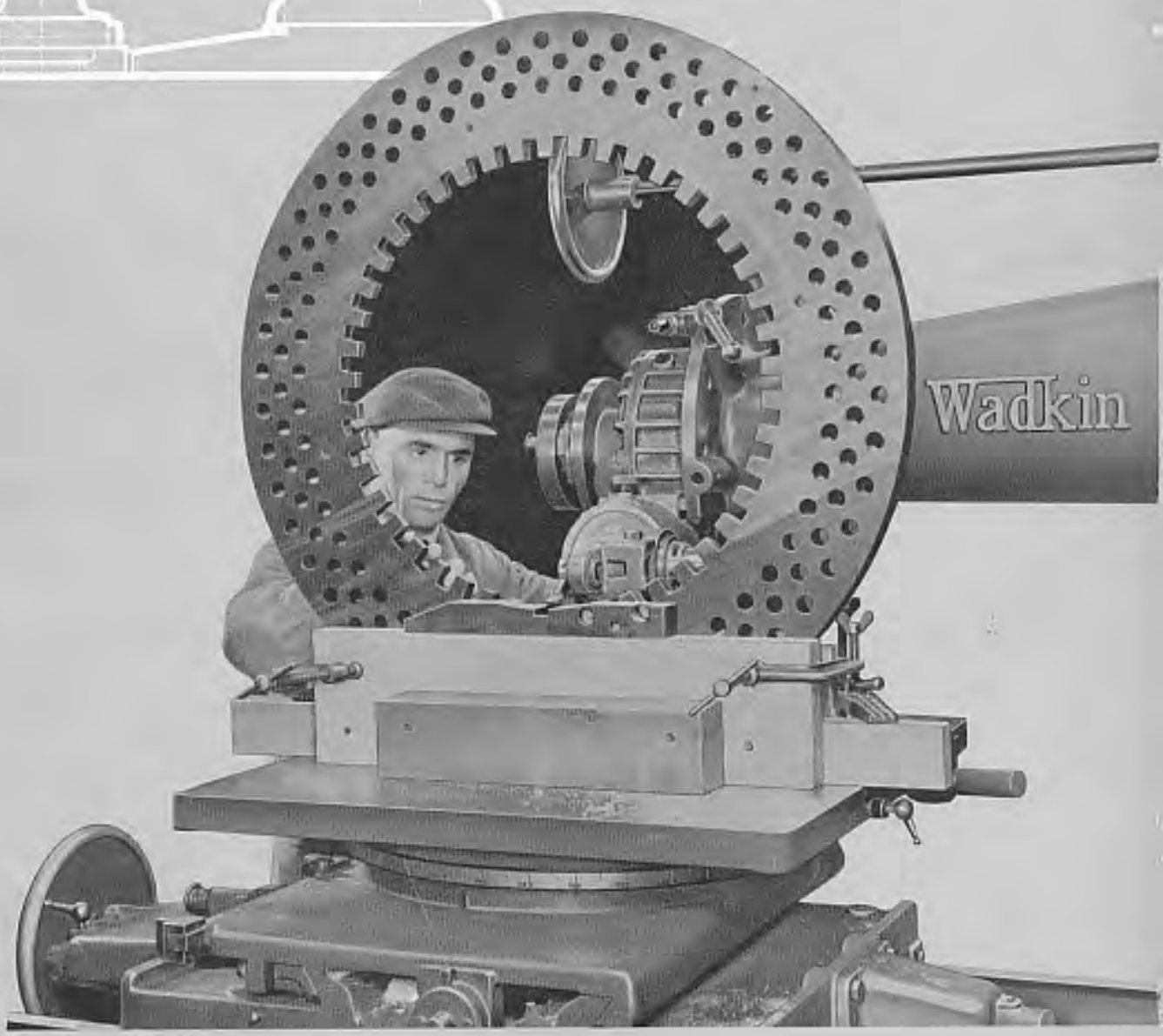
Booklet No. 924/1

Wadkin

UNIVERSAL PATTERN MILLERS

for Wood and Light Metals, types WZ and WX

(For machines for Ferrous Metals, type WL, see separate leaflet)



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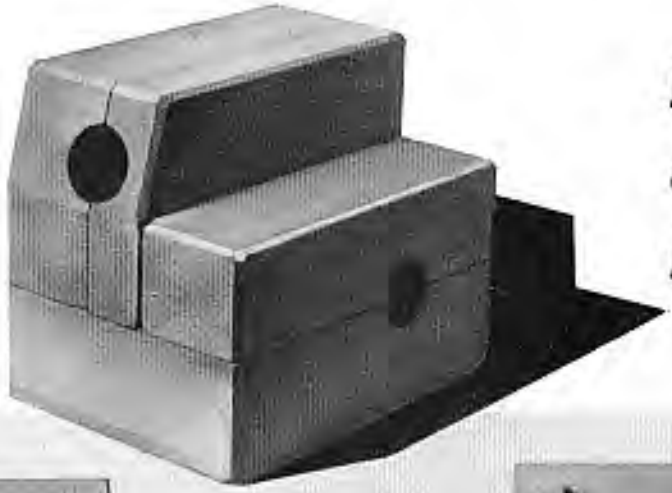
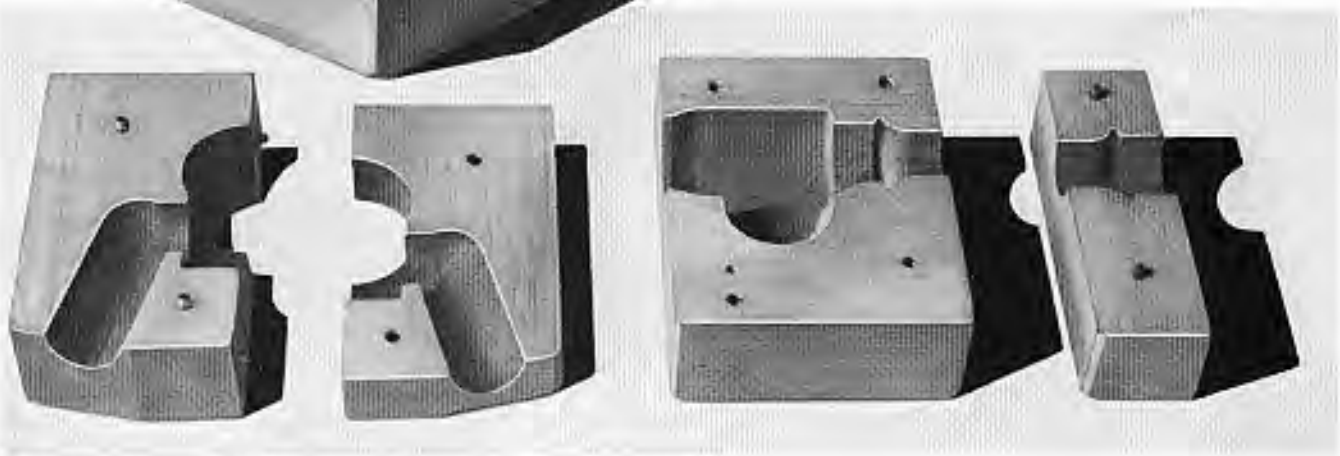
WADKIN LTD.,

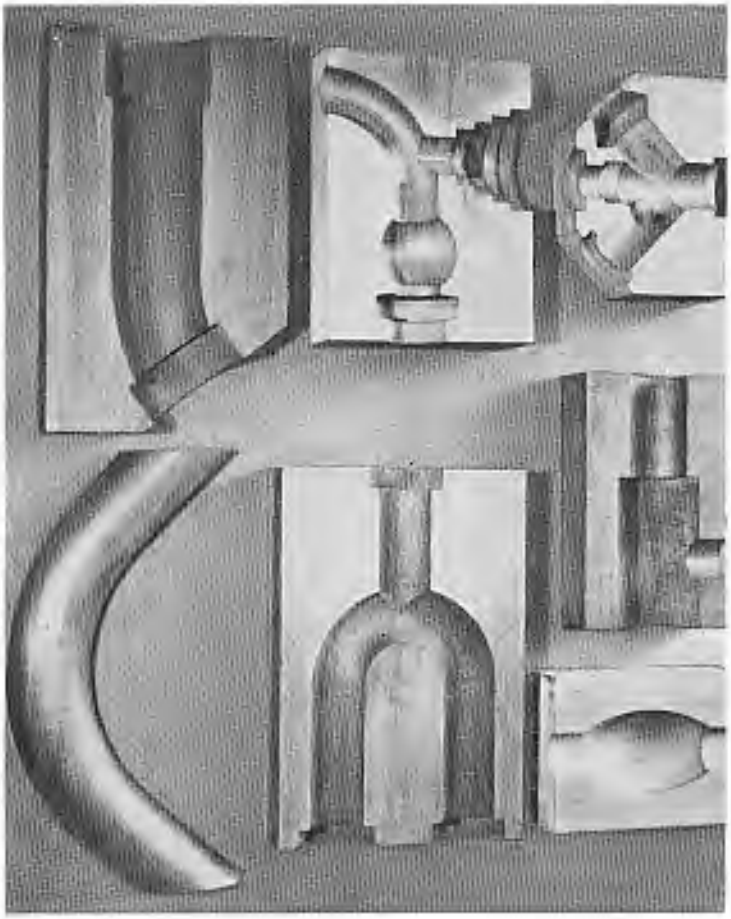
GREEN LANE WORKS, LEICESTER, ENGLAND

Telephone: Leicester 0116 2769111



Produced throughout on a Wadkin *Pattern Miller*





The above corebox gives a good idea of the tremendous labour-saving possibilities of a Wadkin Pattern Miller. Each section of this corebox has been worked out of the solid, and all four machined in less time than a pattern maker would have taken to make any one of them.

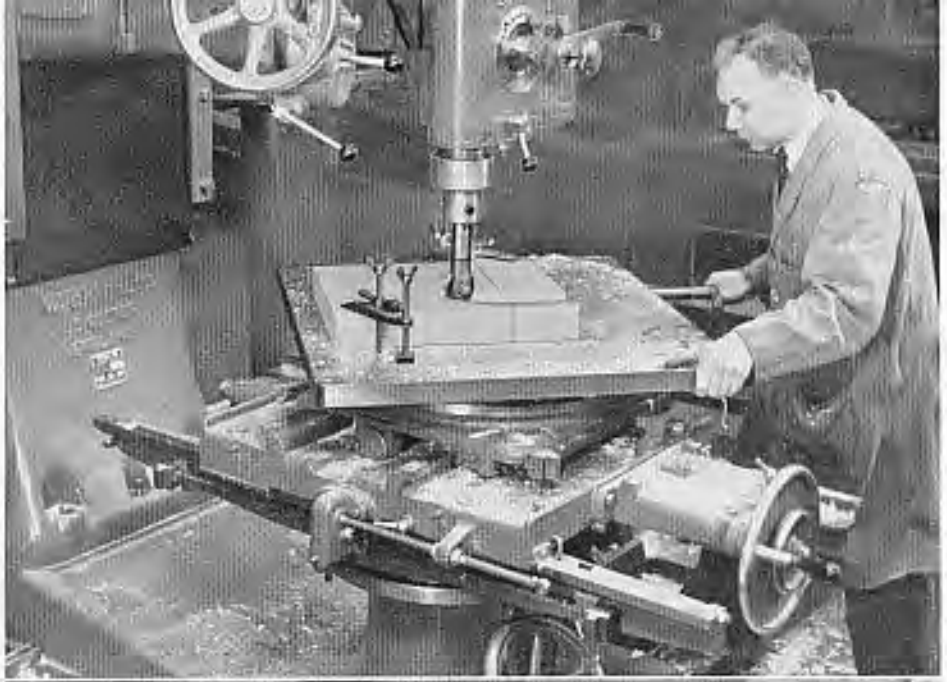
Illustration on left shows typical work produced on Wadkin Pattern Millers, and provides a partial idea of the amazing versatility of the machine. The Wadkin Pattern Miller is the only machine in existence capable of such a wide variety of both corebox and pattern work. Can you afford to continue with your present methods?

Universal movements ensure a wide field of usefulness

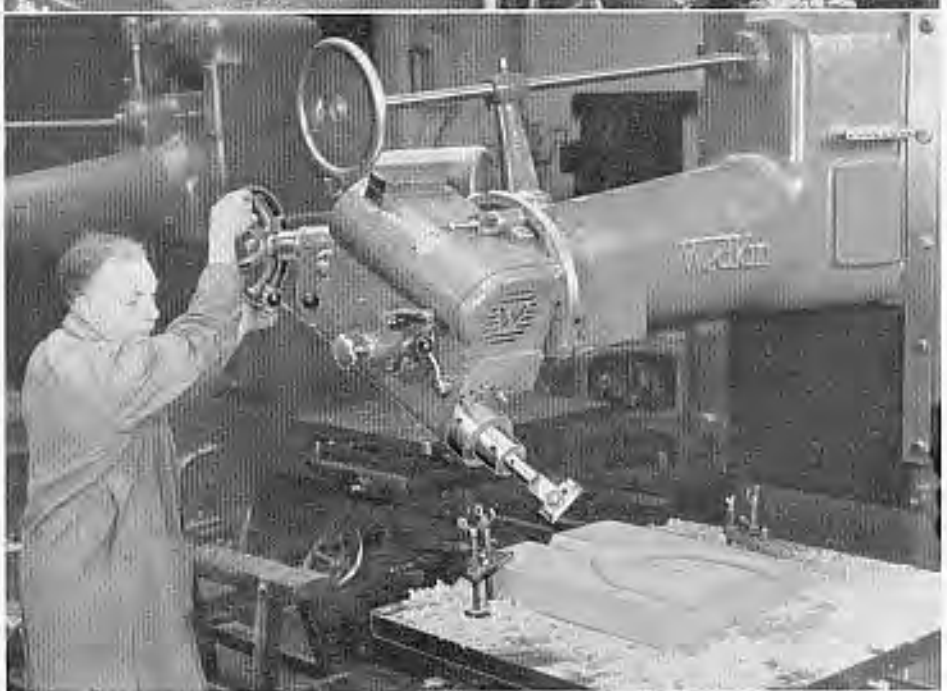
Most of the principal movements of the machine are brought into use in this demonstration.

After centring the job under the spindle, the cutter is quickly brought into the cutting position by hand-lever. Exact setting to the marking out line is by fine screw adjustment, operated by small handwheel on the front of the head.

Taking the cut. The table is traversed by handwheel and screw. Limit stops are provided on all table movements.



Cutting round bend by swinging the table. A stop is engaged after swinging through 90°.



Head being swung round by handwheel to bring cutter spindle horizontal for cutting the sockets. Note cutter has been changed.

The arm is lowered, first by power and then by handwheel to bring the cutter into the job.

Machining inside corebox. This illustration demonstrates one of the big advantages of the latest model. The spindle is below the arm, which enables it to enter a corebox with its axis parallel with the face of the job. The cutterhead can be carried close up to the spindle bearing, and long bars and steadies are dispensed with.

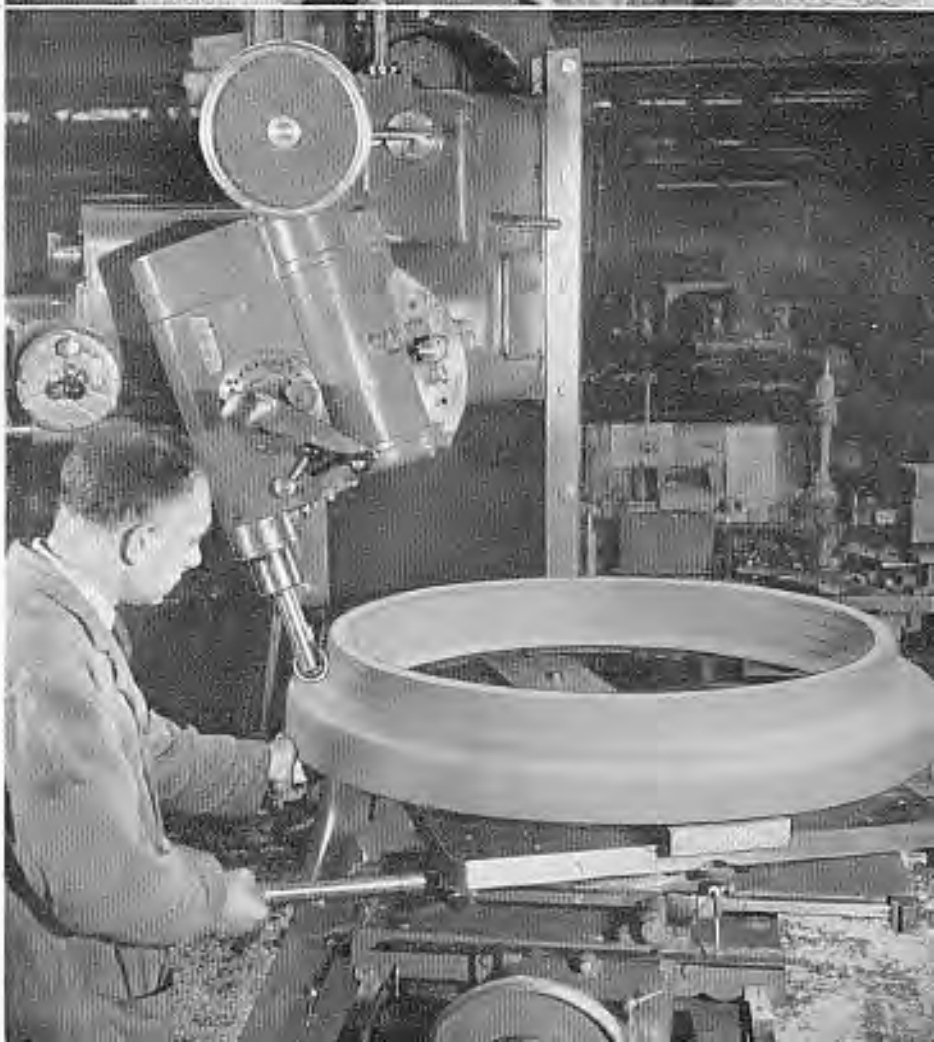
This corebox for a machine tool gearbox, each half measuring 3' 3" × 2' 0", provides a good illustration of the utility of a Wadkin Miller.

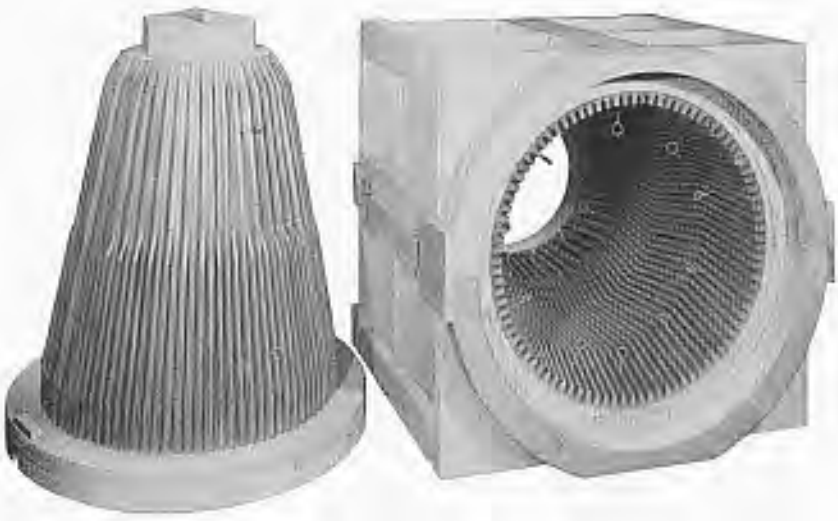
The job was worked out of the solid and the whole of the work excepting the bosses was done on the machine in approximately three hours. Without the aid of the machine this corebox would have represented three days' work for the Pattern Maker.

Typical work done on a Wadkin *Pattern Miller*

Much laborious handwork can be eliminated on both pattern and corebox work.

Illustrations right show the milling of a ring both inside and outside. Any size work of this nature up to a diameter of 10′ 0″ can be worked in far less time than by any other method. Note the slight cant on the head in the top illustration to obtain the required draft on the pattern.

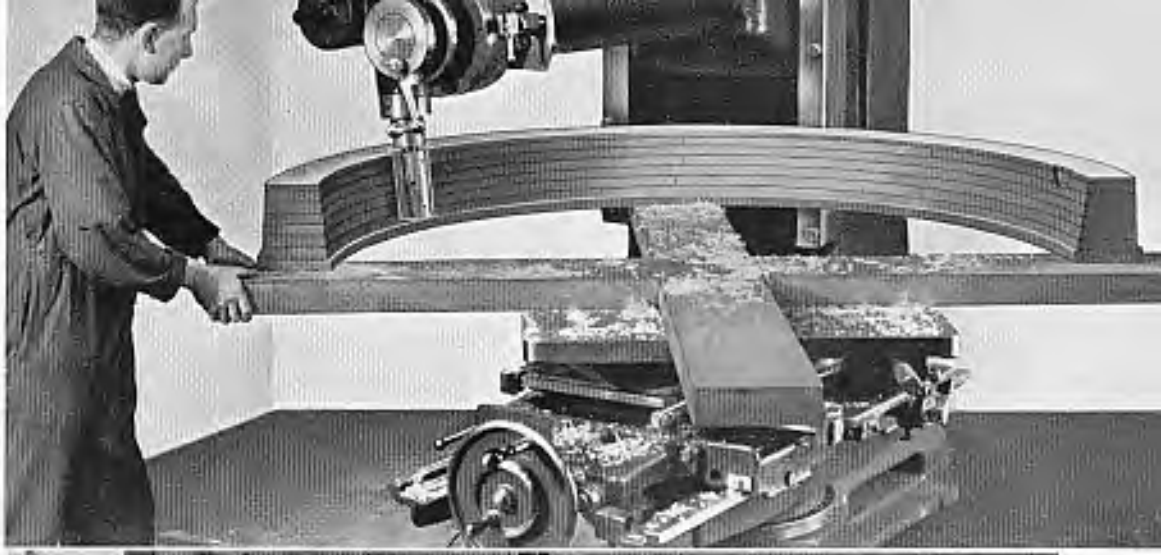




Further examples of efficient pattern milling

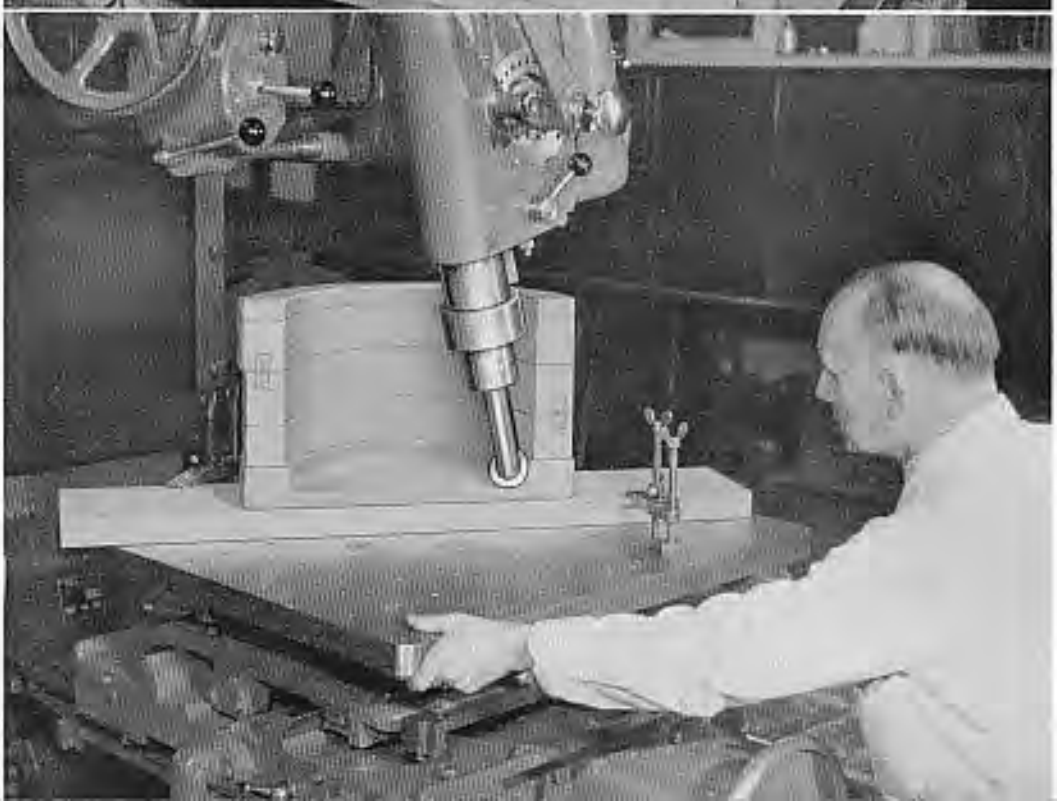
Machining the bent ribs for the job shown above. On one core-box alone the Wadkin Pattern Miller saved at least 200 hours.

Photograph by courtesy of G. Perry & Son Ltd., Leicester.



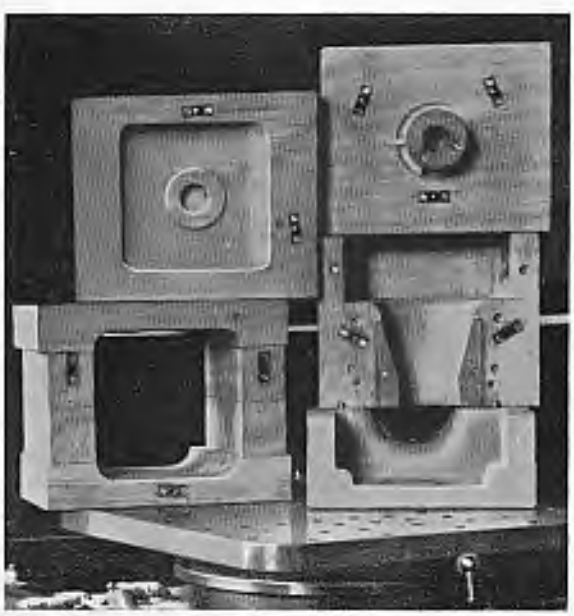
Milling large diameter segmental work. All three faces are machined without unclamping the job.

Machining inside a large corebox using a standard cutter. It was estimated that the Wadkin saved 100 hours on this job besides ensuring greater accuracy than by hand methods.

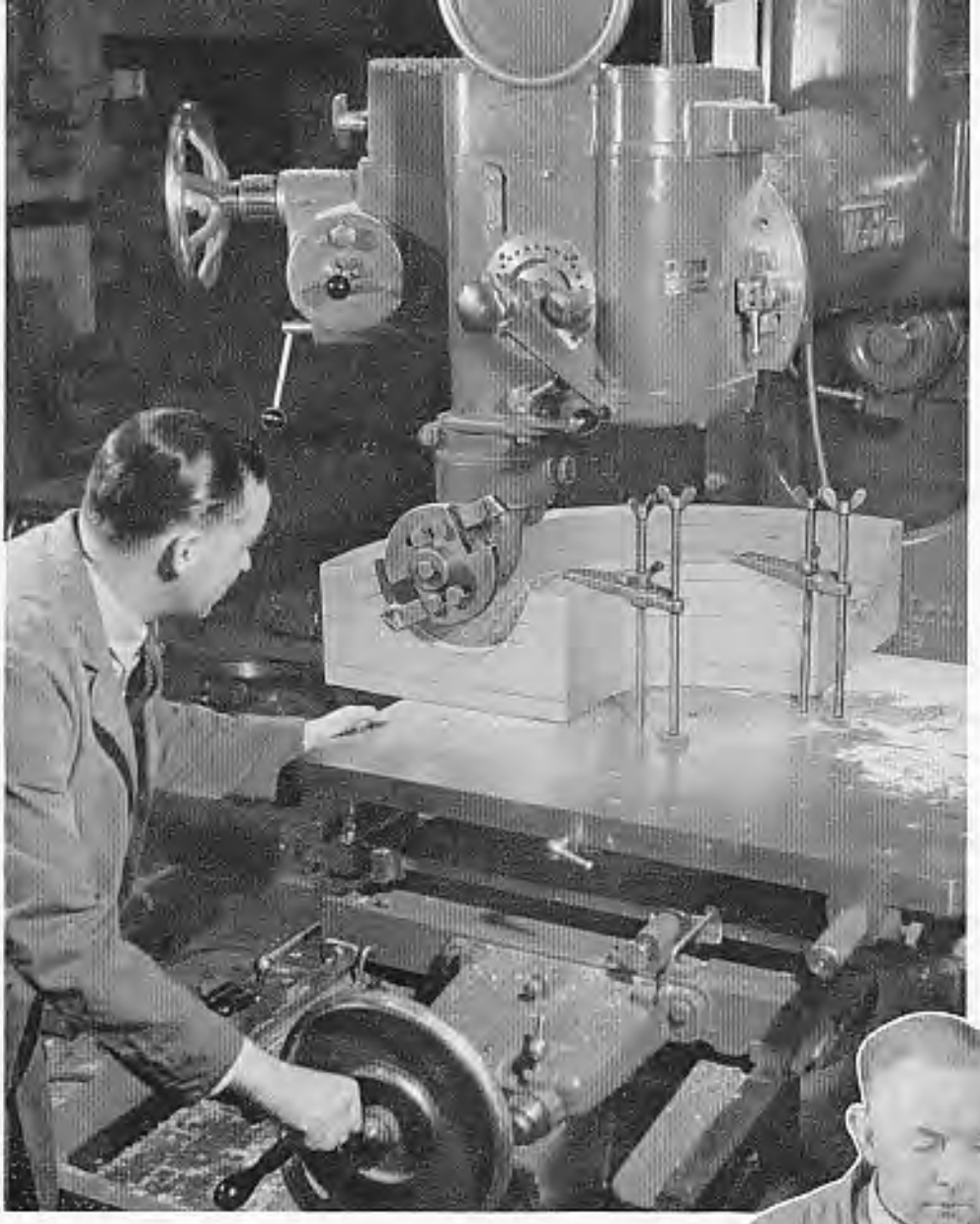


Machining fillet on bottom of a corebox. The sides of this box have been milled by the use of the circular cutterblock as seen in the illustration at the top of the page.

Illustration above shows a recessing operation on a pattern for an Air Compressor Cylinder Block, a job which also provided scope for time saving milling operations.

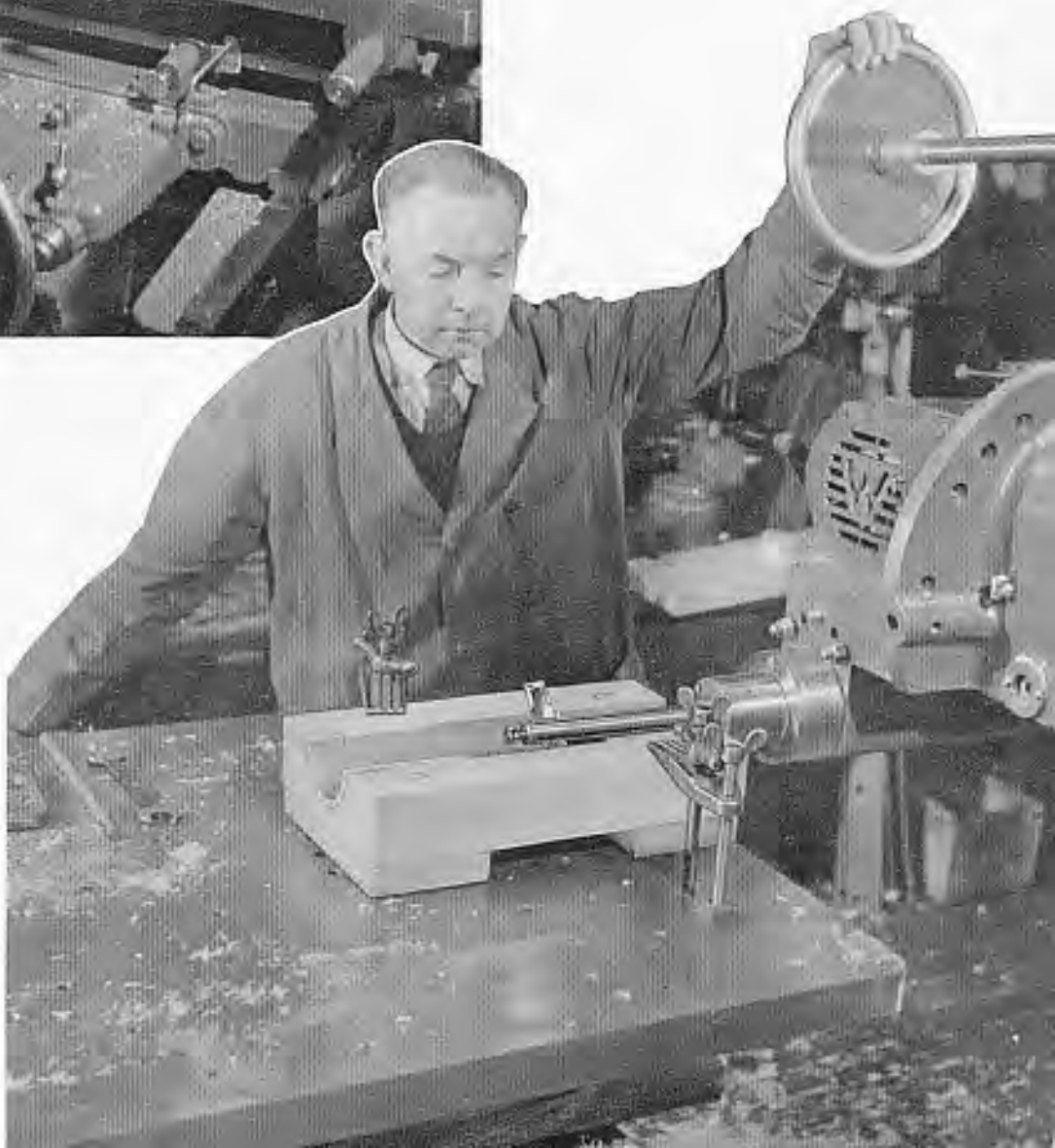


The complete corebox (left) was produced almost entirely on a Wadkin Pattern Miller with a saving in time of at least 75%.

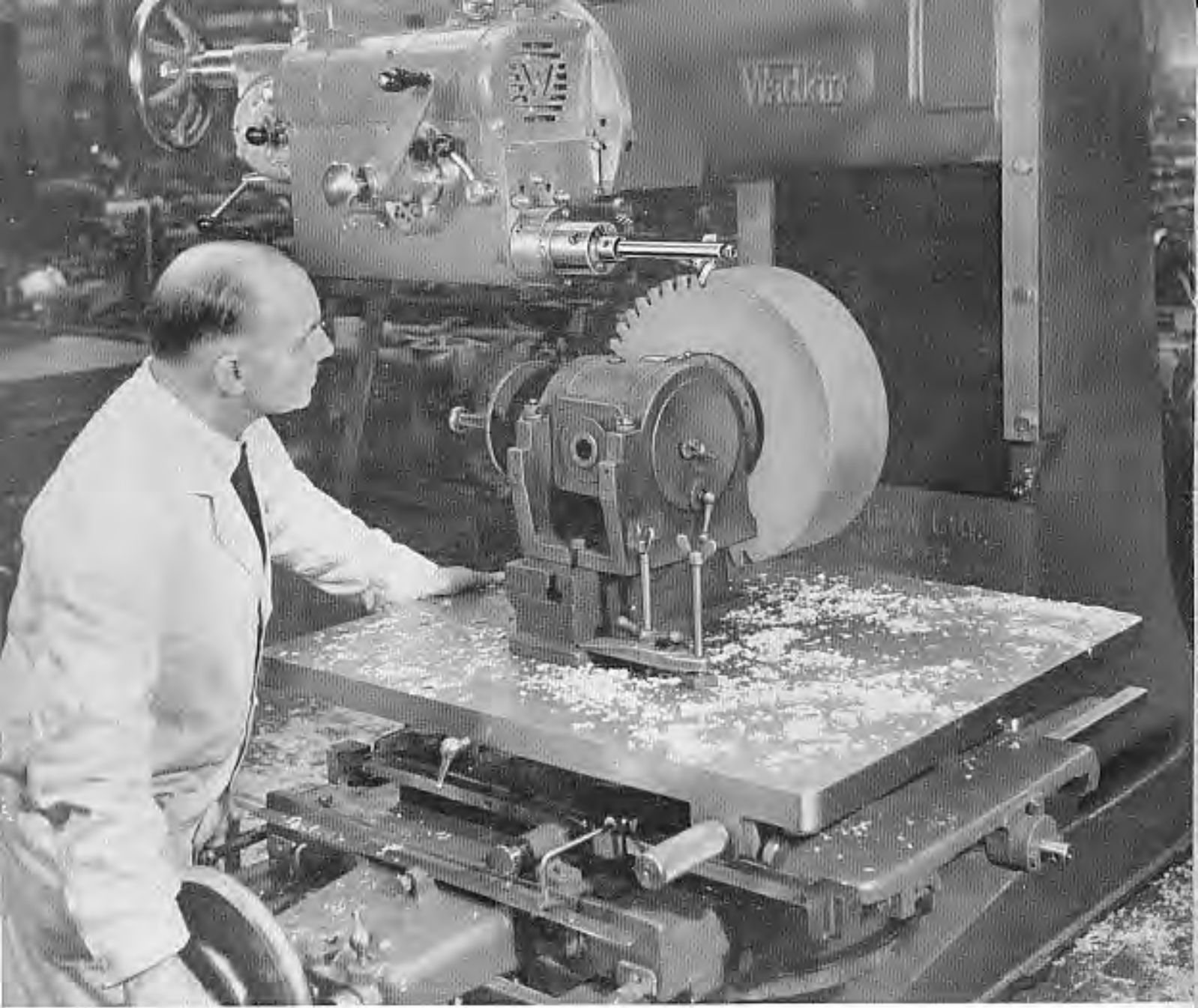


Machining a corebox by means of a revoluble head. Any diameter up to 14½" can be worked in this way.

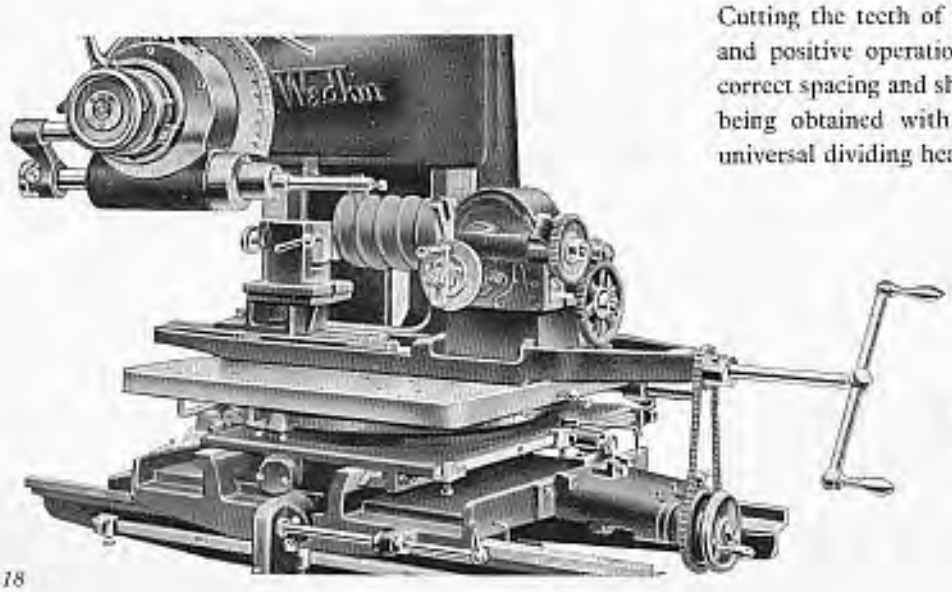
In this job the main spindle of the machine is vertical but the spindle carrying the cutter is parallel to the surface of the work, a method of operation that ensures both accuracy and flexibility.



Milling a corebox with two stepped ends and centre chamber. This job is milled out of the solid far quicker than making up in separate pieces by hand.

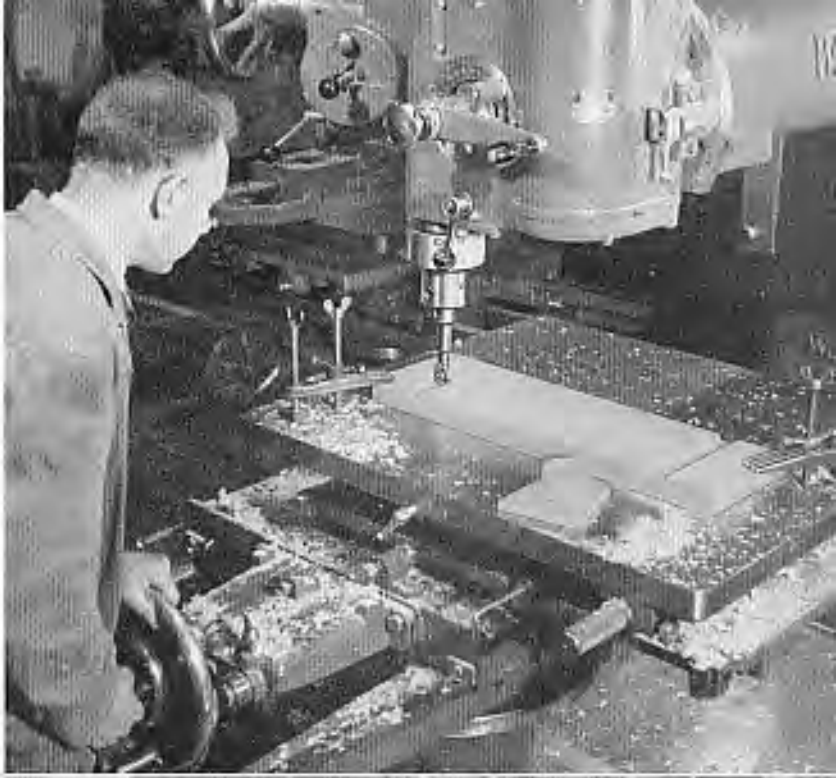


Cutting the teeth of gear patterns is reduced to a simple and positive operation on a Wadkin Pattern Miller, the correct spacing and shape of tooth on spur or bevel gearing being obtained with precision accuracy by means of a universal dividing head.

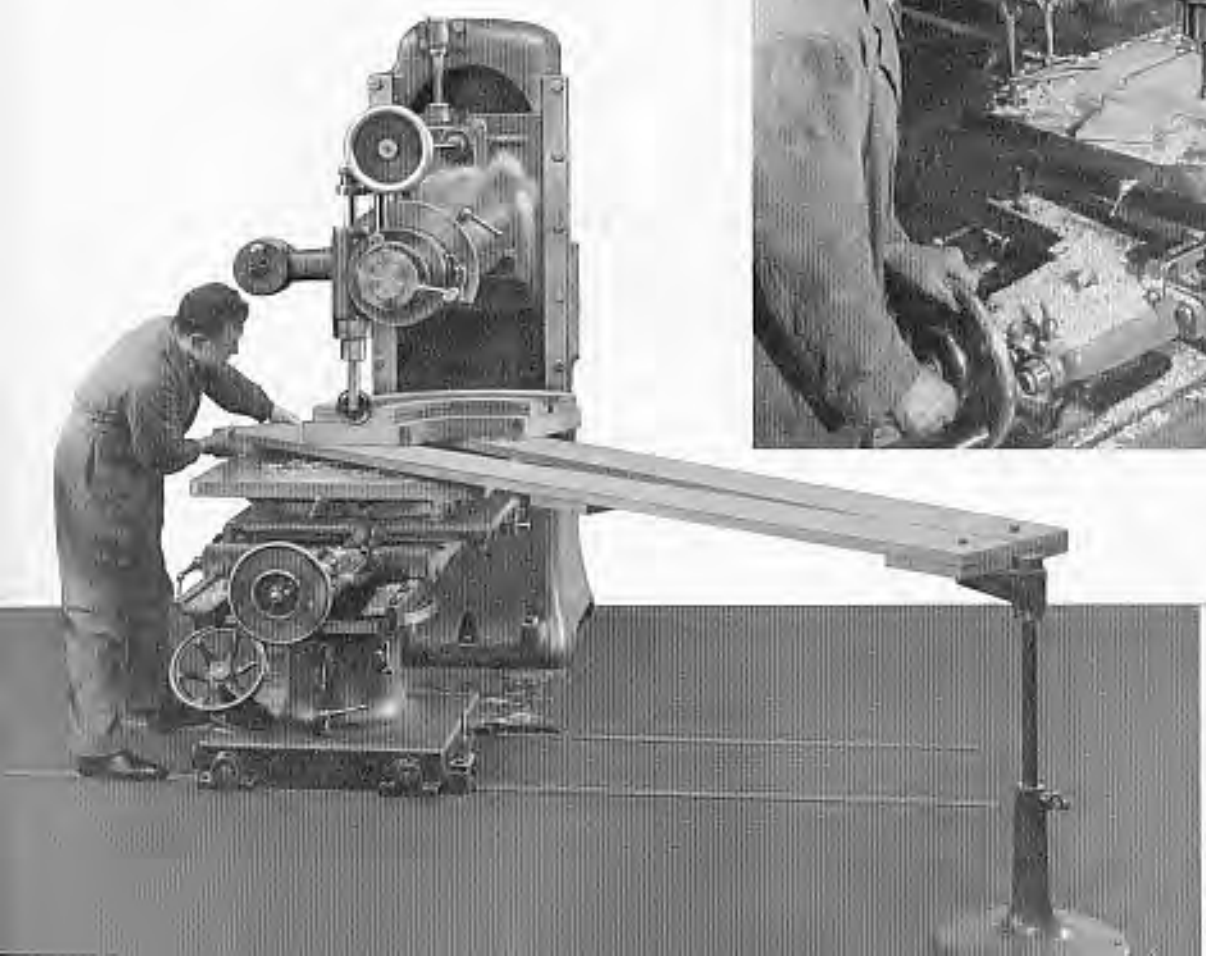


Worm, helical or spiral gears can be generated by means of the fixture shown here.

The variety of work done makes it the most useful machine ever designed for the pattern shop



Trenching the sides and cutting a dovetail recess to receive a loose boss—two very quick and very easy operations on a Wadkin. The dovetail cutter is part of the comprehensive range of cutter equipment supplied with the machine.



The large radius attachment seen here can be supplied for cutting coreboxes with large sweeps.

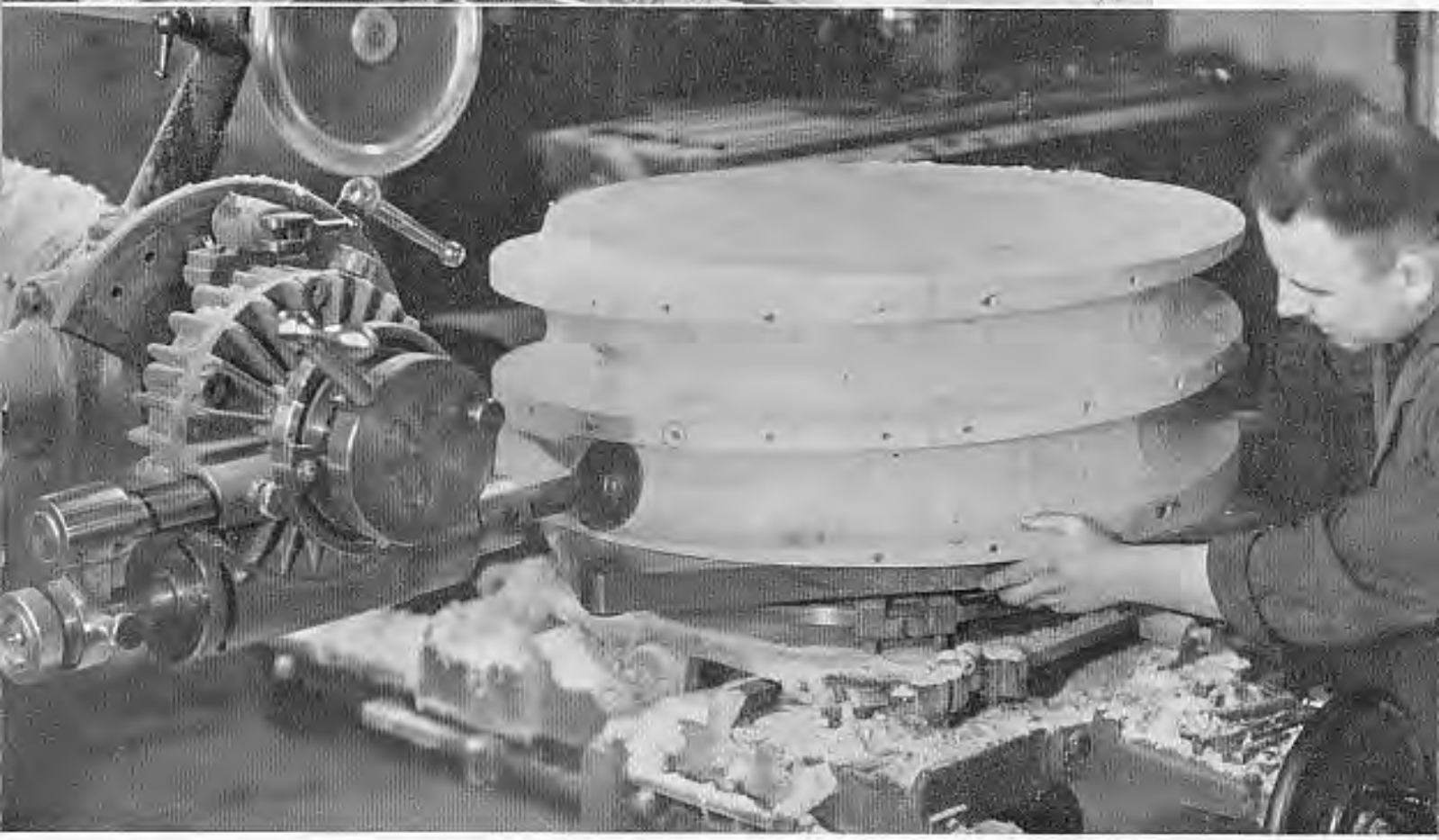
Hours of laborious hand work are saved

ON JOBS LIKE THESE

Machining a large circular pattern on the Wadkin Pattern Miller. The load on the table is counterbalanced by a weight suspended on the lifting bar overhead, enabling the job to be rotated freely. The print ends of the pattern were machined to 72" diameter and the machine is seen milling a flange recess.

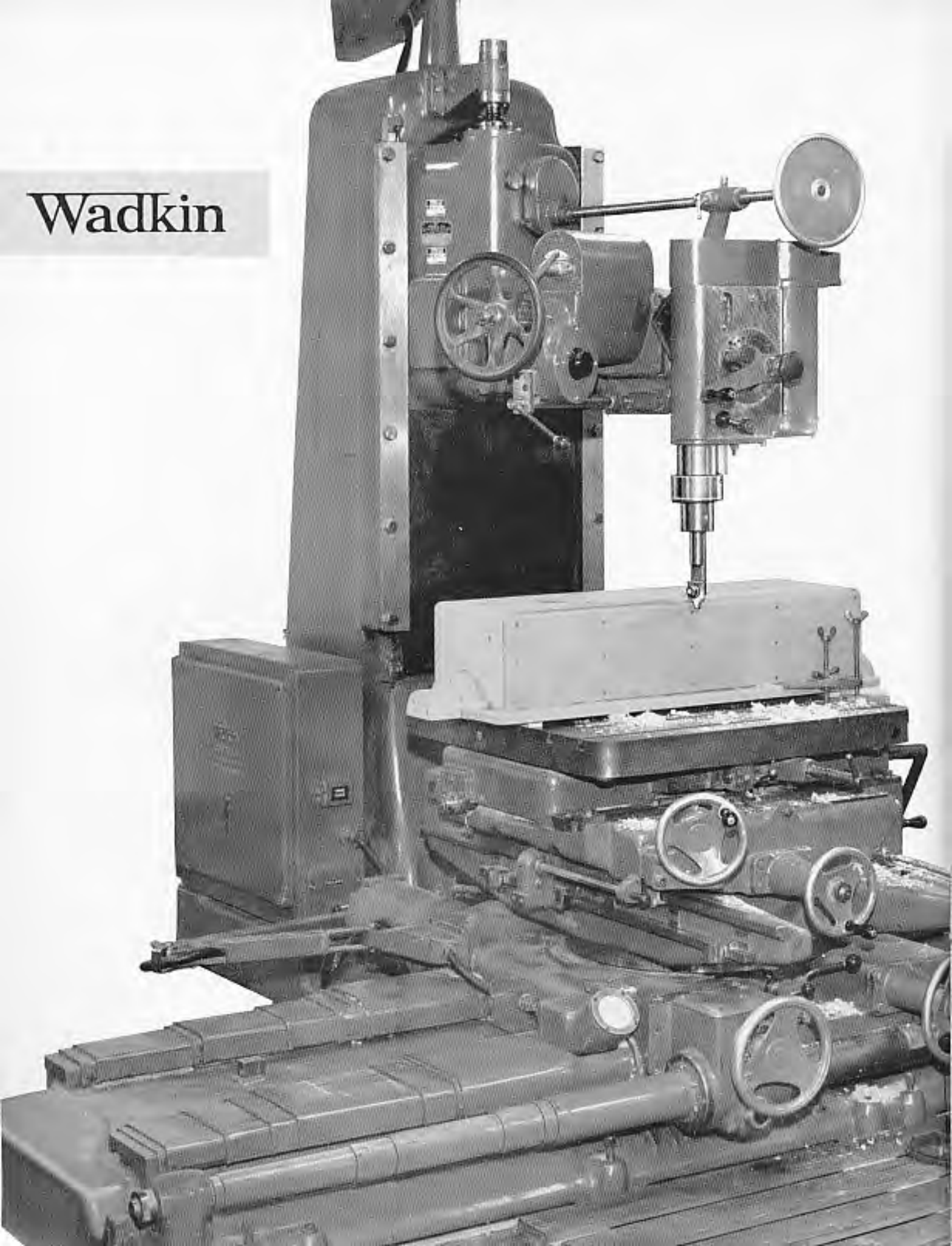
Photograph by courtesy of R. & W. Hawthorn, Leslie & Co. Ltd., Newcastle-upon-Tyne.

The spiral grooves in this pattern were obtained on the machine by first cutting the grooves in a true circle, then cutting down the centre and rejoining the halves.



Difficult jobs such as cutting a spiral groove in a cable reel can be simplified and hours saved by a Wadkin in the hands of an alert operator.

Wadkin



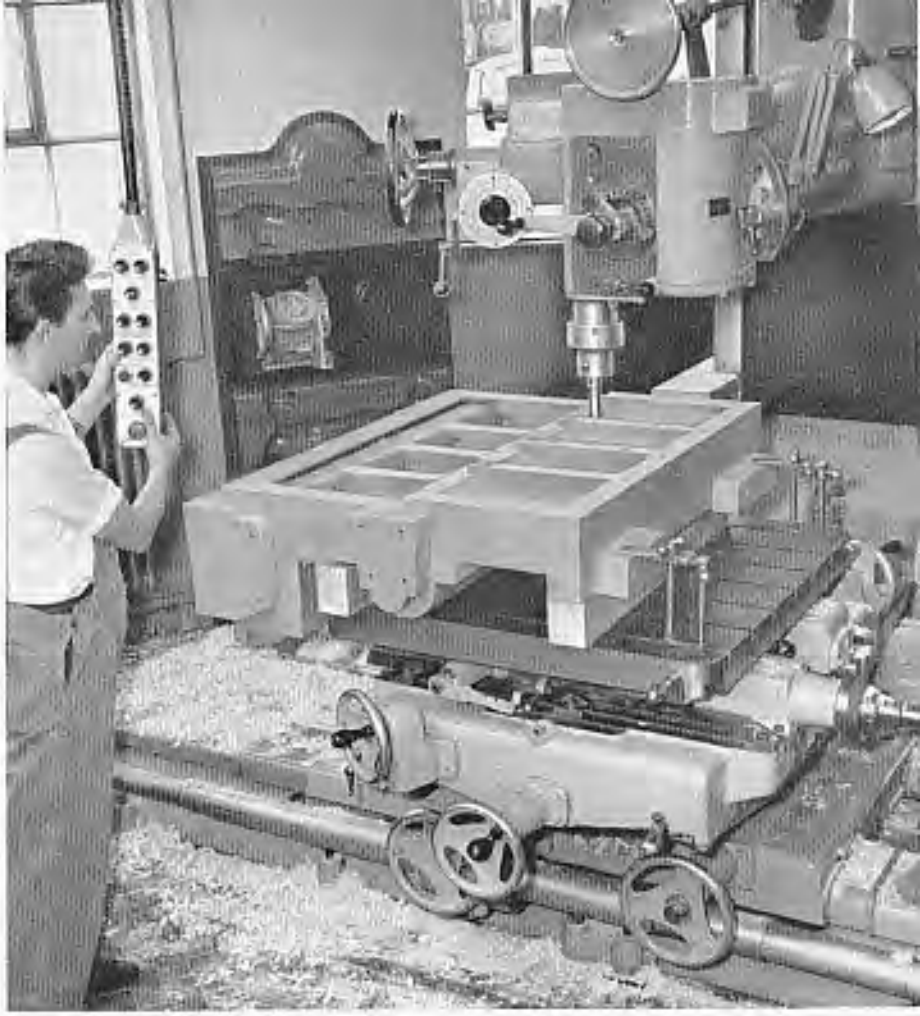
The robust bed-mounted table of the WZ type, combined with infinitely variable power feeds on the table movements, permit heavy cuts to be made on large patterns with both speed and accuracy.

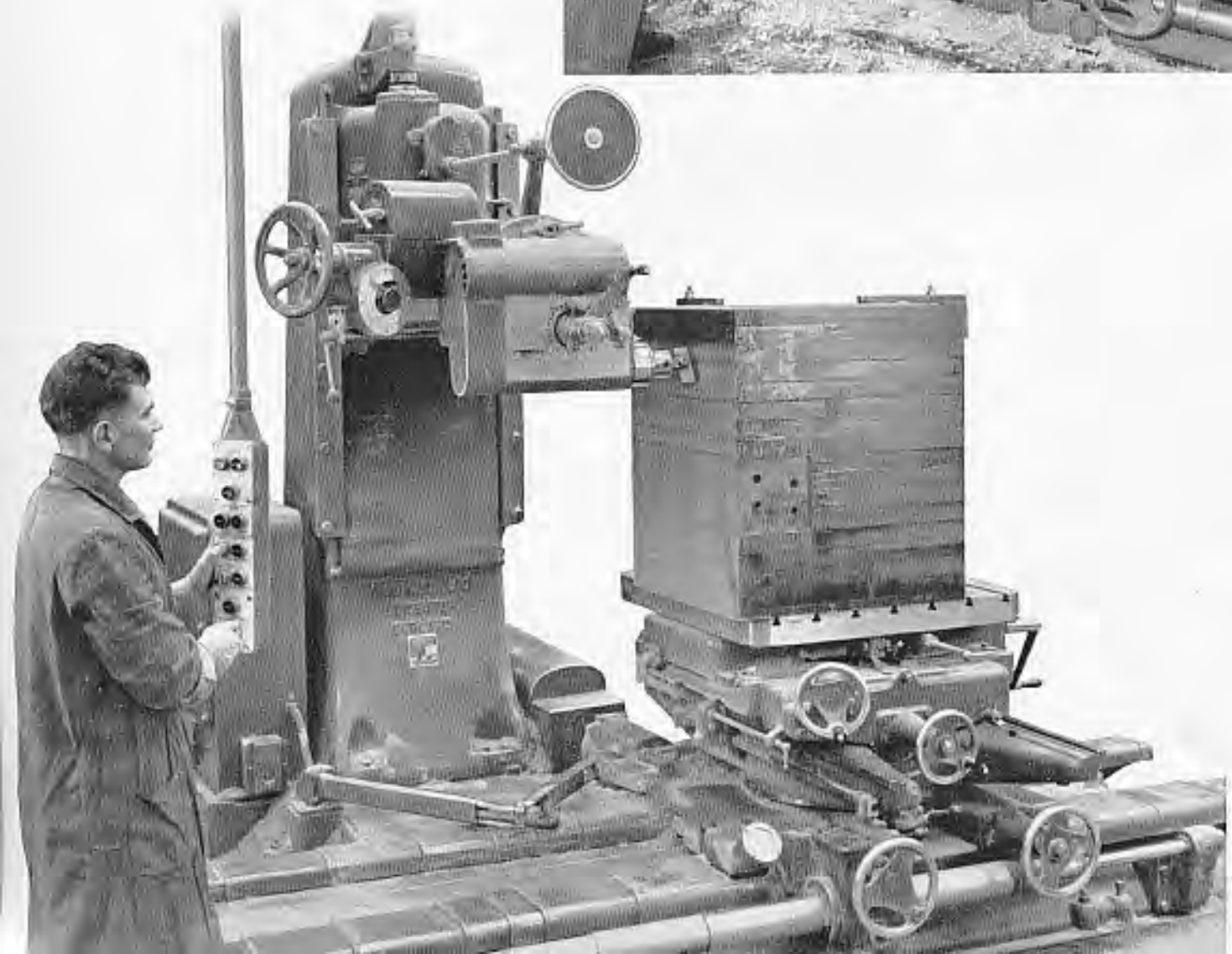
Photographs by courtesy of The Goss Company, Division of Michie-Goss-Dexter Ltd., Preston

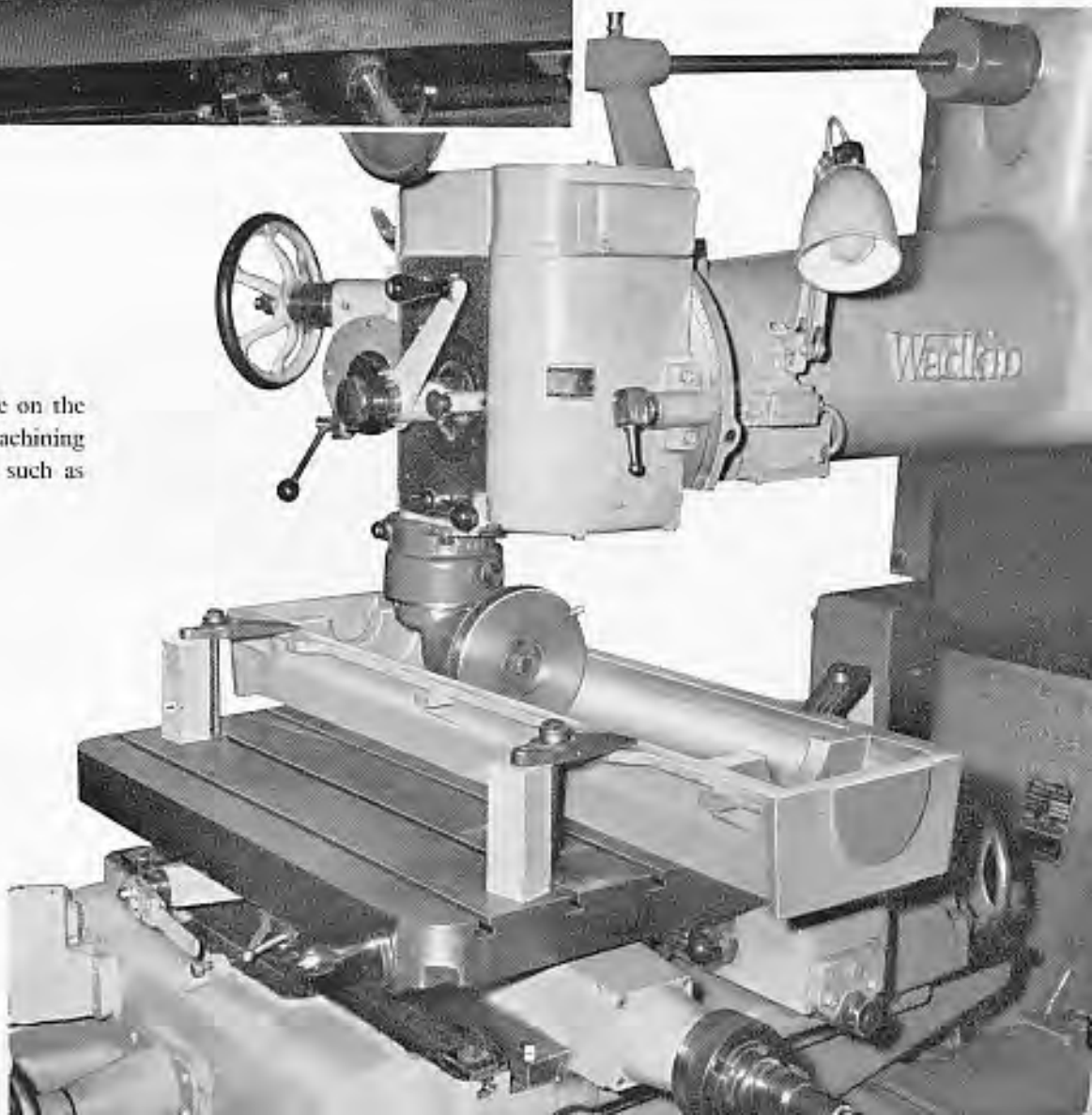
Another large job, involving inside recessing, conveniently handled on the WZ type in our own Pattern Shop.

The combination of power movements on both the head and table make the WZ type ideal for face milling large areas as on this built-up block of 'Permali'.

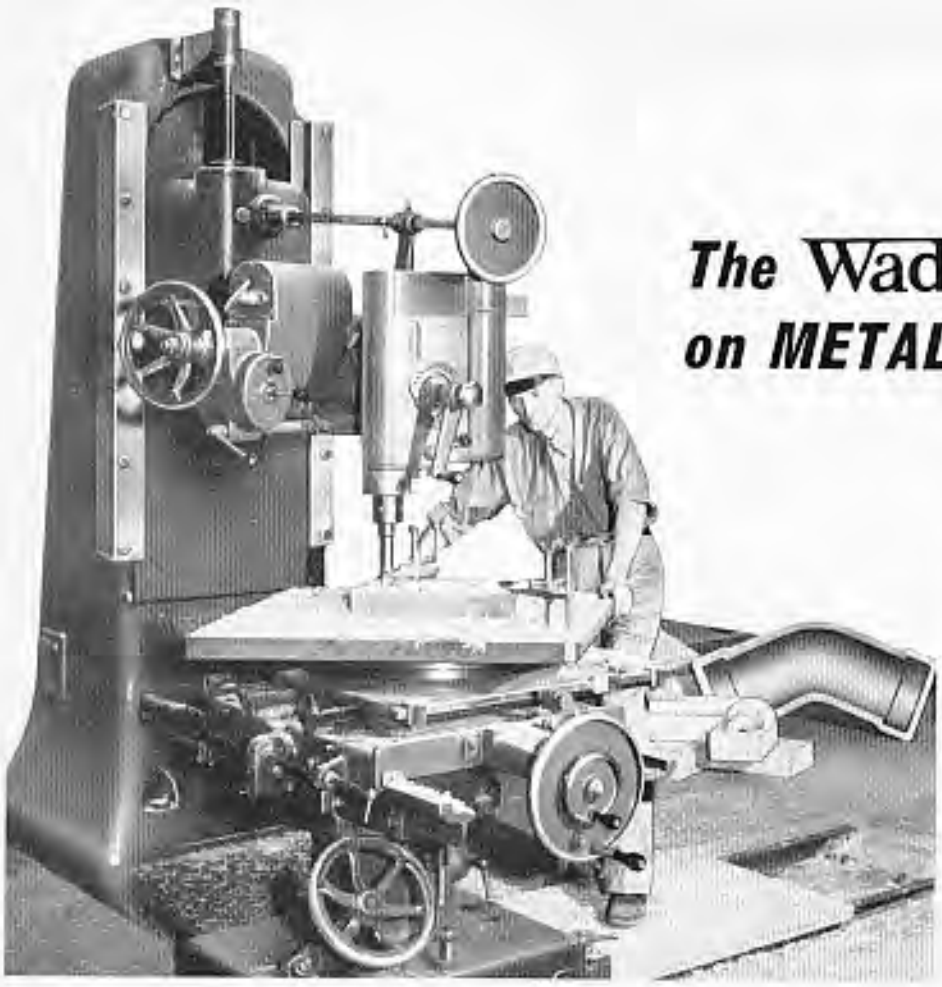
Photograph by courtesy of Permali Ltd., Gloucester.







Power rotation of the table on the WZ greatly facilitates the machining of non-ferrous metal jobs such as these.



The Wadkin is equally useful on METAL PATTERNS

The W.X. type machine although primarily designed for wood will successfully handle light milling and facing operations on non-ferrous metal patterns to the normal limits of accuracy involved in pattern work.

The W.Z. type machine with its heavy power-operated table will handle the heaviest class of work in non-ferrous metal. Its infinitely variable feed on the table movement permits heavier cuts to be taken faster and more accurately.

Surface milling using a 3½" diameter plug cutter cutterhead.

A wide range of milling cutters from ¼" to 2" diameter can be used on the machine. The four speeds on the spindle ensure correct cutting speed for each size of cutter.

This group of Wadkin Pattern Millers is used exclusively on metal patterns in the works of G. Perry & Sons Ltd., of Leicester.

This well-known firm of pattern makers have ordered at various times no less than 10 machines.

Milling inside a gear housing corebox.

Machining an axle housing corebox, using a shortened cutter holder and tungsten carbide tipped cutter.

More examples of METAL pattern milling

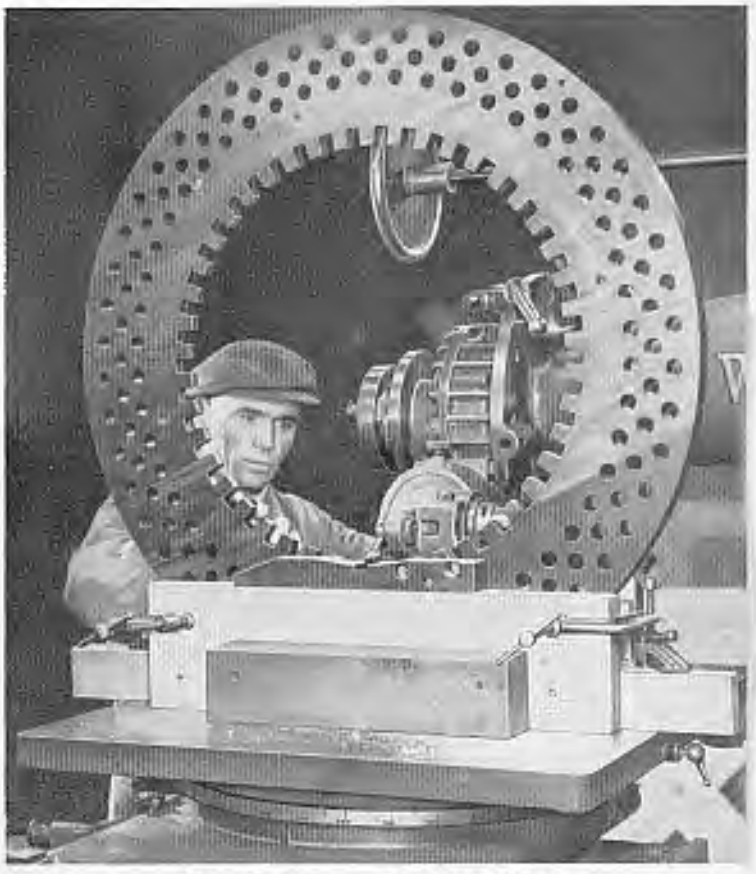
Milling an internal radius on an aluminium pattern.

Photograph opposite. Face milling a metal pattern for an aero engine.

Machining aluminium air intake pattern on an aero engine pattern.

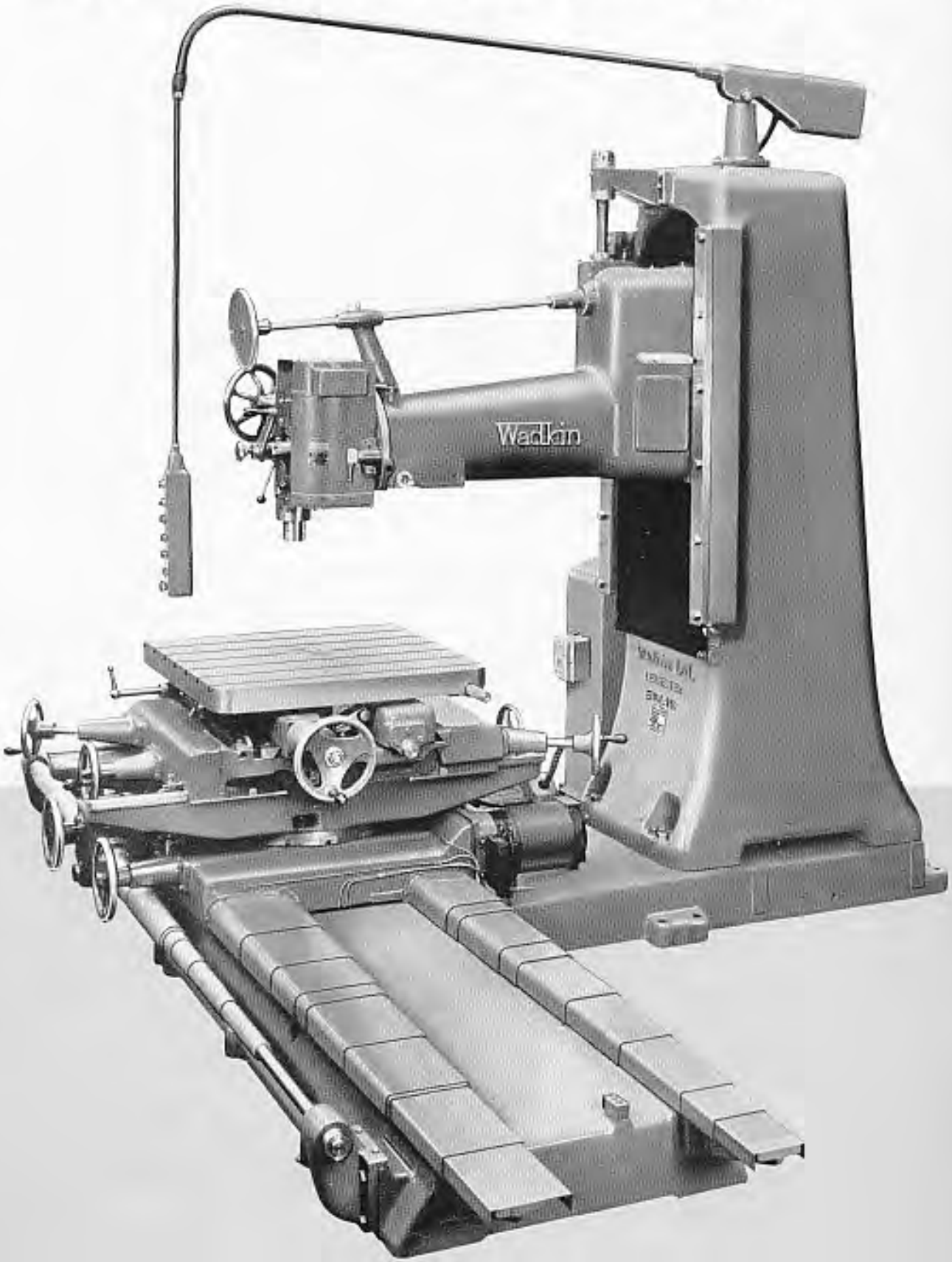
Recessing metal pattern for a hosiery machine head.

Milling an aluminium pattern for a machine base.

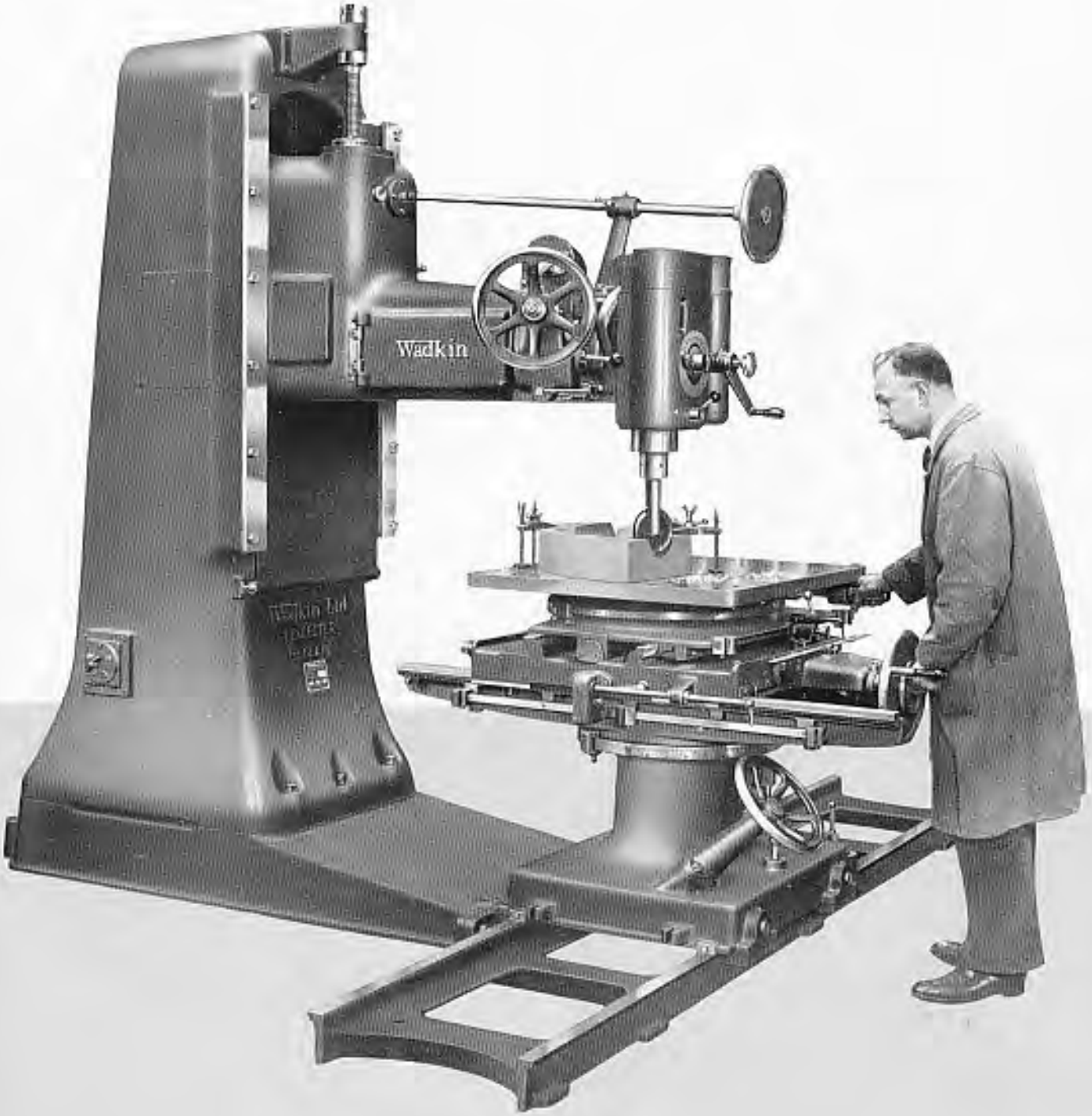


Machining a pattern ring in "PERMALI".

TYPE WZ *with power-operated table*



TYPE WX *with hand-operated table*



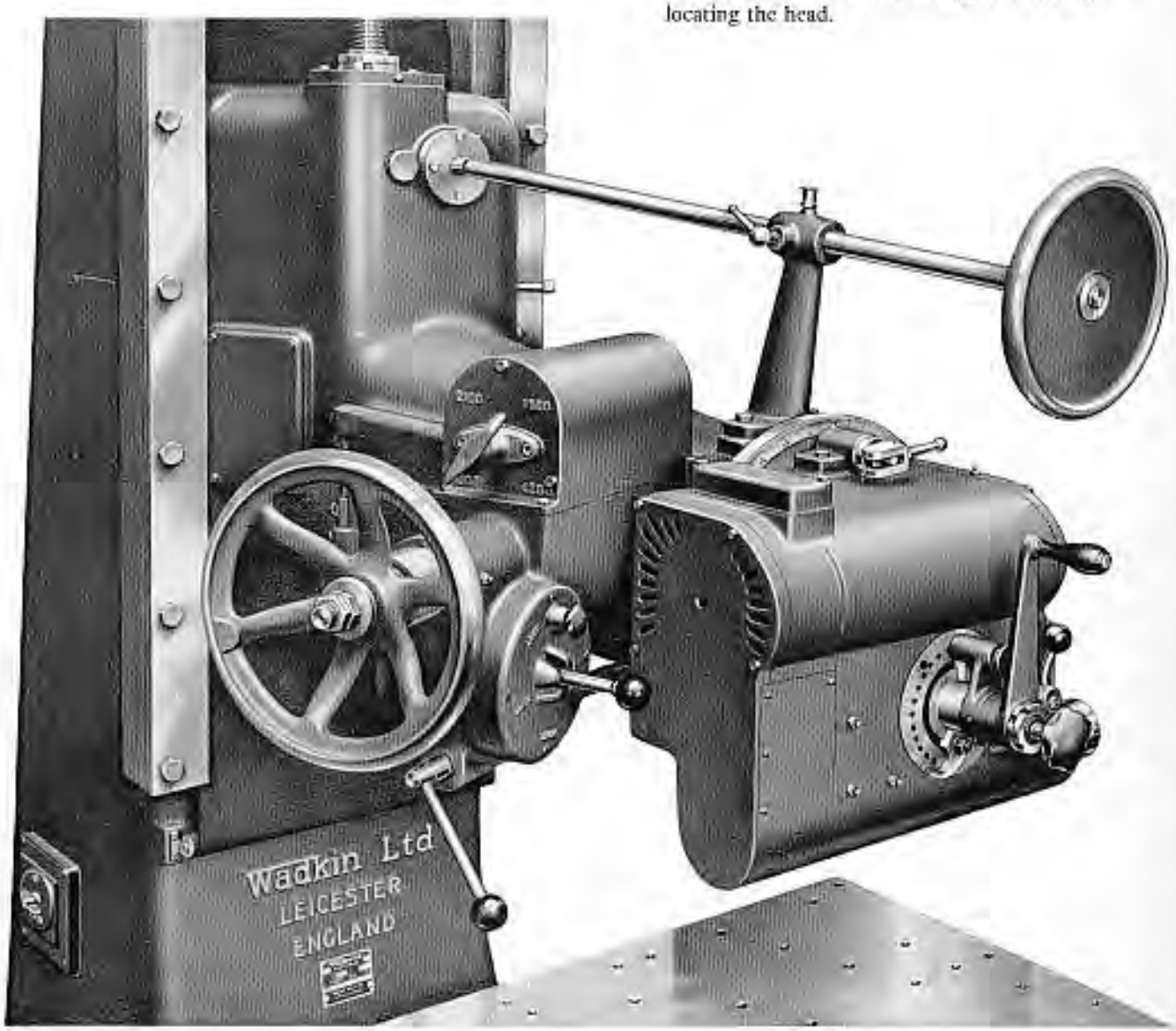
SPECIFICATION

The Overhanging Arm

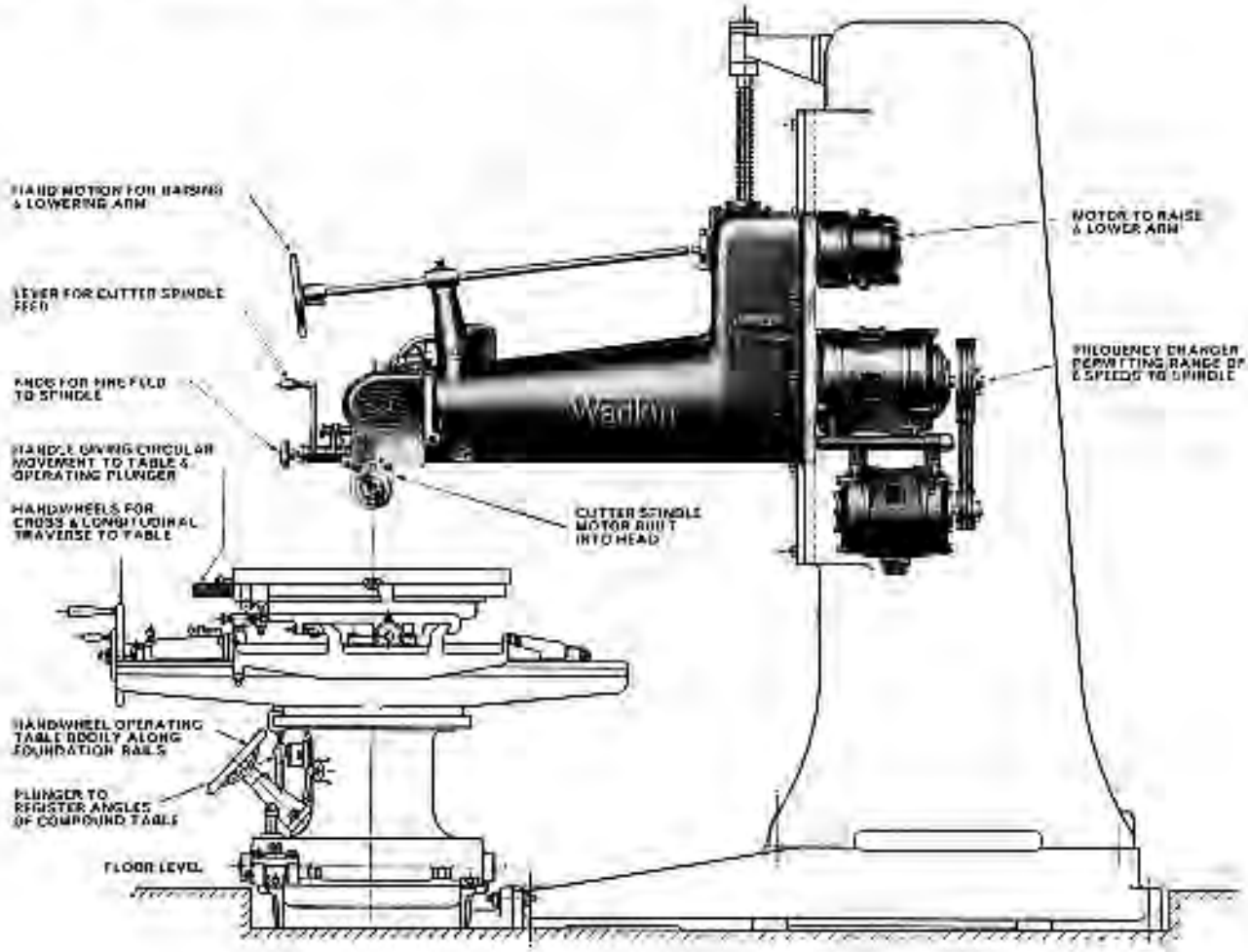
The overhanging arm carrying the spindle head is mounted on gibbed sliding ways on the main frame and can be raised and lowered either by power or hand feed. The power motion is obtained by a 1 h.p. motor built on the end of the arm driving on to the raising and lowering screw by gears. Hand motion is by handwheel placed immediately over the spindle head.

The Spindle Head

The spindle head carried by the overhanging arm swivels to any position from 50° above the horizontal to 20° beyond the vertical. The principal angles are indexed and located by a spring plunger taper pin engaging with suitable holes. Intermediate angles are secured by locking handle. The swivelling movement is by worm and wheel operated by handwheel. This mechanism incorporates a spring-loaded friction clutch to prevent damage to the plunger locating the head.



useful pattern shop machine ever designed



The Cutter Spindle

The cutter spindle is mounted in ball bearings housed in a large diameter sleeve. A movement at right angles to the arm is provided by means of a rack cut in the sleeve. The pinion engaging the sleeve rack is controlled by hand lever on the front of the head for quick adjustment. A fine screw feed operating on the rack is also provided. Hand lever feed is provided with a spring plunger to give definite depths of feed. Adjustable limit stops are also provided. The spindle is counter-balanced at every position by means of a weight mounted in the head, having rack teeth which engage with the opposite side of the pinion operating in the sleeve rack.

The driving end of the spindle has six solid splines ensuring easy sliding motion with freedom from wear. The cutter spindle end is bored No. 5 morse taper and fitted with set screw for securing the tool holders and cutters. The spindle is mounted on ball bearings. The bearing at the spindle nose is a double row double purpose type capable of taking both radial and thrust loads thus eliminating end play on the spindle. The driving end bearing is of the heavy duty double row type. The bearings are housed inside the sleeve and thus remain in the same position relative to the cutter at all positions of the spindle.

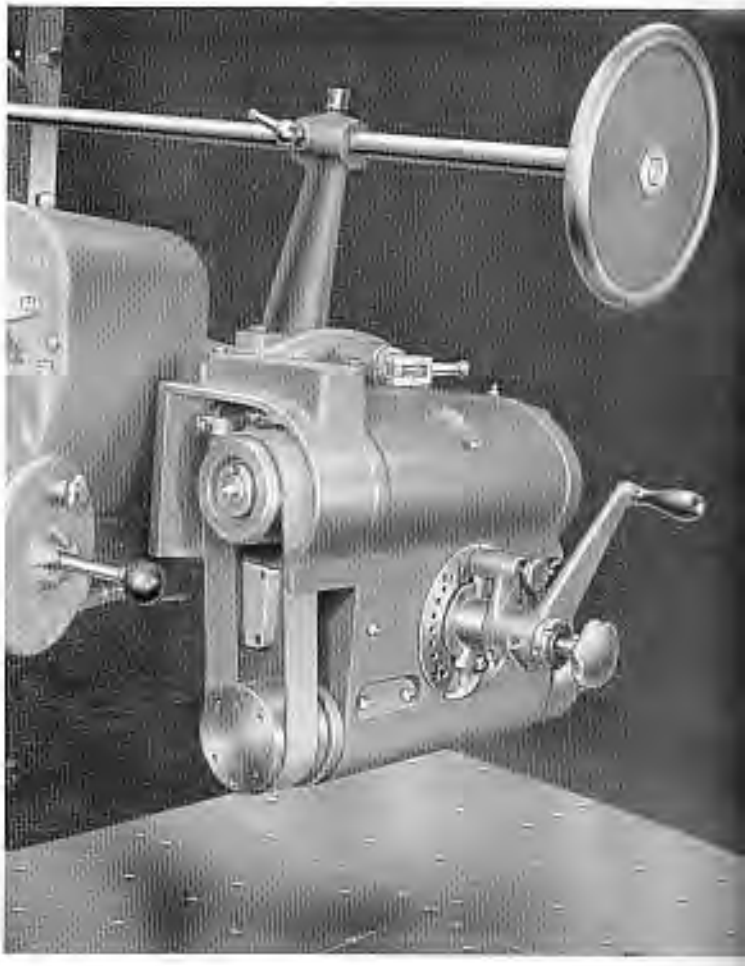
SPECIFICATION (continued)

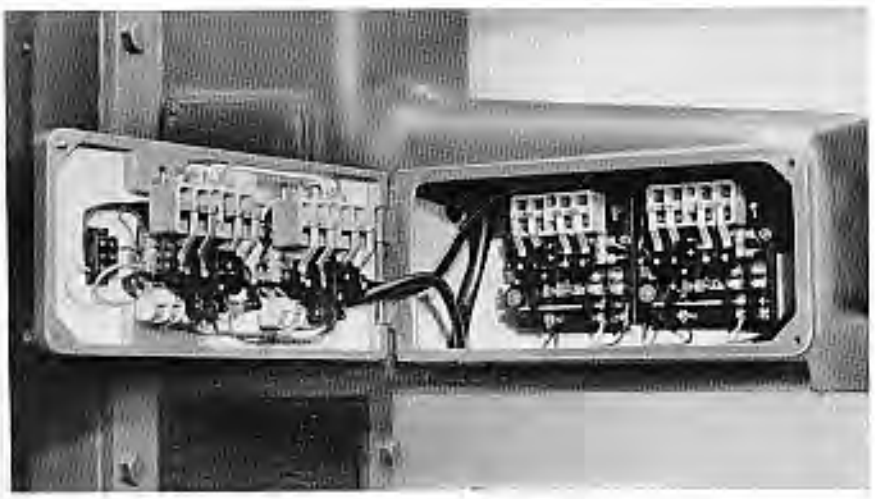
The Spindle Drive and Control

The drive to the cutter spindle is by short centre, flat stretchless belt driving from a six-speed motor built into the headstock. The pulley on the spindle side of the drive is mounted in its own ball bearings thus preventing any belt pull on the spindle itself.

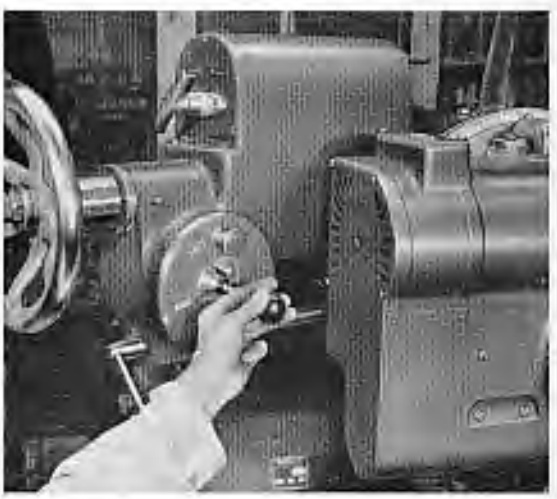
The motor provides speeds of 4,200, 3,000, 2,100, 1,700, 1,500, and 850 r.p.m. The two speeds of 3,000 and 1,500 r.p.m. are obtained direct from the 50 cycles supply line. The remaining four speeds are obtained by means of a frequency changer built on to the end of the arm opposite the cutter spindle end. Motors for both the spindle and the rise and fall of the arm are controlled by a single lever handle on a control station on the head, which gives start, stop and reverse to the spindle, also rise and fall for the arm. Master stop button with lock-off feature is incorporated. A speed selector switch for varying the speed of the spindle is carried immediately above the spindle control.

The main contactor gear is housed inside the arm, and embodies full protective features.





Contactor gear is built in and mounted as shown to give easy access. When closed, the panel is completely dust tight.



All power movements of the machine are controlled from this five-position station. Master stop button is embodied.

Patent Revoluble Cutterheads

Before the introduction of these patent cutterheads, there were many pattern making operations to which it was impossible to apply the Wadkin Pattern Miller, on account of the excessive length or curvature of the coreboxes, or because the ends were not open or of sufficient diameter to admit the use of straight cutter spindles.

These jobs are now reduced to an easy machine operation by simply attaching one or other of these revoluble heads. These heads always cut at right angles to the surface of the work. No. 1 head (shown in Fig. 1) is used for diameters from 4½" to 14½" (112 mm. to 362 mm.) and No. 2 head (shown in Fig. 2) from 2½" to 7" (63 mm. to 175 mm.).

Fig. 1.

The cutter spindles and the housings are specially arranged so that hemispherical cups of the smaller diameters can be cut. These heads will also cut true semi-circular section coreboxes with dead ends, elliptical and rectangular recesses of any length or radius up to the straight.

The main No. 1 head is mounted on the housing of the main spindle and means are provided for setting the spindles to any of the regular right line positions corresponding with the movement of the work table. It may also be clamped in any intermediate angular position desired, and can be used with the spindle either vertical or horizontal.

The heads can be revolved in a plane at right angles to the plane of rotation of the cutters while the latter are in motion, so that the cutter rotates in a spherical path.

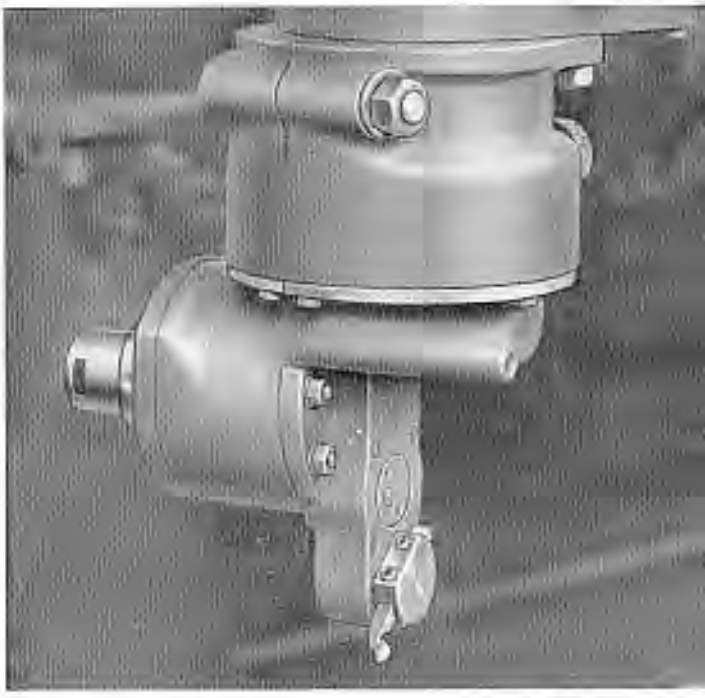


Fig. 2.

The main casting of both heads is of gun metal very accurately machined and fitted. The spindles are of best quality steel and mounted on ball bearings throughout. The gearing is of nickel chrome steel.

The No. 2 head is arranged to receive an adapter, as Fig. 3, to take Router mills with ¼" diameter shanks, for any internal working in coreboxes or for any small milling in a horizontal plane.

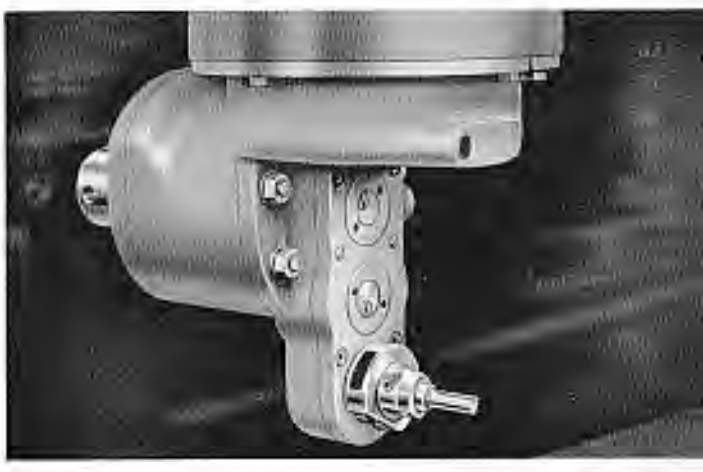


Fig. 3.

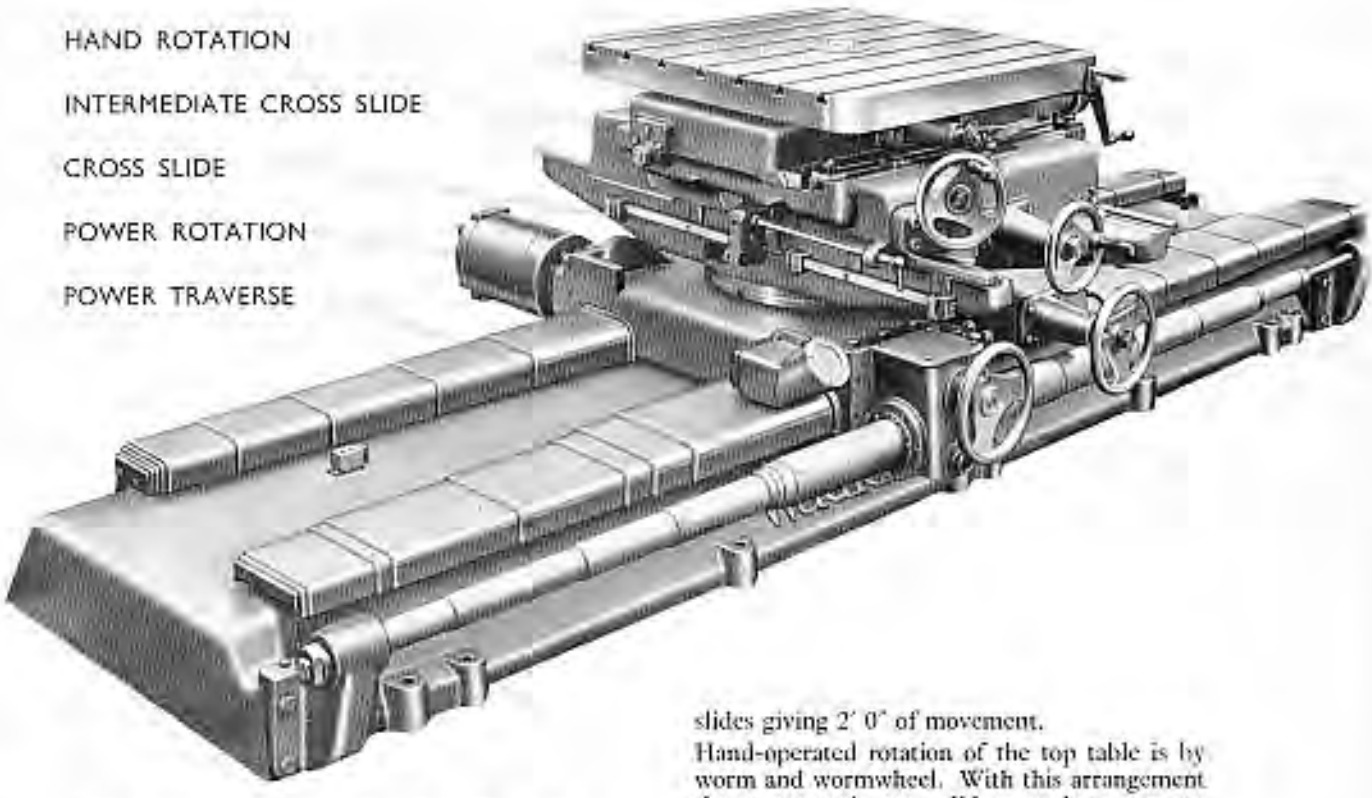
HAND ROTATION

INTERMEDIATE CROSS SLIDE

CROSS SLIDE

POWER ROTATION

POWER TRAVERSE



Power-operated Table for Type WZ

Table unit traverses along the bed by means of screw and rotating unit, at feed speeds between 3 and 90 inches per minute which are infinitely variable. Illuminated magnifying device provides easy reading of a scale in the bed.

Power rotation of the table unit is infinitely variable between ¼ to 4 r.p.m.

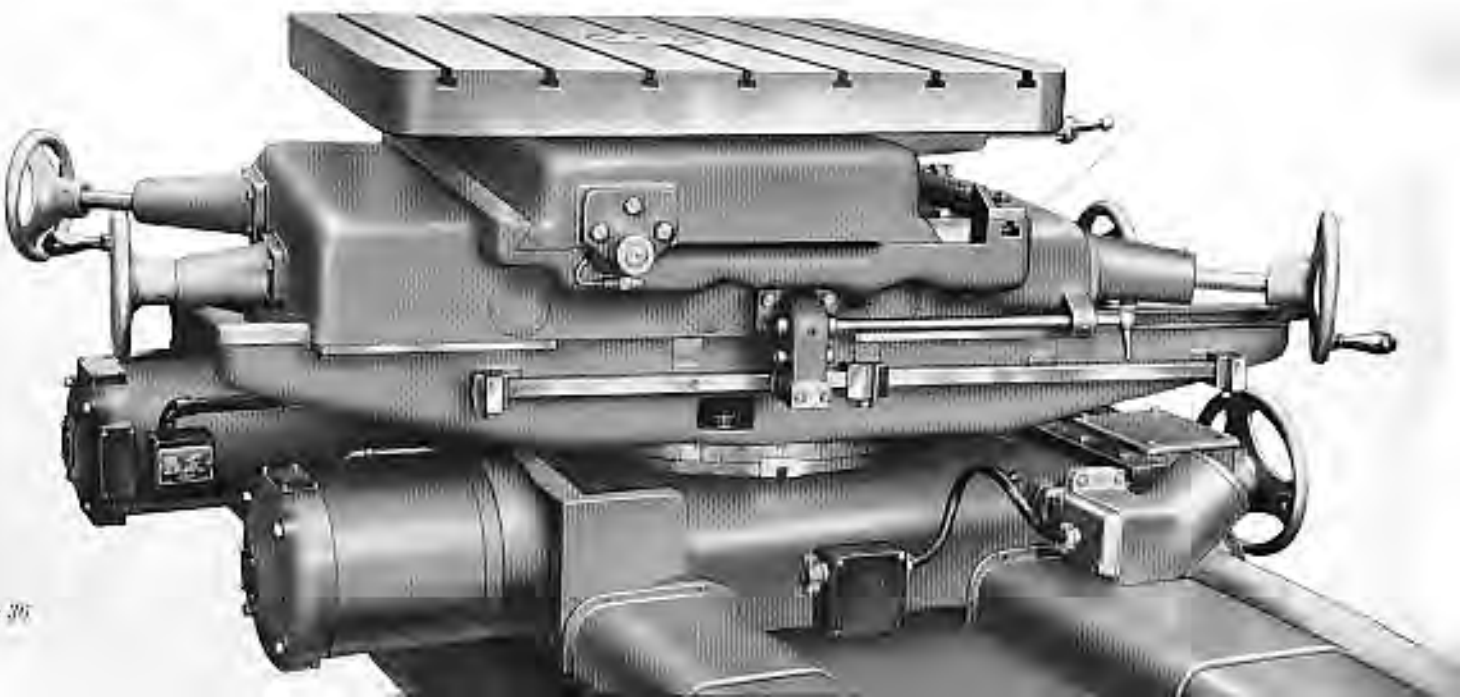
Hand-operated cross slide is on anti-friction rollers giving 3' 0" of movement, and hand-operated intermediate cross slide is on solid vee slides giving 2' 0" of movement.

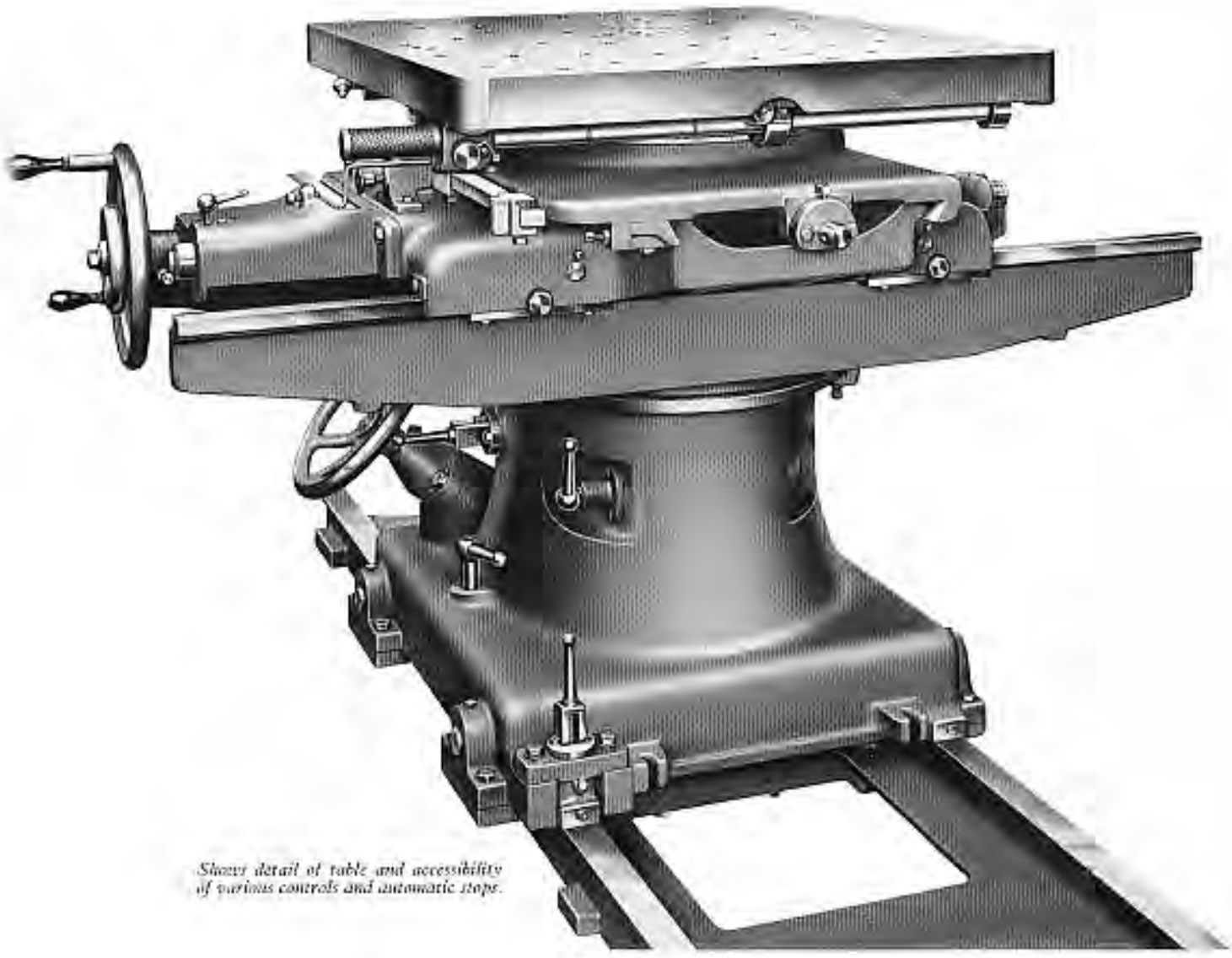
Hand-operated rotation of the top table is by worm and wormwheel. With this arrangement the compound cross slides are between two rotating movements exactly as on the WX table.

Individual handwheels are provided to all power movement for fine setting. Plungers are fitted to rotary slideways to locate principal angles. Dead stops are fitted to cross slides.

All power controls are controlled from a pendant control station, enabling large work to be controlled at a distance from the table. These include start and stop for spindle, reverse spindle, rise and fall of arm, table power traverse along bed, table rotation right or left hand, also rapid table traverse control.

The whole of the table base is above floor level and no excavation is necessary for slide rails.





Shows detail of table and accessibility of various controls and automatic stops.

Hand-operated Table for Type WX

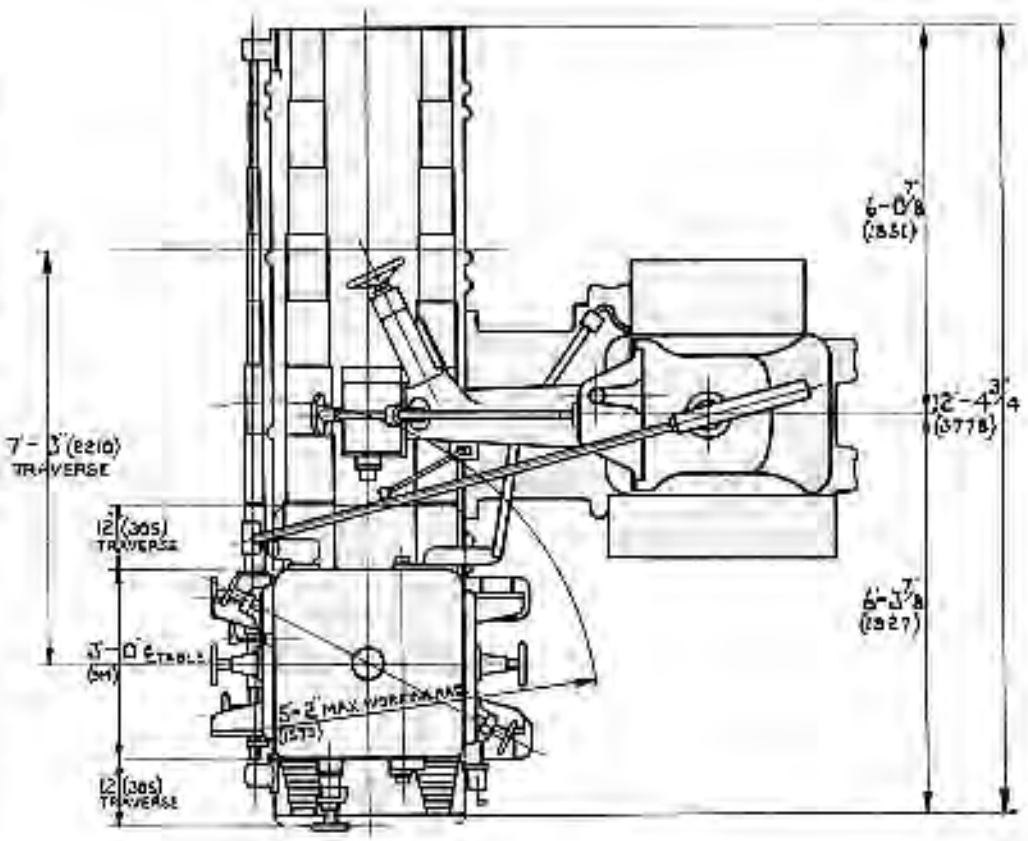
The work table has two motions at right angles, operated by screw and handwheel. The table also has a rotary movement for dealing with all kinds of circular and radius work. A hand lever is arranged with spring plunger taper pin giving all the principal angles.

The surface of the table is provided with tapped holes for fixing clamps. To special order table can be provided with tee slots similar to the W.Z. type table illustrated on opposite page.

The table is graduated and the centre recessed so that cutters may be lowered below the surface of the table. The combined table motions can be read direct from contraction or standard rules. Suitable spring and dead stops are fitted to the various table movements. The table body frame upon which the compound slides are mounted is provided with a secondary rotary motion. This enables the work table and slides to be turned to any desired angle, and frequently dispenses with resetting the work. The principal angles are located by a spring plunger and any intermediate angle may be secured by locking handle.

The complete table body is mounted on anti-friction rollers and travels along the foundation frame rails. This movement is controlled by a conveniently placed handwheel, and a quick acting lever locks the table body in any desired position.

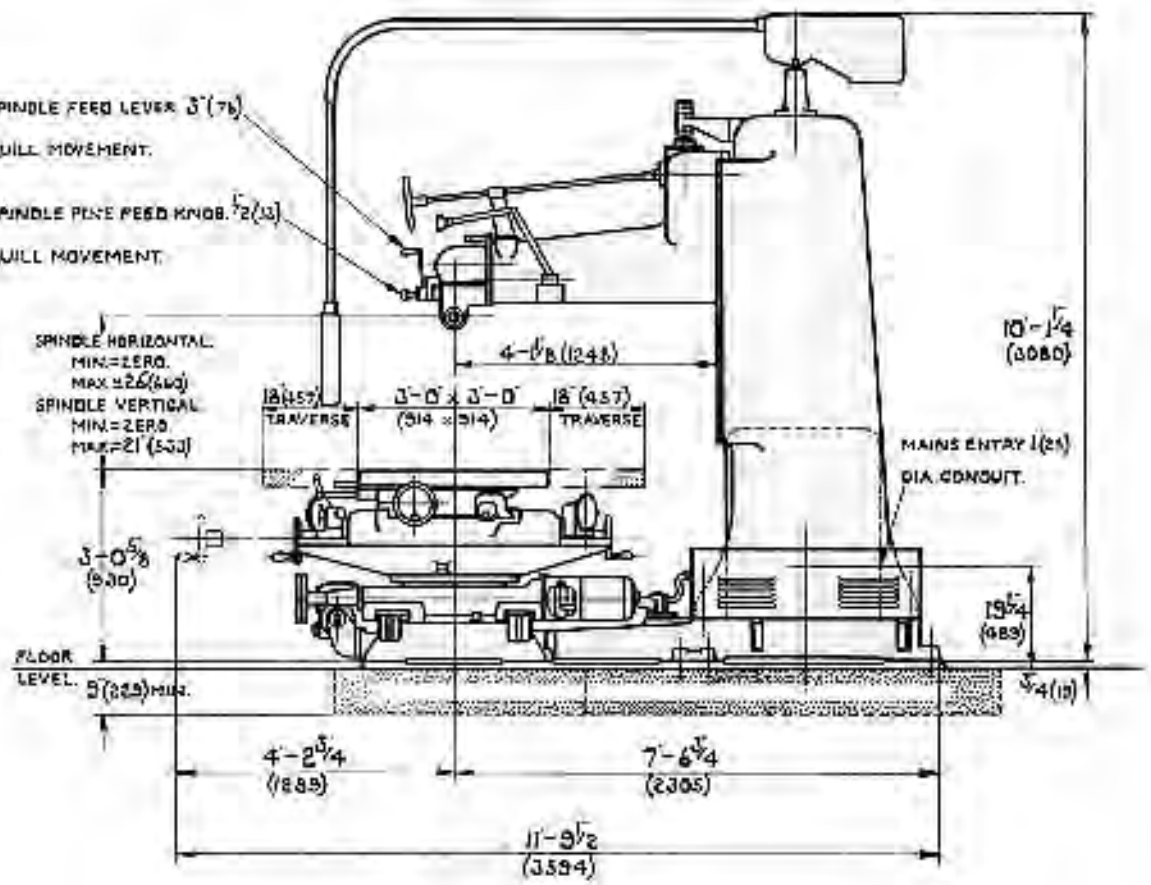
Principal Dimensions and Capacities Type WZ



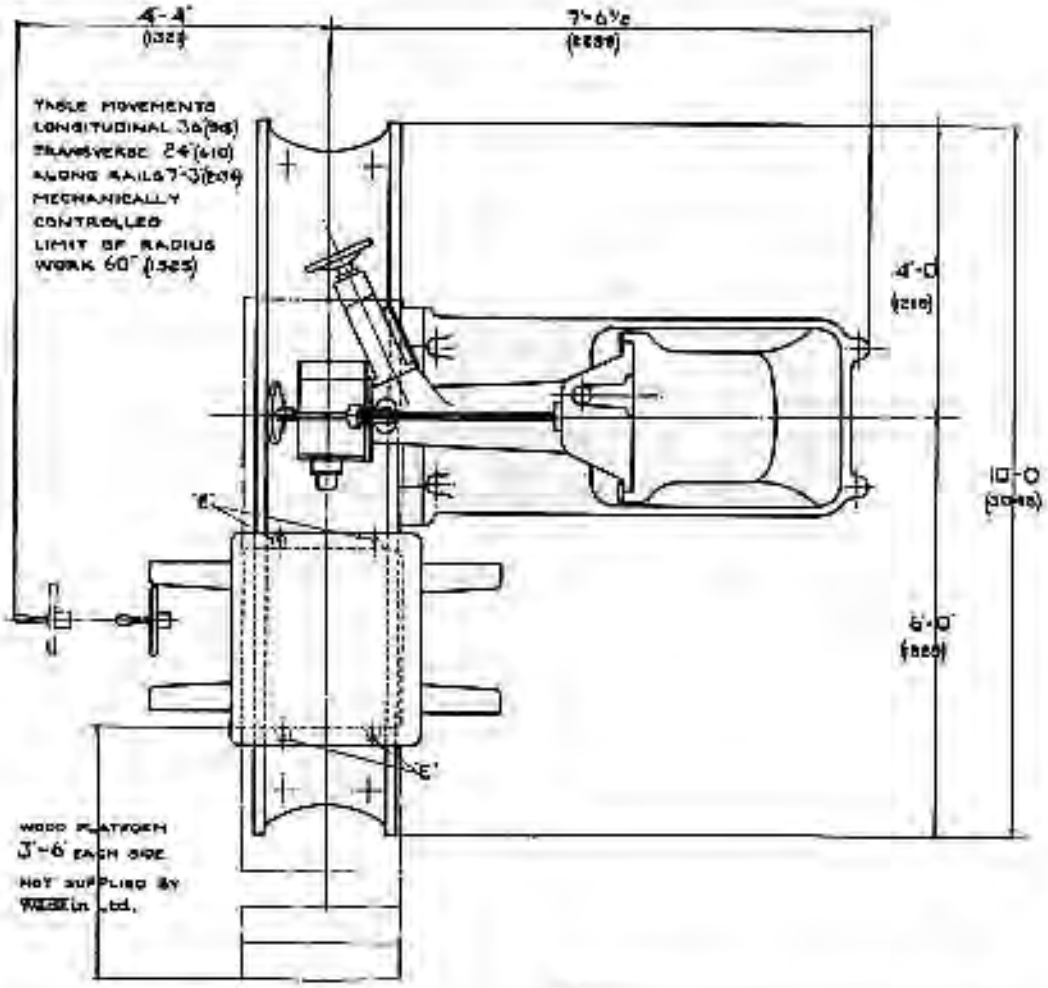
Net weight — 95 cwt. (10640 lb.) 4830 kg.

Gross weight 122 cwt. (13660 lb.) 6200 kg.

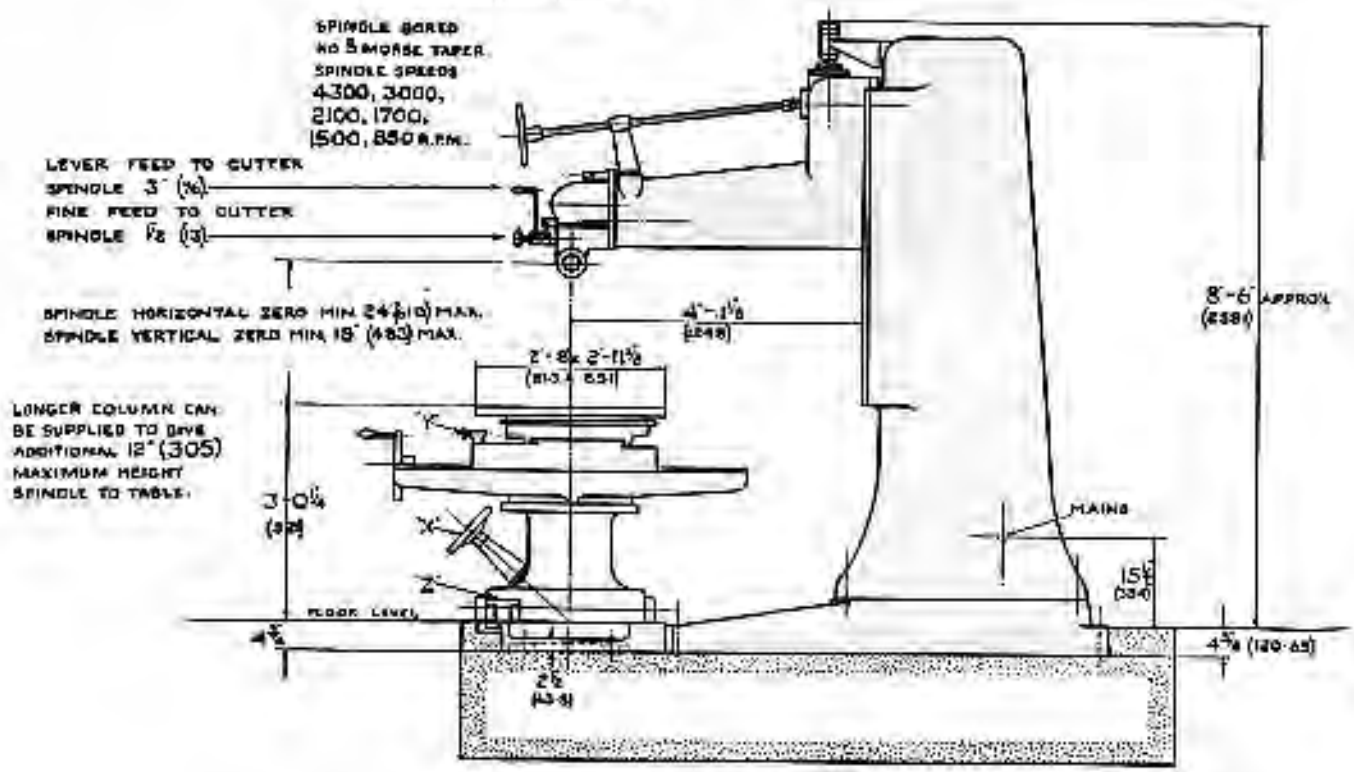
Shipping dimensions .. 611 cu.ft. 17.3 cu.m.



Principal Dimensions and Capacities Type WX



Net weight ... 68 cwt. (7620 lb.) 3450 kg.
Gross weight .. 84 cwt. (9510 lb.) 4266 kg.
Shipping dimensions ... 403 cu.ft. 11·4 cu.m.



Tool Equipment

The illustration of the opposite page represents the equipment that is supplied as standard with every Wadkin Pattern Miller, and included in the price of the machine.

Individual illustrations, together with descriptions and sizes of each of the different items comprising this tool equipment, are given in a separate Booklet "*Tools and Accessories for the Wadkin Pattern Miller*".

A range of cutter equipment for metal patterns is available, details of which are given in Booklet No. 765, sent on request.

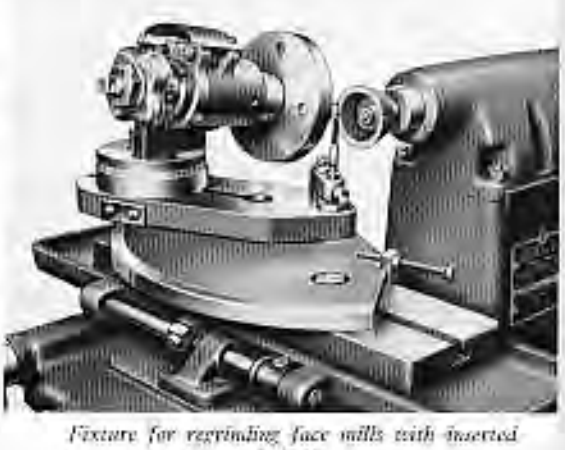
Cutter Maintenance

A range of fixtures as shown below is available for re-grinding various types of cutters. These fixtures are used in conjunction with the Wadkin Cutter Grinder N.U.

Regrinding clearance bevel on circular type corebox cutter (item 1a) using a formed wheel.

Fixture for regrinding semi-circular corebox cutters (item 1).

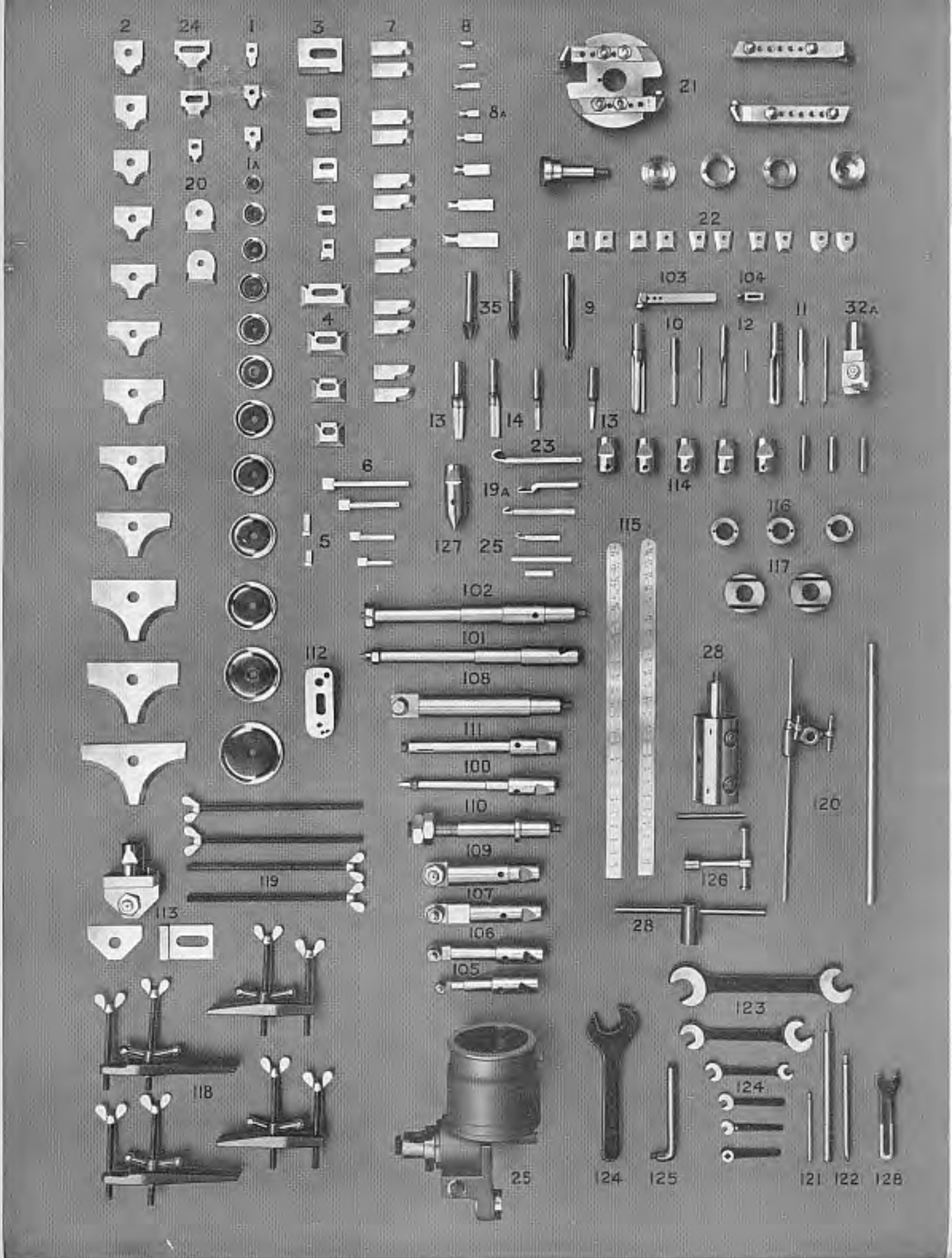
Fixture adapted for regrinding pattern cutters (item 2) using a formed wheel.



Fixture for regrinding face mills with inserted cutters.

The following tools are included and are illustrated opposite. Where necessary the same range of tools is supplied in the nearest equivalent metric sizes.

Item	*Description*
1	Corebox cutters, ½", ¾", 1".
1a	1", 1¼", 1½", 2", 2½", 2½", 2¾", 3", 3½", 3½", 4", 4½".
2	Pattern cutters, 1", 1¼", 1½", 1¾", 2", 2½", 3", 3½", 4", 4½", 5", 6".
3	Hole and slot boring cutters. Five sizes covering ½" to 6¾".
4	Chambering cutters, four sizes covering 2½" to 5".
5	Set over dead end cutters, 1½" to 1⅞"; 1⅞" to 2½".
6	Ditto, spade type. Four sizes covering 2½" to 8½".
7	Fillet cutters (one pair each), ¼", ⅜", ½", ¾", 1" radius.
8	Chambering corebox fly cutters. Three sizes, parallel expanding 1" to 3". Five sizes tapered expanding 1½" to 6".
9	⅞" dovetail cutter.
10	½", ¾", 1", three-wing bits, square noses.
11	½", ¾", 1", three-wing bits, round noses.
12	½", ¾", two fluted centre bits.
13	½", ¾", taper porthole cutters.
14	½", ¾", parallel porthole cutters.
19a	Gauge cutter to cut 4¾" to 6½" diameter.
20	Swivelling cutters.
21	Cutterhead expanding 7½" to 10", one pair long arms 10" to 14½".
22	Five pairs shaped cutters for No. 21.
23	Hook gouge cutter expanding 6½" to 9½".
24	Corner rounding cutters, ¼" and ½" radius, ⅜" and ¾" radius, ½" and ¾" radius.
25	Revoluble head and cutters.
28	6" circular cutterblock.
28a	Box spanner for 28.
32a	2½" recessing cutterhead.
35	½", 1", taper recess cutters.
100 to 113	Holders for above cutters.
114	¼", ⅜", ½", ⅝", ¾", ⅞", 1", adapter bushes.
115	Two contraction rules.
116	Spacing collars, 2" diam., 1" bore, 1½", 1¼", 1" thick.
117	Slotted collars, 2⅜" diam., 1¼" bore, for ½" thick cutter.
118	Four clamps.
119	12" long screws with clamps.
120	Adjustable depth gauge.
121	½" tommy bar, two ⅜" tommy bars.
122	Morse taper bush extractor and tommy bar.
123	Spanners covering ⅛" to ½".
124	Single-ended spanner. One locknut spanner.
125	Peg wrench for spindle chuck.
126	½" square box key wrench.
127	Centre finder.
128	Peg wrench, 1½" centres.
	Sample tin of high speed oil.
	Sample tin of ball bearing grease.
	Grease gun.
	Oil gun.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Tool Equipment

To enable the tool and cutter equipment used with the Wadkin Pattern Miller to be properly cared for the specially designed tool cupboard shown above is supplied. This cupboard is sent with all machines delivered for use in the British Isles. It is not supplied with export machines owing to possible damage in transit and the fact that it is not economical to ship a wooden cabinet of this size. A set of detail drawings would be supplied on request to enable customer to make the cupboard.