

No. 628,703.

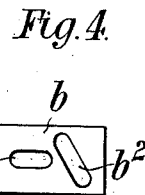
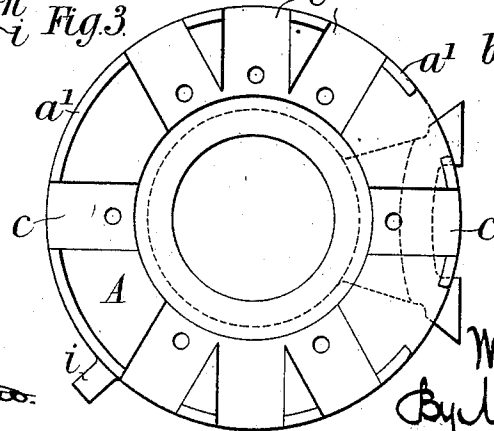
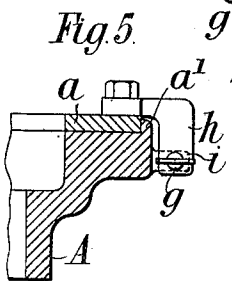
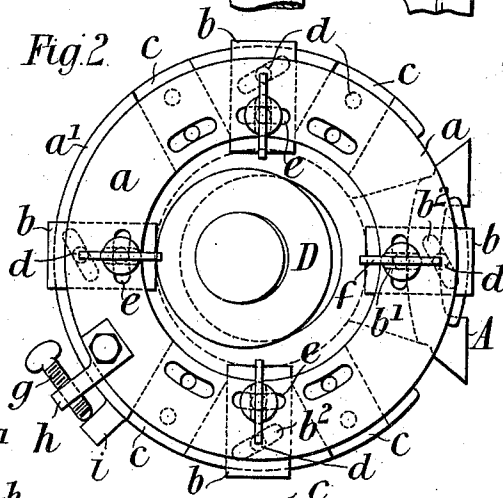
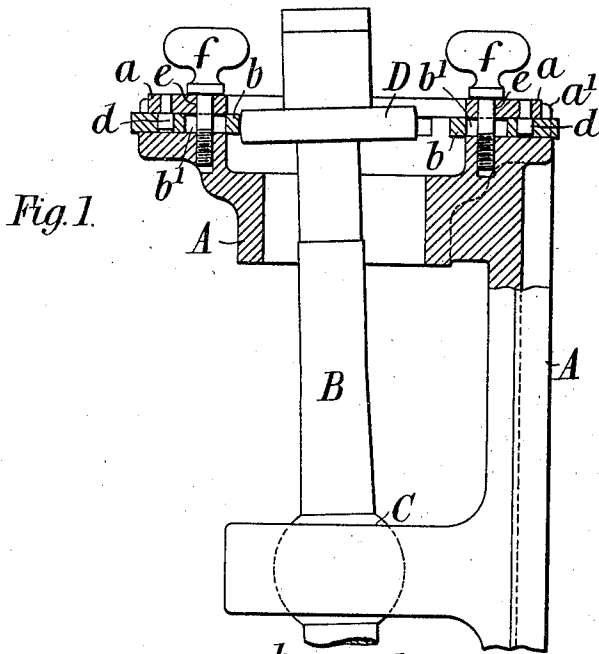
Patented July 11, 1899.

W. FLETCHER.
MACHINE FOR DRILLING, BORING, OR SHAPING.

(Application filed Nov. 21, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.
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Inventor.
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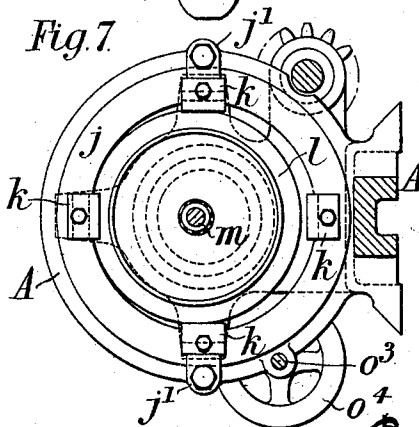
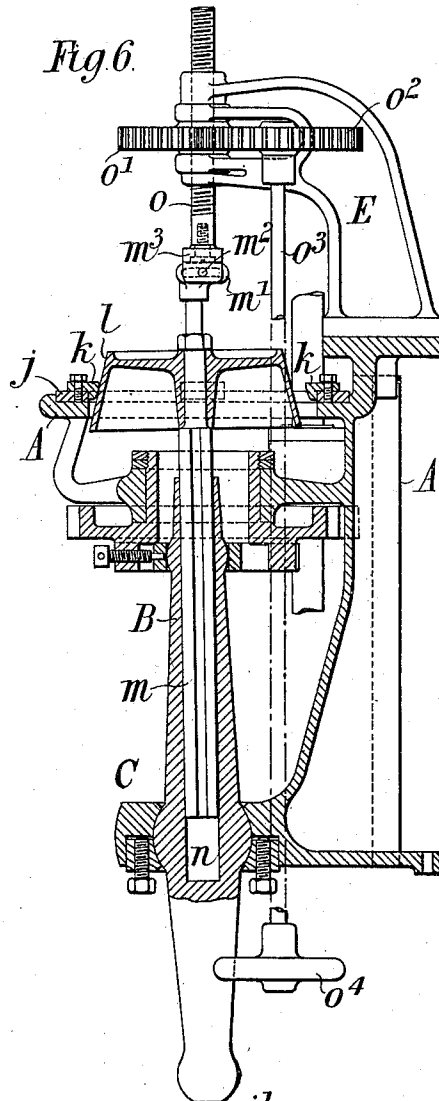
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MACHINE FOR DRILLING, BORING, OR SHAPING.

(Application filed Nov. 21, 1898.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses.
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By *[Signature]*

Inventor.
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UNITED STATES PATENT OFFICE.

WALTER FLETCHER, OF NOTTINGHAM, ENGLAND, ASSIGNOR TO THE ANGULAR HOLE MACHINE COMPANY, LIMITED, OF LONDON, ENGLAND.

MACHINE FOR DRILLING, BORING, OR SHAPING.

SPECIFICATION forming part of Letters Patent No. 628,703, dated July 11, 1899.

Application filed November 21, 1898. Serial No. 697,060. (No model.)

To all whom it may concern:

Be it known that I, WALTER FLETCHER, a subject of the Queen of Great Britain, residing at Nottingham, England, have invented
5 new and useful Improvements in Machines for Drilling, Boring, or Shaping, of which the following is a specification.

This invention relates to machines for drilling, boring, or shaping of the kind described in the specification of Patent No. 452,169 and comprises the improvements hereinafter described. In such machines as hitherto made it has generally been necessary to change the
10 templet each time it is desired to alter the shape or size of the hole or article to be drilled, bored, or shaped. This changing of the templet is troublesome and causes considerable loss of time, and it is the object of this invention to provide means whereby it is dispensed with. To this end I provide an adjustable templet, and I sometimes further
15 furnish the drill-spindle with a conical roller, by adjusting the position of which the movement of the drill or other tool can be varied as desired.

In the accompanying drawings, Figure 1 is a sectional elevation of the upper part of the tool-carrying head or head-stock of such a machine. Fig. 2 is a plan thereof. Fig. 3 is
20 a plan view of the head-stock with the templet removed, and Figs. 4 and 5 are views of details. Fig. 6 is a view similar to Fig. 1 of the modified construction, and Fig. 7 is a sectional plan thereof.

Referring first to Figs. 1 to 4, A is the tool-carrying head or head-stock, which is adapted to be reciprocated in the main framing of the machine in the usual manner, and B is the sleeve which carries the drill-spindle and
30 which is provided at its lower part with an ordinary ball or spherical bearing C and at its upper end with the roller D.

The improved or adjustable templet device which I employ comprises the annular plate *a* and slides *b*, one of which is shown separately
35 in Fig. 4. The upper face of the head-stock, in which the templet rests, is furnished with a projecting rim *a'* to retain the templet in position thereon and with shallow slots or recesses *c*, so as to form guides for the slides *b*. Each slide *b* is formed with a slot *b'*, which is

parallel to its longitudinal axis, and with a slot *b²*, which is inclined to the said axis. Pins *d d*, which project from the under side of the plate *a*, extend into and engage with
40 the inclined slots *b² b²* in the slides *b*, and concentric slots *e e* are made in the plate *a*, so that set-screws *f f* can be passed through the said concentric slots *e e* and the longitudinal slots *b'* in the slides *b* and screw into holes in
45 the head-stock A in order to clamp the slides *b* in any position to which they may be adjusted. To adjust the said slides, the set-screws *f f* are loosened, and the plate *a* is turned relatively with the head-stock A, so
50 that the slides are caused to move in a radial direction and either inward or outward by the engagement of the pins *d d* with the slots *b² b²*, the longitudinal slots *b'* allowing of the radial movement. To enable the plate *a* to be
55 easily turned, I make use of a device such as that illustrated in Figs. 2 and 5, the said device comprising a set-screw *g*, which works in a lug *h*, screwed upon the plate *a*, the end of the said screw *g* bearing against a lug *i*, rigidly attached to the head-stock A. It will be
60 obvious that by turning the screw *g* the plate *a* can be turned relatively with the head-stock A.

It is thus clear that by suitably adjusting
65 the distance to which the slides *b*, which with the annular plate *a* collectively form the templet against which the roller D rotates, project beyond the inside face of the plate *a* the size of the hole or article which is drilled, bored, or shaped is determined. Further-
70 more, in practice I find it advantageous to employ eight slides *b*, with their corresponding slots, the said slots being placed relatively to one another in the manner indicated in
75 Figs. 2 and 3. By employing this arrangement I am enabled with the same templet device to drill or bore holes or to shape an article of a square, triangular, or hexagonal shape by utilizing different combinations of
80 the slides *b*.

In the arrangement illustrated in Figs. 6 and 7 the variation in the amount of movement allowed to the drilling or shaping tool is controlled by adjusting the position of the roller instead of by the templet, which in this
85 case is not adjustable in respect to size. The

said templet comprises a plate or ring j , which fits into a groove or slot in the head-stock A and is fixed therein by the clamps j' j' and has screwed to it plates k , which project into the ring j and collectively form the templet against which the roller slides. This roller is in the form of a frustum l of a cone and is keyed upon a spindle m , which fits in a hole n , bored in the sleeve B. This spindle m is provided at its upper part with a slotted eye m' , with which engages a pin m^2 upon a fork m^3 , which can turn upon the end of a screw o , which passes up through the forked end of a bracket E, secured to the head-stock A of the machine. A spur-wheel o' is mounted as a nut upon the said screw o between the fork ends, and a spur-wheel o^2 gears with the wheel o' , the said wheel o^2 being keyed to a spindle o^3 , having a hand-wheel o^4 , whereby it can be rotated. With this arrangement it will be obvious that when the sleeve B is rotated in the usual manner it carries with it the spindle m , and thereby the cone l , which is held against the templet in the ordinary way. The upper end of the spindle m turns upon the end of the screw o , as above mentioned, and the eye m' allows it the necessary movement given by the templet and cone. To vary the size of the hole or article being drilled or shaped, the hand-wheel o^4 is turned so as to rotate the wheel o^3 , which turns the wheel o' , thereby imparting a longitudinal movement to the screw o , so as to raise or lower the cone l with respect to the templet. To alter the configuration of the hole or article being bored or shaped, the number and position of the plates k are varied as required.

It will be observed that in the constructions shown and described the shape of the field of operation of the tool or the shape of the path of the tool can be regulated without the necessity of having a series of templets of different shapes, and the size of the field of operation of the tool can be varied by varying the distance of the points of contact between the roller and the removable blocks from the axis of rotation of the tool-carrying shaft. The inconvenience and expense of having a series of templets for every variation in the size and shape of the work are thus avoided.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a machine for boring, drilling and shaping, the combination with the tool-operating shaft provided with a roller, of a templet, a plurality of separate, removable blocks, for engaging the said roller to determine the shape of the path of the tool, and means for securing said blocks to the templet, whereby by removing certain of said blocks, the shape of the path of the tool can be varied without changing the templet, substantially as described.

2. In a machine for boring, drilling and

shaping, the combination with the tool-operating shaft provided with a roller, of a templet, a plurality of separate removable blocks, adapted to engage the said roller to determine the shape of the path of the tool, means for securing each of said blocks to the templet, whereby certain of said blocks can be removed to vary the shape of the path of the tool, and adjusting mechanism for said blocks for varying the distance between the points of contact of said roller with said blocks from the axis of the tool-operating shaft, to increase or diminish the path of the tool, without removing the templet, substantially as described.

3. In a machine for boring, drilling or shaping, the combination with the tool-carrying shaft provided with a roller, of the templet comprising a series of radially-movable blocks, having portions adapted to engage the roller to regulate the shape of the path of the tool, and means for moving said blocks toward and from the axis of said shaft to vary the size of the field of operation of said tool, substantially as described.

4. In a machine for boring, drilling or shaping, the combination with the tool-carrying shaft provided with a roller, of the templet comprising a series of removable radially-movable blocks having portions adapted to engage said roller to regulate the shape of the path followed by said tool, and means for moving said blocks toward and from the axis of said shaft to vary the size of the field of operation of said tool, substantially as described.

5. In a machine for boring, drilling or shaping, the combination with the head-stock provided with a series of radial grooves and the tool-carrying shaft provided with a roller, of the templet comprising a series of removable and radially-movable blocks having portions adapted to engage said roller, located in said grooves, an annular ring having portions engaging said blocks for moving them radially toward and from said roller and an adjusting device for moving said ring annularly, substantially as described.

6. In a machine for boring, drilling or shaping, the combination with the head-stock provided with a series of radial grooves and the tool-carrying shaft provided with a roller, of the templet comprising a series of removable and radially-movable blocks having portions adapted to engage said roller located in said grooves, and an annular ring having portions engaging said blocks for moving them radially toward and from said roller, an adjusting device for moving said ring annularly to adjust said blocks simultaneously and an independent clamping device for each of said blocks for securing the same rigidly to the head-stock, substantially as described.

7. In a machine for boring, drilling or shaping, the combination with the head-stock provided with a central opening and an annular part having a series of radially-disposed

grooves or recesses therein, of a tool-carrying shaft passing through said opening and provided with a roller, a series of blocks located in said grooves or recesses, provided each with a part for engaging said roller, and with a cam-recess, an annular plate provided with a series of pins engaging the cam-recesses of said blocks, an adjusting device for moving said plate annularly to force said blocks to-

ward or from the said shaft and an independent clamping device for securing each of said blocks to the head-stock in its adjusted positions, substantially as described.

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Witnesses:

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