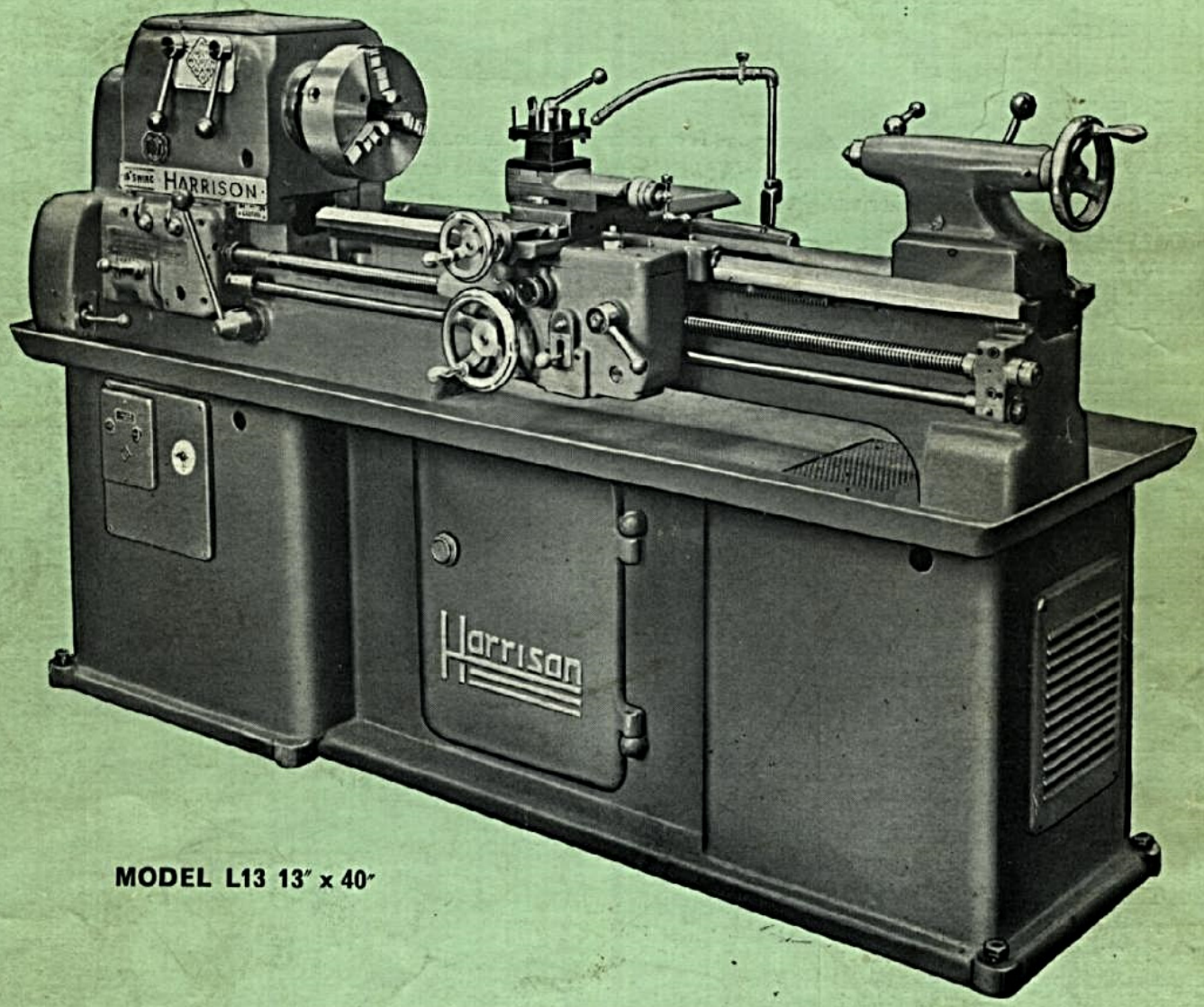
HARRISON



MODEL L13 13" x 40"

13" swing lathe

13" swing copying lathe

HARRISON 13″ *SWING* LATHE

for toolroom and production

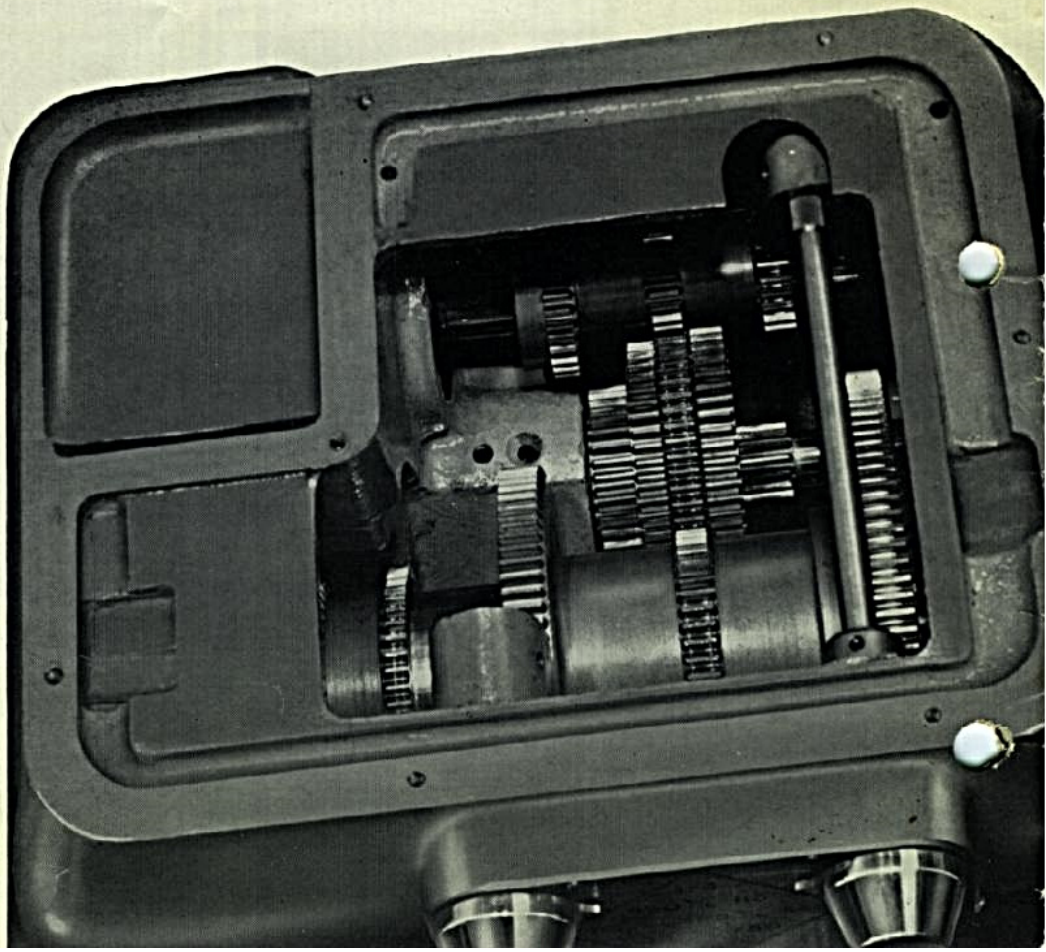
The 'HARRISON' 13″ Swing Lathe has all the qualities expected of a modern precision machine tool. It is outstanding for accuracy, fast metal removal, ease of working and long, trouble-free service.
'HARRISON' Lathes are manufactured in one of the best equipped machine tool works in the country. The plant includes the outstanding products of many countries, chosen to produce to the highest standard in the most economical way.
Highly skilled, specially trained workpeople contribute the large individual element which is responsible for high quality machine tool production.

THE BED

The bed is the gap type, having 70° inverted vees and is of a heavy triangular box section, being uniform throughout and free from deflection and twist. It is induction *hardened and ground* to fine limits ensuring accurate travel of the carriage and alignment of the tailstock. Either straight or gap beds are available to admit 40″ between centres.
The wide cabinet base is a rigid fabricated steel plate construction, forming a substantial mounting for the lathe. It houses the motor, the starter, with overload and no volt protection, the lineswitch and also the tank for coolant when required. The motor is mounted on an adjustable platform for belt tensioning and can be swung out for maintenance. A large cupboard which can be locked is incorporated for the storage of tools and equipment.

THE HEADSTOCK

The all-geared headstock provides nine spindle speeds which can be arranged in accordance with individual requirements. The normal alternatives are 35–750 or 59–1250 r.p.m. but a two-speed motor can be fitted which will give 18 speeds with a range of 41–1750 r.p.m. Speed selection is by two levers on the front of the headstock. Speeds are selected from a clearly marked speed plate. A forward and reverse lever, also mounted on the front of the headstock, controls the direction of rotation of the feed rod and leadscrew.
The combined clutch and brake lever, which passes through the bed at the right of the headstock, is within easy reach of the operator.
All gears are shaved to ensure a high finish and accurate form. The main spindle and spindle gear are dynamically balanced. Seven spline shafts with broached gears are used throughout and so maintain close fitting with a smooth sliding action when changing gear. The main spindle is bored to pass 1⅝″ diameter bar. Opposed, preloaded Timken taper roller bearings are used and adjustment of the loading is provided.
Splash lubrication provides an adequate flow of oil to all working parts. The oil level is clearly indicated by a sight glass let into the front of the headstock.



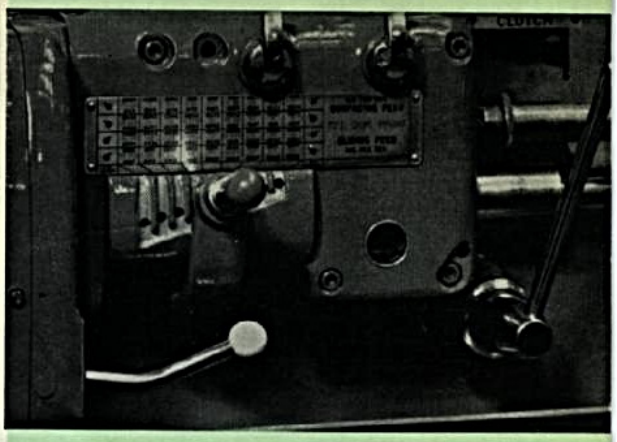
QUICK CHANGE GEARBOX

This is a *totally enclosed* unit with a built-in oil bath for complete lubrication. A visible oil level gauge is fitted. Thirty-six changes of screw threads and feeds are provided, the screw thread range being 4–60 t.p.i. with longitudinal feeds ·0017″ to ·025″ and cross feeds ·001″ to ·015″.

A single lever English/metric conversion can be fitted at the time of assembly, providing 11 metric pitches from 0.5 to 6 m/m pitch. Lever positions for all threads and feeds within the standard range can be obtained from a direct reading screwcutting chart mounted conveniently on the front of the gearbox.

The drive from the gearbox to the leadscrew is by means of a dog clutch which can be disengaged when not screwcutting, thus reducing the wear on the leadscrew.

A slipping clutch is fitted between the feedrod and gearbox to give protection against excessive loads. This also permits the use of a dead stop.



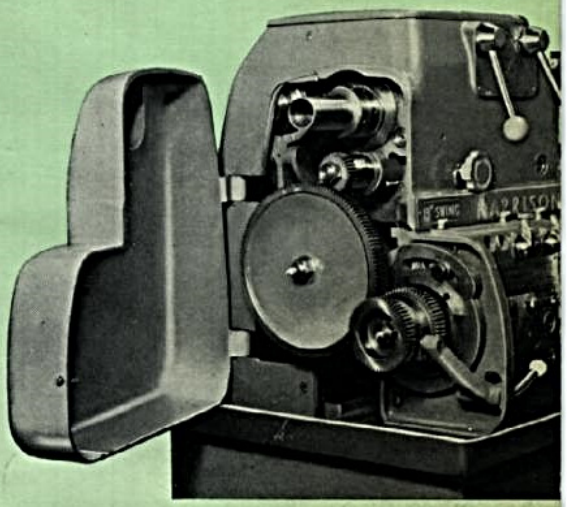
THE APRON

The apron is *totally enclosed* and the *oil bath* ensures adequate lubrication to all parts. All gears are mounted on shafts which run in double bearings of the anti-friction type.

Longitudinal and cross feeds are obtained by the operation of a push-pull knob having a neutral position for use when screwcutting.

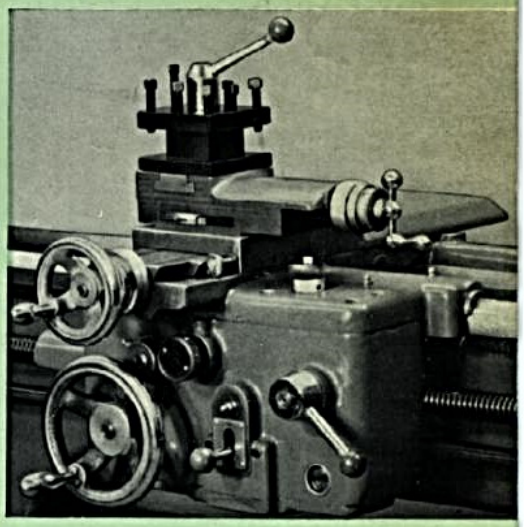
The quick acting feed engagement drop out worm is operated by a single lever which is inter-locked with the leadscrew engagement lever.

Engagement of the leadscrew is by two half-nuts, well proportioned and having a long bearing area. A *built-in*, easily read, screwcutting dial is fitted to the leading side of the carriage.



CARRIAGE AND SLIDES

The carriage is designed to give maximum stability and to form a rigid tool support. Gibs fitted under the front and rear bedways eliminate the possibility of chatter. Wipers are fitted to protect the ways. A clamping device is provided for locking the carriage in any position along the bed. The accurately scraped cross and compound slides are provided with adjustable gibs to take up wear. Friction grip micrometer dials, graduated to read ·001″, are fitted to both slides. The compound slide is arranged to swivel through 360° and is fitted with an English or American type toolholder which can be replaced by a square steel turret. The traverse screws are totally covered for protection against cuttings and are located in ball thrust races.



THE TAILSTOCK

The well proportioned tailstock has a long bearing surface and is located on the front flatway and rear vee.

The design of the body ensures that the travel of the compound slide is not impeded when work is being turned between centres. A quick clamping lever is provided for clamping in any position along the bed. The quill or spindle has a rapid lock by means of a pad bolt. It is graduated for the depth of drilling and is bored to take a No. 3 Morse taper centre which can be ejected by winding the spindle back to its maximum position. A ball thrust bearing is fitted to take all thrust loads. A set over of $\frac{3}{8}$″ each side of centre is provided for slight tapers and resetting is simplified by ground faces on the tailstock and shoe.

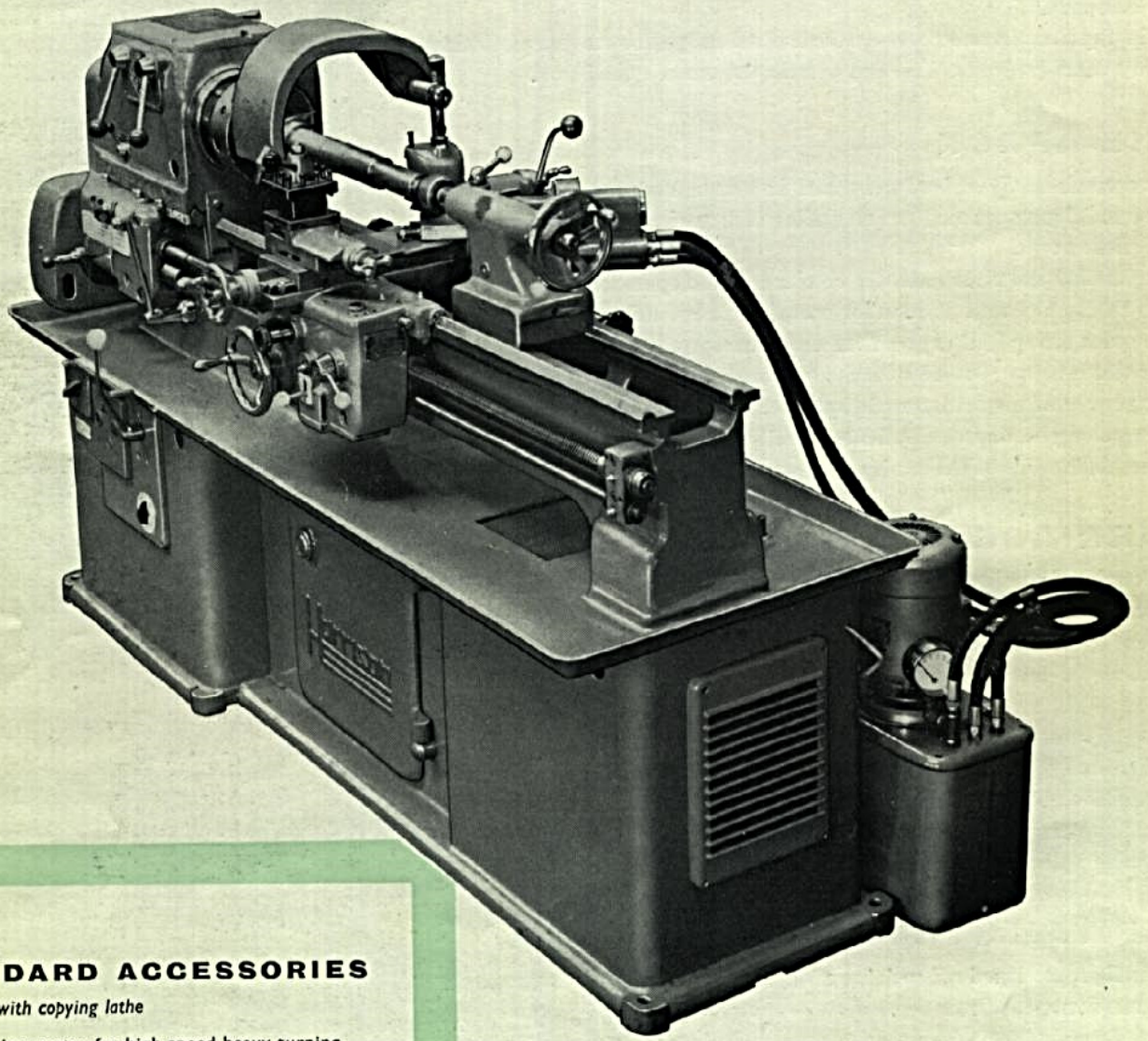
STANDARD ACCESSORIES

- 6¾″ dia. driver plate.
- 12″ dia. face plate.
- Travelling steady.
- 2 cone centres.
- Set of spanners.
- Service manual.

HYDRAULIC COPYING EQUIPMENT

for fast production of all turned parts, can be fitted as original equipment

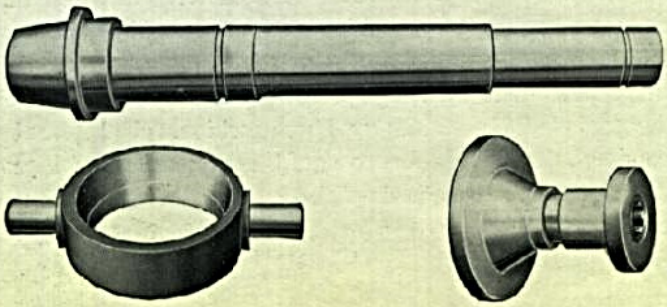
The copying unit is built into the rear of the machine so that normal centre lathe operation is unrestricted. An accurate template can be produced by using the normal centre lathe features and quantity reproduction can follow immediately. The range of speeds through the all-geared head combined with ample horse-power makes it possible to obtain the full advantage of the carbide tools, samples of which form part of the standard equipment.



STANDARD ACCESSORIES

Supplied with copying lathe

Revolving centre for high speed heavy turning.
Micrometer stop.
6¾" dia. driver plate.
Travelling steady.
12" dia. face plate.
2 cone centres.
Four way toolpost.
2 carbide turning tools.
Spanners.
Service manual.



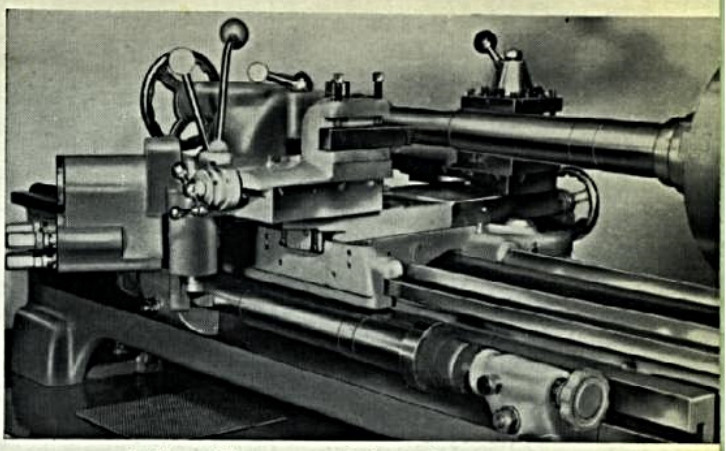
Typical examples of suitable components for copy turning

The 'HARRISON' Copying Unit uses the locked hydraulic servo principle and has four basic assemblies.

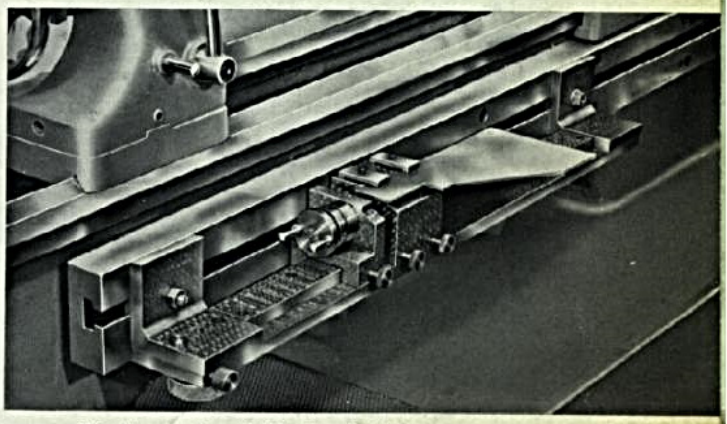
A rear extension to the normal cross-slide carries an angular slide inclined at 60° to the lathe axis. This has an independent tool slide which can be adjusted against a micrometer dial and on which is bolted a swivelling toolholder to take the carbide copying tool. Movement of the angular slide is produced from a hydraulic cylinder, controlled in relation to the template, by a spool type valve and stylus system. The latter is pivoted on taper roller bearings so that perfect freedom of movement exists without "play" and maximum sensitivity is obtained with minimum template pressure. The stylus is made of hardened steel. The control lever actuating the slide is mounted so that it is easily reached from the front operating position of the machine. The cutting tool can be withdrawn or engaged with the work at any point.

The template is held between centres and both support heads are adjustable throughout the length of the tee slotted mounting at the rear of the bed. An eccentric bearing is incorporated in one support head to facilitate correct alignment of template and workpiece. A graduated collar assists setting. A flat template holder is available as additional equipment. It has longitudinal and transverse adjustments with micrometer dial reading and is particularly useful when producing fragile workpieces.

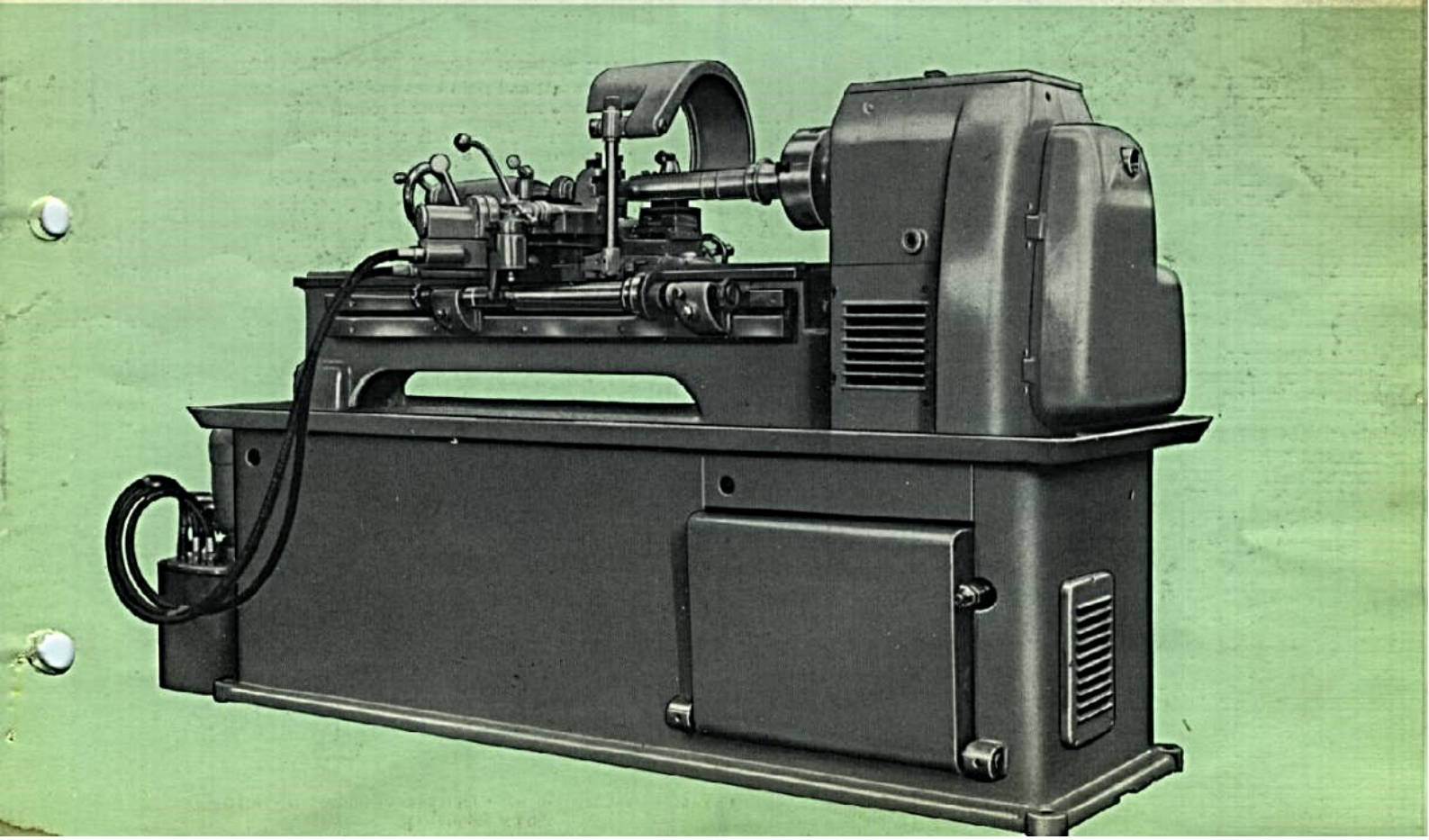
Pressure, return and drain lines convey oil to the hydraulic cylinder from the pump unit which can be placed at the end or behind the lathe. The lid of the completely covered tank carries the relief valve, pressure gauge, totally enclosed flange-mounted motor and the gear pump which is immersed in oil to prevent aeration. Operating pressure is relatively low at 150 lbs. per square inch and joint leakage and maintenance problems are virtually eliminated by this feature.



A "first-off" component being used as a template

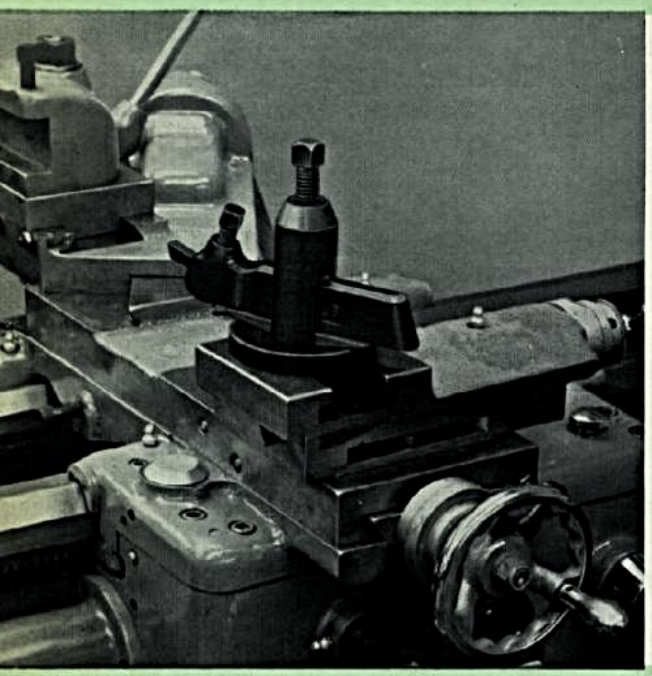


The flat template holder fitted with micrometer adjustment

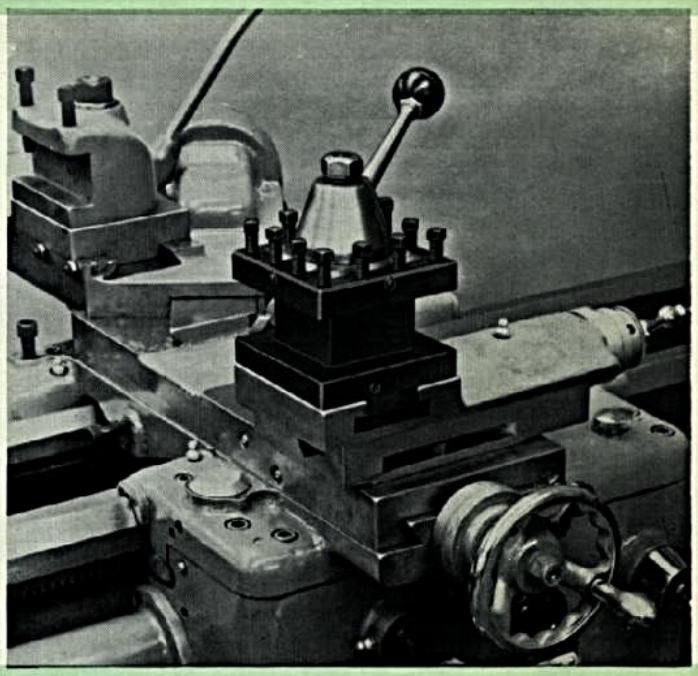


HARRISON

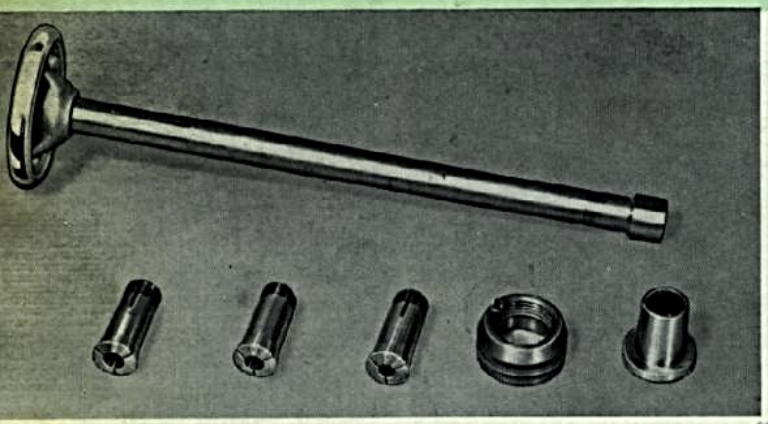
13" *SWING* LATHE ATTACHMENTS



THE AMERICAN TOOLPOST is of the recognised American pattern with swivelling base plate and single clamp screw.
It is designed to take toolholders $\frac{9}{16}$" × $1\frac{1}{8}$" shank size with $\frac{5}{16}$" square tool-bits.



THE 4 WAY TOOLPOST is of the automatic indexing type. It is rigid in design and remains on its base throughout changes. Toolholders with $\frac{3}{4}$" × $\frac{3}{4}$" shank size and $\frac{5}{16}$" square cutters are accommodated.



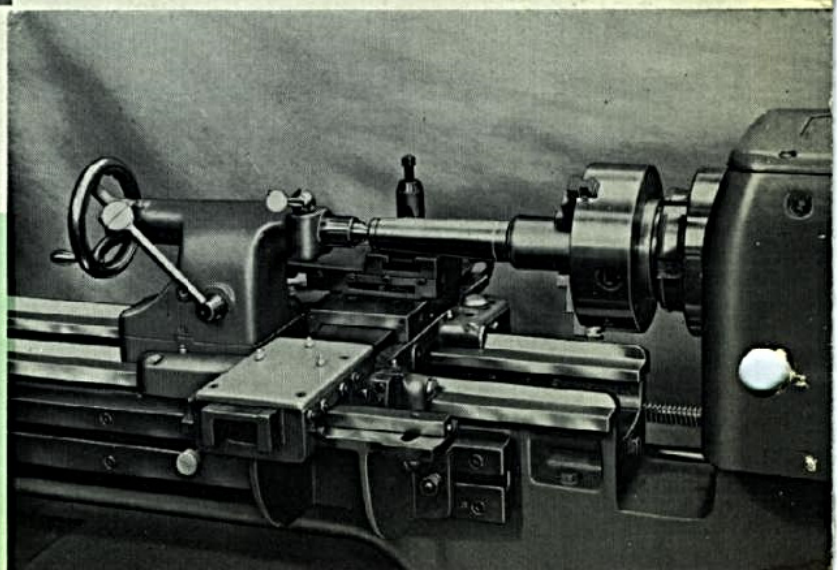
THE TAPER TURNING ATTACHMENT (*below*) is of robust and rigid construction and is necessary where the reproduction of tapers is required.

The cross slide screw is telescopic which eliminates the necessity of disengaging the cross feed nut when taper turning.

A maximum of 20° inclusive, 11" long can be turned at one setting. The swivel slide is graduated in degrees and taper per foot. This attachment can easily be fitted and can be supplied if required at a later date.

COLLET ATTACHMENT (*above*) is the draw tube type, mounted in the bore of the main spindle and operated by a handwheel. Collets can be provided up to $1\frac{1}{4}$" maximum capacity, the standard set being $\frac{1}{16}$" to $1\frac{1}{4}$" in increments of $\frac{1}{16}$" but any size within the range (including metric) can be provided.

If required, a multi-size collet chuck can be supplied. This has an extremely powerful and accurate closing mechanism for the collets. The whole assembly is mounted on the spindle nose and locked by the drawnut which is integral with the spindle. The capacity of this attachment is from $\frac{1}{8}$" to $1\frac{1}{2}$", covered by a set of 11 collets.

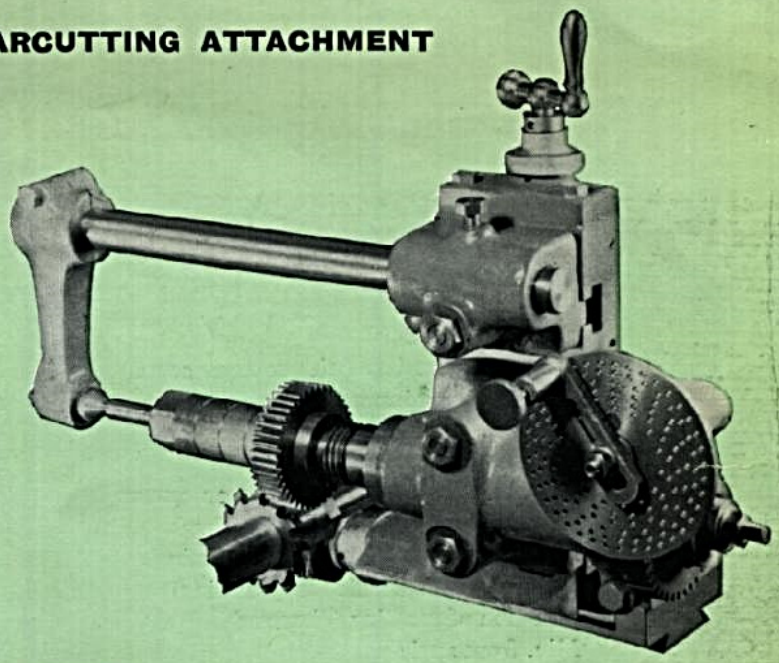


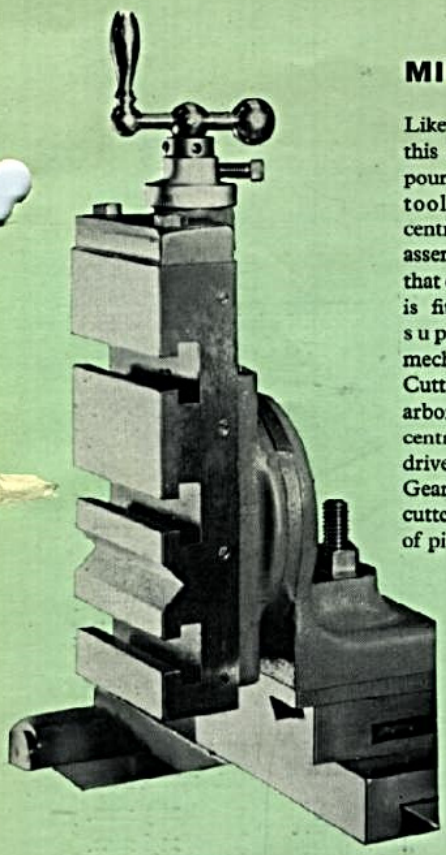
MILLING AND GEARCUTTING ATTACHMENT

Like the milling attachment this is mounted on the compound slide in place of the toolpost, using the same central stud. The vertical slide assembly which is similar to that of the milling attachment is fitted with a work arbor support and indexing mechanism.

Cutters are mounted on an arbor held between the lathe centres and driven by the driver plate.

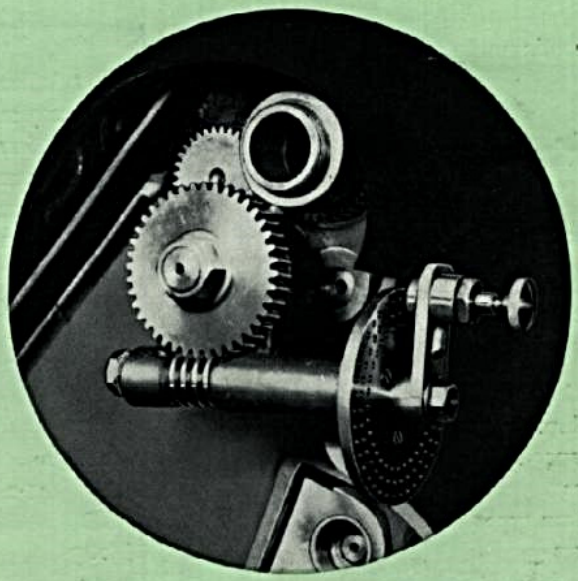
Gears up to 7" can be cut and cutters covering a wide range of pitches are available.





MILLING ATTACHMENT

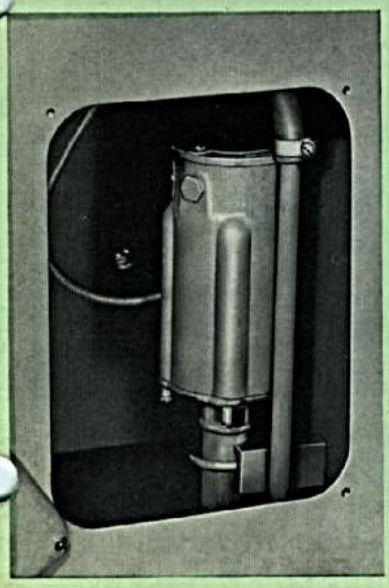
After removing the toolpost this attachment can be mounted on to the compound slide utilizing the central stud. The tee slotted vertical slide can be swivelled to any desired angle up to 45° each side of the vertical centre line, the setting of which is against a graduated scale on the mounting bracket. This attachment is most suitable for face and end milling, the cutters being directly mounted in the lathe spindle. An arbor mounted between centres and driven by the driver plate can be supplied, suitable for 1" bore cutters.



DIVIDING ATTACHMENT

If any accurate indexing is required, the use of a dividing attachment is necessary. This fits on to the top change wheel shaft after the change wheel has been removed and is operated with the guard open.

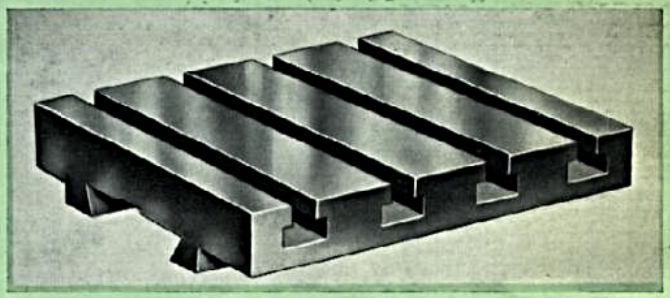
A very wide range of divisions is obtained with the standard index plate but special plates can be provided when necessary.



ELECTRIC PUMP TANK AND FITTINGS

The electric pump unit and storage tank are both housed inside the cabinet base.

The flow of suds is controlled by a tap mounted on the carriage and the start-stop switch is included on the electrical control panel at the front of the lathe.



BORING TABLE

The tee slotted boring table is mounted directly on to the carriage and can be supplied together with a boring bar which is mounted between the lathe centres and is driven by a driver plate and pin.

LEADING DIMENSIONS AND PARTICULARS

	STANDARD LATHE		WITH PROFILING EQUIPMENT	
Swing over bed	13″	330 mm.	13″	330 mm.
Swing over carriage (with cover removed)	9″	228 mm.		
Swing in gap diameter	20½″	520 mm.		
Swing in gap in front of faceplate	4½″	114 mm.		
Admits between centres	40″	1,016 mm.	40″	1,016 mm.
Max. length copy turning between centres			36¼″	920 mm.
Max. length copy turning with chuck			34½″	876 mm.
Swing over cross slide (normal turning)	6½″	165 mm.	6½″	165 mm.
Swing over cross slide (copy turning)			5½″	140 mm.
Variation of profiling (diameter)			4″	102 mm.
Min. front angle			90°	
Max. back angle			30°	
Horsepower of hydraulic pump motor			½	
Bed length	72″	1,828 mm.	72″	1,828 mm.
Bed depth	8″	203 mm.	8″	203 mm.
Bed — width over shears	8½″	216 mm.	8½″	216 mm.
Max. cross slide feed	9½″	241 mm.	9½″	241 mm.
Max. top slide feed	2⅞″	73 mm.	2⅞″	73 mm.
Movement of tailstock spindle	4½″	114 mm.	4½″	114 mm.
Set over of tailstock spindle	⅜″	9·5 mm.	⅜″	9·5 mm.
Centre to tool base (front)	1 1/16″	27 mm.	1 1/16″	27 mm.
Centre to tool base (rear)			⅞″	22 mm.
Max. tool section	1⅛″×¾″	28·5×19 mm.	1⅛″×¾″	28·5×19 mm.
Spindle speeds, number	9 or 18		18	
Speed range with 3 h.p. motor	59 to 1250			
Speed range with 2 speed 5/2½ h.p. motor	41 to 1750		41 to 1750	
Spindle bored to pass	1⅝″ dia.	41·2 mm.	1⅝″ dia.	41·2 mm.
Spindle nose, American type	LO		LO	
Morse taper of centres	No. 3		No. 3	
Leadscrew	1⅛″ dia.×4 T.P.I.		1⅛″ dia.×4 T.P.I.	
Range of threads	4 to 60 T.P.I.		4 to 60 T.P.I.	
Range of feeds (longitudinal)	·0017″ to ·025″		·0017″ to ·025″	
	·043 mm. to ·63 mm.		·043 mm. to ·63 mm.	
Range of feeds (cross feeds)	·001″ to ·015″		·001″ to ·015″	
	·025 mm. to ·38 mm.		·025 mm. to ·38 mm.	
Approx. weight	1,924 lbs.	873 kilograms	2,092 lbs.	948 kilograms
Approx. weight packed	2,484 lbs.	1,127 kilograms	2,652 lbs.	1,203 kilograms
Shipping case dimensions	7′ 6″×2′ 10″×4′ 8″		7′ 6″×2′ 10″×4′ 8″	
	229 cm.×86 cm.×142 cm.		229 cm.×86 cm.×142 cm.	

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