

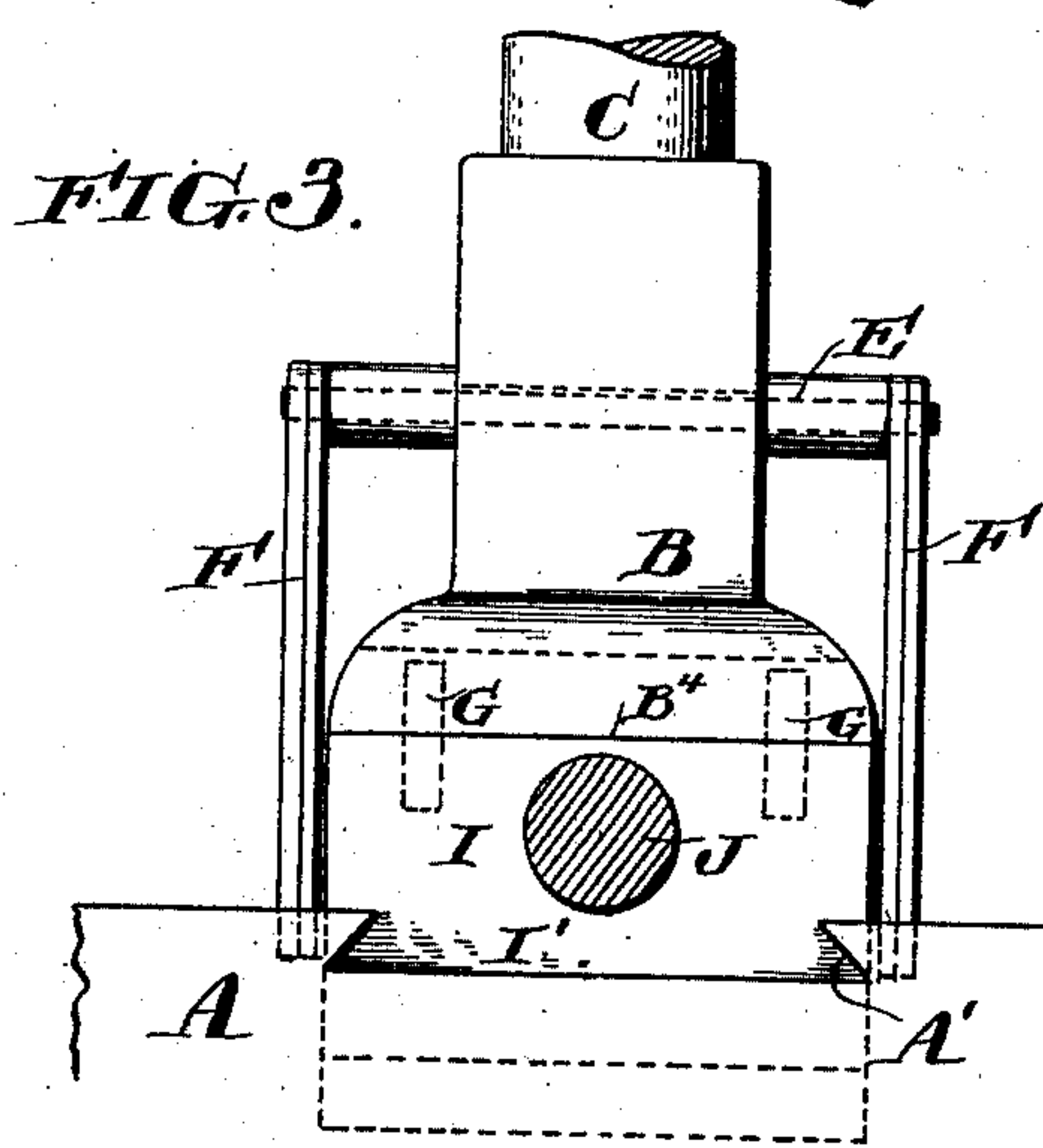
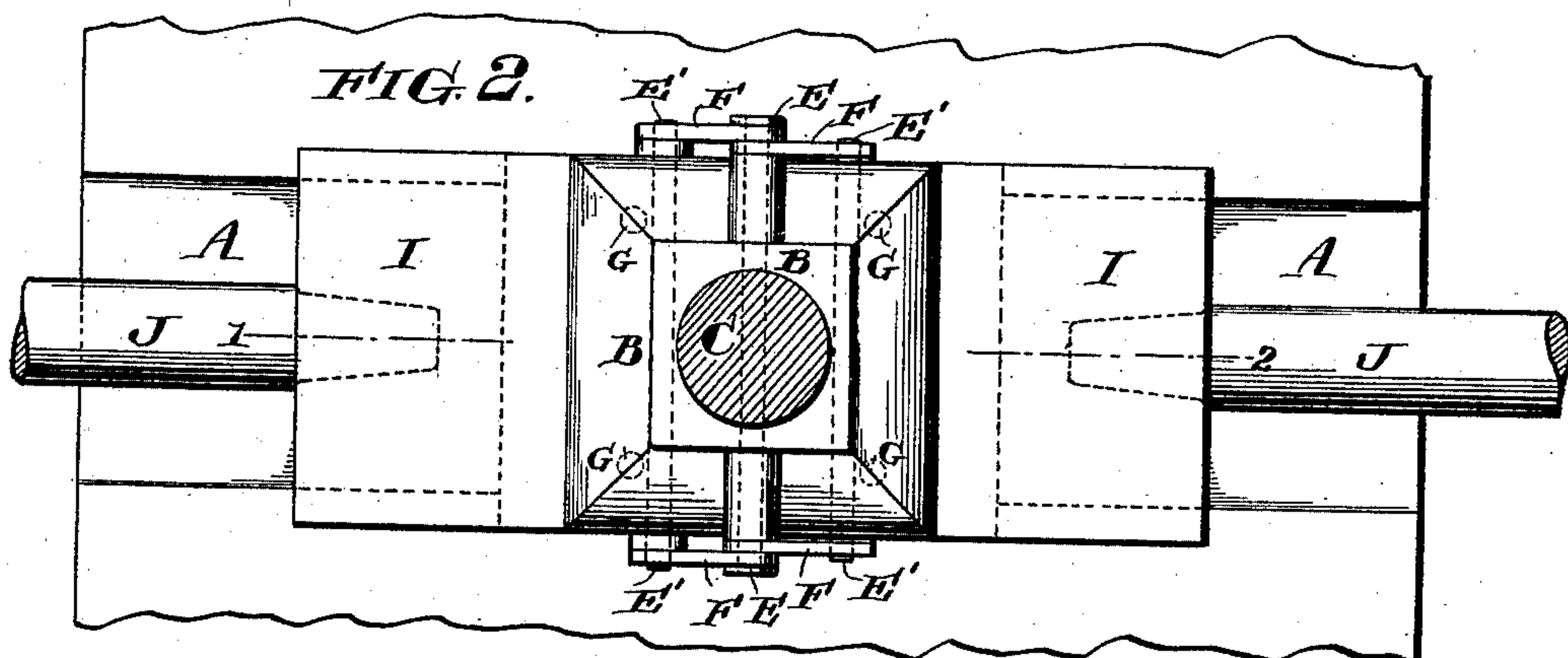
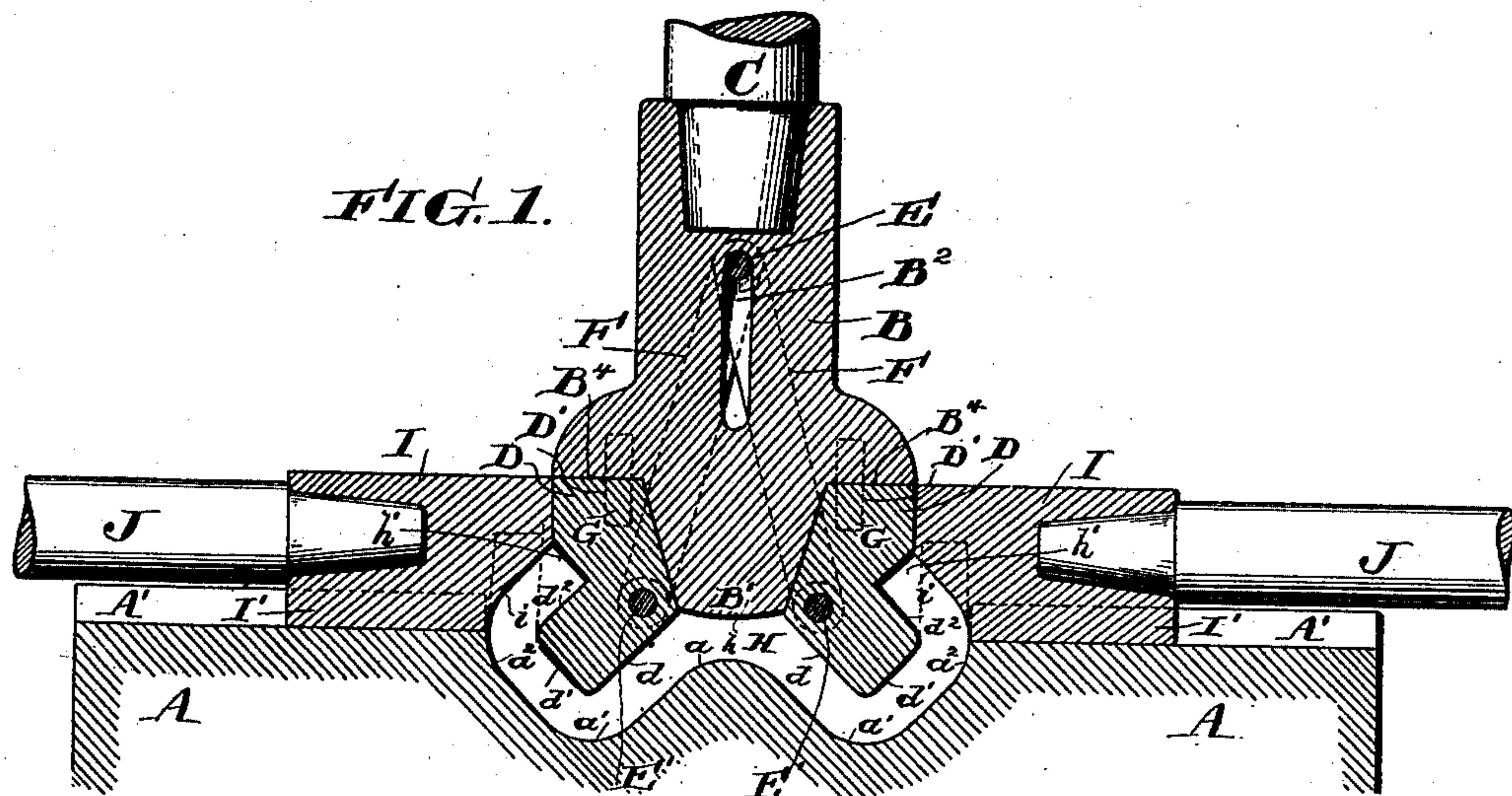
(No Model.)

2 Sheets—Sheet 1.

G. S. STRONG.
FORGING AND BENDING DIE.

No. 505,541.

Patented Sept. 26, 1893.



Witnesses:
Henry Dwyer
J. H. Russell

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Francis T. Chamberlain

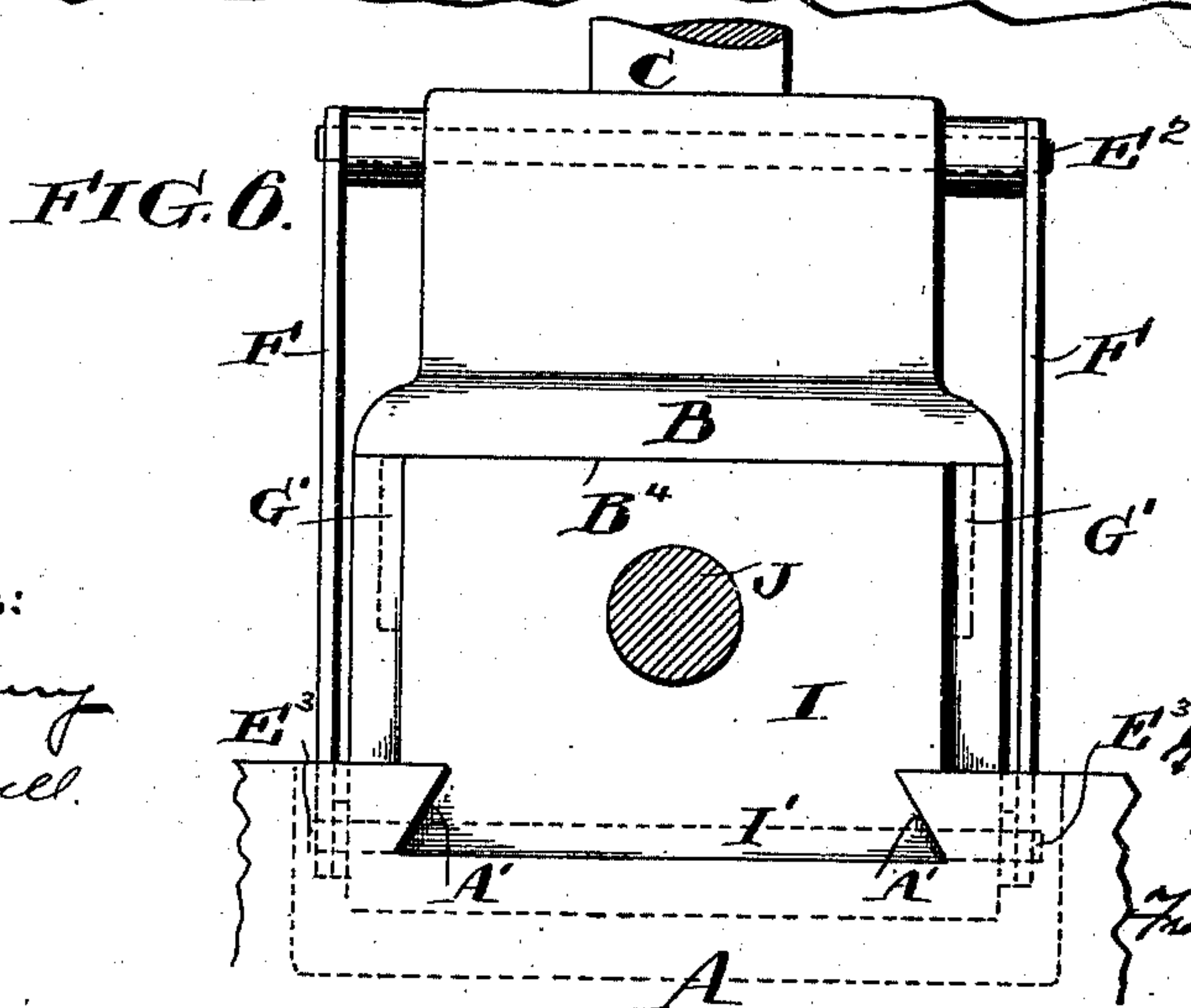
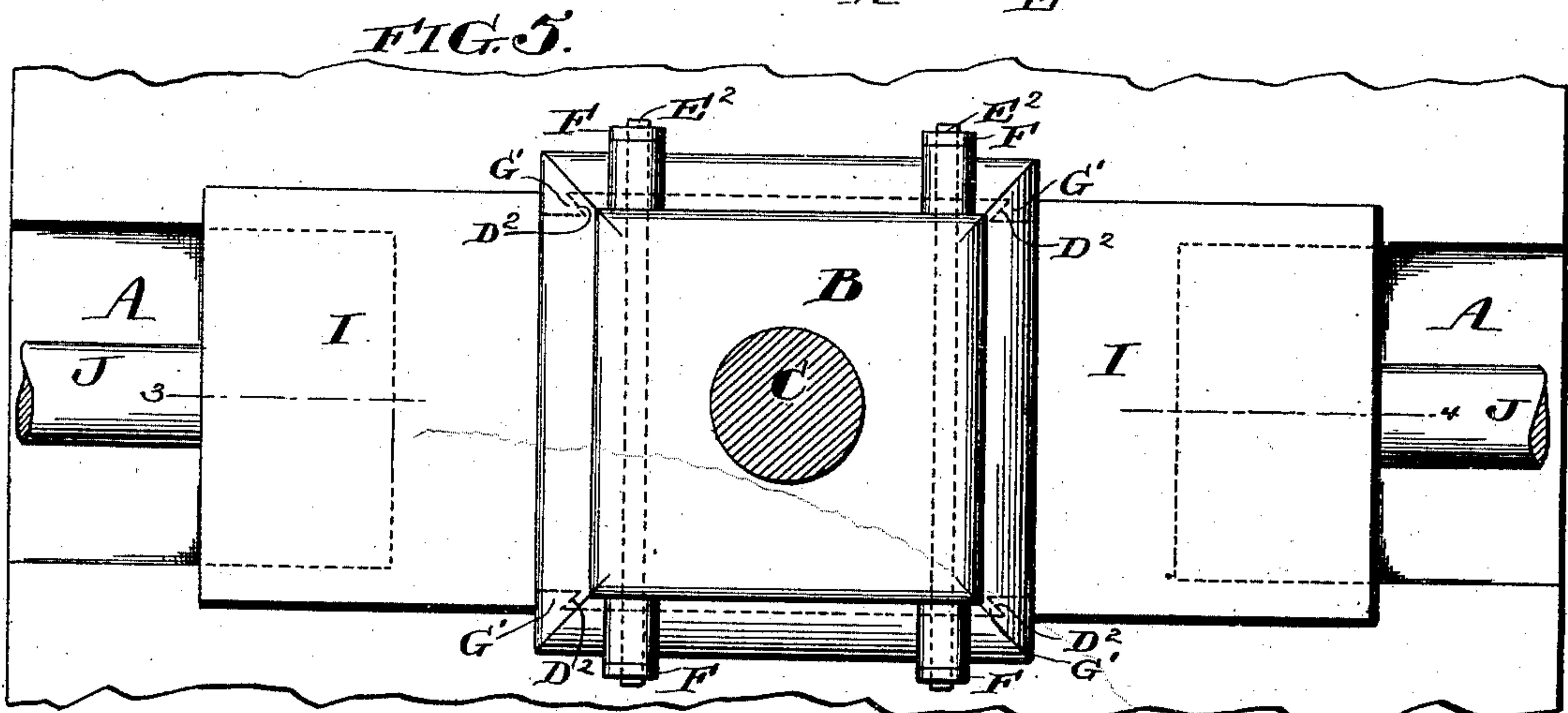
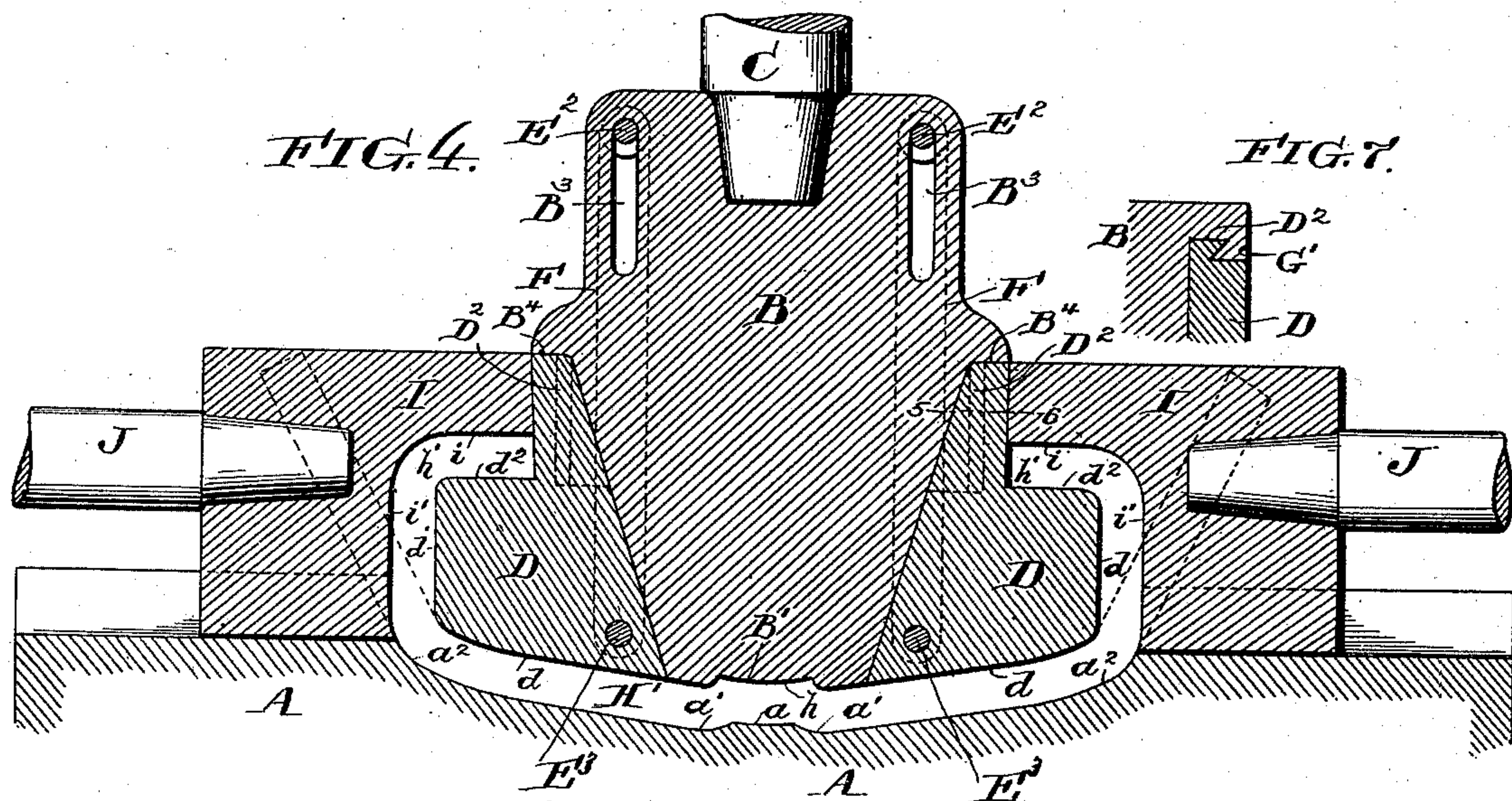
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Witnesses:
Henry D. May
J. V. Russell.

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Francis T. Chambers

UNITED STATES PATENT OFFICE.

GEORGE S. STRONG, OF NEW YORK, N. Y., ASSIGNOR TO JAMES N. GAMBLE,
OF CINCINNATI, OHIO.

FORGING AND BENDING DIE.

SPECIFICATION forming part of Letters Patent No. 505,541, dated September 26, 1893.

Application filed February 11, 1892. Serial No. 421,109. (No model.)

To all whom it may concern:

Be it known that I, GEORGE S. STRONG, of the city, county, and State of New York, have invented a certain new and useful Improvement in Forging and Bending Dies, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to forging and bending dies and has for its object chiefly to provide a suitable die for forging wrought iron bars into shapes suitable for sections of electro-magnet fields, that is to say, of an approximately horseshoe shape. This I accomplish by the combination of dies hereinafter described and which are illustrated in the drawings in two modifications.

Reference is now had to the drawings, in which—

Figure 1 is a longitudinal vertical section embodying my invention taken on the line 1—2 of Fig. 2. Fig. 2 is a plan view of the die. Fig. 3 is an end view. Fig. 4 is a vertical longitudinal section through another modification of my die taken on the line 3—4 of Fig. 5. Figs. 5 and 6 are respectively a plan and end view of the die of Fig. 4, and Fig. 7 a horizontal section through the corner of the plunger and sectional die on the line 5—6 of Fig. 4.

A is the female die having a cavity $a\ a'\ a''$ of the outline of the central part of the bar to be formed.

B is a plunger moving to and from the cavity of die A and actuated through the ram-rod C by an engine or press (not shown). This plunger B together with die sections D D, which fit against and under it on each end, constitute the plunger or male die of the forging machine, the under faces of the parts when assembled having the form to be given to the upper face of the bar through the central part corresponding to that shaped in die A. The die sections D fit up against the ends of the plunger B which is preferably of the wedge form shown and lie beneath the shoulders B^4 . As shown the die face is made up of a section B' of the plunger and the faces $d\ d'$ of parts D. The proportional part of the die

face formed on each face may be varied considerably, but the proportions illustrated are convenient and well adapted for the purpose.

In order to hold the parts D D and B together when assembled in operative position they should be interlocked against relative lateral motion, this being conveniently done by means of steady pins G secured to the shoulders B^4 of plunger B and entering pin holes D' in die sections D or some equivalent construction, such, for instance, as is shown in Figs. 4 to 7 where a tongue D^2 of D engages in dovetail grooves G' in the plunger B; the groove or pin as the case may be releases hold on sections D when the plunger B rises a certain distance above them.

F. F are links pivotally secured to die sections D D at E' and to the plunger B by pivotal sliding connections. Thus in Figs. 1 to 3 the links F are secured to a bar E which is free to move vertically in a slot B^2 in the plunger, and in Figs. 4 to 6 the links F are secured to two bars E^2 , each sliding in a slot B^3 as shown; the use of one or more slots will be a matter of convenience depending on the form of the parts.

I I are laterally moving dies, the function of which is to coact with the outer faces d^2 of the sections D. In forming the ends of the bars to shape, they should be secured to and slide on the face of die A or an attached part. As shown, for example, they are dovetailed into the face of the die A as at $A' I'$.

J J are the actuating rods from rams or engines (not shown).

The operation of my dies is as follows: A wrought iron bar, shown at H and H' in a completed condition, is raised to a proper temperature and laid over the cavity in die A. The plunger die $B' D D$ is then brought down on it forcing the central portion of the bar into the cavity and giving it the desired form while the ends $h' h'$ of the bar are thrown up as shown in dotted lines in Figs. 1 and 4. When the plunger die has completed its downward motion it remains stationary while the lateral dies I I move in against the ends $h' h'$ of the bar and bend them in over and against the upper faces $d^2 d^2$ of the die sections D. This completes the formation of the sectional field

bar which, however, is left wrapped over, so to speak, the die sections D D, but the plunger B being moved upward does not carry with it the sections D D, but moving away 5 from them leaves them free to move together so that they can be drawn out from the lapping ends h' of the bar. By pivotally attaching the sections D to the links F, they are withdrawn by a continued upward motion of the 10 plunger, which when the bar E or bars E^2 reach the bottom of slot B^2 or B^3 acting through the links causes the sections D to turn or twist themselves free from the ends h' of the bars. It will be noticed that the pins G or 15 grooves G' are disengaged from sections D before the links F act upon them.

In the action of the plunger die it is advisable that dies I, I, remain over the bar H until the parts D are withdrawn so as to hold 20 the bar against any pull and prevent it from being lifted by sections D. If the parts B' D, D, are made solid, then the dies I I should first be retracted, then the plunger die raised carrying the bar H with it and the bar then 25 shoved off the die sidewise.

The bars H or H' are as shown formed with an inward central bend which is adapted to form part of a consequent pole, while the ends h' of the bar are adapted to form parts 30 of salient or wound poles, and this bar so formed from a straight wrought iron bar is in itself a novel invention and forms the subject matter of another application filed by me February 11, 1892, Serial No. 421,108.

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

1. The combination with a block having a recess in its face to form a female die A, of a 40 male die B' having movable die sections D D secured thereto and independent lateral dies

I I substantially as and for the purpose specified.

2. The combination with a block having a recess in its face to form a female die A, of a 45 male die B' having movable die sections D D secured thereto and independent lateral dies I I secured to and movable along the die A substantially as and for the purpose specified.

3. The combination with a block having a 50 recess in its face to form a female die A, of a male die B' having movable sections D D secured thereto and independent dies I I moving substantially at right angles to the movement of the dies B' D D and operating to 55 push the ends of the bar under treatment over the upper faces of the die sections D D.

4. The plunger B having one or more slots in combination with die sections D D constituting with it a plunger or male die, links F 60 F pivotally secured to sections D and plunger B, but longitudinally movable with respect to the plunger, the female die A and the lateral dies I I arranged to push the ends 65 of a bar under treatment over the upper faces of the die sections D D.

5. The plunger B having one or more slots in combination with die sections D D constituting with it a plunger or male die, links F 70 F pivotally secured to sections D and plunger B, but longitudinally movable with respect to the plunger, means substantially as described operating to lock the die sections D to the plunger and to release them when the 75 plunger moves up, the female die A, and the lateral dies I I arranged to push the ends of a bar under treatment over the upper faces of the die sections D D.

GEO. S. STRONG.

Witnesses:

LISLE STOKES,
FRANCIS T. CHAMBERS.