

~ 1905 ~

CATALOGUE
OF
Engineers' Tools
ETC.

BRITANNIA
Engineering Company
LIMITED,
COLCHESTER.

Telegrams—"BRITANNIA, COLCHESTER." *Telephone*—No. 47 NATIONAL.

**MAKERS OF ENGINEERS' TOOLS TO THE
BRITISH GOVERNMENT.**

PRICES ARE SUBJECT TO ALTERATION WITHOUT NOTICE.

Britannia Engineering Company, LIMITED,

WHILST inviting attention to the annexed Catalogue, containing a few of their manufactures, would also draw attention to the following notices:—

That they manufacture upwards of 250 varieties of Lathes and Shapers, Milling, Slotting, and Planing Machines, &c.

That they are open to design and make Tools to suit the requirements of Purchasers. Drawing, Details and Measurements must be carefully given.

TERMS:—CASH OR CREDIT AS MAY BE ARRANGED
OR EASY TERMS OF HIRE PURCHASE.

Prices are subject to Alteration without Notice.

The Designs are subject to Modification or Improvement

FOREIGN ORDERS to be accompanied by a remittance, or notification what Bank will pay Cash on receipt of Bills of Lading.

PACKING FOR EXPORT IS CHARGED 5 PER CENT. ON THE NETT
AMOUNT OF INVOICE.

PACKING CASES RETURNED ARE ALLOWED IN FULL.

They are constantly making various Lathes and Engineers' Tools for the British Government, and it is their aim to supply reliable Tools at a **Small Advance** upon prices charged for **Common** quality, which every Engineer knows are not reliable, and therefore not economical.

FROM

THE BRITANNIA ENGINEERING Co., Ltd., COLCHESTER, ENGLAND.

Tool Makers by Appointment to
the British Government.

Prize Medals in all parts
of the World.

Telegrams:—"BRITANNIA," COLCHESTER. Telephone, No. 47, National.
Codes used:—"A B C," "A 1," & "ENGINEERING."

June, 1905.

GENTLEMEN,


This Catalogue contains details of many Tools designed and made by us.

We make many others and will quote for what you require on receipt of details.

Having a staff of efficient workmen, with the most modern plant, we are in a position to execute orders to drawing for Tools or Machinery.

We make 250 different sizes and patterns of Lathes, from the Engineers' 40-foot to the smallest Bench Lathe.

Any Tool will be exchanged if not approved unless specially made.

 With a view to the saving of time and unnecessary correspondence it is essential that as much detail as possible should be given with either enquiry or order.

Orders from strangers should be accompanied by either Post Office Order, Cheque, or reference to some well-known commercial firm or firms, with whom they have open accounts.

Any Cash remitted in excess will be returned.

Foreign and other customers entrusting us with their Orders for goods of any and every description, may rely on best value being selected, and careful packing.

We are, yours truly,

THE BRITANNIA ENGINEERING Co., Ltd.

NOTE.—We have repeated orders from the British Government for their various Workshops, Arsenals, &c. This will be a guarantee to strangers of the quality of our work.

All Cheques and Post Office Orders payable to THE BRITANNIA ENGINEERING CO., Ltd., Colchester.

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THIS Edition of our Catalogue has been compiled with extreme care, and cancels all previous lists.

Prices have been entirely and carefully revised, and many reductions made which we trust will lead to increased business.

Catalogue prices and discounts are subject to alteration without notice.

Illustrations have been re-arranged and many new engravings added. The engravings will be found very accurate, but they are not to be held binding as to detail.

Customers should state clearly on every order how they prefer the goods to be consigned. In the absence of instructions we use our own discretion and cannot be responsible for any delay or loss arising therefrom.

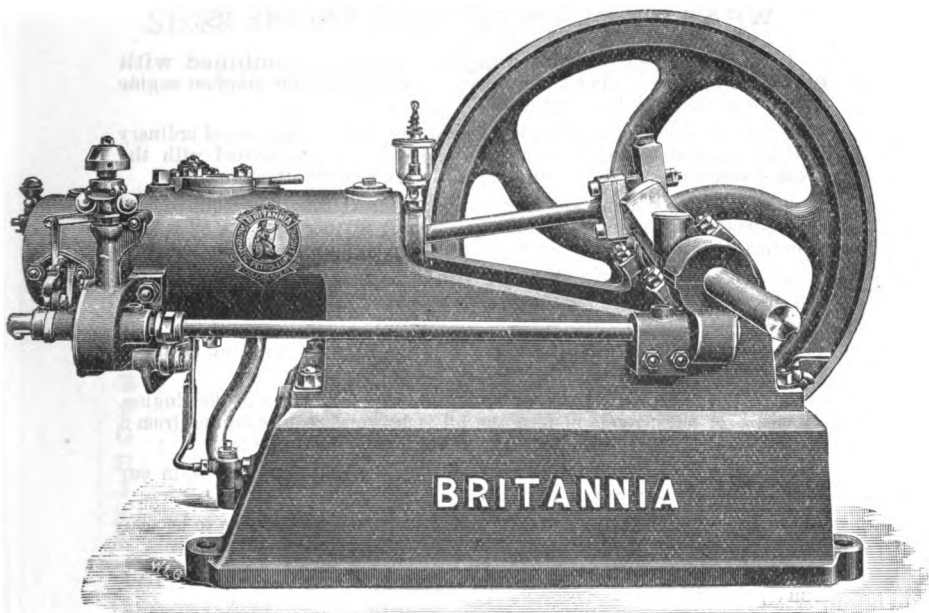
COLCHESTER,

June, 1905.

BRITANNIA SAFETY AUTOMATIC OIL ENGINE

(NICHOLSON'S PATENT).

**The simplest and most perfect Engine of the day.
Suitable for any purpose for which power is required.**



SIMPLE, SAFE, SILENT, ECONOMICAL, POWERFUL.

Occupies little space. Can be got ready to start in a few minutes.

Will run for hours without attention.

Consumes nothing but ordinary Petroleum Oil.

THIS Engine, which is the result of many years' experience, has been designed to meet the great demand that exists for a **cheap form of motive power**, being at the same time absolutely **reliable** in its action. It is adapted for driving any of the innumerable machines now employed in almost every industry, such as machine tools, pumps, threshing machines, fans, dynamos, dairy plants, saw mills, farm and estate work, &c., &c. The great advantage of this over any other type of engine is that it is entirely self-contained: that is to say, that you can have power at any time within a few minutes' notice as long as you have a supply of petroleum in the tank.

After once being started, it requires no further attention, being frequently left for from four to six hours without being touched.

The Britannia Engineering Co., Ltd., Colchester, England.

BRITANNIA

SAFETY AUTOMATIC OIL ENGINE

(NICHOLSON'S PATENT).

WHAT WE CLAIM FOR THIS ENGINE IS:—

1. That it is positively the **simplest Engine, combined with efficiency**, ever produced, and we are convinced that the simplest engine which works successfully is the best.

2. That because of its simplicity it can be worked by any one of ordinary intelligence after having had one or two lessons. It is started with the greatest ease, and can be left running for hours without attention.

3. That after starting, **no lamp or external flame** is required, and consequently the Engine is absolutely safe, and, furthermore, the oil is kept at ordinary atmospheric temperature until it reaches inside the Engine.

4. That there are **no fans or blast lamps** required to heat the Engine for starting, an ordinary plumber's lamp being used for a few minutes only.

5. That there is **no ignition tube** to burst, the igniter being arranged so as not to be subject to the pressure of the explosion.

6. There is **no air or oil under pressure** anywhere in the Engine. By means of our patent oil feed the oil is drawn as required direct from a tank in the bed without the necessity of any pump or delicate part.

7. There is no reservoir of oil fixed over the Engine, which is, in our opinion, both dangerous and unsightly.

8. There are **no small holes or delicate parts** liable to become choked and get out of order, as in practically all other oil engines.

9. The Engine will run **equally well on light, medium, or heavy loads**.

10. The **governing** is arranged on the most economical and successful principle, and is so **perfect** that the Engines are specially adapted for driving electric light direct.

11. The oil consumption is lower than in nearly all other Engines, being about $\frac{1}{4}$ pint in the six-h.p. size, which is considerably less than $\frac{1}{4}$ d. per horse power per hour.

12. The mechanical design is of the most modern and accepted principles, and is intended for continuous and hard work, special care being taken to give ample strength and wearing surfaces. Every part is accessible, and the valves can be removed at a couple of minutes' notice by removing two nuts.

PORTABLE OIL ENGINES. VERTICAL TYPE.
PUMPING SETS. PETROLEUM LAUNCH MOTORS.

Catalogues with full particulars and prices sent on application.

The Britannia Engineering Co., Ltd., Colchester, England.

BRITANNIA

SAFETY AUTOMATIC OIL ENGINE

(NICHOLSON'S PATENT).

SIZES, PARTICULARS AND PRICES OF HORIZONTAL FIXED ENGINES.

Prices subject to a liberal discount.

Type.	Continuous Brake H.P.	Maximum Brake H.P.	Approximate Dimensions of Engine.		Approx. Weight of Engine.	Revo- lutions.	Water Tanks (if required).	Diam. of Fly- wheel.	PRICE.	
			ft. in.	ft. in.					£	s.
B	2	2½	4	4 by 2 4	6½	360	2 0 3	2 6	£	s.
C	3½	3½	5	6 „ 3 2	12½	315	3 14 9	3 1½	68	0
D	4½	5½	6	2 „ 4 1	15½	260	4 12 0	3 7½	81	0
E	6	6½	7	1 „ 4 6	24½	250	5 3 6	4 0	92	0
F	8	9	8	0 „ 5 4	38	250	6 12 3	4 6	110	0
G	12	13½	9	2 „ 5 7	48½	230	8 8 0	5 0	140	0
H	16	18	10	2 „ 6 0	65	200	—	5 6	160	0
J	21	23½	11	0 „ 6 6	86	200	—	5 6	218	0
K	32	35	14	11 „ 6 10	110	200	—	5 6	345	0
L	45	50	16	6 „ 7 3	140	200	—	5 6	425	0
M	64	70	14	11 „ 9 4	205	200	—	6 0	520	0

The above prices include the Engine complete, ready for working, and with one flywheel only up to the 21 b. h.p.

Terms.—Cash, credit, or on the deferred payment system.

Guarantee.—We guarantee to replace or repair, within six months from delivery, any part showing undue wear or breakage, unless such wear or breakage is caused by careless or improper treatment.

Fixing.—Drawings and full instructions for fixing and starting the Engines supplied.

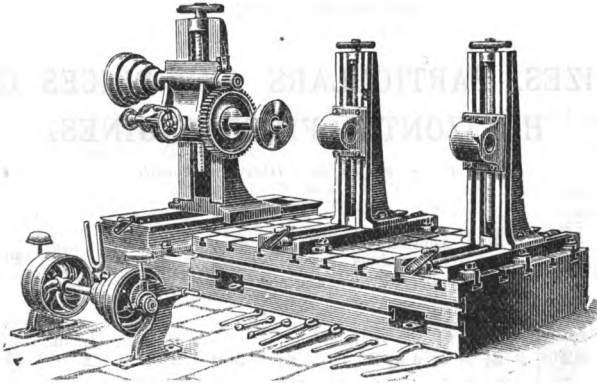
We recommend that these Engines should be fixed only by competent men, and we are willing, if necessary, to send a man for this purpose at a very low cost.

Testing.—Every Engine thoroughly tested before leaving our works.

Packing.—A charge of 2½ per cent. is made for this, two-thirds of which is allowed if the case is immediately returned and in good condition.

The Britannia Engineering Co., Ltd., Colchester, England.

HORIZONTAL BORING, DRILLING & FACING MACHINE, No. 41.



THIS machine is designed especially for boring heavy objects having several holes to bore parallel to each other, of which **any number can be bored at one setting**, as the boring head and rests for the boring bar are fitted with compound motion to adjust to the greatest accuracy, both vertically and horizontally, by screw and nut motion, with convenient handles.

The bed plate is a massive casting 9 ft. long by 4 ft. wide and 12 ins. high, having T slots both longitudinally and transversely on its top face, and longitudinally on its side faces. The top sides and long slots are all accurately planed parallel, and at one end of the bed plate is fixed, at right angles to its length, a truly planed V edged slide, carrying the vertical slide on which is mounted the saddle of the boring head.

The boring head is constructed with single geared motion, 4-speed cone pulley with pinion and spur gearing, feed motion by hand or self-acting by differential wheels, the wheel for hand feed being conveniently placed at the front, always accessible to the operator, particularly useful when starting the cut or facing work. The main spindle is of steel, and fitted in a sleeve revolving with the spur wheel keyed to it.

The pinion is thrown in or out of gear by a clutch and lever to start and stop instantly irrespective of the countershaft motion. The machine, as illustrated, is constructed to bore up to 24 in. in length and 12 in. in diameter; and the general dimensions are as follows:—

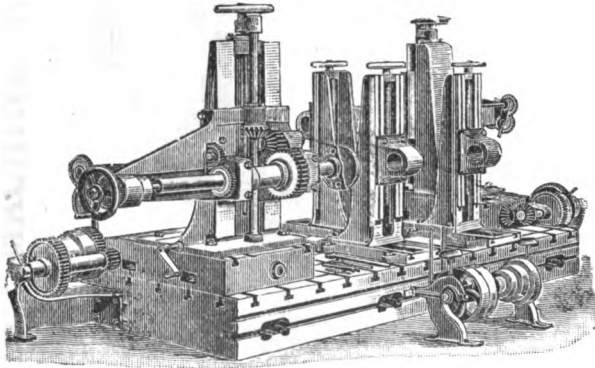
- Diameter of main steel spindle, 3½ in.
- Diameter of gearing, 16½ in. and 3½ in. by 1 inch pitch.
- Diameter of speed cone, largest 13 in., smallest 5 in.
- Width and number of speeds, 4 in. by 3½ in.
- Maximum length and diameter to bore, 24 in. by 12 in.
- Maximum and minimum height to bore from face of bed plate, 35 in. and 6½ in.
- Maximum horizontal range of boring head, 46 in.
- Overhead pulleys, 13½ in. by 3½ in.
- Speed, 110 revolutions per minute.
- Approximate weight, 3½ tons.

PRICE, complete, with Top Driving Apparatus, Spanners, Keys, &c. **£103 10 0**

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

**HORIZONTAL
BORING, DRILLING, & SURFACING MACHINE,
No. 42.
FOR LARGE WORK.**



THIS machine is constructed with powerfully-gear'd boring heads, having steel spindles driven by strong spur and mitre gearing, with variable feed, self-acting in either direction, or stationary for surfacing; the heads are mounted on upright heavily rigidly-constructed slides, with vertical adjustment by screw and hand-wheel, and transverse adjustment by rack and pinion. The upright bar rests are made with socket heads to carry the boring bar and bushes, one bar rest at each side of the work, and are also adjustable vertically by screws and hand-wheels. The driving cone pulleys have four speeds, and double gearing is fitted, giving eight changes of speed. The whole is mounted on a machine-planned heavy foundation bed-plate with T slots for bolting work to. The machine above illustrated has steel spindles $3\frac{1}{2}$ ins. diameter, and is capable of boring holes up to 24 ins. diameter by 42 ins. long, and has a double set of boring heads and bar rests, the foundation plate being 12 ft. by 5 ft., but machines are made of all sizes to suit Purchaser's requirements, and estimates will be given on application.

Overhead pulleys, $13\frac{1}{2}$ ins. by $3\frac{1}{2}$ ins. Speed, 180 revolutions per minute.
Approximate weight, $7\frac{1}{2}$ tons.

PRICE of above Machine on Rails, with Top-Driving Apparatus, &c.,
complete £

Smaller machine driven by single gear, boring up to 12 ins. diameter,
made on similar principle—

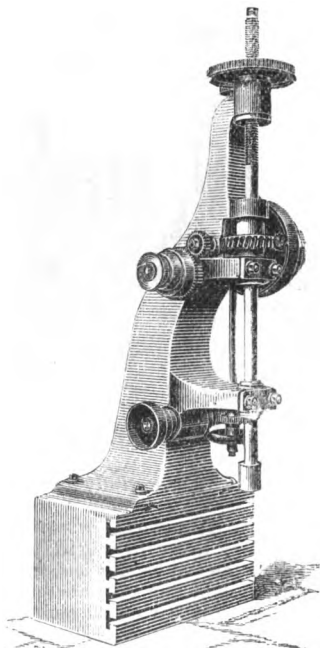
PRICE, with bed 13 ft. by 5 ft., to bore up to 12-in. hole ... £
Other sizes to order.

Neat cast iron gear covers can be fitted to enclose all exposed gearings, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

VERTICAL BORING MACHINE,

No. 43.



This machine is designed for boring vertically pump bodies, cylinders, or any similar work, the boring falling clear through the work. It is intended to be fixed on a bench, or may be mounted on a cast-iron box foundation base, with T slot (as illustrated), to which can be bolted the work, or an angle bracket can be attached, on which small work, as plummer blocks, &c., may be secured.

The Dimensions are as follows:—

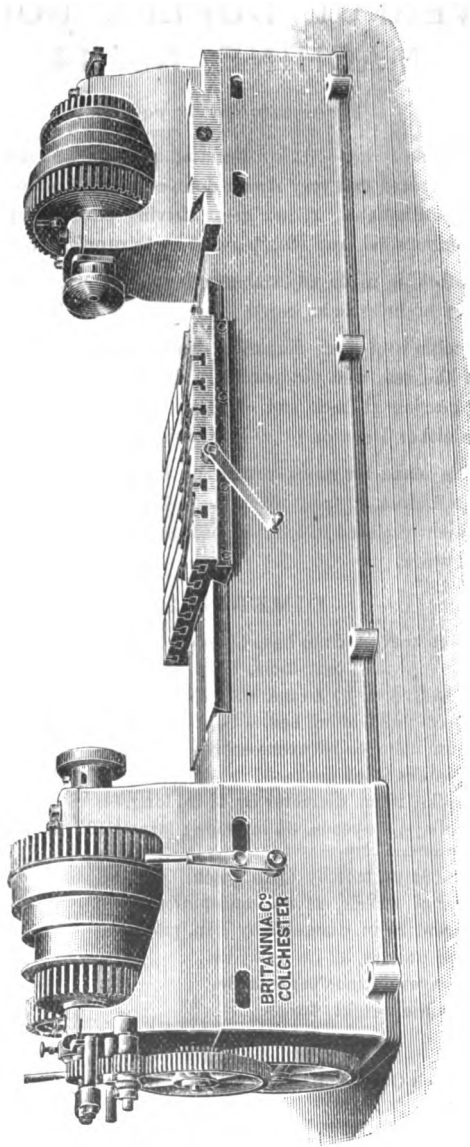
Steel spindle, $2\frac{1}{2}$ in. diameter.
 Driving cone, 4 speeds, $3\frac{1}{2}$ in. wide.
 Diameters of largest and smallest speeds, $17\frac{1}{2}$ in. and 7 in.
 Feed cones, 3 speeds, $1\frac{1}{2}$ in. wide.
 Diameters of largest and smallest speeds, 7 in. and 4 in.
 Worm gearing, 2 in. pitch, double threads.
 Feed wheels, 35 and 105 teeth, 7 pitch.
 Diameter of driving shaft, $2\frac{1}{2}$ in.
 Height, without base, 7 ft. 6 in.
 Takes in diameter, 2 ft. 4 in.
 Overhead pulleys, $17\frac{1}{2}$ in. by $4\frac{1}{2}$ in.
 Speed, 220 revolutions per minute.
 Approximate weight, without base, 15 cwts.

PRICE, without Base, but with Top Driving Apparatus complete £50 0 0

Neat cast iron gear covers can be fitted to enclose all exposed gearings, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

POWERFUL DUPLEX BORING MACHINE, No. 44.



For description see page 8.

The Britannia Engineering Co., Ltd., Colchester, England.

POWERFUL DUPLEX BORING MACHINE, No. 44.

For illustration see page 7.

THIS is a machine of very solid construction with the bed cast in one piece, on which are mounted two very strong double-gearred headstocks, with cone pulleys of large diameter, giving great driving power, and steel spindles with flanges forged solid, and with parallel necks running in gun metal.

One headstock is made adjustable transversely with bed to suit the varying centres of holes to be bored.

The work table is of large dimensions and arranged to move for feed by screw within the bed, and automatically driven spur gearing at the end through the gearing at back end of fixed head, and which can be reversed for feeding in either direction by sliding pinions.

Provision is made for quick return by hand through worm and wheel gearing and a handle at front of table. The rate of feed is altered by a lever conveniently placed in front of bed, and a clutch will disengage the feed for facing work.

DIMENSIONS.

Height of centres from bed, 15 in.

 " " over table, 12 in.

Bed is 12 ft. long by 24 ins. wide by 21 in. high.

Traverse of table along bed, 4 ft.

Maximum distance between centres of holes to be bored, 12 in.

Steel spindles front necks, $3\frac{1}{2}$ in. diameter by $6\frac{1}{2}$ in. long.

Back necks, $2\frac{1}{2}$ in. diameter by $4\frac{1}{2}$ in. long.

Cone pulleys, 3 speeds, $3\frac{1}{2}$ in. wide; largest, 20 in. diameter; smallest, 14 in.

Gearing, $3\frac{1}{2}$ in. face by $1\frac{1}{2}$ in. pitch.

Diameter of wheels, 21 in.; and pinions, 6 in.

Feed screw, $2\frac{1}{2}$ in. diameter by $\frac{1}{2}$ in. pitch.

Overhead pulleys, 32 in. by $4\frac{1}{2}$ in.

Speed, 40 revolutions per minute.

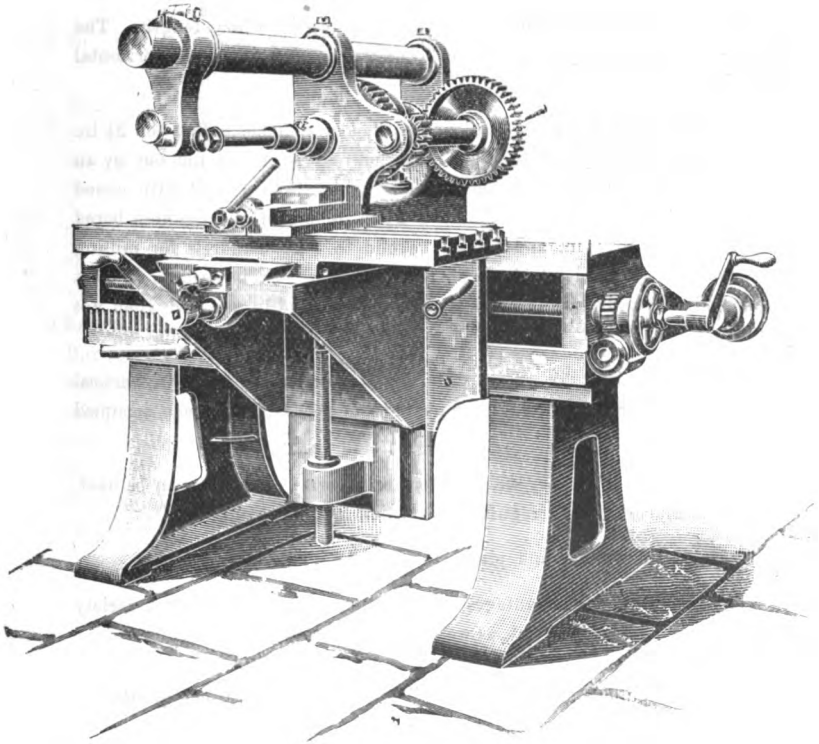
Approximate weight, 4 tons.

PRICE, with Two Overhead Motions, Screw Keys, &c., &c. £180 0 0

Neat cast-iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

MILLING MACHINE, No. 1.



For description see page 10.

The Britannia Engineering Co., Ltd., Colchester, England.

MILLING MACHINE, No. 1.

For illustration see page 9.

THIS is a very useful tool, capable of a large range of work, and will be found a great economiser of labour. From the illustration the principal features of the machine will be readily understood.

The bed is six feet long, self-acting through its whole length. The traversing table has also a vertical traverse of 12 in., and horizontal of 9 in.

The headstock is back geared and with 4-speed cone pulley for 2½ in. strap. The gearing is 1½ in. by ½ in. pitch, and is put in and out by an eccentric. The spindle is of cast steel, running through, and with coned bearings. The neck of the Spindle is 2½ in. diameter, and the nose bored conically 2 in. to 1 in. and tapped beyond to take mandrels for milling cutters. A strong adjustable arm traversing in a rest is used to support outer end of mandrel when necessary, and can be readily removed when not required.

Table 36 in. long by 12 in. wide, longitudinal motion 36 ins., vertical motion 14 in., cross motion 9 in., 6 changes of speeds, floor space occupied 84 by 54 in.

By using the arm, very wide cutters or a series of cutters can be used, for wide surfaces or any irregular form which may be required.

It is fitted with rack and pinion to work the saddle back quickly.

This tool has many advantages over planing machines in point of variety of uses to which it can be put, as well as its more rapid operation.

Overhead pulleys, 12 in. by 3 in. Speed, 150 revolutions per minute.

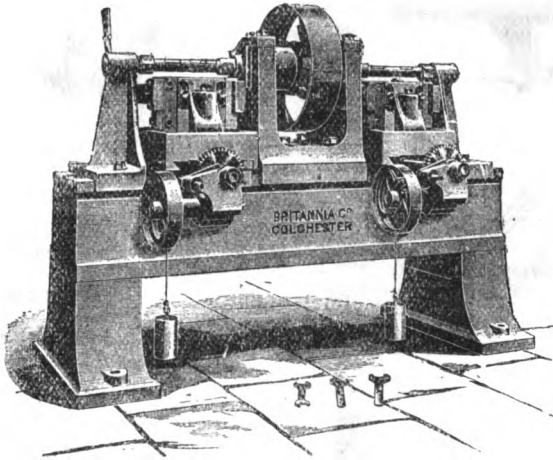
Approximate weight, 24 cwt.

PRICE, including Overhead Motion, one Mandrel and Spanner £62 10 0

Neat cast-iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

MILLING MACHINE, No. 2.



SPECIAL Single Geared Double-ended Machine of very rigid construction. Box section bed mounted on two strong legs carrying headstock in centre with spindle projecting at each end for carrying milling cutters. Steel spindle of large diameter running in special cast iron bearings. Two saddles with transverse slides and gripping arrangements with vertical adjustments for work. Transverse feed by worm and screw, and provided with disengaging motion. Bearings are provided at each end of bed for carrying ends of cutter spindle.

DIMENSIONS.

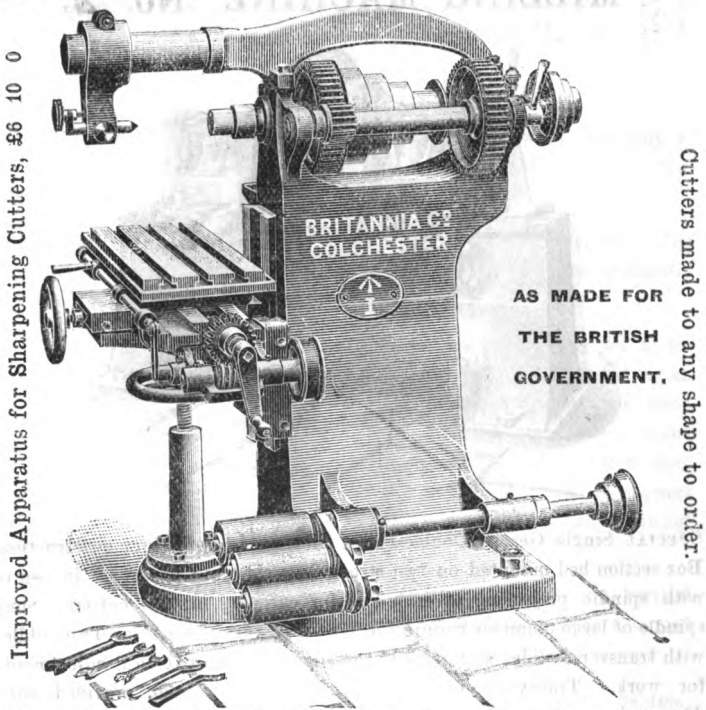
Height of centres, 16 in.
 Bed 6 ft. long, 13 $\frac{1}{4}$ in. across face, 13 in. deep.
 Feed pulleys, 10 in. by 2 in.
 Driving pulley, 20 in. by 6 in.
 Cutter spindle, 3 $\frac{1}{2}$ in. diameter in body.
 Work slides, 12 in. by 7 $\frac{1}{2}$ in.
 Overhead pulleys, 20 in. by 6 in.
 Speed, 80 revolutions per minute.
 Approximate weight, 32 cwt.

PRICE £92 10 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

DOUBLE-GEARED MILLING MACHINE, No. 8.



The spindle of headstock is steel with conical neck running in hard gun metal bearings, and the front is coned and screwed internally for fitting and holding very firmly the chucks and cutter mandrels.

The headstock is also fitted with a top arm (which is removable at pleasure) carrying an adjustable centre, to steady the end of a long cutter mandrel when using extra large, or groups of cutters.

The knee-slide rises and falls 16 in., giving 15½ in. from top of work table to centre of spindle when at its lowest, and is adjusted by a vertical screw and a conveniently placed hand wheel. The longitudinal slide is 31 in. long and 7½ in. wide, and has a transverse traverse, i.e., parallel with axis of spindle, of 7½ in., adjusted by handle and screw.

The work table is 24 in. long, 10 in. wide, with T slots planed out for fixing the work, and has a longitudinal traverse of 15 in., self-acting by worm and wheel and clutch, and has a trough around it to catch the soap and water. The belt cone pulley for self-acting feed has three steps, which give three changes of feed.

The work table is also fitted with adjustable automatic stop arrangement, enabling the feed to be disengaged at any desired position.

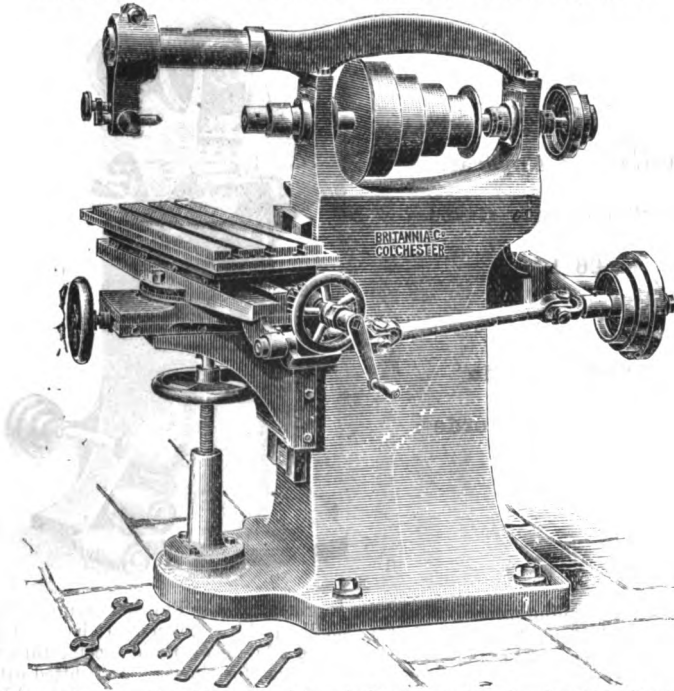
All the slides are accurately scraped and fitted, and have loose angle strips to adjust for wear. All traverse screws are steel, and all material is of the best. The whole is fitted and finished in a superior manner, and is a thoroughly reliable tool.

DIMENSIONS.

Height over all, 4 ft. 4 in.; width 3 ft.; depth, 4 ft.	Diameters of gearing, 10 in. and 3½ in.
Diameter of main spindle 1½ in.	Eight changes of speed.
Cone pulley has 4 speeds, 2½ in. wide.	Three changes of feed.
Diameter of largest speed, 8½ in. wide, and of smallest, 3½ in.	Overhead pulleys 10 in. by 3 in.
Gearing is ½ in. pitch and 2 in. on face.	Speed, 200 revolutions per minute.
	Total weight, about 12 cwt.
PRICE, including Top Driving Apparatus, Screw Keys, &c., complete	£55 0 0
Parallel Vice, with Swivelling Jaw to suit	3 5 0
Dividing Appliance with Tangent Worm & Wheel for Squares, Hexagons, &c.	3 15 0
Best cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.	

The Britannia Engineering Co., Ltd., Colchester, England.

SINGLE-GEARED UNIVERSAL MILLING MACHINE, No. 9.



This machine has the table arranged to swivel to any angle and graduated to 45° either way for spiral and angular milling.

It is fitted in all parts with great care and accuracy; the knee and horizontal slides are all scraped and fitted square and true and with great precision for accurate work, and have loose adjusting strips to take up wear. All the hand adjustments are conveniently placed for the operator.

The long work table has planed T slots for attaching the work, and has a tray around it for catching the soap and water.

The main spindle is of steel, running in hard gun metal coned bearings, with adjustment for taking up wear, and is fitted with a chuck to receive the cutter mandrels.

It is fitted with improved telescopic self-acting feed, as well as quick hand feed, and with overhanging arm and adjustable centre to steady the outer end of long mandrels when using large cutters. The transverse and vertical motion are adjusted by hand wheels and screws. The self-acting feed has three changes of speed.

The principal dimensions are as follows:—

Longitudinal slide 31 in. long.	Height over all, 4 ft. 4 in.
Table, 24 in. long by 10 in. wide.	Width, 3 ft.
The traverses are—longitudinal 15 in.; transverse,	Depth, back to front, 4 ft
7½ in.; vertical, 16 in.	Overhead pulleys, 10 in. by 3 in.
Cone Pulley has 4 speeds, 2½ in. wide; largest 10 in.	Speed, 100 revolutions per minute.
diameter; smallest, 4½ in.	Approximate weight, 14 cwt.

PRICE complete, with Top Driving Apparatus, Screw Keys, &c.	£55 0 0
Parallel Vice, with Swivelling Jaw to suit	3 5 0
Spiral Appliance, as illustrated with the No. 13 Machine, with Dividing Head and Cut Change	
Wheels, &c., complete	22 0 0
Simple Dividing Appliance, with Tangent Worm and Wheel motion	3 15 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

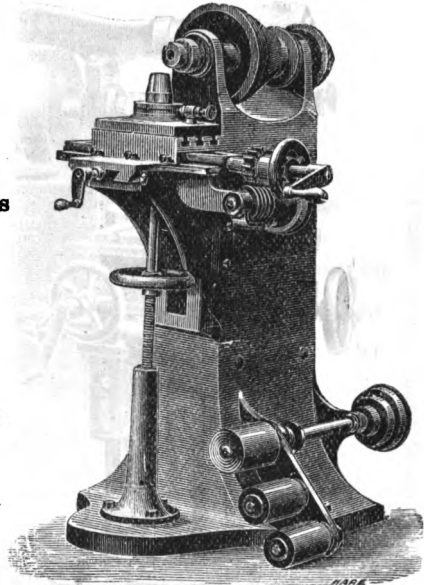
The Britannia Engineering Co., Ltd., Colchester, England.

SINGLE-GEARED MILLING MACHINE, No. 10.

Improved Apparatus
for Sharpening Cutters

£6 10 0

Cutters made
to any shape to order.



THIS is a machine specially suited for Engineers, Brass Finishers, Gunsmiths, Sewing Machine, Bicycle, and other small machine makers. It has a steel spindle with conical neck, steel lock nuts to take up wear and receive thrust-in-face work, and the nose is screwed and coned for chucks. It is fitted with longitudinal, transverse, and vertical slides; is self-acting in longitudinal by the most improved worm and wheel feed, and the vertical actuated by a convenient wheel and screw movement in front. A tray for tools is fitted at the side. An overhead motion with fast and loose, and cone pulleys, countershaft, hangers, and strap shifting gear is included in the price. When required for milling squares, hexagons, octagons, &c., as nuts or brass cocks and fittings, a very convenient dividing appliance can be supplied as shown on the illustration. The hollow body is fitted with a door and shelves for cutters, &c.

DIMENSIONS.

Extreme width, 2 ft. 8 in.
" measure, back to front, 3 ft.

Knee slide has a projection of 10 in.

Longitudinal slide, 20 in. long.

Four changes of speed.

Three changes of feed.

The slides traverse longitudinally 13½ in.

" " transversely (i.e., on

knee slide) 4½ in.

" " vertically 12 in.

Work Table is 11½ in. by 6 in., with T grooves.

Cone pulley has four speeds for 2 in. belt.

Total height is 3 ft. 7 in.

Height to centre, 3 ft. 2 in.

Floor space occupied, 32 in. by 36 in.

Overhead pulleys, 10 in. by 3 in.

Speed, 150 revolutions per minute.

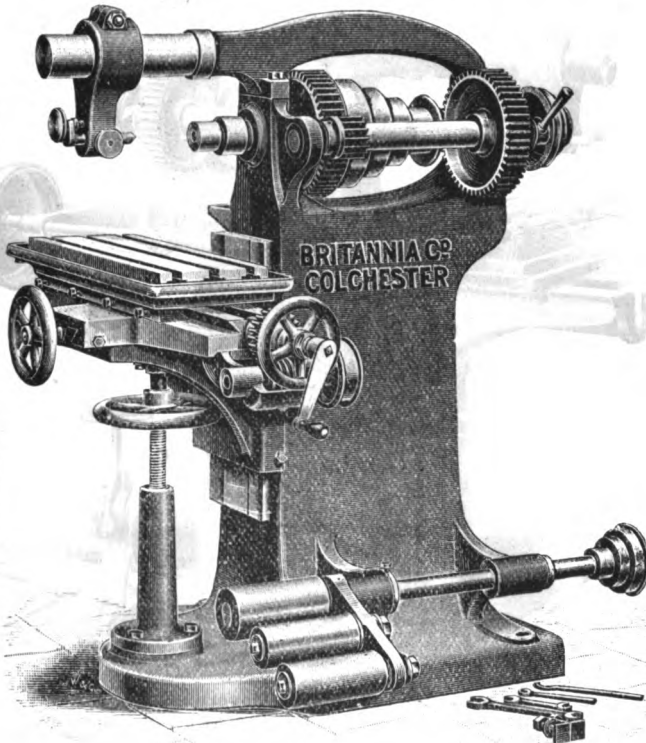
Approximate weight 5½ cwt.

PRICE, complete	...	...	...	£22 10 0
No. 1 Dividing Appliance (as illustrated)	...	...	...	2 10 0
Parallel Vice to suit	...	...	...	2 0 0

The Britannia Engineering Co., Ltd., Colchester, England.

DOUBLE-GEARED MILLING MACHINE, No. 12.

Improved Apparatus for Sharpening Cutters, £6 10 0



Cutters made to any shape to order.

This machine is more strongly built and capable of much heavier work than our No. 10, and is suitable for the general requirements of an engineer's and machinist's shop.

The spindle of headstock is steel with conical neck running in hard gun metal bearings, and the front is coned and screwed internally for fitting and holding very firmly the chucks and cutter mandrels.

The headstock is also fitted with a top arm (which is removable at pleasure) carrying an adjustable centre, to steady the end of a long cutter mandrel when using extra large, or groups of cutters.

The knee slide rises and falls 14 in. giving 15½ in. from top of work table to centre of spindle when at its lowest and is adjusted by a vertical screw and conveniently placed hand-wheel. The longitudinal slide is 2½ ins. long and 7½ ins. wide, and has a transverse traverse, i.e., parallel with axis of spindle, of 7½ ins., adjusted by hand-wheel and screw. It has a trough around it (not shown in illustration) to catch the soap and water.

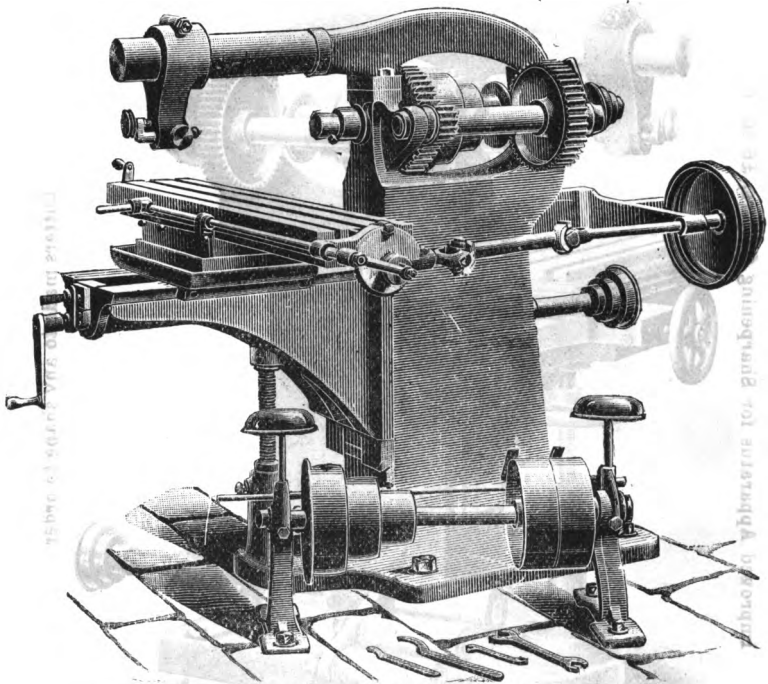
The work table is 14 in. long and 8½ in. wide, with T slots planed out for fixing the work, and has a longitudinal traverse of 18 ins., self-acting by worm and wheel and friction cone. The belt cone pulley for self-acting feed has three steps, which give, with the back gearing, six changes of feed.

All the slides are accurately scraped and fitted, and have loose angle strips to adjust for wear. All traverse screws are steel, and all material is of the best. The whole is fitted and finished in a superior manner, and is a thoroughly reliable tool.

DIMENSIONS.

Height over all, 4 ft. 4 in.; width, 3 ft.; depth, 4 ft.	Eight changes of speed.		
Diameter of main spindle, 1½ in.	Three changes of feed.		
Cone pulley has four speeds 2½ in. wide.	Floor space occupied, 48 in. by 36 in.		
Diameter of largest speed, 8½ in. wide, and of smallest 2½ in.	Overhead pulleys, 10 in. by 3 in.		
Gearing is ½ in. pitch and 2 ins. on face.	Speed, 200 revolutions per minute.		
Diameters of gearing, 10 in. and 2½ in.	Total Weight about 1½ cwt.		
PRICE, including Top Driving Apparatus, Screw Keys, &c. complete ..		£	45 0 0
Parallel Vice and Swivelling Jaw to suit ..			3 5 0
Dividing Appliance with Tangent Worm and Wheel for Squares, Hexagons, &c. ..			8 15 0
Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.			

UNIVERSAL DOUBLE GEARED MILLING MACHINE, No. 19.



As made for the British Government.

THIS Machine is of similar construction to the No. 12 Machine, but is much heavier, and the slides are all much longer, giving a far greater range of work, and it is also fitted with the Universal Swivelling Arrangement, which, with the suitable appliance and wheels, enables skew gearing, spirals, and twist drills to be cut.

The longitudinal slide is also fitted with an automatic stop arrangement, to stop at any given distance the machine is set to. The self-acting feed is constructed on the most improved method by means of universal swivelling joints and telescopic shafts. The machine is most accurately and carefully constructed, and is highly recommended for milling all kinds of fittings where great precision and accuracy are desired, and by its self-acting arrangements great economy of labour is effected, as one man can attend to two or more machines.

THE GENERAL DIMENSIONS OF THE MACHINE ARE AS FOLLOWS:—

The Knee Slide has a projection of 20 inches and rises and falls by hand wheel and vertical screw through a range of 16 inches.

The Longitudinal Slide is 12½ inches long having a transverse traverse on the knee slide of 8 inches.

The Work Table is 3 feet 9 inches long, by 9 inches wide, with planed T slots for securing the work, and has a longitudinal traverse either by hand or self-acting of 1 foot 9 inches.

The Cone Pulley has 3 speeds 3 inches wide, the largest being 10 inches in diameter and the smallest 6½ inches, which gives six changes of feed.

The Gearing is ½ inch pitch, 2 inches on face, the diameter of the large gear 11 inches and small 6½ inches.

Total height of machine 4 feet 4 inches, width 4 feet 4 inches, and depth 6 feet.

Overhead pulleys, 12 ins. by 3½ ins.
Speed, 120 revolutions per minute.

Approximate weight 22 cwt.
Floor space occupied, 5 ft. by 6 ft.

PRICE, with top Driving Apparatus, Screw Keys, Spanners, &c., complete	£79 10 0
Parallel Vice with swivelling jaw to suit	8 5 0
Ditto ditto with swivelling bottom and very strong make	5 10 0
Simple Dividing Appliance with tangent worm and wheel motion giving divisions of 48 and its multiples	3 15 0
Improved Dividing Appliance	14 10 0
Appliance for Milling Twist Drills, &c., with change wheels for various pitches	55 0 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

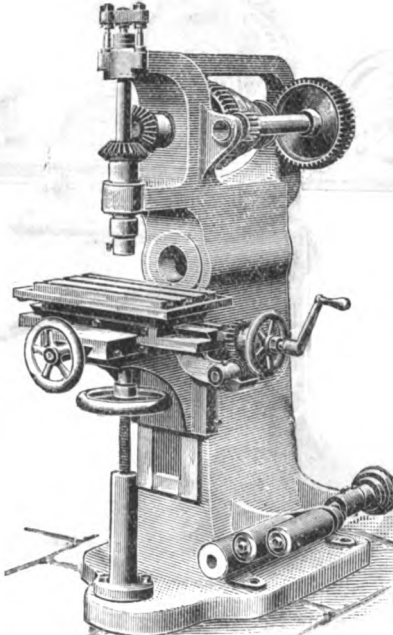
NEW DESIGN

VERTICAL MILLING MACHINE,

No. 14.

NOTE.

Hole in body of Machine seen in illustration is only made when specially ordered.



CUTTER
SHARPENING
APPLIANCES
TO SUIT,
£6 10 0

THE illustration shows a very handy and compact Vertical Milling Machine with double gearing. It has a strong box pattern body and is fitted with a steel spindle revolving in conical bearings, and has a thrust bearing at top, capable of adjustment, to take up wear. Work table is arranged with planed T slots for fixing the work, and is provided with a trough to catch the soap and water. The longitudinal transverse and vertical slides are each adjusted by conveniently placed hand wheels, the longitudinal slide having also a self-acting feed traverse. The self-acting feed is arranged by 3-speed cone pulleys and worm gearing. All the slides are accurately scraped and fitted and have loose angle strips to adjust for wear. All traverse screws are of steel, and all material is of the best. The whole is fitted and finished in a superior manner and is a thoroughly reliable tool.

DIMENSIONS.

Work Table, 24 in. long by 8½ in. wide.
Main spindle, 1½ in. diameter.
Cone pulley, 4 speeds, 2½ in. wide; largest
8½ in. diameter; smallest, 3½ in. diam.
Gearing ½ in. pitch, 2 in. wide; wheel,
10 in. diameter; pinion, 3½ in. diam.

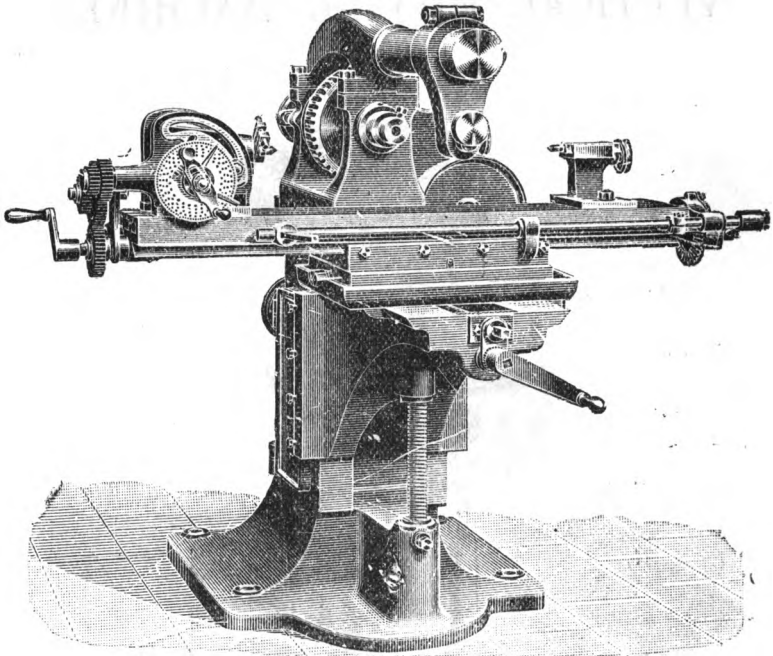
Transverse traverse 7½ in.
Longitudinal „ 18 in.
Vertical „ 14 in.
Overhead pulleys, 10 in. by 3 in.
Speed, 200 revolutions per minute.
Approximate weight, 15 cwt.

PRICE £40

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

SPIRAL MILLING by No. 13 UNIVERSAL MACHINE



THE illustration shows our No. 13 Milling Machine, but fitted with the spiral attachment constructed for grooving twist drills, cutting spiral gearing, cutters, &c.

The appliance is arranged to fit on the longitudinal slide of the machine, the headstock having a steel mandrel with carrier for driving the work, and to be used either in a horizontal position or vertical, or at any angle between, and geared up by mitre gears and change wheels to revolve at any required pitch of spiral, from 1 in. to 40 in., and is further fitted with worm wheel and worm, which, in conjunction with the division plate and index and sextant fitted to the worm shaft, will divide drills, gear wheels, &c., up to 360 divisions.

The spiral movement can be given to the mandrel at any angle.

The price includes eight change wheels and necessary keys, spanners, &c.

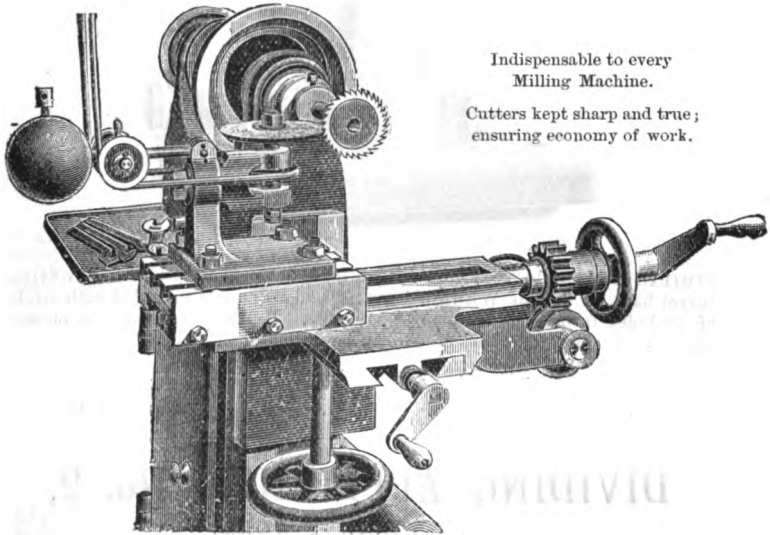
Overhead pulleys on machine, 12 in. by 3½ in.

Speed, 120 revolutions per minute.

PRICE of Spiral Appliance for No. 13 Milling Machine	...	£22	0	0
" No. 13 Milling Machine with Spiral Appliance, Top Driving Appliance, Screw Keys, Spanners, &c. (complete)	...	101	10	0
PRICE of Parallel Vice with Swivelling Bottom and very strong pattern	... .. .	5	10	0

The Britannia Engineering Co., Ltd., Colchester, England

APPLIANCE FOR SHARPENING CUTTERS FOR MILLING MACHINES, &c.



Indispensable to every
Milling Machine.

Cutters kept sharp and true;
ensuring economy of work.

THIS appliance, illustrated as in use on a Milling Machine, is designed as a handy device to fit on the table of an ordinary milling machine, to sharpen its cutters. It is intended to be driven from the countershaft of the machine, and adjusted to correct position for grinding by the slides of the machine, the cutter to be sharpened being meantime held in its usual position as for cutting in the mandrel of the headstock, the driving-belt of the latter being, of course, thrown off for the time.

The appliance is constructed with a firm base to bolt to machine table and has a swivelling head carrying a steel spindle with driving pulley fitted, and arranged to hold an emery wheel at its end.

It has a pair of guide pulleys which swivel and slide upon a hinged lever, with a heavy weight at its end to keep the driving gut tight.

When in operation the emery wheel is brought into contact with the cutter, and the latter is turned by moving the cone pulley by hand, bringing each successive tooth in contact with the emery wheel.

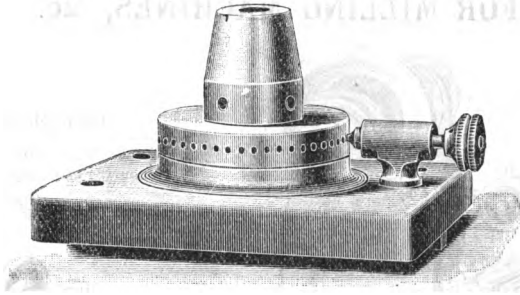
The latter being fitted to swivel can be arranged to suit cutters having teeth cut square across or obliquely, and can also be used with a square-edged emery-wheel, to run in a vertical direction, and sharpen the cutter by grinding the tops of the teeth, which is sometimes preferable.

It is useful also for backing off taps and reamers, flute drills, &c.

PRICE of the Appliance	...	...	...	£4	0	0
Or with Overhead for driving it independently	...	...	...	6	10	0

The Britannia Engineering Co., Ltd., Colchester, England,

DIVIDING APPLIANCE, No. 1,



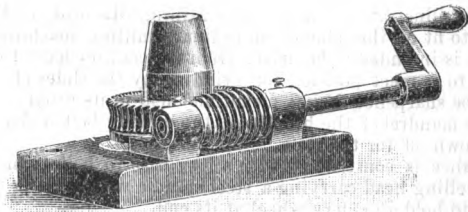
SIMILAR appliance to No. 2, but without tangent worm and wheel. Revolving turret has $\frac{1}{4}$ in. female Whitworth screw, and its base is provided with circle of 48 holes, into which a spring piston fits. By this means articles of any numbers of sides, multiples of 48, can be milled or drilled.

Size of base, 8 in. by 6 in.

PRICE £2 10 0

DIVIDING APPLIANCE, No. 2.

WITH TANGENT WORM.



THIS is a very simple but efficient appliance, useful with any Milling, Shaping, Slotting, Drilling or other similar machine.

It is made with truly planed base, mounted with revolving turret, truly centred, having a $\frac{3}{4}$ inch female Whitworth screw, into which mandrels may be fitted to carry the work, and with a worm wheel at its base with 48 teeth and an index pointer, and is revolved by a tangent worm, with graduated shaft for sub-dividing the 48 teeth, by means of which squares, hexagons or any numbers of divisions can be milled or drilled, which are multiples of 48.

Approximate weight, 21 lbs.

PRICE £3 15 0

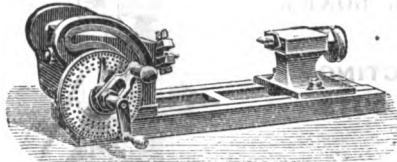
The Britannia Engineering Co., Ltd., Colchester, England,

DIVIDING APPLIANCE, No. 3.

STRONG PATTERN FOR ENGINEERS.

AS SUPPLIED TO THE BRITISH GOVERNMENT.

Especially adapted for use with Milling, Shaping or other similar Machines.



It has a cast iron planed bed, with T slots to bolt on the machine table, and has quadrant slots to allow of adjustment to any angle, for cutting worm wheels, angled tooth cutters, &c.

The fast head is constructed for the spindle to be elevated and locked at either horizontal, vertical or any intermediate angle, and has a graduated quadrant.

The spindle is moved for dividing by steel worm and wheel, and the worm shaft carries a division plate with 5 rows of holes capable of dividing (with the worm gearing) up to 360.

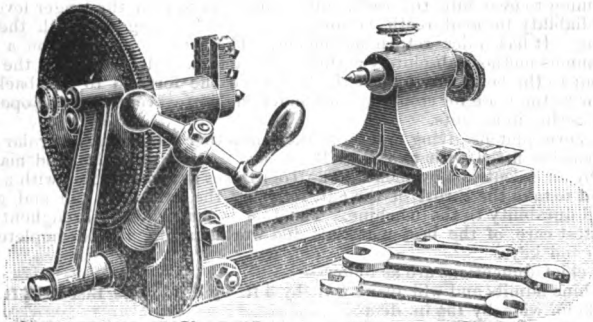
A piston stop and sextant finger are also provided. The main spindle is hollow, and coned for other mandrels than that supplied, as may be required.

All parts are adjustable for taking up back lash and wear, and are of the best materials and workmanship, and very accurately fitted.

Height of Centres, 4 in. Length of bed, 2 ft. Takes between Centres, 11 in.

PRICE £14 10 0

PLAIN DIVIDING HEADSTOCKS, No. 4.



SUITABLE for Horizontal and Vertical Milling Machines. Cast iron bed plate with V slide, on which the heads are adjusted and gripped by friction bolts. Division plate is 9 in. diameter, operated by tangent worm and wheel and conveniently placed balanced handle, suitable circles of holes are drilled in face of plate from a large plate, thus ensuring correct division. The index arm carries a point which is engaged with the holes by means of a strong spring. The dividing spindle has conical neck, and arrangement is made to take up all wear.

This is a very handy appliance and is made with the best material and workmanship, the fitting being very accurate.

Height of centre, 5 in. Length of bed, 24 in. Takes between centres, 12 in.

PRICE complete £11 10 0

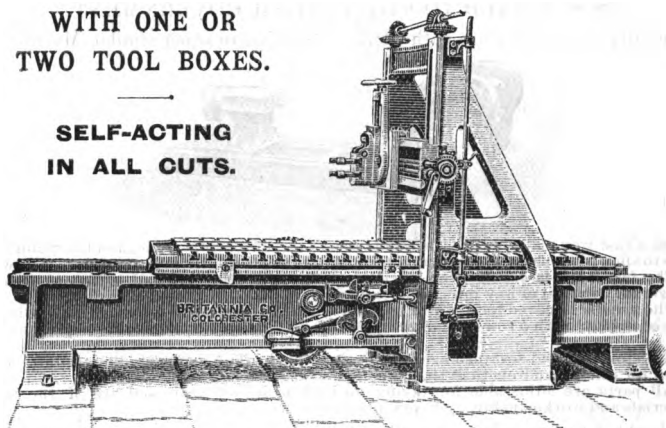
The Britannia Engineering Co., Ltd., Colchester, England.

NEW PLANING MACHINE, No. 8.

8 ft. by 3 ft. by 3 ft.

WITH ONE OR
TWO TOOL BOXES.

—
SELF-ACTING
IN ALL CUTS.



NOTE.—We now make the feed mechanism of this Planer as shown on No. 6 machine.

New and improved type, massive and rigid construction. The bed well ribbed with box ribs, V Slides, oil channel and four lubricating wells and spring action rollers on each side and waste oil wells at each end. The Table very massive, accurately scraped to bed, and driven by intermediate spur gearing, giving a larger pinion to gear into the rack, thus gaining power by the longer leverage, and less liability to break teeth, because more teeth are engaged with the rack in driving. It has quick return movement. The feed is arranged on a novel and ingenious method, absolutely certain in its action, and giving only the exact movement to the belt fork to shift the belt from the forward to the backward pulley, or to the loose for stopping, and under the perfect control of the operator. It is self-acting in all cuts.

The bevel pinions giving motion to the self-acting vertical and angular feeds in the machine fitted with two Tool Boxes are carried on slides, and made to engage by an eccentric movement. The Tool Boxes are constructed with a lip at lower end to take the thrust of the cut, relieving the swivelling pin and giving increased durability to the machine. The tool is constructed throughout with the greatest care, of the best materials and workmanship, and is complete with spanners and keys.

The chief dimensions are as follows—

The machine admits and will plane 8 ft. by 3 ft. by 3 ft. The Bed is 12 ft. long by 25 in. wide by 15½ in. deep.

GEARING—1st Motion. Spur wheel 14½ in., pinion 5½ in., 3 in. face, and 1 in. pitch.

2nd Motion. Spur wheel 20½ in., pinion 6½ in., 3½ in. face, and 1½ in. pitch.

Rack Gear. 5 in. face and 1½ in. pitch, intermediate wheel, 17 in. diameter, pinion 6½ in. diameter.

Pulleys—20 in. diameter by 4 in. wide. Speed, 120 revolutions per minute.

Approximate Weight—4½ Tons.

PRICE, complete, with One Tool Box	...	...	£147 10 0
Extra for Two Tool Boxes	...	...	11 10 0
Extra per foot for longer Table and Bed	...	...	5 10 0

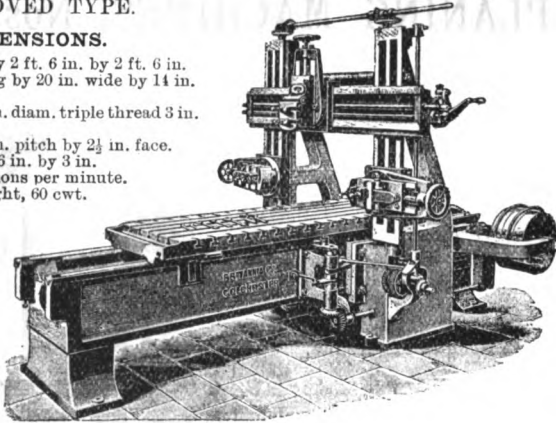
The Britannia Engineering Co., Ltd., Colchester, England.

SCREW-DRIVEN PLANING MACHINE, No. 7.

IMPROVED TYPE.

DIMENSIONS.

Plane, 6 ft. 6 in. by 2 ft. 6 in. by 2 ft. 6 in.
 Bed, 9 ft. 9 in. long by 20 in. wide by 14 in.
 deep.
 Driving Screw, 3 in. diam. triple thread 3 in.
 pitch.
 Bevel Gearing, 1 in. pitch by 2½ in. face.
 Driving Pulleys, 16 in. by 3 in.
 Speed, 200 revolutions per minute.
 Approximate Weight, 60 cwt.



IMPROVED PLANING MACHINE of very strong construction, arranged with one or two tool boxes on cross slide, and one side tool box on each upright, self-acting in all motions. Bed is of very massive construction, and well stayed with box-section cross ribs, V slides, fitted with oil channels and four lubricating rollers, which amply spread the oil over the whole of the bearing surface whilst machine is running. The wells in which these rollers work communicate with pockets cast at each end of bed for receiving the waste oil. Table is very strong, accurately scraped and fitted to bed, having planed slots in top for bolting work to, and is driven by strong square thread steel screw of large diameter, arranged with reversing motion. Large thrust bearing with ample surface to distribute the pressure is provided at one end of driving screw, with means for adjustment. This method of driving ensures a much better finish to the work, no jar or vibration being conveyed to table even whilst reversing. Very efficient mechanism is provided for reversing the motion, and the traverse of table is regulated by means of adjustable steel dogs, bolted to side of table, coming in contact with hardened best steel rollers on reversing levers, connecting to belt-shifting bar. This arrangement also conveys the self-acting feed motions to all tool boxes. The uprights are very strong castings of box section, coming right down to the ground, and are firmly fixed to bed by tongue piece and turned bolts, and secured at top by circular cross bar. Strong cross slide fitted with one or two tool boxes, as desired, having self-acting variable horizontal, vertical and angular feeds. Each upright is provided with a side tool box, having self-acting variable vertical traverse and horizontal feed by hand, and the feed of each can be disengaged independently by clutch on connecting-shaft at bottom. Driving and quick reversing motion is conveyed to screw by belt and three pulleys through bevel gearing.

PRICE, with one Tool Box on Cross Slide	£136	10	0
Each side Tool Box extra	16	12	6
Extra Tool Box on Cross Slide	13	5	0

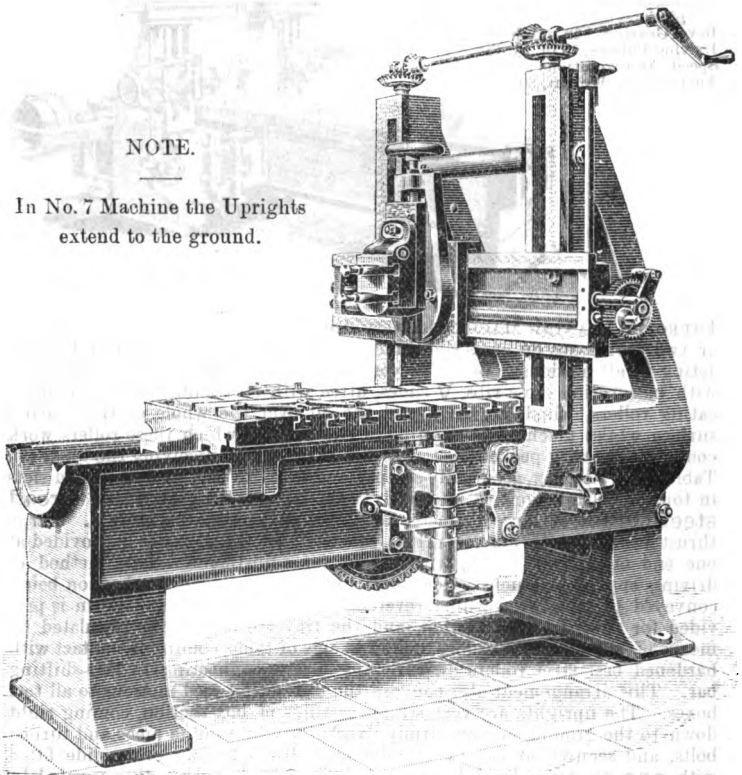
Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

PLANING MACHINES, Nos. 6 & 7.

NOTE.

In No. 7 Machine the Uprights
extend to the ground.



For description see page 25.

The Britannia Engineering Co., Ltd., Colchester, England.

PLANING MACHINES, Nos. 6 & 7.

IMPROVED TYPE.

For illustration see page 24.

IMPROVED Type Planing Machine of very strong construction, self-acting in all motions and with quick return traverse. Bed is well stayed with box section ribs, V slides, fitted with oil channel and four lubricating rollers, which spreads the oil over the whole of the bearing surface whilst machine is running. The wells in which these rollers work communicate with pockets cast at each end of bed for receiving waste oil. Very massive table accurately scraped and fitted to bed having planed \perp slots in top for bolting work, each driven by an improved arrangement of gearing. In the machines a large intermediate spur wheel is introduced, carefully pitched, which engages more teeth of the rack at once than when pinion is geared direct, thus giving a more powerful drive. As a result the drive of the machines is much steadier, the vibration being reduced to a minimum, the finish of the work being greatly enhanced. Machines have improved arrangement for reversing and for adjusting length of traverse, by means of steel dogs bolted to side of table coming in contact with hardened best steel rollers on reversing lever connected to belt-shifting bar. This lever also conveys the self-acting motions to tool boxes. The uprights are heavy castings of box section, firmly fixed to bed by tongue piece and bolts, and secured at top by circular cross bar. Strong cross slide, fitted with one or two tool boxes, as desired, having self-acting horizontal, vertical, and angular feeds. The outer end of driving shaft carrying the pulleys is carried by pedestal. A set of spanners accompanies each machine

DIMENSIONS (No. 6 Planing Machine).

Plane, 4 ft. long by 2 ft. wide by 2 ft. high.
 Bed 6 ft. long by 17 in. wide by 12½ in. deep.
 GEARING—1st Motion— $\frac{3}{4}$ in. pitch, 2¼ in. face, wheel 11 in. diameter,
 pinion 4 in. diameter.
 „ 2nd Motion— $\frac{1}{2}$ in. pitch, 2½ in. face, wheel 13 in. diameter,
 pinion 4½ in. diameter.
 Rack gear 1½ in. pitch, 3¼ in. face. Intermediate wheel 17 in. diameter,
 pinion 5½ in. diameter.
 Pulleys, 14 in. by 3 in.
 Speed 140 revolutions per minute.
 Approximate weight, 37 cwt.

PRICE £84 0 0

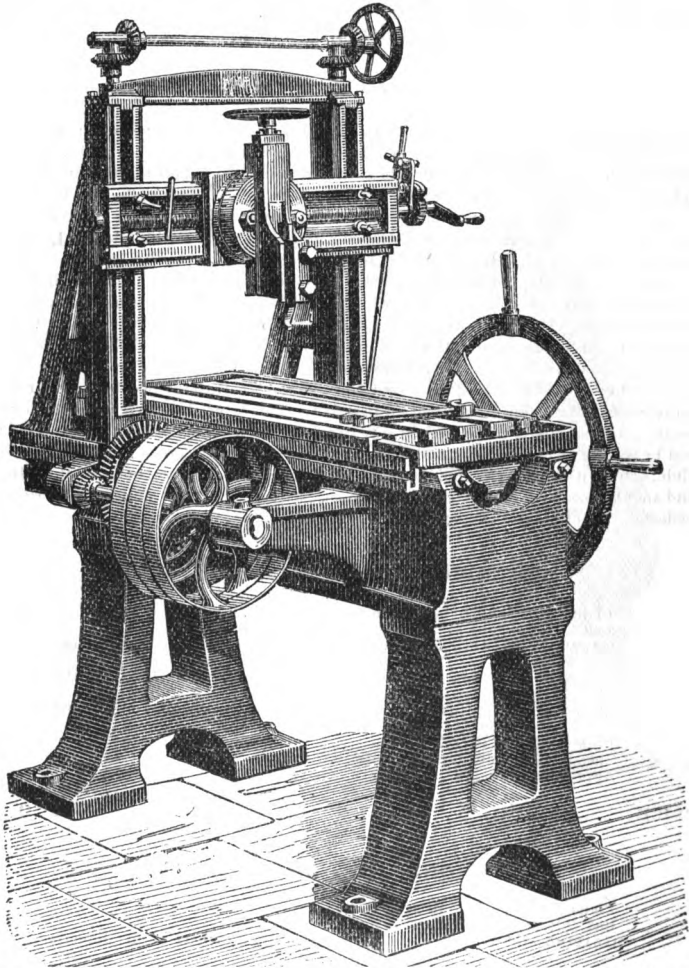
DIMENSIONS (No. 7 Planing Machine).

Plane, 6 ft. by 2 ft. 6 in. by 2 ft. 6 in.
 Bed, 9 ft. long by 20 in. wide by 14 in. deep.
 GEARING—1st Motion— $\frac{3}{4}$ in. pitch. 2½ in. face, wheel 11 in. diameter,
 pinion 4 in. diameter.
 „ 2nd Motion— $\frac{1}{2}$ in. pitch, 2¾ in. face, wheel 16 in. diameter,
 pinion 4½ in. diameter.
 Rack Gear—1½ in. pitch, 3½ in. face. Intermediate wheel 18 in. diameter,
 pinion 5½ in.
 Pulleys, 15 in. by 3 in.
 Speed, 176 revolutions per minute.
 Approximate weight, 50 cwt.

PRICE £115 0 0

The Britannia Engineering Co., Ltd., Colchester, England.

SELF-ACTING PLANER FOR HAND AND STEAM.

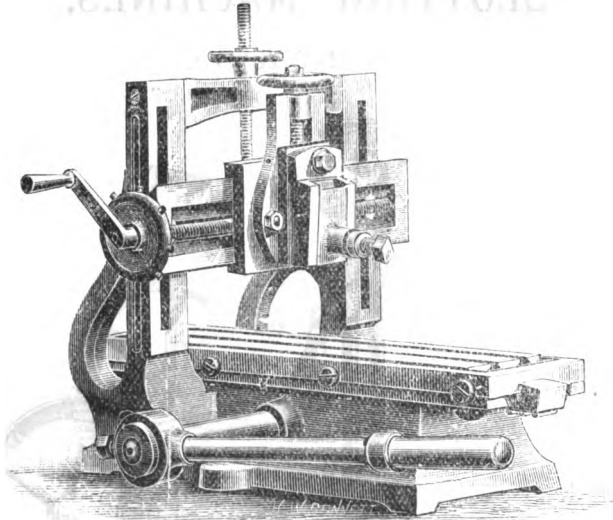


THIS machine is fitted with rack and pinion, three pulleys and fly-wheel with four handles quick return motion, self-feeding in the longitudinal motion.

	No. 1	2	3
Will take in long	16 in.	24 in.	32 in.
„ „ wide	12 in.	16 in.	18 in.
„ „ under tool box	8 in.	12 in.	16 in.
Weight	5½ cwt.	10 cwt.	14 cwt.
PRICE	£24 15 6	£31 10 0	£40

The Britannia Engineering Co., Ltd., Colchester, England.

SMALL BENCH PLANER.

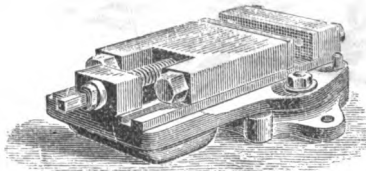


WILL plane articles 14 in. by 6½ in. wide by 4 in. deep. Table measures 14½ in. by 4 in. Approximate weight, 56 lbs.

PRICE £6

IMPROVED ENGINEERS' VICE, No. 1.

(STRONG
PATTERN).



FOR MILLING MACHINES AND PLANERS. WITH SWIVEL BOTTOM.
PRICE, Jaw 5½ in. wide, to open 4 in. £5 10 0
Other sizes to order.

STRONG ORDINARY PATTERN PLANER VICES.

WITH ONE JAW TO SWIVEL TO GRIP PARALLEL OR TAPER WORK.

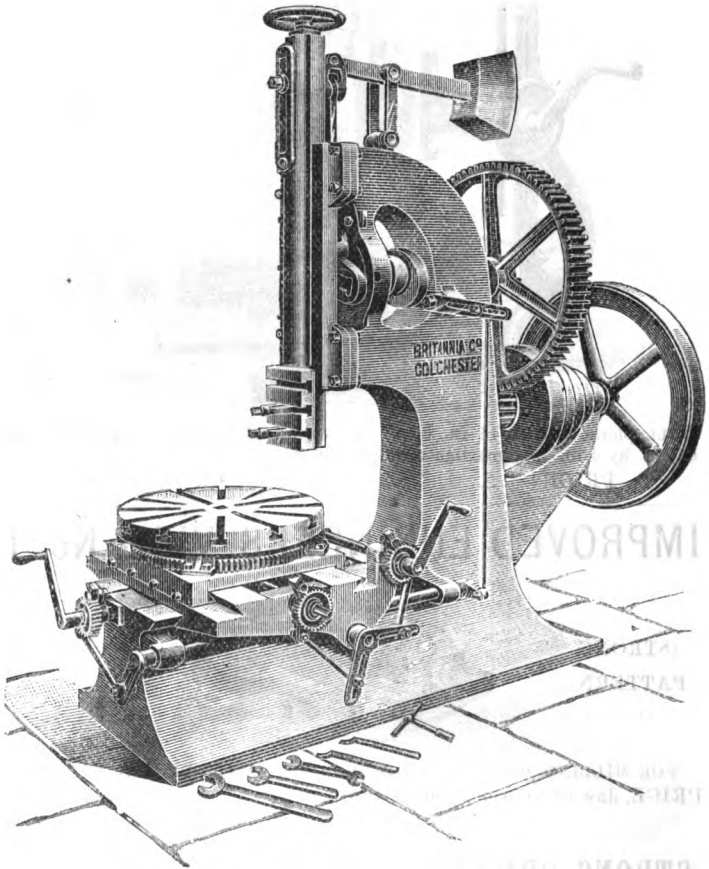
Width of Jaw ...	...	3 in.	4½ in.	5 in.	6 in.	7 in.
To take in ...	...	4 in.	6 in.	7½ in.	9 in.	12 in.
PRICE ...	...	40/-	56/-	72/-	90/-	115/-

AS SUPPLIED TO THE BRITISH GOVERNMENT.

The Britannia Engineering Co., Ltd., Colchester, England.

SLOTTING MACHINES,

Nos. 57 & 59.



NOTE.—Both machines have suds trough arranged round circular tables.

For description see page 29.

The Britannia Engineering Co., Ltd., Colchester, England.

SLOTING MACHINES,

Nos. 57 & 59.

No. 57, 8-Inch Stroke. No. 59, 12-Inch Stroke.

NOTE—Both machines have suds trough arranged round circular tables.

For illustration see page 28.

POWERFUL single-gearred machines of neat design and improved construction. The ram has a long continuous bearing with adjustable strip, and arranged with quick return motion controlled by slotted lever actuated by block on crank pin. They are also fitted with a compensating balance weight, which acts in any position with ram. The crank disc runs in a recess bored out in a body casting, and its wear is taken up by means of an adjustable block at top. The stroke is altered by means of square thread screw in crank disc, the position of stroke being regulated by screw and hand wheel at top. Compound Slides fitted with circular table having horizontal, transverse, and circular, self-acting feed motions varied and adjusted independently of each other, and actuated by cam on crank shaft.

DIMENSIONS.

No. 57.

Cone pulley, 4 speeds $3\frac{1}{2}$ in. wide; largest 17 in. diameter, smallest $8\frac{1}{2}$ in. diameter.
 Gearing, $1\frac{1}{2}$ in. pitch, $3\frac{1}{4}$ in. wide, wheel $33\frac{1}{2}$ in. diameter, pinion $5\frac{1}{2}$ in. diameter.
 Circular Table 24 in. diameter.
 Longitudinal Traverse, 17 in.
 Transverse Traverse, 13 in.
 Admits work up to 3 ft. diameter by 14 in. deep.
 Overhead pulleys, $17\frac{1}{2}$ in. by $4\frac{1}{2}$ in.
 Speed, 220 revolutions per minute.
 Approximate weight 2 tons.

PRICE £86 10 0

No. 59.

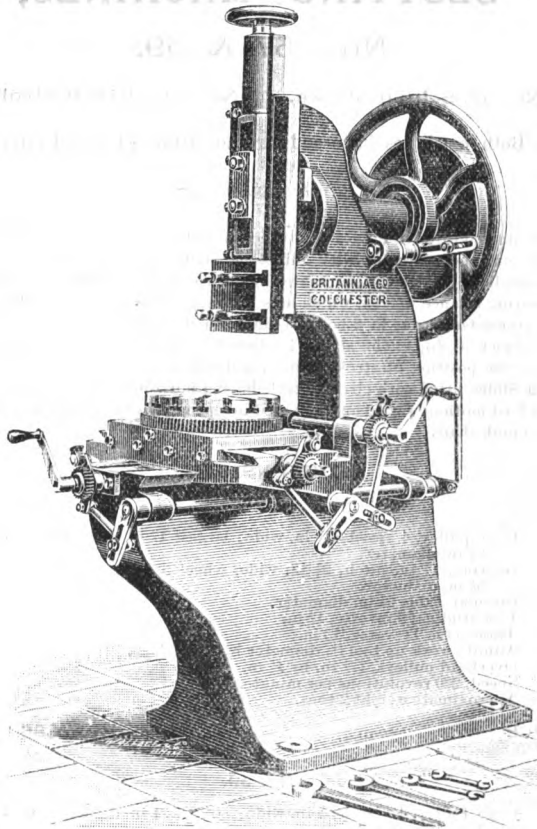
Cone Pulley, 4 speeds, 4 in. wide; largest 21 in. diameter, smallest 9 in. diameter.
 Gearing, $1\frac{1}{2}$ in. pitch, $3\frac{1}{4}$ in. wide, wheel 34 in. diameter, pinion $5\frac{1}{2}$ in. diameter.
 Circular table, 30 in. diameter.
 Longitudinal traverse, 22 in.
 Transverse traverse, 20 in.
 Admits work up to 4 ft. diameter by 20 in. deep.
 Overhead pulleys, 24 in. by 5 in.
 Speed, 200 revolutions per minute.
 Approximate weight, $3\frac{1}{2}$ tons.

PRICE £137 10 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED 4½ in. SLOTTING MACHINE No. 55.



A COMPACT and most convenient tool for small work. It is single geared, with adjustable stroke up to 4½ in., and adjustable in the ram to any position to suit the varying depth of work, and the length of stroke is adjustable by block and stud in a slotted disc. It is fitted with compound slides and a circular table all fitted with self-acting feeds varied and adjusted independently of each other, and actuated by heart cam on main shaft.

The ram works in long slides, accurately scraped and fitted, and with loose strip for taking up wear. The belt cone has two speeds of large diameter.

The principal dimensions are as follows:

Total height, 5 ft. 6 in.; width 2 ft. 9 in.
 depth from back to front, 4 ft. 6 in.
 Cone Pulley, 2 speeds, 2½ in. wide, 17 in.
 and 14 in. diameter.
 Circular table, 12 in. diameter.
 Admits work up to 18 in. diam. by 7 in. deep.

Traverse of slides, 8 in., both directions.
 Diameter of turned hand fly-wheel, 26 in.
 Overhead pulleys, 15½ in. by 3 in.
 Speed, 55 revolutions per minute.
 Approximate weight, 14 cwt.

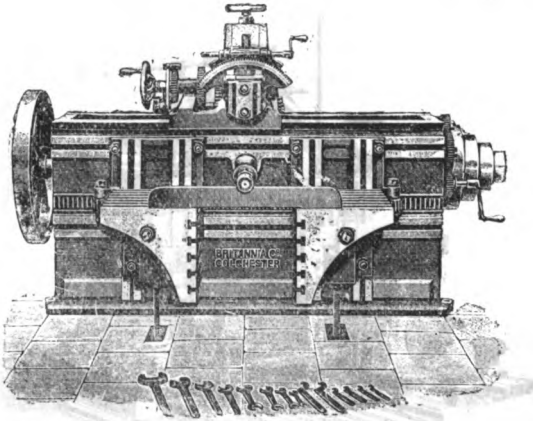
PRICE complete, with Top-Driving Apparatus, Screw Keys, &c. ... £39 10 0

The Britannia Engineering Co., Ltd., Colchester, England.

SHAPING MACHINES, Nos. 35 & 37

IMPROVED TYPE.

No. 35, 18-inch Stroke. No. 37, 14-inch Stroke.



THESE machines are of modern design and of massive construction, the bed at front being made solid right down to the ground. In each machine the shaping head is fitted with adjustable stroke, quick return motion by central driving arm. Curvilinear motion is fitted to tool box by worm and quadrant for internal curves from 0 to 10 in. radius. Self-acting vertical and angular feed to tool box, neatly arranged at side of ram by rod and tappets. Two tables elevated by mitre gears and screws and adjusted horizontally by racks and pinions. Circular motion mandrel fitted in centre of bed with self-acting feed and provided with bearing to carry outer end. All the cuts are fed both automatically and by hand.

DIMENSIONS.

No. 35.

Bed, 6 ft. long, 24 in. wide across, 37½ in. deep.
 Cone pulley, 4 speeds, 3½ in. wide; largest 18½ in. diam., smallest 8 in. diam.
 Fly-wheel, 30 in. diameter, 3½ in. face.
 Driving shaft, 2½ in. diameter.
 Tables, 22½ in. by 18 in. by 19 in. deep.
 Racks and pinions, 1 in. pitch.
 Driving gear, 1½ in. pitch, 3½ in. face; wheel, 21 in. diam.; pinion 5½ in. diam.
 Overhead pulleys, 18 in. by 4½ in.
 Speed, 80 revolutions per minute.
 Approximate weight, 8½ cwt.

PRICE £180

No. 37.

Bed, 6 ft. long, 21 in. wide across, 33 in. deep.
 Cone pulley, 4 speeds 3½ in. wide; largest 17½ in. diam. smallest 7 in. diam.
 Fly-wheel, 30 in. diameter, 3½ in. face.
 Driving shaft, 2 in. diameter.
 Tables 21 in. by 16 in. by 16 in. deep.
 Racks and pinions, ¾ in. pitch.
 Driving gear, 1 in. pitch, 3 in. face; wheel, 18 in. diam.; pinion, 5 in. diam.
 Overhead pulleys, 18 in. by 4 in.
 Speed, 100 revolutions per minute.
 Approximate weight 5½ cwt.

PRICE £130

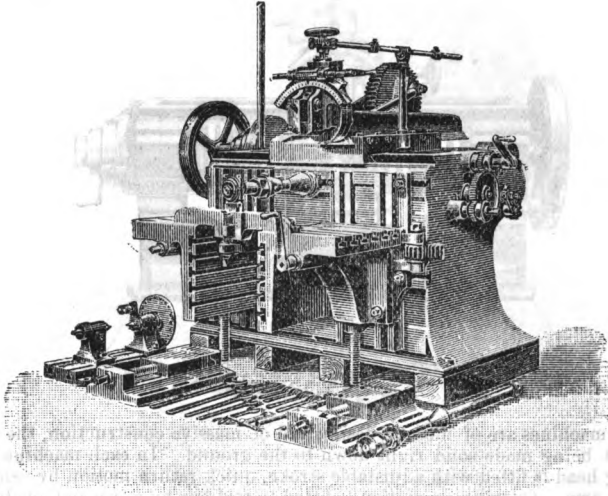
Neat cast iron gear covers can be fitted to enclose all exposed gearing to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England,

EXTRA HEAVY SHAPING MACHINE, No. 36.

TWELVE-INCH STROKE,

As made for the British Government for Indian State Railways.



THIS is a powerful machine, designed for heavy railway work, and by its great weight and strength will save its extra cost in the rapidity of its work by heavy cuts.

It is made self-acting in all cuts, and is arranged for horizontal, vertical, angular, circular and curvilinear motions, the latter being adjustable for internal curves from a radius of 10 in. to nothing.

The cutting motion is given by an improved arrangement of adjustable stroke plate, by which the return motion retains its relative quickness, whether the machine be cutting a long or short stroke.

The tool holder is cut out of a solid block of forged steel, all other parts equally strongly constructed; worms are forged steel, worm and feed gearing machine cut out of solid.

It is made with two tables, and the principal dimensions are as follows:

Length, depth, and width of bed, 4 ft. 6 in., by 3 ft. 1 in., and 1 ft. 10 in.

Traverse of head along the bed, 2 ft. 3 in.

Maximum stroke, 12 in.

Size of table, 17 in. by 17 in. by 9 in.

Driving cone, 4 speeds, 3½ in. wide, largest being 17½ in., and smallest 7 in. diameter.

Fly-wheel, 24 in. diameter.

Driving gear, 14 teeth to 55 teeth, 1 in. pitch, 3 in. face.

Overhead pulleys, 32 in. by 4 in.

Speed, 110 revolutions per minute.

Approximate weight, 3 tons 18 cwt. 0 qrs.

PRICE, complete, with Top Driving Apparatus, Screw

Keys, 2 Vices, &c., but without Dividing Appliance £185 0 0

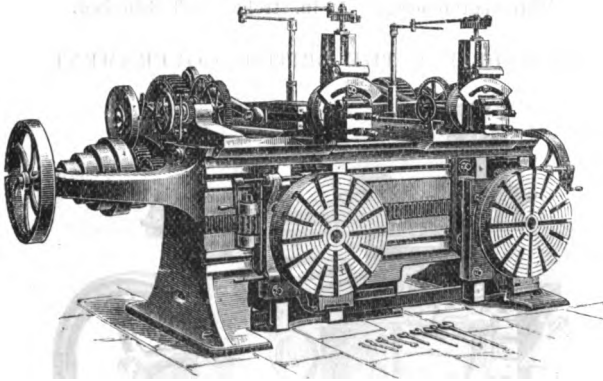
Dividing Appliance, extra £8 5 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED PATENTED SHAPING MACHINE, No. 34.

(Patented No. 7697.)



THIS is a most handy machine for general engineer's or machinist's shop, enabling a piece of work with several planed faces, as valve or bracket seatings, to be shaped on all sides at one setting, the immense advantage of which, by ensuring accuracy and as an economiser of time and labour will at once commend itself to every practical engineer.

The machine is constructed with a strong circular work table, having its face vertical, and with radial T slots for securely bolting the work to, which is capable of being easily rotated on its centre, and readily adjusted by slides both vertically and horizontally, so that any part of a piece of work fixed to it can be brought quickly under the operation of the tool on the ram head.

The circular motion is by worm and wheel gearing (and at a small extra cost can be made self-acting if desired), by which means cylinder flanges, cross heads, ends of connecting rods, and other circular work can be done. The vertical adjustment is by worm or mitre gearing and elevating screw.

The machine is fitted with the most recent improvements; the gearing is on the saddle, conveniently under the control of the operator without having to move from his job, and is self-acting in both horizontal, vertical, and angular cuts.

The machine illustrated is a double machine of large size, having a stroke of 24 in., and is fitted with two heads and two tables, acting independently of each other, but the same patented arrangement can be fitted to any of our smaller machines.

The machine can also be supplied with a loose angle bracket or table to attach to the vertical-faced circular table, forming at once an ordinary shaping machine when circular or multiple-faced work is not required to be done.

Specification of dimensions, &c., of the machine illustrated:—

Length of stroke, 24 in.
Length of bed, 9 ft.
Height of face of bed from floor, 4 ft.
Width of face of bed, 2 ft. 4 in.
Traverse of heads, 3 ft. 6 in.
Vertical adjustment of work table, 16 in.
Diameter of circular work table, 30 in.
Pitch, width on face, and diameters of gearing:—First pair 1½ in. by 4 in.; pinion, 9 in.; spur wheel, 18 in.

Second ditto, 1½ in. by 4½ in.; pinion 10½ in.; spur wheel, 24 in.
Pitch of feed gearing, ½ in. by 1½ in. on face.
Extreme length of machine, 15 ft.; width, 5 ft. 4 in.; height, 7 ft.
Overhead pulleys, 24 in. by 5 in.
Speed, 70 revolutions per minute.
Approximate weight, 11½ tons.

PRICE **£370 0 0**

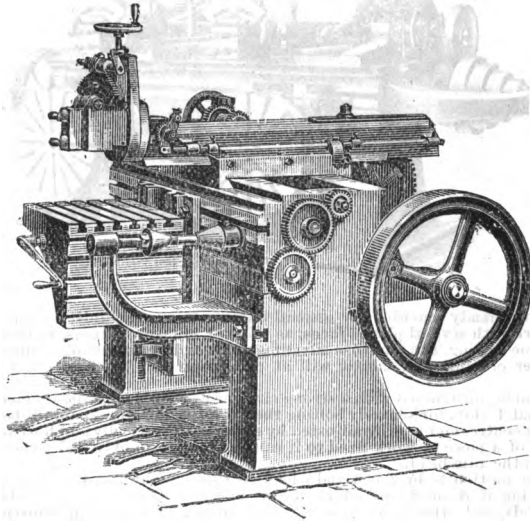
A similar machine, with one head, and with one or two tables. Price on application. Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED SELF-ACTING SHAPING MACHINE, No. 33.

With central action. 12-in. stroke. 3-ft. 6-in. bed.

AS MADE FOR THE BRITISH GOVERNMENT.



THIS machine is driven by direct motion of the link on the **centre** of the interior of the ram, obviating the usual connecting rod attached to the **side** of the ram, thus giving to the cutting tool a more direct and effective thrust.

All the feed motions are self-acting by cam and lever, and the vertical and angular feeds are very neatly and compactly contrived by tappets and rod at side of the ram, and the circular motion by worm and wheel gearing.

The tool holder swivels on the ram head, and is graduated to set to any angle, and the tool box is made with worm and quadrant for shaping internal curves. It has a quick return motion. Table adjusts in both directions. Traverse of head along the bed is 26 inches. Size of table, 16 in. by 14½ in.

Overhead pulleys, 13½ in. by 3½ in. Speed, 80 revolutions per minute.

Approximate weight, 27 cwt.

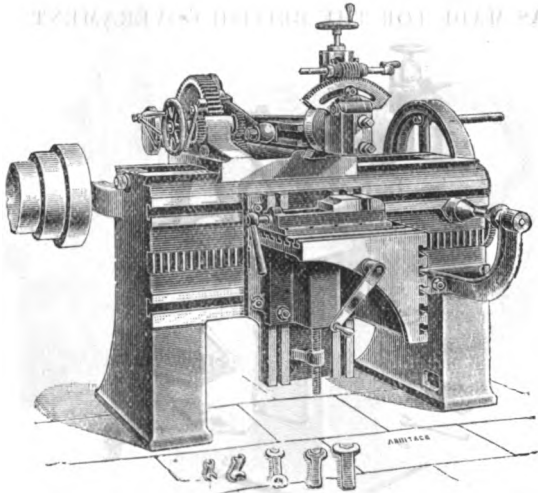
PRICE, complete with Parallel Vice, Overhead Motion,
Screw Keys, &c. **£64 10 0**

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd. Colchester, England,'

IMPROVED POWERFUL SHAPING MACHINE, No. 32

AS MADE FOR THE BRITISH GOVERNMENT.



THIS machine is designed and constructed on the most approved principles, with the gearing for longitudinal traverse on the head or carriage, thus enabling the operator to set the cut without having to go to the end of the bed, as heretofore. The above machine is made throughout with the greatest precision.

It is self-acting in horizontal and circular motion, the ram is indexed, and tool box provided with slides for vertical or angular cuts, and worm and quadrant for internal curves. The table is adjustable on the bed, and is raised and lowered by handle in front. It is fitted with quick return motion by link arrangement and parallel vice. Overhead motion and screw keys complete.

DIMENSIONS.

Length of bed, 4 ft.
Stroke, 13 in.
Traverse of head, 2 ft. 11 in.
Size of Table, 16 in. by 14½ in.

Overhead pulleys, 13½ in. by 3½ in.
Speed, 80 revolutions per minute.
Approximate weight, 27 cwt.

PRICE	£85 0 0
Extra per foot of Bed	2 10 0
Additional Table	8 0 0
Additional Head	30 0 0

NOTE.—If made self-acting in vertical and angular cuts extra, **£5 15 0**

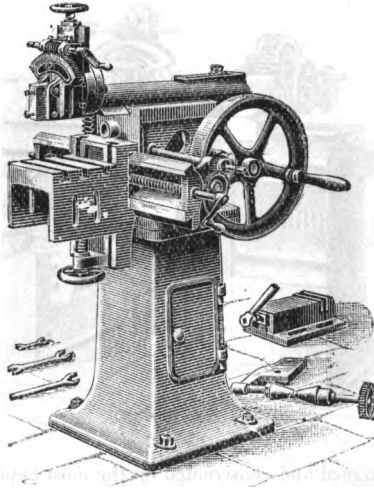
Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

SELF-ACTING SHAPING MACHINE, No. 31.

For Hand or Steam Power. 6-in. Stroke.

AS MADE FOR THE BRITISH GOVERNMENT.



THIS is a handy machine for small work, having a quick action, and under ready control. It is made to be used either on a bench or mounted on a cast iron box column as illustrated, the latter made with a door, and fitted with shelves as a cupboard for tools, &c.

It has an adjustable stroke up to 6 in. long.

The table is 9 in. by 9 in. by 8 in., and rises and falls by screw and hand wheel a distance of $7\frac{1}{2}$ in., and has a traverse along the bed of $25\frac{1}{2}$ in., either by hand or by self-acting feed. It is made with or without a self-acting circular motion, and is fitted with a parallel vice.

The tool box, is made to swivel on ram head to any angle. The driving shaft is fitted with hand fly-wheel, and with 3-speed cone pulley, for power driving.

Overhead pulleys, 10 in. by 3 in. Speed, 140 revolutions per minute. Approximate weight, with pedestal complete, $9\frac{1}{2}$ cwt.

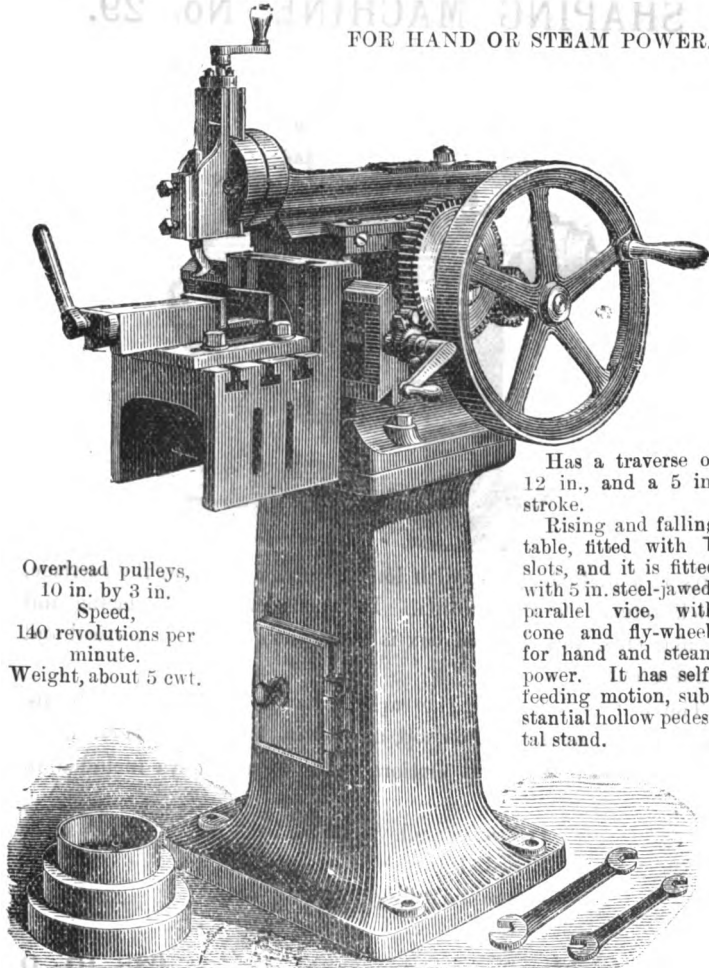
PRICE, with Vice, but without Pedestal, for use	
on bench	£25 0 0
Pedestal for ditto	3 15 0
If fitted with Self-Acting Circular Motion, extra	2 10 0
Complete Top Driving Apparatus for Power, extra	2 10 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

SELF-ACTING SHAPER, No. 30.

FOR HAND OR STEAM POWER.



Overhead pulleys,
10 in. by 3 in.
Speed,
140 revolutions per
minute.
Weight, about 5 cwt.

Has a traverse of
12 in., and a 5 in.
stroke.

Rising and falling
table, fitted with T
slots, and it is fitted
with 5 in. steel-jawed,
parallel vice, with
cone and fly-wheel,
for hand and steam
power. It has self-
feeding motion, sub-
stantial hollow pedes-
tal stand.

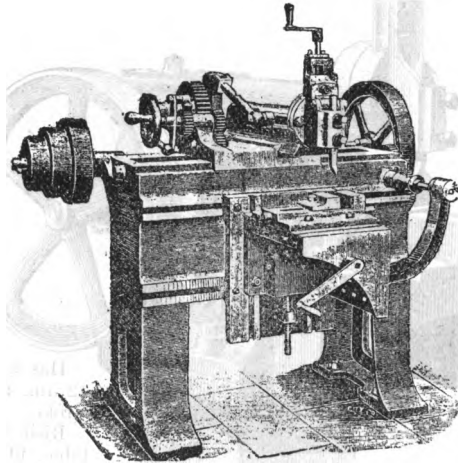
PRICE, with Vice, but without Pedestal, for use on bench	£19 10 0
Pedestal for ditto, extra	3 5 0
If fitted with Self-Acting Circular Motion, extra	2 10 0
Overhead Motion for power, extra	2 10 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED SHAPING MACHINE, No. 29.

9 in. STROKE.



THIS is a first-class tool, with longitudinal motion on the carriage, quick return by link motion. It is self-acting in surfacing and circular cuts, and the tool box is fitted with slides for vertical and angular cuts.

The bed is 3 ft. long, the carriage having a traverse of $19\frac{1}{2}$ in. Table, 15 in. by $10\frac{3}{4}$ in. on top, and 15 in. by 9 in. on side.

Parallel vice, overhead motion, spanners and keys included in price.

Overhead pulleys, 10 in. by 3 in.

Speed, 100 revolutions per minute.

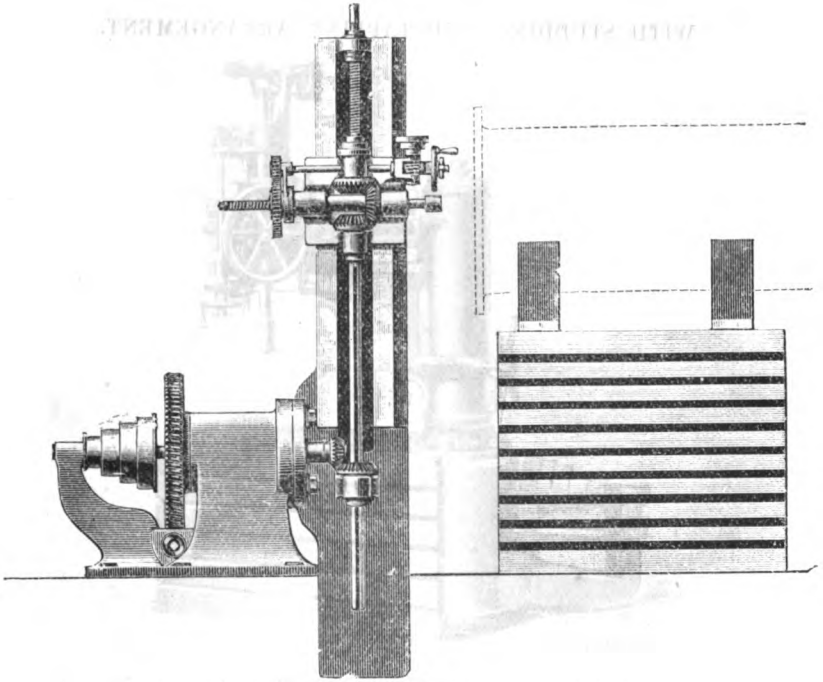
Approximate weight, 15 cwt.

PRICE, complete	...	...	...	£38 10 0
Extra length of Bed, per ft.	...	...	...	1 15 0
Additional Table	...	...	...	6 0 0

Neat cast iron gear covers can be fitted to enclose all exposed gearings, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England

HORIZONTAL RADIAL DRILL, No. 9



A VERY handy tool for drilling flanges at ends of long pipes or holes in any position in the vertical sides of machines or machine frames, as spindle holes, &c., which can all be done at one setting by rotating the arm and moving the saddle along it. The radial arm is counterbalanced, and is rotated by worm and wheel gearing to any position, and would revolve through an entire circle but for the floor. The feed is self-acting, with three changes of speed, and hand feed is also provided. The table for holding the work is truly planed, and has T slots on top and one side, and carries a pair of V blocks for holding pipes up to 24 in. diameter.

DIMENSIONS.

Radial arm is 5 ft. long from centre.
 Traverse of saddle on it is 3 ft. 8 in.
 Will drill a hole 1½ in. diameter by 9 in. deep, and 4 ft. 6 in. from centre.
 Steel spindle is 1½ in. diameter.
 Vertical driving shaft, 1½ in. diameter.
 Bevel and mitre gearing, ¾ in. pitch.
 Worm wheel, 22 in. diameter and ¾ in. pitch. 7½ in.
 Cone pulley has 4 speeds, 2½ in. wide; largest speed, 10 in. dia.; smallest, 12 in. by 3½ in.
 Overhead pulleys, 12 in. by 3½ in. Speed, 140 revolutions per minute.
 Approximate total weight, 2½ tons.
 Table is 3 ft. high by 3 ft. wide by 4 ft. long.

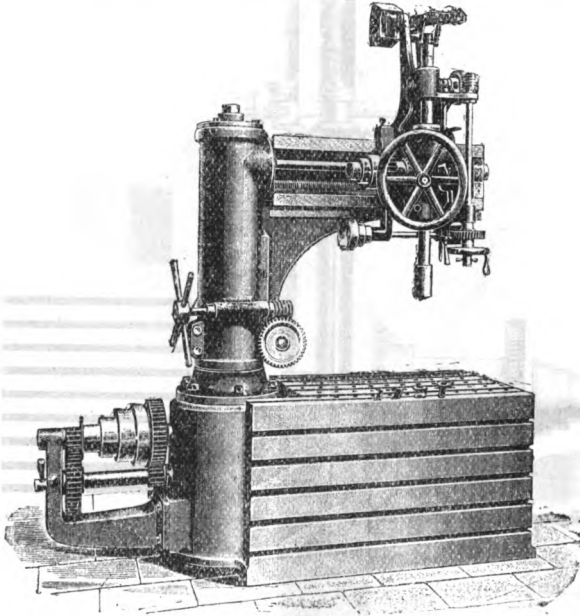
PRICE, with Table and V Blocks, as illustrated	...	£81 10 0
Drill only, without Table and Blocks	...	65 10 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

RADIAL DRILL, No. 14.

WITH STUDDING AND TAPPING ARRANGEMENT.



SELF-ACTING double geared radial Drilling Machine of improved design and strongly constructed with arm to revolve through entire circle and to rise and fall by worm gearing and rack and pinion. Mounted on strong cast iron base with \perp slots planed out of solid for securing work to. Drill spindle is fitted with self-acting feed motion by worm gearing and square thread screw.

DIMENSIONS.

Spindle, 2 in. diameter.

Base Plate, 4 ft. 10 in. long, 2 ft. 4 in. wide, 2 ft. 3 in. deep.

Length of Radial Arm, 4 ft.; will drill through a maximum radius of 3 ft. 6 in., drills out of solid up to $1\frac{1}{2}$ in.

Gearing, $\frac{3}{4}$ in. pitch, $2\frac{1}{2}$ in. face.

Cone Pulley, 4 speeds $2\frac{1}{2}$ in. wide; largest, 10 in. diameter; smallest, $4\frac{1}{2}$ in. diameter.

Wheel, 11 in. diameter.

Pinion, $3\frac{1}{2}$ in. diameter.

Overhead Pulleys, $13\frac{1}{2}$ in. by $3\frac{1}{2}$ in.

Speed, 200 revolutions per minute.

Approximate weight, 45 cwt.

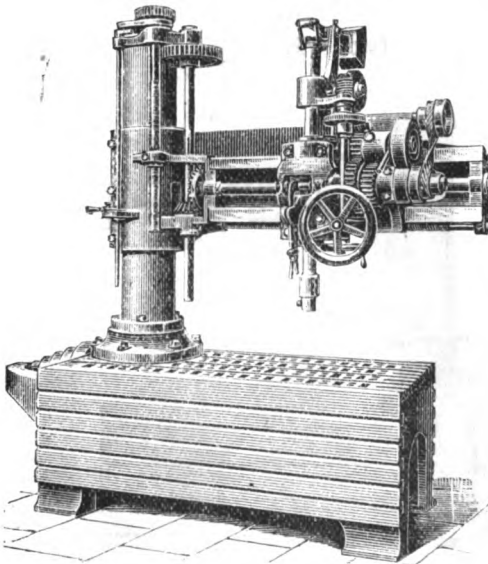
PRICE, as Specification and with Plain Saddle ... £82 15 0

Arranged for Studding and Tapping as illustration 95 10 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

RADIAL DRILL, No. 18.



THIS is an improved Drilling Machine, of special design, strongly constructed, embodying many new features. It has a heavy foundation table of box form truly planed, and with planed T slots on top face and each side for securing the work, mounted on which is a turned column, firmly fixed and carrying within it the vertical driving shaft, geared up with mitre gearing, and around which revolves a strong truly bored and turned external column, accurately fitting it. The latter carries a radial arm, made to rise and fall by self-acting arrangement by power, fitted to the arm, and accurately scraped and gibbed to fit a planed parallel slide is a saddle carrying the drilling spindle, which is fitted to drive by single or double gear, and with

reversing motion to drive right or left, or remain stationary, without stopping the machine, which enables tapping and studding to be efficiently and rapidly done by the machine, and also permits the drill to be quickly withdrawn from the hole, and the spindle is also counterbalanced by weight and lever, and fitted with self-acting feed motion by rack and pinion, with engaging clutch. The horizontal driving shaft, fitted into the foundation bed, carries a driving cone having five speeds, giving, with the double gear, ten changes of speed.

The machine is strongly built in all parts, truly machined, accurately fitted, materials and workmanship of a high class.

The spur gearing is machine-cut out of the solid, the smaller gears cut out of mild steel, the mitre gearing is of crucible steel castings, the spindle and shafts and screws are all of steel.

The dimensions are as follows:—

Foundation bed, 6 ft. 4 in. long by 3 ft. 2 in. wide by 2 ft. 6 in. high.
The external rotary column, 12 in. diameter
Length of arm, 6 ft. 4 in.
Vertical traverse of arm, 2 ft. 4 in.
Drills through a maximum radius of 5 ft.
Drills out of solid up to 2 in. diameter.
Bores up to 9 in. diameter and 12 in. deep.
The steel spindle is 2½ in. diameter.

Driving shafts, 2½ in. diameter.
Bevel gearing, 1½ in. pitch.
Machine cut spur gearing, 1 in. pitch.
Speed cone, 5 speeds, 3½ in. wide.
Largest speed, 17 in. diameter, smallest 6 in. diameter.
Overhead pulleys, 15½ in. by 4½ in.
Speed, 200 revolutions per minute.
Approximate weight, 4½ tons.

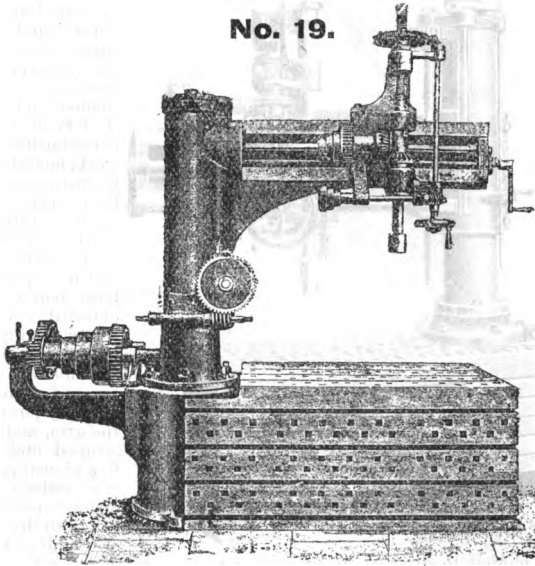
PRICE £182 10 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED SELF-ACTING DOUBLE-GEARED RADIAL DRILLING MACHINE,

No. 19.



DIMENSIONS, &c.

Arm to revolve the entire circle, and to rise and fall 18 in.

Distance from centre of pillar to end of arm, 4 ft. 6 in.

Steel spindle, 2½ in. diameter.

Self-acting vertical traverse, 16 in.

Mounted on massive block, with planed slots, 5 ft. 4 in. long from centre of pillar, by 2 ft. 9 in. wide on top and 2 ft. 3½ in. deep.

Will admit 2 ft. 4 in. high from top of block, and 4 ft. 7 in. from the ground.

Driving cone has 4 speeds, each 3 in. broad; largest speed, 12 in. diameter; small cone, 4½ in. diameter.

Gear wheel, 13 in. diameter, 3 in. broad, and ⅞ in. pitch.

Cone hangers with pulleys 13 in. diameter and 3 in. broad.

Will bore holes 10 in. diameter.

Screw keys, &c.

Overhead pulleys, 13½ in. by 3½ in.

Speed, 180 revolutions per minute.

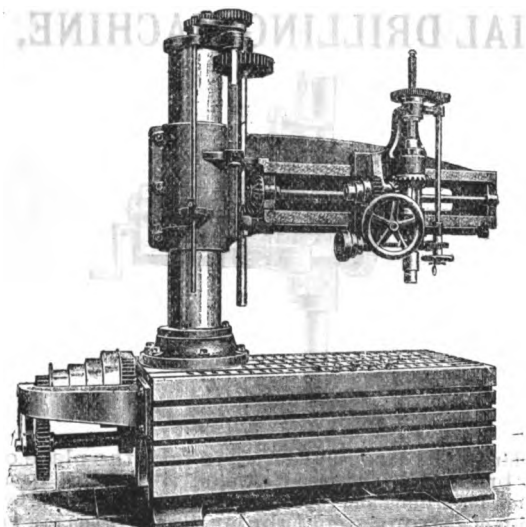
Approximate weight, 2 tons 10 cwt.

PRICE £90 0 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester; England,

RADIAL DRILL, No. 27.



IMPROVED double-gear radial Drilling Machine of strong construction. Heavy foundation table of box form truly planed with planed T slots on top face and each side for securing the work, mounted on which is a turned column, firmly fixed and carrying within it the vertical driving shaft geared up with mitre gearing and around which revolves a strong truly bored and turned external column, accurately fitting it. The latter carries a radial arm, made to rise and fall by self-acting arrangement by power; fitted to the arm and accurately scraped and gibbed to fit a planed parallel slide, is a saddle carrying the drilling spindle fitted with self-acting feed by screw and gearing having three changes. The horizontal driving shaft, fitted into the foundation bed, carries a driving cone having four speeds, giving with the double gear, eight changes of speed. The machine is strongly built in all parts, truly machined, accurately fitted, materials and workmanship of a high class.

DIMENSIONS.

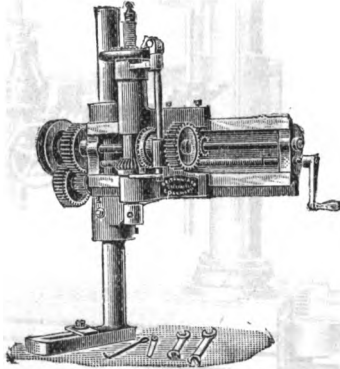
Foundation bed, 6 ft. 4 in. long by 3 ft. 2 in. wide by 2 ft. 6 in. high.
 The external rotary column, 12 in. diameter.
 Length of arm, 6 ft. 4 in.
 Vertical traverse of arm, 2 ft. 4 in.
 Drills through a maximum radius of 6 ft.
 Drills out of solid up to 2 in. diameter.
 Bores up to 9 in. diameter and 12 in. deep.
 The steel spindle is 2½ in. diameter.
 Driving shafts, 2½ in. diameter.
 Bevel gearing, 1½ in. pitch.
 Machine cut spur gearing, 1 in. pitch.
 Speed cone 4 speeds, 3½ in. wide, largest speed, 17 in. diameter, smallest, 8½ in. diameter, complete with countershaft.
 Overhead pulleys, 15½ in. by 4½ in.
 Speed 200 revolutions per minute.
 Approximate weight, 4½ tons.

PRICE £162 10 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

NEW PORTABLE RADIAL DRILLING MACHINE, No. 6



THIS machine has been specially designed to take the place of the old ratchet brace, and is adapted for bolting to locomotive frame plates, or similar work for drilling and rimming holes up to $1\frac{1}{2}$ in. diam. by $\frac{1}{4}$ in. deep.

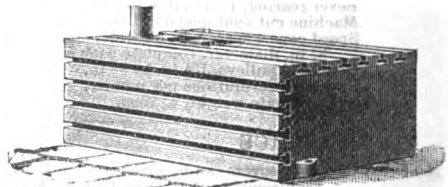
It consists of a strong steel tubular pillar forged on to a wrought iron slotted foot, and is capable of being turned to any desired angle, and when bolted in position of drilling all holes within a radius of 18 in. from centre of pillar. The spindle is of steel $1\frac{1}{2}$ in. in diameter, driven by strong gearing, and arranged to drive from either a swinging countershaft as used in locomotive shops, or from a fixed countershaft if desired. The spindle has a variable self-acting and also hand feed. The drill will rise and fall on the pillar through a range of 18 in. The bevel and driving gear is $\frac{3}{8}$ in. pitch. Approximate weight, 4 cwt.

PRICE complete, if for swinging countershaft	...	£22	0	0
If for fixed countershaft	... ..	27	0	0
Countershaft to suit, if required	... ..	2	10	0

A BOX FOUNDATION PLATE.

PREPARED to receive the wrought iron slotted foot of the drill, and accurately planed on top and one side, with planed T slots for bolting work to, can also be supplied, thus enabling the drill to be used (when desired) as a small but complete fixed radial drill.

Dimensions of base,
2 ft. 6 in. by 1 ft. 6 in. by
12 in. high.
Approximate weight of base,
4 cwt.

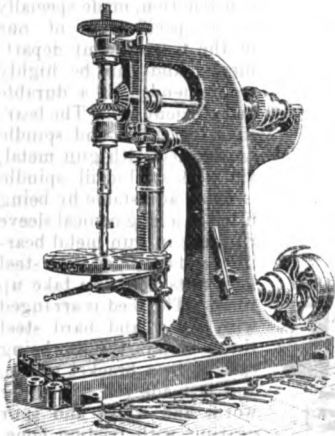


PRICE extra of base	£8	10	0
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The Britannia Engineering Co., Ltd., Colchester, England.

POWERFUL VERTICAL DRILLING MACHINE, No. 12.

Designed and made for the British Government for
the Indian States Railways.



THIS is a back-geared machine of powerful build, having a heavy box section body, machine planed at bottom and securely bolted to a machine planed heavy foundation plate, and with a turned pillar at one side to carry the strong arm which supports the table, which can thus be swung away for large work on the foundation plate, the latter being prepared with T slots for securing the work, and fork-shaped at front with filling piece fitted in.

The main spindle is of steel and fitted with conical gun metal bearings, made to adjust by lock nuts to take up wear. All bearings are truly bored and bushed with gun metal. It has a self-acting screw feed by worm gearing, and the nut of feed screw is made to adjust to take up wear. The table

elevates on the pillar by rack and pinion with worm and wheel purchase gear.

The steel spindle is coned to receive a 2 in. taper shank twist drill. The counter-shaft is self-contained in the frame of the machine, and is provided with convenient striking gear. It will drill out of solid 2 in. diameter by 12 in. deep, with a feed of 90 per inch, and bore up to 9 in. diameter. Admits 48 in. diameter, and has a maximum depth of 39 in. between nose of spindle and the circular table, and of 58 in. between spindle and foundation plate.

DIMENSIONS, &c.

- Diameter of spindle, 2½ in.
- Diameter of table, 36 in.
- Diameter of pillar, 8 in.
- Cone pulley, four speeds, 3¼ in. wide.
- Largest and smallest diameters, 13 in. and 5 in.
- Back gear, 13 T and 42 T, 1 in. pitch, 3 in. face.
- Feed gear, 1½ in. face, ½ in. pitch.
- Fast and loose pulleys, 24 in. by 4 in.
- Total height, width, and length, 9 ft. 8 in. by 4 ft. 5 in. by 9 ft. 3 in.
- Speed, 150 revolutions per minute.
- Approximate weight, 4 tons 7 cwt.

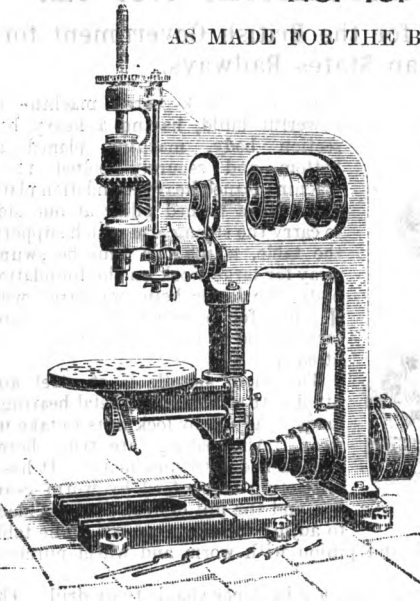
PRICE, complete, with Spanners, Nuts, Keys, &c. ... £126 10 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

DOUBLE-GEARED PILLAR DRILL,

Patent No. 16.



AS MADE FOR THE BRITISH GOVERNMENT.

THIS is a Drill of a superior construction, made specially to a specification of one of the Government departments, and can be highly recommended as a durable and efficient tool. The bearings for shafts and spindle are bushed with gun metal, and the steel drill spindle is made adjustable by being fitted in a long conical sleeve running in gun metal bearings and arranged with steel lock nuts above to take up wear. The feed is arranged with screw and hard steel thrust collars, the nut being carried in a bracket at top, and is made self-acting by worm and wheel and spur gearing with friction cone, or operated by hand with wheel and handle.

The principal dimensions are as follows:—

- Diameter of steel spindle, 2 in.
- Drills up to 2 ins.
- Drills in depth, 10 in.
- Admits in diameter, 30 in.
- Admits from base to spindle, 48 in.
- Diameter of table, 24 in.
- Table rises and falls, 29 in.
- Diameter of pillar, 6 in.
- Pitch of bevel gear, 1 in.
- Pitch and face of double gear, $\frac{3}{4}$ in. by $2\frac{1}{4}$ in.
- Diameter of large and small gear, 11 in. by $3\frac{3}{4}$ in.
- Diameter and face of driving pulleys, 12 in. by 3 in.
- Cone pulley has 4 speeds, $2\frac{1}{2}$ in. wide.
- Diameter of largest and smallest speed, 10 in. and $4\frac{1}{2}$ in.
- Total height, 8 ft.
- Speed, 150 revolutions per minute.
- Approximate weight, complete, 21 cwt.

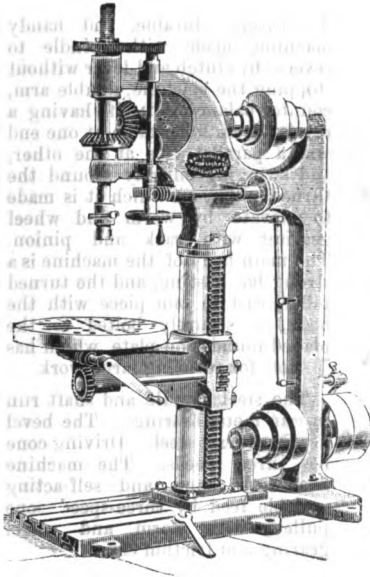
PRICE, complete, with Spanners, Nut Keys, &c. £48 10 0

Neat cast-iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

STRONG PILLAR DRILLING MACHINE, No. 1.

AS MADE FOR THE BRITISH GOVERNMENT.



THIS is a very useful machine, strongly built for its size. The main body is a box casting, faced and truly fitted on to a turned pillar, and carefully fitted on to a planed foundation plate, having T slots for bolting large work to. The turned circular table is made to swivel on its centre, and to swing around the turned pillar, and is raised and lowered by rack and pinion with worm gearing.

The driving apparatus is self-contained, making the machine very compact.

The steel spindle is driven by strong bevel gear, and has both hand and self-acting feed by worm wheel and screw and friction cone.

All motions are arranged so as to be conveniently accessible to the operator, and all material and workmanship are of the best.

This is very superior to the drills generally sold both in finish, accuracy, and handiness.

DIMENSIONS, &c.

Diameter of steel spindle, $1\frac{1}{2}$ in.
 Drills up to 2 in.
 Drills in depth, 7 in.
 Admits in diameter, 24 in.
 Diameter of table, 20 in.
 Table rises and falls 27 in.
 Cone pulley has 3 speeds, width $2\frac{1}{2}$ in.

Diameter of largest, 9 in.
 Diameter of pillar, 6 in.
 Pitch of bevel gear, $\frac{3}{4}$ in.
 Pitch of rack and pinion, $\frac{3}{4}$ in.
 Total height, 6 ft. 6 in.
 Driving pulleys, 10 in. by 3 in.
 Speed, 150 revolutions per minute.
 Approximate weight, 12 cwt.

PRICE complete	...	...	...	...	£28 10 0
Or with Double Gearing	...	...	...	...	32 10 0

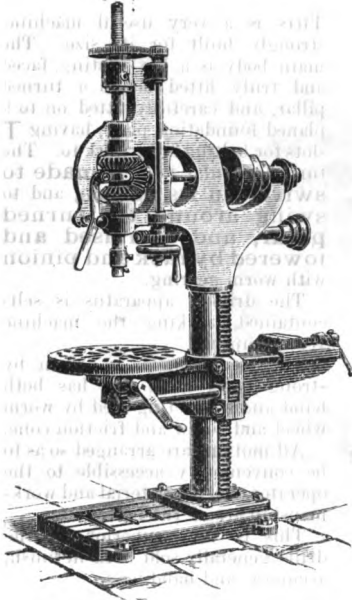
Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

SINGLE-GEARED DRILLING MACHINE.

Made in Two Sizes, Nos. 17 and 3a.

DESIGNED AND MADE FOR THE BRITISH GOVERNMENT.



A STRONG, durable, and handy machine, made with spindle to reverse by clutch and lever without stopping the machine, double arm, counter-balancing itself, having a revolving circular table at one end and a parallel vice at the other, and swinging entirely around the turned pillar, on which it is made to elevate by worm and wheel gearing with rack and pinion. The main body of the machine is a strong box casting, and the turned pillar, cast in one piece with the body, is securely bolted to the planed foundation plate, which has T slots for securing large work.

The steel spindle and shaft run in gun metal bearings. The bevel gearing is cast steel. Driving cone has three speeds. The machine has both hand and self-acting variable feed by three-speed cone pulley, with worm and wheel gearing and friction cone.

The Dimensions are as follows:—

	No. 17.	No. 3a.
Steel spindle, diameter	1½ in.	1½ in.
To drill up to, diameter	1½ in.	1½ in.
To drill to a depth of	7 in.	6 in.
Diameter of table	20 in.	20 in.
Admitting in diameter	2½ in.	2½ in.
Table rises and falls	2½ in.	2½ in.
Total height	6 ft. 6 in.	6 ft. 3 in.
Cone pulley, three speeds, width	2½ in.	2 in.
Diameter of largest speed	9 in.	7½ in.
Diameter of pillar	6 in.	5 in.
Pitch of bevel gears	¾ in.	¾ in.
Pitch of rack and pinion	¾ in.	¾ in.
Overhead pulleys, diam. and face	16 in. by 3 in.	10 in. by 3 in.
Speed, revolutions per minute	140	150
Approximate weight	13 cwt.	10 cwt.

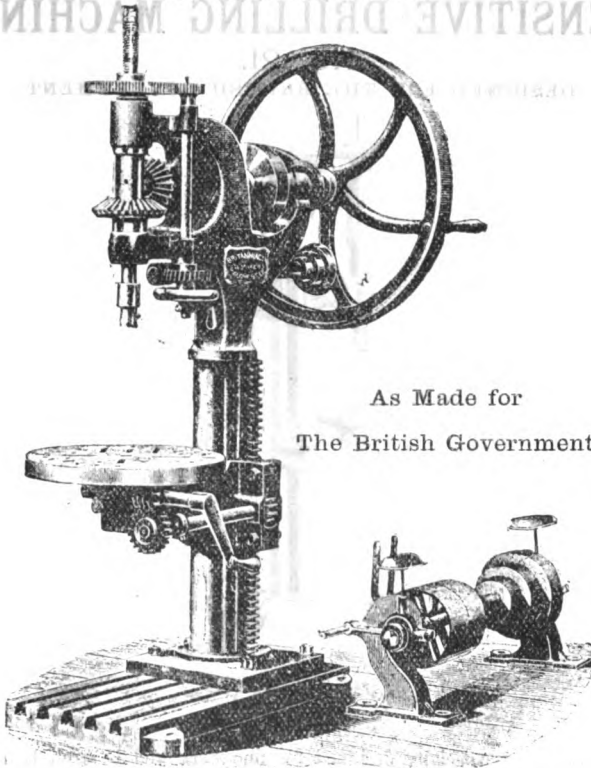
PRICE, No. 17, with complete Overhead Motion, &c. £35 10 0
 No. 3a. 32 0 0
 Extra for Tapping arrangement, fitted to either machine 1 18 6

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

Strong Single-Gear Pillar Drilling Machines, Nos. 2 & 3

FOR HAND AND POWER.



As Made for
The British Government

These machines are of new design, and embody all the latest improvements in small Drills. They have strong box casting for the body, pillar and base in one piece, the pillar being turned bright, and the base firmly bolted on to a planed foundation plate with T slots for larger work. The spindle is of steel, driven by strong bevel gearing; hand and self-acting feed by worm wheel and screw, engaging by friction cone. The circular work table will swivel on its centre, and also swing entirely round the pillar, and is raised and lowered by worm and wheel, with rack and pinion gearing. The fly-wheel has truly turned bright rim, and fitted with wood handle for driving by hand when that is desired. A complete top driving apparatus for steam power, and the necessary keys and wrenches are included in the price. They are of the best material and workmanship.

DIMENSIONS, &c.		No. 2	No. 3	DIMENSIONS, &c.		No. 2	No. 3
Steel spindle, diameter	...	1½ in.	1½ in.	Diameter of pillar	...	6 in.	5 in.
Drill up to	...	1½ in.	1½ in.	Pitch of bevel gearing	...	¾ in.	¾ in.
Drill in depth	...	7 in.	6 in.	Pitch of rack and pinion	...	¾ in.	¾ in.
To admit in diameter	...	24 in.	24 in.	Total height	...	5ft. 6in.	4ft. 11
Diameter of table	...	20 in.	20 in.	Overhead pulleys	...	10by 3in.	10by 3in.
Table rises and falls	...	21 in.	18 in.	Speed, revolutions per min.	...	150	160
Cone pulley, 3 speeds, width	...	2½ in.	2 in.	Approximate weight	...	11 cwt.	9½ cwt
Diameter of largest speed	...	9 in.	7½ in.				

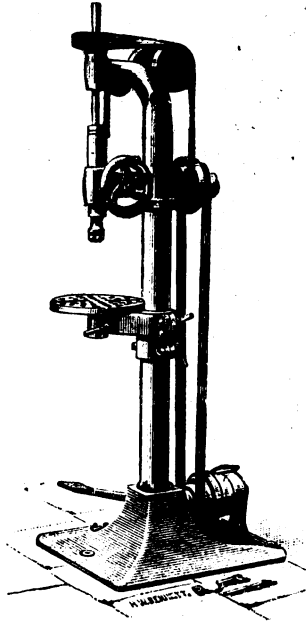
PRICE, complete with Countershaft, No. 2, £25 10s.; No. 3, £21 10s.
Extra for machine cut gear and gun metal bushes, No. 2, £3; No. 3, £2 10s.
Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

QUICK-RUNNING SENSITIVE DRILLING MACHINE,

No. 21.

DESIGNED FOR THE BRITISH GOVERNMENT.



THIS machine is specially designed for fine work, and is strongly recommended for Electrical Engineers, Cycle Makers, and all kinds of light trades requiring large quantities of small holes accurately and quickly drilled.

The machine is made with counter-balanced steel spindle, working through the driving pulley and sleeve, and having its nose fitted with a patent scroll chuck, to take up to $\frac{1}{8}$ in. The feed is arranged by hand wheel and pinion, engaging with a rack on the sleeve, and is under perfect control, and only the necessary pressure need be applied. There are no gears—all revolving parts are turned to balance truly, and are driven by flat belt. The machine is started by treadle lever, and stops on removal of the foot. The workmanship throughout is of a high class, and material of the best.

DIMENSIONS.

Diameter of spindle, $\frac{1}{8}$ in.
Depth of feed, 6 in.
Drills up to $\frac{1}{4}$ in.
Distance from centre to frame, $7\frac{1}{2}$ in.
Cone pulleys, four speeds, $1\frac{1}{4}$ in. wide.
Largest, $7\frac{1}{2}$ in. diameter.

Smallest speed, 3 in. diameter.
Total height, 6 ft. 6 in.
Countershaft pulleys, 6 in. by $2\frac{1}{2}$ in.
Speed, 400 revolutions per minute.
Approximate weight, $5\frac{1}{2}$ cwt.

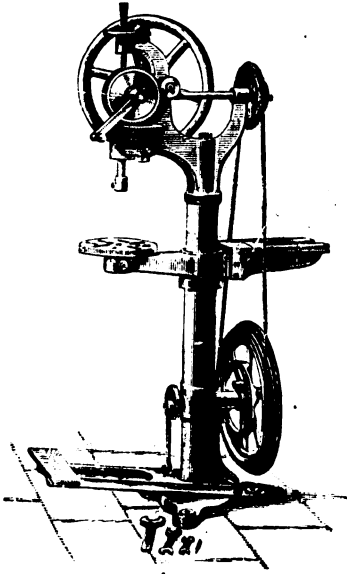
PRICE £17 10 0

The Britannia Engineering Co., Ltd., Colchester, England.

LIGHT PILLAR DRILL, No. 25.

FOR EITHER FOOT, HAND, OR POWER.

AS MADE FOR THE BRITISH GOVERNMENT.



THE body is of strong web section, turned to fit on the top of the pillar, secured to it by strong bolt and nut and can be swivelled round to any angle. Very handy for drilling holes in large articles. The pillar and base are cast in one, pillar is truly turned, and is fitted with a bracket carrying a circular work table.

The spindle is fitted for both single and double gearing to suit small or large holes, and the feed self-acting or by hand.

It has two driving shafts, that for the treadle or power running to the back, and that for the hand motion to the right side, and these drive the spindle by bevel and spur gearing, which, by an ingenious contrivance and combination with the fly-wheel, give an immense impetus to the motion and greatly facilitate the work.

The treadle wheel has four speeds, and with the double gearing gives eight variations of speed.

DIMENSIONS.

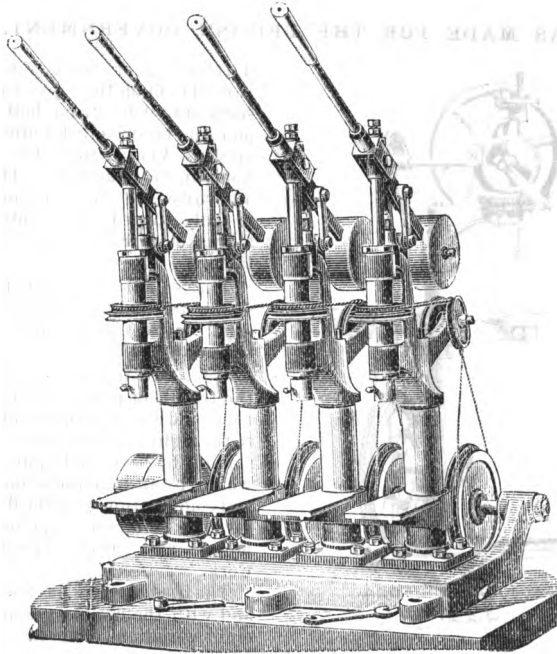
Diameter of spindle, $\frac{3}{8}$ in.
 Drilling holes up to $\frac{3}{4}$ in. diameter by 5 in. deep.
 Turned pillar, 4 in. diameter.
 Distance from drill to pillar, 9 in.
 Diameter of fly-wheel, 18 in.
 Diameter of treadle wheel, 20 in.
 Diameter of circular table, 10 in.
 Table will rise and fall on pillar 20 $\frac{1}{2}$ in.
 Approximate weight, 3 $\frac{1}{2}$ cwt.

PRICE, as Hand and Treadle Drill	...	...	...	£10 15 0
Extra for Countershaft for Power	...	...	...	2 0 0
For Planed Square Table (as shown in illustration) in addition to the circular one	...	...	...	0 15 0
For adjustable Vice to fit on last attachment	...	...	...	1 0 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

ELECTRICAL ENGINEERS' DRILLS, No. 8.



THIS illustration represents a gang of four quick speed Drilling Machines, mounted on a cast iron base, for rapidly drilling small holes of equal or varying size, countersinking, recessing, &c.

They are driven by countershaft at back, fitted with one pair of fast and loose pulleys, and a cone pulley for each drill, and are designed to be driven by power.

They are made with steel spindles, running in hard steel bearings, and are fed by hand lever and link motion, with balance weight to bring up the spindle, the latter having a steel swivel at top. They have turned pillars, with tables to rise and fall, or swivel around.

DIMENSIONS.

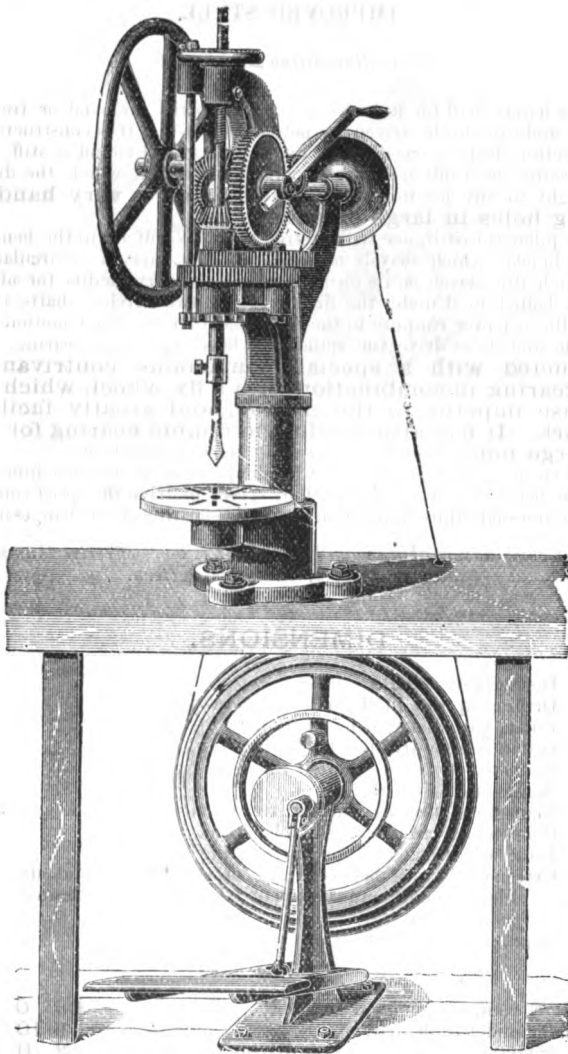
To drill holes up to $\frac{3}{8}$ in. diameter, and
 $3\frac{1}{2}$ in. deep.
 Diameter of steel spindle $\frac{1}{2}$ in.
 Turned pillar, $2\frac{1}{2}$ in. diameter by 9 in.
 high.

Table rises and falls $6\frac{1}{2}$ in.
 Distance between centres of drills, 6 in.
 Size of cast iron base for four drills,
 $26\frac{1}{2}$ in. by 10 in.
 Total height from base to lever, 26 in.

PRICE, for gang of four Drills (as illustration)	£25	0	0	
Single Drills, made as above, but with base to suit, and independent countershaft	8	10	0

The Britannia Engineering Co., Ltd., Colchester, England.

BENCH DRILLING MACHINE, No. 5.



For description see page 54.

The Britannia Engineering Co., Ltd., Colchester, England.

BENCH DRILLING MACHINE, No. 5.

IMPROVED STYLE.

For illustration see page 53.

THIS is a handy drill for **light** work; made to drive by hand or treadle, or by both, and can also be driven by power if desired. It is constructed with a web-section body, turned to fit on to and swivel round a stiff turned pillar, secured by a nut at any angle, and by loosening which the drill can be brought to any position in its radius, and is thus **very handy for drilling holes in large objects.**

The pillar is cast in one with a strong foot, to bolt on to the bench, and carries a bracket which swivels entirely round it, carrying a circular work-plate which also swivels on its own centre, giving every facility for adjusting the work bolted to it under the drill. It has two driving shafts, that for the treadle or power running to the back, and that for hand motion to the right side, and these drive the spindle by bevel and spur gearing. **It is constructed with a specially ingenious contrivance of spur gearing in combination with a fly-wheel, which gives immense impetus to the motion, and greatly facilitates the work. It has also single and double gearing for small and large holes, and has both self-acting and hand feed.**

The treadle driving gear is made independent of the machine, to fix under the bench, the wheel having four speeds to drive the speed cone fitted to the driving shaft, thus giving with the double gearing eight changes of speed.

By the combination above named, this drill is more effective than much larger tools of the same pattern.

DIMENSIONS.

Diameter of spindle, $\frac{3}{4}$ in.
 Drilling up to $\frac{3}{8}$ in. diameter, by 5 in. deep.
 Pillar, 4 in. diameter by 11 in. high.
 Distance from drill point to pillar, 9 in.
 Diameter of driving shaft, $\frac{3}{4}$ in.
 Diameter of fly-wheel, 18 in.
 Diameter of driving wheel of treadle motion, 20 in.
 Diameter of circular work table, 10 in.
 Table will rise and fall on pillar $6\frac{1}{2}$ in.
 Extreme distance between nose of spindle when at its highest point, and the top of table when at its lowest point, $9\frac{1}{2}$ in.
 Approximate weight, $2\frac{1}{2}$ cwt.

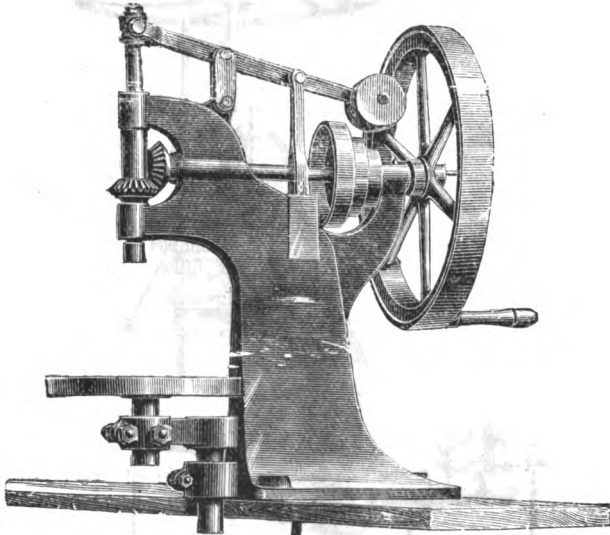
PRICE, complete, as hand drill only	£8 0 0
As hand and treadle drill	9 10 0
Top driving apparatus for power driving, if desired	2 0 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

BENCH DRILL, No. 4.

AS MADE FOR THE ADMIRALTY.



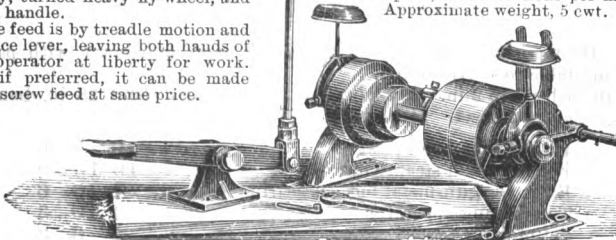
This is a very handy little Drill for both hand and power. It is constructed with a strong box casting for the main body, with shaft holes truly bored, and with steel spindle fitted with mitre gearing. A turned circular table to rise and fall, and adjustable to any position by a swivelling bracket, in split bearings, pinched by bolts and nuts.

It has a turned 3-speed cone pulley, turned heavy fly-wheel, and wood handle.

The feed is by treadle motion and balance lever, leaving both hands of the operator at liberty for work. But if preferred, it can be made with screw feed at same price.

DIMENSIONS.

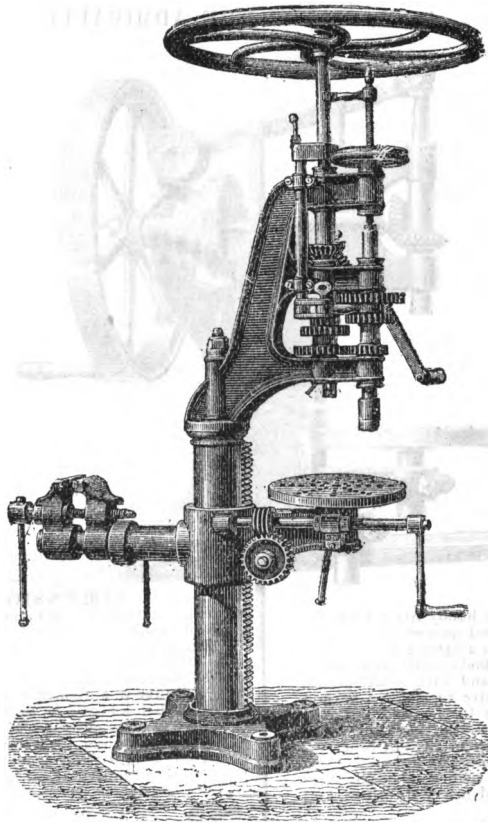
Steel spindle, $1\frac{1}{2}$ in. diameter.
 Cone pulley, 3 speeds, $1\frac{1}{2}$ in. wide.
 Diameters—Largest 9 in., smallest 5 in.
 Circular table, $16\frac{1}{2}$ in. diameter.
 Distance between spindle and table, 12 in.
 Will take in a diameter of $17\frac{1}{2}$ in.
 Will drill a hole $\frac{1}{4}$ in. by $4\frac{1}{2}$ in. deep.
 Base of body measures 18 in. by 14 in.
 Fly-wheel, 26 in. diameter, $2\frac{1}{4}$ in. face.
 Total height from bench to top of drill, 40 in.
 Overhead pulleys, 8 in. by 3 in. [40 in.]
 Speed, 160 revolutions per minute.
 Approximate weight, 5 cwt.



PRICE, complete, including countershaft for power	...	£15 10 0
With hardened steel spindle	... ..	17 5 0

▶ The Britannia Engineering Co., Ltd., Colchester, England.

PILLAR DRILL, No. 140.



THIS Drill is self-acting, treble geared, for hand and power, with parallel vice and table to swivel round.

Will drill up to 2 in. Fly-wheel, 43 in. Admits about 28 in. diameter.
Weight, about 9½ cwt. Height, 7 ft. 6 in.

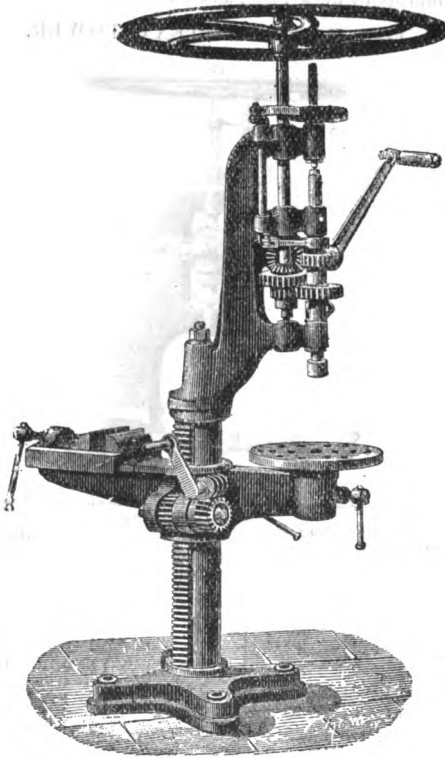
PRICE, for hand power	...	...	£19	2	6
For hand and steam power	...	...	19	15	9
Extra for gun-metal bushed bearings	...	...	1	10	6
Top driving apparatus	...	...	4	10	3
Set of drills	...	...	1	6	3
Extra for automatic raising gear	...	...	2	12	6

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

PILLAR DRILL, No. 340, &c.

FOR HAND OR POWER.



No.	Drills up to	Diam. of Flywheel.	Admits in diam.	Weight.	Height.	PRICE.			Extra for Steam.	Overhead Extra.		
						£	s.	d.		£	s.	d.
340	1 ⁹ / ₁₆	38	25	6 ¹ / ₂	7 0	14	18	6	12/6	4	10	0
350	1 ³ / ₄	38	28	7 ¹ / ₂	7 4	16	7	6	12/6	4	10	0
360	2	40	30	9	7 6	17	12	6	12/6	4	10	0

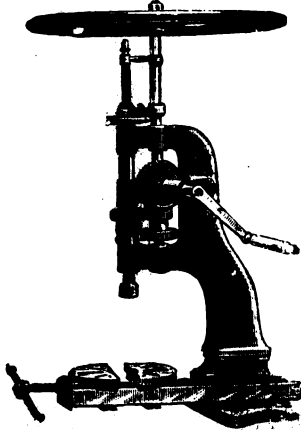
Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

NEW PATENT DRILLING MACHINES.

With Improved Chuck-plate, and Parallel Vice, Self-centring.

FOR HAND OR STEAM POWER.



Numbers of Machines.	To drill holes up to diam.	Diameter of Fly-wheel.	Diameter admitted under Spindle.	Diameter of Patent Vice Plate.	Height over all.	Weight Approx.
	in.	in.	in.	in.	in.	cwt.
29BB*	$\frac{3}{4}$	20	8	10	37	1 $\frac{1}{2}$
37BB	1 $\frac{1}{4}$	32	10	12	40	3
38BB	1 $\frac{3}{8}$	32	10	14	46	4
39BB	1 $\frac{5}{8}$	38	12 $\frac{1}{2}$	14	52	5
40BB	1 $\frac{3}{4}$	40	14	15	54	6

Numbers of Machines.	Price for Hand.			Price for Hand and Steam.			Set of 6 Drills.		
	£	s.	d.	£	s.	d.	£	s.	d.
29BB*	5	1	6	5	9	0	0	8	0
37BB	6	15	0	7	2	9	0	12	9
38BB	8	5	9	8	12	0	0	15	9
39BB	10	5	9	10	18	6	0	19	0
40BB	12	16	0	13	5	0	1	1	0

*Single geared only.

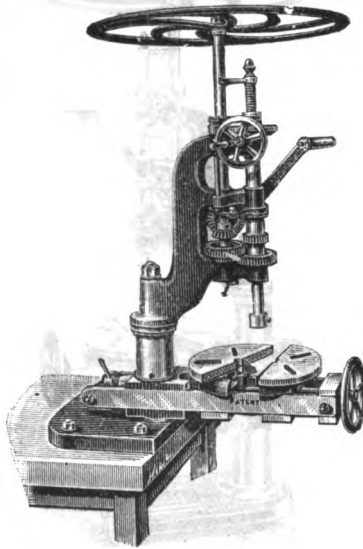
Hand Wheel and Gear for raising Drilling Spindles, 8/6 extra, which is supplied if no mention is made to the contrary.

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED BENCH PILLAR DRILLING MACHINES.

FOR HAND OR STEAM POWER.



Numbers of Machines.	To drill holes up to dia.	Diameter of Fly-wheel.	Diameter of Patent Circular Vice-Plate.	Distance from spindle to frame or pillar.	Total height.	Weight Approx.
	in.					
48	1½	32	14	12	54	4½
49	1½	40	15	12½	60	5½
50	1¾	40	15	13	65	6½

Numbers of Machines.	Price for Hand.	Price for Hand and Steam.	Price of Overhead Motion Extra.	Set of 6 Drills.	Set of Twist Drills.
	£ s. d.	£ s. d.	£ s. d.		
48	12 0 0	12 16 0	3 3 0	15/9	44/-
49	18 5 0	13 17 6	4 4 0	19/-	52/6
50	14 14 0	15 6 6	4 4 0	21/-	63/-

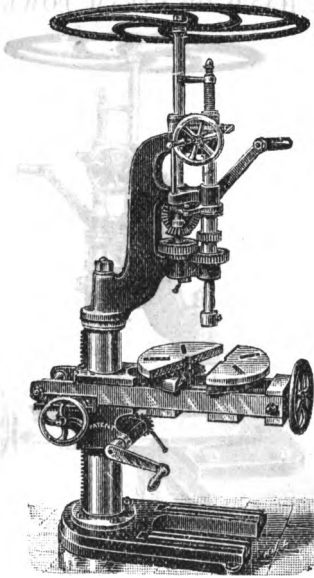
33 Set of Improved Tubular Dogs on Face-plate, 52 6.

The above are fitted with patent parallel vice and revolving chuck-plate.

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED PILLAR DRILLING MACHINES.



FOR HAND
OR
STEAM POWER.

Numbers of Machines.	To drill holes up to dia.	Diameter of Fly-wheel.	Diameter of Patent Vice Plate.	Distance from spindle to frame or pillar.	Total Height.	Weight Approx.
	in.	in.	in.	in.	in.	cwt.
51	1 $\frac{1}{4}$	36	14	12	72	6
52	1 $\frac{1}{2}$	38	15	12 $\frac{1}{2}$	76	7
53	1 $\frac{3}{4}$	40	15	13	86	8 $\frac{1}{2}$

Numbers of Machines.	Price for Hand.	Price for Hand and Steam.	Price of Overhead Motion Extra.	Set of 6 Drills.	Set of Twist Drills.
	£ s. d.	£ s. d.	£ s. d.		
51	14 10 0	15 2 6	3 3 0	15/0	44 -
52	17 0 0	17 12 9	4 4 0	19 -	52 6
53	18 10 0	19 2 6	4 4 0	21 -	63/-

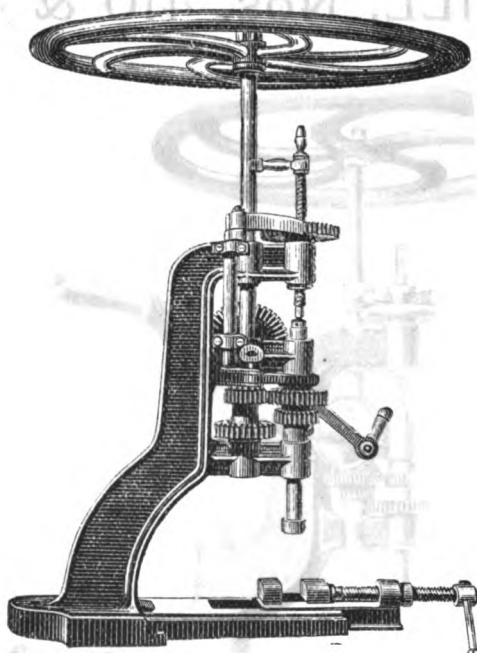
LARGER SIZES IN PROGRESS.

☛ Set of Improved Tubular Dogs on Face-plate, 52, 6.

These Drills are fitted with patent combined parallel vice and revolving face-plate. Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

DRILL, No. 110.



DIMENSIONS.

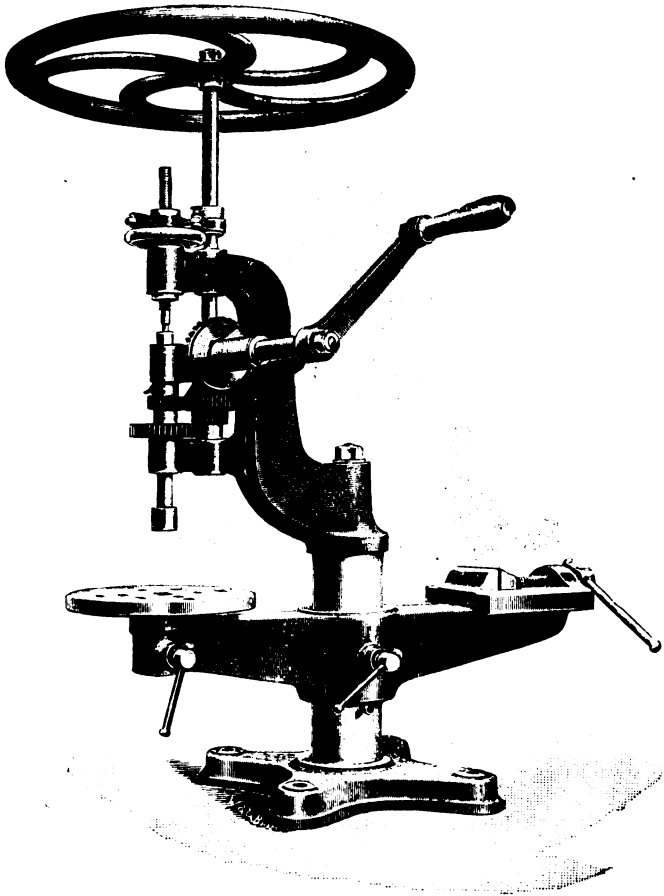
Height, 3 ft. 8 in.
 Diameter of fly-wheel, 36 in.
 Distance of spindle to frame, 11 in.
 To drill holes $1\frac{1}{2}$ in. diameter.
 Will take in diameter, 22 in.
 Approximate weight, $2\frac{1}{2}$ cwt.
 These machines have a solid frame.
 Parallel vice, double gearing, two speeds, self-feeding.

PRICE, for hand only	...	...	...	£5 17 6
Hand and steam	...	...	...	6 6 0
Overhead motion to suit above,	£3	3	0.	

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

DRILL, Nos. 410 & 420.



For description see page 63.

The Britannia Engineering Co., Ltd., Colchester, England.

DRILL, Nos. 410 & 420.

MADE IN TWO SIZES.

For illustration see page 62.

THESE Drills have double gearing, fast and slow feed motion, fast and loose pulleys, or 3-speed cone on side, when arranged for steam power, circular table, 9 in. to rise and fall, parallel vice to swing round under drill. The top part revolves by loosening a nut.

DIMENSIONS.

No. 410.

To drill holes $\frac{3}{4}$ in. diameter.
Diameter of fly-wheel, 28 in.
Will take in diameter, 24 in.
Height, 4 ft. 4 in.
Approximate weight, $3\frac{1}{2}$ cwt.

PRICE, for hand only	...	...	...	£7 14 0
Hand and steam	...	...	...	8 2 9

No. 420.

To drill holes 1 in. diameter.
Diameter of fly-wheel, 32 in.
Will take in diameter, 26 in.
Height, 4 ft. 6 in.
Approximate weight, $3\frac{1}{2}$ cwt.

PRICE, for hand only	...	...	...	£8 16 0
Hand and steam	...	...	...	9 5 0

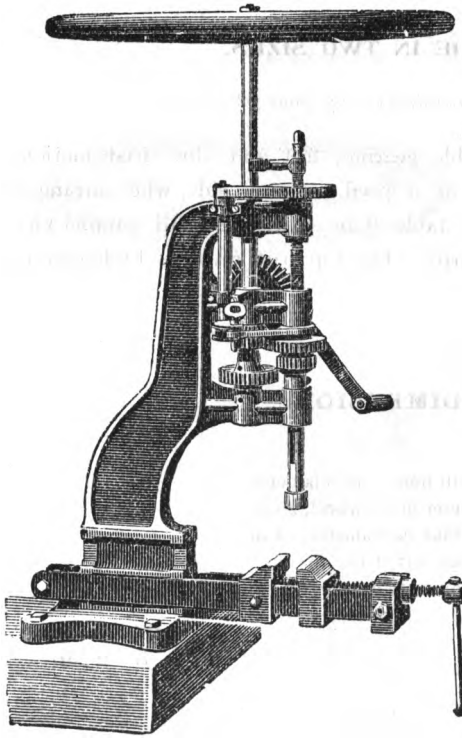
N.B.—No. 420 can be raised on pillar so as to give 14 in. more distance between spindle and vice, at an extra charge of 15/-

Overhead motions to suit either of above	£3 3 0
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Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

BENCH DRILLING MACHINES.



TO WORK BY
HAND OR STEAM
POWER.

THIS pattern Machine is made in five sizes, has a solid cast iron frame, powerful double gearing, strong self-feeding motion by pressure from the top, a large fly-wheel on top of inside spindle, an improved adjustable parallel vice sliding round the frame of machine, in grooves one above the other. The handle (and fast-and-loose pulleys or cone when arranged for steam power) are on the right hand side. These machines are used largely amongst Coach-builders and Wheelwrights.

No. 290a is Single Geared.

Nos. of Machines.	Diameter of Fly-wheel. ins.	To drill holes up to diam. ins.	Distance from Spindle to Frame to ins.	Approximate Weight. cwt.	Price for Hand Power.			Height. ft. in.
					£	s.	d.	
290a	20	$\frac{3}{4}$	8	1	3	15	6	3 1
370	32	1	10	2	5	8	6	3 3
380	36	$1\frac{1}{4}$	11	$2\frac{1}{2}$	6	14	6	3 6
390	38	$1\frac{1}{2}$	$12\frac{1}{2}$	3	7	15	6	4 4
400	40	$1\frac{3}{8}$	14	4	8	12	3	4 6

Arranged for hand and steam ... 8 3 and 12 6 extra respectively.
Set of drills ... 8/- 10/6 12/6 15/9 19/- " "
Extra vice plate ... 15/9 19/- 21/- 21/- 26/3 " "

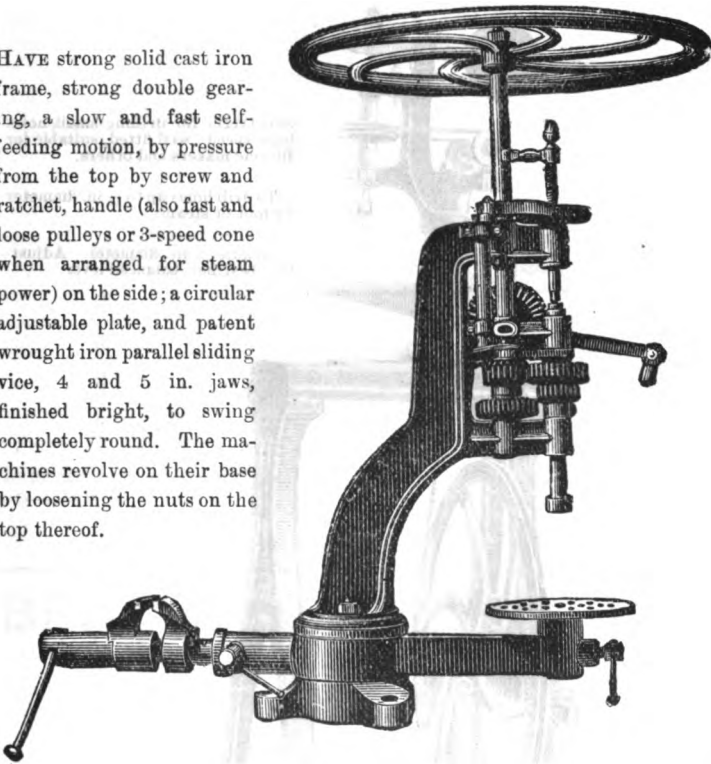
Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

BENCH DRILLING MACHINES.

TO WORK BY HAND OR STEAM POWER.

HAVE strong solid cast iron frame, strong double gearing, a slow and fast self-feeding motion, by pressure from the top by screw and ratchet, handle (also fast and loose pulleys or 3-speed cone when arranged for steam power) on the side; a circular adjustable plate, and patent wrought iron parallel sliding vice, 4 and 5 in. jaws, finished bright, to swing completely round. The machines revolve on their base by loosening the nuts on the top thereof.



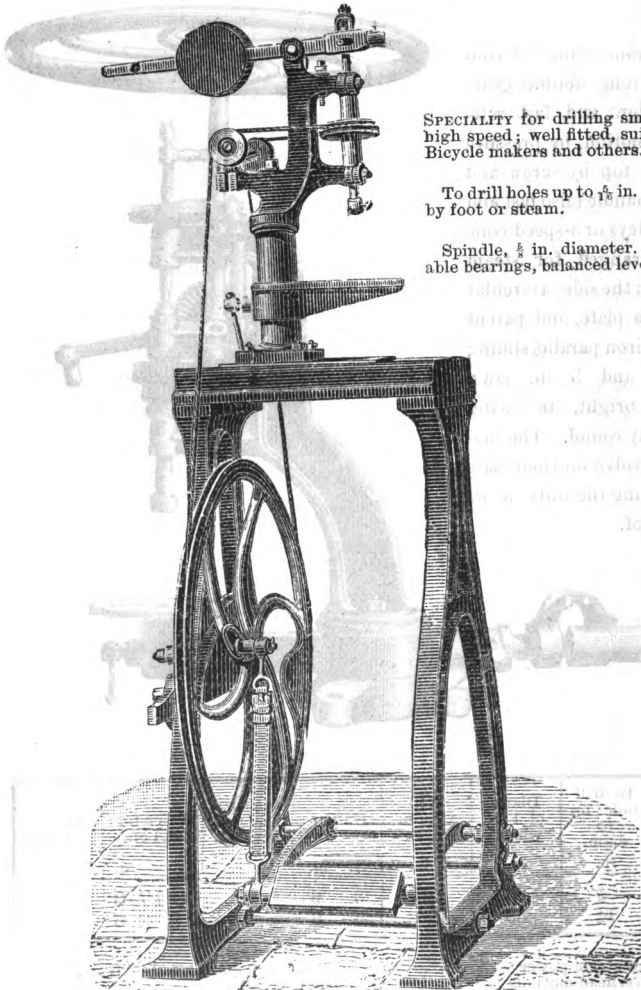
Nos. of Machines.	To drill holes up to diam. in.	Diam. of Fly-wheel. in.	Will take in diam. in.	Height. ft. in.	Approximate Weight. cwt.	Price for Hand only. £ s. d.	Diam. of Plates. in.
190	$\frac{1}{2}$	28	19	3 9	2	6 17 6	10
200	$1\frac{1}{4}$	36	26	4 8	$3\frac{1}{2}$	10 2 6	12

For steam power 8 6 and 8 6 extra respectively.
 Overhead motions 58 9 " 84/- " "
 Set of drills 12 6 " 15 9 " "

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

LEVER TREADLE DRILLING MACHINE, No. 10.



SPECIALITY for drilling small holes
high speed; well fitted, suitable for
Bicycle makers and others.

To drill holes up to $\frac{1}{8}$ in. diameter
by foot or steam.

Spindle, $\frac{1}{2}$ in. diameter. Adjust-
able bearings, balanced lever.

PRICES:—For foot, 130/-

For foot and steam, 140/-

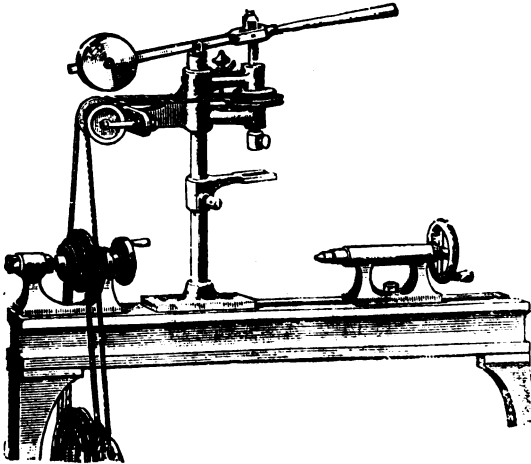
Without stand, 57/6

Set of drills, 15/9

The Britannia Engineering Co., Ltd., Colchester, England.

DRILLING MACHINE FOR LATHE,

No. 160.



THIS can be used on any ordinary Lathe, and driven either from below on a treadle lathe or from an overhead. This is a useful tool.

PRICE from £2 2 0

BENCH DRILL, No. 150.

SIZE A.

Weight 25 lbs. ... Drill $\frac{1}{2}$ holes.

30/-

SIZE C.

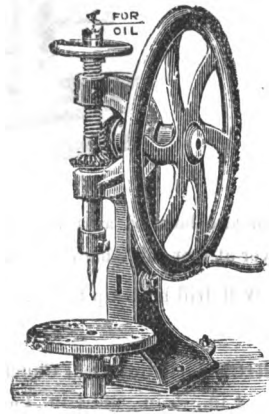
Weight 80 lbs. ... Drill $\frac{3}{4}$ holes.

45/-

SIZE E.

Weight 150 lbs. ... Drill $1\frac{1}{2}$ holes.

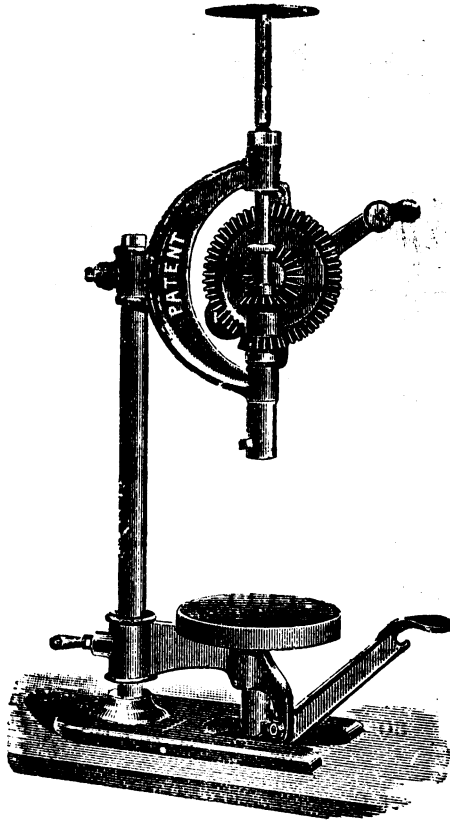
80/-



The Britannia Engineering Co., Ltd., Colchester, England.

BENCH & BREAST DRILL,

No. 130.



Can also be used as a Brace by taking it off the pillar. By pressing the lever at foot the table is raised.

Will drill holes up to $\frac{1}{8}$ in. diameter. Takes $7\frac{1}{2}$ in. diameter.

PRICE, including Drill Chuck to grip up to $\frac{1}{4}$ in., and $\frac{1}{16}$ in.,
 $\frac{1}{8}$ in., $\frac{3}{16}$ in., and $\frac{1}{2}$ in. Twist Drills £1 10 0

The Britannia Engineering Co., Ltd., Colchester, England.

UNION BENCH DRILL, No. 120.

THE standard is very rigid and is made to move radially on the base, a provision which gives great scope and convenience in use.

The table is carried on a slotted armand can be revolved and moved to and fro in the slot so that any part of the table can be brought under the drill.

It has two rates of speed, obtained by means of two sets of bevel wheels, the pinions of which are caused to be in or out of gear by turning the eccentric lever controlling them.

The feed is self acting.

It is also made single speed, with or without self-acting feed.

Suitable vice can be supplied when desired.

DIMENSIONS.

Will drill up to 1 in. diameter, and 3½ in. in depth.

Distance between the drill spindle and table, 12 in.

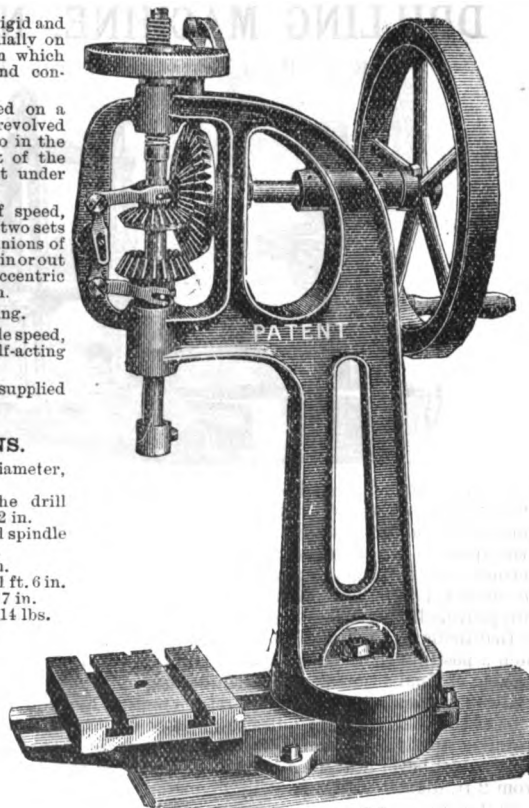
Distance between drill spindle and standard, 6½ in.

Total height, 2 ft. 9 in.

Diam. of hand wheel, 1 ft. 6 in.

Size of table, 7 in. by 7 in.

Weight, about 1 cwt. 14 lbs.



PRICES.

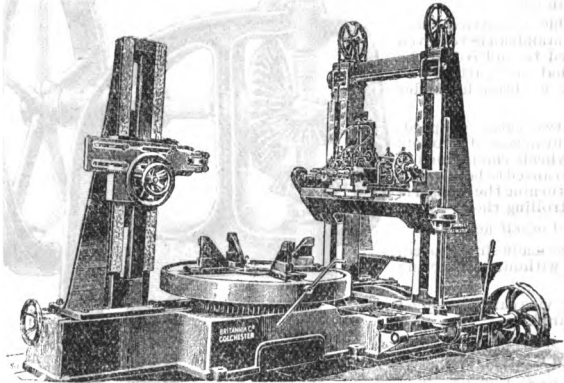
Double Speed, Self-acting Feed	...	...	...	£4	5	0
Single	"	"	"	3	17	6
"	"	(not Self-acting)	"	3	15	0
Drill Vice (A), width of jaw, 2½ in.; opening, 3½ in.	...	...	...	0	15	6
" (B), " " 3¼ in.; " 6¼ in.	...	...	...	1	2	6
Extra for longer Shaft, with fast and loose Pulley and Belt Guide	...	...	...	0	17	6
" " " 3-speed Cone, and Countershaft with fast and loose Pulley (giving 6 speeds on Drill), and including the Hand wheel	...	...	...	1	12	6

When the Hand-wheel is not needed, 2/6 is allowed.

The Britannia Engineering Co., Ltd., Colchester, England.

BOILER FLUE OR BOILER SHELL DRILLING MACHINE, No. 30.

NOTE—No Boiler Maker should be without this.



THIS machine is designed to economically drill Boiler Flues or Shells. It is of special design and very massive construction, arranged with three or more horizontal spindles, carried on strong housings. The cross slide on which drill spindles are adjusted is counterbalanced by weights, and is traversed vertically by bevel gearing by hand. The two outside drill spindle carriages are adjusted together horizontally to varying pitches from $1\frac{1}{2}$ in., and are also provided with swivelling arrangement to suit diameters of flues or shells, so that drills always point to centre of same. Centre drill carriage is fixed in such a position that spindle always points to centre line of flue or shell, but is capable of final adjustment. Each drill spindle is provided with self-acting feed-motion, and also with quick return motion by hand, each being independent of the other. All spindles can also be fed or withdrawn simultaneously. Circular work table, arranged with four jaws all moved together by screws and central bevel gear, forming a large universal chuck, which will grip work from 2 ft. diameter to 4 ft. 6 in. diameter. Dividing appliance is fitted to work table for dividing circle into required number of holes. All handles for performing the foregoing operations are placed within easy reach of operator when standing on platform provided on machine. Machine will drill holes at a distance of from 7 in. to 5 ft. above top of work table. Back stay, carrying two rollers, is arranged at opposite side to drill housings, with vertical and horizontal adjustment to suit diameters of flues or shells. The whole is mounted on a strong substantial base 15 in. deep, the best material and workmanship being used throughout. All exposed gearing is covered to meet the requirements of the Factory Act.

Driving pulleys, 24 in. by 4 in. Speed, 120 revolutions per minute.
Approximate weight, 8 tons.

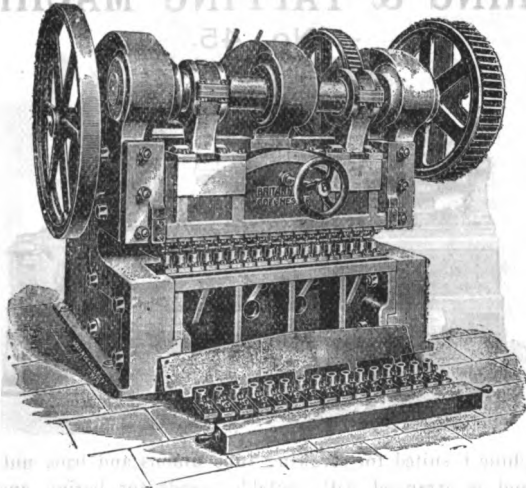
PRICE, complete £397 10 0

Larger machines with vertical standard carrying drill spindles for drilling longitudinal seams, are also made. Particulars and Prices on application.

The Britannia Engineering Co., Ltd., Colchester, England.

MULTIPLE PUNCHING MACHINE,

No. 46.



THIS Machine has been designed to operate on boiler casing work, and is of very strong construction. It is made to punch plate without any previous setting out. The punches are arranged to the required pitch at any position along face of slide, all holes being punched at one time. Punch slide is fitted with disengaging motion enabling the slide to remain at rest, when in top position, whilst machine is still running, allowing plate to be taken out and replaced, or advanced for another operation. The machine consists of three strong hollow box casting uprights, braced rigidly together by cast iron girder at bottom and stay girders at back, which carries intermediate bearings for shafts. The punch slide is operated by very strong eccentric shaft through powerful double gearing, and on end of first motion shaft is keyed a fly-wheel of large diameter. The whole machine is well made, thoroughly efficient and rigid in all its members.

DIMENSIONS.

Machine will punch 18 holes $\frac{1}{2}$ in. diameter through $\frac{1}{2}$ in. plate.

Will take plates up to 4 ft. wide at one operation.

Depth of gap, 14 in.

Gearing, first pair—1 $\frac{1}{2}$ in. pitch, 3 $\frac{1}{2}$ in. face, wheel 27 in. diameter, pinion (cast steel) 5 $\frac{1}{2}$ in. diameter.

Gearing, second pair—1 $\frac{1}{2}$ in. pitch, 5 $\frac{1}{2}$ in. face, wheel 34 $\frac{1}{2}$ in. diameter, pinion (cast steel) 7 in. diameter.

Teeth of all gearing shrouded to pitch circle.

Fly-wheel, 5 ft. by 4 in.

Pulleys, 2 ft. by 5 in.

Speed of pulleys, 370 revolutions per minute.

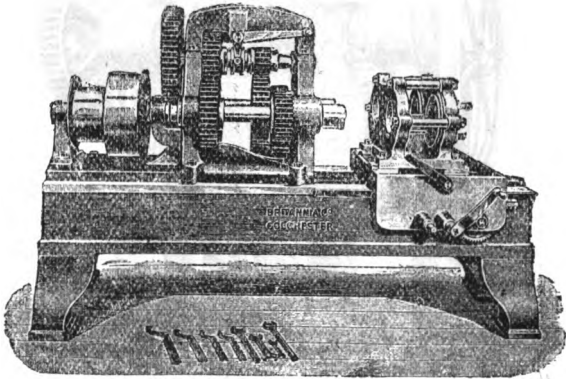
Approximate weight, 7 tons.

PRICE £240 0 0

Not cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

DOUBLE SPINDLE BORING & TAPPING MACHINE, No. 45.



THIS Machine is suited for screwing tube unions and back nuts and like articles, and is arranged with suitable speeds for boring and tapping. Articles being operated upon are gripped in two suitable vices mounted on a saddle, and are first bored by the two spindles having a boring head on each. The boring heads are then replaced by two taps, and articles are then tapped, so that after the work is once fixed in vices it is finished before being removed from same. The changing of the speeds of the spindles from boring to tapping is easily effected by means of a balanced lever in front of machine operating a clutch which gears up either the one or the other speed. The saddle carrying the two vices is moved along bed by strong steel feed screw driven through gearing from spindle and is fitted with a long double disengaging gun-metal clasp nut.

DIMENSIONS.

Will bore and tap up to $4\frac{1}{2}$ in. inside diameter.

Traverse of saddle along bed, 17 in.

Feed screw, 3 in. diameter.

Bed, 7 ft. 6 in. long by 24 in. across face by $12\frac{1}{2}$ in. deep.

Gearing, 1 in. pitch, 3 in. face, machine cut teeth.

Cone pulley, 2 speeds, 6 in. face, 16 in. and $10\frac{1}{2}$ in. diameter.

Countershaft pulleys, 18 in. diameter by 6 in. face.

Speed of ditto, 140 revolutions per minute.

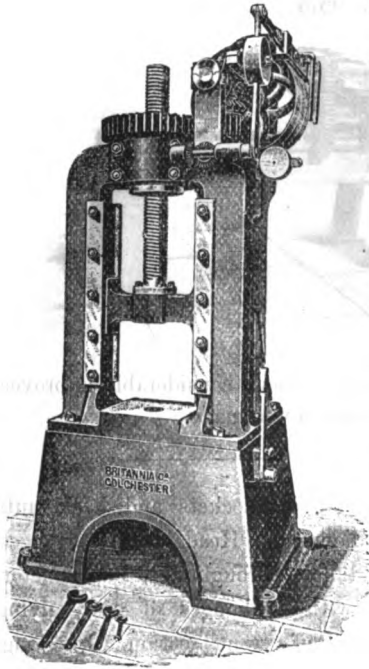
Approximate weight, 55 cwt.

PRICE £148 10 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

DRIFTING MACHINE, No. 48.



THIS is a specially designed machine for drifting the holes in boiler tube junction boxes, and is also suitable for varied work of a similar character.

Machine consists of strong box casting upright mounted on box base and is driven by open belt through strong gearing fitted with reversing motion. The strong thrust screw is fitted at one end with square flange and neck, to which is bolted a slide block arranged to slide in guide ways on upright frame. At top of frame is fitted a thrust bearing of sufficient area to amply distribute the pressure. This bearing has loose cap, so that by removing same together with slide block strips, the screw with its attachments can be taken out complete. Automatic reversing motion is arranged by means of tappet rod and adjustable tappets, thus allowing the traverse of slide block to be varied to any desired stroke up to 24 in. Starting handle is placed in a convenient position for operator.

DIMENSIONS.

Diameter of thrust screw, 4 in. by $1\frac{1}{4}$ in. pitch, double thread.
 Gearing, $1\frac{1}{4}$ in. pitch, $3\frac{1}{2}$ in. face; wheel, 20 in. diam.; pinion, $6\frac{1}{2}$ in. diam.
 Pulleys, 20 in. diam. by 4 in. face.
 Maximum stroke, 24 in.
 Total height, 8 ft.
 Speed of pulleys, 230 revolutions per minute.
 Approximate weight, 42 cwt.

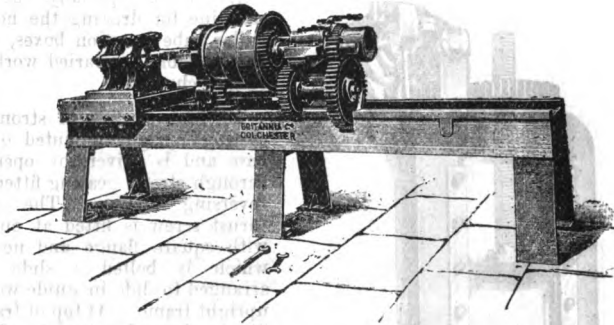
PRICE £86 10 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

TAPPING MACHINE.

No. 63.



NOTE.—The design of this tool has been considerably improved since this illustration was made.

This Machine is designed for tapping sockets and back nuts for tubes up to $4\frac{3}{4}$ in. outside diameter. Headstock is arranged with hollow mandrel with bored hole throughout 6 in. diameter, and has 3 speed cone pulley with 2 changes of gear, giving 6 changes of speed. Straight bed of strong section 10 ft. long, carrying saddle provided with gripping jaws for securely holding the work. Saddle has self-acting feed by screw, and disengaging double gun-metal nut, and also quick hand traverse by rack and pinion, and large hand wheel at front. Tapping spindle carrying taps is fitted at front end of spindle.

Overhead pulleys, $17\frac{1}{2}$ in. by 5 in.

Speed, 140 revolutions per minute.

Approximate weight, 39 cwt.

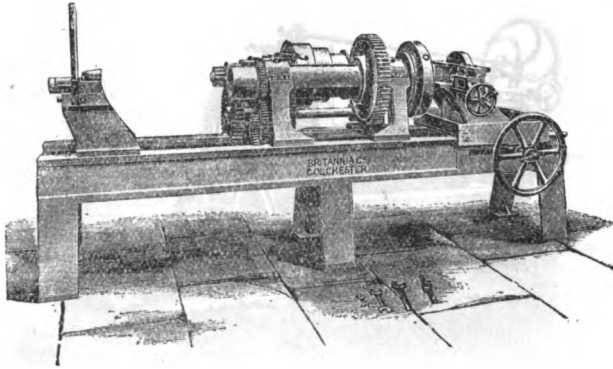
PRICE **£95 10 0**

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

PARTING-OFF MACHINE

No. 62.



NOTE.—The design of this tool has been considerably improved since this illustration was made.

THIS Machine is adapted for cutting-off tubes up to 6 in. outside diameter. Headstock is arranged with hollow mandrel with bored hole throughout, and has 3-speed cone pulley with 2 changes of gear, giving 6 changes of speed. Straight bed of strong section 10 ft. long, carrying saddle with parting-off rest. Saddle has self-acting feed by screw and disengaging double gun-metal nut, and also quick hand traverse by rack and pinion, and large hand wheel at front. 3-jaw independent chuck for gripping the work is provided at front end of mandril, and at tail end of bed is arranged a back support for carrying the end of tube.

Overhead pulleys, $17\frac{1}{2}$ in. by 5 in.

Speed, 140 revolutions per minute.

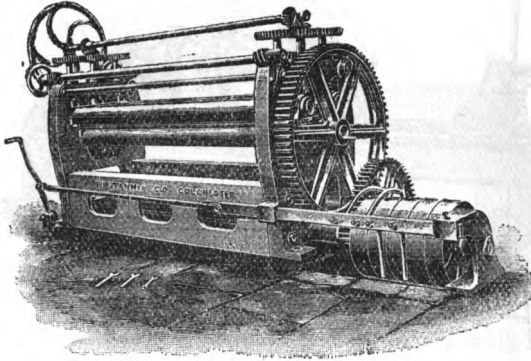
Approximate weight, 39 cwt.

PRICE **£93 10 0**

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

PLATE STRAIGHTENING MACHINES.



THESE Machines are of very strong construction and neat design, arranged with seven rolls, carried in bearings in two end uprights. The top set of four rolls can all be adjusted together vertically by screws and gearing, the centre pair can also be adjusted together, and the outer pair has independent adjustment. The end uprights are braced together by two girders at bottom and two wrought-iron stay rods at top. The driving motion is conveyed to rollers through double gear and quick motion for reversing. The belt shifting handle and all hand wheels for adjusting rollers are conveniently placed at one end of machine within easy reach of operator.

The machines are well constructed, the best material being used, and fitted with steel rolls.

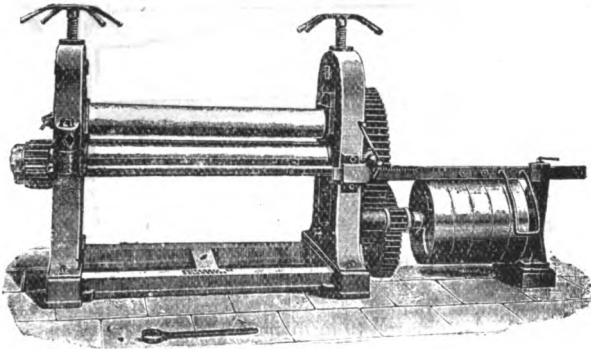
No.	Width of Plates.		Thick-ness.	Diameter of Rolls.	Driving Pulleys.		Speed. Revols per minute.	Approx. Weight.	PRICE.		
	ft.	in.			in.	in.			in.	in.	£	s.	d.
45	4	6	$\frac{3}{8}$	$5\frac{1}{2}$	18	4	370	75	146	10	0
	6	0	$\frac{1}{4}$	$5\frac{1}{2}$	18	4	370	85	155	0	0
49	6	6	$\frac{1}{4}$	6	20	4	350	102	165	0	0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.]

IMPROVED PLATE BENDING MACHINE, No. 51.

MADE IN TWO SIZES.



OF modern construction and heavy build. Rollers are of mild steel mounted in cast iron box section framings, and driven by powerful gearing and belt pulleys. The whole is mounted on a cast iron bed plate extending the full length. The spur pinions on the end of bottom rollers are of cast steel and made very strong, being capped on each side. The whole of the driving motion is arranged at one end of the machine; the other end is entirely free, the framing being made in halves and firmly held together by hinged bolts. The top part is arranged to swing out of the way to allow of rings and tubes being easily removed from the top roller. The whole machine is well made and rigidly constructed.

DIMENSIONS.

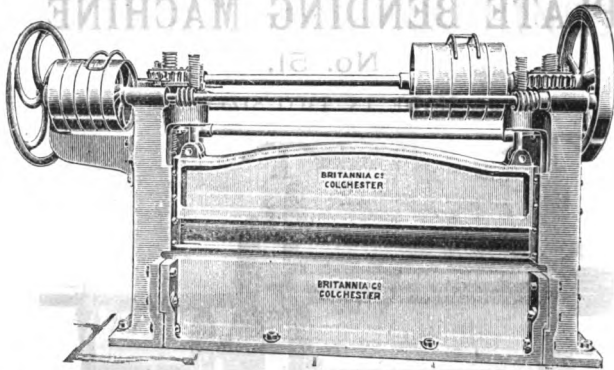
Diameter of rollers, $6\frac{1}{2}$ in.
 Gearing— $1\frac{1}{2}$ in. pitch, $4\frac{1}{2}$ in. face; large wheel,
 30 in. diameter; pinion, 6 in. diameter.
 Pulleys, 18 in. by 4 in.
 Speed, 200 revolutions per minute.
 Approximate weight, 41 cwt.

PRICE, to bend plates 4 ft. wide and up to $\frac{1}{2}$ in. thickness £77 10 0
 „ „ 6 ft. „ „ $\frac{1}{2}$ in. „ „ 84 0 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The **Britannia Engineering Co., Ltd.**, Colchester, England:

PLATE FLANGING MACHINE.



THIS is a very heavy and strongly constructed machine made in two sizes, and consisting of two end uprights rigidly braced together by box stay casting at bottom, and wrought iron stay rod at top. In these uprights are sliding blocks carrying the flanging roll (9 in. diameter) which is raised and lowered by powerful worm gearing and screws. The clamping girder for gripping plate is raised and lowered in a similar manner. Both of these operations are driven by power by open and cross belts. The whole machine is arranged in a rigid manner.

DIMENSIONS.

No. 40.

To flange plates, 6 ft. wide, $\frac{3}{4}$ in. thickness.

Flanging roll driving pulleys, 18 in. by 4 in. Speed, 250 revolutions per minute.

Fly-wheel, 3 ft. diameter, 3 in. face.

Clamping girder driving pulleys, 15 in. by 2 $\frac{1}{2}$ in. Speed, 200 revolutions per minute.

Flanging roll worm gearing, 1 $\frac{1}{2}$ in. pitch, 11 in. diameter, 3 in. face.

Clamping girder worm gearing, 1 in. pitch, 8 in. diameter, 2 in. face.

Approximate weight, 4 $\frac{1}{2}$ tons.

PRICE £142 10 0

No. 50.

To flange plates 6 ft. 6 in. wide by $\frac{1}{2}$ in. thickness.

Flanging roll driving pulleys, 18 in. by 4 in. Speed, 250 revolutions per minute.

Fly-wheel, 3 ft. diameter, 3 in. face.

Clamping girder driving pulleys, 15 in. by 2 $\frac{1}{2}$ in. Speed, 200 revolutions per minute.

Flanging roll worm gearing, 1 $\frac{1}{2}$ in. pitch, 11 in. diameter, 3 in. face.

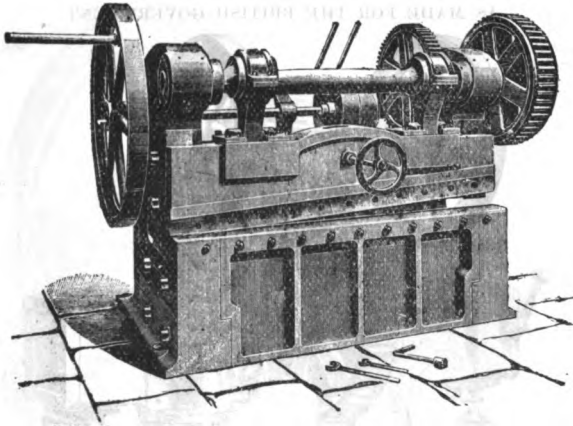
Clamping girder worm gearing, 1 in. pitch, 8 in. diameter, 2 in. face.

Approximate weight, 4 $\frac{1}{2}$ tons.

PRICE £151 10 0

The Britannia Engineering Co., Ltd, Colchester, England.

DOUBLE-GEARED PLATE SHEARING MACHINE.



POWERFUL double-g geared Machine of very strong construction, consisting of two hollow box casting end uprights, to which are bolted bottom shear blade girder, and top shear blade slide plate. The shear blade slide is driven by eccentric shaft and toggles, and is provided with stop motion, enabling shears to be stopped at any time while machine is still running. The driving motion is conveyed to eccentric shaft through powerful double-gearing, and on end of first motion shaft is keyed a fly-wheel of large diameter. The whole machine is well braced and stayed together, and is made in four sizes as specified below.

Gearing—1st pair, $1\frac{1}{4}$ in. pitch, $3\frac{1}{2}$ in. face.
2nd pair, $1\frac{3}{4}$ in. pitch, 5 in. face.

No.	To Shear.		Diam. of Crank- shaft.	Driving Pulleys.	Fly- wheel.		Speed of Counter- shaft.	Weight.	PRICE.			
	Wide.	Thick.			ft.	in.			Tons.	£	s.	d.
42	3	0	$\frac{1}{2}$	5 $\frac{1}{2}$	20 × 5	4 × 3 $\frac{1}{4}$	260	5	160	0	0	
43	4	6	$\frac{3}{8}$	4 $\frac{1}{2}$	18 × 5	4 × 3 $\frac{1}{4}$	250	5 $\frac{1}{2}$	167	10	0	
44	6	0	$\frac{1}{4}$	4 $\frac{1}{2}$	18 × 5	4 × 3 $\frac{1}{4}$	250	6	176	10	0	
47	6	6	$\frac{1}{4}$	5 $\frac{1}{2}$	20 × 5	4 × 3 $\frac{1}{4}$	260	6 $\frac{1}{2}$	191	10	0	

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED DOUBLE-ENDED PUNCHING AND SHEARING MACHINES.

AS MADE FOR THE BRITISH GOVERNMENT.

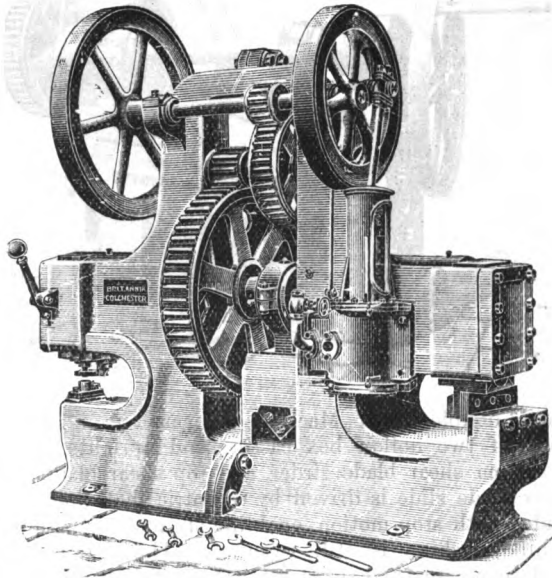


ILLUSTRATION shows our No. 34 and 37 Improved Double-ended Punching and Shearing Machines. the No. 34 not being supplied with engine. Shear blades are set at an angle for shearing long bars. Disengaging motion to punch and angle shears, and can also be fitted, if required, to straight shears. Gearing in No. 37 Machine is shrouded on both sides to pitch line as shown. Dimensions of Engine fitted to No. 37 Machine:—Cylinder, 7 in. diameter; stroke, 10 in.; engine fly-wheel, 32 in. diameter, 4 in. face.

N. 37.

DIMENSIONS.

No. 34.

Punch $\frac{1}{2}$ in. holes through $\frac{1}{2}$ in. plates and shear $\frac{1}{2}$ in. plates.

Angle iron shears for $4\frac{1}{2}$ in. by $4\frac{1}{2}$ in. by $\frac{1}{2}$ in.

Depth of gulleets, 18 in. each.

Shear blades, 12 n. wide.

Fly-wheel, 3 ft. 3 in. diam., 4 in. face.

Gearing—1st pair, pinion $7\frac{1}{2}$ in. diam., wheel 22 $\frac{1}{2}$ in. diam., 1 $\frac{1}{2}$ in. pitch, $4\frac{1}{2}$ in. face.

2nd pair, pinion $8\frac{1}{2}$ in. diam.,

wheel 41 in. diam., 2 $\frac{1}{2}$ in.

pitch 6 in. face.

Diameter of steel eccentric shaft, $5\frac{1}{2}$ in.

Length of machine over all, 8 ft. 8 in.

Height " " 8 ft. 3 in.

Approximate weight, 6 tons.

PRICE, with Engine £177 10 0

Without Engine 160 0 0

Punch $\frac{1}{2}$ in. holes through $\frac{1}{2}$ in. plates and shear $\frac{1}{2}$ in. plates.

Angle iron shears for $3\frac{1}{2}$ in. by $2\frac{1}{2}$ in. by $\frac{1}{2}$ in.

Depth of gulleets, 14 in. each.

Shear blades, 10 in. wide.

Fly-wheel, 2 ft. 7 in. diam., 3 $\frac{1}{2}$ in. face.

Gearing—1st pair, pinion $5\frac{1}{2}$ in. diam., wheel 18 in. diam., 1 $\frac{1}{2}$ in. pitch, 3 $\frac{1}{2}$ in. face.

2nd pair, pinion $7\frac{1}{2}$ in. diam.,

wheel 30 in. diam., 1 $\frac{1}{2}$ in.

pitch, $4\frac{1}{2}$ in. face.

Diameter of steel eccentric shaft, $3\frac{1}{2}$ in.

Length of machine over all, 6 ft. 6 in.

Height " " 6 ft. 1 in.

Driving pulleys, 20 in. " 4 in.

Speed, 150 revolutions per minute.

Approximate weight, 4 $\frac{1}{2}$ cwt.

PRICE £87 10 0

The Britannia Engineering Co., Ltd., Colchester, England.

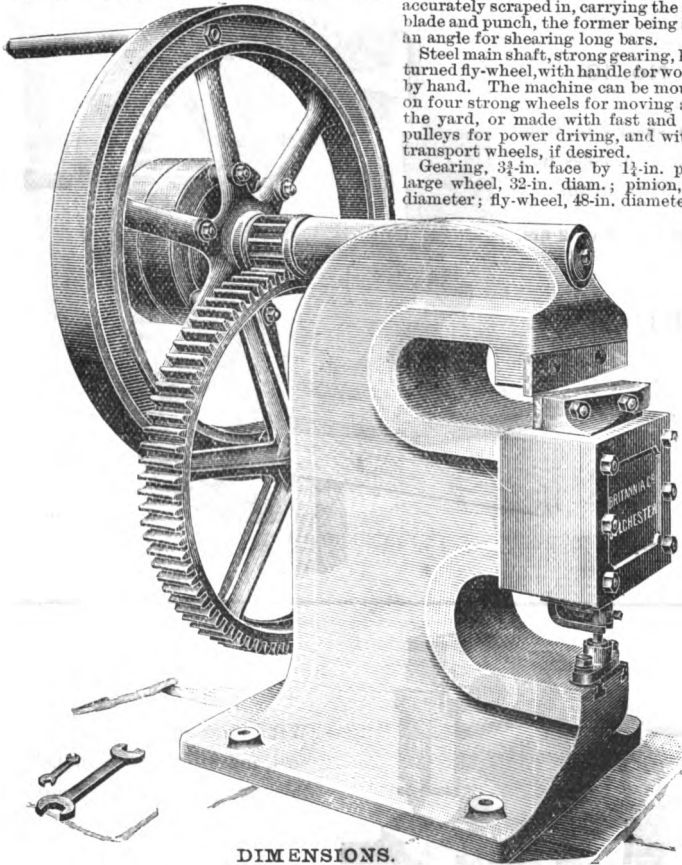
IMPROVED PUNCHING & SHEARING MACHINES.

AS MADE FOR THE BRITISH GOVERNMENT.

The illustration represents a very handy punching and shearing machine of improved construction, powerfully geared, single ended, shearing above and punching below. The body is a strong box casting, with thick beads round the gullets, and fitted with slide, accurately scraped in, carrying the shear blade and punch, the former being set at an angle for shearing long bars.

Steel main shaft, strong gearing, heavy turned fly-wheel, with handle for working by hand. The machine can be mounted on four strong wheels for moving about the yard, or made with fast and loose pulleys for power driving, and without transport wheels, if desired.

Gearing, 3 $\frac{1}{2}$ -in. face by 1 $\frac{1}{2}$ -in. pitch; large wheel, 32-in. diam.; pinion, 6-in. diameter; fly-wheel, 48-in. diameter.



DIMENSIONS.

	No. 33.	No. 36.
To punch in diameter ...	$\frac{1}{2}$ in.	$\frac{1}{2}$ in.
Thickness of plate to punch ...	$\frac{1}{2}$ in.	$\frac{1}{2}$ in.
Thickness of plate to shear ...	$\frac{1}{2}$ in.	$\frac{1}{2}$ in.
Thickness of square and round bars to shear ...	$\frac{1}{2}$ in.	$\frac{1}{2}$ in.
Depth of gullets { ...	to punch 6 $\frac{1}{4}$ in.	to punch 10 in.
	to shear 6 $\frac{1}{4}$ in.	to shear 11 in.
Pulleys ...	14 in. by 3 in.	15 in. by 3 in.
Speed ...	120 revs. per minute.	130 revs. per minute.
Approximate weight ...	19 cwt.	25 cwt.
PRICE, for hand power only ...	£23 10 0	£32 0 0
Hand and steam power ...	25 0 0	33 10 0

For larger or smaller sizes send for quotations.

The Britannia Engineering Co., Ltd., Colchester, England.

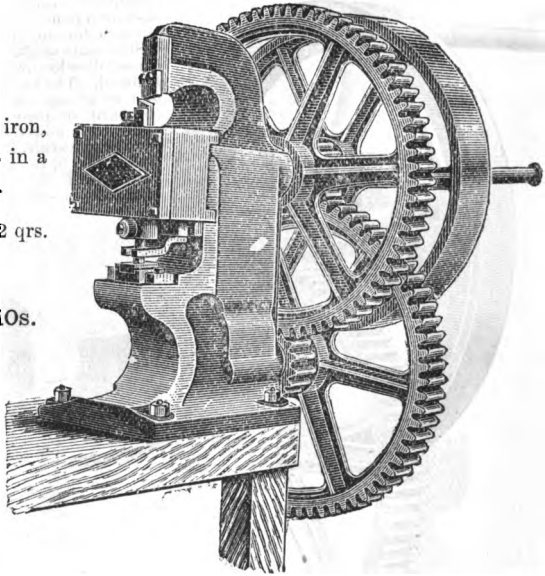
SHEARING & PUNCHING MACHINES.

No. 16.

WILL shear $\frac{3}{8}$ in. iron,
punch $\frac{3}{8}$ in. holes in a
circle $9\frac{1}{2}$ in. diam.

Weight, 10 cwt. 2 qrs.

PRICE, £22 10s.

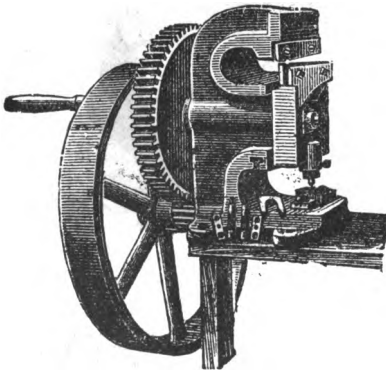


No. 15.

WILL shear iron $\frac{1}{4}$ in. in thick-
ness, and will punch $\frac{3}{8}$ in. holes
through $\frac{1}{4}$ in. iron, in a circle
 $9\frac{1}{2}$ in. diameter.

Weight, 3 cwt.

PRICE ... £8 10s.

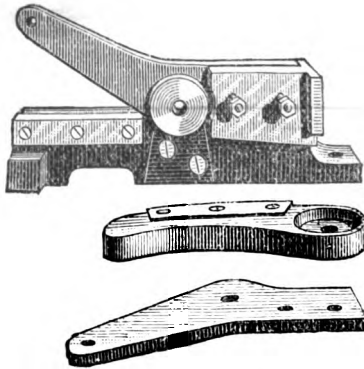


Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

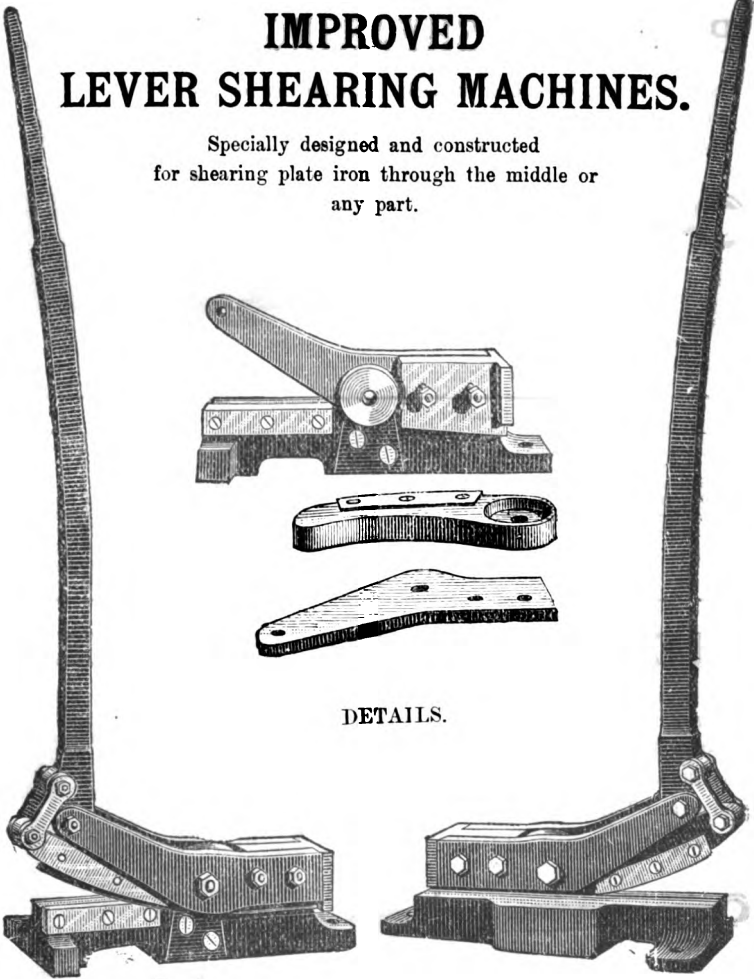
The Britannia Engineering Co., Ltd., Colchester, England,

IMPROVED LEVER SHEARING MACHINES.

Specially designed and constructed
for shearing plate iron through the middle or
any part.



DETAILS.



Back.

Front.

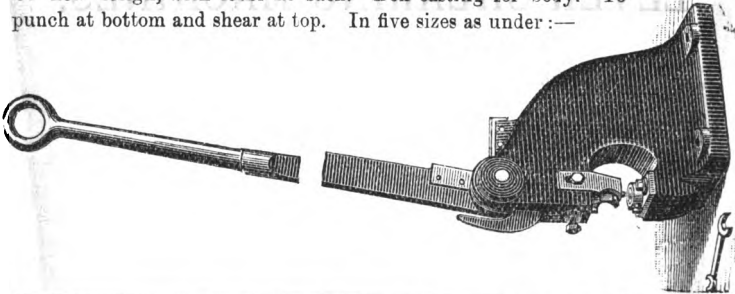
	Number	OO	OOa	O	Oa	1	1A	2	3
Thickness to shear	in.	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
Length of blades	„	6	9 $\frac{1}{2}$	8	12 $\frac{1}{2}$	9 $\frac{1}{2}$	9 $\frac{1}{2}$	10	10
Approximate weight,	lbs.	36	64	100	150	175	360	600	800
PRICE ...	...	67/3	80/-	100/-	121/9	155/-	277/6	450/-	545/-
„ extra blades	...	8/6	12/6	15/3	16/9	21/-	23/6	25/3	63/-

NOTE.—No. 2 has a counterweight.

The Britannia Engineering Co., Ltd., Colchester, England.

PUNCHING & SHEARING MACHINES

Of new design, with lever at back, Box casting for body. To punch at bottom and shear at top. In five sizes as under:—

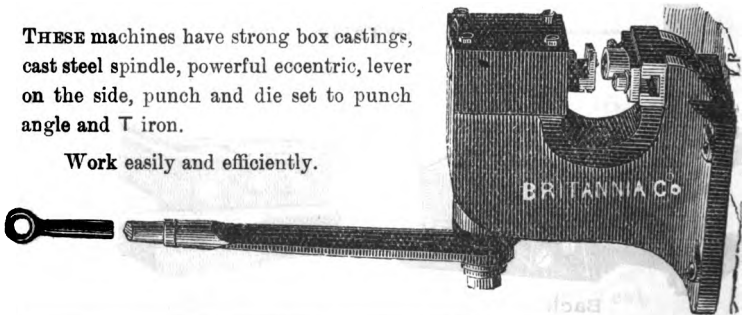


	Number	21	22	23	24	25
Largest diameter to punch	in.	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
Thickness to punch	... ..	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$
Width and thickness to shear	... ..	$\frac{1}{2}$ by $\frac{1}{8}$	$\frac{3}{4}$ by $\frac{1}{4}$	1 by $\frac{1}{8}$	$1\frac{1}{2}$ by $\frac{3}{8}$	$1\frac{1}{2}$ by $\frac{1}{2}$
Distance from body to punch	... ..	$1\frac{1}{2}$	$2\frac{1}{2}$	3	$3\frac{1}{2}$	$3\frac{1}{2}$
Approximate weight	... lbs.	23	55	92	146	182
PRICE		42/-	52/6	67/3	92/6	113/6
" extra punches	... ..	1/-	1/6	1/6	2/3	2/3
" dies	... ..	1/6	1/6	1/6	2/3	2/6
" blades	... ..	5/3	5/3	5/9	6/9	7/-

LEVER PUNCHING MACHINES.

THESE machines have strong box castings, cast steel spindle, powerful eccentric, lever on the side, punch and die set to punch angle and T iron.

Work easily and efficiently.



	Number	1	2	20	4
Will punch diameter	... in.	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{1}{2}$
Through plates	... ..	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
Depth of gap	... ..	3	4	$4\frac{1}{2}$	$1\frac{1}{2}$
Weight	... ..	1 cwt.	2 cwt.	3 cwt.	28 lbs.
PRICE		84/-	117/6	190/-	33/6
" extra punches	... ..	1/-	1/3	1/6	1/-
" dies	... ..	1/6	1/9	2/-	1/3

The Britannia Engineering Co., Ltd., Colchester, England.

LEVER SHEARING MACHINE, No. 11.

To cut sheet iron up to $\frac{1}{4}$ in. by $3\frac{1}{2}$ in. wide. Round or square bars up to $\frac{1}{8}$ in.

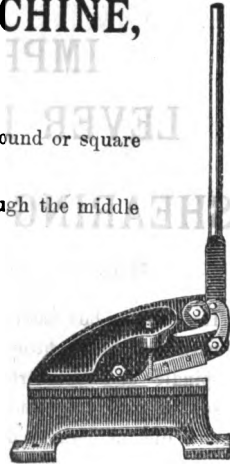
Has a solid casting, and guide; will cut through the middle of sheet iron.

Weight, 60 lbs.

Length of blades, 6 in.

PRICE 42/-

Extra Shears, 7/-



LEVER SHEARING MACHINE, No. 12.

HAS a solid casting, a forged upper jaw, with guillotine at one end and guide.

Will cut $\frac{1}{4}$ in. sheets and round bars up to $\frac{1}{2}$ in.

Weight, $2\frac{1}{2}$ cwt.

Length of shears, 8 in.

PRICE £7 7 0

„ Extra Shears 0 3 3

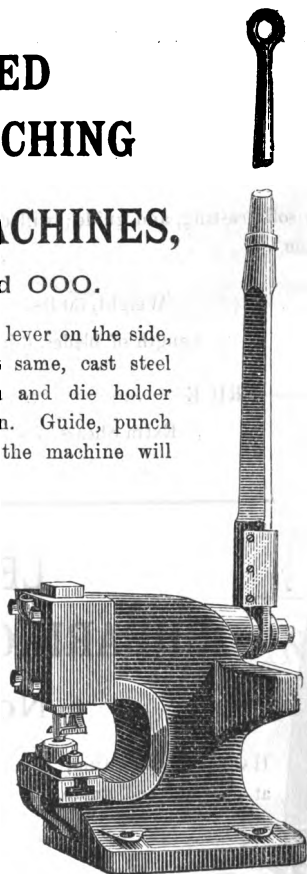


The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED LEVER PUNCHING AND SHEARING MACHINES,

Nos. O, OO, and OOO.

HAS strong box castings, with lever on the side, with top blade fitted against same, cast steel spindle and eccentric, punch and die holder set to punch \perp and \equiv iron. Guide, punch and die, of largest diameter the machine will punch.

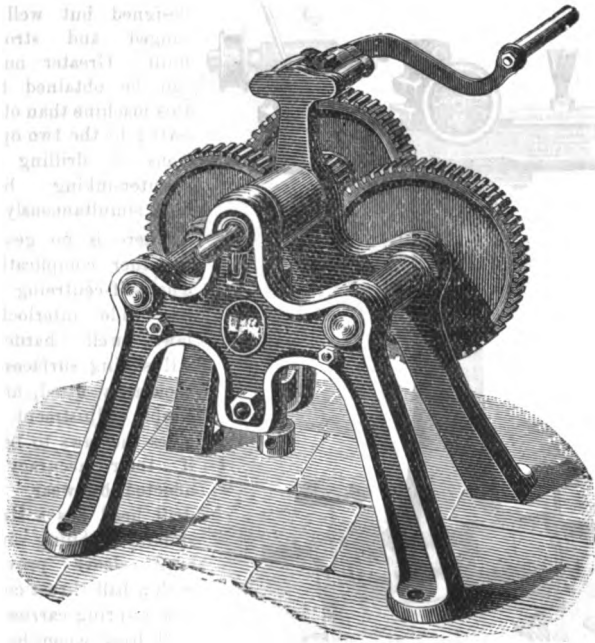


Number	O	OO	OOO
To punch holes diameter ...	$\frac{5}{16}$ in.	$\frac{3}{8}$ in.	$\frac{1}{2}$ in.
Through plates ...	$\frac{3}{16}$ in.	$\frac{1}{4}$ in.	$\frac{5}{8}$ in.
Shear bars thick ...	$\frac{3}{16}$ in.	$\frac{1}{4}$ in.	$\frac{1}{2}$ in. hoops.
Admitted at gap ...	$2\frac{3}{8}$ in.	$3\frac{1}{2}$ in.	$1\frac{1}{2}$ in.
Weight ...	50 lbs.	100 lbs.	30 lbs.
PRICE ...	54/6	92/6	42/-
Extra punches and dies, per pair	2/-	2/9	2/-
„ pair of blades ...	5/3	7/-	5/3

The Britannia Engineering Co., Ltd., Colchester, England.

TYRE, BENDING MACHINES.

For Hand and Steam Power.



IF FITTED FOR HAND AND STEAM POWER £1 11 0 EXTRA.

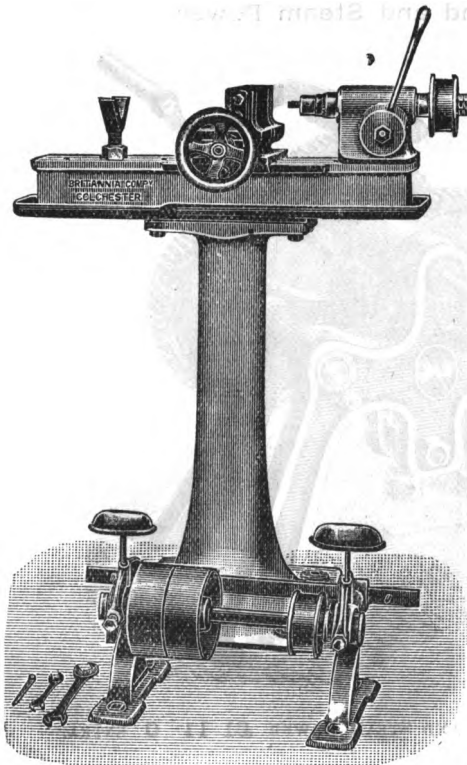
HAVE solid cast iron frames and extra powerful gearing. The cylinders are of wrought iron, case hardened, the outside ones are fluted; pressure by screw underneath. Warranted to bend a bar to any desired sweep by once going through. A welded tyre can be replaced in the machine for finishing by drawing out the top spindle and removing the cylinder.

These machines are used all over the world, and are recommended to be durable and more efficient than any other machine of this kind; very little power required to work them.

NUMBER OF MACHINES.	6	6a	7	8
Warranted to bend bars ..	4½ in. by 1½ in.	6 in. by 1½ in.	6 in. by 1½ in.	7 in. by 1½ in.
Weight	3½ cwt.	3½ cwt.	5 cwt.	6 cwt.
PRICE	£7 7 0	£8 0 0	£10 10 0	£11 2 6

The Britannia Engineering Co., Ltd., Colchester, England.

CENTREING MACHINE.



SINGLE Spindle Centreing Machine, simply designed but well arranged and strongly built. Greater output can be obtained from this machine than others owing to the two operations of drilling and countersinking being done simultaneously.

There is no gearing or other complications. The self-centreing vice has wide interlocking jaws well hardened. All sliding surfaces are accurately fitted, and a simple adjustment enables the jaws to be set if their accuracy be affected by wear. The drill head has a strong spindle running in a long sleeve provided with a ball thrust collar, and a spring carries the drill back when handle is released. The special drills can be readily sharpened on an emery

wheel and will last a considerable time. The bed of machine is surrounded with a suds tray and also a separate shelf for holding work, etc. The whole is mounted on a strong substantial column and will centre bars up to $2\frac{1}{2}$ in. diameter.

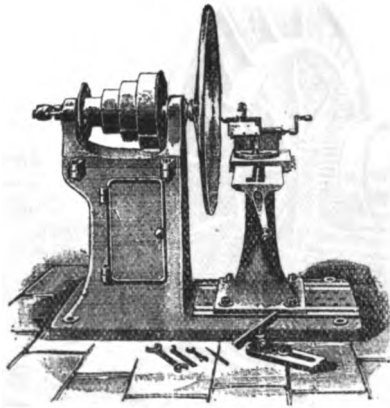
Overhead pulleys, 5 in. by 2 in. Speed, 300 revolutions per minute.
Approximate weight, 3 cwt.

PRICE, complete, with Overhead Motion, Spanners, etc. £15. 0. 0 .

The Britannia Engineering Co., Ltd., Colchester, England.

PATTERN MAKER'S FACE LATHE,

No. 34.



THIS lathe is specially adapted for pattern makers, for turning large pieces on face. It is arranged with strong headstock, having cone pulley of large diameter and wide speeds, steel spindle running in hard gun-metal conical bearings, adjustable to take up all wear, large face plate, with holes for attaching work.

Foundation plate with planed \perp slots is cast in one piece with pedestal, which has a door at side, forming a cupboard for tools, &c. On the foundation plate is carried a movable column, fitting and bolting down to foundation plate, with planed slide at top, on which is fitted, at option, either the hand rest or slide rest.

This is a very handy tool and will be found indispensable in the pattern maker's shop.

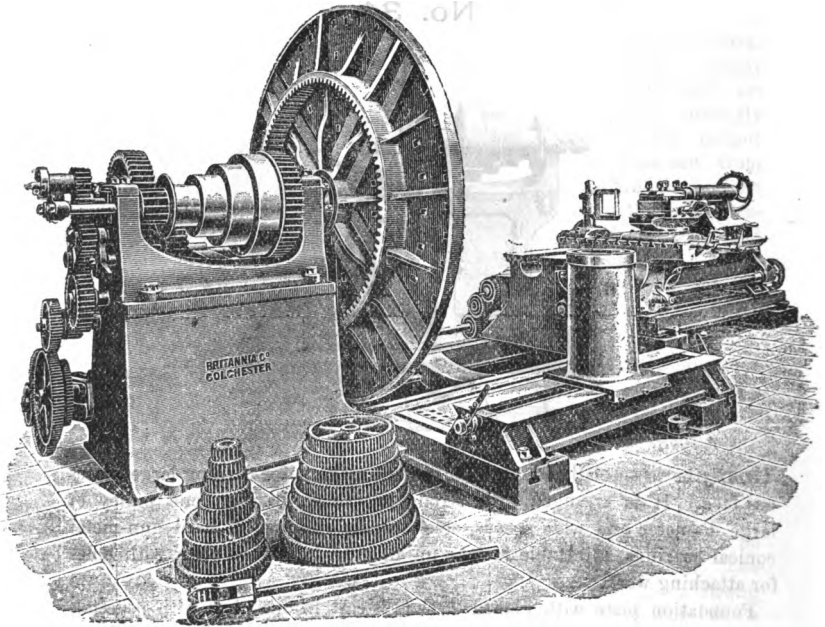
DIMENSIONS.

- Face plate, 3 ft. diameter, will turn in diameter 5 ft. 6 in.
- Cone pulley, 4 speeds, $3\frac{1}{2}$ in. wide; largest, 18 in. diameter; smallest, 5 in.
- Face plate, 4 ft. diameter, can be supplied.
- Overhead pulleys, $13\frac{1}{2}$ in. by 4 in.
- Speed, 320 revolutions per minute.
- Approximate weight, with small face plate, 14 cwt.

PRICE, complete, with 3 ft. face plate, hand rest, slide rest,				
overhead motion, spanners, &c.	...	...	...	£33 10 0
Complete, with 4 ft. face plate	...	...	...	38 0 0

The Britannia Engineering Co., Ltd., Colchester, England.

BREAK LATHE, No. 40.



AN 18 in. central treble-gear self-acting sliding, surfacing and screw-cutting Break Lathe with sliding bed. Headstock will work either single, double, or treble gear, fitted with strong gearing. Steel spindle with parallel necks of large diameter adapted for turning heavy work. The large face plate is geared by internal wheel and pinion and is bolted securely to large flange forged on spindle by bolts made to driving fit. The loose head is moved on planed base plate by screw and ratchet for adjusting the width of gap. The saddle is fitted with self-acting motion for sliding and surfacing from a back-shaft and has quick traverse by rack and pinion and is also fitted with double clam disengaging nut of ample length for screw cutting. Compound slide rest fitted to saddle arranged to swivel to any angle. The loose headstock or poppet is fitted with a slide on its face for taper turning. Base plate is fitted at side with slots carrying a short bed capable of being placed parallel with or at right angles to line of centre. On this short bed is mounted a pillar made to receive compound slide rest which is fed from disc at end of fast headstock through overhead to pawl and ratchet on rest screws.

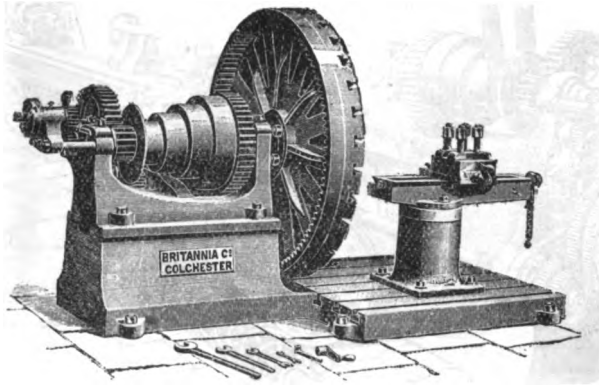
DIMENSIONS.

Height of centre, 18 in. Loose bed, 27 in. wide, 16½ in. deep, any length gap, maximum width in front of face plate, 6 ft. 6 in., take 16 ft. 6 in. between centres with 20 ft. bed when gap is closed. Turn in gap, 8 ft. 2 in. diameter. Cone 4 speeds 4 in. wide, largest 22½ in. diameter, smallest 9 in. diameter. Gearing, double, 1½ in. pitch, 4½ in. wide, wheel 21 in. diameter, pinion 7½ in. diameter, internal wheel 1½ in. pitch, 5 in. face. Bearings, front, 6 in. diameter by 9 in. long; back, 4 in. diameter by 6 in. long. Face plate either 6 ft. or 8 ft. diameter. Change wheels, ½ in. pitch, 2 in. face; leading screw, 3½ in. diameter, ½ in. pitch. Backshaft, 2½ in. diameter. Overhead motion, 24 in. by 6 in. Speed, 120 revolutions per minute. Approximate weight, with 20-ft. bed and 8 ft. diameter face plate, 13 tons.

PRICE, complete, with overhead, spanner, &c. ... £410 0 0

The Britannia Engineering Co., Ltd., Colchester, England.

POWERFUL TREBLE-GEARED
FACING & BORING LATHE. No. 32.



WITH 12½ in. centre headstock mounted on strong box section pedestal, cast in one piece with a strong foundation plate, latter truly planed and with T slots on its face, on which is securely bolted, but adjustable in position, a circular pillar, planed at bottom and turned at top, and fitted with a compound slide rest, with extra long slide.

The headstock is fitted with a steel mandrel with parallel necks, running in hard gun-metal bearings; the front end forged with a broad flange truly turned, and having bolted securely to it a strong well ribbed face plate with radial T slots and internal gear; and the tail end of mandrel fitted with a slotted disc, carrying an adjustable stud and eye for self-acting overhead feed, the slide rest being provided with lever, pawl, and ratchet for that purpose.

DIMENSIONS.

Headstock, mandrel bearings—Front, 6½ in. long by 3½ in. diameter; back, 4½ in. long by 2½ in. diameter.

Speed cone, 4 steps, 3½ in. wide; largest, 16 in. diameter; smallest, 7 in.

Gearing—Double, 17 in. and 5½ in.; 3½ in. face, 1½ in. pitch, treble pinion, 6½ in. diameter; internal wheel, 43 in. diameter, 3½ in. face, 1½ in. pitch.

Face plate, 48 in. diameter. Slide rest arranged to bore 24 in. deep. Foundation plate, over all 7 ft. long by 3 ft. 4 in. wide.

Overhead pulleys, 18 in. by 4½ in.

Speed, 150 revolutions per minute.

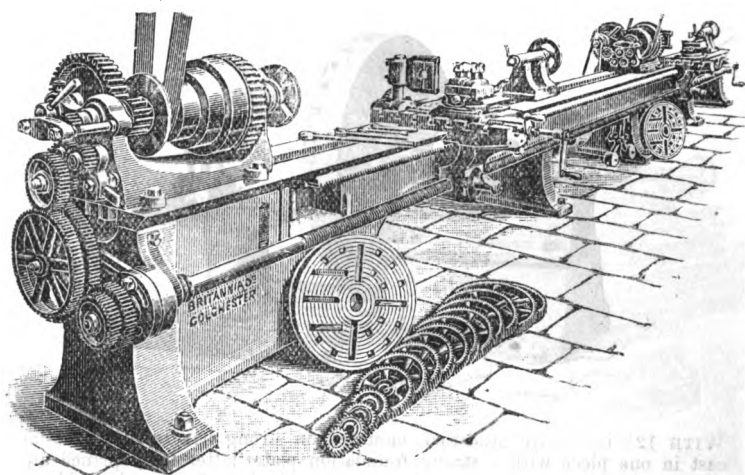
Approximate weight, 2½ tons.

PRICE, complete, with top driving apparatus, keys
 and spanners, &c. £85 0 0

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England

DOUBLE-HEADED LATHE.



THE above represents our Double-headed Lathe made for long lengths of shafting screws, etc., which is very handy in the general engineers' shop, where long work may only occasionally be wanted, when the centre head and one poppet can be quickly removed and the whole length of lathe is then available, and both the saddles and rests can be used, one for roughing and the other for finishing; while for ordinary work of shorter lengths both heads and rests are complete and ready for either two distinct jobs, or one can rough out or slide, and the other can finish or cut screws. The lathe can thus be used economically and conveniently by one man, and a great deal of work turned out cheaply.

DIMENSIONS.

Height centres, 10 in.
 Bed—Width and depth, 16 in. by 11 in.
 „ Length up to 40 ft.
 Gap, 15½ in. wide, 10½ in. deep.
 Leading screw, 2½ in. diam., ¼ in. pitch.
 Back shaft, 1½ in. diameter.
 Cone pulleys, 4 speeds, 3½ in. wide;
 largest 13 in. diameter, smallest 5 in.
 Face and pitch of gearing, 3 in. by 1 in.
 Diameters of gearing, 14 in. and 4½ in.

Diameters of body and nose of spindles,
 2½ in. and 2¼ in.
 Face and pitch of change wheels, 1½ in.
 and ⅞ in.
 Extreme length between centres with
 40 ft. bed, 35 ft.
 Overhead pulleys, 18½ in. by 3½ in.
 Speed, 130 revolutions per minute.
 Approximate weight, 5 tons.

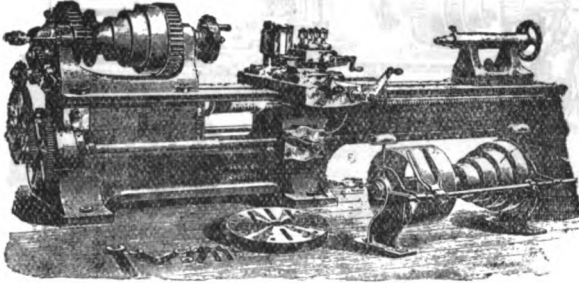
PRICE—as shown	} On application
With only 1 pair of heads	...	...	...	...
Sliding and surfacing only	...	...	...	...
Sliding surfacing and screwcutting only	...	...	...	...
Sliding and screwcutting only	...	...	...	...
Poppets to set over, extra	

Next cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

SELF-ACTING, SLIDING, SURFACING AND SCREW-CUTTING LATHES.

No. 23—14 in. Centres. No. 33—16 in. Centres. As made for the British Government.



THESE Lathes are fitted with double-gearred headstock, steel spindle, conical necks, gun-metal bearings, reversing motion for cutting right and left-hand screws. The loose headstock is fitted with cylinder mandrel and left-hand square thread traverse screw, bright turned hand wheel, and can be made to set over by transverse slide motion for taper turning, if desired. The saddle has a flush top and T grooves for bolting work to, for boring purposes, compound slide rest, made to swivel to any angle for surfacing, and graduated for turning conical. The bed is accurately planed and surfaced, and provided with movable bridge piece for gap, box end at left hand, and firmly bolted to strong standard with planed faces at right-hand end. The metal is carefully distributed, so that the lathe is quite rigid under the heaviest cutting strain; the leading screw is of steel, accurately cut, and extends full length of bed. It has a double clam gun-metal nut, actuated by eccentric movement to engage and release the saddle, the latter having also a quick hand traverse by rack, pinion, and double purchase gearing. The self-acting sliding and surfacing motions are arranged with back shaft and worm gearing. Any length of bed made to order.

The Lathes are fitted complete with back traversing stay, 23 change wheels, index plate, face plate, catch plate, and top driving apparatus complete, screws, keys, etc.

These Lathes can be made self-surfacing by means of cones and belts, instead of by gear wheels, if desired.

More accurate and durable than generally made, and therefore more economical in use. Leading screws, mandrels and wearing parts of steel.

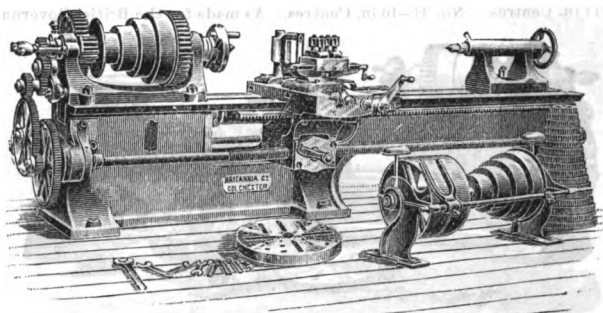
DIMENSIONS, PRICES, &C.	No. 23.	No. 33.
Height of centres	14 in.	16 in.
Length, width, and depth of bed	20ft. x 23in. x 14½ in.	20 ft. x 27in. x 16 in.
Width and depth of gap	21 in. x 14½ in.	25 in. x 16 in.
Diameter and pitch of leading screw	2½ in. x ½ in.	3½ in. x ½ in.
Diameter of back surfacing shaft	1½ in.	1½ in.
Number of speeds on cone pulley, and width	4—4½ ins.	4—5 in.
Diameters of largest and smallest speeds	18 in. and 8½ in.	22½ in. and 9 in.
Width on face and pitch of gearing	3½ ins. x 1½ ins.	4½ in. x 1½ in.
Diameters of large wheel and pinion	19½ in. and 6½ in.	23½ in. and 7½ in.
Diameters of body and nose of steel spindle	3 in. and 3½ in.	3½ in. and 4½ in.
Width on face and pitch of change wheels	2 in. x ¾ in.	2 in. x ¾ in.
Extreme length between centres (unless longer beds)	13 ft. 6 in.	12 ft. 3½ in.
Overhead pulleys	20 in. x 5 in.	24 in. x 6 in.
Speed, revolutions per minute	90	80
Approximate weight	5½ tons.	8½ tons.
Price, sliding, surfacing, and screw cutting	£173 10 0	£250 0 0
Sliding and screw cutting only (no back shaft)	165 10 0	237 0 0
If with poppet to set over for taper turning	1 2 6	1 12 6
Per foot of extra length of bed	2 10 0	3 0 0

Neat cast iron covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

SELF-ACTING, SLIDING, SURFACING AND SCREW-CUTTING LATHES.

Specification of No. 21, 10 in., and No. 22, 12 in.



FITTED with double-gear headstock, steel spindle, conical necks, gun-metal bearings reversing motion for cutting right and left hand screws; the loose headstock is fitted with cylinder mandrel, and left-hand square thread traverse screw, bright turned hand wheel, and can be made to set over by transverse slide motion for taper turning if desired. The saddle has a flush top and T grooves for bolting work to for boring purposes, compound slide rest, made to swivel to any angle for surfacing, and graduated for turning conical. The bed is accurately planed and surfaced, and provided with movable bridge piece for gap, box end at left hand, and firmly bolted to strong standard with planed faces at right-hand end. The metal is carefully distributed, so that the Lathe is quite rigid under the heaviest cutting strain; the leading screw is of steel, accurately cut, and extends full length of bed. It has a double clam gun-metal nut, actuated by eccentric movement to engage and release the saddle, the latter having also a quick hand traverse by rack, pinion, and double purchase gearing. The self-acting sliding and surfacing motions are arranged with backshaft and worm-gearing. Any length of bed made to order.

The Lathes are fitted complete with back traversing stay, 22 change wheels, index plate, face plate, catch plate, and top driving apparatus complete, screws, keys, &c.

These Lathes can be made self-surfacing by means of belt and cones instead of gear wheels, if desired

DIMENSIONS, PRICES, &c.	No. 21.	No. 22.
Height of centres	10 in.	12 in.
Length, width, and depth of bed	12 ft. × 16 in. × 11 in.	12 ft. × 19 in. × 13 in.
Width and depth of gap	15½ in. × 10½ in.	19½ in. × 12½ in.
Diameter and pitch of leading screw	2½ in. × ½ in.	2½ in. × ½ in.
of back surfacing shaft	1½ in.	1½ in.
Number of speeds on cone pulley, and width	4-3½ in.	4-3½ in.
Diameters of largest and smallest speeds	13 in. and 5 in.	16 in. and 6½ in.
Width on face and pitch of gearing	3 in. × 1 in.	3½ in. × 1½ in.
Diameters of large wheel and pinion	14 in. and 4½ in.	17½ in. and 6 in.
of body and nose of steel spindle	2½ in. and 2½ in.	2½ in. and 2½ in.
Width on face and pitch of change wheels	1½ in. × ½ in.	1½ in. × ½ in.
Extreme length between centres	7 ft. 3 in.	6 ft. 8 in.
Overhead pulleys	13½ in. × 3½ in.	18 in. × 4½ in.
Speed, revolutions per minute	130	100
Approximate weight	2½ Tons	4 Tons.
Price, sliding, surfacing, & screw-cutting	£21 5 0	£121 10 0
Sliding & screw cutting only (no back shaft)	28 5 0	126 10 0
If with poppet to set over for taper turning	0 17 6	0 17 6
Per foot of extra length of bed	2 0 0	2 5 0

Can be made with parallel necks if preferred.

These Lathes are fitted for hard and accurate work, and are similar to those supplied to the British Government.

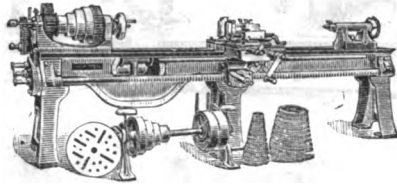
Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

SELF-ACTING, SLIDING, SURFACING AND SCREW-CUTTING LATHE, No. 24.

9 in. and 10 in. Centres.

AS MADE FOR THE BRITISH GOVERNMENT.



THIS Lathe is a stiff built tool, for heavy work, up to its capacity of size, and is strong enough to raise to 10 in. for lighter work. It is well proportioned in all parts, and is constructed with gap bed, accurately planed and surfaced, and bridge piece fitted to gap; double-gear headstock, steel spindle, conical neck, gun metal bearings, reversing motion for cutting either right or left hand screws, loose head with cylinder barrel and left hand square thread traverse screw, and made to set over for taper turning if required; steel leading screw, accurately cut, and extending full length of bed, with double clam gun metal nut clipping screw at top and bottom, saddle with long wings, flush top and grooved for bolting work to for boring, and with quick hand traverse by rack and pinion, compound slide rest, to swivel to any angle graduated, for turning conical, &c., and steel draw screws; back surfacing shaft and worm gearing for sliding without the leading screw (saving wear of same), and for surfacing. The price includes back following stay catch and face plates, 22 change wheels, index plate, overhead motion, screws, keys, &c., complete. All materials and workmanship guaranteed.

This lathe can be made self-surfacing by means of cones and belts, instead of by gear wheels, if desired.

DIMENSIONS,

Height of centres, 9 in. or 10 in.
 Length, breadth and depth of bed, 12 ft. by 14½ in. by 10 in.
 Length and diameter will swing in gap, 15 in. by 38 in.
 Diameter and pitch of steel leading screw, 2 in. by ½ in.
 " of back surfacing shaft 1½ in.
 Number and width of speeds on cone and pulley, 4—3 in.
 Diameters of largest and smallest speeds, 12 in. and 4½ in.
 Width on face and pitch of gearing, 2½ in. by ¼ in.
 Diameters of large and small gear, 13 in. and 4½ in.
 " of body and nose of steel spindle, 2 ins. and 2½ in.
 Pitch of 22 change wheels 7/8 in.
 Extreme length between centres (12 ft. bed), 7 ft. 6 in.
 Overhead pulleys, 13½ in. by 3½ in.
 Speed, 150 revolutions per minute
 Approximate weight, 35 cwt.

PRICE of 12 ft. lathe with both leading screw and back shaft	9 in. Centre.	10 in. Centre
.. .. .	£78 10 0	£82 15 0
Leading screw only	75 10 0	79 15 0
Poppet to set over, extra	0 17 6	0 17 6
More or less of bed per foot	2 0 0	2 0 0

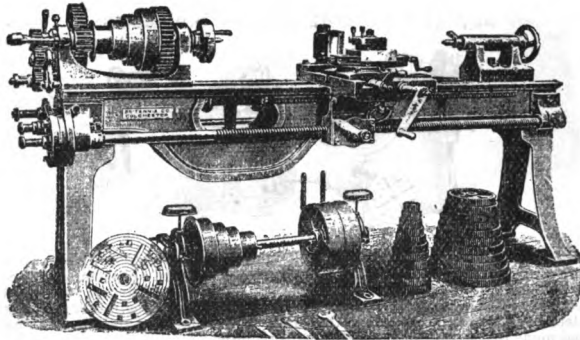
NOTE.—These Lathes are accurate and durable, and therefore economical in use. The Leading Screws and wearing parts are steel.

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

SELF-ACTING, SLIDING, SURFACING AND SCREW-CUTTING LATHES, Nos. 25 & 20.

AS MADE FOR THE BRITISH GOVERNMENT.



WITH gap-bed, accurately planed and surfaced, and bridge piece fitted to gap; double-gear headstock steel spindle, conical neck, gun metal bearings reversing motion for cutting either right or left hand screws loose head with cylinder barrel and left hand square thread traverse screw, and made to set over for taper turning if required; steel leading screw, accurately cut and extending full length of bed with double clam gun metal nut clipping screw at top and bottom, saddle with long wings, flush top and grooved for bolting work to, for boring, and with quick hand traverse by rack and pinion, compound slide rest to swivel to any angle, graduated for turning conical, etc., and steel draw screws, back following stay, catch and face plates, 22 change wheels, index plate, overhead motion, screws, keys, etc., complete. All materials and workmanship guaranteed.

These lathes can be made self-surfacing by means of belts and cones, instead of gear wheels, if desired.

DIMENSIONS.	No. 25.	No. 20.
Height of centres	7½ in.	9 in.
Length, breadth, and depth of bed	8 ft. by 10½ in. by 8 in.	10 ft. by 13 in. by 8½ in.
Length and diameter will swing in gap	11 in. by 3½ in.	12 in. by 3½ in.
Diameter and pitch of steel leading screw	1½ in. by ½ in.	1½ in. by ½ in.
Diameter of back surfacing shaft	1½ in.	1½ in.
Number and width of speeds on cone pulley	4 in. by 2½ in.	4 in. by 2½ in.
Diameters of largest and smallest speeds	8½ in. and 3½ in.	10 in. and 4½ in.
Width of face and pitch of gearing	2½ in. by ½ in.	2½ in. by ½ in.
Diameters of large and small gear	10 in. by 3½ in.	11 in. and 3½ in.
Diameters of body and nose of steel spindle	1½ in. and 2 in.	1½ in. and 2½ in.
Pitch of the 22 change wheels	3 in.	3 in.
Extreme length between centres	4 ft. 6 in.	6 ft. 6 in.
Overhead pulleys	10 in. by 3 in.	11½ in. by 3 in.
Speed, revolutions per minute	200	160
Approximate weight	16 cwt.	26 cwt.
Price, with both leading screw & back shaft	£48 10 0	£75 10 0
With leading screw only	45 10 0	72 10 0
Poppet to set over extra	0 17 6	0 17 6
Extra length of bed, per foot	1 12 6	1 12 6

Beds to any length. Up to 10 feet beds are fitted with 2 standards.

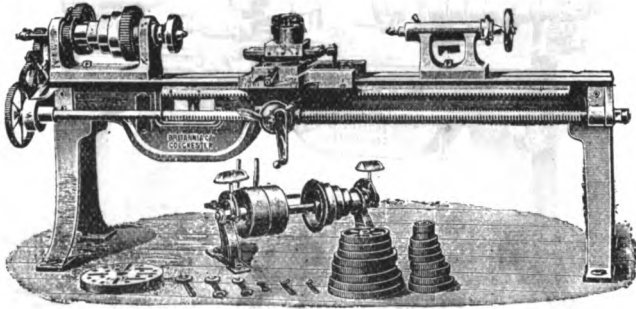
Above 10 feet 3 standards.

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

SELF-ACTING SLIDING AND SCREW-CUTTING LATHE, No. 29.

7½-in. Centre.



A good and useful Lathe for light work; the bed is gapped with gap piece fitted and accurately planed and surfaced; double geared headstock, steel spindle, conical necks, gun metal bearings, reversing motion for cutting either right or left hand screws, poppet head with cylinder barrel and internal left hand square thread screw, steel leading screw, accurately cut, and extending full length of bed, saddle with flushed top and grooved for securing work for boring, and with quick hand traverse by rack and pinion, compound slide rest to swivel to any angle and graduated, steel draw screws, back following stay, catch and face plates, 22 change wheels, overhead motion, screws, keys, &c., complete. This Lathe can be made self-surfacing by means of belts and cones, instead of gear wheels if desired.

DIMENSIONS.

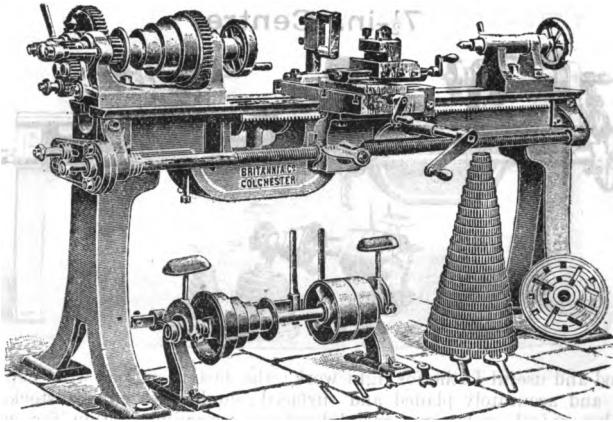
Height of centres	7½ in.
Length, breadth, and depth of Bed ...	8 ft. by 10½ in. by 7½ in.
Gap will admit	9½ in. long by 29 in. diameter.
Diameter and pitch of Leading Screw ...	1½ in. by ½ in.
Diameter of Back Shaft	1½ in.
Number and width of speeds on Cone Pulley ...	4 by 2⅜ in.
Diameter of largest and smallest speeds ...	7½ in. and 3½ in.
Width on face and pitch of Gearing ...	1½ in. by ½ in.
Diameter of large and small Gear ...	9½ in. and 3½ in.
Diameter of body and nose of Spindle ...	1½ in. and 1¼ in.
Pitch of 22 Change Wheels	⅜ in.
Extreme length between Centres	4 ft. 8 in.
Overhead Pulleys	8 in. by 3 in.
Speed	180 revolutions per minute
Approximate weight	15 cwt.

PRICE, complete as above	£37 15 0
„ if self-surfacing by back shaft	40 15 0
„ per foot of extra length bed	1 12 6

The Britannia Engineering Co., Ltd. Colchester, England.

SELF-ACTING, SLIDING, SURFACING AND SCREW-CUTTING LATHES, No. 17.

6 in., 6 ft.



WITH gap bed accurately planed and surfaced, and bridge piece fitted to gap, double-gear headstock, steel spindle with conical neck, gun-metal bearings, reversing motion for cutting right and left hand screws. The loose head has cylinder barrel and left-hand traverse screw, and made to set over for taper turning, if required; steel leading screw accurately cut, and extending full length of bed, with double clam gun-metal nut gripping screw at top and bottom, saddle with long wings, flush top, and grooved for bolting work to when boring; quick hand traverse by rack and pinion, compound slide rest to swivel to any angle, graduated for turning conical, steel draw screws, back following stay, catch and face plates, twenty-two change wheels, index plate, overhead motion, screws, keys, etc., etc.

All materials and workmanship guaranteed.

DIMENSIONS.

Height of Centre, 6 in. ; breadth of Bed, $8\frac{1}{2}$ in. ; depth of Bed, 6 in. ; width and depth of Gap, 10 in. by 6 in. ; diameter and pitch of Leading Screw, $1\frac{1}{2}$ in. by $\frac{1}{4}$ in. ; diameter of Back Shaft, 1 in. ; Swing in the Gap, 24 in. ; admits between centres of 6 ft. Lathe, 3 ft. 6 in. ; Change Wheels $22\frac{1}{8}$ in. pitch ; Cone Pulley 4 speeds, 2 in. broad ; Large Cone, $7\frac{1}{2}$ in. diameter ; Large Gear, $8\frac{1}{2}$ in. diameter, $1\frac{1}{2}$ in. broad, $\frac{1}{2}$ in. pitch ; Body of Spindle, $1\frac{3}{8}$ in. diameter ; Nose, $1\frac{1}{2}$ in. diameter ; Overhead Pulleys 8 in. by 3 in. ; Speed, 220 revolutions per minute ; Approximate Weight, with 6 ft. bed, $13\frac{1}{2}$ cwt.

NOTE.—The Leading screws and wearing parts are STEEL.

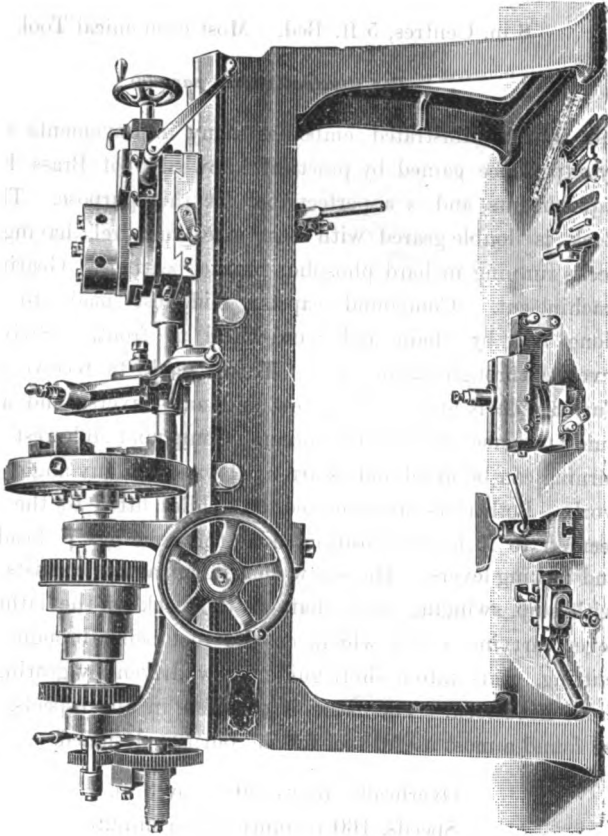
PRICE, Sliding and Screw-cutting	£37 16 0
" for Self-acting, Sliding, Surfacing, & Screw-Cutting	
" (by Back Shaft)	44 2 0
Poppet to set over, extra	1 0 0
Extra Length of Bed, per foot	2 0 0

This lathe can be supplied with 7 in. centre headstocks at £2 extra.
Any Lathe can be made with Cut Gear Wheels at an extra charge
Chucks of every description to order.

Many of the above Lathes have been made for the British Government.

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act. at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

BRASS FINISHERS' LATHE, No. 41.

For description see page 100.

The Britannia Engineering Co., Ltd., Colchester, England.

BRASS FINISHERS' LATHE, No. 41.

8 in. Centres, 5 ft. Bed. Most economical Tool.

For illustration see page 99.

THE LATHE illustrated embodies many improvements suggested by experience gained by practical knowledge of Brass Finishers' requirements, and is a perfect tool for this purpose. The headstock is double-g geared with best steel mandrel, having conical necks running in hard phosphor bronze bearings. Gearing is all machine-cut. Compound capstan slide-rest made to traverse along bed by chain and hand-wheel at front. Swivel slide revolves through entire circle. Turret made to receive six tools. Turret slide is fitted with screw and nut traverse and also with quick traverse by rack and pinion. Compound slide rest for plain turning can be fitted and is arranged to set at any angle for taper work. Both rests are mounted on saddles fitted to the bed, and secured to it in any position along the same by T headed bolts and locking levers. The screw chasing apparatus consists of a tool with stop, swinging on a shaft at the back of the lathe with a lever carrying a die, which, on the tool being brought over for cutting, gears into a short guide screw driven by gearing off the front headstock. The lathe is complete in all respects, and will be found a most useful tool for the purpose designed.

Overhead pulleys, 10 in. by 3 in.

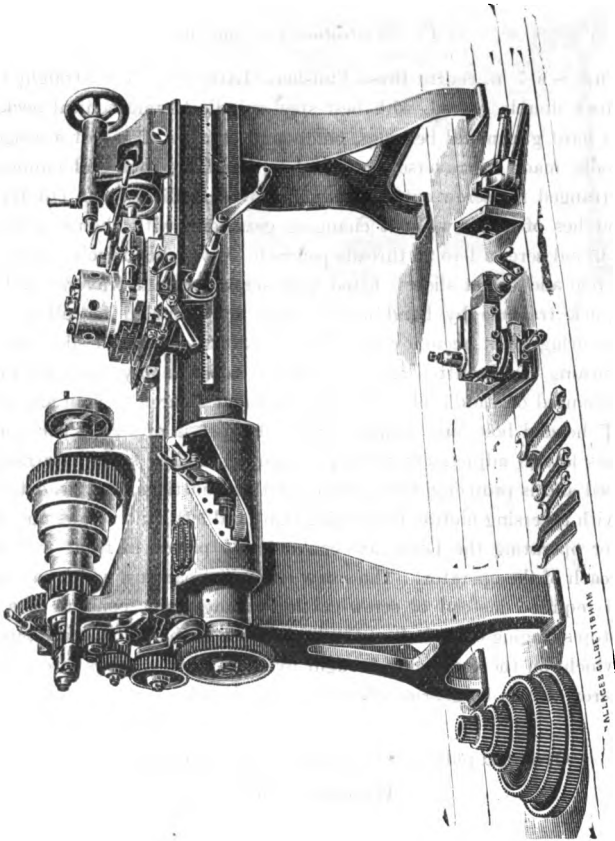
Speeds, 160 revolutions per minute.

Approximate weight, 17 cwt.

PRICE of Lathe	£75	0	0
Compound Slide Rest extra	15	10	0
With lever motion to turret in addition to screw	4	17	6

The Britannia Engineering Co., Ltd., Colchester, England.

BRASS FINISHERS' LATHE, No. 43.



For description see page 102.

BRASS FINISHERS' LATHE, No. 43.

AMERICAN PATTERN, BUT STRONGER

For illustration see page 101.

THIS is a 7 in. centre Brass Finishers' Lathe with 5 ft. straight bed, head-stock double geared, with best steel spindle having conical necks running in hard gun metal bearings, compound capstan slide rest arranged for six tools, made to traverse along bed by hand, by rack and pinion, and also arranged for screw-cutting with improved facilities: can cut ten different pitches of screw without changing gear, and with change gears supplied can cut screws 1 to 96 threads per inch, swivel slide revolves through entire circle and turret slide is fitted with screw and nut traverse and also with quick traverse by hand lever: stops are provided for all motions thus ensuring great accuracy in repetition work, compound slide rest for plain turning can be fitted and is arranged to set at any angle for taper work, mounted on saddle plate fitted to bed and secured to it in any position by T headed bolts and locking lever. Poppet is of strong construction and has lateral adjustment for taper turning, leading screw is arranged inside bed and is protected from contact with all cuttings, &c., headstock is fitted with reversing motion for cutting right and left hand screws and all handles for operating the Lathe are conveniently placed in front well within the reach of the operator. The screw chasing apparatus, which can be supplied if required instead of screw-cutting arrangement, consists of a tool with stop swinging on a shaft at the back of the Lathe with a lever carrying a die which, on the tool being brought over for cutting, gears into a short guide screw driven by gearing off the fast headstock.

Overhead pulleys, 8 in. by 3 in. Speed 160 revolutions per minute.

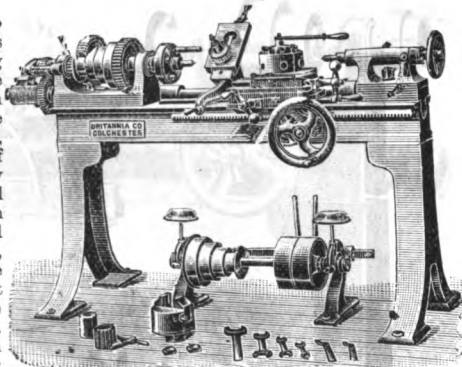
Approximate weight, 11½ cwt.

PRICE, Screw-cutting by screw running whole length of bed			
including 12 in. three jaw chuck	£89	10	0
With screw-chasing apparatus in lieu of screw-cutting	71	10	0
Slide rest as shown at foot of Lathe, extra	14	10	0
Less if without Poppet	4	0	0

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED CHASING LATHE for BRASS FINISHERS, &c., No. 31.

THIS Lathe is offered to Brass Finishers and others as the best labour saving machine of its kind in the trade. It is constructed with a strong straight bed of wide and deep section, well ribbed, and with a fast headstock of heavy build, having a hollow steel mandrel, with conical necks, running in hard gun metal bearings, and arranged to adjust to take up wear, and made with either single or double gear. The belt cone has 4 speeds for 2 inch belt, and of large diameter. The loose head is made with slide to set over laterally for turning taper shafts. The saddle is made to traverse the bed by rack and pinion, with conveniently placed hand wheel, and is carefully and accurately fitted square with the bed, and carries a compound slide rest mounted with a revolving turret prepared for 6 tools, accurately adjusted to the centres of the heads, and the rest is made to swivel and is accurately graduated to turn or bore to any angle. The rest screws are all of steel and their handles are balanced.



A special advantage of this Lathe is the simple and efficient means provided for self-acting screw chasing, by a shaft at the back of the lathe fitted with levers and a tool holder and die, fitting into a "former" fixed at the back of the fast head, and driven from its mandrel by gearing as shown. The die and former are engaged and disengaged by the lever with handle seen in the engraving laying across the face of the bed, and which carries at its back end the adjustable tool holder with chasing tools, as will be seen. This chasing apparatus can be swung completely out of the way, leaving all clear when working the turret rest.

By this means skilled labour is no longer necessary for screwing, as a boy can use this tool and produce quicker and more uniformly accurate work. The turret is arranged with locking levers to fix when adjusted and is moved along its slide by screw and by lever also if desired. The lathe is sent out with one former and die to suit, and one master tap to recut the die, and to cut 11 threads per inch or any other pitch preferred; and with complete top driving apparatus made to reverse; tool board, spanners, &c., &c.

DIMENSIONS.

Bed—length, breadth, and depth, 5 ft. by 8½ in. by 6 in.
Headstock—6½ in. centres, 16½ in. long.
Cone Pulley—4 speeds, 2 in. wide, largest 7½ in. diameter, smallest 3 in. diameter.
Hole through spindle—1 in. diameter.

Gearing (when fitted)—large, 8½ in. diam., small, 3 in. by 1½ in. face.
Holes in Turret—½ in. diameter.
Overhead pulleys, 8 in. by 3 in.
Speed, 260 revolutions per minute.
Approximate Weight—10¼ cwt.

PRICE.

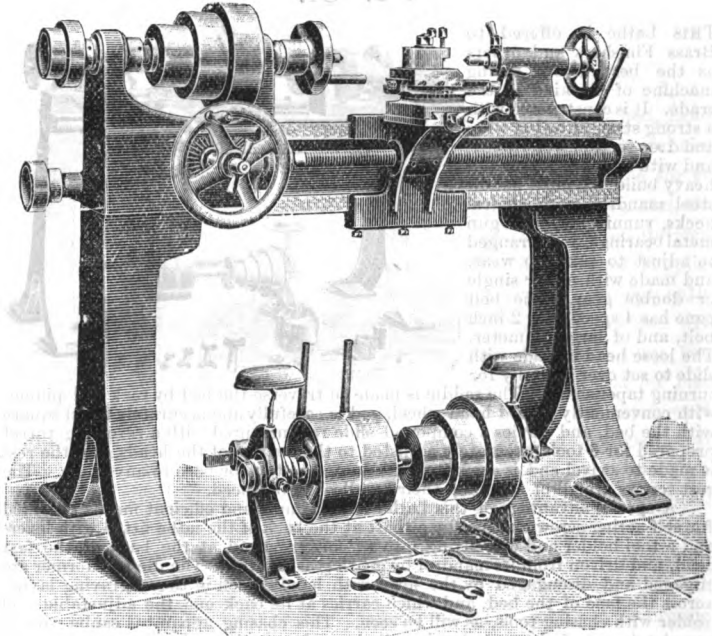
<p>Complete, with Single Gear ... £43 0 0 Extra for Back Gearing ... 3 15 0 " for 2-jaw Chuck with slip jaws 4 10 0 " for Lever motion to Turret, in addition to Screw ... 4 5 0</p>	<p>Extra for additional Formers, Dies and Taps, per set of 3 pieces ... £1 15 0 Per pair of Chasers for Rest ... 0 7 6 Each for Tool Holders and Tools for Turret ... 1 5 0</p>
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The Britannia Engineering Co., Ltd., Colchester, England.

FRONT SLIDE LATHE. No. 39.

Can be fitted with Capstan Rest in lieu of ordinary Compound Rest.

MOST ECONOMICAL TOOL.



FRONT SLIDE BRASS FINISHERS' LATHE, neatly constructed and so arranged that saddle and rest are able to pass the poppet or loose head. Bed is of strong box section, with slide way on front. Saddle fitted with compound slide rest capable of being set at any angle for taper turning. Cone Pulley has large diameters. Hollow Mandrel is made of steel with conical necks, running in hard gun metal bearings, and arranged with adjustment for taking up wear. Feed Motion is arranged by two speed belt pulleys (which are interchangeable, thus giving four changes of feed) and worm gearing, through mitre gear at front of bed engaged by friction fly nut. Hand Traverse to Saddle is arranged by large hand fly wheel at front conveniently placed for operator.

DIMENSIONS.

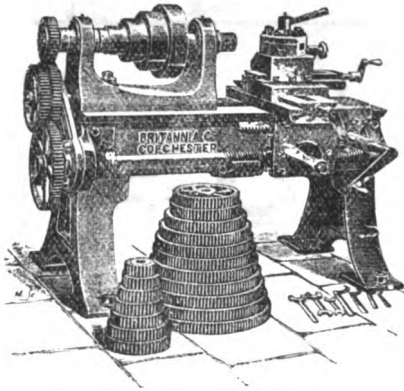
Height of centres 6 in.
Hole through mandrel, 1 in.
Cone Pulley 3 speeds, 2½ in. wide.
Largest diam. 9 in., Smallest diam. 5½ ins.

Bed 4 ft. long, 6 in. deep.
Overhead pulleys, 8 in. by 3 in.
Speed. 100 revolutions per minute.
Approximate weight, 10 cwt.

PRICE , complete, with catch plate, overhead, and spanners	£24	10	0
Two-jaw chuck, with one pair of steel slip jaws	...	5	0
If with capstan rest for four tools, extra	...	4	7

The Britannia Engineering Co., Ltd., Colchester, England.

POWERFUL SINGLE-GEARED HOLLOW MANDREL
TURRET
SCREW-CUTTING LATHE, No. 46.



HEAD-STOCK has steel hollow spindle, bored 2 ins. the whole length, running in hard gun metal conical bearings of larger diameter, and provided with hardened steel thrust collars. The cone pulley is arranged for four speeds of 3 in. wide. The nose of mandrel is screwed to receive chucks, &c. Bed is of very strong section and is mounted on two strong neat cast iron standards. The saddle is fitted with cross slide and compound slide rest, the top slide being fitted with turret (which is of mild steel), 8 in. diameter, arranged to carry six tools. This slide may be actuated from a former fixed to the bottom of the cross slide, not shown in the illustration, but can be added if desired. Lathe is fitted with strong steel leading screw, complete set of change wheels and overhead motion, consisting of cone speed, hangers, and two sets of pulleys for reversing.

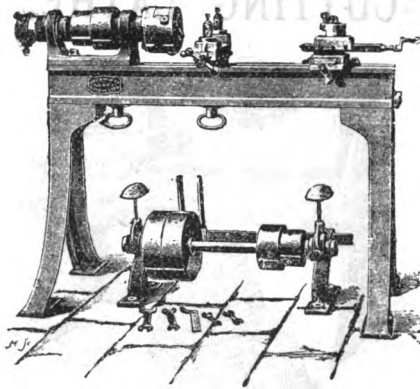
DIMENSIONS.

Height of centre, 10½ in.	Leading screw, 2½ in. diameter, ¼ in. pitch.
Bed, 4 ft. 6 in., 15 in. on face, 10 in. deep.	Change wheels, 6 pitch.
Cone pulley, 4 speeds, 3 in. wide; largest, 13½ in.; smallest 7 in.	Overhead pulleys, 13½ in. by 3½ in.
Hole in mandrel, 2 in. diameter.	Speed, 120 revolutions per minute.
	Approximate weight, 2½ cwt.

PRICE. with former	£74 10 0
Without former	69 10 0

The Britannia Engineering Co., Ltd., Colchester, England

HOLLOW MANDREL STUD LATHE, No. 12.



THIS is a tool of very substantial construction, designed for a heavy class of work (for its size and capacity), while its handiness and smoothness of working enables even light work to be efficiently produced. The Headstock is fitted with hollow steel spindle, ground absolutely true, and running in adjustable phosphor bronze bearings, and fitted with Gripping Chucks at both ends.

The illustration shows ordinary Compound Slide Rest, but a Capstan Rest is preferable, fitted with four or more tools and provided with Clamping Lever for fixing it absolutely rigid with the slide when doing heavy work. The Capstan is rotated by hand and is fitted with hardened and ground steel locking ring and adjustable bolt. The Cut-off Rest carries tools back and front, is fitted with tool adjustment for regulating the height, and provided with stops.

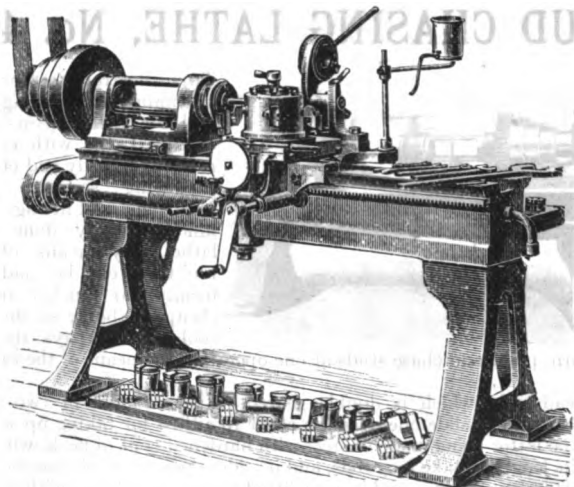
DIMENSIONS.

Height of centre ...	5 in.	Diameter of Capstan ...	4½ in.
Length of Bed ...	5 ft.	Overhead pulleys ...	10 in. by 3½ in.
Admit through Spindle ...	2 in.	Speed	110 revolutions per minute
Cone Pulley, 2 Speeds	3 in. wide	Approximate Weight	6 cwt.
Diameters of Cone Pulley	6 in. and 4½ in.		

PRICE of Lathe, with Capstan Rest and plain Cut-off Rest	£32	0	0
With plain Cut-off Rest and plain Compound Slide Rest	...	26	10
Extra for Automatically Revolving Capstan	...	4	0

The Britannia Engineering Co., Ltd., Colchester, England.

STUD CHASING LATHE. No. 27.



The above illustration represents our improved hollow and open-sided spindle Lathe with Capstan Rest, for quickly and cheaply producing screwed studs, joint pins, and small fittings of all kinds usually done in a Lathe. By means of this tool these can be made uniformly, far quicker, and by cheap labour, so that the tool soon repays its cost. It will turn, point, and chase studs at one operation by means of the Capstan Rest.

The Headstock is constructed of two parts, accurately fitted to slide one over the other to adjust for taking up wear of spindle, the latter being made of steel, with hardened conical neck, with hole through its length to take up long rods, and its sides open to enable headed bolts to be inserted for screwing, and its nose fitted with a coned chuck, and gripping dies for 9 sizes of tools and rods— $\frac{1}{4}$ in. to 1 in. diam.

The saddle is arranged with traverse slide, carrying a Capstan tool holder, fitted with five tools, adapted for sliding, rounding points, surfacing, parting, &c.

On the saddle is mounted the screwing arrangement with die box and adjustable dies for screwing $\frac{1}{4}$ in., $\frac{1}{2}$ in., $\frac{3}{8}$ in., $\frac{1}{2}$ in., $\frac{5}{8}$ in., $\frac{3}{4}$ in., $\frac{7}{8}$ in., and 1 in., and hinged to throw back out of the way when not screwing.

The saddle is also fitted with quick traverse by rack and pinion, also self-acting traverse by fine thread leading screw with convenient disengaging nut.

The bed is of trough section to catch the soap and water, and constructed to conveniently draw it off.

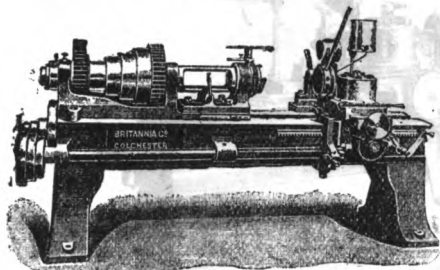
The whole is of best materials and workmanship, and of the following dimensions. Complete overhead motion with reversing motion, soap-sud can and stand, screw keys, spanners, &c., are included in the price.

DIMENSIONS.

Height of centre	... .. 7 inches.	Feed cones, 3 speeds	$1\frac{1}{2}$ inches wide.
Length and width of bed,	5 ft. by $12\frac{1}{2}$ in.	Overhead Pulleys,	$13\frac{1}{2}$ in. and 10 in. diam.
Driving cone, 4 speeds	$2\frac{1}{2}$ inches wide.	Speeds	50 and 40 revolutions per m nute
Largest, 13 in. diam. ;	Smallest, 7 in.	Approximate Weight	... 15 cwt.
PRICE, complete	... ..		... £63 10 0

The Britannia Engineering Co., Ltd., Colchester, England.

DOUBLE-GEARED STUD CHASING LATHE, No. 42.



THIS illustration represents our improved double-gear hollow and open-sided spindle Lathe with capstan rest, for quickly and cheaply producing screwed studs, joint pins, and fittings of all kinds, usually done in a lathe. By means of this tool these can be made uniformly, far quicker and by cheaper labour, so that the tool soon repays its cost,

It will turn, point and chase studs at one operation by means of the capstan rest.

The headstock, which is double geared, is constructed in two parts, accurately fitted to slide one over the other to adjust for taking up wear of spindle, the latter being made of steel with hardened conical neck, with hole through its length to take long rods, and its sides open to enable headed bolts to be inserted for screwing, and its nose fitted with a cone chuck, with tangent worm as shown, if preferred, and gripping dies for 11 sizes from $\frac{1}{2}$ in. to $1\frac{1}{2}$ in. diameter.

The saddle is arranged with transverse slide carrying a capstan tool holder fitted with five tools, adapted for sliding, rounding points, surfacing, parting, &c.

On the saddle is mounted the screwing arrangement with die box and adjustable dies for screwing $\frac{1}{2}$ in., $\frac{3}{8}$ in., $\frac{1}{2}$ in., $\frac{5}{8}$ in., 1 in., $1\frac{1}{4}$ in., $1\frac{1}{2}$ in., $1\frac{3}{4}$ in., $1\frac{1}{2}$ in., $1\frac{3}{4}$ in., $1\frac{1}{2}$ in., balanced and hinged to throw back out of the way when not screwing.

The saddle is also fitted with quick traverse by rack and pinion, also self-acting traverse by fine thread leading screw with convenient disengaging nut.

The bed is of trough section to catch the soap and water, and constructed to conveniently draw it off.

The whole is of the very best materials and workmanship and the following dimensions. Complete overhead motion with reversing motion, soap sud can and stand, screw keys, spanners, &c., are included in the price.

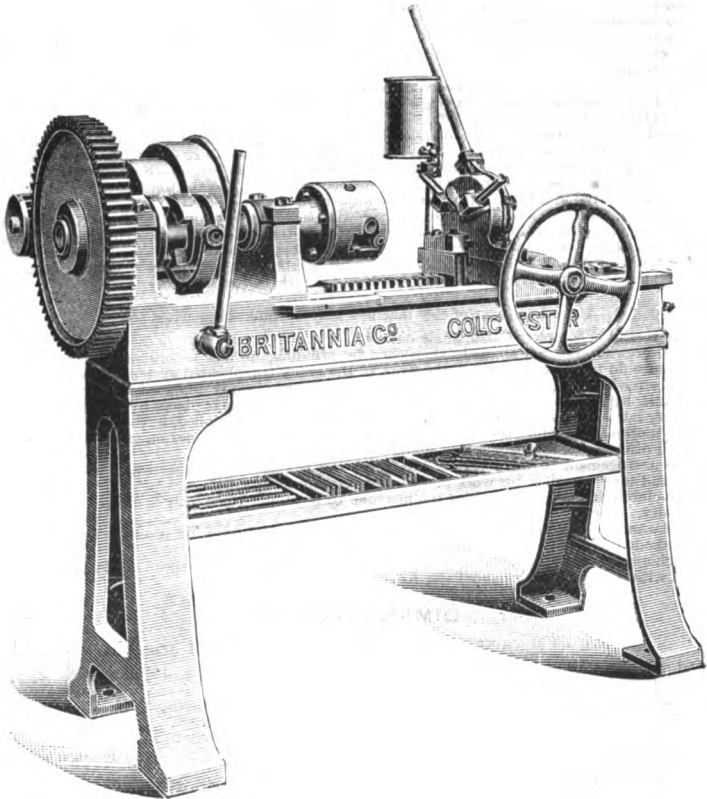
DIMENSIONS.

<p>Height of centre, 9 in. Length and width of bed, 7 ft. 6 in. by $10\frac{1}{2}$ in. Driving cone, 4 speeds, $3\frac{1}{4}$ in. wide; largest, $13\frac{1}{2}$ in. diameter; small- est, $6\frac{1}{2}$ in. diameter. Hole through mandrel, $2\frac{1}{2}$ in. Gearing, 1 in. pitch, $2\frac{1}{4}$ in. wide.</p>	<p>Wheel, 15 in. diameter, pinion, $6\frac{1}{2}$ in. diameter. Feed cones, 3 speeds, $1\frac{1}{2}$ in. wide. Overhead pulleys, 18 in. and 12 in. by $3\frac{1}{4}$ in. Speed of overhead pulleys: large, 60 revolutions; small, 160. Approximate weight, 32 cwt.</p>
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PRICE complete £117 10 0

The Britannia Engineering Co., Ltd., Colchester, England.

NEW PATENT SCREWING MACHINE.



For description see page 110.

The Britannia Engineering Co., Ltd., Colchester. England.

NEW PATENT SCREWING MACHINE.

(McILQUHAM'S PATENT, No. 13,982.)

OTHER SIZES IN PREPARATION.

For Illustration see page 109.

THIS Machine is constructed on improved and very simple principles, greatly advantageous to users in point of economy both in working and maintaining in repair.

The headstock is constructed with a hollow spindle to take rods or tubes of any length, and with a self-centring die chuck for gripping rods, tubes or bolt-heads. A clutch and lever enables the machine to be started and stopped instantly and independently of the countershaft.

The spindle is driven by a 3-speed cone pulley and powerful gearing.

The bed is machine planed, of tough section to catch the soap and water used in screwing, and is fitted with a tap to draw off.

Fitted to the bed is a saddle to slide along, and moved by racks and pinions and hand wheel, carries the screwing head. This is fitted with three tool boxes carrying tools similar to ordinary chasers and so constructed as to be held firmly in position by one set screw to each. These are closed and opened by lever and eccentric cam, and the top face of the screwing head is graduated and fitted with a stop to adjust the depth of cut.

The IMPORTANT FEATURE of this screwing head is the simplicity of the dies, which are simply pieces of steel cut off the bar, put into the tool holder and secured by set screws. In this machine they can then be cut up by the master tap and hardened and are finished ready for use; NO EXPENSIVE FITTING for length or in any other respect is needed, but treated as an ordinary turning tool is put in the slide rest of the lathe.

The advantages of this machine may be thus summarised :—

The thread is completed at a single cut.

The screwing dies are as easily sharpened by grinding the face as ordinary lathe chasers, and hence do ten or twelve times the work of the many complicated systems in the market.

The screwing dies, when at last fairly worn out, are cheaply replaced by any ordinary mechanic, by merely cutting off from a bar of steel, fixing in their places by set screws as an ordinary lathe tool, and cutting the thread by the master tap supplied, in their own machine.

The method of holding the dies is so arranged that the strain comes on the rest or holder, instead of upon the dies which thus endure so much more work.

The arrangement of the screwing head and dies enables the cutting edges to be plainly seen, and these are clear for work and cannot get choked by cuttings.

The clutch arrangement enables the machine to be stopped instantly in case of accident or necessity.

The whole is so simple that there is nothing to get out of order by ordinary fair use, and if breakage occurs by any mishap parts can be easily replaced.

Each machine is sent out complete with Master Taps and Dies; Overhead motion, Standards fitted with Shelves for Dies and Taps, Keys, Screw, &c., &c.

DIMENSIONS, &c.

No. 60 MACHINE.

Bed, 4 ft. long, 10 in. on face, 6 in. deep.
Cone Pulley, 3 speeds, 3 in. wide, largest
12 in. diameter.
Gearing, $\frac{3}{4}$ in. pitch, 2 in. face.
Spur Wheel, $12\frac{1}{2}$ in. diameter, and pinion
 $4\frac{1}{2}$ in.
Spindle bored with $1\frac{1}{2}$ hole.
Overhead Pulleys, 13 in. by $3\frac{1}{2}$ in.
Speed, 90 revolutions per minute.
Approximate Weight, 9 cwt.

PRICE to screw up to 1 in. ... £40

” ” ” $1\frac{1}{2}$ in. ... 45

No. 61 MACHINE.

Bed, 4 ft. 4 in. long, $10\frac{1}{2}$ in. on face, $6\frac{1}{2}$ in. deep
Cone Pulley, 3 speeds, $3\frac{1}{2}$ in. wide, largest
13 in. diameter.
Gearing, $\frac{3}{4}$ in. pitch, $2\frac{1}{2}$ in. face.
Spur Wheel, $17\frac{1}{2}$ in. diameter, and pinion
 $4\frac{1}{2}$ in.
Spindle Bored with $2\frac{1}{2}$ in. hole.
Overhead Pulleys, 14 in. by $3\frac{1}{2}$ in.
Speed, 80 revolutions per minute.
Approximate Weight, 12 $\frac{1}{2}$ cwt.

PRICE to screw up to 2 in. ... £50

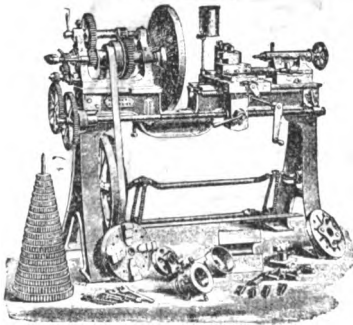
The Patented Screwing Head can be fixed to existing machines or to the Saddles of ordinary lathes. Estimates on application.

The Britannia Engineering Co., Ltd., Colchester, England.

TREBLE-GEARED SCREW-CUTTING FOOT LATHE.

No. 18, 5 in. No. 19, 6 in.

THESE LATHES WERE DESIGNED FOR THE BRITISH NAVY.



DESIGNED specially for heavy work by foot power, where steam, gas, or water power is not available.

It is sufficiently strong to take a 1/2 in. cut off a 2 in. or 3 in. shaft, or turn a 20 in. or 24 in. plate or wheel without chattering.

Care has been taken to distribute the metal so that strength is obtained without overloading the foot power.

The bed has a gap with loose bridge fitted, and is firmly bolted to substantial standards. The driving or fly wheel is counterbalanced to overcome the dead centre. The crank-shaft has two dips, and runs in anti-friction roller bearings of the most improved design, boxed in so as to exclude all dirt, &c., &c.

The treadle is fitted with anti-friction rollers, and chain connections. The leading screw is steel, accurately cut to 1/4 in. pitch, and has double clam gun-metal nut. The carriage has a flat face and T slots for bolting work to for boring; it is provided with a jamming nut to fix in any position, and has quick return by rack and pinion. The slide rest is made to swivel, and is graduated to turn to any angle, and provided with an adjusting nut to take up back lash.

It is fitted with reversing motion for cutting right and left hand screws.

The head stock is fitted with treble gearing, disengaging by eccentric movement, and can be changed at pleasure to EITHER SINGLE, DOUBLE, OR TREBLE GEAR INSTANTLY. Steel mandrel with conical neck running in gun-metal.

The poppet is made either in one casting or with loose bottom and planed sides to set over for turning taper. Steel barrel. Best cast steel centres. Full set of 23 change wheels. Travelling back stay. Face plate and set of steel spanners.

DIMENSIONS AND PRICE.

	No. 18.	No. 19.
Bed—length, depth, and face	{ 5 ft. 0 in.	6 ft. 0 in.
Bed—width, and depth of gap	{ 5 1/2 in. by 7 1/2 in.	6 in. by 8 1/2 in.
Diameter of Leading Screw	8 in. by 5 in.	7 1/2 in. by 6 in.
Diameter of Crank-shaft	1 1/2 in.	1 1/2 in.
Diameter of Body of Mandrel	1 1/2 in.	1 1/2 in.
Nose of Mandrel, Whitworth	1 in.	1 1/2 in.
Cone Pulley, 3 speeds	1 1/2 in.	1 1/2 in.
Diameter of Gearing	{ 3 in., 4 1/2 in., and 6 1/2 in. by 1 1/2 in.	4 in., 6 in., 8 in., by 1 1/2 in.
Face and pitch of Gearing	6 1/2 in. by 2 1/2 in.	8 1/2 in. by 3 in.
Face and pitch of Change Wheels	1 1/2 in. by 1 7/8 in.	1 1/2 in. by 1 1/2 in.
Approximate Weight	1/2 in. by 1 1/2 in.	5/8 in. by 1 in.
	10 cwt.	14 cwt.

PRICE—Complete	No. 18.	No. 19.
.. .. .	£36 0 0	£46 10 0
.. .. . If Sliding and Surfacing by Back Shaft also	48 0 0	58 0 0
.. .. . If Sliding and Surfacing only (no Leading Screw)	40 0 0	51 0 0
.. .. . Extra for Poppet to set over	1 5 0	1 10 0
.. .. . Less if with Overhead for Power instead of Treadle Motion	2 0 0	3 0 0
.. .. . More or less of bed at per foot	2 0 0	2 0 0

The various Chucks and Fittings shown in the illustration can be supplied,

if desired, at the following prices:—

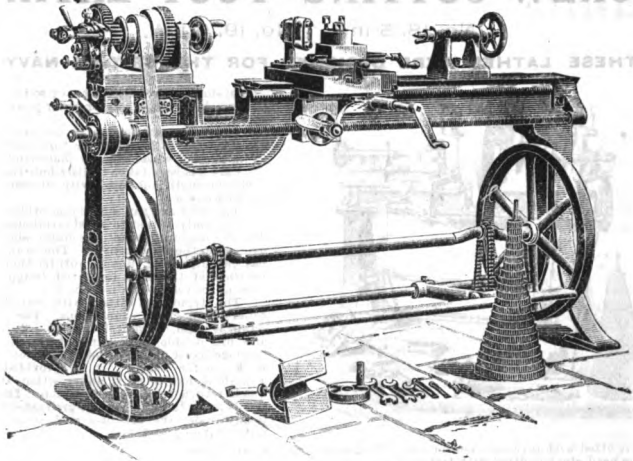
Extra Large Face Plate, to Swing in the Gap	1 15 0	2 0 0
4-jaw Chuck	5 0 0	6 0 0
Fixed steady with 3 adjustable Jaws, top hinged	2 0 0	2 0 0
8-screw Bell Chuck	1 5 0	1 10 0
Angle Brackets to Bolt to Face Plate for boring, &c., 3 sizes	10/- to 15/-	12/6 to 17/6
Clement's Driver, as shown in illustration, instead of Ordinary Catch Plate	£1 5 0	£1 5 0
Hand Rest and 4 Tees to fit on saddle	0 15 0	1 0 0
Boring Collar	1 0 0	1 5 0
Soap Suds Can, with brass cock and stand with swivel to rise and fall	0 10 0	0 10 0

No. 18, with 5 ft. Bed, is 3 ft. 2 in. between centres. No. 19, 6 ft. Bed, 3 ft 6 in. between centres.

Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

SELF-ACTING SLIDING AND SCREW-CUTTING LATHE. No. 16.



With gap bed accurately planed and surfaced, and bridge piece fitted to gap; double-gear headstock; steel spindle with conical neck; hard steel collars; reversing motion for cutting right and left-hand screws. The loose head has cylinder barrel and left-hand traverse screw, made to set over for taper turning, if required; steel leading screw, accurately cut, and extending full length of bed, with double clam gun-metal nut gripping screw at top and bottom; saddle with long wings, flush top, and grooved for bolting work to when boring; quick hand traverse by rack and pinion; compound slide-rest to swivel to any angle, graduated for turning conical, steel draw screws; back following stay; catch and face-plates; twenty-two change wheels; index plate; treadle motion; screw keys, etc., etc. All materials and workmanship guaranteed. The 5 ft. lathe measures 2 ft. 11 in. between centres; 6 ft. lathe measures 3 ft. 10 in. The gear wheels in the heads are machine-cut. The mandrel is made with $\frac{1}{8}$ in. hole through. If larger is required, price will be extra.

DIMENSIONS.

Breadth of Bed	7 in.	5 in. Cone Pulley, 3 speeds	1½ in. broad
Depth of Bed	5½ "	Large Cone 6½ in. diam.,	smallest 3½ in.
Width of Gap	9 "	Width on face and } 5 in. centre,	1½ & 1
Depth of Gap	5½ "	pitch of gearing } 6 in.	" 1½ "
Diameter of Leading Screw	1½ "	Diam. of large and } 5 in.	" 6½ "
Pitch	1 "	small gear wheels } 6 in.	" 7½ "
Diameter of Back Shaft ...	1 "	Diameter of nose of } 5 in.	" 1½ "
Change Wheels, 22	½ in. Pitch	Steel Mandril ... } 6 in.	" 1½ "
6 in. Cone Pulley, 3 speeds	1½ in. broad		

Approximate Weight, with 6 ft. Bed, 10½ cwt.; 5 ft., 9 cwt.

PRICE, Sliding and Screw-cutting, 5 in. Centre, 5 ft. Bed	£31 10 0
6 in. Centre, 6 ft. Bed	35 14 0

Extra Length of Bed, per foot	2 0 0
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If made without Treadle, but with Overhead for Steam Power,	
5 in. Centre, 5 ft. Bed	30 0 0
6 in. Centre, 6 ft. Bed	34 0 0

If Self-acting, Sliding, Surfacing, and Screw-cutting (by Back Shaft	
and Leading Screw), extra	4 4 0

Poppet to set over, extra	1 0 0
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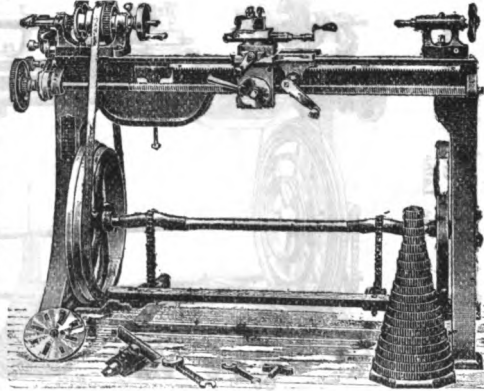
Neat cast iron gear covers can be fitted to enclose all exposed gearing, to conform to the requirements of the new Factory Act, at slight extra cost.

The Britannia Engineering Co., Ltd., Colchester, England.

LATHE, No. 50.

4 in. Centres, 4 ft. Bed.

SELF-ACTING, sliding, and screw-cutting Lathe with 4ft. gap bed, back-gear headstock, hollow steel mandrel with conical necks running in hard gun-metal bearings. Ball thrust bearing at end of mandrel and provided with steel lock nuts for taking up all wear, three speed cone pulley for flat band, and fitted with reversing gear for cutting right and left hand screws. The poppet or loose head has steel cylindrical mandrel, a left hand



square thread traverse screw and bright turned hand wheel, and made to set over for turning taper, and heads are fitted with best steel coned centres.

The saddle is strongly made and well scraped and fitted to bed with adjustable strips to take up wear, and carries a compound slide rest of modern construction, swivelling and graduated to turn at any angle. The bed is accurately fitted with V edges, the gap bridge piece being accurately fitted. The leading screw is of steel and accurately cut, double clasp nut with disengaging motion by eccentric, and quick return motion by rack and pinion is provided and fitted to saddle. The bed is planed at bottom and firmly bolted to two strong cast iron standards planed on top. The crankshaft runs on anti friction rollers. It is fitted either with easy running treadle, or can be had with overhead in lieu of treadle. The driving wheel is of large diameter and turned bright, with three speeds. A heavy counter-balanced fly-wheel is keyed to other end of crankshaft. A polished wooden tray is fitted at back extending the whole length of bed for holding tools, work, &c. Full set of change wheels, face and catch plate, eccentric hand rest and two tees, spanners, &c., are supplied.

DIMENSIONS.

Height of centre, 4 in.
Hole through mandrel, $\frac{7}{8}$ in.
Bed, width and depth, $5\frac{1}{2}$ in. by $4\frac{3}{4}$ in.
Gap, width and depth, 5 in. by $3\frac{1}{2}$ in.
Diameter and pitch of leading screw,
1 in. by $\frac{1}{4}$ in.
Cone pulley, 3 speeds, width 1 in.
Diameters of ditto, $4\frac{1}{2}$ in. $3\frac{3}{4}$ in., $2\frac{3}{4}$ in.
Width on face and pitch of gearing, $\frac{1}{4}$ in.
by $\frac{1}{16}$ in.

Diameter of wheels and pinions, $5\frac{1}{2}$ in. by
 $1\frac{3}{4}$ in.
Diameter of mandrel nose, 1 in.
Width on face and pitch of change
wheels, $1\frac{3}{4}$ in., $\frac{1}{4}$ in.
Balance flywheel, diameter and face,
 $21\frac{1}{2}$ in. by $1\frac{1}{2}$ in.
Diameter of driving cone pulley, $20\frac{1}{2}$ in.,
 $20\frac{1}{2}$ in. $19\frac{1}{2}$ in.
Admit between centres, 2 ft $4\frac{1}{2}$ in.
Approximate weight, 5 cwt.

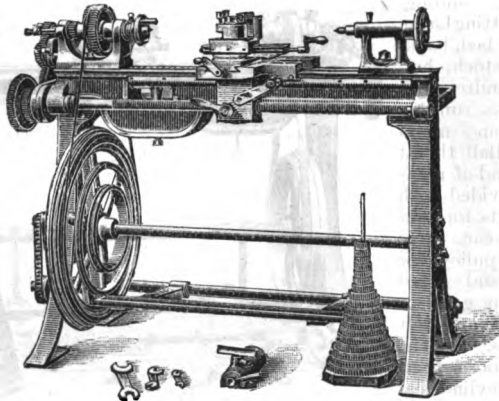
PRICE £20 0 0

The Britannia Engineering Co., Ltd., Colchester, England.

LATHE, No. 15.

With 4 ft. and 5 ft. Bels.

Chucks of every description.
Slide-rest Tools, and every requisite for
the Lathe.



Overhead motions similar to that shown
on Indian Lathe can be fitted to any
Lathe, from £5 5 0
Ornamental Drill Spindles, £2 2 0

SELF-ACTING, sliding and screw-cutting, with gap bed, back geared headstock, cast steel mandrel, conical necks running in hardened collars, steel lock nuts and back centre, cone pulley turned 3 speeds for gut band, fitted with reversing motion for cutting right and left hand screws. Compound slide rest with long bearings, accurately fitted to bed. The top slide is made to swivel and is guaranteed to 50° each side of centre to turn cones to any angle. The tail stock has cylinder mandrel, square thread traverse screw, bright turned hand wheel.

The bed is accurately planed, and is 6½ in. wide and 4½ in. deep. The gap is 4½ in. deep and 6 in. wide. STEEL leading screw 1½ in. diameter and ½ in. pitch; the gun metal nut for ditto is in halves to detach. The Lathe is fitted with rack and pinion for quick return. It has a full set of 22 change wheels to cut from 1 to 60 threads per inch, is fitted with steel centres, face plate, catch plate, double spanner. Strong iron stand with improved treadle motion, with adjustable outside crank and friction rollers, or with ORDINARY CRANK and PITMAN. The 4 ft. Lathe measures between centres 2 ft. 6 in. SWINGS 1 ft. 4 in. IN GAP. The fly-wheel is counterbalanced and has 5 speeds. Weight of 4 in. Lathe about 5 cwt. The mandrel has ½ in. hole through. If larger is required price will be extra.

These Lathes can be fitted with overheads for steam power at same price as for foot power. The gear wheels in the headstock of this lathe are machine cut.

PRICE, 4 in. centre	£25 4 0
4½ in. centre	26 15 6
5 in. „	28 7 0
If Self-acting and Surfacing by back shaft, extra	4 0 0
If with Flat speed pulleys, extra	1 1 0
Set over Poppet, extra	1 10 0
If with 5 ft. bed, extra	2 0 0
Quick withdraw motion to Slide Rest, extra net	1 10 0

The 5 in. flat speed belt pulleys have 3 speeds, 3½, 4½ and 6½ in., 1 in. gearing, ¼ in. face, 6½ in. diameter, 10 pitch.

The 4 in. flat speed belt pulleys have 3 speeds, 2½, 3½ and 5½ in., 1 in. gearing, ¼ in. face, 5½ in. diameter, 12 pitch.

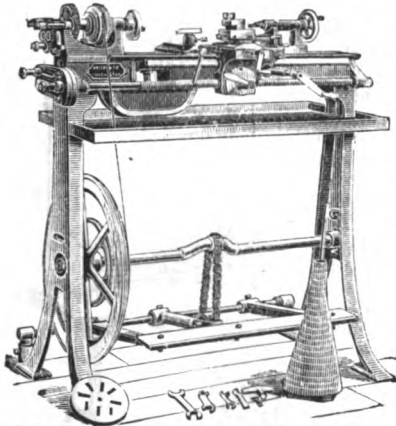
NOTE.—The Leading Screws and Wearing Parts are Steel.

The Britannia Engineering Co., Ltd., Colchester, England.

NEW AND IMPROVED SELF-ACTING & SCREW-CUTTING LATHE, No. 14.

3½ in. Centres.

3 ft. 6 in. Bed.



This is a self-acting sliding and screw-cutting Lathe of new design of 3½ in. centre and with 3 ft. 6 in. gap bed. The fast Headstock is well constructed with back gearing, hard steel mandrel, conical neck, adjusting cone at back end to take up wear, and running in hardened steel collars, three-speed cone pulley for gut band and fitted with reversing gear to cut right or left-hand screws. The poppet head has a steel cylindrical Mandrel, a left hand square thread traverse screw, and bright turned hand-wheel, best steel centres, cone-fitted.

The saddle is strongly made, with flush top and T grooves for bolting work to, for boring; well scraped and fitted to bed, with adjustable strip to take up wear, and carries a compound slide rest of modern design, swivelling and

graduated to turn at any angle; improved tool-holder.

The Bed is cast-iron, V edges, all machine planed, 3 ft. 6 in. long, 4½ inch on face, 3½ inch deep, with gap 5 inch wide and 3½ inch deep, with bridge piece properly fitted.

The leading screw is steel, accurately cut ¼ inch pitch and 1 inch diameter, with double gun-metal nuts, disengaging by eccentric motion, and the saddle is fitted with rack and pinion for quick return motion.

The Bed is planed at bottom and firmly bolted on strong cast-iron standards, planed at top faces.

The mandrel has ⅛ inch hole through. If larger is required, price will be extra. The Crank Shaft and Treadle Shaft run in self-adjusting, swivelling bearings. The Treadle is made with three cast-iron arms, and bright turned shaft, and connected with the bright turned crank shaft by anti-friction chain and roller. The driving wheel is 24 in. in diameter, bright turned, with three top speeds and a small speed for slow motion. A polished tool tray is neatly fitted between the standards, extending back and front to hold tools, small work, &c. It has a full set of 22 change wheels, 14 pitch ⅝ inch face, face and catch plates, eccentric hand rest and 2 tees, spanners, keys, &c., &c. It will admit 25 inch between centres, 5½ inch diameter over saddle, 7 inch over Bed and 14½ inch in the gap.

Height from centro to floor is 3 ft. 8 in. Approximate weight, 430 lbs.

PRICE £18 18 0

As Bench Lathe only, £16 5 0

NOTE.—The gear wheels in the head of this Lathe are machice cut.

Quick Withdraw Motion to Slide Rest 30/- extra.

If with Cone Speed and Driving Wheel for Flat Belt, 21/- extra.

Overhead Motion, similar to Lukin Lathe, £5 5s.

Drill Spindle for Ornamental Turning, 30/- extra.

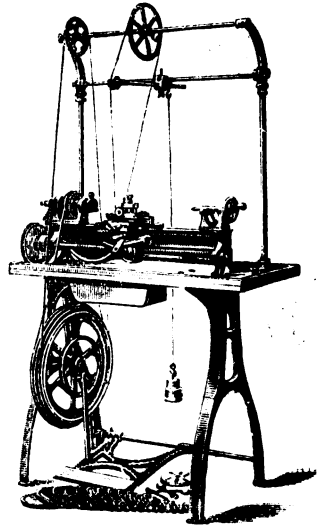
The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED SELF-ACTING, SLIDING AND SCREW-CUTTING GAP BED LATHE, No. 13.

SUPERIOR FINISH, BEST MATERIAL & WOKKMANSHIP.

SPECIFICATION.

THREE inch centre, 30 in. gap bed; the headstock is back-geared, with cast steel spindle hollow, to take $\frac{1}{4}$ in. rod, conical necks, steel lock nuts and back centre, coned pulley, turned three speeds for gut band, fitted with reversing motion for cutting right and left-hand screws; compound slide rest on carriage with long bearings accurately fitted and scraped to bed, and well gibbed. The top slide is made to swivel, and is graduated to 50° each side of centre to turn cones to any desired angle; strong tool holder with steel screws made to swivel; tail stock of good design, cylinder mandrel, square thread traverse screw, bright turned hand wheel. The bed (machine planed) is $3\frac{1}{2}$ in. on face, $2\frac{1}{2}$ in. deep, with gap $2\frac{1}{2}$ in. deep and $2\frac{1}{2}$ in. wide. The leading screw is $\frac{3}{8}$ in. diameter, $\frac{1}{4}$ in. pitch, accurately cut; the gun-metal nut is in halves to detach, and the lathe is fitted with rack and pinion for quick return motion. It has a full set of 22 change wheels to cut screws from one to sixty threads per inch, it is fitted with face plate, catch plate, steel centres, double spanner, and mounted on an iron stand with polished wood top and drawer; flywheel 20 in. diameter with four turned speeds, treadle motion, &c., complete. Measures between centres 19 in., swings $10\frac{1}{2}$ in. by $2\frac{1}{8}$ in. in gap, 6 in. over the bed, and $4\frac{1}{2}$ in. over the carriage. Total weight about $2\frac{1}{2}$ cwt.



PRICE (without Ornamental Overhead)	£15 15 0
With 3 ft. Gap Bed	16 16 0
„ 3 ft. 6 in. Gap Bed	17 17 0

Overhead motion for ornamental Turning, as illustration, £3 15 0

Drill Spindle, £1 10 0 extra.

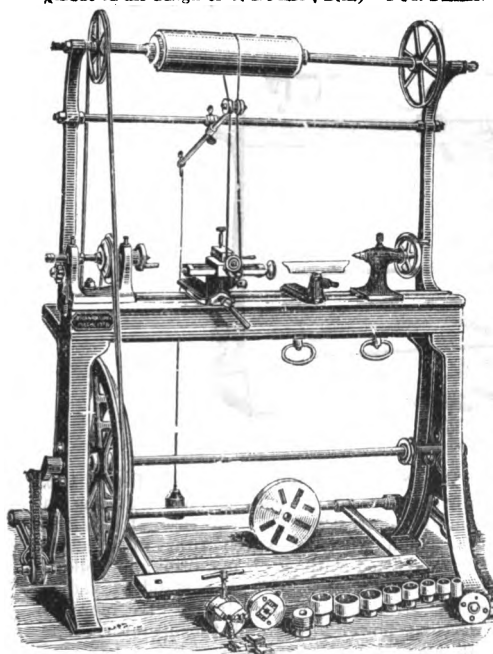
Extra hard Mandrel and Collars, £1 10 0 extra.

Self-surfacing off leading Screw, extra, £2 10 0

The Britannia Engineering Co., Ltd., Colchester, England.

THE "LUKIN" LATHE.

(Made to the design of J. LUKIN, B.A.) FOR PLAIN & ORNAMENTAL TURNING.



THE annexed engraving represents our ornamental Lathe, made with 5 in. centres, and 4 ft. straight bed.

The fast headstock is made with steel traversing mandrel running in hardened steel collars and fitted with six screw guides or "formers" of different pitches, one being that of the mandrel nose and others selected at pleasure. These work in a segment plate adjustable into and out of gear with the former by eccentric motion, and enable short screws in brass, wood or ivory, such as fittings for optical or electric work, or wood boxes, ivory ornaments, &c., to be cut with great facility and accuracy. A plain sleeve is provided, to be used in place of the screw "former" when plain turning is to be done, or when screw cutting is only temporarily interrupted, a simple device is provided to avoid taking off and putting on screw guide and sleeve.

The cone pulley is made of gun metal with 3 or 4 speeds, and its front fitted with a division plate having 3 or more circles of holes of any selected numbers, and a spring index point. A driver chuck and face plate are fitted.

The loose head or poppet is fitted with a steel tubular mandrel, coned at front end for

centres, and screwed at back end and fitted with a left-hand square thread traversing screw and bright turned hand wheel, and secured to bed by a through bolt and bow nut and plate beneath. A plain hand rest and tees for wood and metal is fitted. The bed is of cast iron of strong section, without cross ribs to impede the free passage of poppet and rest from end to end, and with double flat face, truly planed. It is mounted on strong cast iron standards. The trestle is fitted with bright turned rocking shafts and cast iron arms, the bright turned wheel shaft runs on friction rollers, and is coupled to the rocking shaft by chain and roller gearing. The heavy rimmed driving wheel has 3 quick speeds, and 2 smaller for slow motion. It can be fitted with dip crank shaft running on centres and hooks or chains if desired.

The lathe is fitted with a polished mahogany tool board at back.

The ornamental overhead is constructed with strong rigid cast iron vertical supports, carrying the bright turned shafts, and has a turned and polished mahogany drum to slide along the grooved shaft, and driving wheels with tension roll and pulleys for adjusting the driving gut.

The ornamental slide rest is of good construction, all accurately fitted, and a plain ordinary compound slide rest for heavier metal turning can also be fitted. Other chucks and fittings can be adopted or added at pleasure.

DIMENSIONS.

Height of centres 5 in.
Length of bed (which may be varied), 4 ft.
Across face of bed, 4½ in.
Depth of bed 4½ in.

Diameter of nose of mandrel, 1 in.
Pitch of screw, 8 per inch.
Diameter of driving wheel, 27 in.;

PRICE OF LATHE ALONE, with Headstock, Poppet and Hand Rest, as above described 223 10 0

Ornamental Overhead Motion, as described 7 10 0

Ornamental Slide Rest 15 15 0

Plain Slide Rest 5 0 0

Ornamental Drill Spindle 1 10 0

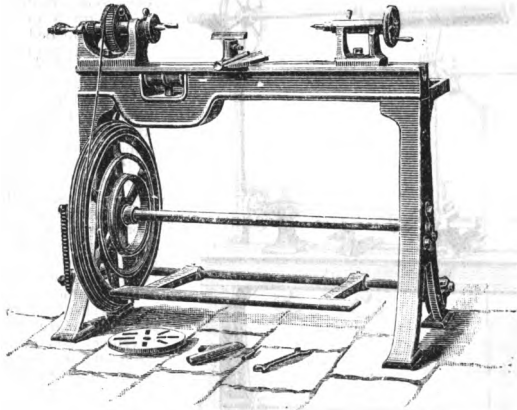
Division Plate 2 10 0

PRICE extra if Bed be 4 ft. 6 in., 12/6, or 5 ft. long, 25/-; extra if Bed be made with Gap, 20/-
Oval, eccentric, geometric or any of the Chucks or appliances in our list can be fitted at list price.

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED FOOT LATHE, No. 5.

4 in. to 6 in. centres.



THIS is a Lathe with a heavy Bed, Standards, and Fly wheel. Bed is 4 ft. long and 4½ in. on face; total weight of Lathe about 4½ cwt. It has an Improved Treadle Motion, combining great power with ease of motion; the bright turned Shaft on which wheel is keyed runs in Friction Rollers at each end. The Head is fitted with steel mandrel and collars. The Crank (as illustration shows) is *outside* the left hand standard, and is slotted in order that the driving stud may be adjusted to give more or less leverage to increase or decrease power at will of the operator. The Fly Wheel is counterbalanced to avoid dead centre.

Each Lathe is accompanied by Hand Rest with two Tees, two Face Plates (large and small), two Plain Centres, and Spanners.

4 in. Centre (¾ in. Nose)	£11 0	Back Geared (1 in. Nose)	£13 0
4½ in. „ ¾ in. „	11 10	„ 1¼ in. „	13 15
5 in. „ ¾ in. „	12 0	„ 1½ in. „	14 10

Gap Bed, £1 extra.

Slide Rests and Chucks as per list.

Extra large Face Plate to suit, £1 extra.

5 ft. Bed, £1 extra.

A similar Lathe, with 5 in. centre, heavier bed, 5½ in. on face, 5 ft. long, weight about 5½ cwt.—

Single Geared ... £14 Back Geared ... £16

Gap Bed, £1 extra. If with 6 ft. Bed, £1 extra.

Headstocks fitted with extra hard Mandrel and Collars, 30s. extra.

If with 6 in. centres, £1 extra.

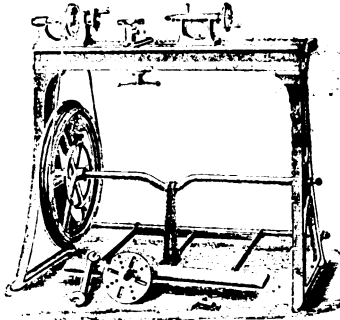
The above Lathes can be fitted with Hooks and Cranks instead of Chains. The Lathes with 4 ft. Bed will measure 2 ft. 4 in. between Centres.

Overhead similar to the Lukin Lathe, £5 5

Drill Spindle, 30/- Division Plates to order.

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED FOOT LATHE, No. 4.



THIS illustration represents an excellent Foot Lathe especially suited for Gas Fitters, Jewellers, Dentists, or Amateurs.

It has a machine-planned iron Bed, 3 ft. long, on strong iron standards, with 4-speed turned fly-wheel, and an easy, light-running treadle movement.

The single-gear headstock has a steel mandrel, with hard-coned neck running in hard collar.

The back-gear headstock has a steel mandrel, with reverse cones (adjustable to take up wear), and running in steel collars, steel-coned centre, 3-speed turned coned pulley.

The tailstock has cylinder mandrel, with square thread steel traversing screw and steel-coned centre. Each Lathe is accompanied by hand rest, with two tees, two face plates (large and small), two plain centres, spanner, and tool table. The 3 ft. Lathe takes 1 ft. 6 in. between centres.

Slide Rests and Chucks as per List.

Strength and durability are obtained, in a high degree, without clumsiness.

Ordinary Tees, 4 in. and 9 in.; extra long Tee, 12 in., extra 3/6.

Gut Band with Hook and Eye, 3/6.

Approximate weight of 3 ft. 6 in. Lathe, 2 cwt. 3 qrs.

3½ in. Centre (½ in. Nose)	£8 0	Back Geared (1 in. Nose)	£10 0
4 in. " ¾ in. "	8 10	" 1 in. "	10 15
4½ in. " ⅞ in. "	9 0	" 1¼ in. "	11 10
5 in. " 1 in. "	9 10	" 1½ in. "	12 0

3 ft. 6 in. Bed, 10/- extra; 4 ft. 20/- extra.

If with Gap Bed and Bridge, £1 extra.

Extra Large Face Plate, to use with Gap Bed, £1.

Extra hardened Mandrel and Collars, 30/- extra.

Division Plates to order.

Fitted with Overhead similar to the Lukin Lathe, £5 5 0

Ornamental Drill, 30/- extra.

The Britannia Engineering Co., Ltd., Colchester, England.

BACK-GEARED LATHE, No. 3.



A **FIRST-CLASS**, well-finished Lathe, with machine-planed iron bed, plain or with gap; back-geared headstock, cast steel mandrel, conical necks, tail pin running through; adjustable screw and lock nuts to take up wear; 3-speed bright turned cone pulley; steel centres, tail-stock with cylinder mandrel, square thread traverse screw; eccentric hand rest and 2 tees and catchplate as shown.

Bed 30 in. long, and 3 in. centres, turning 18 in. by 6 in.

	£	s.	d.
PRICE without Stand, as Bench Lathe only, with back-geared headstock	4	0	0
Ditto, with back gear and gap bed	4	10	0
Ditto, with 3 ft. gap bed like No. 13 Lathe, extra	1	0	0
Face Plate, to suit, 5½ in. diameter	0	10	0
Slide Rest to suit	2	10	0
Foot Power Motion, to fix under Bench, with 4-speed turned fly-wheel, 20 in. diameter, treadle and frame complete, as illustrated	1	10	0
Substantial Iron Stand complete, with polished wood top and tool drawer, 4-speed turned fly-wheel, 20 in. diameter, treadle, &c.	2	0	0
Ditto, of a heavier make, with very heavy fly-wheel, as shown with No. 13 Lathe	2	10	0
Lathes fitted with extra hardened mandrel and collars, extra ...	1	10	0
Ditto, division plate and steel index	1	10	0

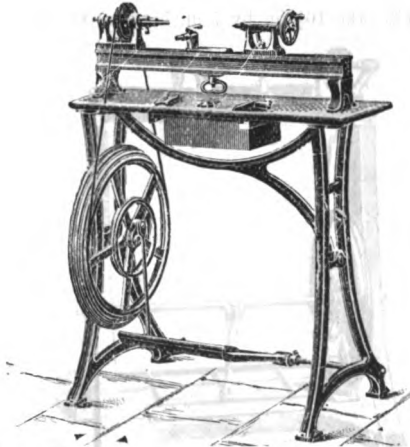
Can also be fitted with Fret Sawing Appliance, Circular Saws, Emery and Buff Wheels, Chucks, &c.

The Britannia Engineering Co., Ltd., Colchester, England.

LIGHT FOOT LATHES, Nos. 2 & 3.

Suitable for Amateurs, Jewellers, Dentists,

OR ANY LIGHT USE.



FIRST-CLASS well-finished Lathes with machine planed iron bed; headstock has steel mandrel with conical neck and adjusting screw and lock nut to take up wear; 3 speed bright turned cone pulley; hardened centres, driver chuck, cylinder mandrel with square thread traverse screw to tail stock; hand rest and 2 tees. Substantial iron stand with polished wood top and tool drawer, turned speed fly wheel, and easy treadle motion.

No. 2.

24 in. bed, 2½ in. centres, turning 14 in. long by 5 in. in diameter.

PRICE without stand, as Bench Lathe only	...	...	£1 15 0
Or with Stand, Fly-wheel, and Treadle complete	...	...	3 10 0
Foot-power Motion, with Treadle and Frame, and 18-in. Fly-wheel, as illustrated on page 120	...	...	1 0 0
Weight, about 117 lbs.			

No. 3.

30 in. bed, 3 in. centres, turning 18 in. long by 6 in. in diameter.

PRICE without Stand, as Bench Lathe only	...	...	£2 5 0
Or with Stand, Fly-wheel, and Treadle complete	...	...	4 5 0
If with Gap Bed, extra	...	...	0 10 0
Foot-power Motion, with 20 in. Fly-wheel, Treadle and Frame, as illustrated on page 120	...	...	1 10 0

Circular Saws, emery and buff wheels, can be used in these Lathes.

Fret Sawing Appliance to suit No. 3 Lathe, which attaches very easily to bed, and is driven by the Lathe, PRICE £1 10s.

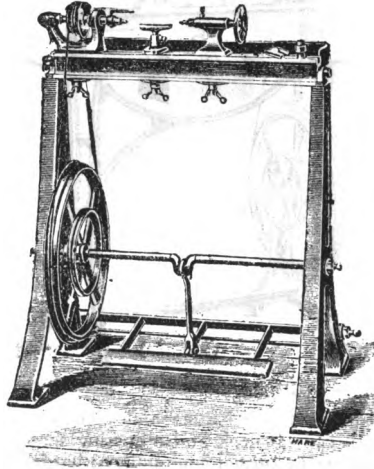
If fitted with extra hard Mandrels and Collars, 80/- extra.

The Britannia Engineering Co., Ltd., Colchester, England.

NEW SINGLE-GEARED LATHE, No. 8.

3½ in. Centres. 2 ft. 6 in. Bed.

Will take 16½ in. by 7 in. between Centres



THIS Lathe is introduced to supply a demand for a Lathe coming between our No. 3 and No. 4 patterns. It is fitted with gun metal mountings, and it can be recommended with confidence for general light turning and for amateurs, clock makers, &c.

It is thoroughly well made, and very light running. The fast head is fitted with best steel mandrel and best steel collar, both hardened, 4 speed turned cone pulley, nose $\frac{1}{8}$ in. Whitworth; the loose head has steel cylindrical spindle, square thread traverse screw, best steel centres, hand rest and 2 tees, machine planed cast iron bed $3\frac{1}{4}$ in. face, 3 in. deep, securely bolted to cast iron standards; wrought iron crank shaft and treadle, working on steel centres, turned speed fly wheel, tool board, leather driving cord, driver chuck, drill chuck, &c., complete. Weight 180 lbs.

PRICE	..	..	..	..	..	£6	10	0
Or with 3 ft. Bed	..	..	..	..	..	7	0	0

Slide Rest to suit, £3

Tools for both hand and slide rest kept in stock.

Any of the chucks in our general list can be fitted to any Lathe.

The Britannia Engineering Co., Ltd., Colchester, England.

CHEAP LATHE, No. 6.



THIS Lathe has been designed to meet the demand for a lower priced tool than No. 2 and 3 Lathes.

It has a planed iron bed 20 in. long; $2\frac{1}{2}$ in. centre heads, which can easily be blocked up to 4 in. for wood turning, will admit 11 in. between centres. It is fitted with a well-designed stand with a turned fly wheel, 19 in. diameter. Each Lathe has a spanner, hand-rest and two tees, driving chuck and centres, drill chuck, and fork centre for wood.

The "catch-plate" shown in illustration has been replaced by a more convenient "driver chuck."

Weight about 84 lbs.

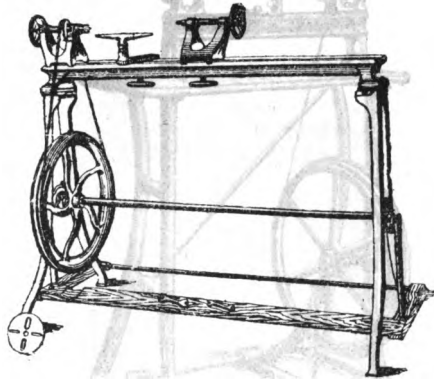
PRICE, complete	..	..	..	£2 15 0
Slide Rest to suit	..	..	..	2 0 0

Even this, our cheapest Lathe, has a conical mandrel.

Beware of so-called cheap Lathes which have no provision for taking up wear.

The Britannia Engineering Co., Ltd., Colchester, England.

CHEAP WOOD-TURNING LATHE, No. 10.



THE very great demand for a cheap but efficient Lathe for wood turning, with long bed and high centres suitable for pattern-makers, joiners and amateurs, has led us to introduce the above, and we fix the price so low as to bring it within the reach of the million.

It is entirely constructed of Iron and Steel except the treadle, which is of hard wood for quietness and lightness.

The planed cast iron bed is 4 ft. long, 4 in. wide, 4 in. deep, iron standards, arranged with adjusting swivelling bearings for the steel wheel shaft. The driving wheel has two speeds, and is 21 in. diameter. The parallel bearings of the Fast Head are split and fitted with screws to take up wear.

The steel mandrel is made with a collar forged on, with a $\frac{3}{4}$ in. nose screwed Whitworth standard, to which most of our ordinary chucks may be at any time fitted; the tail end of this mandrel carries a balance wheel. The cone pulley has two speeds corresponding with driving wheel.

Turned steel centres with taper shanks to fit into spindles. Face plate 5 in. diameter, Fork driver Chuck, Hand Rest and 9 in. Tee; Spanner and Belt are sent with each Lathe.

DIMENSIONS.

Height from floor to top of bed, 36 in.
Height of centres from bed, 5 in.
Extreme distance between centres, 36 in.
Total weight, 144 lbs.

PRICE, complete £4 10 0

The Britannia Engineering Co., Ltd., Colchester, England.

APPLIANCES FOR LATHES.

MANY of the foregoing Lathes have hollow mandrels and are listed as such. Those which have not can be so fitted if desired, drilled 5 in. up at from 10/- extra, or, if hollow quite through from 20/- extra.

If with extra hardened and finished Mandrels and bushes, extra 30/-

Self-Acting Screw Cutting Lathes. can be fitted for Self-Acting, Surfacing also, either from the Leading Screw (in small sizes), or by Back Shaft (in larger sizes), at from £2 10 0 extra.

Boring Collars—

For ... 3 4 4½ 5 6 7½ 9 10 12 in. centre Lathes.
PRICE 15/- 17/6 20/- 25/- 30/- 37/6 45/- 50/- 55/-

Back Stays—

10/- 12/6 12/6 12/6 15/- 20/- 25/- 30/- 35/-

Division Plates can be fitted to any of the foregoing Lathes, either to Single or Double Geared Headstocks, and with one, two, three, four or more circles of holes, including Spring Index Point, at from 10/- to 60/- extra; about 5/- per 100 holes.

Ornamental Slide Rests, from £6 10 0 each.

Ornamental Tool Cutter Receptacle. 15/-
Cutters, 1/6 each.

Eccentric Cutting Instruments, from £3 10 0 each.

Ornamental Cutters, for above, 18/- to 24/- per dozen.

Drilling Instruments, for Ornamental Work, from £1 10 0

Ornamental Drills, for above, 1/6 and 2/- each.

Vertical Cutting Instrument, for Wheel Cutting, Fluting, Slotting, Nicking Heads of Screws, £4 4 0. Cutters for ditto, 10/- each.

Eccentric Chucks, with Ratchet Wheel and Detent, Rectilinear Slide and Screw, Ratchet Nose, at £8, £12, and £15, according to size and construction.

Oval Chucks, at £9, £12 10 0 and £16, according to size and construction.

Geometric Chucks, from £25 to £90.

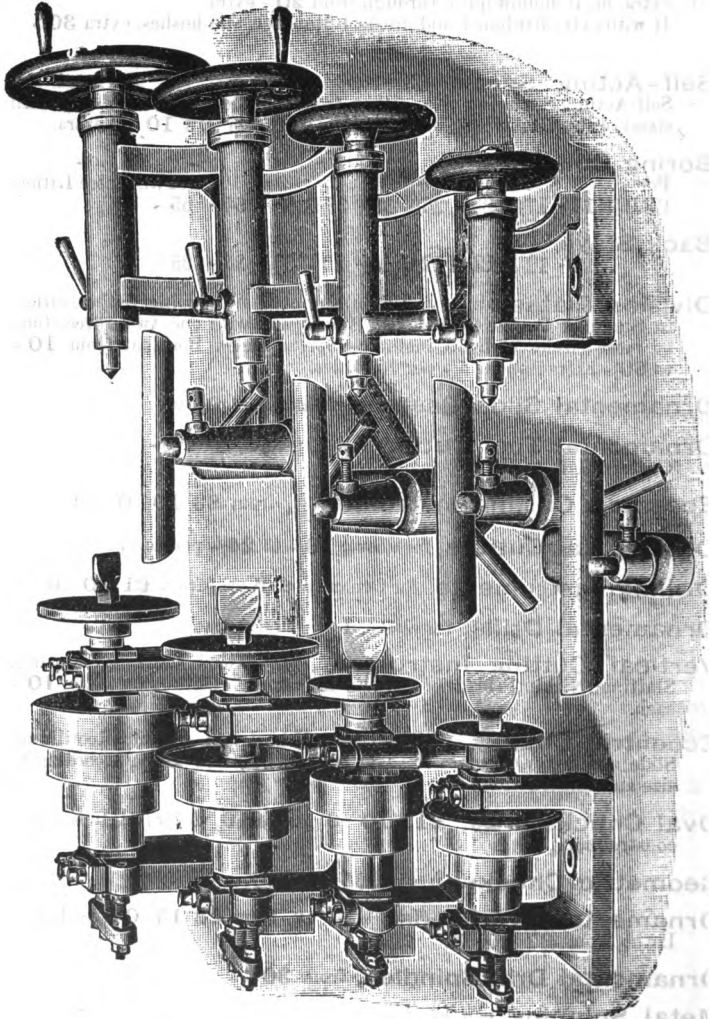
Ornamental Overheads, as No. 13, from £3 15 0; as Lukin Lathe from £7 10 0.

Ornamental Drill Spindles, from 30/-

Metal Spinning can be done on almost all our Lathes. See our Lathe Book.

The Britannia Engineering Co., Ltd., Colchester, England.

LATHE HEADS FOR WOOD TURNERS, &c.



For description see page 127.

The Britannia Engineering Co., Ltd., Colchester, England.

LATHE HEADS FOR WOOD TURNERS, &c.

For illustration see page 126.

WE make loose headstocks, as illustrated on preceding page, to meet the demand of those who require an efficient apparatus for wood turning, but do not want to go to the expense of purchasing a complete Lathe.

The frames of headstocks are cast solid, and spindles are steel with provision at ends for taking up wear.

Bearings are of gun metal, and adjustable.

With each set we supply one face plate drilled and countersunk for bolting on work ; one wing centre, one rest and two tees.

We fit them with either cone as shown, or fast and loose pulleys.

PRICES.

5 in. centres	...	...	...	£4 10 0
7 " "	...	...	...	5 15 0
8 " "	...	...	...	6 5 0
9 " "	...	...	...	7 0 0
12 " "	...	...	...	9 5 0

Holding-down bolts, extra, from **8/6** per set.

Countershaft from **65/-**

The Britannia Engineering Co., Ltd., Colchester, England.

LATHE HEADSTOCKS.

OF SUPERIOR QUALITY, NEW DESIGNS, AS SHOWN ON
OUR LATHES.

Complete with Face and Catch Plates, Hand Rest, and Two Tees.

Under 3½ in. have no Face Plate. Face Plates are charged extra for Lathes
under 3½ in.

PRICE, single geared for gut or flat band.

2½ in.	3 in.	3½ in.	4 in.	4½ in.	5 in.	6 in.	7½ in.	9 in.
25/-	35/-	70/-	80/-	90/-	100/-	120/-	160/-	200/-

Back geared for gut,

3 in.	3½ in.	4 in.	4½ in.	5 in.	6 in.
70/-	110/-	125/-	140/-	150/-	190/-

Extra strong for flat band

6 in.	7½ in.	9 in.	10 in.	12 in.
260/-	290/-	330/-	450/-	600/-

Extra hard Steel Mandrel and Collars, from 30/- extra.

Back Geared Headstocks for flat band, 6 in. and under, 21/- extra.

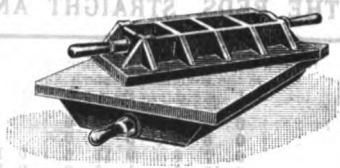
CHANGE WHEELS.

FOR SCREW-CUTTING LATHES.

	Nos.	14	12	10	8	7	6½
Pitch	Ins.	⅜ full	½	⅝	¾	⅞	1
PRICE in Rough	...	11/6	15/-	28/-	46/-	64/-	85/- per set of 22
Bored, Turned, Key- wayed and Machine Cleaned	...	23/-	30/-	56/-	70/-	90/-	110/- " "
Machine Cut out of Solid	...	36/-	42/-	67/6	100/6	150/-	190/- " "

The Britannia Engineering Co., Ltd., Colchester, England.

SURFACE PLATES.

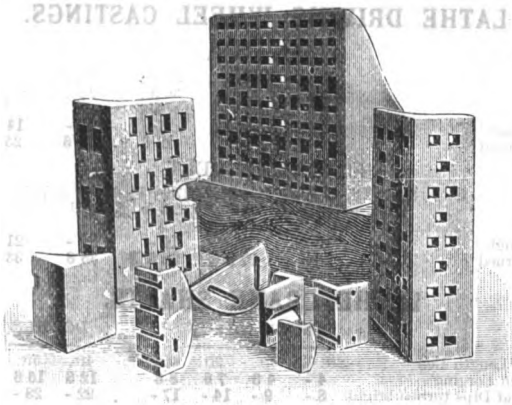


Made from specially prepared close-grained iron, carefully planed, and scraped perfectly true; well ribbed, thick and heavy, turned handles, fitted with lock nuts.

PRICES.—8 in. by 4½ in.	£0 17 6
12 in. by 6 in.	1 10 0
15 in. by 9 in.	2 10 0
18 in. by 14 in.	4 0 0

Other sizes always in stock. Prices will be quoted on receipt of details.

ANGLE BRACKETS.



We make a large variety of 'Angle' Brackets, some of the patterns being shown in engraving, but as customers' requirements are so varied, we shall be pleased to quote specially on receipt of full details of size, etc., required.

The Britannia Engineering Co., Ltd., Colchester, England.

LATHE CASTINGS, in Rough or, Part Finished.

PLAIN LATHE BEDS, STRAIGHT AND GAP.

Catalogue No.	Length.	Face.	Depth.	Price of Castings in the Rough.			Price Machine Planed.			Gap Beds in the Rough.			Gaps fitted in and Planed.		
				ft.	ins.	ins.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
6	0 20	by 2	by 2	0	2	8	0	5	8	—	—	—	—	—	—
2	2 0	" 2	" 2	0	6	0	0	9	0	—	—	—	—	—	
3	2 6	" 2½	" 2½	0	7	8	0	11	8	0	10	8	1	1	0
4	3 0	" 4½	" 3½	0	13	0	1	6	0	0	18	0	2	0	0
4	3 6	" 4½	" 3½	0	15	0	1	10	0	1	0	0	2	5	0
5	4 0	" 4½	" 4½	1	0	0	1	17	0	1	7	8	2	15	0
5	5 0	" 5½	" 5½	1	10	0	2	15	0	2	0	0	3	15	0
5	6 0	" 5½	" 6½	1	15	0	3	2	6	2	5	0	4	5	0

SCREW-CUTTING LATHE BEDS, WITH GAPS.

Catalogue No.	Length.	Face.	Depth.	Price of Castings in the Rough.			Prices with Gaps fitted in and Planed.		
				ft.	ins.	ins.	£	s.	d.
13	2 6	by 3½	by 3	0	18	0	2	0	0
13	3 0	" 3½	" 3	1	0	0	2	5	0
14	3 6	" 4½	" 3½	1	5	0	2	10	0
15	4 0	" 6½	" 4½	1	10	0	3	0	0
15	5 0	" 6½	" 4½	1	15	0	3	10	0
16	5 0	" 7½	" 5½	2	5	0	4	10	0
16	6 0	" 7½	" 5½	2	12	6	5	5	0
17	6 0	" 8½	" 6	3	7	6	6	0	0
17	7 0	" 9	" 7	4	7	6	8	0	0

Larger Lathe Beds to any size to order.

LATHE DRIVING WHEEL CASTINGS.

FOR GUT.

Diameter	14 in.	18½ in.	20 in.	20 in.	24 in.	27 in.
Weight	17 lb.	28 lb.	36 lb.	59 lb.	82 lb.	124 lb.
No. of Speeds	3	4	4	4	4	5
PRICE in Rough	3/-	4/9	6/-	10/-	14/6	21/-
Bored and Turned	7/-	9/-	12/6	17/6	25/6	34/-

FOR FLAT BELT.

Diameter	in.	20 by 1½	20 by 1½	25½ by 1	27 by 1½	27 by 2½	27 by 1½	27 by 2
Weight	60 lb.	60 lb.	95 lb.	118 lb.	130 lb.	125 lb.	183 lb.	
No. of Speeds	3	3	3	3	4	3	4	
PRICE in Rough	10/-	10/6	16/-	19/-	22/-	21/-	30/6	
Bored and Turned	17/6	18/6	27/9	32/6	35/6	33/6	52/-	

LATHE CRANK SHAFTS.

SINGLE THROW.

DOUBLE THROW.

For Lathes of Length Bed	2ft. 6in.	3ft.	3ft.	4ft.	4ft.	5ft.	6ft.	7ft.
PRICE, Rough Forging	4/-	4/6	7/6	8/6	12/6	16/6	18/6	21/-
With Shaft and Dips turned bright	8/-	9/-	14/-	17/-	22/-	28/-	32/-	36/-

Anti-friction Roller Bearings for Crank Shaft, 17/6 per pair.

COMPOUND SLIDE REST CASTINGS.

For Lathes of Height Centre	2	2½	3	3½	4	4½	5	6	7	8	10 ins.
PRICE, Rough	2/8	2/8	2/9	4/-	5/6	6/9	11/-	13/-	—	22/-	40/-
Planed	6/-	6/-	9/-	11/6	16/-	18/6	22/-	30/-	33/-	60/-	100/-

The Britannia Engineering Co., Ltd., Colchester, England.

LATHE CASTINGS,

IN ROUGH OR PART FINISHED.

CUT GEAR WHEELS OF ANY SIZE TO ORDER.

Special quotations for Bevel and Mitre Wheels, Racks, &c.

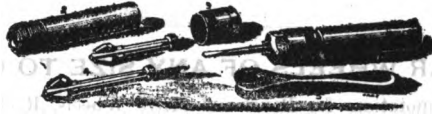
CASTINGS FOR LATHE HEAD STOCKS & RESTS.

Catalogue No.	Height of Centres. Inches.	Component Parts of Sets.	Prices in the Rough.			Do. Heads Bored and Planed.		
			£	s.	d.	£	s.	d.
SINGLE-GEARED.								
2	2½	Headstock, Cone Speed, Driver Chuck, Poppet, Hand Wheel Cap, Barrel and Screw, Mandrel, Cast Steel for Centres, Holding Down Plates, Hand Rest, and Two Tees	0	10	0	0	14	0
3	3	Do. do. and Locking handle ...	0	12	0	0	17	0
4	3½	Do. do. and Face & Catch Plates	1	5	0	1	14	0
4 or 5	4	Do. do. do. do. do.	1	7	6	1	17	6
4 or 5	4½	Do. do. do. do. do.	1	10	0	2	1	0
4 or 5	5	Do. do. do. do. do.	1	15	0	2	7	0
5	6	Do. do. do. do. do.	2	5	0	2	19	0
BACK-GEARED.								
3	3	Headstock, Cone Speed and Pinion, Two Gear Wheels and Pinion, Catch Plate Poppet, Hand Wheel and Handle, Cap, Barrel and Screw, Back Cone, Locking Handle, Gear Knob and Bolt, Mandrel, Tail Pin, Cast Steel for Centres and Back Shaft	0	15	0	1	1	6
4	3½	Do. do. and Face Plates and Gun Metal Bushes ...	1	10	0	2	0	0
4 or 5	4	Do. do. do. do. do.	1	15	0	2	7	0
4 or 5	4½	Do. do. do. do. do.	2	0	0	2	13	0
4 or 5	5	Do. do. do. do. do.	2	5	0	2	19	0
16	5	Do. do. do. Gut speed	3	3	0	3	19	0
16	6	Do. do. do. do. do.	3	7	6	4	3	6
16	5	Do. do. Flat Speeds with Eccentric Back Barrel and Shaft	3	7	6	4	4	0
16	6	Do. do. do. do. do.	3	10	0	4	6	6
17	6	Do. do. do. do. do.	5	17	6	7	7	6
17	7	Do. do. do. do. do.	6	10	0	8	2	0

The Britannia Engineering Co., Ltd., Colchester, England.

THE ESSEX CHUCK

Is a self-centring, three-jawed Steel Chuck, carefully made, durable and convenient.



No. 1 is the complete Chuck with drill in to show its use. No. 2 is the Shank or Plug when taken in pieces. No. 3 is the Cap. No. 4 are the Dies (two sizes). No. 5 is the Spanner to screw up the cap.

For accuracy and efficiency it equals the best, whilst its simplicity permits of its being produced at about half-price.

It is all steel, the wearing parts hardened.

The Jaws have a good bearing on the Drill, and hold securely either straight or taper shanks from $\frac{1}{4}$ in. down.

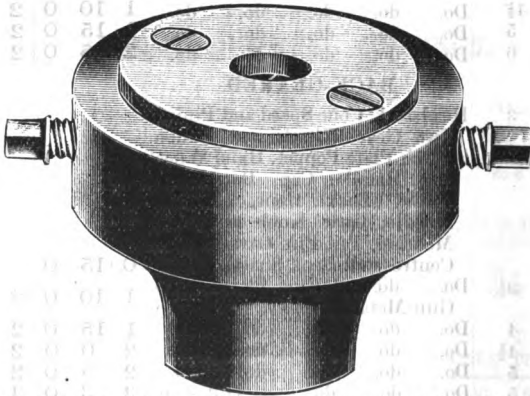
It is finished with parallel shank or plug, left soft, which can be easily fitted to any lathe by turning taper or other form as may be necessary.

PRICE 10/-

A larger size, with 4 Dies, taking from $\frac{1}{2}$ in. down to nothing, price 25/- each.

NEW CHEAP DIE CHUCK.

Is simple, durable, and remarkably cheap.



UNLIKE Scroll Chucks, they can be used either concentric with or eccentric to the Lathe centre. They have back plates with plain hole, ready for screwing to fit any lathe. They have a wide range of work, and from their simplicity of construction are free from liability to get out of order.

Diameter.	Size of Lathe to suit.	Range.	Price.
$2\frac{1}{4}$ in. ..	$2\frac{1}{2}$ in. to $3\frac{1}{2}$ in. ...	$\frac{1}{8}$ in. to $\frac{1}{2}$ in. ...	20/-
$4\frac{1}{2}$ in. ...	4 in. to 6 in. ...	$\frac{1}{4}$ in. to 1 in. ...	25/-

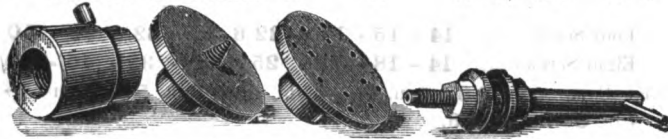
Fitting to Lathe extra, about 2/6.

The Britannia Engineering Co., Ltd., Colchester, England.

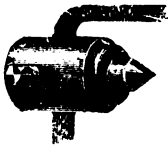
PRICE LIST OF VARIOUS USEFUL CHUCKS.



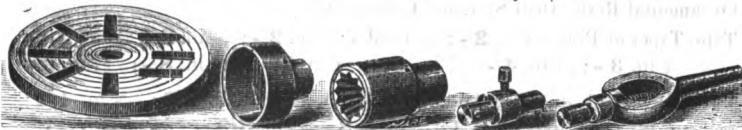
- | | | |
|--------|---|---------------|
| 1. | Pronged Chuck for Wood, $\frac{3}{8}$ in. shank | £0 2 6 |
| 2. | Cross or Four-blade-Chuck for hard wood, $\frac{3}{8}$ in. shank .. | 0 3 0 |
| 3. | Square Tapered-hole Chuck to suit ordinary brace bits,
$\frac{3}{8}$ shank | 0 3 0 |
| 4. | Solid Gun Metal Chuck, $\frac{3}{8}$ in. shank, face left solid and
plain to turn to requirements | 0 1 6 |
| 5 & 6. | Main chuck, turned and tapped to fit nose of mandrel,
and with $\frac{3}{8}$ in. hole at other end, to receive the "Essex"
and other small chucks | 5/- and 0 7 6 |



- | | | |
|----|--|--------|
| 7. | Flange Chuck, 2 in. diameter, with taper screw for wood
in centre | £0 6 0 |
| | Ditto, ditto, 4 in. diameter | 0 7 6 |
| 8. | Flange Chuck for attaching flat wood to, bored and tapped
to fit mandrel nose, and drilled and countersunk at
back, 3 in. diameter | 0 5 0 |
| | Ditto, ditto, 6 in. diameter | 0 7 6 |
| 9. | Mandrel with Screw Collars for holding saws, emery wheels, grindstones,
&c., as below— 6 in., 6/-; 8 in., 8/-; 10 in., 10/6; 12 in., 12/6 | |
| | 10. Driver Chucks .. each 5/- and | 0 7 6 |
| | 11. Face Plates—8 in., 10/-; 8 in., 15/-;
12 in., 20/-; 16 in., 30/-; 18 in., | 1 15 0 |
| | 12. Gun Metal Cup Chucks, of various diam.
$\frac{3}{4}$ in., 2/6; 1 in., 3/-; 1 $\frac{1}{4}$ in., 4/-;
1 $\frac{1}{2}$ in., 5/-; 2 in., 6/6; 2 $\frac{1}{2}$ in. 8/-;
and 3 in., 10/- each .. the set | 1 19 0 |
| | 13. Self-centring Chuck for wood, with conical
hole ribbed longitudinally 5/- and | 0 7 6 |



10

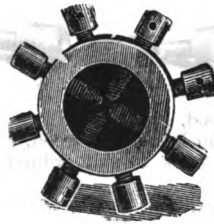


- | | | |
|-----|--|--------|
| 14. | Drill Chuck, $\frac{3}{8}$ in. hole, with set screw and extra plug for
small drills, $\frac{3}{8}$ in. shank | £0 4 6 |
| 15. | Lathe Carriers, steel screws, turned shanks— $\frac{3}{8}$ in., 1/4; $\frac{1}{2}$ in., 1/8;
$\frac{3}{4}$ in., 2/-; 1 in., 2/6; 1 $\frac{1}{4}$ in., 3/-; 1 $\frac{1}{2}$ in., 3/6; 1 $\frac{3}{4}$ in., 4/6; 2 in., 5/- | |

The above Chucks are cut to Whitworth Standard Pitches; Chucks with odd threads or bastard pitches can be cut to order at Special Prices.

The Britannia Engineering Co., Ltd., Colchester, England.

USEFUL LATHE APPLIANCES.



Bell Chucks—As illustration.

Outside diameter } inches }	2	3	4	5	6	7	7½	10
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Four Screws ... 14/- 15/- 17/6 22/6 25/- 32/6 38/- 50/-

Eight Screws ... 14/- 18/- 22/- 25/- 30/- 38/- 45/- 60/-

Circular Saws—2 in. 2/6; 3 in. 3/-; 4 in. 4/-; 5 in. 5/6; 6 in. 7/-; 7 in. 8/-; 8 in. 9/6.

Platforms for ditto, with adjustable tables—6 in. by 8 in. 12/6; 8 in. by 12 in. 15/-

Emery Wheels—3 in. 3/-; 4 in. 4/-; 6 in. 4/6.

Buff Polishing Wheels—3 in. 1/-; 4 in. 2/-

Grindstones with Troughs—4 in. 3/6; 5 in. 4/-; 6 in. 5/-

Best Polishing Bobs, 2/- each.

Polishing Brushes, 1/- each.

Wire Polishing Brushes, 1/6, 2/-, 2/6.

Oval, Eccentric, and Ornamental Chucks made to order.

Square, Half-round, and Female Centres, from 1/6 each.

Screw Chasing Tools, internal and external—Price per pair, handled, from 40 to 12 threads per inch, 3/-; from 11 to 6 threads, per inch, 4/-

Milling Wheels with handles, 2/- each.

Metal Spinning Tools, 2/- each.

Ornamental Rests, Drill Spindles, Cutters, &c.

Taps, Taper or Plug—¼ in. 2/-; ⅜ in. 2/-; ½ in. 2/-; ⅞ in. 2/6; 1 in. 2/6; 1¼ in. 3/-; 1½ in. 4/-; 1¾ in. 5/-; 2 in. 7/-; 2½ in. 8/-; 3 in. 9/-

Twist Drills—⅜ in. 4d.; ½ in. 6d.; ⅞ in. 8d.; 1 in. 1/2; 1¼ in. 1/4; 1½ in. 1/11; 1¾ in. 2/3; 2 in. 2/8; 2½ in. 3/9; 3 in. 4/8; 3½ in. 5/6; 4 in. 6/4.

Plain Drills—2d., 3d., 4d., and 6d. each and upwards.

Carving Tools, with Applewood handles—Set of 3, with 3½ in. blade, 4/-

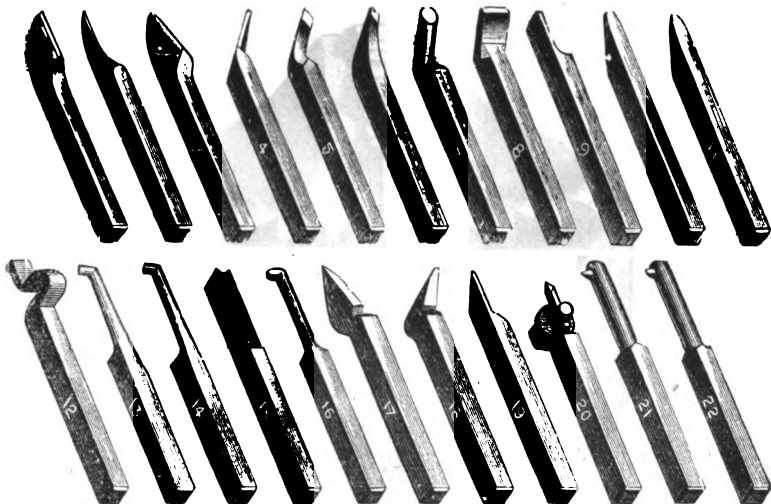
„ „ Rosewood „ Set of 6, with 2½ in. blade, 5/-

The Britannia Esquire Ring Co., Ltd., Colchester, England.

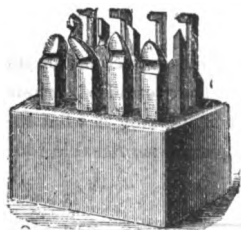
SLIDE REST TOOLS.

In great variety, made of the very best steel.

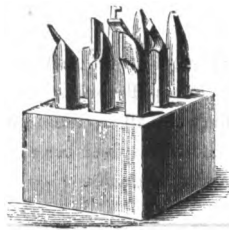
The patterns most generally used are—Nos. 1 to 19, $\frac{1}{4}$ in. 9d.; $\frac{3}{8}$ in. 1/-; $\frac{1}{2}$ in. 1/3;
 $\frac{5}{8}$ in. 1/6; $\frac{3}{4}$ in. 1/0; $\frac{7}{8}$ in. 1/9



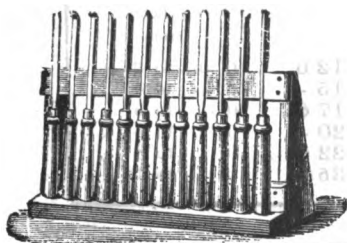
No. 20, Swivel Cut Bar ... $\frac{3}{4}$ in. 4/6 $\frac{1}{2}$ in. 5/- $\frac{3}{8}$ in. 6/- $\frac{1}{4}$ in. 7/-
 Nos. 21 and 22, Boring Bars ... $\frac{3}{4}$ in. 2/6 $\frac{1}{2}$ in. 3/- $\frac{1}{4}$ in. 3/- $\frac{1}{2}$ in. 4/- $\frac{1}{4}$ in. 5/-
 Cutters for Nos. 20, 21 and 22. 6d. each,



In Sets
of 12
with block,
 $\frac{1}{4}$ inch 10 -
 $\frac{3}{8}$ " 13 -
 $\frac{1}{2}$ " 15 -
 $\frac{5}{8}$ " 18 -
 $\frac{3}{4}$ " 19/6
 $\frac{7}{8}$ " 22 9



In Sets
of 9
with block.
 $\frac{1}{4}$ inch 8/9
 $\frac{3}{8}$ " 10/-
 $\frac{1}{2}$ " 11/6
 $\frac{5}{8}$ " 12/6
 $\frac{3}{4}$ " 15/-
 $\frac{7}{8}$ " 17/6

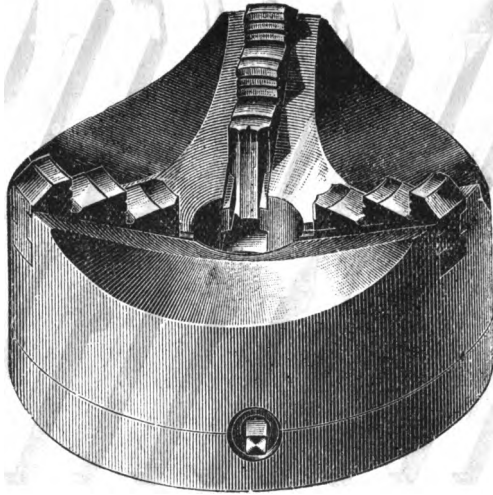


HAND TURNING TOOLS.

1/- each, 10/- per dozen.
 Larger sizes, 1/3, 1/6 and 2/- each.
 Longer handles if specially ordered.
 Stands to hold Tools, from 2/6 each.

The Britannia Engineering Co., Ltd., Colchester, England.

PATENT SPIRAL SELF-CENTREING CHUCK.



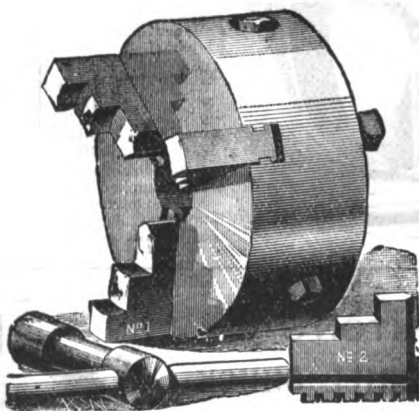
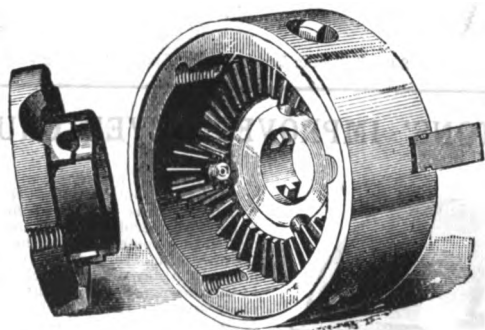
THIS Chuck is designed to replace the ordinary American Self-centreing Chuck, in which the jaws are actuated by a scroll, instead of by a "spiral," as in this chuck.

The ordinary scroll chuck, although extensively used on account of its useful property of rapidly holding work truly, is open to several and serious objections, which are all overcome in the spiral chuck, making it what no self-centreing chuck has ever been as yet—a really general serviceable tool for engineers and machinists.

Size of Chuck Diameter. ins.	Price.	Price of Extra Jaws, Per set.	Chuck will hold. From
3	£3 0 0	12/6.	0 in. to 3 in.
4	3 16 0	15/-	0 " to 4 "
5	4 10 0	17/6	0 " to 5 "
6	5 5 0	20/-	0 " to 6 "
8	6 5 0	22/6	0 " to 8 "
12	9 5 0	35/-	0 " to 12 "

The Britannia Engineering Co., Ltd., Colchester, England.

WHITON'S PATENT GEARED SCROLL CHUCK.

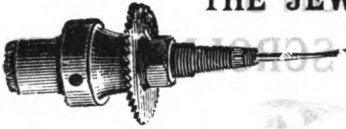


THE outer shells of all chucks up to and including 5 in. are of malleable iron, and the jaws, scrolls, pinions, &c., of all sizes are of steel. The workmanship is first class throughout. Price list includes keys and bolts. Unless otherwise ordered these chucks are always supplied with lathe jaws. Add 10 per cent. for chucks having four jaws. Add 20 per cent. for chucks having two sets of jaws (lathe and drill).

Diameter in.	Weight about. lbs.	Price.	Diameter. in.	Weight about. lbs.	Price.
2½	1½	£1 11 0	6	12½	£3 15 0
3	3	2 1 6	7½	21	4 13 0
4	5½	2 10 0	9	33	5 0 0
5	8½	3 2 6	12	58	6 7 5 0

The Britannia Engineering Co., Ltd., Colchester, England.

THE JEWELLERS' CHUCK.

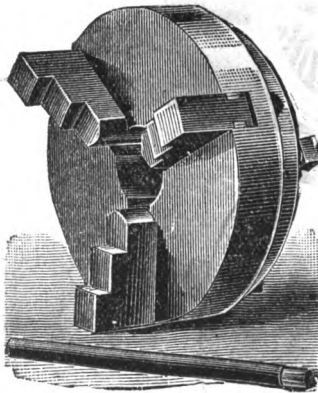


Is a valuable appliance to the mechanic or amateur. It carries drills, circular saws, polishing brushes, and polishing bobs. It is made with $\frac{3}{8}$ in. shank to suit any main chuck.

Price .. 5/-

Saws to suit, 2/6; Polishing Brushes, 1/6; Emery Wheels, 2/- each,

WHITONS' IMPROVED LEVER CHUCKS.



A heavy band of wrought iron is shrunk firmly around the front plates of the larger sizes, which are thus greatly strengthened. The holes in the scroll for receiving the lever are drilled into bosses cast for the purpose, while the outer rim of the scroll between these bosses is much lighter than formerly; thus the parts of this chuck receiving the heaviest strains are made stronger than in other chucks of this class, without making them inconvenient from over weight.

The front plates of the 3 in., 4 in., and 6 in. sizes are of malleable iron, and the scrolls and jaws of steel.

DIAMETER.	PRICE.	DIAMETER.	PRICE.
3 inches	38/6	15 inches.	134/-
4 "	42/-	18 "	159/-
6 "	62/6	21 "	200/-
9 "	83/6	24 "	250/-
12 "	109/-		

Unless otherwise ordered, these chucks are always supplied with lathe jaws.

Add 10 per cent. to above list for chucks with four jaws. Add 20 per cent. to above list for chucks with two sets of jaws (lathe and drill).

WHITON'S "1883" DRILL CHUCK.

THESE Chucks are easily attached to any Lathe or Drill by a taper plug. All the parts are of steel thoroughly made.

No. 1.—2 in. diameter, holds Drills, from 0 in. to $\frac{1}{8}$ in.

Price ... 17/-

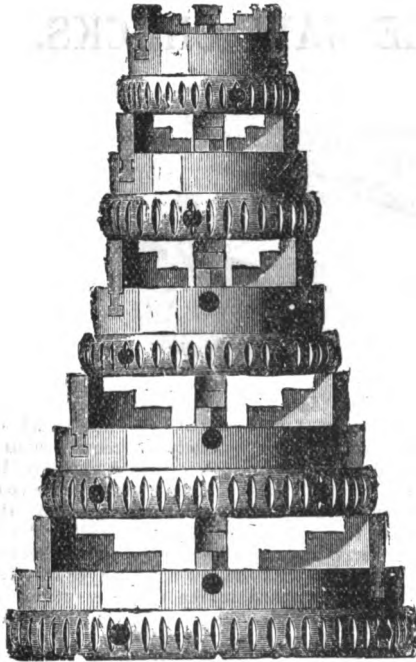
No. 2.—2½ in. diameter, holds Drills from $\frac{1}{4}$ in. to $\frac{3}{8}$ in.

Price ... 21/-



The Britannia Engineering Co., Ltd., Colchester, England.

WHITON'S IMPROVED AMATEUR CHUCKS



ARE very neat in design, and are intended for amateurs' use on foot and light power lathes, and for all classes of light work.

Although very light, they are strong and durable, the shell being made of malleable iron and the scroll and jaws of steel.

They are intended for attachment by means of a face plate.

They operate by hand or lever.

Diameter.	Weight about.	With Lathe Jaws (as shewn in Sketch).	With Lathe and Drill Jaws.
2 inches	$\frac{3}{4}$ pounds	19/-	24/-
2½ "	1¼ "	21/-	26/-
3 "	1¾ "	23/-	28/6
4 "	3¼ "	27/6	33/6
5 "	4¾ "	31/6	37/6
6 "	8½ "	42/-	50/-
7½ "	14½ "	50/-	58/6
9 "	22 "	58/6	67/-

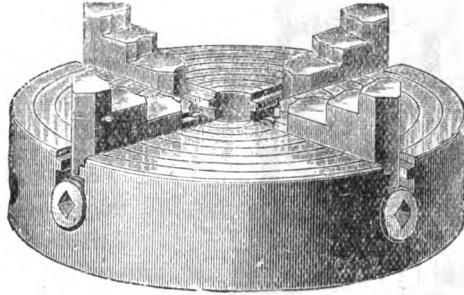
Above Prices include Levers and Face Plate Screws.

When ordering chucks, it is necessary to send a chuck which exactly fits your mandrel. When chucks require fitting, an extra charge is made, usually about 10s. for face plate, &c.

Other American scroll chucks to order at usual lists.

The Britannia Engineering Co., Ltd., Colchester, England.

WHITON'S NEW AMATEUR INDEPENDENT REVERSIBLE JAW CHUCKS.



AN entirely new line of Independent Jaw Chucks for all kinds of light work, provided with three or four *independent reversible steel jaws*, each of which is operated by a separate screw. Every variety of round, square, irregular or eccentric work may be held in them to be operated upon by the tool. The Chucks will hold with great firmness, and will take pieces considerably larger than the diameter of the Chucks. All are provided with circular lines on the face by which to set the jaws true for holding round work. There are no projecting screw heads. The thread on the screws extends to the outside of the Chuck, so that the jaw has a longer traverse than in other Jaw Chucks. All are attached to the lathe by means of a face plate, screws for which accompany each Chuck. The Chuck may be very readily taken apart.

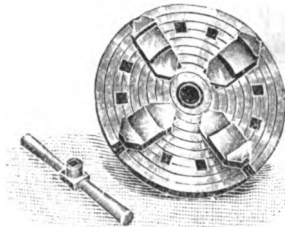
The sizes above 9in. are only made with 4 Jaws.

PRICES.

Diameter.	Weight.	3 Jaw.	4 Jaw.
2 inch	$\frac{3}{4}$ pound	27 6	34/-
2½ "	1½ "	31 6	38/-
3 "	2 "	35 6	42/-
4 "	4 "	4 -	50/-
5 "	5½ "	50 -	60/6
6 "	14 "	68 -	75/-
7½ "	18 "	75 -	83/6
	Price.		Price.
9 inches diameter	100/-	24 inches diameter	271 -
12 "	125/-	26 "	313 -
15 "	146/-	28 "	417/-
18 "	184/-	30 "	500 -
21 "	229 -	32 "	625 -

The Britannia Engineering Co., Ltd., Colchester, England.

INDEPENDENT REVERSIBLE 4-JAW CHUCKS.

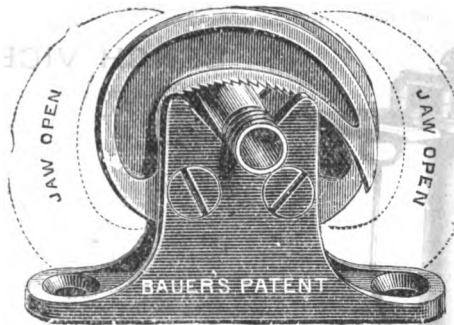


THESE chucks are strongly made, with heavy plates and forged steel case-hardened jaws, made reversible; the screws of mild steel with square thread, bearing necks case-hardened. Plates are cut to Whitworth standard pitches, but can be specially made to any pitch at same prices.

6 in.	..	..	..	..	£2	8	0
8 in.	..	..	..	..	3	4	0
9 in.	..	..	..	..	3	12	0
10 in.	..	..	..	..	4	0	0
12 in.	..	..	..	..	4	16	0

Larger sizes up to 20 in. diameter, per in., 10/-; 22 in., to 60 in. per in., 12/6

INSTANTANEOUS SELF-ADJUSTING AND SELF-ACTING TUBE AND BOLT VICE.



THIS is the handiest and best, as it grips automatically and works in any position. It weighs only about one-fifth of the old-fashioned cast-iron tube vices.

No. 1 holds $\frac{1}{4}$ in. to $1\frac{1}{2}$ in. tubes, &c.	..	-	7/6
No. 2 holds $\frac{1}{4}$ in. to $2\frac{1}{2}$ in. tubes, &c.	..	..	15/-

The Britannia Engineering Co., Ltd., Colchester, England.

INSTANTANEOUS GRIP PARALLEL VICES.

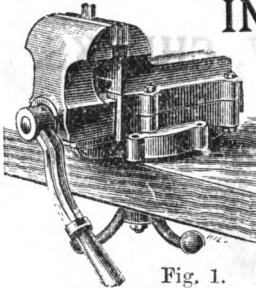


Fig. 1.

OVER 10,000 OF THESE VICES IN USE.

In various sizes and styles for Engineers, Machinists, Founders, Gun Makers, Blacksmiths, Sewing Machine Makers, Brass Finishers, Amateurs, Jewellers, Dentists, &c.

THE FIRST COST SAVED IN TWELVE MONTHS.

ALTHOUGH one of the most noticeable features of the present day is the extent to which labour-saving appliances have been successfully introduced, yet it may safely be said that in no branch has less progress been made than in Vices, articles which are so commonly in use everywhere. The old screw vice is still to be found in every workshop, large or small, and were it possible to estimate the amount of time spent in a twelve month in the repeated screwing up and the unscrewing, it would show a great amount of mis-directed energy and a startling amount of wasted time. Fig. 1 represents one of the Engineer's Vices with instantaneous grip. These vices are invaluable in enabling a man to fasten **INSTANTLY** any size of work. By raising the handle to a vertical position, the sliding or loose jaw is at liberty to be moved, and can be adjusted at once to any thickness of article within the scope of the vice. The work is held in one hand and the loose jaw is, with the other hand, pushed against the work, and by a half-turn of the handle instantly fastened, all screwing being entirely dispensed with. These vices will stand any amount of hard usage. The grip is certain and cannot relax, and from the fewness of working parts, it is almost an impossibility for them to get out of order.

The racks are made of a special steel, suitably hardened, and as they merely engage without rubbing, will last an indefinite length of time. The method of fixing the loose steel jaws is also a great improvement over that adopted in ordinary parallel vices. They are easily removable at any time, which makes the cost of re-cutting trifling, compared with that of wrought vices.

The vices can be swivelled round to any position on the bench, and are therefore particularly adapted for many classes of work otherwise bad to get to a vice. They can be easily removed from one bench to another by taking off the wing nut and screws. They can always be kept clean without trouble, as five seconds suffice to take one to pieces. No workshop ought to be without them. The whole first cost is saved in twelve months in economy of time, and through requiring no repairs.

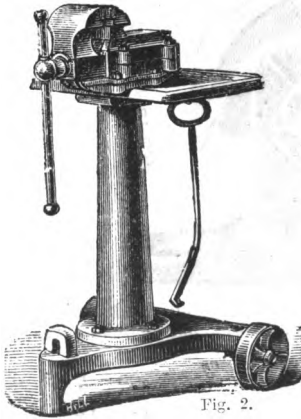


Fig. 2.

BENCH VICES. (Fig. 1.)

No. 0	E	3 in. Jaws, to open 3 in.	£1	12	6
01	E	3½ " " "	"	17	6
1	E	5 " " "	5	3	6
2	E	6 " " "	6½	2	6
3	E	7 " " "	8½	3	13 0

N.B.—These vices from 5 in. jaws and upwards, are supplied with fast handle, as shewn in Fig. 1, except specially ordered with long loose handle, as shewn in Fig. 2. For ordinary work and particularly where there is much changing in and out of the vice, the fast handles are certainly preferable, the loose handle only being recommended for very heavy work.

For general work No. 2 E and No. 3 E are particularly recommended.

PORTABLE VICES. (Fig. 2.)

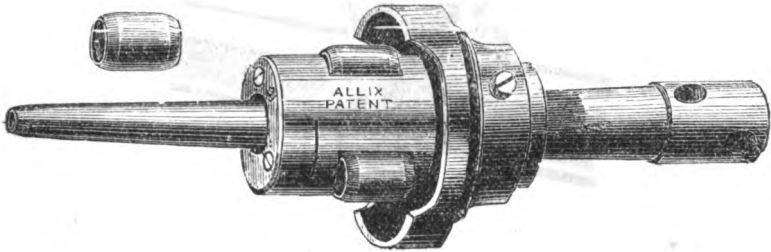
No. 1	S.	Jaws 5 in., opens 5 in.	£4	10	0
2	S.	" 6 " " "	6½	5	6 6
3	S.	" 7 " " "	8½	7	0 0

The Britannia Engineering Co., Ltd., Colchester, England.

ALLIX'S PATENT ROLLER TUBE EXPANDER.

One of these Expanders will expand Six Sizes of Tube. Made throughout of best quality Steel, with High-class Workmanship.

As supplied to His Majesty's Government, The Japanese Government, &c., The Principal Boiler Makers, Shipping and Railway Companies.



THIS is the best improvement in tube expanders ever brought before the engineering trade, one of these expanders being equal to from 3 to 7 of the ordinary make, according to size. The advantage of a tool covering so many sizes is obvious. They are made of steel throughout, the rollers being of the finest cast steel, solid, and specially tempered. We have numerous testimonials as to its economy and efficiency. Each expander is supplied with an extra set of rollers and 2 mandrels.

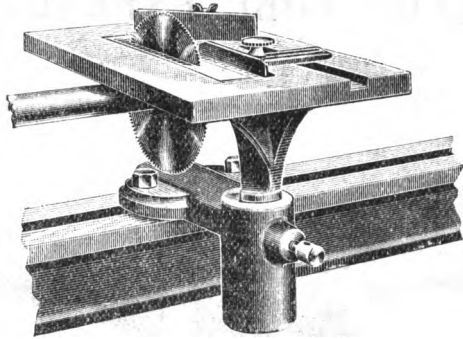
Letter.	Outside Diameter of Tube.		Price.
	in.	in.	
A	Expanding from	to	£2 0 0
B	"	"	2 5 0
C	"	"	2 7 6
D	"	"	2 10 0
E	"	"	2 10 0
F	"	"	2 12 6
G	"	"	2 15 0
H	"	"	3 0 0
I	"	"	3 7 6
J	"	"	3 12 6
K	"	"	3 17 6
L	"	"	4 2 6
M	"	"	4 12 6
N	"	"	5 5 0
O	"	"	5 17 6
P	"	"	6 10 0
Q	"	"	7 5 0
R	"	"	9 0 0

Delivered Free on Rail in London.

To denote the Size when ordering it is sufficient to give the Capital Letter as above.

The Britannia Engineering Co., Ltd., Colchester, England.

CIRCULAR SAW PLATFORM.

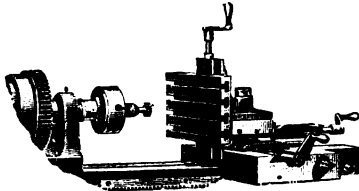


SUITABLE for use in a lathe, the platform being securely fixed in required position to lathe bed, and the saw mandrel revolving between headstock centres. Platform has vertical adjustment and is fitted with plain and mitre guides.

PRICE—6 in. by 8 in.	..	..	..	£0 12 6
8 in. by 12 in.	..	..	..	0 15 0

For prices of Mandrels, Circular Saws, &c., see pages 133 & 134.

VERTICAL SLIDE REST.



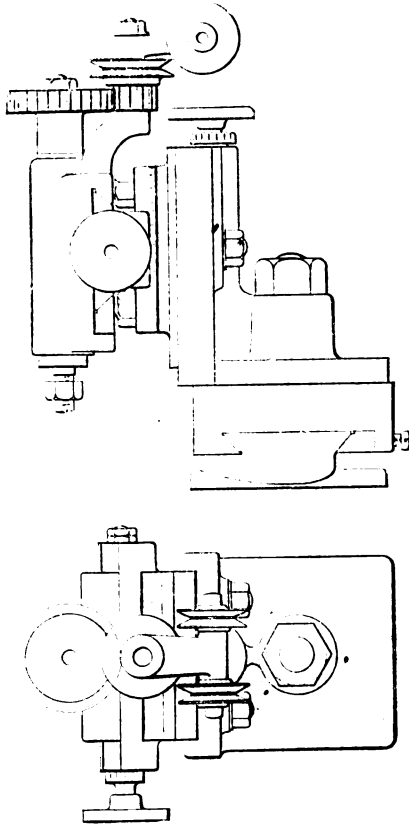
FOR general milling this is an invaluable attachment to the lathe. It is mounted on the top slide of rest, taking the place of the tool holder, and is provided with a vertical adjustment, the compound movements horizontally and transversely being obtained by the slide-rest. The table is 11 in. by 6 in. wide, and is provided with \perp slots for holding the work, and has a vertical adjustment of $5\frac{1}{2}$ in. Provided with the necessary milling cutters, all kinds of milling can be done with very little trouble; it is also very useful for drilling.

PRICE, complete, for $3\frac{1}{2}$ in. Lathe	£5 0 0
--	----	--------

For larger Lathes proportionately higher.

The Britannia Engineering Co., Ltd., Colchester, England.

VERTICAL GEAR CUTTING ATTACHMENT.



THIS is a most useful adjunct to the lathe for fluting taps, milling key ways in shafts, spiral fluting, and for cutting teeth in all kinds of gearing, spur, bevel or worm.

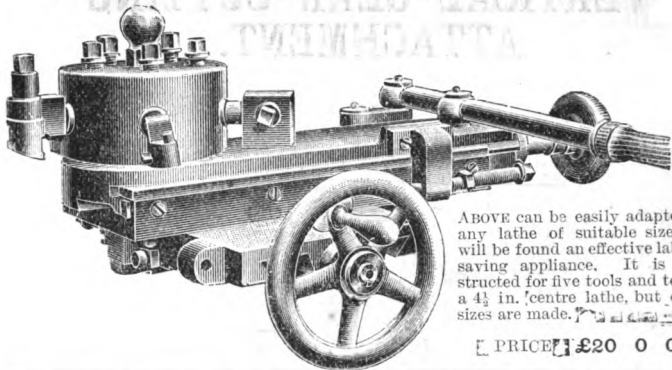
Wheels of any number of teeth can be cut accurately with the combination of a division plate on headstock of lathe. The milling spindle can work both in a horizontal and vertical position as well as at any angle between these positions. Adjustments are also provided vertically and horizontally so that the apparatus is in every way complete.

The illustration is in $\frac{1}{2}$ size.

PRICE, complete, for 5 in. Lathe	..	£10 0 0
For 6 in. centre Lathe	..	.. 10 10 0
For other size Lathes send for quotation.		

The Britannia Engineering Co., Ltd., Colchester, England.

AUTOMATIC TURRET REST.



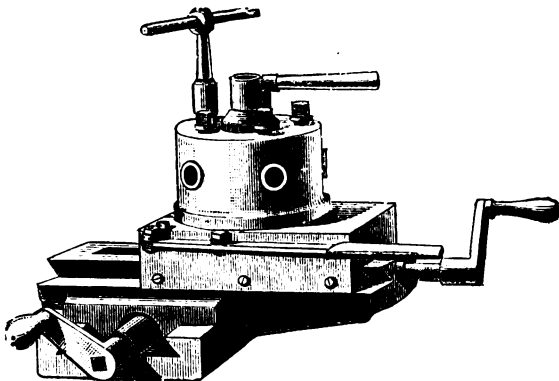
ABOVE can be easily adapted to any lathe of suitable size and will be found an effective labour-saving appliance. It is constructed for five tools and to suit a 4½ in. centre lathe, but other sizes are made.

PRICE £20 0 0

CAPSTAN or TURRET COMPOUND SLIDE REST

For Brass Finishers and Electricians.

Send Template of Face and height of Centre.



Can be fitted to any Lathe. Great economies of time.

THESE are designed for use on any ordinary plain Lathe, for brass finishers and others where quantities of parts of uniform size and shape are to be produced, giving many of the advantages of the expensive turret lathes.

The Revolving Head is constructed to hold five tools of any desired form for sliding, surfacing, pointing, parting, etc., enabling all such operations to be done at one setting of the work, and if the rest be used in conjunction with a headstock having a hollow spindle through which rods of brass or iron may be passed, studs, joints, pins, etc., with cheese or cup heads, or without heads, may be quickly and cheaply produced and cut off finished from the rod.

The "Capstan" or "Turret" Tool Holder is rotated by hand, held in desired position by lever and link motion (as seen in illustration), actuating a steel piston dropping into accurately fitted notches in a ring at the bottom of capstan, and the latter is then firmly locked in position by the handle at the top.

The Rests have compound slides having longitudinal and transverse traverse, and are prepared to bolt securely to any ordinary plain lathe, or can be made to fit the saddle of a screw-cutting Lathe.

PRICES ARE AS FOLLOWS ---

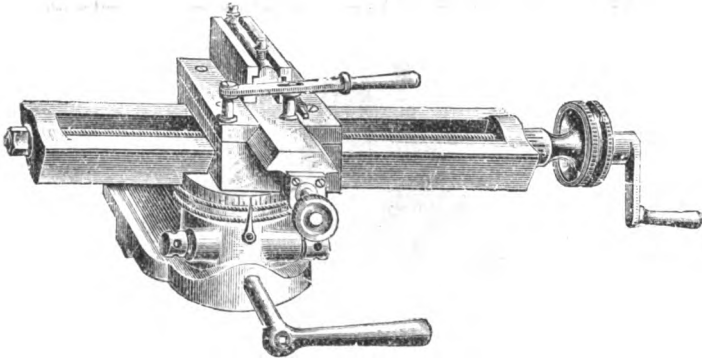
For Lathes } 3 in.	3½ in.	4 in.	4½ in.	5 in.	6 in.	
having centres } PRICE ...	£6	£6 10	£7 10	£9	£10 10	£12 15

The illustration is that of the 6 in. size.

The Britannia Engineering Co., Ltd., Colchester, England.

ORNAMENTAL SLIDE REST,

As supplied with Lukin Lathe.



THE accompanying illustration represents our Ornamental Slide Rest, constructed to suit a 5 in. Lathe, and embodying all the most material and useful improvements. It is arranged with a gun metal cradle planed to fit the Lathe bed and slide along it to any part, and planed at top to receive an eccentric socket at right angles to the bed. The socket is 12 in. long, planed parallel at sides to slide along the gun metal cradle, and adjust to any distance from axial line of centres. Within it is an eccentric shaft with eye and nut, a half turn of which rigidly secures it to the Lathe bed. At its top rim it is turned and screwed, and fitted with a gun metal ring with milled edge to turn by thumb and finger, to adjust the height of the cutter. The longitudinal slide is 12 in. long, made with a turned shank to fit into the socket of eccentric slide and swivel to any angle, its circular bottom being graduated to 50' each side of centre. Along its upper face are graduations in tenths of an inch and it is fitted with a steel draw screw having 10 threads per inch, with cones at each end to take up wear, and with a split gun metal nut to adjust to take up back lash. On the collar of the screw are 20 divisions to give an adjustment to 200ths of an inch, and it has a long milled edge knob for thumb and finger adjustment, and groove for gut to enable it to be driven from overhead gear; it also has a square at its end fitted with crank and handle. The top slide is made of gun metal, fitted to longitudinal slide by loose adjusting strips, with a transverse slide carrying Tool Holder to suit $\frac{3}{8}$ in. tools, and actuated by a milled head thumb screw and garter slide, screwed to 20 in., graduated by an ingenious contrivance to 25 divisions, giving an adjustment of the tool to the greatest nicety. The garter slide is instantly detachable, enabling the slide and tool holders to be operated freely by lever.

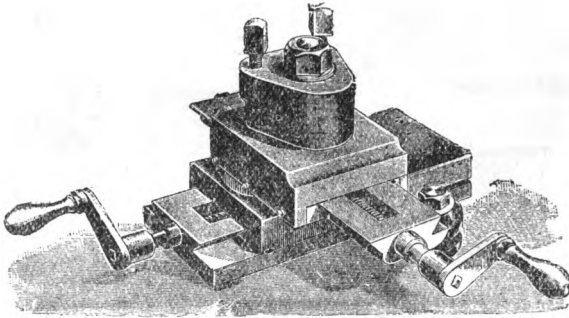
A stop screw is fitted to the tool holder, and the face of the slide is graduated in 20ths of an inch.

The whole instrument is well devised, very complete, and accurately and carefully made.

PRICE £15 15 0

The Britannia Engineering Co., Ltd., Colchester, England.

THE NEW COMPOUND SLIDE REST.



THESE are made so that the Bottom Slide always remains at a right angle with the Lathe Bed, the rest having a swivel arrangement, accurately graduated for turning taper or conical work to any desired angle.

The bottom cover extending full length excludes turnings and dirt from the screw and slide.

The materials are of the best. Screws are cast steel, gun metal nuts, horn handles, improved tool box, with hardened steel screws.

The workmanship is excellent. The slides, &c., are surfaced up, and the parts, being machine made and uniform, are interchangeable.

PRICES.

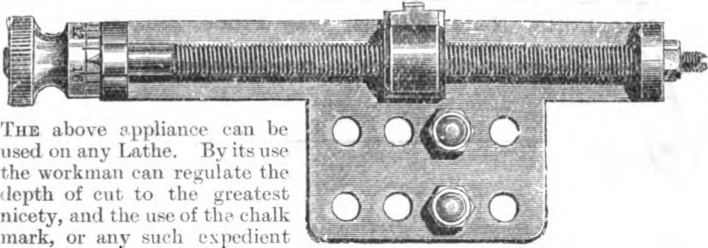
To suit 2½ in. centre Lathe	...	...	£2	0	0
„ 3 in. „	...	...	2	10	0
„ 3½ in. „	...	...	3	0	0
„ 4 in. „	...	...	3	10	0
„ 4½ in. „	...	...	4	0	0
„ 5 in. „	...	...	5	0	0
„ 6 in. „	...	...	6	0	0
„ 7 in. „	...	...	7	0	0
„ 8 in. „	...	...	8	0	0

Larger sizes to order at 20/- per inch.

Tool holders with plates or other pattern to order.

The Britannia Engineering Co., Ltd., Colchester, England.

REGISTERED SCREW-CUTTING GUIDE.



THE above appliance can be used on any Lathe. By its use the workman can regulate the depth of cut to the greatest nicety, and the use of the chalk mark, or any such expedient is unnecessary.

It can be used for inside or outside screw cutting, or other work requiring uniformity. It saves time from insufficiency of cut. It prevents the breaking of tools, or the work being torn out from the centres. It is a reliable stop for ornamental drilling and fluting.

While the Lathe is cutting this can be adjusted for the following cut. It only requires to be bolted upon the saddle of a Screw-cutting Lathe, and a projecting stud or screw fixed in the middle engages the stop.

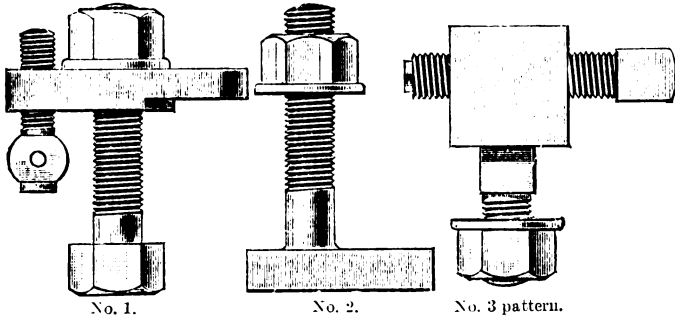
It can also be used on ordinary Lathes with slide rest—in this case it must be fixed to the bed.

This is a tool which has long been wanted by engineers, and will also be appreciated by amateurs.

PRICES.

For 3 in. to 4 in. centre Lathes, **18/-** For 5 in. and 6 in. centre Lathes, **20/-**
For 8 in. to 10 in. centre Lathes, **22/-**

LATHE CLAMPING DOGS of VARIOUS STYLES



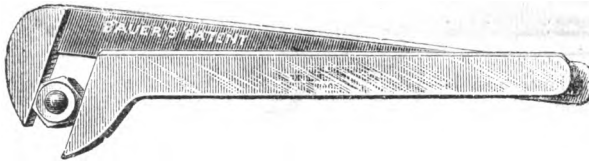
THE above will be found very useful for securing the work to be bored or turned, to the face-plate on the Lathe.

PRICE, to suit 4 in. to 6 in. centre Lathes : Pattern No. 1, **3/6** ; No. 2, **1/6** ;
No. 3, **4/-**. Other sizes and patterns made to order.

The Britannia Engineering Co., Ltd., Colchester, England.

SELF-ADJUSTING, SELF-GRIPPING AND SELF-ACTING
LINK SPANNER PIPE & WRENCH

For Bolts, Nuts, Tubes, Gas Pipes, &c., &c.



5 in., 1/8

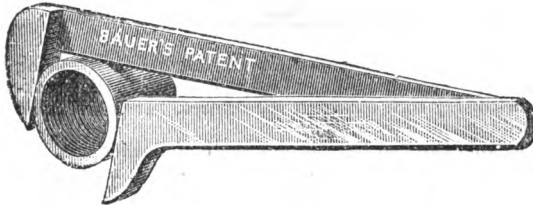
8 in., 3/-

12 in., 4/9

15 in., 6/-

18 in., 7/-

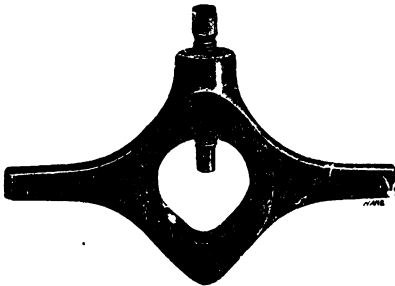
24 in., 9/-



It is made entirely of steel, and acknowledged to be the best shifting spanner ever seen; also the best pipe wrench, as it grips from the smallest to the largest size instantly.

The best and cheapest. Many thousands in use.

PATENT DOUBLE-DRIVING LATHE CARRIER



WE can strongly recommend these for Engineers' and Mechanics' use. The advantages will be seen by Engineers at a glance, but we enumerate the following:—

1. They equalise the strain, and reduce the thrust upon the Lathe centres; thereby reducing the wear of the Lathe. When the Lathe has not a Clement's driver, an extra stud in the face plate is required.
2. By their use truer work can be produced, and saving of time effected.
3. They prevent the work being thrown out of the centres.
4. They are especially valuable when the work to be done is of large diameter.
5. The position of the grip screw prevents it being sheared off, through being improperly used as a driver, as is frequently done by the ordinary carrier.
6. They are made of steel, with steel set screws, and will be found to be the most handy and durable carrier yet introduced.
7. The price is but a trifle higher than the ordinary carrier.

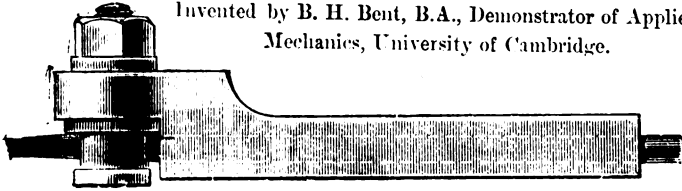
To hold the following sizes.		Price each.	To hold the following sizes.		Price each.
No. 00.	$\frac{3}{8}$ in. to $\frac{1}{2}$ in.	... 2 6	No. 3.	$2\frac{1}{2}$ in. to $2\frac{1}{2}$ in.	... 5 6
"	0. $\frac{3}{4}$ in. to 1 in.	... 3 -	"	4. $2\frac{3}{4}$ in. to 3 in.	... 7 6
"	1. 1 in. to $1\frac{1}{2}$ in.	... 3 6	"	5. $3\frac{1}{2}$ in. to $3\frac{1}{2}$ in.	... 9 6
"	2. $1\frac{1}{2}$ in. to 2 in.	... 4 6	"	6. $3\frac{3}{4}$ in. to 4 in.	... 11 6

The smaller sizes can be sent per Parcel Post at 2d. to 6d. extra.

The Britannia Engineering Co., Ltd., Colchester, England.

PATENT TOOL HOLDER.

Invented by B. H. Bent, B.A., Demonstrator of Applied Mechanics, University of Cambridge.



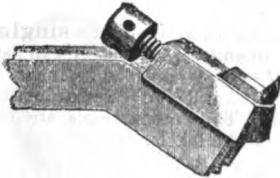
THIS is one of the best tool holders for boring and cutting internal threads. The cutters or tools can be made of round rod which is easy to obtain. They are held firmly, and in boring it is so easy to adjust depth of cut. Various sizes of steel can be used in the same holder.

It is an economical tool, no skilled smith being required to forge them.

It can be used for ordinary turning and surfacing.

Prices same as Haydon. Cutters for the Bent's Tool-holder, 6d. to 1 6 each.

The HAYDON TOOL HOLDER, or CUTTER BAR.



ADVANTAGES.—Users of these Holders save the cost and inconvenience of forging their tools. The cutters are easily sharpened to the correct angle. By due attention to the instructions, superior finish can be given to the work. A stock of the small cutters can be always kept sharpened, as they cost but little, and occupy a small place. The steel of which the cutters are made can be bought in

12 in. lengths and cut off as required, or cutters can be purchased at 6d. to 9d. each. Plain directions for sharpening cutters to the **exact angle** required for various metals, and how to use the tools to best advantage will be sent with each bar. A diagram showing the various angles will prevent the possibility of errors in judgment.

$\frac{3}{8}$ in.	Bars will suit Lathes 3 and 3½ in. centre ...	Price £0 9 6
$\frac{1}{2}$ in.	„ „ 4, 4½, and 5 in. ...	„ 0 10 0
$\frac{5}{8}$ in.	„ „ 5 or 6 in. ...	„ 0 10 0
$\frac{3}{4}$ in.	„ „ 6 and 7 in. Lathes ...	„ 0 12 6
$\frac{7}{8}$ in.	„ „ 7 to 9 in. ...	„ 0 15 0
1 in.	„ „ 10 to 12 in. ...	„ 0 17 6
1½ in.	„ „ 14 in. ...	„ 1 0 0
1¾ in.	„ „ 16 in. ...	„ 1 2 6

Directions how to sharpen Cutters, with diagram, will be sent to any address in England for 6d.

Reduced prices. Cutters 6d. each. Guaranteed correct.

The Britannia Engineering Co., Ltd., Colchester, England.

THE "CLIMAX" TOOL-HOLDER

(PATENT),

For Lathes, Shaping and Planing Machines, &c.



THE advantages and great saving the Tool-holder possesses over the forged tools are proved by its adoption by the leading firms of engineers both in this country and in America. The "Climax" Tool-holder is designed to meet the demand

for a useful all-round cutting-tool, which will cut **straight or irregular work, and into corners, and face either right or left, without altering its position in the slide rest.**

The important improvements in this Tool-holder over those already in use lie in the fact that side rake as well as top rake can be given to the cutter, which thus always presents the correct cutting angle to the work. The object of this side rake is not only to make the tool more keen, without sacrificing its strength, but to relieve the feed screw or gearing of strain, by giving the tool a tendency to feed along and into its cut.

The cutter is held perfectly rigid in any position by tightening a **single nut**. This Holder is invaluable for screw-cutting, as the cutter can be canted to suit the angle of any thread either **V** or square. The "Climax" Tool-holder is made entirely of steel, the bolt, &c., being case-hardened, and is of the best workmanship and finish. The cutting tools are of uniform section, made from the finest cast steel obtainable.

Cutters of Mushet's special self-hardening steel can be supplied for the larger sizes. This steel is strongly recommended, and machine tools should be worked at faster speeds, and with deeper cuts when using it.

Size of Shank.	Section of Cutter.	Suitable for use in Lathes to	Price of Tool holder.	Price of Best Cast Steel Cutters Per dozen.	Price of Mushet's Steel Cutters Per dozen.
			£ s. d.	£ s. d.	£ s. d.
$\frac{5}{8}$ in. sq.	$\frac{5}{8}$ in. by $\frac{1}{8}$ in.	4 in. centres	0 13 6	0 4 6	—
$\frac{3}{4}$ in. "	$\frac{3}{4}$ in. by $\frac{5}{16}$ in.	4½ in. "	0 14 0	0 5 0	—
$\frac{1}{2}$ in. "	$\frac{1}{2}$ in. by $\frac{3}{8}$ in.	5 in. "	0 14 6	0 5 6	—
$\frac{3}{8}$ in. "	$\frac{3}{8}$ in. by $\frac{1}{4}$ in.	6 in. "	0 15 0	0 6 0	0 8 0
$\frac{7}{8}$ in. "	$\frac{7}{8}$ in. by $\frac{3}{8}$ in.	10 in. "	1 0 0	0 8 6	0 11 0
1 in. "	1 in. by $\frac{3}{8}$ in.	12 in. "	1 5 0	0 8 6	0 11 0
1½ in. "	1 in. by $\frac{1}{2}$ in.	14 in. "	1 10 0	0 10 0	0 14 0
1½ in. "	1 in. by $\frac{7}{16}$ in.	16 in. "	1 15 0	0 10 0	0 14 0

Angle Gauges, 4/6 each.

Special Quotations for Larger Sizes.

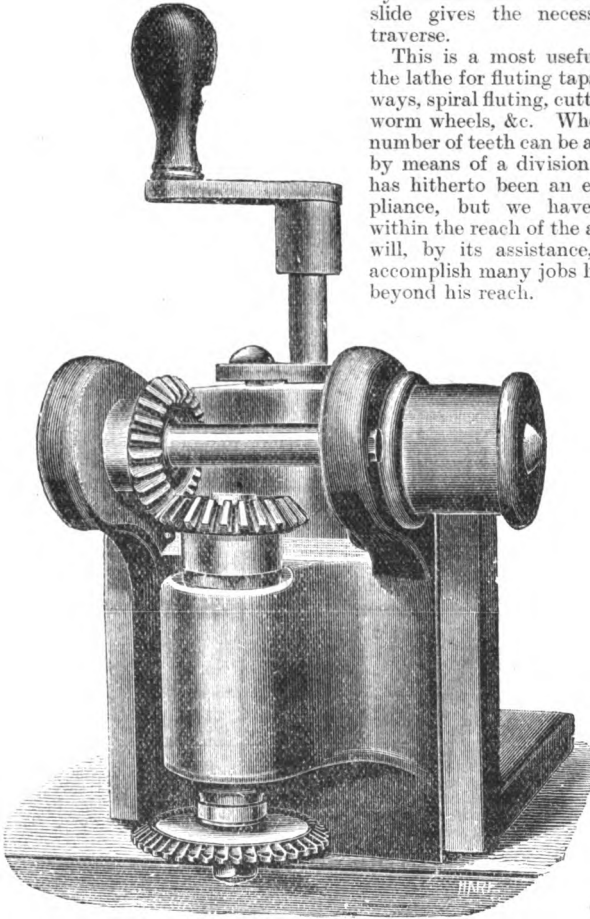
The Britannia Engineering Co., Ltd., Colchester, England.

GEAR CUTTER FOR LATHE.

THE annexed illustration shows the new Gear Cutter, which can be fitted upon the slide rest of any lathe, and the cross and parallel slides are thus utilised to give the necessary traverse. Or, it can also be fixed upon a tool post.

It is driven from an overhead pulley, and is fitted with either flat pulley for belt, or V grooved for gut. The milling cutters are held on the spindle by the nut and washer. A vertical slide gives the necessary vertical traverse.

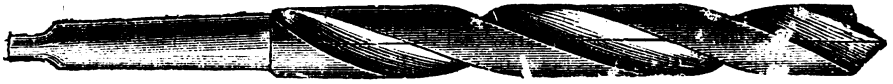
This is a most useful adjunct to the lathe for fluting taps, milling key ways, spiral fluting, cutting bevel and worm wheels, &c. Wheels with any number of teeth can be accurately cut by means of a division plate. This has hitherto been an expensive appliance, but we have brought it within the reach of the amateur, who will, by its assistance, be able to accomplish many jobs hitherto quite beyond his reach.



PRICE, adapted for lathes up to 6 in. centres .. £4 4 0

The Britannia Engineering Co., Ltd., Colchester, England.

TWIST DRILLS.



TURNED DRILLS, WITH TAPER SHANKS.

Diameter of Drills.	Length of Drills.	Price per Drill.	No. & Price of Sockets for Drills.	Diameter of Drills.	Length of Drills.	Price per Drill.	No. & Price of Sockets for Drills.
1/2 in.	6 1/2 in.	2/-	1	1 1/2 in.	11 1/2 in.	12 9	3
3/8 in.	6 1/2	2 1	1	1 1/4	11 3/4	13 4	3
1/4 in.	6 1/2	2 2	1	1 3/8	11 1/2	14 -	3
3/16 in.	6 1/2	2 3	1	1 1/2	12	14 9	3
1/8 in.	6 1/2	2 5	1	1 1/4	12	15 6 3	3
	7	2 7	1	1 1/2	12 1/2	16 4	3
	7 1/2	2 10	1	1 3/8	14	18 -	4
	7 3/4	3 1	1	1 1/2	14 1/2	19 -	4
	7 7/8	3 4	1	1 3/4	14 3/4	21 6	4
	8	3 8	1	1 5/8	15	24 -	4
	8 1/4	4 -	1	1 3/4	15 1/4	31 6	4
	8 1/2	4 4	1	1 7/8	15 1/2	32 6	4
	8 3/4	4 9	2	1 15/16	15 3/4	33 8	4
	9	5 2	2	1 1/2	16	35 6	4
	9 1/4	5 7	2	1 1/4	16 1/4	38 -	4
	9 1/2	6 1	2	1 1/2	16 1/2	40 -	4
	9 3/4	6 7	2	1 3/4	16 3/4	41 8	4
	10	7 1	2	1 7/8	16 7/8	43 -	4
	10 1/4	7 7	2	2	17	47 -	4
	10 1/2	8 1	2	2 1/4	17 1/4	52 -	4
	10 3/4	8 8	2	2 1/2	17 1/2	58 -	4
	10 7/8	9 3	2	2 3/4	17 3/4	65 -	4
	10 3/4	9 10	3	2 5/8	19	73 -	4
	11	10 5	3	2 3/4	19	80 -	4
1	11	11 -	3	2 7/8	20 1/2	85 -	4
1 1/4	11	11 7	3	3	20 3/4	90 -	4
1 1/2	11 1/2	12 2	3				

Milli-metres	Price.	Milli-metres	Price.	Milli-metres	Price.	Milli-metres	Price.
6	2 -	16	4 10	28	12 11	40	32 6
7	2 1	17	5 4	29	13 9	41	33 6
8	2 2	18	5 11	30	14 7	42	34 6
9	2 4	19	6 6	31	15 5	43	35 8
10	2 7	20	7 1	32	16 3	44	36 8
11	2 10	21	7 9	33	18 -	45	37 9
12	3 2	22	8 5	34	18 6	46	38 9
13	3 6	23	9 2	35	19 -	47	40 -
14	3 11	24	9 11	36	20 -	48	41 3
15	4 1	25	10 8	37	21 0	49	42 3
		26	11 5	38	24 -	50	43 -
		27	12 2	39	31 -		

We would call attention to the set of Sockets, Nos. 1, 2, 3, 4, & 5, in column 4 of Turned Drills. By use of these sockets all further fitting of drills to machines is saved.

Bit-Stock Drills for use in bit braces will be found especially useful to Carriage Builders and for general repairing, because holes may be drilled without removing the work. They can be used for either wood or metal.

BIT STOCK DRILLS.

Size	1 1/8	3/8	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3	3 1/2	4
Price per Drill—	7d.	8d.	9d.	10d.	1-	1 2	1 6	1 8	1 10	2-	2 3	2 6	2 9	3-	3 1		
Price per dozen—	5 9	6 4	7 8	9-	10 6	12 6	17-	19 3	21 6	23 9	26-	28 6	31 6	3-	39 -		

The Britannia Engineering Co., Ltd., Colchester, England.

TWIST DRILLS.



STRAIGHT SHANKS.			STRAIGHT SHANK DRILLS TO STUBS' LETTER GAUGE.			STUBS' STEEL WIRE GAUGE STRAIGHT SHANKS.			
Diam. of Drills.	Length of Drills.	Price per Drill.	Letter.	Price per drill.	Price per Dozen.	Nos. of Wire Drills are made from.	Entire Length of Drills	Price per Drill.	Price per dozen.
1/8 in.	2 in.	4d.	A	11	12 3	1 to 5	4 ins.	9d.	8 7
1/8	2 1/2	5d.	B	11	12 6	6 to 10	5 1/2	8d.	7 10
1/8	3	5d.	C	11	12 9	11 to 15	5 3/4	7d.	7 -
1/8	3 1/2	6d.	D	12	13 -	16 to 20	5 3/8	7d.	6 4
1/8	4	6d.	E	12	13 3	21 to 25	5	6d.	5 5
1/8	4 1/2	7d.	F	12	13 6	26 to 30	4 3/4	6d.	5 5
1/8	5	7d.	G	12	13 9	31 to 35	4 3/8	5d.	4 6
1/8	5 1/2	8d.	H	1/3	11 -	36 to 40	4 1/4	5d.	4 6
1/8	6	8d.	I	13	11 3	41 to 45	4 1/8	4d.	3 8
1/8	6 1/2	9d.	J	13	11 6	46 to 50	4 1/4	4d.	3 8
1/8	7	10d.	K	13	11 9	51 to 65	4 1/8	3d.	2 9
1/8	7 1/2	1 -	L	14	15 -				
1/8	8	1 2	M	14	15 3				
1/8	8 1/2	1 3	N	14	15 6				
1/8	9	1 3	O	15	15 9				
1/8	9 1/2	1 4	P	16	16 -				
1/8	10	1 4	Q	17	17 -				
1/8	10 1/2	1 6	R	18	18 6				
1/8	11	1 7	S	19	20 -				
1/8	11 1/2	1 9	T	110	21 -				
1/8	12	1 11	U	111	22 -				
1/8	12 1/2	2 -	V	2 -	22 9				
1/8	13	2 1	W	2 1	23 6				
1/8	13 1/2	2 2	X	2 2	24 3				
1/8	14	2 3	Y	2 3	25 -				
1/8	14 1/2	2 4	Z	2 4	25 6				
1/8	15	2 5							
1/8	15 1/2	2 7							
1/8	16	2 8							
1/8	16 1/2	3 1							
1/8	17	3 4							
1/8	17 1/2	3 9							
1/8	18	4 2							
1/8	18 1/2	4 8							
1/8	19	5 1							
1/8	19 1/2	5 6							
1/8	20	5 11							
1/8	20 1/2	6 4							
1/8	21	7 1							
1/8	21 1/2	7 7							
1/8	22	8 1							
1/8	22 1/2	8 8							
1/8	23	9 3							
1/8	23 1/2	9 10							
1/8	24	10 5							
1/8	24 1/2	11 -							

TURNED DRILLS.		
With Taper Shanks. Tapping Sizes.		
Diameter of Taps.	Length of Drill.	Price per Drill.
1/8 in.	6 1/2	2 -
1/8	6 3/4	2 1
1/8	6 7/8	2 3
1/8	7	2 5
1/8	7 1/4	2 10
1/8	7 1/2	3 4
1/8	7 3/4	4 -
1/8	8 1/4	5 2
1/8	9	7 1
1/8	10	8 8
1/8	10 1/2	10 5
1/8	11 1/4	12 9
1/8	12	14 9
1/8	14 1/2	18 -
1/8	14 1/4	21 6
1/8	15 1/2	31 6
1/8	15 1/4	32 6
1/8	16	35 6

Millimetre Drills, with straight shanks, of the same length and prices as the taper shanks, are kept in stock from 6 to 25 m.m.

SETS OF DRILLS, Nos. 1 to 5. Mounted on Stands.

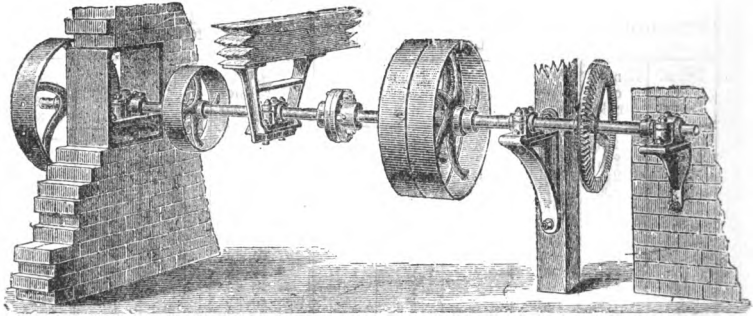
1.—Sets of Straight Shank Drills, 1/8 to 1/2, advancing by 32nds	...	...	£1 0 8
2.—Ditto, by 64ths	...	...	2 1 4
3.—Sets of Wire Drills, No. 60 to 5 (65 Drills)	...	...	1 16 3
4.—Sets of Wire Drills, No. 1 to 60	...	...	1 8 6
5.—Half Sets, ditto, No. 1 to 60, alternate numbers	...	...	0 14 3
Jewellers' Sets, in case 36 Drills, No. 30 to 65	...	...	0 18 3
Sets of Drills for Bit Stocks, 1/8, 3/16, 1/4, 5/16, 3/8, 1/2, 5/8, 3/4, 7/8	...	...	0 10 6

The Britannia Engineering Co., Ltd., Colchester, England.

TURNED STEEL SHAFTING.

Bracket Bearings, A Standards, Wall Brackets, Sling Hangers, Sill Plates, Wrought Iron Slings, &c., supplied.

State requirements and we will quote special low price for cash..



In consequence of the increased facilities for obtaining steel, we have now withdrawn our Wrought Iron list and supply all shafting of steel, guaranteed true to Whitworth gauge, turned in the lathe and polished.

It is of the greatest importance that shafting should be true and well turned, and buyers will do well to study the quality rather than the saving of a few shillings in the first cost.

We can turn shafting in lengths up to 24 feet, but as the railway company will not carry such long lengths, unless there are two tons, we advise shorter lengths being chosen.

Diameter	ins.	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$
Weight per ft.	lbs	2·67	4·17	6·02	8·19	10·70	13·54	16·72	20·24
PRICE	... per ft.	9d.	1 -	1/3	1/6	1/9	2/3	2 9	3/3
Diameter	ins.	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	5 $\frac{1}{2}$	6
Weight per ft.	lbs.	24·07	28·25	32·77	42·81	54·18	64·85	80·93	96·31
PRICE	... per ft.	3 10	4 6	5 3	7 -	9 6	12 -	15 -	17 6

Intermediate sizes charged at proportionate prices.

Fractions of 6 inches charged as 6 inches.

It is important in fixing shafting to have a sufficient number of bearings, and the following table will be useful for general guidance, but these distances will of course vary according to the nature of the work put upon the shafting.

Diameter of shaft	ins.	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{4}$
	ft. in.	5 0	6 0	7 0	7 6	8 0	8 6
Distance of bearings...							
Diameter of shaft	ins.	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3	3 $\frac{1}{4}$	3 $\frac{1}{2}$	4
	ft. in.	9 0	9 6	10 0	10 6	11 0	12 0
Distance of bearings...							

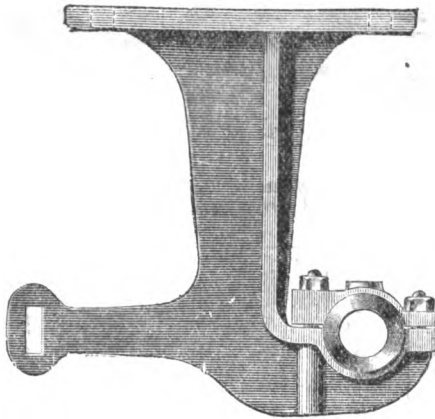
The Britannia Engineering Co., Ltd., Colchester, England.

SPECIAL SERIES NEW

LIGHT "J" HANGERS

WITH BRASSES.

Length of Brasses, $1\frac{1}{2}$ diameters.



THESE are specially suited for carrying small counter shafts, &c. They are fitted with top and bottom brasses, and have a guide for the striking apparatus, but this can be stopped off if not required.

Distance of centre from beam ins.	8	10	12	14	14	16	Can be made from 6 ins. to 16 ins.
Bore of brasses ...	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	$2\frac{1}{2}$	
PRICE ...	7/3	9/6	14/-	18/-	26/-	27/-		20/-

The Britannia Engineering Co., Ltd., Colchester, England.

PLUMMER BLOCKS.

THE large demand for these articles has induced us to put down special plant for their manufacture, by means of which we are enabled to offer Plummer Blocks of a superior quality at prices that will compare favourably with any house in the trade.

Planned on sole, bored, faced, and fitted with top and bottom brasses.

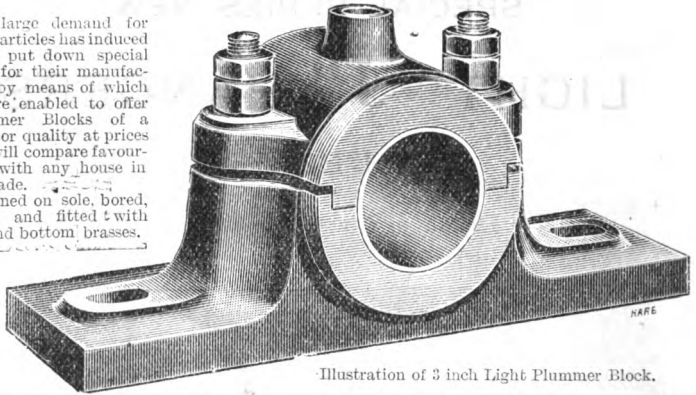


Illustration of 3 inch Light Plummer Block.

LIGHT SERIES. Length of Brasses equal to 1 1/2 Diameters.							
Size of bore.	Weight of brasses finished.	Length of sole.	Width of sole.	Centres of bolt holes.	Height of centre from sole.	PRICE each.	If with phosphor bronze bearings instead of gun metal.
ins.	lb. oz.	ins.	ins.	ins.	ins.	£ s. d.	£ s. d.
1	0 7	6 1/2	1 1/2	5 1/2	1 1/2	0 3 0	0 3 6
1 1/4	0 10	7 1/2	1 3/4	6	1 3/4	0 3 6	0 4 0
1 1/2	0 15	8 1/2	1 3/4	6 1/2	1 3/4	0 4 6	0 5 2
1 3/4	1 4	9 1/2	2 1/4	7 1/2	1 3/4	0 5 6	0 6 4
2	1 11	10	2 1/2	8 1/2	2	0 7 0	0 8 2
2 1/4	2 4	10 1/2	2 3/4	8 1/2	2 1/4	0 9 0	0 10 6
2 1/2	3 2	11 1/2	3	9 1/2	2 1/2	0 11 6	0 13 8
2 3/4	4 0	12 1/2	3 1/2	10 1/2	2 3/4	0 14 6	0 17 2
3	4 12	13 1/2	3 3/4	10 1/2	2 3/4	0 17 6	1 0 8
3 1/4	6 4	13 1/2	3 1/2	11 1/2	3 1/4	1 1 0	1 5 2
3 1/2	7 11	14 1/2	4 1/4	12	3 1/2	1 6 0	1 11 2
4	11 7	16	4 1/2	12 1/2	3 1/2	1 16 0	2 3 8
MEDIUM SERIES. Length of Brasses 1 1/2 Diameters plus 1/2 inch.							
1	0 11	7 1/2	1 1/2	5 1/2	1 1/2	0 3 6	0 4 0
1 1/4	0 14	7 1/2	1 1/2	5 1/2	1 1/2	0 4 6	0 5 2
1 1/2	1 7	8 1/2	2 1/4	6 1/2	1 1/2	0 5 6	0 6 6
1 3/4	2 2	10	2 1/2	7 1/2	2	0 7 0	0 8 6
2	2 14	10 1/2	2 3/4	8 1/2	2 1/4	0 9 0	0 11 0
2 1/4	3 9	11 1/2	3	9 1/2	2 1/4	0 11 6	0 14 0
2 1/2	4 12	12 1/2	3 1/2	10 1/2	2 1/2	0 14 6	0 17 8
2 3/4	5 12	13 1/2	3 3/4	10 1/2	2 3/4	0 17 6	1 1 4
3	7 2	13 1/2	3 1/2	11 1/2	3 1/4	1 2 6	1 5 4
3 1/4	8 8	14 1/2	4 1/4	12 1/2	3 1/4	1 8 0	1 13 8
3 1/2	10 1	15 1/2	4 1/2	13 1/2	3 1/2	1 17 0	2 3 10
4	15 8	18 1/2	4 1/2	14 1/2	3 1/2	2 8 0	2 18 0
EXTRA HEAVY SERIES. Length of Brasses equal to Two Diameters.							
1 1/4	3 0	10 1/2	2 1/4	8 1/2	2 1/4	0 10 0	0 12 0
2	4 4	11 1/2	2 3/4	9	2 3/4	0 12 6	0 15 4
2 1/4	5 4	12 1/2	3 1/4	9 1/2	2 3/4	0 16 0	0 19 6
2 1/2	6 8	13 1/2	3 3/4	10 1/2	2 3/4	0 19 0	1 2 4
2 3/4	8 0	14 1/2	4 1/4	11 1/2	3 1/4	1 2 6	1 7 10
3	9 12	15 1/2	4 1/2	11 1/2	3 1/2	1 7 6	1 14 0
3 1/4	12 0	15 1/2	5 1/4	12 1/2	3 1/2	1 13 0	2 1 0
3 1/2	14 0	16 1/2	5 1/2	13 1/2	3 3/4	2 2 0	2 11 4
4	20 12	18 1/2	6	14 1/2	4 1/4	2 17 0	3 10 10

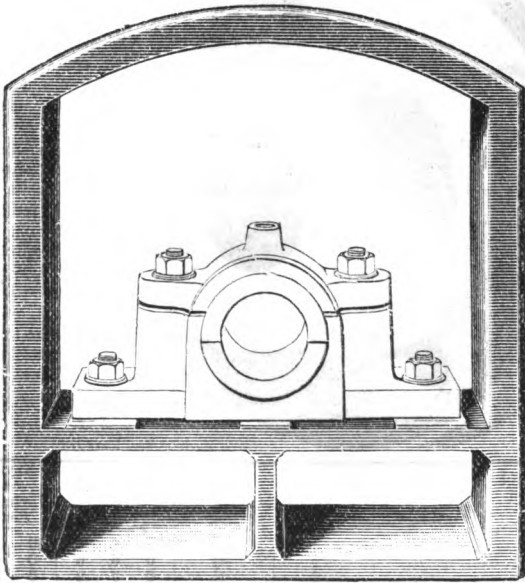
Intermediate sizes same price as next size larger. All our Plummer Blocks are planned on sole.

Any of the Plummer Blocks can be made with oil catchers cast on each side, if specially ordered.

Size ... 1 in. to 1 1/4 in. 2 in. to 2 1/2 in. 3 in. to 4 in.

PRICE (any series) extra, each 6s. 9s. 1-

WALL BOXES.



THESE Wall Boxes are of new design with curved top and flange, giving them a very neat appearance when fixed. They are planed to receive Plummer Block, and prices include bolts for same, but not the Plummer Block.

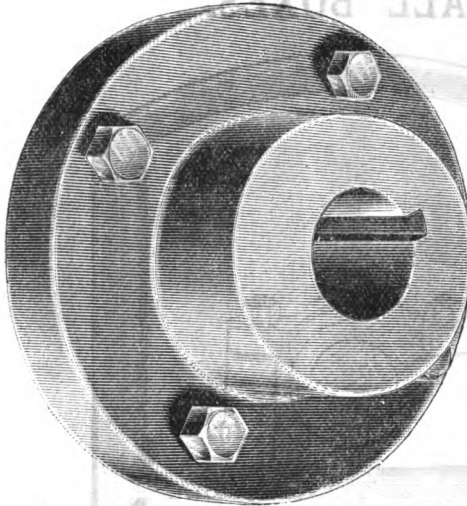
For $4\frac{1}{2}$ in Wall, to take any Plummer Block up to 2 in. . .	£0	6	0
„ $4\frac{1}{2}$ „ „ „ „ „ 3 „ . .	0	10	0
„ 9 „ „ „ „ „ $1\frac{1}{2}$ „ . .	0	8	1
„ 9 „ „ „ „ „ $2\frac{1}{4}$ „ . .	0	12	0
„ 9 „ „ „ „ „ $2\frac{3}{4}$ „ . .	0	16	0
„ 9 „ „ „ „ „ $3\frac{1}{2}$ „ . .	1	2	6
„ 9 „ „ „ „ „ 4 „ . .	1	7	6
„ 9 „ „ „ „ „ 5 „ . .	2	12	6
„ 9 „ „ „ „ „ 6 „ . .	4	10	0

All our fittings are planed to receive Plummer Block.

Bracket Bearings, A Standards, Wall Brackets, Slng Hangers, Sill Plates, Wrought Iron Slings, etc., supplied.

The Britannia Engineering Co., Ltd., Colchester, England.

FLANGED COUPLINGS.



ORDINARY PATTERN.

THE importance of having shafting coupled up securely and true cannot be over-estimated, and although many patent and novel couplings are before the public, there are none to beat the old-fashioned Flanged Coupling, securely keyed on to the shaft and faced down true after keying on. These couplings are bored, faced, turned on edge, key-grooved, bolt holes reamed, and fitted with turned bolts and nuts. The price for keying on, &c., includes grooving the shafts, providing keys, keying on the couplings, and facing down afterwards.

Size of Bore. ins.	Diameter of Flange. ins.	Thickness of each Flange. ins.	Length over all. ins.	PRICE.		Keying on and Facing down.			
				Per pair.		Per pair.			
1	4 $\frac{1}{4}$	$\frac{3}{8}$	3 $\frac{1}{2}$	0	6	0	20	4	0
1 $\frac{1}{2}$	5 $\frac{1}{2}$	$\frac{3}{8}$	4 $\frac{1}{2}$	0	6	6	0	4	6
1 $\frac{3}{4}$	5 $\frac{3}{8}$	$\frac{3}{8}$	4 $\frac{1}{2}$	0	7	6	0	5	0
1 $\frac{1}{2}$	6	$\frac{3}{8}$	5 $\frac{1}{2}$	0	9	6	0	6	0
2	6 $\frac{1}{2}$	$\frac{3}{8}$	5 $\frac{3}{4}$	0	12	0	0	6	8
2 $\frac{1}{4}$	7 $\frac{1}{4}$	1	6 $\frac{1}{2}$	0	14	0	0	7	6
2 $\frac{1}{2}$	7 $\frac{3}{8}$	1 $\frac{1}{16}$	6 $\frac{1}{2}$	0	18	0	0	8	0
2 $\frac{3}{4}$	8 $\frac{1}{4}$	1 $\frac{1}{8}$	7 $\frac{1}{2}$	1	1	0	0	9	0
3	9 $\frac{1}{4}$	1 $\frac{1}{16}$	7 $\frac{1}{2}$	1	5	0	0	10	0
3 $\frac{1}{4}$	9 $\frac{3}{8}$	1 $\frac{1}{8}$	8 $\frac{1}{2}$	1	8	0	0	12	0
3 $\frac{3}{4}$	9 $\frac{3}{4}$	1 $\frac{1}{8}$	8 $\frac{3}{4}$	1	12	0	0	13	0
4	12	1 $\frac{1}{2}$	9 $\frac{1}{2}$	2	0	0	0	15	0

Flanged Couplings with Recessed Bolts.

1	6 $\frac{1}{2}$	1 $\frac{1}{2}$	3 $\frac{1}{2}$	20	8	6	20	4	0
1 $\frac{1}{2}$	6 $\frac{3}{8}$	1 $\frac{1}{2}$	4 $\frac{1}{2}$	0	9	6	0	4	6
1 $\frac{3}{4}$	6 $\frac{3}{8}$	1 $\frac{1}{2}$	4 $\frac{1}{2}$	0	10	0	0	5	0
1 $\frac{1}{2}$	7 $\frac{1}{2}$	1 $\frac{1}{2}$	5 $\frac{1}{2}$	0	13	0	0	6	0
2	8 $\frac{1}{2}$	1 $\frac{3}{8}$	5 $\frac{3}{4}$	0	16	0	0	6	8
2 $\frac{1}{4}$	8 $\frac{3}{4}$	1 $\frac{3}{8}$	6 $\frac{1}{4}$	1	0	0	0	7	6
2 $\frac{1}{2}$	9 $\frac{1}{4}$	1 $\frac{3}{8}$	6 $\frac{3}{4}$	1	3	0	0	8	0
2 $\frac{3}{4}$	9 $\frac{3}{4}$	1 $\frac{3}{8}$	7 $\frac{1}{4}$	1	7	6	0	9	0
3	10 $\frac{1}{2}$	1 $\frac{3}{8}$	7 $\frac{3}{4}$	1	12	0	0	10	0
3 $\frac{1}{4}$	11	1 $\frac{3}{8}$	8	1	17	6	0	12	0
3 $\frac{3}{4}$	11 $\frac{1}{2}$	1 $\frac{3}{8}$	8 $\frac{1}{2}$	2	2	0	0	13	0
4	12 $\frac{1}{2}$	1 $\frac{3}{8}$	9 $\frac{1}{2}$	2	10	0	0	15	0

Intermediate sizes same price as next size larger.

Flanged Couplings with Recessed and Projecting Faces.

EITHER of the preceding Couplings can be made with one face recessed, the other projecting, and accurately turned to fit tightly. This is of most value when coupling up shafts of different diameters.

Diameter Up to 2 in. 3 in. 4 in. 4 $\frac{1}{2}$ in. 5 in. 6 in. 6 in.
PRICE ... 2/- 3/6 5/- 6/- 8/- 10/- 12/- per pair extra.

The Britannia Engineering Co., Ltd., Colchester, England.

CAST IRON PULLEYS.

NEW SERIES, SPECIAL REDUCED PRICES.

4 to 48 in. diameter. 2, 3, 4, 5 and 6 in. wide. Turned flat or rounding on face.
Key way cut or Set Screw fitted.

		WIDTH ON FACE.					
Diam.	2 in.	3 in.	3 in.	4 in.	5 in.	6 in.	
Inch.	Will bore up to 1 1/2 in. only.	If bored up to 1 1/2 in.	If bored up to 2 in.	Will bore up to 3 in.	Will bore up to 3 in.	Will bore up to 3 in.	
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	
4	1 6	2 0	3 0	4 0	4 6	5 0	
5	1 9	2 3	3 3	4 6	5 0	5 6	
6	2 0	2 6	3 6	4 9	5 3	6 0	
7	2 4	3 0	4 0	5 3	5 9	6 6	
8	2 8	3 6	4 6	5 6	6 3	7 0	
9	3 0	4 0	5 0	6 0	6 9	7 6	
10	3 4	4 6	5 6	6 6	7 3	8 0	
11	3 8	4 9	5 9	7 0	7 9	8 6	
12	4 0	5 0	6 0	7 6	8 3	9 0	
13	4 4	5 6	6 6	7 9	8 6	9 3	
14	4 8	5 9	6 9	8 0	8 9	9 6	
15	5 0	6 3	7 3	8 6	9 3	10 0	
16	5 4	6 9	7 9	9 0	9 9	10 6	
17	5 8	7 0	8 0	9 6	10 6	11 6	
18	6 0	7 6	8 6	10 6	11 3	12 0	
19	6 4	8 0	9 0	11 6	12 3	13 0	
20	6 8	8 6	9 6	12 0	12 9	13 6	
21	7 0	9 0	10 0	13 0	13 6	14 0	
22	7 6	9 6	10 6	13 6	14 3	15 0	
23	8 0	10 0	11 0	14 0	15 0	16 0	
24	8 6	10 6	11 6	15 0	16 0	17 0	
25	No pattern above 2 1/2 in.	No pattern	No pattern	16 6	18 0	19 0	
26	—	12 6	13 6	18 0	20 0	21 0	
27	—	15 0	16 0	20 0	22 0	23 0	
28	—	17 6	18 6	22 0	24 0	25 0	
29	—	No pattern	No pattern	24 0	25 0	27 6	
30	—	20 0	21 0	25 0	26 0	28 6	
31	—	No pattern above 30 in.	No pattern above 30 in.	26 0	28 0	30 0	
32	—	—	—	27 0	29 0	31 0	
33	—	—	—	28 0	30 0	32 0	
34	—	—	—	29 0	31 0	33 0	
35	—	—	—	30 0	32 0	34 0	
36	—	—	—	31 0	33 0	35 0	
38	—	—	—	35 0	35 0	37 6	
39	—	—	—	36 0	36 0	38 6	
40	—	—	—	37 6	37 6	40 0	
42	—	—	—	38 0	41 0	44 0	
44	—	—	—	44 0	44 0	47 6	
45	—	—	—	46 0	46 0	48 0	
46	—	—	—	47 0	47 0	50 0	
48	—	—	—	47 6	50 0	55 0	

Above pulleys are cast from well proportioned iron patterns, thus ensuring clean and well balanced castings.

INTERMEDIATE DIAMETERS CANNOT BE SUPPLIED AT ABOVE PRICES.

Pulleys 2 in. and 3 in. wide, if bored larger or of larger diameter than named above, will be made from 4 in. patterns and charged accordingly.

The Britannia Engineering Co., Ltd. Colchester, England.

STRONG CAST IRON PULLEYS.

SUITABLE FOR GENERAL ENGINEERING PURPOSES.

Turned Flat or Rounding on Face. Flat Faces always sent unless otherwise ordered.

Diam. ins.	Max. bore. ins.	WIDTH ON FACE,					
		7 in. s. d.	8 in. s. d.	9 in. s. d.	10 in. s. d.	11 in. s. d.	12 in. s. d.
7	3	8 6	—	—	—	—	—
8	3	9 6	11 0	—	—	—	—
9	3	10 0	11 6	13 0	—	—	—
10	3	11 0	12 6	14 0	15 6	—	—
11	3	11 6	13 0	14 6	16 0	18 0	—
12	3	12 6	14 0	15 6	17 0	19 0	21 0
13	3	13 0	14 6	16 6	18 0	20 0	22 0
14	3	13 6	15 0	17 0	19 0	21 6	23 0
15	3	14 0	15 6	17 6	19 6	22 0	24 6
16	3	14 6	16 0	18 0	20 0	22 6	25 0
17	3	15 6	17 0	19 0	21 6	23 6	26 0
18	3	16 6	18 0	20 0	22 6	25 0	27 6
19	3	17 6	19 6	21 6	24 0	26 6	29 0
20	3	18 6	20 6	22 6	25 0	27 6	30 0
21	3	19 6	21 6	23 6	26 0	28 6	31 0
22	3	21 6	23 6	25 6	28 0	30 6	33 0
23	3	22 6	24 6	27 0	29 6	32 0	34 6
24	3	23 6	26 0	28 6	31 0	33 6	36 0
25	3	25 6	28 0	30 6	33 0	36 0	39 0
26	3	26 6	29 0	32 0	34 6	37 6	41 0
27	3	27 6	30 0	33 0	36 0	39 0	42 6
28	3	28 6	31 0	34 0	37 0	40 0	44 0
29	3	29 6	32 0	35 0	38 0	42 0	46 0
30	3	30 6	33 0	36 0	40 0	44 0	48 0
31	3	32 0	34 0	37 0	41 0	45 0	49 0
32	3	33 0	35 0	38 0	42 0	46 0	50 0
33	3	34 6	37 0	40 0	44 0	48 0	52 6
34	3	35 6	38 0	41 0	45 6	50 0	55 0
35	3	36 6	39 0	42 0	46 6	51 0	56 0
36	3	37 6	40 0	43 0	47 6	52 6	57 6
38	3	40 0	43 0	46 0	50 0	55 0	60 0
39	4	41 0	44 0	48 0	52 6	57 6	62 6
40	4	43 0	46 0	50 0	55 0	63 0	65 0
42	4	48 0	51 0	55 0	60 0	65 0	70 0
44	4	51 0	56 0	60 0	65 0	70 0	75 0
45	4	53 0	58 0	62 6	67 6	72 6	77 6
46	4	55 0	60 0	65 0	70 0	75 0	80 0
48	4	60 0	65 0	70 0	75 0	80 0	85 0
50	4	63 0	69 0	75 0	80 0	85 0	90 0
52	4	67 0	72 6	77 6	85 0	90 0	95 0
54	4	70 0	75 0	80 0	87 6	95 0	100 0
56	4	75 0	80 0	85 0	92 6	100 0	105 0
58	4	80 0	85 0	90 0	97 6	105 0	110 0
60	4	85 0	90 0	97 6	102 6	110 0	117 6

Above pulleys are cast from well proportioned iron patterns, thus ensuring clean and well balanced castings.

INTERMEDIATE DIAMETERS CANNOT BE SUPPLIED AT ABOVE PRICES.

Pulleys 2 ins. and 3 ins. wide, if bored larger or of larger diameter than named above, will be made from 4 in. patterns and charged accordingly.

The Britannia Engineering Co., Ltd., Colchester, England.

CAST IRON SPLIT PULLEYS.

Split and bolted up Bored, Turned Flat or Rounding on Face, and Key-grooved
or Fitted with Set Screw.
Flat Faces always sent unless specially ordered otherwise.

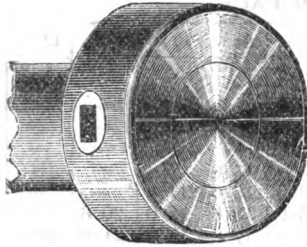
Diam.	Max. bore.	WIDTH ON FACE.									
		3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	11 in.	12 in.
ins.	ins.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
5	3	5 9	6 6	7 0	—	—	—	—	—	—	—
6	3	6 0	7 0	7 6	8 0	—	—	—	—	—	—
7	3	6 6	7 6	8 0	8 6	10 0	—	—	—	—	—
8	3	7 0	8 0	8 6	9 6	11 0	12 6	—	—	—	—
9	3	7 6	8 6	9 0	10 0	11 6	13 0	15 0	—	—	—
10	3	8 0	9 0	10 6	11 6	13 0	14 6	16 0	17 6	—	—
11	3	8 6	9 6	11 0	12 0	13 6	15 0	16 6	18 0	20 6	—
12	3	9 0	10 6	11 6	12 6	14 0	16 0	17 6	19 0	21 6	23 6
13	3	9 6	11 0	12 0	13 0	14 6	16 6	18 0	20 0	22 6	24 6
14	3	10 0	11 6	12 6	13 6	15 0	17 0	19 0	21 0	24 0	25 6
15	3	10 6	12 0	13 0	14 0	15 6	17 6	19 6	21 6	24 6	27 0
16	3	11 0	12 6	13 6	14 6	16 0	18 0	20 0	22 0	25 0	27 6
17	3	—	14 6	16 0	17 0	19 0	20 0	23 0	25 0	28 0	30 6
18	3	—	15 6	17 0	18 0	20 0	21 6	24 0	26 6	29 6	32 0
19	3	—	16 6	18 0	19 0	21 0	23 0	25 6	28 0	31 0	33 6
20	3	—	17 6	19 0	20 0	22 0	24 0	26 6	29 0	32 0	34 6
21	3	—	18 6	20 0	21 0	23 0	25 0	27 6	30 0	33 0	35 6
22	3	—	19 6	21 0	22 6	25 0	27 0	29 6	32 0	35 0	37 6
23	3	—	20 6	22 0	23 6	26 0	28 0	31 6	33 6	36 6	39 0
24	3	—	21 6	23 0	24 6	27 0	29 6	32 6	35 0	38 0	40 6
25	3	—	23 0	25 0	27 0	29 6	32 0	35 0	37 6	41 0	44 0
26	3	—	24 0	26 0	28 0	30 6	33 0	36 6	39 0	42 6	46 0
27	3	—	25 0	27 0	29 0	31 6	34 0	37 6	40 6	44 0	47 6
28	3	—	26 0	28 0	30 0	32 6	35 0	38 6	41 6	45 0	49 0
29	3	—	27 0	29 0	31 0	33 6	36 0	39 6	42 6	47 6	51 0
30	3	—	28 0	30 0	32 0	34 6	37 0	40 6	44 6	49 0	53 0
31	3	—	29 0	31 6	33 6	36 0	38 0	42 0	45 0	51 6	54 6
32	3	—	30 6	33 0	35 0	37 6	39 6	43 0	47 0	52 0	56 0
33	3	—	31 6	34 0	36 0	39 0	41 6	45 0	49 0	54 0	58 6
34	3	—	32 6	35 0	37 0	40 0	42 6	46 0	50 6	56 0	61 0
35	3	—	33 6	36 0	38 0	41 0	43 6	47 0	51 6	57 0	62 6
36	3	—	34 6	37 0	39 0	42 0	44 6	48 0	52 6	58 0	63 6
38	3	—	—	39 6	42 0	45 0	48 0	52 0	56 0	62 6	67 6
39	4	—	—	40 6	43 0	46 0	49 0	54 0	58 6	65 0	70 0
40	4	—	—	42 0	44 6	48 0	51 0	56 0	61 0	67 6	72 6
42	4	—	—	45 6	48 6	53 0	56 0	61 0	66 0	72 6	77 6
44	4	—	—	48 6	52 0	56 0	61 0	67 6	72 6	80 0	85 0
45	4	—	—	50 6	52 6	58 0	63 0	70 0	75 0	82 6	87 6
46	4	—	—	51 6	54 6	60 0	65 0	72 6	77 6	85 0	90 0
48	4	—	—	54 6	59 6	65 0	70 0	77 6	82 6	90 0	95 0
50	4	—	—	—	—	69 0	75 0	85 0	90 0	97 6	102 6
52	4	—	—	—	—	73 0	78 6	87 6	95 0	102 6	107 6
54	4	—	—	—	—	76 0	81 0	90 0	97 6	107 6	112 6
56	4	—	—	—	—	82 6	87 6	95 0	102 6	112 6	117 6
58	4	—	—	—	—	87 6	92 6	100 0	107 6	117 6	122 6
60	4	—	—	—	—	92 6	97 6	107 6	112 6	122 6	130 0

Pulleys narrower than those priced above are charged same price as the next size wider.

The Britannia Engineering Co., Ltd., Colchester, England.

LOOSE SET COLLARS.

WITH NON-PROJECTING SET SCREWS.



THESE Collars are made of wrought iron, turned, bored, faced and fitted with safety set screw.

These set screws entirely do away with the danger arising from projecting set screws, and are a great advantage to Mill owners and the Engineering trade.

The illustrations fully explain their merits, and they will be found *thoroughly efficient, most effective, and perfectly safe.*

We still make Collars with the ordinary square-headed Set Screw, if specially ordered, at same prices as below.

LIGHT SERIES WROUGHT IRON				HEAVY SERIES, WROUGHT IRON.				CAST IRON.			
Bore	Width	Thick- ness	PRICE	Bore	Width	Thick- ness.	PRICE	Bore	Width	Thick- ness.	PRICE
ins.	ins.	ins.	each	ins.	ins.	ins.	each.	ins.	ins.	ins.	each.
1	1	$\frac{1}{2}$	1/3	1	1 $\frac{1}{4}$	$\frac{5}{8}$	1/9	1	1 $\frac{1}{4}$	$\frac{5}{8}$	10d.
1 $\frac{1}{4}$	1	$\frac{1}{2}$	1/6	1 $\frac{1}{4}$	1 $\frac{1}{4}$	$\frac{5}{8}$	2/-	1 $\frac{1}{4}$	1 $\frac{3}{8}$	$\frac{5}{8}$	1/-
1 $\frac{1}{2}$	1	$\frac{1}{2}$	1/9	1 $\frac{1}{2}$	1 $\frac{1}{4}$	$\frac{5}{8}$	2/3	1 $\frac{1}{2}$	1 $\frac{3}{8}$	$\frac{5}{8}$	1/2
1 $\frac{3}{4}$	1 $\frac{1}{4}$	$\frac{1}{2}$	2/-	1 $\frac{3}{4}$	1 $\frac{3}{8}$	$\frac{5}{8}$	2/6	1 $\frac{3}{4}$	1 $\frac{3}{8}$	$\frac{5}{8}$	1/4
2	1 $\frac{1}{2}$	$\frac{1}{2}$	2/3	2	1 $\frac{5}{8}$	$\frac{5}{8}$	3/-	2	1 $\frac{3}{4}$	1 $\frac{1}{2}$	1/6
2 $\frac{1}{4}$	1 $\frac{1}{2}$	$\frac{5}{8}$	2/6	2 $\frac{1}{4}$	1 $\frac{5}{8}$	$\frac{3}{4}$	3/6	2 $\frac{1}{4}$	1 $\frac{3}{4}$	1 $\frac{1}{2}$	1/9
2 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{5}{8}$	2/9	2 $\frac{1}{2}$	1 $\frac{5}{8}$	$\frac{3}{4}$	4/-	2 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{1}{2}$	2/-
2 $\frac{3}{4}$	1 $\frac{1}{2}$	$\frac{5}{8}$	3/3	2 $\frac{3}{4}$	1 $\frac{5}{8}$	$\frac{3}{4}$	4/6	2 $\frac{3}{4}$	1 $\frac{3}{4}$	$\frac{3}{4}$	2/3
3	1 $\frac{1}{2}$	$\frac{5}{8}$	3/6	3	1 $\frac{5}{8}$	$\frac{3}{4}$	5/-	3	1 $\frac{3}{4}$	$\frac{3}{4}$	2/6
3 $\frac{1}{4}$	1 $\frac{1}{2}$	$\frac{5}{8}$	4/-	3 $\frac{1}{4}$	1 $\frac{7}{8}$	$\frac{3}{4}$	5/6	3 $\frac{1}{4}$	2	$\frac{3}{4}$	2/9
3 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{5}{8}$	4/6	3 $\frac{1}{2}$	1 $\frac{7}{8}$	$\frac{3}{4}$	6/-	3 $\frac{1}{2}$	2	$\frac{3}{4}$	3/-
4	1 $\frac{1}{2}$	$\frac{5}{8}$	5/-	4	1 $\frac{7}{8}$	$\frac{3}{4}$	7/-	4	2	$\frac{3}{4}$	3/6
4 $\frac{1}{2}$	1 $\frac{1}{2}$	$\frac{5}{8}$	6/-	4 $\frac{1}{2}$	1 $\frac{7}{8}$	$\frac{3}{4}$	7/6	4 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	4/6
5	1 $\frac{3}{4}$	$\frac{3}{4}$	7/-	5	2	$\frac{3}{4}$	8/6	5	2 $\frac{1}{2}$	1 $\frac{1}{2}$	5/3
5 $\frac{1}{2}$	1 $\frac{3}{4}$	$\frac{3}{4}$	8/-	5 $\frac{1}{2}$	2	$\frac{3}{4}$	10/-	5 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{1}{2}$	6/-
6	1 $\frac{3}{4}$	$\frac{3}{4}$	9/-	6	2	$\frac{3}{4}$	11/6	6	2 $\frac{1}{2}$	1 $\frac{1}{2}$	7/6

Intermediate sizes, same prices as next size larger.

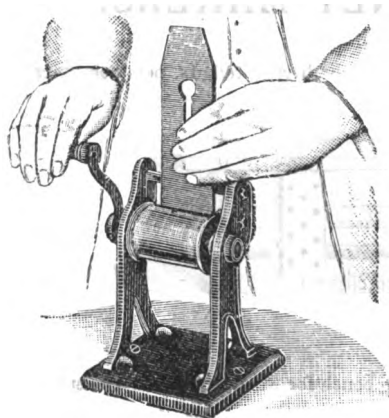
Collars up to $\frac{1}{4}$ ins. with Two Set Screws, 6d. each extra; above $\frac{1}{4}$ ins. Two Set Screws are included.

FIXED COLLARS.

Collars welded on to shafts and turned, same price as heavy series given above.

The Britannia Engineering Co., Ltd., Colchester, England.

PATENT PLANE IRON, CHISEL & TOOL SHARPENING MACHINE.



This useful machine is fast taking the place of the oil stone, being so simple in use, and giving the work a much better finish. A boy can sharpen a Plane Iron and ensure having a straight and true edge in less time than the most experienced workman could with a stone.

NOTE.—When grinding on the grindstone, which, as a rule, is **UNTRUE**, we advise that you do not let the cutting edge touch the stone, but leave about one-sixty-fourth of an inch; then finish the tool on the above Sharpening Machine. By this means your tools will always have a straight edge, and much time be saved.

Can be used on bench as shown, but it is more convenient if fixed on a post or wall.

PRICE 8/6 each

TESTIMONIALS.

Waddesdon, April 5th, 1889.

SIR,

The Plane Iron and Chisel Sharpening Machine you supplied me some months since must supply a long felt want. I have no hesitation in saying it is most economical with regard to saving time, and puts the edge of tools to much greater truth than the ordinary way. The consequence is better work. It only wants to be known to command a ready sale.—Yours truly,

H. H. SHERWIN.

Bicester Road, Aylesbury, March 6th, 1889.

DEAR SIR,

I have been using your Patent Sharpening Machine for Plane Irons and Chisels the last few weeks, and find it a great improvement on the oil stone. A good edge is easily obtained and in much less time, and I think when known will be extensively used.—Yours truly,

W. ROADS.

The Printing Works, Aylesbury, May 10th, 1889.

DEAR SIR,

In reply to your application, we beg to state that we have now had your Tool Sharpening Machine in use for a very long time, and cannot speak too highly of its merits; and on account of its truth is much preferred to the ordinary oil stone.—Yours faithfully,

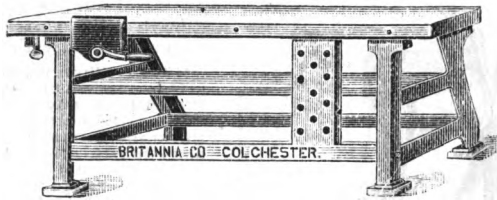
FOR HAZELL, WATSON & VINEY, Ltd.,

H. JOWETT, *Manager.*

The Britannia Engineering Co., Ltd., Colchester, England

BENCHES FOR CARPENTERS AND CABINET MAKERS.

30 in. high from floor. Extra height if required, 1s. per inch extra.



THIS illustration represents a strong bench for wood workers. The supports are of iron, and firmly held together by bolts and screws, thus avoiding the nuisance of a rickety bench. It is fitted with a screw top, shown on left which is a great improvement on the old plan.

The tops are of sound well seasoned wood firmly bolted together.

Shelf is provided for tools.

PRICES.

No. 1, with Deal Top, 5 ft. by 18 in.	..	..	..	..	£3 4 0
No. 2, with Hard Wood Top	..	..	..	..	3 16 6
No. 3, with Deal Top, 6 ft. by 22 in.	..	..	..	..	3 8 6
No. 4, with Hard Wood Top	..	..	..	..	4 4 0
No. 5, with Deal Top, 7 ft. by 22 in.	..	..	..	..	3 14 6

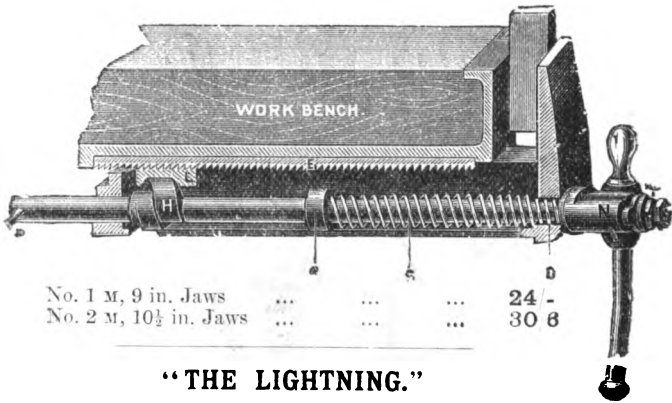
These Benches are fitted with Patent Instantaneous Grip Vices,

improved Bench Knives or Back stops for firmly securing work upon Bench,
extra 3s. 6d. each.

The Britannia Engineering Co., Ltd., Colchester, England.

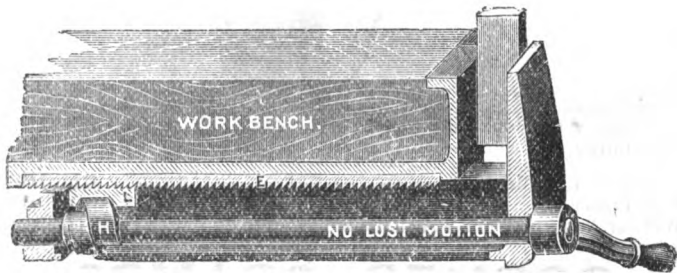
INSTANTANEOUS GRIP BENCH VICES.

“THE EW BANK.”



No. 1 M, 9 in. Jaws 24 -
 No. 2 M, 10½ in. Jaws 30 6

“THE LIGHTNING.”

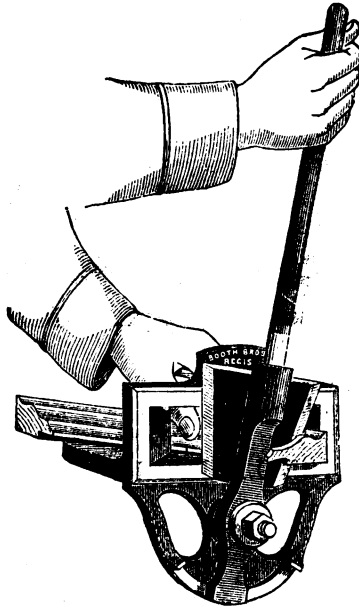


Tempered Steel Racks, with Machine Cut Teeth.			Iron Racks, with Cast Teeth.		
Kind.	PRICE.	Width of Jaws in.	Opens. in.	Kind.	PRICE.
No. 0 SJ, Amateur's	18 -	7½	6	No. 0 J, Amateur's	15/-
No. 1 SJ, Joiner's ... (Without Bench Hook)	20 -	9	12	No. 1 J, Joiners ... (Without Bench Hook)	17/-
No. 1 SILJ, Joiner's (With Bench Hook)	20 9	9	12	No. 1 HJ, Joiner's ... (With Bench Hook)	17 9
No. 1½ SJ, Joiner's (Without Bench Hook)	23 6	10½	13	No. 1½ J, Joiner's ... (Without Bench Hook)	20 6
No. 1½ SHJ, Joiner's (With Bench Hook)	24 6	10½	13	No. 1½ HJ, Joiner's (With Bench Hook)	21 6

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED MITRE CUTTERS.

Cuts Mitres for picture Frames without injury to Gilt Surface.

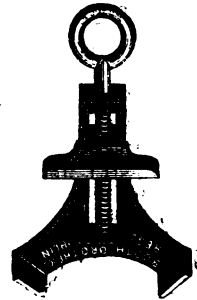


No. 1 Cuts 2 in. Mouldings	..	..	..	..	..	£0	15	0
Extra Cutter	..	..	..	..	..	0	3	0
<hr/>								
No. 2 Cuts 4 in. Mouldings	..	..	..	..	..	£1	10	0
Extra Cutter	..	..	..	..	..	0	6	0

Will cut Architrave and Panel Mouldings up to 4 in. with great precision.

CORNER CRAMPS.

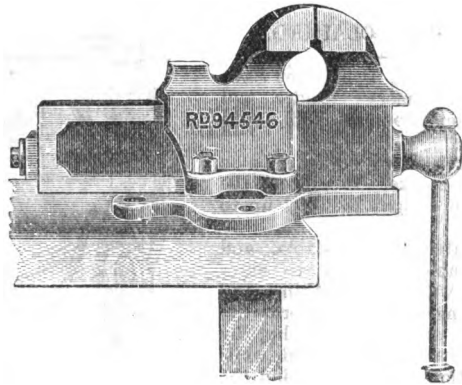
			Takes.		Per Pair.
No. 1	..	..	1 ³ / ₄ in.	..	2/-
No. 2	..	..	2 ³ / ₄ in.	..	3/-
No. 3	..	..	4 in.	..	5/-



The Britannia Engineering Co., Ltd., Colchester, England.

PARALLEL BENCH VICES.

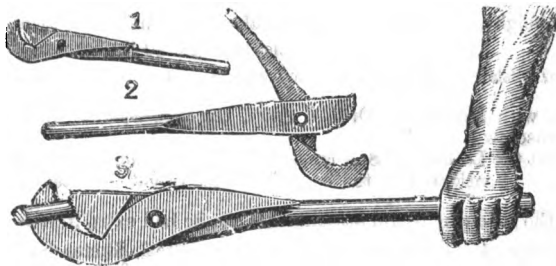
Improved Pattern with Riveting Block.



No.	Width of Jaw.	Depth of Jaw.	To Grip.	Weight.	PRICE.
1a	2 $\frac{3}{8}$ in.	1 $\frac{1}{2}$ in.	2 $\frac{3}{4}$ in.	7 $\frac{1}{2}$ lbs.	£0 8 6
1	2 $\frac{1}{4}$ "	1 $\frac{1}{4}$ "	3 $\frac{1}{2}$ "	11 "	0 10 0
2	3 $\frac{1}{4}$ "	2 $\frac{1}{2}$ "	3 $\frac{3}{4}$ "	19 "	0 15 0
3	3 $\frac{1}{2}$ "	2 "	5 $\frac{1}{4}$ "	27 $\frac{1}{2}$ "	1 0 0
3a	4 $\frac{1}{4}$ "	3 "	5 $\frac{1}{2}$ "	42 "	1 10 0
3b	5 "	3 $\frac{3}{8}$ "	6 "	63 "	2 0 0

PIPE TONGS.

Which for utility, usefulness, and firmness of grip are unsurpassed.



In three sizes; No. 1 is 8 in. long, and will take from $\frac{1}{8}$ in. to $\frac{1}{2}$ in. pipe
No. 2 is 14 in. long and takes from $\frac{1}{2}$ in. to 1 in. coupling; No. 3 is 23 in.
long and takes from 1 in. to 2 in. coupling.

Acts as Pipe Tongs or Screw Key.

For screwing in studs or nuts with corners off, they are invaluable.

PRICE, £2 4s. 6d. the Set, net.

The Britannia Engineering Co., Ltd., Colchester; England,

COMBINED LATHE AND FRET SAW, No. I.

ADVANTAGES CLAIMED.

1.—It is a Lathe, Drill, Fret Saw, Circular Saw, Emery Grinder and Polisher in one compact tool, with heavy fly-wheel.

2.—The fret saw works with a perpendicular stroke. It will cut the most intricate designs in wood up to $1\frac{1}{2}$ in. thick.

3.—The table is adjustable, and drops to enable the saw to enter another hole, without loss of time, and tilts to any angle for inlaid work.

4.—It has an improved clip, by which the saw is instantly fixed, while the introduction of rollers behind the saw prevents breakage.

5.—The adjustable presser foot is introduced, and prevents the wood being jerked upwards.

6.—It has a horizontal drill for drilling holes for fretwork and can be fitted with a vertical spindle with mitre gear wheels and 3 drills for drilling metal, &c., price 12 6 extra.

7.—As a lathe it is very durable, with planed bed, takes 8 in. by 4 in. between centres, conical mandrel, hardened shaft, 3 in. face-plate, driver, 2 rests, square thread in barrel, same as a first-class engineer's lathe.

By means of an emery and buff wheel fixed on mandrel of lathe, steel, stones, shells may be polished, and tools and knives sharpened.

These tools are coming into favour for ladies as well as gentlemen, and are a most useful and never-ending source of amusement and profit.

Total height, 3 ft. 10 in., and will take 15 in. under the arm.

Approximate weight, 3 qrs. 20 lbs.

The under tension is now fixed under the Lathe, instead of as shown in the engraving.

PRICE, with Horizontal Drill, 6 Saws, Oil Can, Spanner and

Turnscrew £5 5 0

If without the Lathe, this Saw is sold at £3 3 0, and quality and efficiency considered, is the best value of any yet invented.

Any of the following useful attachments can be had extra if desired, viz. :—

Circular Saw, 4", Emery Wheel, for Grinding Steel, Stones, Shells, &c., 4 - ,

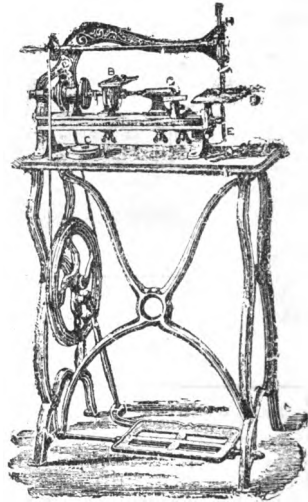
Buff Wheels for polishing the same, 2 - each, (fine or coarse).

Mandrel with Screw Collars for holding Saw or Wheels, 6 - .

Platform with Guide for Circular Saw, 10 6.

Vertical Spindle Drill, with Mitre Gear Wheels to fit in place of the Fret-Saws Spindle, with 3 Drills for Metal, &c., 12 6.

Fret Saws, 4d. per dozen, or 3 - per gross.



The Britannia Engineering Co., Ltd., Colchester, England.

"WINDSOR" FRET SAW, No. 4.



Is constructed entirely of iron and steel, except the arms, which are of wood for quietness and lightness. The work table is 32 in. from the floor, and is made to tilt for inlaying. The upper arm throws back, to enable the end of the saw to be inserted for internal work.

The stand is nicely japanned. The driving-wheel is 12 in. in diameter, with a 5-in. balance-wheel. It will admit 18 in. under the arm. The saw clamps are hung on pivots and will hold firmly the finest or coarsest saw. It is fitted with an automatic blower and a drill shaft. A drill, wrench, and 6 saws accompany each machine.

The most surprising thing of all, however, is its cheapness, for the

PRICE is only .. 17 6

If required to be sent by rail—Box to pack, 2 ..

TESTIMONIALS.

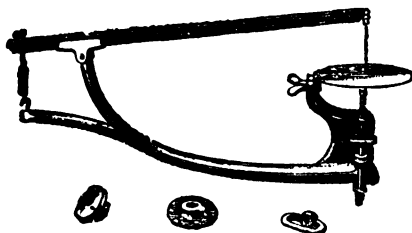
"I received the 'Windsor' quite safely a few days ago; I put together the same night and find that it works very well indeed, and shall recommend it to my friends."

"I have to-day returned the case the 'Windsor' came in; I have tried the machine, and like it very much."

"I received the machine yesterday, in proper order, and find that it works in a very satisfactory manner."

FRET SAW APPLIANCE, No. 3.

For use with any ordinary Lathe.



The frame is constructed to fix to any ordinary lathe bed, by the usual bolt with ring nut, and a driver chuck or catch plate is provided to screw to the nose of mandrel, and having a pin or roller which works in a slotted cam, fixed on the saw bar. The latter has thus a rapid vertical motion imparted to it when the lathe is put in motion, and works in guides bushed with hardened steel.

A screw clamp at upper end of saw bar fastens the lower end of saw, the top end being attached by a similar clamp to a pivot piece on the end of the top or moving arm, and is kept taut by a tension spring. The moving arm is made of tough ash, being light and quiet, and it takes 16½ in. under arm. The table is made to tilt for cutting at an angle or for inlaid work, &c.

PRICE complete £1 10 0

NOTE.—In ordering it is necessary to give the exact height from bed to centre, an accurate sketch or zinc template of size and form of lathe bed, and to send the lathe mandrel to fit the catch plate to nose screw, or if a correctly fitting chuck is sent it will answer the latter purpose as well.

The Britannia Engineering Co., Ltd., Colchester, England.

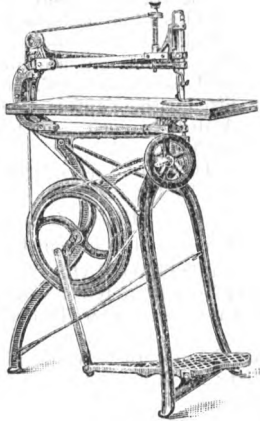
NEW PATTERN FRET SAW, No. 8.

WITH IMPROVED TENSION.

Not a toy, but a
useful tool.

The presser foot
prevents jerking of
the work.

Cuts $\frac{1}{2}$ in. easily.



Compare this before
you purchase.

It is worth two of
many others.

Will cut metals,
Has a durable blower.

The Fret Saw, as illustrated, fills a want which has long been expressed. The advantages claimed for this over every other saw are to the practical fret cutter of considerable importance.

- 1.—True vertical stroke.
- 2.—Without any upper spring to offer resistance the tension is instantly put on or off by altering the thumb nut, so that when fixing a new saw the tension is taken off by a turn of the nut. This gives entire freedom of action, however tight the tension.
- 3.—It will cut metal up to $\frac{1}{16}$ in. thick, and wood up to $\frac{1}{2}$ in.
- 4.—It has a heavy two-speed fly-wheel which ensures steadiness of working in either metal or wood.
- 5.—It will take in work 20 in. long under the arm.
- 6.—The table extends the whole distance under the arm, and gives ample space for the work.
- 7.—It is made to tilt for doing inlaid work.
- 8.—It has an efficient blower.
- 9.—It is more substantial than most fret saws.

PRICE, with horizontal and vertical Drill £3 0 0

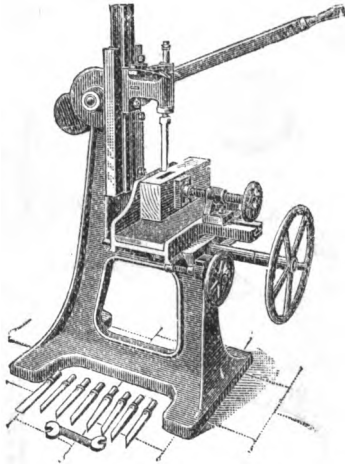
Screw Collars for holding Emery Wheels, 2/6 each.

Polishing Brushes, 1/- each. Emery Wheels, 2/- each. Drills, 1/- per doz.

The Britannia Engineering Co., Ltd., Colchester, England.

THE BRITANNIA MORTISE MACHINE.

We have put into this Machine all the additions and improvements that experience can suggest.



Our Mortise Machines are working various kinds of wood to the satisfaction of the users in all parts of the world.

In designing and constructing this machine our great aim has been to make a MORTISE MACHINE at a low price, and which for simplicity, efficiency, and accuracy in all its working parts cannot be surpassed. It is suitable for working either hard or soft wood, thus making it a most acceptable machine for all classes of Joiners, Builders, Cabinet Makers, &c., &c.

The frame itself is made in one casting. By this means strength and solidity is given to the machine, which is not only very desirable but very necessary where good work is required to be done. The wrought iron lever, which is used for bringing the chisel down to its work, is so placed that when the workman is using the machine he stands in an easy and convenient position for operating upon, and seeing the work he is doing. The chisels are made at the works under our own supervision, from a high-class steel, which many years' experience has taught us is the best for mortise chisels. Each chisel is fitted with a pin, which fits in a slot hole in a taper socket in chisel box; this keeps it immovable and perfectly true in reversing, thus by a half turn of chisel box handle the chisel is reversed truly.

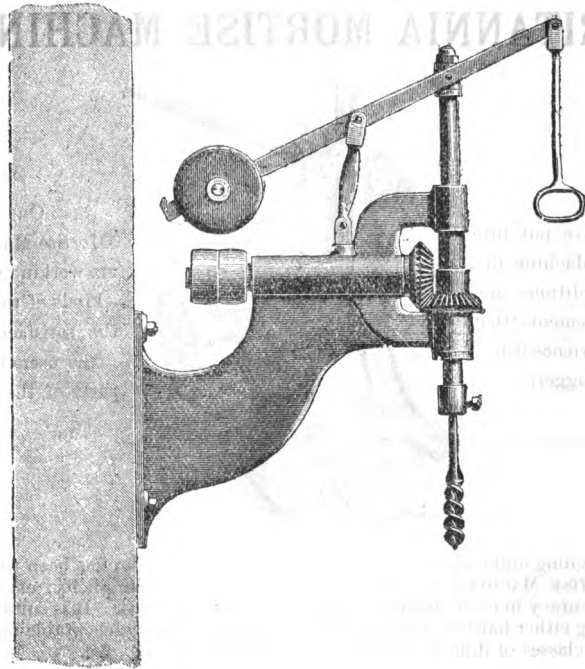
This machine will mortise 6 in. deep, and take work on the movable table 15 in. by 8 in.

Weight of machine, 3 cwt. 3 qrs. ; with boring apparatus, 4 cwt.

PRICE of machine, including 8 chisels, $\frac{1}{4}$ to $\frac{3}{4}$ in., one Spanner
and one Core Driver (without Boring Apparatus) .. £8 10 0
Ditto, with Boring Apparatus, including three bits for iron, and
three for wood 9 10 0
Self-Coring Chisels, extra 20/-

The Britannia Engineering Co., Ltd., Colchester. England.

WALL BORING MACHINE.



THE above machine has been specially designed to meet the demand for a cheap boring machine for the use of builders, cabinet makers, &c. It is capable of boring holes in all kinds of hard or soft wood with efficiency and despatch. Where room is an object this machine will be found to be very convenient on account of the very small space it requires. The boring spindle revolves in a strong cast iron frame, firmly bolted to a wall, and is counter-balanced by weight and lever. It is driven by bevel tooth gear, and fast and loose pulleys, and the spindle is raised or lowered to suit various depth of work required by means of wrought handle attached to weight lever, as shown in front of machine.

DIMENSIONS.

SIZE—To bore holes up to 2 in. diameter and 8 in. deep.
 Average power required, $\frac{1}{2}$ horse nominal.
 Size of driving pulleys, 5 in. by 2 $\frac{1}{2}$ in.
 Speed of driving pulleys, 500 revolutions.
 Approximate weight, 2 cwt.

PRICE £8 15 0

The Britannia Engineering Co., Ltd., Colchester, England.

ROGERS' PATENT SAW SHARPENER.

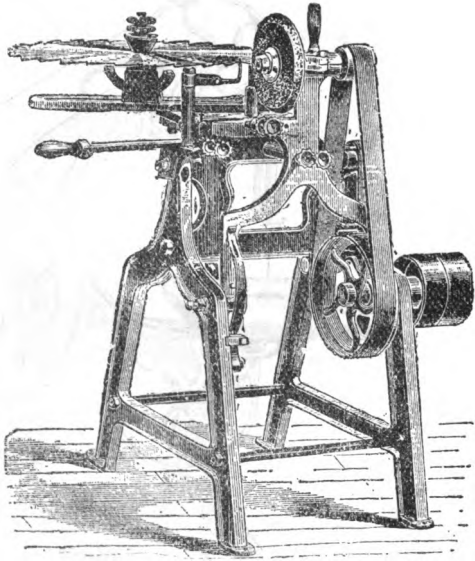
Each Machine includes
Three Wheels, Hart's
Patent.

SEMI AUTOMATIC.

Pitch, Angle, and Depth
of Teeth can be
Regulated with ease.

ANY BOY.
CAN WORK THEM.

Will save their cost in
a few months.



PRICES
as follows:—

No. 1 size for Circular
Saws up to 36 in. diam.

£9 7 6

No. 2 ditto 48 in. diam.

£11 2 6

No. 3 ditto 60 in. diam.

£12 5 0

If with attachment for
sharpening Straight
Saws

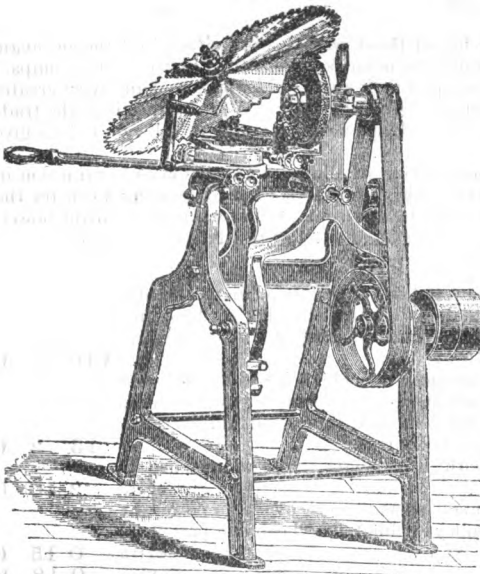
£2 18 6 extra.

Ditto Wood Planing
Machine Knives.

£2 18 6 extra.

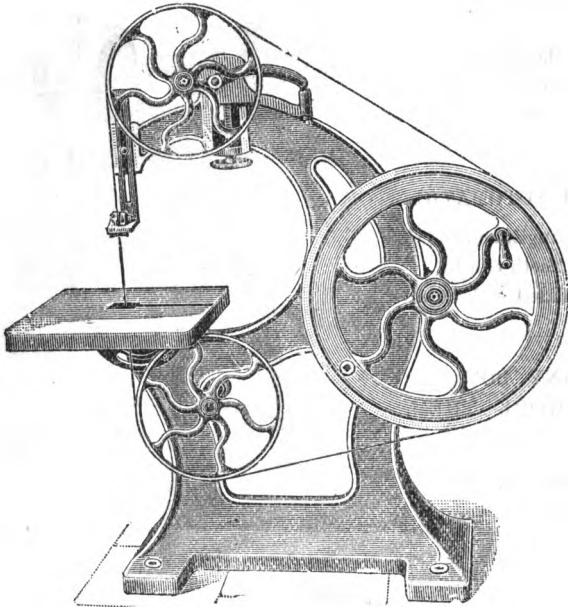
If with
both attachments.

£5 17 0 extra.



The Britannia Engineering Co., Ltd., Colchester, England.

THE IMPROVED BAND SAW MACHINE.



THE above represents a useful Band Saw to work either by hand or steam power. It is strongly built, the pillar being one solid casting; it is compact and complete in itself, occupies little room, and works by hand with greater ease than any other hand machine of its class. We introduce it to the trade with full confidence in its working, feeling certain it will not fail to give satisfaction.

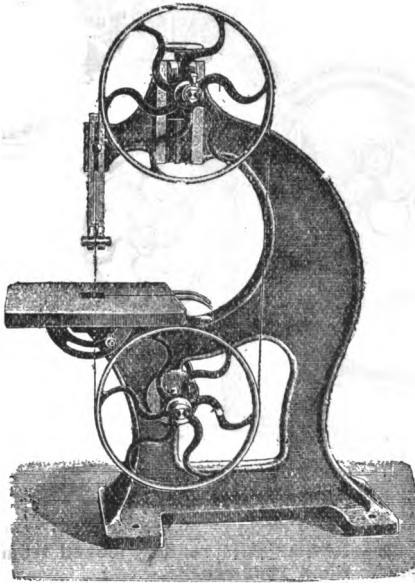
It is fitted with tension motion to allow for expansion or contraction of saw whilst working. The table is made to cant for cutting work on the bevel. It will admit of work 11 in. deep. When worked by steam power, speed of driving pulleys should be about 100 revolutions per minute.

PRICES.

No. 1 Size, with band saw pulleys each 20 in. diameter, and fly-wheel 32 in. diameter, with angle bracket for tenoning, one screw-key, and one $\frac{3}{8}$ in. saw, sharpened and set ready for use. Weight, 7 cwt.	£16 17 6
No. 2 Size, with band saw pulleys each 16 ins. diameter, and fly-wheel 26 in. diameter, with angle bracket for tenoning, one screw-key, and one $\frac{3}{8}$ in. saw, sharpened and set ready for use. Weight 5 cwt. 2 qrs.	13 2 6
A Boring Apparatus, with 1 in. augur, may be attached to either machine extra	2 10 0
Either machine may be made so as to work by steam power, by placing a pair of pulleys behind fly-wheel, one pair 9 in. pulleys extra	0 15 6
Ditto 12 in. ditto extra	0 18 9
Belt, Fork, and Striking Gear for ditto extra	0 15 0

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED BAND SAW MACHINES.



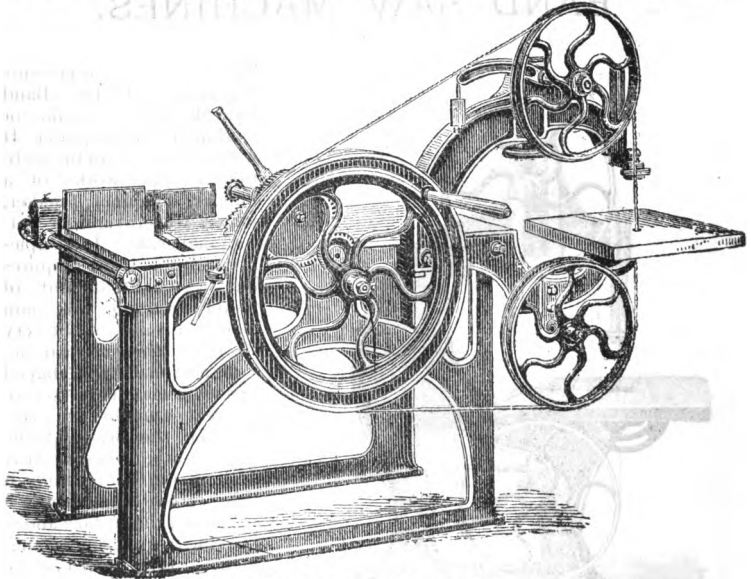
This illustration represents the type of Endless Band Saw Machines we make for working by steam power. It will be a most useful addition to the works of a builder, cabinet maker, joiner, wheelwright or pattern maker, &c. It occupies little space, and requires but a small amount of power to work it. The main standard is a plain but very strong casting, of neat design, and made and shaped in such a manner as to give a great amount of space between the saw and the frame; this being a great desideratum in a machine of this class. The table is planed on the surface and is fitted with a canting arrangement so that work may be sawn at any required angle. The band saw pulleys are bored and turned, and then carefully balanced so as to ensure steadiness in working. The face of each pul-

ley on which the saw works is covered with tyres, made of best rubber, this being found to be the best substance for the purpose. The top pulley is made to cant, and fitted with hand-wheel and screw arrangement for raising or lowering it to suit various lengths of saws; it is also fitted with a compensation spring, to meet any expansion or contraction of the saw whilst working. The saw blade is sustained against the pressure of sawing by two steel wheels, one of which is placed above the table, and the other immediately below the table. Each machine is fitted with fast and loose driving pulleys, striking gear, and spanners complete.

Sizes. To cut in depth.	Approx. weight.	Average power required Nominal.	Diameter of Saw Pulleys.	Size of Driving Pulley.	Speed of Driving Pulleys.	PRICE.		
						£	s.	d.
in. 12	cwts. 9	horse. $\frac{1}{2}$	in. 24	in. 10 by 3	revs. 300	22	10	0
14	15	$\frac{3}{4}$	30	12 „ 3 $\frac{1}{2}$	500	37	10	0
16	20	1	36	14 „ 4	450	50	0	0

The Britannia Engineering Co., Ltd., Colchester, England

HAND-POWER COMBINED CIRCULAR AND BAND SAWING MACHINE.



For the use of Joiners, Builders, Cabinet Makers,
Coach Builders, &c.

It is also very useful for Contractors, as it is readily moved from place to place when required.

The table for above bench is 4 ft. by 2 ft., substantially made of iron, planed true on the top. It is fitted with rising and falling spindle, self-acting feed motion; parallel fence, made to cant, so as to cut bevels and also to turn over end of bench, to be out of the way of cross cutting. It is also fitted with weight and roller, for keeping the timber to fence.

With this bench one man can cut 3 in. deep at the rate of 10 ft. in four minutes, or 2 in. deep at the rate of 10 ft. in two minutes, thus effecting a saving of 150 per cent, over what can be done with the hand saw.

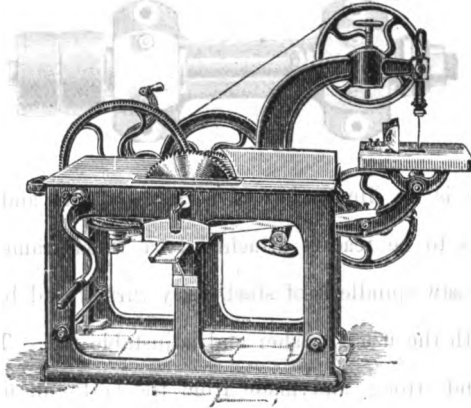
Band saw apparatus is fitted with square table, made so as to cant over for cutting to any bevel, with this may be cut any irregular, curved, or ornamental design, with an ease not attained before by any hand-power machine. The band saw is fitted with a new arrangement for securing equal tension to saw at all times.

Band saw pulleys, 16 in. diameter. Approximate weight, 8 cwt. 2 qrs.

PRICE, of above machine, with one each 9 in. and 14 in. circular and $\frac{3}{8}$ in. band saw for hand and steam power ..	£30	0	0
If with boring apparatus and one auger	2	10	0
If for steam power only and not for hand	29	5	0
If for hand power only	27	10	0

The Britannia Engineering Co., Ltd., Colchester, England.

THE COMBINATION HAND-POWER CIRCULAR AND BAND SAWING MACHINE.



The above hand-power machine is fitted with two handles, one on each side of machine; by this arrangement, when requisite, two men may be turning at the same time without being in each other's way.

It can also be fitted with fast and loose pulleys to work by steam power.

It is specially adapted for joiners, builders, cabinet makers, and other workers in wood.

Saw spindle is made to rise and fall for rabbeting and grooving purposes.

Parallel fence is arranged so as to cant to any angle, for cutting work on the bevel.

Table is 4 ft. by 2 ft., planed true on the surface.

A self-acting feed arrangement brings the work up to the circular saw.

A boring apparatus can also be attached to the bench, as shown above.

DIMENSIONS.

SIZE—To take a circular saw 15 in. diameter, to cut 5 in. deep, and with the band saw 6 in. deep.

Size of driving pulleys if fitted with steam power, 7 in. by 2½ in.

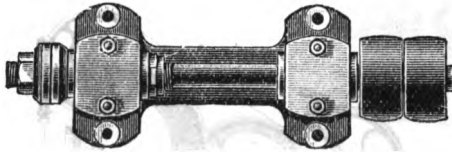
Speed of driving pulleys if fitted up for steam power, 100 revs.

Approximate weight, 9 cwt.

PRICE with one each 9 in. and 15 in. circular saw, and one ¾ in. band saw	£30	0	0
Bench, without band saw apparatus, with one 15 in. and one 9 in. circular saw	17	10	0
If with boring apparatus and one ½ in. auger, extra	2	10	0
It with fast and loose pulley, 7 in. by 2½ in. for steam power, extra	1	5	0

The Britannia Engineering Co., Ltd., Colchester, England.

SAW SPINDLES.

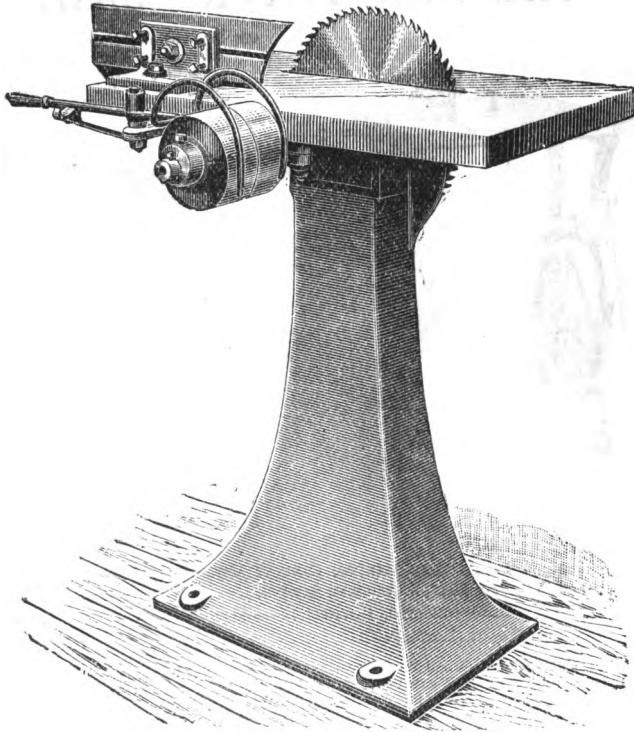


THE above is an illustration of a Saw Spindle and Frame, so arranged as to be readily attached to a wood frame at a small cost. The saw spindle is of steel, truly turned and balanced, and is fitted with the usual washer and adjustable nut. The bearings are long and strong, and made from the best gun metal. Each spindle is complete with fast and loose pulley as shown above.

No.	SIZES.		Approximate Weight.	Average power required.	Size of fast and loose driving pulleys.	Speed of driving pulleys.
	Diameter.	Prepared for Saw.				
1	in. 2½	in. 48	cwt. 3½	nom. horse. 4	15 by 5	800
2	2	42	2½	3	12 „ 4½	900
3	2	36	2½	3	12 „ 4½	1050
4	1½	30	2	2	10 „ 4½	1200
5	1¼	24	1½	2	9 „ 4	1300
6	1¼	18	1¼	1½	8 „ 3	1500
PRICE, as illustration.			PRICE without Frame, but with Pedestals only.			
1	£11 0 0		£10 6 6			
2	9 5 0		8 15 0			
3	7 10 0		7 5 0			
4	6 17 6		6 13 6			
5	5 16 3		5 12 6			
6	4 11 6		4 11 6			

The Britannia Engineering Co., Ltd., Colchester, England.

SMALL FIXED SPINDLE BENCH.



THE engraving represents a small but very useful circular saw bench for amateurs, or to place amongst the joiners or workmen of any kind of manufactory where wood has to be worked.

It is handy for cross-cutting odd lengths, or for ripping light work. With a circular saw 14 in. diameter it will cut 4 in. deep.

It occupies but a small space, takes little power to drive it, and the price is such as to place it within the reach of any one to whom such a machine would be serviceable.

Surface of table is 2 ft. 9 in. by 1 ft. 6 in. and admits a saw up to 14 in. diameter. Saw spindle is made of steel, and works in adjustable brass bearings. It is complete with fast and loose pulley and strap guider, as shown.

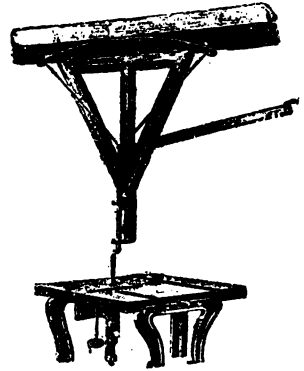
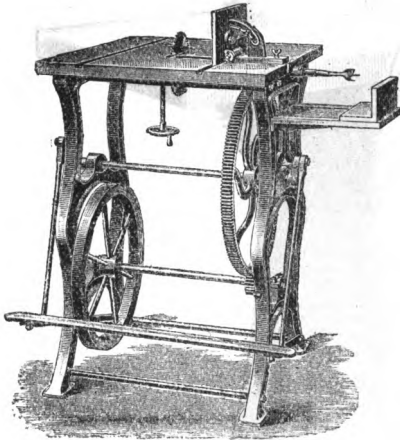
DIMENSIONS.

Size of table, 2 ft. 9 in. by 1 ft. 6 in., and prepared for taking a saw 14 in. diameter.	Driving pulleys, 4 in. by 2½ in. Speed of driving pulleys, 2000 revolutions.
Average power required, ½ horse nom.	Approximate weight, 4 cwt. 2 qrs.
PRICE .. ..	.. .. £8 12 0

The Britannia Engineering Co., Ltd., Colchester, England.

THE NEW PATENT SAW.

Some idea of the power of this Saw when worked by foot may be formed from the fact that 3 ft. 8 in. of 1 in. pine can be cut after the foot is taken off the treadle.



Small Illustration shows the vertical arm when in use.

Especially adapted for PATTERN MAKERS, CABINET MAKERS, JOINERS, PICTURE FRAME MAKERS; for VERTICAL OR CIRCULAR SAWING, GROOVE CUTTING, DOWELLING and DRILLING, DOVETAILING and MORTISING.

WE invite the attention of Wood Workers to the above most economical tool, by which nearly DOUBLE THE AMOUNT of work can be done as by any other Treadle Saw. It will SAVE ITS ENTIRE COST every year. It will cut up to 4 ins. square, with one man working at the treadle.

SCROLL CUTTING. This is a separate appliance, the upper arm is suspended from wall or ceiling and only let down when wanted, thus leaving the table QUITE CLEAR for work of any size, will cut up to 4 ins. thick with the vertical saw.

GROOVING is done at a speed much greater than by other saws.

DOWELLING is done on the adjustable table which is shown at the side of the machine; special appliance is fitted for holding work and ensuring uniformity.

MITRE CUTTING. The common gilt mouldings for Picture Frames can be cut without any shake, and will not require planing or finishing.

BORING can be done with great rapidity. Holes up to 2 ins.

Dovetailing and Mortising Attachments.

WILL CUT 10 FT. OF INCH WOOD IN A MINUTE. Can be worked at 1,500 revolutions per minute. Height. 3 ft. 5 ins. Table is 2 ft. 9 ins. 2 ft. 3 ins. Weight 4 cwt.

PRICE, including one each 8 in. Rip and Cross cut Saws, and one 6 in. Saw, with one pair of Bevel Washers for Grooving	£15	0	0
Fret Arm to suspend from ceiling for Fret Cutting	2	10	0
Two Mitre and Cross-cut Gauges	0	17	6
If 12 in. Cross cut Saw instead of 8 in. extra	0	5	0
Adjustable Table at side, including Chuck for holding bits of various sizes ..	1	2	6

Centre Bits fitted— $\frac{1}{4}$ in. 8d., $\frac{3}{8}$ in. 8d., $\frac{1}{2}$ in. 8d., $\frac{3}{4}$ in. 8d., 1 in. 10d., 1 $\frac{1}{4}$ in. 1 -, 1 $\frac{1}{2}$ in. 1 -, 1 $\frac{3}{4}$ in. 13.

A Handle at left can be used as auxiliary to, or in lieu of Treadle. Price 7 6.

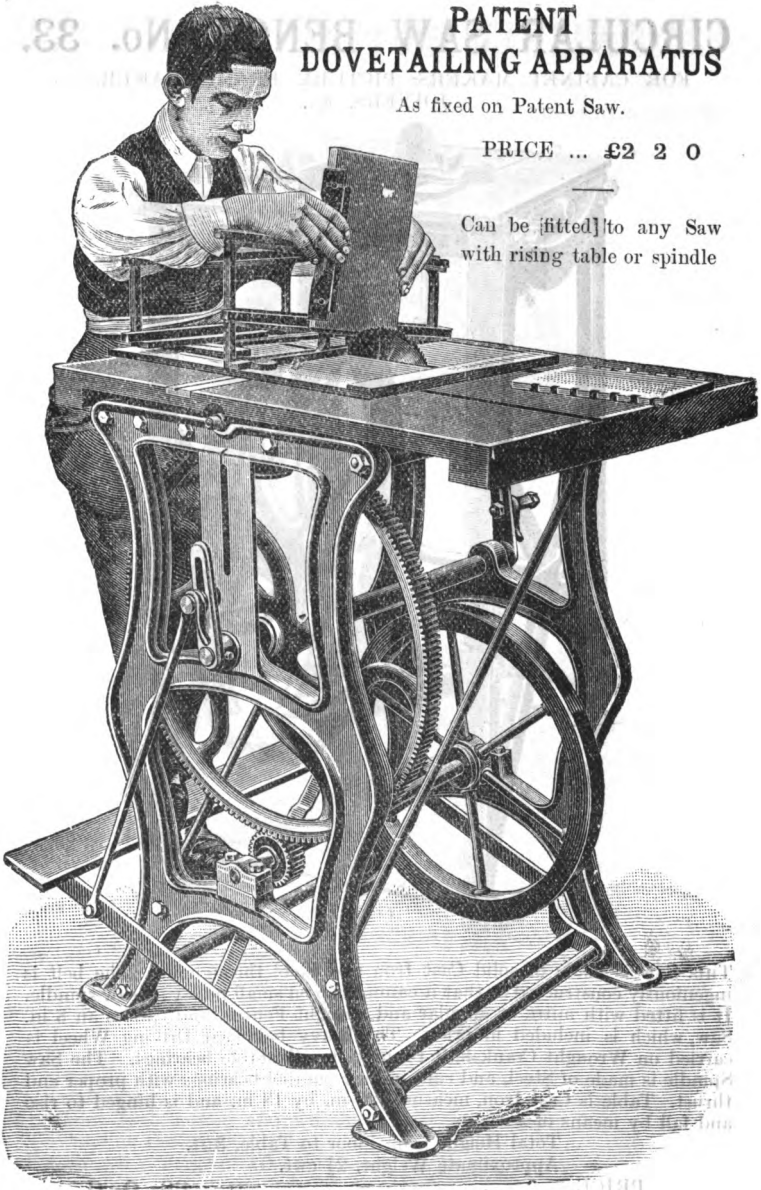
The Britannia Engineering Co., Ltd., Colchester, England,

PATENT DOVETAILING APPARATUS

As fixed on Patent Saw.

PRICE ... £2 2 0

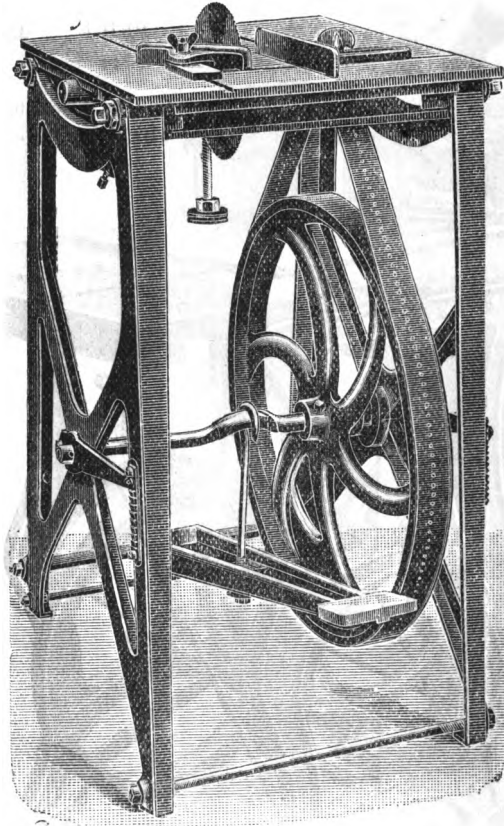
Can be fitted to any Saw
with rising table or spindle



The Britannia Engineering Co., Ltd., Colchester, England,

CIRCULAR SAW BENCH, No. 33.

FOR CABINET MAKERS, PICTURE FRAME MAKERS,
JOINERS, &c.



THIS Saw is made of solid Cast Iron and Steel throughout. The belt is ingeniously constructed so that it cannot slip on small pulley on saw spindle. It is fitted with mitre or angular and straight Fences, and carries an 8 in. Saw, which is included in price. The heavy balanced Driving Wheel is carried on Wrought Crankshaft running in adjustable bearings. The Saw Spindle is made of Steel, and runs in long parallel bearings with proper end thrust. Table is Cast Iron, measures 20 in. by 18 in. and is hinged to rise and fall by means of a screw.

Total Height from Floor to Table, 3 ft.

Approximate Weight, 2½ cwt.

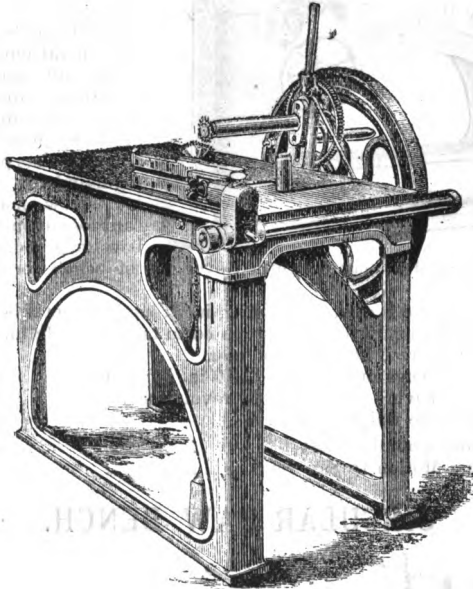
PRICE £8 0 0

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED HAND-POWER CIRCULAR SAW BENCH

For the use of Joiners, Builders, Cabinet Makers, and Coach Builders.

It is also very useful for contractors, as it is readily moved from place to place where required.



THE above Bench, 4 ft. by 2 ft., is substantially made of iron, planed true on top. It is fitted with rising and falling spindle, self-acting feed motion, parallel fence made to cant so as to cut bevels and also to turn over end of bench to be out of the way for cross-cutting. It is also fitted with weight and roller for keeping timber to fence.

With this bench one man can cut 3 in. deep at the rate of 10 ft. in four minutes, or 2 in. deep at the rate of 10 ft. in two minutes, thus effecting a saving of 150 per cent. over what can be done with the hand saw.

SIZE—Will cut with a 14 in. saw $4\frac{1}{2}$ in. deep.

Approximate weight, with 6 rollers for extending the bench, 6 cwt. 2 qrs.

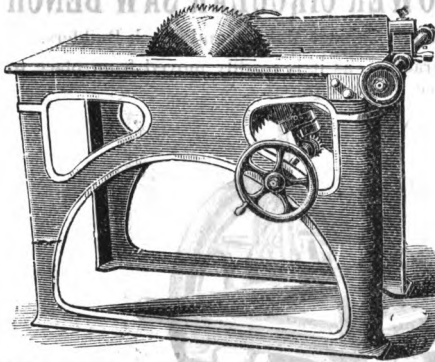
The above may be worked by steam power by replacing the fly-wheel with pulleys for belt driving. It can be fitted with boring apparatus if desired.

PRICE, including two Circular Saws, viz. : 9 in. and 14 in. ;
 six rollers and carriers for extending the bench, and two
 extra change wheels for feed motion £15 12 6
 If without feed motion and without rollers and carriers for
 extending the bench 13 2 6

For an extra charge of 10/- this bench can be prepared to work either
 by steam or hand, as occasion requires.

The Britannia Engineering Co., Ltd., Colchester, England.

SMALL RISING SPINDLE SAW BENCH.



THE Saw Bench represented is exceedingly useful in any joiner's, builder's or cabinet maker's works, being specially adapted for placing in any part of such works where it may be most handy for general purposes.

The saw spindle is fitted with rising and falling apparatus, to which motion is given by hand wheel and screw. It has parallel fence, regulated by hand wheel and screw, made so as to cant for cutting work to any bevel required, and arranged of bench for cross-cutting

that when required it may be turned over end purposes.

The saw spindle is of steel, working in strong gun metal bearings.

Size—4 ft. long, 2 ft. wide, prepared to take a saw 18 in. diameter.

Power required, $1\frac{1}{2}$ horse nominal.

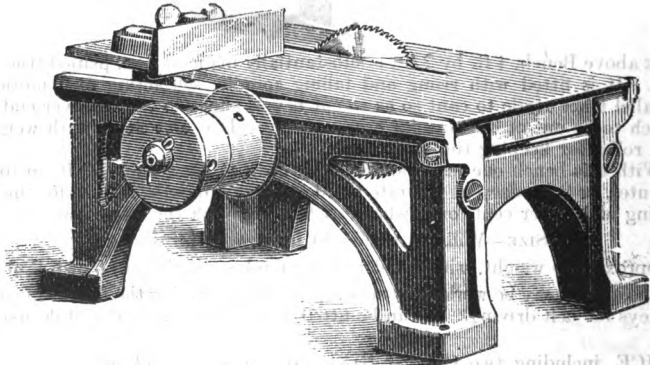
Driving pulleys on saw spindle, 6 in. by 3 in.

Speed of driving pulleys, 2,000 revolutions.

Approximate weight, 6 cwt.

PRICE, without Counter Shaft	£18 15 0
Without Rising Motion to Saw Spindle	18 5 0

CIRCULAR SAW BENCH.



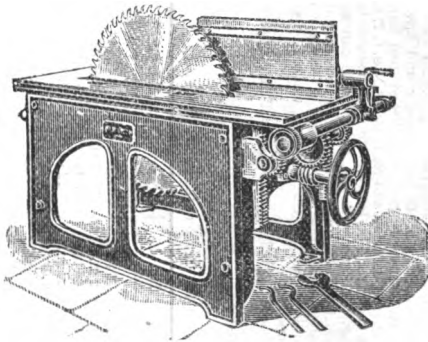
For Wood or Metals; with Rising Table; to be driven by ordinary foot power.

$6\frac{1}{2}$ in. long by 10 in. wide at base; table, $9\frac{1}{2}$ in. by 6 in.; fast and loose pulleys, $1\frac{1}{2}$ in. diameter by 1 in. wide; height of bench, $4\frac{1}{2}$ in.; will take a $3\frac{1}{2}$ in. circular saw.

PRICE	£2 2 0
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The Britannia Engineering Co., Ltd., Colchester, England.

NEW SAW BENCHES.



THIS Saw Bench is recommended as a very firm and substantial tool; it is made with either stationary or rise and fall table, and the larger sizes can be fitted with drag motion if required. All the parts are planed together, the table is planed and polished, the spindles in the 4 larger sizes have three long necks, and is fitted up with lock nuts of improved design for taking up all side wear; the fence is in every way adjustable, and will swing clear over end for cross cutting. Complete with belt guide and necessary screw keys.

To admit Saw diam.		Table.	Will cut fully through. deep.	Diam. and width of Pulley.		Rev. per minute.	Aprox weight Stationary top.	Aprox weight Rising top.	Price Rising top.	Price Rising and Falling Spindle.	Price Stationary top.
in.	in.	in.	in.	in.	in.		cwt.	cwt.			
18	40	20	6½	5	by 3	1400	6	8	£14 10	£14 10	£12 15
26	48	24	10	6	„ 3½	1200	8	10	16 0	16 0	13 10
32	60	27	13	7	„ 3½	1000	11	14	21 10	21 10	18 10
38	66	33	15	8	„ 4	950	14	18	25 15	25 15	22 10

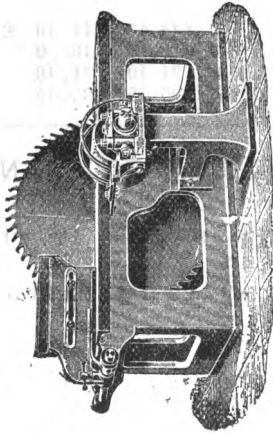
CIRCULAR SAWS (Cast Steel)—New.

4	4½	5	6	7	8	9	10	12	14	16 inch.
3/2	3/6	4/3	5.-	5/8	6/8	7/9	9/-	11/3	14/-	16/9
18	20	22	24	25	28	30	32 inch.			
£1 1	£1 5 3	£1 9 6	£1 13 8	£2	£2 6 3	£2 13 3	£3 2			
34	36	38	40	42	44	46	48 inch.			
£3 12 9	£4 4	£5 1 6	£5 12	£6 6	£6 10 6	£8 8	£9 9			
50	52	54	56	58	60 inch.					
£13 6	£14 14	£16 16	£19 10	£21 14	£23 16					

Perforated Saws 10 per cent. extra.

The Britannia Engineering Co., Ltd., Colchester, England.

PLAIN SAW BENCHES.



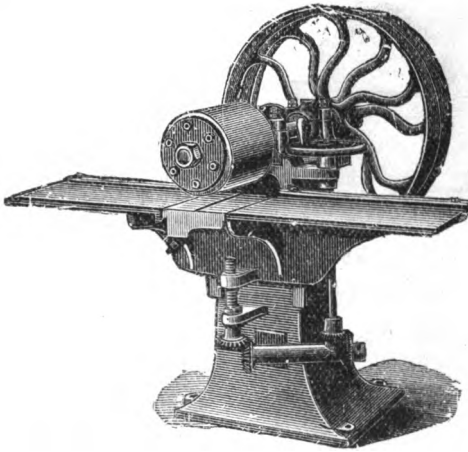
THESE Saw Benches are of massive construction, iron frame, with Planed Iron Table. Saw Spindle is of Mild Steel of special quality turned and polished. The Saw Spindle Bearings are of Gun Metal, of extra length, and in all sizes except Nos. 1 and 2, a third bearing is placed on the outer side of driving pulleys, and supported on a cast-iron standard, securely bolted to side of Bench; this standard is provided with a foot for additional support on all Benches carrying Saws of 42 ins. diameter, and upwards. The fence is of improved pattern, sliding on a strong turned and polished steel Bar at end of table, with hand wheel and screw for fine adjustment, and on Benches Nos. 1, 2, 3, and 3a, is fitted with a canting motion for bevel cutting. The Fence plate is adjustable for Saws of various diameters. For Cross Cutting, the Fence with the Fence plate can be instantly turned back over end of Bench, leaving the Table quite clear. A turned and polished steel roller is placed at each end of the Table to facilitate the moving of heavy work. Each Bench is fitted with fast and loose pulleys and Belt Striking gear, worked by a lever from a convenient position outside the frame.

The pulleys are of cast-iron, bored and turned, and the Loose Pulley is provided with special arrangement for oiling.
A Complete Set of Spanners is provided.

The Benches 1-3a inclusive are fitted with canting motion to fence for bevel cutting.

	No. 1	No. 2	No. 3.	No. 3a.	No. 4.	No. 5.	No. 6.	No. 7.
Size of Table	4 ft. 6 in.	5 ft.	5 ft.	5 ft. 6 in.	6 ft.	6 ft.	6 ft.	8 ft.
Take Saw in Diameter	by 2 ft.	by 2 ft.	by 2 ft. 6 in.	by 2 ft. 9 in.	by 3 ft.	by 3 ft.	by 3 ft. 6 in.	by 3 ft. 6 in.
Maximum Depth of Cut	26 in.	30 in.	36 in.	42 in.	48 in.	50 in.	54 in.	60 in.
Diameter and Width of Pulleys	10 in.	12 in.	15 in.	18 in.	21 in.	22 in.	23 in.	25 in.
Speed, revolutions per minute	8 in. by 4 in.	9 in. by 4 in.	10 in. by 4 in.	10 in. by 4 in.	12 in. by 6 in.	12 in. by 6 in.	12 in. by 6 in.	14 in. by 6 in.
Average H.P. required, nominal	1450	1900	1100	950	900	850	800	600
Approximate Total Weight	2	3	4	5	6	7	7	8
PRICE	11 cwt.	12 cwt.	15 cwt.	20 cwt.	21 cwt.	25 cwt.	26 cwt.	31 cwt.
" with Rising and Falling Spindle..	315 0 0	350 5 0	324 15 0	327 0 0	330 7 6	333 15 0	337 2 6	343 15 0
Cross Cutting Groove, extra ..	21 7 6	24 15 0	29 5 0	—	—	—	—	—
Boring Attachment, extra ..	0 13 6	0 17 0	0 19 3	—	—	—	—	—
Steel Roller at both ends, extrg. ..	3 7 6	3 7 6	3 9 6	4 10 0	4 10 0	4 10 0	4 10 0	4 10 0
	1 16 0	1 16 0	2 9 6	2 14 0	2 14 0	3 7 6	3 13 0	3 13 0

PATENT PLANING MACHINE.



THE machine as represented above, will plane Venetian blind laths, reed laths, Heald laths, lap boards, stuff for cigar boxes, or other light work.

It will also smooth floor boards, skirting boards, stair steps, drawer sides and fronts, and various other kinds of joiner work, after having passed through a machine having revolving cutters.

The work is done by a stationary knife fitted in a knife box, and fixed in cast iron table.

Each machine is supplied with two knives and knife boxes, so that one may be sharpened whilst the other is in use.

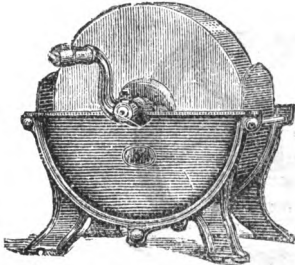
The work to be planed is fed up to and past the knife by a roller of large diameter, made of india-rubber, and revolving at such a high rate of speed that it will plane stuff as rapidly as the hand can place it on the table, with a finish that cannot be surpassed by any other process.

The table is made to rise and fall by hand wheel and screw to suit various thicknesses of work required to be planed.

SIZE. To plane stuff.	Approximate weight.	Average power required. Nominal horse	Size of Driving Pulleys.	Speed of Driving Pulleys.	PRICE.
5 ins. wide	cwt. 8	$\frac{1}{2}$	ins. 20 by 4	Revs. 300	£32 10 0
7 " "	9	1	30 " 5	250	37 10 0
9 " "	10	1	30 " 5	250	56 5 0

The Britannia Engineering Co., Ltd., Colchester, England.

GRINDSTONES.



No. 1 Grindstone, 12 in. by 2 in.

No. 000.	6 in. by 2 in.	.. .. .	8/-
„ 00.	8 in. „ 2 in.	.. .. .	8.-
„ 0.	10 in. „ 2 in.	.. .. .	10/-
„ 1.	12 in. „ 2 in.	.. .. .	12/-
„ 2.	18 in. „ 2½ in.	.. .. .	18/-
„ 3.	14 in. „ 2 in.	.. .. .	14.-
„ 4.	16 in. „ 2 in.	.. .. .	16/-
„ 5.	18 in. „ 2½ in., with fast and loose pulleys	.. .. .	25/-
„ 6.	18 in. by 3½ in., with fast and loose pulleys	.. .. .	27 6



No. 10 Grindstone, 22 in. by 3½ in.

**Grindstones,
mounted with Wood Troughs
and Stands.**

		£	s.	d.
No. 7.	18 in. by 2½ in.	..	1	1 0
„ 8.	18 in. „ 3 in.	..	1	3 0
„ 9.	20 in. „ 3½ in.	..	1	7 0
„ 10.	22 in. „ 3½ in.	..	1	10 0

With Anti-friction Rollers.

		£	s.	d.
No. 11.	24 in. by 4 in.	..	1	16 0
„ 12.	26 in. „ 4 in.	..	2	5 0
„ 13.	30 in. „ 5 in.	..	3	7 6



No. 14 Grindstone,
18 in. by 2½ in.

**With Iron Troughs and Stands,
for Hand and Treadle.**

No.		£	s.	d.
14.	18 in. by 2½ in., plain bearings	..	1	7 0
15.	18 in. „ 3½ in., plain bearings	..	1	9 0
16.	18 in. „ 2½ in., anti-friction bearings	1	10	0
17.	18 in. „ 3½ in., anti-friction bearings	1	12	0
18.	21 in. „ 3 in., plain bearings	..	1	15 0

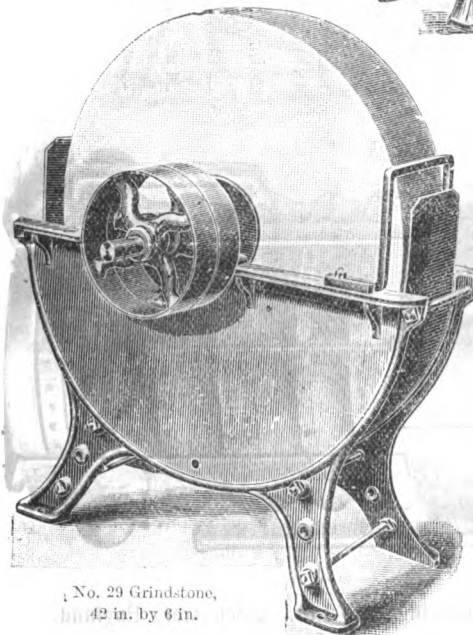
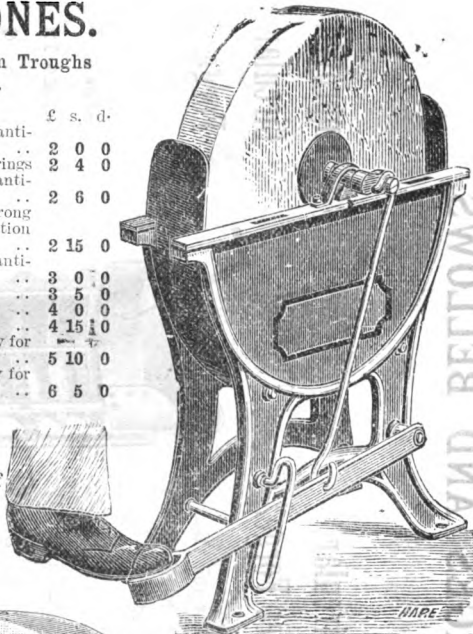
The Britannia Engineering Co., Ltd., Colchester, England.

GRINDSTONES.

With strong Cast Iron Troughs and Frames.

No		£	s.	d.
19.	21 in. by 4 in., with anti-friction rollers	2	0	0
20.	24 in. by 4 in., with bearings	2	4	0
21.	24 in. by 4 in., with anti-friction rollers	2	6	0
22.	24 in. by 5 in., extra strong frame and anti-friction rollers	2	15	0
23.	26 in. by 4½ in., with anti-friction rollers	3	0	0
24.	28 in. by 4½ in.	3	5	0
25.	30 in. by 4½ in.	4	0	0
26.	30 in. by 6 in.	4	15	0
27.	36 in. by 5 in., with pulley for power	5	10	0
28.	36 in. by 8 in., with pulley for power	6	5	0

Fast and Loose Pulleys, fitted to any of the above, 18/- per pair extra.



No. 29 Grindstone, 42 in. by 6 in.

Larger size Grindstones, for Power only, with very heavy Cast Iron Troughs and Frames, Fast and Loose Pulleys.

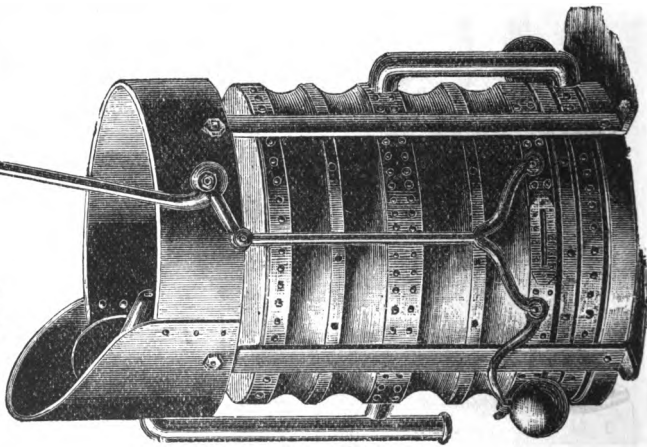
No.		£	s.	d.
29.	42 in. by 6 in. ..	8	0	0
30.	42 in. by 8 in. ..	9	0	0
31.	48 in. by 6 in. ..	10	0	0
32.	24 in. by 4½ in., with solid Wrought Iron Frame, Government Pattern ..	3	10	0

Wrought or Cast Iron Hoods and Galvanized Water Cans, with Taps, fitted to any of the above Stones at an extra cost.

IMPROVED

No. 1011.

FORGES AND BELLOWS.



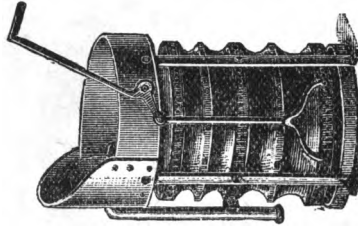
Circular

Rivet Forge,

With Double Blast
Bellows adapted for
all purposes.

Bellows.	
18 in. ...	£7 0 0
20 in. ...	8 5 0
22 in. ...	9 10 0
24 in. ...	10 15 0
26 in. ...	12 0 0

No. 1037.

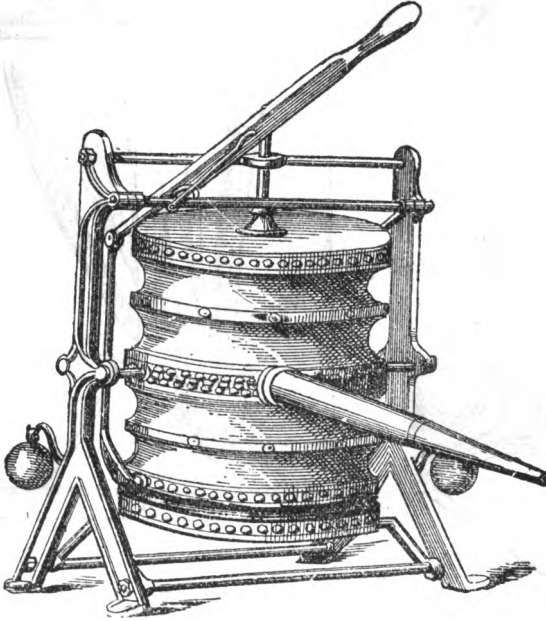


Improved Circular Forge.

SIZES.

16 in. ...	£4 12 0
18 in. ...	5 0 0
20 in. ...	5 16 0
22 in. ...	6 15 0
24 in. ...	7 18 0

DOUBLE BLAST BELLOWS.



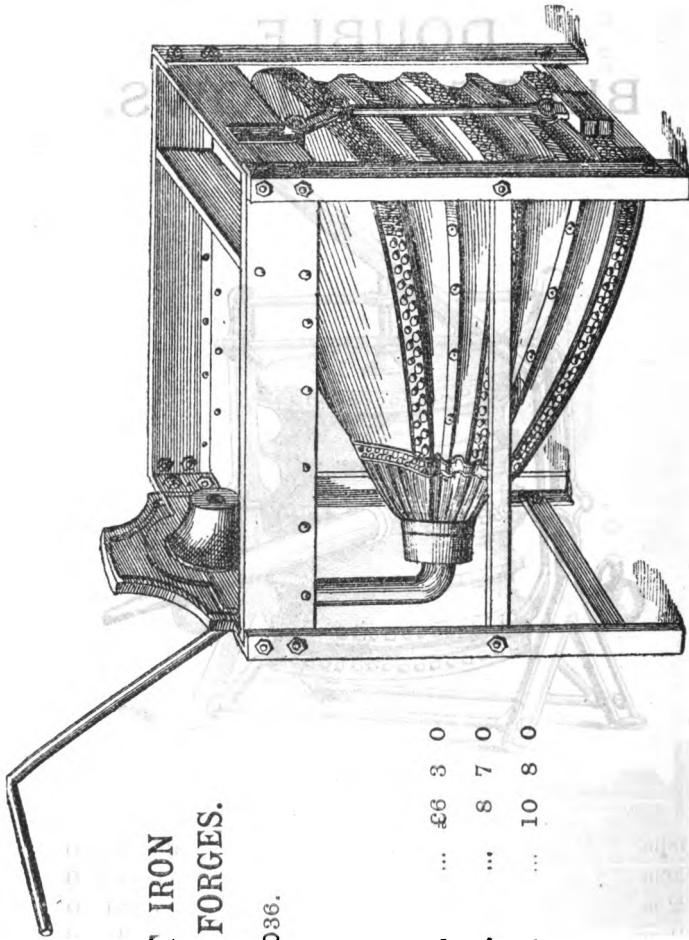
No. 101.

SIZES.

18 in.	..	..	..	..	..	£5	15	0
20 in.	..	..	..	..	..	6	12	0
22 in.	..	..	..	..	..	7	14	0
24 in.	..	..	..	..	..	8	16	6
26 in.	..	..	..	..	..	9	18	0
28 in.	..	..	..	..	..	11	10	0
30 in.	..	..	..	..	..	13	8	0
32 in.	..	..	..	..	..	15	0	0
34 in.	..	..	..	..	..	17	10	0
36 in.	..	..	..	..	..	20	0	0

On account of the expense of carriage, the weights are not included in price,
and are not sent with the Bellows.

The Britannia Engineering Co., Ltd., Colchester, England.



**WROUGHT IRON
PORTABLE FORGES.**

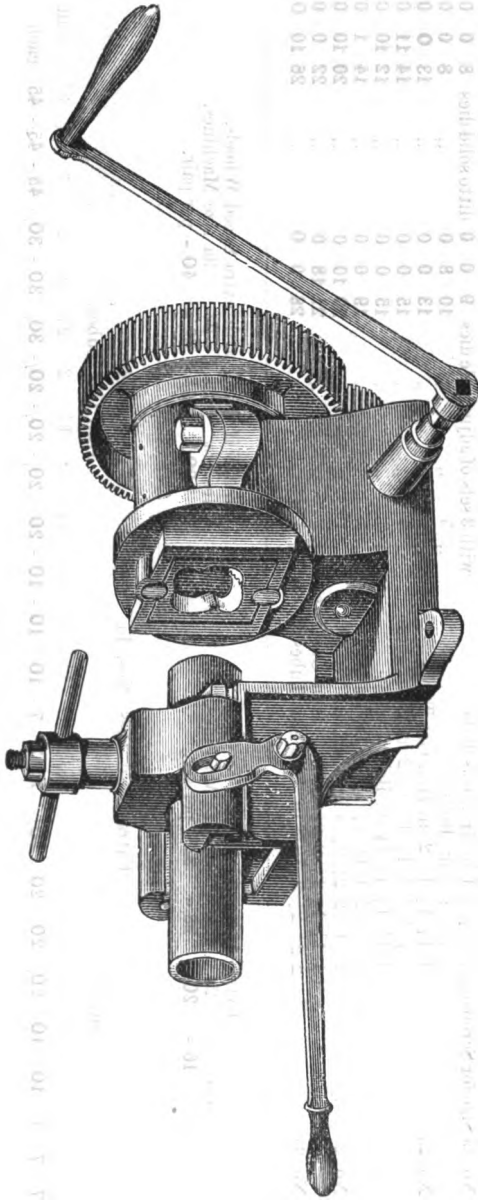
No. 1036.

SIZES—24 in.	...	£6 3 0
26 in.	...	8 7 0
28 in.	...	10 8 0

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED HAND-POWER SCREWING MACHINES.

FOR IRON GAS TUBES OR BOLTS.



MADE with either solid or adjustable dies as preferred. Machines with adjustable dies screwing at once over. It is strongly recommended to have extra Speed Wheels (as fitted to Cutting-off Machine as per drawing above) for increasing the speed when screwing smaller sizes. For prices see page 135.

The Britannia Engineering Co., Ltd., Colchester, England.

IMPROVED HAND-POWER SCREWING MACHINES.

(For Illustration see page 195.)

No. 1a	Size for Screwing	Iron Gas Tubes	with 3 sets of adjustable dies	£	s.	d.	ditto solid dies	£	s.	d.
" 2a	1 1/4	1 1/4 in. Bolts	5	10	8	0	"	8	0	0
"	1 1/2	1 1/2 in. Bolts	1	13	0	0	"	13	0	0
"	1 3/4	1 3/4 in. Bolts	3	15	0	0	"	14	11	0
"	2	2 in. Bolts	7	19	0	0	"	14	1	0
No. 2c	1 1/4	1 1/4 in. Bolts	1	20	10	0	"	20	10	0
"	1 1/2	1 1/2 in. Bolts	2	21	18	0	"	22	0	0
"	1 3/4	1 3/4 in. Bolts	1	28	0	0	"	28	10	0

Extra Adjustable Dies.

Nos. 1a	2a	2c	3a size Machines,
16/-	20/-	28/-	33/- per set.

Extra if fitted with extra Speed Wheels.

Nos. 1a	2a	2c	3a size Machines.
20/-	25/-	32/-	40/- per pair.

Extra Solid Dies, Nos. 1a 2a 2c 3a size Machines.

Iron Gas Tubes.

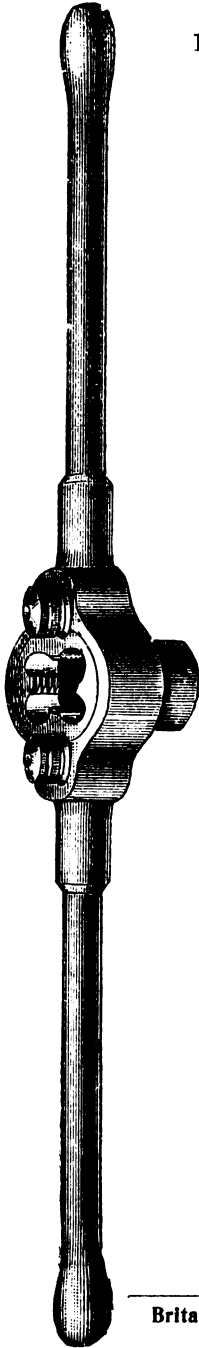
1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/2	2 3/4	3	3 1/2	3 3/4	4 in
7/-	7/-	10/-	10/-	20/-	20/-	10/-	10/-	20/-	20/-	30/-	30/-	45/- each

Cutting-off Apparatus for Tubes for Nos. 1a 2a 2c 3a size Machines.

Extra if fitted with 3-speed Cone or fast and loose Pulley to work by power	...	...	...	...	...	...	...	...	...	...	...	...
Extra if mounted on cast-iron Stand	...	...	...	...	...	...	...	...	...	...	...	...
Extra for Overhead Driving Gear	...	...	...	...	...	...	...	...	...	...	...	...

SOLID DIE STOCK, No. 10.

Made to screw up to 3 in. at once going over.



A PERFECT Screw can be cut on Gas Tube by this tool at once going down, thereby effecting a great saving of time and labour. The principle is entirely new. The Dies are made to screw the tube slightly taper, so that if there is a variation of size in the gas fittings, tubes screwed by this tool will fit equally well. The guide is grooved so as to allow the swarf made in the screwing to escape. It is extremely simple in construction, it is not liable to get out of order, and it works much easier than the ordinary stocks and dies.

PRICES OF EXTRA DIES AND GUIDES FOR ABOVE STOCK.

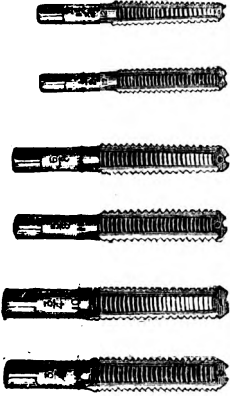
Size of Stocks	...	A	B	C	D	E	F	G	H	J	K
Extra Dies	...	3/6	4/9	6/6	7/6	10/-	13/6	17/-	21/-	24/-	30/-
Extra Guides	...	...	1/6	1/9	2/6	3/-	3/6	4/6	6/-	7/6	8/6
											10/-

SOLID DIE STOCK, No. 10.

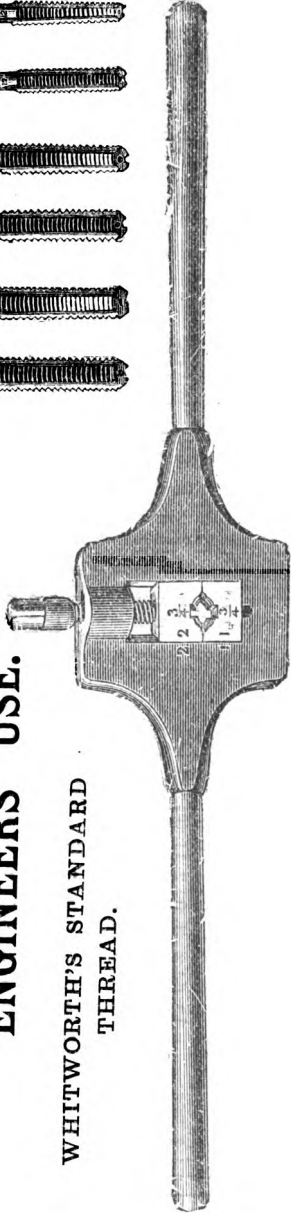
For Illustration see page 197.

Size of Stock.	TO SCREW.	With Taper and Plug Tap to each size.		Without Tap.		Size of Stock.	TO SCREW.	With Taper and Plug Tap to each size.		Without Tap.		Size of Stock.	TO SCREW.	With Taper and Plug Tap to each size.		Without Tap.					
		£	s. d.	£	s. d.			£	s. d.	£	s. d.			£	s. d.	£	s. d.	£	s. d.	£	s. d.
A	1 1/2 in. only	1	2	0	15	6	1 1/2 in. only	2	16	0	4	6	2 1/2 in. only	6	5	0	4	5	0		
	1 1/4 in.	1	10	0	1	1	1 1/4 in.	3	10	0	2	10	2 1/4 in.	9	1	0	5	14	0		
	1 1/8 in.	1	4	0	0	19	6	1 1/8 in.	4	10	0	3	4	1 1/2 in.	11	5	0	7	3	0	
	1 1/16 in.	1	11	0	1	3	0	1 1/16 in.	5	8	0	3	18	1 1/8 in.	11	12	0	7	3	0	
B	1 1/8 in.	1	18	0	1	7	0	1 1/8 in.	6	5	0	4	11	1 1/4 in.	13	5	0	8	12	0	
	1 1/16 in.	2	6	6	1	13	0	1 1/16 in.	6	7	0	4	11	1 1/8 in.	13	16	0	8	13	0	
	1 1/32 in.	1	14	0	1	8	0	1 1/32 in.	3	12	0	2	18	2 1/2 in. only	8	5	0	5	14	0	
	1 1/64 in.	2	2	0	1	11	6	0	1 1/64 in.	4	16	0	3	10	2 1/4 in.	11	17	0	7	6	0
C	1 1/8 in.	2	12	0	1	18	0	1 1/8 in.	7	4	0	5	5	1 1/2 in.	13	12	0	8	18	0	
	1 1/16 in.	2	14	0	1	18	0	1 1/16 in.	8	7	0	6	3	2 1/4 in.	14	7	0	8	19	0	
	1 1/32 in.	3	4	0	2	7	0	1 1/32 in.	1	14	0	3	12	1 1/8 in.	17	4	0	10	11	0	
	1 1/64 in.	3	19	0	2	16	0	1 1/64 in.	1	14	0	3	12	3 in. only	12	16	0	9	3	0	
D	1 1/8 in.	2	1	0	1	12	6	1 1/8 in.	6	4	0	4	9	2 1/2 in.	17	7	0	11	3	0	
	1 1/16 in.	2	12	0	1	18	0	1 1/16 in.	7	14	0	5	8	2 1/4 in.	20	15	0	13	3	0	
	1 1/32 in.	3	3	0	2	4	6	1 1/32 in.	9	4	0	6	10	2 1/8 in.	21	7	0	13	3	0	
	1 1/64 in.	3	17	0	2	14	6	1 1/64 in.	5	0	0	3	12	2 1/16 in.	23	0	0	13	2	0	
E	1 1/8 in.	3	18	6	2	14	6	1 1/8 in.	8	17	0	5	13	2 1/4 in.	24	15	0	15	3	0	
	1 1/16 in.	4	10	6	3	5	0	1 1/16 in.	9	10	0	6	10	2 1/8 in.	24	15	0	15	3	0	
	1 1/32 in.	5	6	0	3	15	6	1 1/32 in.	10	5	0	6	12	2 1/16 in.	27	0	0	15	12	0	
	1 1/64 in.	11	16	0	7	15	0	1 1/64 in.	11	16	0	7	15	2 1/8 in.	27	0	0	15	12	0	
F	1 1/8 in.	1	14	0	1	8	0	1 1/8 in.	3	12	0	2	18	2 1/2 in. only	8	5	0	5	14	0	
	1 1/16 in.	2	2	0	1	11	6	0	1 1/16 in.	4	16	0	3	10	2 1/4 in.	11	17	0	7	6	0
	1 1/32 in.	2	12	0	1	18	0	1 1/32 in.	6	0	0	4	7	1 1/2 in.	13	12	0	8	18	0	
	1 1/64 in.	2	14	0	1	18	0	1 1/64 in.	7	4	0	5	5	2 1/4 in.	14	7	0	8	19	0	
G	1 1/8 in.	3	4	0	2	7	0	1 1/8 in.	8	7	0	6	3	1 1/8 in.	17	4	0	10	11	0	
	1 1/16 in.	3	7	0	2	7	0	1 1/16 in.	1	14	0	3	12	3 in. only	12	16	0	9	3	0	
	1 1/32 in.	3	19	0	2	16	0	1 1/32 in.	6	4	0	4	9	2 1/2 in.	17	7	0	11	3	0	
	1 1/64 in.	3	19	0	2	16	0	1 1/64 in.	7	14	0	5	8	2 1/4 in.	20	15	0	13	3	0	
H	1 1/8 in.	1	14	0	1	8	0	1 1/8 in.	3	12	0	2	18	2 1/2 in. only	8	5	0	5	14	0	
	1 1/16 in.	2	2	0	1	11	6	0	1 1/16 in.	4	16	0	3	10	2 1/4 in.	11	17	0	7	6	0
	1 1/32 in.	2	12	0	1	18	0	1 1/32 in.	6	0	0	4	7	1 1/2 in.	13	12	0	8	18	0	
	1 1/64 in.	2	14	0	1	18	0	1 1/64 in.	7	4	0	5	5	2 1/4 in.	14	7	0	8	19	0	
J	1 1/8 in.	3	4	0	2	7	0	1 1/8 in.	8	7	0	6	3	1 1/8 in.	17	4	0	10	11	0	
	1 1/16 in.	3	7	0	2	7	0	1 1/16 in.	1	14	0	3	12	3 in. only	12	16	0	9	3	0	
	1 1/32 in.	3	19	0	2	16	0	1 1/32 in.	6	4	0	4	9	2 1/2 in.	17	7	0	11	3	0	
	1 1/64 in.	3	19	0	2	16	0	1 1/64 in.	7	14	0	5	8	2 1/4 in.	20	15	0	13	3	0	
K	1 1/8 in.	2	1	0	1	12	6	1 1/8 in.	6	4	0	4	9	2 1/2 in.	17	7	0	11	3	0	
	1 1/16 in.	2	12	0	1	18	0	1 1/16 in.	7	14	0	5	8	2 1/4 in.	20	15	0	13	3	0	
	1 1/32 in.	3	3	0	2	4	6	1 1/32 in.	9	4	0	6	10	2 1/8 in.	21	7	0	13	3	0	
	1 1/64 in.	3	17	0	2	14	6	1 1/64 in.	5	0	0	3	12	2 1/16 in.	23	0	0	13	2	0	

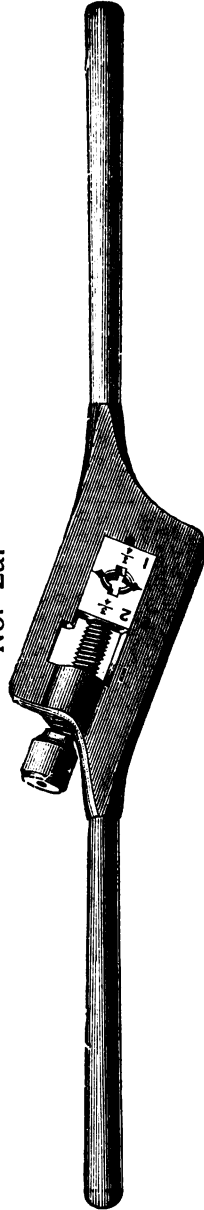
**BEST STOCKS AND DIES FOR
ENGINEERS' USE.**



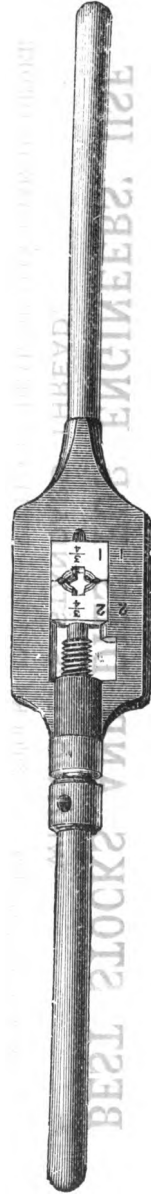
WHITWORTH'S STANDARD
THREAD.



No. 2a.



No. 2.



No. 2b.

The Britannia Engineering Co., Ltd., Colchester, England.

BEST STOCKS AND DIES FOR ENGINEERS' USE.

WHITWORTH'S STANDARD THREAD.

(For Illustration see page 199). STOCKS AND DIES FITTED IN DEAL OR OAK CASE TO ORDER.

TO SCREW.	With Taper and Plug Tap to each size.		With Taper 2nd, and Plug Tap Master Tap to each size.		TO SCREW.	With Taper and Plug Tap to each size.		With Taper 2nd, and Plug Tap Master Tap to each size.	
	£	s. d.	£	s. d.		£	s. d.	£	s. d.
1 0 0	1 4 0	1 9 0	2 7 0	3 15 0	1 1 1 1/2	4 8 0	5 11 0	6 19 0	
1 5 0	1 10 0	1 17 0	2 16 0	4 10 0	1 1/8 1 1/2	4 14 0	6 1 0	7 13 0	
1 10 0	1 17 0	2 5 0	3 1 0	3 19 0	1 1/8 1 1/4	5 6 0	6 16 0	8 12 0	
1 15 0	2 3 0	2 14 0	3 7 0	4 4 0	1 1/8 1 1/2	5 13 0	7 6 0	9 6 0	
1 17 0	2 5 0	2 15 0	2 16 0	3 9 0	1 1/8 1 1/4	6 12 0	8 11 0	10 18 0	
1 9 0	1 15 0	2 3 0	2 16 0	3 11 0	1 1/8 1 1/2	6 19 0	8 4 0	10 1 0	
1 10 0	1 17 0	2 5 0	3 7 0	4 3 0	1 1/8 1 1/4	7 16 0	9 16 0	11 0 0	
1 17 0	2 5 0	2 15 0	3 7 0	4 5 0	1 1/8 1 1/2	8 3 0	10 12 0	13 5 0	
1 18 0	2 7 0	2 18 0	3 12 0	4 13 0	1 1/8 1 1/4	9 6 0	12 3 0	15 2 0	
2 6 0	2 16 0	3 9 0	3 17 0	4 18 0	1 1/8 1 1/2	8 0 0	9 19 0	12 5 0	
1 12 6	2 1 0	2 11 0	3 4 0	4 2 0	1 1/8 1 1/2	8 10 0	10 16 0	13 6 0	
1 19 0	2 9 0	3 1 0	3 16 0	4 18 0	1 1/8 1 1/2	9 3 0	11 15 0	14 12 0	
2 0 0	2 10 0	3 3 0	4 8 0	5 14 0	1 1/8 1 1/2	10 4 0	12 18 0	15 17 0	
2 3 0	2 14 0	3 9 0	3 4 0	4 2 0	1 1/8 1 1/4	10 10 0	13 15 0	17 6 0	
2 8 0	2 19 0	3 14 0	3 4 0	4 2 0	1 1/8 1 1/2	11 10 0	15 6 0	19 9 0	
2 16 0	3 10 0	4 7 0	3 6 0	4 6 0	1 1/8 1 1/2	10 0 0	13 2 0	16 10 0	
2 0 0	2 10 0	3 3 0	3 17 0	5 4 0	1 1/8 2 1/4	13 15 0	18 5 0	23 0 0	
2 8 0	3 0 0	3 16 0	3 19 0	5 4 0	1 1/8 2 1/4	12 0 0	16 3 0	20 10 0	
2 13 0	3 8 0	4 6 0	4 12 6	6 2 0	2 1/8 2 1/4	16 5 0	22 4 0	28 10 0	
2 16 0	3 11 0	4 9 0	5 0 0	6 9 0	2 1/8 2 1/4	16 5 0	22 4 0	28 10 0	

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