

INSTRUCTION BOOK

6



**MODEL TV2 TURRET
MILLING MACHINE**

MADE IN ENGLAND

OPERATORS INSTRUCTION HANDBOOK

FOR THE



MODEL TV2

TURRET MILLING MACHINE

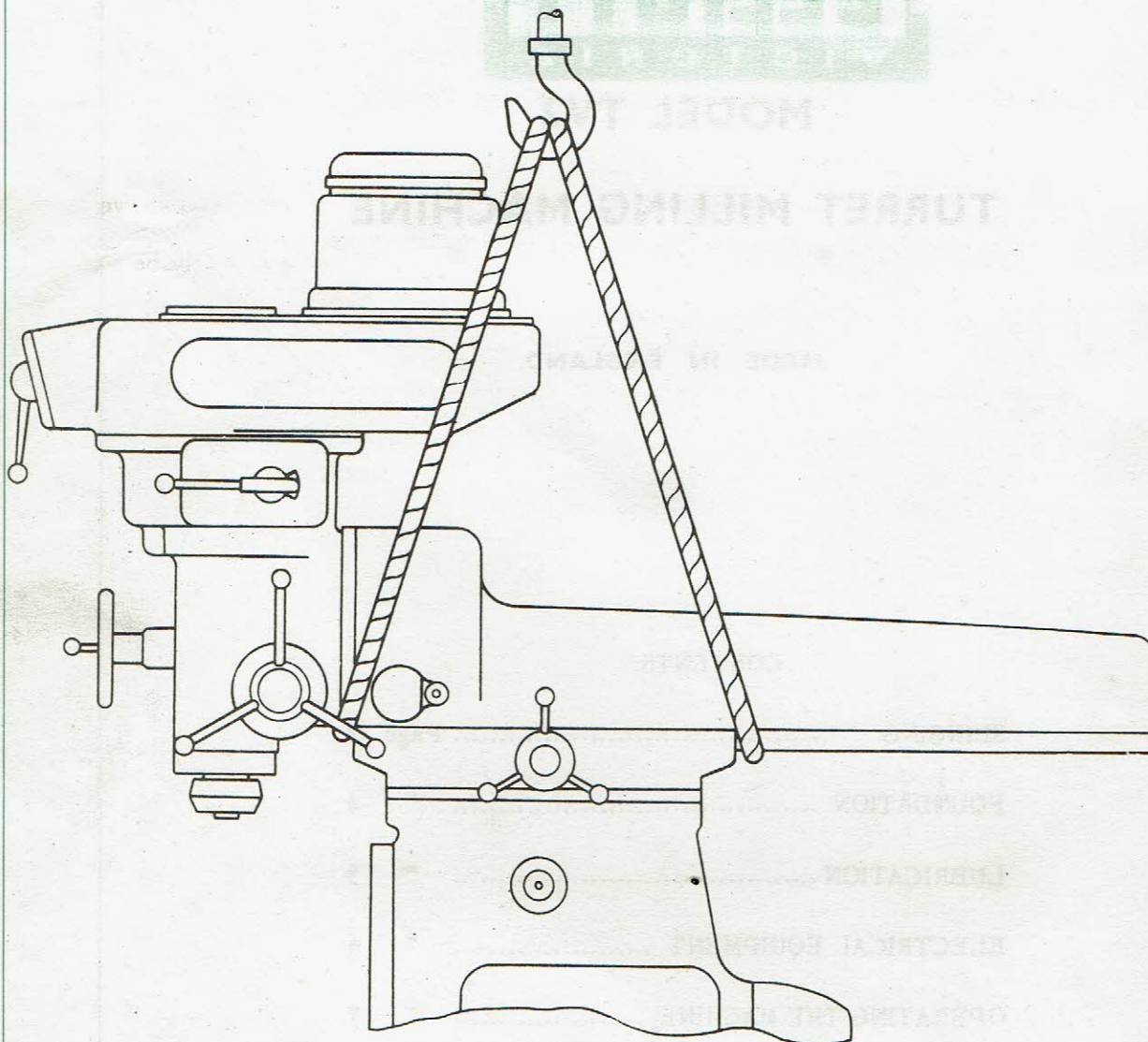
MADE IN ENGLAND

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SLINGING

The machine should be slung in the correct manner shown in figure 1. Sacking should be inserted between the sling and the machine at the lifting points to protect the paintwork and prevent any sharp edges damaging the sling. Ensure that the overarm clamping bolts and the column swivel locking bolts are tightened before lifting.



EXAMINATION.

Fig.1.

The machine should be carefully examined on arrival and any damage sustained in transit reported to the responsible authority without delay.

FOUNDATION (cont.),

CLEANING.

All machined surfaces are covered with a rust preventative which is soluble in oil. Do not use paraffin or thinners. After every trace of rust preventative has been removed the surfaces should be wiped with a clean dry cloth and coated with a film of light machine oil.

FOUNDATION.

The foundations should be prepared in accordance with the plan shown in Figure 2, particular care being taken to leave room for the operator to move freely between machines and for the rear door to be opened.

Suitable fuse protection for the direct starting $1\frac{1}{2}$ H.P. motor should be provided.

Lower the machine complete with rag bolts or bolts and plates onto suitable wedges or strips so that it may be correctly levelled before grouting down. Correct levelling is established by using a precision spirit level longitudinally on the table surface and transversely at each end.

After the wedges or strips have been adjusted, the usual procedure is to build a dam around the machine approximately 4" wide, by placing pieces of timber in position and filling up with grouting cement to 1" above the normal level of the floor. This procedure creates a 1" step around the machine which if considered objectionable may be overcome by laying the foundation 1" below normal floor level, leaving 4" all round for grouting.

FOUNDATION

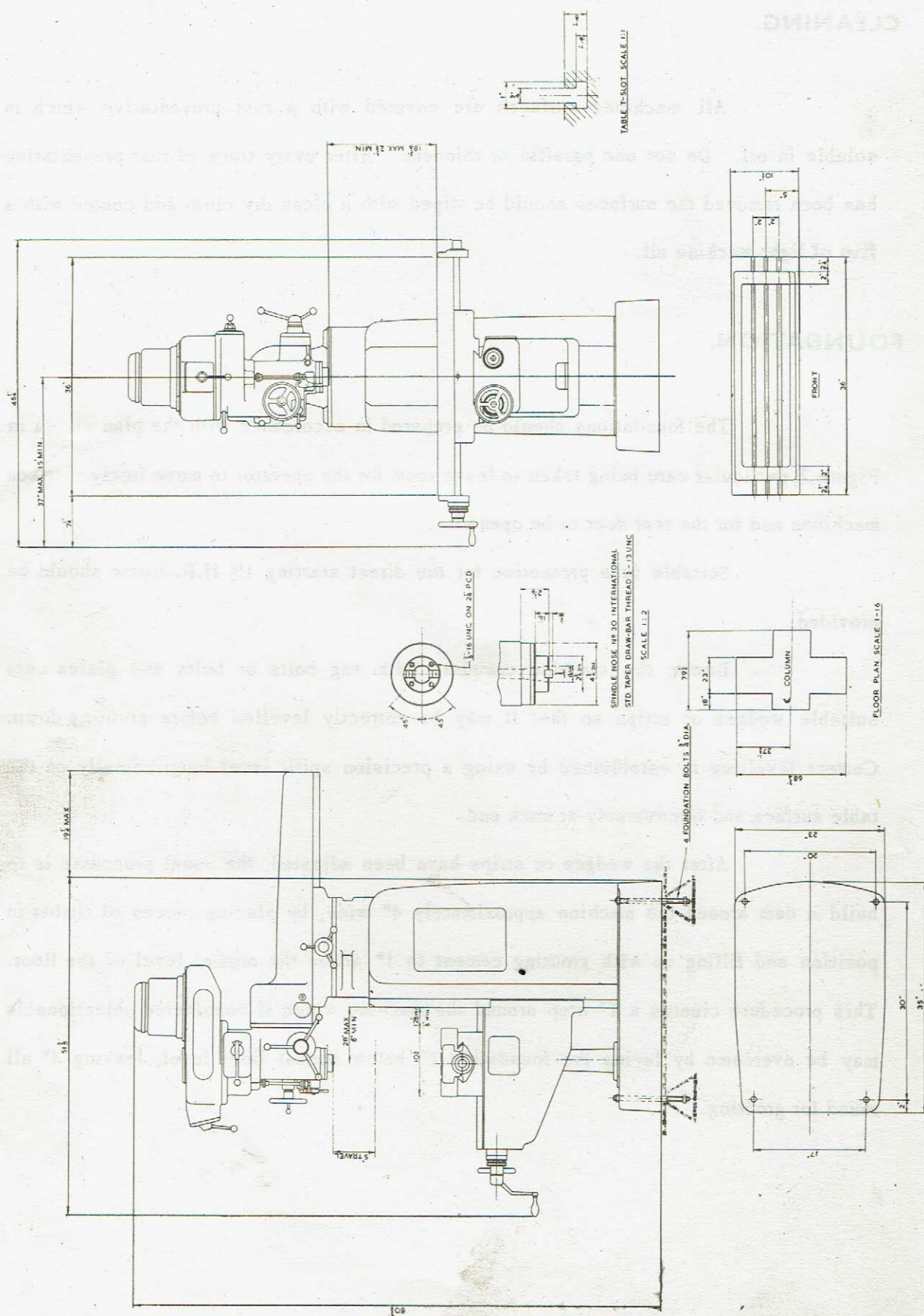
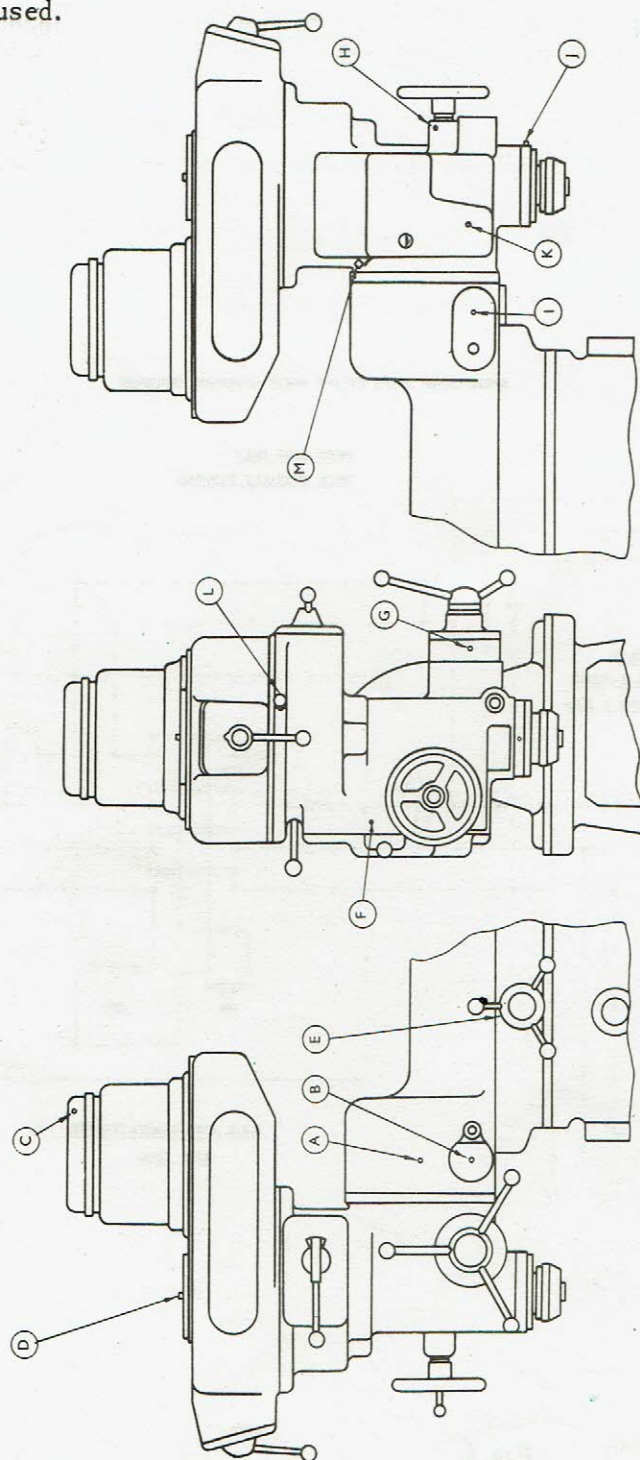


Fig. 2.

LUBRICATION

It is essential that the lubricating instructions given in figure 3 and the corresponding chart are followed in order to maintain the accuracy and smooth operation of the machine.

If the recommended lubricants are not available, branded equivalents may be used.



PART LUBRICATED	METHOD OF LUBRICATION	PERIOD	SHELL GRADE OF OIL OR GREASE
TABLE, SADDLE AND KNEE	OIL NIPPLE ON LEFT FRONT OF SADDLE	DAILY	VITREA 37 OIL
SADDLE AND TABLE UNIT	OIL NIPPLE ON EACH TABLE BRACKET	DAILY	VITREA 37 OIL
TABLE LEADSCREW BEARINGS	OIL BATH	MAINTAIN LEVEL ON RIGHT SIDE OF KNEE	VITREA 37 OIL
VERTICAL DRIVE GEARS	OIL NIPPLE ON EACH SIDE OF KNEE	WEEKLY	VITREA 37 OIL
VERTICAL KNEE SLIDES	OIL NIPPLE ADJACENT TO KNEE SIGHT GLASS	WEEKLY	VITREA 37 OIL
VERTICAL SCREW BEARING	OIL NIPPLE	WEEKLY	VITREA 37 OIL
CROSS & VERT. SHAFT BEARINGS	OIL DIRECT FROM CAN	DAILY	LIGHT LUBRICATING OIL

Fig.3.

ELECTRICAL EQUIPMENT

The head is powered by a 1½ h.p. flange mounted motor which is controlled by a reversing switch. No volt release is provided by the contactor.

A detailed wiring diagram is shown in figure 4.

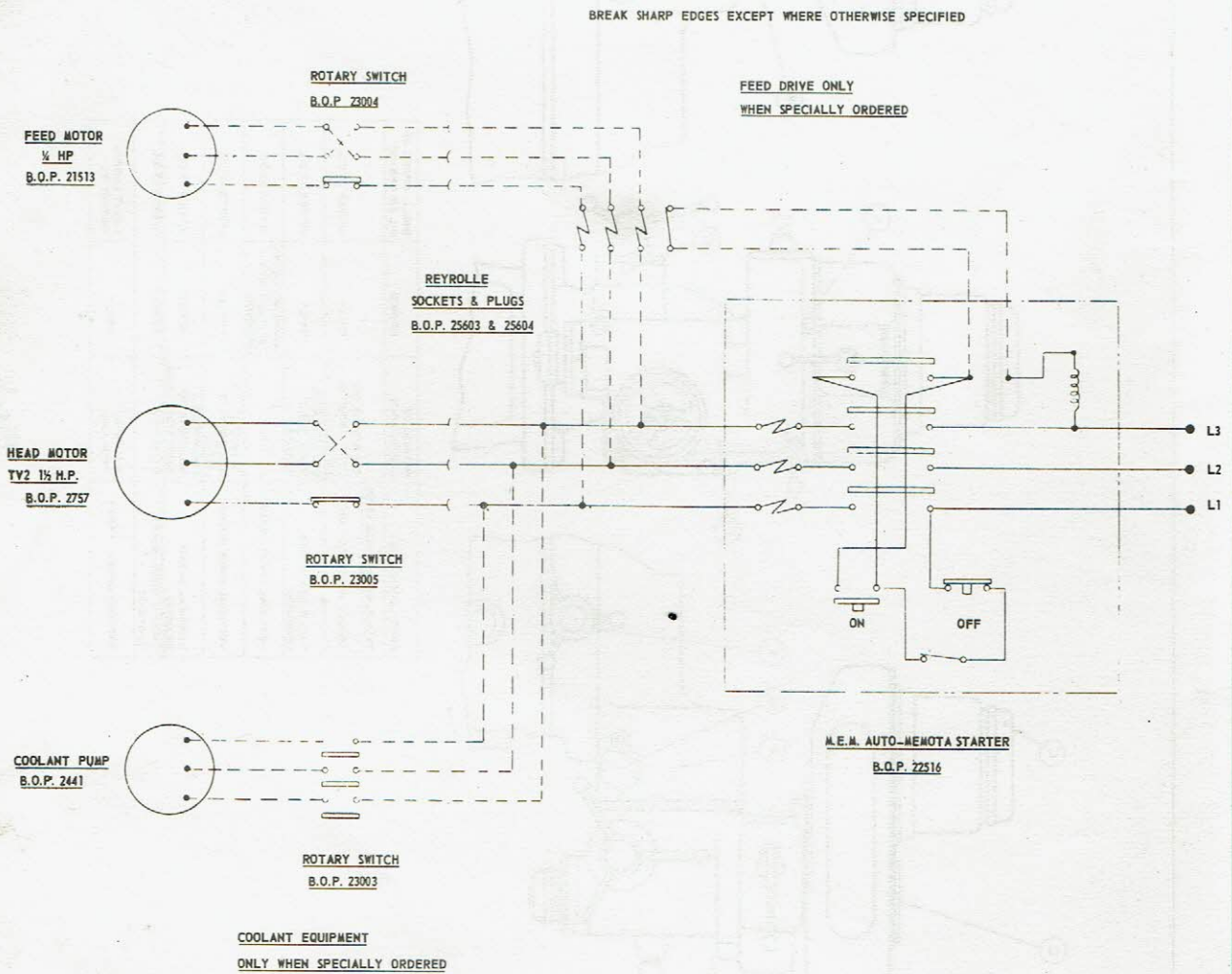


Fig.4.

OPERATING THE MACHINE

SPINDLE SPEEDS

Eight spindle speeds are available as indicated on the plate fitted to the head, the lower four being through back gearing engaged by lever B. A brake operated by lever C is provided for stopping the spindle after switching off the motor.

The motor and spindle must be stopped before attempting to engage back gearing.

To change the position of the driving belt on the vee pulleys, the three bolts D must be slackened off to enable the motor position to be adjusted using handle E.

SPINDLE FEEDS

Coarse hand feed is effected by the star hand wheel F which may be withdrawn from engagement if required when using automatic feed. A dead stop G is fitted which can be swung into position when required (Warning – ensure this stop is out of position when using power feed) and the lower knurled collar H adjusted to the desired position on the depth gauge screw. The lever I enables the quill to be locked in any desired position of its travel.

Fine hand feed is controlled by the hand wheel J after setting the plunger K in its neutral, or halfway position and then lifting lever L to engage the drive. Disengagement of feed may be made by moving lever M to the right or by one of the knurled collars H at the appropriate setting.

Automatic feed is engaged by lifting lever L after selecting the required rate and direction of feed. Three rates of feed are provided – .0015, .003 and .006 in. per revolution selection being by lever N. The feed rate may be varied without stopping the spindle. Selection of either up or down feed is by plunger K as indicated on the plate. It should be noted that the directions shown only apply when the spindle is rotating in the normal direction, i.e. with switch pointer A over to the left.

A slipping clutch is incorporated in the feed drive to prevent damage in the event of accidental overloading.

The feed may be disengaged automatically by setting either the top or bottom knurled collar H (depending on the direction of feed) to the appropriate position, or manually by moving lever M to the right.

TRANSVERSE MOVEMENT OF HEAD

Rack and pinion movement is provided for the transverse adjustment of the overarm, and this is utilised by the star hand wheel and shaft O, after slackening the clamping bolts P.

OPERATING THE MACHINE (Cont.)

ROTATION OF OVERARM ON COLUMN

The complete head and overarm unit can be swivelled through 360° on the column after slackening the four clamping bolts Q. The swivelling portion of the column is graduated $0-90^{\circ}$ each side of zero.

TILTING THE HEAD

This is effected by using the star hand wheel on shaft R after slackening the three clamping bolts situated at the rear of the head. Movement is by worm and worm wheel. The head is graduated $0-90^{\circ}$ each side of zero and a vernier scale is also provided.

TABLE MOVEMENT

Longitudinal hand feed is direct on the screw at the left hand end of the table, one revolution of the handle advancing the table $\frac{1}{4}"$ (5 m/m on metric machines). The graduated dial which is provided with a locking screw for setting to zero is calibrated in .001" (.02 m/m on metric machines).

The cross and vertical hand feed dials are also provided with locking screws and calibrated in .001" (.02 m/m on metric machines).

LONGITUDINAL POWER FEED UNIT (Extra Equipment).

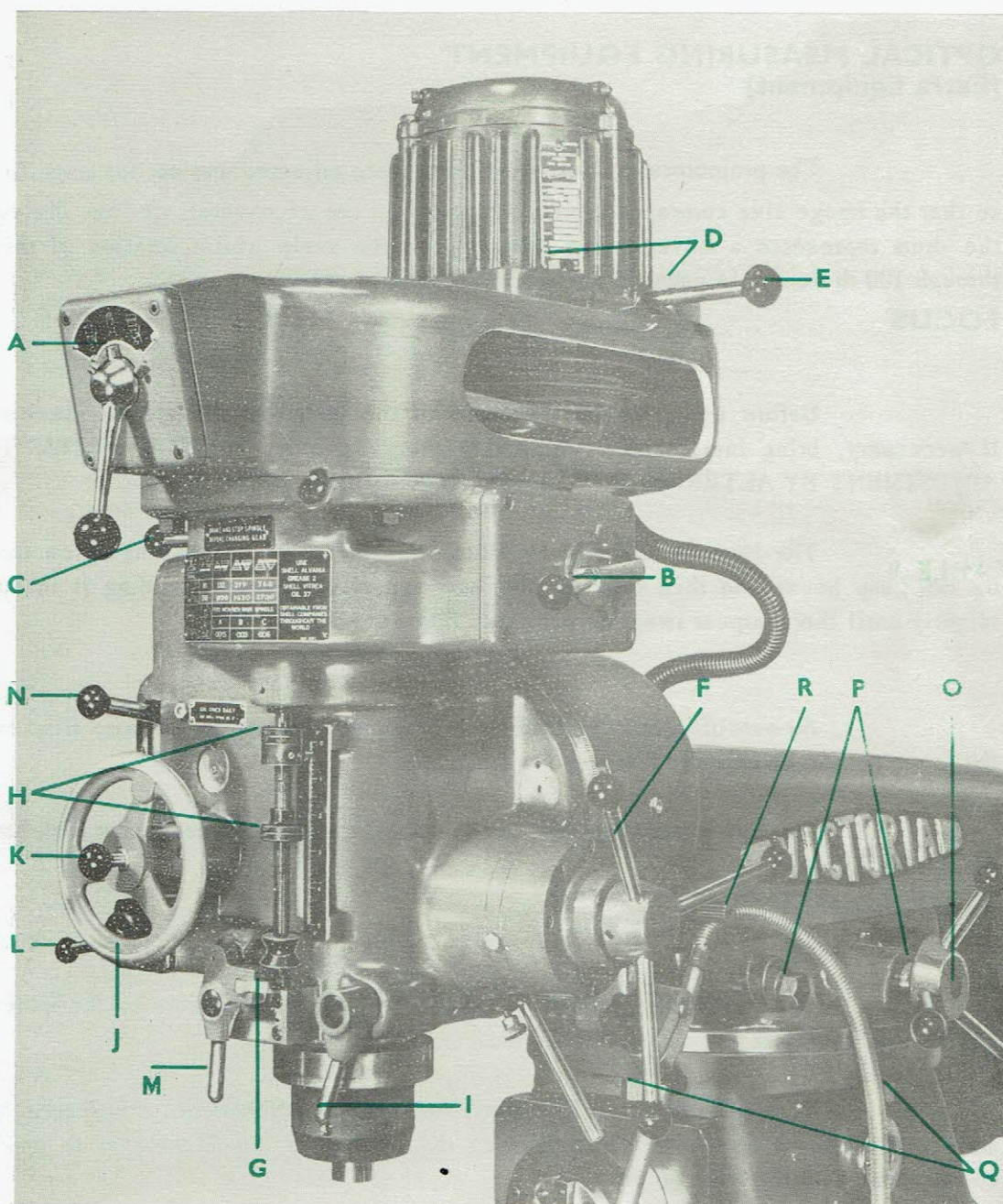
This self-contained unit, powered by a $\frac{1}{4}$ h.p. motor, provides six rates of table feed — .75, 1.3, 2.0, 3.4, 5.7, and 9 ins./min.

A reversing switch is fitted to provide feed in either direction and adjustable trips disengage the feed at any desired point over the table traverse.

COOLANT (Extra Equipment).

The coolant pump is operated by a switch situated on the electrical contactor panel on the right hand side of the machine. The base of the machine serves as a reservoir for the coolant and should be cleaned out occasionally. This is effected by removing the drain cover-plate on the left-hand side of the base casting, after having allowed the pump to drain the reservoir as far as possible.

The pump and coolant return cover should now be removed so that a scoop may be used for cleaning. When cleaning out the base it is advisable to clean the strainer on the coolant pump.



- | | |
|--|------------------------------------|
| A. Forward/reverse switch. | J. Fine hand feed control. |
| B. Back gear engagement lever. | K. Feed direction selector. |
| C. Spindle brake lever. | L. Auto feed engagement lever. |
| D. Motor clamping bolts. | M. Auto feed disengagement lever. |
| E. Motor positioning lever. | N. Auto feed rate selector. |
| F. Star hand wheel for spindle traverse. | O. Transverse movement shaft. |
| G. Spindle traverse dead stop. | P. Overarm clamping bolts. |
| H. Auto feed trip collars. | Q. Column swivel clamping bolts. |
| I. Quill locking lever. | R. Head swivelling movement shaft. |

Fig.5.

OPTICAL MEASURING EQUIPMENT

(Extra Equipment)

The projectors, as delivered, have been adjusted and set for magnification so that the image size corresponds with the travel on the micrometer, i.e. one division on the drum represents a movement of .0001 in. on the scale whilst rotation of the drum through 100 divisions is equal to one scale division of .01 in.

FOCUS

Before using, check the focus of the image on the ground glass screen. If necessary, bring into focus by adjusting the lamp only. DO NOT ATTEMPT ANY ADJUSTMENT BY ALTERING THE PROJECTOR - LENS UNIT.

The lamp is adjusted by slackening the knurled clamping screw situated on the lamp house and then rotating the lamp and simultaneously sliding it in and out slightly until the sharpest image is obtained. Then re-clamp.

An-out-of-focus condition can be caused by sag of the lamp filament and the focus should be checked from time to time.

The lamps used are Siemens 11 volt, 12 watt miniature lamps with bayonet fitting, No.X951259.

ZERO ADJUSTMENT

The scale may be slid along in the mounting brackets to facilitate zero setting and setting to the nearest whole number.

Also the projector screen unit has a linear adjustment to the extent of one main scale sub-division, which facilitates the setting of the micrometer to read zero co-incident with the work piece.

1. Set the micrometer to zero.
2. Slacken the small milled head clamping screw which is situated in line with the index mark.
3. Adjust by means of the longer milled head screw on the side of the projector body, so that the open lines of the index mark symmetrically

OPTICAL MEASURING EQUIPMENT (Cont.)

If when making this adjustment the movement of the screen appears to be unduly free, the two grub screws on either side of the clamping screw should be tightened sufficiently to provide a smooth, firm movement. These grub screws are provided with locking nuts.

EXAMPLE OF TABLE SETTING

To set the table a certain measurement, e.g. 4.7328 ins. from a predetermined position proceed as follows:

1. Slide the scale in the mounting brackets to read either zero or a convenient whole number.
2. Set the micrometer to read zero as described above.
3. Traverse the table 4.73 ins. reading from the screen.
4. Rotate the micrometer drum 28 divisions.
5. Traverse the table until open lines of index mark symmetrically straddle 4.73 ins. (or original setting plus 4.73 ins.) scale reading.

CLEANING

The projector lenses are bloomed and should be carefully cleaned using a silica-free tissue (such as is used for cleaning spectacles). DO NOT DISMANTLE THIS UNIT.

The condenser lens, which is exposed when the lamp and cooling disc on top of the lamp house are removed, should also be cleaned in a similar manner. It is convenient to wrap the tissue round the unsharpened end of a pencil or a similar object for this purpose. Do not use pressure on the lens surface.

The cover glass of the scale should be kept clean and free from oil by occasionally wiping with a soft clean rag, and the glass cover of the screen unit can be treated in the same way.

END MEASURING EQUIPMENT (Extra Equipment)

Consisting of dial gauges, housings and troughs mounted parallel with the longitudinal and cross traverses, this equipment provides a means of accurately setting the table independent of the accuracy of the traversing screws.

Using slip rods and a micrometer rod (which can be purchased in standard sets), together with the dial gauges provided, readings to .0001 in. can be made.

SPECIFICATION

RANGE	Longitudinal table traverse (standard table)	22"	560 mm.
	(special table)	28"	710 mm.
	Cross	12"	305 mm.
	Vertical	16"	405 mm.
	Quill traverse	5"	125 mm.
	Spindle to table—maximum	18½"	465 mm.
	minimum	2½"	60 mm.
	Centre of spindle to column face—maximum	28"	710 mm.
	minimum	6"	150 mm.
	Centre line of centre table tee slot to column face—maximum	17½"	450 mm.
	minimum	5½"	145 mm.
TABLE	Working surface (standard table)	36" x 10½"	915 x 265 mm.
	(special table)	42" x 10½"	1065 x 265 mm.
	Number and size of tee slots	3 x ⅜"	3 x 14 mm.
	Pitch of tee slots	2"	50 mm.
SPINDLE	Spindle nose	No. 30 I.S.T.	No. 30 I.S.T.
	Number of spindle speeds	8	8
	Range (50 c. machines)	80-2700 rpm.	80-2700 tr/min.
	(60 c. machines)	96-3240 rpm.	96-3240 tr/min.
	Feeds per spindle revolution0015", .003", .006"	.04, .08, .15 mm.
	Head swivels each side of vertical	90°	90°
	Power of motor	1½ hp.	1½ hp.
	Speed of 50 c. motor (sync.)	1500 rpm.	1500 tr/min.
	60 c. motor (sync.)	1800 rpm.	1800 tr/min.
GENERAL	Net weight (approx.)	2100 lbs.	955 kg.
	Gross weight (approx.)	2632 lbs.	1196 kg.
	Case size (approx.)	72" x 50" x 54"	3.2 m ³
	Code word	TUVTO	TUVTO
STANDARD EQUIPMENT. Complete 3-phase electrical equipment, operating handles and spanners, grease gun, operator's instruction book.			
EXTRA EQUIPMENT. Coolant equipment, base splash guard, longitudinal power feed unit, hydraulic copying attachment, slotting attachment, combined punch shaping and slotting attachment, optical measuring equipment, end measuring equipment, vertical and horizontal dividing head, plain and swivel base vices, self-centring shaft vice, rotary milling tables, boring heads, tool cabinet, collet chuck sets, low voltage lighting set, etc.			

All dimensions, weights, etc., are approximate only, and illustrations are not binding as to details as we are constantly improving designs.

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