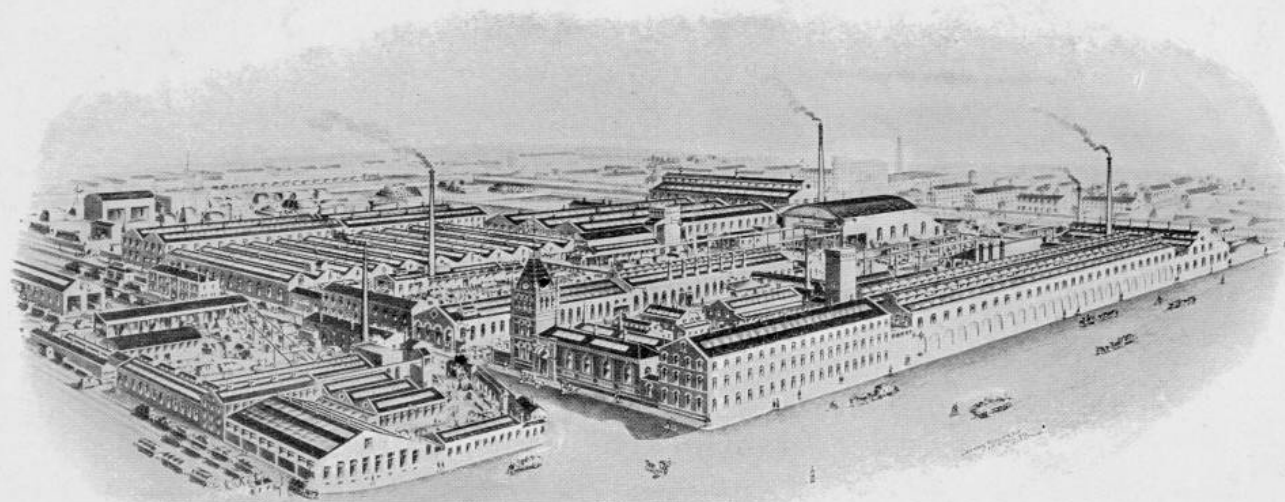


# WOODWORKING MACHINERY

SERIES NINE



THOMAS ROBINSON AND SON, LTD.  
RAILWAY WORKS, ROCHDALE, ENG.



Head Office and Works—  
Rochdale, England.

## Fret Sawing Machines—Types E<sup>3</sup> and B<sup>2</sup>

These are excellent machines for General Fretwork. The **Type E<sup>3</sup>** is especially useful when a clear space on all sides of the machine is required. The **Type B<sup>2</sup>** is entirely self-contained, the distance between saw and frame being 26-in.

The tables of both types are 2-ft. 6-in. square, made to cant, and the tops are truly planed, and a blower is provided on the top guide to remove the sawdust.

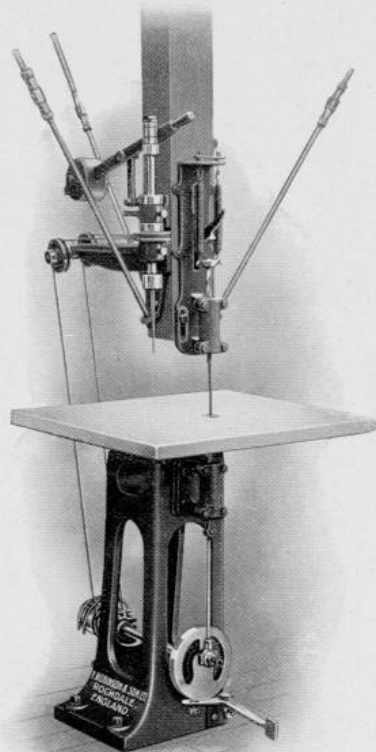
A boring apparatus (*as shown in the illustration E3*) is fitted if required to either type.

	Size of driving pulleys.		Revs. per minute.	Approximate B.H.P. required.	Space occupied.		Approximate Nett. Weight.		Approximate Gross Weight.		Code Word.
	Diam. in.	Face in.			Length. ft. in.	Width. ft. in.	cwts. lbs.	cwts. lbs.			
<b>Type E<sup>3</sup></b>	4	x 2	1200	$\frac{1}{2}$	3 0	2 6	5 = 560	7½ = 840		<b>Brewing</b>	
<b>Type B<sup>2</sup></b>	4	x 2	1200	$\frac{1}{2}$	4 8	2 6	8½ = 950	11½ = 1290		<b>Bridecake</b>	

If with Boring Apparatus, Code Words, Type E<sup>3</sup> **Exbrewing**, Type B<sup>2</sup> **Bridal**.

ELECTRIC DRIVING.—These machines should be driven by belt from the motor to fast and loose pulleys on the driving shaft.

**Fret  
Sawing  
Machine,  
Type E<sup>3</sup>**



**Self-Sustained  
Fret Saw,  
Type B<sup>2</sup>**



## Small Saw Bench, with Rising and Falling Table—Type ND.

A most useful machine for Cabinet Makers, Joiners, Pattern Makers, &c. Capable of doing Ripping, Cross-cutting, Mitering, Jointing, Rebating, Tonguing and Grooving, Beading, and Small Moulding.

**The Spindle** is so arranged that the saw may be easily replaced with a cutterblock for tonguing and grooving, or working moulds up to 1¾-in. wide.

**The Fence** is adjustable both to suit the width of timber and different diameters of saws; it has quick and fine screw adjustments, will cant 45°, and is easily removed when desired. When required—especially for cross-cutting—a different type of fence can be supplied, arranged to turn over the end of the bench, leaving the table top clear. This fence has similar adjustments to the one illustrated.

Countershaft and belt shifting gear included.

Maximum diameter of saw carried **20-in.**

Maximum depth of cut, **7-in.**

**The Driving Pulleys** on countershaft are **10-in. diam.**  
by 5½-in. face, and run **600** revs. per minute.

**Approximate Power** required, **5 B.H.P.**

Size of table top, **3-ft. 3-in. x 2-ft.**

**Space occupied**, not including countershaft, **3-ft. 6-in.**  
by **3-ft.**

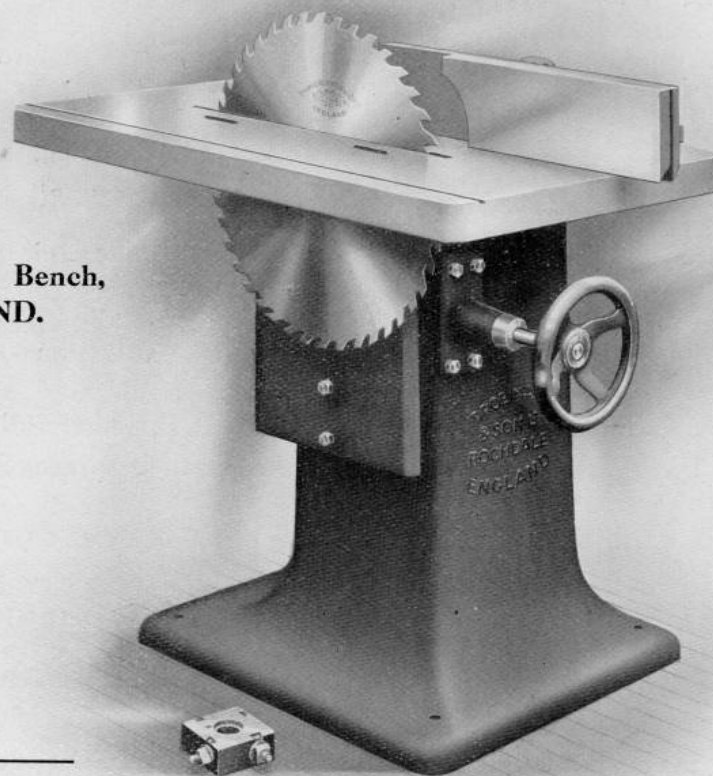
**ELECTRIC DRIVING.**—With electric driving the countershaft may be dispensed with, and the motor belted direct to the saw spindle, which carries a pulley **6-in. diameter x 5-in. face**, and runs **1800** revs. per minute.

**Weights**—Approx. Nett Weight **9½-cwts. = 1065-lbs.**

Approx. Gross Weight **12½-cwts. = 1400-lbs.**

		Code Word, with <b>ring-oiling</b> bearings.		Code Word, with <b>ball</b> bearings.
With fence as illustrated	-	<b>Dioptric</b>	-	<b>Diplovia</b>
With turn-over fence	-	<b>Diorite</b>	-	<b>Dipody</b>
Without Countershaft	-	<b>Dioxide</b>	-	<b>Dipper</b>

**Small Saw Bench,  
Type ND.**



## Two Spindle Saw Bench for Dimension Sawing—Type LS

A tool of the highest grade for all kinds of accurate sawing as required in Pattern Making, Cabinet Making and Fine Joinery. It will cut Compound Angles, rough out Core Boxes, do Ripping and Cross-cutting, Grooving, Mitering, Bevelling, &c.

**Two Saws**, 16-in. diameter, for ripping and cross-cutting—one on each spindle—can be carried, which project  $4\frac{1}{4}$ -in. (maximum) above the table top. A single saw of 20-in. diameter may be used, projecting  $6\frac{1}{4}$ -in. (maximum).

**The Table** cants to  $45^\circ$  and is 44-in. long by 40-in. wide, the sliding front portion being 16-in. wide.

**The Fence** is adjustable to 21-in. from the saw, and can be quickly removed when necessary. It cants to  $45^\circ$  and will swivel for cutting out core boxes; it has both quick and fine screw adjustments.

Universal cutting off and also double mitre gauges are included—all as illustrated.

Countershaft and belt shifting gear included. This can be arranged above or below the floor level.

**The Driving Pulleys** on countershaft are 10-in. diameter by  $5\frac{1}{2}$ -in. face, and run 600 revs. per minute.

**The Driving Pulleys** on saw spindles are  $4\frac{1}{2}$ -in. diameter by  $5\frac{1}{2}$ -in. face, and run 2500 revs. per minute.

**Approximate Power** required, 5 B.H.P.

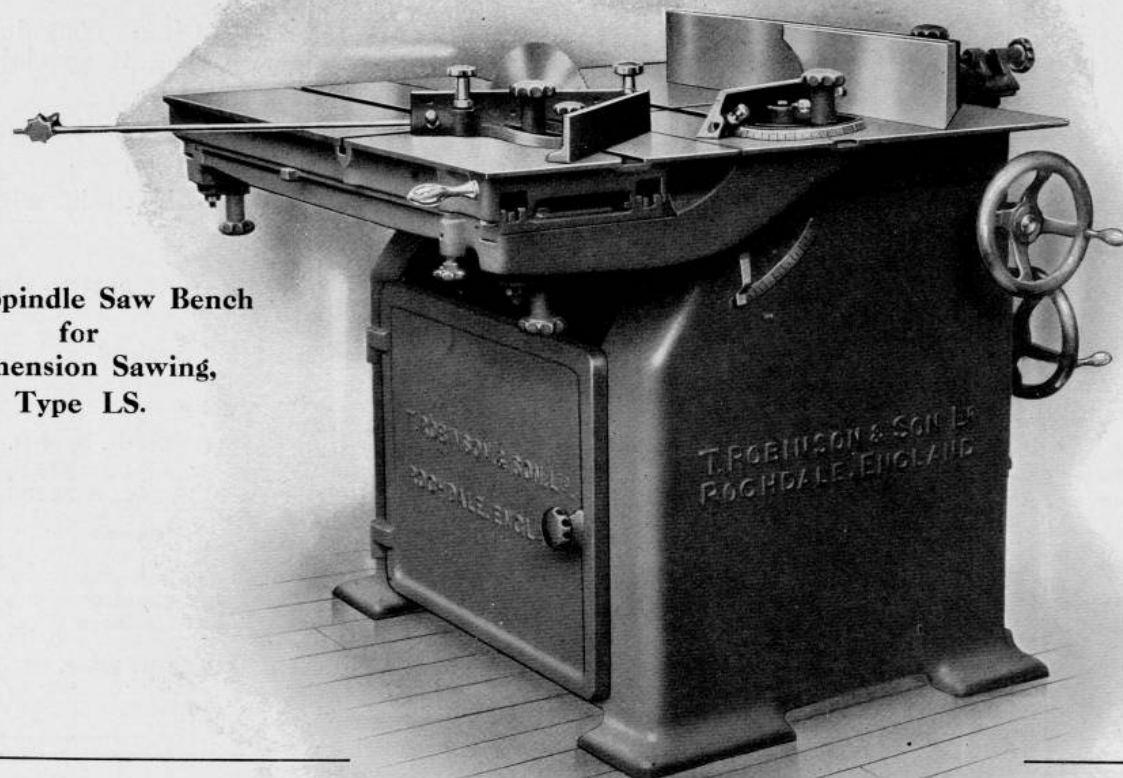
**Space occupied**, including countershaft, 6-ft. 3-in. x 4-ft. 6-in.

**WEIGHTS**:—Approx. Nett Weight, 18-cwts. = 2020-lbs.  
Approx. Gross Weight, 22-cwts. = 2460-lbs.

Code Word, **Illude**.

**ELECTRIC DRIVING**.—With electric motor drive the countershaft is dispensed with, the motor taking its place.

**Two Spindle Saw Bench  
for  
Dimension Sawing,  
Type LS.**





## Variety Saw Bench—Type LT

This machine will cut Compound Angles, do Ripping and Cross-cutting, Tonguing, Grooving, Mitering, and Bevelling, &c. All parts are accurately fitted, making it specially suitable for Cabinet and Pattern Makers, &c.

**Saws** up to 20-in. diameter may be carried, to cut 6-in. deep. A cutterblock 4-in. wide may also be fixed on the spindle in place of the saw for moulding, trenching, rebating, &c.

**The Table** cants to 45°, the angle being shown on a scale; it is 48-in. long by 40-in. wide. **Countershaft** and belt shifting gear included.

**Sliding Front Table.**—When desired, the table can be arranged with the front part to slide on rollers; this sliding part is 16-in. wide, and 36-in. may be cross-cut.

**A Boring Apparatus** can be fitted at the back suitable for light work, if desired.

**The Driving Pulleys** on countershaft are 10-in. diameter by 5½-in. face, and run 600 revs. per minute.

**The Driving Pulley** on saw spindle is 4½-in. diameter by 5½-in. face, and runs 2500 revs. per minute.

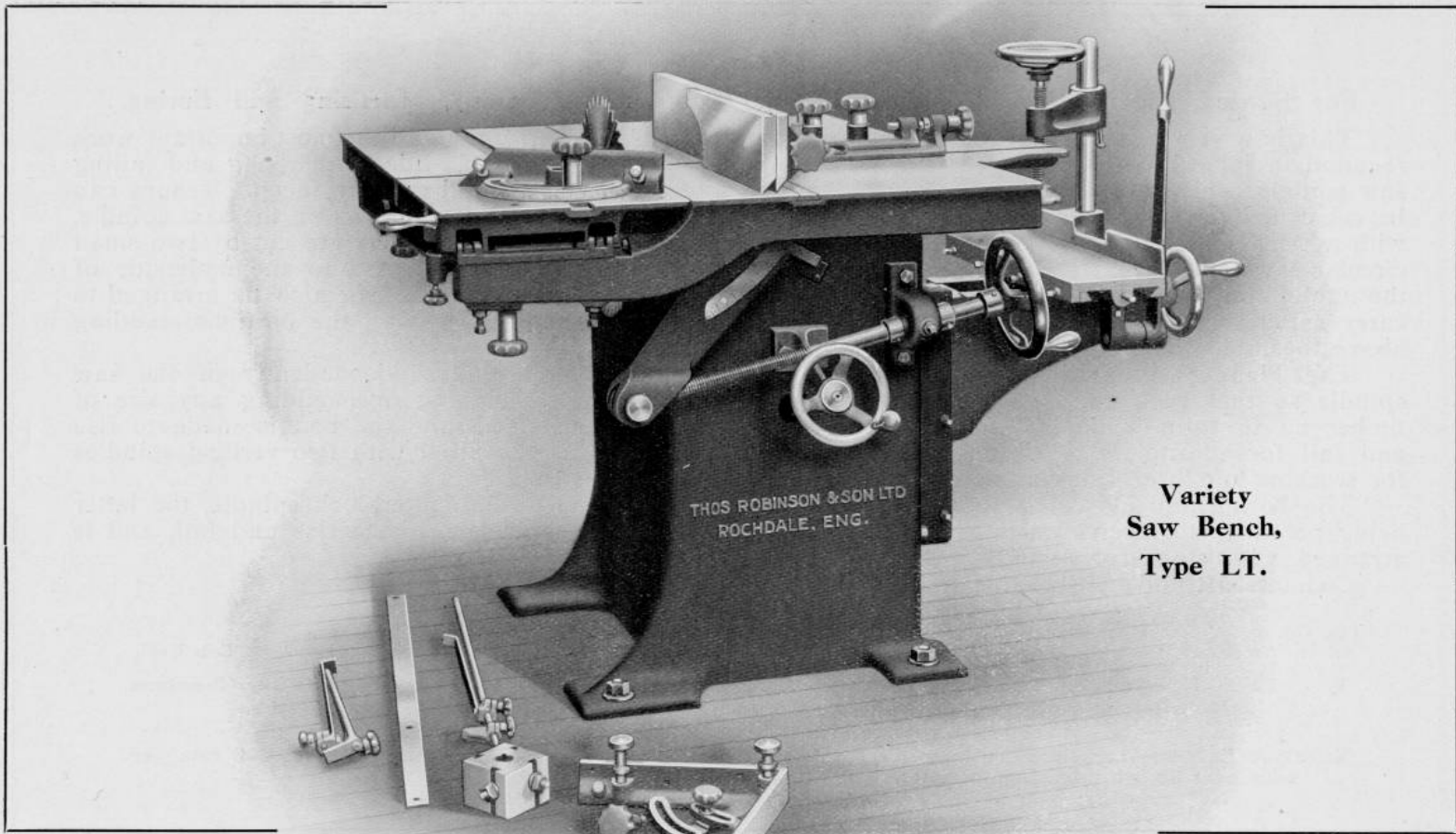
**Approximate Power** required, 5 B.H.P.

**Space Occupied**, including countershaft, 7-ft. by 4-ft.

**WEIGHTS:**—Approx. Nett Weight, 14-cwts. = 1570-lbs.  
Approx. Gross Weight, 18-cwts. = 2020-lbs.

With Plain Table, Canting Fence, and Universal Cutting off Gauge -	-	-	-	-	-	Code Word, <b>Imbank</b>
With Sliding Front Table, Canting Fence, and Universal Cutting off Gauge, and Double Mitre Gauge -	-	-	-	-	-	„ <b>Imbellie</b>
Boring Apparatus, <i>extra</i> -	-	-	-	-	-	„ <i>add</i> <b>Cavalier</b>
Slot-mortising and Boring Apparatus -	-	-	-	-	-	„ <i>add</i> <b>Cavicorn</b>

**ELECTRIC DRIVING.**—With electric motor drive the countershaft is dispensed with, the motor taking its place.



**Variety  
Saw Bench,  
Type LT.**

## General Joiner—Type N<sup>3</sup>

**For Sawing, Planing and Moulding, Circular Moulding, Tenoning, Mortising and Boring.**

This is a very useful type of General Joiner, and capable of performing all the most important work required in Joinery. It is arranged with saw table 5-ft. long by 2-ft. 6-in. wide, with rising and falling saw spindle, which will carry a saw of any size up to 24-in. diameter, and cut 7-in. deep. Tenons can be cut completely at one operation of any length up to 7-in., by placing two saws on the saw spindle, with a washer between them to gauge the thickness of the tenon. The shoulders are cut by two small circular saws, carried on vertical spindles which are mounted on a bracket fitted to the underside of the table, and are adjustable both vertically and laterally. These spindles can also be arranged to carry cutterblocks for circular moulding. When these spindles are not in use, the portions standing above the table can be screwed off, so as to leave the table clear.

The Planing Apparatus has one horizontal cutterblock, driven quite independently of the saw spindle so that each can be worked separately. It is capable of planing or moulding any size of timber up to 12-in. wide by 4-in. thick. It has self-acting roller-feed, and the bed is made to rise and fall for adjustment to various thicknesses. If desired, it can be fitted with two vertical spindles for working on three sides at once, when tonguing or grooving, &c.

The Boring and Mortising Apparatus is worked from the end of the cutterblock spindle, the latter being bored up to receive an auger. The boring and mortising table is made to rise and fall, and is arranged with stops for regulating the length of the mortise.

Countershaft and belt shifting gear included.

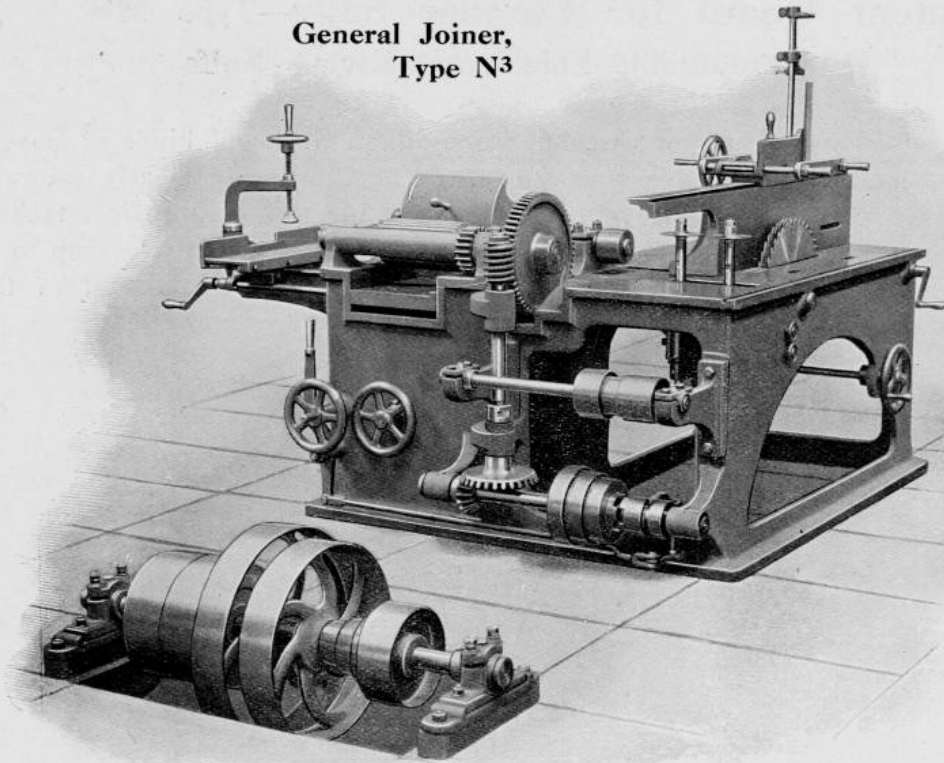
Size No.	To plane.		Maximum diameter of saw.	Size of driving pulleys.		Revs. per minute.	Approximate B.H.P. required.	Space occupied, (not including countershaft).		Approximate Nett Weight.		Approximate Gross Weight.		Code Word.
	in.	in.		in.	Diam.			Face.	*Length.	Width.	ft.	ft.	cwts.	
<b>1</b>	<b>12</b>	<b>x 4</b>	<b>- 24</b>	<b>- 12</b>	<b>x 5½</b>	<b>- 600</b>	<b>- 15</b>	<b>- 6</b>	<b>x 7</b>	<b>- 47=5260</b>	<b>- 60=6720</b>	<b>- 60=6720</b>	<b>- 60=6720</b>	<b>- Champion</b>

If the planing portion is fitted with two side spindles, prefix "**Be**" to above Code Word, *extra*.

\*The length is taken in the direction of the feed of the machine.

**ELECTRIC DRIVING**—For electric driving the countershaft can be coupled to a motor running about **600** revs. per minute, or by belt drive from a motor.

General Joiner,  
Type N<sup>3</sup>



## Hand-feed Planing and Surfacing Machines—Types I<sup>1</sup> & GF

For Joinery and Cabinet Work, such as Planing, Surfacing, Jointing, Trying-up, Rebating, Chamfering, Stop-Chamfering, Bevelling, and Taking Out of Wind. It can also be supplied to do Circular Moulding when so ordered. **The Tables** are 6-ft. overall to enable long timber to be worked. A canting fence, an efficient cutter-guard and countershaft, with ring-oiling bearings and belt shifting gear, are included. When desired, a round safety cutterblock may be substituted, without extra charge; but no cutter-guard is then furnished. This applies to both **Types I<sup>1</sup>** and **GF**.

### Type I<sup>1</sup>

Maximum width to plane. in.	Size of driving pulleys.		Revs. per minute.	Approximate B.H.P. required.	Space occupied, not including countershaft.		Approximate Nett Weight.		Approximate Gross Weight.		Code Word.
	Diam. in.	Face. in.			Length. ft. in.	Width. ft. in.	cwts. lbs.	cwts. lbs.			
15	8	4	750	3	6 0	3 0	12 = 1345	15½ = 1735	-	Coarctate	
12	8	4	750	3	6 0	2 9	11½ = 1290	15 = 1680	-	Coaxing	
9	8	4	750	2	6 0	2 6	10½ = 1175	14 = 1570	-	Coassume	

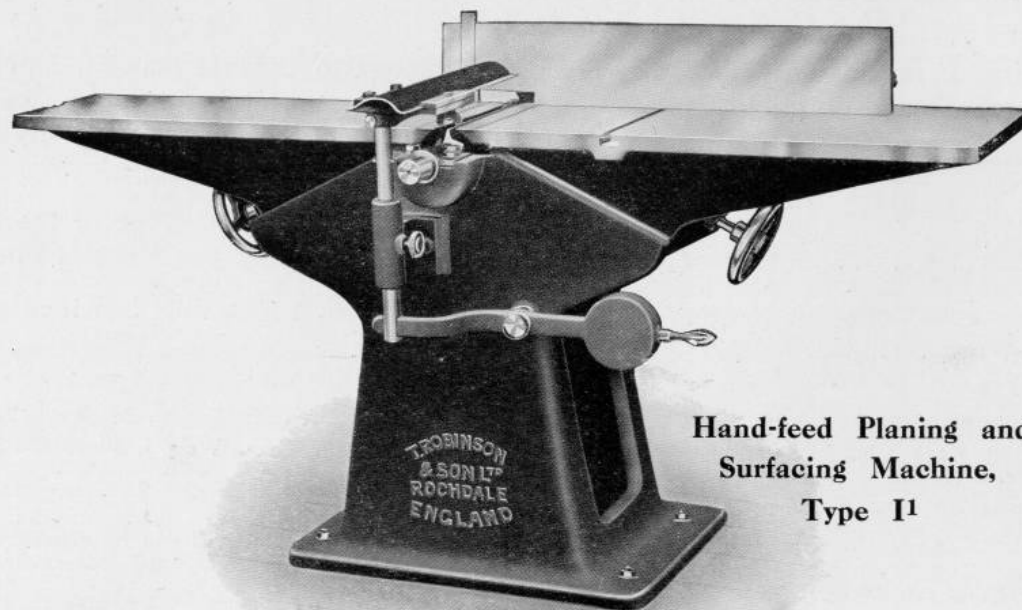
A **Vertical Spindle for Circular Moulding** may be fitted in conjunction with the 12-in. and 15 in. sizes; as this is an integral part of the machine it can only be supplied at the time of ordering. The weight is increased 220-lbs.; Code Word, *add* **"Coact"** to above Code Words.

We can supply the 12-in. and 15-in. sizes with loose top tables which may be easily drawn apart to enable mould cutters to be used. In this type we fit a square lipped cutterblock, slotted on four sides to take ½-in. diam. T-headed bolts, and we also groove the tables at the front edge to carry wood slides or fences for various purposes. Code Word, 12-in. size, **Coannex**; 15-in. size, **Coamings**.

**Type GF**—This is a heavier and wider machine; the tables are 7-ft. overall. Cutterguard and countershaft included. The tables of this type are always supplied with loose tops.

Size No.	Maximum width to plane. in.	Size of driving pulleys.		Revs. per minute.	Approximate B.H.P. required.	Space occupied, not including countershaft.		Approximate Nett Weight.		Approximate Gross Weight.		Code Word.
		Diam. in.	Face. in.			Length. ft. in.	Width. ft. in.	cwts. lbs.	cwts. lbs.			
1	30	10	5½	750	5	7 6	4 6	26 = 2910	32 = 3580	-	Coaster	
2	24	10	5½	750	4	7 6	4 0	22 = 2460	28 = 3140	-	Coatee	
3	18	10	5½	750	3	7 6	3 6	18 = 2020	24 = 2690	-	Coaxation	

**ELECTRIC DRIVING.**—When independent motor driving is to be installed the countershaft can be dispensed with, and the cutterblock be driven direct from the motor. Pulley on cutterblock spindle is 4½-in. diameter x 3½-in. face on **I<sup>1</sup>**, 4½-in. diameter x 4½-in. face on **GF**; speed **4000** revs. per minute.



Hand-feed Planing and  
Surfacing Machine,  
Type I<sup>1</sup>

## Hand Jointing and Planing Machine—Type HV

A machine of the highest grade and of special interest to Cabinet Makers, Shipbuilders, and others, for Square Jointing, Planing, Surfacing, Trying-up, Rebating and Chamfering, Stop-Chamfering, Bevelling, and Taking Out of Wind. The cutterblock can be easily removed for replacing with trenching blocks, &c.

**The Tables** are 6-ft. and 4-ft. in length—10-ft. over all. The front edge of the tables is grooved to carry wood slides or fences for various purposes. A canting fence is fitted.

An efficient balanced cutter-guard and countershaft, with ring-oiling bearings and belt shifting gear, are included.

Maximum width to plane, **15-in.**

**The Driving Pulleys** are 8-in. diameter by 5½-in. face, and run **750** revs. per minute.

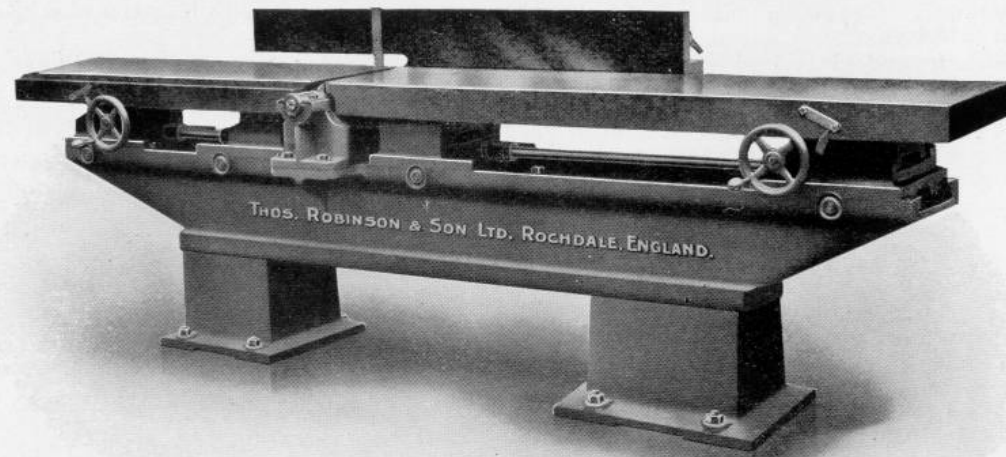
**Approximate Power** required, **3 B.H.P.**

**WEIGHT:**—Approx. Nett Weight, **25-cwts. = 2800-lbs.**

Approx. Gross Weight, **30-cwts. = 3360-lbs.**

Code Word, **Coarsen.**

**ELECTRIC DRIVING.**—When independent motor driving is to be installed the countershaft can be dispensed with and the cutterblock be driven direct from the motor. Pulley on cutterblock spindle is 4½-in. diameter by 4½-in. wide, and should run **4000** revs. per minute.



**Hand Jointing and  
Planing Machine—Type HV.**



## Universal Woodworker—Type CI

This is an exceedingly useful machine, which is capable of performing almost all the operations required in an ordinary woodworking establishment, viz:—**Planing, Surfacing, Jointing, Rebating, Chamfering, Stop-Chamfering, Tonguing, Grooving, Beading, Thicknessing, Straight Moulding, Circular Moulding, Tenoning, Slot Mortising, and Sawing.** A balanced cutter-guard is included to protect the operator from the cutters.

**The Driving Pulleys** on the countershaft are 8-in. diameter by 4-in. face, and run **750** revs. per minute (when no sawing attachment is required with the machine).

When **Sawing Attachment** is required the driving pulleys are 10-in. diameter by 4-in. face, and run **450** and **750** revs. per minute. There are two driving belts necessary and two different diameter pulleys required on the main driving shaft, to permit of the machine countershaft running **450** revs. per minute when sawing, and **750** revs. per minute when planing, moulding, tenoning, &c.

**Approximate Power** required: If without sawing, **5** B.H.P.; if with **24-in.** saw, **10** B.H.P.

**Space Occupied**, 6-ft. long by 3-ft. 9-in. to 5-ft. 3-in. (the width varies according to the extra attachments required).

**WEIGHTS:—**

**The Machine Complete**, with **all** the attachments and sawing apparatus for **24-in.** saw.

Approximate Nett Weight, **20-cwts.** = **2240-lbs.**

Approximate Gross Weight, **25-cwts.** = **2800-lbs.**

When fitted with **Vertical Spindle** for circular moulding, weight increased—

Approximate Nett Weight, **2-cwts.** = **220-lbs.**

Approximate Gross Weight, **2-cwts.** = **220-lbs.**

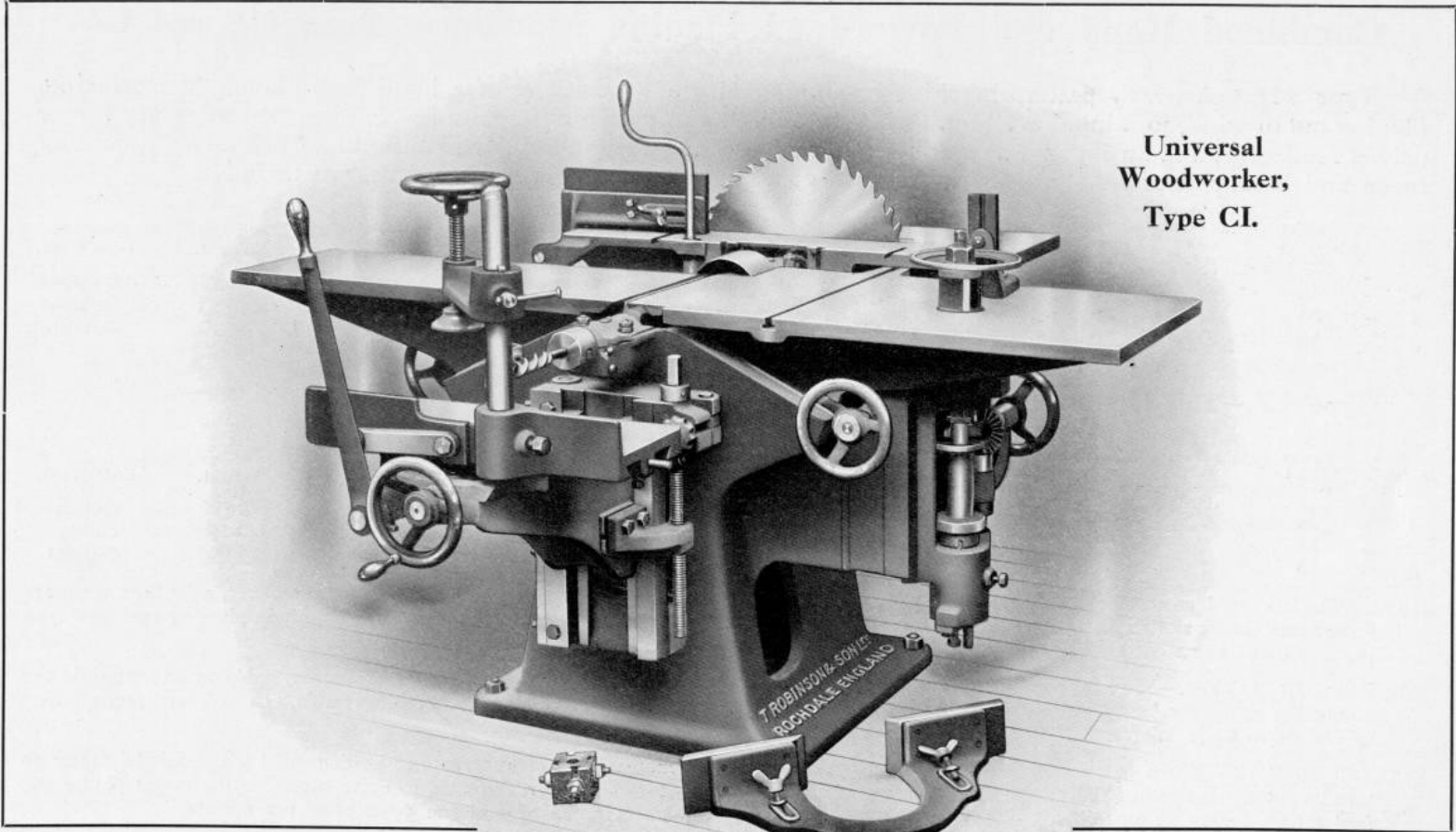
### Code List for different combinations of the Universal Woodworker.

	Code Word.		Code Word.
Combined 12-in. Hand-feed Planer and Variety Moulder, with 5-in. overhanging cutterblock for tonguing, grooving, &c. - - - -	<b>Cobbler</b>	If with Tenoning Apparatus - - - -	<i>add</i> <b>Cockpit</b>
If with Self-acting Feed for moulding and planing, takes timber up to 4-in. by 2-in. - - - -	<i>add</i> <b>Cobcoals</b>	If with Slot Mortising and Boring, capacity up to 8-in. square - - - -	<i>add</i> <b>Cleansot</b>
If with Sawing Apparatus for 24-in. saw, with sliding table - - - -	<i>add</i> <b>Cocagne</b>	If with Circular Moulding Apparatus, to work up to 2½-in. deep - - - -	<i>add</i> <b>Cobnut</b>
		Complete machine with <b>all</b> the above attachments	<b>Coluber</b>

When desired, a round safety cutterblock may be supplied without extra charge; no cutter-guard is then furnished.

It is impossible to set forth all details of the machine in the limited space of this catalogue, and we will gladly send our illustrated pamphlet on request.

**ELECTRIC DRIVING.**—When the sawing attachment is not required the countershaft can be dispensed with, and the cutter-spindle be driven direct by belt from a standard speed motor. If, however, the sawing attachment is included, an intermediate countershaft is necessary to obtain the two speeds for the spindle as well as to change the direction of rotation. The countershaft can be driven by belt or be coupled to a motor of low speed. - Plans sent on request.



Universal  
Woodworker,  
Type CI.

## Combined Hand and Power-feed Planing Machines—Types ME and LZ

**Type ME.**—A heavy pattern machine combining all the advantages of a hand feed planer, for surfacing, planing out of wind, jointing, bevelling, trying-up, rebating and chamfering, and which has the necessary power driven feed gear, and an independent table placed below the cutterblock for planing to a thickness. A canting fence and balanced cutter-guard, together with countershaft and belt shifting gear, are included.

Size No.	Max'm width to plane. in.	Maximum thickness with power feed. in.	Fast and loose driving pulleys on countershaft.		Revs. per minute of countershaft.	Approximate B.H.P. required.	Space occupied, not including countershaft.		Approximate Nett Weight. cwts. lbs.	Approximate Gross Weight. cwts. lbs.		Code Word.
			Diam. in.	Face. in.			ft. in.	ft. in.		cwts.	lbs.	
0	30	9	12	5½	750	8	5 6	5 0	34=3810	45=5040	Compot	
1	24	9	10	5½	750	8	5 6	4 6	29=3250	40=4480	Comtist	
2	18	9	10	5½	750	7	5 6	4 0	27=3020	36=4030	Comptoir	

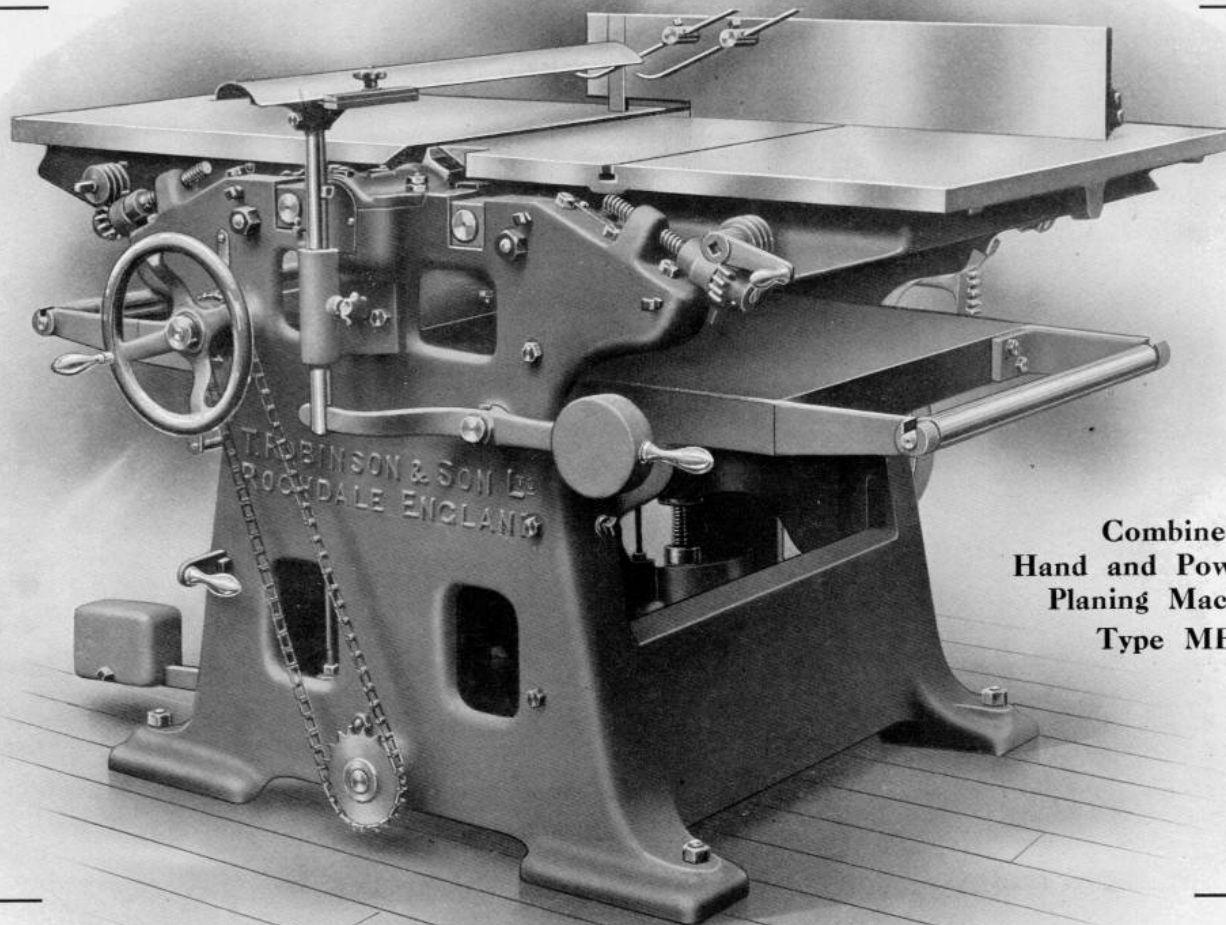
**Type LZ.**—This is a similar machine of lighter type, manufactured in the following sizes:—

Size No.	Max'm width to plane. in.	Maximum thickness with power feed. in.	Diam or driving pulley on countershaft.		Revs. per minute of countershaft.	Approximate B.H.P. required.	Space occupied, not including countershaft.		Approximate Nett Weight. cwts. lbs.	Approximate Gross Weight. cwts. lbs.		Code Word.
			Diam. in.	Face. in.			ft. in.	ft. in.		cwts.	lbs.	
1	24	7	10	5½	750	7	4 9	4 6	20=2240	24=2690	Cubeb	
2	18	7	10	5½	750	6	4 9	4 0	18=2020	22=2460	Cubit	
3	15	7	10	5½	750	5	4 9	3 9	17=1900	21=2350	Cuboid	

**NOTE.**—The standard cutterblock is of the skew type, and the knives operate with a shear cut. We can, however, substitute a square lipped cutterblock slotted on all four sides for use when it is desired to do moulding. (This we will supply in place of the skew type block without extra cost). Code Word, prefix "**Ex**" to the Code Words of either Types **ME** or **LZ**.

**FOR PATTERN MAKERS.**—We have supplied a great number of these machines with provision made for the bottom table to cant slightly for giving the necessary "strip" or "draw." The machine can be so arranged at the time of ordering (*extra*); Code Word prefix "**Be**" to the above Code Words.

**ELECTRIC DRIVING.**—When independent motor driving is desired, we recommend the countershaft to be dispensed with, and the motor to take its place. Instead of the countershaft we supply a special pulley for the motor, arranged to drive direct to the cutterspindle and feed gear. Pulley on cutterblock spindle is 4½-in. diameter by 5½-in. face, and should run **4000** revs. per minute.



**Combined  
Hand and Power-feed  
Planing Machine,  
Type ME.**

## Small Planing and Thicknessing Machines—Types BZ and CZ

For the use of Joiners, Cabinet Makers, and Box Makers. They are capable of producing an excellent finish on all kinds of timber, and, with side heads (**Type CZ**) will also do edging, moulding, tonguing and grooving, and rebating. The working sides of the machines are free from moving parts, both the cutterblock and feed gear being driven from one side respectively. Countershaft and belt shifting gear included.

### Type BZ.

Size No.	Maximum size to plane.		COUNTERSHAFT.		Revs. per minute.	Approximate B.H.P. required.	Space occupied, not including countershaft.		Approximate Nett Weight. cwts. lbs.	Approximate Gross Weight. cwts. lbs.	Code Word.
	Wide. in.	Thick. in.	Diam. in.	Face. in.			Length. ft. in.	Width. ft. in.			
1	24	7	10	5½	750	7	2 9	4 9	15 = 1680	18 = 2010	Compiler
2	18	7	10	5½	750	6	2 9	4 3	14 = 1570	17 = 1900	Compensate
3	15	7	10	5½	750	5	2 9	4 0	13 = 1460	16 = 1790	Compeer

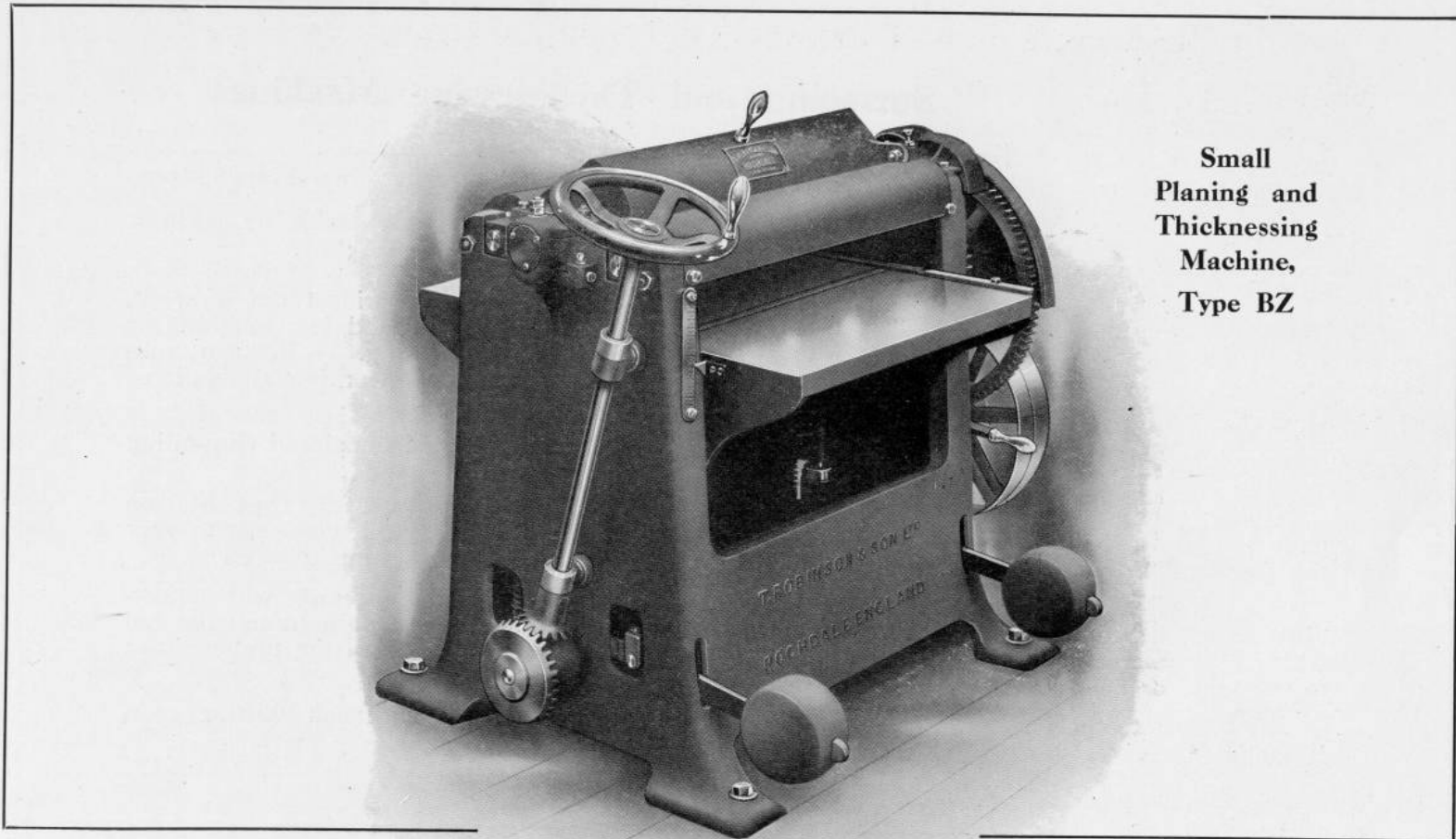
ELECTRIC DRIVING.—When independent motor driving is desired we recommend the countershaft to be dispensed with and the motor to take its place. Instead of the countershaft we supply a special pulley for the motor, arranged to drive direct to the cutterspindle and feed gear. The pulley on the cutterspindle is 4½-in. diameter by 4½-in. wide, and should run 4000 revs. per minute.

**Type CZ.**—With side cutters, to work on three sides at one operation. The side heads work up to 4-in. deep.

Size No.	Maximum size to plane.		COUNTERSHAFT.		Revs. per minute.	Approximate B.H.P. required.	Space occupied, not including countershaft.		Approximate Nett Weight. cwts. lbs.	Approximate Gross Weight. cwts. lbs.	Code Word.
	Wide. in.	Thick. in.	Diam. in.	Face. in.			Length. ft. in.	Width. ft. in.			
1	24	4	10	5½	750	9	3 6	4 9	26 = 2910	32 = 3580	Complacent
2	18	4	10	5½	750	8	3 6	4 3	24 = 2690	30 = 3360	Complain
3	15	4	10	5½	750	7	3 6	4 0	22 = 2460	28 = 3140	Compose

NOTE.—For both **Types BZ** and **CZ** we supply a square lipped cutterblock slotted on all four sides, for use when it is desired to do moulding. If taken in place of the skew type block, the cost remains the same. Code Word, prefix "**Ex**" to the above Code Words.

ELECTRIC DRIVING.—We can arrange this machine for direct coupled drive to the machine countershaft from an electric motor running about 750–900 revs. per minute (flexible type coupling, *extra*).



**Small  
Planing and  
Thicknessing  
Machine,  
Type BZ**

## Single Spindle Circular Moulders—Types NC and AY

Two most useful tools for Cabinet Makers, Joiners, Builders, and for any Woodworking Establishment. They are capable of performing work which would be difficult and costly to do by hand, such as curved and irregularly shaped moulding, straight moulding, tonguing and grooving, jointing, &c.

INCLUDED.—A straight fence with universal adjustments, the front plates being adjustable independently; spring pressures for straight work and jointing; a ring fence for curved mouldings; a square lipped cutterblock; a pair of slotted washers, and one screwed spindle end 1-in. diameter; countershaft and belt shifting gear.

**Dovetailing Apparatus** to cut drawer fronts 15-in. wide and up to 1-in. thick, the pitch of dovetails being  $\frac{3}{4}$ -in., 1-in., and  $1\frac{1}{4}$ -in.

**Tonguing and Grooving Attachment** for the ends of parquetry, consisting of a sliding plate fitted with screw clamp, and arranged to slide on the table of the machine.

**Tenoning Attachment.**—Using the above sliding plate, tenoning cutters are fixed on the cutter-spindle, a filling-up washer being placed between the cutters for determining the size of the tenon. Maximum length of tenon  $2\frac{1}{2}$ -in.

**Type NC**—(For dimensions see opposite page with illustration of machine).

**Type AY**—

Size of table top, 24-in. x 24-in.

To work timber  $2\frac{1}{2}$ -in. thick.

**The Driving Pulleys** on countershaft are 6-in. diameter by 3-in. face, and run 1100 revs. per minute.

**Approximate Power** required, 2 B.H.P.

**Space Occupied**, including countershaft, 4-ft. 6-in. x 6-ft.

**WEIGHTS:**—Approximate Nett Weight, 8-cwts. = 895-lbs.

Approximate Gross Weight, 11-cwts. = 1230-lbs.

Code Word, **Dimensive**.

If with Dovetailing Apparatus, Code Word, *add Dimpled*. For Tonguing and Grooving Apparatus, Code Word, *add Dimidiate*.

**ELECTRIC DRIVING.**—With the electric driving the countershaft may be dispensed with, the motor driving with a quarter-twist belt to the cutter-spindle. The motor should be of the reversing type with brake if it is desired to quickly reverse the spindle. Diameter of spindle pulley  $3\frac{1}{4}$ -in. for **NC**; 2-in. for **AY**; revs. per minute, 4000—5000.

**Type NC.**

Size of table top, **30-in. x 30-in.** To work timber **4-in. thick.**

**The Driving Pulleys** on countershaft (with reversing motion) are **8-in. diameter** by **5½-in., 2¾-in., and 5½-in. wide,** and run **1100 revs. per minute.** This machine can be made without the reversing motion, in which case the fast and loose pulleys are **8-in. diameter** by **3½-in. face.**

**Approximate Power** required, **4 B.H.P.**

**Space Occupied,** not including countershaft, **3-ft. 3-in. x 2-ft. 6-in.**

Approximate **Nett Weight,**  
**11½-cwts. = 1290-lbs.**

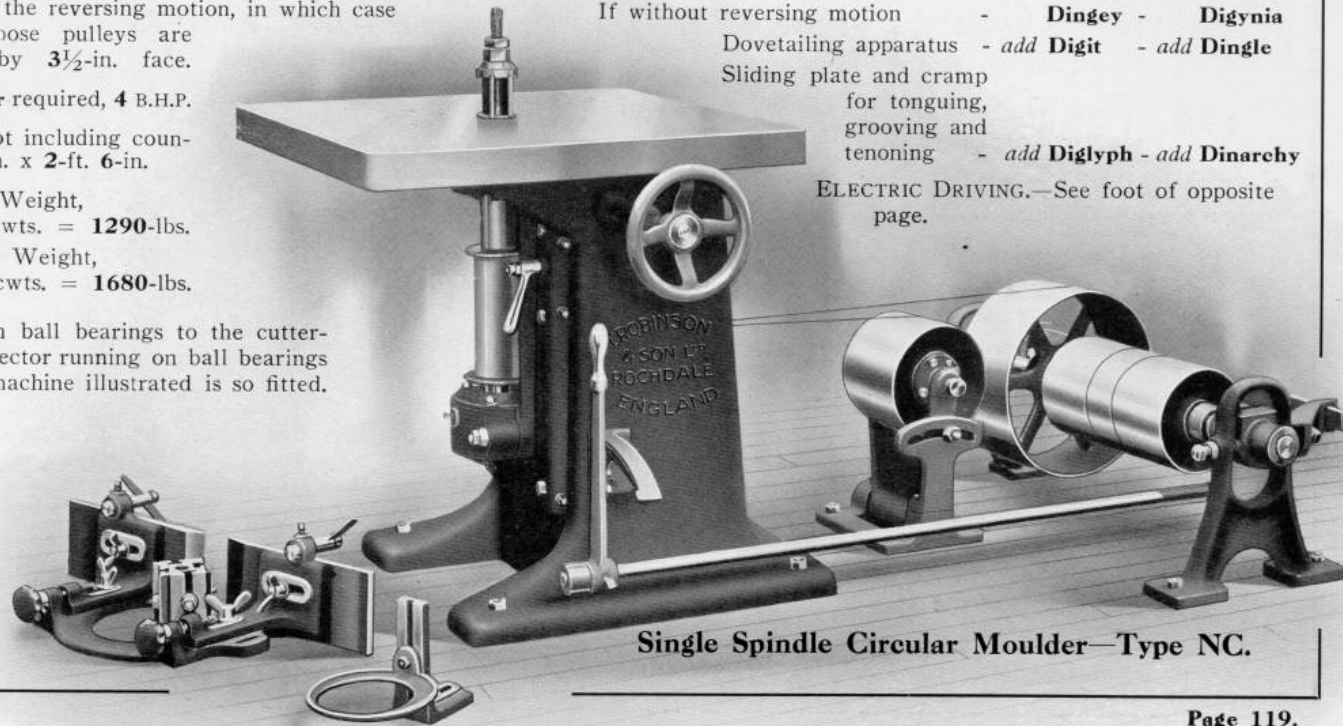
Approximate **Gross Weight,**  
**15-cwts. = 1680-lbs.**

When ordered with ball bearings to the cutter-spindle, a belt deflector running on ball bearings is supplied—the machine illustrated is so fitted.

Code Word, with <b>bronze</b> bearings.	Code Word, with <b>ball</b> bearings.
---	---

With single spindle and reversing motion - -	<b>Dingo</b> -	<b>Diagraph</b>
If without reversing motion - -	<b>Dingey</b> -	<b>Digynia</b>
Dovetailing apparatus - add	<b>Digit</b> -	add <b>Dingle</b>
Sliding plate and cramp for tonguing, grooving and tenoning - add	<b>Diglyph</b> -	add <b>Dinarchy</b>

**ELECTRIC DRIVING.**—See foot of opposite page.



**Single Spindle Circular Moulder—Type NC.**



## Vertical Spindle and Disc Sanders—Types JE and JF

For sandpapering the internal and external edges of curved timbers and irregular work. These will be found useful tools for Pattern Makers, &c.

**The Type JE** has a vertical cylinder only.

**The Type JF** has in addition a horizontal disc 20-in. diameter, as illustrated.

**The Vertical Spindles** are arranged to carry cylinders from 1-in. to 3-in. diameter, and up to 8-in. long, and are provided with oscillating motion to prevent the sandpaper marking the timber. Three cylinders for carrying sandpaper are provided with either machine, together with suitable circular filling-in plates to fit the table-tops.

### Type JE

**The Driving Pulleys** on countershaft are 8-in. diameter by 4-in. face, and run 800 revs. per minute.

**Approximate Power** required, 1½ B.H.P.

**Space Occupied**, including countershaft, 7-ft. 6-in. x 3-ft. 6-in.

**WEIGHTS:**—Approx. Nett Weight, 8-cwts. = 900-lbs.  
Approx. Gross Weight, 11-cwts. = 1230-lbs.

Code Word, **Chert.**

**ELECTRIC DRIVING.**—The countershaft should be direct coupled to a motor of suitable speed; flexible type coupling *extra*.

### Type JF

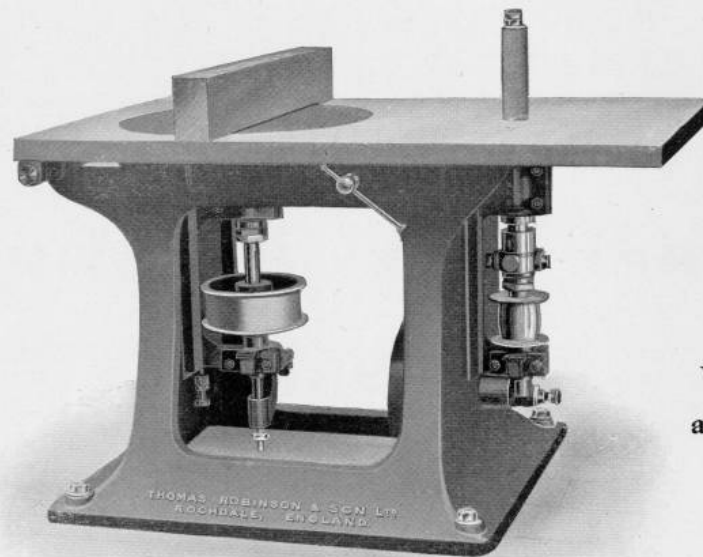
**The Driving Pulleys** on countershaft are 8-in. diameter by 4-in. face, and run 800 revs. per minute.

**Approximate Power** required, 3 B.H.P.

**Space Occupied**, including countershaft, 7-ft. x 4-ft. 6-in.

**WEIGHTS:**—Approx. Nett Weight, 13-cwts. = 1460-lbs.  
Approx. Gross Weight, 17-cwts. = 1900-lbs.

Code Word, **Chess.**



**Vertical Spindle  
and Disc Sander,  
Type JF.**

## Small Tenoning Machine—Type B<sup>5</sup>

This is a simple machine for Light Tenoning Sash and Door Work; also for Wheel Spokes, and Railway Carriage Window Frames.

The machine is constructed to cut tenons of any size up to 2½-in. long and 6-in. wide.

The horizontal cutterblocks have both vertical and horizontal adjustments.

The table is provided with both hand lever and screw cramps, and also adjustable stops to obviate marking out the timber. The fence will swivel.

**A Bottom Scribing Attachment** can be fitted when desired. This can also be used for light double tenoning.

**The Driving Pulleys** on countershaft are 6-in. diameter by 3½-in. face. and run 1200 revs. per minute.

**Approximate Power** required, 3 B.H.P.

**Space Occupied**, 3-ft. 6-in. x 4-ft.

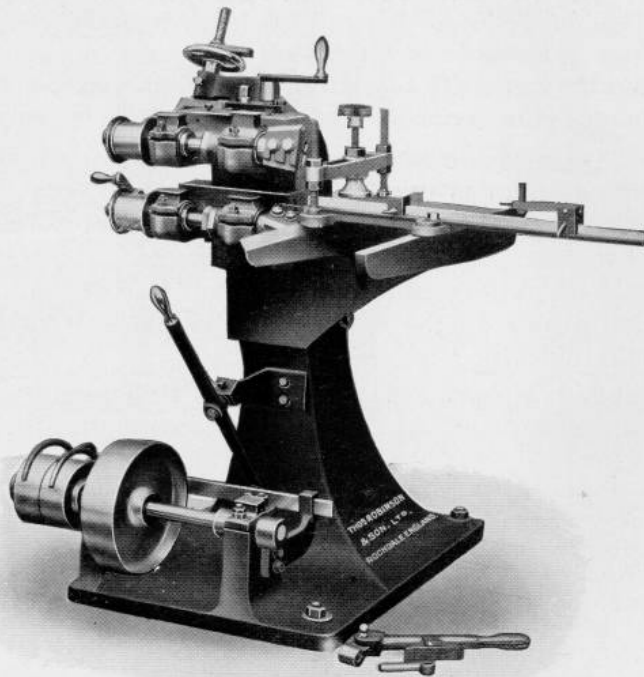
**WEIGHTS**:—Approx. Nett Weight, 9-cwts. = 1010-lbs.

Approx. Gross Weight, 11-cwts. = 1230-lbs.

Code Word, **Lingual**.

If with Vertical Spindle for Double Tenoning and Bottom Scribing, prefix "**Ex**" to the above Code Word.

**ELECTRIC DRIVING**.—The countershaft should be direct coupled to a motor of suitable speed. Flexible type coupling *extra*.



Small  
Tenoning  
Machine  
Type B5

## Double-ended Chain-fed Tenoning Machine—Type FE

This is a most valuable machine for producing accurate tenons in large quantities. Used in large Joinery and Cabinet Establishments, Railway Carriage and other Works.

**Each Headstock** carries two tenoning blocks, so that both ends of the timber are tenoned at one operation. Either end of the timber may be made to different sizes if desired, the headstocks being quite independent. The timber is automatically fed between the cutters by dogs, fixed at intervals on endless steel chains, running in planed guide grooves. These dogs are quickly removable, and may be spaced every 3-in. or more apart to suit the work; they are held firm and square with the direction of the feed.

The machine will cut tenons up to 6-in. long, and deal with timber up to 8-in. thick. The shortest piece that can be cut is 6-in. between the shoulders.

**A Cross-cut Saw** 20-in. diameter may be fitted to each headstock (if desired) for cutting the timber perfectly square and to the required length, as it passes through the machine. This attachment will cut up to 6-in. thick.

**Vertical Spindles** for both top and bottom scribing can be fitted to the headstocks. These have independent adjustments, both horizontally and vertically.

Countershaft and belt shifting gear included.

**The Driving Pulleys** on countershaft are 14-in. diameter by 7½-in. face, and run 660 revs. per minute.

**Approximate Power** required, 15 B.H.P.

**Space Occupied**, including countershaft—16-ft. x 9-ft. for 6-ft. 6-in. long timbers; 20-ft. 6-in. x 9-ft. for 11-ft. long timbers.

**WEIGHTS**:—Approximate Nett Weight, 67-cwts. = 7500-lbs.

Approximate Gross Weight, 85-cwts. = 9520-lbs.

To cut tenons from 6-in. to 5-ft. 6-in. between the shoulders (*i.e.*, 6-ft. 6-in. overall), and timber up to 8-in. thick

To cut tenons from 6-in. to 10-ft. between the shoulders (*i.e.*, 11-ft. overall), and timber up to 8-in. thick. Also with power traverse to the loose headstock. Weight increased 8-cwts. = 900-lbs.

With Bottom Scribing Spindles to **both** headstocks - - - - -

With Bottom Scribing Spindles to **one** headstock - - - - -

With Top and Bottom Scribing Spindles to **both** headstocks - - - - -

With Top and Bottom Scribing Spindles to **one** headstock - - - - -

Cross-cut saw to each headstock - - - - -

Code Word.  
**Disowment**

**Dispose**

- add **Dispace**

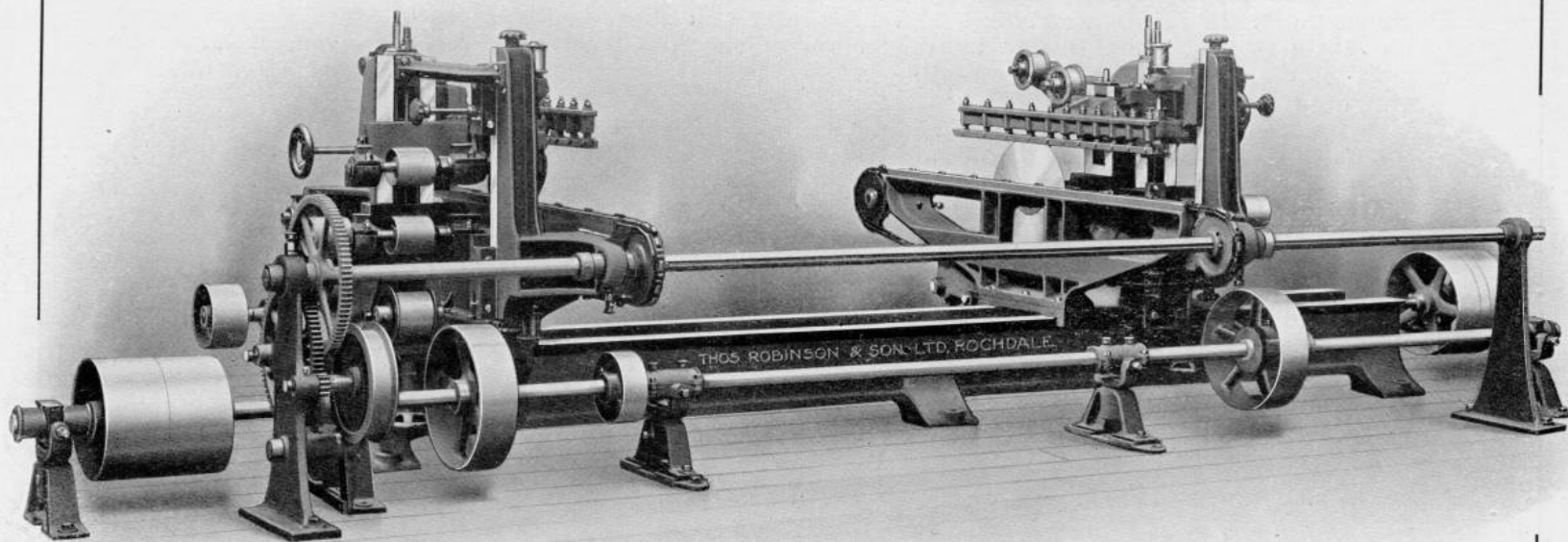
- add **Dispense**

- add **Disorbed**

- add **Disorder**

- add **Disoxydate**

**ELECTRIC DRIVING**.—The machine should be direct coupled to a motor running about 660 R.P.M. (flexible type coupling *extra*).



**Double-Ended Chain-fed Tenoning Machine—Type FE.**

## Combined Chain and Hollow Chisel Mortiser—Type KH

Mortises are quickly cut by the chain cutter, and very short mortises—in fact square holes—can be made by the hollow chisel operating in the same line as the chain cutter. The table has vertical adjustment enabling light timbers to be worked with ease, **the height of the table being adjustable to the level most convenient for the operator.** It has also cross and lateral movements. A powerful screw cramp is fitted. The range of the standard machine is to work timber up to 11-in. deep and 6-in. wide; to cut mortises with a square hollow chisel up to 1-in. wide, and 3-in. or 5-in. deep, according to the length of chisel; and with the chain cutter any width of mortise from  $\frac{1}{4}$ -in. to  $\frac{3}{4}$ -in., any length from  $1\frac{5}{8}$ -in. to 2-in., and from  $3\frac{1}{2}$ -in. deep with the light chain bars, up to 6-in. with the heavier ones. A Nave Mortising Attachment may be supplied to work naves up to 12-in. diam. by 15-in. long (*extra*). Dividing plates for 10, 12, 14 and 16 mortises are included, and stops are fitted to gauge the length of the mortises without the necessity of setting out.

**A Sharpening Apparatus—Type LF**, *see page 222*—is included with the machine. All chains, chisels and augers extra according to requirements.

**The Driving Pulleys** (three) are 10-in. diameter by  $4\frac{1}{2}$ -in. face, and should run 750 revs. per minute.

**Approximate Power** required, 5 B.H.P.

**Space Occupied**, 5-ft. x 3-ft.

**WEIGHTS:**—Approximate Nett Weight, 16-cwts. = 1790-lbs.

Approximate Gross Weight, 20-cwts. = 2240-lbs.

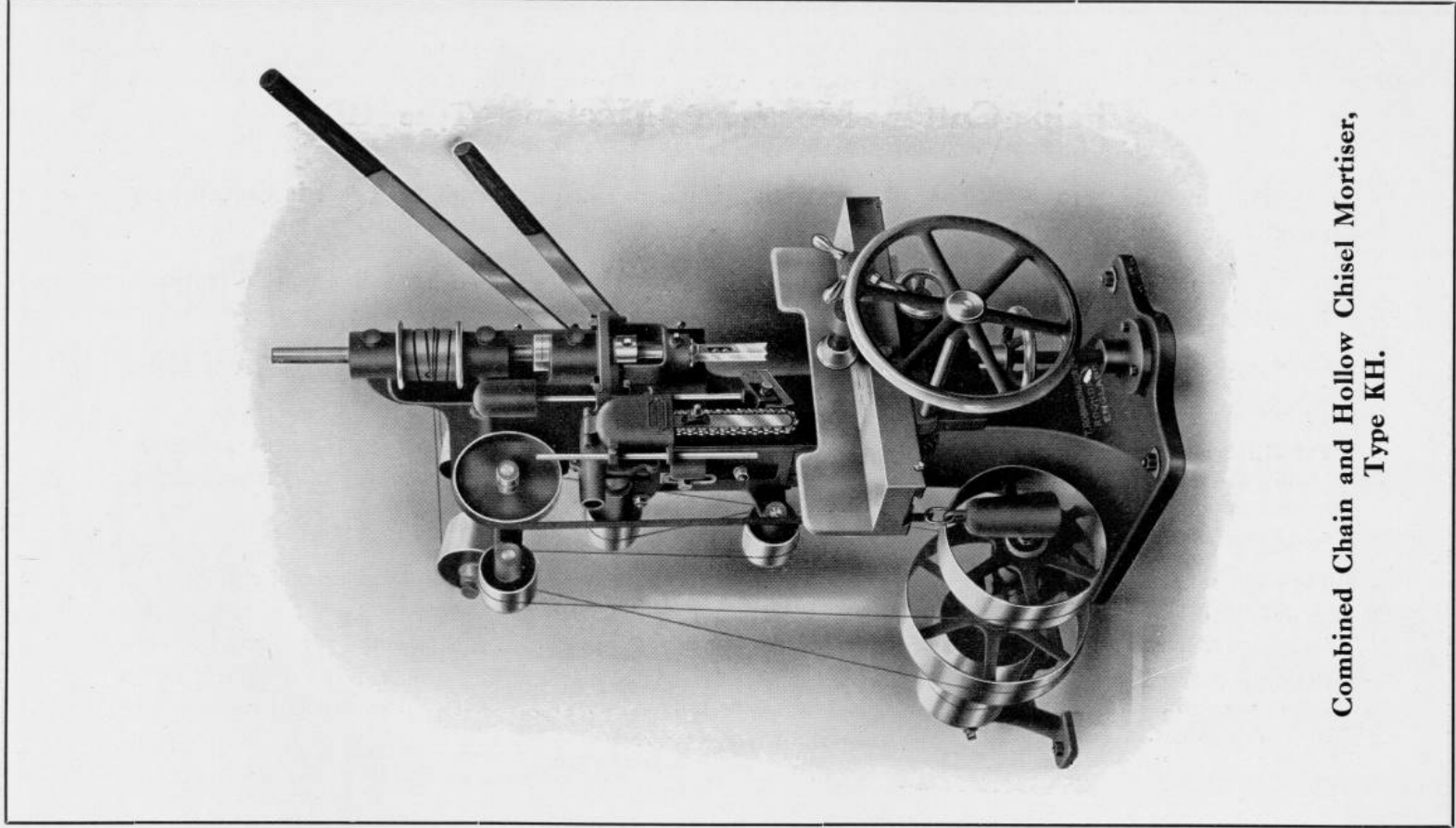
Code Word, **Disgate.**

Machine with Hollow Chisel portion only, Code Word, **Exdisgate.** The weight is reduced (approximately) 120-lbs.

**Nave Mortising Attachment:**—Weight, 2-cwts. = 224-lbs.; Code Word, **Disnave.**

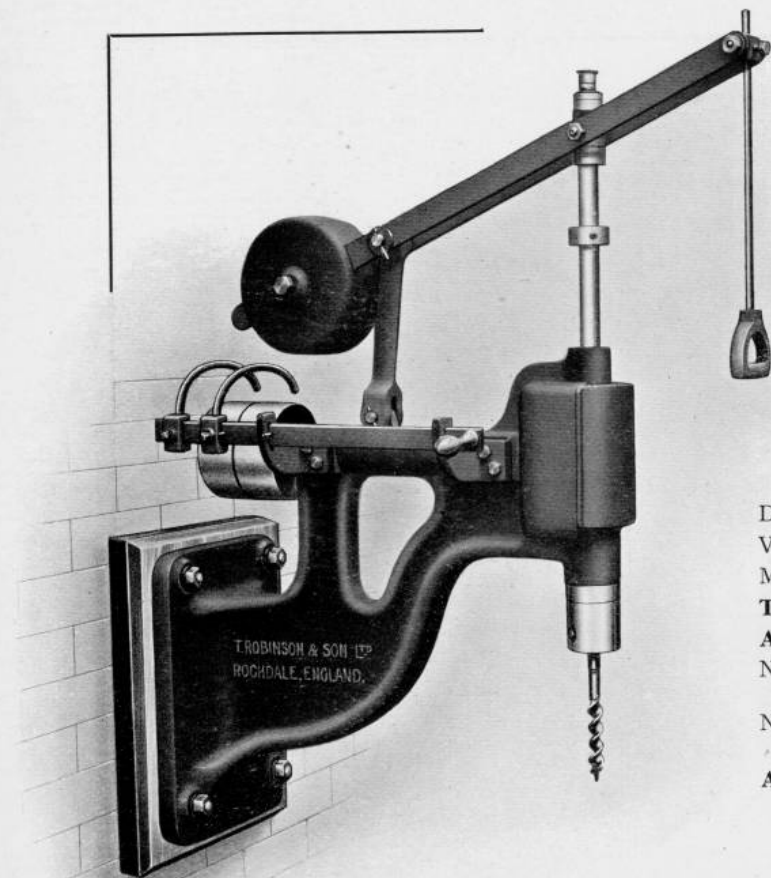
**Sharpening Apparatus**, pulley,  $1\frac{3}{4}$ -in. diam. by  $1\frac{1}{8}$ -in. face; 2000 revs. per minute; weight, 25-lbs.; Code Word, **Cercopes.**

**ELECTRIC DRIVING.**—This machine must be driven by belt from a standard speed motor carrying a flat face pulley 14-in. wide; the motor will require an outer bearing in most cases. Coupled drive cannot be arranged in this machine.



**Combined Chain and Hollow Chisel Mortiser,  
Type KH.**





## Boring Machine for Wall or Pillar Type HB.

A cheap and simple type Boring Machine to fix to a wall or post for general work, where space and first cost have to be considered. The auger spindle is driven through enclosed mitre gears, and is pulled down to the timber by the counter-balanced hand lever. The belt shifting gear is carried on the main casting, the machine being entirely self-contained. An adjustable collar is provided on the auger spindle to act as a depth gauge for the hole to be bored.

Distance from centre of auger spindle to wall or post, **27-in.**

Vertical movement of auger spindle, No. 0, **12-in.**; No. 1, **8-in.**

Maximum diameter of hole bored (in both sizes) **2-in.**

**The Driving Pulleys** are 6-in. diam. by 3-in. face, and run **750** revs. per min.

**Approximate Power** required, **2** B.H.P.

No. **0**:—Approx. Weights—Nett, **3-cwt.** = **335-lbs.**; Gross, **4½-cwt.** = **505-lbs.**  
Code Word, **Disenable.**

No. **1**:—Approx. Weights—Nett, **2¾-cwt.** = **310-lbs.**; Gross, **4¼-cwt.** = **475-lbs.**  
Code Word **Disendow.**

**A Foot Treadle** can be supplied for operating the boring spindle, at extra cost. The weight is increased **14-lbs.** Code Word for the machine so fitted, No. **0**, **Disenclose**; No. **1**, **Disentail.**

## Light Horizontal Single Spindle Boring Machine—Type JW

This is a very simple and effective machine for general light boring, as required by Cabinet Makers, &c.

The machine will carry bits to bore up to  $\frac{3}{4}$ -in. diameter and 6-in. deep.

The timber is usually fed by hand, but a sliding table can be fitted if desired.

The table is adjustable vertically by handwheel and screw. The fence is also moveable to determine the depth to be bored.

Countershaft and belt shifting gear included.

**The Driving Pulleys** on countershaft are 6-in. diameter by 3-in. face, and run 600 revs. per minute.

**Approximate Power** required,  $\frac{3}{4}$  B.H.P.

**Space Occupied**, 2-ft. 6-in. x 3-ft. 3-in.

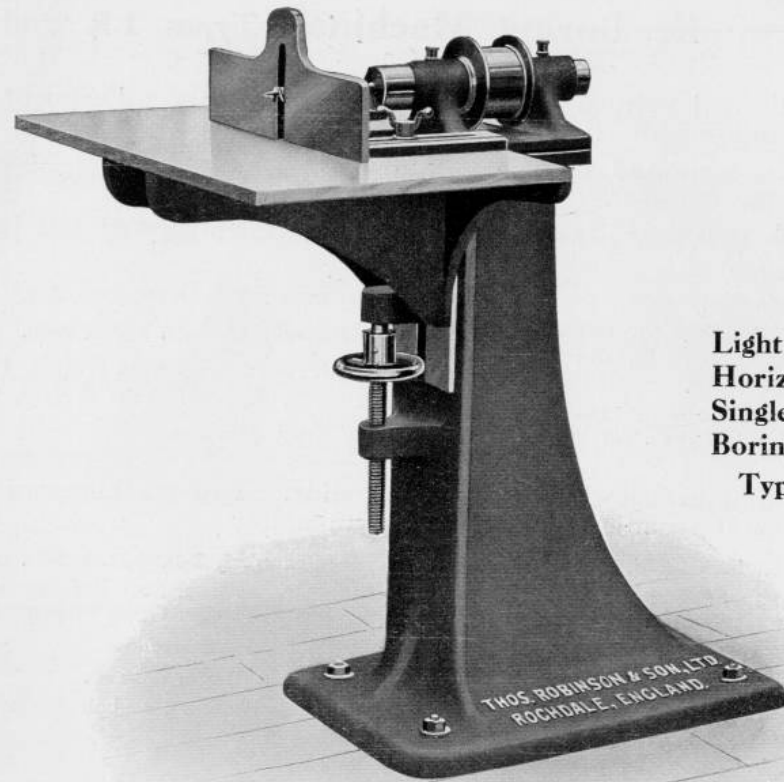
**WEIGHTS:**—Approx. Nett Weight, 7-cwts. = 780-lbs.

Approx. Gross Weight, 10-cwts. = 1120-lbs.

Code Word, **Dischurch.**

If required with sliding table, Code Word, **Discal.**

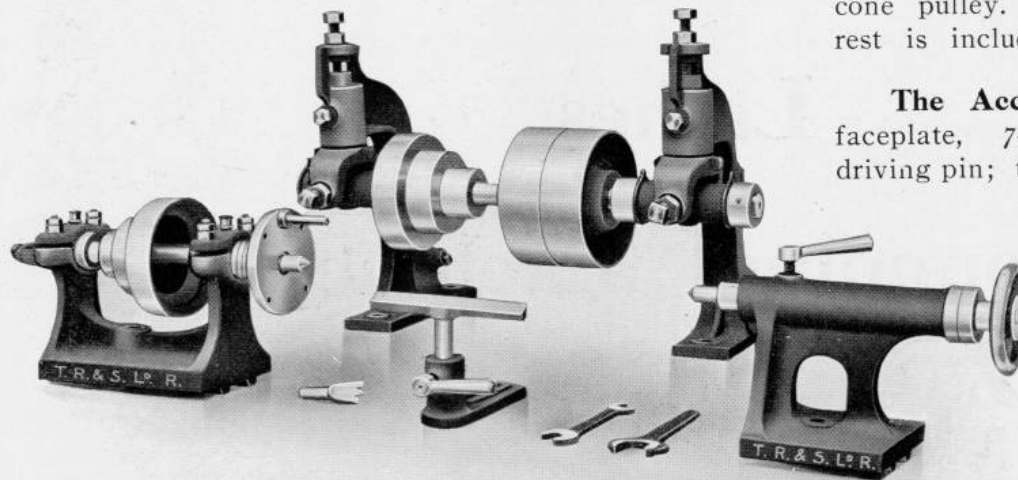
**ELECTRIC DRIVING.**—The countershaft can be dispensed with and the spindle be driven by belt direct from a standard speed motor.



**Light  
Horizontal  
Single Spindle  
Boring Machine,  
Type JW.**

## Lathe Headstocks—Type BU

These headstocks can be fixed either on a wooden bed, or an existing iron one. The 7-in. machine is fitted with three-step cone pulley, and the 9-in. and 12-in. machines with four-step cone pulley. One T socket and rest is included.



**The Accessories** include one faceplate, 7-in. diameter, with driving pin; two plain centres; one fork centre; six hand turning tools; bolts for securing head-stock and rest to the bed; counter-shaft, belt guide, and set of spanners.

Size No.	COUNTERSHAFT.				Revs. per minute.	Approximate B.H.P. required.	Approximate Nett Weight.		Approximate Gross Weight.		Code Word.
	Diam. in.	Face. in.	Centres. in.	Size of driving pulleys.			cwts.	lbs.	cwts.	lbs.	
1	12	x 3	- 12	-	500	4	8 = 900	10 = 1120	-	Distune	
2	10	x 3	- 9	-	500	3	7 = 780	9 = 1010	-	Diswont	
3	8	x 2½	- 7	-	500	2	2½ = 280	3½ = 390	-	Disturb	

## Double Headstock Lathe for Pattern Makers—Type KL

For use in Shipyards, Engine Shops, and where any large wood turning is required. The standard lengths of bed are 18-ft. and 26-ft. Both fast headstocks are arranged to carry faceplates at each end of the spindle, the larger one being capable of turning 6-ft. in diameter.

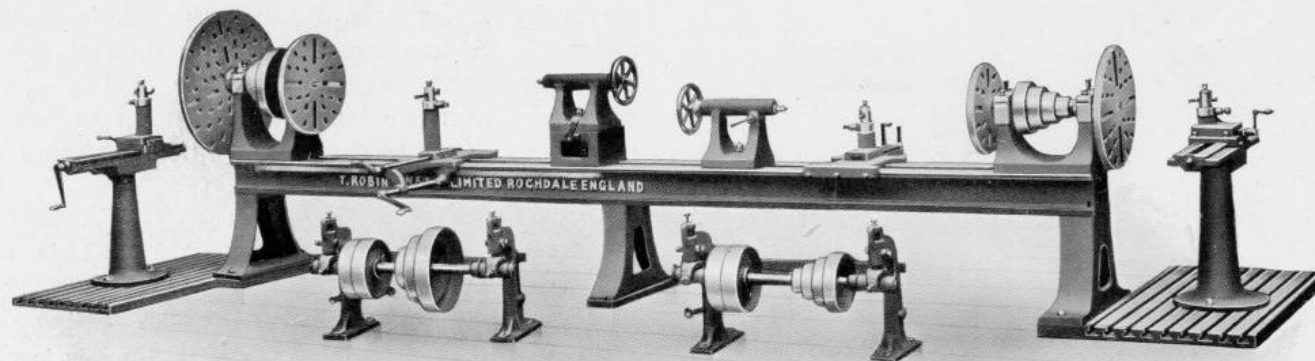
Included with this machine are two countershafts and belt shifting gear, six hand turning tools, four tools for slide rest, four plain and two fork centres, and one 7-in. faceplate with driving pin; also one 18-in. and one 24-in. diameter faceplates for inside working, and one 24-in. and one 36-in. diameter faceplates for the overhanging spindles.

This type of lathe can be built with different heights of centres and lengths of bed to suit special requirements.

Size No.	Height of centres.		Size of driving pulleys.		Revs. per minute.	Approximate B.H.P. required.	Space occupied.					
	in.	in.	Diam. in.	Face. in.			18-ft. bed.		26-ft. bed.			
							Length. ft.	Width. ft.	Length. ft.	Width. ft.		
1	-	15 and 22	-	12 x 3½	-	500	-	7	-	24 x 5	-	32 x 5
2	-	12 and 18	-	12 x 3	-	500	-	5	-	24 x 4	-	32 x 4

Size No.	Approximate Nett Weight. with 18-ft. bed.		Approximate Gross Weight.		Approximate Nett Weight. with 26-ft. bed.		Approximate Gross Weight.		Code Word.			
	cwts.	lbs.	cwts.	lbs.	cwts.	lbs.	cwts.	lbs.	with 18-ft. bed.	with 26-ft. bed.		
1	-	83 = 9295	-	90 = 10080	-	100 = 11200	-	107 = 11985	-	Disuse	-	Disvouch
2	-	80 = 8960	-	87 = 9745	-	95 = 10640	-	102 = 11425	-	Disvalue	-	Diswarn



Double Headstock Lathe for Pattern Makers—Type KL.

## Dovetailing Machine—Type NNN

The Dovetailing Machine here shown is specially useful for all kinds of Box and Case Making, and wherever a high class dovetail is required. It is the only machine built that exactly imitates a hand-made dovetail.

Its production is so great that boxes and cases can be dovetailed together almost as cheaply as if nailed.

The machine is semi-automatic and very simple to operate, and **forms the dovetails by sawing out the timber** as is done when cutting hand dovetails, thus forming a very close and strong joint when put together.

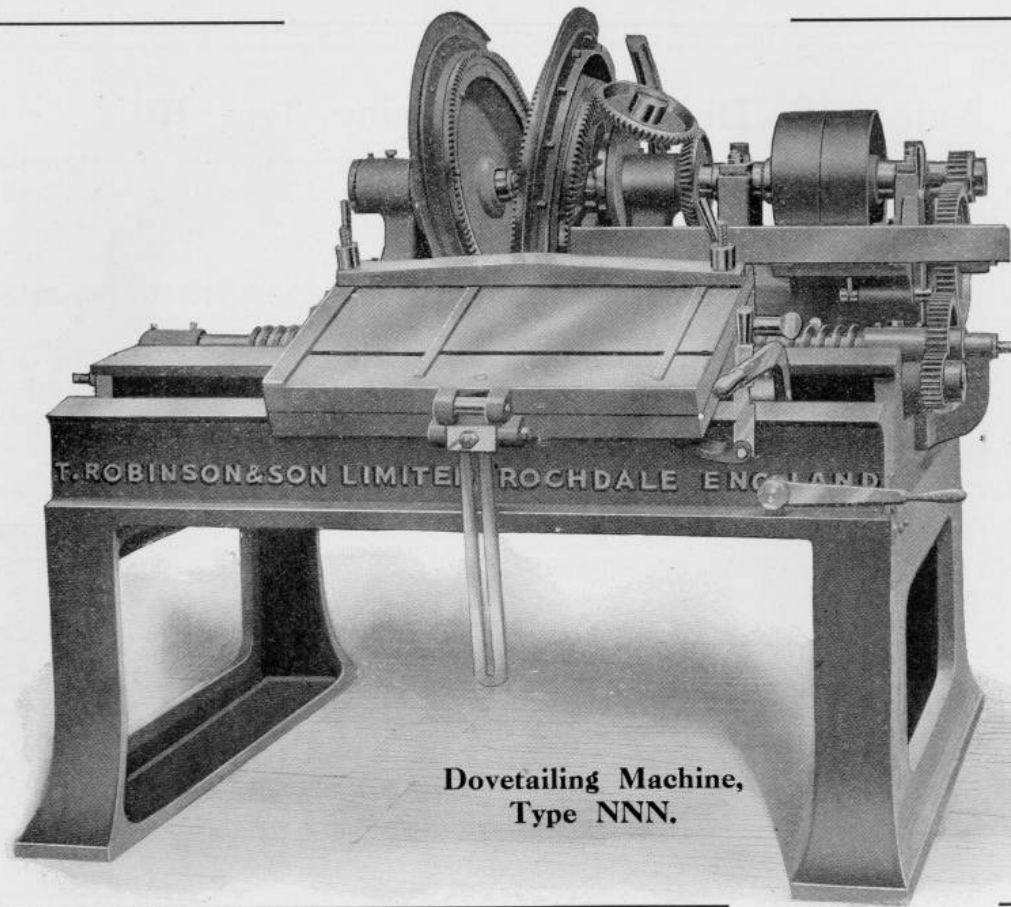
**The Saws** which cut out the dovetails are mounted on discs, geared together at an angle; these are varied for cutting either the mortise or the tenon dovetail. The discs are graduated for setting, so that the position of the saws can be adjusted for cutting tight or slack dovetails.

Boards from  $\frac{1}{4}$ -in. to  $1\frac{1}{4}$ -in. thick can be dovetailed on each side of the machine.

The standard machine cuts dovetails 1-in. pitch. Other sizes and pitches can be made to order.

Size No.	Maximum width of board in.	Size of pulleys. Diam. in.	Face in.	Revs. per minute.	Approximate B.H.P. required.	Space occupied. Length. ft. in.	Width. ft. in.	Approximate Nett Weight. cwts. lbs.	Approximate Gross Weight. cwts. lbs.	Code Word.
1	- 36	- 10	x $3\frac{1}{2}$	- 250	- 3	- 5 6	x 4 9	- 26 = 2910	- 32 = 3580	- Dictate
2	- 24	- 10	x $3\frac{1}{2}$	- 250	- 3	- 5 0	x 4 9	- 24 = 2690	- 30 = 3360	- Diary
3	- 15	- 10	x $3\frac{1}{2}$	- 250	- 3	- 4 3	x 4 9	- 22 = 2460	- 28 = 3140	- Diamond

ELECTRIC DRIVING.—This machine must be driven by belt from a standard speed motor.



**Dovetailing Machine,  
Type NNN.**



## Automatic Dovetailing Machine—Type HU

This machine is constructed to do the highest class of work for the use of Cabinet Makers and Office and other Furniture Makers, and is especially adapted for cutting blind and secret dovetails for drawer fronts, &c.

Both the mortise and tenon dovetails are cut simultaneously.

The machine will work timbers of any size up to 24-in. wide, the pitch of dovetails being either  $\frac{3}{4}$ -in. or 1-in. as may be ordered.

The timbers are held in position by adjustable cramps, and the carriage is automatically moved forward after each cut. When the carriage has travelled the full length of the board, it is automatically thrown out of gear, so that boards may be changed, and dovetails cut on the return travel.

The carriage may be set to stop at any point of its travel.

**The Driving Pulleys** are 6-in. diam. by 3-in. face, and run 900 R.P.M.

**Approximate Power** required, 3 B.H.P.

**Space Occupied**, 6-ft. 3-in. x 3-ft. 9-in.

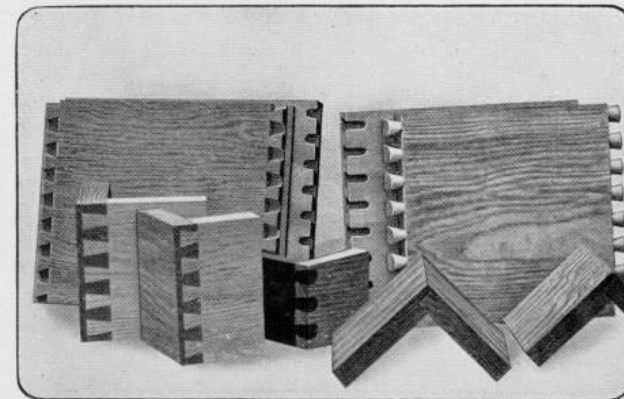
**WEIGHTS:**—Approximate Nett Weight, 13-cwts. = 1460-lbs.

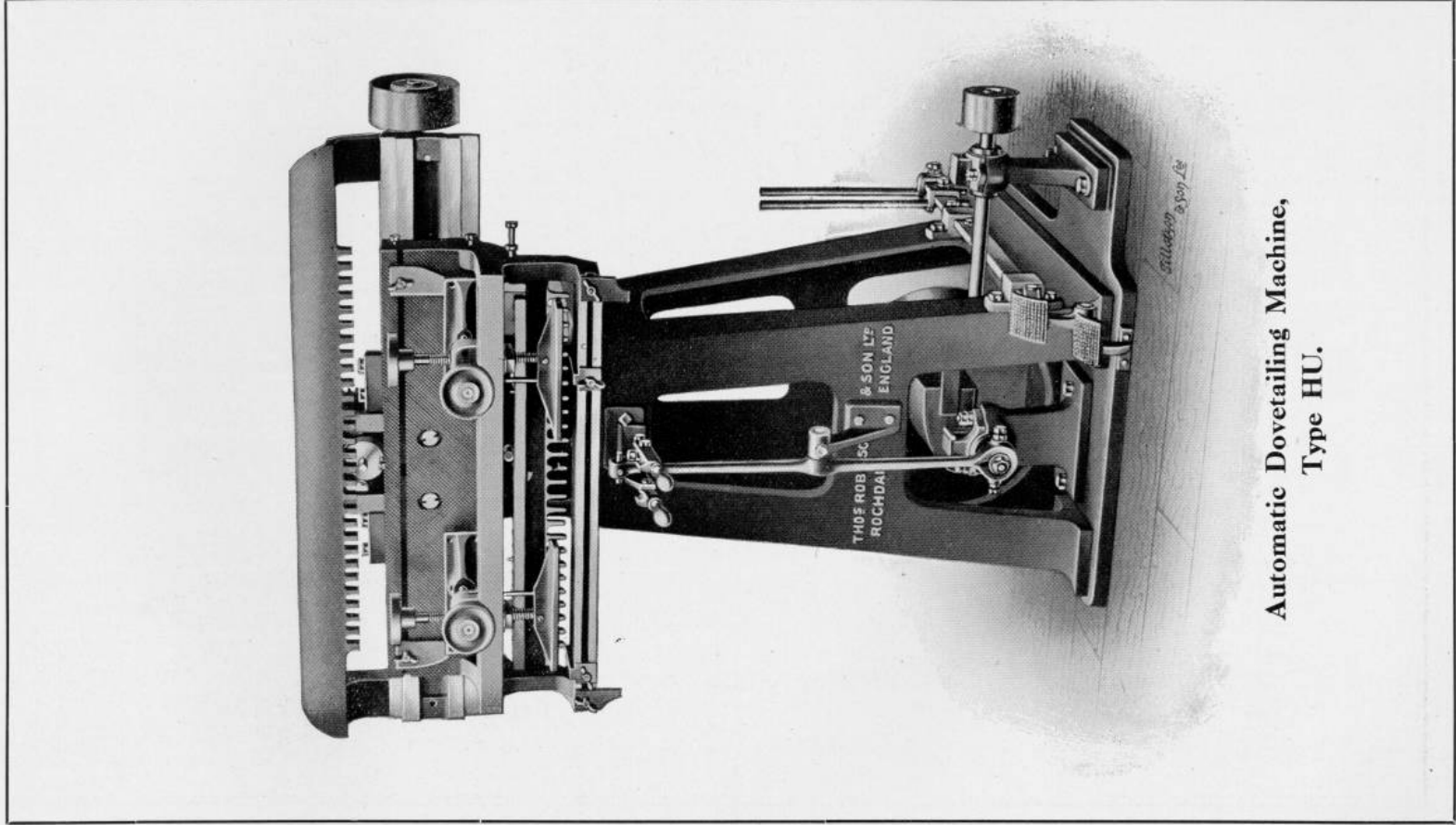
Approximate Gross Weight, 16-cwts. = 1790-lbs.

Code Word, **Dialist.**

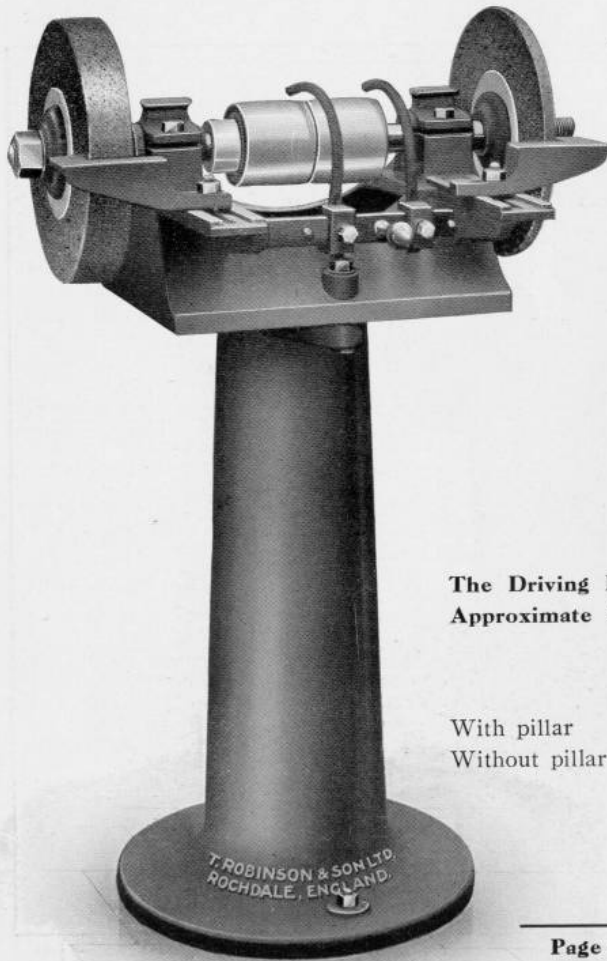
**ELECTRIC DRIVING.**—The machine can be coupled direct to a motor running about 900—1000 revs. per minute. Flexible coupling *extra*.

**Samples of work done on this machine.**





**Automatic Dovetailing Machine,  
Type HU.**



## Small Grinding Machine—Type BE For Moulding Irons.

This is a useful little machine, carrying two emery wheels, for Sharpening Mould Cutters, without the use of water.

The frame carrying the spindle and bearings is a single casting, suitable for fixing on a bench, but it can be supplied mounted on a cored cast iron pillar if preferred.

**The Driving Pulleys** are 4-in. diameter by 3½-in. face, and run **1000** revs. per minute.  
**Approximate Power** required, **1** B.H.P.

		Approximate Nett Weight.		Approximate Gross Weight.		Code Word.
		cwts.    lbs.		cwts.    lbs.		
With pillar	-	3¼ = 360	-	4½ = 500	-	<b>Digeri</b>
Without pillar	-	1½ = 170	-	2½ = 280	-	<b>Drenching</b>

Emery Wheels *extra*.

## Small Grinding Machine for Moulding Irons—Type LC.

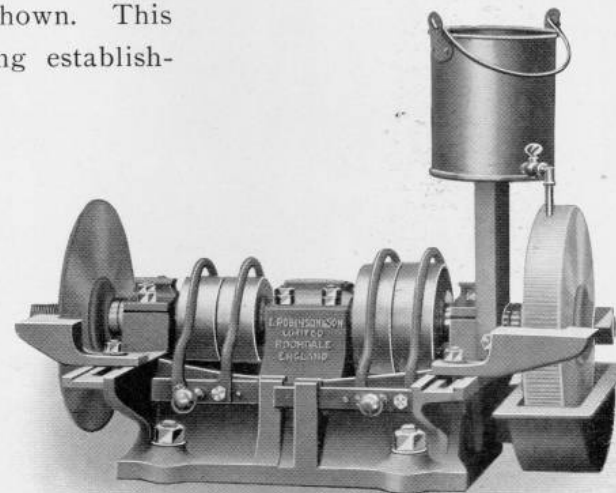
This is a variation of **Type BE** Grinding Machine, but made to carry one emery wheel and a soft sand-stone wheel driven independently; the latter wheel is fitted with water can and trough as shown. This forms a useful combination for small woodworking establishments.

Size of driving pulleys.		Revs. per minute.		Approximate
Sand-stone.	Emery wheel.	Sand-stone.	Emery wheel.	B.H.P. required.
Diam. Face.	Diam. Face.	Diam. Face.	Diam. Face.	
in. in.	in. in.	in. in.	in. in.	
6 x 2	4 x 2	400	1000	1

	Approximate	Approximate	Code Word.
	Nett Weight.	Gross Weight.	
	cwts. lbs.	cwts. lbs.	
With pillar	4 = 450	5 = 560	Dido
Without pillar	2 = 220	3 = 340	Diana

One sand-stone 2-in. wide included.

Emery Wheels *extra*.



## Grinding Apparatus for Chain Cutters—Type LF

A necessary appliance for Sharpening the Chain Cutters for Chain Mortising Machines, and which is included with all types of these machines.



The chain cutter is mounted on a suitable holder, and is pushed up to the emery wheel by hand.

Four assorted chain holders are supplied suitable for chains up to 1-in. One emery wheel is also included.

**The Driving Pulleys** are  $1\frac{3}{4}$ -in. diameter by  $1\frac{1}{8}$ -in. face; and run **2000** revs. per minute.

**Approximate Power** required,  $\frac{1}{8}$  B.H.P.

**WEIGHT:**—Approximate Nett Weight, **10-lbs.**

Code Word, **Cercopes.**

**ELECTRIC DRIVING.**—We advise the machine being driven from any convenient shafting.

## Glue Heaters—Type S<sup>2</sup> for Steam, Gas, or Electricity

This apparatus enables glue to be heated with absolute safety in woodworking establishments.

The vessels containing the glue are made of **copper**, and are placed in a cast iron container, in which steam is circulated.

As the container is steam tight, no steam is emitted when the glue pots are removed.

A safety valve is fitted to the top of the container, and a tap is placed in the side for draining off water for diluting the glue, &c.

Inlet and outlet valves are included.

Size No.			Approximate Nett Weight.		Approximate Gross Weight.		Code Word.
			cwts.	lbs.	cwts.	lbs.	
1,	to hold 6 pots,	each of 6 pints capacity	-	5½ = 620	-	7 = 780	- Abia
2,	" 5 "	4 of 6 pints and 1 of 13 pints capacity	-	5½ = 620	-	7 = 780	- Abrota
3,	" 4 "	3 " 6 " 1 " 25 " "	-	5 = 560	-	6½ = 730	- Abyla
4,	" 3 "	2 " 6 " 1 " 13 " "	-	4 = 450	-	5½ = 620	- Aboras
5,	" 2 pots,	each of 6 pints capacity	-	3 = 340	-	4½ = 500	- Abdera

We recommend No. 4 size (as illustrated) for ordinary requirements.

We can also supply Glue Heater heated by Gas or Electricity; when enquiring for electrically heated apparatus, the voltage of the supply of current must be given, and also state whether direct or alternately.



Glue Heaters,  
Type S<sup>2</sup>

## **Variable Speed Countershaft**

**Lang's Patent, Nos. 6559/02 & 11307/04.**

**We hold the sole right of manufacture** in Great Britain for this Variable Speed Gear applied to all kinds of woodworking machinery for varying the rates of feed, and we have embodied this device in many of our latest types of woodworking machines referred to in this catalogue.

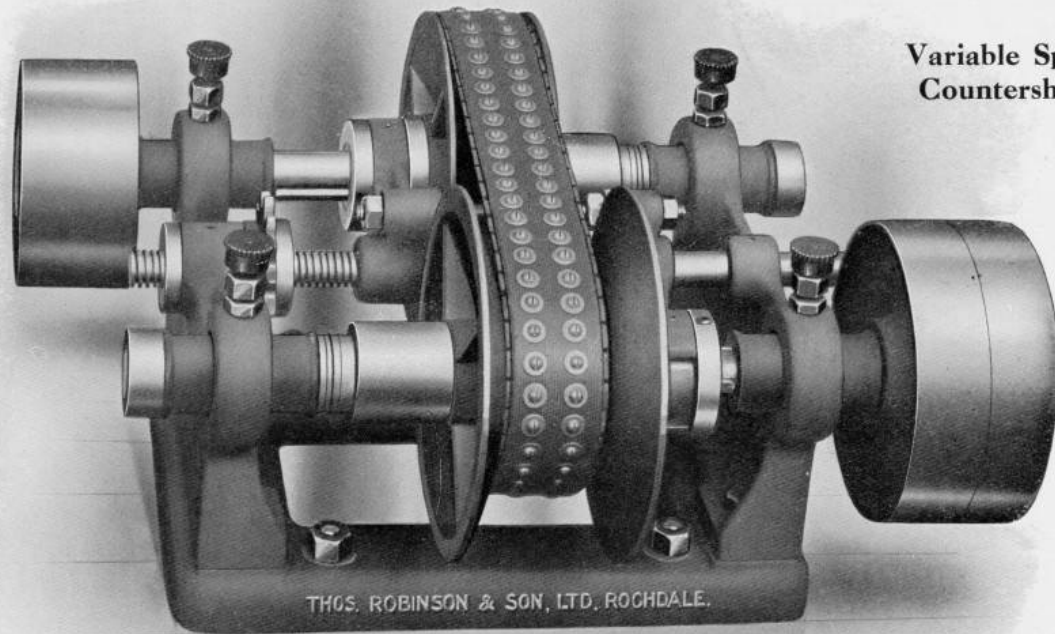
**The Ideal Variable Speed Gear** must, in order to cope with modern demands for increased output, be capable of transmitting considerably more power than the friction devices hitherto in use, which are of necessity—due to their principle of construction—very limited in this respect. Yet at the same time the undoubted convenience of being able to change the speed through its full range without stopping the feed, must be retained. These conditions are amply filled by this Patent Feed Gear.

**The Rate of Feed can be varied** at will whilst the machine is running, making it possible to perform every operation at the maximum speed, and at the same time allowing of quick variation, or reduction to the lowest speed, without pause or intermission in the work, and without any belt shifting.

**The Feed Gear** consists of a heavy **V** belt running between two pairs of expanding conical discs. The belt itself consists of a number of hard wood lags screwed to a special belt. Each of these lags is faced with leather, and is trimmed off to exactly the same length and angle throughout the length of the belt. The result is a very powerful but quite noiseless driving medium, which will run for a considerable period without attention.

The relative opening of the conical discs—which determines the rate of feed—is adjusted by means of a screw. This adjustment may be operated by a chain from the most convenient position on the machine to which the feed is applied.





**Variable Speed  
Countershaft.**

THOS. ROBINSON & SON, LTD. ROCHDALE.

Showing a combination of the **Multiple Spindle Boring Machine (Type KO)**, with four fixed and two canting boring spindles, and the **Square Hollow Chisel Mortiser (Type HK)**. The table is fitted with both hand and power feed.

