

(No Model.)

2 Sheets—Sheet 1.

F. W. BRUCH.
MACHINE FOR UPSETTING METAL.

No. 504,909.

Patented Sept. 12, 1893.

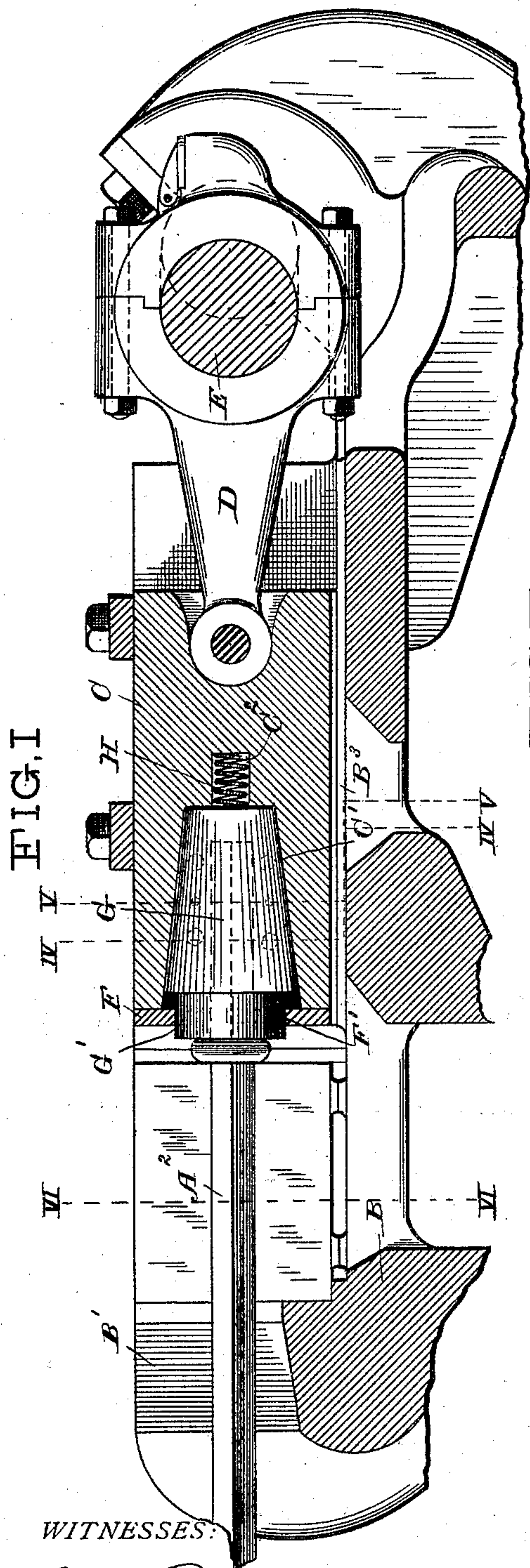


FIG. I

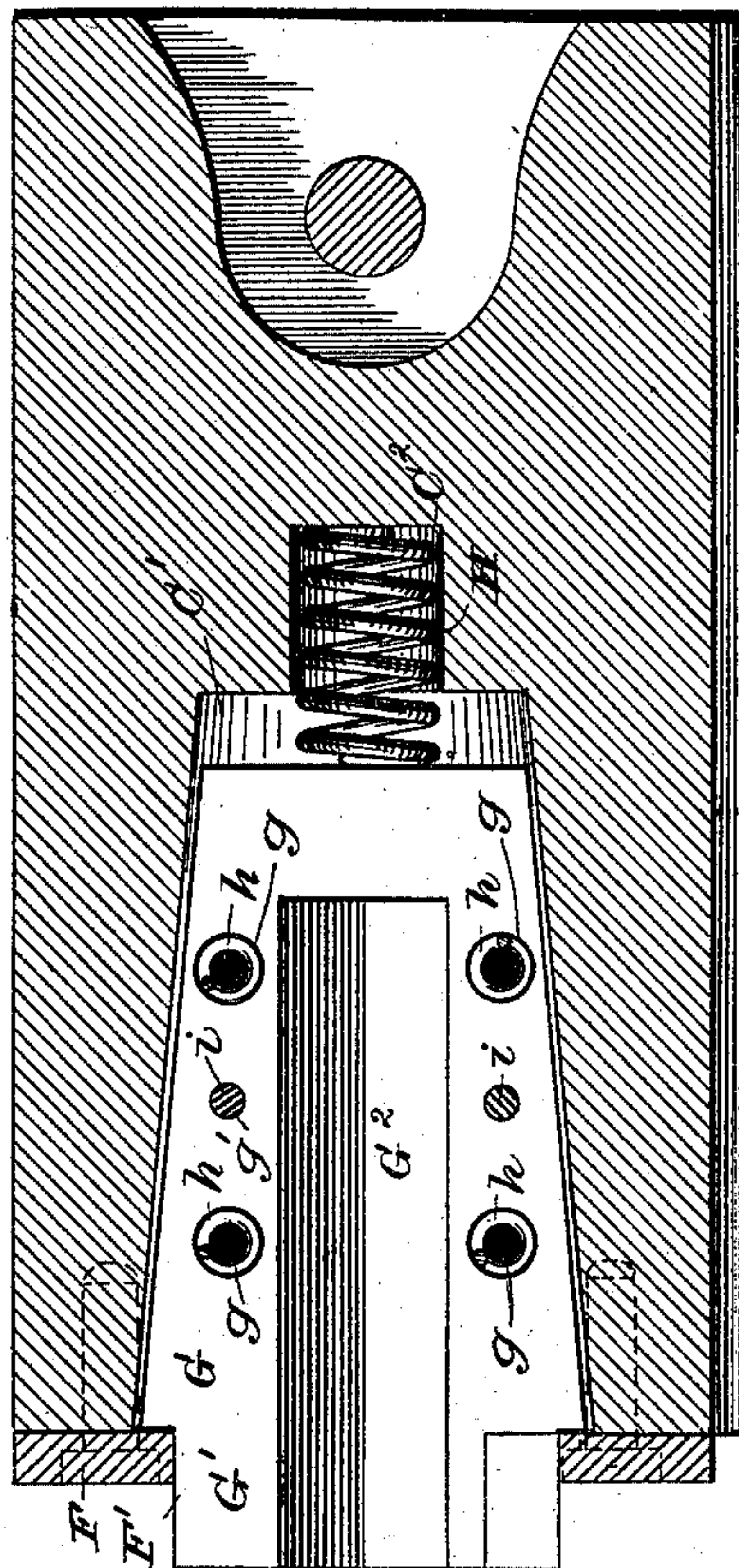


FIG. II

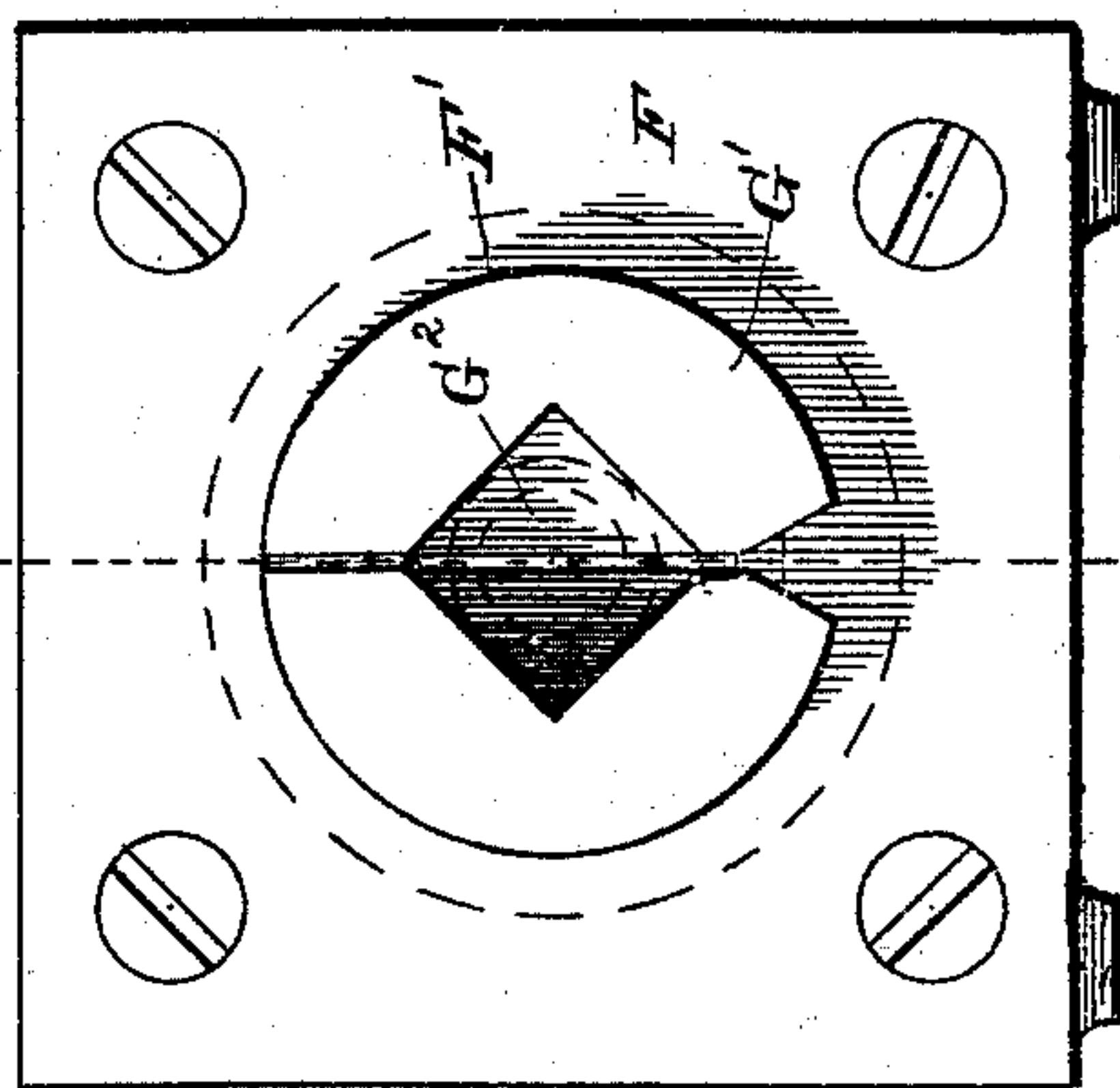


FIG. III

WITNESSES:

J. C. Turnes
J. W. Lecher

INVENTOR.

F. W. Bruch
By Hall & Gay ATTORNEYS.

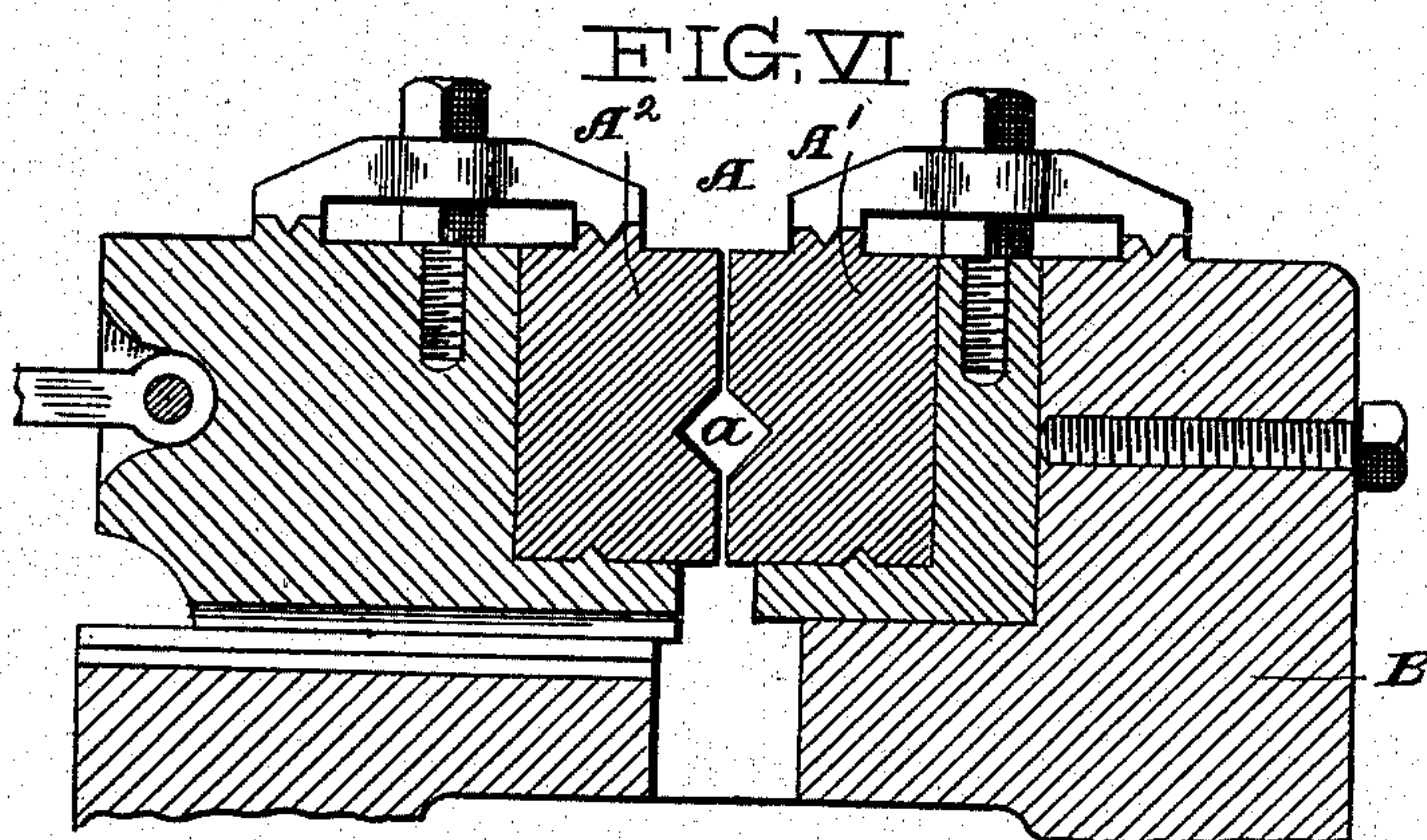
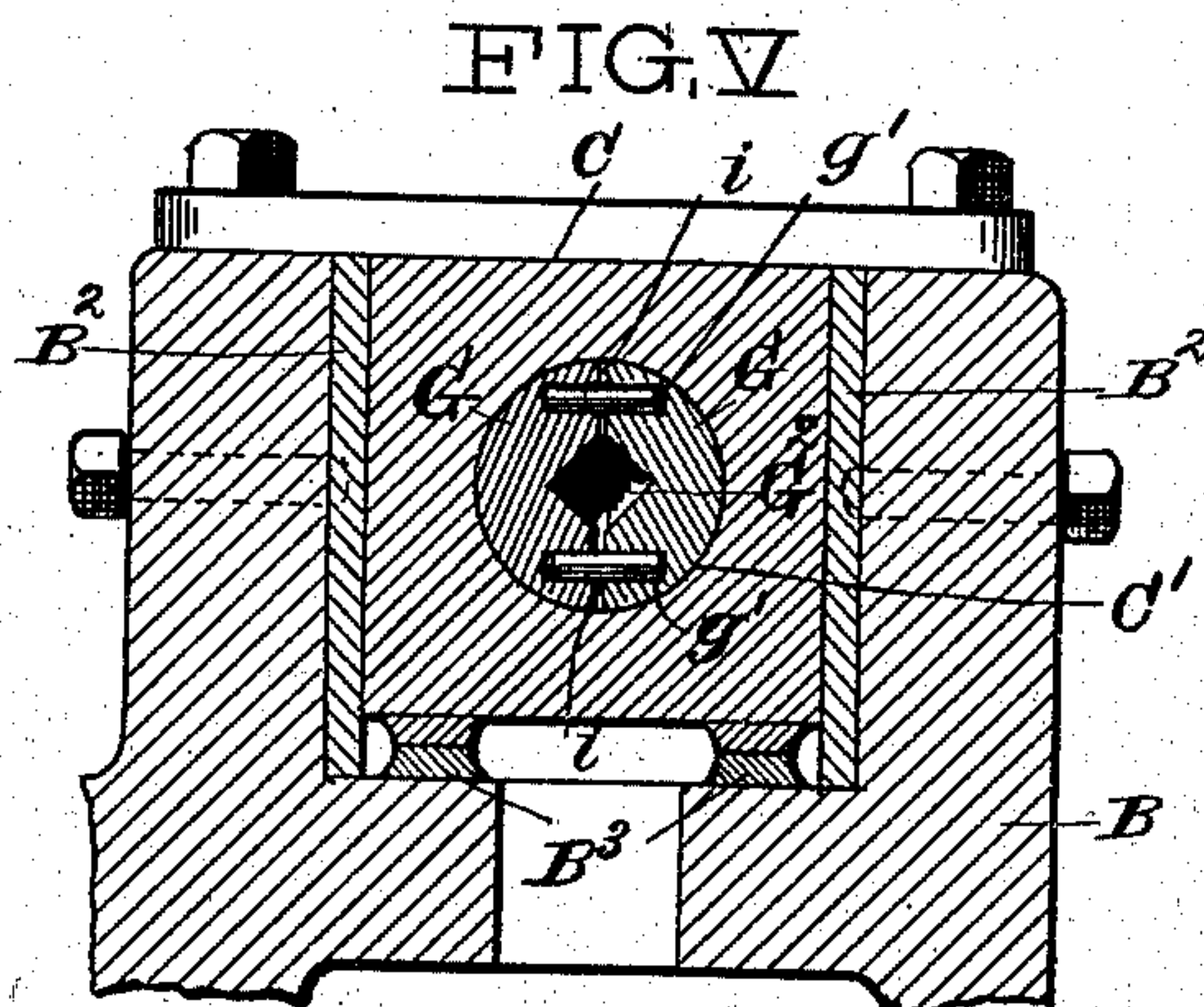
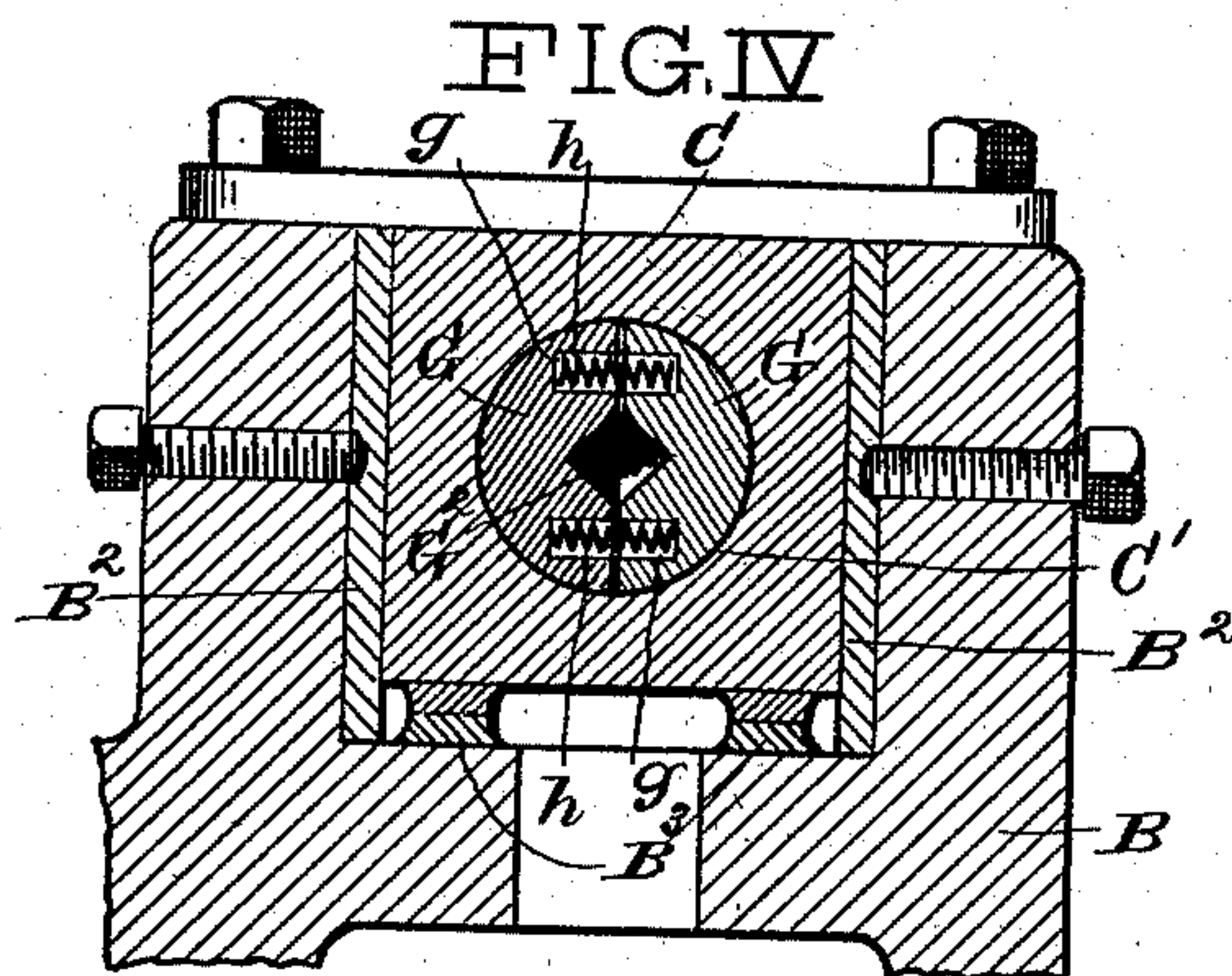
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J. C. Tunnes
Jm. Lecher

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UNITED STATES PATENT OFFICE.

FREDERICK W. BRUCH, OF CLEVELAND, OHIO.

MACHINE FOR UPSETTING METAL.

SPECIFICATION forming part of Letters Patent No. 504,909, dated September 12, 1893.

Application filed November 25, 1892. Serial No. 453,018. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK W. BRUCH, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Upsetting-Machines, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The annexed drawings and the following description set forth in detail, one mechanical form embodying the invention; such detail construction being but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings—Figure I represents a vertical section through as much of a machine for upsetting rods, &c., as will serve to illustrate my improvement; Fig. II, a longitudinal, vertical section of the plunger; Fig. III, a front view of said plunger; Fig. IV, a transverse, vertical section on the line IV—IV, in Fig. I; Fig. V, a transverse, vertical section on the line V—V, in Fig. I; and Fig. VI, a transverse, vertical section on the line VI—VI, in Fig. I.

A die, A, is supported upon the bed frame, B; and consists of a rigidly secured die-half, A', and a movable die-half, A². Both of said die-halves are formed with longitudinal grooves which register with each other and form a square opening, *a*, of a size suitable to hold the blank to be upset.

The bed frame of the machine is formed with an opening, B', through which the blank to be upset may be inserted between the die-halves. The movable die-half A² has suitable means,—which form no part of this present invention and need, therefore, no further explanation or illustration,—for reciprocating it toward and from the stationary die-half A'. An upsetting plunger, C, slides between suitably adjustable guides, B², in the bed frame, and upon suitable guide rails, B³. A pitman, D, is pivotally connected to the rear end of the plunger, and is pivoted to a crank shaft, E, which is journaled in suitable bearings in the bed frame, and derives rotary motion from the same power source as the mechanism which reciprocates the die,—the plunger

and movable die-half being so connected to their respective actuating mechanisms, that the movable die-half will close upon the stationary die-half immediately before the plunger is forced against the die, and will move away from the stationary die-half when the plunger is withdrawn from the die. The axial line of the movement of the plunger passes directly through the axis of the die opening *a*. The forward end of the plunger is formed with a conical or rearwardly contracting recess, C'; the bottom or inner end of which is formed with a small cylindrical recess, C². A face plate, F, is secured to the forward end of the plunger, and has a circular opening, F', which is of smaller diameter than the rearwardly contracting recess. Two plunger die-sections, G G,—or a larger number of such sector-shaped die sections,—are movably supported within the conical or rearwardly contracting recess; having,—when brought together,—the same taper as the inner portion of the conical or rearwardly contracting recess. The outer end of the expandible and contractible plunger die, formed by said die-sections, is reduced to form a neck, G', which fits and slides in the circular opening F' in the face plate F, which latter serves to retain the plunger die within the recess and to prevent a spring, H,—fitting in the small, cylindrical recess C²,—from forcing the die out of the conical recess. The two die-sections have their meeting faces longitudinally cut out so as to form a square axial socket, G², preferably of the same shape and size as the opening in the clamping die A. Transverse, cylindrical recesses, *g*, are formed in the meeting faces of the plunger die-sections. Springs, *h*, fit in said recesses and serve to spread the die-sections apart to enlarge the socket, when the die is forced out by its spring H. Pins, *i*, are secured in the meeting faces of the sections and fit into opposite, corresponding bores, *g'*; said pins serving to maintain the two die-sections in their proper, relative positions.

In operation, the blank to be upset is inserted through the opening in the bed frame, and between the holding die-sections into the contractible and expandible socket formed in the plunger by the plunger die-sections. The movable holding die-section is forced against

the stationary die-section, thus tightly closing upon the blank, whereupon the plunger is brought toward the holding die. As the blank has previously been heated, it will be
 5 upset at the points between the face of the plunger and the face of the holding die, thus having a collar formed upon it and integral with it. As the die-sections in the plunger close against each other as the plunger is
 10 forced forward against the holding die, and thus contract the plunger socket; the shoulder, formed between the collar and that end of the axle which is within the socket of the plunger, may be perfectly sharp,—without a
 15 fin, and at a perfect right angle to the blank. This effect cannot be attained in a non-expansible and contractible plunger die socket, which necessarily must be sufficiently large
 20 to admit of the end of the blank being inserted into it, and which, therefore, cannot form as sharp a shoulder as a contractible and expansible plunger die.

Other modes of applying the principle of my invention may be employed for the mode
 25 herein explained. Change may therefore be made as regards the mechanism thus disclosed, provided the principles of construction set forth respectively in the following claims are employed.

30 I therefore particularly point out and distinctly claim as my invention—

1. In an upsetting machine, the combination of an upsetting plunger formed with an inwardly tapering recess, of die sections movable within said recess and shaped to form
 35 an expansible and contractible die, substantially as set forth.

2. In an upsetting machine, the combination of an upsetting plunger formed with an
 40 inwardly tapering recess, die-sections shaped

to jointly fit in the inner portion of said recess and formed with cut-out portions which form an axial, expansible and contractible socket, and a spring, bearing against the inner end of the die formed by said die sections, 45 substantially as set forth.

3. In an upsetting machine, the combination of an upsetting plunger formed with an inwardly tapering recess, die sections shaped to jointly form an inwardly tapering die, having an axial, expansible and contractible
 50 socket and a reduced neck at its outer end, a face plate secured to the end of the plunger and having an opening through which said neck projects, and a spring, bearing
 55 against the inner end of said die, substantially as set forth.

4. In an upsetting machine, the combination of a holding die, an upsetting plunger having means for reciprocating it in a line
 60 axial to said holding die and formed with an inwardly tapering recess in the end facing said die, die-sections shaped to form an inwardly tapering die, fitting within said recess, having springs forcing them apart, and
 65 formed with grooves at the axial line of the die to jointly form a socket and with a reduced neck at the outer end of the die, a face plate secured to the end of the plunger and
 70 formed with an opening through which said neck projects, and a spring, bearing against the inner end of the die, formed by said die-sections, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand
 75 this 15th day of November, A. D. 1892.

FREDERICK W. BRUCH.

Witnesses:

J. B. FAY,

DAVID T. DAVIES.