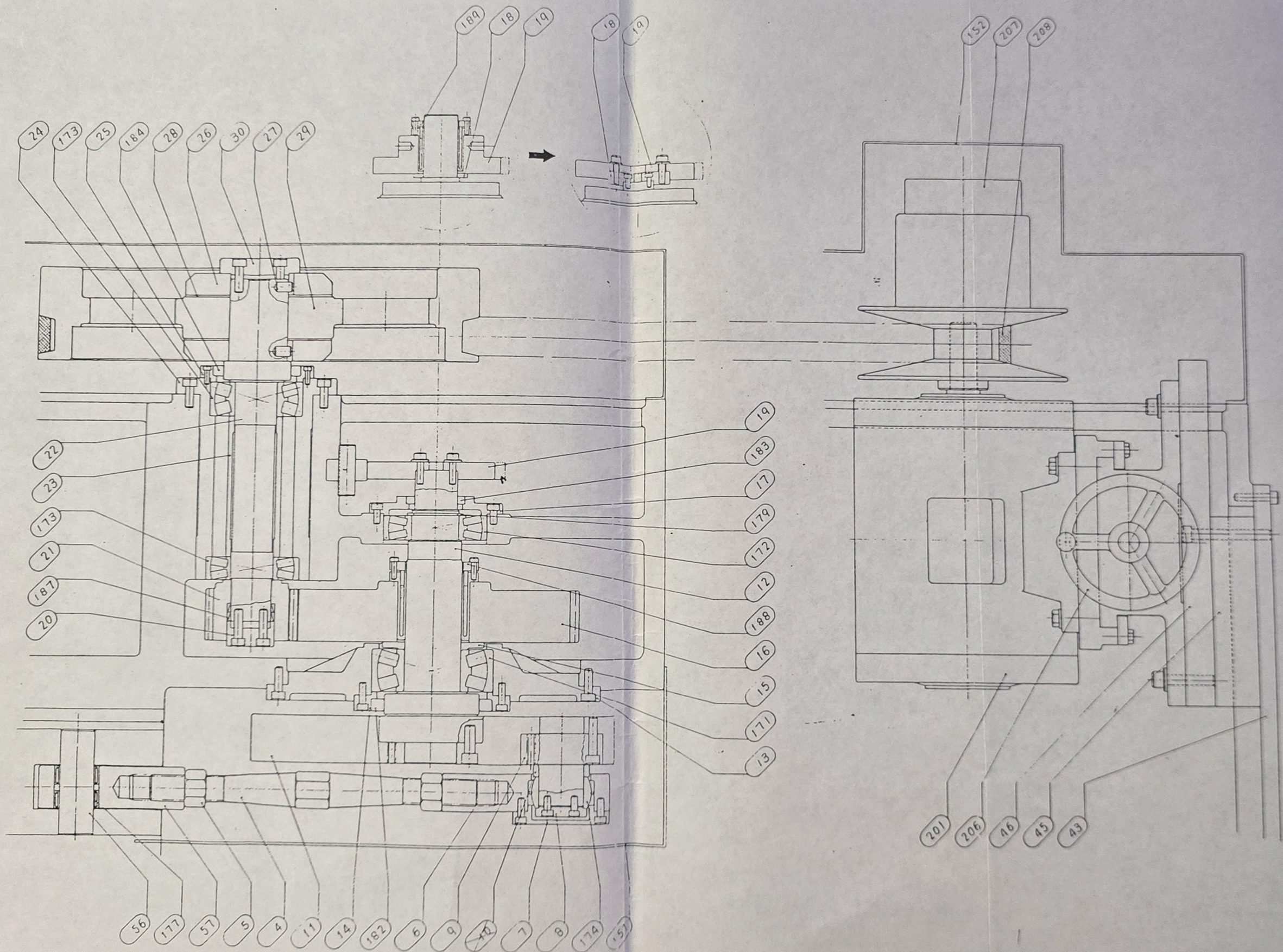
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