

OPERATORS INSTRUCTION HANDBOOK
FOR THE

ELLIOTT

HIGH SPEED SHAPING MACHINES

MODELS

14M, 18M & 24M

Also

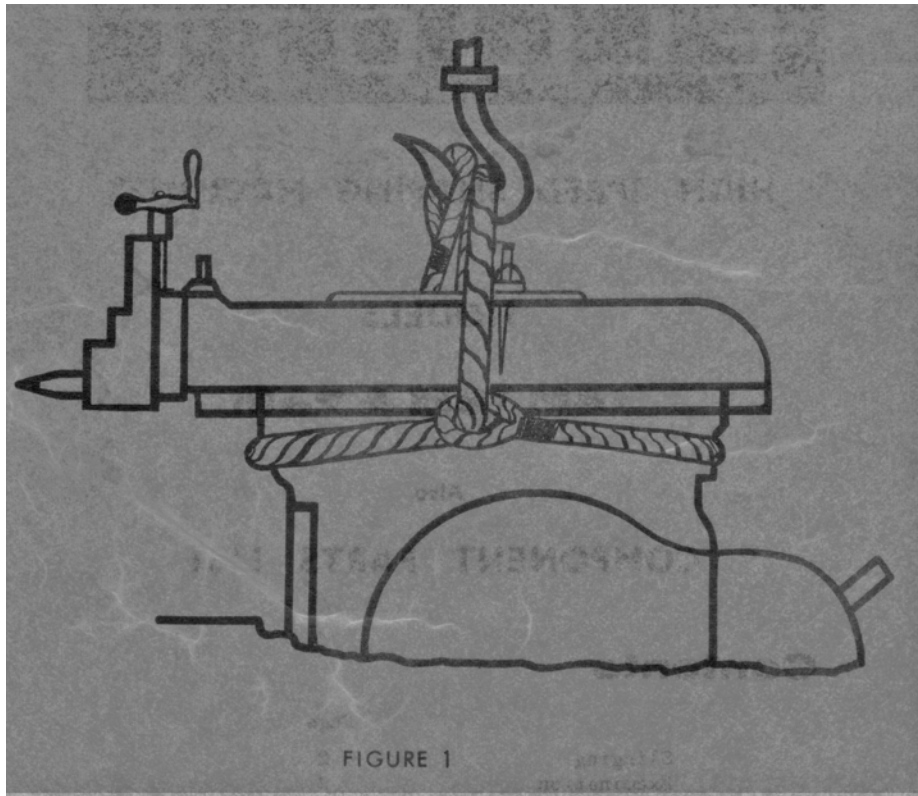
COMPONENT PARTS LIST

Contents

| | Page |
|------------------------|------|
| Slinging | 2 |
| Examination | 2 |
| Cleaning | 2 |
| Installation | 3 |
| Foundation | 4 |
| Lubrication | 5 |
| Operating instructions | 8 |
| Wiring | 10 |
| Maintenance | 10 |
| Extra equipment | 12 |
| Specification | 16 |

Slinging

In order not to disturb the alignment of the machine, care is required when lifting, and the method shown in figure 1 should be employed.



Examination

The machine should be carefully examined on arrival and any damage sustained in transit reported immediately to the responsible authority.

Cleaning

All bright surfaces are covered with a rust preventative which is soluble in ordinary machine oil. Do not allow the sliding members to be moved until all the protective material has been removed and

use only lubricating oil for this purpose.

Installation

Figure 2 shows the Foundation Plan which gives all the required dimensions for installation.

In order to ensure accurate and efficient operation, the machine should be correctly levelled and bolted to a good concrete foundation.

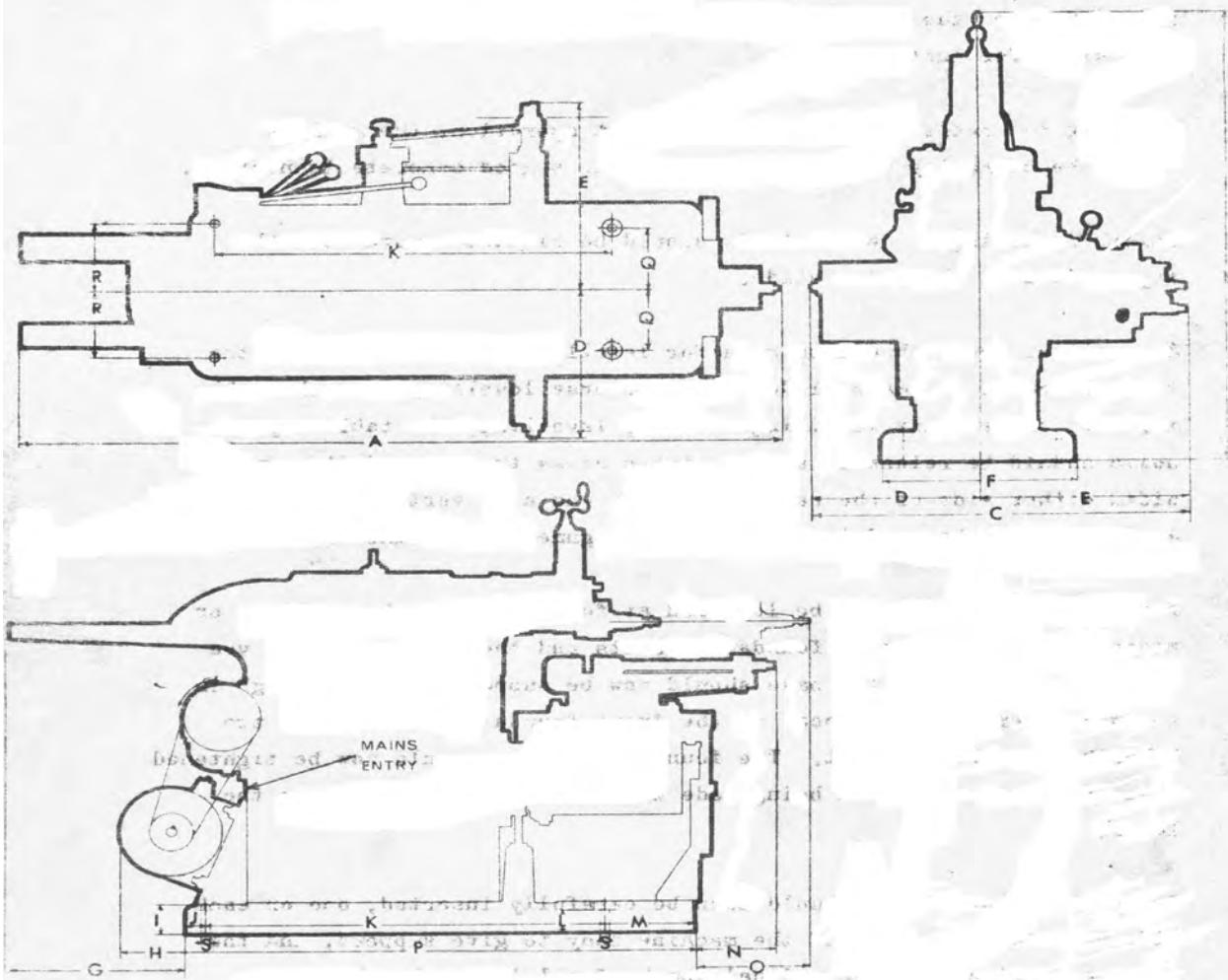
Before levelling, a swivel table should be clocked square with the top surface of the cross slide.

A precision level should be used for levelling the machine using the top surface of the main slide for transverse levelling, and the table top for fore and aft levelling. During levelling, the table support bolts should be released, and the table cross transversed its own width either side of the ram centre line and also vertically transversed. A clock should be used to check table alignments with the ram.

The machine should first be levelled at four positions by packings or wedges local to the rear foundation bolts and the front vertical vee slide. The front of the base should now be supported by “feeling” in two wedges or packings local to the front foundation bolts, and two beneath the table support. The foundation bolts should now be tightened down, careful correction being made where necessary to maintain the level.

Two packings or wedges should then be carefully inserted, one on each side beneath the centre of the machine body to give support, and the machine grouted in after a final check of all levels has been made.

Foundation



| SIZE OF MACHINE | A | B | C | D | E | F | G | H | I | J | K | L | M | N MAX | O | P | Q | R | S |
|-----------------|-----------------------|----------------------|----------------------|-------|-------|--------|----------------------|-------------------|-------------------|-------------------|-----------------------|-------------------|--------------------|----------------------|----------------------|-----------------------|-------------------|-------------------|-------------------|
| 14M | 5' 2 $\frac{1}{2}$ " | 4' 8 $\frac{1}{2}$ " | 2' 7 $\frac{1}{2}$ " | 1' 1" | 1' 6" | 1' 6" | 9 $\frac{1}{2}$ " | 8 $\frac{1}{2}$ " | 4 $\frac{1}{2}$ " | 2 $\frac{1}{2}$ " | 3' 0 $\frac{1}{2}$ " | 3 $\frac{1}{2}$ " | 6 $\frac{1}{2}$ " | 8 $\frac{1}{2}$ " | 6 $\frac{1}{2}$ " | 3' 9" | 6 $\frac{1}{2}$ " | 6 $\frac{1}{2}$ " | 1 $\frac{1}{2}$ " |
| 18M | 5' 11 $\frac{1}{2}$ " | 4' 8 $\frac{1}{2}$ " | 2' 11" | 1' 3" | 1' 8" | 1' 9" | 14 $\frac{3}{4}$ " | 8 $\frac{1}{2}$ " | 4 $\frac{1}{2}$ " | 2 $\frac{1}{2}$ " | 3' 1 $\frac{1}{2}$ " | 3 $\frac{1}{2}$ " | 9 $\frac{1}{2}$ " | 7 $\frac{1}{2}$ " | 6" | 4' 1 $\frac{1}{2}$ " | 7 $\frac{1}{2}$ " | 8 $\frac{1}{2}$ " | 1 $\frac{1}{2}$ " |
| 24M | 3' 0 $\frac{3}{4}$ " | 5' 7 $\frac{1}{2}$ " | 3' 9" | 1' 8" | 2' 1" | 1' 11" | 1' 8 $\frac{1}{2}$ " | 8 $\frac{1}{2}$ " | 5 $\frac{1}{2}$ " | 2 $\frac{1}{2}$ " | 3' 10 $\frac{1}{2}$ " | 4 $\frac{1}{2}$ " | 10 $\frac{1}{2}$ " | 1' 1 $\frac{1}{2}$ " | 1' 3 $\frac{1}{2}$ " | 4' 11 $\frac{1}{2}$ " | 8 $\frac{1}{2}$ " | 9" | 1 $\frac{1}{2}$ " |

FIGURE 2

Lubrication

Before running, it will be necessary to fill the gear box with a suitable oil to a level half way up the oil level window, the gears and ball bearings on which the gear shafts run are automatically oiled by splash, and it is only necessary to maintain the level as indicated above. The automatic feed gearing, links, etc. should be oiled and the bull wheel bearing oil well refilled each day, and the oil cups and ball oilers that lubricate the slides should be replenished frequently whilst the machine is running. The inspection cover at the side of the main body should be removed once daily in order to lubricate the crank block slides and pivot bearing.

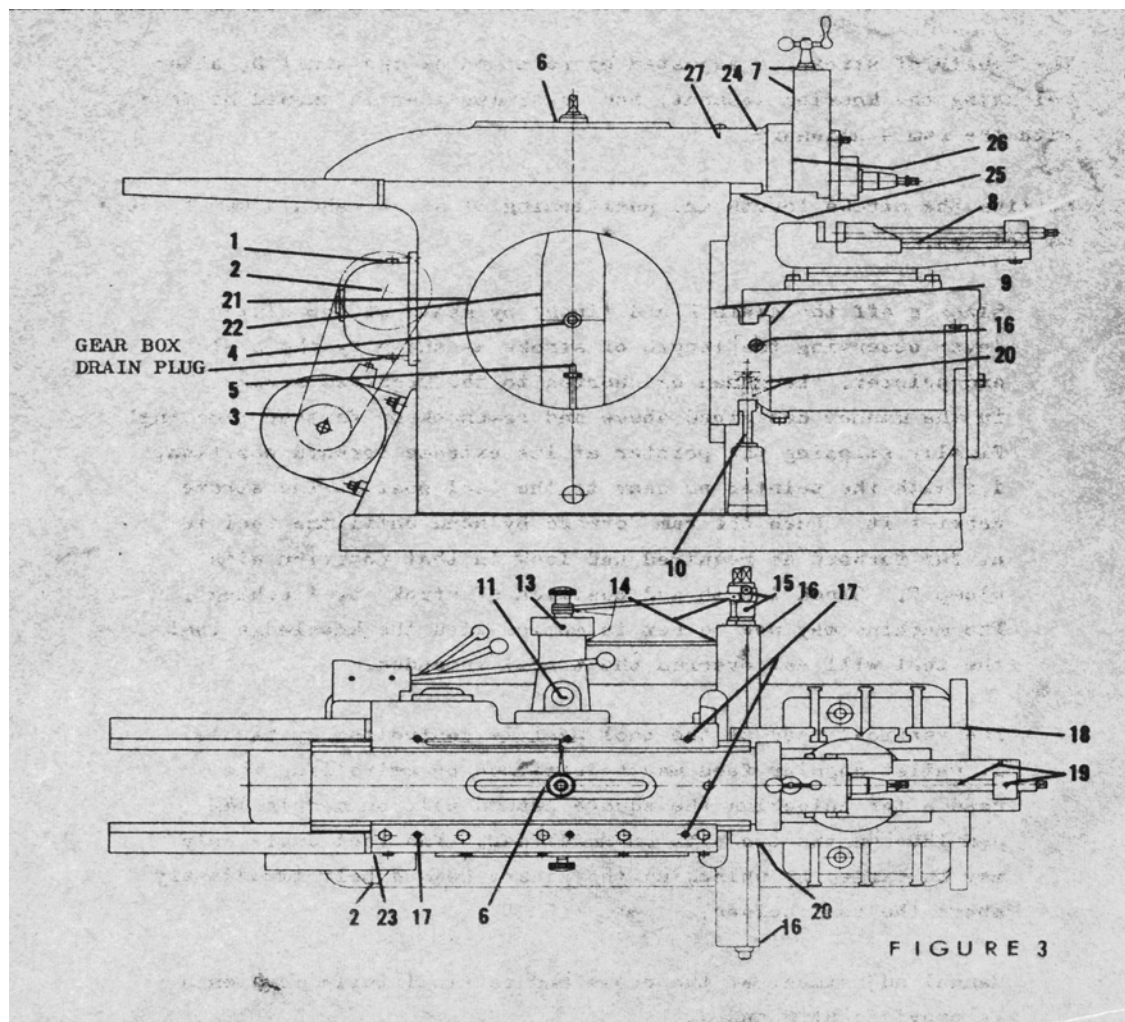
| Ref. No. | Parts Lubricated | Lubrication Instructions and Location | Lubricant | Period |
|----------|-----------------------------------|--|-----------------------------------|--|
| 1 | Gearbox and Intermediate gear | Remove plug to maintain oil level oh indicator. The oil should be changed at least twice a year. | Shell Oil Vitrea 69 or equivalent | Maintain level. Change oil twice yearly. More often if discoloured or dirty. |
| 2 | Gearbox pulley shaft and bearings | Tecalemit lubricator provided. | Shell Oil Vitrea 69 or equivalent | Periodically |
| 3 | Motor Spindle | Grease nipple provided | Shell grease Alvania 2 | Periodically |
| 4 | Rocking arm die (upper) | Remove door and oil through hole in rocking arm | Shell Oil Vitrea 33 or equivalent | Daily |
| 5 | Rocking arm die (lower) | Fill wickfeed lubricator on rocking arm feed pipe | Shell Oil Vitrea 33 or equivalent | Daily |
| 6 | Rocking arm spindle | Oil through top of ram to oil hole in bracket | Shell Oil Vitrea 33 or equivalent | Daily |
| 7 | Tool head feed screw and slide | Oil screw and slide. Lower tool head to ensure complete lubrication | Shell Oil Vitrea 33 or equivalent | Daily |
| 8 | Vice slide | Oil guideways with vice open an traverse slide to ensure complete lubrication | Shell Oil Vitrea 33 or equivalent | Daily |

| | | | | |
|----|----------------------------|---|-----------------------------------|-------|
| 9 | Main slide and cross slide | Oil slides and traverse. Elevate table to ensure complete lubrication | Shell Oil Vitrea 33 or equivalent | Daily |
| 10 | Table elevating screw | Oil at maximum elevation and lower to ensure complete lubrication | Shell Oil Vitrea 33 or equivalent | Daily |
| 11 | Bull gear bearing | Remove plug and maintain oil level | Shell Oil Vitrea 33 or equivalent | Daily |

| Ref. No. | Parts Lubricated | Lubrication Instructions and Location | Lubricant | Period |
|----------|---|--|--|-------------------------------|
| 13 | Self act | Grease at nipples provided | Shell oil Vitrea 33 or equivalent | Daily |
| 14 | Self act bracket | Grease at nipples provided | Shell oil Vitrea 33 or equivalent | Daily |
| 15 | Self act bracket and ratchet | Bennet flush fitting lubricator provided. Oil ratchet assembly locally | Shell oil Vitrea 33 or equivalent | Daily |
| 16 | Cross traverse screw | Oil through holes in main slide. Oil screw and traverse table to ensure complete lubrication | Shell oil Vitrea 33 or equivalent | Daily |
| 17 | Ram guides | Main oil level in oil wells | Shell oil Vitrea 33 or equivalent | Daily |
| 18 | Table support slide | Clean and oil | Shell oil Vitrea 33 or equivalent | Daily |
| 19 | Vice screw | Oil and traverse to ensure complete lubrication | Shell oil Vitrea 33 or equivalent | Daily |
| 20 | Elevating screw bevel gears | Move table over to extreme position away from operator. Oil through central holes in main slide and grease bevel gears | Shell oil Vitrea 33 and Shell Grease Alvania 2 or equivalent | Oil daily Grease Periodically |
| 21 | Bull gear | Remove door and grease teeth | Shell grease Alvania 2 or equivalent | Periodically |
| 22 | Stroke adjusting spindle, bevel gears and slide | Remove door and oil spindle through oil hole in bull gear. Grease bevel gears and oil slide with oil can | Shell oil Vitrea 22 and Shell grease Alvania 2 or equivalent | Periodically |

| | | | | |
|----|-------------|--|-----------------------------------|-------|
| 23 | Clutch fork | Hinge back clutch cover and oil dies etc. through hole in fork | Shell oil Vitrea 33 or equivalent | Daily |
|----|-------------|--|-----------------------------------|-------|

| No. | Lubricated | And Location | | |
|-----------------------------------|-----------------------|--|--------------------------------------|--------------|
| AUTOMATIC DOWN FEED MACHINES ONLY | | | Shell Oil Vitrea 33 or equivalent | Daily |
| 24 | Bevel spindles | Oil through oil holes in ram | | |
| 25 | Bevel gears | Pull ram forward and grease from underneath | Shell grease Alvania 2 or equivalent | Periodically |
| 26 | Bevel gears | Elevate tool head to maximum and grease from front | Shell grease Alvania 2 or equivalent | Periodically |
| 27 | Ratchet Feed Assembly | Oil locally with oil can | Shell Oil Vitrea 33 or equivalent | Daily |



Operating Instructions

The power, except for single pulley drive machine, is supplied by a standard electric motor mounted at the back of the main body. The drive is transmitted to the gearbox by vee belts through a 'Matrix' multiple disc friction clutch, operated by lever A. Figure 4. Six speeds are selected by means of the two levers B & C.

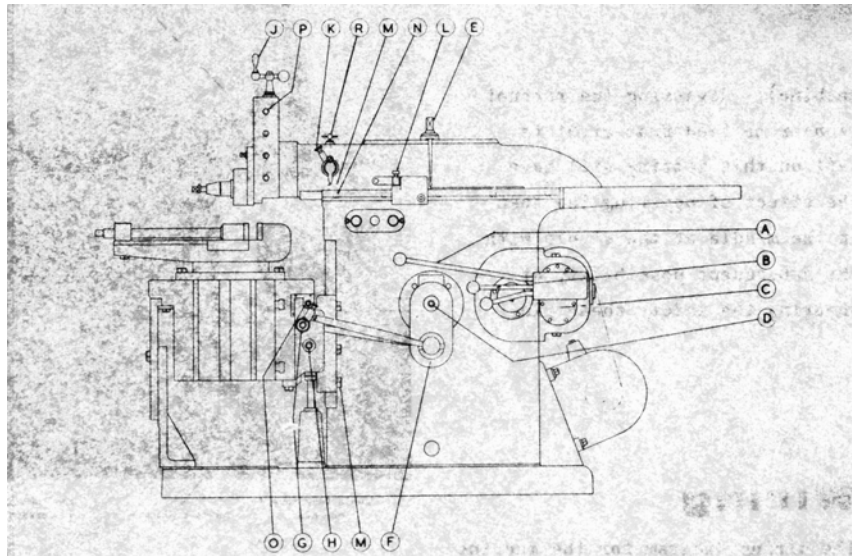
The length of stroke is adjusted by rotation of the shaft D, after releasing the knurled locknut, and we advise that it should be done with the ram stationary.

Setting the stroke length and positioning of stroke should be effected as follows: -

Slacken off the clamp E and 'inch' by means of the clutch lever observing the length of stroke as shown by the scale and pointer. Lengthen or shorten to the required stroke in the manner described above and re-check by further 'inching' finally stopping the pointer at its extreme forward position, i.e. with the pointer as near to the tool post as the stroke carries it. Push the ram forward by hand until the tool is as far forward as required and lock in that position with clamp E. Check length and position of stroke by 'inching'. The machine may now be set in motion with the knowledge that the tool will not overrun the travel intended.

The vertical feed of the tool post is controlled by handle J, whilst angular feed may be obtained by swivelling the head after unlocking the square headed bolt on models 14M and 18M and the two nuts on Model 24M. The tool angle only may be varied by unlocking the square headed bolt immediately above the tool holder.

Manual adjustment of the cross and vertical table movements



| | | | |
|---|-----------------------------|---|--------------------------------|
| | Clutch lever | K | Auto down feed plunger |
| A | | L | Auto down feed adjusting screw |
| B | Gear change lever | M | Gib lock bolts |
| C | Gear change lever | N | Gib adjusting studs |
| D | Length of stroke adjustment | O | Table gib (tapered) screw |
| E | Position of stroke lock | P | Tool head gib adjusting nuts |
| F | Slotted feed disc | R | A,D,F engaging handle |
| G | Cross traverse screw | | |
| H | Vertical traverse screw | | |
| J | Tool head screw | | |

AUTO FEED

The slotted disc F provides four rates of automatic cross feed. When the feed drive arm is anchored at the outer position on the slotted disc, the largest feed of .0417" per stroke is obtained.

Alternatively minimum feed is obtained at the centre of the disc. When the automatic cross feed is not required lift and half turn the plunger in the ratchet mechanism at the end of the cross slide.

The auto feed to the apron must be applied at the correct time relative to the ram position, i.e at the back of stroke, and this may be altered to suit the direction of feed by shifting the throw of the feed

actuating link from one side of the slotted disc to the other.

The illustration Fig.5 page 10, shows the feed set correctly for the apron feeding from left to right (looking from front of the machine)

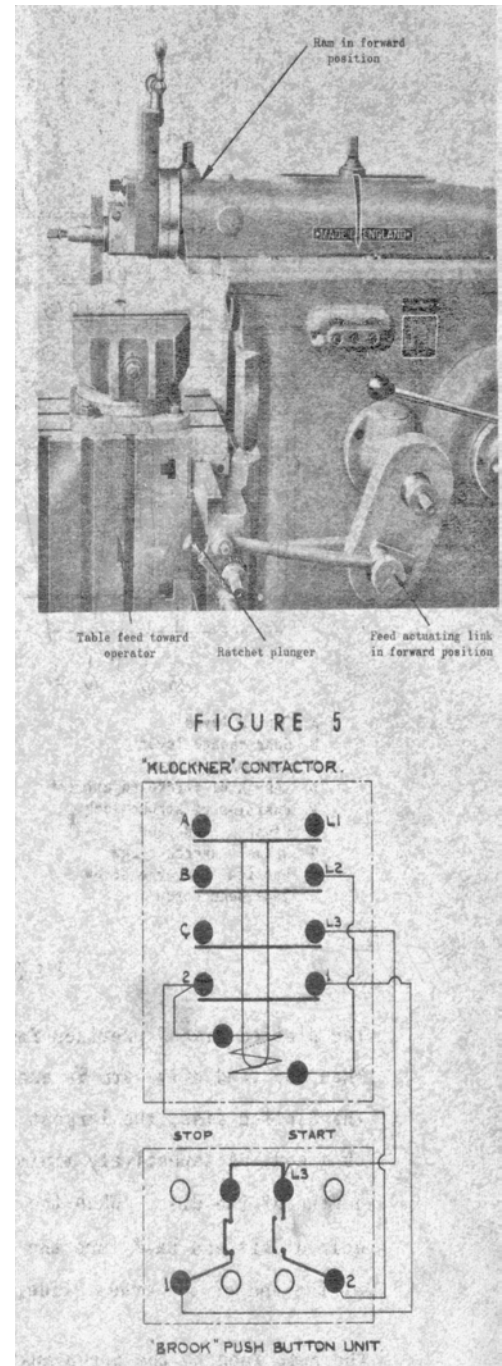
Reversing the ratchet plunger to feed from right to left on this setting will have the effect of applying the feed in the middle of the stroke with the subsequent possibility of shearing the safety shear pin.

Wiring

The wiring diagram from the machine is shown in Figure 6. The contactor is mounted inside the body of the machine and is accessible through the door on the left side of the machine, the base plate only being visible from the outside. Remote control buttons – Start and Stop – are Mounted conveniently high up the operating side the machine.

Maintenance

All slides are fitted with gibs adjustable for wear. Adjustment to the ram and cross slide



Gibs is effected by the hexagon headed bolts M holding them in position together with the setting studs N at the side of the gibs. Make sure that the lock nuts on the setting screws are secure after adjustment has been made. The table slide is fitted with a tapered gib which is adjusted by the screw O at the operating side of the cross slide. The tool slide gib is adjusted by the screws and lock nuts P. End play in the

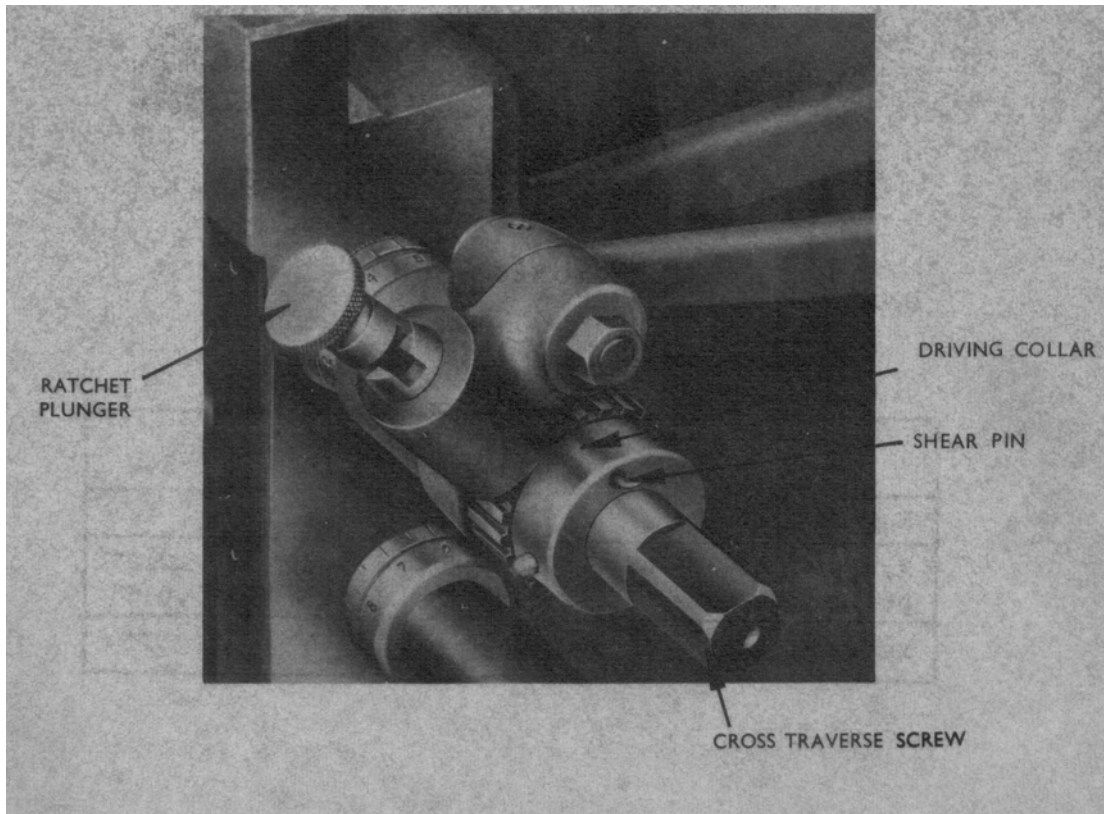
To tension the initial drive V belts, unlock the 4 motor flxink bolts and slide motor downwards over motor plate. Reclamp motor in the new position.

SAFETY SHEAR PIN.

The cross feed mechanism is protected from overload or overrun by means of a shear pin fitted in the feed ratchet arrangement. If the pin shears, replace by proceeding as follows: -

Referring to the illustration below:

- 1 Draw out the sheared portion of the pin from the drive collar.
- 2 Rotate the cross traverse screw to bring the pin hole in the drive collar in line with the clearance slot on the underside of the ratchet plunger housing.
- 3 Insert the replacement pin into the drive collar
- 4 Rotate ratchet, at the same time applying pressure on the pin until the pin hole in the ratchet is located.
- 5 Push pin into the ratchet, this will drive out the sheared half of the old pin into the clearance slot of the plunger housing.



Extra equipment

AUTOMATIC DOWN FEED

Automatic down feed to the tool head can be supplied on all machines, but must be specifically ordered with the machine.

Automatic feed is applied by a plunger and ratchet mechanism 'A' (Fig.7) fitted at the side of the ram is engaged by giving half a turn to handle 'B' (Fig.7) at the top of the ram. The feed increment may be varied by adjusting the height of the trip lever by

means of the knurled screw 'C'.

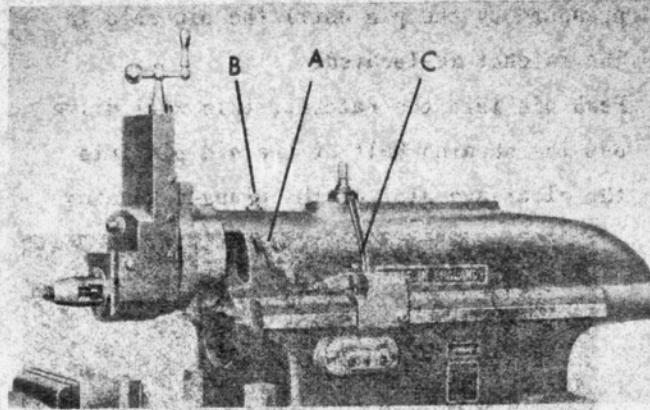


FIGURE 7

| | 14M | 18M | 24M |
|-----------------------------------|-------------------|-----------------|----------------|
| Number of feeds | 4 | 4 | 4 |
| Range of down feeds per stroke | .0075" .030" | .0075" .030" | .012" .048" |
| Maximum length of feed | 4 $\frac{1}{4}$ " | 5" | 7" |

Swivelling table incorporating a special support can be supplied on all machines if specially ordered with the machine. The amount of swivel is 45° in either direction and can be locked in position by three clamps at the front of the table.

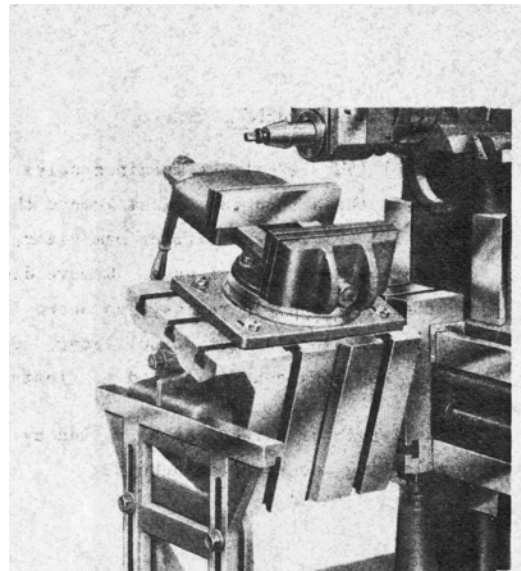


FIGURE 8

TILTING TABLE TOP

This accessory, which can be supplied separately, is quickly mounted on the top surface of the table and is very useful item of additional equipment when used in conjunction with the swivelling table.

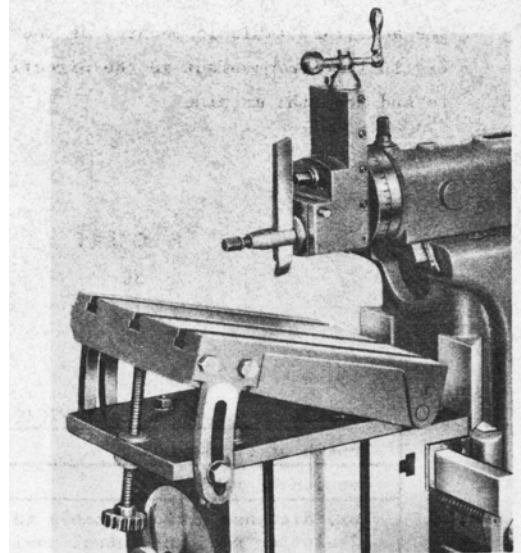


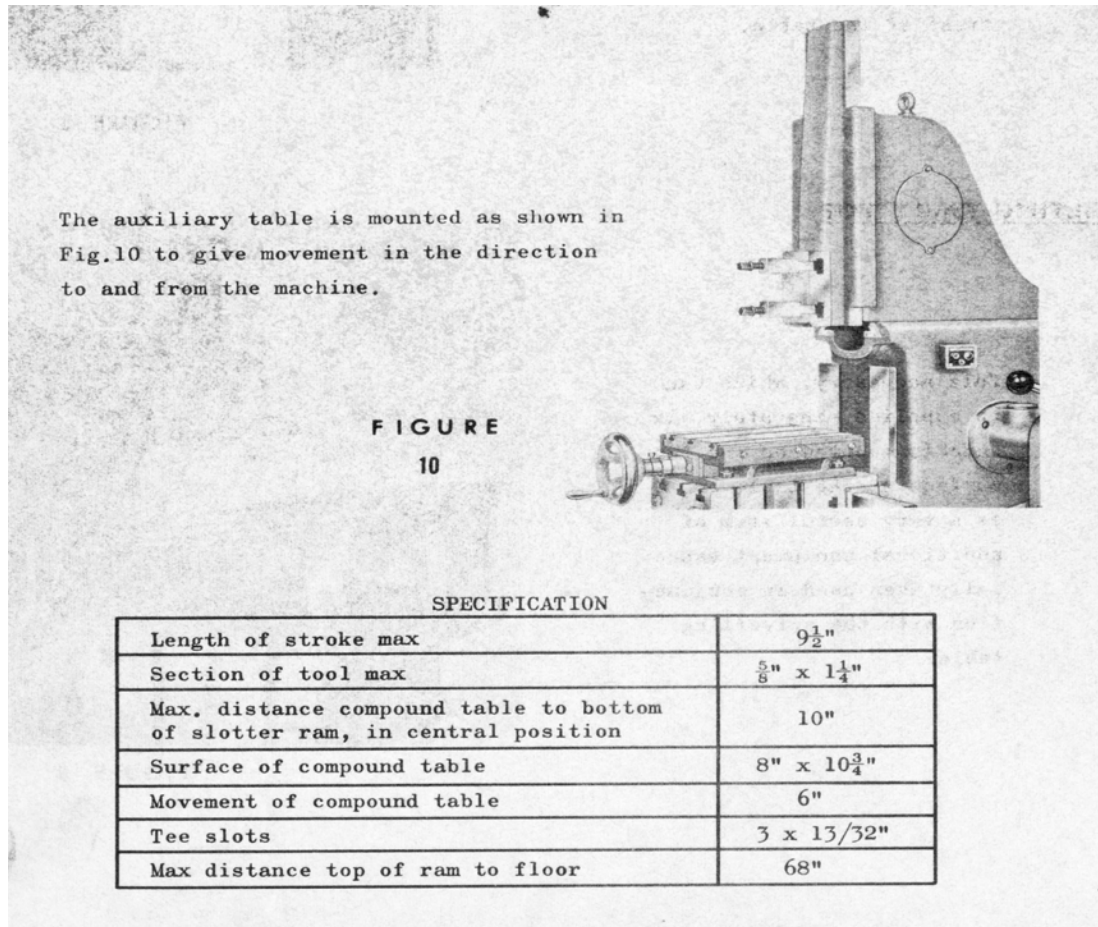
FIGURE 9

SLOTING ATTACHMENT

(model 14M 14" stroke machines only)

To fit the attachment, first remove the ram by removing gib and locking nut 'E' (Fig.4) and lifting ram clear. Remove rocking bracket by lifting clear between the ram ways. Remove die block from spigot. Place slotting attachment body in ram ways as shown in Fig. 10 and slip connecting rod end over die block spigot on bull gear. Open inspection cover in attachment body and link connecting rod to

slotter ram. The length of stroke may be varied by rotating shaft 'D' (Fig.4) after releasing the knurled locknut.



KEYWAY CUTTER HOLDER

The keyway cutter holder is clamped in the clapper box in place of the standard tool holder, as illustrated in Fig. 11 and is used for internal shaping, keyway

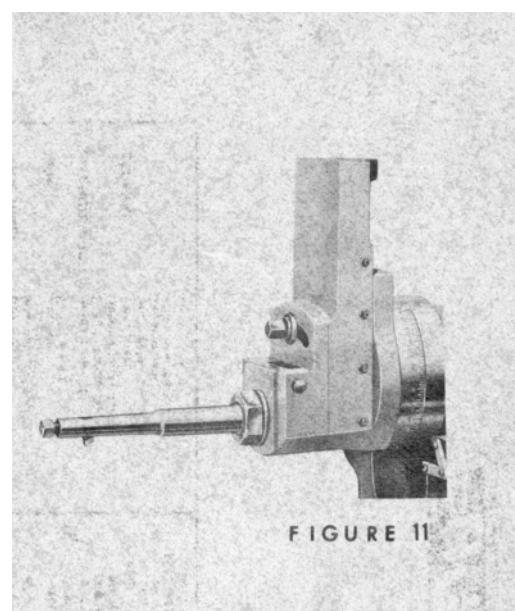


FIGURE 11

cutting and general work that is difficult
to reach with the standard holder.

SPECIFICATION

| | 14M | 18M | 24M |
|---|--------------|--------------|-------------|
| Section of tool max | 3/8" x 9/16" | 3/8" x 9/16" | 1/2' x 5/8" |
| Distance, back of tool to clapper box face | 5 1/4" | 7" | 9 7/16" |
| Diameter of holders | 3/4" | 3/4" | 1" |

Component Parts List

E L L I O T T

HIGH SPEED SHAPING MACHINES

MODELS

14M, 18M & 24M

NOTE

The parts shown in this book are finished parts and for identification purposes only.

In some cases it is necessary for the individual part to be correctly fitted to the machine.

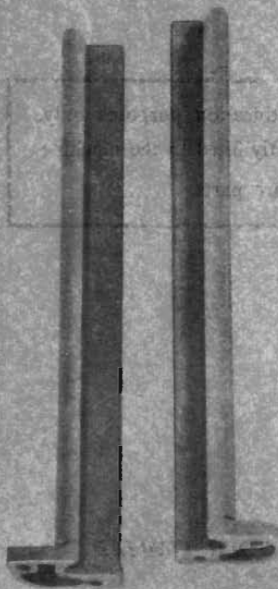
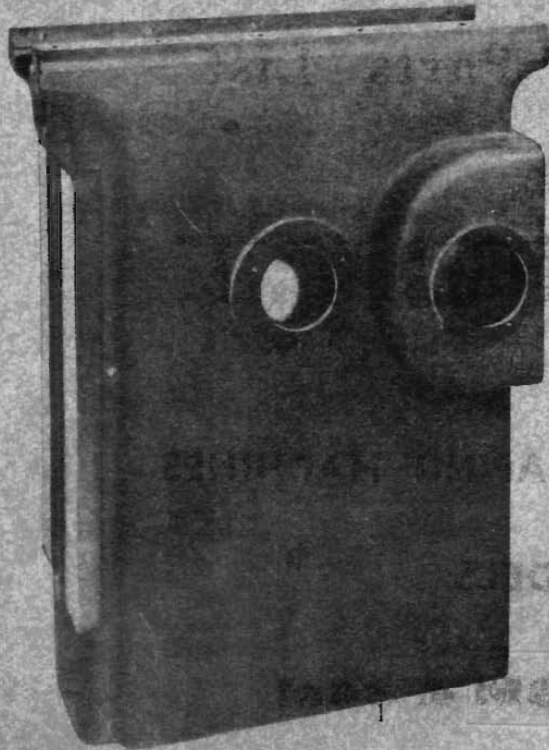
Please always supply machine serial number when ordering spare parts.

E L L I O T M A C H I N E T O O L S L I M I T E D

Victoria Road, London, N W 10

Telephone 01-985 4050. Telegrams: Elliottona London N.W.10 Telex 262750

BODY and BASE



Ref. No.

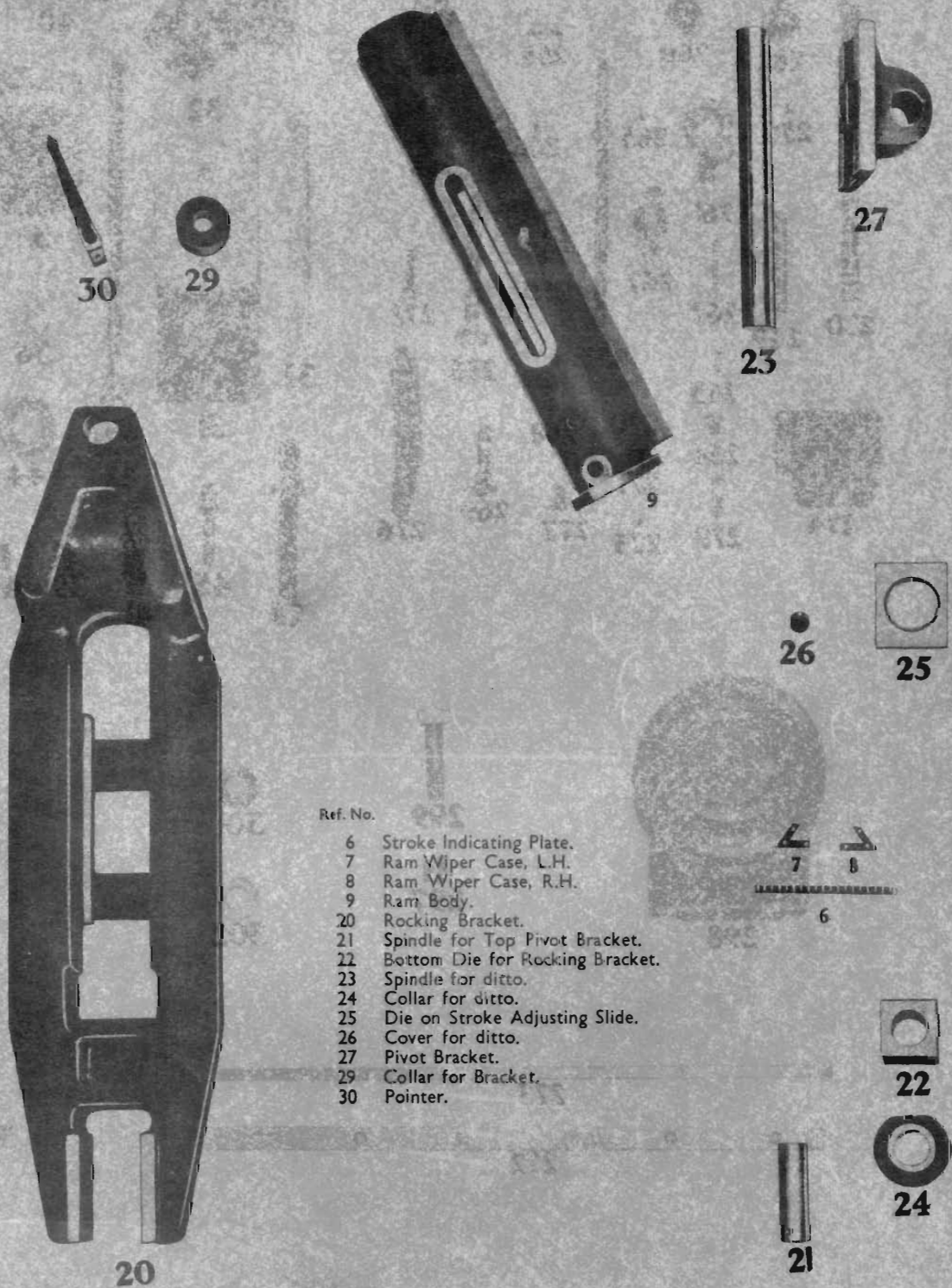
- 1 Main Body.
- 2 Main Base.
- 3 Packing Strip for Ram Guides.
- 4 Door.
- 5 Catch and Knob for Door.
- 65 Ram Guard, R.H.
- 66 Ram Guard, L.H.

66

65

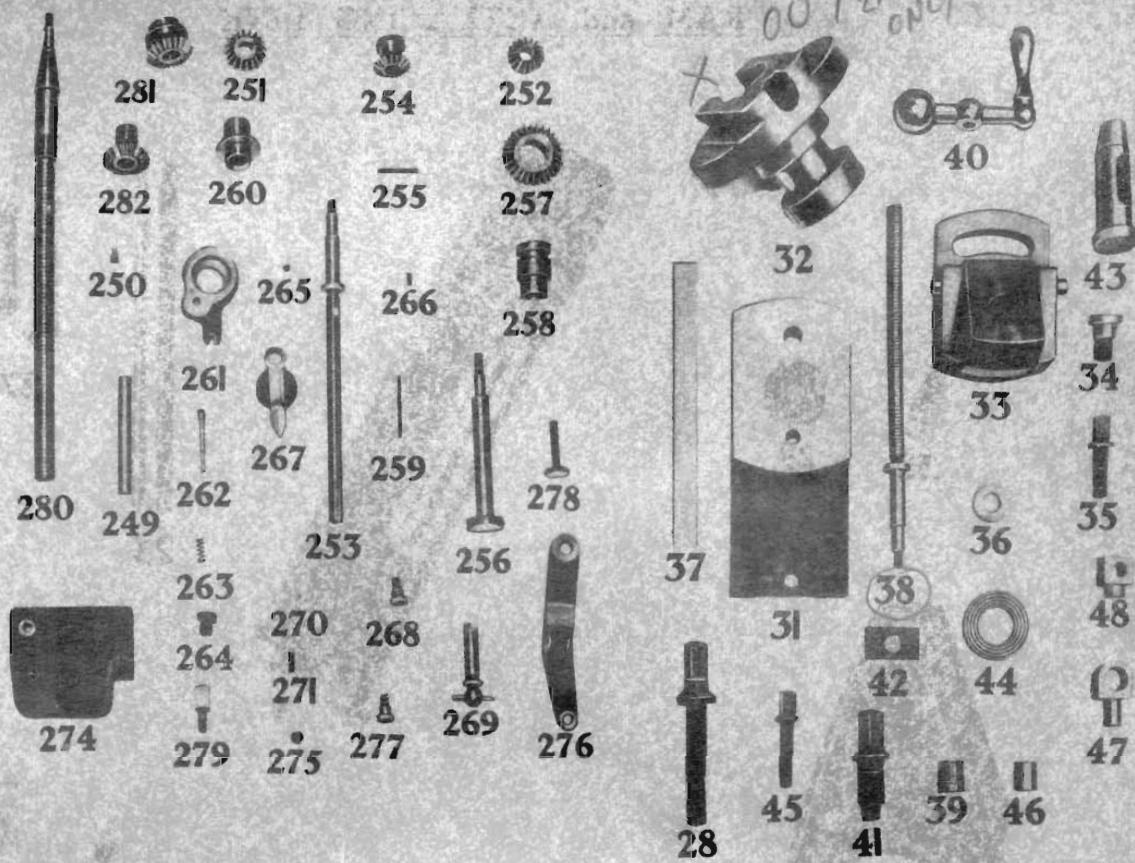
2

RAM and ACTUATING LINK



Ref. No.

- 6 Stroke Indicating Plate.
- 7 Ram Wiper Case, L.H.
- 8 Ram Wiper Case, R.H.
- 9 Ram Body.
- 20 Rocking Bracket.
- 21 Spindle for Top Pivot Bracket.
- 22 Bottom Die for Rocking Bracket.
- 23 Spindle for ditto.
- 24 Collar for ditto.
- 25 Die on Stroke Adjusting Slide.
- 26 Cover for ditto.
- 27 Pivot Bracket.
- 29 Collar for Bracket.
- 30 Pointer.



273

272

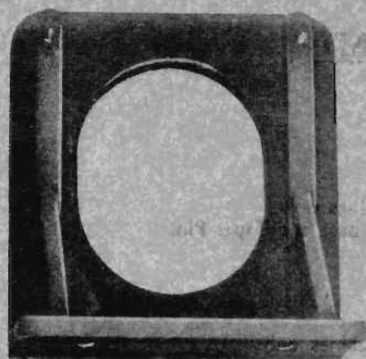
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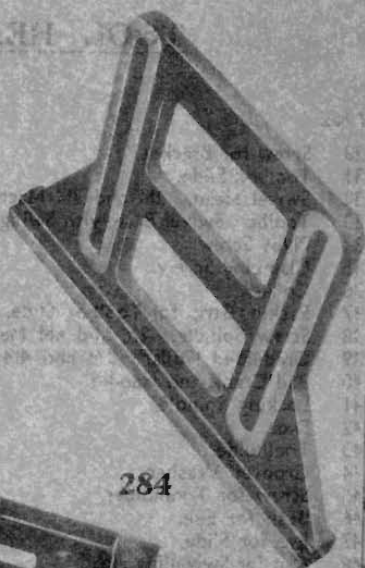
| | |
|-----|---|
| 28 | Screw for Bracket. |
| 31 | Toolbox Slide. |
| 32 | Swivel Head. 2M and 4M Machines only. |
| 33 | Toolbox Swivel Base with Swing Base and Taper Pin. |
| 34 | Pivot Screw. |
| 35 | Clamping Screw. |
| 36 | Collar |
| 37 | Packing Strip for Toolbox Slide. |
| 38 | Screw Spindle. 2M and 4M Machines only. |
| 39 | Graduated Collar. 2M and 4M Machines only. |
| 40 | Ball Crank and Handle. |
| 41 | Locking Spindle. |
| 42 | Die. |
| 43 | Toolholder. |
| 44 | Grooved Washer. |
| 45 | Screw for Toolholder. |
| 46 | Bush for Eye. |
| 47 | Eye for Slide. |
| 48 | Nut for Swivelling Head. |
| 249 | Shaft in Toolhead. |
| 250 | Peg for ditto. |
| 251 | Bevel Gear on Shaft |
| 252 | Ditto. For 2M and 4M Machines only. |
| 253 | Screw Spindle. For 2M and 4M Machines only. |
| 254 | Bevel Gear on Screw Spindle. For 2M & 4M Machines only. |
| 255 | Key for Bevel Gear. |
| 256 | Ratchet Shaft. |
| 257 | Bevel Gear for ditto. |
| 258 | Bevel Gear Sleeve. |
| 259 | Key for ditto. |
| 260 | Bearing Sleeve in Ram. |
| 261 | Ratchet Bracket. |

| | |
|-----|---|
| 262 | Pawl for ditto. |
| 263 | Spring for Pawl. |
| 264 | Knob. |
| 265 | Friction Pad. |
| 266 | Spring for ditto. |
| 267 | Catch for Ratchet Bracket. |
| 268 | Screw for ditto. |
| 269 | Gear Operating Spindle with Handle. |
| 270 | Ball for ditto. |
| 271 | Spring for ditto. |
| 272 | Strip on Body. |
| 273 | Ditto. |
| 274 | Bracket on Body. |
| 275 | Pad for ditto. |
| 276 | Lever for Bracket. |
| 277 | Pivot Screw. |
| 278 | Adjusting Screw. |
| 279 | Pin for Lever. |
| 280 | Screw Spindle. For 5M and 6M Machines only. |
| 281 | Bevel Gear on Shaft. For 5M and 6M Machines only |
| 282 | Bevel Gear on Shaft. For 5M and 6M Machines only |
| 297 | Distance Stop Collar. For 5M and 6M Machines only |
| 298 | Swivelling Head. For 5M and 6M Machines only |
| 299 | Bolt for Swivelling Head. For 5M and 6M Machines only |
| 300 | Screw Spindle. For 5M and 6M Machines only. |
| 301 | Graduated Collar. For 5M and 6M Machines only. |
| 302 | Lock Nut. For 5M and 6M Machines only. |

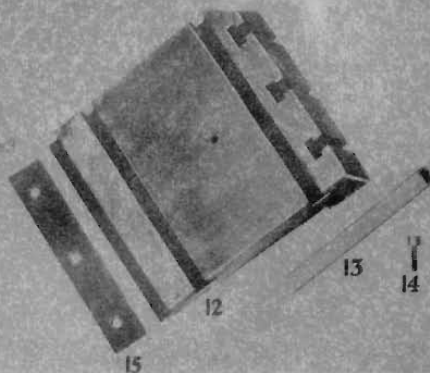
Parts Nos. 249 – 282 inclusive for machines fitted with auto down feed.



204



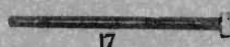
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12

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14

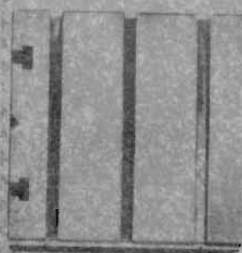


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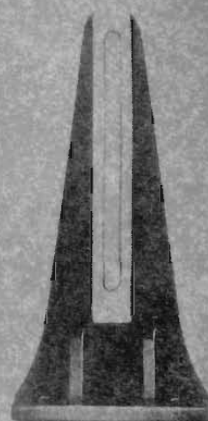


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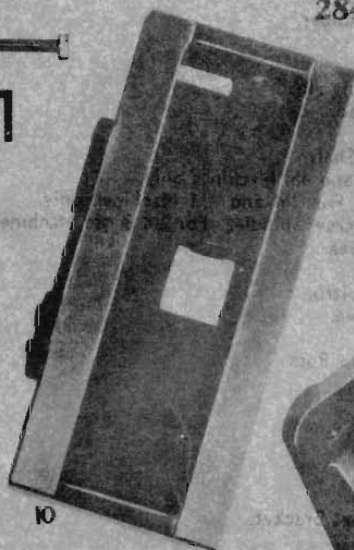
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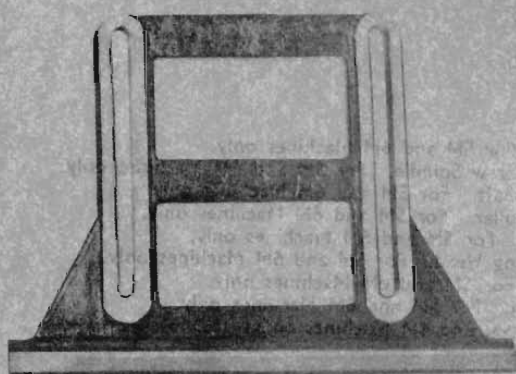
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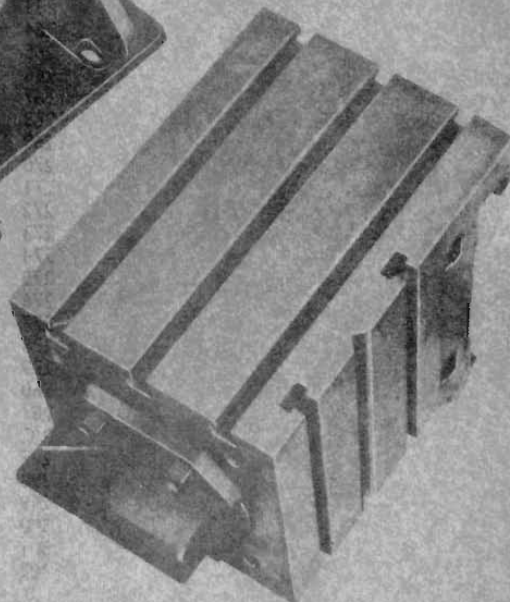
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286



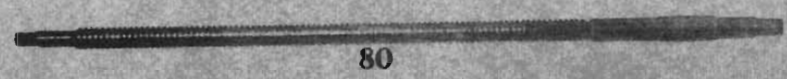
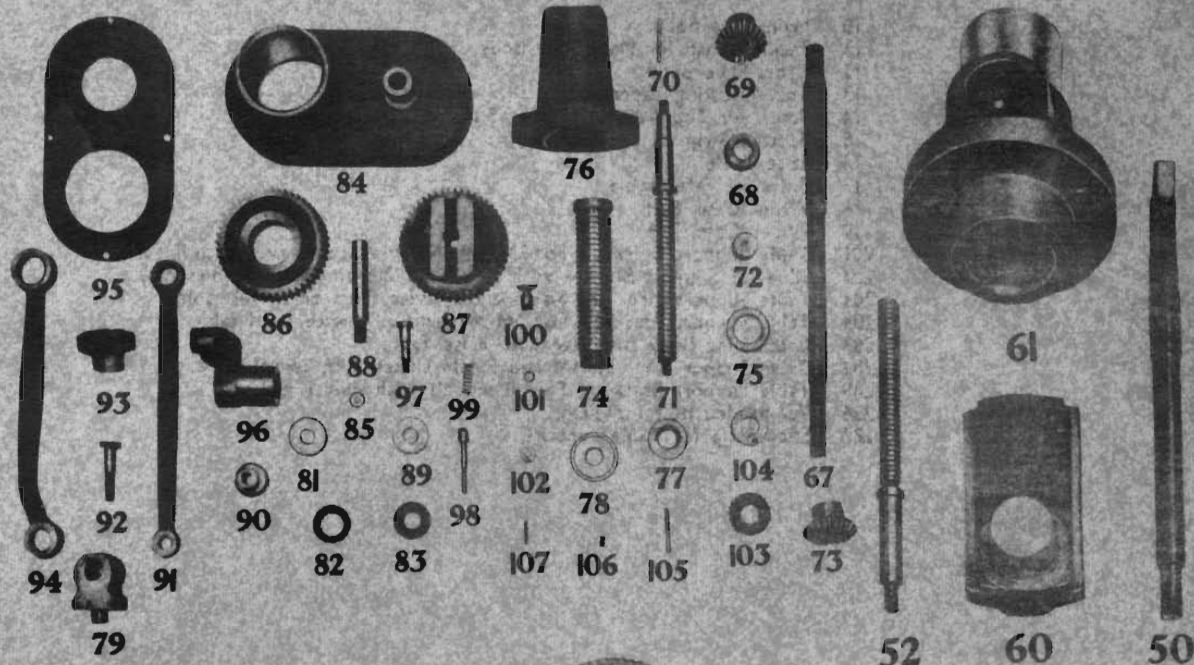
283

NOTE TABLE SUPPORT BRACKET FOR 18M
IS ALMOST IDENTICAL TO 203 AND 284
BUT IS NOT SHOWN ON THIS PAGE
285 IS CORRECT PART BUT ONLY ONE PART

TABLE & CROSS SLIDE

Ref. No.

- 10 Main Slide Body.
- 11 Packing Strip for Main Slide Body.
- 12 Cross Slide Body.
- 13 Top Adjusting Taper Strip.
- 14 Screw for Top Adjusting Taper Strip.
- 15 Bottom Strip.
- 16 False Table.
- 17 Bolts For False Table.
- 18 Wiper Case, R.H.
- 19 Wiper Case, L.H.
- 201 Table Support Bracket. For 2M, 4M and SM Machines only with fixed table.
- 202 Slide for Support Bracket with bolt. For 2M and 4M Machines only.
- 203 Table Support Bracket. For 6M Machine only with fixed or swiveltable.
- 204 Table Support Bracket. For 6M Machine only with fixed table.
- 283 Cross Slide Body complete with False Table.
- 284 Table support for 2M, 4M and 5M Machines with swivel table.
- 285 Table Support Bracket. For all models swivel table.
- 286 Tee-headed Bolt for ditto.
- 287 Slide Strip for Table Support.



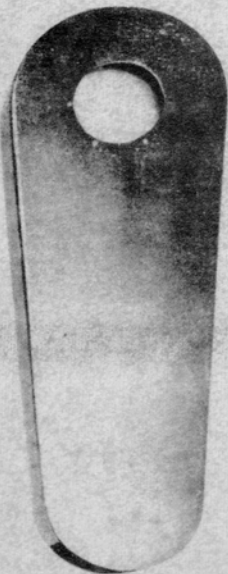
BULL WHEEL & SELF ACT

Ref. No.

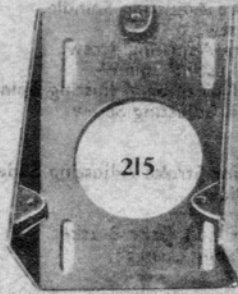
- 49 Bull Gear.
- 50 Stroke Adjusting on Spindle
- 51 Bevel Gear on Stroke Adjusting Spindle
- 52 Stroke Adjusting Screw.
- 53 Bevel Gear on Stroke Adjusting Screw.
- 54 Locking Nut for Adjusting Spindle.
- 55 Taper Pin for Bevel Gear on Adjusting Spindle.
- 56 Taper Pin for Stroke Adjusting Screw.
- 57 Collar for ditto.
- 58 Strip for Bull Gear.
- 59 Stop in Boll Gear, for Stroke Adjusting Slide.
- 60 Stroke Adjusting Slide.
- 61 Bracket in Bull Gear.
- 62 Oil Well Cover for Bull Gear Bracket.
- 67 Operating Shaft (Table Raising).
- 68 Graduated Collar.
- 69 Bevel Gear, for Shaft.
- 70 Taper Pin for ditto.
- 71 Internal Screw.
- 72 Nut for Screw.
- 73 Bevel Gear on Screw.
- 74 External Screw.
- 75 Nut for ditto.
- 76 Bracket for Telescopic Screw.
- 77 Collar for Internal Screw.
- 78 Thrust Bearing.
- 79 Cross Slide Nut.

- 80 Cross Traverse Screw.
- 81 Collar for ditto.
- 82 Rubber Washer. 11/64" hole.
- 83 Ditto. 48/64" hole.
- 84 Self Act Gear Case.
- 85 Flush Type Lubricator. 1/2" hole
- 86 Self Act Gear on Bull Gear.
- 87 Self Act Driven Gear.
- 88 Spindle for ditto.
- 89 Collar for ditto.
- 90 Pivot Sleeve.
- 91 Connecting Link.
- 92 Tee Bolt.
- 93 Hand Grip Nut.
- 94 Self Act Link.
- 95 Cover for Self Act Gear Case.
- 96 Self Act Bracket.
- 97 Pin for Self Act Link in Bracket.
- 98 Pawl for Self Act Bracket.
- 99 Spring for Pawl.
- 100 Knob.
- 101 Flush Type Lubricator. 1/4" dia.
- 102 Sleeve for Self Act Bracket.
- 103 Self Act Ratchet on Traverse Screw.
- 104 Driving Collar.
- 105 Taper Pin for ditto.
- 106 Thimble and Driving Collar.
- 107 Shear Pin.

MOTOR DRIVE



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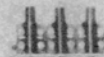
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Ref. No.

215 Motor Base.

216 Retaining Clip for Motor Bolts.

217 Motor Pulley (diameter of bore and size of keyway to be specified in all cases).

218 Key for Pulley, $\frac{1}{8}$ " square.

219 Belt Guard.

220 Support Clip.

221 Bottom Support Bracket.

222 Cover for Guard.

223 Clutch Cover.

224 Clutch Cover Support Bracket.

225 A Support Rod.

226 Cover for Contactor.

227 Cover for Push Button Unit.

228 Three-button Switch Interior.

229 Contactor.

230 Cover for Contactor.

231 Short Arm Elbow.

232 Adaptor.

233 Bend.

234 Brass Bush.

235 Plate for Motor Terminal Box.

236 Flexible Conduit.

237 Clips.

238 Cable Ends.

239 Vee Belts.



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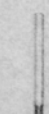


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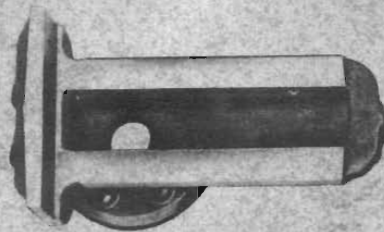


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VICE and ACCESSORIES



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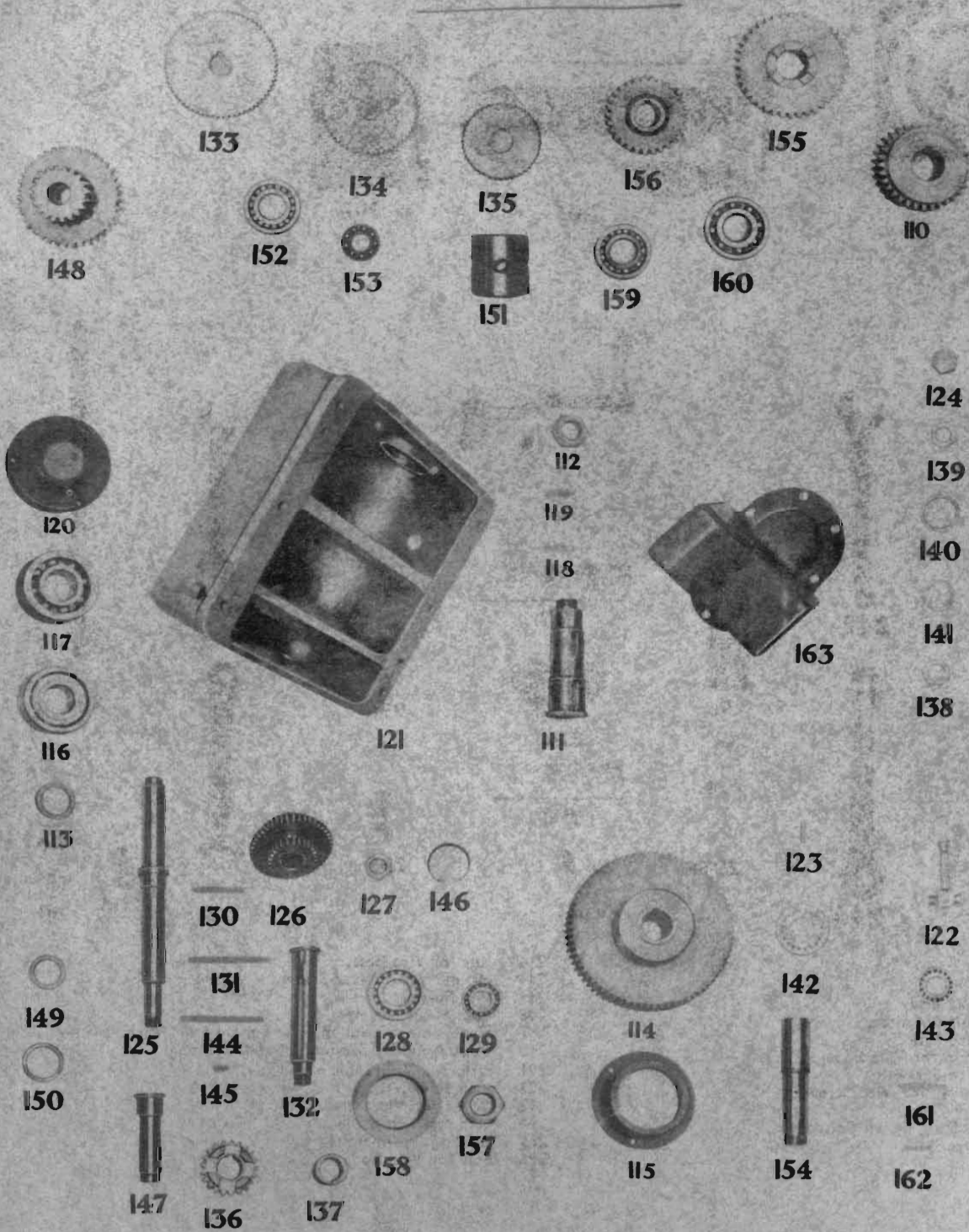
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Ref. No.

- 205 Vice Body.
- 206 Bolt for ditto.
- 207 Vice Slide.
- 208 Strip for Vice Slide.
- 209 Vice Screw.
- 210 Collar for Vice Screw.
- 211 Jaw Plate.
- 212 Holding Down Bolts.
- 213 Vice Base.

- 214 Key for Vice Base.
- 244 Handle for Traverse Screw.
- 245 Vice Spanner.
- 246 Tool Head Spanner.
- 247 Single-ended Spanner, $\frac{1}{4}$ " For 5M & 6M Machines only.
- 248 Double-ended Spanner, $\frac{1}{8}$ " and $\frac{3}{8}$ ".
- 291 Strip for Vice Slide.
- 292 Vice Screw.
- 293 Collar for Vice Screw.
- 294 Nut for Vice Screw.
- 295 Holding Down Bolts.
- 296 Bolt for Vice Body.

GEAR BOX



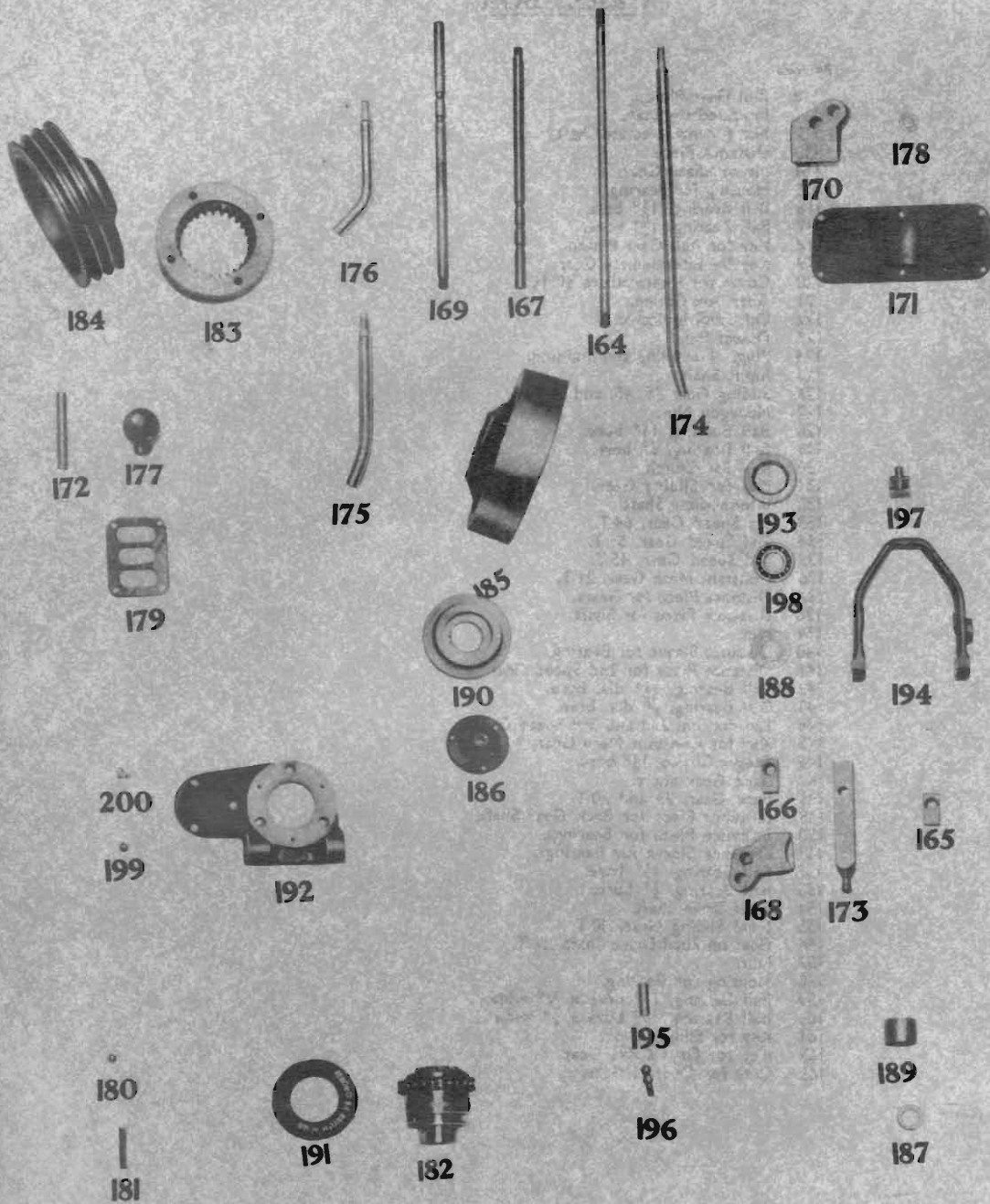
GEAR BOX

Ref. No.

- 110 Bull Gear Pinion.
- 111 Intermediate Shaft.
- 112 Nut for Intermediate Gear.
- 113 Distance Piece.
- 114 Intermediate Gear.
- 115 Housing for Bearing.
- 116 Ball Bearing 1-5/8 " bore.
- 117 Ball Bearing 1-3/4" bore.
- 118 Key for Bull Gear Pinion.
- 119 Key for Intermediate Gear.
- 120 Cover for Intermediate Shaft.
- 121 Gear Box Casing.
- 122 Oil Level Casing.
- 123 Dowel Pin.
- 124 Plug for Filling & Draining.
- 125 Input Shaft.
- 126 Sliding Gear 35, 45, & 26 Teeth.
- 127 Hexagon Nut.
- 128 Ball Bearing 1-1/4" bore.
- 129 Ball bearing 7/8" bore.
- 130 Key for Clutch.
- 131 Key for Sliding Gear.
- 132 Intermediate Shaft.
- 133 1st Speed Gear 64t.
- 134 2nd Speed Gear 55t.
- 135 3rd Speed Gear 45t.
- 136 Constant Speed Mesh Gear 21t.

- 137 Distance Piece for Gears.
- 138 Distance Piece for Shaft.
- 139 Nut.
- 140 Distance Sleeve for Bearing.
- 141 Distance Piece for 2nd Speed gear.
- 142 Ball Bearing 1-1/8" dia Bore.
- 143 Ball Bearing 7/8" dia Bore.
- 144 Key for 1st 2nd and 3rd Speed Gears.
- 145 Key for Constant Mesh Gear.
- 146 Seeger Circlip 1-7/8" Bore.
- 147 Back Gear Shaft.
- 148 Back Gear 39 and 20t.
- 149 Distance Piece for Back Gear Shaft.
- 150 Distance Piece for Bearings.
- 151 Distance Sleeve for Bearings.
- 152 Ball Bearing 1-1/4" Bore.
- 153 Ball Bearing 7/8" Bore.
- 154 Final Drive Shaft.
- 155 Final Sliding Gear 40t.
- 156 Gear on Final Drive Shaft 29t.
- 157 Nut.
- 158 Housing for Bearing.
- 159 Ball Bearing 1-1/4" Bore by 11/16" Wide.
- 160 Ball Bearing 1-1/4" Bore by 7/8" Wide.
- 161 Key for Sliding Gear.
- 162 Key for Final Drive gear.
- 163 Case for Control Gear.

CLUTCH



GEAR BOX

Ref. No.

- 164 Clutch Rod.
- 165 End for Control Rod.
- 166 End for Clutch Rod.
- 167 Change Speed Rod.
- 168 Die for ditto.
- 169 Back Gear Rod.
- 170 Die for ditto.
- 171 Rear Cover.
- 172 Pivot Pin for Levers.
- 173 End for Levers.
- 174 Clutch Lever.
- 175 Change Speed Lever.
- 176 Back Gear Lever.
- 177 Knob for Levers.
- 178 Distance Piece for Levers.
- 179 Gate Plate.
- 180 Index Ball.
- 181 Spring for ditto.
- 182 Single Multi Disc Clutch.
- 183 Clutch Adaptor.
- 184 Driving Pulley for Vee Belts.
- 185 Driving Pulley for Vee Belts.
- 186 Cover for ditto.
- 187 Distance Piece for Pulley Bearings.
- 188 Grease Retaining Ring.
- 189 Distance Sleeve for Brake Plate.

- 190 Brake Plate.
- 191 Ferodo Disc.
- 192 Cover for Gear Box – Clutch End.
- 193 Gitseal.
- 194 Clutch Actuating Fork.
- 195 Pivot Pin for ditto.
- 196 Ball End for Fork.
- 197 Die for Clutch Fork.
- 198 Ball Bearing, 7/8" bore.
- 199 Tecazerk Lubricator, 1/8" Gas.
- 200 Key for Brake Plate.