

Wadkin

OPERATING AND MAINTENANCE INSTRUCTION BOOK

PNEUMATICALLY OPERATED CHAIN OR CHISEL MORTISER TYPE MT

INSTRUCTION BOOK No. 1081

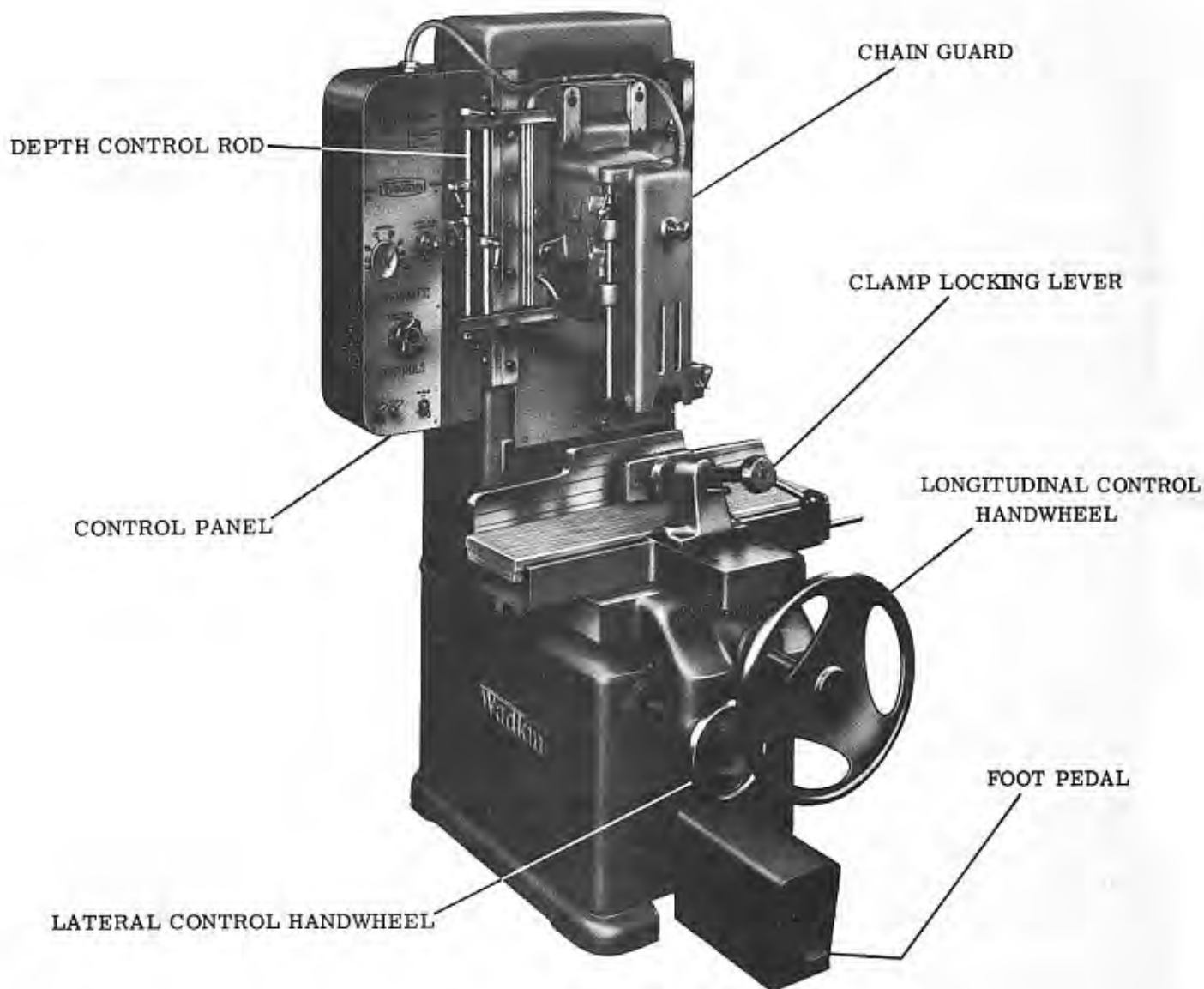
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IT IS DESIRABLE THAT THIS BOOK BE GIVEN TO THE OPERATOR OF THE MACHINE

USER PLEASE INSERT SERIAL
NUMBER OF MACHINE

MODIFICATIONS ARE MADE TO THESE BOOKS FROM TIME TO TIME
AND IT IS IMPORTANT THEREFORE THAT ONLY THE BOOK SENT
WITH THE MACHINE SHOULD BE USED AS A WORKING MANUAL

PNEUMATICALLY OPERATED CHAIN OR CHISEL MORTISER (TYPE MT)



SPECIFICATION

Will take timber up to	12" x 9"	280 x 200mm
Maximum size of mortise using chain	1 1/4" x 3" x 6" deep	30 x 75 x 150mm
Maximum size of square chisel in softwood	1"	25mm
Maximum size of square chisel in hardwood	3/4"	19mm
Horsepower of motor	5	5
Speed of motor - 50 cycles	3,000 rpm	3,000 rpm
60 cycles	3,600 rpm	3,600 rpm
Size of table	27" x 6"	685 x 150 mm
Height of table from floor	33"	840mm
Longitudinal movement of table	23"	585mm
Lateral movement of table	4"	100mm
Floor space	80" x 46"	2030 x 1170 mm
Maximum working air pressure	80lb. /sq. in.	5,6 kg. /cm ²
Approx. net weight	1,230 lb.	560 kg
Approx. gross weight	1,460 lb	660 kg
Approx. shipping dimensions	74 cu. ft.	2,09 m. ³
Air required	20-25 cu. ft. /min.	056-070 cu. m. /min.

Installation

Remove protective coating from all bright parts by applying a cloth soaked in paraffin, turpentine or other solvent.

Wiring Details

The motor and control gear have been wired in before despatch, all that is required is to connect the power supply to the starter or isolator when fitted.

Points to note when connecting to the power supply:-

1. Check that the voltage, phase and frequency correspond to those on the motor plate, also the correct coils and heaters are fitted to the starter.
2. It is important that the correct size of cable is used to give the correct voltage at the starter. Too light a cable will give a voltage drop at the starter and may damage the motor.
3. Check the main line fuses are of the correct capacity. See list below. When an isolator is fitted, the fuses are of the correct capacity as received.
4. Connect the line leads to the appropriate terminals. See Fig. 2 for 3phase supply.
5. Check all connections are sound.
6. Check the rotation of the motor for the correct direction. If this is incorrect, reverse any two of the line lead connections for 3phase supply.

Voltage	Phase	HP	S, W, G, Tinned Copper Wire	Fuse Rating Amps
220	3	5	17	65
380/420	3	5	22	24
550	3	5	23	20

Lubrication See Fig. 3.

It is advisable to keep all bright parts covered with a thin film of oil to prevent rusting.

TYPE OF OIL RECOMMENDED

POWER EM 125

TYPE OF GREASE RECOMMENDED

SHELL ALVANIA 3

Foundation

See Fig. 4 for bolt positions and clearances required. When installing the machine, level the table by packing under the base.

Foundation bolts are not supplied with the machine except by special order.

Mortising, How to Set Chisel

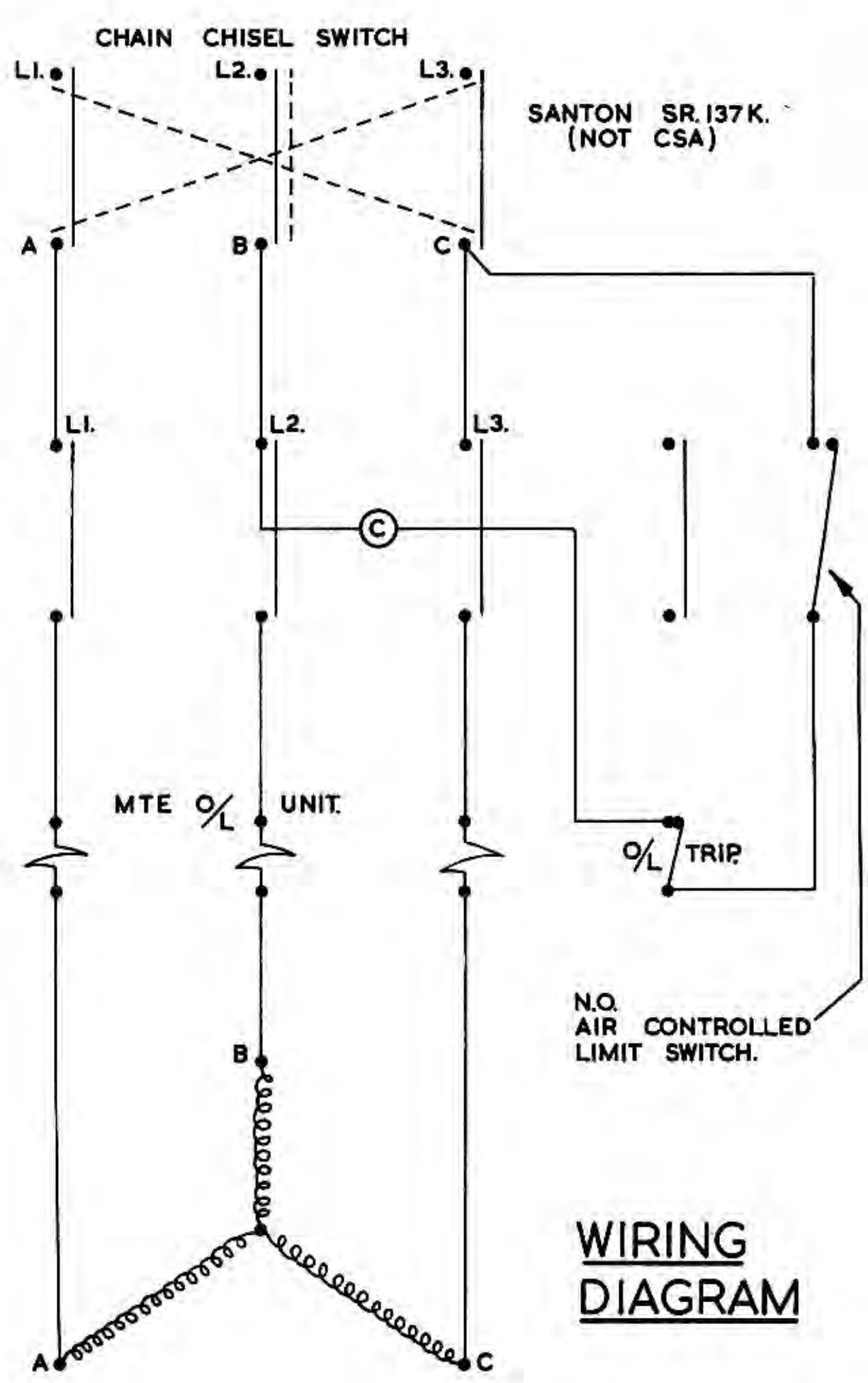
The lips or spurs of the bit should not be allowed to touch the cutting edge of the chisel but should be set $1/16''$ (1.6mm) below the chisel points, as shown in Fig. 5 so that the bit cuts before the chisel.

The bit is held in the machine spindle by means of the hollow set screw "A" in Fig. 6. The bore of the spindle is $\frac{1}{2}''$ (12.7mm) and the machine is supplied with bushes so that all sizes of bits can be fitted up to the maximum size required for 1" (25.4mm) square chisel.

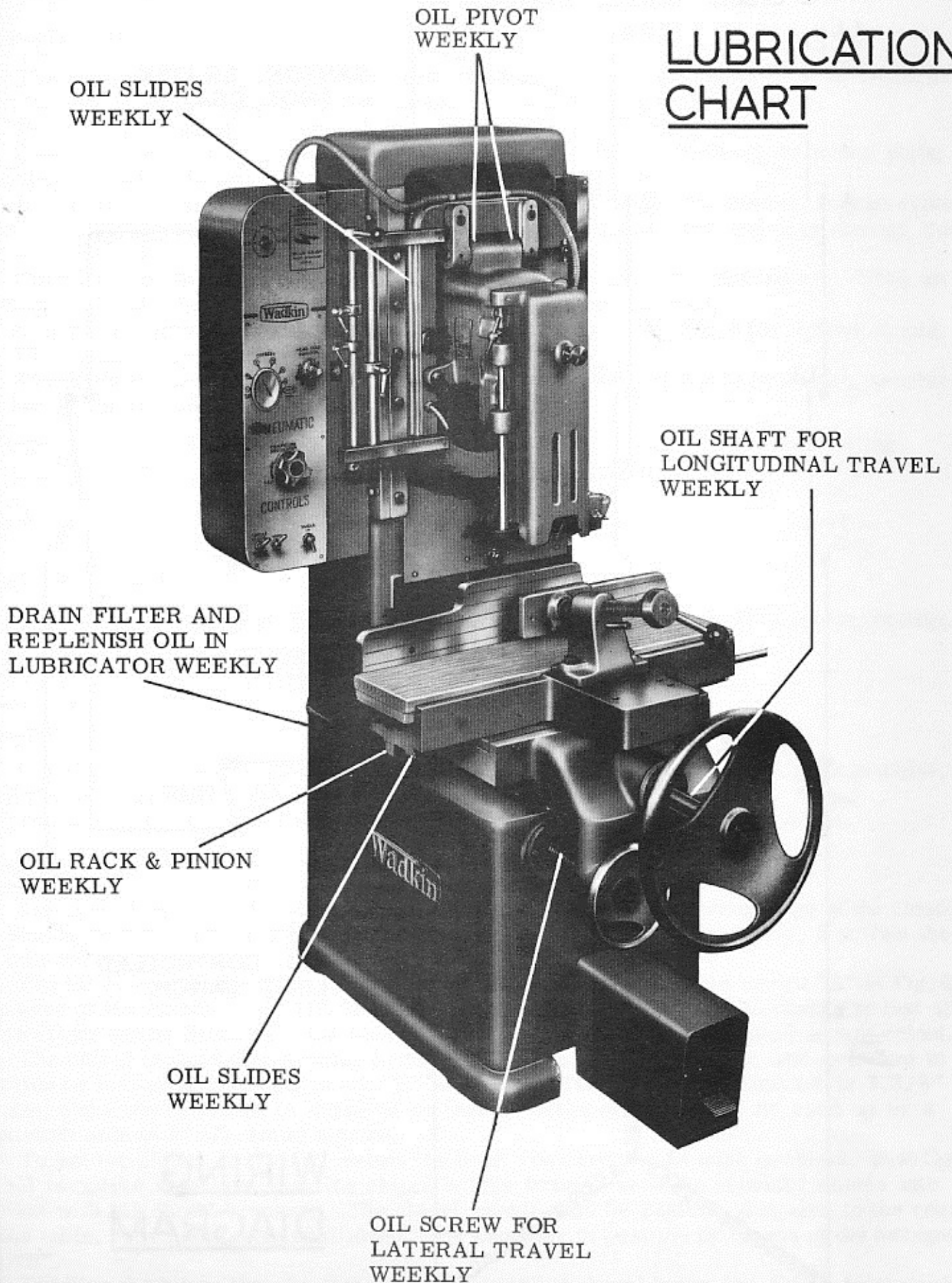
The chisel is held in a special bracket below the machine spindle and is locked in position by means of the hexagon nut "B" in Fig. 6. The bore of the bracket is $1.3/8''$ (35mm) and a set of bushes is supplied so that all sizes of chisel can be used up to a maximum size of 1" (25.4mm) square.

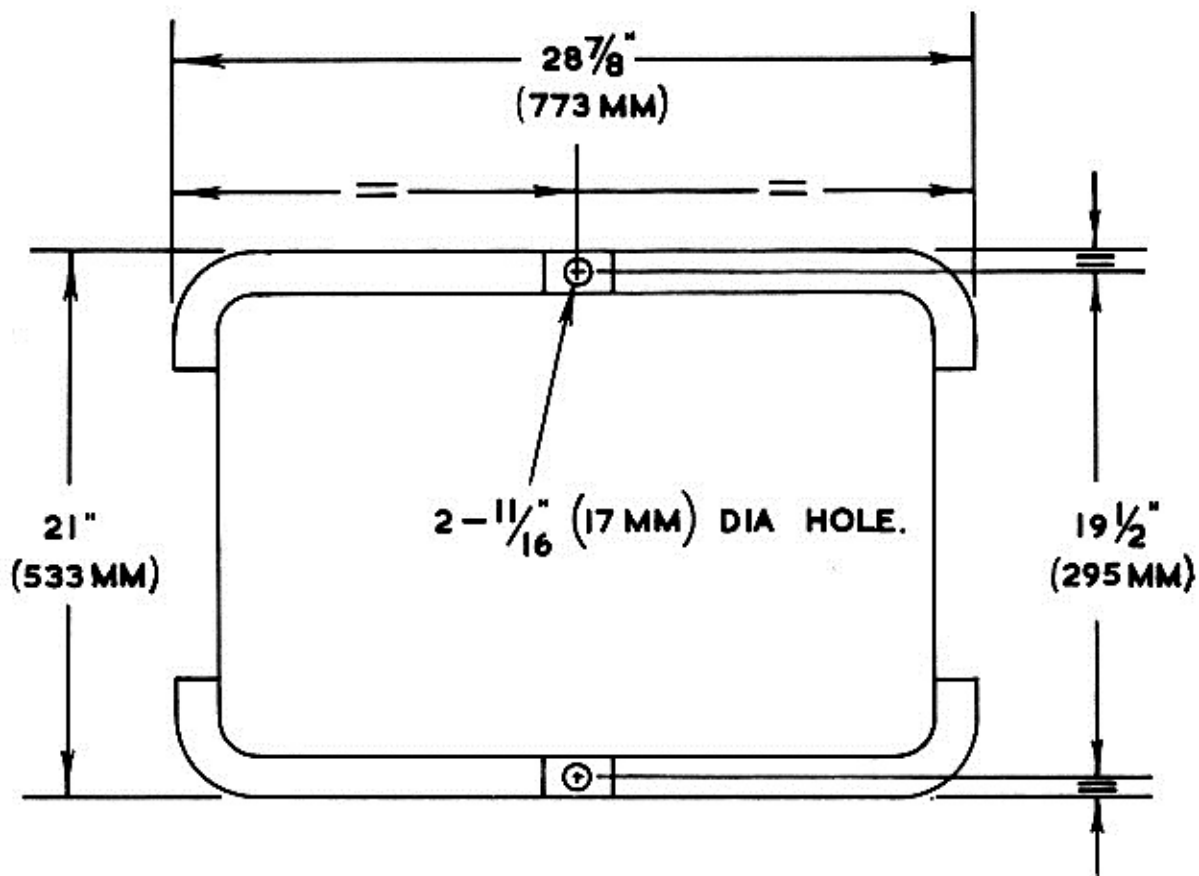
To set the chisel correctly, select the bush required and fit bush to chisel, push the chisel complete with bush into the chisel holder bracket until the shoulder comes into contact with the chisel bracket. The chisel should also be positioned square to the rear of the table. When correctly positioned, lock securely in position by means of the hexagon nut "B".

Position the bit so that the lips protrude $1/16''$ (1.6mm) below the chisel points and lock the bit tightly in position. Care should be taken to ensure that the bit is securely



LUBRICATION CHART





FOUNDATION PLAN

FIG 4

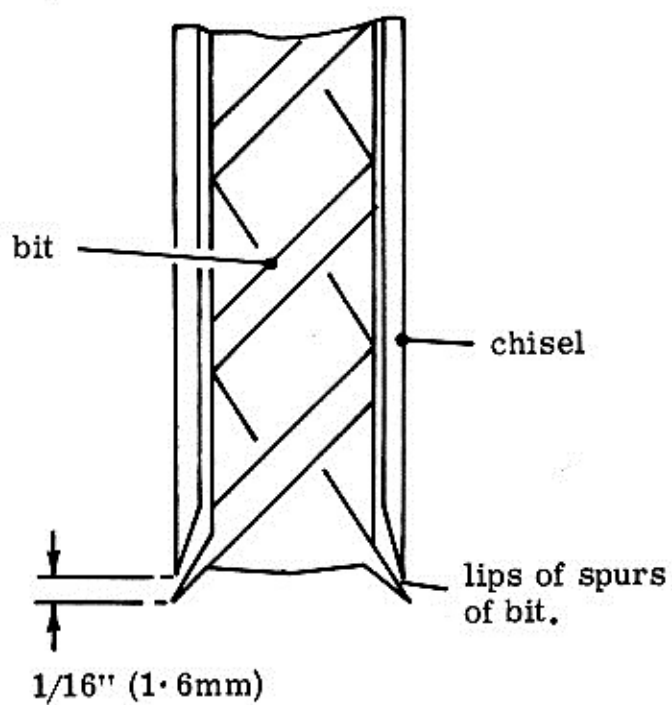


FIG 5

locked so that it cannot be forced against the cutting edge of the chisel resulting in a fractured tool.

Do not jerk the tool into the work but give steady pressure. Withdraw the tool occasionally from the work to allow the bit to clear itself of chips.

The maximum chisel which can be used in soft wood is 1" (25.4mm) square and $\frac{3}{4}$ " (19mm) square in hardwood.

Mortising, How to Set Chain

The mortise chain must revolve so that the cutting edges descent into the work as in Fig. 7. Use only the sprocket wheel and guide bar for the size of the mortise required. Each is clearly marked. Keep the chain adjusted so that it can be pulled away from the bar $\frac{1}{4}$ " as in Fig. 7. Screw "A" above the bar "B" is to adjust the chain to the correct tension and to take the thrust of the bar. The chain when new should run idle for a few minutes and be re-adjusted before being put to use. Lubricate about every half hour. See note below.

Do not force chain into wood, but feed smoothly. Do not traverse table while the chain is in the mortise. To cut a longer or wider mortise than the chain allows, bring chain out of cut and traverse table before making second cut. Although the mortise chains are supplied suitable for general work, in hard and soft woods it is advisable when wet oak is used to grind them to a special angle.

The guide bar "B" in Fig. 8 is held in position by guide block "C" in Fig. 8 and the chain sprocket "D" is attached to the main spindle and held tight by the nut "E". The correct working position for the bar "B" is when the fixing bolt is in the centre of the slot and the mortise chain tensioned in the manner described above.

Note:-

The efficient lubrication of the mortise chains during operation has always been a difficulty and therefore we have introduced a greasing arrangement which it is considered will prolong the life of the chain. The improvement incorporates a grease nipple in the guide bar from which the lubricant is carried down the bar and into the bottom roller.

Should the mortise chain be in operation for a long period, it is essential to give one or two depressions of the grease gun every half hour. The exact period for lubricating must be decided by the operator. Do not allow the guide bar to become hot.

Work Cramp

The work cramp has 3 positions on the machine table allowing a maximum width of timber of 9" (229mm) between the cramp face and the rear of the table

The cramp is controlled by lever "A" in Fig. 9. The cramp face is drilled to receive a wooden pad to prevent possible marking of the workpiece.

Table Controls

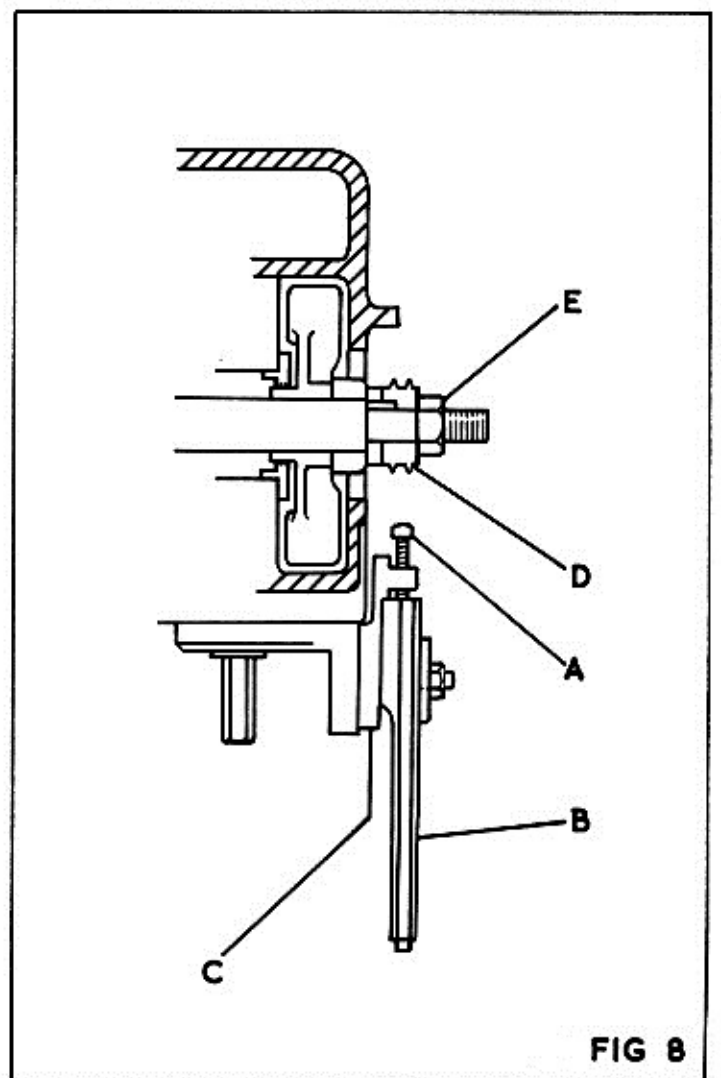
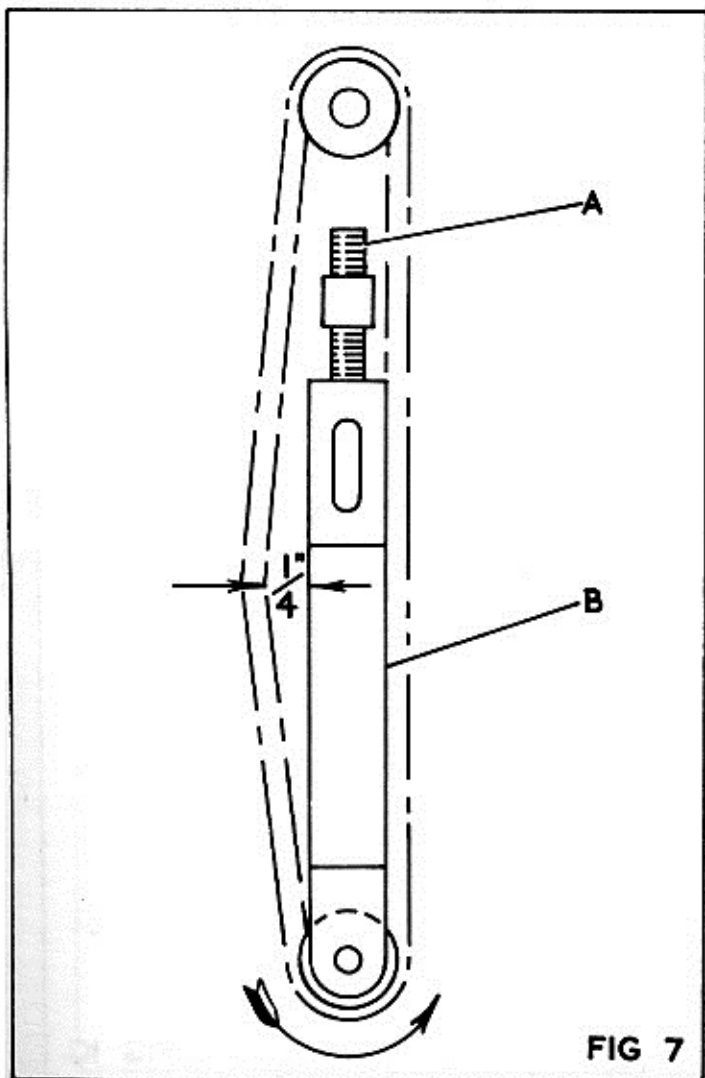
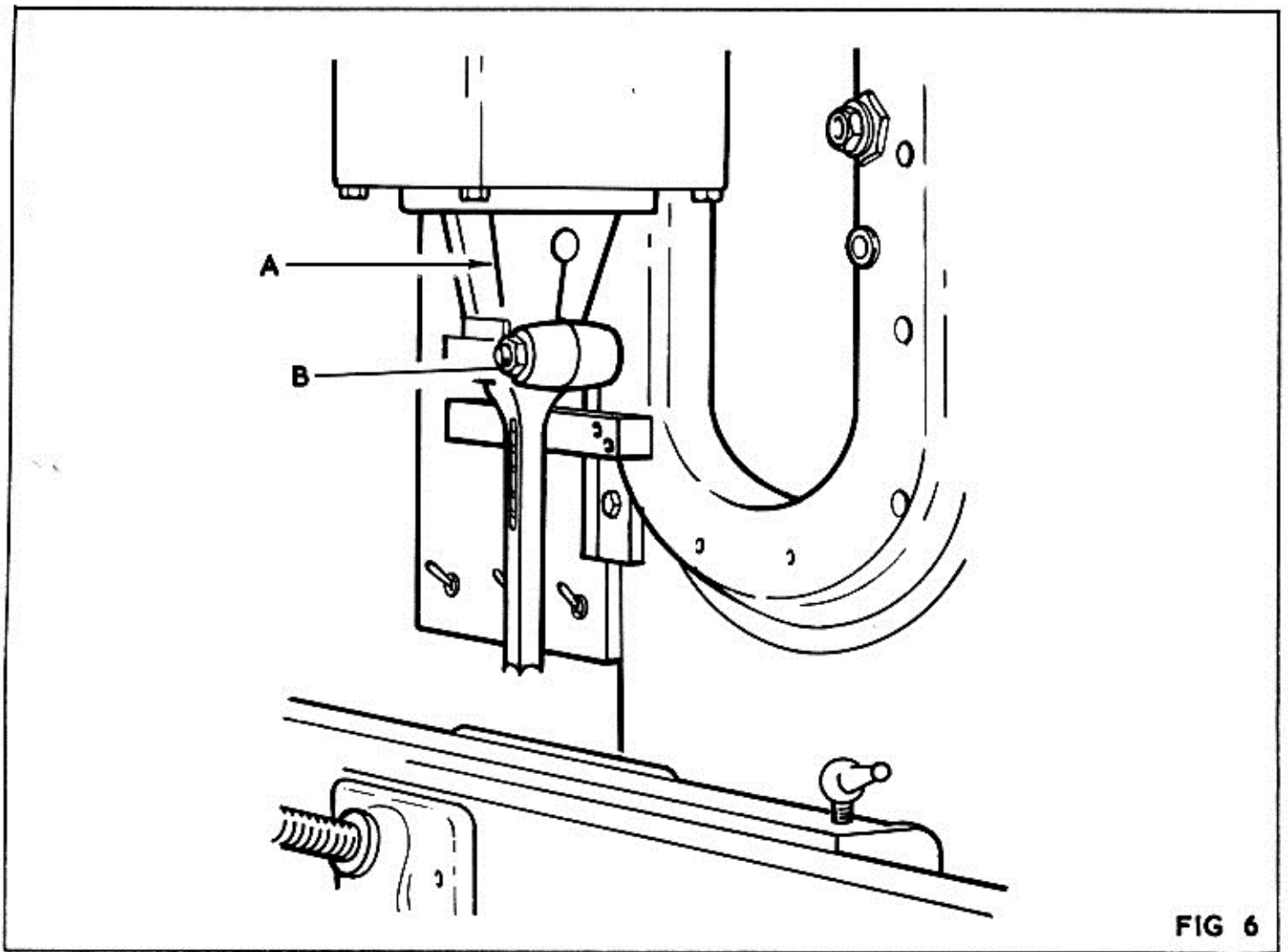
The table has both longitudinal and lateral movements. The longitudinal movement is controlled by means of handwheel "B" in Fig. 9 and has a maximum movement of 23" (584mm). The table has positive stops in the side which can be set to control the length of mortise to be cut.

Lateral movement is controlled by means of the handwheel "C" and has a maximum movement of 4" (101.6mm). The table can be locked in position laterally by means of the ball lever screw "D".

How to Change the Position of the Head

To change head from chisel mortising to chain mortising the following procedure should be followed:-

1. Remove chain end cover by depressing the hinge springs, lifting off the catch and sliding cover off the hinges.
2. Remove chisel as previously described.



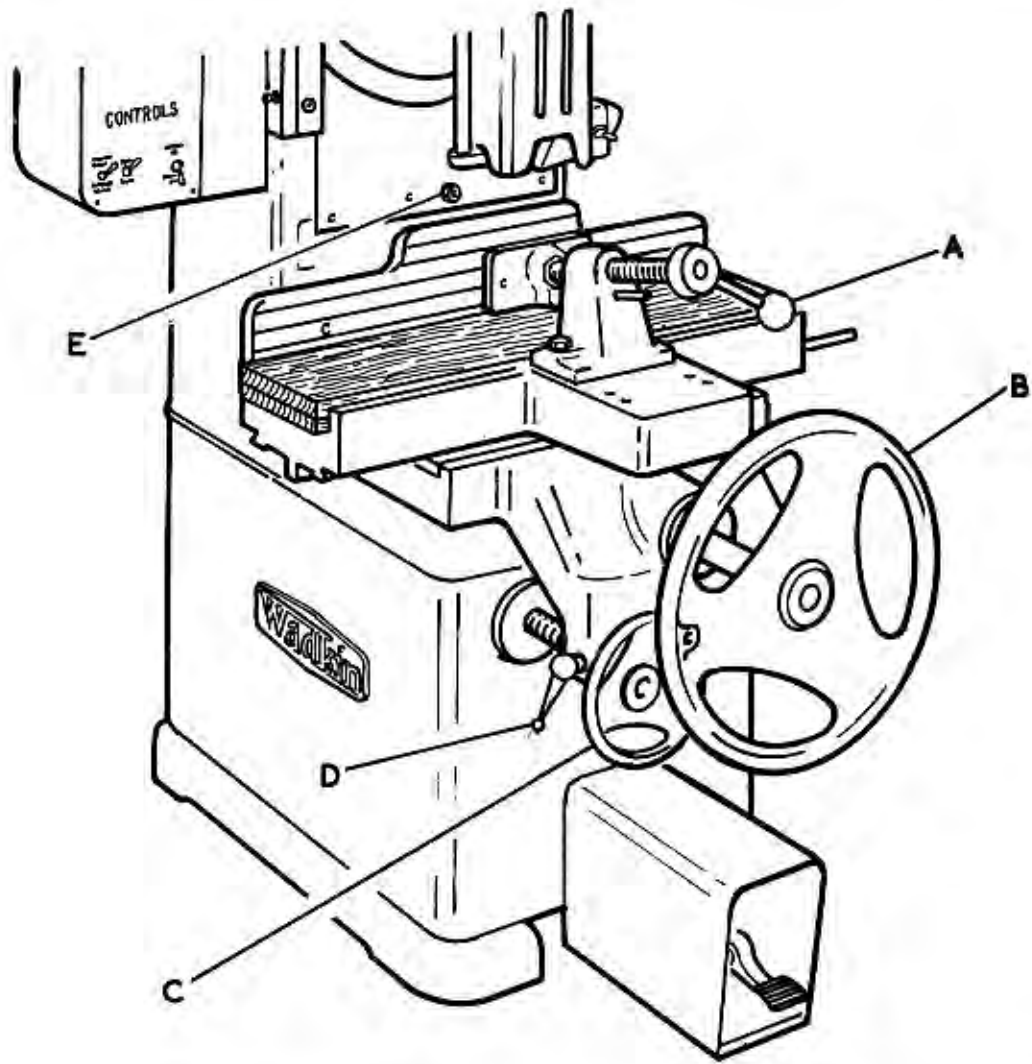


FIG 9

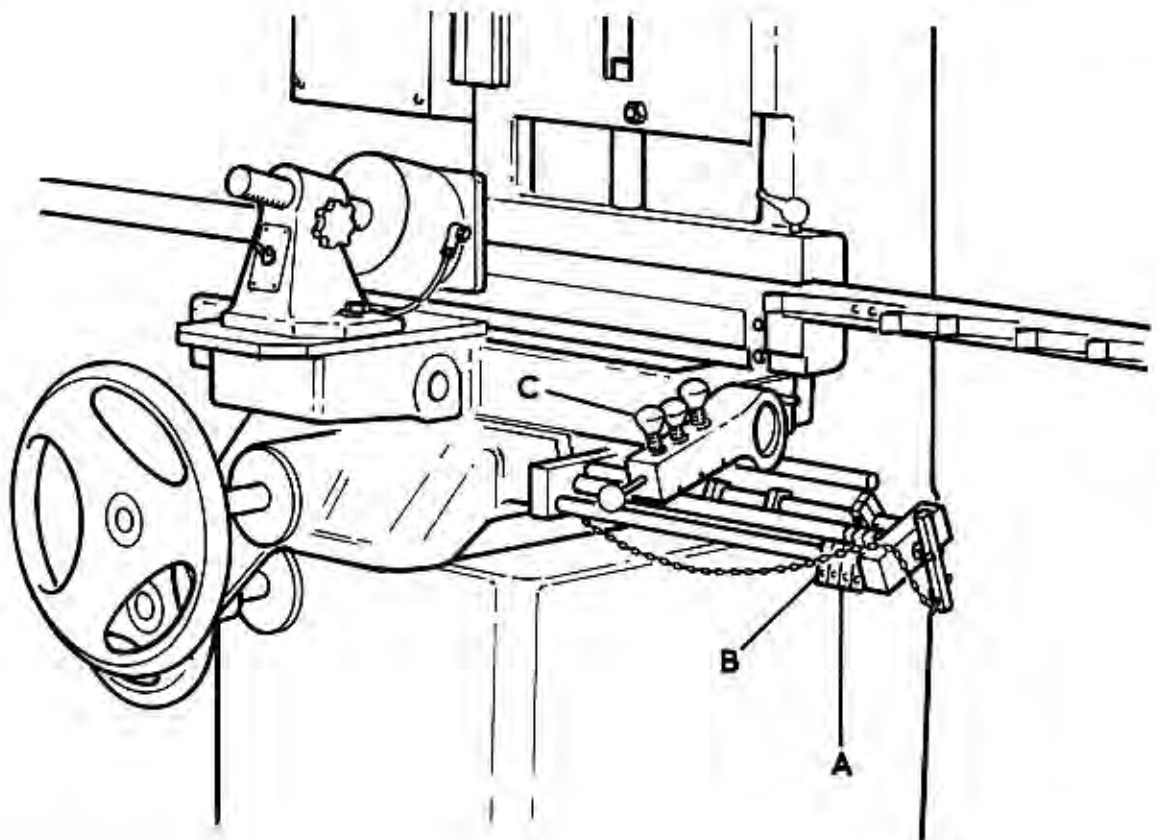


FIG 10

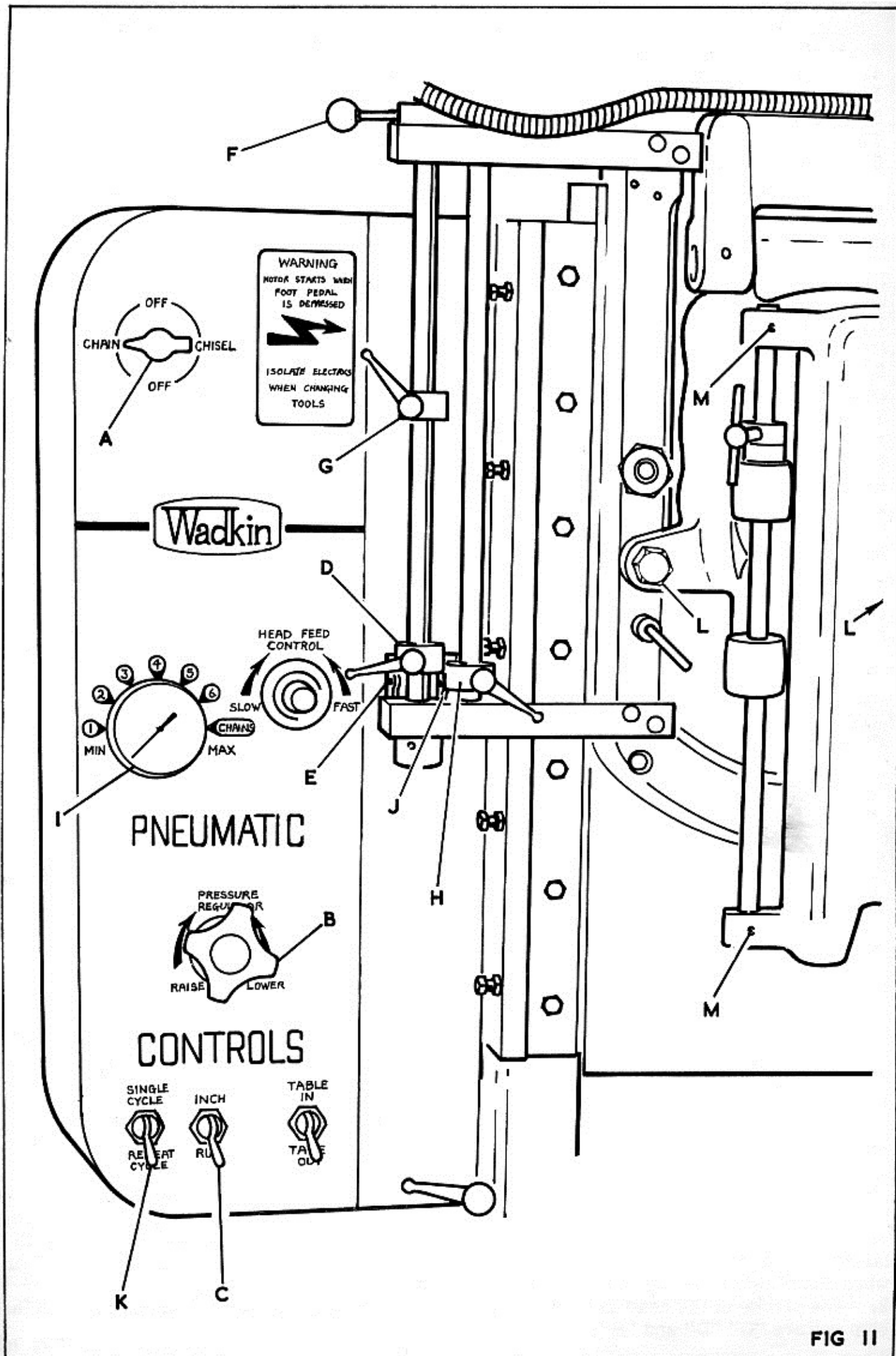


FIG 11

3. Remove two hexagon head bolts which hold head in chisel position.
4. Swing head round to chain position and lock with two hexagon head bolts "L" as in Fig. 11
5. Fit chain guard swivel bar complete with chain guard and tighten grub screws "M" in Fig. 11
6. Fit chain as previously described.

To change the head from chain to chisel mortising the above procedure should be reversed.

How to Adjust the Position of the Head

Note:- Before setting machine to either chain or chisel the electrics must be isolated by use of the switch "A" in Fig. 15.

1. With stock firmly locked by pneumatic or manual clamp on table the headstock can be inched down until $1\frac{1}{2}$ " clearance exists between chain or chisel and stock.
2. Loosen ball lever depth stop screw on right of headstock and move up slide until contact is made with fixed depth stop latch, then relock.
3. Loosen hexagon clamp nut "E" in Fig. 9 and allow piston rod to return to its maximum extent by moving switch from "inch" to "run". Relock hexagon clamp nut "E".
4. Loosen ball lever depth stop screw and move to the bottom of slide and relock. Return fixed depth stop latch to normal position which is out of way when machine is working.

Instructions for Setting Up Machine

To set the pneumatic controls the undermentioned procedure should be followed :-

1. Set chain or chisel as previously described.
2. Adjust pressure by knob "B" in Fig. 15 to suit either chain or chisel depending on which is required.
3. Mark on end of the timber, the haunch depth and the full depth of the mortise required. Lock timber by means of the clamp "A" in Fig. 9 and traverse the table by means of handwheel "B" until the tool misses the timber end fractionally.
4. With the switch "C" in Fig. 15 in the "INCH" position depress the foot pedal until the chisel end reaches the required haunch depth. Position stop "D" to operate trip valve "E". Swing haunch stop clear by means of ball lever "F" and proceed to inch head to the required mortise depth. Position stop "G" to operate trip valve "E".
5. Position switch "C" in the RUN position, the head will now return to the top position. All that is required now is to position stop collar "H" to give $\frac{3}{4}$ " to 1" (19mm to 25mm) clearance between the timber and the tool end when used on the repeat cycle.

Control Panel

All the controls are conveniently placed on one panel to the left of the head for easy access of the operator.

Incorporated in the control panel are controls for the depth of cut, return stroke air pressure indicator for the use of chain or the size of chisel required, switch for single or repeat cycles of the head, slow positioning and holding for setting purposes. A switch for changing the motor direction for chain or chisel is also provided. Also provided is a head feed control knob for use with different types of timber.

The undermentioned instructions give the relative positions of the switches for the alternative movements of the head.

1. The pressure on the air line is indicated on the gauge "I" in Fig. 15 and can be increased or decreased by the knob "B". It should be noted that the pressure must be set to the size of chisel being used i. e. when using small chisels the pressure does not need to be high, either 1, 2 or 3 pressure setting may be used as shown on gauge "I". With larger chisels it may be necessary to use a higher pressure setting of either 4, 5 or 6 or when chain mortising the pressure should be set at "chains".
2. The stroke of the head is controlled by the valves "E" and "I" in conjunction with the stop collars "G" "D" and "H".

3. With switch "K" in single cycle and switch "C" in the "run" position with foot pedal depressed the head will travel down until stop collar "G" depresses the valve "E" then (when haunch collar "D" is swung to one side by means of the lever "F") head will return to top of stroke.
4. With switch "K" in repeat cycle and switch "C" in the "run" position with foot pedal depressed the head will travel down until stop collar "H" depresses valve "J" then the head will return towards top of stroke. When stop collar "H" depresses valve "J" the head will return on the downward stroke again. The head will work in repeat cycle as long as foot pedal is depressed.
5. When haunching is required the stop collar "D" can be brought into operation by the movement of the lever "F". This moves the stop collar "G" to one side making ease of the operation as the haunch collar "D" can be pre-set.
6. For ease of setting the switch "C" should be in the "inch" position. The head will then move as long as the foot pedal is depressed, but as soon as this is released the head will remain in the position it has reached. To return the head to the top position switch "C" should be put in the run position.

Setting Out Attachment (Extra)

The machine can be supplied with a setting out attachment for rapid and accurate repetition mortising or boring on short or long runs as shown in Fig.10.

The stop carriage casting is secured to the machine table by screws inserted through the holes provided in the fence. The spring stops are set on the long bar to locate the position of each mortise to be cut.

Short circular stop bars extend out to the right and are attached to the intermediate cross slide. Each of the three stop bars are fitted with four adjustable collars "A" in Fig.10, which can be locked in any position, by means of the hexagon head bolt "B". The necessary spanner is provided. Three spring loaded stops "C" attached to the end of the table locate against the adjustable collars "A".

Thus the combination of these two sets of stop bars permits a wide choice of accurately dimensioned and located mortises to be cut and haunched without need for slow and laborious marking out.

Sharpening Square Chisels and Bits

This chisel must be sharpened on the side only and the cutting edges should be shaped to give a curve, as shown in Fig. 10B and maintained in shape as new. The bevels of the cutting edges must meet exactly at the corners. The depth "A" i. e. the distance from the corner point to the curve at the centre should be about 1/8" the diameter of the size of the chisel. The cutting edges must be as short as possible and filed to an angle of about 35° as shown in Fig. 10B. The angle behind the cutting edge must then taper off at an angle of 25°. It is recommended that the special tool which can be supplied should be used to ensure the correct angle on all four cutting edges of the chisel.

It is most important that the outside of the chisel is never filed as this will reduce the size of the mortise and tend to bind in the timber.

The bit is sharpened by filing above the cutting edges "B" in Fig. 10A keeping the file at an angle of 15°. They must be kept in a straight line with the inside points extending past the centre as shown. Sharpen the spurs "C" on the top and front only never on the outside. Keep them in line with the cutting edges "B".

When a bit has been worn away by frequent re-sharpening replace it by a new one. Using a short bit may lead to the chisel being split at the cutting edges. Use a file of very fine grade for sharpening both chisels and bits.

Chain Grinding

When chain grinding the head must be in the chain mortising position as previously described. To fit grinding attachment the undermentioned procedure should be followed:-

1. Fit grinding wheel to the attachment spindle then fit complete attachment to the chisel

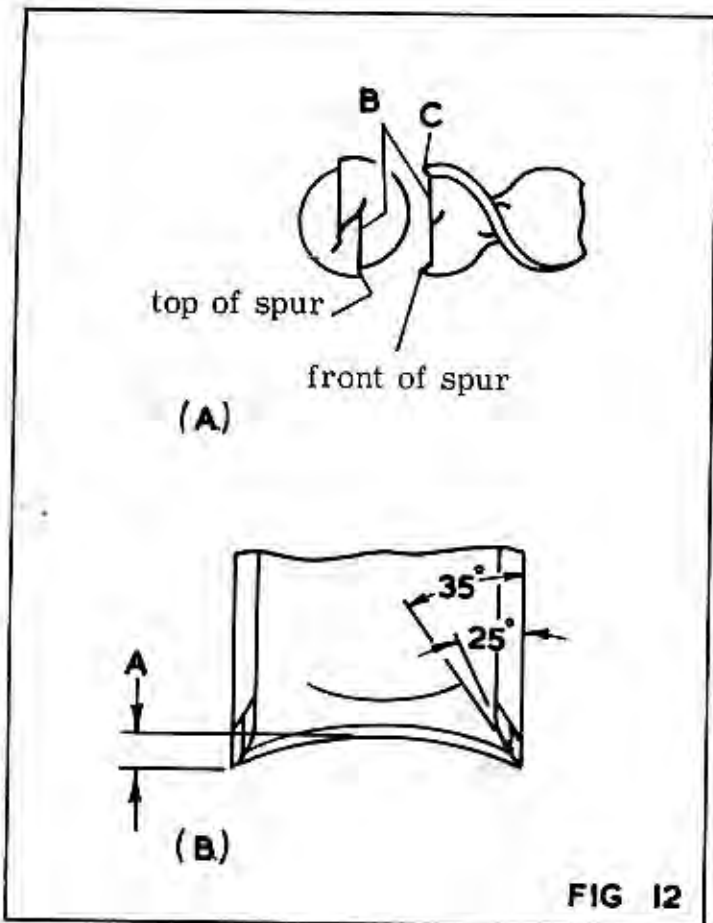


FIG 12

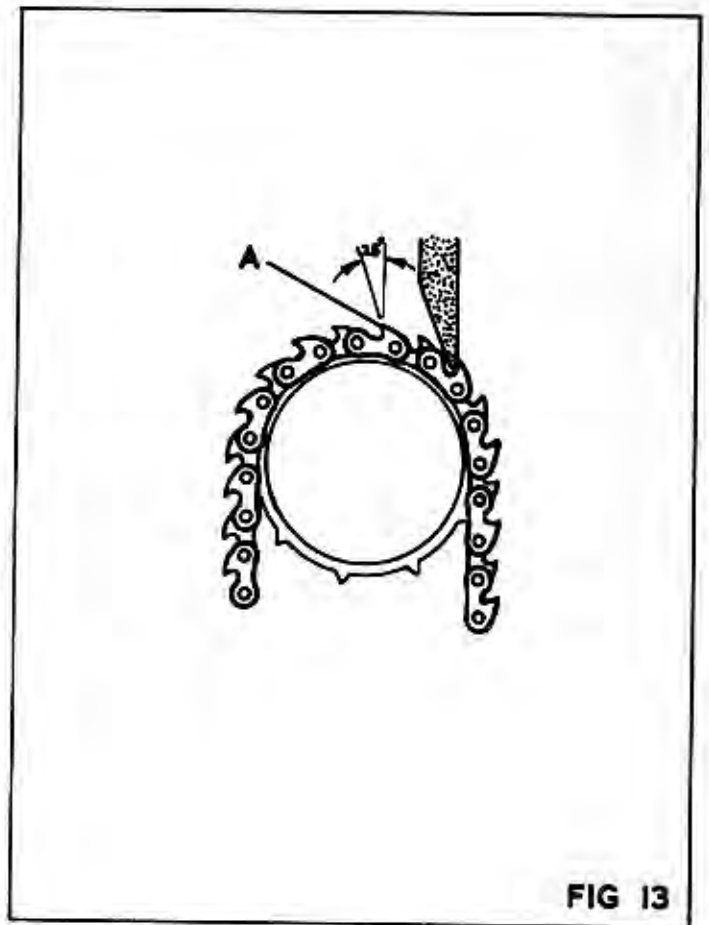


FIG 13

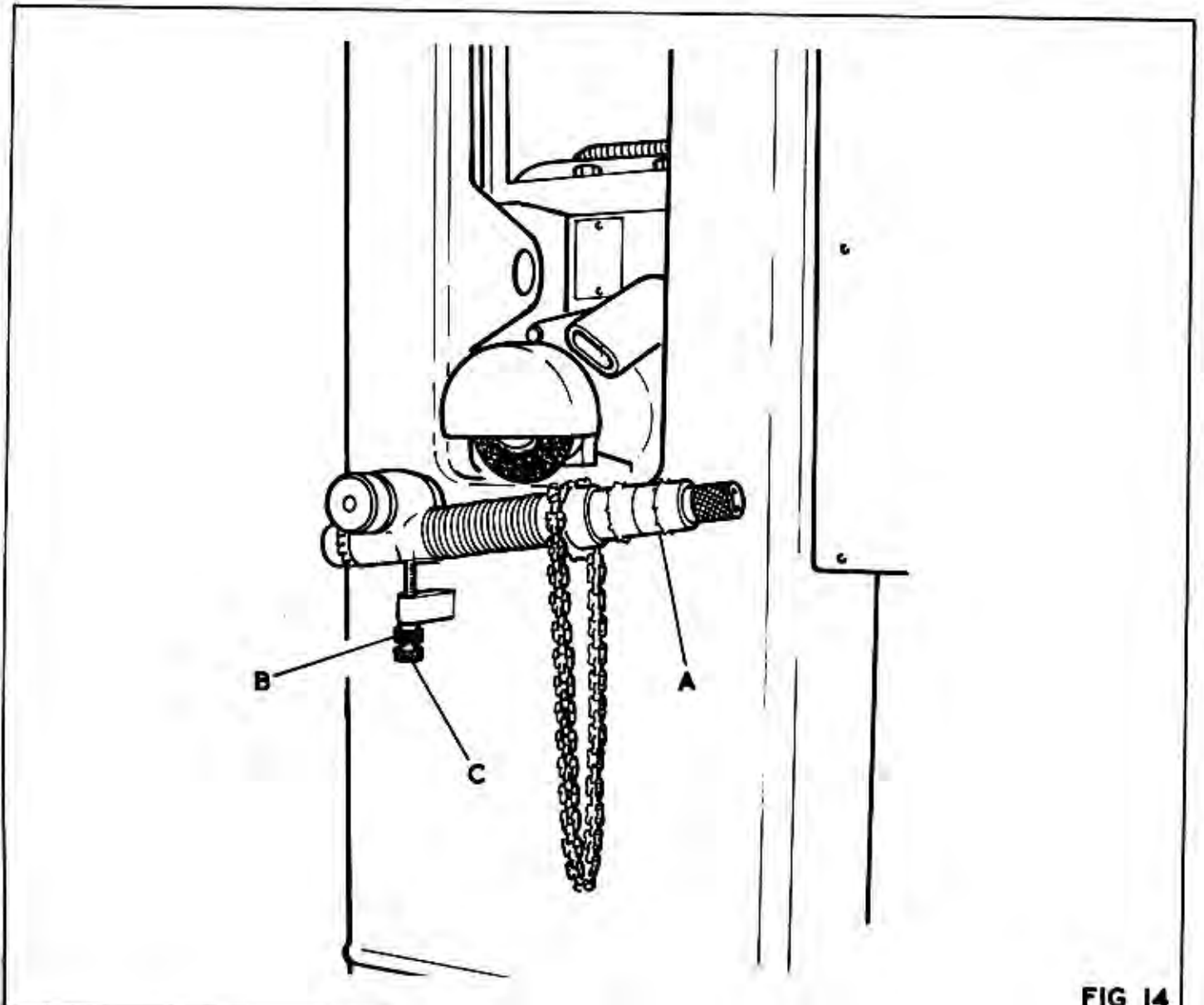


FIG 14

holder bracket at rear of machine and tighten $\frac{1}{2}$ " nut.

2. Tighten grub screw in main spindle (as for chisel auger).

3. With switch "C" in Fig. 11 in "INCH" position, move head to lowest point of travel. Note:- Switch on side of machine must be in "chain grinding" position to ensure that the motor keeps running during the grinding operation. When operation is finished switch should be returned to mortising position.

The mortise chains should be sharpened with an oil stone slip on the face "A" in Fig. 13. Care being taken to sharpen square across each link.

When this is no longer adequate and to bring the chain cutters into correct angle for clean cutting they should be ground on the special grinder.

The sleeve "A" in Fig. 14 is adjusted by nuts "B" and "C" until the grinding wheel lightly touches the face of the link at the correct angle as shown in Fig. 13. Each link must be ground on the face only and not too deep in the gullet, care being taken always to retain the angle as new. On no account must the sides be ground.

A link is ground by sliding the sleeve "A" along the bar each successive one is brought into position for grinding by the spring ratchet wheel. The sprocket wheels carrying the chain on sleeve "A" are adjustable to accommodate varying widths of chain. Three pairs of these sprockets are supplied with the grinder.

To Remove Broken Links

1. It is important to grind flat all rivet heads before driving out rivets.
2. Place chain on anvil block as shown in Fig. 15A and drive a little with "first breaking punch" on each rivet, allowing both to be driven out together with bottom side link.
3. Drive rivets right through with "second breaking punch". Note: Shouldered rivets will not permit pins to be driven out separately. Due to fragile links on $\frac{1}{4}$ " and $\frac{5}{16}$ " wide chains use "breaking fork" as shown in Figs. 15B and C for support of chain by placing over narrow deep groove in anvil.
4. Place side link on anvil block as in Fig. 15D and use "first and second breaking punches" to remove rivets.

To Assemble Chain

5. Set rivets in one pair of blind holes in anvil block Fig. 13E and tap outer link onto heads of rivets, afterwards carefully pean over rivet heads with light hammer.
6. Assemble links with necessary centre and outer links.
7. Place chain along groove of anvil block Fig. 15F and support the overhanging end. The chain must be placed in the groove to give maximum support. The deep groove for wide chains and shallow one for narrow chains.
8. Carefully rivet down or swell out heads of rivets Fig. 15G with the "making punch" which must be used for finishing only.
9. Grind down rivet heads to finish similar to remainder of chain as in Fig. 15H

Before using a repaired chain carefully grind any new links to the same amount of gullet as the remainder of the chain.

One set of tools comprises:-

As in Fig. 16

1. One anvil block
2. First breaking punch
3. Second breaking punch
4. Making punch
5. Breaking fork

Note:- One set of tools is necessary for each pitch of mortise chain.

.54" pitch

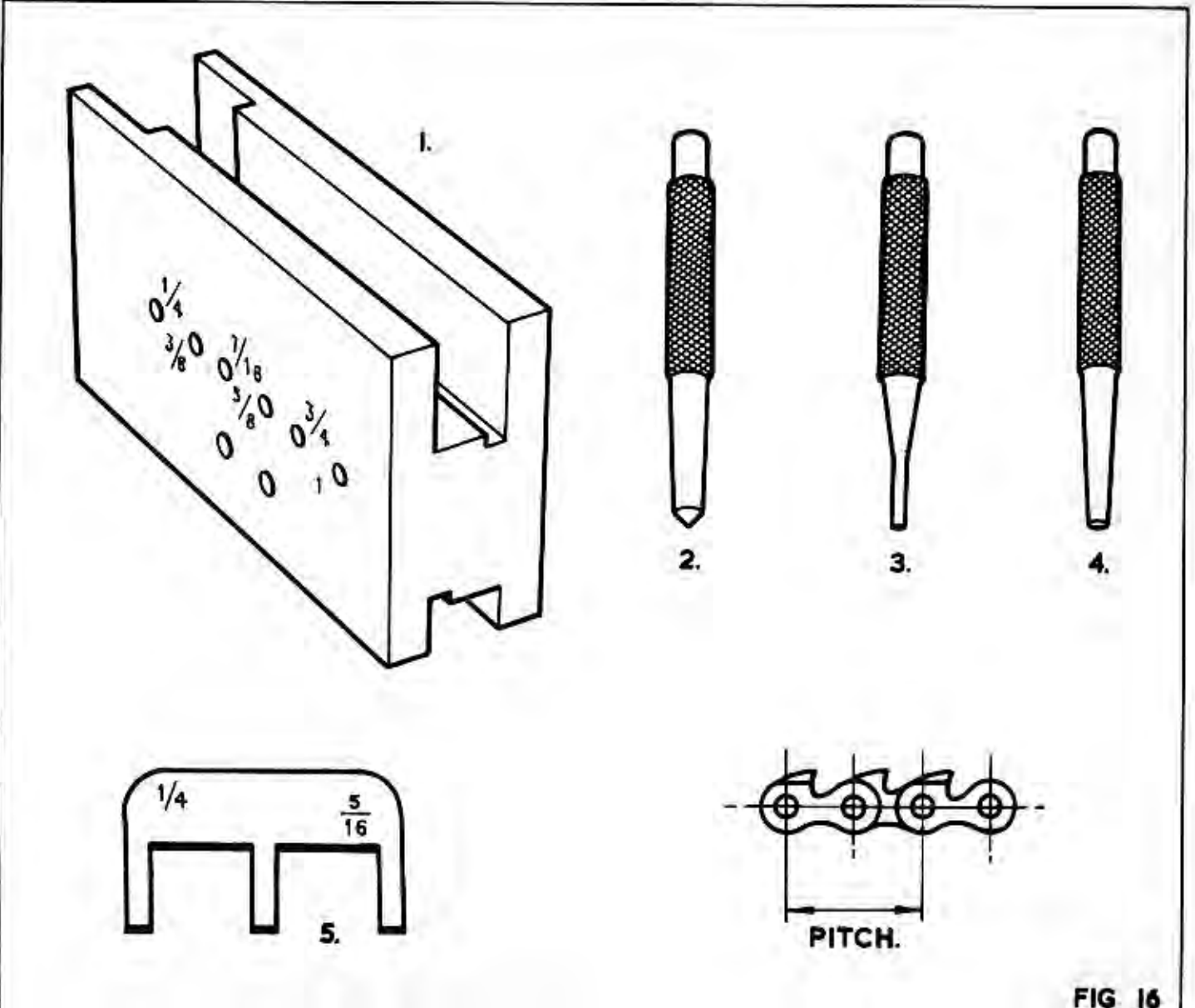
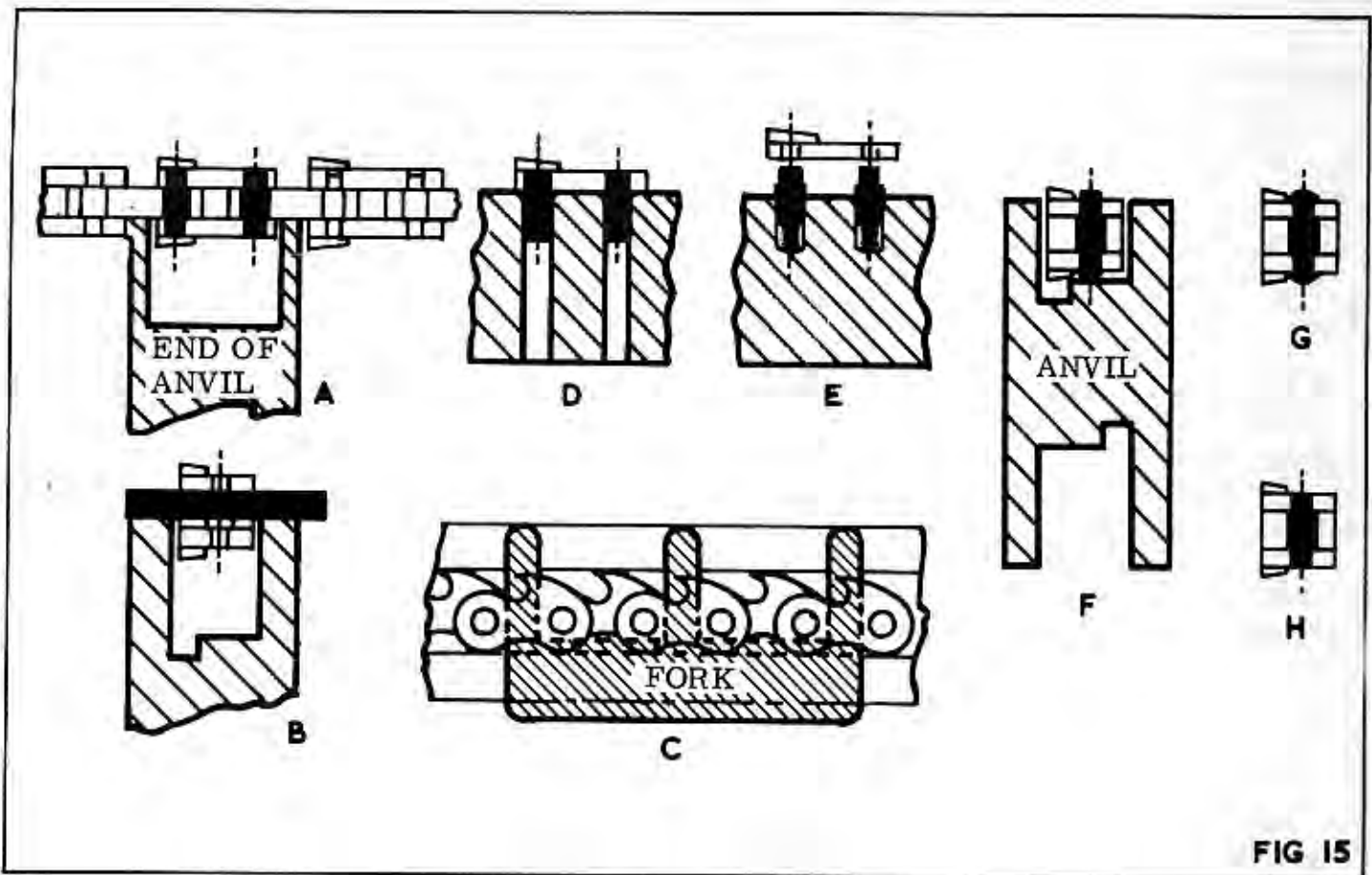
.62" pitch

.89" pitch

Hints on Servicing Martonair Pneumatic Equipment

Valves

Martonair valves require a supply of clean, dry, lubricated air, A filter and



lubricator are fitted to this circuit to assist in providing these conditions.

The construction of Martonair valves is simple, and dismantling and re-assembly require no special tools. In general replacement of seals is all that need be undertaken. After removal of the old seals, new seals can be rolled into position in the piston grooves, working up from one end. Reasonable care should be taken when re-assembling valves to ensure that seals are not pinched or damaged, and that the valves are kept free from dirt.

Cylinders

Under normal conditions only servicing which Martonair cylinders require is the replacement of the piston seals and the piston rod packing. The time period between each servicing will be determined by the frequency at which the cylinder operates, and the total number of operations.

Another important factor is the condition of the cylinder bore. When the cylinders are assembled, the internal surfaces are coated with a special assembly compound which adheres to the rubbing surfaces for a considerable time. This together with the lubricator which is fitted as standard ensure that the internal surfaces are kept well lubricated and that friction wear is kept to a minimum.

Martonair cylinders are held by four tie rods, and therefore to replace worn seals the nuts should be removed from one end of the rods, and the tie rods withdrawn. When this has been done, the near end cover can be removed and the cylinder barrel slide off the piston. The external distributor can now be removed. This is a simple matter and all that is required is a manipulation of the fingers.

If a piston rod seal is to be replaced it is advisable, but not strictly essential, to first extract the piston and piston rod assembly from the front end cover. The piston rod seal is held in position by the tie rods. After removing the worn piston rod seal, it should be replaced by a new one, at the same time making sure that the sharp edge is not damaged when threading the seal on to the piston rod. If the piston and piston rod assembly are removed before extracting the seal they should be replaced before fitting a new seal.

Whilst the cylinder is dismantled check condition of the cushion seals and replace if necessary. These take the form of "O" rings in the end cover and can be easily replaced.

When the cylinder is re-assembled after replacing worn seals, care should be taken to ensure that no dirt is allowed to enter the cylinder and that the end covers are in line with each other. The tie rods should be tightened up with an even tension on each rod. It is also advisable to thoroughly lubricate the cylinder before assembly.

In the absence of a preventative maintenance schedule, the necessity for replacing a piston rod seal will be made evident by leakage of air from around the piston rod. All of the seals fitted to Martonair equipment are self adjusting. Thus unlike a packed gland, a leaking piston rod seal cannot be cured by tightening down the piston rod bearings. The seal must be replaced.

N. B. When the piston seals on a cylinder become worn it is not always easy to recognise the trouble immediately, because the evidence of wear is at the control valve in the form of leakage through one exhaust port. In many cases the symptom leads first to the replacement of the valve seals, and it is only when the escape of air continues that the cylinder comes under suspicion.

In cases where an escape of air from a valve exhaust port occurs, a simple test should be made to establish its source before any equipment is dismantled. All that is required is to remove the pipe fitting from the outlet port of the valve which is connected to the exhaust end of the cylinder. If the escape of air comes from the valve it must be the valve which is leaking if the air is coming down the pipe from the cylinder the cylinder piston seals are leaking and must be replaced.

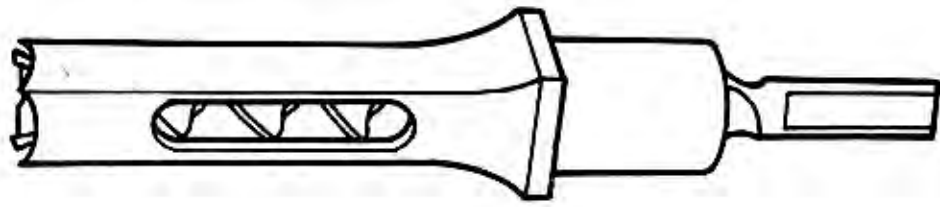


FIG 18

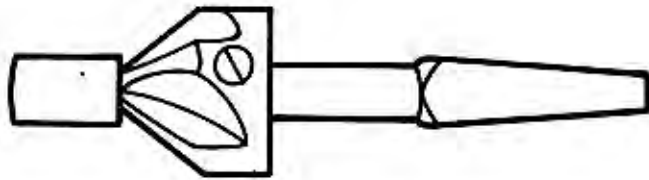


FIG 19

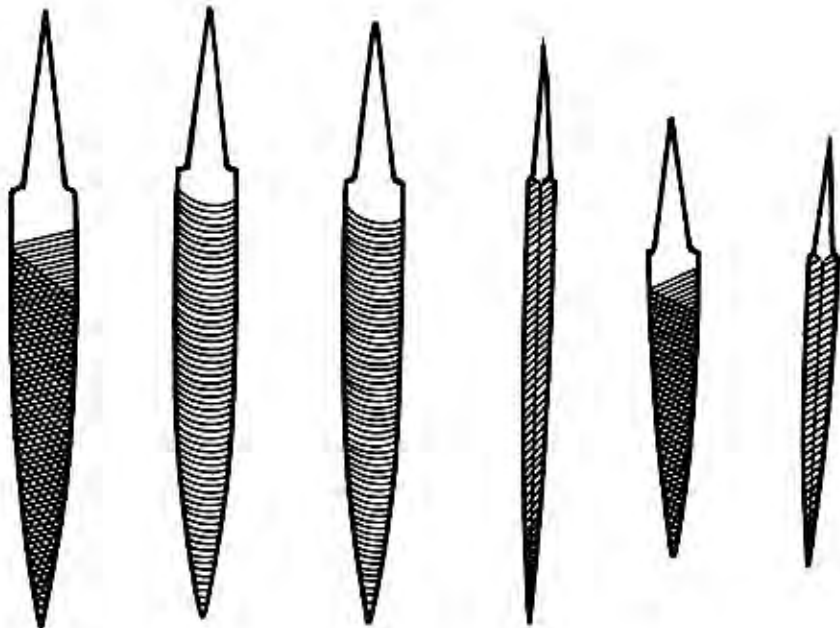
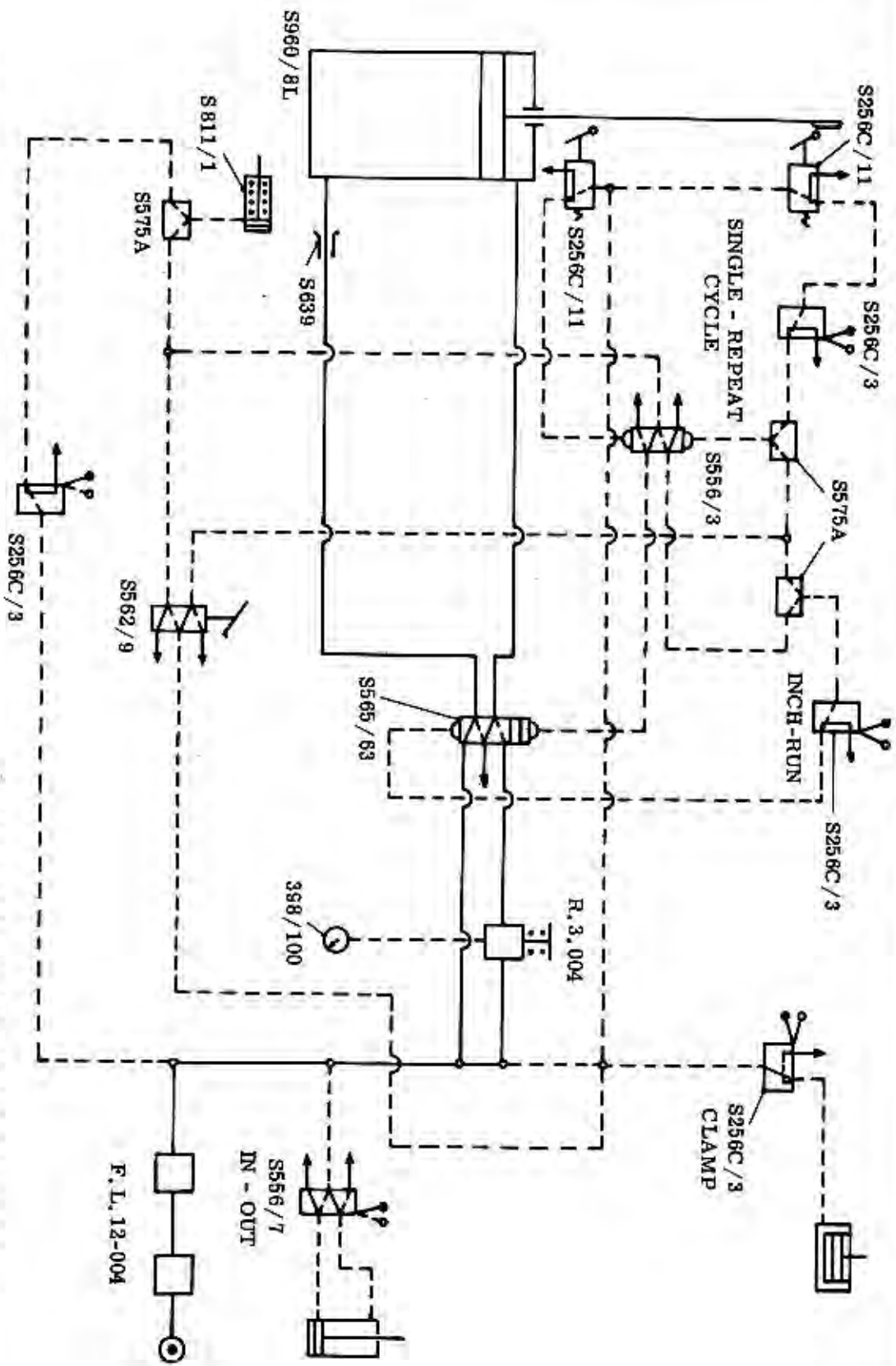


FIG 20



AIR CIRCUIT DIAGRAM

TYPE OF OIL RECOMMENDED FOR LUBRICATOR
 SHELL TELLUS 27
 MINIMUM DIAMETER OF AIR SUPPLY PIPE
 TO MACHINE - $\frac{3}{8}$ " (13mm)

FIG 17

EXTRA EQUIPMENT

Hollow Mortise Chisels and Bits

The standard sizes of tools which can be supplied to order are listed below:-

To cut square	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{5}{8}$ "	$\frac{3}{4}$ "	$\frac{7}{8}$ "	1"
Length of chisel blade	4"	4"	4"	$6\frac{1}{2}$ "	$6\frac{1}{2}$ "	$6\frac{1}{2}$ "	$6\frac{1}{2}$ "
Dia of bit shank	$\frac{3}{16}$ "	$\frac{1}{4}$ "	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "	$\frac{1}{2}$ "
Dia of chisel shank	$\frac{13}{16}$ "	$\frac{13}{16}$ "	$\frac{13}{16}$ "	$1\frac{3}{16}$ "	$1\frac{3}{16}$ "	$1\frac{3}{16}$ "	$1\frac{3}{16}$ "

Sharpeners for Hollow Mortise Chisels

The tools shown in Fig. 19, has been produced to enable mortise chisels to be kept correctly sharpened. It is for use in an ordinary Joiners brace and is mounted carefully with the axis of the chisel by means of a pilot which fits the bore of the chisel. This ensures that all four cutting edges are sharpened to the correct angle. The corners only require finishing off sharp with a file. The sharpeners are available in three sizes with interchangeable loose pilots for each size to suit different chisels.

<u>No. 1 Set</u>	$\frac{1}{4}$ " to $\frac{3}{8}$ " chisel with 3 pilots
<u>No. 2 Set</u>	$\frac{3}{8}$ " to $\frac{11}{16}$ " chisel with 5 pilots
<u>No. 3 Set</u>	$\frac{3}{4}$ " to 1" chisel with 3 pilots

Also available are sharpeners as shown above but with fixed pilots, the range of these are 2" to 1" rising in increments of $\frac{1}{16}$ ".

Files for Mortise Chisels and Bits

This set of special files are recommended for sharpening the square chisel and bits. They are of very fine grade and shaped to efficiently sharpen the corners of chisels after use of the sharpeners as shown in Fig. 20.