

Gearboxes supplied for subsequent fitting only
For ML7 lathes prior to K125240 and Super 7 lathes prior to SK124461 instead of screws 267 (paragraphs 9, 11S and 11M also parts list) use $\frac{1}{4}$ " B.S.F. x $\frac{3}{4}$ ". If for your machine you need the $\frac{1}{4}$ " B.S.F. screws, return the metric screws to us for exchange.

myford

QUICK CHANGE GEARBOX

Nos. 1480 (ML7) and 1680 (ML7-R and Super 7)

**INSTRUCTIONS FOR
INSTALLATION AND OPERATION
WITH
PICTORIAL PARTS LIST**



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CAUTION

IT IS OF THE UTMOST IMPORTANCE THAT THE WHOLE GEARBOX AND TRANSMISSION MECHANISM SHALL ROTATE WITH COMPLETE FREEDOM.

MISALIGNMENT OF LEADSCREW OR TIGHTNESS IN ANY OF THE BEARINGS (GEAR TRAIN—GEARBOX—OR LEAD-SCREW) WILL IMPOSE HEAVY LOADS ON THE GEAR TRAIN AND MAY LEAD TO SERIOUS DAMAGE.

THE CUTTING OF UNUSUALLY COARSE PITCHES (IN EXCESS OF .125"), EXERTS EXCESSIVE PRESSURE ON THE LEADSCREW AND GEAR MECHANISMS. GREAT CARE SHOULD BE TAKEN SO AS TO MINIMISE THE LOADS IMPOSED.

N.B. When changing to the slotted quadrant (page 6 fig. 5) or back to the standard quadrant (page 3 fig. 2) it may be necessary to reset the anchor pin No. 203 (see page 15 paragraph 22) in order to line up the driven gear on the first stud with the driver on the tumbler stud.

The chart for diametral pitches has been included for the benefit of users wishing to cut worms to mesh with wormwheels whose pitch is expressed as D.P. The table of module pitches has been included for the same reason.

Where as diametral pitch is the ratio of the number of teeth to the pitch diameter (in inches), module is the ratio of the pitch diameter (in millimetres) to the number of teeth.

LUBRICATION

Before operating the lathe, remove the level plug (at the right-hand end of the box), and fill to just short of plug level with 80025, Esso Febis K68 oil. Replenish the oil bath occasionally. At long intervals, flush with 80027, Esso Nuto H15, very thin oil and refill with Febis K68.

The tumbler reverse gear pins and quadrant gear pins should be lubricated frequently. Occasional application of the oil gun to the oil nipples on the gear box will be sufficient.

Illustrations not binding in detail.

OPERATION

The Myford Quick Change Gear Box permits instant selection of 48 English threads and feeds without the necessity for setting-up gear trains. A conversion set is available for cutting Metric, B.A., and thousands of other odd pitches, using ordinary changewheels in conjunction with the gear box.

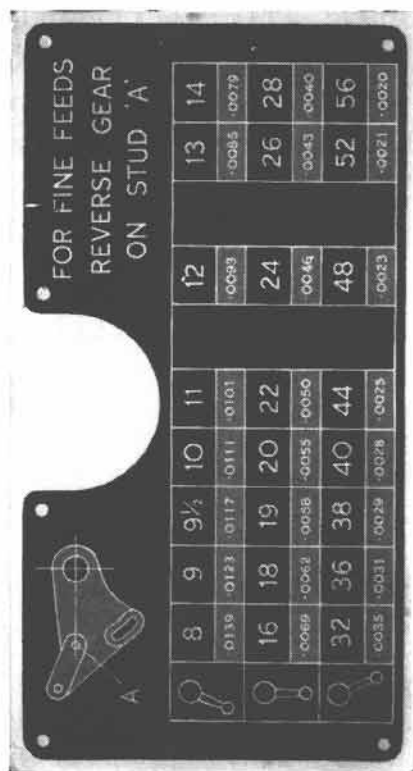


Fig. 1. Gear Box Chart showing English threads and feeds.

Reference to the gear box chart Fig. 1, will show that all the commonly used English pitches are covered. In view of this the gear pins on the normal quadrant (as supplied with the gear box), are placed at fixed centres. This permits the advantage of mounting the driving train of gears on pins which are considerably greater in diameter, and more robust than the movable type of changewheel stud.

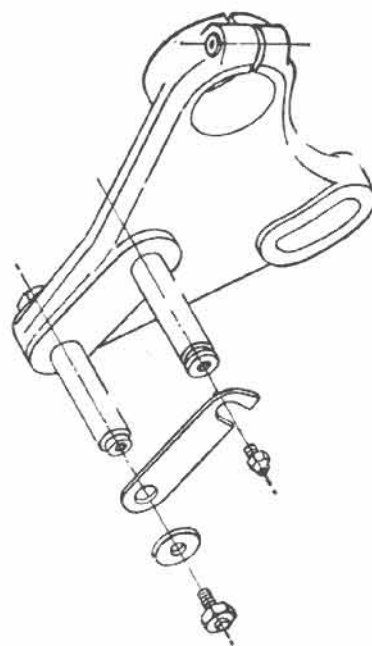


Fig. 2. Normal Quadrant.

MYFORD QUICK CHANGE GEARBOX DIAMETRAL PITCHES

D.P.	TUMBLER STUD	1 ST STUD DRIVEN DRIVER	2 ND STUD DRIVEN DRIVER	INPUT	SET UP	SELECTOR POSITION	LEVER
16	55	55	40	35	1	1	A
18	55	55	40	35	1	2	A
19	55	55	40	35	1	3	A
20	55	55	40	35	1	4	A
22	55	55	40	35	1	5	A
24	55	55	40	35	1	6	A
26	55	55	40	35	1	7	A
28	55	55	40	35	1	8	A
32	55	55	40	35	1	1	B
36	55	55	40	35	1	2	B
38	55	55	40	35	1	3	B
40	55	55	40	35	1	4	B
44	55	55	40	35	1	5	B
48	55	55	40	35	1	6	B
52	55	55	40	35	1	7	B
56	55	55	40	35	1	8	B
64	55	55	40	35	1	1	C
72	55	55	40	35	1	2	C
76	55	55	40	35	1	3	C
80	55	55	40	35	1	4	C
88	55	55	40	35	1	5	C
96	55	55	40	35	1	6	C
104	55	55	40	35	1	7	C
112	55	55	40	35	1	8	C

D.P.	TUMBLER STUD	1 ST STUD DRIVEN DRIVER	2 ND STUD DRIVEN DRIVER	INPUT	SET UP	SELECTOR POSITION	LEVER	
17	55	50	35	60	51	2	4	A
21	55	55	35	60	63	2	4	A
23	55	65	35	40	46	2	4	A
25	55	55	35	40	50	2	4	A
27	55	55	35	40	45	2	6	A
30	55	55	35	40	60	2	4	A
34	55	50	35	60	51	2	4	B
42	55	55	35	60	63	2	4	B
46	55	65	35	40	46	2	4	B
50	55	55	35	40	50	2	4	B
54	55	55	35	40	45	2	6	B
60	55	55	35	40	60	2	4	B
68	55	50	35	60	51	2	4	C
84	55	55	35	60	63	2	4	C
92	55	65	35	40	46	2	4	C
100	55	55	35	40	50	2	4	C
108	55	55	35	40	45	2	6	C
120	55	55	35	40	60	2	4	C

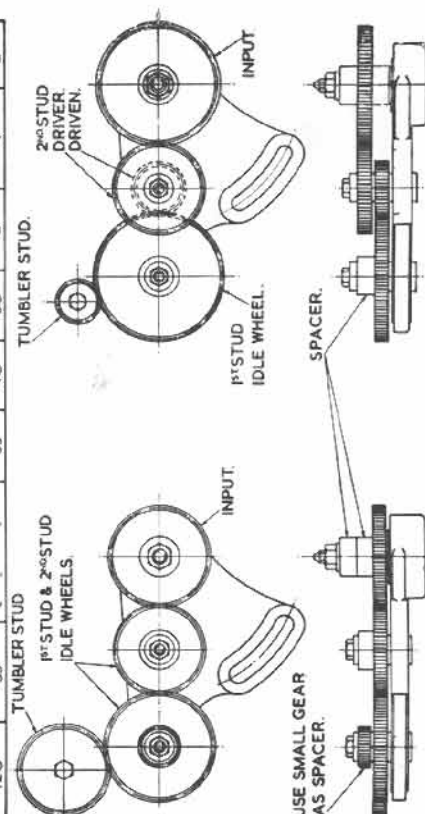


Fig. 3. Chart showing Changewheel Trains for Diametral Threads. (The four diagrams on pages 4 and 5 apply to Diametral, Module and B.A. Charts).

MYFORD QUICK CHANGE GEARBOX MODULE PITCHES

MODULE	TUMBLER STUD	1 ST STUD		2 ND STUD		INPUT	SET UP	SELECTOR POSITION	LEVER		
-20	20	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	B
-25	25	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	B
-30	30	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	B
-35	35	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	B
-40	40	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	B
-45	45	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	B
-50	47	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	B
-55	55	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	B
-60	60	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	B
-65	65	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	B
-70	35	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	A
-75	45	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	A
-80	47	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	A
-85	51	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	A
-90	45	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	A
-95	47	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	A
-100	47	55	DRIVER	WHEEL	DRIVER	40	47	50	2	3	A

The above Chart shows Gear Trains for ML7-R & Super 7 lathes, for ML7 Lathes replace the 55T Idle Wheel on the 1st Stud with a 65T Wheel.

B.A. PITCHES.

	PITCH	TUMBLER STUD	1 ST STUD DRIVEN DRIVER	2 ND STUD DRIVEN DRIVER	INPUT	SET UP	SELECTOR POSITION	LEVER	
1	0 00-1/4	63	60	75	50	21	70	3	A
2	1 90 -1/2	45	60	63	50	21	70	3	A
3	2 81 -1/2	63	40	45	50	27	75	3	B
4	3 73	63	60	73	50	21	70	3	B
5	4 66 -1/2	33	60	63	50	21	70	3	A
6	5 59	59	60	63	50	21	70	3	D
7	6 53 -1/2	53	60	63	50	21	70	3	B
8	7 48	48	60	63	50	21	70	3	B
9	8 43 -1/2	43	60	63	50	21	70	3	B
10	9 39 -1/2	39	60	63	50	21	70	3	B
11	10 35	35	60	63	50	21	70	3	B
12	11 31 -1/2	31	60	63	50	21	70	3	B
13	12 28 -1/2	28	60	63	50	21	70	3	B

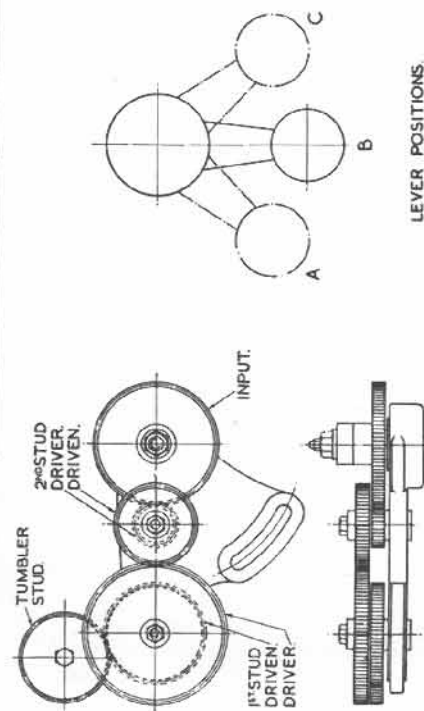


Fig. 4. Chart showing Changewheel Trains for Module and B.A. Threads. (The four diagrams on pages 4 and 5 apply to Diametral, Module and B.A. Charts).

METRIC, B.A., AND ODD THREADS AND PITCHES

Hundreds of odd threads, metric threads and feeds can be obtained by using a special slotted quadrant, with standard change-wheels on movable studs, in place of the normal quadrant and gear train as supplied with the gear box. (See also pages 4 and 5).

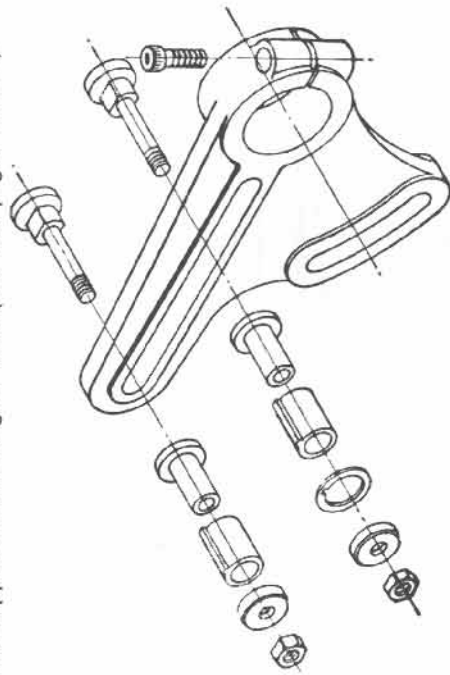


Fig. 5. Slotted Quadrant (with movable changewheel studs "exploded" to show construction).

THE METRIC CONVERSION SET (No. 1481/1, not 1481) comprises a slotted quadrant, 12 changewheels, 2 spacers, and 2 movable changewheel studs. This set covers all the pitches shown on the **METRIC CHART** which is located inside the hinged gear guard.

Alternatively, the slotted quadrant can be supplied separately, or with any changewheels, spacers and movable studs which are required for a particular gear train.

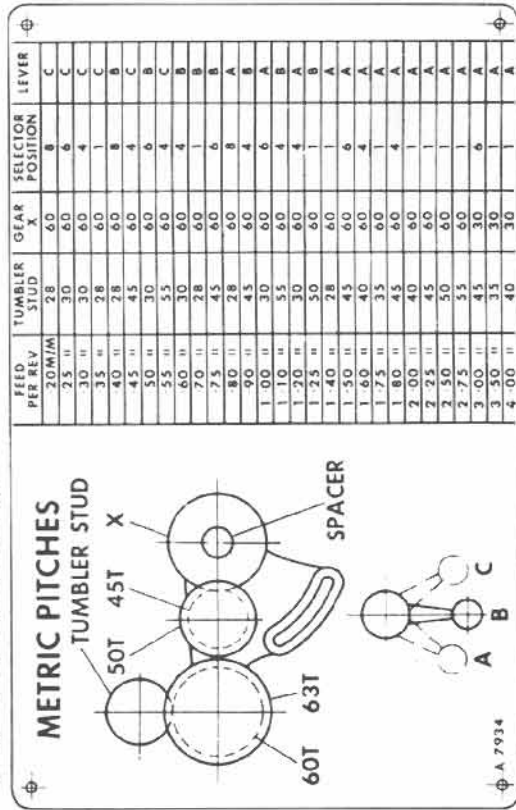


Fig. 6. Metric Chart (located inside the hinged gear guard).

CONTROLS

The Myford gear box is designed for smooth and easy operation. To obtain the various threads and feeds it is only necessary to arrange the levers of the gear box and the reversible cluster gear, as indicated on the Chart (6) Fig. 7.

IMPORTANT

The movement of the control levers whilst the lathe is in motion is only practicable when set for fine feeds. The lathe speed must be slow and the load light. Generally it is preferable to stop the lathe and turn the spindle by hand whilst engaging the gears.

DO NOT USE FORCE.

Care should be taken when No. 1031 MYFORD spindle nose collets are being used, or when any other work is being done close to the headstock spindle nose. Under these conditions the leadscrew guard and clasp nut lever are both very close to the gearbox, and serious damage would ensue if the leadscrew guard were allowed to run into the gearbox.

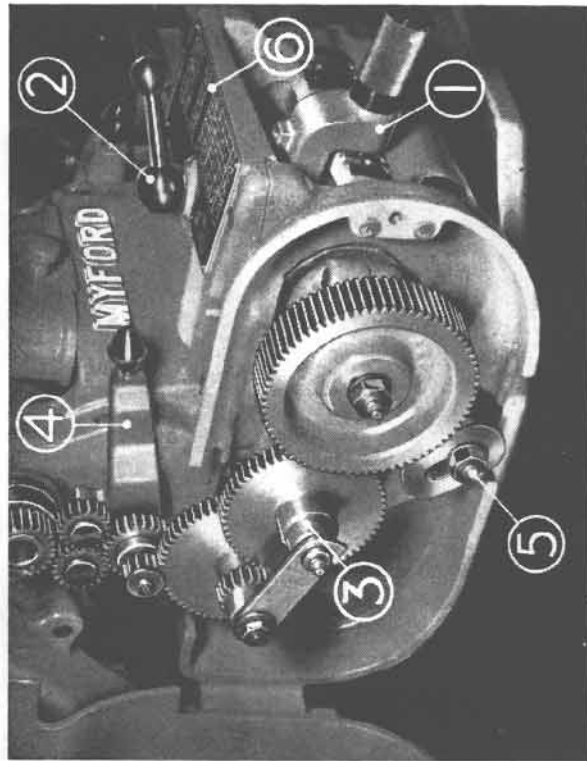


Fig. 7. Quick Change Gear Box Controls.

The **SELECTOR** (1) selects any one of the eight ratios available from the 'cone' of gears on the lower shaft. The indexing position of the lever is always directly below the column on the chart which contains the thread or feed desired. (See Fig. 7).

To move the Selector it is necessary to pull the knob forward and lift the lever until it bears against the slide provided underneath the cover plate, then slide sideways to the desired position.

The **LEVER** (2) provides three variations of the ratio selected by the selector (1). The position of the lever (2), is indicated on the chart to the left of the line which contains the thread or feed desired.

The **REVERSIBLE CLUSTER GEAR** (3) is changed (i.e. the Cluster Gear is mounted with the 57T or larger gear innermost) to select the range of fine pitches. (See Figs. 8, 9 and 10).

Reversal of Cluster Gear (3) is permitted by the Swinging Latch which retains the Cluster Gear.

NOTE:

The **TUMBLER REVERSE LEVER** (4) must be set to the neutral position, to allow easy meshing of the Cluster Gear with the adjacent gears on the quadrant.

The **QUADRANT CLAMP** (5) permits adjustment of the alignment of the quadrant gears with the **WHEEL ON THE TUMBLER CLUSTER.**

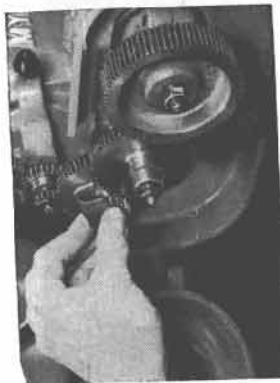


FIG. 8



FIG. 9



FIG. 10

INSTALLATION

The MYFORD Quick Change Gear Box can be easily fitted to the Lathe if the following instructions are carried out.

The Quick Change Lathe requires a shorter leadscrew than standard, and whilst this item is available, it is practicable to shorten the existing leadscrew. The leadscrew guard must also be shortened on ML.7 machines.

During the past years minor modifications have been carried out on ML.7 Lathes, for example, the latest changewheel guard backplate can be removed without disturbing the tumbler reverse assembly. All except the earliest machines (both ML.7 and Super 7) have been drilled and tapped ready to accept the gearbox.

The part numbers referred to in the FITTING INSTRUCTIONS are those used in the PICTORIAL PARTS LIST.

IMPORTANT. It is essential that the following instructions are carefully adhered to, and in particular that the **GEARBOX AND TRANSMISSION MECHANISM SHALL ROTATE WITH COMPLETE FREEDOM.**

MISALIGNMENT OF LEADSCREW OR TIGHTNESS IN ANY OF THE BEARINGS (GEAR TRAIN—GEARBOX—OR LEADSCREW) WILL IMPOSE HEAVY LOADS ON THE GEAR TRAIN AND MAY LEAD TO SERIOUS DAMAGE.

After assembly, and before operating under power, the required freedom should be ascertained in the following manner:—

- (1) Disengage tumbler reverse.
- (2) Set reversible cluster, 3 Fig. 7, in screwcutting position, i.e. with smaller gear (19 teeth) innermost.
- (3) Set lever, 2 Fig. 7, on top of box, in a position giving disengagement of gearing.
- (4) Set selector, 1 Fig. 7, in 8 T.P.I. position.
- (5) Disengage leadscrew nut (clasp nut lever in upper position).
- (A) Gripping on the 8 T.P.I. threaded portion it should be possible to rotate the leadscrew.
- (B) Gripping the 72 tooth wide input gear it should be possible to rotate the input drive gearing and the gears in the box.

OPERATION OF LEADSCREW NUT, ETC.

ML7, ML7-R and SUPER 7 Lathes are fitted with a stop screw to the lead screw nut to control the depth of engagement with the lead screw, and if your Lathe is not arranged with this feature it is recommended that you carry out the modifications as shown at Fig. 11 below.

The screw should be so adjusted that there is minimal backlash between lead screw and nut but without causing any binding.

Furthermore, we recommend that when the gear box has been fitted and lined up, the right hand lead screw bracket should be doweled to the Lathe bed. Please see Fig. 12 below.

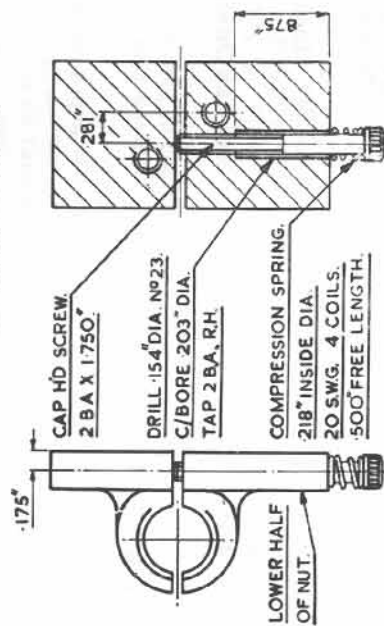


Fig. 11. Diagram showing stop screw and spring fitted to lead screw nut.

2 DOWELS
1/4" DIA. x 3/4" LONG

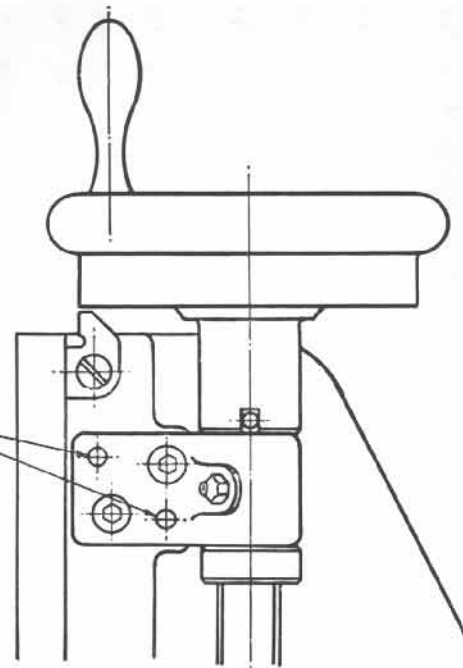


Fig. 12. Diagram showing doweled lead screw bracket.

FITTING INSTRUCTIONS

Where paragraph numbers are duplicated, the letter S denotes Super 7 and the letter M denotes ML7 except as shown below.

For ML7 Lathe serial number K108718B and higher numbers ignore ML7 instructions and treat as though Super 7, e.g. paragraphs 1, 2, 3, 4S, 5S etc.

For ML7-R lathe, treat as though later ML7 lathe (K108718B) and higher numbers, i.e. paragraphs 1, 2, 3, 4S, 5S etc.

For Super 7 Lathe SK108891B and higher numbers, packing strip reference 230 is no longer required and must not be used.

For Super 7 Lathes fitted power cross traverse (SK115830 and higher numbers) treat as though ML7, e.g. paragraphs 1, 2, 3, 4M, 5M etc.

Preparing the Lathe



FIG. 13

See notes in heading

4S With the carriage adjacent to the right-hand lead screw bracket, engage the clasp nut to support the lead screw, and tighten the clasp bolt at the rear of the saddle. Fig. 14.



FIG. 15

5S Remove the Simmonds nut, lead screw handwheel and driving pin from the lead screw. Release the caphead screws which secure the lead screw bracket, and remove the bracket. Fig. 15.

6S Disengage the clasp nut and withdraw the lead screw to the right.

7S Remove the left-hand lead screw bracket.

See notes in heading

4M With the carriage near the headstock end of the bed engage the clasp nut to support the lead screw and tighten the clasp bolt at the rear of the saddle. Fig. 14, but saddle at other end of bed.

5M Remove left-hand lead screw bracket.

6M Remove the lead screw guard and shorten to the new dimensions given in Fig. 16.



FIG. 14

1 Open changewheel guard. Remove the changewheel quadrant and change wheel guard backplate.

Note On earlier ML7 models it will be necessary to remove the tumbler reverse assembly to facilitate backplate removal.

2 Fit the 24T gear to the tumbler sleeve gear. Fig. 13.

Note A 24T gear in high tensile steel is provided with each gearbox.

3 Remove the tailstock from the machine.

Preparing the Gearbox Attachment Holes. (ML.7 and Super 7).

8 Where attachment holes for the gearbox are NOT already provided in the Lathe bed, withdraw both headstock thrust screws to permit the mounting of the drilling template No. 232. Fig. 17. (Available on request, if required.)

9 Mount the template using two $\frac{1}{4}$ "

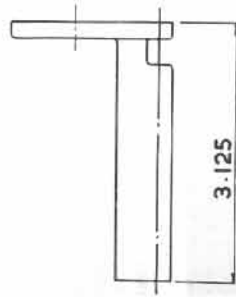


FIG. 16



FIG. 17

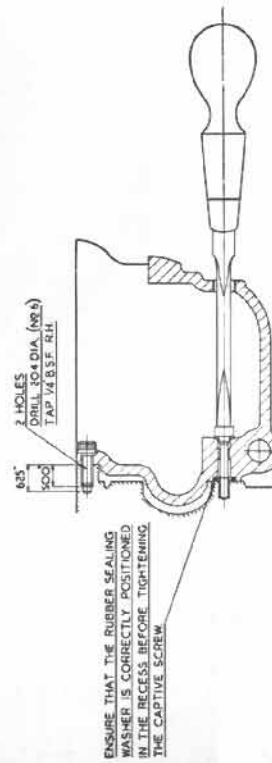


Fig. 18.

B.S.F. x $\frac{1}{4}$ " long caphead screws and drill the two mounting holes for gearbox. Fig. 19.

Remove the template and open out the two drilling guide holes in it to $\frac{1}{4}$ " dia. Remount the template as a tap guide, and tap the two gearbox mounting holes $\frac{1}{4}$ " B.S.F., as shown in the diagram.



FIG. 19

Remove the template and replace the headstock thrust screws.

Note It is important that the drilling depth indicated should not be exceeded.

10 Remove from the gearbox, the top cover No. 260, 72T wide faced gear No. 186, and the gear quadrant No. 202 complete with gears. Fig. 20.



FIG. 20

Remove the right-hand leadscrew bracket assembly, leadscrew gear and leadscrew, and cut off surplus and trim the leadscrew end.

155 With the carriage in the central position enter the leadscrew through the clasp nut from the right-hand side and engage the clasp nut.

165 Re-assemble the leadscrew and right-hand leadscrew bracket assembly. Centralise and finally secure the bracket. Check the leadscrew for free rotation. (Upper lever in neutral position).

FIG. 21

strip No. 230 must be inserted before fitting the caphead screws No. 267, but not for SK10891B and onwards).

125 With the carriage in a central position, enter the leadscrew through the clasp nut from the right-hand end, and engage the clasp nut. Traverse the carriage to the left until the leadscrew passes right through the Gearbox bearings Fig. 21.

135 Assemble the right-hand leadscrew bracket on the leadscrew, and lightly tighten the securing screws. Open the clasp nut, traverse the carriage to the right-hand end, engage the clasp nut to centralise the leadscrew, and secure the leadscrew bracket.

Replace the driving pin, handwheel, and Simmonds nut, to locate the leadscrew longitudinally.

145 Position the leadscrew gear No. 168 to give .015" clearance from the Gearbox face and note the amount of surplus to be removed from the leadscrew to provide .031" maximum projection through the leadscrew gear. See Fig. 22.

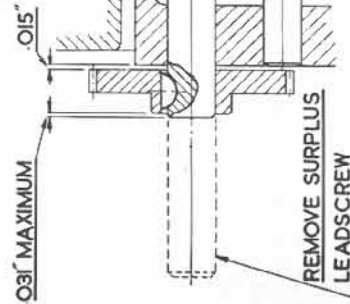


FIG. 22

See notes in heading, page 11

11M Feed the gearbox on to the leadscrew and mount the box using the two caphead screws No. 267 provided. Ensure that the rubber sealing washer is correctly positioned in the recess before tightening the captive screw. See diagram Fig. 18. At this stage the 3 screws need only to be lightly tightened.

12M Position the leadscrew gear No. 168 to give .015" clearance from the gearbox face and note the amount of surplus to be removed from the leadscrew to provide .031" maximum projection through the leadscrew gear. See Fig. 22.

13M Remove the gear No. 168 and detach the gearbox.

14M Remove the Simmonds nut, distance collar (or leadscrew handwheel, if fitted) and driving pin from the leadscrew. Release the socket set screw which secures the collar on the leadscrew to the left of the bracket.

15M Disengage the clasp nut and withdraw the leadscrew to the left. Cut off surplus and trim the leadscrew end.

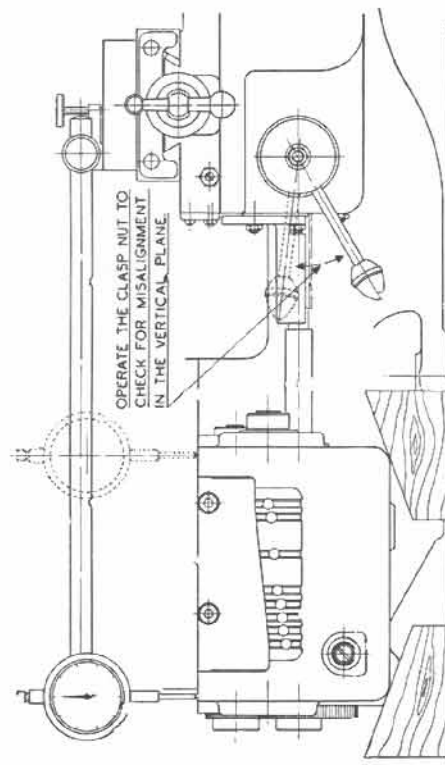


FIG. 23

16M Fit the leadscrew back into the machine, feeding it through the clasp nut and replacing the collar (to the left of the bracket) before passing through the right-hand bracket.

17M Mount the gearbox back into position ensuring that the rubber sealing washer is correctly positioned in the recess before tightening the captive screw. At this stage all 3 screws should only be lightly tightened. Replace the shortened leadscrew guard on the apron.

18M Replace the driving pin, distance collar (or leadscrew handwheel, if fitted), and Simmonds nut. Tighten the Simmonds nut to position the collar to the left of the bracket and tighten the socket set screw to secure the collar. Release the Simmonds nut and adjust to allow the leadscrew to rotate without end play.

Aligning the gearbox

19 The gearbox bearing should now be centralised with the leadscrew, and at the same time levelled (i.e. set parallel with the top surface of the lathe ways). Adjustment of the position of the box, before final tightening, is accomplished by inserting wooden wedges under each end of the box, alternatively jack screws can be used. Levelling can either be carried out with a dial gauge as shown in diagram Fig. 23 or with an accurate spirit level (check in relation to top surface of bed ways). Misalignment in the vertical plane will be shown by vertical deflection of the leadscrew, when the clasp nut is operated.

Finally tighten the three gearbox securing screws, check the leadscrew for free rotation and replace top cover No. 260. (SET THE UPPER LEVER NO. 197 TO A NEUTRAL POSITION WHILE CHECK IS CARRIED OUT).



FIG. 24



FIG. 25

20 Assemble the leadscrew gear, with driving pins or Woodruff key, onto the leadscrew end, position to give .015" clearance from the gearbox face and secure with the grub screw. See Fig. 22.

Final Assembly

21 Drive the $\frac{1}{4}$ " B.S.F. Stud No. 220 into the lower of the three tapped holes at the end of the lathe bed, and screw on one each of the lock nuts and washers No. 222 and 221 (nut first).

Attach the new change wheel guard assembly to the machined end face of the gearbox and cover No. 260 using, in the upper hole, the 2 B.A. cap screw and washer Nos. 219 and 255; in the lower hole, the hexagon head screw and washer Nos. 217 and 221. Screw the remaining nut and washer Nos. 222 and 221 (washer first) on to the stud, No. 220, and adjust the locknuts to secure the guard backplate without distortion.

22 Place one of the two $\frac{3}{8}$ " dia. washers on the anchor pin No. 203. Assemble the gear quadrant No. 202 on to the input shaft housing No. 179, and over the anchor pin. Lightly secure the gear quadrant to the anchor pin with the remaining $\frac{3}{8}$ " dia. washer and $\frac{3}{8}$ " B.S.F. nut. Fig. 24. Release the grub screw No. 195 which secures the anchor pin in the gearbox and position the gear quadrant to align the quadrant gears with the 24T. CHANGE WHEEL on the tumbler reverse stud. Secure the anchor pin in this position, and tighten the $\frac{3}{8}$ " B.S.F. nut.

23 Tighten the gear quadrant pinch screw No. 139 (the pinch screw must not be excessively tightened, as this can cause stiffness on the input shaft No. 183),



FIG. 26

and mount the wide faced 72T. gear on the end of the input shaft, and secure with $\frac{3}{8}$ " B.S.F. nut and washer. Fig. 25.

(Note: this gear is keyed with the No. 404 Woodruff key which is supplied).

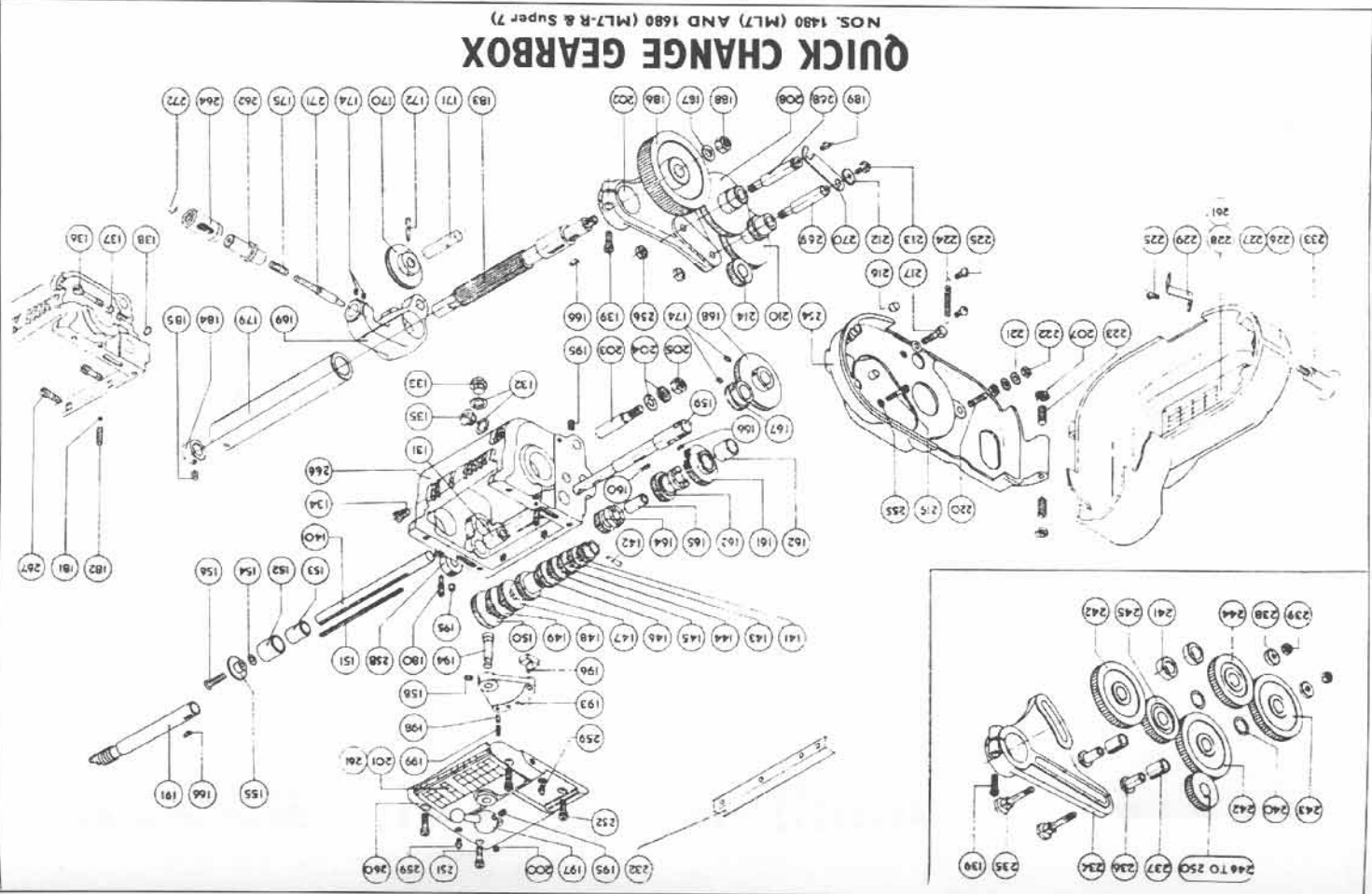
24 Set the various controls as described on page 9 and check for freedom of foot of same page.

25 Replace the reversible cluster gear in the position which gives the fine pitch range (i.e., with the 19T. gear outermost), and test for free rotation right through by manual rotation of the headstock spindle. Fig. 26.

26 Before operating the Lathe, remove the level plug (at the right-hand end of the box) and fill to over-flowing with S.A.E. No. 30 oil. The tumbler reverse gear pins and quadrant gear pins should be lubricated frequently. Occasional application of the oil gun to the oil nipples on the gear box will be sufficient.

PARTS LIST FOR QUICK CHANGE GEARBOX

Drg. No.	Part	Description	No.
169	A2269/1	Bush -	1
168	A3014	Sealing Washer (Dowty Selon Mark 5)	1
167	A3013	Drain Plug ($\frac{1}{2}$ " B.S.F.)	1
166	A2304/18	Oil Level Plug	1
165	A2698	Plug -	1
164	A2699	Captive Screw	1
163	A2304/20	Spring Washer ($\frac{1}{2}$ " Terrys 159)	1
162	A2304/22	O' Ring (BS/USA 011)	1
161	A2304/26	Cap Screw ($\frac{1}{2}$ " B.S.F. x $\frac{3}{4}$ ")	1
160	A2304/28	Shaft	1
159	A2284	16T. Gear	1
158	A3005	Taper Pin (No. 0 x $\frac{3}{4}$ ")	1
157	A2304/32	18T. Gear	1
156	A2304/26	26T. Gear	1
155	A2304/22	22T. Gear	1
154	A2304/20	20T. Gear	1
153	A2304/19	19T. Gear	1
152	A2304/18	18T. Gear	1
151	A3006	Key -	1
150	A3003	Bush -	1
149	A3007	Clamping Sleeve	1
148	A2752	Laminated Washer	1
147	A2492	Clamp Washer	1
146	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
145	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
144	A2304/28	28T. Gear	1
143	A2304/32	32T. Gear	1
142	A3006	Key -	1
141	A3003	Bush -	1
140	A3007	Clamping Sleeve	1
139	A2752	Laminated Washer	1
138	A2492	Clamp Washer	1
137	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
136	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
135	A2304/28	28T. Gear	1
134	A2304/32	32T. Gear	1
133	A3006	Key -	1
132	A3003	Bush -	1
131	A3007	Clamping Sleeve	1
130	A2752	Laminated Washer	1
129	A2492	Clamp Washer	1
128	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
127	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
126	A2304/28	28T. Gear	1
125	A2304/32	32T. Gear	1
124	A3006	Key -	1
123	A3003	Bush -	1
122	A3007	Clamping Sleeve	1
121	A2752	Laminated Washer	1
120	A2492	Clamp Washer	1
119	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
118	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
117	A2304/28	28T. Gear	1
116	A2304/32	32T. Gear	1
115	A3006	Key -	1
114	A3003	Bush -	1
113	A3007	Clamping Sleeve	1
112	A2752	Laminated Washer	1
111	A2492	Clamp Washer	1
110	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
109	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
108	A2304/28	28T. Gear	1
107	A2304/32	32T. Gear	1
106	A3006	Key -	1
105	A3003	Bush -	1
104	A3007	Clamping Sleeve	1
103	A2752	Laminated Washer	1
102	A2492	Clamp Washer	1
101	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
100	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
99	A2304/28	28T. Gear	1
98	A2304/32	32T. Gear	1
97	A3006	Key -	1
96	A3003	Bush -	1
95	A3007	Clamping Sleeve	1
94	A2752	Laminated Washer	1
93	A2492	Clamp Washer	1
92	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
91	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
90	A2304/28	28T. Gear	1
89	A2304/32	32T. Gear	1
88	A3006	Key -	1
87	A3003	Bush -	1
86	A3007	Clamping Sleeve	1
85	A2752	Laminated Washer	1
84	A2492	Clamp Washer	1
83	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
82	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
81	A2304/28	28T. Gear	1
80	A2304/32	32T. Gear	1
79	A3006	Key -	1
78	A3003	Bush -	1
77	A3007	Clamping Sleeve	1
76	A2752	Laminated Washer	1
75	A2492	Clamp Washer	1
74	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
73	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
72	A2304/28	28T. Gear	1
71	A2304/32	32T. Gear	1
70	A3006	Key -	1
69	A3003	Bush -	1
68	A3007	Clamping Sleeve	1
67	A2752	Laminated Washer	1
66	A2492	Clamp Washer	1
65	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
64	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
63	A2304/28	28T. Gear	1
62	A2304/32	32T. Gear	1
61	A3006	Key -	1
60	A3003	Bush -	1
59	A3007	Clamping Sleeve	1
58	A2752	Laminated Washer	1
57	A2492	Clamp Washer	1
56	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
55	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
54	A2304/28	28T. Gear	1
53	A2304/32	32T. Gear	1
52	A3006	Key -	1
51	A3003	Bush -	1
50	A3007	Clamping Sleeve	1
49	A2752	Laminated Washer	1
48	A2492	Clamp Washer	1
47	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
46	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
45	A2304/28	28T. Gear	1
44	A2304/32	32T. Gear	1
43	A3006	Key -	1
42	A3003	Bush -	1
41	A3007	Clamping Sleeve	1
40	A2752	Laminated Washer	1
39	A2492	Clamp Washer	1
38	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
37	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
36	A2304/28	28T. Gear	1
35	A2304/32	32T. Gear	1
34	A3006	Key -	1
33	A3003	Bush -	1
32	A3007	Clamping Sleeve	1
31	A2752	Laminated Washer	1
30	A2492	Clamp Washer	1
29	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
28	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
27	A2304/28	28T. Gear	1
26	A2304/32	32T. Gear	1
25	A3006	Key -	1
24	A3003	Bush -	1
23	A3007	Clamping Sleeve	1
22	A2752	Laminated Washer	1
21	A2492	Clamp Washer	1
20	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
19	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
18	A2304/28	28T. Gear	1
17	A2304/32	32T. Gear	1
16	A3006	Key -	1
15	A3003	Bush -	1
14	A3007	Clamping Sleeve	1
13	A2752	Laminated Washer	1
12	A2492	Clamp Washer	1
11	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
10	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1
9	A2304/28	28T. Gear	1
8	A2304/32	32T. Gear	1
7	A3006	Key -	1
6	A3003	Bush -	1
5	A3007	Clamping Sleeve	1
4	A2752	Laminated Washer	1
3	A2492	Clamp Washer	1
2	A3008	Socket Countersunk Screw ($\frac{1}{2}$ " B.S.F. x 1")	1
1	A2304/26	Socket Setcrew (2 B.A. x $\frac{1}{2}$ ") (Cup Point)	1



PARTS LIST FOR QUICK CHANGE GEAR BOX (contd.)

Drg. Ref.	Part No.	Description	No. Off/Mc
202	A2328/1	Change Gear Quadrant	1
203	A3015	Anchor Pin	1
204		Washer (3/8")	1
205		Hexagon Nut (3/8" B.S.F.)	1
207		Hexagon Lock Nut (1/2" B.S.F.)	1
208	A2326/1	19/57T. Reversible Cluster Gear	2
210	A2325/1	19/57T. Fixed Cluster Gear	1
212	V1220	Washer	1
213		Retaining Screw	1
214	A3115	24T. Gear	1
216	A2023	Pad	1
217		Hexagon Head Set Screw (1/2" B.S.F. x 1")	2
219		Cap Screw (2 B.A. x 1")	1
220	A3017	Stud	1
221		Washer (1/2")	1
222		Hexagon Lock Nut (1/2" B.S.F.)	3
223	A2024	Hinge Screw	2
224	A2012	Tension Spring	2
225		Round Head Screw (2 B.A. x 1/8")	1
226	A2527/1	Change Wheel Guard (ML7)	3
227	A2528/1	Change Wheel Guard (ML7-R & Super 7)	1
228	A7934	Metric Screwwriting Chart	1
229		Change Gear Quadrant	1
230		Washer (3/8")	1
231		Hexagon Nut (3/8" B.S.F.)	1
232		Hexagon Lock Nut (1/2" B.S.F.)	1
233		Cap Screw (2 B.A. x 1")	1
234		Change Gear Quadrant	1
235	A1496	Change Wheel Stud	2
236	A1501	Sleeve	2
237	A1500	Bush	2
238	A1498	Washer	2
239		Hexagon Nut (1/2" B.S.F.)	2
240	A1499	Change Wheel Spacer	2
241	A2604	Distance Piece	2
242	72/1125	60T. Change Gear	2
243	A5396	Part	1
244	72/1123	50T. Change Gear	1
245	72/1122	45T. Change Gear	2
246	A5395	28T. Change Gear	2
247	72/1118	30T. Change Gear	2
248	72/1119	35T. Change Gear	2
249	72/1121	40T. Change Gear	2
250	72/1124	55T. Change Gear	2
251		Cap Screw (1/2" B.S.F. x 3/4")	1
252		Cap Screw (1/2" B.S.F. x 3/4")	1
253		Knob (Evans reference No. 780)	1
254	A2963	Backplate	1
255		Washer (2 B.A.)	1
256		Hexagon Lock Nut (1/2" B.S.F.)	1
257	75/1115/1	Collar	1
258		Oil Nipple (Lumatic HDFV4/45)	1
259		Top Cover	1
260	A2977/2	Rivet (No. 0 x 1/8")	1
261		Plunger Housing	1
262	A2977/1	Plunger	1
263		Knob	1
264	A2519/1	Gear Stud	1
265	A2965/2	Cap Screw (M6 x 1 x 20 mm.)	1
266		Gear Stud	1
267	A2330/3	Cap Screw (1/2" B.S.F. x 3/4")	1
268		Washer (2 B.A.)	1
269	A2329/3	Gear Stud	1
270	A2331/1	Link	1
271	A2279/2	Plunger	1
272		Cir-Clip (Anderton 1400-6)	1
273		Spring Clip	1
274		Packing Strip (Super 7 only)	1
275	A2754	Drilling Template	1
276		Cap Screw (1/2" B.S.F. x 3/4")	1
277		Knob (Evans reference No. 780)	1
278		Hexagon Lock Nut (1/2" B.S.F.)	1
279		Washer (2 B.A.)	1
280		Backplate	1
281		Oil Nipple (Lumatic HDFV4/45)	1
282		Top Cover	1
283		Rivet (No. 0 x 1/8")	1
284		Plunger Housing	1
285		Knob	1
286		Gear Stud	1
287		Cap Screw (1/2" B.S.F. x 3/4")	1
288		Washer (2 B.A.)	1
289		Hexagon Lock Nut (1/2" B.S.F.)	1
290		Collar	1
291		Oil Nipple (Lumatic HDFV4/45)	1
292		Top Cover	1
293		Rivet (No. 0 x 1/8")	1
294		Plunger Housing	1
295		Knob	1
296		Gear Stud	1
297		Cap Screw (1/2" B.S.F. x 3/4")	1
298		Washer (2 B.A.)	1
299		Hexagon Lock Nut (1/2" B.S.F.)	1
300		Collar	1
301		Oil Nipple (Lumatic HDFV4/45)	1
302		Top Cover	1
303		Rivet (No. 0 x 1/8")	1
304		Plunger Housing	1
305		Knob	1
306		Gear Stud	1
307		Cap Screw (1/2" B.S.F. x 3/4")	1
308		Washer (2 B.A.)	1
309		Hexagon Lock Nut (1/2" B.S.F.)	1
310		Collar	1
311		Oil Nipple (Lumatic HDFV4/45)	1
312		Top Cover	1
313		Rivet (No. 0 x 1/8")	1
314		Plunger Housing	1
315		Knob	1
316		Gear Stud	1
317		Cap Screw (1/2" B.S.F. x 3/4")	1
318		Washer (2 B.A.)	1
319		Hexagon Lock Nut (1/2" B.S.F.)	1
320		Collar	1
321		Oil Nipple (Lumatic HDFV4/45)	1
322		Top Cover	1
323		Rivet (No. 0 x 1/8")	1
324		Plunger Housing	1
325		Knob	1
326		Gear Stud	1
327		Cap Screw (1/2" B.S.F. x 3/4")	1
328		Washer (2 B.A.)	1
329		Hexagon Lock Nut (1/2" B.S.F.)	1
330		Collar	1
331		Oil Nipple (Lumatic HDFV4/45)	1
332		Top Cover	1
333		Rivet (No. 0 x 1/8")	1
334		Plunger Housing	1
335		Knob	1
336		Gear Stud	1
337		Cap Screw (1/2" B.S.F. x 3/4")	1
338		Washer (2 B.A.)	1
339		Hexagon Lock Nut (1/2" B.S.F.)	1
340		Collar	1
341		Oil Nipple (Lumatic HDFV4/45)	1
342		Top Cover	1
343		Rivet (No. 0 x 1/8")	1
344		Plunger Housing	1
345		Knob	1
346		Gear Stud	1
347		Cap Screw (1/2" B.S.F. x 3/4")	1
348		Washer (2 B.A.)	1
349		Hexagon Lock Nut (1/2" B.S.F.)	1
350		Collar	1
351		Oil Nipple (Lumatic HDFV4/45)	1
352		Top Cover	1
353		Rivet (No. 0 x 1/8")	1
354		Plunger Housing	1
355		Knob	1
356		Gear Stud	1
357		Cap Screw (1/2" B.S.F. x 3/4")	1
358		Washer (2 B.A.)	1
359		Hexagon Lock Nut (1/2" B.S.F.)	1
360		Collar	1
361		Oil Nipple (Lumatic HDFV4/45)	1
362		Top Cover	1
363		Rivet (No. 0 x 1/8")	1
364		Plunger Housing	1
365		Knob	1
366		Gear Stud	1
367		Cap Screw (1/2" B.S.F. x 3/4")	1
368		Washer (2 B.A.)	1
369		Hexagon Lock Nut (1/2" B.S.F.)	1
370		Collar	1
371		Oil Nipple (Lumatic HDFV4/45)	1
372		Top Cover	1
373		Rivet (No. 0 x 1/8")	1
374		Plunger Housing	1
375		Knob	1
376		Gear Stud	1
377		Cap Screw (1/2" B.S.F. x 3/4")	1
378		Washer (2 B.A.)	1
379		Hexagon Lock Nut (1/2" B.S.F.)	1
380		Collar	1
381		Oil Nipple (Lumatic HDFV4/45)	1
382		Top Cover	1
383		Rivet (No. 0 x 1/8")	1
384		Plunger Housing	1
385		Knob	1
386		Gear Stud	1
387		Cap Screw (1/2" B.S.F. x 3/4")	1
388		Washer (2 B.A.)	1
389		Hexagon Lock Nut (1/2" B.S.F.)	1
390		Collar	1
391		Oil Nipple (Lumatic HDFV4/45)	1
392		Top Cover	1
393		Rivet (No. 0 x 1/8")	1
394		Plunger Housing	1
395		Knob	1
396		Gear Stud	1
397		Cap Screw (1/2" B.S.F. x 3/4")	1
398		Washer (2 B.A.)	1
399		Hexagon Lock Nut (1/2" B.S.F.)	1
400		Collar	1
401		Oil Nipple (Lumatic HDFV4/45)	1
402		Top Cover	1
403		Rivet (No. 0 x 1/8")	1
404		Plunger Housing	1
405		Knob	1
406		Gear Stud	1
407		Cap Screw (1/2" B.S.F. x 3/4")	1
408		Washer (2 B.A.)	1
409		Hexagon Lock Nut (1/2" B.S.F.)	1
410		Collar	1
411		Oil Nipple (Lumatic HDFV4/45)	1
412		Top Cover	1
413		Rivet (No. 0 x 1/8")	1
414		Plunger Housing	1
415		Knob	1
416		Gear Stud	1
417		Cap Screw (1/2" B.S.F. x 3/4")	1
418		Washer (2 B.A.)	1
419		Hexagon Lock Nut (1/2" B.S.F.)	1
420		Collar	1
421		Oil Nipple (Lumatic HDFV4/45)	1
422		Top Cover	1
423		Rivet (No. 0 x 1/8")	1
424		Plunger Housing	1
425		Knob	1
426		Gear Stud	1
427		Cap Screw (1/2" B.S.F. x 3/4")	1
428		Washer (2 B.A.)	1
429		Hexagon Lock Nut (1/2" B.S.F.)	1
430		Collar	1
431		Oil Nipple (Lumatic HDFV4/45)	1
432		Top Cover	1
433		Rivet (No. 0 x 1/8")	1
434		Plunger Housing	1
435		Knob	1
436		Gear Stud	1
437		Cap Screw (1/2" B.S.F. x 3/4")	1
438		Washer (2 B.A.)	1
439		Hexagon Lock Nut (1/2" B.S.F.)	1
440		Collar	1
441		Oil Nipple (Lumatic HDFV4/45)	1
442		Top Cover	1
443		Rivet (No. 0 x 1/8")	1
444		Plunger Housing	1
445		Knob	1
446		Gear Stud	1
447		Cap Screw (1/2" B.S.F. x 3/4")	1
448		Washer (2 B.A.)	1
449		Hexagon Lock Nut (1/2" B.S.F.)	1
450		Collar	1
451		Oil Nipple (Lumatic HDFV4/45)	1
452		Top Cover	1
453		Rivet (No. 0 x 1/8")	1
454		Plunger Housing	1
455		Knob	1
456		Gear Stud	1
457		Cap Screw (1/2" B.S.F. x 3/4")	1
458		Washer (2 B.A.)	1
459		Hexagon Lock Nut (1/2" B.S.F.)	1
460		Collar	1
461		Oil Nipple (Lumatic HDFV4/45)	1
462		Top Cover	1
463		Rivet (No. 0 x 1/8")	1
464		Plunger Housing	1
465		Knob	1
466		Gear Stud	1
467		Cap Screw (1/2" B.S.F. x 3/4")	1
468		Washer (2 B.A.)	1
469		Hexagon Lock Nut (1/2" B.S.F.)	1
470		Collar	1
471		Oil Nipple (Lumatic HDFV4/45)	1
472		Top Cover	1
473		Rivet (No. 0 x 1/8")	1
474		Plunger Housing	1
475		Knob	1
476		Gear Stud	1
477		Cap Screw (1/2" B.S.F. x 3/4")	1
478		Washer (2 B.A.)	1
479		Hexagon Lock Nut (1/2" B.S.F.)	1
480		Collar	1
481		Oil Nipple (Lumatic HDFV4/45)	1
482		Top Cover	1
483		Rivet (No. 0 x 1/8")	1
484		Plunger Housing	1
485		Knob	1
486		Gear Stud	1
487		Cap Screw (1/2" B.S.F. x 3/4")	1
488		Washer (2 B.A.)	1
489		Hexagon Lock Nut (1/2" B.S.F.)	1
490		Collar	1
491		Oil Nipple (Lumatic HDFV4/45)	1
492		Top Cover	1
493		Rivet (No. 0 x 1/8")	1
494		Plunger Housing	1
495		Knob	1
496		Gear Stud	1
497		Cap Screw (1/2" B.S.F. x 3/4")	1
498		Washer (2 B.A.)	1
499		Hexagon Lock Nut (1/2" B.S.F.)	1
500		Collar	1
501		Oil Nipple (Lumatic HDFV4/45)	1
502		Top Cover	1
503		Rivet (No. 0 x 1/8")	1
504		Plunger Housing	1
505		Knob	1
506		Gear Stud	1
507		Cap Screw (1/2" B.S.F. x 3/4")	1
508		Washer (2 B.A.)	1
509		Hexagon Lock Nut (1/2" B.S.F.)	1
510		Collar	1
511		Oil Nipple (Lumatic HDFV4/45)	1
512		Top Cover	1
513		Rivet (No. 0 x 1/8")	1
514		Plunger Housing	1
515		Knob	1
516		Gear Stud	1
517		Cap Screw (1/2" B.S.F. x 3/4")	1
518		Washer (2 B.A.)	1
519		Hexagon Lock Nut (1/2" B.S.F.)	1
520		Collar	1
521		Oil Nipple (Lumatic HDFV4/45)	1
522		Top Cover	1
523		Rivet (No. 0 x 1/8")	1
524		Plunger Housing	1
525		Knob	1
526		Gear Stud	1
527		Cap Screw (1/2" B.S.F. x 3/4")	1
528		Washer (2 B.A.)	1
529		Hexagon Lock Nut (1/2" B.S.F.)	1
530		Collar	1
531		Oil Nipple (Lumatic HDFV4/45)	1
532		Top Cover	1
533		Rivet (No. 0 x 1/8")	1
534		Plunger Housing	1
535		Knob	1
536		Gear Stud	1
537		Cap Screw (1/2" B.S.F. x 3/4")	1