J. H. PINDER.

MACHINE FOR HAMMERING WIRE DRAWING DIES.

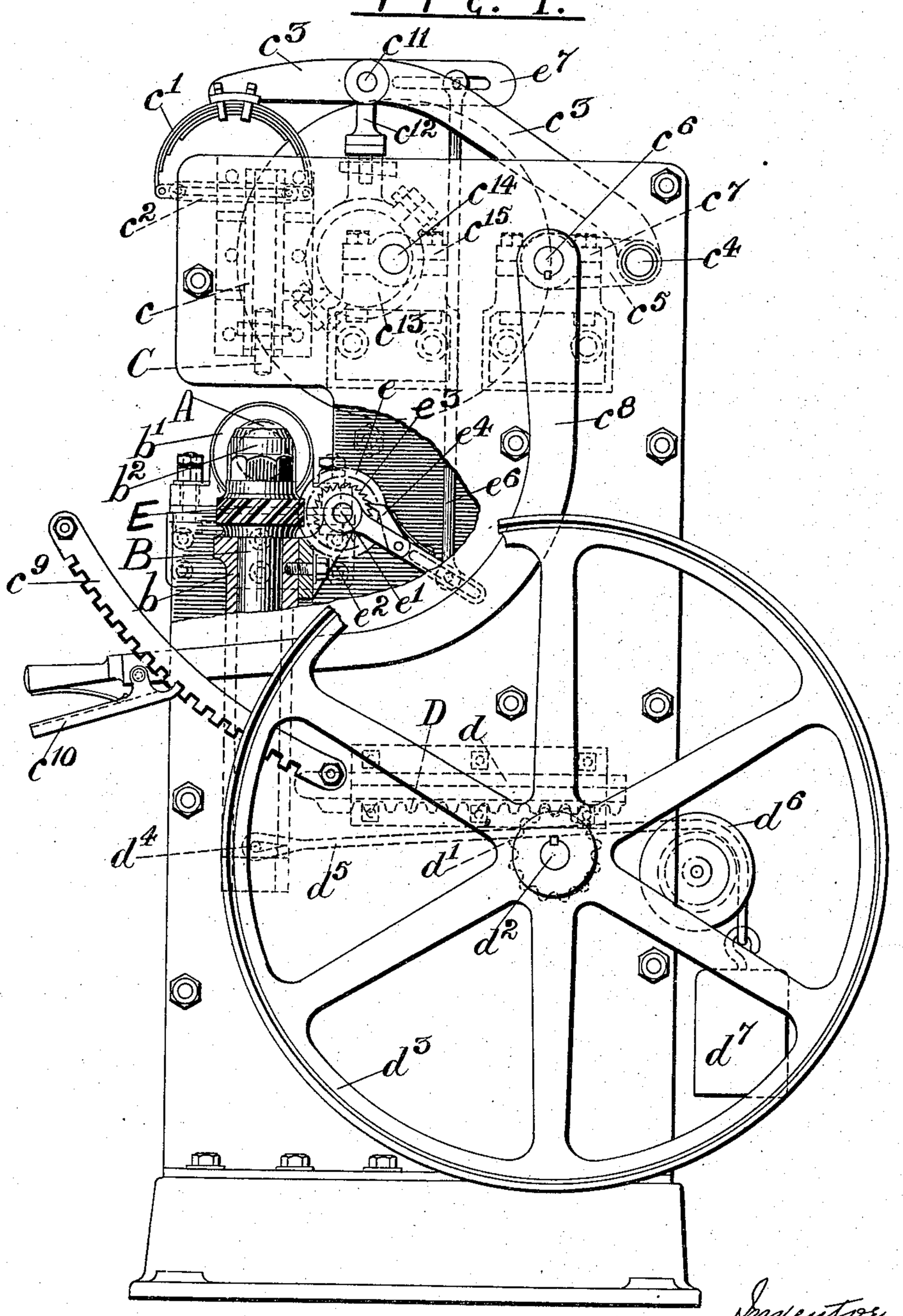
APPLICATION FILED MAY 19, 1915.

1,166,931.

Patented Jan. 4, 1916.

3 SHEETS—SHEET 1.

Fig. 1.



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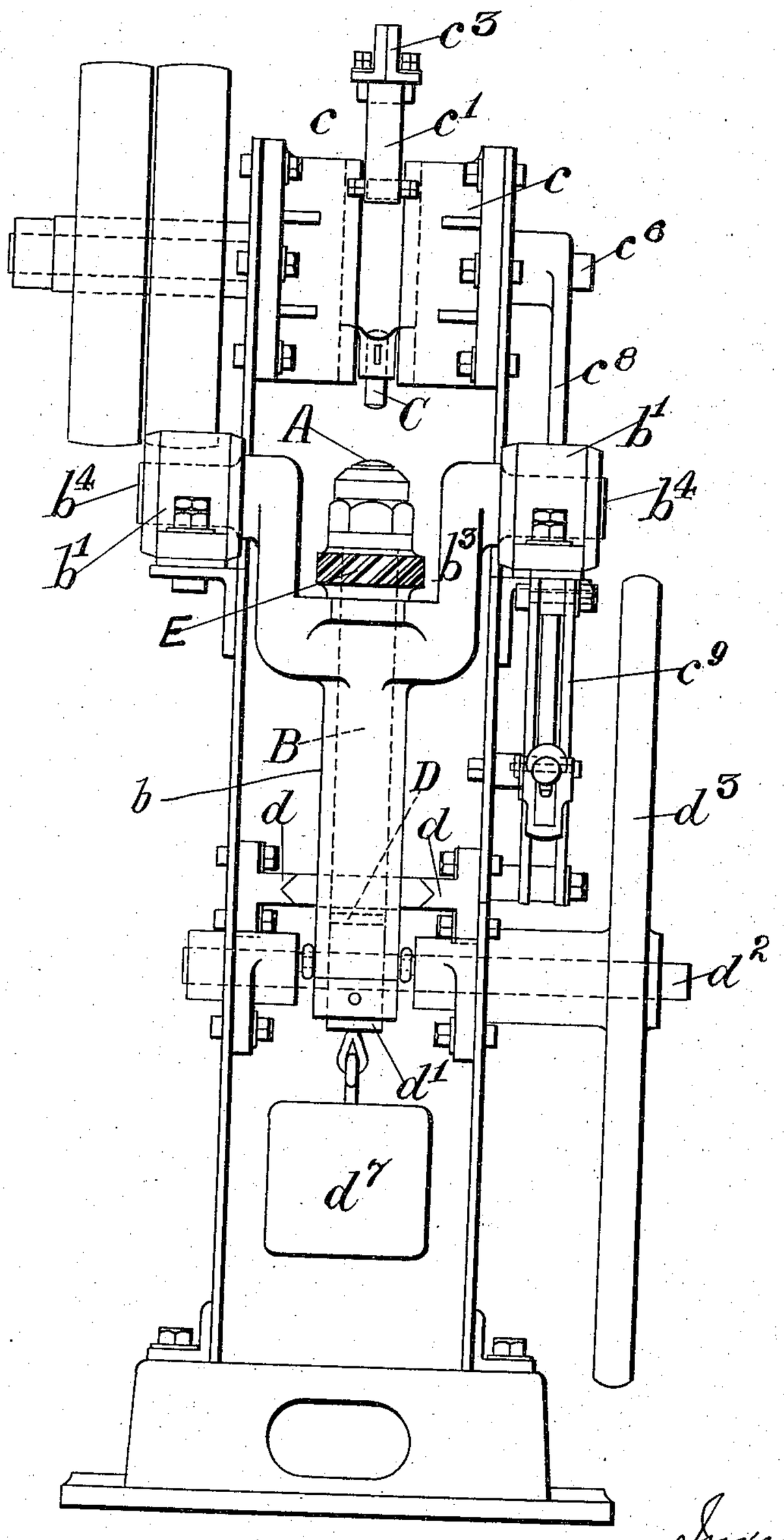
3 SHEETS—SHEET 2.

FIG. 2.



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3 SHEETS—SHEET 3

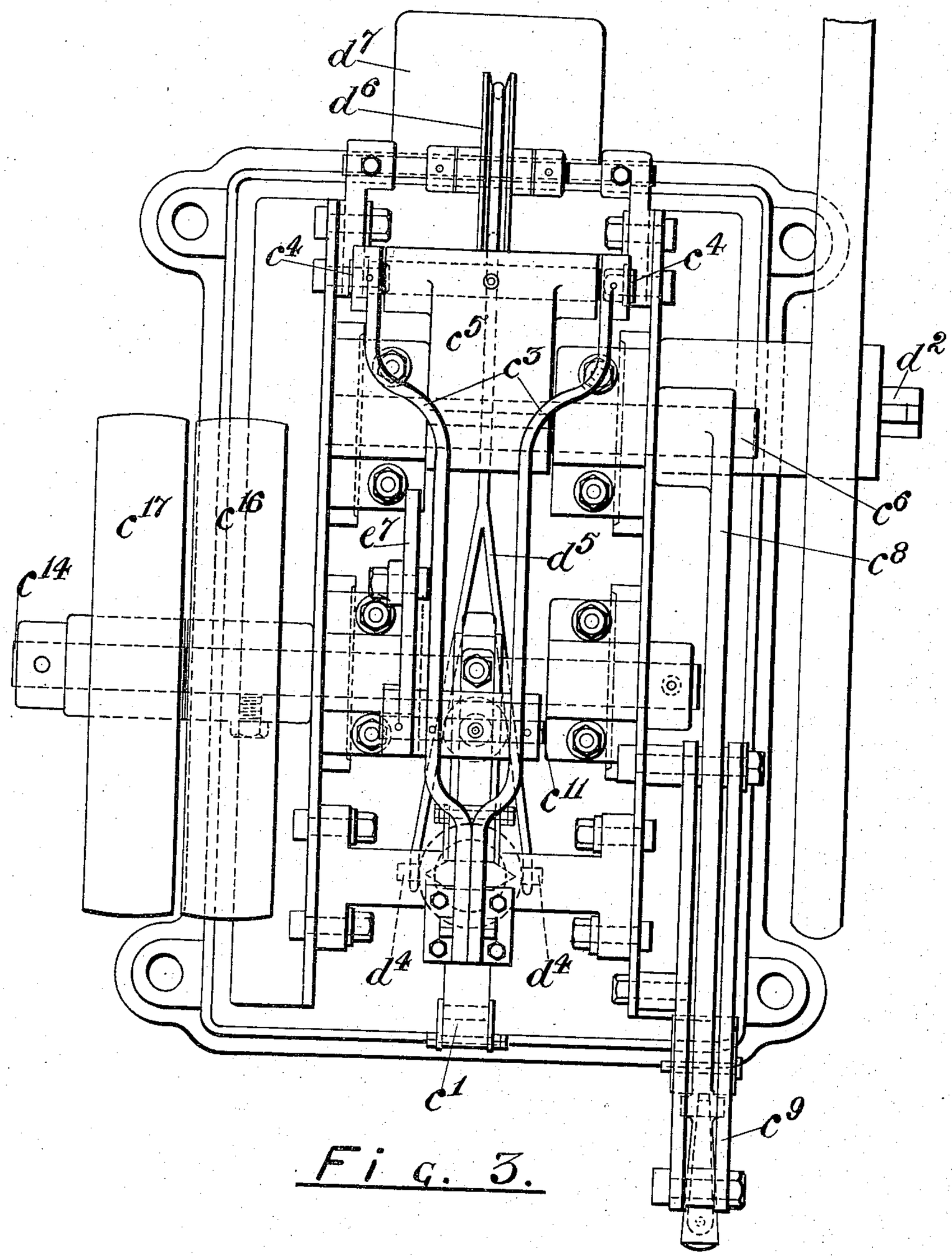

Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN HENRY PINDER, OF CLECKHEATON, ENGLAND, ASSIGNOR OF ONE-HALF TO S. HALEY AND SON LIMITED, OF CLECKHEATON, ENGLAND.

MACHINE FOR HAMMERING WIRE-DRAWING DIES.

1,166,931. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed May 19, 1915. Serial No. 29,170.

To all whom it may concern:

Be it known that I, JOHN HENRY PINDER, a subject of the King of Great Britain, residing at Pyenot Hall Works, Cleckheaton, in the county of York and country of England, have invented certain new and useful Improvements in Machines for Hammering Wire-Drawing Dies, of which the following is a specification.

This invention relates to mechanism for hammering wire drawing dies and has for its chief object to construct a simple and efficient machine which will cause the original convex or conical surface of the die to be maintained throughout each hammering operation and preserve the symmetry and centricity of the die aperture.

The invention is described in the accompanying specification with reference to the drawings, in which:—

Figure 1 is a side elevation. Fig. 2 a front elevation and Fig. 3 a plan of a die hammering machine constructed in accordance with this invention.

A indicates the wire drawing die, B the die anvil and C the hammer.

The die anvil B is rotatably mounted in a sleeve or socket b pivoted transversely to its length in bearings b^1 carried by the machine frame, a chuck or holding device b^2 being provided for securing the die in position during the hammering operation. To provide for a sufficiently short radius to produce the required curvature to the die surface the socket b extends from the center of a crank b^3 (Fig. 2), from the sides or webs of which journal pins b^4 project to enter the bearings b^1. The socket b is moved to traverse the die under the hammer during the hammering operation by a rack D that is slidably mounted in guides d and gears with a pinion d^1 rigidly fixed on a shaft d^2 on which is also rigidly fixed a large hand wheel d^3. Projecting from the socket are two pins d^4 to which are attached the ends of a flexible connection d^5 which passes over a guide pulley d^6 and suspends a weight d^7 which effects the return movement of the socket and die when the hand wheel is released. The movement of the socket through a circular arc may be produced automatically from the devices for driving the hammer by any other approved intermediate driving mechanism in carrying out this invention.

Any appropriate type of hammer may be employed and in the example shown a mechanical hammer C is slidably mounted in vertical guides c c and is connected by a spring c^1 and chain c^2 with one end of two cranked arms c^3. The other ends of these arms are pivoted on a shaft c^4 passing through a crank c^5 that is rigidly fixed on a shaft c^6 supported in bearings c^7 carried by the side frame of the machine. Rigidly secured to the shaft c^6 is a hand lever c^8 which passes through a toothed quadrant c^9 and carries a catch c^{10} which by engaging with any of the teeth in such quadrant secures the crank c^5 in any required position and so regulates the position of the hammer in a direction toward and away from the die A and the force with which the blows will be delivered upon such die. Passing through the cranked arms c^3 and rigidly secured thereto is a shaft c^{11} to which the end of a rod c^{12} of an eccentric c^{13} is pivoted. The eccentric c^{13} is rigidly fixed on a shaft c^{14} supported in bearings c^{15} carried by the machine frame and mounted on such shaft are fast and loose pulleys c^{16} c^{17} respectively. The die anvil B comprises a shaft that is rotatably mounted in the socket b and has rigidly fixed to it a screw or helical gear wheel E which occupies a position within the aforesaid crank b^3. Gearing with this wheel is a similar wheel e rigidly fixed on a shaft e^1 that is rotatably mounted in a bracket e^2 carried by the crank b^3 and rigidly fixed on such shaft is a ratchet wheel e^3 operated by a spring pressed detent e^4 on a slotted arm e^5 that is loosely mounted on the shaft e^1. The slotted arm e^5 is connected by a rod e^6 to a slotted arm e^7 that is rigidly fixed on the shaft c^{11}.

When the machine is in operation the eccentric c^{13} imparts a reciprocating movement to the hammer C and an intermittent rotary motion to the ratchet wheel e^3, gear wheels e E, and die anvil B the amount of rotary motion that is imparted to the ratchet wheel e^3 and die anvil B being regulated by adjusting the position of the rod e^6 in relation to the slotted arms e^5, e^7.

To perform the die hammering operation a die is clamped in position in the chuck which together with the die anvil occupies an inclined position in relation to the hammer so that the hammering operation will

be commenced at the outer edge of the die. The machine is now set in motion and the hand wheel d^3 turned in a direction to force the rack D against the socket *b* and gradually bring the latter to a vertical position as shown in Fig. 1 in which position the hammering operation is completed.

The details of the invention can be variously modified without departing from the nature of the invention, for example in some cases it may be convenient to move the hammer instead of the die anvil in order to produce the curved formation upon the surface of the die. The parts may also be arranged to produce a conical die surface instead of a convex die surface as herein described, and in such arrangement the hammer and die may be set the required angle in relation to each other and the die traversed at a constant angle toward the hammer and vice versa to produce the conical formation required, a rotary, or intermittent rotary motion being imparted to the die during the aforesaid traverse.

What I claim for my invention and desire to secure by Letters Patent in the United States is:—

1. In a die hammering machine, a supporting frame, a crank having its shaft portions pivoted in the frame, a socket journaled in the middle part of the crank, a die anvil secured to the said socket and arranged between the shaft portions of the crank, driving mechanism for moving the socket and crank pivotally, a reciprocatory hammer arranged over the die anvil, and driving devices operating automatically to revolve the said socket and die anvil step by step as the hammer is reciprocated.

2. In a machine for hammering wire drawing dies provided with a reciprocating hammer, a die anvil rotatable about its own axis and arranged to be moved into and out of line with the hammer, the combination of a toothed wheel rigidly connected with the die anvil, another wheel gearing therewith, a ratchet wheel arranged in rigid connection with the last mentioned wheel, a slotted arm loosely mounted in relation to such ratchet wheel and carrying a spring pressed detent to engage therewith, an oscillatory lever operatively connected with the die hammer, and a rod connecting such lever with the slotted arm.

3. In a machine for hammering wire drawing dies provided with a vibratory hammer, a die anvil rotatable on its own axis, a socket carrying such anvil and arranged to be swiveled about an axis at right angles thereto; the combination of a sliding rack mounted in guides, a pinion gearing with such rack, a hand wheel rigidly connected with the pinion and means for retaining the socket in contact with the rack during the backward and forward movement of the latter.

In testimony whereof I affix my signature.

JOHN HENRY PINDER.