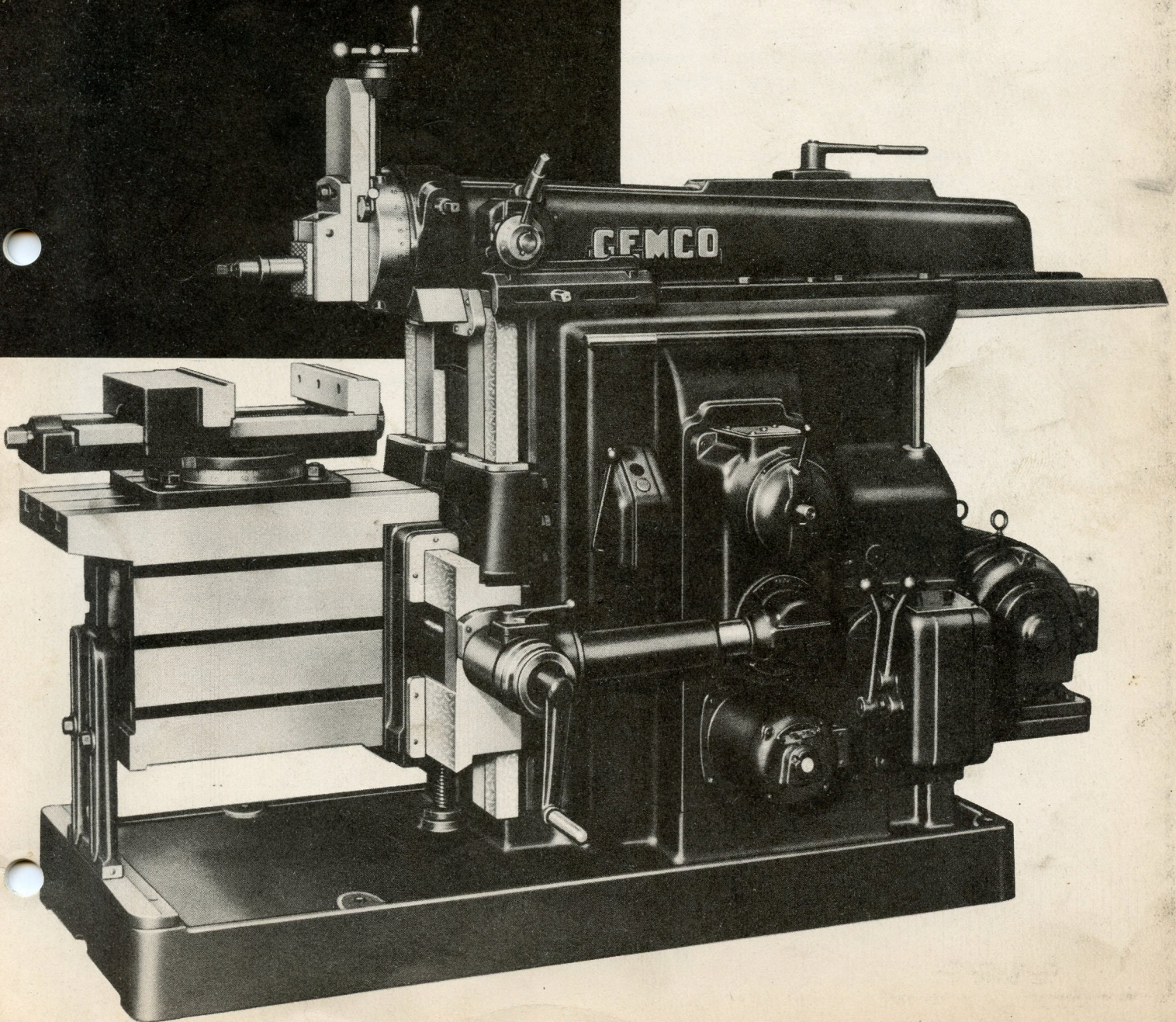


INSTRUCTIONS
FOR OPERATION

OF

GEMCO

SHAPERS



The installation and operation of GEMCO Shapers does not differ very materially from that of similar shaping machines and an experienced operator will quickly understand the functioning of the various mechanisms and devices.

It is with the view, however, of assuring the best possible results, that a number of hints and suggestions are being offered herewith which will be found to be very useful and simple to follow, and will assist materially in obtaining the best results from the successful operation of GEMCO Shapers.

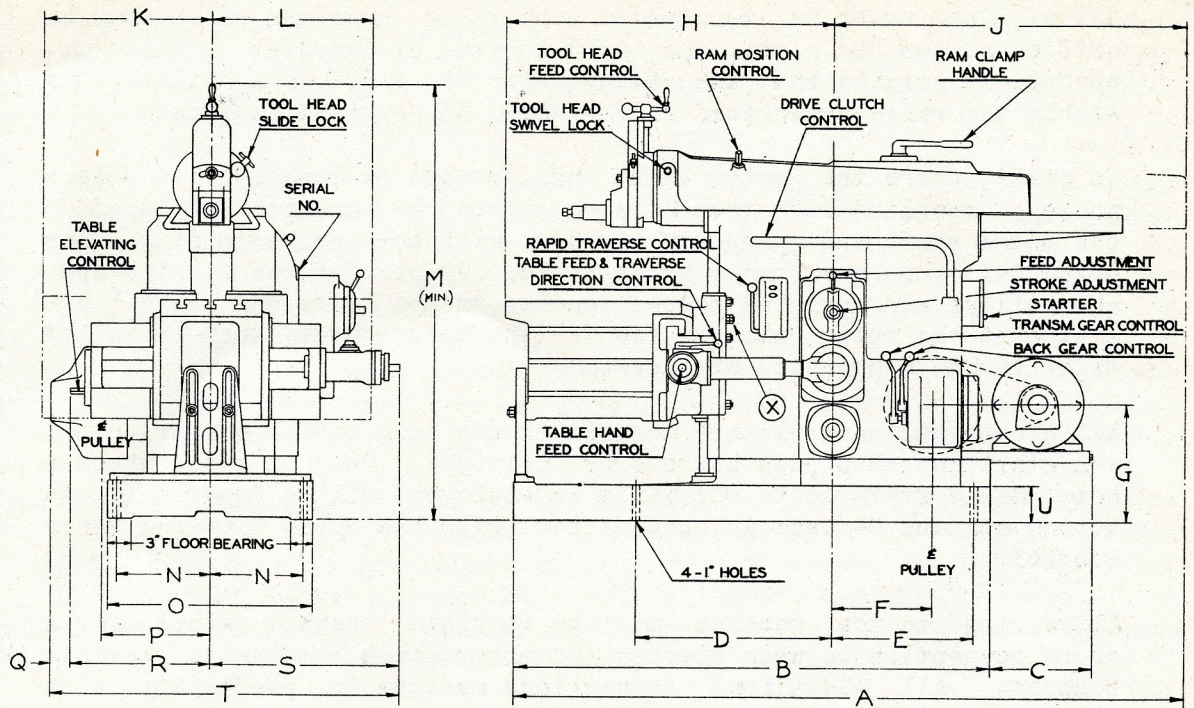
I N S T A L L A T I O N

Remove the coating used for protection of machined surfaces during shipment with kerosene and apply a light film of oil. This should be done before moving the table or other machine elements.

Because of the reciprocating actions of the heavy ram and rocker arm, it is necessary that the shaper be properly leveled and secured to a concrete foundation or substantial wood floor. An accurate level should be used on the table and steel shims should be placed near the bolt holes to assist in leveling the machine. When a table front support is furnished, it should be removed and an indicator attached to the table will facilitate checking alignment of the base as the table is moved horizontally. The table should be moved by hand crank from one side of the crossrail to the other to assure that no binding effect exists at any one point. Be sure that the shims actually support the base at all points before tightening the bolts.

For best results, a concrete foundation is recommended which need not be deeper than 18 inches, but which should cover the entire area under the base of the machine. Provision should be made to insert foundation bolts into the concrete spaced in accordance with the accompanying Installation Diagram, (Fig. 1). A space of about one inch should be allowed between the foundation and shaper base for shims and grouting. After the grouting has sufficiently hardened tighten the foundation bolts.

Although the shaper has been thoroughly run in at the factory, it would be well to start the ram and allow it to operate for a period of time at slow speed to be sure that all parts move freely, and that no distortion developed in securing the base to the foundation.



TYPE OF MACHINE	DRIVE PULLEY SPEED	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U
16" HVY. PLAIN	570	77 $\frac{3}{4}$	57 $\frac{3}{4}$	14	26	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	34 $\frac{3}{8}$	41 $\frac{1}{2}$	22 $\frac{1}{4}$	20	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
* 16" " "	570	72	52	14	26	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	34 $\frac{3}{8}$	41 $\frac{1}{2}$	22 $\frac{1}{4}$	20	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
20" STD. "	570	77 $\frac{7}{8}$	57 $\frac{3}{4}$	14	26	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	38 $\frac{3}{8}$	41 $\frac{5}{8}$	22 $\frac{1}{4}$	20	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
* 20" " "	570	72 $\frac{1}{8}$	52	14	26	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	38 $\frac{3}{8}$	41 $\frac{5}{8}$	22 $\frac{1}{4}$	20	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
20" HVY. "	520	84 $\frac{1}{4}$	57 $\frac{3}{4}$	14	26	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	38 $\frac{3}{8}$	48	22 $\frac{1}{4}$	20	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
* 20" " "	520	78 $\frac{1}{2}$	52	14	26	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	38 $\frac{3}{8}$	48	22 $\frac{1}{4}$	20	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
16" " PROD.	570	78 $\frac{3}{4}$	58 $\frac{3}{4}$	14	26	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	35 $\frac{1}{4}$	41 $\frac{1}{2}$	24 $\frac{1}{4}$	22	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
20" STD. "	570	78 $\frac{3}{4}$	58 $\frac{3}{4}$	14	26	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	38 $\frac{1}{4}$	41 $\frac{1}{2}$	24 $\frac{1}{4}$	22	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
20" HVY. "	520	88 $\frac{3}{4}$	64 $\frac{3}{4}$	14	28	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	41 $\frac{3}{8}$	45 $\frac{1}{2}$	24 $\frac{1}{4}$	22	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
24" STD. "	520	89	64 $\frac{3}{4}$	14	28	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	44 $\frac{3}{8}$	45 $\frac{3}{4}$	24 $\frac{1}{4}$	22	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
16" HVY. UNIV.	570	79	62 $\frac{3}{4}$	14	26	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	38 $\frac{3}{8}$	37 $\frac{3}{4}$	24 $\frac{1}{4}$	22	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
* 16" " "	570	68 $\frac{1}{4}$	52	14	26	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	38 $\frac{3}{8}$	37 $\frac{3}{4}$	24 $\frac{1}{4}$	22	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
20" STD. "	570	80 $\frac{1}{2}$	62 $\frac{3}{4}$	14	26	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	38 $\frac{3}{8}$	39 $\frac{1}{4}$	24 $\frac{1}{4}$	22	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
* 20" " "	570	69 $\frac{3}{4}$	52	14	26	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	38 $\frac{3}{8}$	39 $\frac{1}{4}$	24 $\frac{1}{4}$	22	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
20" HVY. "	520	87 $\frac{1}{4}$	64 $\frac{3}{4}$	14	28	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	40 $\frac{3}{8}$	44	24 $\frac{1}{4}$	22	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5
24" STD. "	520	88 $\frac{3}{4}$	64 $\frac{3}{4}$	14	28	20	13 $\frac{5}{8}$	15 $\frac{3}{8}$	40 $\frac{3}{8}$	45 $\frac{1}{2}$	24 $\frac{1}{4}$	22	56	12 $\frac{1}{2}$	28	14	1 $\frac{1}{2}$	20	26	47 $\frac{1}{2}$	5

* WITHOUT TABLE FRONT SUPPORT.

INSTALLATION DIAGRAM for GEMCO SHAPERS

GENERAL ENGINEERING & MFG. CO. ST. LOUIS MO. U.S.A.

FIG. 1

The majority of shapers are furnished with individual electric motor drive. The motor is mounted on supporting brackets which may be shifted on the bed plate and held to same by T-bolts. This construction permits the use of any motor of N.E.M.A. specifications within the range prescribed in the GEMCO Shaper specifications.

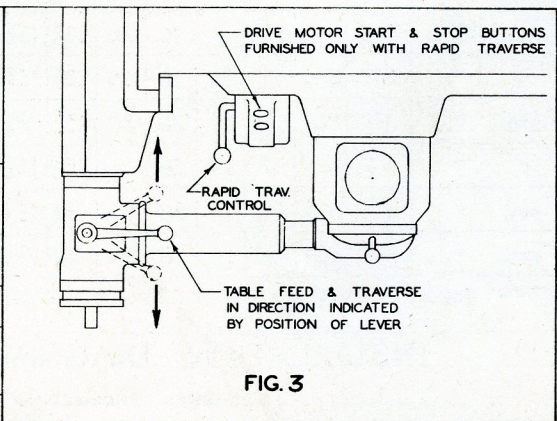
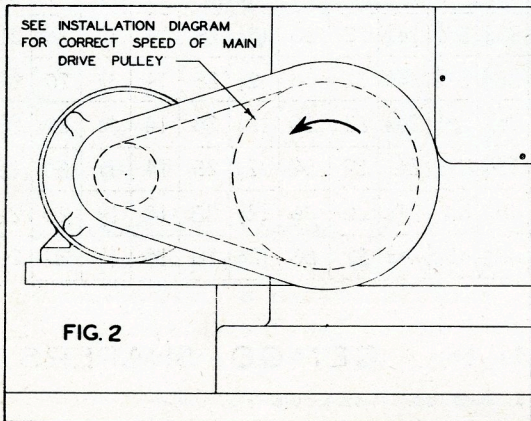
In cases where the motor is to be mounted at location, a V-belt pulley, supplied with the Shaper, should be mounted and keyed on the motor shaft and properly lined up with the corresponding Main Drive Pulley on the Shaper Drive Shaft. By placing the V-belts over the pulleys and applying proper tension to the Belts the initial position of the motor will be found. The Motor should then be bolted tight to the supporting brackets.

All electrical controls are mounted to the back of the shaper column and start and stop push buttons are provided. Only in cases where a Power Rapid Traverse to the Table is employed, will a separate push button station be used in combination with the Rapid Traverse Motor Control.

All wiring on the machine must be in rigid conduit except for a short connection between starter and motor which must be in flexible conduit. All electrical connections must be in conformity with standard regulations of state and local authorities.

Be sure that the driven V-belt pulley will turn counter-clockwise as viewed from the pulley side of the machine. (See Fig.2) If the direction of rotation is incorrect, the Drive Clutch Control Lever cannot be shifted and consequently the machine cannot be started. It is important that the speed of the Drive Pulley be in accordance with that shown in the installation diagram.

The Motor of the Power Rapid Traverse should turn so that the Table will move in the direction indicated by the position of the Feed and Traverse Direction Control Lever. (As indicated in Fig.3) The Rapid Traverse mechanism cannot be damaged as a result of incorrect rotation. If the Table fails to traverse when engaged, the direction of rotation of the Motor should be reversed.



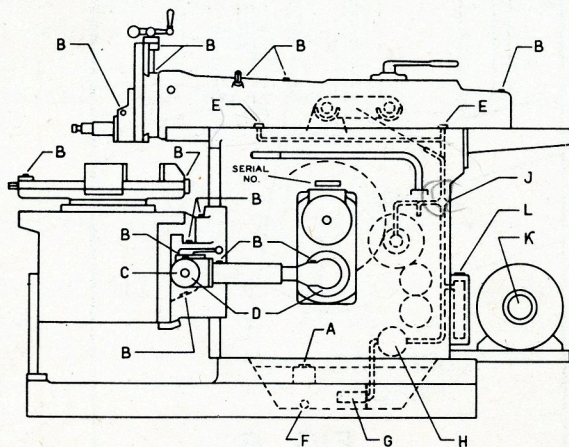
The lubrication system is of a continuously circulating pressure type which serves all bearing surfaces, gears, journals, etc. located within the shaper Column. The system, which is illustrated diagrammatically in Fig. 4, functions automatically and is safeguarded by the LUBRIGARD, which is described in paragraphs following.

Fill the oil reservoir in the base through the filler opening (A), until oil reaches its rim. One filling requires slightly less than five gallons of oil, and it is recommended to use highly refined mineral oil of S.S.U. 500/550 viscosity at 100° F. (S.A.E.30) when normal operating temperature is above 35° F. For sustained operation at lower temperatures, oil of 250/300 viscosity at 100° F. (S.A.E.20) is recommended. If the oil is too light, the pressure may be insufficient to operate the LUBRIGARD. If the oil is too heavy, the pump may be noisy. Do not overfill the Reservoir. At no time should the oil level be above the top surface of the base.

There are also several points on the machine for manual lubrication, where the same lubricating oil should be applied. These are indicated at (B). The Cross Feed Spindle is lubricated by means of a wick filled Reservoir (C) in the Spindle Nut and should be filled with oil weekly. The nut is made accessible through openings in the rear of the Cross Rail, when the Table is moved to the extreme L.H. side of the machine, as shown in Fig. 5.

The Main Drive Pulley drives the Lubricant Pump (H) located above the oil reservoir of the base. The oil passes from the reservoir through a mechanical, automatically cleaned filter, (G), to the pump, and is forced under a pressure of about 35 pounds to the main Lubricant Distributor (J). From there the oil is forced through various copper tubes to all principal sliding surfaces and bearings. The pump remains in operation while the Main Drive Pulley of the machine is rotating. It may be necessary to prime the pump the first time it is started. This is done by removing the pipe plug and filling the suction line located behind the Rocker Arm inside the Column.

All Timken Bearings and Gears are flood lubricated. A jet of oil is pumped against the wick-lined chamber of the Ram Connecting Link and the oil is automatically filtered and conducted to the Link Bearings and journals. Part of the jet is deflected to supply a bath of oil to the crank pin, crank block, and sliding surfaces of the Rocker Arm.



GEMCO SHAPER LUBRICATION

LUBRIGARD PROTECTED

- A - FILL RESERVOIR WITH HIGHLY REFINED MINERAL OIL OF 500 S.U.V. AT 100° F. DRAIN AND CLEAN TWICE A YEAR
- B - FILL OIL CUPS OR GROOVES DAILY WITH SAME OIL
- C - FILL RESERVOIR IN TABLE FEED NUT WEEKLY WITH OIL
- D - APPLY SOFT GREASE TO BEVEL GEARS TWICE A YEAR
- E - LIFT FITTINGS TO INSPECT FLOW OF OIL TO RAM WAYS
- F - RESERVOIR DRAIN PLUG ON OPPOSITE SIDE OF MACHINE
- G - AUTOMATIC SELF CLEANING FILTER. H - LUBRICANT PUMP
- J - LUBRICANT DISTRIBUTOR AND PRESSURE REGULATOR
- K - LUBRICATE MOTOR ACCORDING TO MFGRS. SPECIFICATION
- L - LUBRIGARD - PREVENTS STARTING OF MACHINE WHEN THE SUPPLY OF OIL IN THE RESERVOIR IS INADEQUATE, OR THE PRESSURE IN THE OIL SYSTEM IS INSUFFICIENT.

FIG. 4.

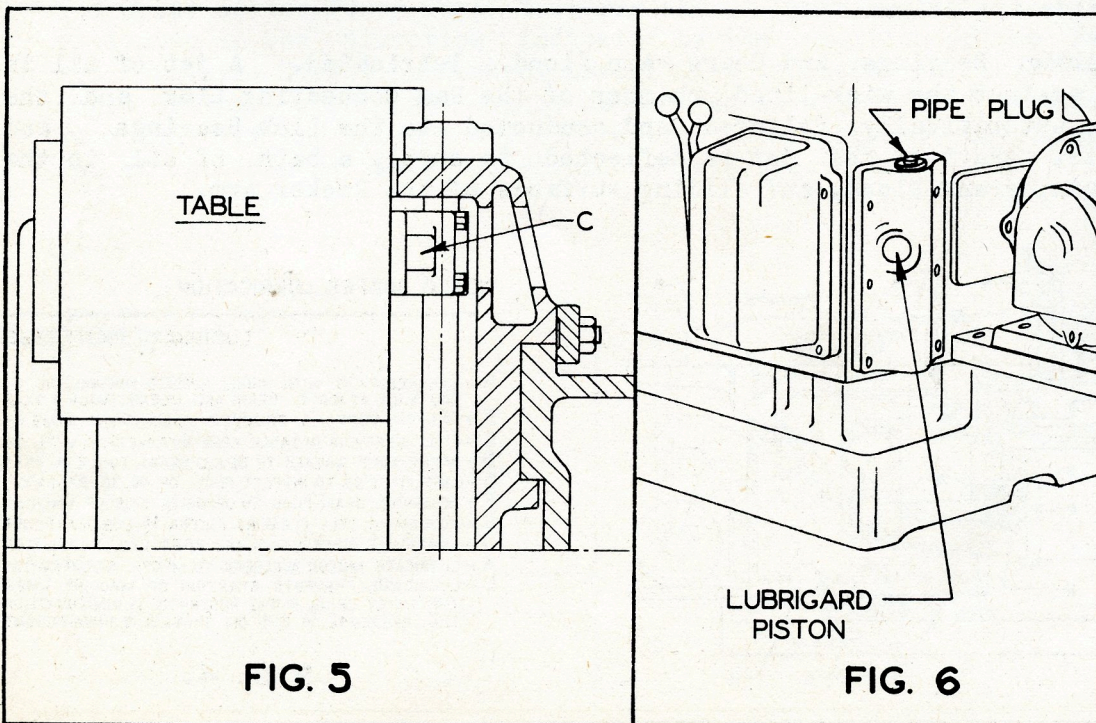
Wick and felt filter pads should be soaked well with oil before the machine is started for the first time or after having been idle for a long period of time. This soaking will accelerate the flow of oil through these filter pads to the various bearing surfaces. This process is best accomplished by allowing the motor to drive the main shaft for a period of time with the Ram standing still.

Oil is forced to four ducts located in the Ram Gibs and flows from there by gravity through filtering felt pads to all ram ways. Special Fittings (E) permit inspection of this continuous flow of oil. Surplus oil flows by gravity to the Feed Unit, Drive Pulley bearings, lower rocker arm bearings and other points, and finally gathers in the oil reservoir to be circulated again.

The mechanical filter, interposed between the reservoir and oil pump, is cleaned automatically and incidental to the movement of the Drive Clutch Control Lever of the machine.

The oil supply in the reservoir should be checked periodically, and cleaned out at least twice a year. Be careful not to damage the filter when cleaning. A Drain Plug (F) on the side of the base permits draining of used oil out of the reservoir. Soft grease should be applied to the Feed Bevel Gears (D) at least twice a year. It will be necessary to remove the housing cover at the Table Feed Direction Control for access to these gears, but those at the Feed Unit Housing may be greased through a slotted opening in the bottom of the cover.

For checking the oil pressure, stop the drive motor, remove the pipe plug shown in Fig. 6, and install a pressure gauge. After checking pressure reading, remove the gauge before operating the machine.



GEMCO Shapers are equipped with the LUBRIGARD, a safety feature, to assure the proper functioning of the Lubricating system while the machine is in operation. The LUBRIGARD Unit (L) is attached to the back of the Column and is in direct connection with the oil pressure system. As long as oil pressure of over 25 pounds is maintained, the LUBRIGARD permits the Ram to be operated at will. A relief valve permits regulation of the oil pressure if needed. This valve is set for correct pressure before the machine leaves the factory. Should the oil pressure in the lubricating system drop below this predetermined point for any reason whatever, the LUBRIGARD will go into action and prevent the Drive Clutch Control Lever from being brought into starting or running position.

Should a deficiency of the oil pressure develop during a cutting operation, the work will not be interrupted until the Drive Clutch Control Lever is shifted into "stop" position. The presence of a sufficient film of oil on all bearing surfaces insures ample lubrication during this short period.

When the Main Drive Pulley is at rest, the LUBRIGARD Piston will be in an upper position, but when the Motor (or Drive Pulley) is started the piston should move downward until a projection of the Drive Clutch Control Lever will pass the recess in the piston. This action may be observed through a sight glass in the LUBRIGARD Housing. If the piston fails to move sufficiently to clear the lever projection, a deficiency exists in the lubrication system, and the machine cannot be started.

The LUBRIGARD will prevent the Ram from being started:

- (1) In case the supply of oil in the Reservoir should be insufficient.
- (2) Should the pressure in the system be below the minimum required.
- (3) Should a leak or failure of the oil pressure system occur.
- (4) Should the filter become clogged.
- (5) Should the direction of rotation of the Drive Pulley be incorrect.

In addition the LUBRIGARD will prevent the Drive Clutch Control from being shifted into "running" position should the motor or Main Drive Pulley of the machine be at rest.

If it should be desirable for any reason to operate the machine or move the Ram by hand, by means of the Drive Pulley, it will be necessary to cause the LUBRIGARD to be ineffective to be able to shift the drive clutch into engagement. This may be accomplished by removing the pipe plug (See Fig.6) in the top of the unit, inserting and depressing the Special Pin (R), provided for this purpose, until the threads on the pin engage the tapped hole.

It is imperative that the pin be removed and the pipe plug reinstalled when the machine is intended to be power driven again.

Should the filter become clogged, and the lubricating system pressure drop as a result, it will be impossible to clean the Filter with the Control Lever until the LUBRIGARD is made ineffective. To clean the filter insert the Special Pin into the LUBRIGARD Unit as previously described, and operate the Drive Clutch Control Lever about 20 times.

After starting the motor allow a few seconds for the pressure in the lubricating system to reach the point where the Lubrigard will allow the machine to be started. To start the Ram, move the Drive Clutch Control Lever away from the machine and return toward the machine to stop.

Various speeds for the Ram may be selected by the Transmission and Back Gear Control Levers. Available speeds and corresponding positions of the levers are indicated on a plate attached to the Gear Shift Housing. It is important that the stroke of the Ram be limited to 4" until the operator becomes familiar with the selection of the Ram Speeds.

The stroke of the Ram may be changed by applying the Special Hand Crank (M) to the stroke adjusting spindle and pushing it toward the machine as it is rotated. Clockwise rotation increases and counter clockwise rotation decreases the length of the stroke, the amount being indicated by a dial. Spring pressure will force the crank out of engagement and allow it to hang idle while the spindle may be revolving. The stroke adjustment is locked automatically.

The position of the Ram may be changed by loosening the Ram Clamp and rotating the Ram Positioning Control Spindle with the Regular Handcrank (N). The Ram Clamp should be tightened before a cut is taken.

The angular position of the Tool Head may be changed by loosening the Tool Head Swivel Lock and rotating the Tool Head to any desired angle, 120 degrees either side of neutral. To clamp the Tool Head, rotate the Swivel Lock Stud clockwise. A Tool Slide Lock is provided to prevent creeping during cutting operations.

The Cross Rail is guided on the column by square vertical guides and has two vertical clamping bars with four clamping studs and one binding stud each. The latter studs (indicated as X in the Installation Diagram) must remain untouched as they serve to keep the Cross-rail in position while the clamping bolts are released for vertical adjustment. The table may be raised or lowered by rotation of the Table Elevating Control Spindle after having loosened the Crossrail Clamping Bars. Be sure to tighten the bars before taking a cut. The Table Front Support should be loosened before making an adjustment in the vertical position of the Table.

The amount of feed to the Table may be selected by means of the Feed Adjustment Lever and is indicated by a dial. The direction of Feed or Traverse for the Table is governed by the position of the Feed and Traverse Direction Control Lever. (See Fig.3)

The Power Rapid Traverse, to the Table may be operated at any time regardless of whether the main drive motor or pulley may be rotating.

The ram is held in position by V type gibs. The gib at the R.H. side of the ram is in a fixed position, whereas the gib on the other side may be adjusted by horizontal pressure studs with lock nuts to compensate for wear. (See Fig. 7)

Adjustment for wear of the tool head slide is obtained by a single tapered gib with two adjusting screws. Loosen the lower and tighten the upper screw to take up for wear. (See Fig. 8)

Adjustment for wear of the Table Lower Gib is accomplished by loosening the socket cap screws and tightening the adjacent set screws. The Table Lower Gib is adjusted by loosening the four retaining cap screws and tightening the two set screws at the extremities of the gib. (See Fig.9)

A Twin Disc Clutch is mounted at the outer end of the Main Drive Shaft of the machine. If it becomes necessary to compensate for wear of the friction discs, adjustment is made by withdrawing the Locking Pin of the Clutch Spider Plate, and turning same slightly clockwise and inserting the pin in one of the many holes of the Plate. (See Fig. 10)

Brake wear should be negligible and adjustment should not be necessary for some time. Adjustment is obtained by removing shims between the Brake Cone and the Shifting Collar on the Main Drive Shaft. Access to this part is had by removing the Transmission Gear Shift Mechanism Housing. This is accomplished by removal of five cap screws and disconnecting the Connecting Link between the Back Gear Control Lever and the Back Gear Control Rod inside the Housing. It will then be necessary to remove the Brake Cup and the Clutch Cone Member on the opposite sides of the machine to be able to withdraw the Brake Cone Assembly. Do not disturb the castellated nut. Disconnect the Brake Cone and Clutch Shift Collar and remove the two shims clamped between these parts. (See Fig.11).

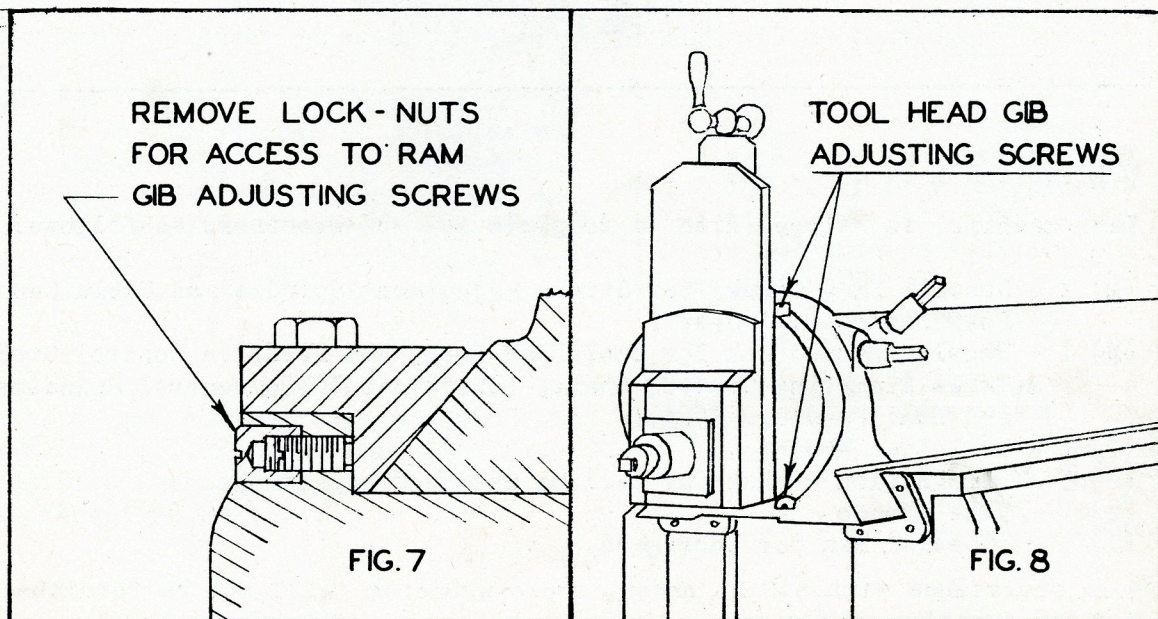


FIG. 9

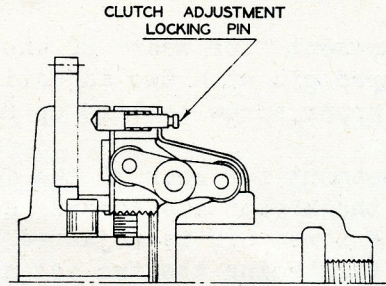
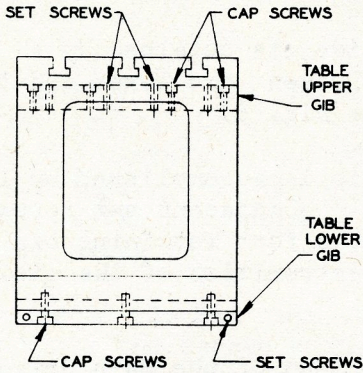


FIG. 10

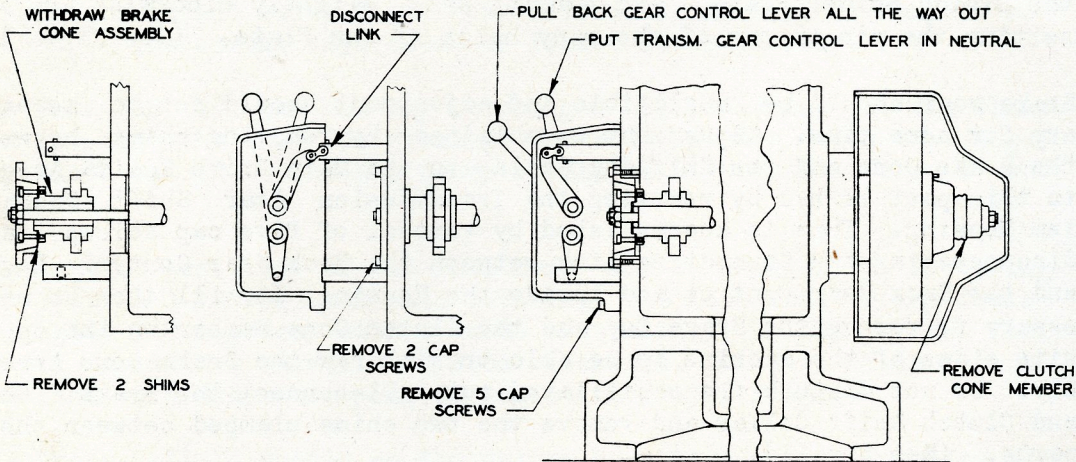


FIG. 11

WRENCHES

Each machine is shipped with a complete set of wrenches, as follows:

- (M) 1 - Special Hand Crank for Stroke Adjustment Spindle and Table Hand Feed Control Spindle.
- (N) 1 - Regular Hand Crank for Tool Head Lock, Ram Position Control Stud, Table Elevating Control Shaft, Universal Table Control Spindles, and Down Feed Cam Stud.
- * (O) 1 - Tool Post Wrench.
- * (P) 1 - Combination wrench for various nuts and cap screws.
- (Q) 1 - Vise wrench.
- (R) 1 - Special Pin for Lubrigard.

* In accordance with W.P.B. order, these wrenches will not be furnished for the duration of the war.

The Power Rapid Traverse mechanism, when furnished, will be built into the machine. A special push button station is mounted near the front of the machine and the push button circuit is connected to the main drive motor starter. The contacts of the Rapid Traverse Control Lever are connected to the starter of the Rapid Traverse Motor. All control wires are run through a single conduit.

The direction of traverse for the table is identical with the automatic feed and is indicated by the position of the Feed and Traverse Direction Control Lever. (See Fig.3)

Rapid Traverse to the Table is always available to the operator regardless of whether the Main Drive Pulley is rotating. No lubrication for the mechanism is required other than that which has been described for the entire machine. The Motor should be lubricated according to the manufacturer's recommendations.

P O W E R D O W N F E E D

The Power Down Feed Mechanism, when furnished, will be built into the machine. The amount of feed may be selected by the Down Feed Control Lever and is indicated by a dial. (See Fig.12.) It will be necessary to move the Control Lever to zero position to be able to raise the tool head slide with the Tool Head Feed Control.

The Feed Cam Member is secured to the shaper column by a single square head stud proportioned to receive the Regular Hand Crank (N). After the ram adjustments have been determined for a setup, the cam should be positioned on the column so that the Feed Lever Lug will ride all the way up the Primary Cam Surface.

If the cam member is advanced too far forward the Feed Lever Lug will engage the Secondary Cam and the Lever will be latched in an inoperative position. When this occurs, reset the Cam Member properly and release the Feed Lever by withdrawing the Knurled Latch Pin. Be sure that the Feed Lever is never released when it is in back of the Feed Cam.

When the Down Feed mechanism is not in use, it may be desirable to place the Feed Lever Lug in this inoperative position to avoid contact with the cam and resultant clicking. This may be accomplished by lifting the Feed Lever Lug until it becomes latched.

There are several points (B) on the unit for manual lubrication where lubricating oil, of the type previously specified for general use on the machine, should be applied.

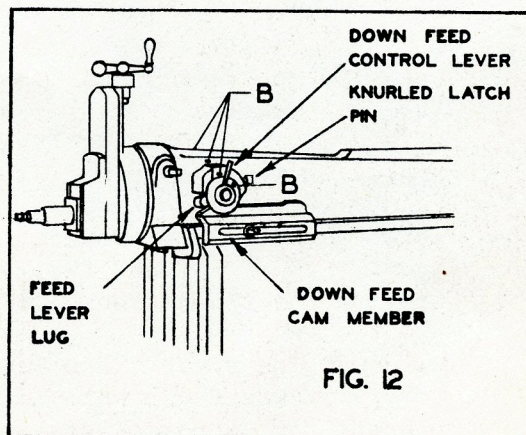


FIG. 12

UNIVERSAL SHAPERS . . .

Always mention the serial number in correspondence relative to your machine, particularly when ordering replacement parts. The Shaper Serial Number is stamped on the column just above the stroke indicator dial, as shown in the Installation Diagram.

With the exception of the elements effected by the universal type table and the table itself, Universal Shapers are similar to other types of shapers and the same general instructions and recommendations should apply.

The various controls and clamps are pointed out in the illustration below.

- A—Swivel Control
- B—Swivel Clamp Studs
- C—Tilting Top Control
- D—Tilting Top Clamp Studs
- E—Table Front Support Studs

