

OPERATOR'S HANDBOOK

HARRISON

9" Swing Lathe
(4 $\frac{1}{2}$ " Centre)

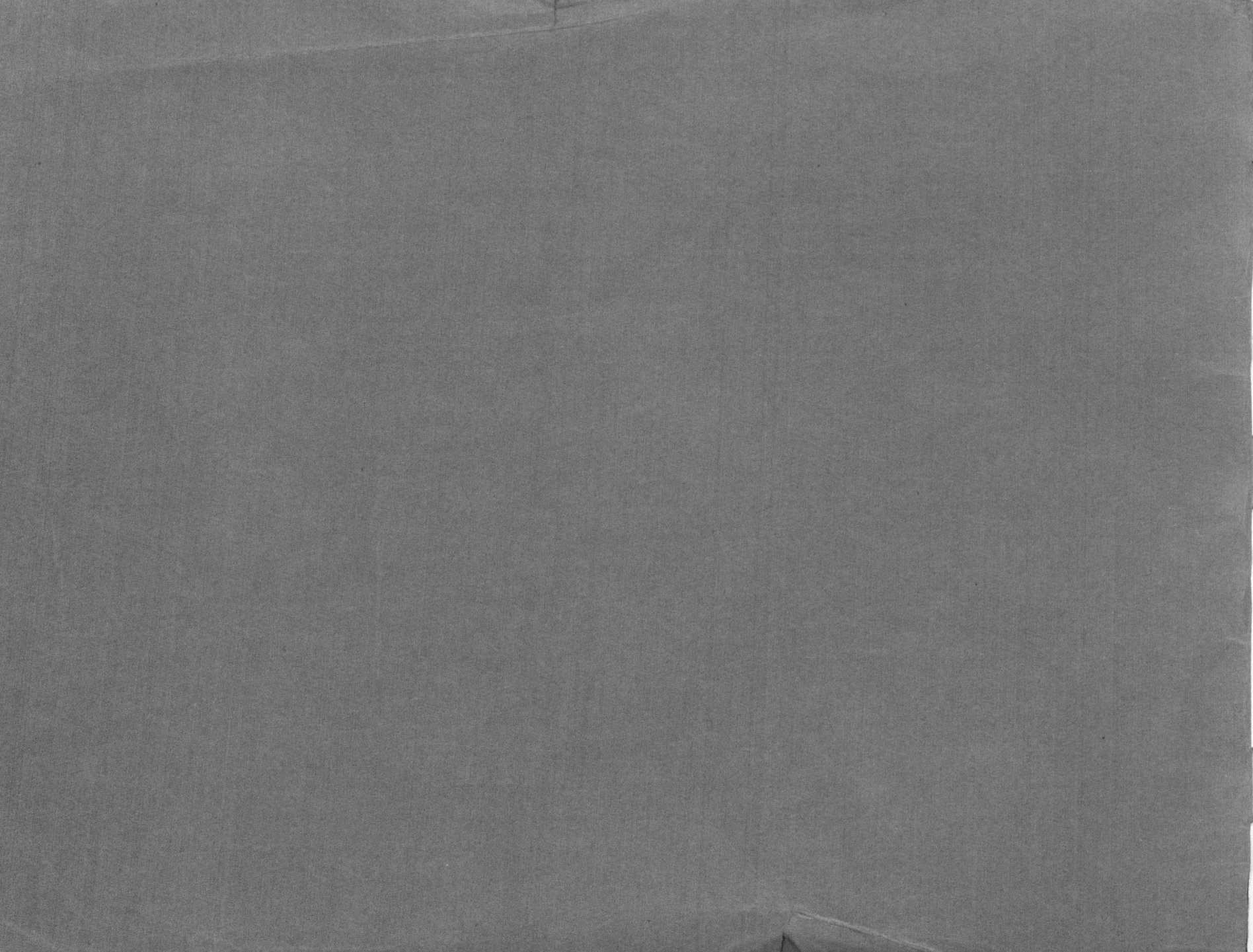
MODEL L5

11" Swing Lathe
(5 $\frac{1}{2}$ " Centre)

MODEL L5A

PRICE 21/-

AND SPARE PARTS LIST



OPERATOR'S HANDBOOK

AND SPARE PARTS LIST

HARRISON

9" Swing Lathe
(MODEL L5)

11" Swing Lathe
(MODEL L5A)

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INSTRUCTIONS FOR ORDERING SPARES

When ordering Spare parts **always quote Machine No.**

which is stamped on the bed at the tailstock end.

Spares can be obtained through your usual machinery dealer, or
direct from the manufacturers :—

T. S. HARRISON & SONS LIMITED

P.O. BOX 20,

HECKMONDWIKE,

YORKSHIRE, ENGLAND

Telephone: Heckmondwike 3751 *Telegrams:* Harrison, Heckmondwike *Telex:* 55217

SPECIFICATION AND LEADING DIMENSIONS

	MODEL L5		MODEL L5A		
Swing over bed	9 $\frac{3}{8}$ "	240 mm.	11 $\frac{3}{8}$ "	290 mm.	
Admits between centres	24" or 40"	610 or 1020 mm.	24" or 40"	610 or 1020 mm	
Bed length	51" or 67"	1295 or 1700 mm.	51" or 67"	1295 or 1700 mm.	
Swing over saddle	6 $\frac{1}{8}$ "	155 mm.	8 $\frac{1}{8}$ "	205 mm.	
Swing in gap—Diameter	17"	430 mm.	18 $\frac{3}{4}$ "	475 mm.	
Swing in gap—width in front of faceplate	$\left. \begin{array}{l} \frac{3}{4}" \text{ and } 1\frac{3}{8}" \text{ Bore} \\ \text{screwed spindles} \\ 1\frac{3}{8}" \text{ Bore spindle} \\ \text{L00 taper nose} \end{array} \right\}$	4 $\frac{1}{2}$ "	115 mm.	4 $\frac{1}{2}$ "	115 mm.
Swing in gap—width in front of faceplate		3 $\frac{3}{8}$ "	85 mm.	3 $\frac{3}{8}$ "	85 mm.
Maximum cross slide feed	7"	180 mm.	7"	180 mm.	
Maximum top slide feed	2 $\frac{7}{8}$ "	75 mm.	2 $\frac{7}{8}$ "	75 mm.	
Maximum movement of tailstock spindle	4"	100 mm.	4"	100 mm.	
Maximum set over of tailstock spindle	3 $\frac{3}{8}$ "	9.5 mm.	3 $\frac{3}{8}$ "	9.5 mm.	
Centre to tool base	9 $\frac{5}{16}$ "	14.3 mm.	1 $\frac{5}{16}$ "	23.8 mm.	
Maximum tool section	3 $\frac{3}{4}$ " × 5 $\frac{5}{8}$ "	19 × 15.9 mm.	1 $\frac{1}{8}$ " × 5 $\frac{5}{8}$ "	28.5 × 15.9 mm.	
Spindle speeds—number	8 or 16		8 or 16		
Range in r.p.m. with 1 h.p. motor	22 to 500		22 to 500		
Range in r.p.m. with 1 $\frac{1}{2}$ h.p. motor	34 to 750		34 to 750		
Range in r.p.m. with 2 h.p. motor	45 to 1,000		45 to 1,000		
Range in r.p.m. with 2 speed 3/1 $\frac{1}{2}$ h.p. motor	34 to 1,500		34 to 1,500		
Spindle bored to pass—diameter	3 $\frac{3}{4}$ " or 1 $\frac{3}{8}$ "	19 or 35 mm.	1 $\frac{3}{8}$ "	35 mm.	
Size of morse taper centres	No. 3		No. 3		
Leadscrew—diameter... ..	1 $\frac{1}{8}$ "	28.6 mm.	1 $\frac{1}{8}$ "	28.6 mm.	
Leadscrew—T.P.I.	4		4		
Range of threads (T.P.I.)—3 speed gearbox	2 $\frac{1}{2}$ to 80				
Range of feeds —3 speed gearbox (sliding) ... ..	.002" to .050"	.05 to 1.27 mm.		
Range of feeds —3 speed gearbox (surfacing) ... ..	.001" to .030"	.025 to .76 mm.		
Range of threads (T.P.I.)—36 speed gearbox	4 to 60		4 to 60		
Range of feeds —36 speed gearbox (sliding) ... ..	.0021" to .032"	.053 to .83 mm.	.0021" to .032"	.053 to .83 mm.
Range of feeds —36 speed gearbox (surfacing)... ..	.0012" to .018"	.03 to .47 mm.	.0012" to .018"	.025 to .47 mm.	

INTRODUCTION

The main purpose of this booklet is to provide users with a full list of parts, should replacements become necessary. When ordering spares please quote the part number, description and the LATHE NUMBER, which will be found stamped at rear end of bed. Attention has been drawn to a few points which may be of use to the

purchaser of a "HARRISON" lathe, the observance of which will ensure satisfactory service.

New developments and modifications resulting in improved performance may be incorporated from time to time on them and the right is reserved to modify the specification as may be required.

INSTALLATION

Slinging: Holes are provided in the base under the headstock and tailstock through which a bar may be passed for slinging purposes.

Care should be taken to avoid the lifting ropes bearing on the leadscrew or feed rod.

Cleaning: All bright surfaces are covered with an anti-corrosive compound before despatch from the works. This should be removed with petrol or paraffin before putting the machine into operation.

Levelling: Because of the rigid integrated construction of the bed and cabinet base the machine is inherently accurate and capable of performance within the specification when it leaves the works.

The lathe should not be bolted down but should be lowered on to locating pins secured to a rigid floor and the jacking screws adjusted to eliminate rock. By bolting down, distortion could occur, introducing twist in the bed and the resultant damage may not be corrected by releasing the nuts on the bolts.

It is advisable to support the jacking screws on steel plates. The screws should be adjusted to enable the headstock end of the lathe to be slightly higher than the tailstock end and so that the front of the machine is raised relative to the rear. This facilitates return of the coolant to the sump.

Before despatch the machine has been carefully tested for smooth running and accuracy. (See Test Chart).

Any checks for accuracy **MUST** be made with the machine on a rigid floor.

Ensure that the test mandrels are true, clean and free from burrs on the taper seating. Clean and inspect the internal taper of the spindle before inserting the mandrel. **DETAILS OF ANY DISCREPANCY BETWEEN THE TEST CHART AND YOUR OWN TESTS SHOULD BE REPORTED TO THE MANUFACTURERS BEFORE ANY ADJUSTMENT IS MADE.**

Electrical connection: The supply wires should be connected to the isolator switch at the end of the cabinet in the usual manner.

Initial operation: It is important to make sure that the feed or screwcutting levers are in the disengaged position before operating the Lathe otherwise damage can be caused by the saddle or tools running into the headstock or tailstock.

As the headstock is the most important unit of the Lathe, only the best materials and workmanship are incorporated in this assembly. All the gear teeth are induction hardened to 450/500 Brinell and honed to a smooth and accurate form. The hardening may result in a sound of higher pitch than is evident on a Lathe which does not have hardened gears.

To ensure satisfactory operation of the bearings it is essential to run in the machine at lower speeds only during the first 40/50 hours of operation. After this initial run in period we also recommend that a further gradual build-up to the top speed operation is followed.

LUBRICATION

Complete lubrication is essential before running a new lathe and light running for a short period is recommended.

Daily lubrication will reduce wear and ensure trouble free running.

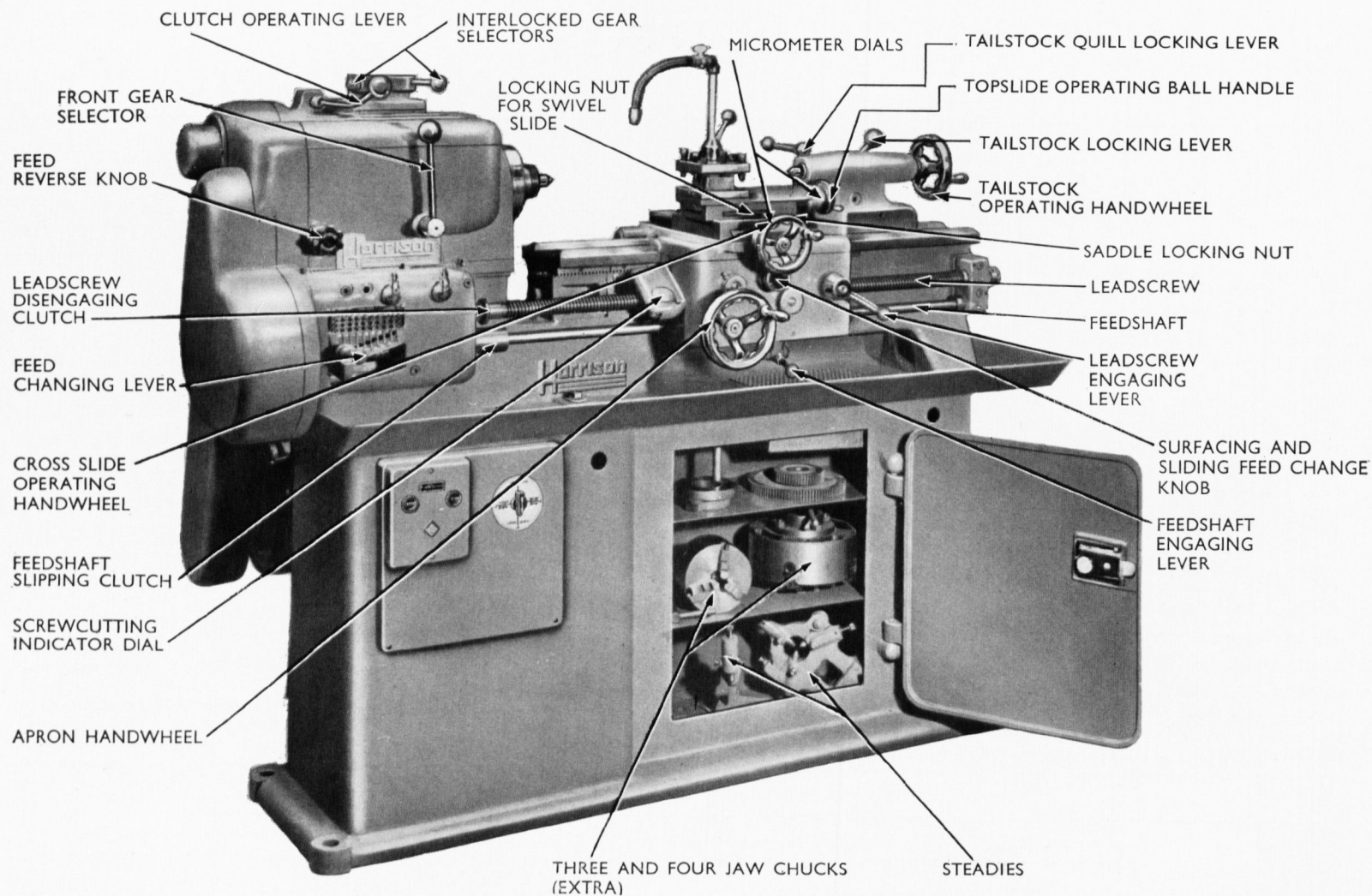
All oil nipples are easily visible and an oil gun is provided.

The headstock level should be kept within the limits shown on the oil indicator at the rear of the headstock. Incorporated in the oil indicator are screwed filler and drain plugs.

The external reverse gears on the headstock should be kept clean and occasionally smeared with grease based with Molybdenum Disulphide such as (Rocol) Molygear.

RECOMMENDED LUBRICANTS

	MOBIL	SHELL	ESSO	POWER	REGENT	S.A.E. No.
Headstock, Slideways and nipples ...	D.T.E. Heavy Medium	Tellus 33	Nuto H 44	B.P. Energol HP20	Rando H.D.C.	10
Motor, grease cups ...	Mobilux Grease No. 3	Alvania grease 3	Beacon Grease 3	B.P. Energrease LS 3	Regal Starfak Premium 3	



CONTROLS ON MODELS L5 AND L5A LATHES

CONTROLS

All control levers are shown on the illustration on the opposite page.

(a) **Electrical Controls.** A single panel, on the front of the lathe, contains all the electrical controls within easy reach of the operator. A push-button operated starter with overload and no-volt protection is standard equipment on all machines; other controls available being two speed, reversing and coolant pump rotary type switches.

(b) **Headstock.** Speed changes should only be made after disengagement of the clutch. The clutch lever is at the top of the headstock, engagement is by moving to the right, disengagement by moving to left.

A two-position front gear lever selects the high speed range when in the right hand position and the low speed range in the left hand position and this, used in conjunction with the two position twin selectors at the top of the headstock, gives a total of eight spindle speeds. Freely sliding gears combined with a direct reading speed chart ensures effortless and instantaneous speed change.

Forward or reverse rotation of the feed gear train is obtained by rotating the knob at the front of the headstock.

(c) **Norton Feed Gearbox.** Thirty-six changes of threads and feeds are obtained by manipulation of the tumbler lever in conjunction with the two adjacent compound gear levers. The lever positions are determined by reference to the direct reading screwcutting and feed chart. For changewheel combinations see charts on page 11. When not being used it is recommended that the leadscrew be disengaged by operation of the dog clutch.

(d) **Three Speed Gearbox.** Three changes of both sliding and surfacing feeds are obtained by moving the selector lever into the appropriate positions A, B or C. The screwcutting and feed chart attached to the inside of the changewheel guard gives changewheel combinations for threads from 2 to 80 TPI. For 19 TPI an extra 95T changewheel is required and for fine threads of 36 TPI and upwards an extra 120T wheel is necessary.

(e) **Apron.** Instantaneous engagement and disengagement to both feeds is obtained by the trip lever of the drop out worm box situated at the base of the apron. The feed selector knob which is directly below the cross slide handwheel should be pushed in for sliding feeds and pulled out for surfacing feeds.

Engagement of the leadscrew for screwcutting is by means of the lever at the right of the apron which is pulled up for engagement and pushed down for disengagement. Simultaneous engagement of lead-screw and feedshaft is prevented by interlocking control.

The carriage may be locked to the bed by means of the hexagon screw on the right hand side of the saddle.

Exact repeat of leadscrew engagement is obtained with the screw-cutting indicator.

To cut even threads per inch engage at any graduation.

To cut odd threads per inch engage at any numbered graduation.

To cut half threads per inch engage at graduations 1 or 3.

To cut quarter threads per inch engage at graduation 1.

The pivoting screwcutting indicator should be disengaged when not in use.

(f) **Slides.** Cross slide and tool slide are fitted with friction grip micrometer dials graduated to read .001". The tool slide assembly is arranged to rotate through 360 degrees on the graduated cross slide and locking is by means of the two nuts on the swivel slide.

(g) **Tailstock.** Clamping to the bed is effected by the lever at the rear and spindle quill locking is by means of the pad bolt on top of the tailstock.

FITTING AND USE OF ATTACHMENTS

Many operations other than turning are possible on a lathe fitted with a few attachments and these enable further operations to be carried out without recourse to special machines.

The following attachments are available for "HARRISON" Lathes.

Collet Attachments. This type of chuck provides a most accurate means of gripping work, the accuracy being 0.0005 in. at the collet nose, and 0.003 in. at a distance of 3 in. out.

Use of attachments is not restricted to cylindrical work and collets for square or hexagonal bar can be provided.

- (i) **For $\frac{3}{4}$ in. bore spindle.** To fit the attachment, unscrew the tail end sleeve from the driving end of the spindle, and remove chuck or faceplate, centre and sleeve from the spindle nose. Assemble the collet nose piece, closer bush and collet. Pass the draw tube through the spindle from the driving end and screw on to collet. Collets can be provided up to $\frac{1}{2}$ in. capacity, a standard set being $\frac{1}{16}$ in. to $\frac{1}{2}$ in. in increments of $\frac{1}{16}$ in., but sizes from $\frac{1}{64}$ in. together with millimetre sizes are available.
- (ii) **Draw Tube Type Collet Attachment for $1\frac{3}{8}$ in. Bore Spindle (Screwed or Taper Nose).** To fit the attachment, remove chuck or faceplate, centre and sleeve from spindle nose. Pass the draw tube through the spindle from nose, then assemble handwheel and clamping nut onto tube. Screw on spindle nose cover (screwed type) or mount onto taper and secure with draw-nut which is integral with spindle (Taper nose spindle). Assemble the closer bush into mouth of spindle, insert required size of collet and screw onto draw tube. The standard range of collets is from $\frac{1}{16}$ in. to 1 in. maximum in increments of $\frac{1}{16}$ in., but any size within this range (including metric) can be provided.
- (iii) **Multisize Collet Attachment (Screwed or Taper Nose Spindle).** The complete assembly is mounted on the spindle

nose. Collets are inserted after removing the closer bush with the wrench provided. The capacity of the attachment is $\frac{1}{2}$ in. to $1\frac{1}{2}$ in. and is covered by 11 collets.

Taper Turning Attachment. Whilst it is preferred that this attachment be fitted at the works, little difficulty should be experienced by the engineer wishing to make this addition to the lathe. Bolt holes are drilled in the rear of the saddle on all lathes to accept the support bracket of the attachment and an assembly instruction drawing is supplied with each unit. Taper turning of lengths up to 11 in. with included angles up to 20 degrees can be carried out, graduated scales being provided, reading degrees at the tailstock end and inches taper per foot at the headstock end. Instructions for setting up prior to taper turning are as follows:—

Release the two nuts clamping the swivel bar, set to the required angle by means of the adjusting screw at the rear and reclamp.

Release the two socket head cap screws at the left-hand side of the attachment – these must remain released during taper turning.

Taper turning at any point along the bed can be achieved by setting the support bracket at the rear of bed to the desired position.

Change over to normal turning is as follows:—

Set swivel bar to zero graduation.

Withdraw support bracket to tailstock end of bed.

Lock the two socket head cap screws.

FITTING AND USE OF ATTACHMENTS—(contd.)

Milling Attachment. This attachment is mounted on to the top slide, replacing the toolpost. The tee slotted, vee grooved slide has vertical screw adjustment and is arranged to swivel against a scale graduated 45 degrees each side of the vertical centre line. An arbor for mounting between centres and driven by the lathe driver plate is available to take 1 in. bore cutters. Machining by this means is, however, restricted to thin work and so, wherever possible, face or end milling is recommended. Face and end mills together with Woodruff key cutters can be provided having No. 3 morse taper shanks for direct fitting in the spindle nose.

Milling and Gearcutting Attachment. As in the previous case, this attachment is mounted on the top slide in place of the toolpost. On the vertical slide assembly, of similar construction to the milling attachment, is fitted a support for the work arbor together with indexing mechanism. Cutter arbor and cutter are mounted between the lathe centres, the drive being by driver plate and pin. It is important that, when setting up for gear cutting, the work arbor be exactly at right angles to the cutter arbor and the cutter directly under the centre line of the work arbor. Gears up to 7 in. diameter can be cut and cutters covering a wide range of gear pitches are available.

Dividing Attachment. Accurate indexing of the lathe spindle is achieved by use of this attachment. Work mounted in the chuck, on faceplate or between centres can be indexed for operations such as graduating, slotting, key seating, etc. The attachment fits on the top changewheel shaft after removal of the gear, the hinged guard remaining open whilst in use. A very wide range of divisions is possible with the standard index plate, but special plates can be provided when necessary.

Boring Table. This attachment fits directly on to the saddle. A boring bar with six cutters for use between centres can be supplied. To fit the table, remove the complete cross slide by turning the handwheel until the slide becomes free and can be taken from the

rear of the saddle. Replace by the boring table, feeding on to the screw which is operated in the reverse direction. Place the boring bar between the lathe centres and drive by means of the driver plate.

Fourway Toolpost. Indexes against a spring loaded plunger. This unit replaces the standard type toolpost.

American Toolpost. Of the recognised American pattern with swivelling base plate and single clamp screw. Suitable for 11 in. swing (Model L5A) lathes only.

Electric Pump Unit. This attachment comprises a flanged electric pump mounted on a storage tank, the whole being secured to the rear of the cabinet base. It is recommended for high speed lathes and for work requiring continuous, copious supplies of coolant.

Feed Stops.

- (i) **Micrometer Carriage Stop.** Clamps to the front vee bed way and used for accurate machining of shouldered work. The screwed spindle is fitted with a micrometer dial having 0.001 in. graduations.
- (ii) **Four Position Carriage Stop.** Similar to the above, this unit clamps to the front vee bed way and is used for multi-shouldered work. The indexing body contains four adjustable screws each of which can be used in turn to control various shoulder lengths.
- (iii) **Cross Slide Stop.** Is located on the cross slide ways and is used on facing operations.

Bed Turret (Model L5A only). This attachment is clamped to the bed ways replacing the tailstock. It comprises a lever operated slide of 4 in. stroke length with a six station automatically indexing

FITTING AND USE OF ATTACHMENTS—(contd.)

turret, each station having an adjustable stop screw. Supplied with lathe, the turret head is bored suitable for 1 in. diameter tool shanks but otherwise is left solid for boring *in situ* to ensure perfect alignment with the headstock centre.

Cut-off Slide. Used for parting off and facing operations. This quick acting lever operated slide, with front and rear toolposts, is clamped to the bed ways immediately in front of the chuck.

Changewheels for Screwcutting.

Metric Threads (Norton Feed Gearbox with 4 TPI Leadscrew). A thread pitch range of 0.5 to 7 mm. is available on both models. Additional wheels required for 9 in. (Model L5) lathe are 40, 60, 63 and 127T, and for 11 in. swing (Model L5A) lathe, 40, 63 and 127T. Combinations are given on chart No. 63 (page 11).

Metric Threads (Norton Feed Gearbox with 6 mm. pitch Leadscrew). With this combination a metric pitch range of 11 pitches, 0.5 to 6 mm. can be achieved. Change wheels required are 1 - 50T, 1 - 80T and 1 - 85T. A range of 36, English and American threads from 4 to 60 can be obtained by using the following extra change wheels, 1 - 45T and 1 - 90T. (see page 12).

Metric Threads (Metric Norton Feed Gearbox with 6 mm. pitch Leadscrew). The thread pitch range available with this arrangement is 0.5 to 7 mm. (coarse) and 0.2 to 0.9 mm. (fine). Change wheels required are 1 - 25T, 1 - 50T, 1 - 60T, 2 - 80T, 1 - 100T and 1 - 120T. Extra gears required for converting to English and American threads are 1 - 36T, 1 - 75T, 1 - 76T, 1 - 85T and 1 - 95T. These gears, used in conjunction with some of the metric gears, will give a range of 36 threads, 4 to 60 TPI. (see page 12)

American Pipe Threads (Norton Feed Gearbox). The complete range of pipe threads is directly available through the gearbox with the exception of 11½ and 27 TPI:

the additional changewheels required for these together with their combinations are given on page 11.

Metric Threads (Three Speed Gearbox with 4 TPI Leadscrew). A thread pitch range of 1 to 11 mm. on the 9 in. (Model L5) lathe and 1 to 9 mm. on 11 in. swing (Model L5A) are obtained with an additional 127T changewheel. Combinations are given on chart No. 6 on page 11.

Metric Threads (Three Speed Gearbox with 6 mm. pitch Leadscrew). The range of metric threads is 0.5 to 9 mm. pitch (total 20). Changewheels required are 1 - 20T, 1 - 40T, 1 - 45T, 2 - 50T, 1 - 55T, 1 - 60T, 1 - 70T, 1 - 80T, 1 - 100T and 1 - 120T.

A range of 4 to 24 TPI (total 18) can be obtained by using the following extra gears in conjunction with some of the gears supplied for cutting metric pitches. 1 - 63T, 1 - 69T, 1 - 77T, 1 - 81T, 1 - 84T, 1 - 86T, 1 - 90T, 1 - 108T and 1 - 127T. (see page 12).

Special Threads. Changewheels can be provided for comprehensive ranges of B.A., module, diametral, fractional and many other special thread pitches.

Note.—The indicator dial cannot be used for metric, B.A., and other special threads or for English and American Threads when a metric leadscrew is fitted. It is necessary to maintain engagement of the lead-screw during screwcutting and an electrical reversing switch can be supplied for returning the carriage to enable repeat cuts to be taken.

Two Speed Equipment. Spindle speed ranges can be doubled by fitting a two speed motor and selector switch. The standard is 31 to 1440 r.p.m., but other ranges can be provided.

Additional Equipment. A wide selection of equipment available includes chucks of all sizes within the capacity of the lathe, tailstock drill chuck, rotating centre, half centre, pipe centre, turning tools and tool holders, etc.

FITTING AND USE OF ATTACHMENTS—(contd.)

9" (MODEL L5) LATHE

(Norton Gearbox)

RANGE	T.P.I.	TOP SHAFT	INTER-MEDIATE SHAFT	BOTTOM SHAFT	G'BOX LEVER POSITION
Standard	4 to 60	50	50	100	As G'box Chart
Fine	8 to 120	50	100-50	100	4 to 60
Coarse	2 to 30	50	100	50	4 to 60
	11½	50	100-50	115	5
Special Threads	27	40	100	60	36

11" SWING (MODEL L5A) LATHE (Norton Gearbox)

RANGE	T.P.I.	TOP SHAFT	INTER-MEDIATE SHAFT	BOTTOM SHAFT	G'BOX LEVER POSITION
Standard	4 to 60	50	60	100	As G'box Chart
Fine	8 to 120	50	100-50	100	4 to 60
Coarse	2 to 30	50	100	50	4 to 60
	11½	50	60	115	10
Special Threads	27	40	100	60	36

* G'box T.P.I. Position = $\frac{\text{T.P.I. Required}}{2}$

† G'box T.P.I. Position = T.P.I. Required × 4

COMPLETE RANGE OF T.P.I.

(Norton Gearbox)

Coarse	2	2¼	2⅝	2½	2¾	3	3¼	3½	3¾
Standard	4	4½	4¾	5	5½	6	6½	7	7½
	8	9	9½	10	11	12	13	14	15
	16	18	19	20	22	24	26	28	30
	32	36	38	40	44	48	52	56	60
Fine	64	72	76	80	88	96	104	112	120
Special	11½	27							

Warning: When cutting threads coarser than ¼" pitch it is advisable to engage the half nuts with the spindle stationary, then engage the clutch. The use of the lowest spindle speed is essential. The maximum pitch that can be cut on a centre lathe is determined by the diameter and depth of cut required. The recommended maximum helix for roughing is 8° and a light cut up to 10°-12°. The cutting of a coarse thread should only be carried out by a skilled operator who will appreciate the limitations imposed by the conditions which will vary according to the type of material, thread and depth of cut, etc.

METRIC SCREWCUTTING CHART FOR THREE-SPEED GEARBOX

METRIC PITCH MM.	TOP SHAFT	INTER-MEDIATE SHAFT	BOTTOM SHAFT	GEARBOX LEVER
1	40	60	127	A
1.25	50	60	127	A
1.5	60	60	127	A
1.75	70	60	127	A
2	40	60	127	C
2.25	60	40-60	127	A
2.5	50	60	127	C
2.75	55	60	127	C
3	60	60	127	C
3.5	70	60	127	C
4	80	60	127	C
4.5	60	20-60	127	A
5	80	40-50	127	C
5.5	80	40-55	127	C
6	80	40-60	127	C
7	80	40-70	127	C
8	80	20-40	127	C
9	60	20-60	127	C
10	80	20-50	127	C
11	80	20-55	127	C

No. 6

METRIC SCREWCUTTING CHART FOR "NORTON" TYPE GEARBOX

METRIC PITCH MM.	TOP SHAFT	INTER-MEDIATE SHAFT	BOTTOM SHAFT	T.P.I. POSITION
.5	50	40-60	127	60
.75	50	40-60	127	40
1	50	40-60	127	30
1.25	50	40-60	127	24
1.5	50	40-60	127	20
1.75	50	40-63	127	18
2	50	40-60	127	15
2.5	50	40-60	127	12
3	50	40-60	127	10
3.5	50	40-63	127	9
4	50	40-60	127	7½
4.5	50	40-63	127	7
5	50	40-60	127	6
6	50	40-60	127	5
7	50	40-63	127	4½

No. 63

FOR 11 in. SWING LATHE SUBSTITUTE

* 4.5	60	40-60	127	C
† 8	80	127-100	50	C
† 9	60	127-120	40	C

Delete 10 and 11 mm. pitch

FITTING AND USE OF ATTACHMENTS—(contd.)

9" (MODEL L5)

11" (MODEL L5A)

Norton Gearbox, Metric Leadscrew

RANGE	Pitch or T.P.I.	Top Shaft	Inter-mediate Shaft	Bottom Shaft	G'box Lever Position
Metric	0.5 to 6 mm. Pitch	50	85	80	As G'box Chart
Threads Per Inch	4 to 60 T.P.I.	45	90	85	4 to 60

Full range of metric pitches

6	5	4	3
2.5	2	1.5	1.25
1	.75	.5	

Full range of threads per inch

4	4½	4¾	5	5½	6	6½	7	7½
8	9	9½	10	11	12	13	14	15
16	18	19	20	22	24	26	28	30
32	36	38	40	44	48	52	56	60

11" (MODEL L5A)

Metric Norton Gearbox, Metric Leadscrew

RANGE	Pitch or T.P.I.	Top Shaft	Inter-mediate Shaft	Bottom Shaft	G'box Lever Position
Metric Coarse	4 to 7 mm. Pitch	50	80	80	As G'box Chart
Metric Coarse	0.5 to 3.5 mm. Pitch	25	100	80	As G'box Chart
Metric Fine	0.2 to 0.9 mm. Pitch	25	100-60	120	As G'box Chart
T.P.I.	4 to 7½ T.P.I.	36	85-95	76	4 to 7½
T.P.I.	8 to 60 T.P.I.	36	85-75	120	8 to 60

Full range of metric pitches

7	6	5	4.5	4	3.5	3	2.5	2.25	2
1.75	1.5	1.25	1.125	1	0.9	.875	0.8	0.75	0.7
.625	0.6	.5625	0.5	0.45	0.4	0.35	0.3	0.25	0.2

Full range of Threads Per Inch, as for standard Norton Gearbox

9" (MODEL L5)

11" (MODEL L5A)

METRIC THREADS				
PITCH	TOP SHAFT	INTER-MEDIATE SHAFT	BOTTOM SHAFT	GEARBOX LEVER POSITION
.5	20	70	120	A
.75	20	100	80	A
1	40	60	120	A
1.25	50	60	120	A
1.5	20	100	80	C
1.75	50	50-70	120	A
2	40	60	120	C
2.25	45	100	60	A
2.5	50	60	120	C
2.75	55	100	60	A
3	50	100	50	A
3.5	50	50-70	120	C
4	40	100	60	C
4.5	45	100	60	C
5	50	100	60	C
5.5	55	100	60	C
6	50	100	50	C
* 7	70	100	60	C
* 8	60	100	45	C
* 9	60	80-100	50	C

Three Speed Gearbox, Metric Leadscrew

THREADS PER INCH				
T.P.I.	TOP SHAFT	INTER-MEDIATE SHAFT	BOTTOM SHAFT	GEARBOX LEVER POSITION
* 4	60	90-100	63	C
* 4½	60	81-80	63	C
* 5	60	90-80	63	C
* 5½	70	77-80	63	B
* 6	60	90-100	63	B
* 7	60	84-80	63	B
* 8	60	90-100	63	A
* 9	60	81-80	63	A
* 10	60	90-80	63	A
* 11	80	77-70	127	B
* 12	50	63-80	120	B
* 14	80	84-60	127	B
* 16	50	63-80	120	A
* 18	40	81-80	84	A
* 19	40	86-80	84	A
* 20	40	63-80	120	A
* 22	80	69-40	120	A
* 24	40	84-60	108	B

* Remove tail end sleeve from main spindle

MAINTENANCE

Periodic inspection with adjustment where necessary, as given below, will ensure that this lathe retains its original high standard of accuracy and performance.

Drive Belts. The drive motor is mounted on slide rails and adjustment to the vee belt tension is by screws beneath the motor feet. Procedure for replacing vee belts is as follows :—

Remove outer section on the drive guard (secured to inner section by three socket head screws).

Release tension in belts by adjusting screws beneath motor feet. Replace belts and carefully retension.

Check for correct alignment of motor pulley by laying a straight edge across face of pulley. This should line up with face of head pulley.

It is important to ensure that the belts do not slip as this would only increase both pulley and belt wear.

Clutch. If slip occurs then adjustment is as follows :—

Remove small cover at top of the outer drive guard.

Increase spring load by slightly rotating nut (anti-clockwise, i.e. left-hand thread) on end of clutch shaft.

Constant operation of the clutch results eventually in wear on the driving faces (usually signified by clutch refusing to drive) and the following adjustment will be necessary :— (Fig. 1)

Stop motor, leaving clutch in "ON" position.

Remove outer section on drive guard.

Remove adjusting nut "A" (by turning clockwise), and spring "B".

Withdraw clutch plate "C" until it is clear of the splines leaving nut "D" in engagement with splines.

Turn clutch plate clockwise 2 splines i.e. $2/7$ th of a turn and push back into position.

Replace spring "B" and nut "A" and load spring sufficiently to drive machine.

When the clutch lever is in the "START" position a radial clearance of approximately 1" should be evident at the end of the lever.

The clutch should be dismantled at six-monthly intervals and any lubricant on the driving faces removed by washing in paraffin.

Headstock Spindle Bearings. Adjustment for wear on the Timken taper roller bearings at the front of the main spindle is as follows:—

Remove headstock cover.

Release locknut (by turning anti-clockwise, i.e. right-hand thread) and rotate adjusting nut sufficiently to obviate play, then re-tighten locknut. It must be emphasized that this operation requires the utmost care as over-tightening can seriously impair the life of the bearings.

Sealing compound should be used when refitting the headstock cover.

The magnetic plug (chromed head) which is fitted in the headstock cover immediately over the front main spindle bearings must be occasionally removed and cleaned of any particles of steel which may have collected there. Always replace the magnetic plug after cleaning.

Saddle Adjustment. To adjust the rear strip release the four nuts on the underside of the strip, adjust the headless set screws by turning clockwise and re-lock the nuts. To adjust the front strip release the cap head screw which secures the adjusting screw and rotate the latter anti-clockwise, re-clamp the cap head screw. Care should be taken to avoid over adjustment.

Cross Slide. Take-up of wear on the taper gib strip is by releasing the locknut, adjusting the screw and re-locking the nut.

The gib strip is of a length to allow adjustment over a range of wear but after a number of adjustments it may be necessary to shorten the screw.

Top Slide. Adjustment to the strip is by releasing the locknuts, tightening the screws and re-locking the nuts.

Electrical Controls. All electrical control equipment is mounted on the panel at the front of the cabinet and if removal is required it is **important** to ensure that the isolating switch, at the end of the machine, is in the OFF position.

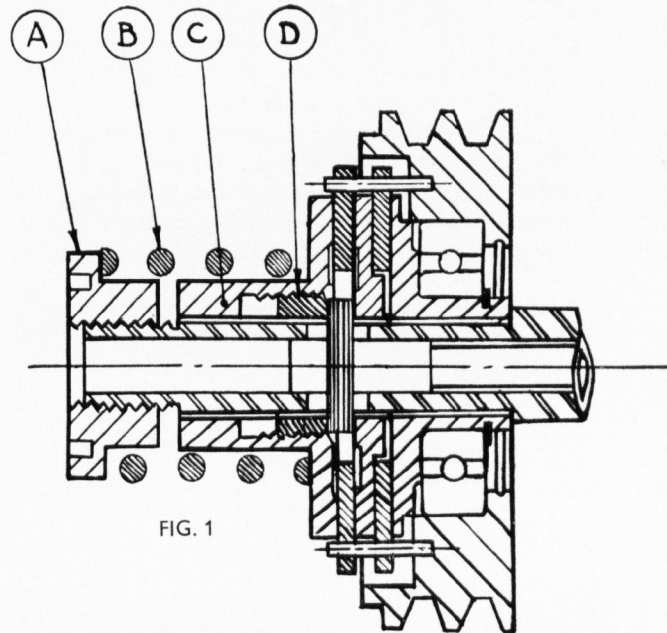


FIG. 1

RECOMMENDED LATHE PRACTICE

When a component is required to be machined on a lathe, the following principal points must be settled : (1) the manner in which the work should be mounted ; (2) the tool set-up to be employed ; and (3) the speeds and feeds to be employed.

Turning between Centres. This method of turning necessitates centre holes being drilled in both ends of the work. The operation should be performed by a special drill giving a countersink of 60 deg. angle to suit the lathe centres, the centre drill being held in a drill chuck mounted in the tailstock spindle with the work held in a chuck.

It is usual practice to carry out a facing operation on the end of the work piece before centre-drilling and it is essential that work overhang from chuck jaws, for both facing and drilling operations, should be a minimum, to ensure concentricity. Centre drills are delicate tools and easily broken, largely owing to lack of sensitivity in feeding the drill, and to work speed being too low. To prevent breakage use a high speed of work revolution and a very fine feed.

With the work mounted between centres, and fitted with a driving dog and with the tailstock centre well lubricated, it is important that the work should be free enough to turn by hand but without any end movement. Owing to heat generated by the cutting action, the work expands during machining, and if screwed up tightly before cutting commences, the result is that the centre end may become overheated causing damage to both centre and work.

When using carbide turning tools, the work speed may be so high that damage to a dead centre may take place however much care is used. It is better then, to use a revolving centre which rotates with the work, and is not therefore affected by high work speeds.

Tool Settings. Correct tool setting is important, for accurate grinding of tool angles is of no avail if the tool is improperly set in

relation to the work. While normally the tool point should be on the centre line of the work, a setting slightly above centre is permissible, but a setting below centre may cause slender work to deflect and spring on the top of the tool and out of the centres. For all taper turning and screw cutting operations, it is essential that the cutting edge of the tool be mounted exactly on the centre line of the work, otherwise discrepancies in taper and thread form will result. A simple way to obtain correct tool height is by setting to one of the lathe centres.

For parting-off operations, use a tool with a rigid shank and with the overhang from the toolpost kept to a minimum. The cutting edge must be set on the work centre and square to the lathe axis. Do not attempt parting-off unless the work is well supported and ensure that overhang from the chuck is not excessive.

Chuck Work. When a chuck is not in use it should not be left so that cast iron dust or other cuttings may enter the bore or parts of the mechanism. The threads in the bore may be protected by plugging with a cloth, nevertheless before mounting the chuck on the lathe spindle, clean the threads of both the spindle and chuck and lubricate with Molybdenum Disulphide, a tube of which is supplied with the machine.

When mounting or removing a chuck, protect the slides of the bed with a piece of wood upon which to rest the chuck before lifting it on to the spindle nose. Once the threads engage, do not spin the chuck rapidly back against the spindle shoulder or it may be difficult to remove later. To remove a chuck, place a block of wood between one of the jaws and the lathe bed, and pull the chuck so that the jaw strikes the wood and begins to unscrew. Do not attempt to use power for this operation : it is dangerous and may damage the chuck and spindle. When tightening chuck jaws, never try to obtain increased gripping power by lengthening the arm of the box key.

RECOMMENDED LATHE PRACTICE—(contd.)

When an electric reverse motion is fitted on the lathe, there is some danger of a chuck coming loose on the spindle through the rapid change of direction. As a safety device under such circumstances, the American-type long taper spindle nose is preferable and can be fitted to all "HARRISON" Lathes.

For second operation work, or for work which may be difficult to hold by standard jaws, the use of soft jaws shaped as required will often prove a time saving factor and ensure greater accuracy.

When setting work in an independent four-jaw chuck, make use of the setting rings on the face of the chuck to obtain an approximate location. It is then a simple matter to make the final adjustment for greater accuracy.

Faceplate Work. The remarks in regard to the mounting of chucks apply equally to faceplates and catch plates. Some castings or forgings are so shaped as to be difficult to hold in a chuck, but can be clamped on a faceplate by straps and bolts utilising the holes and slots provided, but do not rely entirely upon these. Whenever possible use stops against the work to take the pressure of the cut.

An angle plate bolted on to the faceplate, on to which the work is mounted, is often useful for boring and facing operations. Always ensure that revolving work is securely fastened and that a balance weight is fitted to counteract the out-of-balance effect of the mounting units and work.

Use of Steadies. Long slender work, if unsupported between centres, will tend to whip or bend under pressure of the cutting action. To prevent this happening, a travelling steady should be employed. When machining black bar, first turn a short length of the bar at the tailstock end to the diameter required, and adjust the steady

jaws to touch the work, then lock them in position. The jaws will then support the work at the point of the cut all along the length. Keep jaws well lubricated during the operation.

A stationary steady can be set up at any point along the bed to support a long shaft. If the shaft is of black bar, a ring somewhat wider than the jaws of the rest must be turned as a bearing for the jaws. If the shaft is slender, this can be a delicate operation, so that a sharp pointed tool with a very light cut should be employed.

Another use of a stationary steady is when an operation requires to be performed on the end of a bar. In such instances the distance from the chuck may be too great for machining to take place without additional support, and if drilling is required, the tailstock centre is not available. Thus to support the work by means of a steady, adjust the jaws to touch the work until it is running true, and then lock them. Again, use plenty of oil between the steady jaws and the revolving work.

Drilling and Reaming from the Tailstock. For these operations the work is gripped in a chuck or mounted on a faceplate. It is important that the drill be started true so that a hole concentric with the work diameter is produced, and a common method employed to attain this is by centre drilling before commencing normal drilling.

The limitation of a twist drill as a cutting tool is that it follows its own point which takes the line of least resistance. Incorrect grinding can cause additional inaccuracies by (1) cutting edges being ground to different angles, (2) cutting edges of equal angles but different lengths, (3) cutting edges of unequal angles and lengths causing the point to be off-centre. It is essential then to see that the radial components of the two cutting edges are equal so that they constrain the

RECOMMENDED LATHE PRACTICE—(contd.)

drill to follow a direct path, but if an accurate bore is required, a drilled hole should be enlarged by a single point tool and final size obtained by reaming.

Straight shank reamers are held in a chuck, while taper shanks may be inserted into the tailstock spindle. The reamer should be fed carefully through the hole by rotation of the tailstock handwheel, using an ample supply of lubricant when reaming steel.

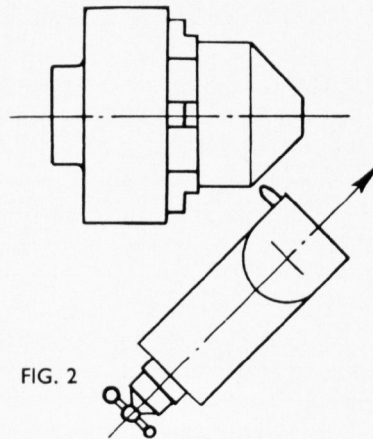


FIG. 2

The recommended cutting speeds for reaming are :

Cast iron	20 ft. per min.
Mild steel	35 " "
Medium carbon steel	30 " "
Phosphor-bronze	35 " "
Aluminium and duralumin	35 " "

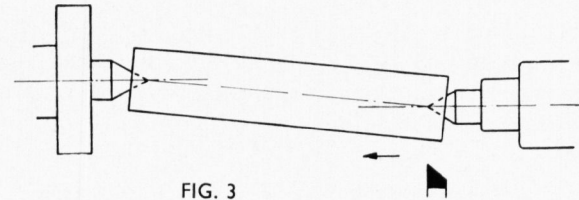


FIG. 3

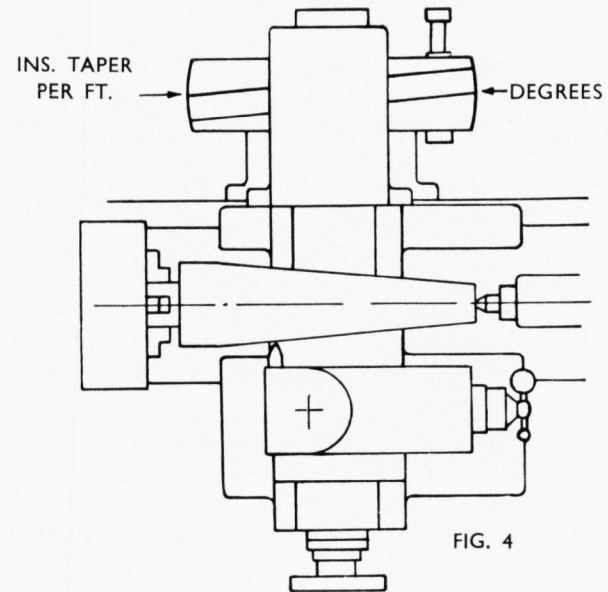


FIG. 4

Methods of Taper Turning and Boring. Three general methods are applicable. (1) As shown in fig. 2, by means of swivelling the compound rest to the angle required for either boring or turning. This method is by hand traverse of the tool, and is limited to the

RECOMMENDED LATHE PRACTICE—(contd.)

length of movement of the top slide, but it has the advantage that taper surfaces of any angle can be machined.

(2) The method shown in fig. 3 is by off-setting the tailstock centre. The drawback is that the centre points are not on the axis of the work, so that the centres are subjected to uneven wear and strain.

Thus the method is limited to slow tapers on long work.

To find the amount of off-set X, if the taper is T inches per foot on diameter and the length of work is L inches, then $X = \frac{T \times L}{24}$ inches.

If the included angle of the taper is θ , $X = L \times \tan \frac{\theta}{2}$ inches.

(3) If the lathe is fitted with a taper turning attachment, fig. 4, then more accurate tapers, either external or internal, can be produced than by the two preceding methods. By the use of this attachment, the lathe centres are not of course taken out of alignment, so that the bearing surfaces are unaffected.

LATHE TOOLS

In mounting turning tools in the rest, the tool should only extend the minimum amount from the rest to obtain the maximum support

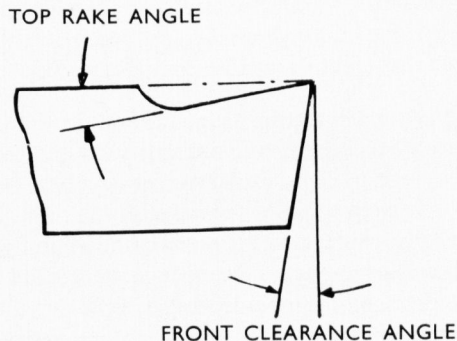


TABLE 1
Cutting Angles for H.S.S. and Cemented Carbide Tools

Materials	H.S.S.		Cemented Carbide	
	Top Rake	Clearance	Top Rake	Clearance
Mild steel	20°	6°	8°	4°-6°
High carbon steel	10°	4°	3°-4°	4°-6°
Soft cast iron	10°	8°	4°-8°	4°-6°
Chilled iron	0°	4°	0°	2°-4°
Copper	12°	10°	13°	4°-6°
Brass	0°-6°	10°	3°	4°-6°
Aluminium	30°	10°	16°	6°-8°

TABLE 2
Cutting Speeds in feet per minute

Material	H.S.S. Tools		Cemented Carbide	
	Roughing	Finishing	Roughing	Finishing
Mild steel	130	200	200	300
High carbon steel	45	60	200	400
Soft cast iron	60	75	200	350
Chilled iron	10	15	15	30
Copper	200	200	400	700
Brass	250	400	400	700
Aluminium	300	400	500	1000

TABLE 3
Feeds in inches per revolution

Material	H.S.S. and Cemented Carbide Tools	
	Roughing	Finishing
Mild steel... ..	.010	.007
High carbon steel ... ..	.010	.007
Soft cast iron ... ..	.013	.008
Chilled iron ... ..	.008	.005
Copper ... ..	.020	.008
Brass ... ..	.020	.008
Aluminium ... ..	.013	.007

RECOMMENDED LATHE PRACTICE—(contd.)

against the downward pressure of the cut. For clamping the tool, ample pressure is provided with the spanner supplied, and on no account should extra pressure be applied by lengthening the leverage by dubious means such as a piece of piping. Such methods are unnecessary, and cause damage not only to the clamping screws, but the entire compound rest.

Boring tools may be of one piece solid forged, or may comprise cutter inserts fixed in a boring bar. A point of note in regard to the grinding of boring tools is that the conditions governing the top rake and clearance angles are different from those in turning, so that a secondary clearance is required for the front of the tool to clear the enveloping curve of the bore.

Speeds and Feeds. The cutting speed is expressed in surface feet per minute, and is the speed at which the surface of the work passes the tip of the tool. If D is the diameter of the work in inches, N the work speed in r.p.m., and S the cutting speed in feet per minute, then

$$N = \frac{3.82 \times S}{D}$$

The feed rate is expressed in inches per revolution of the headstock spindle.

The time to complete one cut, in minutes, can be calculated from

$$\frac{\text{Length of cut (in.)}}{\text{Spindle speed (r.p.m.)} \times \text{feed (in. per rev.)}}$$

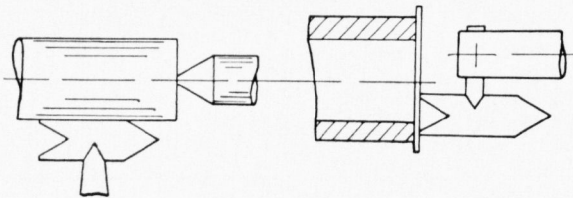


FIG. 5

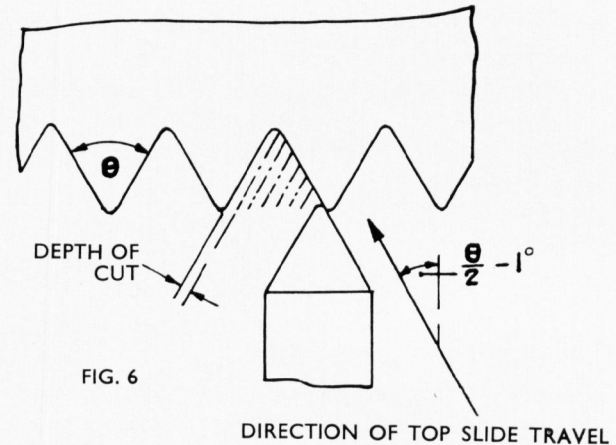


FIG. 6

Tables 1, 2 and 3 give suitable tool angles, cutting speeds, and feed, for a range of the common engineering materials.

Screwcutting.

For cutting vee threads the top of the tool is placed at centre height, having been previously ground to the required shape without any top rake. Note that if the tool is given top rake the plan angle of the tool is not the angle that will be reproduced in the work.

Fig. 5 shows the use of a setting gauge for both external and internal threading, but when cutting vee threads with the tool set in this manner, slow speeds and light feeds are necessary because the cuttings cannot be free flowing without top rake on the tool. Thus a better method for cutting external vee threads is shown in fig. 5 where the compound slide is swung around so that the tool is fed in at an angle of slightly less than half the included angle of the thread (i.e. approximately 26 deg. from normal, i.e. 64 deg. on cross slide graduations

RECOMMENDED LATHE PRACTICE—(contd.)

when cutting standard 55 deg. threads) so that metal is mostly removed by the left hand side of the tool. Side rake can be provided so that heavier cuts can be taken and the chips flow easily away.

In commencing a screwcutting operation, take a light trial cut and check the number of threads per inch by measuring with a rule or screw pitch gauge. Then proceed by taking successive cuts until the full depth is reached. Check for depth and accuracy by means of the nut to fit the screw, or by a thread gauge of the ring type.

Tapered threads may be cut by means of a taper attachment or by off-setting the tailstock. In either case the tool must be set square to the work axis, and not to the tapered portion.

Square Threads. This section of thread is often used for multiple threaded screws, and the terms "pitch" and "lead" should be understood. Pitch is the distance from a point on one screw thread to a corresponding point on the next thread, measured parallel to the axis.

Lead is the distance that a screw thread advances axially in one turn.

Thus on a single threaded screw the terms are identical, but a notation such as $\frac{1}{8}$ in. pitch, $\frac{1}{4}$ in. lead, would indicate a two start screw, and to produce this, the gearbox would require to give a saddle movement of $\frac{1}{4}$ in. for every revolution of the spindle, while the tool would be ground to produce $\frac{1}{8}$ in. pitch section of thread. The procedure when cutting a multiple start screw is to set the top slide parallel with lathe axis and cut the first thread in the usual manner at the correct LEAD. Cut subsequent threads by advancing the top slide each time a distance equal to the lead divided by the number of starts. This, of course, applies to all multiple threaded screws regardless of thread section.

Acme and Worm Threads. The procedure to be adopted for Acme and worm thread cutting is similar to that recommended for vee threads except for the setting angle of the compound slide. In this case the thread included angle is 29 deg. so that a slide setting of approx. 13 deg. from normal (i.e. 77 deg. on cross slide graduates) would be appropriate.

Full depth of an Acme thread is $0.5 P + 0.01$ in. and width at bottom is $0.3707 P - 0.0052$ in. where P is the thread pitch.

HYDRAULIC PROFILING EQUIPMENT

DESCRIPTION

The attachment comprises an independently operated rear tool slide fitted to a hydraulically operated angle slide, the whole being mounted on an extended cross slide. (A front compound slide is also fitted for normal turning.) Automatic copying control from the template to the hydraulic slide is by means of a stylus arm, mounted on taper roller bearings, actuating a spool type valve.

Template support heads and slide are mounted on the rear of the bed, one of the heads having a graduated eccentric sleeve to give 'set over' when required. Both heads can be locked in any position along the slide, the centres of each being adjustable by a handwheel.

Oil is supplied by the hydraulic pump unit usually placed on the

floor at the tailstock end of the machine. The unit comprises an oil container, flange mounted motor and geared pump with pressure relief valve. Three flexible hoses connect the pump unit to the hydraulic slide, these being pressure, return and drain lines.

Copy turning is carried out with the tool in the normal upright position; an electrical reversing switch facilitating quick change-over from normal turning. The American type, key drive, long taper nose headstock spindle ensures complete protection and positive drive in both directions of rotation.

A micrometer saddle stop controls the movement of the carriage.

OPERATION

TEMPLATES AND COMPONENT BLANKS

The circular templates are usually produced exactly similar to the finished work, and often the first of a batch of components is used as the template. It is important that the template has a good surface finish, otherwise irregularities will be transmitted to the workpiece.

For work of large diameter a smaller overall diameter template may be used providing the profile and lengths are the same.

It is important that the lengths of the component blanks be similar and the ends centre drilled to a constant depth to ensure uniformity of shoulder lengths throughout the batch.

PREPARATION AND SETTING UP (Fig. 7)

The oil container should be filled with the recommended grade of hydraulic oil and the level always maintained between the end and the maximum level shown on the dipstick.

The end fittings of the pressure, return and drain hoses are numbered 1, 2 and 3 respectively, and care must be taken to ensure that these are connected to the fittings on the attachment and oil container bearing corresponding numbers.

Connection of the electrical leads to the hydraulic pump motor should be such that the direction of rotation is anti-clockwise when viewed from above.

Before commencing copy turning, the hydraulic pump unit should be run for a few minutes and the hydraulic slide fed in and out a few times by means of the hand control lever to allow the oil to circulate quite freely through the system. This should apply whenever the machine has been idle for any length of time. The oil pressure reading on the gauge should be 150 lb. per sq. inch approximately.

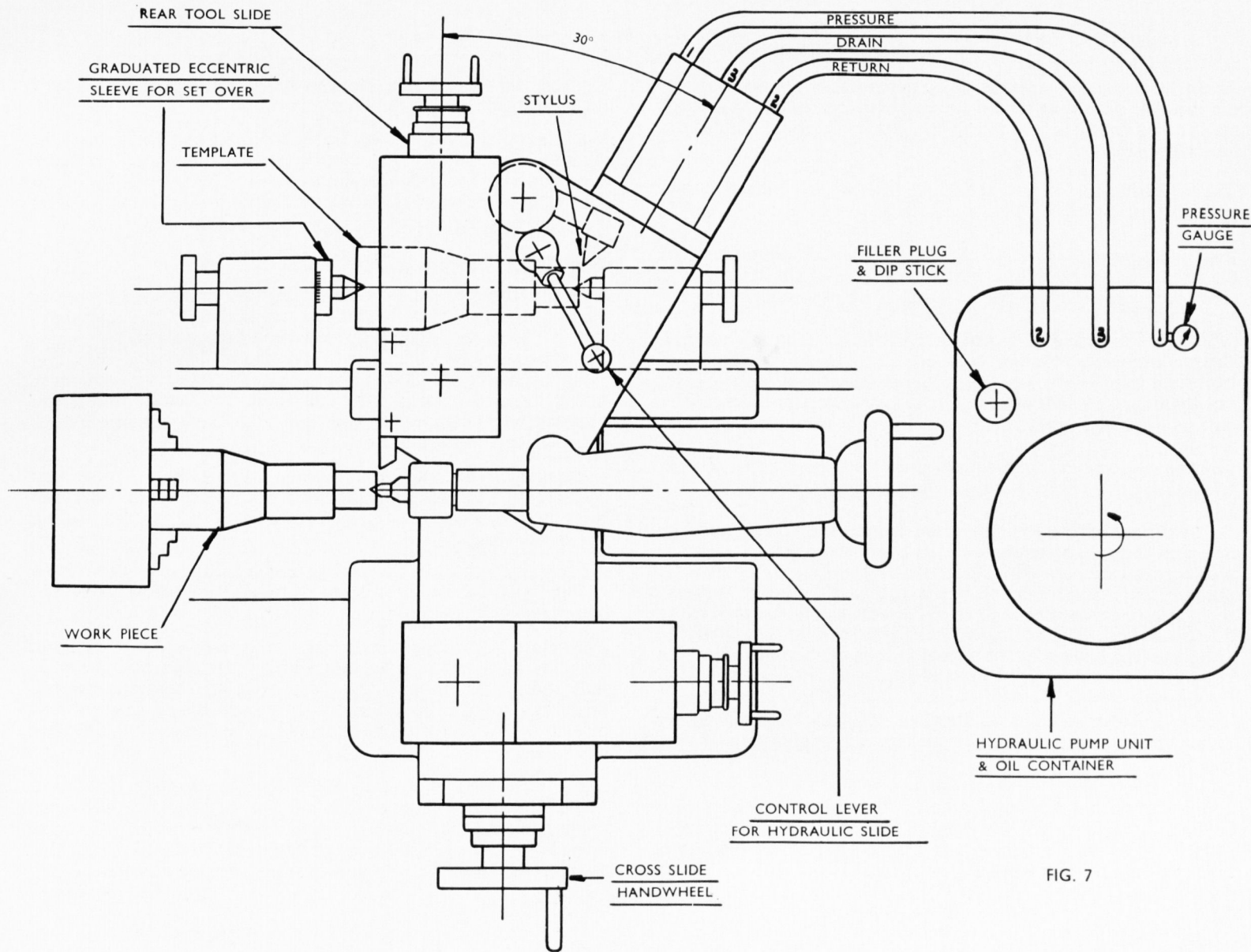


FIG. 7

OPERATION (Continued)

As the tool lies approximately $6\frac{1}{4}$ in. to the left of the stylus point, the template should be placed between the centres of the support heads a similar distance to the right of the intended position of the finished workpiece.

The hydraulic angle slide should be fed to its extreme inward position by means of the hand control lever.

Rotate the cross slide handwheel in an anti-clockwise direction until the stylus point contacts the smallest diameter of the template and commences actuating the valve controlling the hydraulic slide.

With a tool overhang of approximately 1 in. position the rear tool slide to ensure that the tool is clear of the largest diameter of the workpiece blank. Care should be taken to ensure that the tool is set exactly to centre height otherwise discrepancies will occur especially on small diameter work.

Copy turning can now commence, the depth of cuts for the 'first off' only being set by the rear tool slide handwheel.

On completion of the first workpiece, withdraw the hydraulic slide by means of the hand control lever and, only if more than one cut is necessary, traverse the whole slide assembly away from the work by means of the cross slide handwheel a distance equal to the depth of profile; on subsequent workpieces the cuts should be applied by this handwheel. The setting of the rear tool slide should not be altered after completion of the 'first off' unless a uniform fine finishing cut over the entire profile of the workpiece is required.

The micrometer saddle stop supplied with the lathe can be set towards the tailstock to position carriage after completion of each cut.

The cutting speed, depth of cut and feed rate are, as in normal turning, dependent upon the material, but accepted practice using carbide tipped tools is to combine high cutting speed with a fine feed to obtain the best surface finish.

E.g. material — mild steel, cutting speed 200 ft. per min., depth cut $\frac{3}{16}$ in., feed rate .002 in. per rev.

A minimum number of cuts per component should be taken to minimise tool point wear, thereby maintaining repeat accuracy throughout the batch. Wherever possible, the more robust (a) of the two cutting tools should be used, the lighter tool (b) being reserved for work requiring steep back angles and grinding reliefs (*fig. 10*).

SCREWCUTTING (*Fig. 8*)

A higher cutting speed for screwcutting can be achieved by use of the Copying equipment. Whilst the only purpose of the equipment during screwcutting is the automatic withdrawal of the tool, the manual withdrawal speed is usually the factor limiting a threading operation, so the advantage to be gained from using the equipment will be readily appreciated. The most satisfactory results are obtained on fine threaded work and with the more free cutting materials, *e.g.* brass, cast iron, etc.

For cutting right-hand threads the tool should be in an inverted position, the direction of rotation of the headstock spindle therefore being in an anti-clockwise direction when viewed from the tailstock end of the lathe.

For cutting left-hand threads the tool should be in the normal upright position, the direction of rotation of the headstock spindle being in a clockwise direction.

The template required should have a single shoulder of sufficient depth to allow the tool to be automatically withdrawn from the work. The stylus point must always be clear of the template diameter contacting only the shoulder at point of withdrawal. If more than one cut is necessary, then these should be applied by the cross slide handwheel.

Taper screwcutting can be carried out to advantage (the above remarks regarding fine threads or free cutting materials again applicable), but the 'setting-up' differs slightly from that of parallel screwcutting. A template is required having a taper similar to that of the taper thread being produced, the stylus point contacting this

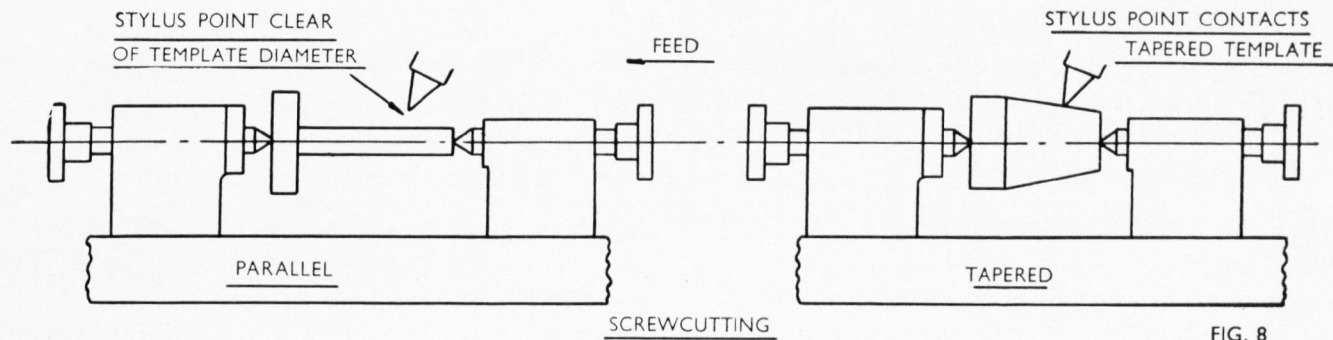


FIG. 8

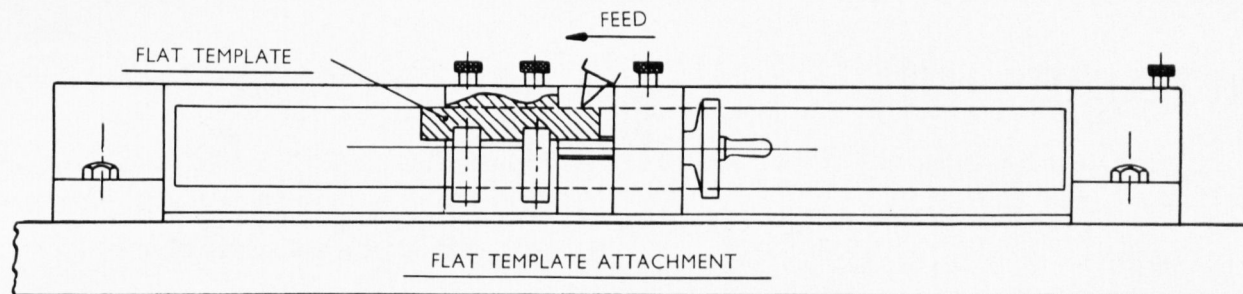


FIG. 9

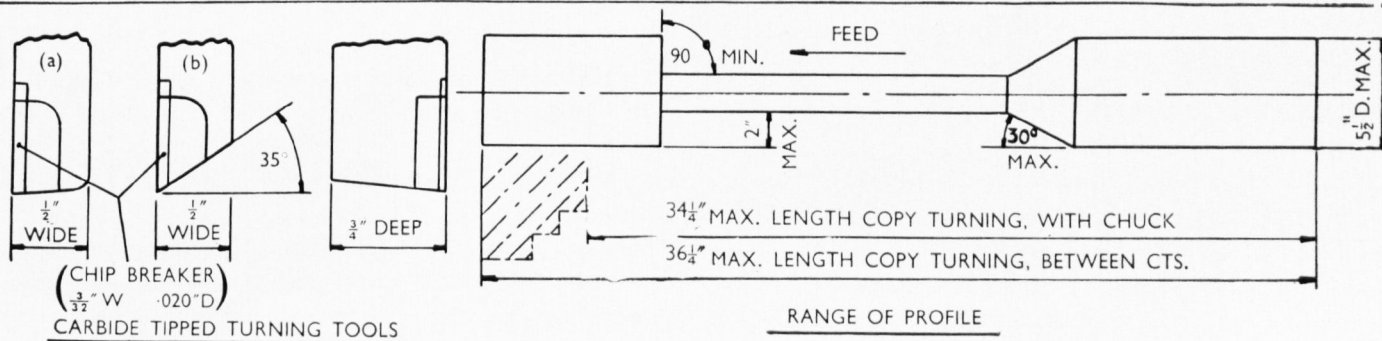


FIG. 10

OPERATION (Continued)

during thread cutting. If more than one cut is necessary then this should be applied with the rear tool slide handwheel. Because of the angular action of the hydraulic slide a modified changewheel combination is required for each different taper.

FLAT TEMPLATE ATTACHMENT (Fig. 9) (ADDITIONAL EQUIPMENT)

Whilst the major proportion of profile turned work is accomplished

by the use of cylindrical templates an attachment is available specifically designed to accommodate flat templates.

The unit replaces the cylindrical template support heads and is clamped to the tenoned block attached to the rear of the lathe bed.

Provision is made for accurate alignment of the template to the lathe axis and a graduated dial provides micro longitudinal adjustment.

COPYING DISCREPANCIES

Discrepancies occurring between workpieces and template may be attributed to the following —

(1) Tool requires regrinding.

(2) Tool is not on centre height — particularly important on small diameter work.

(3) Template and workpiece are not parallel — adjust by means of graduated eccentric sleeve in template support head.

(4) Gib strips on slides require adjusting.

MAINTENANCE

HYDRAULIC PUMP UNIT

Recommended grades of hydraulic oil —

D.T.E. Oil Light. Supplied by Mobil Oil Co. Ltd.

or

Tellus Oil 33 Supplied by Shell-Mex & B.P. Ltd.

or

Nuto - H44 Supplied by Esso Petroleum Co. Ltd.

or other equivalent grades. American equivalent S.A.E. 10.

The oil container should be drained, cleaned and renewed with oil at six-monthly intervals, whilst the filter fitted to the inlet port of the

pump should be cleaned at three-monthly intervals. A drain plug is fitted at the base of the container and after draining, the cover and pump unit complete should be removed—by releasing the four screws at the corners of the cover. The container is then available for easy cleansing.

The working pressure registered on pressure gauge should read approximately 150 lb. per sq. inch, but if readings differ greatly from this figure then adjustment should be made to the relief valve which is inside the container.

Capacity of oil container approximately 3 gallons.

MAINTENANCE (Continued)

LUBRICATION

Being a closed hydraulic system, the internal mechanism of the attachment requires no additional lubrication except for an oil nipple provided for lubrication of the stylus arm bearings and this together with periodic lubrication of the slides is all that is necessary.

(It is recommended that the slides be lubricated with molybdenum disulphide in petroleum jelly.)

PLAY IN SLIDEWAYS

All the slides are provided with gibs. Adjustment should be effected as required and the set screws and locknuts carefully tightened.

REPLACEMENT OF HYDRAULIC RAM LEATHER

(Fig. 11)

Instructions for replacing the hydraulic ram leather sealing the piston rod in the cylinder are as follows —

Remove cap screws 'A' and withdraw hydraulic slide in direction of arrow.

Release set screw 'B' and raise item 'C' clear of the cross slide — cylinder and valve unit should now be clear.

Remove end cover 'D' and withdraw piston and rod from the cylinder.

Remove piston.

Replace ram leather 'E' — care being taken to ensure that the sealing lip is not damaged.

On assembling end cover 'D' use sealing compound on face.

This hydraulic equipment has been made in the simplest and most foolproof form without unnecessary complications, and we believe that this is the most effective way of dealing with such apparatus. IT IS IMPORTANT TO SWITCH OFF THE HYDRAULIC UNIT WHEN NOT IN USE, so as to minimise temperature

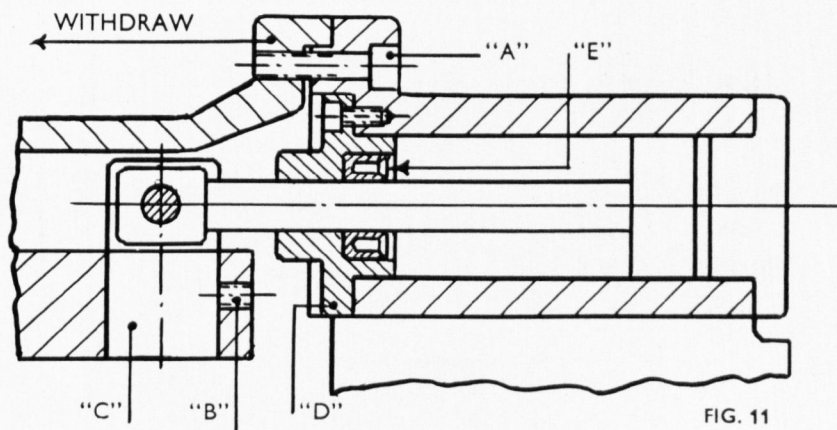


FIG. 11

rise in the hydraulic tank. Heat is generated when the hydraulic fluid is by-passed through the relief valve to the tank and if the pump is left running unnecessarily without utilising the copying slides, viscosity of the oil can be reduced and can affect smooth operation.

SPARE PARTS LIST

ALL-GEARED HEAD

ALL-GEARED HEAD

Item No.	Part No.	Description	No. Off
1 {	L5-2-1H	Headstock, Model L5 (L5-2-1G)...	1
	L5-2-1D	„ Model L5A (L5-2-1F)	1
2	L5-2-106	Washer	4
3	OS-10	“O” Ring	4
4	L5-2-159	Cover	1
5		Speed Plate (when ordering state Speed Range) ...	1
‡6	L5-2-104	Spacing Washer... ..	4
‡7	L5-2-103	“Perspex” Cover	1
8	L5-2-20	Oil Level Indicator	1
9	L5-2-19	Window	1
10	L21-2-141A	Filler Cap	1
11	SP-41	Fibre Washer	1
12		$\frac{1}{4}$ ” B.S.P. Taper Plug	1
‡13	L5-2-47	Driving Shaft	1
‡14	L5-2-59	Collar, R.H.	1
‡15	SKF.51102	Thrust Washer	1
‡16	L5-212	Bearing	1
‡17	L5-615B	Collar, L.H.	1
‡18	L5-2-49	Double Gear, 35T and 45T L5-2-174 for alternative driving shaft assembly	1
‡19	L5-2-48	Double Gear, 20T and 26T L5-2-173 for alternative driving shaft assembly	1
‡20	L5-2-69	Clutch Operating Block	1
‡21	L5-884	Washer, Clutch Block	1
‡22	L5-885	Washer, Clutch Pin	1
‡23	L5-213	Bearing	1
‡24	L5-624	Clutch Push Rod L6-2-23B for alternative driving shaft assembly ...	1
‡25	L5-609	Pin	1
‡26	L5-608	Pin	1
‡27	L5-2-67	Clutch Plate, R.H.	1
‡28	DC.1	“Halo” Disc	1
‡29	PB.1	Brass Pin... ..	2
‡30	RXLS $1\frac{1}{2}$ ”	Roller Bearing	1
‡31	L5-2-68	Vee Pulley	1
‡32	L5-2-63	Clutch Plate, Centre	1
‡33	DC.4	“Halo” Disc	1
‡34	L5-2-64	Pin	6
‡35	L5-2-66	Clutch Plate, L.H.	1
‡36	L5-814	Washer	3
‡37	L5-814A	Washer	1
‡38	SG.15A	Spring SG.236 for alternative driving shaft assembly ...	1
39	L5-613	Clutch Adjuster L6-2-24 for alternative driving shaft assembly ...	1

Item No.	Part No.	Description	No. Off
ALTERNATIVE DRIVING SHAFT ASSEMBLY			
40	L5-2-172	Driving Shaft	1
41	L5-2-99	Sealing Plug	1
42	L5-212	Bearing	1
43	L5-2-149	Collar	1
44	L5-2-193	Clutch Operating Block	1
‡45	L5-2-128	Braking Ring	1
46	L5-2-194	Braking Collar	1
47	$\frac{1}{4}$ ” PG 2”	Pin	1
‡48		$1\frac{1}{8}$ ” dia. External Circlip	1
‡49	L5-884	Washer	1
50	LJ. $1\frac{1}{8}$ ”	Ball Journal	1
51	L5-2-221	Locating Plate	1
52	L5-2-187	Vee Pulley	1
53	LJ. $1\frac{3}{8}$ ”	Ball Journal	1
54	L6-2-126	Clutch Plate, R.H.	1
55	DC.6	“Halo” Disc	2
56	L16-2-20	Pin for Clutch Disc	6
57	L16-2-110	Clutch Plate, Centre	1
58	L6-2-124	Clutch Plate, L.H.	1
	L6-2-125	Clutch Plate Adjusting Nut } Not	1
	L5-2-150	Spacer, Inner Clutch Plate } illust. ...	1
		$1\frac{3}{8}$ ” External Circlip } Not	1
		$1\frac{1}{16}$ ” External Circlip } illust. ...	1
‡59	L5-840	Clutch Lever	1
60	BB.2	Ball, $1\frac{1}{2}$ ” dia.	1
‡61	L5-2-5	Boss	1
62	L5-2-4	Stop Piece	1
‡63	L5-2-7	Eccentric Stud	1
64	L5-2-6	Bush	1
65	L5-610	Shoe	1
66	L5-2-3	Top Selector Bracket	1
67	L5-2-18	Selector Boss	2
68	SG.5	Spring	2
69	SB.3	Steel Ball, $\frac{1}{4}$ ” dia.	2
70	L5-654	Selector Lever	2
71	BB.1	Ball, 1” dia.	2
72	L5-2-16	Stud, R.H.	1
73	L5-205	Interlocking Lever, R.H.	1
74	L5-221	Shoe	1
75	L5-2-17	Stud, L.H.	1
76	L5-206	Interlocking Lever, L.H.	1
77	L5-220A	Shoe	1
78	L5-2-175	Intermediate Shaft	1
79	L5-2-95	Sealing Plug	1

Part Nos. bracketed thus (—) refer to $1\frac{3}{8}$ ” bore Spindle Components.

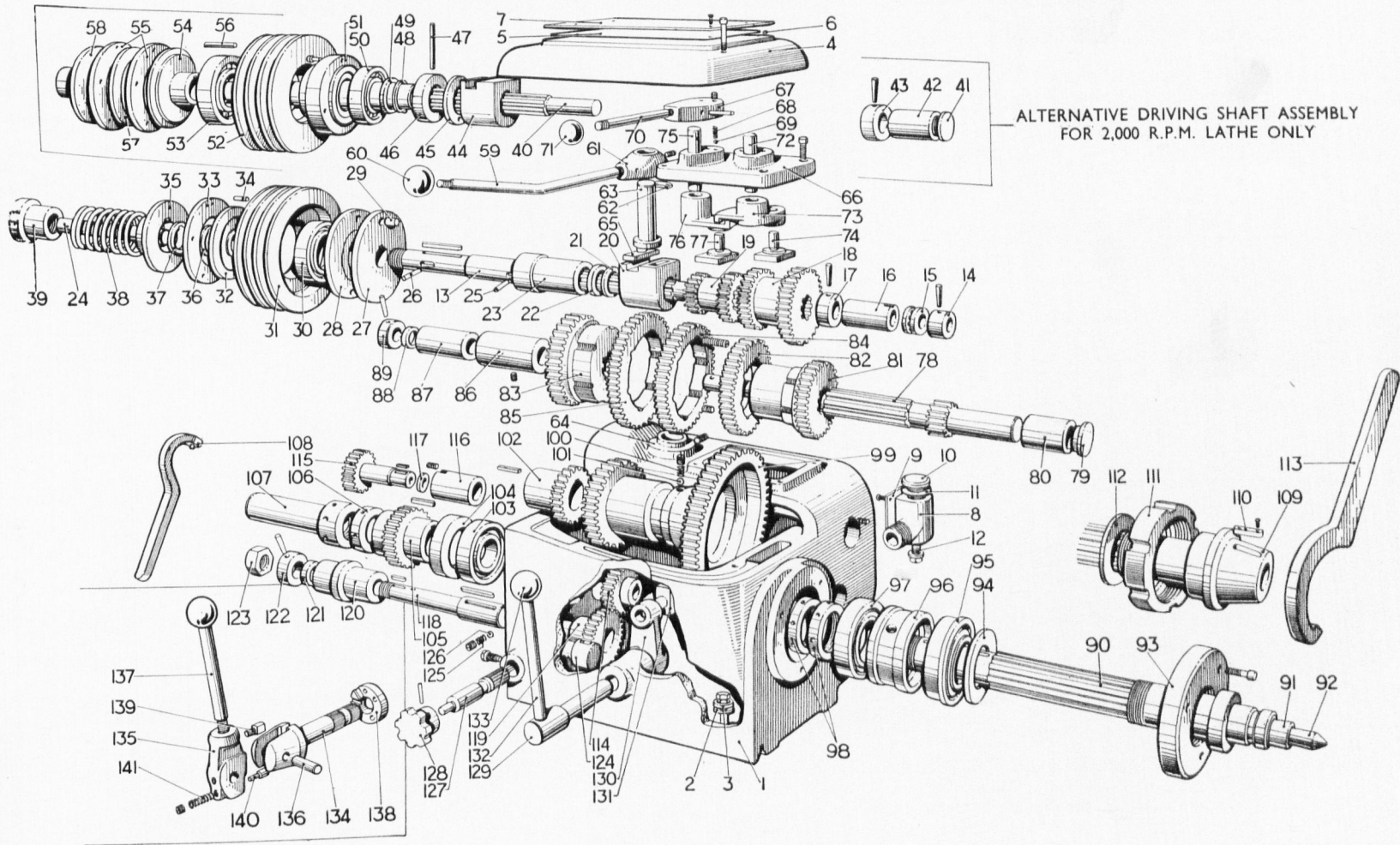
Part Nos. marked thus ‡ fitted refer to previous models.

ALL-GEARED HEAD

Item No.	Part No.	Description	No. Off
80	L5-214	Bearing	1
81	L5-2-177	Gear 46T	1
82	L5-2-12	Gear 56T	1
83	L5-2-176	Gear 56T	1
84	L5-2-10	Gear 65T	1
85	L5-2-9	Gear 71T	1
86	L5-2-178	Spacing Bush	1
87	L5-215A	Bearing	1
88	L5-2-117	Oil Seal M1. 062100 $\frac{1}{4}$ " SE85	1
89	L5-615A	Collar	1
90	L5-2-191	Main Spindle (L5-2-189)	1
91	L5-2-101	Sleeve (for $1\frac{3}{8}$ " bore spindle only)	1
92	L5-585A	Centre No. 3 Morse Taper	1
93	L5-202	Bearing Cover (L5-2-41)	1
94	L5-604	Washer (L5-2-45)	1
95	355/354B	Timken Taper Roller Bearing (387/382B)	1
96	L5-233	Spacer (L5-2-42)	1
97	355/354A	Timken Taper Roller Bearing (387/382A)	1
98	L5-2-39	Lock Nut (L5-2-83)	2
99	L5-2-195	Main Spindle Gear (L5-2-192)	1
100	SG.5	Spring	1
101	SB.3	Steel Ball, $\frac{1}{4}$ " dia. } Not req'd with alternative front gear selector assy.	1
102	L5-2-31	Spindle Gear, Inner, 42T (L5-2-37)	1
103	LJ $1\frac{1}{4}$	Ball Journal (XLJ $1\frac{3}{4}$ ")	1
104	L5-203	Bearing Cover (L5-2-79)	1
105	L5-2-32	Spindle Gear, Outer 42T (L5-2-38)	1
106	L5-652	Lock Nut (L5-2-39)	1
107	L5-2-57	Tail End Sleeve (L5-2-165)	1
108	WR.19	Wrench (WR.20)	2
109	L5-2-190	Main Spindle ($1\frac{3}{8}$ " Bore L00 Taper Nose)	1
110	L5-2-77	Key ($1\frac{3}{8}$ " Bore L00 Taper Nose)	1
111	L5-2-151	Draw Nut ($1\frac{3}{8}$ " Bore L00 Taper Nose)	1
112	L5-2-45	Washer ($1\frac{3}{8}$ " Bore L00 Taper Nose)	1
113	WR.17	Wrench ($1\frac{3}{8}$ " Bore L00 Taper Nose)	1
114	L5-2-23A	Idler Gear, Inner 32T	1
115	L5-2-22A	Idler Gear, Outer 32T	1
116	L5-218A	Bush	1
117	L5-2-118	Oil Seal M1.075112 $\frac{1}{4}$ " SE85	1
118	L5-2-179	Reverse Shaft	1
119	L5-2-180	Gear, 42T	1
120	L5-2-116	Bearing	1
121	L5-2-119	Oil Seal M1.087125 $\frac{9}{32}$ " SE85	1
122	L5-626	Collar	1

Item No.	Part No.	Description	No. Off
123	$\frac{7}{8}$ " F.B.	Hexagon Nut	1
124	L5-629	Feed Gear Selector Rack	1
125	SG.5	Spring	1
126	SB.3	Steel Ball $\frac{1}{4}$ " dia.	1
127	L5-2-13	Feed Gear Selector	1
128	SP.40	Hand Wheel	1
‡129	L5-2-84A	Front Gear Selector Shaft	1
130	L5-210A	Selector Lever (L5-2-44A)	1
131	L5-220	Shoe (L5-2-43)	1
‡132	L5-7-9	Hand Lever	1
133	BB.2	Ball $1\frac{1}{2}$ " dia.	1
	L5-2-65	Gasket, Headstock Cover (Not illust.)	1
	L6-2-104	Philips Magnet (Not illustrated)	1
	L5-2-115	Gauze, Oil Filter (Not illustrated)	1
	L5-2-123	Reducer, Oil Level Indicator	
		(Not Illustrated)	1
	L5-2-158	Gasket, Front Bearing Cover (L5-2-156)	
		(Not illustrated)	1
ALTERNATIVE FRONT GEAR SELECTOR ASSEMBLY			
134	L5-2-108A	Front Gear Selector Shaft	1
135	L5-2-114A	Selector Boss	1
136	L5-2-113	Swivel Pin	1
137	L5-2-109	Hand Lever	1
138	L5-2-110A	Locating Plate	1
139	L5-2-111B	Plunger	1
140	L5-2-112	Return Pin	1
141	SG.231	Spring	1
ALTERNATIVE SAFETY CLUTCH LEVER ASSEMBLY (Not illustrated)			
	L5-2-171A	Clutch Lever	1
	BB.2	Bakelite Ball $1\frac{1}{2}$ " dia.	1
	L5-2-170C	Boss	1
	L5-2-188	Pin	1
	SG.231	Spring	1
	L5-2-112	Return Pin	1
	L5-2-111B	Plunger	1
	L5-2-169A	Fork	1
	L5-2-168	Locating Plate	1
	L5-2-167A	Eccentric Stud	1
	L5-2-6	Bush	1
	L5-610	Shoe	1

ALL-GEARED HEAD



SPARE PARTS LIST

**GEARBOXES
AND
TAILSTOCK**

GEARBOXES and TAILSTOCK

Item No.	Part No.	Description	No. Off
NORTON FEED GEARBOX			
1	L5-3-1A	Gearbox	1
2	L5-3-5	Top Shaft	1
3	L5-3-40	Bush, L.H.	1
4	L5-3-7	Sleeve	1
5	L5-3-6	Gear 16T	1
6	L5-3-8	Gear 32T	1
7	L5-3-59	Sleeve	1
8	L5-3-41	Bush, Centre	1
9	L5-3-10	Sliding Gear 24T	1
10	L5-3-9	Sliding Gear 16T	1
11	SK.8	Key	1
12	L5-3-60	Sleeve	1
13	L5-3-42	Bush, R.H.	1
14	L5-3-3	Selector Handle	2
15	SG.142	Spring	2
16	SB.2	Steel Ball, $\frac{3}{16}$ " dia.	2
17	L5-3-56	Selector Shaft	2
18	L5-3-39 & 39A	Selector Lever (L.H & R.H.)	1 off each
19	L5-3-38	Selector Shoe	2
20	L5-3-63	Mid. Shaft	1
21	L5-3-58	Sleeve	1
22	L5-3-43	Bush, L.H.	1
23	L5-3-73	Gear 32T	1
24	L5-3-72	Gear 30T	1
25	L5-3-71	Gear 28T	1
26	L5-3-70	Gear 26T	1
27	L5-3-69	Gear 24T	1
28	L5-3-68	Gear 22T	1
29	L5-3-67	Gear 20T	1
30	L5-3-66	Gear 19T	1
31	L5-3-65	Gear 18T	1
32	L5-3-64	Gear 16T	1
33	L5-3-76	Spacer	1
34	L5-3-61	Sleeve	1
35	L5-3-75	Bush, R.H.	1
36	L5-3-74	Clutch Shaft, Leadscrew	1
37	L5-3-13	Gear 24T and 32T	1
38	L5-3-45	Bush, Clutch Shaft	1
39	L5-3-49	Bush, Leadscrew	1
40	L5-3-15A	Clutch	1
41	SG.5	Spring	1
42	SB.3	Steel Ball, $\frac{1}{4}$ " dia.	1
43	L5-3-77	Bottom Shaft	1
44	$\frac{7}{8}$ " FB	Hexagon Nut	1
45	L5-502	Change Wheel Collar	1

Item No.	Part No.	Description	No. Off
Norton Feed Gearbox (contd.)			
‡46	L5-3-46	Bush, L.H.	1
47	L5-3-78	Sleeve	1
48	L5-3-47	Bush, R.H.	1
49	L5-3-17	Collar	1
50	L5-3-31	Slipping Clutch Shaft	1
51	L5-3-48	Bush	1
52	L5-3-30	Gear 32T	1
53	L5-3-50&89	Bush, Feedshaft	1 off each
54	L5-3-35	Sleeve	1
55	L5-3-32	Slipping Clutch	1
56	SG.266	Spring	1
57	L5-3-34	Washer	1
58	L5-3-33	Adjusting Nut	1
59	L5-3-2	Swing Lever	1
60	L5-3-29	Gear 22T	1
61	L5-3-55	Bush	1
62	L5-3-28	Pin	1
63	L5-3-36	Plunger Sleeve	1
64	L5-3-37	Plunger	1
65	SG.141	Spring	1
66	BB.1	Ball, 1" dia.	1
For Banjo Plate Assembly see Three Speed Gearbox			

Part Nos. marked thus ‡ fitted on previous models.

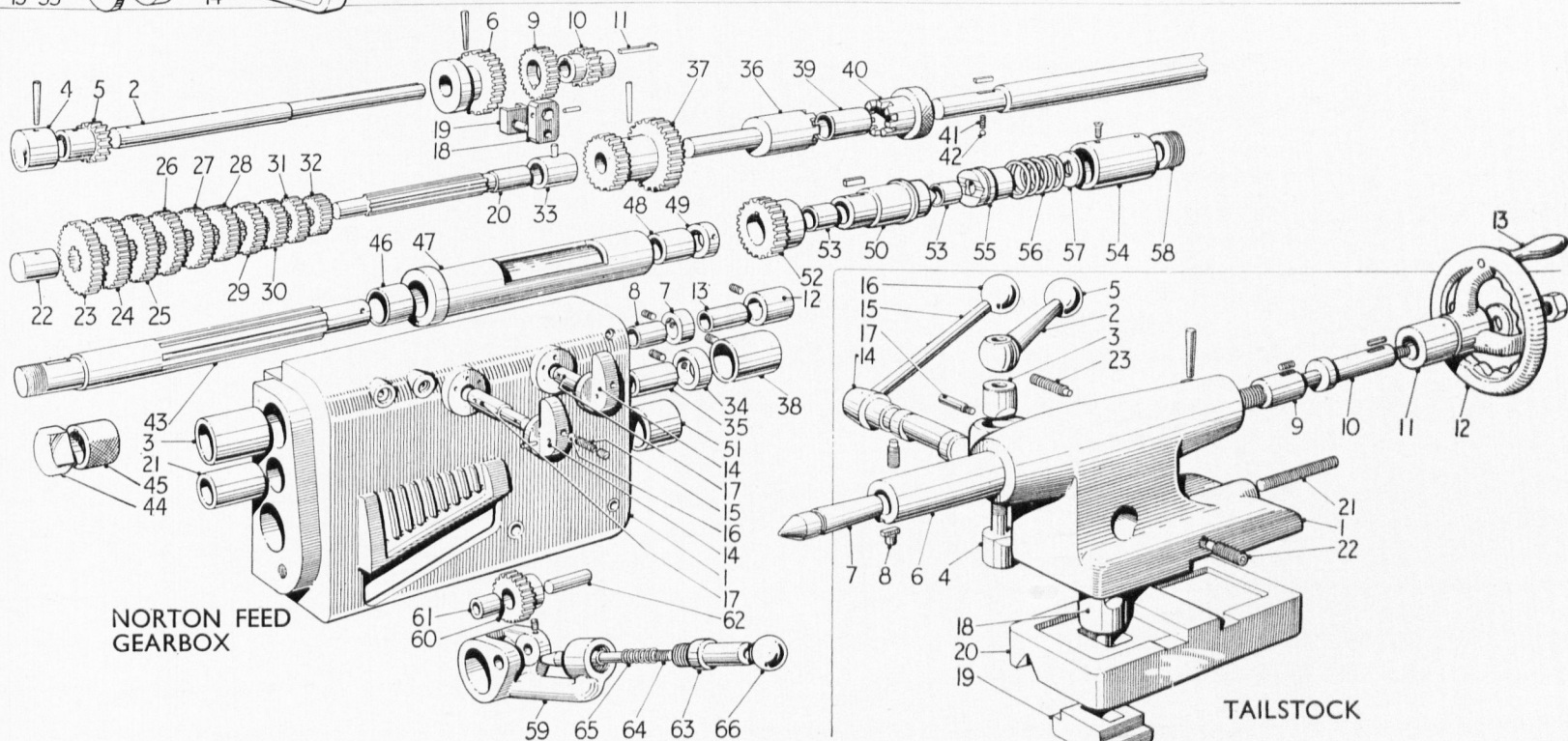
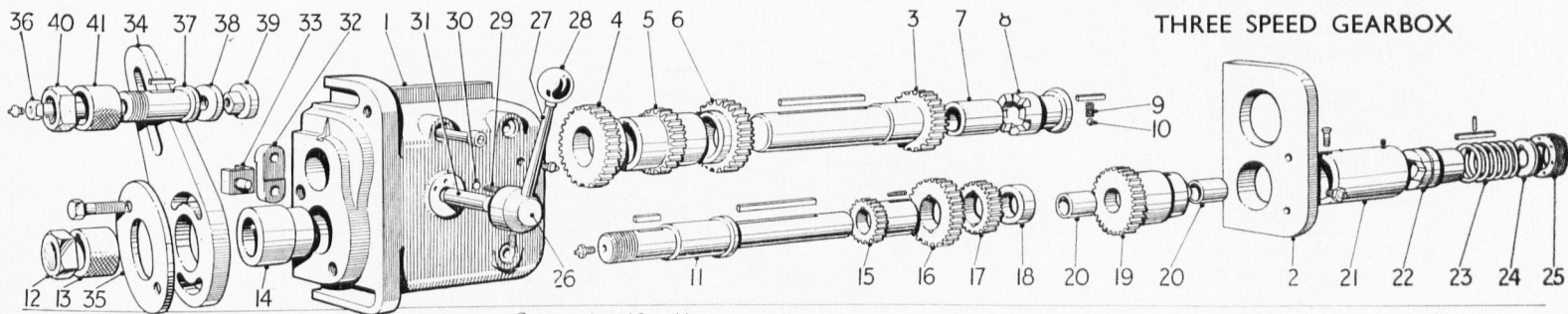
GEARBOXES and TAILSTOCK

Item No.	Part No.	Description	No. Off
THREE SPEED GEARBOX			
1	L5-6-1A	Gearbox	1
2	L5-53	Endplate	1
3	L5-555	Top Shaft	1
4	L5-6-6	Gear 40T	1
5	L5-6-7	Gear 30T	1
6	L5-6-9	Gear 36T	1
7	L5-6-12	Bearing	1
8	L5-3-15A	Clutch	1
9	SG.5	Spring	1
10	SB.3	Steel Ball, $\frac{1}{4}$ " dia.	1
11	L5-6-4	Bottom Shaft	1
12	$\frac{7}{8}$ " F.B.	Hexagon Nut	1
13	L5-502	Change Wheel Collar	1
14	L5-6-5	Bearing, L.H.	1
15	L5-557	Gear 20T	1
16	L5-549	Gear 30T	1
17	L5-550	Gear 24T	1
18	L5-6-10	Bearing, R.H.	1
19	L5-6-8	Pinion, Feed Shaft... ..	1
20	L5-3-50&89	Bearing	1 off each
21	L5-3-35	Sleeve	1
22	L5-3-32	Slipping Clutch	1
23	SG.266	Spring	1
24	L5-3-34	Washer	1
25	L5-3-33	Adjusting Nut	1
26	L5-6-11	Selector Boss	1
27	L5-713	Lever	1
28	BB.1	Ball, 1" dia.	1
29	SG.5	Spring	1
30	SB.3	Steel Ball, $\frac{1}{4}$ " dia.	1
31	L5-6-13	Selector Shaft	1
32	L5-6-2	Gear Mover Lever	1
33	L5-6-3	Gear Mover Shoe	1
34	L5-13-13	Banjo Plate	1
†35	L5-13-14A	Lock Plate	1
36	L5-196	Changewheel Stud	1
37	L5-505	Changewheel Socket	1
38	L5-198	Collar, Stud	1
39	L5-197	Nut, Stud	1
40	$\frac{7}{8}$ " F.B.	Hexagon Nut	1
41	L5-502	Changewheel Collar	1
	L5-13-18	Lock Washer (not illustrated)	2

Item No.	Part No.	Description	No. Off
LOOSEHEAD			
1	L5-7-3	Tailstock (Model L5)	1
	L5-7-4	Tailstock (Model L5A)	1
2	L5-589	Locking Lever (Quill)	1
3	L5-7-18	Locking Bush (Quill)	1
4	L5-7-17	Locking Bolt (Quill)	1
5	BB.1	Ball, 1" dia.	1
6	L5-595C	Quill (L5-595A Metric) No. 3 M.T.	1
7	L5-585A	Centre No. 3 Morse Taper	1
8	L5-94	Key	1
9	L5-96	Nut	1
10	L5-7-15A	Screw	1
11	L5-49	Bush	1
12	L5-7-16	Handwheel	1
13	L5-598	Handle	1
14	L5-7-10	Eccentric Lock Stud	1
15	L5-7-9	Locking Lever	1
16	BB.2	Ball, $1\frac{1}{2}$ " dia.	1
17	L5-7-13	Stop Pin	1
18	L5-7-6	Eye Bolt	1
19	L5-50	Holding Down Plate	1
20	L5-7-5	Base	1
21	$\frac{1}{4}$ " BSP/ FX 3"	Set Up Screw, End	1
22	$\frac{1}{4}$ " BSP/ FX $1\frac{1}{2}$ "	Set Up Screw, Front	1
23	$\frac{1}{4}$ " BSP/ FX $1\frac{1}{4}$ "	Set Up Screw, Rear	1

Part Nos. marked thus † fitted on previous models.

GEARBOXES and TAILSTOCK



SPARE PARTS LIST

**NORTON, 36 SPEED
GEARBOX (METRIC)**

NORTON, 36 SPEED GEARBOX (METRIC)

Item No.	Part No.	Description	No. Off
NORTON 36 SPEED GEARBOX (METRIC)			
1	L5-3-109	Gearbox	1
2	L5-3-77B	Bottom Shaft	1
3	L5-13-13	Banjo Plate	1
4	L5-13-18	Lock Washer	2
5	$\frac{1}{2}$ " FH $1\frac{1}{4}$ "	Hex. H'd. Set Screw	2
6	L5-196	Changewheel Stud	1
7	H.4146	"Kingfisher" Lubricator $\frac{1}{4}$ " Whit.	1
8	L5-197	Socket Nut	1
9	L5-198	Collar Socket Stud	1
10	L5-505	Socket	1
11	L5-502	Changewheel Collar	1
12	$\frac{1}{4}$ " KS $1\frac{1}{8}$ "	Square Key	1
13	$\frac{7}{8}$ " FB	Hex. Nut 12 T.P.I.	1
14	352	Screwcutting and Feed Plate	1
15	L5-3-90	Stud	2
	468	English Screwcutting Chart (Not illust.)	1
16	$\frac{3}{8}$ " FY $3\frac{1}{2}$ "	Socket H'd. Cap Screw	1
17	$\frac{3}{8}$ " FY $3\frac{1}{4}$ "	Socket H'd. Cap Screw	2
18	$\frac{5}{16}$ " PG 2"	Grooved Pin	2
19	L5-3-58	Sleeve	1
20	L5-3-59	Sleeve	1
21	L5-3-60	Sleeve	1
22	L5-3-61	Sleeve	1
23	H.466	"Kingfisher" Lubricator $\frac{1}{4}$ " Whit.	1
23A	H.466	"Kingfisher" Lubricator $\frac{1}{4}$ " Whit.	3
24	L5-3-98	Top Shaft	1
25	L5-3-40	Bush L.H.	1
26	$\frac{1}{4}$ " FX $\frac{1}{2}$ "	Hollow Set Screw $\frac{1}{2}$ " DOG. PT.	1
27	L5-3-7C	Sleeve	1
28	L5-3-6C	16T Gear... ..	1
29	$\frac{1}{4}$ " PT $1\frac{1}{4}$ "	Taper Pin	1

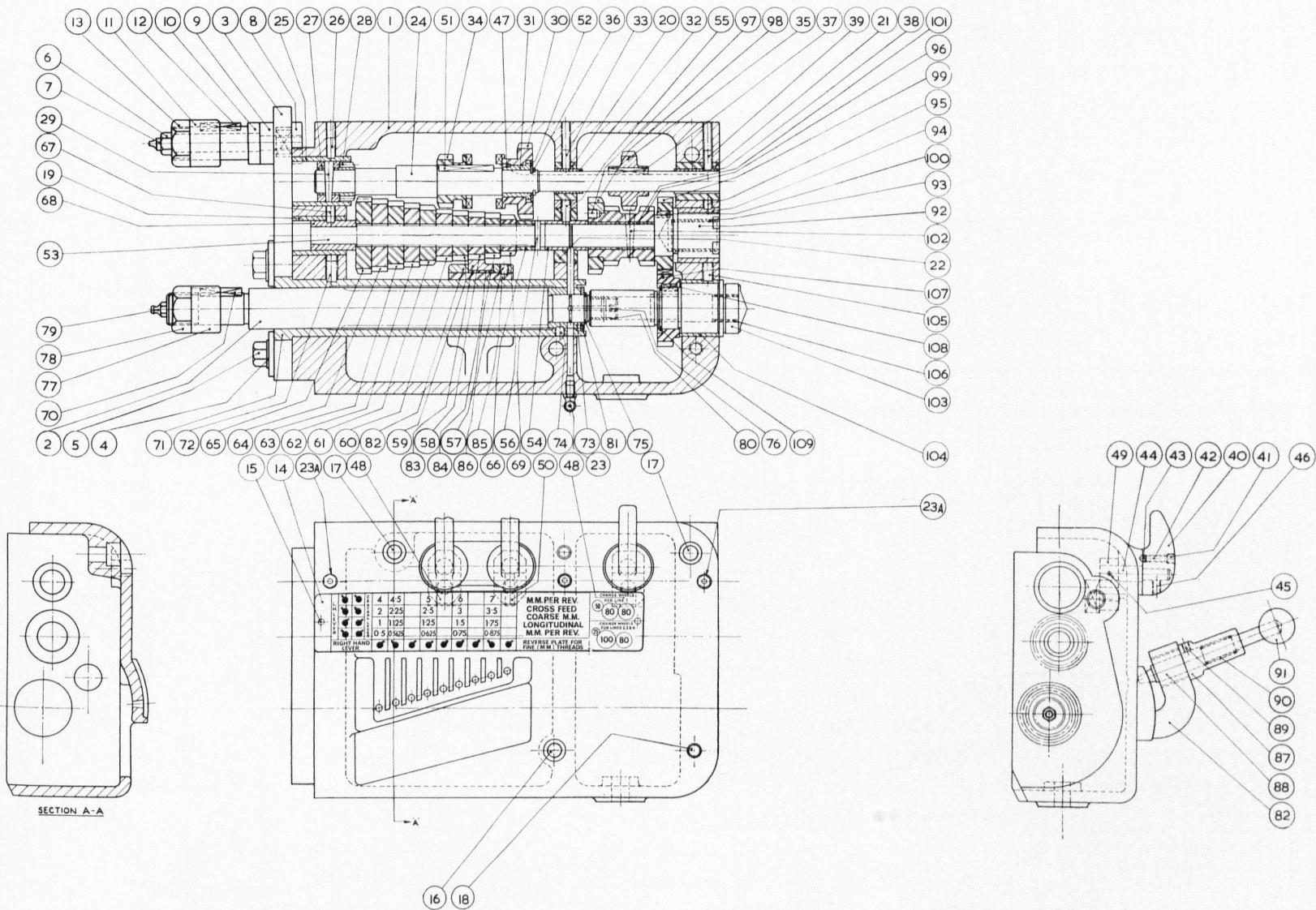
Item No.	Part No.	Description	No. Off
Norton 36 Speed Gearbox (Metric) (contd.)			
30	L5-3-102	32T Sliding Gear	1
31	L5-3-116	Bush (Flanged)	1
32	L5-3-41	Bush, Top Shaft, Centre	1
33	$\frac{1}{4}$ " FX $\frac{1}{2}$ "	Hollow Set Screw $\frac{1}{2}$ " DOG. PT.... ..	1
34	L5-3-103	24T Sliding Gear	1
35	L5-3-104	21T Sliding Gear	1
36	$\frac{5}{8}$ " Dia.	External Circlip	1
37	SK.8	Peg Feather Key	1
38	L5-3-42	Bush Top Shaft, R.H.	1
39	$\frac{1}{4}$ " FX $\frac{1}{2}$ "	Hollow Set Screw $\frac{1}{2}$ " D.P. PT.	1
40	L5-3-3	Selector Handle	3
41	$\frac{1}{4}$ " FX $\frac{1}{4}$ "	Hollow Set Screw C.P. PT.	3
42	SG.142	Spring	3
43	SB.2	$\frac{3}{16}$ " Dia. Steel Ball	3
44	L5-3-56A	Selector Shaft	3
45	$\frac{3}{16}$ " PT 1"	Taper Pin	3
46	$\frac{1}{4}$ " FX $\frac{3}{8}$ "	Hollow Set Screw $\frac{1}{2}$ " DOG. PT.	3
47	4BA/FX $\frac{1}{4}$ "	Hollow Set Screw CUP. PT.	1
48	L5-3-38	Selector Shoe	2
49	L5-3-39A	Selector Lever	3
50	L5-3-93	Selector Shoe (Central)	1
51	$\frac{3}{16}$ " KS $1\frac{1}{2}$ "	Square Key	1
52	L5-3-114D	Spacing Washer	1
53	L5-3-111	Mid. Shaft	1
54	L5-3-43C	Bush, Mid. Shaft, R.H.	1
55	$\frac{5}{16}$ " FX $\frac{1}{2}$ "	Hollow Set Screw $\frac{1}{2}$ " DOG. PT.... ..	1
56	L5-3-64	16T Splined Gear	1
57	L5-3-65	18T Splined Gear	1
58	L5-3-66	19T Splined Gear	1
59	L5-3-67	20T Splined Gear	1
60	L5-3-68C	22T Splined Gear	1

NORTON, 36 SPEED GEARBOX (METRIC)

Item No.	Part No.	Description	No. Off
Norton 36 Speed Gearbox (Metric) (contd.)			
61	L5-3-69C	24T Splined Gear	1
62	L5-3-70	26T Splined Gear	1
63	L5-3-71	28T Splined Gear	1
64	L5-3-72	30T Splined Gear	1
65	L5-3-73	32T Splined Gear	1
66	L5-3-76C	Spacer	1
67	$\frac{5}{16}$ " FX $\frac{1}{2}$ "	Hollow Set Screw $\frac{1}{2}$ DOG. PT....	1
68	L5-3-75	Bush, Mid. Shaft, L.H.	1
69	$\frac{1}{8}$ " Dia.	Spirol Pin	1
BOTTOM SHAFT ASSEMBLY			
70	$\frac{1}{4}$ " KS $1\frac{1}{8}$ "	Square Key	1
71	L5-3-78A	Sleeve	1
72	$\frac{5}{16}$ " FX $\frac{1}{2}$ "	Hollow Set Screw Full DOG. PT. ...	1
73	L5-3-47A	Bush, Bottom Shaft, R.H.	1
74	$\frac{1}{4}$ " FX $\frac{1}{4}$ "	Hollow Set Screw $\frac{1}{2}$ DOG. PT....	1
75	$\frac{3}{4}$ " Dia.	External Circlip	1
76	$\frac{1}{4}$ " FX $\frac{1}{4}$ "	Hollow Set Screw CUP. PT.	1
77	L5-502	Changewheel Collar	1
78	$\frac{7}{8}$ " FB	Hex. Nut 12 T.P.I.	1
79	H.4146	"Kingfisher" Lubricator $\frac{1}{4}$ " Whit. ...	1
80	L5-3-55	Bush	1
81	L5-3-114F	Spacing Washer	1
82	L5-3-2	Swing Lever	1
83	L5-3-29	Gear (22T)	1
84	L5-3-55	Bush, Swing Lever	1
85	L5-3-28	Shaft	1
86	$\frac{1}{4}$ " FX $\frac{1}{4}$ "	Hollow Set Screw $\frac{1}{2}$ DOG. PT....	1
87	L5-3-36	Plunger Sleeve	1
88	L5-3-37	Plunger	1

Item No.	Part No.	Description	No. Off
Norton 36 Speed Gearbox (Metric) (contd.)			
89	2BA/FX $\frac{5}{16}$ "	Hollow Set Screw $\frac{1}{2}$ DOG. PT. ...	1
90	SG.141	Spring	1
91	BB.1	Bakelite Ball 1" Dia.	1
92	L5-3-74C	Clutch Shaft, Leadscrew	1
93	L5-3-49	Bush, Leadscrew	1
94	L5-3-45A	Bush, Clutch Shaft	1
95	$\frac{5}{16}$ " FX $\frac{1}{2}$ "	Hollow Set Screw $\frac{1}{2}$ DOG. PT....	1
96	L5-3-105B	Gear, 21T and 20T	1
97	$\frac{1}{4}$ " FX $\frac{1}{4}$ "	Hollow Set Screw CUP. PT.	2
98	L5-3-101	32T Gear... ..	1
99	L5-3-112	32T Gear... ..	1
100	$\frac{3}{16}$ " KS $\frac{3}{8}$ "	Square Key	1
101	SC.108	Needle Roller Bearing	2
102	$\frac{1}{4}$ " PT $1\frac{1}{8}$ "	Taper Pin	1
	L5-3-43	Bush (not illustrated)... ..	1
103	L5-3-31C	Slipping Clutch Shaft	1
104	L5-3-48C	Bush	1
105	$\frac{5}{16}$ " FX $\frac{1}{2}$ "	Hollow Set Screw $\frac{1}{2}$ DOG. PT....	1
106	L5-3-50	Bush, Feedshaft	1
107	L5-3-96	Gear, 32T	1
108	$\frac{3}{16}$ " KS $\frac{3}{8}$ "	Square Key	1
109	$1\frac{1}{8}$ " Dia.	External Circlip	1
Refer to Pages 26 and 27 for Slipping Clutch Details			

NORTON, 36 SPEED GEARBOX (METRIC)



SPARE PARTS LIST

APRON, SADDLE and SLIDES

APRON, SADDLE and SLIDES

Item No.	Part No.	Description	No. Off
APRON			
1	L5-4-1	Apron	1
2	L5-4-2A	Hand Motion Pinion	1
3	L5-4-3	Bearing, Rear	1
4	L5-4-5	Bearing, Front	1
5	L5-4-39	Handwheel	1
6	L5-597	Handle	1
7	L5-4-15B	Rack Pinion	1
	L5-4-15C	Rack Pinion (for Profile Lathe)	1
8	L5-4-4	Bearing	1
9	L5-4-33	Gear	1
10	L5-4-37	Sliding Shaft	1
11	L5-4-35	Knob	1
12	SG-5	Spring	1
13	SB.3	Steel Ball, $\frac{1}{4}$ " dia.	1
14	L5-583A	Gear	1
15	L5-576A	Pinion	1
16	L5-4-41	Bush	1
17	L5-4-38	Worm Wheel Shaft	1
18	L5-4-7	Sleeve, Front	1
†19	L5-4-6	Sleeve, Rear	1
20	L5-88	Worm Wheel	1
21	L5-565	Broad Pinion	1
22	L5-4-9	Worm Box	1
23	L5-4-10	Clip	1
24	L5-4-18	Lever	1
25	B.B.1	Ball, 1" dia.	1
26	L5-4-11	Hinge Pin	1
27	L5-564	Clip Bar	1
28	L5-4-40	Stud, Worm	1
29	L5-567	Worm and Pinion	1
30	L5-87	Bush	1
31	L5-86A	Bearing, R.H., Box	1
32	L5-86	Bearing, L.H., Box	1
33	L5-566	Gear	1
34	L5-699	Key	1
35	L5-4-36	Shaft, Nut Slides	1
36	L5-4-8	Bearing	1
37	L5-4-17A	Boss, Lever	1
38	L5-4-16	Lever	1

Item No.	Part No.	Description	No. Off
Apron (contd.)			
39	B.B.1	Ball, 1" dia.	1
40	L5-4-34	Interlocking Quadrant	1
41	L5-4-19	Nut Slide, Top (L5-4-19A Metric)	1
42	L5-538	Pin, Long	1
43	L5-4-20	Nut Slide, Bottom (L5-4-20A Metric)	1
44	L5-539	Pin, Short	1
45	L5-4-21	Indicator Bracket (L5-4-21A Metric)	1
46	S.S. $\frac{5}{16}$ " x 2"	Pivot Stud	1
47	SG-5	Spring	1
48	SB.3	Steel Ball, $\frac{1}{4}$ " dia.	1
49	L5-4-13	Dial (L5-4-13A Metric)	1
50	L5-90	Pinion (L5-90A Metric)	1
	L5-4-32	Nut Slide Plate	1
	L5-4-31	Bearing Pad, Nut Slide Plate (Not Illust.)	2
SADDLE AND SLIDES			
51	L5-5-96	Saddle	1
52	L5-34B	Front Strip, R.H.	1
53	L5-5-95	Front Strip, L.H.	1
54	L5-5-91	Rear Strip	1
55	L5-5-16	Wiper Cover, Front	1
56	L5-5-7 & 9	Wipers	2 each
57	L5-5-17	Wiper Cover, Rear	1
58	L5-5-8 & 10	Wipers	2 each
59	L5-697	Stud	1
60	L5-696	Pinion	1
61	L5-698	Collar	1
62	L5-25	Cross Slide	1
63	L5-33	Strip	1
64	L5-16-39	Adjusting Screw	1
65	L5-5-46A	Screw (L5-5-48A Metric) (L5-5-99 single start)	1
66	L5-93	Nut (L5-808 Metric)	1
67	SKF.51102	Thrust Bearing	2
68	L6-5-8	Fixed Collar (L6-5-80 For single start screw)	1
69	L5-5-42	Micrometer Collar (L5-5-45A Metric) (L5-5-100 single start)	1
70	L5-5-43A	Bush	1
71	L5-5-15	Die Piece	2
72	SG-289	Spring	2
73	L5-31B	Handwheel	1

Part Nos. marked thus † fitted on previous models.

APRON, SADDLE and SLIDES

Item No.	Part No.	Description	No. Off
Saddle and Slides (contd.)			
74	L5-5-60	Handle	1
75	L5-345	Cover Plate, Front	1
†76	L5-346	Cover Plate, Rear	1
77	L5-26B	Swivel Slide	1
78	L5-572A	Clamp Plate	1
79	L5-573A	Studs	2
80	L5-91	Strip	1
81	L5-27	Top Slide (Model L5)	1
82	L5-5-22A	Top Slide (Model L5A)	1
84	L5-5-47A	Screw (L5-5-49A Metric)	1
85	L5-92	Nut (L5-811 Metric)	1
86	SKF.51101	Thrust Bearing	2
87	L5-5-40	Fixed Collar	1
88	L5-5-39	Graduated Collar (L5-5-44A Metric)	1
89	L5-5-55A	Bush	2
90	L5-5-15	Die Piece	1
91	SG-290	Spring	2
92	L5-5-57A	Ball Handle	1
93	L5-570	Handle	1
94	L5-5-28	Tool Holder	1
95	$\frac{3}{8}$ " FZ.1 $\frac{3}{4}$ "	Square Head Set Screw	2
96	L5-5-29	Pivot Stud	1
97	WR.7	Wrench	1
83	L5-5-30	Tee Piece (Model L5A)	1
	L5-5-61	Swarf Shield in Saddle (Not Illustrated)	1
	L6-5-11	Cover, Cross Slide Ways (Not illust.)	1
	L5-5-93	Adjusting screw, LH front strip (Not ill.)	1
	L5-5-94	Locking Piece, LH front strip (Not ill.)	1
	L5-5-92	Rear Saddle Strip (Not illust.)	1
†FOUR WAY TOOLPOST			
98	L5-5-27	Square Turret	1
99	L5-712	Pivot	1
100	L5-715	Plunger Shell	1
101	L5-716	Plunger	1
102	SG-26	Spring	1
103	$\frac{3}{16}$ " P.R. $\frac{3}{4}$ "	Dowel	1
104	L5-5-29	Pivot Stud	1
105	L5-726	Nipping Boss	1
106	L5-713	Tightening Lever	1
107	BB.1	Ball, 1" dia.	1
108	$\frac{3}{8}$ " FZ.1 $\frac{3}{4}$ "	Square Head Set Screw	8
109	WR.7	Wrench	1
†AMERICAN TOOLPOST (L5A Model)			
110	L5-5-25	Tool Post	1
111	L5-5-24	Tool Plate	1
112	L5-5-23	Ring	1
113	L5-5-26	Clamp Plate	1
114	$\frac{1}{2}$ " FZ.2 $\frac{1}{2}$ "	Square Head Screw	1
115	WR.10	Wrench	1

Item No.	Part No.	Description	No. Off
†ALTERNATIVE COMPOUND SLIDE (Not Illustrated) (L5A Model)			
	L6-5-2/N	Top Slide	1
	L6-5-6	Screw	1
	L6-5-7	Nut	1
	L6-5-3A	Bearing Housing	1
	L6-5-5	16T Gear	2
	SKF 51101	Thrust Race	2
	L6-5-4B	Shaft, Top Slide Handle	1
	L5-5-39	Micrometer Collar	1
	L5-5-15	Die	2
	SG.290	Spring	2
	L5-5-55	Spacer	1
	L5-5-57A	Ball Handle	1
	L5-570	Handle	1
†EXTENDED CROSS SLIDE (Not Illustrated) (L5A Model)			
	L5-5-76	Extended Cross Slide	1
	L5-16-37	Cross Slide Strip	1
	L5-5-77	Rear Tool Post	1
	L5-5-69	Locking Nut	1
	L5-5-78	Stud, Rear Tool Post	1
LEADSCREW AND FEEDSHAFT			
116	L5-8-1	Bracket	1
	L5-561A	Leadscrew (L5-561B Metric)	1
		(3 Speed Gearbox, 24" Centres)	1
	L5-800	Leadscrew (L5-800A Metric)	1
		(3 Speed Gearbox, 40" Centres)	1
117	L5-3-51	Leadscrew (L5-51A Metric)	1
		(Norton Feed Gearbox, 24" Centres)	1
	L5-3-54	Leadscrew (L5-3-54A Metric)	1
		(Norton Feed Gearbox, 40" Centres)	1
118	L5-588	Collar	1
119	L5-541	Washer	1
120	L5-540	Nut	2
	L5-8-2	Feed Shaft	
		(3 Speed Gearbox, 24" Centres)	1
	L5-8-3	Feed Shaft	
		(3 Speed Gearbox, 40" Centres)	1
121	L5-3-82	Feed Shaft	
		(Norton Feed Gearbox, 24" Centres)	1
	L5-3-83	Feed Shaft	
		(Norton Feed Gearbox, 40" Centres)	1
122	L5-645	Collar	1
	L5-8-5	Rack (24" long)	1
	L5-8-5B	Rack (24" long) (for Profiling Lathes)	1
123	L5-8-4A	Rack (16" long) (for Profiling Lathes)	1
	L5-8-4	Rack (16" long) (40" between Centres)	1

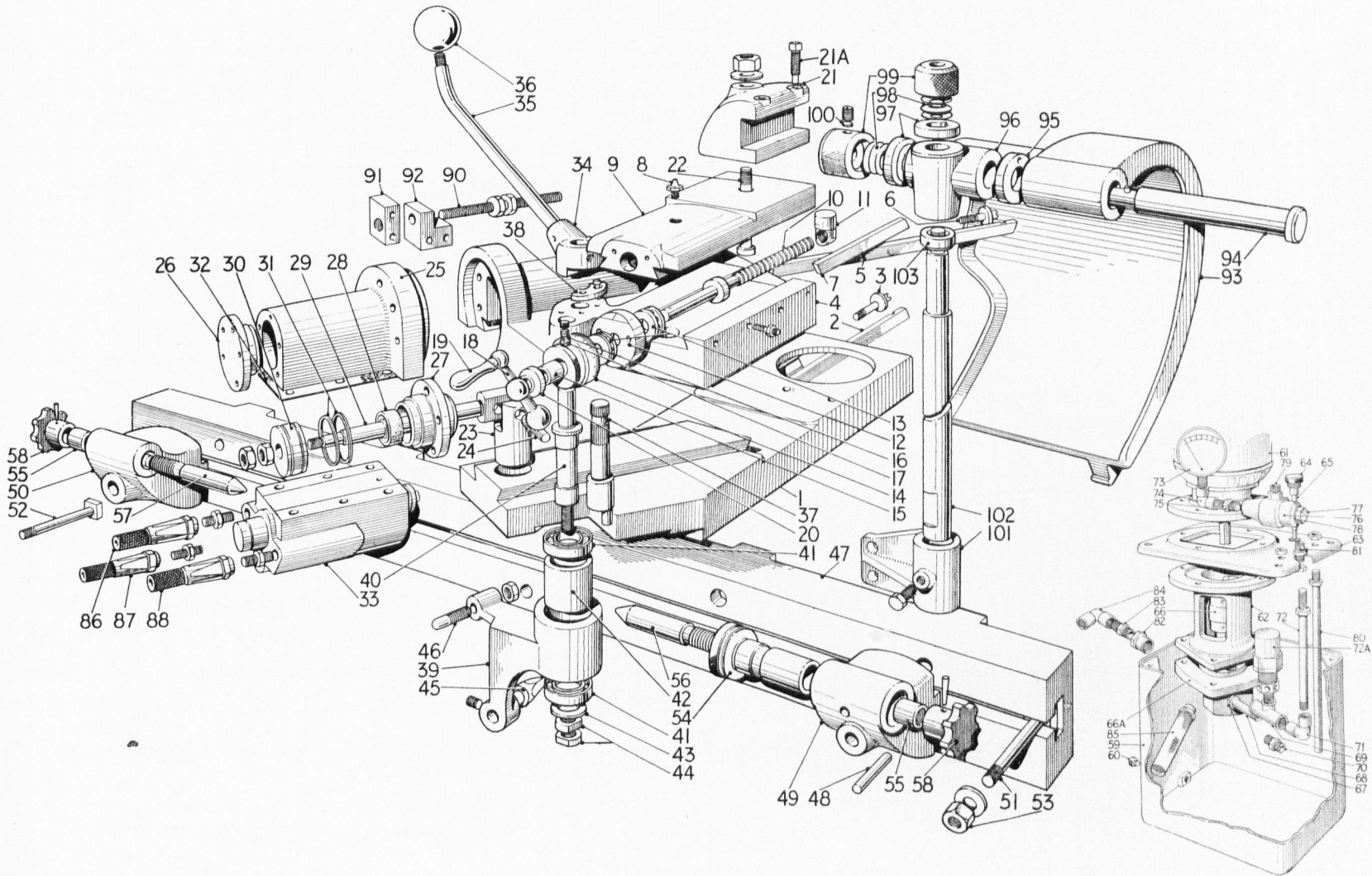
†Additional Equipment.

Part Nos. marked thus ‡ fitted on previous models.

S P A R E P A R T S L I S T

PROFILING EQUIPMENT

PROFILING EQUIPMENT



PROFILING EQUIPMENT

Item No.	Part No.	Description	No. Off
PROFILING EQUIPMENT			
1	L5-16-1	Cross Slide...	1
2	L5-16-37	Strip ...	1
3	L5-16-39	Adjusting Screw ...	1
4	L5-16-2	Hydraulic Slide ...	1
5	L5-16-38	Strip ...	1
6	L5-16-39	Adjusting Screw ...	1
7	L5-91	Strip, Top Slide...	1
8	NA5700/2	'Tecalmit' Nipple $\frac{1}{4}$ " Whit.	1
9	L5-5-52	Top Slide ...	1
10	L5-5-47A	Top Slide Screw (L5-5-49A Metric)	1
11	L5-92	Nut (L5-811 Metric)	1
12	L5-5-40	Fixed Collar ...	1
13	SKF51101	Thrust Race ...	2
14	L5-5-39	Graduated Collar (L5-5-44A Metric)...	1
15	L5-5-55A	Bush ...	1
16	SG.290	Spring ...	2
17	L5-5-15	Die ...	2
18	L5-5-57A	Ball Handle ...	1
19	L5-570	Handle ...	1
‡20	L5-5-55	Spacer ...	1
21	L5-5-51	Tool Holder ...	1
21A	$\frac{3}{8}$ " FZ $1\frac{3}{4}$ "	Square Head Set Screws ...	2
22	L5-5-53	Pivot Stud ...	1
23	L5-16-20	Connecting End, Piston Rod ...	1
24	L5-16-23	Pin ...	1
25	L5-16-3	Cylinder ...	1
26	L5-16-5	End Cover. R.H. ...	1
27	L5-16-6	End Cover. L.H. ...	1
28		'U' Leather, $1\frac{3}{16}$ " \times $\frac{9}{16}$ " B.	1
29	L5-16-22	Piston Rod ...	1
30	L5-16-21	Piston ...	1
31	P-2667B	Piston Rings ...	2
32	L5-16-123	Gasket ...	1

Item No.	Part No.	Description	No. Off
Profiling Equipment (contd.)			
33	L5-16/D	Valve Block (Complete) ..	1
34	L5-16-7	Boss, Control Lever ...	1
35	L5-16-10	Control Lever ...	1
36	BB2	Bakelite Ball, $1\frac{1}{2}$ " Dia. ...	1
37	L5-16-9	Eccentric Stud ...	1
38	L5-16-24	Stop Piece ...	1
39	L5-16-51	Pivot Arm, Stylus ...	1
40	L5-16-54	Swivel Stud ...	1
41	A6075 A6157	Timken Taper Roller Bearing...	2
42	L5-16-55	Spacer ...	1
43	L5-16-56	Washer ...	1
44	L5-16-57	Lock Nut ...	2
45	L5-16-12	Stylus ...	1
46	L5-16-11	Contact Pin ...	1
47	L5-16-91 L5-16-92	Support Block (22" Centres) Support Block (38" Centres)	1 1
48	L5-16-122	Dowels ...	2
49	L5-16-78	Head, R.H. Master Holder ...	1
50	L5-16-79	Head, L.H. Master Holder ...	1
51	L5-16-75	Locking Stud ...	1
52	L5-16-76	Locking Stud ...	1
53	L5-5-69	Locking Nut ...	2
54	L5-16-67	Eccentric Bush ...	1
55	L5-16-70	Nut ...	2
56	L5-16-68	Centre, R.H. ...	1
57	L5-16-17	Centre, L.H. ...	1
58	SP110	Handwheel ...	2
59	L5-16-40	Oil Container ...	1
60		Plug, $\frac{1}{4}$ " B.S.P. ...	1
61	T.10	'Brook' Gryphon Totally Enclosed Motor Flange Fitting. $\frac{1}{2}$ H.P. 1000 R.P.M.	1
62	L5-16-50A	Adaptor ...	1

Part Nos. marked thus ‡ fitted on previous models.

PROFILING EQUIPMENT

Item No.	Part No.	Description	No. Off
Profiling Equipment (contd.)			
63	L5-16-52	Cover, Oil Container	1
64	L5-16-65	Plug, Dipstick	1
65	L5-16-66	Dipstick	1
66	70/CAX	Flexible Coupling, $\frac{5}{8}$ " B.	1
66A	L5-16A	Hydraulic Pump (Complete)	1
†67	L5-16-141A	Reducing Bush, $\frac{1}{2}$ " \times $\frac{3}{8}$ " B.S.P.	1
68	L5-16-81	Oil Supply Pipe	2
69	L5-16-142	Tee Piece, $\frac{3}{8}$ " B.S.P.	1
70	L5-16-143	Hex. Nipple, $\frac{3}{8}$ " B.S.P.	1
71	L5-16-144	Elbow, $\frac{3}{8}$ " B.S.P.	1
72	L5-16-59	Oil Supply Pipe	1
72A	L5-16/B	Relief Valve Complete	1
73		3" Dia. Pressure Gauge	1
74	L5-16-144	Elbow, $\frac{3}{8}$ " B.S.P.	1
75	L5-16-143	Hex. Nipple, $\frac{3}{8}$ " B.S.P.	1
76	L5-16-140	Housing, Magnetic Plug	1
77	7734/05	Magnetic Filter Plug	1
78	SP41	Fibre Washer	1
79	105341	Hex. Nipple, $\frac{3}{8}$ " B.S.P.	1
80	L5-16-58	Oil Return Pipe	1
81	{ 105341	Hex. Nipple, $\frac{3}{8}$ " B.S.P.	2
		$\frac{3}{8}$ " B.S.P. Female Coupling	1
†82	L5-16-141A	Reducing Bush, $\frac{1}{2}$ " - $\frac{3}{8}$ " B.S.P.	1
†83	L5-16-143	Hex. Nipple, $\frac{3}{8}$ " B.S.P.	1
84	L5-16-144	Elbow, $\frac{3}{8}$ " B.S.P.	1
85		Gauze Filter	1
86	{ SK 106 122	} $\frac{3}{8}$ " Bore, High Pressure Nylon Hose ...	1
	{ 24" between centres		
87	{ SK 106 104	} $\frac{3}{8}$ " Bore, High Pressure Nylon Hose ...	1
	{ 40" between centres		
87	{ SK 106 123	} $\frac{3}{8}$ " Bore, High Pressure Nylon Hose ...	1
	{ 24" between centres		
87	{ SK 106 105	} $\frac{3}{8}$ " Bore, High Pressure Nylon Hose ...	1
	{ 40" between centres		

Item No.	Part No.	Description	No. Off
Profiling Equipment (contd.)			
88	{ SK 106 124	} $\frac{3}{8}$ " Bore, High Pressure Nylon Hose...	1
	{ 24" between centres		
88	{ SK 106 106	} $\frac{3}{8}$ " Bore, High Pressure Nylon Hose...	1
	{ 40" between centres		
SPLASH GUARD OVER TOOL (SPECIAL ORDERS ONLY)			
101	L5-16-130	Support Bracket	1
102	L5-16-131	Support Pillar	1
103	L16-13-82	Swivel Washer	1
96	L16-13-78	Hinge Boss	1
97	L16-13-81	Washer	2
98	Z10	Disc Springs (Schnorr)... ..	6
99	L16-13-80	Clamp Nut	2
100	L5-5-15	Die Piece	2
93	L5-16-141	Splash Guard	1
94	L16-13-79	Hinge Stud	1
95	L16-13-83	Washer	1
RETRACTION STOP (SPECIAL ORDERS ONLY)			
90	L5-16-110	Screw	1
91	L5-16-111	End Support	1
92	L5-16-112	Stop Piece	1

MISCELLANEOUS ACCESSORIES

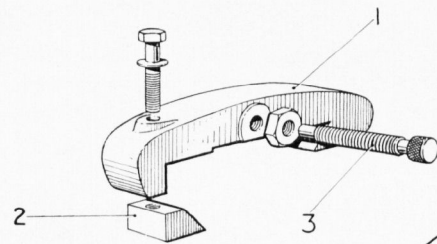
Item No.	Part No.	Description	No. Off
STATIONARY STEADY			
1	L5-10-48A	Base (Model L5)	1
	L5-10-48	Base (Model L5A)... ..	1
2	L5-10-49	Top	1
3	L5-521	Swivel Stud	1
4	L5-95	Clip	1
5	L5-640	Hinge Pin	1
6	L5-10-50	Pin	3
7	L5-522	Nut	3
8	$\frac{5}{16}$ " FY 2 $\frac{1}{2}$ "	Screw	3
9	L5-50	Clamp Plate	1
10	$\frac{1}{2}$ " BC 3"	Clamp Bolt	1
TRAVELLING STEADY*			
11	L5-9-10	Body (Model L5)	1
	L5-9-9	Body (Model L5A)	1
‡12	L5-73	Strip	1
13	L5-69	Pin	2
14	L5-522	Nut	2
15	$\frac{3}{16}$ " FY 1 $\frac{3}{4}$ "	Screw	2
DRIVER, FACE AND CHUCK BACK PLATES 3/4" BORE SPINDLE			
*1	L5-9-4	Driver Plate, 6" diam.	1
*2	L5-531	Pin	1
*3	L5-9-8	Balance Peg	1
4	L5-230	Driver Plate, 15" diam.	1
*5	L5-22	Face Plate, 9" diam.	1
6	L5-23	Face Plate, 15" diam.	1
7	L5-10-260	Back Plate (5", 3 Jaw Self-Centring Chuck)	1
8	L5-241A	Back Plate (8", 4 Jaw Independent Chuck)	1
1 3/8" BORE SPINDLE			
*9	L5-9-3	Driver Plate, 6" diam.	1
*10	L5-531	Pin	1
*11	L5-9-8	Balance Peg	1
12	L5-10-20	Driver Plate, 15" diam.	1

Item No.	Part No.	Description	No. Off
Driver, Face and Chuck Back Plates (contd.)			
*13	L5-9-1	Face Plate, 9" diam.	1
14	L5-10-18	Face Plate, 15" diam.	1
15	L5-10-263	Back Plate (6", 3 Jaw Self-Centring Chuck)	1
16	L5-10-17	Back Plate (9", 4 Jaw Independent Chuck)	1
1 3/8" BORE SPINDLE (L00 Taper Nose)			
*17	L5-9-5	Driver Plate	1
*18	L5-531	Pin	1
*19	L5-9-8	Balance Peg	1
*20	L5-9-7	Face Plate, 9 1/2" diam.	1
21	L5-10-81	Face Plate, 15" diam.	1
MICROMETER CARRIAGE STOP			
1	L5-10-31	Body (L5-10-61 Metric)	1
2	L5-10-33	Screw (L5-10-59 Metric)	1
3	L5-10-32	Micrometer Collar (L5-10-60 Metric)... ..	1
4	L5-10-35	Die Piece	1
5	L5-10-36	Knurled Screw	1
6	L5-10-34	Clamp Plate	1
CROSS SLIDE STOP			
1	L5-10-37	Body	1
2	L5-10-38	Clamping Strip	1
3	L5-10-39	Screw	1
	L5-10-146	Locknut	1
BORING TABLE			
1	L5-247	Table	1
2	L5-260	Strip	1
3	L5-93	Nut	1

* Standard equipment.

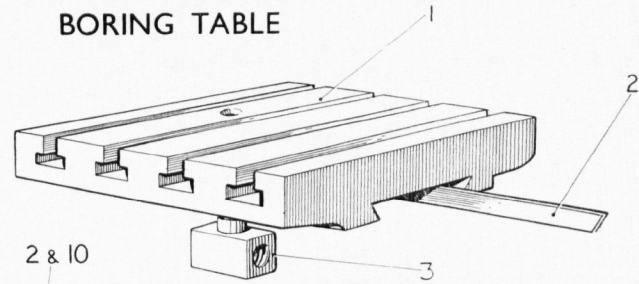
Part Nos. marked thus ‡ fitted on previous models.

MISCELLANEOUS ACCESSORIES

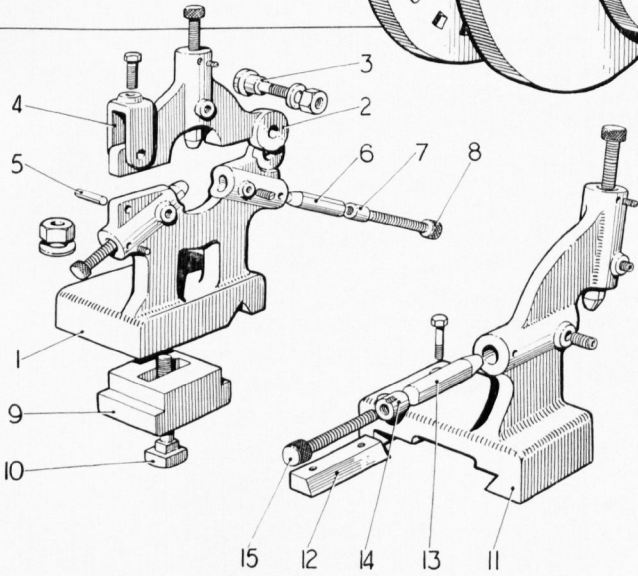
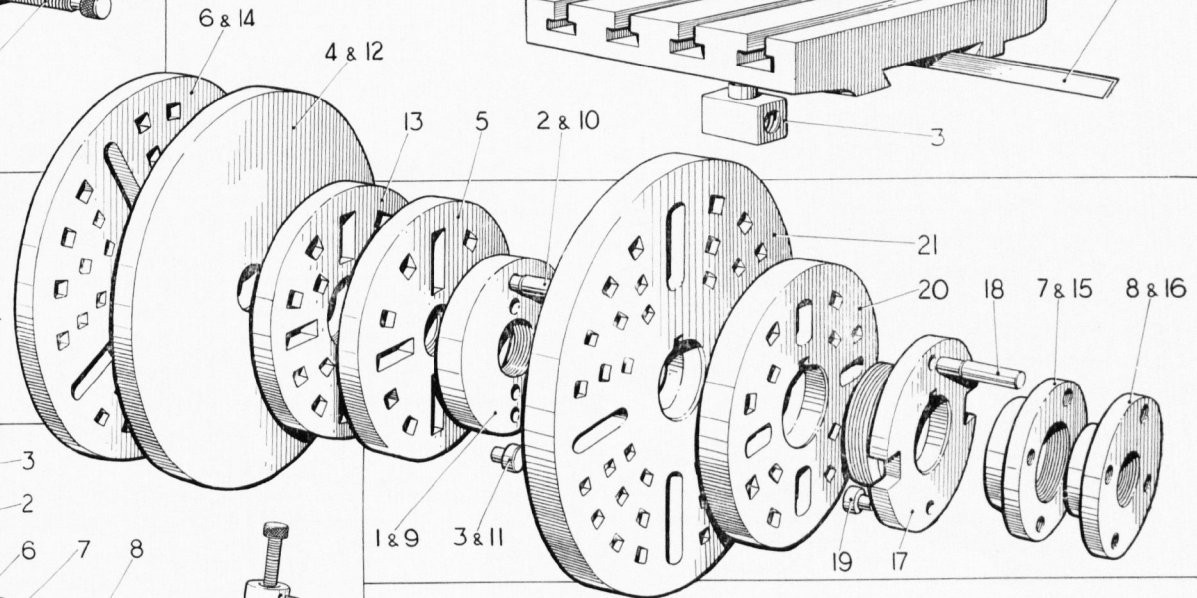


CROSS-SLIDE STOP

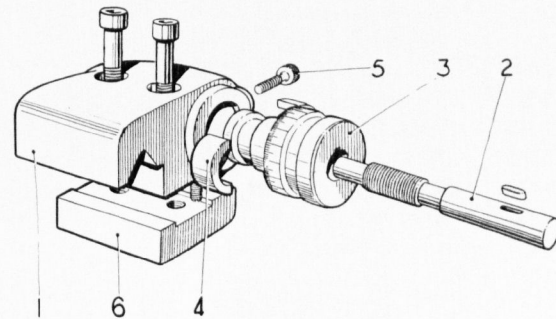
BORING TABLE



DRIVER,
FACE AND
CHUCK BACK
PLATES



STEADIES



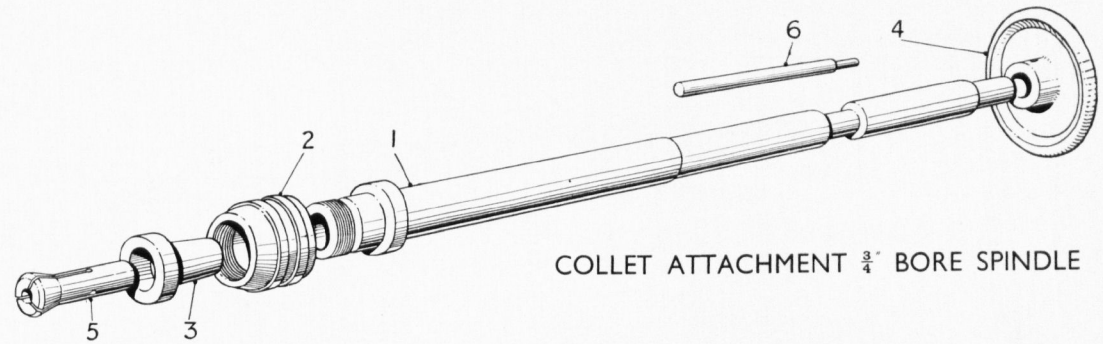
MICROMETER CARRIAGE STOP

MISCELLANEOUS ACCESSORIES

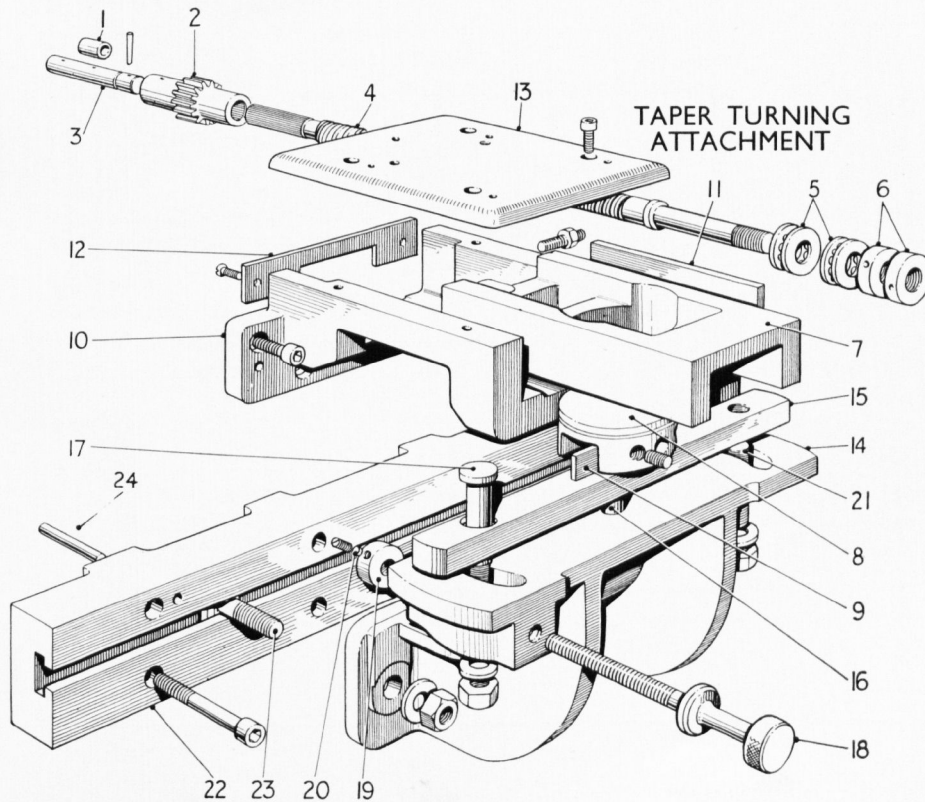
Item No.	Part No.	Description	No. Off
COLLET ATTACHMENT			
Draw Tube Type			
($\frac{3}{4}$ " BORE SPINDLE)			
1	L5-10-245	Draw Tube... ..	1
2	L5-249	Nose Piece	1
3	L5-676	Closer Bush	1
4	L5-10-246	Handwheel	1
5	L5-677	Collets	As requ'd
6	L5-10-88	Tommy Bar	1
	L5-10-247	Nut } (Not illustrated)	1
	L5-10-239	Key }	1
COLLET ATTACHMENT			
Draw Tube Type			
($1\frac{3}{8}$ " BORE SPINDLE Screwed and Taper Nose)			
(Not Illustrated)			
	L5-10-244	Draw Tube (L00 Spindle)	1
	L5-10-243	" (Screwed Nose)	1
	L5-10-153	Spindle Nose Cover (L00 Spindle)	1
	L5-10-140	" " (Screwed Nose)	1
	L5-10-154	Closer Bush	1
‡	L5-10-240A	Hand Wheel	1
	L5-10-158	Anchor Plate	1
	L5-10-249	Nut	1
	L5-10-172	Collets	As requ'd
	WR-24	Wrench	1
	L5-10-248	Thrust Washer	1
	L5-10-270	Key	2

Item No.	Part No.	Description	No. Off
TAPER TURNING ATTACHMENT			
1	L16-12-4	Bush	1
2	L5-14-28A	Pinion } supplied integral	1
3	L6-12-4		Shaft } ... ..	1
4	L5-14-16	Screw (L5-14-29 Metric) (L5-14-42 single start)	1
5	SKF.51101	Thrust Bearing	2
6	PT/F146/ 11/201	Lock Nut	1
7	L5-14-10A	Slide Block	1
8	L5-14-40	Top Slide	1
9	L5-14-20	Strip	1
10	L5-14-12A	Support Bracket Slide Block	1
11	L5-14-21	Strip	1
12	L5-14-18B	Cover Strip	1
13	L16-12-12A	Cover Plate	1
14	L5-14-14	Support Bracket (L5-14-14A Metric)	1
15	L5-14-41	Swivel Slide	1
16	L5-14-36	Swivel Pin	1
17	L5-14-25	Stud, Taper Setting	1
18	L5-14-24	Screw, Taper Setting	1
19	L5-14-26	Collar	1
20	L5-14-32	Die Piece	1
21	L5-14-37	Locking Stud	1
22	L5-16-84	Block, Bed (24" between Centres)	1
	L5-16-85	Block, Bed (40" between Centres)	1
23	L5-822	Bolt	2
24	L5-16-122	Dowels	2
	L5-346	Rear Cover Plate	1
	L5-14-34	Saddle Cover } Not illustrated	1
	L5-14-35	Stud }	1
	L5-14-38	Spherical Washer, male (Not illust.)	1
	L5-14-39	Spherical Washer, female (Not illust.)	1

MISCELLANEOUS ACCESSORIES



COLLET ATTACHMENT $\frac{3}{4}$ " BORE SPINDLE



TAPER TURNING ATTACHMENT

MISCELLANEOUS ACCESSORIES

SUDS PUMPS

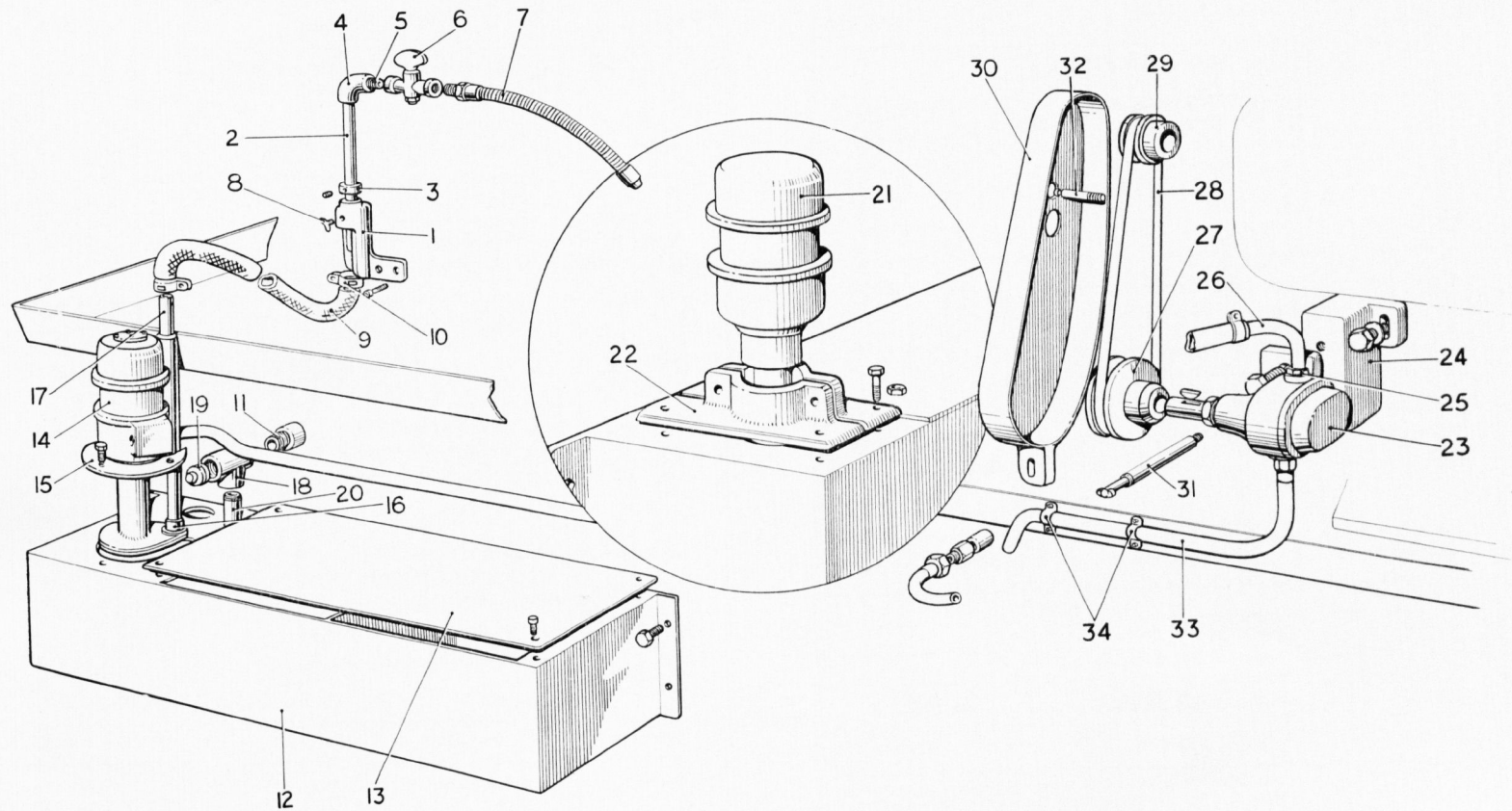
Item No.	Part No.	Description	No. Off
ELECTRIC AND MECHANICAL SUDS PUMPS			
COMMON PARTS			
1	L5-12-13	Bracket	1
2	L5-12-6	Stand Pipe	1
3	L5-12-7	Collar	1
4	G14-98	Elbow, $\frac{1}{4}$ " B.S.P.	1
†5	L5-12-21	Hex. Nipple	1
†6	G14-105A	Tap	1
†7	L5-682	Flexible Pipe	1
8	L5-12-8A	Thumb Screw	1
9		Hose, 3'-2" L. (24" between Centres)	1
10		Hose, 4'-6" L. (40" between Centres)...	1
	G14-95	Pipe Clip... ..	2
	L5-12-17	Pipe } Extra for Taper	1
	G14-98	Elbow, $\frac{1}{4}$ " B.S.P. } Turning Attachment	1
11	L5-12-27	Hex. Nipple, $\frac{3}{8}$ " B.S.P.	1
	LP198	Telescopic Nozzle, tap & Universal Fitting (Not illustrated)	1
ELECTRIC PUMP ONLY			
†12	L5-12-41	Suds Tank	1
†13	L5-12-3A	Cover	1
14	L21-19-1	Electric Suds Pump (A.C. supply only)	1
†15	L5-12-26	Flange (A.C. supply only)	1
16	L21-19-7	Reducing Coupling	1
†17	L5-12-24	Supply Pipe	1
†18	L5-12-28	Tee, $\frac{3}{8}$ " B.S.P.	1
†19	L5-12-29	Plug, $\frac{3}{8}$ " B.S.P.	1
†20	L5-12-5	Inlet Pipe, $\frac{3}{8}$ " B.S.P.	1
21	L5-12-31	Electric Suds Pump (D.C. supply only)	1
22	G14-121	Bracket (D.C. supply only)	1
	L16-11-13	Connecting Pipe, Bottom	1
		Rubber Hose, $\frac{3}{8}$ " Bore × 18" Long	1
		Jubilee Pipe Clip	2
	L16-11-1	Connecting Pipe	1
	L5-16-58	Return Pipe, 10" Long	1
	L16-12-39	Elbow, $\frac{3}{8}$ " Gas	1

for wide cabinet base only

Item No.	Part No.	Description	No. Off
Electrical and Mechanical Suds Pumps (contd.)			
MECHANICAL PUMP ONLY (MODEL L5 LATHES ONLY)			
23	L5-894	Geared Suds Pump	1
24	L5-687	Block	1
25	L5-12-25	Reducing Bush	2
26	G14-96	Bend	1
27	L5-12-14	Pump Pulley (Lathe speeds up to 720 r.p.m.)	1
	L5-743A	Pump Pulley (Lathe speed over 720 r.p.m.)	1
28		Belt, 28" L. (up to 720 r.p.m.)	1
		Belt, 30" L. (over 720 r.p.m.)	1
29	L5-12-36	Driving Pulley	1
30	L5-12-15	Belt Guard	1
31	L5-12-11	Hinge Stud	1
32	L5-12-12	Stud	1
33	L5-12-32	Tube, 3'-8" L. (24" between Centres)...	1
	L5-12-32A	Tube, 5'-0" L. (40" between Centres)...	1
34		Saddle	3
Mechanical Pump not available after December 31st, 1959			

† Not required with wide cabinet base.
 Part Nos. marked thus ‡ fitted on previous models.

SUDS PUMPS



AS THE ELECTRIC SUDS PUMP IS MORE EFFICIENT
THE MECHANICAL SUDS PUMP WILL NOT BE
AVAILABLE AFTER DECEMBER 31st 1959.

BED and DRIVE NOT ILLUSTRATED

Part No.	Description	No. Off
BED AND DRIVE		
L5-235A	Bed (24" between Centres)	1
L5-799	Bed (40" between Centres)	1
L5-1-1	Bed (24" between Centres) without gap	1
L5-1-50	Bed (40" between Centres) without gap	1
L5-2	Gap Piece	1
L5-1-55A	Cabinet Base (24" between Centres) ...	1
L5-1-56A	Cabinet Base (40" between Centres) ...	1
L5-1-138	Door	1
L5-1-183	Hinge Pin	2
L5-1-181	Hinge Boss	4
L5-1-115	Electrical Control Panel	1
L5-1-2	Drive Guard (Model L5)	1
L5-1-2B	Drive Guard (Model L5A)	1
L5-1-3	Drive Cover (Model L5)	1
L5-1-3B	Drive Cover (Model L5A)	1
L5-1-4	Change Wheel Guard (Model L5)	1
L5-1-4B	Change Wheel Guard (Model L5A)	1
L5-1-98	Cover, Clutch Spring	1
L5-1-8	Hinge Pin	2
L5-1-6	Button	1
L5-1-7	Latch	1
SG.170	Spring	1
L5-1-108C	Wide Cabinet Base (24" between Centres)	1
L5-1-99C	Wide Cabinet Base (40" between Centres)	1
L16-1-31	Inspection Cover	1
L16-1-32	Louvre	1
L5-1-100	Motor Platform	1
L16-1-12	Hinge Pin	2
L16-1-10	Swivel Stud, Base	1
L16-1-9	Adjusting Screw	1
L16-1-11	Swivel Stud, Platform	1
L5-1-101	Slide Rails	2
L6-1-45	Washer, Support	4
L6-1-50	Pad, Support	2
L6-1-47	Pad, Support	2
L6-1-42	Washer, Motor Mounting	4
L6-1-43	Pad, Motor Mounting	4
1501016	Bracket, Motor Platform	1
ALTERNATIVE DRIVE ASSEMBLIES		
3 Phase, 50 c/s Supply		
	Motor, 1 h.p., 1000 r.p.m. (22 to 500 r.p.m.)	1
L5-1-164A	Motor Pulley	1

For profiling and wide cabinet base machines

Part No.	Description	No. Off
Alternative Drive Assemblies		
3 Phase 50 c. s. Supply (contd.)		
A.66	Vee Belts (Model L5)	2
A.68	Vee Belts (Model L5A)	2
	Motor, 1½ h.p., 1500 r.p.m. (34 to 750 r.p.m.)	1
L5-1-164A	Motor Pulley	1
A.66	Vee Belts (Model L5)	2
A.68	Vee Belts (Model L5A)... ..	2
	Motor, 2 h.p., 1500 r.p.m. (45 to 1,000 r.p.m.)	1
L5-1-165A	Motor Pulley	1
A.66	Vee Belts (Model L5)	2
A.68	Vee Belts (Model L5A)... ..	2
	2 Speed Motor, 3/1½ h.p., 3000/1500 r.p.m. (34 to 1,500 r.p.m.)	1
L5-1-164E	Motor Pulley	1
A.66	Vee Belts (Model L5)	2
A.68	Vee Belts (Model L5A)... ..	2
	2 Speed Motor, 3/1½ h.p., 3000/1500 r.p.m. (45 to 2000 r.p.m.)	1
L5-1-165E	Motor Pulley	1
A.66	Vee Belts (Model L5)	2
A.68	Vee Belts (Model L5A)	2
3 Phase, 60 c/s. Supply		
	Motor, 1½ h.p., 1800 r.p.m. (34 to 750 r.p.m.)	1
L5-1-168B	Motor Pulley	1
A.66	Vee Belts (Model L5)	2
A.68	Vee Belts (Model L5A)	2
	Motor, 2 h.p., 1800 r.p.m. (45 to 1000 r.p.m.)	1
L5-1-171B	Motor Pulley	1
A.66	Vee Belts (Model L5)	2
A.68	Vee Belts (Model L5A)	2
A.82	Vee Belts (Fitted to all machines with motor mounted inside cabinet base) ...	2

MISCELLANEOUS ACCESSORIES

NOT ILLUSTRATED

Part No.	Description	No. Off
Alternative Drive Assemblies 3 Phase 60 c/s. Supply (contd.)		
	2 Speed Motor, 3/1½ h.p., 3600/1800 r.p.m. (34 to 1500 r.p.m.)	1
L5-1-168F	Motor Pulley	1
A.66	Vee Belts (Model L5)	2
A.68	Vee Belts (Model L5A)... ..	2
	2 Speed Motor, 3/1½ h.p., 3600/1800 r.p.m. (45 to 2000 r.p.m.)	1
L5-1-171F	Motor Pulley	1
A.66	Vee Belts (Model L5)	2
A.68	Vee Belts (Model L5A)... ..	2
Single Phase, 50 c/s Supply		
	Motor, 1½ h.p., 1500 r.p.m. (34 to 750 r.p.m.)	1
L5-1-164E	Motor Pulley	1
A.66	Vee Belts (Model L5)	2
A.68	Vee Belts (Model L5A)	2
ELECTRICAL EQUIPMENT Starters for 50 cycles supply		
ISH.340	"Prentice" Direct on Line Starter, 3 phase 50 cycles, 400/440 volts for 1 H.P. Motors	1
ISH.440	"Prentice" Direct on Line Starter, 3 phase 50 cycles, 400/440 volts for 1½ & 2 H.P. Motors	1
ISH.540	"Prentice" Direct on Line Starter, 3 phase 50 cycles, 400/440 volts for 3 H.P. Motors	1
ISH.623	"Prentice" Direct on Line Starter, single phase 50 cycles, 230/250 volts for 1½ H.P. Motors	1
Starters for 60 cycles supply		
ISH.5/6	"Prentice" Direct on Line Starter, 3 phase, 60 cycles 200/220 volts for 3 H.P. Motors.	1

Part No.	Description	No. Off
Spares for "Prentice" Starters		
AC52/3	Heater Coil only (1.5-2.5 amps)... ..	3
AC52AS/3	Heater Coil Assembly (1.5-2.5 amps) with base mounting terminals	3
AC52/4	Heater Coil only (2.0-3.75 amps)	3
AC52AS/4	Heater Coil Assembly (2.0-3.75 amps) with base mounting terminals	3
AC52/5	Heater Coil only (3.0-5.75 amps)	3
AC52AS/5	Heater Coil Assembly (3.0-5.75 amps) with base mounting terminals	3
AC54/1	Magnetic Coil for 400/440 volts A.C. 50 cycles... ..	1
AC54/3	Magnetic Coil for 200/250 volts A.C. 50 cycles... ..	1
Common Parts for "Prentice" Starters		
AC 11 AS	Main Moving Contact	4
AC 13	Main Fixed Contact	8
AC 14	Bow Spring	8
AC 15	Bimetal Strip	3
AC 50	Push Button Spring (for interior)	2
AC 51	Trip Switch Spring	1
AC 53	Trip Scale (State amps and range)	1
AC 60 AS	Trip Switch Assembly, without scale	1
AC 62 AS	Trip Bar	1
AC 67	Serial Plate †(see note)	1
AC 105	Carrier Spring	2
<p>† If it is desired to change the voltage and/or current rating of an existing starter, please give the serial and list number. A new serial plate (AC 67) will then be supplied to obviate the starter being used under wrong conditions. If the current rating is being altered, a new trip scale (AC 53) will also be required.</p>		

MISCELLANEOUS ACCESSORIES

NOT ILLUSTRATED

Part No.	Description	No. Off
Isolating Switches		
TS 520	"Prentice" Isolating Switch (fitted on all 9 $\frac{3}{8}$ " Swing Lathes and on 11" Swing Lathes with motor mounted on outside)	1
S 20	"Prentice" Isolating Switch (single phase)	1
ADS 10	"Prentice" Isolating Switch (fitted on all Profile Lathes and 11" Swing Lathes with motor mounted inside the cabinet)	1
229	Instruction Plate	1
246	" " (American Machs. only)	1
Reversing Switches		
IPA 46/312P or SR 137K MTH SR 137 KA/ MTH SR 1313 AB 67/MTH 130 L5-1-53	Rotary Reversing Switch for 3 phase 50 cycles, 400/440 volts	1
	Rotary Reversing Switch for single phase 50 cycles, 230 volts	1
	Rotary Reversing Switch for 3 phase 60 cycles, 220/600 volts	1
	Instruction Plate	1
	Spacer	2
Two Speed Control Switch		
IPA 413/349P or SR 1314 AX 92/MTH SR 1320AY 56/MTH	Rotary 2 speed Control Switch for 3 phase 50 cycles, 220/440 volts	1
	Rotary 2 speed Control Switch for 3 phase 50 cycles, 220/440 volts	1
	Rotary 2 speed Control Switch for 3 phase 60 cycles, 220/600 volts	1
Electric Suds Pump Switch		
SR 134 or IPA 44/31P 135 L5-1-53	Rotary Switch	1
	Instruction Plate (for Suds Pump)	1
	Spacer	2
Electric Pump and Hydraulic Pump Switch (combined)		
IPA 47/319P or SR 137 GB 239 L5-1-53	Rotary Switch	1
	Instruction Plate	1
	Spacer	2

Part No.	Description	No. Off
Low Voltage Lighting Unit		
D100 LL Type A4	Low Voltage Lighting Unit with two arm fitting suitable for 50 volts, 25 volts or 12 volts lighting (please state mains voltage and low voltage required) ...	1
L5-10-225	Bracket for Low Voltage Lighting Unit	1
CHANGE WHEELS FOR THREE SPEED GEARBOX with 4 T.P.I. Leadscrew		
Wheels for Cutting Whit. and B.S.F. Threads		
*L5-51 T	Change Wheel, 20T	1
*L5-51 Q	Change Wheel, 40T	1
*L5-51 P	Change Wheel, 50T	1
*L5-51 M	Change Wheel, 55T	1
*L5-51 K	Change Wheel, 60T	2
*L5-51 J	Change Wheel, 65T	1
*L5-51 G	Change Wheel, 70T	1
*L5-51 E	Change Wheel, 80T	1
*L5-51 C	Change Wheel, 100T	1
L5-51 B	Change Wheel, 120T (Standard Equipment on Model L5A only)	1
L5-51 SS	Change Wheel 130T (Standard Equipment on Model L5A only)	1
L5-51 S	Change Wheel, 95T (for 19 T.P.I. only)...	1
Additional Wheel for Cutting Metric Threads		
L5-51 A	Change Wheel, 127T	1
Additional Wheels for Cutting B.A. Threads		
L5-51 R	Change Wheel, 36T	1
L5-51 Q	Change Wheel 40T	1
L5-51 N	Change Wheel, 53T	1
L5-51 L	Change Wheel, 59T	1
L5-51 H	Change Wheel, 66T	1
L5-51 F	Change Wheel, 73T	1
L5-51 D	Change Wheel, 81T	1
L5-51 A	Change Wheel, 127T	1

MISCELLANEOUS ACCESSORIES

NOT ILLUSTRATED

Part No.	Description	No. Off
CHANGE WHEELS FOR THREE SPEED GEARBOX with 6 mm. pitch Leadscrew		
Wheels for Cutting Metric Threads		
L5-51 T	Change Wheel, 20T	1
L5-51 Q	Change Wheel, 40T	1
L5-51 W	Change Wheel, 45T	1
L5-51 P	Change Wheel, 50T	2
L5-51 M	Change Wheel, 55T	1
L5-51 K	Change Wheel, 60T	1
L5-51 G	Change Wheel, 70T	1
L5-51 E	Change Wheel, 80T	1
L5-51 C	Change Wheel, 100T	1
L5-51 B	Change Wheel, 120T	1
Additional Wheels for Cutting English and American T.P.I.		
L5-51 V	Change Wheel, 63T	1
L5-51 HH	Change Wheel, 69T	1
L5-51 LLL	Change Wheel, 77T	1
L5-51 D	Change Wheel, 81T	1
L5-51 BBB	Change Wheel, 84T	1
L5-51 PPP	Change Wheel, 86T	1
L5-51 Y	Change Wheel, 90T	1
L5-51 JJJ	Change Wheel, 108T	1
L5-51 A	Change Wheel, 127T	1
CHANGE WHEELS FOR NORTON FEED GEARBOX with 4 T.P.I. Leadscrew		
Wheels for Cutting Whit. and B.S.F. Threads		
*L5-51 P	Change Wheel, 50T	1
*L5-13-1	Change Wheel, 50T (Fibre) (Model L5 only) } fitted on machines with 750 r.p.m. top speed	1
*L5-13-3	Change Wheel, 60T (Fibre) (Model L5A) only } r.p.m. top speed	1
*L5-51 C	Change Wheel, 100T	1
L5-51 X	Change Wheel, 25T } fitted to M/cs with 1,000 r.p.m. top speed and over.	1
L5-51 E	Change Wheel, 80T } speed and over.	1

Part No.	Description	No. Off
Additional Wheels for Cutting Metric Threads		
L5-51 Q	Change Wheel, 40T	1
L5-51 K	Change Wheel, 60T (Model L5 only)	1
L5-51 V	Change Wheel, 63T	1
L5-51 A	Change Wheel, 127T	1
Additional Wheels for Cutting B.A. Threads		
L5-51 R	Change Wheel, 36T	1
L5-51 Q	Change Wheel, 40T	1
L5-51 N	Change Wheel, 53T	1
L5-51 L	Change Wheel, 59T	1
L5-51 H	Change Wheel, 66T	1
L5-51 F	Change Wheel, 73T	1
L5-51 D	Change Wheel, 81T	1
L5-51 A	Change Wheel, 127T	1
Additional Wheels for Fine Thread Range (Norton Gear Box)		
L5-51 C	Change Wheel, 100T	1
L5-51 P	Change Wheel, 50T (Model L5A only)	1
Additional Wheels for Coarse Thread Range (Norton Gearbox)		
L5-51 P	Change Wheel, 50T (Model L5A only)	1
Additional Wheels for Cutting 11½ T.P.I. (Norton Gearbox)		
L5-51 U	Change Wheel, 115T	1
Additional Wheels for Cutting 27 T.P.I. (Norton Gearbox)		
L5-51 Q	Change Wheel, 40T	1
L5-51 K	Change Wheel, 60T (Model L5 only)	1

MISCELLANEOUS ACCESSORIES

NOT ILLUSTRATED

Part No.	Description	No. Off
CHANGE WHEELS FOR NORTON FEED GEARBOX with 6 mm. pitch Leadscrew Wheels for Cutting Metric Threads		
L5-51 P	Change Wheel, 50T	1
L5-51 E	Change Wheel, 80T	1
L5-51 JJ	Change Wheel, 85T	1
Additional Wheels for Cutting English and American T.P.I.		
L5-51 W	Change Wheel, 45T	1
L5-51 Y	Change Wheel, 90T	1
CHANGE WHEELS FOR METRIC NORTON GEARBOX with 6 mm. pitch Leadscrew Wheels for Cutting Metric Threads		
L5-51 X	Change Wheel, 25T	1
L5-51 P	Change Wheel, 50T	1
L5-51 K	Change Wheel, 60T	1
L5-51 E	Change Wheel, 80T	2
L5-51 C	Change Wheel, 100T	1
L5-51 B	Change Wheel, 120T	1
Additional Wheels for Cutting English and American T.P.I.		
L5-51 R	Change Wheel, 36T	1
L5-51 AAA	Change Wheel, 75T	1
L5-51	Change Wheel, 76T	1
L5-51 JJ	Change Wheel, 85T	1
L5-51	Change Wheel, 95T	1
BED TURRET (Model L5A only)		
DEH 4256/75	Base (Model L5)	1
DEH 4256/60	Base (Model L5A)	1
DEH 4256/54	Clamp, Eccentric	2
DEH 4256/61	Clamp	2
DEH 4256/76	Clamp Pin (Model L5)	2
DEH 4256/62	Clamp Pin (Model L5A)	2
DEH 4256/28	Trip Plate	1
DEH 4256/29	Pin	1
DEH 4256/30	Spacing Washer	1
DEH 4256/31	Spacing Washer	1
DEH 4256/32	Roller	1
DEH 4256/23	Screwed Pin	2
DEH 4256/49	Spring	1
DEH 4256/63	Gib	1

Part No.	Description	No. Off
Bed Turret (contd.)		
DEH 4256/64	Gib	1
DEH 4256/65	Gib Clamp	1
DEH 4256/66	Clamp Screw	1
DEH 4256/67	Handle, Clamp Screw	1
DEH 4256/8	Gib Strip	1
DEH 4256/9	Gib Strip	1
DEH 4256/10	Pin, Gib Strip	2
DEH 4256/2	Slide	1
DEH 4256/33	Sleeve	1
DEH 4256/34	Plunger	1
DEH 4256/51	Spring	1
DEH 4256/35	Screw	1
DEH 4256/36	Trip Lever	1
DEH 4256/24	Screwed Pin	1
DEH 4256/37	Roller	1
DEH 4256/38	Stud	1
DEH 4256/52	Spring	1
DEH 4256/39	Indexing Finger	1
DEH 4256/40	Pin	1
DEH 4256/50	Spring	1
DEH 4256-68	Turret Head	1
DEH 4256-69	Tool Clamp	6
DEH 4256-16	Plunger Locating Bush	6
DEH 4256-15	Locating Pin	6
DEH 4256-11	Spigot	1
DEH 4256-17	Pin	1
DEH 4256-26	Bevel, 22T	1
DEH 4256-12	Washer	1
DEH 4256-13	Nut	1
DEH 4256-14	Turret Clamp	1
DEH 4256-5	Locking Handle	1
	Ball, 1/4" dia.	1
DEH 4256-19	Index Drum	1
DEH 4256-20	Collar	1
DEH 4256-22	Shaft	1
DEH 4256-27	Bevel, 22T	1
DEH 4256-18	Stop Screw	6
DEH 4256-21	Die	6
DEH 4256-45	Hand Lever	1
DEH 4256-44	Handle	1
DEH 4256-47	Handle Bush	1
DEH 4256-48	Stud	1
DEH 4256-41	Pivot	1
DEH 4256-42	Roller Stud	2
DEH 4256-43	Roller	2
DEH 4256-46	Pivot Bracket	1

MISCELLANEOUS ACCESSORIES NOT ILLUSTRATED

Part No.	Description	No. Off
CUT OFF SLIDE		
DEH 4574-45	Saddle (Model L5)...	1
DEH 4574-40	Saddle (Model L5A) ...	1
DEH 4574/8	Clamp Eccentric ...	1
DEH 4574/44	Clamp Pin (Model L5) ...	1
DEH 4574/42	Clamp Pin (Model L5A) ...	1
DEH 4574-41	Clamp ...	1
DEH 4574-20	Rack ...	1
DEH 4574-10	Cross Slide Stop ...	1
DEH 4574-11L	Cross Slide... ..	1
DEH 4574-21	Gib Strip ...	1
DEH 4574/26	Die Piece ...	6
DEH 4574-28	Pin ...	1
DEH 4574-11	Stop ...	2
DEH 4574-19	Stop Clamp ...	2
DEH 4574-3	Wheel House ...	1
DEH 4574-4	Gear Wheel Shaft ...	1
DEH 4574-13	Handle ...	1
	Ball, 1 1/4" dia. ...	1
DEH 4754-7	Gear Wheel, 40T ...	1
DEH 4754-5	Sleeve ...	1
DEH 4754-6	Collar ...	1
DEH 4991-1	Toolpost, Rear ...	1
DEH 4991-3	Clamping Stud, Rear ...	1
DEH 4991-5	Wedge, Rear ...	1
DEH 4991-2	Toolpost, Front... ..	1
DEH 4991-4	Clamping Stud, Front ...	1
DEH 4991-6	Wedge, Front ...	1
DEH 4991-7	Adjusting Nut ...	2
DEH 4991-8	Adjusting Screw ...	2
MILLING AND GEARCUTTING ATTACHMENT (Common Parts)		
L5-140	Angle Bracket ...	1
L5-165	Nipping Stud ...	1
L5-141	Swivel Slide ...	1
L5-155	Nut (L5-892 Metric) ...	1
L5-143	Vertical Slide ...	1
L5-150	Strip ...	1
L5-162A	Screw (L5-893A Metric) ...	1
L5-144	End Plate ...	1
L5-5-39	Micrometer Collar (L5-5-44A Metric) ...	1
L5-5-15	Die ...	2
SG-290	Spring ...	2
L5-351A	Locking Bush ...	1
L5-14-32	Die ...	1
L5-5-57A	Ball Handle... ..	1
L5-570	Handle ...	1

Part No.	Description	No. Off
GEAR CUTTING ATTACHMENT ONLY		
L5-146	Bracket for Arm ...	1
L5-164	Nipping Stud ...	3
L5-167	Support Bar ...	1
L5-147	Supporting Arm ...	1
L5-156	Bush ...	1
L5-159	Centre ...	1
L5-145	Spindle Bracket ...	1
L5-160	Spindle ...	1
L5-142	Worm Bracket ...	1
L5-151	Worm Wheel ...	1
L5-161	Nut ...	1
L5-10-220	Worm ...	1
L5-662A	Lock Nuts ...	2
L5-148 A & B	Index Plate ...	1 off each
L5-10-221	Index Arm ...	1
L5-10-222	Plunger ...	1
L5-10-215	Plunger Knob ...	1
SG.119	Spring ...	1
L5-170	Cutter Arbor ...	1
L5-179	Nut ...	1
L5-173	Short Spacer ...	2
L5-172	Long Spacer ...	1
L5-174	Driver Pin ...	1
L5-169	Work Arbor ...	1
L5-175	Washer ...	1
L5-171	Draw Screw ...	1
L5-10-211	Bush, Index Finger ...	1
L5-10-214A & B	Index Finger ...	1 each
L5-10-213	Lock Nut ...	1
SG.252	Spring Clip ...	1
L5-10-229	Clamp Plate ...	1
4 POSITION CARRIAGE STOP		
L5-10-119	Body ...	1
L5-10-120	Bush ...	1
L5-10-121	End Plate... ..	1
L5-10-122	Stop Screw ...	4
L5-10-143	Die Piece ...	4
SG.5	Spring ...	1
SB.3	Steel Ball, 1/4" dia. ...	1
L5-10-34	Clamp ...	1

MISCELLANEOUS ACCESSORIES

NOT ILLUSTRATED

Part No.	Description	No. Off
HIGH SPEED STEEL TURNING TOOLS		
7	R.H. Knife Tool	1
8	L.H. Knife Tool	1
11	Square Nose Tool... ..	1
13	External Screwcutting Tool	1
16	Cut Off Tool	1
17	Straight Round Nose Tool	2
19	R.H. Round Nose Tool	1
20	L.H. Round Nose Tool	1
50	Internal Screwcutting Tool... ..	1
50	Internal Round Nose Tool	1
50	Internal Square Nose Tool	1
CENTRES, ETC.		
L5-10-185	Half Centre No. 3 M.T.	1
L5-10-186	Square Centre "	1
L5-10-193	2 Prong Centre "	1
L5-10-192	3 Prong Centre "	1
L5-10-191	4 Prong Centre "	1
L5-10-170	Light Centre "	1
L5-10-194	Screwed Centre "	1
L5-10-190	Cup Centre "	1
L5-10-189	Hollow Centre "	1
L5-10-187	Flange Chuck "	1
L5-10-188	Drill Pad "	1
HAND REST		
L2A-36	Base (Model L5)	1
JL.334	Base (Model L5A)	1
L2A-65	Eccentric Shaft (Model L5)	1
JL.146	Eccentric Shaft (Model L5A)	1
JL.300	Handle	1
L5-664A	Eye Bolt	1
L5-50	Holding Down Plate	1
JL.217	7" Tee (Wood Turning)	1

Part No.	Description	No. Off
Hand Rest (contd.)		
L5-246	Tee (Metal Turning)	1
JL45A	Nipping Stud	1
JL46	Nipping Handle... ..	1
DIVIDING ATTACHMENT		
L5-10-82	Bracket	1
L5-657	Worm	1
L5-10-223	Worm Shaft	1
L5-662A	Lock Nuts	2
L5-10-83	Index Plate	1
L5-10-221	Index Arm	1
SG.119	Spring	1
L5-10-222	Plunger	1
L5-10-215	Plunger Knob	1
L5-138	Worm Wheel	1
L5-10-211	Bush, Index Finger	1
L5-10-224A & B	Index Finger	1 each
L5-10-213	Lock Nut	1
SG252	Spring Clip	1
L5-10-229	Clamp Plate	1
BORING BARS		
L5-646	1 $\frac{3}{4}$ " dia. Boring Bar	1
L5-647.		
A.B.C.D.E.F.	$\frac{3}{8}$ " dia. Bits	6
L5-680	$\frac{9}{16}$ " dia. Boring Bar	1
WATER POT		
L5-681	Water Pot	1
L5-683	Support Rod	1
L5-682	Flexible Pipe	1
G14-105A	Tap	1
L5-750	Bracket	1

HARRISON PRODUCTS

HARRISON LATHES	11" Swing
	12" Swing
	13" Swing
	15" Swing
	17" Swing
HARRISON COPYING LATHES	11" Swing
	12" Swing
	13" Swing
	15" Swing
	17" Swing
WOODTURNING LATHES	12" Swing
'UNION' GRINDING MACHINES	10" to 24"
'UNION' TOOL AND CUTTER GRINDERS	6"/8" Swing
HORIZONTAL MILLING MACHINE	30" × 8" Table
UNIVERSAL MILLING MACHINE	30" × 8" Table
'UNION' DRILLING MACHINES	½" and ¾"
'UNION' ENGINEERING ACCESSORIES	Angle Plates
	Adjustable Angle Plates
	Box Table Parallel Packings
	Surface Plates Testing Centres
	Tilting Tables Vee Blocks
	Vices
BOXFORD LATHES	9" Swing
BOXFORD VARIABLE SPEED LATHE	9" Swing
BOXFORD SHAPING MACHINES	8" Stroke
BOXFORD 'LITTLE GIANT' TOOLPOST GRINDER	

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