Brookman HYDRAULECTRIC MORTICER

OPERATING INSTRUCTIONS

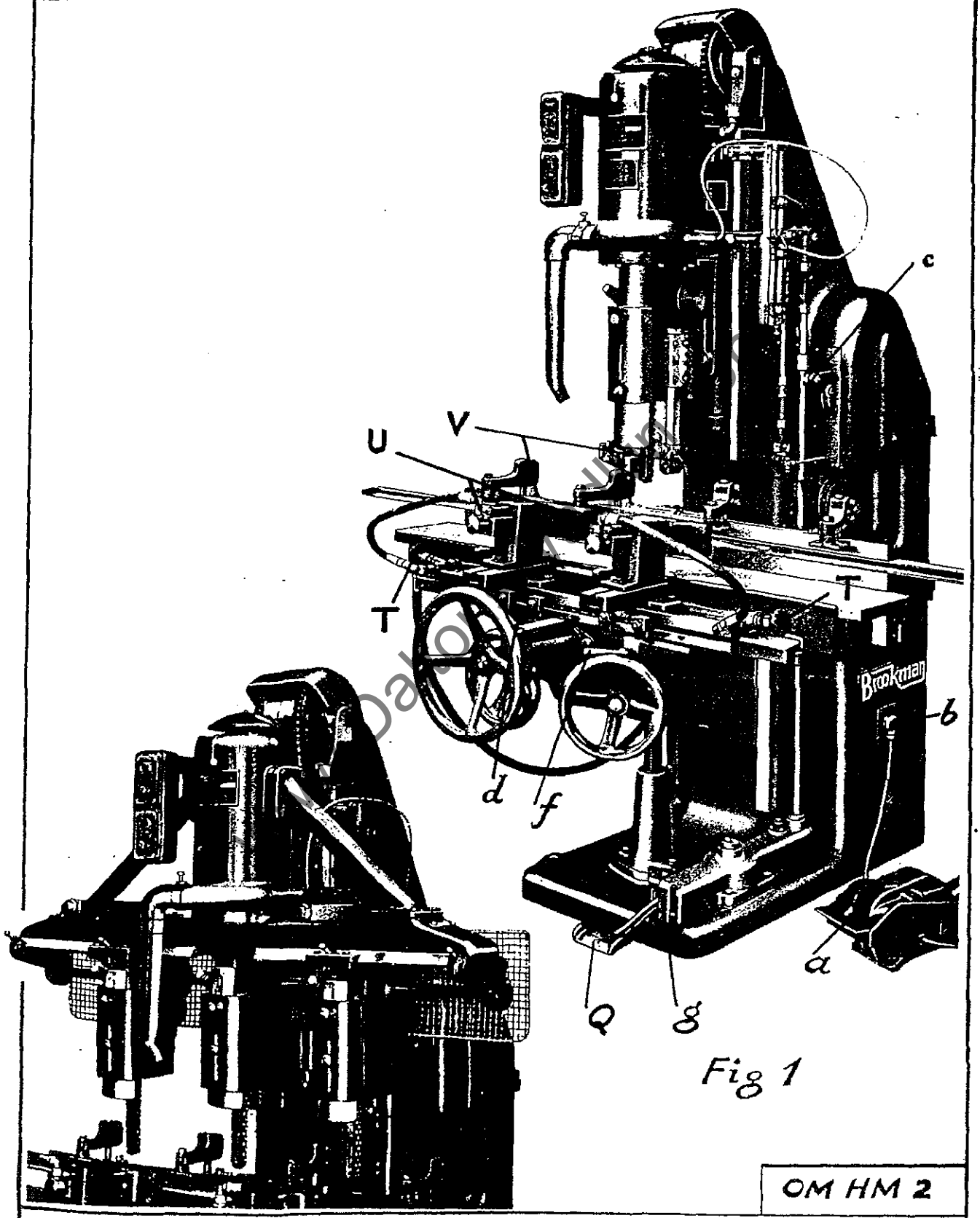


Fig 1

OM HM 2

R. S. BROOKMAN LIMITED . ROTHLEY . LEICESTER LE7 7NS . ENGLAND
Telephone: ROTHLEY 2323-4
Telegrams: BROOKMAN - ROTHLEY - LEICESTER

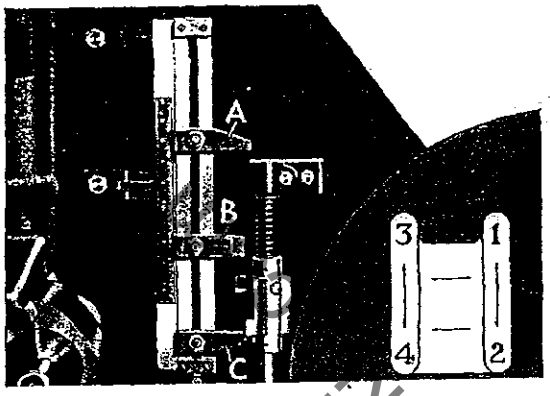
Brookman

design features

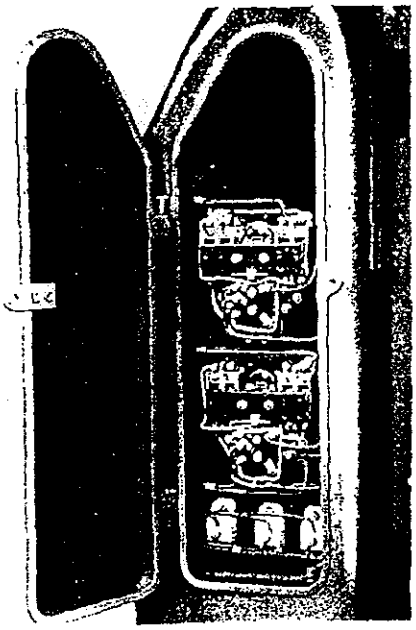
680313

HYDRAULECTRIC

MORTICER

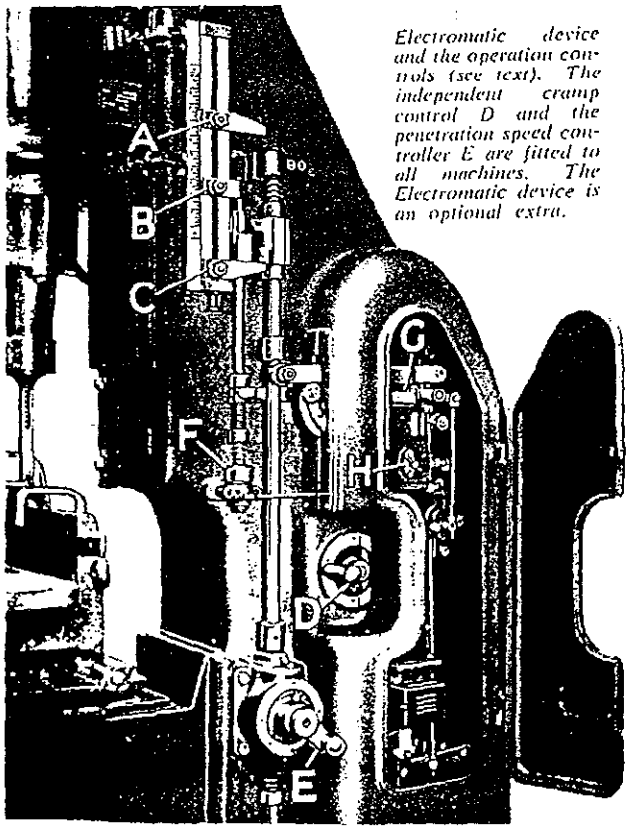


Stops to control depth of penetration, and intermediate tool position. Diagram indicates the compound pedal movement.

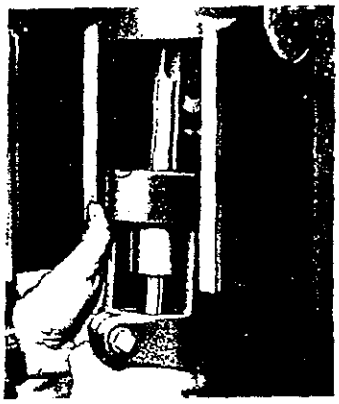


Electrical installation neatly housed in integral cupboard. All internal wiring is completed.

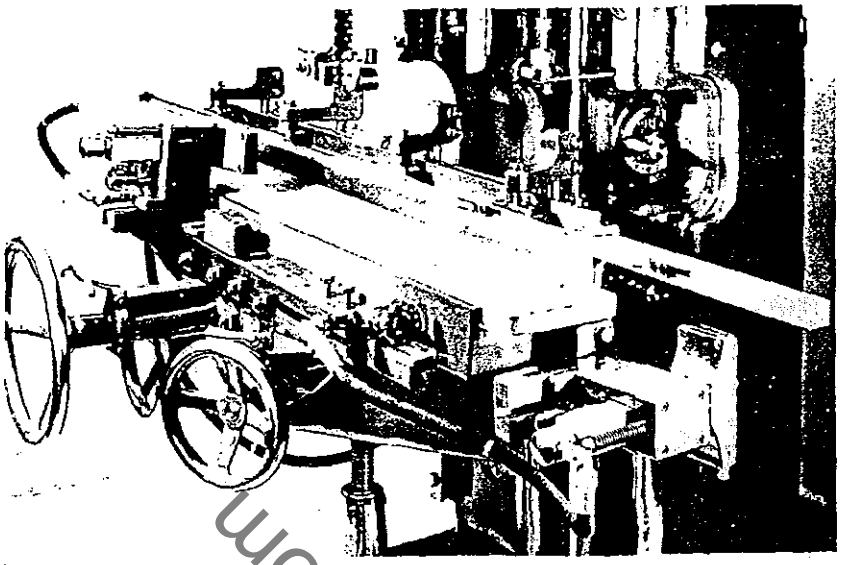
Removal of chain arbor to allow fitting of Chisel attachment.



Electromatic device and the operation controls (see text). The independent cramp control D and the penetration speed controller E are fitted to all machines. The Electromatic device is an optional extra.



Fitting Chisel attachment. Note absence of exposed external gears.



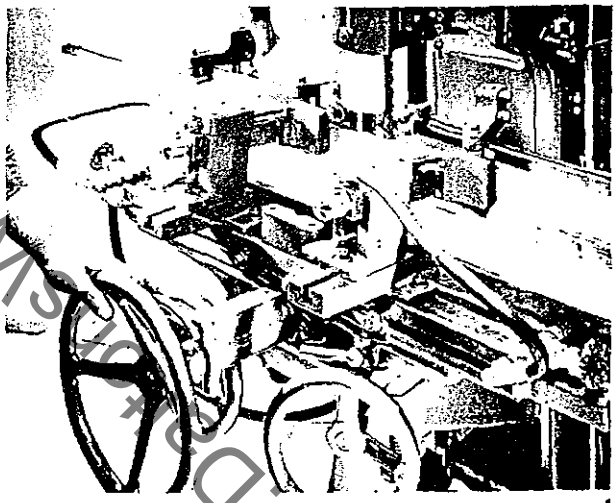
LEFT Work Table is provided with two horizontal cramps and four vertical hold downs Operation is automatic by hydraulic power

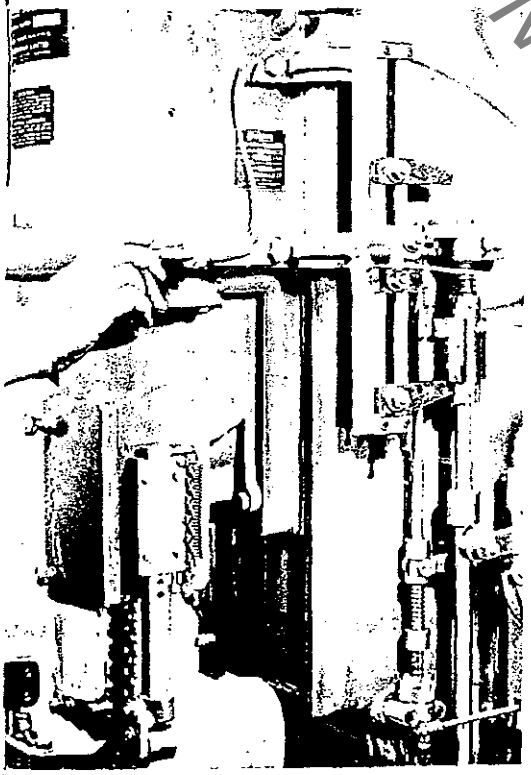
Horizontal cramps can be positioned as work requires along the length of the table. (Removable centre bracket accepts work operated table switch for automatic operation of morticing action)

To mortice panel component and similar, table can be cleared by parking horizontal cramps at table end. One is shown in parked position

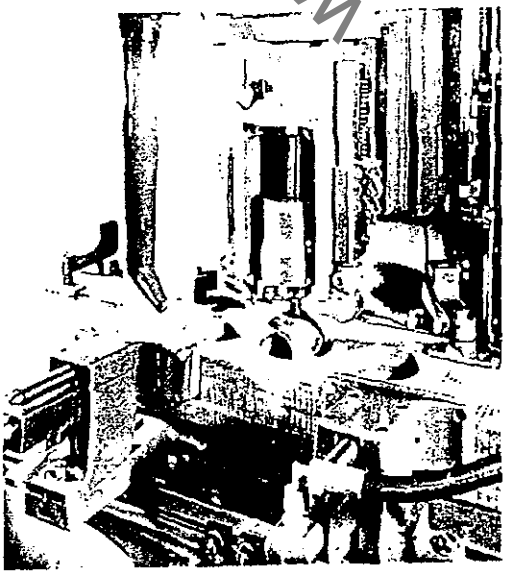
RIGHT Work Table is positioned by stops which can be over-ridden by finger tip trip. Stops are in pairs handed with ramp run in.

Horizontal cramps have ratchet take up, with trigger release to retract. Actual cramping, both horizontal and vertical is automatic.





LEFT Auxiliary head stop to facilitate haunching depth. Upper stop determines full mortice depth. Haunch stop is brought into play by turning handle.



RIGHT Boring Attachment, available as an extra

Also shows orthodox chip breaker bracket to left of head and guard roller to the right (also shown in above illustration) Additional chain guard can be bolted to roller guard

B R O O K M A N HYDRAULECTRIC M O R T I C E R

Introduction

This booklet is in three sections. Section One deals with establishing the morticer when first installed. It also deals thoroughly with the hydraulic system, knowledge of which is required to facilitate maintenance.

Section two concerns the method of operating. The hydraulic functioning enables a variety of methods to be used according to the work in hand.

The third section deals with the general features of the machine and hints on maintenance.

The Brookman Hydraulectric Morticer is available arranged for chain cutting gear, with hollow chisel attachment, or for hollow chisel only. Both types can be single or triple head, and the Electromatic device may or may not be fitted. Hence there are eight models in all, and these vary slightly as to method of operating, although the general principles are the same in all cases.

The main differences are as between models with the Electromatic device and those without, which are in consequence restricted to foot pedal (Q) operation. Where in these notes the instructions do not refer to all models those excluded are indicated - viz NA (not applicable) HC (chisel head models) CG (chain gear models) PD (pedal only models).

S E C T I O N O N E

INSTALLATION & CHECKING HYDRAULIC SYSTEM.

For inland transport the machine is despatched in the normal upright position. To lower the centre of gravity the table will have been lowered, and also the tool head. The latter is retained down by a temporary distance piece N. The hydraulic sump is despatched filled with oil, but before starting, check the level in the sight glass (see LUBRICATION).

For overseas transport the machine may be laid on its back, for which reason the sump has to be drained. The machine must be stood up and the sump filled with Mobil Oil DTE Light.

The morticer is entirely self-contained and needs no special foundation provided that the floor is firm and solid. The terminal connections for the electric supply will be found at the bottom, inside the left hand cupboard. (Note: the expressions Left and Right Hand throughout these notes, refer to the operator's left and right hand when facing

the machine in working position). An earth connection screw is also provided here. The correct rotational direction is indicated by an arrow on the tool head. The outer heads, if any, may be removed whilst first testing by sliding, bodily outwards, the two horizontal driving shafts being held in position by the outer bearings only.

Do not run the pump motor until the correct rotational direction has been ascertained by momentarily switching on the tool head motor and then only after following closely the instructions given below.

Air will not enter the hydraulic system in the normal course of operation but there may be a tendency for some to occur during transport. The machine will not work satisfactorily until all air has been removed from the hydraulectric system. The greater part of this can be removed by carrying out the following directions. Some small amount may however persist over the first few hours of working. This can be removed periodically in the same way and after a few removals no further air will accumulate provided the oil level is maintained.

Preliminary directions

NAPD Observe carefully that the word "PEDAL" on the knurled barrel F, Fig.2 is in alignment with the pointer. If not, lift the knurled barrel to disengage the interior clutch and give one quarter turn to the left, noting that the clutch teeth again engage in the new position.

Move pedal Q over to the left-hand side and drop hinged retaining piece (g) as shown in Fig.1. Place control handle D Fig.2 in the lower position marked SHUT.

Remove cover plate of the pump box at the rear of the machine to expose the interior as in Fig.3. The machines are usually despatched with the priming screws J and K removed. This prevents any possibility of damage either by incorrect rotation or incorrect operation before these notes have been acted upon. On either side of the pump will be seen two hexagon steel components which house the relief valves. These have been carefully set and need not to be touched in any way.

Alongside each of these are shorter hexagon components with protruding round portions. The priming screws fit into the top of these. Their positions should be carefully noted as they will be submerged when the oil is introduced which should now be carried out. Fill up with suitable oil nearly to the top of the gauge glass L taking especial care that no dirt or foreign matter enters.

Having checked the direction of rotation on the head motor, the pump motor should now rotate in the correct direction. This is anti-clockwise when viewed from above.

If the pump motor is now switched on a flow of oil will emerge from the right hand (left hand looking in the pump box) priming screw hole. Pressing the pedal will cause it to

emerge from the left hand hole. Press the pedal a few times until there is a good flow from either hole thus indicating that the pump is functioning correctly.

Stop the pump motor, screw in the priming screws and tighten.

To remove air from power cylinders

New machines leaving our works have the tool head fixed at approximately the 6" down stroke position by a distance piece in the right hand slideway of head at N, Fig.4. This must not be removed until directed below.

Place control handle E, fig.2 in the uppermost position marked SAFETY. Fix stop A with the pointer on the 8" mark of the vertical scale. Hold the foot pedal depressed firmly and move stop B Fig.2. (Labelled "PEDAL ONLY") up to within $\frac{1}{8}$" of the upper projection on the swing piece M as shown in Fig.4. that is, the vertical control rod carrying stop-piece M will now have a movement of $\frac{1}{8}$" when the foot pedal is alternatively depressed and released, and stop-piece M will normally rest on Stop B when the foot is removed from the pedal.

Remove right hand hexagon cap behind the tool head motor and fit the copper draining pipe supplied as shown at P, Fig.4. Switch on pump motor and oil should flow through pipe. Allow motor to run until the oil flows steadily and free from air bubbles. Switch off. Remove copper pipe and immediately replace the hexagon cap. Fit pipe in similar way to left hand cap, but do not switch on until the following adjustments are made.

Place control handle E in the "half past seven" position marked R, Fig.2. Depress foot pedal firmly and move stop B up to stop-piece M to retain it in that position. Switch on pump motor and oil should flow through pipe in the new position; switch off when a steady flow is obtained. Remove pipe and replace hexagon cap.

Pour oil removed back into the pump box adding more if necessary to maintain level in oil gauge.

Switch on pump motor. The tool head slide should now move downwards slightly to permit the removal of the distance piece from the slideway at N. Should tool head not move down sufficiently far for the removal of the distance piece depress foot pedal and the head will then descend until stop A Fig.2 strikes swinging stop M. Switch off motor whilst holding the pedal depressed and the head will then remain stationary at the lower position and the distance piece can be safely removed. Remove stop B also, leaving stop A in position at 8" on the scale and stop C at the extreme lower end against the adjuster screw O.

Switch on the pump motor and the head will immediately ascend to the uppermost position, the upward movement being arrested by stop C striking swing stop M and thence being held firmly against fibre buffers S. Alternatively depressing and releasing the pedal will now cause the head to move up and down between stops A and C, the speed of downward movement being controlled by the position of control handle E, the upward movement always

being at a fast constant rate.

To remove air from the Work Cramps

Oil under pressure is supplied to the cramps by the Accumulator W Fig.3. Cramping is normally automatic, the cramp valve being actuated by a lever which in turn is engaged by the tool head. As soon as the head moves down fractionally, the cramps will close, provided the control D Fig.2, is in the "Auto" position.

The cramps can be controlled manually by moving handle D. In the uppermost position the cramps are put out of action in the lowermost position they close and remain so independent of the head movement. Handle D in the midway horizontal position cause. automatic action from the head movement.

It is important to clear the air from the cramp oil. Proceed as follows:

Front, or horizontal cramps. Turn off gate valves T, and slacken Unions U. Start up Pump and either depress foot pedal or move Control D (to lowest position) to cause the cramps to close. Open one of the gate valves slowly; oil and air will emerge from the slackened union. When the force of oil is spent, close the gate valve and release the foot pedal (or move control D). Allow the accumulator to recharge, and then repeat this operation. Do this several times until the oil is clear of air. Close the gate valve each time to ensure there is no tendency to suck back, although in theory this cannot occur. Repeat with the second front cramp.

Hold-down, or vertical cramps. Turn off the front cramp gate valves to isolate these, and to make all the oil available for the vertical cramps. Slacken the four unions V, depress foot pedal, tighten unions, release foot pedal. In other words proceed as for the front cramps except that the advantage of the gate valve is lacking and the unions themselves have to be re-tightened each time.

If the wood base is removed from the Work Table, (it is secured by wood screws from the underside each end) it will be found that the cramps are fed by nylon pipes in which the air bubbles, if present, can be clearly seen.

The Hold-downs will be more difficult to clear because the oil passes through a "check valve". This is inclined to bounce and shut off the oil flow when air is present and/or the unions are slackened. Hence it is necessary to persevere. When completely free of air, the function of the check valve is to trap the oil in the hold-down cylinders thereby providing a solid lock which prevents any up movement of the hold-down when the tool (particularly the chisel) withdraws. Any tendency of the hold-down to allow the wood to lift indicates the presence of air in the hold-down oil circuit.

To test working of hydraulic motion

Place control hand D in midway position marked AUTO, and handle E also in midway lower position as in Fig.2. Adjust stop B to 3" on the scale and stop A to 6". Place any conveniently sized piece of wood in position on the table. Adjust front cramps up to within about $\frac{3}{8}$" and the top hold-downs to within about $\frac{1}{4}$" of the wood. See that tool head can descend a clear 6" without striking any part of the table. Switch on pump motor.

Keeping foot pedal to the right, depress firmly. Both horizontal cramps and vertical hold-downs should close smartly on to the wood and the tool head descend 3", that is until stop B strikes swinging stop-piece M. Still holding the pedal depressed swing the toe to the left. Tool head will now descend a further 3" but at a slower cutting speed, until stop A strikes stop M.

Release the pedal and head will ascend 3", the cramps still remaining closed. These latter can now be tested. If functioning correctly the vertical hold-downs should be held firmly down on the wood and should resist all efforts to raise. The front horizontal cramps should be closed firmly but these can be forced open if sufficient power be used.

Pushing the pedal over to the right-hand side will immediately cause the tool head to rise to the uppermost position and all cramps to open.

NOTE If after carrying out the above instructions the tool head moves with a jerky motion it indicates that some air still remains in the power cylinder. This must be released through caps P following the procedure as before.

To replace the distance piece in the head slide it is only necessary to press the pedal so that the head descends. Keeping the pedal pressed locate the distance piece, and then easing the pedal carefully allow the head to ascend gently until arrested by the distance piece. No harm will come to the machine in any way as the relief valve will lift as the head is arrested. The only care is to avoid trapping fingers.

Now proceed as under "To remove air from power cylinders".

Work hold-downs failing to lock down solidly on to the wood also indicates air. This must be removed.

The pump control adjustment Y is set prior to despatch. To check however, especially after use when the traverse speeds may appear unbalanced, press the pedal to cause the head to descend approximately 3" and switch off the pump motor. Place the control handle E at the uppermost position at SAFETY. Press the pedal firmly and switch on the pump motor. The head should remain stationary, or if there is any movement it should be very slow indeed.

A setting which gives a very slight tendency for the head to move upwards is preferable if a dead stationary position cannot be obtained.

The adjustment is on the two nuts Y. To correct a tendency

for the head to descend turn the nuts clockwise. For tendency to ascend turn them anti-clockwise. Lock them solidly against one another.

After some use the accumulator spring W may fail to compress or may do so too slowly. First check the pump control adjustment as above, and see that priming screw J is tightened home. If trouble persists lower stop C slightly, first suitably adjusting screw O. When functioning properly the tool head slide should pause about $\frac{1}{8}$" before reaching the fibre buffers S, the spring be compressed moderately quickly, and the head slide then finally moved firmly against the buffers. If stop C is too low, excessive noise and undue load on the pump motor will be caused when idling. If too high, the spring W will not compress and the tool head slide will "flutter" when idling at the top of its stroke.

Should the system at first not function as outlined above although these instructions have been carefully followed, do not assume that some part is broken or has become deranged. A very small quantity of air in the system will cause what appears to be serious trouble. Loosen or remove bodily both priming screws J and K, switch on motor and move pedal up and down. Agitation of oil will plainly show when the pump is working properly. With pedal in the normal "released" position oil should flow in at K and out at J. Depressing the pedal reverses the flow. Keep pedal to the right when doing this.

Maintain level in oil gauge. Remove strainer Z and clean periodically. Use only the recommended oil - Mobil DTE light.

NAPD No additional precaution is necessary on machines fitted with "Electromatic" Device, and air in this attachment being self clearing. It will not however, function satisfactorily until after having been operated for a few minutes. See instructions under "Electromatic" Device.

S E C T I O N T W O

MORTICE CUTTING METHODS

The machine can be operated in many different ways as may be best suited to the work in hand, the only important rule relates to stop B and knurled adjuster barrel F - as follows:-

NAPD IMPORTANT The lettering on stops B whichever is being used must coincide with that on the adjuster barrel F, that is the stop reading "PEDAL ONLY" must only be used with barrel F in "PEDAL" position and vice versa. The stop carrier bracket is liable to be broken if the "PEDAL" stop is used with the auxiliary rod in the "AUTO" position.

Operation by Pedal

Assume that the cutting tool, either chain or chisel as may be, is in position and properly adjusted, and the piece to be morticed is in position on the work table.

Fix the main cramps so that the cramp face is about $1\frac{1}{2}$" distant from the face of the wood when the quick adjustment ratchet bar is in the back position. The cramps are then instantly adjusted by merely being pushed forward against the wood, the actual cramping being effected automatically as described later. The top hold-downs must be adjusted by means of the set screws provided to within about $\frac{1}{4}$" of the top face of wood. These will also close automatically later.

Adjust work table position by means of the handwheels in the usual way to a convenient working position making certain that the cutting tool when descending will not foul the hold-downs or back fence of table.

Measure the distance from the bottom of cutting tool to the top face of wood and fix stop B (marked "PEDAL ONLY") with the pointer at the same reading on the scale. To this measurement add that of the depth of mortice required and fix stop A at the combined reading (e.g. distance of tool to wood say 3", Mortice depth $2\frac{1}{2}$". Fix stop B at 3" and stop A at $5\frac{1}{2}$"). Place cramp control handle D in AUTO position and feed control handle E in the SLOW POSITION to commence with. Switch on both motors.

Keeping the pedal over to the right depress firmly. The tool will now descend quickly, automatically stopping about $\frac{1}{4}$" short of the top face of the wood. Meanwhile all the work cramps will have closed firmly on to the wood. Still holding the pedal depressed, slide it over to the left. The tool will now penetrate into the wood, again automatically stopping when the depth of $2\frac{1}{2}$" previously set has been reached. Release the pedal, still keeping it to the left, and the tool will withdraw from the wood, again coming to rest just clear of the top face of the wood and with the work cramps still firmly closed on to the wood.

The cutting stroke can now be repeated as required by alternatively depressing and releasing the pedal, keeping it held to the left side the whole time. When the mortice is completed, move the pedal over to the right and release. The tool head will ascend to the uppermost position and the cramps automatically re-open.

NOTE Feed controller E is operative only when the pedal is held over to the left and then controls the downward movement of the head only. The upward or withdrawal movement is always at the fastest rate irrespective of the position of either pedal or control handle.

The tool head movement is controlled solely by the pedal movements and may be started, stopped or reversed at any part of the stroke. There are no gears, clutches, levers or other mechanism to become damaged or broken through misuse.

The position of the control handle E governs the maximum rate of penetration for that position only. If desired, the tool can be "felt" into the wood exactly as with the common type of

hand lever machine by merely "Feeling" the pedal; but by keeping the pedal to the left, the tool cannot be made to go faster into the wood than the selected rate no matter how hard the pedal may be depressed.

On work which can be completed by one stroke only of the cutting tool, the intermediate stop B can be dispensed with and the pedal held permanently over to the left by dropping retaining piece (g), the table being adjusted to bring the work fairly close up to the cutting tool to save idle motion. The operation is then by depression and release of the pedal only with no sideways movement.

NAPD Electromatic Device

This attachment is self clearing of air and needs no special attention. It will not however function correctly until all air is removed which can be done satisfactorily by merely operating the machine.

Preliminary directions

First ensure satisfactory working by pedal as directed above, removing the cutting tool to guard against accident and damage. Place any suitable piece of wood on table and suitably adjust cramps to working position to obviate excessive movement of the cramp plungers.

Note that tool head can descend a clear six inches without striking any part of the table.

Remove stop B (marked PEDAL ONLY) and fix stop A, at say 5" on the scale. Lift knurled barrel - nut F slightly and give one quarter turn to the right to bring the word AUTO into alignment with the pointer, making sure that the clutch dogs inside the knurled barrel have re-engaged properly. Move pedal Q over to the left and secure by dropping retainer piece (g). Fix stop piece B, fig.2 (marked AUTO ONLY) at say 3" on the scale. Plug in floor switch (a) Fig.1 at socket (b). Place cramp control handle in AUTO position as shown in Fig.2. Turn knob G Fig.2 to show the word INSTANT. Unscrew thumbscrew H about three turns. Switch on pump motor.

Depressing switch (a) will energise the solenoid magnet which in turn will move the first valve to allow oil to enter the Valve Control Block.

In this first instance probably nothing further will happen owing to the presence of air. Release the switch, wait a few moments to permit the recharging of the accumulator and again depress, repeating this action until lever (c) operates smartly against the collar thus lifting the control rod in the same manner as it was previously lifted by the foot pedal.

The control should now operate normally and may be tested out as follows:-

Retaining all adjustments as above and with the pump motor running, depress switch (a) and hold depressed. The cramps

should instantly close and the tool head descend at a controlled speed as set by control handle E, reversing instantaneously at a depth of 5" as previously set by stop A, ascend quickly for 2" as set by stop B, and again instantly reverse to make a second cutting stroke at the controlled speed This action between stops A and B will be repeated so long as the switch is held depressed except that the number of strokes is limited by capacity of the spring loaded accumulator W. Releasing the switch at any point will cause the head to ascend the top-most position and the cramps automatically to re-open.

Turn knob G Fig.2 to show the word DELAYED, screw home clock-wis the thumb screw H and then turn back by one full turn (in effect opening a small needle valve by one turn). Depress switch (a). The tool head will not now respond instantly but after a short interval or delay, the length of the delay being governed by the adjustment of thumb screw H. This delay will have effect at all upper reversals of the head both at the full and intermediate stroke positions. The lower end reversals will remain instantaneous as before.

The "delay" period can be eliminated at any time by merely turning knob G to show the word INSTANT, one idling stroke then being necessary to locate the operating piston.

The control cannot operate with needle valve H completely closed and knob G in the DELAYED position, and may not do so in the INSTANT position. Keep needle valve H partially open at all times.

A work operated table switch is provided for in place of floor switch (a). This may be bolted to the table as provided for and so adjusted against the side face of the wood that the pressure roller is depressed about $\frac{1}{4}$" or a little less. This adjustment should be carefully made to ensure an effective electrical contact being made to prevent "Fluttering" of the solenoid, but yet not so hard as to prevent easy movement of the wood across the table. The mere action of placing the wood in position against the roller will then cause the machine to operate as described above. The operation can be stopped immediately at any time by striking the STOP knob, the tool head then instantly returning to the uppermost position and the cramps opening. Lift the knob to operate again.

Operation by Electromatic Control

Set up exactly as described under "Operation by Pedal" excepting only for the following THREE IMPORTANT rules:-

Knurled nut F must be turned to bring the word AUTO in line with the pointer.

Pedal Q must be moved to the left and retained there by retainer piece (g).

Intermediate stop B if used must be that marked AUTO ONLY.

Failure to observe any one of the above may result in broken mechanism or tools.

Procedure may then be generally as described under one of the following examples, all of which are applicable to a single head machine using either chain or chisel cutting tool. On multiple-head machines the same general rules apply but production can in most instances be increased.

1 Cutting a mortice requiring one stroke only of a full size tool.

Remove intermediate Stop B. Set stop A at the requisite total depth of stroke. Place control handle E at estimated suitable speed position and cramp control handle at AUTO. Lock table in position by means of table locating stops. Adjust work locating stops and work cramps.

The method now employed may be either one of two alternatives:
(i) Turn knob G to show INSTANT and plug in foot switch (a). The mortice can now be cut by placing the wood in position agains the work stops, depressing the switch which can be placed in any convenient position, and again releasing the switch when the tool head has completed the downward stroke and commenced to ascend.

(ii) Turn knob B to show DELAYED, fix table switch in position, suitably adjust to make contact and plug into socket. The mortice can now be cut merely by pushing the wood past the roller and under the cramps up to the work locating stop, the "delay" action permitting this to be done before the cramps close and the wood again removed between the strokes whilst the cramps are still open. The operator has only to handle the woods, and the machine will wait indefinitely until each piece is placed in position on the table.

2 Cutting a series of similar size mortices in the same piece of wood by means of a full size cutting tool.

Many alternatives are offered, some of which are as follows:
(i) Using floor switch (a), omitting intermediate stop B; knob G on INSTANT; work table locked in position and a series of spring work fences fixed in long work stop-bar to locate the positions of the mortices. The wood is now placed in position against the spring stops in turn, each mortice being cut by one depression of the switch.

(ii) Set up as above but using the table switch instead of floor switch (a) and with knob G on DELAYED, and thumb screw H about one half turn open. The woods can now be "threaded" through the cramps, slightly beyond and back against each spring fence in turn, the DELAYED action permitting this to be done whilst the cramps remain open between each stroke. The action automatically commences when the wood depresses the switch roller and ceases when passing clear.

(iii) Using intermediate Stop B and table stops to locate mortices, one work fence stop to locate wood on table, knob G on DELAYED, floor switch (a). Depressing switch causes first mortice to be cut and head automatically to re-ascend to intermediate stop, the table being moved to next position during DELAYED period, the cramps remaining closed on the woods.

Releasing switch permits head to ascend to top-most position and cramps to re-open.

3 Cutting elongated mortices, especially when near the end of long pieces.

(i) Set up as in paragraph 2(iii) above, using table stops to govern length of mortice and work fence stop to locate wood on table.

Ensure that table moves freely in slides. After first stroke, traverse table to elongating position during the DELAYED period, the wood still being held in cramps, releasing switch at commencement of ascent of finishing stroke.

(ii) Set up as in paragraph 2(ii) above. With table locked in one position, and using table switch, together with two work fence stops, to locate and control length of mortice to be cut, the wood is moved in the cramps during the DELAYED period to cut an elongated mortice.

4 Cutting a series of elongated mortices all of the same length

(i) Set up as in paragraph 3(i) above using additional work fence stops to locate position of mortices.

(ii) Set up as in paragraph 3(ii) above, locking table in one position and using additional work stop fences to control both length of mortice and position.

5 Cutting a series of elongated mortices of unequal lengths

Set up as in paragraph 4(ii) above, using work fence stops as required.

Many other methods will suggest themselves to the user with experience. In many instances the operator need not touch any part of, or even approach near to the machine after it is once set up. This particularly applies to the boring or morticing near the end of moderately long pieces. The remote control switch (a) brings the operating point to the position most convenient to the operator. The table switch abolishes the operating point entirely, the operator having to handle the woods only, the Brookman Hydraulectric Morticer then operates itself.

IMPORTANT: Ensure that the work table is locked or has restricted movement only when using large size chains with the automatic action. Otherwise the table may "run" and cause damage.

The Brookman "Hydraulectric" is extremely simple to "set up" and operate, but in common with all other automatic machines some little care is necessary at first. It is safer when first trying out a new "set up" to lower the work table beyond the reach of the tool head and to mount the cutting tool or tools after the automatic movements have been tried out and proved to be satisfactory. A few moments only will then suffice to bring the table up to the correct depth of cut.

S E C T I O N T H R E E

GENERAL FEATURES, ACCESSORIES & LUBRICATION

Controls concerned with the operation of the tool head are dealt with in Section Two. The following paragraphs deal with the operation of the morticer in the areas of the Work Table and Cramps and the like.

Table Cramps and Hold-downs

The Work Table is provided with two horizontal cramps and four vertical hold-downs. The cramping action, both horizontal and vertical is normally automatic, under hydraulic power. Control handle D (fig 2) if kept in the horizontal position will cause the cramps to operate automatically, the cramps closing immediately the tool heads begin to descend, and will remain closed until the head returns to the uppermost position.

To operate the cramps independently of the tool head movement the handle D is moved to the lower six o'clock position. To open the cramps, or to put them out of action, move the handle D to the upper twelve o'clock position. Handle D must be returned to the horizontal nine o'clock position to re-establish automatic operation.

Each of the horizontal cramps can be isolated by closing the gate valve T in either case.

Should the Work Table be required clear to enable morticing panel components or similar the complete cramp unit can be bolted on to the mounting provided at the ends of the Work Table. The cramp should be isolated by the Valve T, in these circumstances.

The horizontal cramps can be positioned, in a series of positions along the length of the Work Table. An initial adjustment, for width of stock, is made by moving the upper block across the lower bracket. A secondary adjustment is by the ratchet location of the cramp barrel. The ratchet is cleared by lifting the handle which protrudes from the block. If advantageous the ratchet can be cleared between each operation to facilitate loading and unloading.

The hold-downs should be adjusted to within $\frac{1}{4}$" approximately of the upper surface of the wood. Adjustment can be at the upper or lower set screw or at both.

Table and Work Location Stops

The table is provided with stops to position the cross traverse motion; these are employed to govern the amount that the table can be moved when cutting a mortice requiring several strokes of the cutting head. Normally two pairs of stops are provided so that two different lengths can be cut. There is ample room to employ additional pairs if necessary.

The stops are provided with ramps on the outer sides, so that the spring loaded bar against which they locate will lift itself to enable the run-in to a pair of stops. To pass the stops the bar is withdrawn by means of the trip handle (d).

The work locating stop bar bolts into a recess in the back fence of the table. It is provided with a number of tapped holes so that it can be bolted on in a variety of positions; that is centrally, or with the bulk of the bar to the left or to the right. The bar can also be turned over thus avoiding the need to change over each stop individually when changing the side from which the wood is to be worked.

One solid stop; and two sprag disappearing stops are provided as standard. The bar will, of course, accommodate many more stops if necessary.

The table rise and fall is locked by a handle (e) in the boss immediately behind the handwheel. The cross-slide by a handle (f) just above the rise and fall handwheel. The table traverse motion is locked by locating a pair of the table stops hard up to each side of the locating bar.

NPHC Cutting Chains and Chip Breakers

The mounting for mortice chain cutting gear is orthodox except that the sprocket arbor rotates clockwise, viewed from the front, thereby causing the chain to travel down on the right, and up on the left. The thread to the sprocket securing nut has a LEFT HAND thread.

On single head chain models, a spring loaded chip breaker, of orthodox pattern, is provided to the left of the tool head.

A similar spring loaded bar, with a roller at the lower end, is provided to the right. This acts as a guard preventing the operator coming into contact with the chain on the more dangerous down side.

Each of the vertical hold-downs is provided with a drilled shoe, to which stripper woods can be secured by wood screws. The cutting chain can be caused to pass through such stripper woods thereby forming a first class chip breaker.

On triple head chain models spring loaded chip breakers are available as optional extras. They are nor normally provided because they must be removed to allow the tool heads to be adjusted to minimum centres. Moreover the stripper system as described in the previous paragraph is considered superior.

NPHC Chisel Attachment

The Chisel attachment, for use on Chain Head models, locates on to the chain guide bar mounting. It is first necessary to remove the sprocket arbor, which is detachable for this reason. Unscrew the centre retaining bolt, and withdraw the arbor.

The squared end of the auger spindle engages in the lower end of the motor spindle which protrudes through the tool head gear box.

NPHC Boring Attachment

This attachment, which is an optional extra, fits into the Chain head exactly as does the Chisel Attachment. The spindle is bored to accept $\frac{1}{2}$" diameter shanks to the boring bits.

Haunch Depth Stop

This is an optional extra and provides an intermediate depth between stops A and B. It is brought in and out of action by a handle positioned to the right of the tool head motor. The Stop, which is adjusted as are stops A and B, is positioned in relation to stop A to give the required haunch depth.

Lubrication

The greater part of the machine, being hydraulically operated with oil as the medium of transmission, is self lubricating. The oil level must be maintained in the gauge. If the level is allowed to get too low air may be sucked into the system which will interfere with the operation of the machine, and must be removed as described in the earlier part of these notes. The level is not critical, however, and replenishing is only necessary when the level is dropping low in the gauge.

The blend of oil recommended is DTE Light marketed by the Mobil Oil Co. In warmer climates a heavier oil of similar quality may be used. Heavier oil will improve the transmission properties and enable heavier cuts, particularly with hollow chisels, to be taken. It will however tend to retard the speed of action, especially of the cramps.

Similarly there may be some oil wastage especially from the cramp and hold-down barrels. These could be tightened up to avoid this, but it retards the return action of the cramps which in turn retards output and is irritating to the operator.

The strainer Z in the rear of the pump box will unscrew to facilitate removal for cleaning, which operation should be carried out approximately once every three months of general running.

Excepting the Single Chisel head model HCB.1 the tool head has a gear box at the lower extremity, and care must be taken to keep this well filled with good quality oil. We recommend Mobil DTE AA. A daily check is advisable. The latest machines are provided with dip sticks. The older models have filler cups, the level in these must be to the top, ie fill until overflowing. The check should be made when the motor head is not running.

The remainder of the machine needs periodic attention with the oil can. Oiling points are provided with thumb screw plugs. These are brought together over controller E in the case of the pump control mechanism. The slides on the tool head have wick feeders at the upper ends; there is also a wick feeder to the upper head arrester gear, this is situated in the aluminium cover on the top of the machine.

There are also thumb plugs in the balance spring drums at the top of the machine; these are above eye level and therefore not readily noticed. The remainder of the oiling points are readily apparent, excepting perhaps for the ball bearing on the top of the head motor. Some models have grease gun nipples, others an oil hole. On the oil type only a few drops are necessary. Excessive oil will run through into the motor. The newer machines have screw type grease caps. The latter are also fitted to the pump motor.

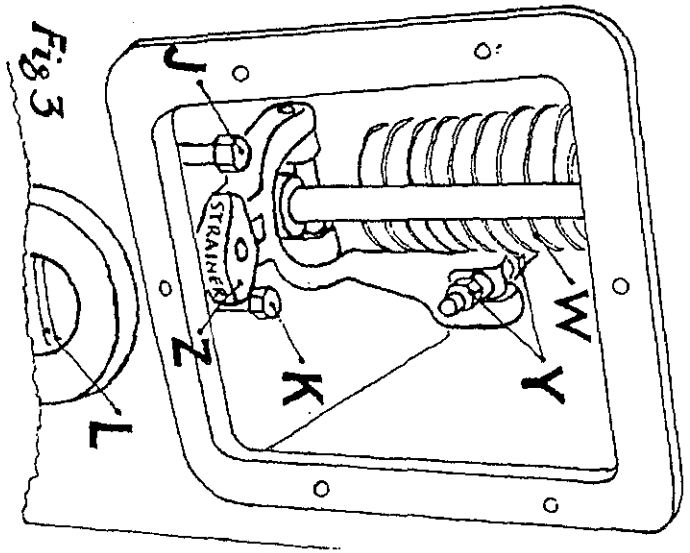


Fig 3

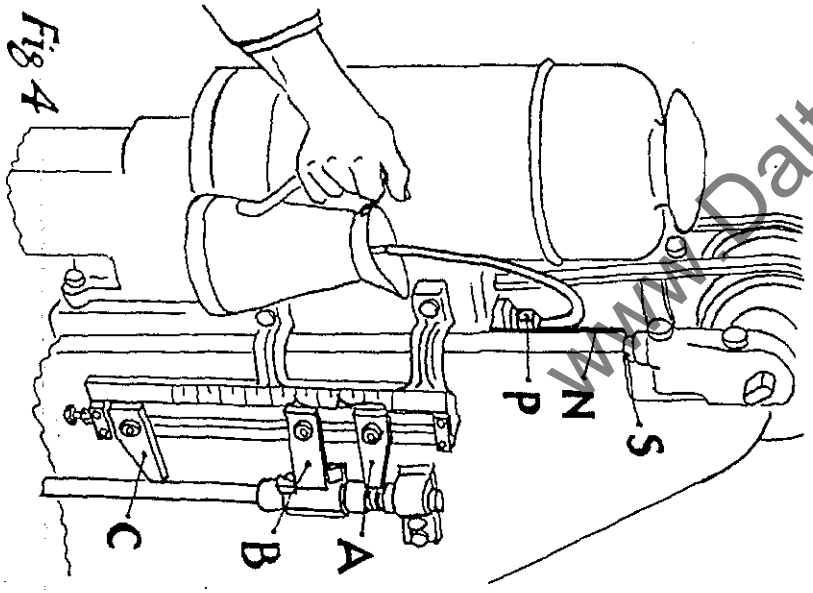


Fig 4

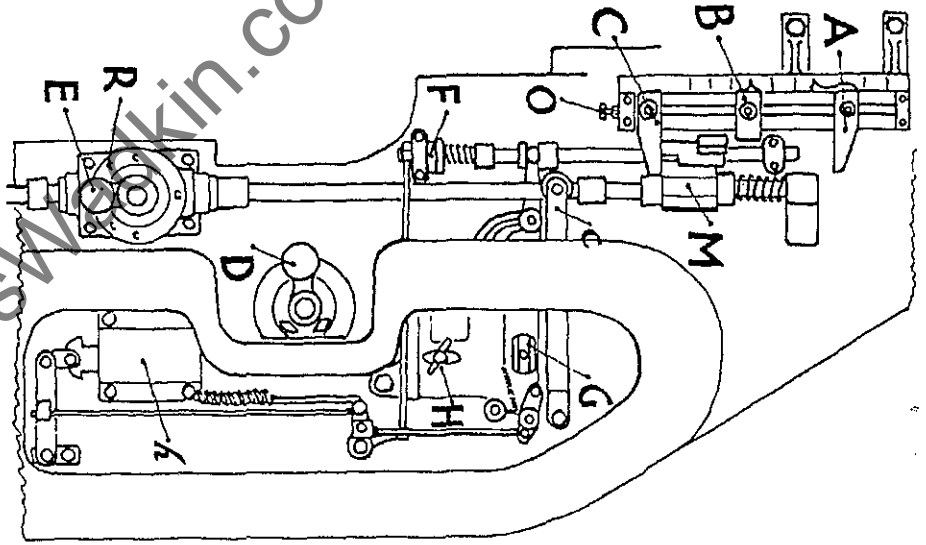


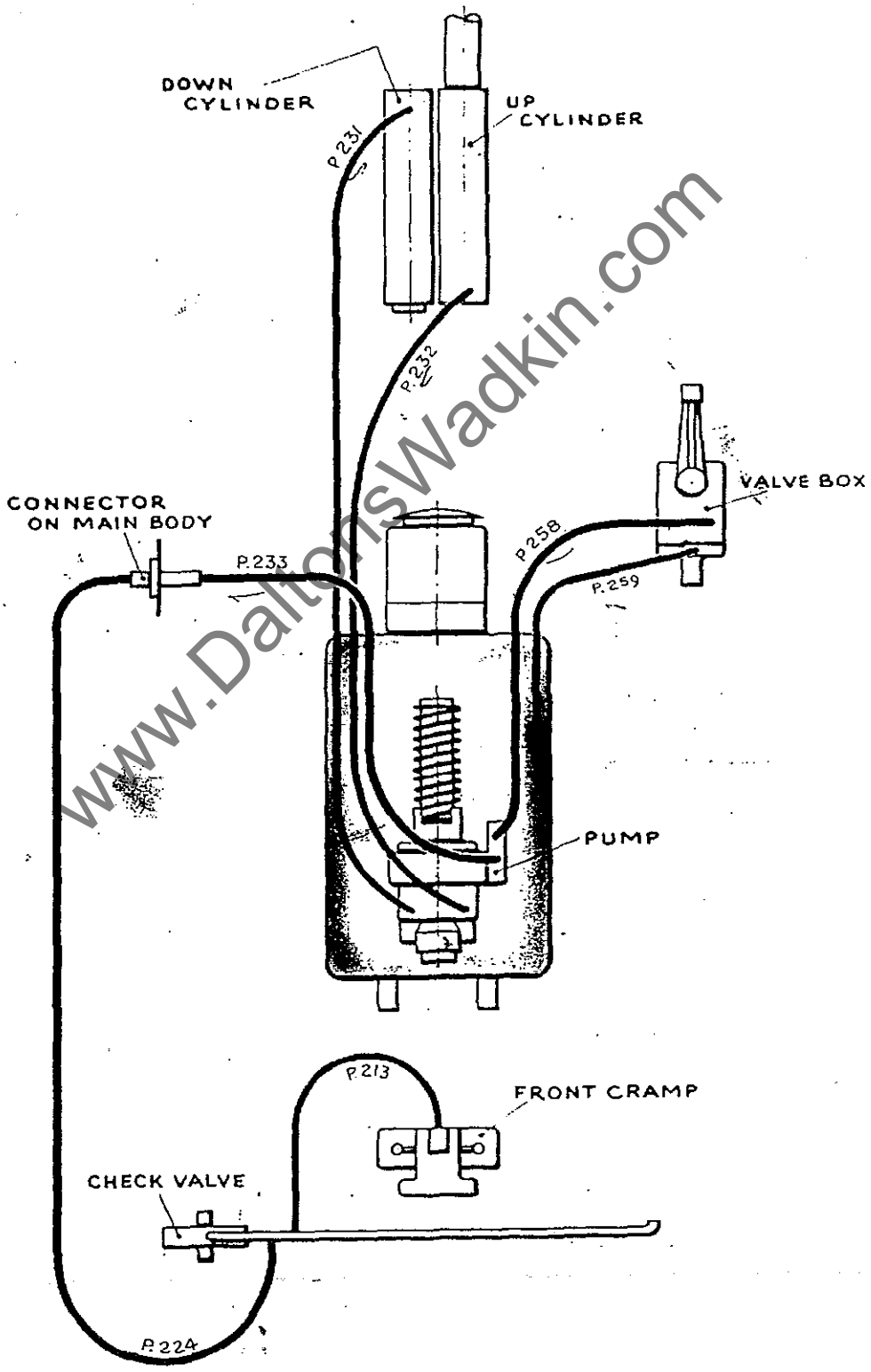
Fig 2

Brookman

HYDRAULECTRIC MORTICER

FLEXIBLE PIPES

VIEW FROM FRONT OF MACHINE

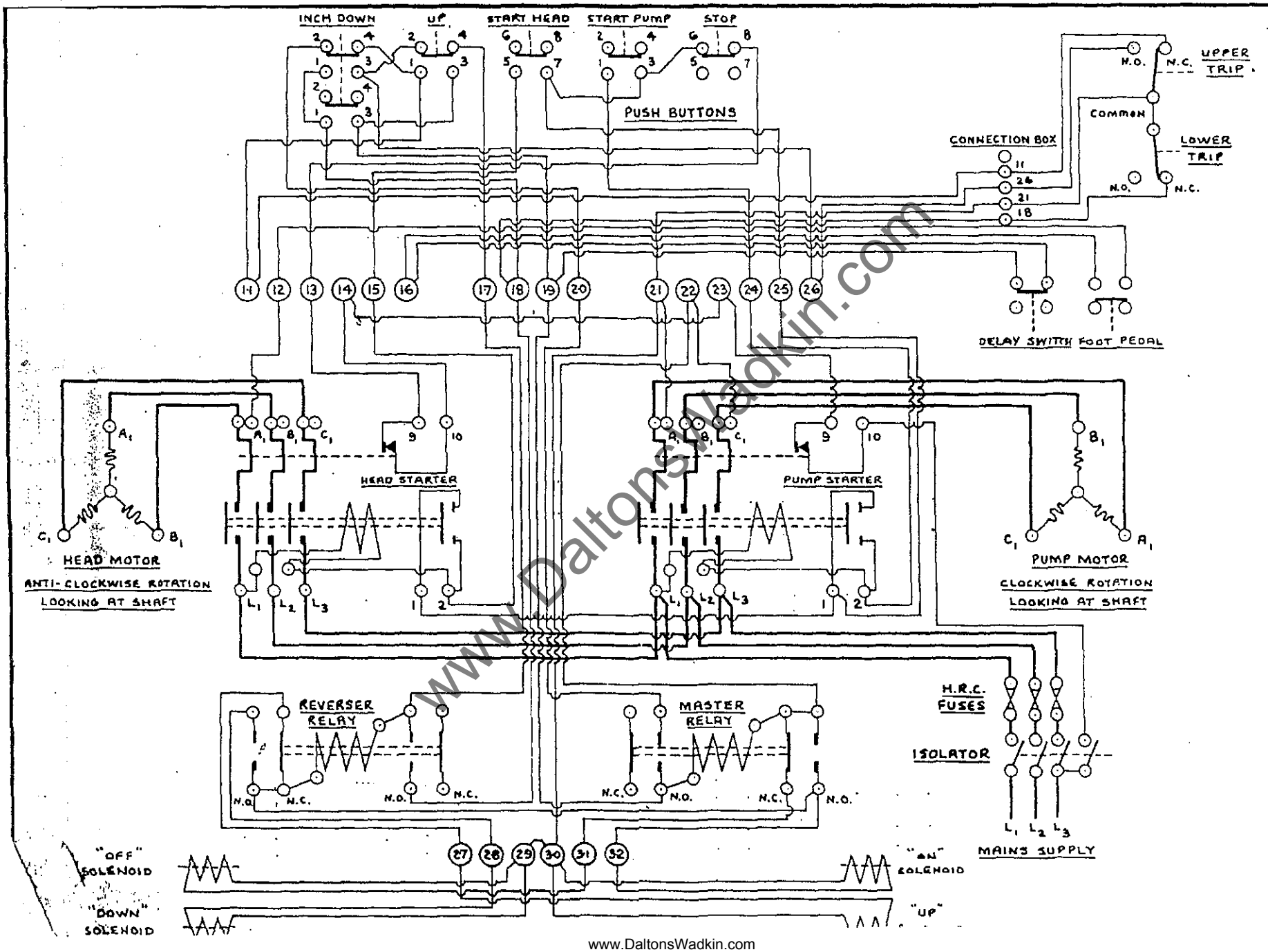


SERIES 2600 MORTICER

WIRING DIAGRAM

MACHINE TYPES: 2601 3PHASE A.C.

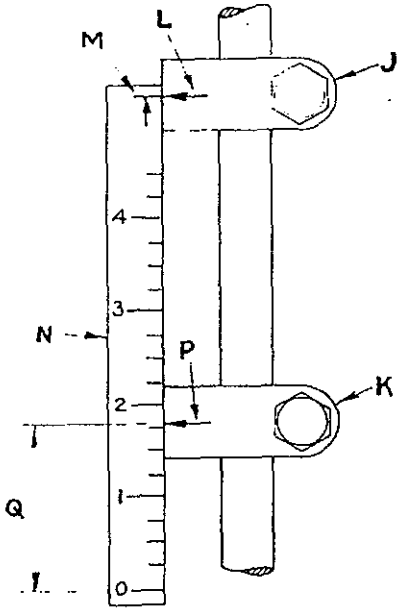
MACHINES SERIAL NOS. L2 &

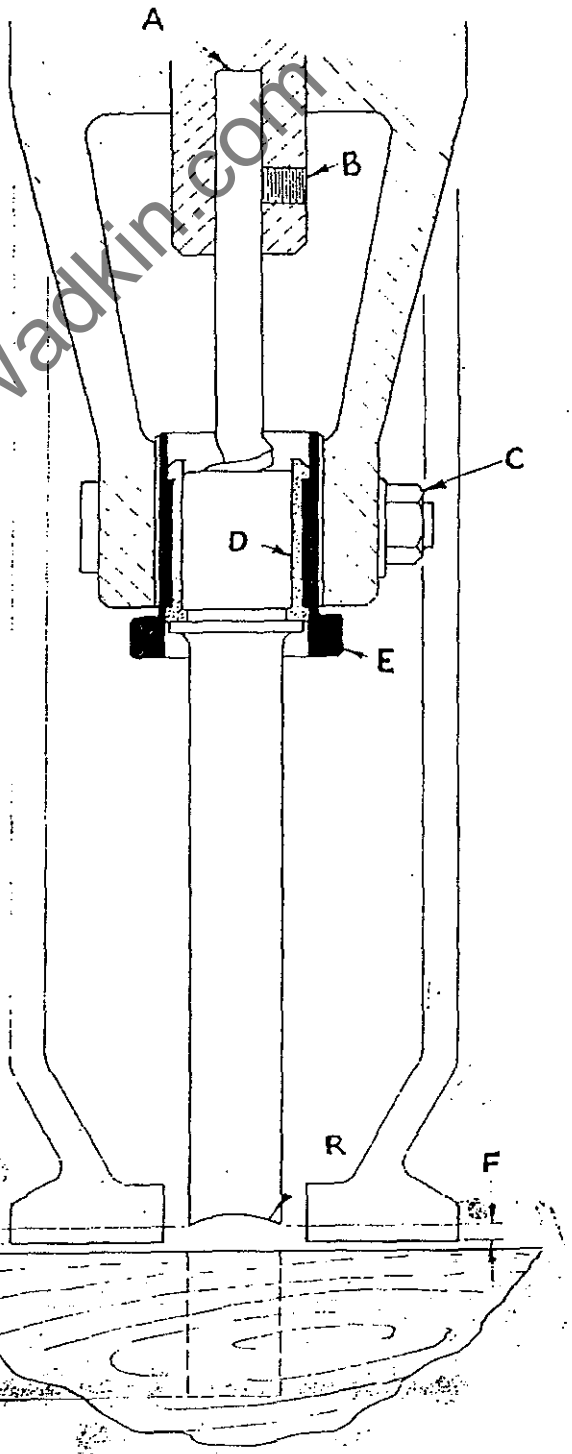


Brookman

SERIES 2600
MORTICER

SETTING-UP INSTRUCTIONS





TO FIT CHISEL

1. Insert auger into chisel.
2. Place collets D around chisel shank.
3. Insert auger chisel & collets complete into nut E and twist a quarter turn so that prongs of collets engage away from slots.
4. Make sure auger is seating properly at A. (Screw in nut E if necessary.) Lock screw B.
5. Screw back nut E to give required auger clearance at R. Square up chisel and lock nut C.

ADJUSTMENT FOR DEPTH

1. Place work to be morticed on table.
2. Wind head down until cramp face is about 1/16" clear of work at G.
3. Inch chisel down until tip is level or just above cramp face at F.
4. Move upper trip J up so that arrow L coincides with line M on scale N.
5. Move lower trip K so that depth of mortice required plus gaps left at F and G (ie. total measurement H) registers on scale N at Q.