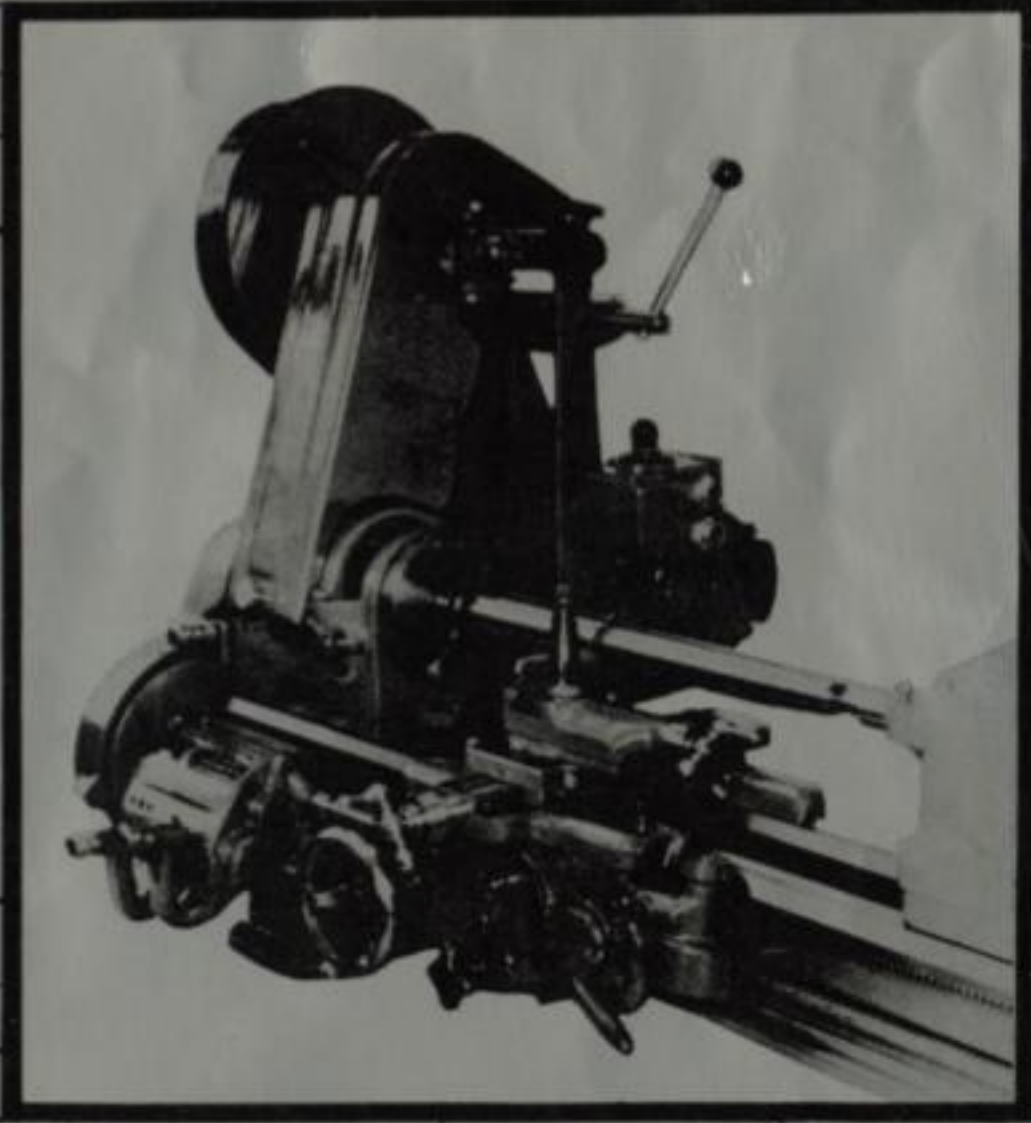
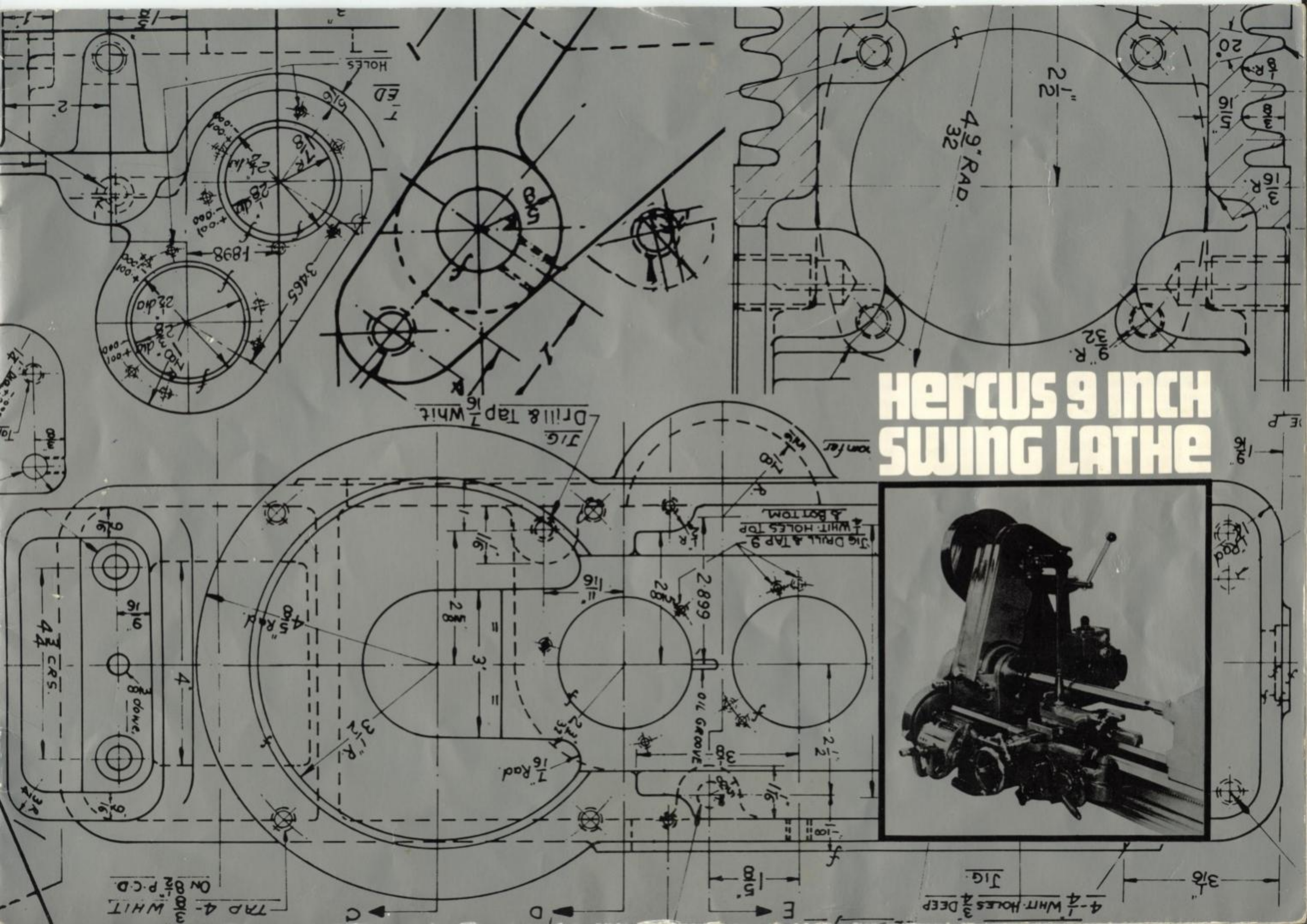


HERCUS 9 INCH SWING LATHE



Hercus Lathes are precision machine tools, built to give years of trouble free service under the most arduous working conditions. They have available an extensive range of additional attachments and equipment to enhance their usefulness and are backed by an unsurpassed spare parts service.

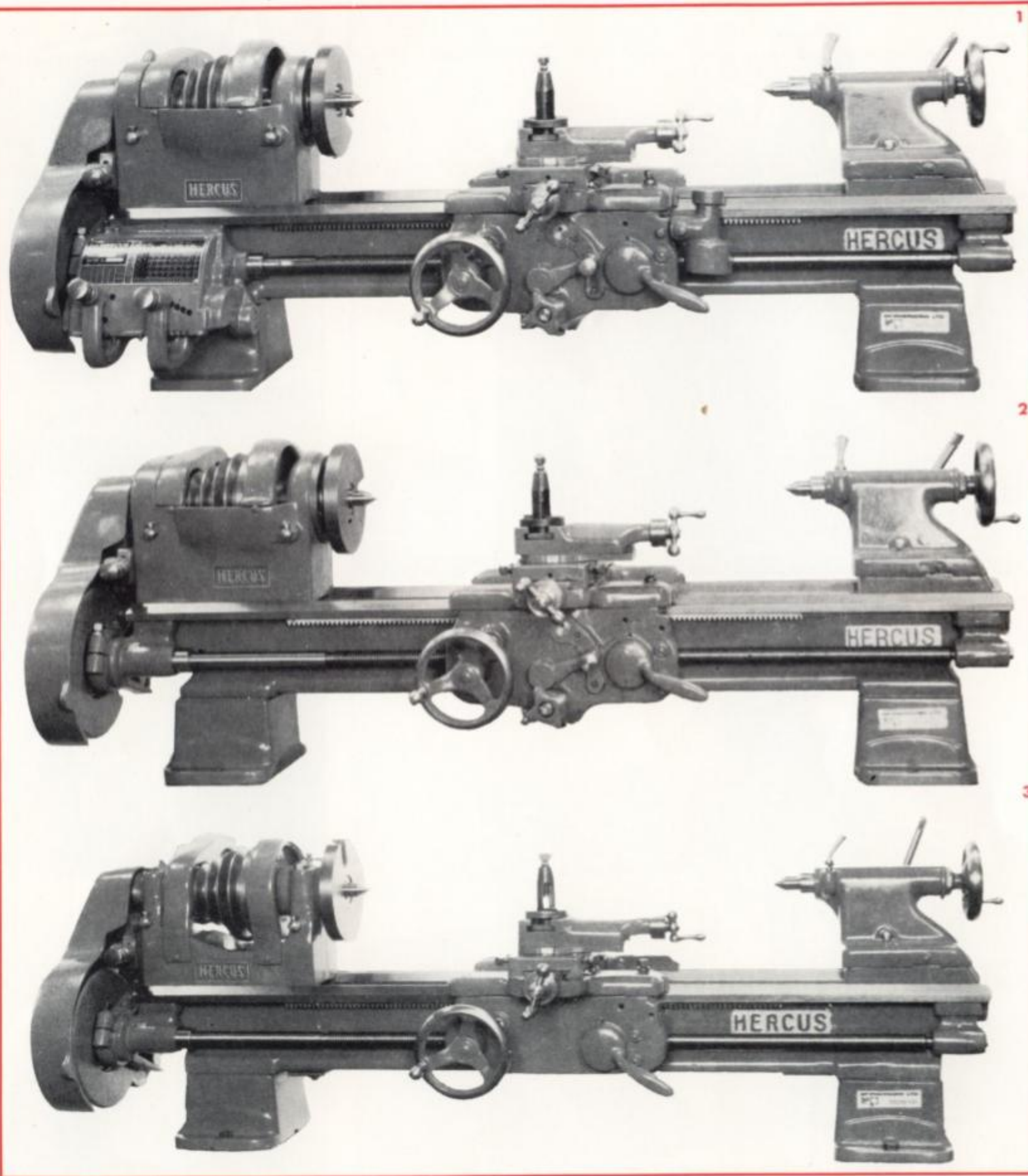
The Bed is of close grained alloy cast iron, naturally aged and precision ground. The working surface comprises two outer Vee ways carrying the saddle and a third Vee and flat accommodating the tailstock. When required beds can be supplied with flame hardened working surfaces.

The Back Geared Headstock is available with either plain or roller bearings and carries a four-step Vee pulley giving 8 or 16 changes of speed according to the type of drive employed. The roller bearing spindle is of high tensile alloy steel and mounted in precision, opposed tapered roller bearings. The plain bearing spindle is of case-hardened alloy steel running in integral adjustable bearings with adequate provision for lubrication. It is fitted with a ball thrust bearing and take-up nut to eliminate end play. The Craftsman range of lathes have an enclosed roller bearing headstock arranged for undermount drive. Spindles of all headstocks are bored to clear a 1/8" dia. bar and the front end has a No. 3 Morse taper fitted with a sleeve and No. 3 Morse centre. The reverse gears on the end of the headstock are controlled by a knob and plunger, a clamp screw being provided to lock these firm when required.

The Tailstock is of rigid design and the top can be set over

for taper turning. The barrel is graduated and the hardened centre is self ejecting. The tailstock is clamped to the bed by an eccentric lock and lever.

The Carriage has a long bearing on the bed ways and provides a solid support for the cutting tool. The compound rest swivels to any angle and is graduated through 360°. Both cross-feed and compound rest screws are fitted with large diameter, adjustable, graduated collars, reading in thousandths of an inch.



Range of Hercules 9" Lathes

The standard range of Hercules lathes is made in 3 basic models, A, B & C. With the exception of feed and thread cutting mechanism all 3 models are identical. All models are available with either plain or roller bearings and standard or long series bed. The Craftsman range of lathes are also available in Models A, B & C and with standard or long series bed. Craftsman machines are made with roller bearings only and feature an enclosed headstock with underneath drive from a drive unit built in to a cabinet base. For further information on Craftsman lathes, see page 10.

Model A Lathe

The model A lathe, fig. 1, features a quick change gearbox for screw cutting and feed selection and an automatic power feed apron. The gear-box provides 40 screw pitches and feed changes by shifting two levers in accordance with a direct reading index chart. A further coarse thread range from 4 to 7 T.P.I. may be obtained by transposing one gear in the change gear train.

The power feed apron provides power sliding and surfacing feeds through a worm drive and friction clutch. Power is transmitted through a spline cut along the leadscrew, the threads being used only for screw cutting. A built-in safety device prevents simultaneous engagement of the halfnuts and power feeds.

Model B Lathe

The model B lathe, fig. 2, has an automatic power feed apron but is not fitted with a gear-box. Power feeds and screw thread pitches are obtained through a

set of conventional pick off change-wheels, arranged in accordance with an index chart.

Model C Lathe

The model C lathe, fig. 3, has a plain apron and is not fitted with a gear-box, thus considerably simplifying the machine. A set of conventional pick off change gears, together with an index chart, give a screw cutting range from 4 to 160 T.P.I. and provide 14 sliding feeds through the leadscrew. No power surfacing feed is provided. The set of change-wheels provided with B. & C model lathes comprises 13 change gears, one idler and two compound idler gears, the larger gears being cast iron and the smaller ones steel.

- 1 Model AR lathe
(Roller bearing headstock)
- 2 Model BR lathe
(Roller bearing headstock)
- 3 Model C lathe
(Plain bearing headstock)

Stands, Drive Units

The standard range of lathes may be supplied for bench mounting or with Cabinet base, fig. 4, or legs and tray, fig. 5. Two types of drive unit are available, the H type as per fig. 5, or the P type, fig. 6. Either unit may be fitted with two-speed drive from motor to countershaft, giving 16 spindle speeds in lieu of the 8 available with the single speed countershaft. If desired, 3 step flat belt pulleys, giving 6 or 12 spindle speeds may be fitted in lieu of the standard 4 step Vee pulley.

Both drive units bolt directly to the back of the lathe bed. Tension of each belt may be adjusted independently of the other and an eccentric, lever operated device is provided to slacken the belt for ease in speed changing.

As an optional extra, a ball bearing countershaft may be supplied in place of the conventional plain bearing type.

Belt Guards

When required, guards can be supplied to cover either or both belts of both patterns of unit drives as per figs. 4 & 7. Motor Belt Guards in both instances are of fibreglass, fitting over a back-plate and quickly removable to provide access to the belt. Drive belt guards are of fibreglass and are hinged to facilitate changing of speeds.

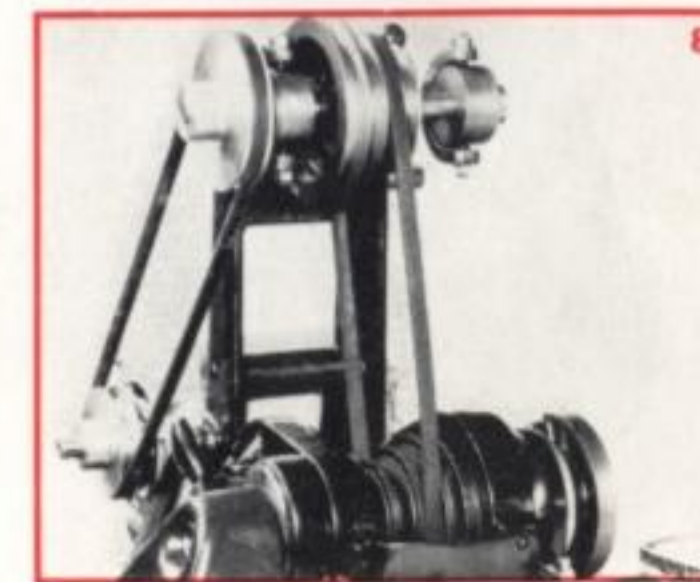
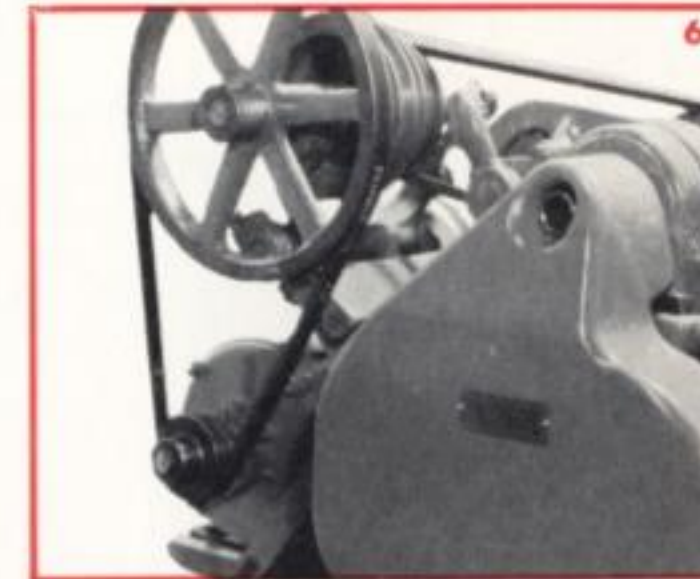
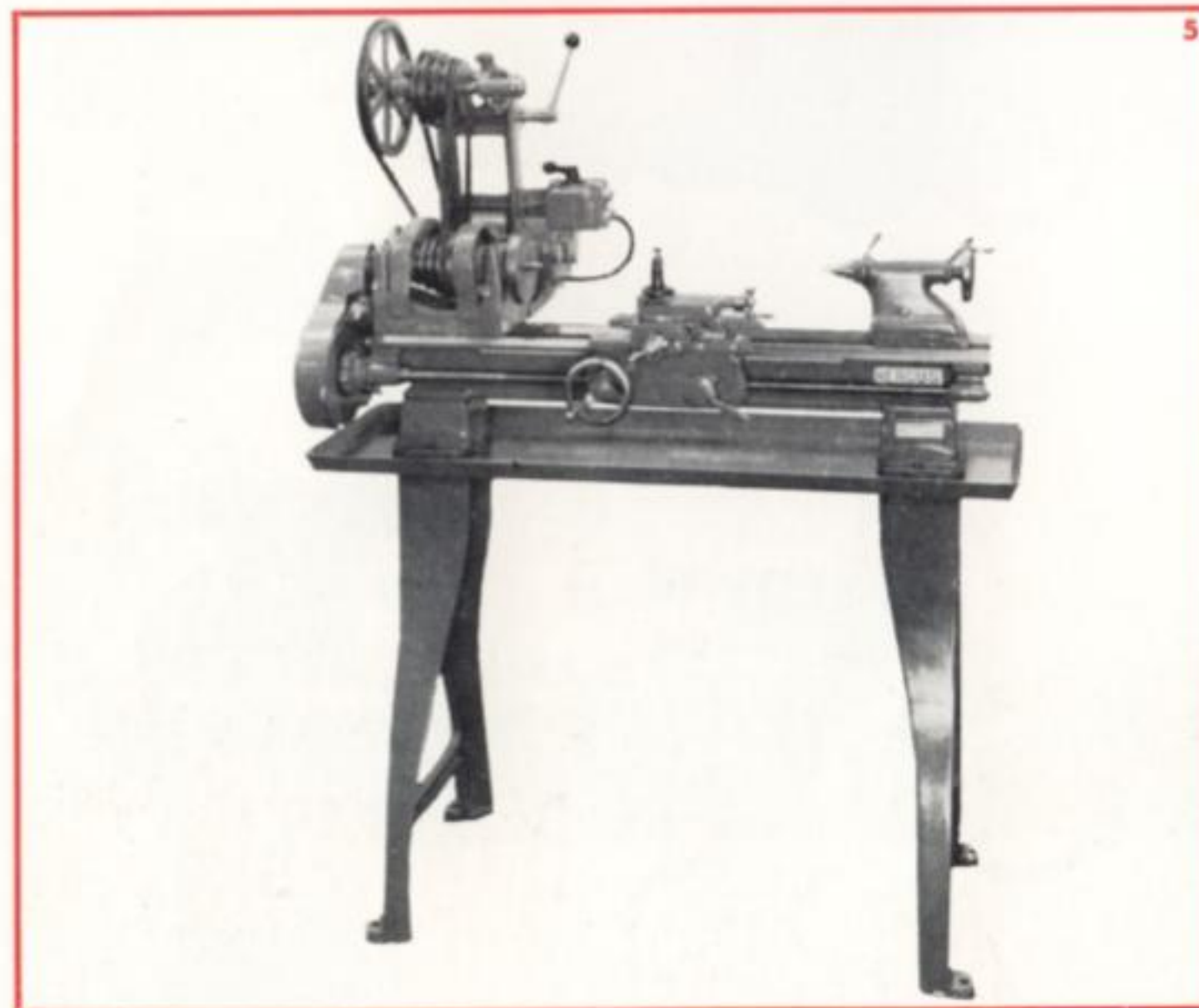
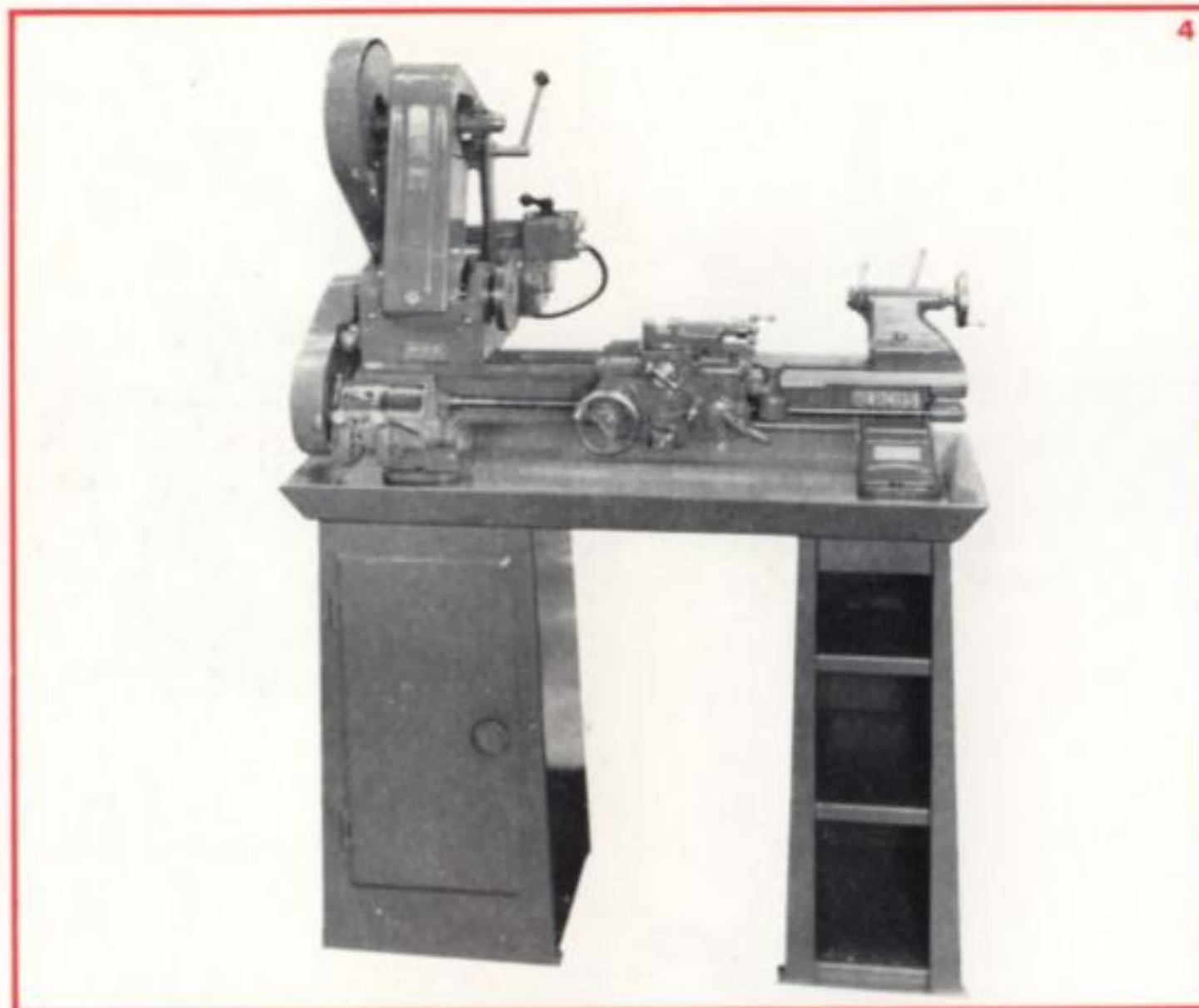
High Speed Drive

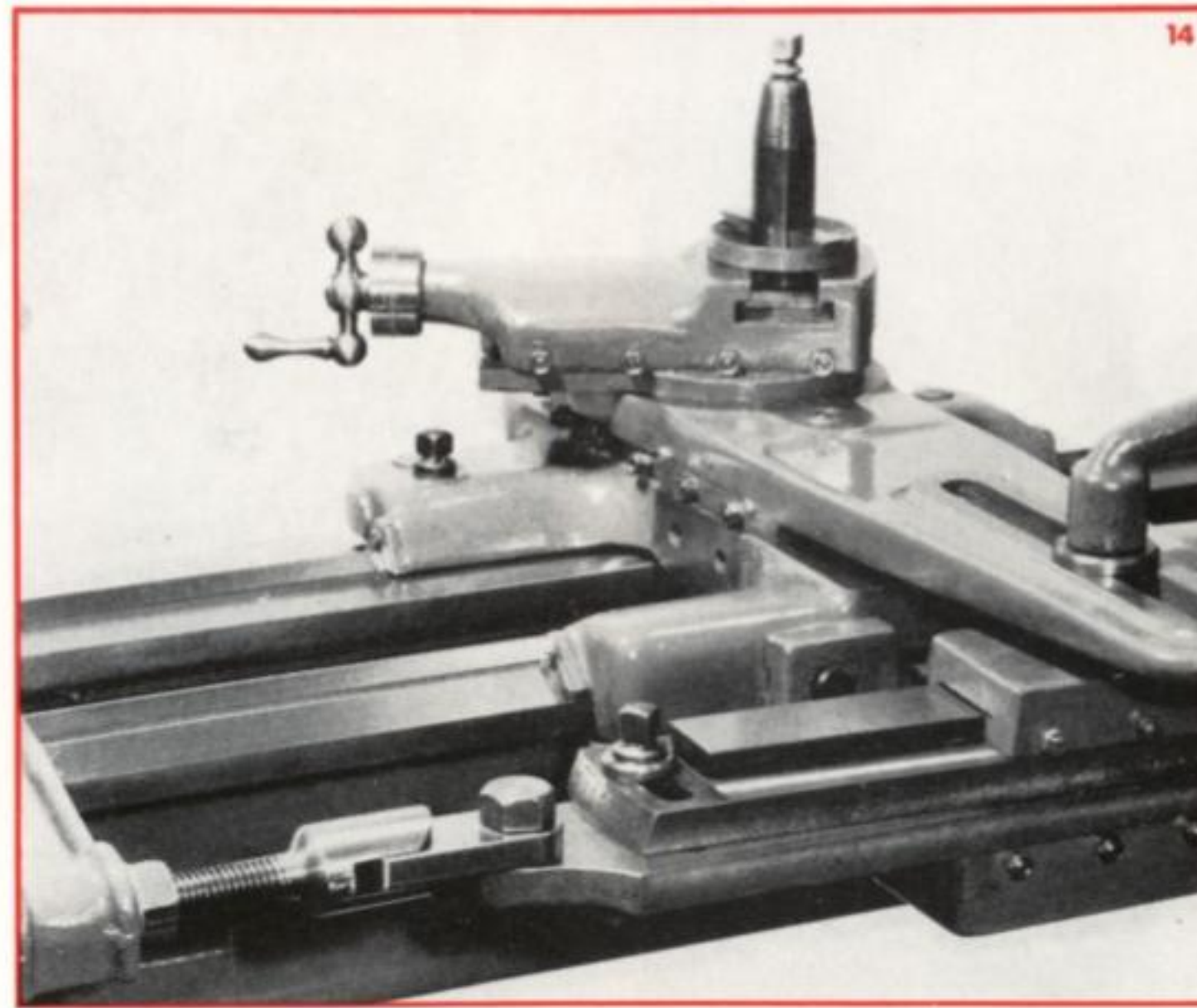
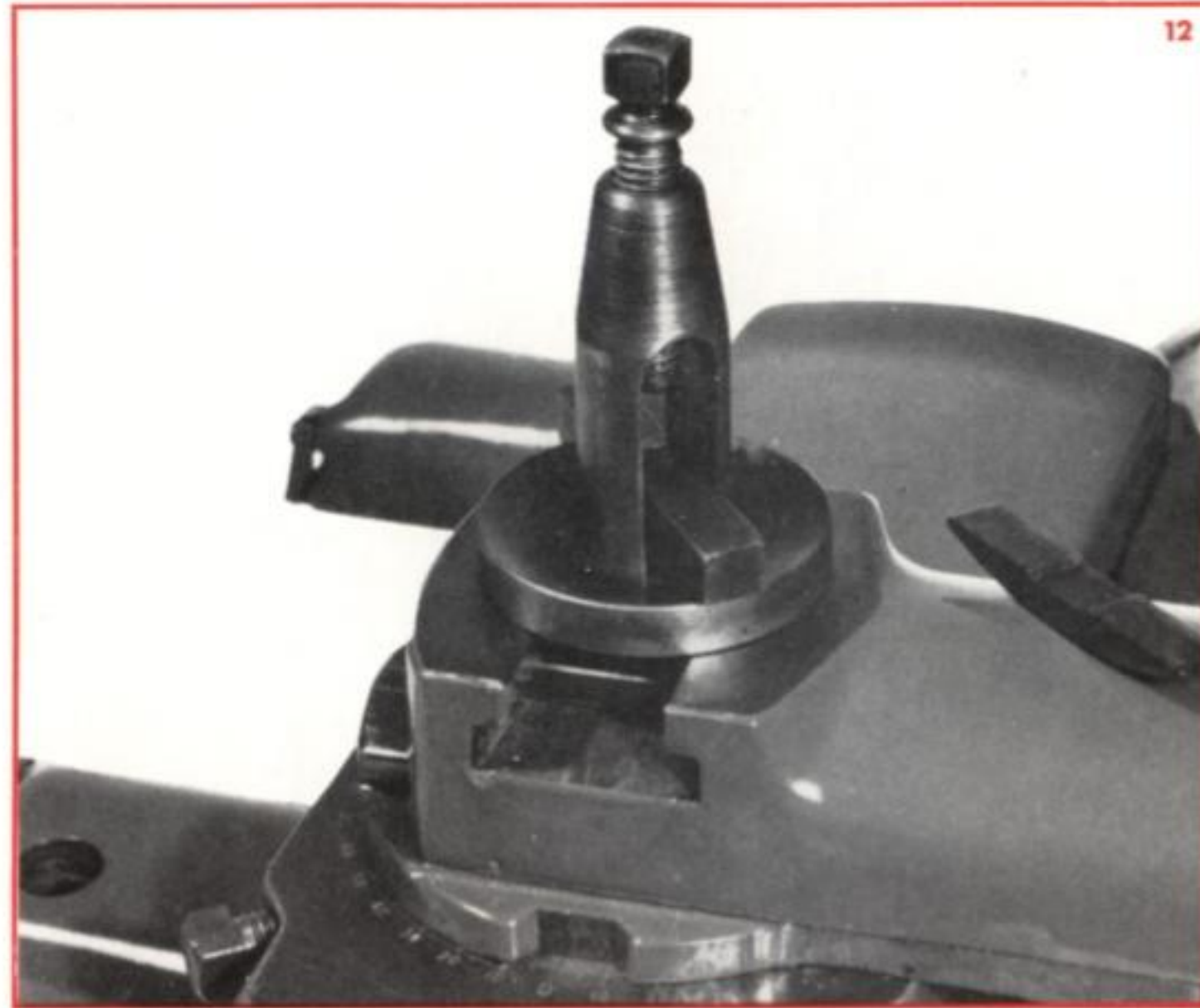
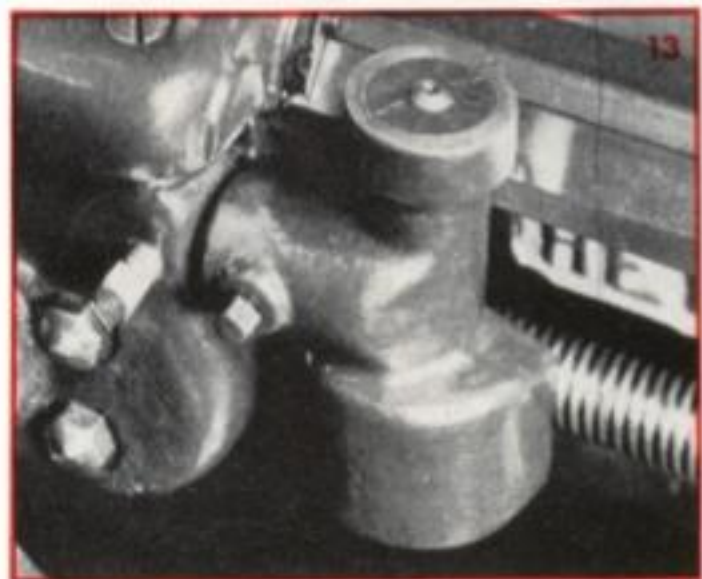
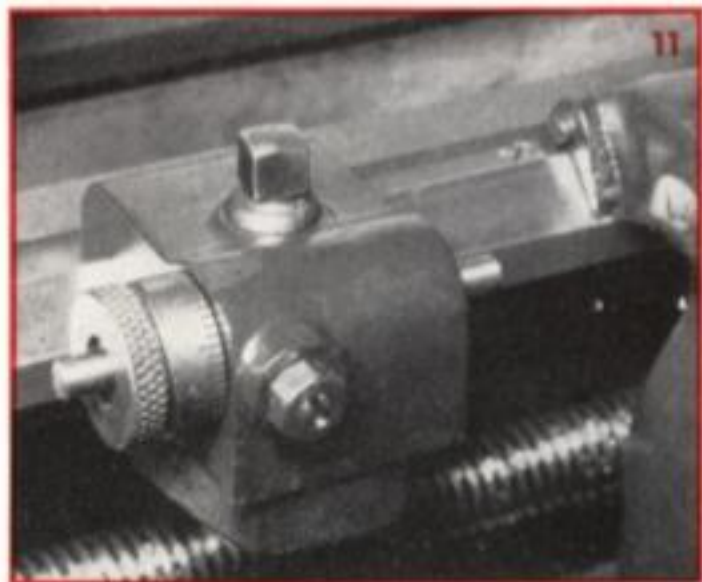
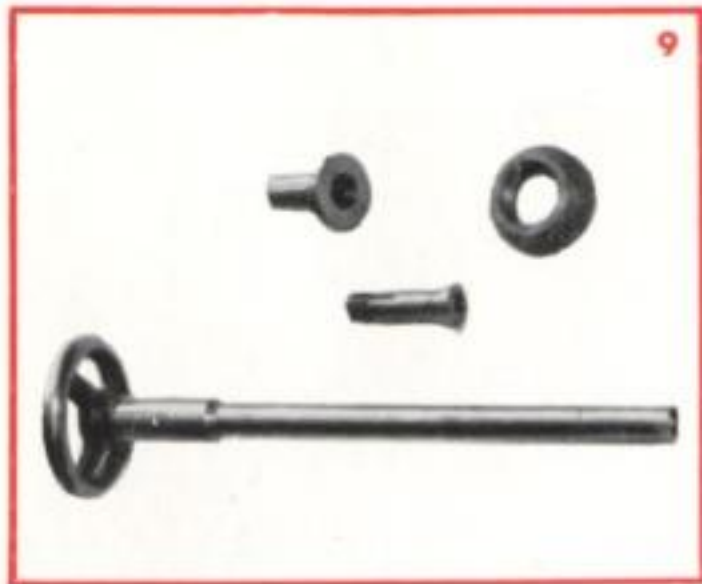
For high speed applications roller bearing lathes with ball bearing countershafts may be fitted with special high speed pulleys to give speeds up to 2,600 RPM. Spindle speeds of high speed drive machines have been chosen to avoid the natural frequency of the machine. This natural frequency depends to a large extent on the weight and size of the motor and therefore the motor should be ordered with the drive where possible.

Speed Ranges with H or P Type Drive Unit

Single Speed Countershaft	8 speeds	60-700 R.P.M.
Two Speed Countershaft		
High Range	8 speeds	92-1050 R.P.M.
Low Range	8 speeds	47-540 R.P.M.
High Speed Drive		
Single Speed Countershaft	8 speeds	180-2600 R.P.M.
Two Speed Countershaft		
High Range	8 speeds	180-2600 R.P.M.
Low Range	8 speeds	76-1090 R.P.M.

- 4 Model AR lathe on cabinet base
- 5 Model C lathe on legs and tray
- 6 "P" Pattern Unit Drive
- 7 Belt Guards, P Pattern Unit Drive
- 8 High Speed Drive





Collet Attachments and Collets

The draw-in collet attachment, fig. 9, comprises a draw-in tube with handwheel, a hardened closing sleeve and a nose protection ring which also serves to withdraw the closing sleeve from the lathe spindle. Collets can be supplied individually from stock or in sets of 15 ranging from $\frac{1}{16}$ " to $\frac{1}{2}$ " in 32nds. Collets of 64th sizes, together with standard sizes of squares and hexagons, can also be supplied from stock. Special collets comprising special or metric sizes of rounds, squares and hexagons can be supplied to order. Square collets can be supplied in sizes from $\frac{3}{32}$ " to $1\frac{1}{32}$ "; hexagons from $\frac{3}{32}$ " to $\frac{7}{16}$ " A/F.

Collets for Milling Attachment

The collet attachment illustrated in fig. 10 can be supplied for use with the milling attachment index head. A special short draw tube enables all collets, which fit the standard collet attachment, to be used with the milling attachment.

Tool Holders

An American pattern tool holder is supplied as standard equipment with all Hercus lathes. If required, a thick float piece $\frac{1}{2}$ " higher than standard can be supplied as per fig 12.

Thread Chasing Dial

The use of this attachment makes it unnecessary to reverse the lathe to return the saddle to the starting point to begin each successive cut when screw cutting. The dial is graduated and numbered to indicate when to close the half nuts on the leadscrew. The thread chasing dial can not be used for cutting metric threads.

The Micrometer Saddle Stop

The Micrometer Saddle Stop, fig. 11, is a precision stop with micrometer adjustment and is very useful for facing shoulders when turning or boring. It is not an automatic saddle stop, and the saddle should always be brought up to it by hand.

Taper Turning

The taper turning attachment greatly simplifies the turning of tapers or the boring of taper holes. It reduces this otherwise awkward job to a plain turning or boring operation. The cross feed screw must be removed when it is desired to do taper turning or boring work. Tapers up to $16\frac{1}{2}^\circ$ included angle, or $3\frac{1}{2}$ " per foot can be turned or bored over a length of 7" in one setting. Swing over the taper attachment cross slide is 5". This attachment can be fitted at the factory or supplied as a complete unit for fitting to the lathe at a later date. Neither the forming and cut-off slide nor the boring table can be used in conjunction with the taper turning attachment.

- 9 Draw-in Collet attachment
- 10 Collet attachment for milling attachment
- 11 Micrometer Saddle Stop
- 12 American Pattern tool holder
- 13 Thread chasing dial
- 14 Taper turning attachment

Milling Attachment

The Milling attachment is made in the form of a T slotted vertical slide, having a movement of 3" and a face area of 3" x 6". The vertical slide swivels either way off the vertical to 90°, and is mounted on the compound rest base of the lathe, where it can be set through 360°. The work piece may be bolted direct to the T slotted vertical slide or it can be held in the vice as shown in fig. 15. For indexing work such as squares, hexagons, or light gear cutting, the vice is replaced with the index head. This has a No. 3 Morse taper in the front and an index plate is fitted to the back. The collet attachment shown in fig. 10 is used with this head to hold small pieces, and larger work may be held with arbors made to fit into the No. 3 Morse taper. A 24 division index plate is supplied as standard equipment; other numbers can be supplied to order.

Milling Cutter Arbor, fig. 16

Fits direct into the No. 3 Morse taper of the lathe spindle and is secured by the draw bolt. It has capacity between the nut and the shoulder of 1½" for cutters of 1" bore, and is fitted with three spacing collars.

The Travelling Steady

The Travelling Steady, fig. 17, is attached to the lathe saddle and travels with it. It is used to support long slender shafts while being machined between the lathe centres, and is particularly useful for long thread cutting work. The adjustable jaws are made of cast iron, machined all over, will open to 2" diameter, and are fitted with clamping and adjusting screws.

The Stationary Steady

The Stationary Steady, fig. 18, clamps to the bed guide ways and is used to support long shafts between centres or to support the outer end of a shaft while the other end is held in the chuck.

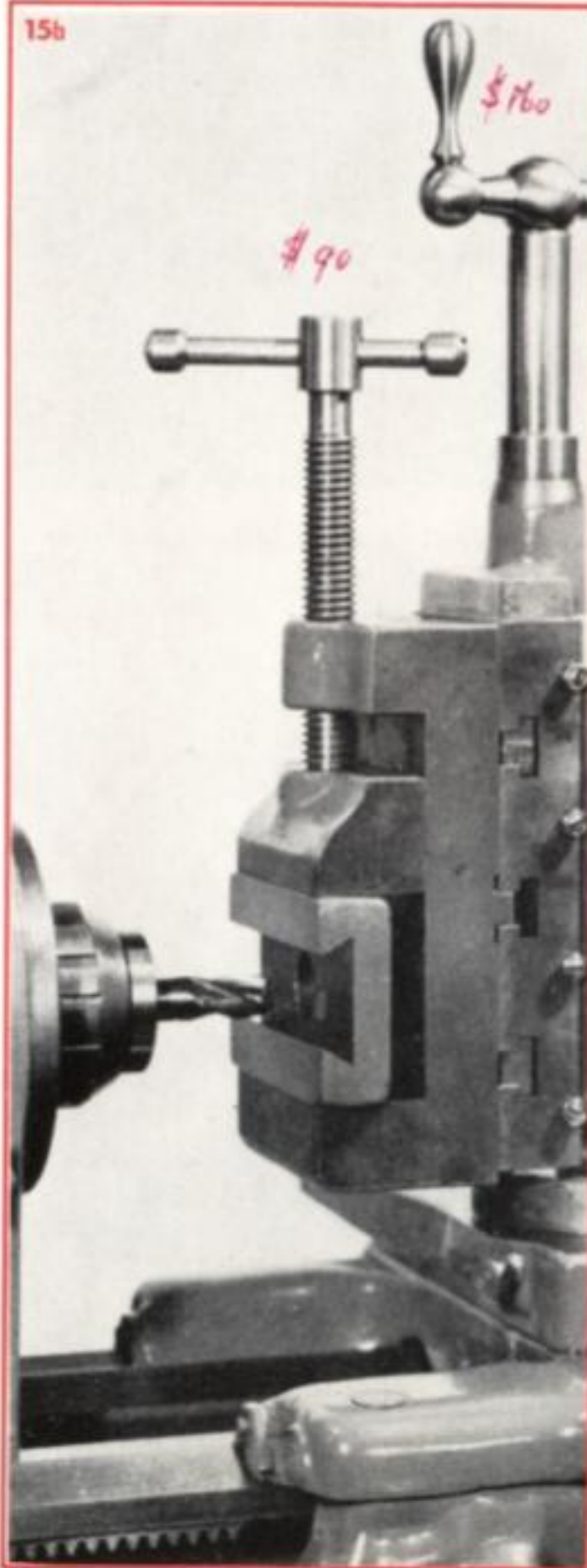
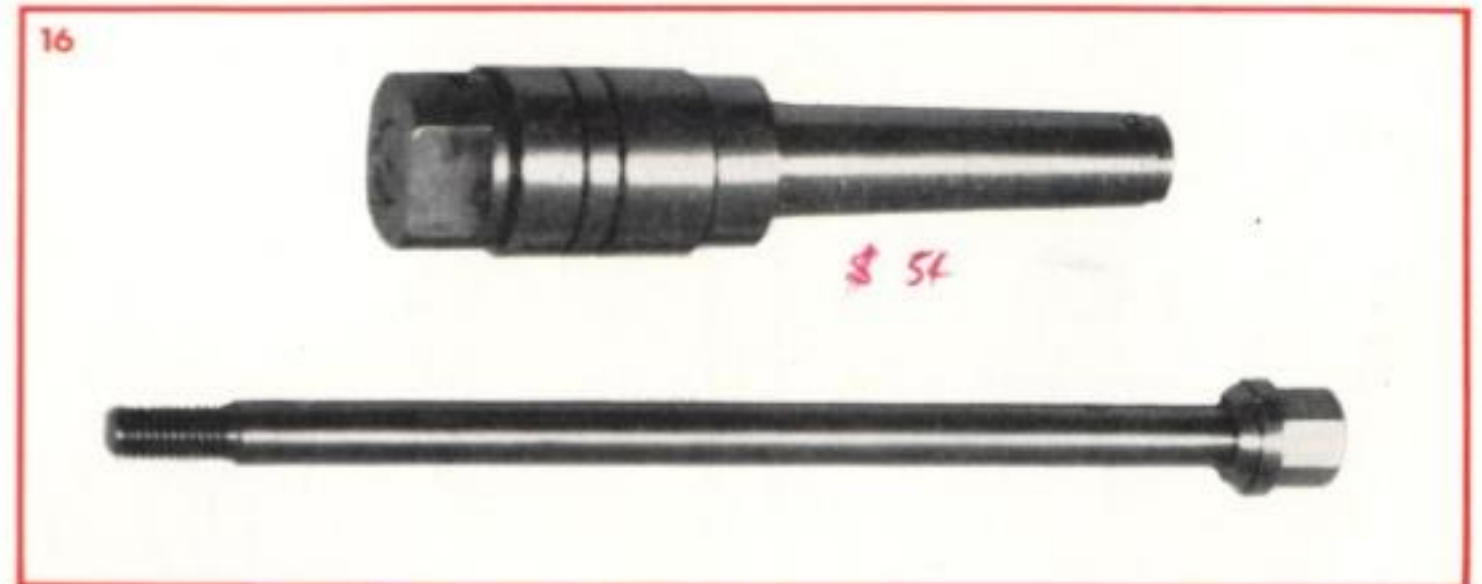
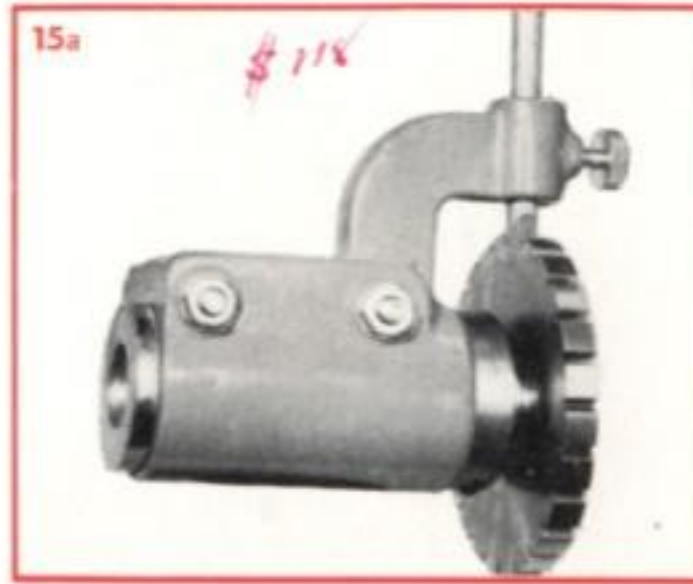
The 3 adjustable jaws are made of cast iron machined all over and will open to 2" diameter. The jaws are fitted with clamping and adjusting screws. The top half of the stationary steady is hinged to facilitate insertion and removal of work piece.

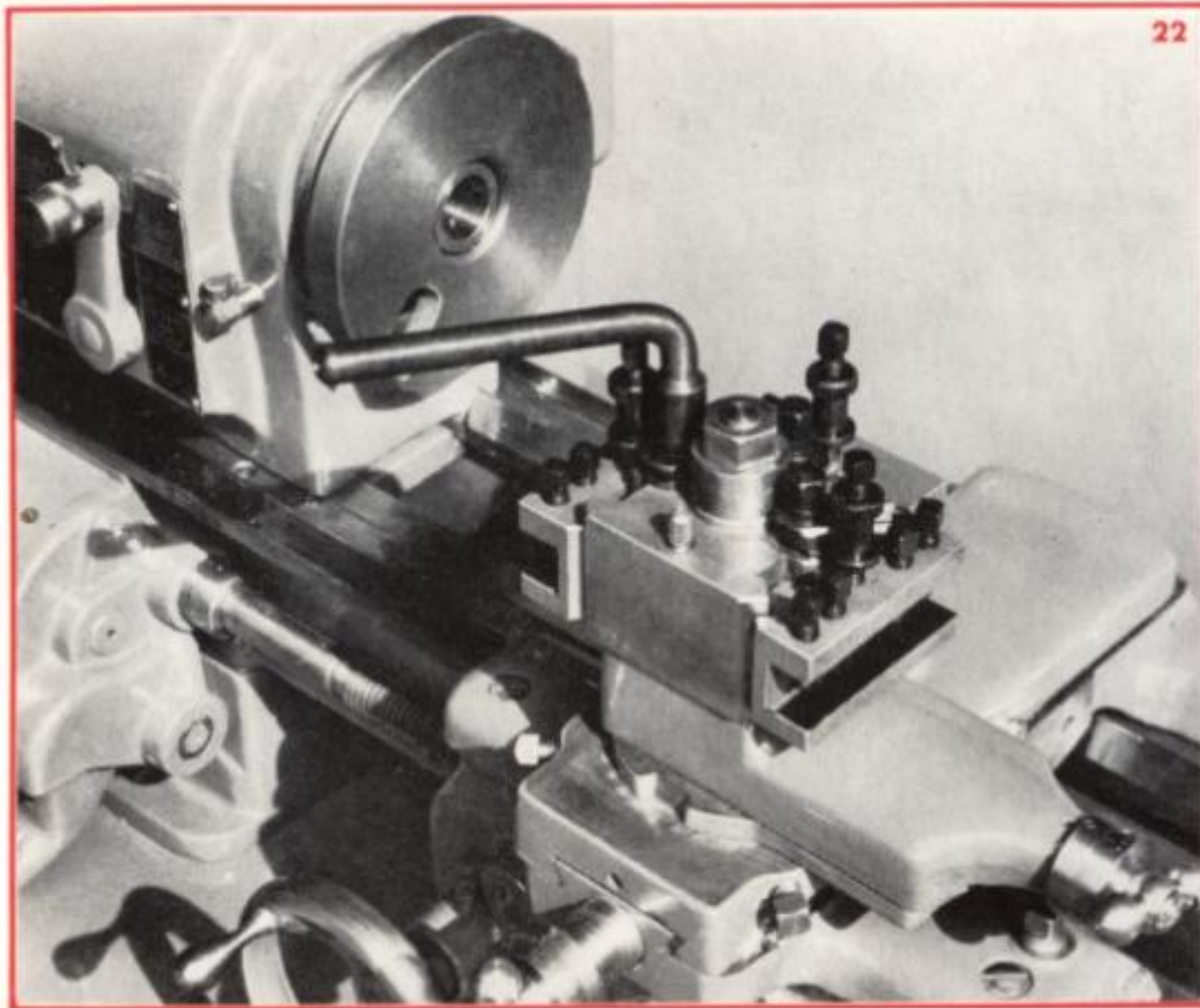
Chucks, fig. 19

The Chucks recommended as most suitable for general purpose work on the Hercules 9" lathe are a 6" or 6½" light pattern 4 jaw independent and a 5" 3 jaw self centring with 2 sets of jaws. Suitable chucks are available direct mounted (i.e. with screwed chuck body), mounted to a back plate, or unmounted. Chuckmounts of 4", 5" and 6" nominal diameter, fig. 20, are available for unmounted chucks.

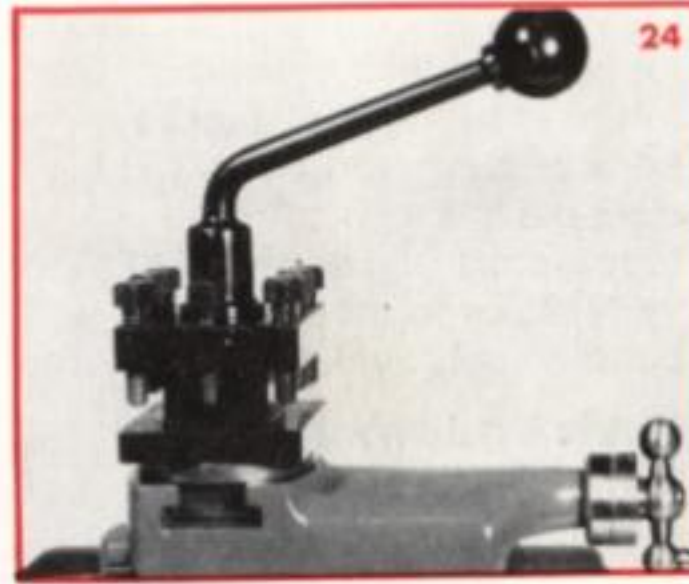
Large Face Plate, fig. 21.

Screwed to fit the spindle nose is slotted for clamping work or fixtures. It is strongly ribbed and is 7¾" diameter.





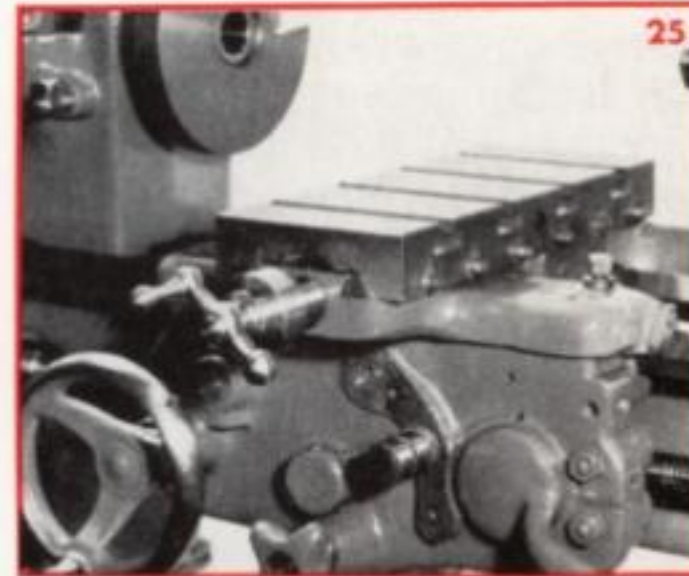
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24

Rapid Style Tool Block

The Rapid Style Tool Block, fig. 22, provides a fast and simple interchange of pre-set tooling. Tool holders are held against positive location faces by a quick action clamp permitting rapid and accurate tool change. Each tool holder has independent vertical adjustment. Four holders for standard tools, one Vee seat and one Morse taper holder are supplied as standard with each block. Other holders to suit round shanks and parting off blades are available.



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The rapid style tool block is mounted direct to a special compound rest top. This compound rest top may be supplied with the lathe in lieu of the standard rest, or it may be supplied as an extra to interchange with the standard rest. Alternatively, a full compound rest assembly comprising special compound rest top with feed screw, gib, swivel, etc., may be supplied to interchange with the standard assembly.

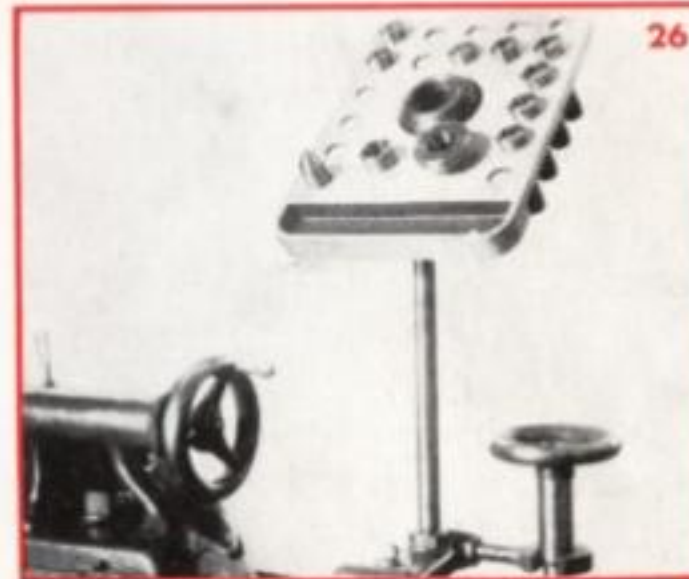
Extended Cross Slide

The Extended Cross Slide, fig. 23, carries a compound rest at the front and has Tee slots at the back to accommodate a rear tool post for parting off or other operations.

The height of this slide will not permit the standard compound rest with the American Pattern Tool Holder to be fitted. Instead a special compound rest is supplied carrying either a direct mounted square turret as per fig. 23, or a Rapid style tool block.

Square Turret

The square turret, fig 24, is made to fit the Tee slot of the



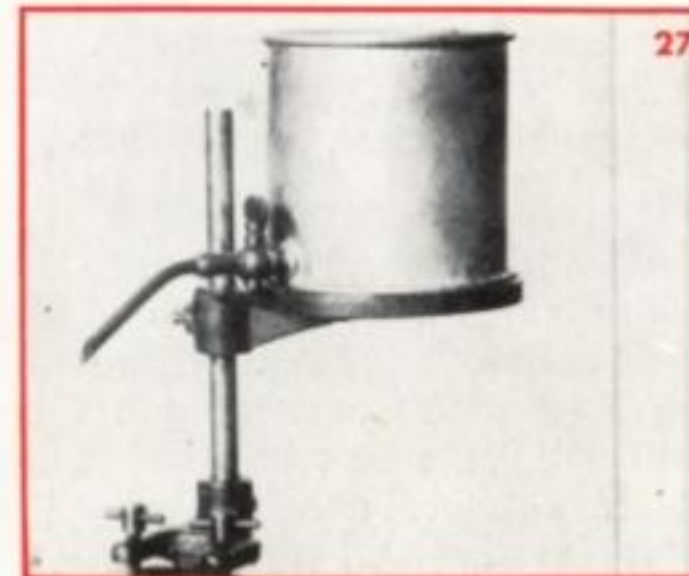
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Collet Rack

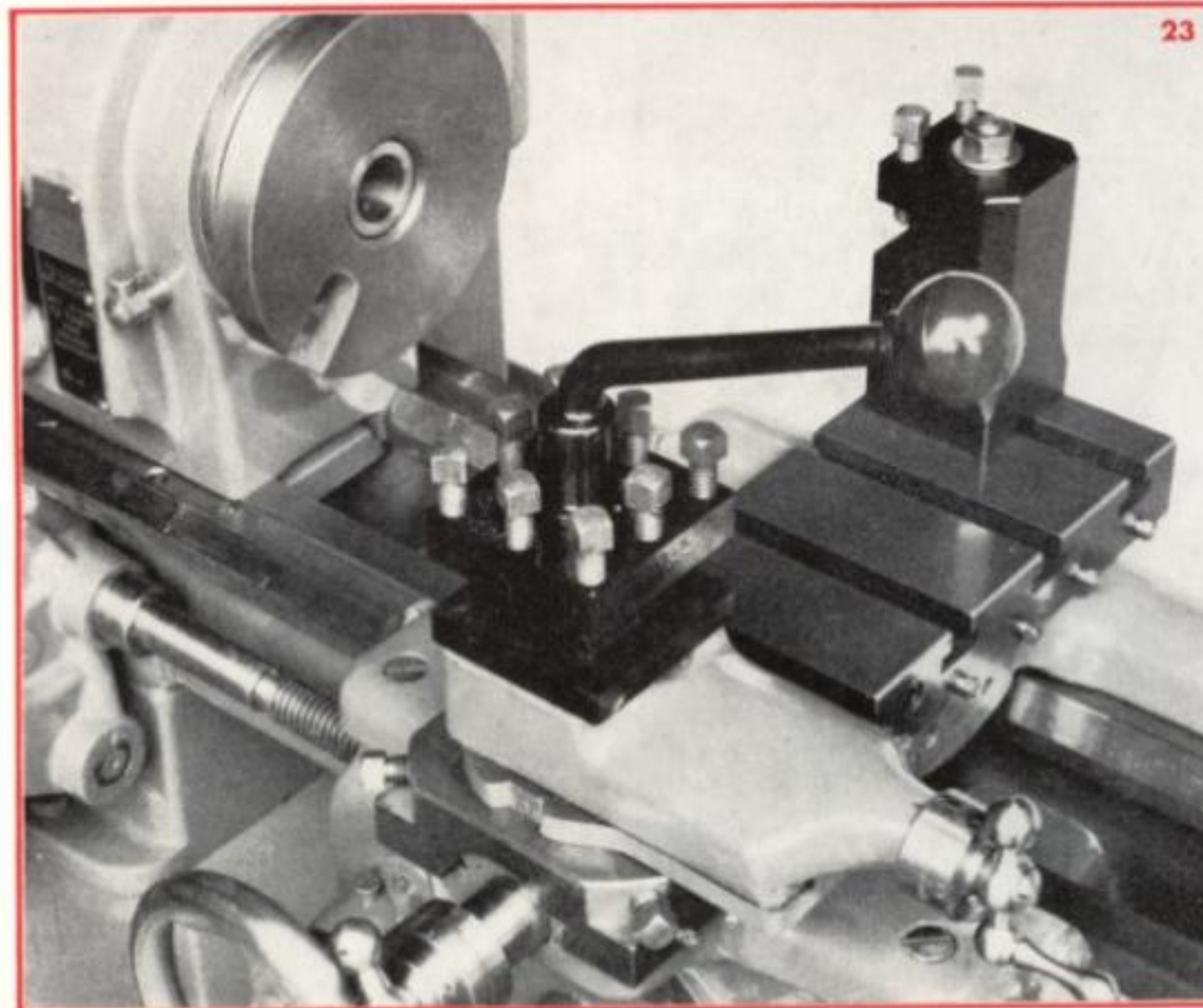
The collet rack, fig. 26, is held by a bracket which clamps on to the back V-way of the bed. It has provision for 16 collets, 2 centres, centre sleeve, nose adaptor, nose protection ring and draw tube.

Drip Can

Fig. 27. This is made to clamp on to the back of the cross-slide base. It is adjustable for height and can be swivelled to drop the lubricant direct on to the cutting tool.



27



23

Non-indexing type } Square Turret \$ 74
indexing type }

Special Centres

Drill Pad, Fig. 28. Is used in the lathe tailstock to support flat work when drilling.

Hollow Centre, Fig. 29. Has a 60° conical hollow centre for supporting parts such as shafts which are not centred. Will accommodate up to 7/8" diameter. Made of tool steel hardened and ground all over.

Crotch Centre, Fig. 30. Is used in the tailstock to support round work for cross drilling.

Two-Third Centre, Fig. 31. This is used in the tailstock when turning very small diameter work on centres where the full centre would foul the turning tool.

Half Centre, Fig. 32. If used in the tailstock with extreme care it will centre work very accurately.

Square Centre, Fig. 33. Used in the tailstock for centring material or for trueing up out of true centres in work.

Standard Centre, Fig. 34. Headstock and tailstock centres are interchangeable, made of tool steel hardened and ground all over. Angle 60°, No. 2 Morse taper. Two are supplied with each lathe.

Wood Turning Equipment

The lathe may be adapted for

wood turning by addition of a tool rest and suitable special centres.

The tool rest attachment, fig. 35, mounts on the cross slide in the place of the compound rest and is supplied with 4" & 12" long rests.

The screw centre, fig. 36, is used in the headstock for turning wooden discs and similar work.

The spur centre, fig. 37, is used in the headstock for turning work between centres.

The cup centre, fig. 38, is used in the tailstock for turning between centres.

Raising Blocks

Raising blocks are used for raising the centre height of the lathe to accommodate relatively light work of large diameter. The set comprises blocks 1" high for headstock, tailstock and compound rest, a high bracket for the change gear guard, special safety guard plus all necessary bolts and screws.

Electrical Equipment

Electrical equipment can be supplied to order to suit 240 volt single phase 50 cycle or 415 volt 3 phase 50 cycle supply. The recommended size of motor for standard speed lathes is 1/2 H.P. and unless otherwise ordered a motor of this power is fitted,

together with a lever operated reversing switch. For machines to run at high speeds more power is required and a 1 H.P. motor is fitted.

Electrical equipment to suit other voltages or to meet special conditions is available if required.

Metric Equipment Screw Cutting

Transposing gears can be supplied to enable all models of Hercus lathes to cut metric threads from the standard 8 TPI leadscrew.

For model A lathes a set of seven gears is supplied together with a chart showing the required change gear arrangements and gear-box positions. For models B & C lathes a set of 6 gears is supplied to be used in conjunction with the standard set of change gears, together with a chart showing the required gear arrangements.

Metric pitches available are given in the table below. Pitches other than those listed may be obtained with special change gears which can be supplied to order.

The thread chasing dial cannot be used for screwing metric threads and the lathe must be reversed to return the saddle to its starting point.

Metric leadscrews 3 mm. pitch can be supplied to suit all models of lathe, and model A lathes can be supplied with a metric quick change gear-box.

Metric Graduations

Metric feed screws can be supplied for both the cross-slide and compound rest together with graduated collars reading in .02 mm. A metric graduated tailstock barrel can be supplied if required.

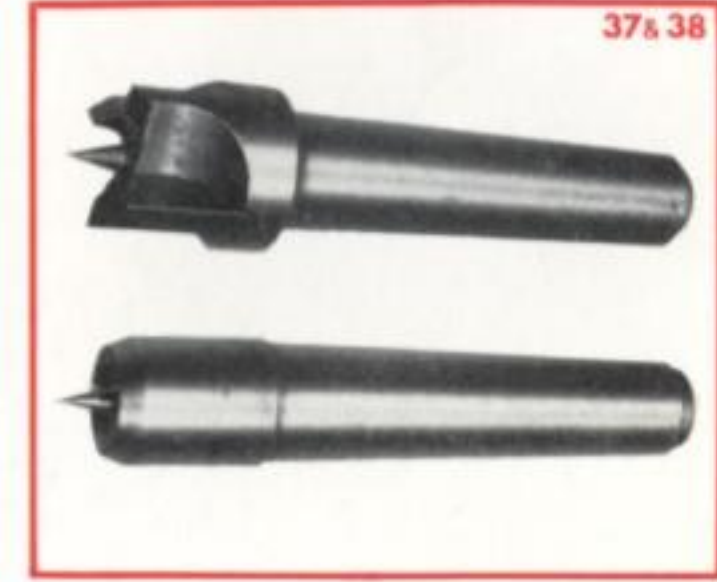
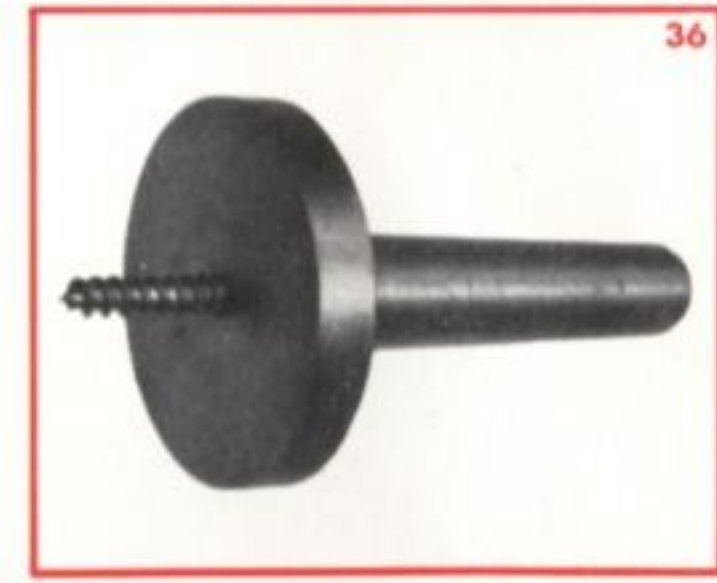
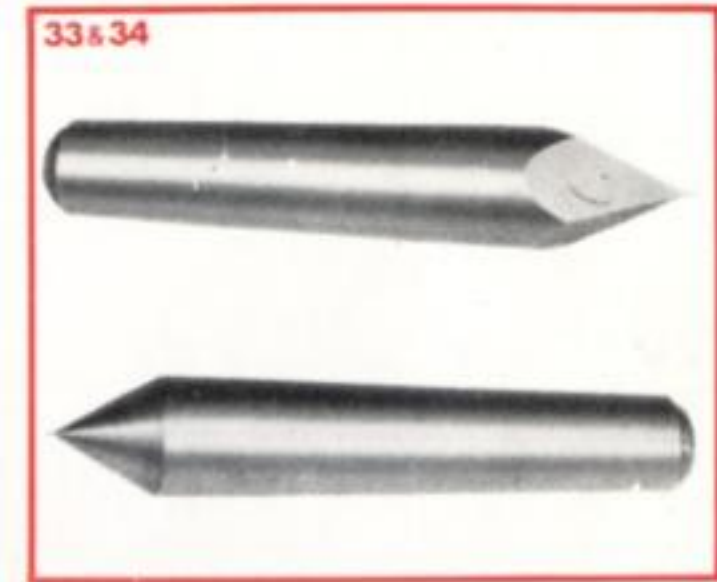
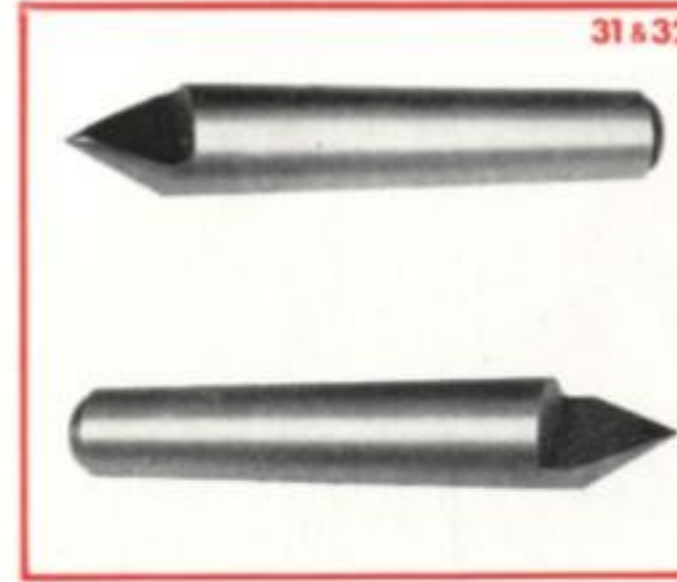
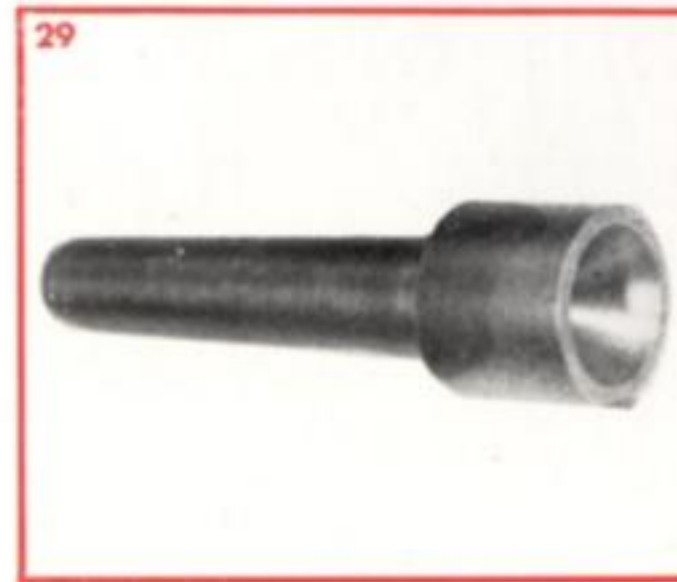
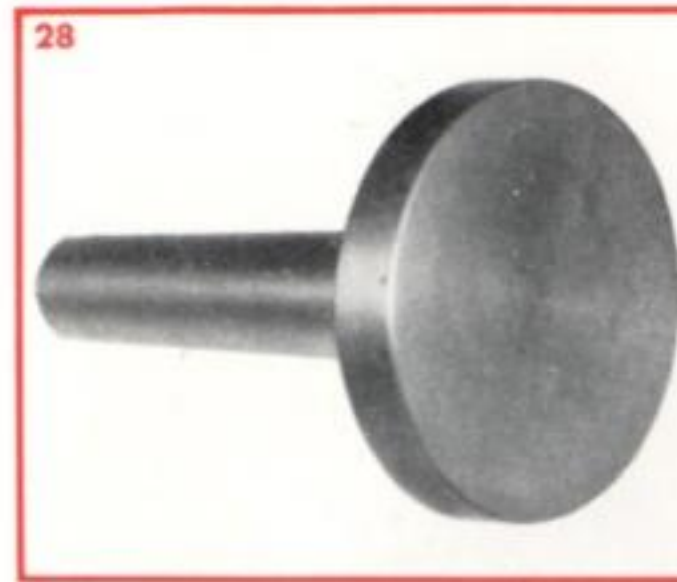
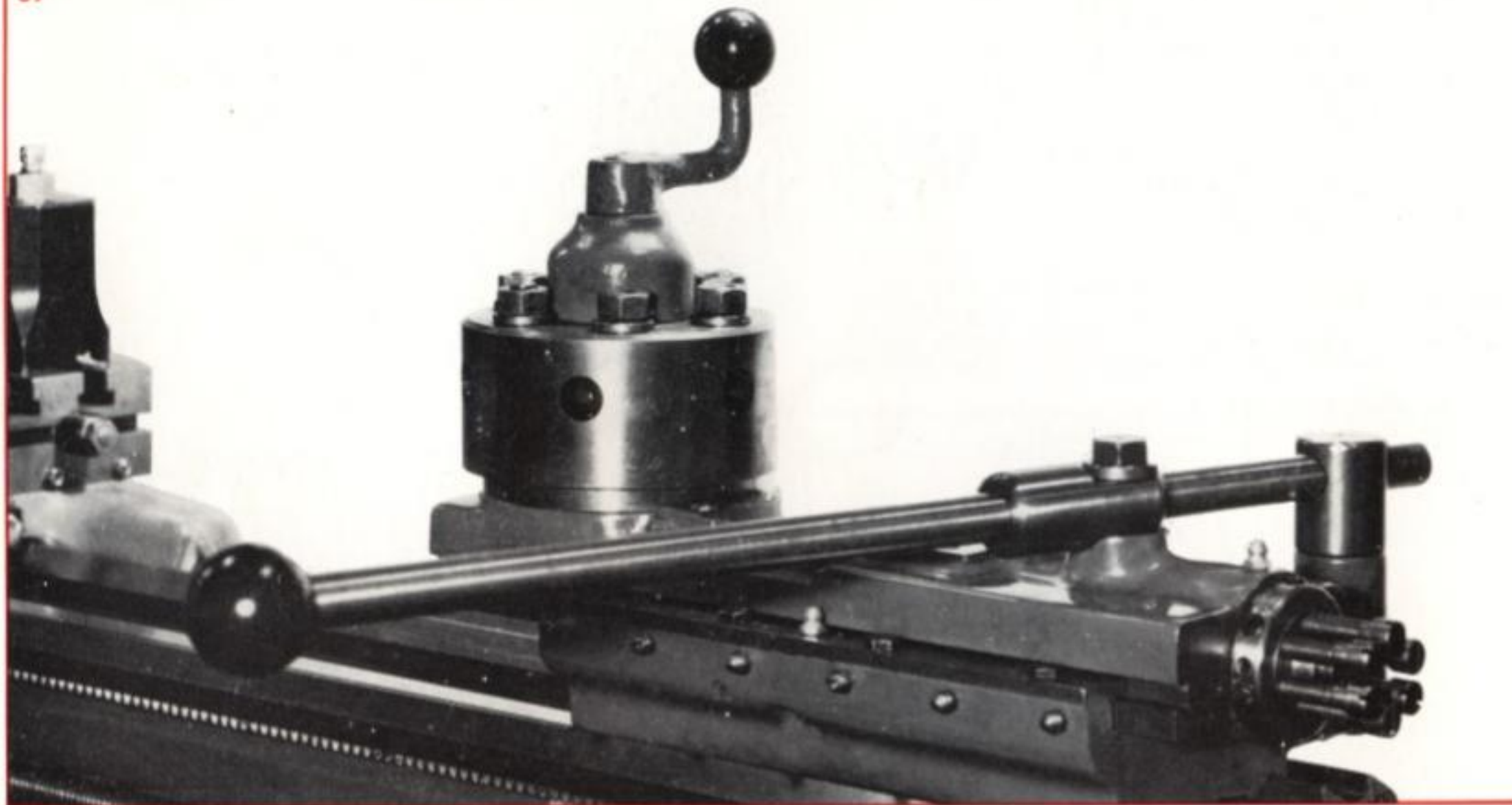


Table of Metric Pitches available from standard Transposing Gears

Model A					
0.4	0.45	0.5	0.6	0.7	0.75
0.8	0.9	1.0	1.25	1.5	1.75
2.0	2.25	2.5	2.75	3.0	3.5
4.0	4.5	5.0	5.5	6.0	
Models B & C					
0.25	0.3	0.35	0.4	0.45	0.5
0.6	0.7	0.75	0.8	0.9	1.0
1.25	1.5	1.75	2.0	2.5	3.0
3.5	4.0	4.5	5.0	5.5	6.0

39



Lever Turret Attachment

This attachment fits on the bed ways in place of the tailstock, and is held by an eccentric clamping device. The turret slide is operated by a lever, and the head indexes automatically each time the lever is moved to the extreme right. Each position of the turret has independently adjustable feed stop screws to control the length of cut. The effective feed of the turret slide is $3\frac{3}{4}$ ". The distance, centre of turret hole to top of slide is $1\frac{7}{16}$ ". Turret holes are bored $\frac{3}{4}$ " when supplied with the lathe unless ordered otherwise. If the turret is sold separately from the lathe, the purchaser accepts the responsibility of fitting to the lathe and boring in position. When turrets are supplied this way the holes are rough bored to $1\frac{1}{16}$ ".

Saddle Stop

This attachment clamps directly on to the bed and is extremely useful for work where a number of shoulders need to be accurately spaced. It indexes to six positions and, in addition to the six short stops as illustrated, Fig. 40, six long stop screws are also provided.

The Forming and Cut-Off Slide

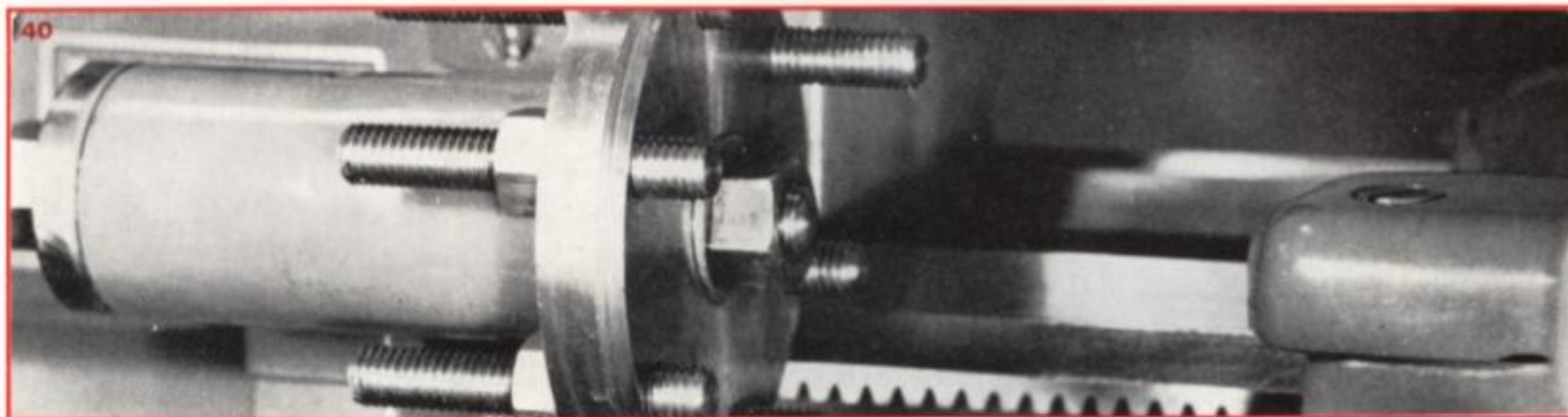
The Forming and Cut-Off Slide is fitted on the saddle cross-slide dovetail in place of the compound slide assembly. It is operated by a rack pinion and lever. The operating position of the lever can be varied to suit the convenience of the operator. Two tool blocks are provided and may be used, the front one for forming and the rear one for parting off or as desired. Adjustable stops are provided to regulate the movement of the

slide in either direction. The square turret, fig. 24 page 7, can be supplied in a form suitable for mounting in place of the front tool post where it adds considerably to tooling capability.

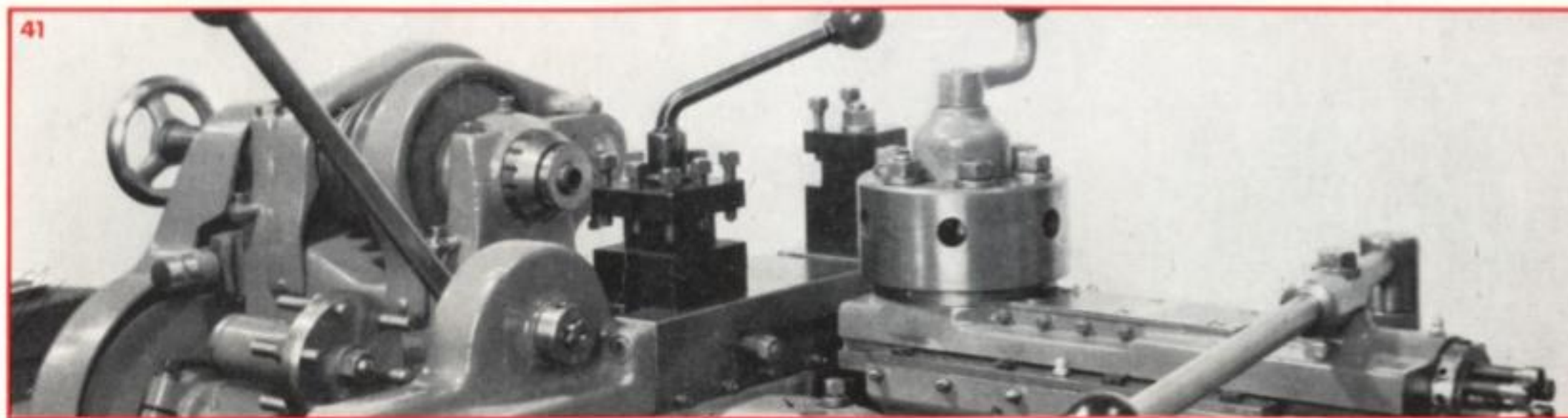
As a Capstan Lathe

The fitting of the lever turret attachment and the forming and cut-off slide virtually convert the lathe to a light capstan lathe which, if used in conjunction with the collet attachment, is suitable for a wide range of bar work. Chuck work can also be done using the hand lever turret, together with the forming and cut-off slide or the square turret. If the six position saddle stop, fig. 40, is used, this adds to the usefulness of the forming and cut-off slide, and adds considerably to the usefulness of the square turret because of the greater number of tools available. Lathes can be supplied built specifically as capstan lathes in a variety of forms to suit light production work. These machines can incorporate features such as:—lever operated collet attachments, two speed motor drives, power feeds to turret, etc. Illustrated literature dealing with these machines is available on request.

40



41



39 Turret Attachment

40 Six Position Saddle Stop

41 Lathe set up as Capstan lathe

Craftsman Lathes

The Hercus "Craftsman" Lathe, fig. 42, is a self-contained unit comprising a lathe mounted on a rigid steel cabinet. The Craftsman headstock is enclosed, back geared and has a roller bearing spindle carrying a single pulley driven from underneath.

The Cabinet Base

The cabinet is of rigid construction and is divided into 4 compartments. The left hand compartment houses the drive unit, the upper centre contains the electrical equipment, and the lower centre accommodates the coolant system if required. The right hand compartment is fitted with shelves for storage of equipment.

The Unit Drive

The Drive Unit, fig. 43, takes the drive from the motor to a countershaft, thence through 5 step pulleys to a lay shaft and from there through wedgelink belt to the headstock. This gives a range of 10 speeds from 58-1840 R.P.M. Both countershaft and lay shaft are mounted on ball bearings and are supported on either side of the stepped pulleys. Provision is made for individual tensioning of all 3 drive belts as well as an eccentric device for slackening of the speed change drive belt.

Electrical Equipment

The Electrical equipment includes a $\frac{3}{4}$ H.P. motor controlled by a push button starter with overload protection and no volt release. A reversing switch is provided for normal operating control. A safety cut-out switch is fitted to stop the machine when the drive compartment door is opened. Similar safety switches can be fitted as optional

extras to the change gear guard, the headstock lid and as a saddle movement limit switch. When one of these switches is released the machine stops and will not re-start until the switch is closed and the start button is pressed. A junction box is fitted to the rear of the machine for easy electrical connection.

Coolant Equipment

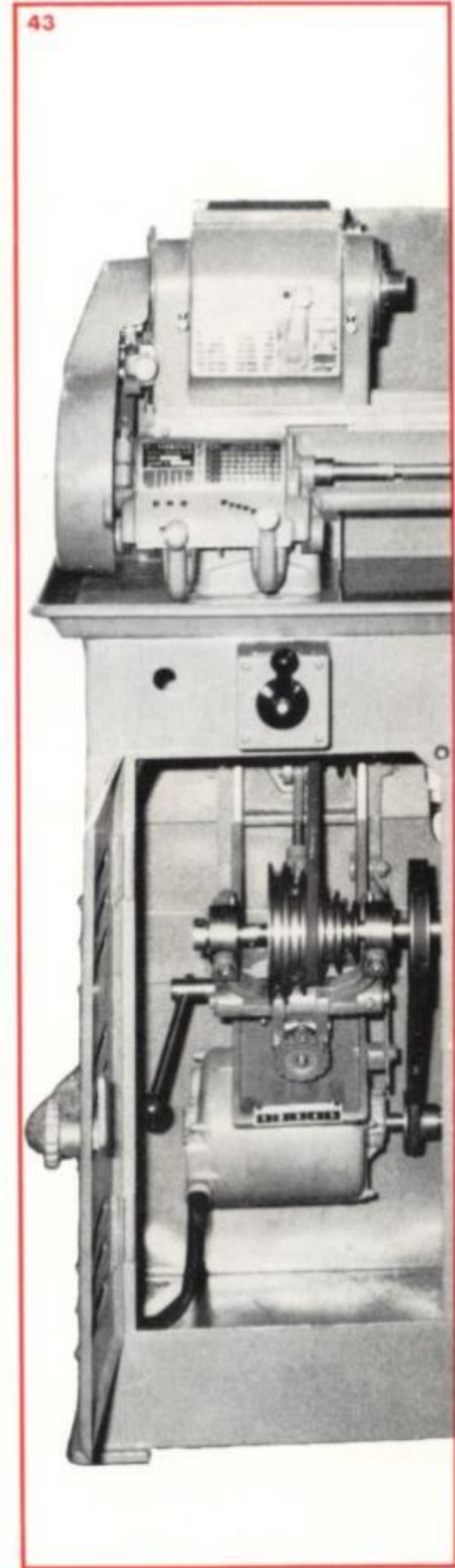
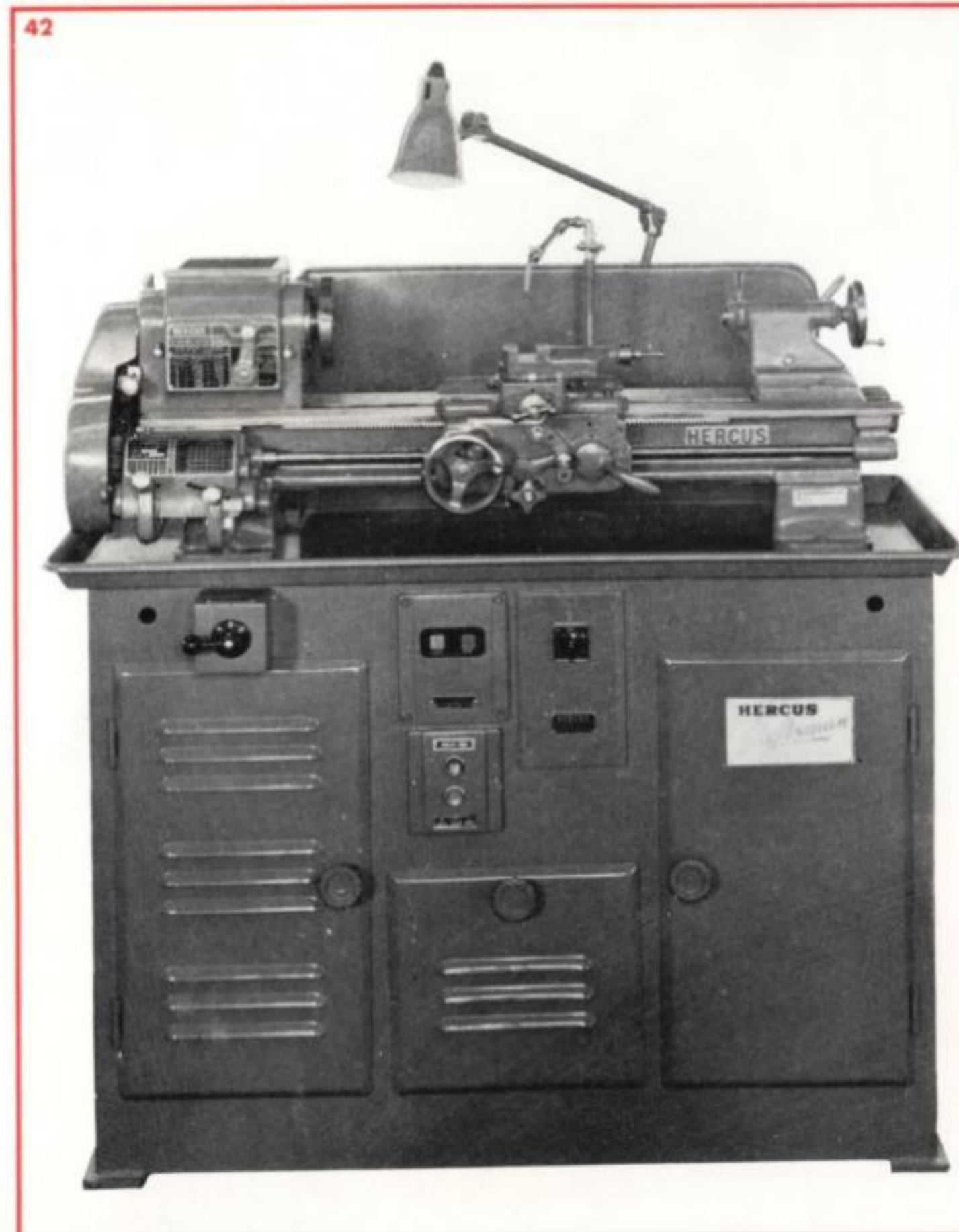
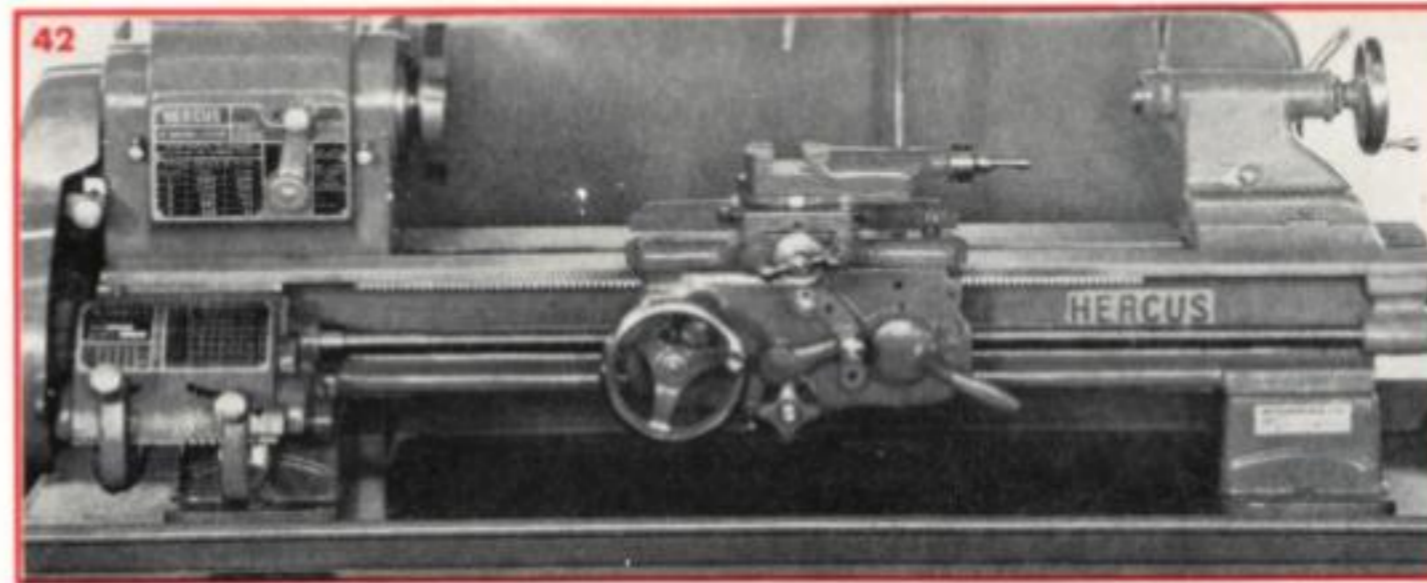
A removable coolant tank can be supplied to fit in the lower central compartment. This unit includes an electrically driven coolant pump, which is controlled through a push-button switch, with overload protection, mounted in the electrical panel. An adjustable director fitting is mounted on the saddle. If required, a rear splash guard is also available.

Low Volt Light

A 32 volt machine light unit can be supplied which includes a control switch and fuses on the high tension side of the transformer. This is mounted in the electrical panel. An adjustable light arm is mounted at the rear of the machine.

Instrument Lathe

The Hercus Craftsman Lathe can be supplied in a form suitable for precision turning on instrument components. Lathes built for this purpose are made with hardened beds, and are aligned to one half of standard tolerances. The main spindle is mounted in precision zero bearings and can, if desired, be supplied with a 4" B.2 flanged spindle nose. Unless ordered otherwise the lathe is fitted with an extended cross slide and rapid style tool block.



F. W. HERCUS PTY. LIMITED
ANDERSON STREET, THEBARTON, S.A. 5031

HERCUS 9" PRECISION LATHE

Model AR Machine No. 12930

INSPECTION RECORD

	Permissible Error	Test Record	Tested By
HEADSTOCK SPINDLE			
Spindle taper run-out—			
At end of 7" bar	.001	.0002	W.B.
At Spindle Nose	.0003	.0001	"
Test Bar parallel with bed—			
Horizontal plane (free end inclined towards tool)	.0007	.0002	"
Vertical plane (free end rising)	.0007	.0005	"
Axial Slip (measured at two points displaced by 180°)	.0005	.0001	"
TAILSTOCK SPINDLE			
Test Bar parallel with bed—			
Horizontal plane (free end inclined towards tool)	.0004 in 2"	.0004	"
Vertical plane (free end rising)	.0004 in 2"	.0003	"
AXIS OF CENTRES			
Horizontal plane (tailstock end inclined towards the tool)	.0005	.0004	"
Vertical plane (tailstock end rising)	.0005	.0005	"
CROSS SLIDE ALIGNMENT			
Lathe must face concave only within	.001 on 9" diam.	.0003	"
Does saddle fit bed correctly, travel smoothly, and clamp firmly?		✓	"
Do Cross Slide and Compound Rest work smoothly?		✓	"
Does Lead Screw turn freely and nut fit correctly?		✓	"
Tailstock moves freely on bed and clamps firmly		✓	"
Tailstock barrel works smoothly and clamps correctly		✓	"
Tailstock Centre knocks out		✓	"
Tailstock Set-over works correctly and graduations are correct		✓	"
Headstock gears work correctly		✓	"
Gear Box gears and Tumblers all work correctly		✓	"
Apron Gears work correctly		✓	"
All Change Wheels and bushings have been tested and fit into place		✓	"

REMARKS:

Inspected by W. Bartley

Date 27-1-70

H.S.J. 46777

Inspection

Illustrated at left is a copy of the inspection sheet which accompanies every lathe that leaves the Hercus Works. A duplicate is also kept for official reference.

In addition to checks shown on the inspection sheet, every lathe is subject to over 50 additional checks after assembly. These checks apply to only the assembled lathe. Every individual part in the lathe is inspected after every machining operation, to guard against faulty material or workmanship reaching the finished product. The inspection department only passes work that comes within the rigid tolerances which have been determined through years of experience on this class of work.

General Specifications

Swing over bed	9 1/4"
Swing over saddle	5 1/2"
Length of bed	40" or 49"
Admits between centres	21" or 30"
Width of bed	6"
Hole through spindle	2 5/32"
Spindle nose	1 1/2", 8 thds., U.S.S.
Spindle nose Morse taper	No. 3
Leadscrew acme thread	3/4" x 8 thds.
Compound rest hand feed	2 1/4"
Cross slide travel	6"
Tailstock spindle travel	2 1/8"
Tailstock top sets over	5/8"
Small face plate diameter	5 1/8"
Collet capacity maximum	1/2" diam.
Centres Morse taper	No. 2

Manufactured by

F. W. Hercus Pty. Ltd.
Anderson Street,
Thebarton
South Australia 5031
Telephone 57 6273

Distributed by **McPHERSON'S LTD**

Melbourne 2 Buckhurst Street,
South Melbourne
Victoria 3205
Telephone 62 0301

Sydney 65 Ashmore Street,
Alexandria
New South Wales 2015
Telephone 51 0433

Brisbane 76 Commercial Road,
Fortitude Valley
Queensland 4006
Telephone 5 0191

Adelaide 217 South Road,
Ridleyton
South Australia 5008
Telephone 51 0411.

Perth 53 Burswood Road,
Victoria Park
Western Australia 6100
Telephone 6 3211