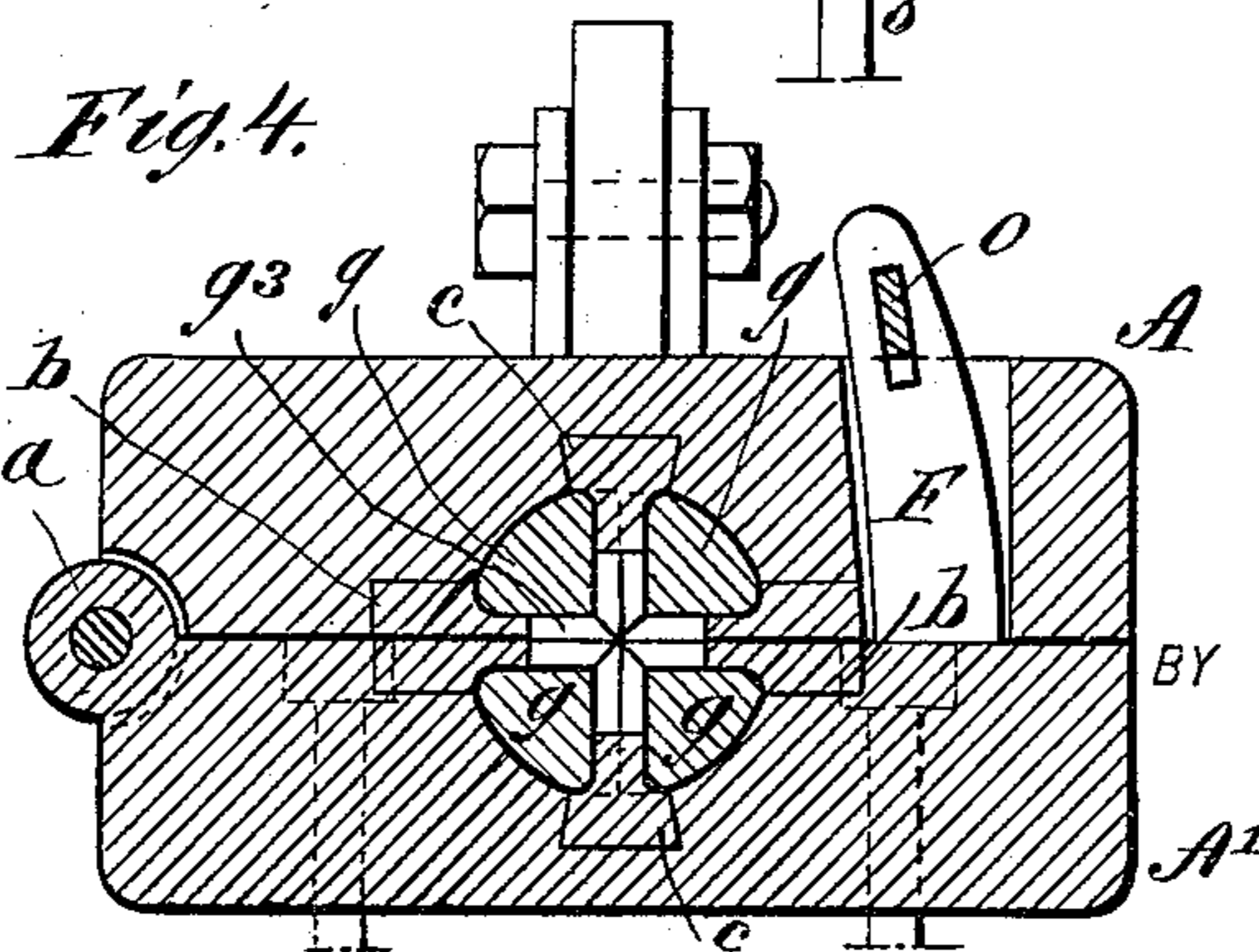
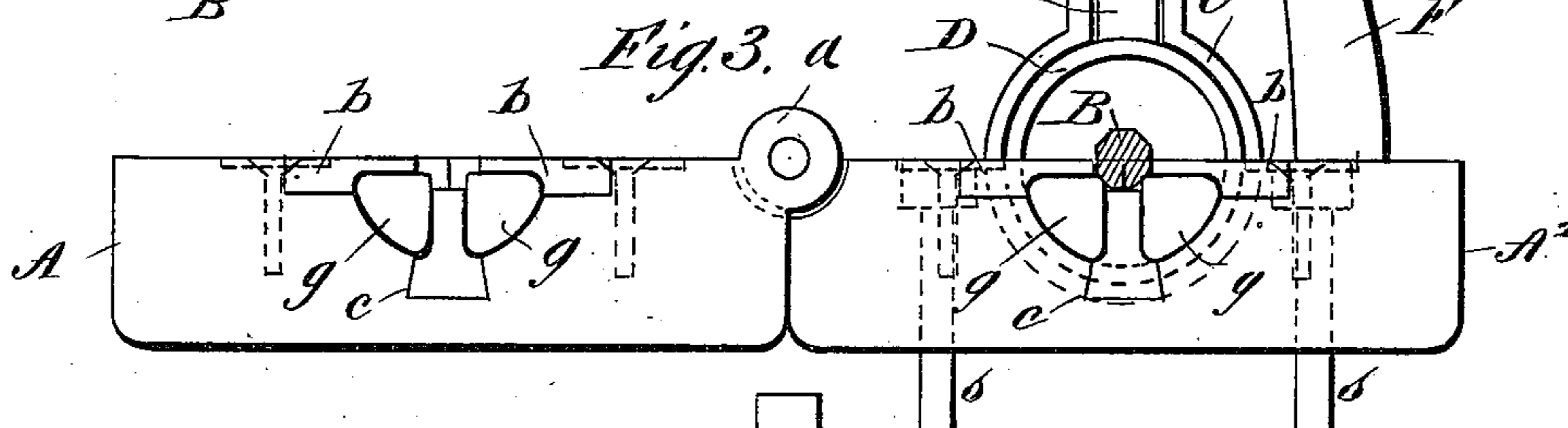
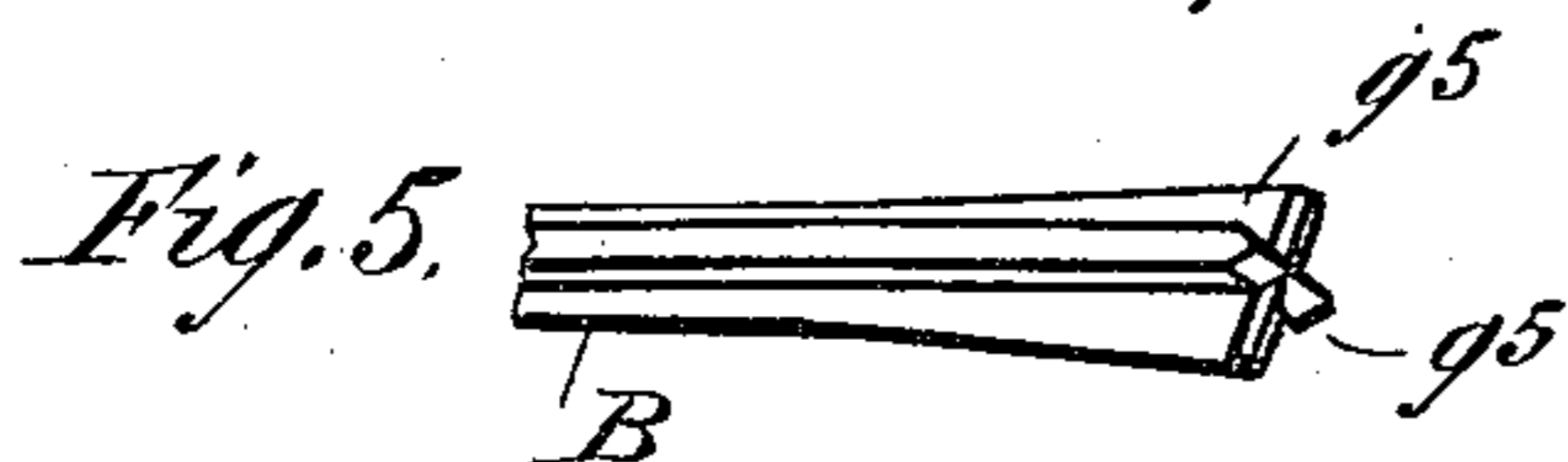
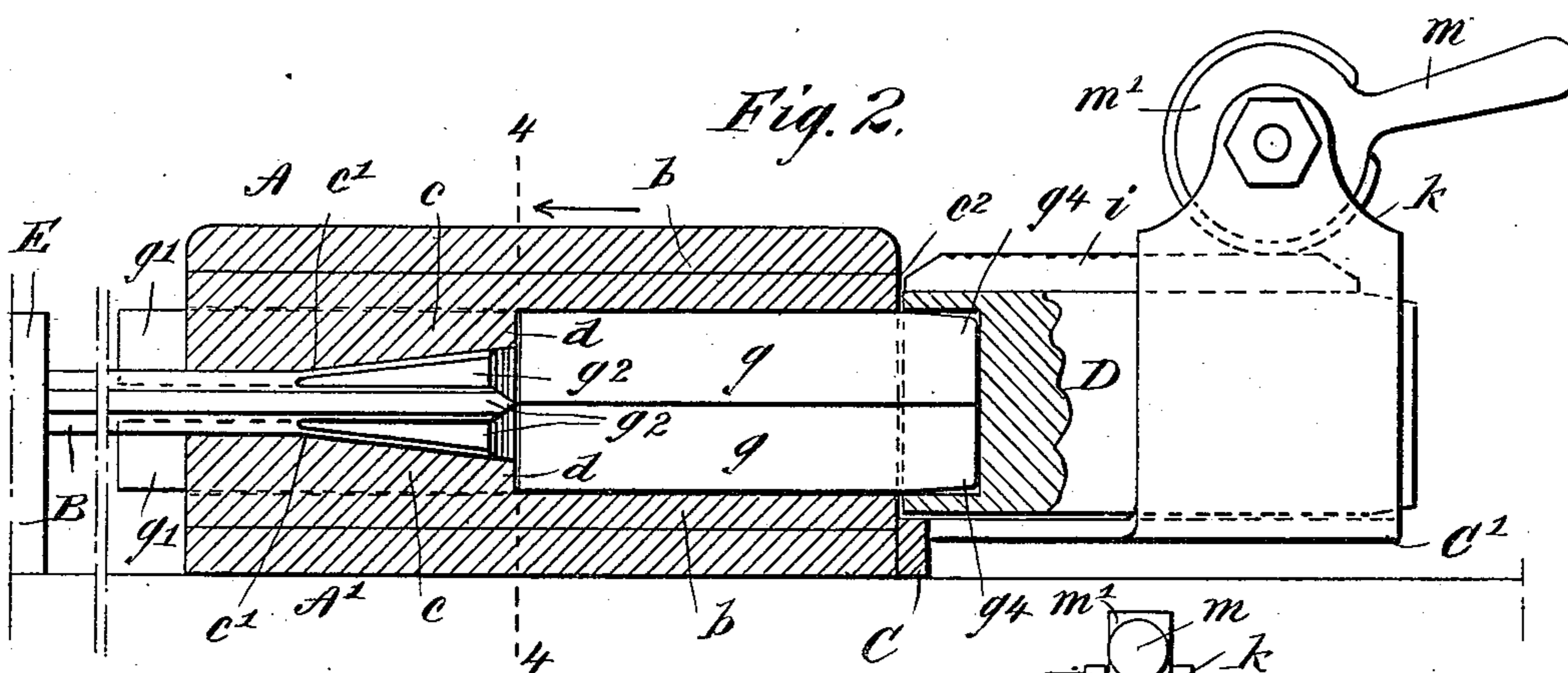
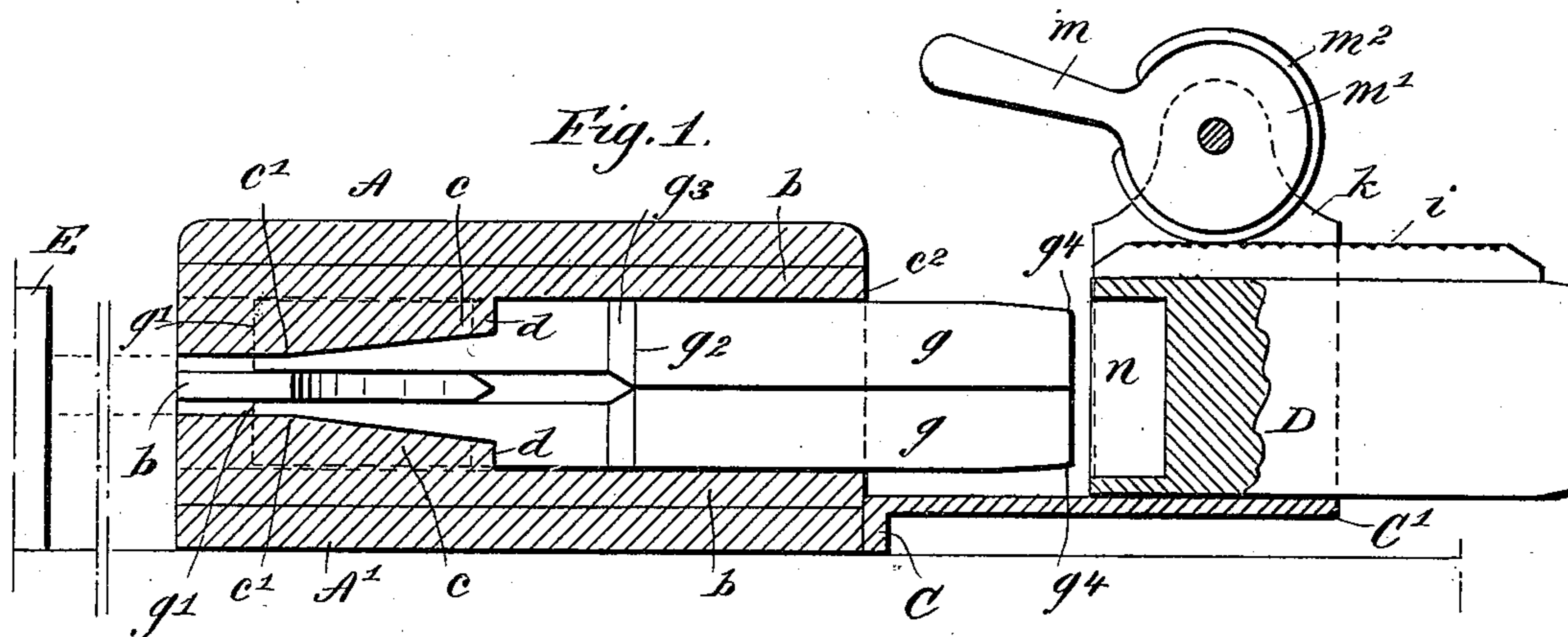


(No Model.)

J. CAHILL.  
DIE FOR MAKING ROCK DRILLS.

No. 426,710.

Patented Apr. 29, 1890.



WITNESSES:  
*Down Twitchell*  
*C. Sedgwick*

INVENTOR:  
*J. Cahill*  
BY *Munn & Co.*  
ATTORNEYS

# UNITED STATES PATENT OFFICE.

JOHN CAHILL, OF TARRYTOWN, NEW YORK.

## DIE FOR MAKING ROCK-DRILLS.

SPECIFICATION forming part of Letters Patent No. 426,710, dated April 29, 1890.

Application filed January 31, 1890. Serial No. 338,750. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN CAHILL, of Tarrytown, in the county of Westchester and State of New York, have invented a new and useful  
5 Upsetting-Die for the Manufacture of Rock-Drills, of which the following is a full, clear, and exact description.

Ordinarily the operation of making rock-drills that are provided with radial wings on  
10 their cutter-heads to afford several cutting-edges is conducted by first upsetting the end or the bar manually, then swaging the thickened portion between forming-dies, which spread the material into four recesses in the  
15 dies, thus producing four spaced radial wings on the end of the drill-bar, the cutting-edges on these wings being afterward filed to give them proper form.

The expenditure of hard labor and considerable time is necessary to form a drill-head  
20 on the bar by the usual methods of manipulation.

The object of this invention is to provide a simple inexpensive device by which a steam-  
25 projected hammer may be utilized to rapidly and perfectly form the wings and cutting-edges on a rock-drill.

To this end my invention consists in the construction and combination of parts, as is here-  
30 inafter described, and indicated in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate  
35 corresponding parts in all the figures.

Figure 1 is a side elevation, partly in section, taken on a line through the transverse center of the device, showing the parts adjusted to upset a bar shown in dotted lines and broken near its end. Fig. 2 represents  
40 the machine with its parts in the relative positions assumed when the upsetting of a drill-head is completed, a longitudinal central section of a portion of the device being shown, other parts being in full form and a drill-bar in place therein, broken near its outer end.  
45 Fig. 3 is a front end elevation of the upsetting-machine with the die-sections in open adjustment ready to receive a hot bar, also shown in section. Fig. 4 is a transverse section of the die-halves closed with other parts  
50 in place, the section being taken on the line

4 4 in Fig. 2; and Fig. 5 represents, on a reduced scale, the drill-head complete removed from the machine.

The half-sections A A' of the forming-die 55 are preferably cast into shape and are of the same dimensions, being rectangular in form, with the corners rounded. These pieces are hinge-jointed at *a*. In the adjoining faces of the die-sections A A' half-circular longitudinal channels are formed, which extend through  
60 them. On opposite side edges of the circular aperture just mentioned shallow open recesses are produced, wherein the mating guide-strips *b* are secured, these having their exposed faces  
65 level with the general surface of the die-sections in which they are embedded, so that when the die-sections are closed and in contact said strips *b* form guides for the lateral support of the end of the octagonal bar B when  
70 it is inserted to be upset, the opposite edges of these guides being projected suitably toward each other to embrace loosely the sides of the bar. At equal distances from each guide-piece *b* the similar guide-pieces *c* are  
75 inserted tightly into dovetail grooves formed in the die-sections, these guides being projected into the aperture of the die to have loose contact with other sides of the octagonal bar B, whereby said bar is held concentric  
80 with the circular wall of the die-aperture.

The guides *b c* extend within the die-aperture to a point *d*, where they terminate to avoid contact with other parts.

The inwardly-extending portions of the 85 guides *b c* are of the same thickness, thus affording longitudinal quadrantal cylindric passages between them of the same size, and at *c'* said guides diverge, their opposite edges that are parallel between the front ends *g'* 90 and the point *c'* being laterally and equally inclined in opposite directions toward their inner terminals *d*, a proper space intervening between these inner terminals and the rear edge *c''* of the cylindrical aperture they 95 are located in.

Four die-keys *g* are provided, which are quarter-cylinders in shape. These from their terminals *g'* to the points *g''* on the same are cut away to adapt them to slide between the 100 guides *b c*, loosely fitting in the quadrantal passages produced by said guides. The

shoulders  $g^3$  at the points  $g^2$  are beveled, for a purpose hereinafter set forth. The rounded outer surface of the die-keys  $g$  conforms throughout their length to the circular wall of the aperture they are located in, their angular corners projecting toward a common center, as shown in Fig. 4.

On the rear side of the lower die-section A' a bracket-arm C is secured, which projects therefrom and has a cylindrical box C' formed on it that is axially coincident with the aperture in the die-sections A A', a proper space intervening between the die and box.

Within the box C' a cylindrical slide-block D is introduced, which is furnished with a longitudinal guiding-rib  $i$  on its upper surface. Said rib loosely engaging two spaced bracket-flanges  $k$ , that project from the box C', is thus adapted to hold the block from turning around, so that a rocking circular-headed lever  $m$  may have contact with the roughened upper surface of the rib  $i$  and move the box C' longitudinally when the lever is vibrated, the peripheral surface of the circular head  $m'$  thereon being covered with slightly-elastic material  $m^2$ , which increases the friction of the engagement of parts and causes a more positive action of the same. A cupped recess  $n$  is formed in the front end of the slide-block D of proper diameter to receive the adjacent ends of the die-keys  $g$ , which latter are slightly tapered at  $g^4$ , so that they will not stick fast to the slide-block when in use.

The die-sections and attached parts comprise the upsetting device, which for convenience in use is mounted upon a frame similar to lathe-shears, the lower die-section being engaged therewith and secured by bolts  $s$  to the shears, and at a proper distance from the die in front of the same an upright post E or other similar abutment is secured, the position of which is changeable to permit drill-bars of various lengths to be headed in the dies.

In use the octagonal straight body of the drill-bar B is heated at one end and laid in the open die, as shown in Fig. 3, the other end of the bar being in contact with the post E. The die-sections are now closed and secured together by insertion of a wedge  $o$  through a slot in the upper portion of the curved locking-bar F, which passes through a slot in the upper die-section A. Said wedge bearing on the top die-section A secures both sections together.

The entire apparatus is designed to be located near to a horizontally-reciprocal power-hammer, (not shown,) which may be caused to impinge upon the free end of the slide-block D, and when said block has been adjusted to have contact with the die-keys  $g$  these are driven into the die-sections A A' by successive strokes upon the slide-block, which will upset the end of the drill-bar and produce wings thereon, as shown in Figs. 4 and 5.

The beveled shoulders  $g^3$  on the die-keys  $g$

limit the inward movement of said keys, and these shoulders, being produced on both flat surfaces of each key, form V-shaped recesses, which produce sharp edges on the wings  $g^5$  of the drill-head, the edges resulting from the impact of the die-keys as they are driven inwardly.

When the drill-head is complete, the die-sections A A' are opened and the drill-bar removed.

In practice it has been found that the work of upsetting and producing integral drill-heads on bars, as is herein described, shortens the time and greatly reduces labor, while a more perfect implement is thus produced as compared to ordinary methods of manipulation.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with two mating die-sections which are longitudinally channeled, of spaced guides therefor, and die-keys which are made to slide between the guides, substantially as set forth.

2. The combination, with two similar hinged die-sections oppositely and longitudinally channeled to produce a circular aperture, of four spaced guides secured in the die-sections, and die-keys adapted to slide between the guides, substantially as set forth.

3. The combination, with two similar hinged die-sections oppositely and longitudinally channeled to produce a circular aperture, of four spaced guides secured in the die-sections, and die-keys formed with beveled shoulders and adapted to slide between the guides, substantially as set forth.

4. The combination, with two similar hinged die-sections, each channeled oppositely to form a longitudinal circular aperture therein when closed, means to adjustably secure the die-sections together, and four flat spaced guides having their edges near one end sloped to cause them to diverge, of four die-keys which loosely engage the quadrantal cylindric passages between the guides, and a device to support the outer ends of the die-keys and transmit percussive force thereto, substantially as shown and described.

5. The combination, with two die-sections which are hinged and equally channeled, four spaced guides therein which have one end of each sloped to cause them to diverge oppositely on their edges producing quadrantal cylindric passages between said guides, of four similar die-keys having beveled shoulders and which slide between the guides and fit the quadrantal passages, a cupped slide-block, a support for the slide-block, and a rocking lever which is adapted to reciprocate the slide-block, substantially as shown and described.

JOHN CAHILL.

Witnesses:

DAVID ARMSTRONG,  
FREDERICK HACKETT.