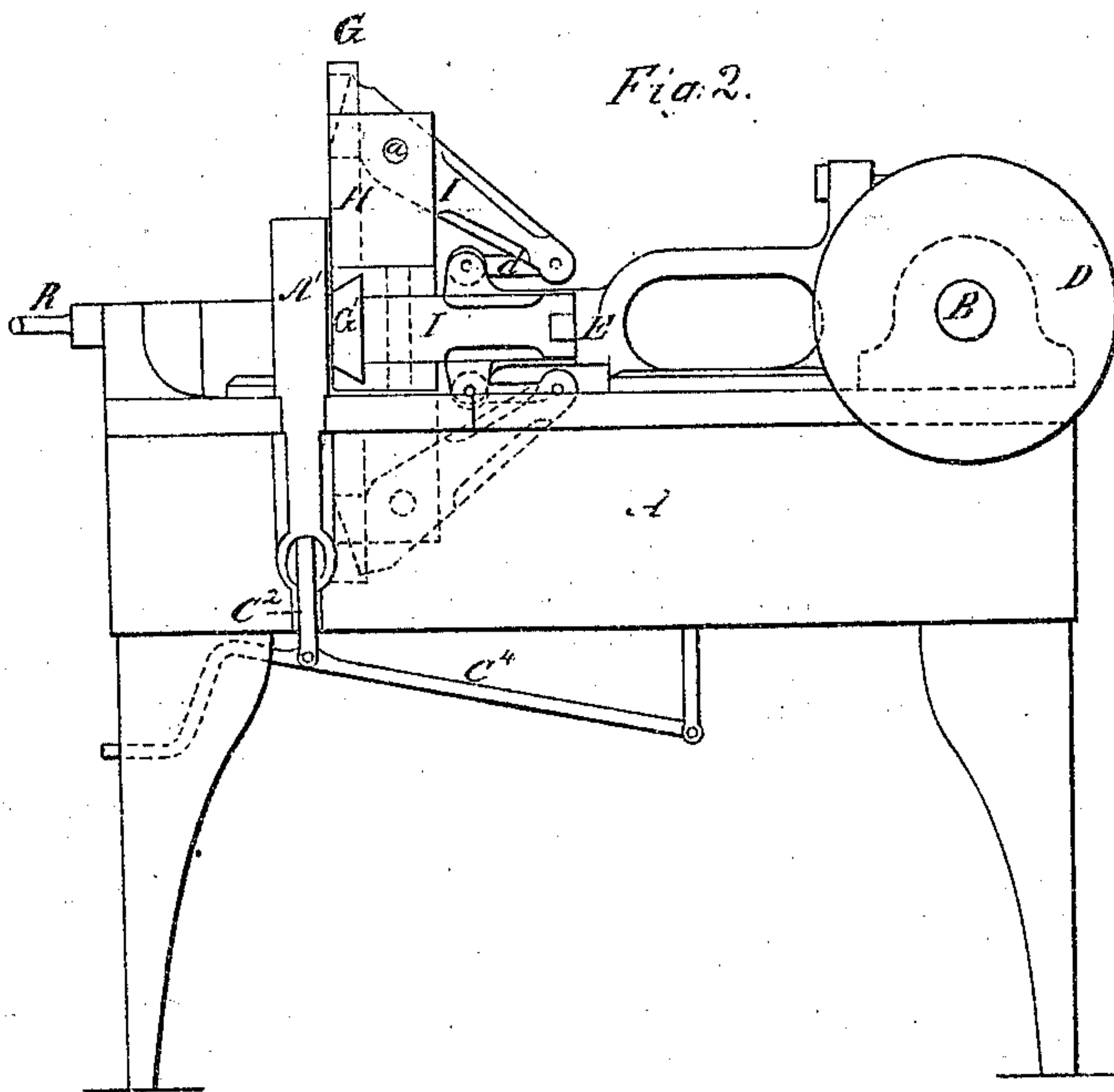
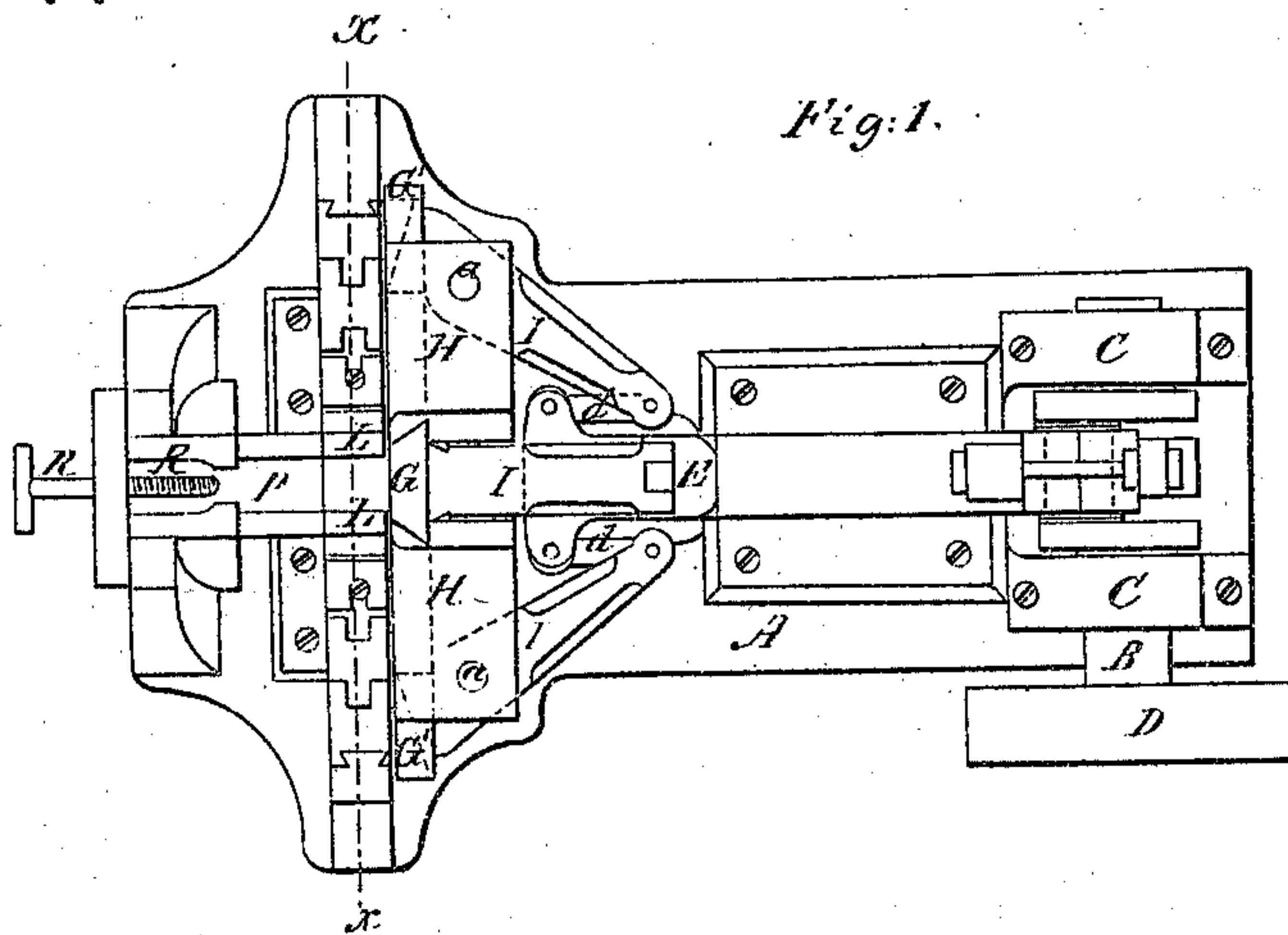


*O. C. Burdick. Sheet 1 of 2 Sheets.*  
*Bolt-Heading Mach.*  
*N<sup>o</sup> 97,351. Patented Nov. 30, 1869.*



Witnesses.

*J. H. Sumner*  
*a. j. Tibbitts*

Inventor.

*O. C. Burdick*  
*By his Attorney*  
*John E. Earle*

O.C. Burdick. *Sheet 2 of 2 Sheets.*  
*Bolt Heading Mach.*  
*Nº 97,351. Patented Nov. 30, 1869.*

Fig. 7.

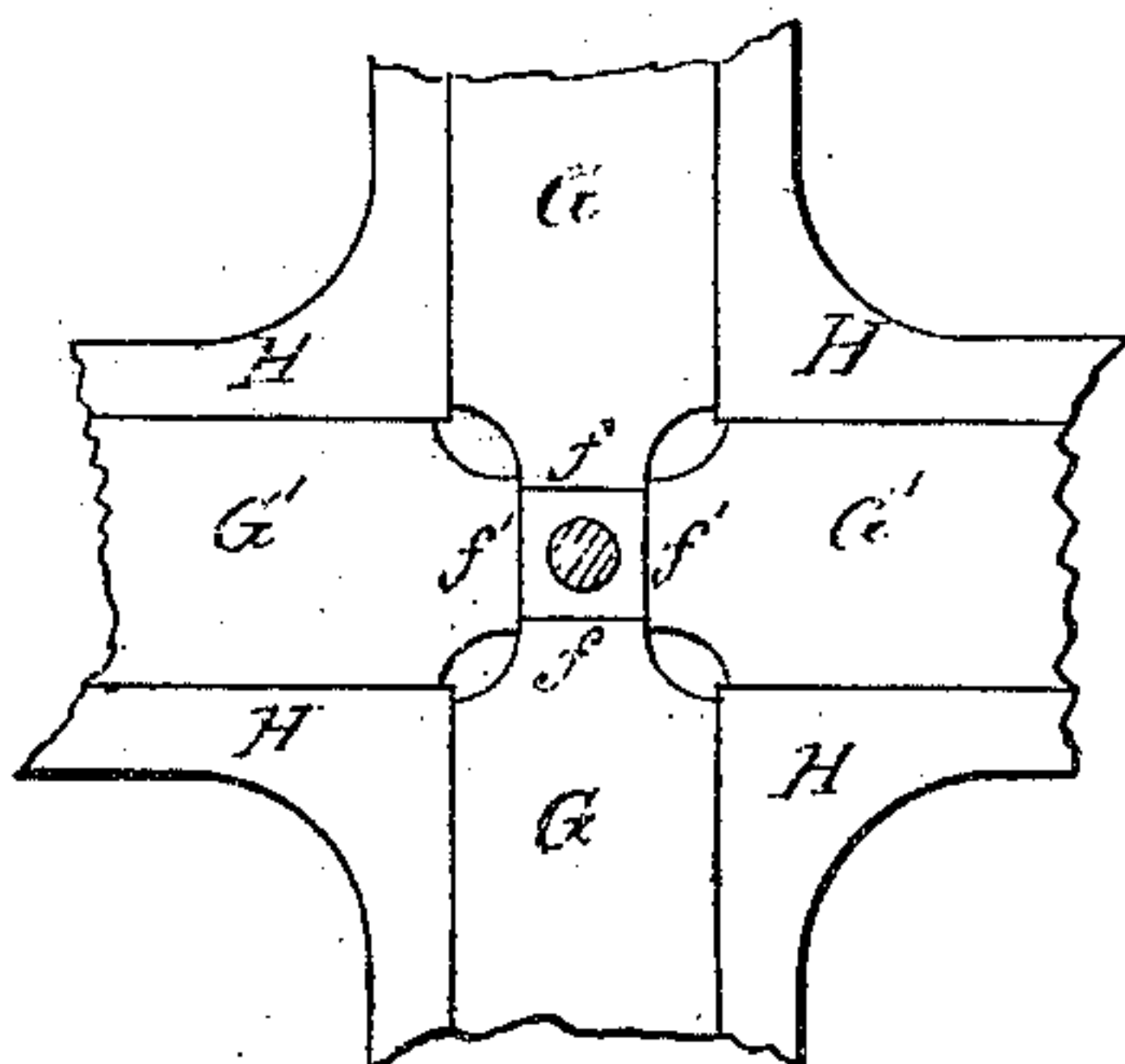


Fig. 3.

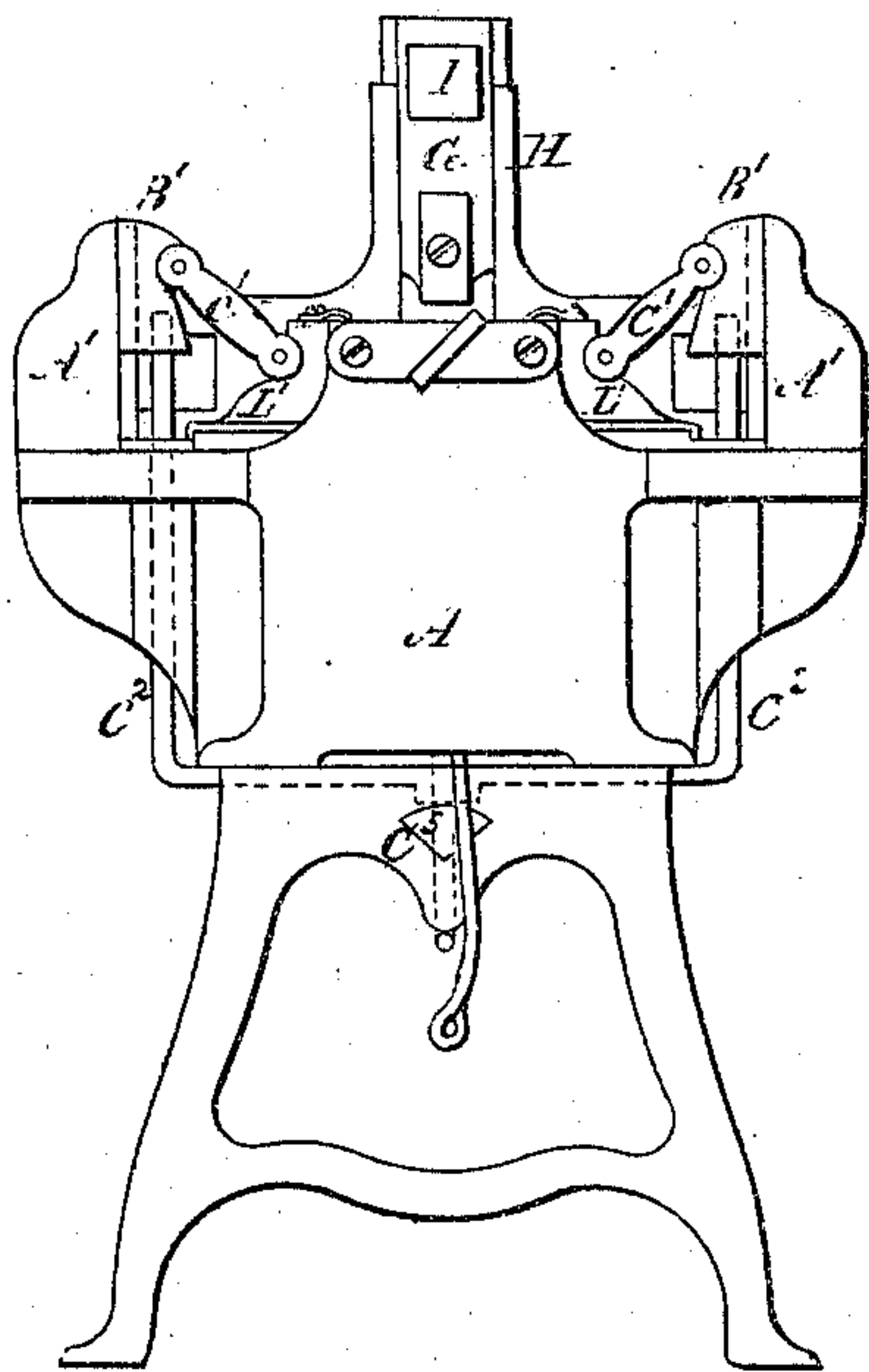


Fig. 5.

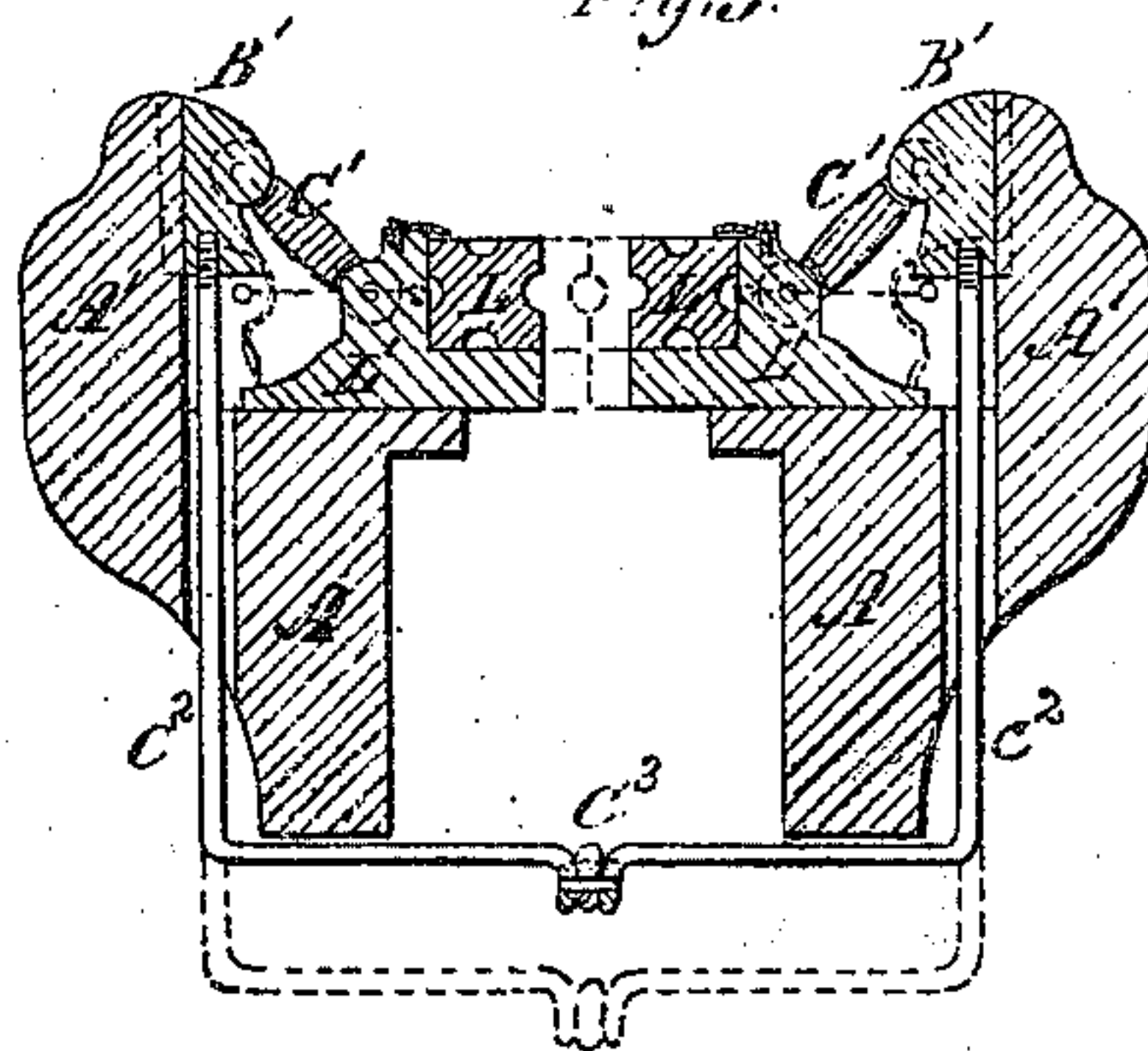


Fig. 4.

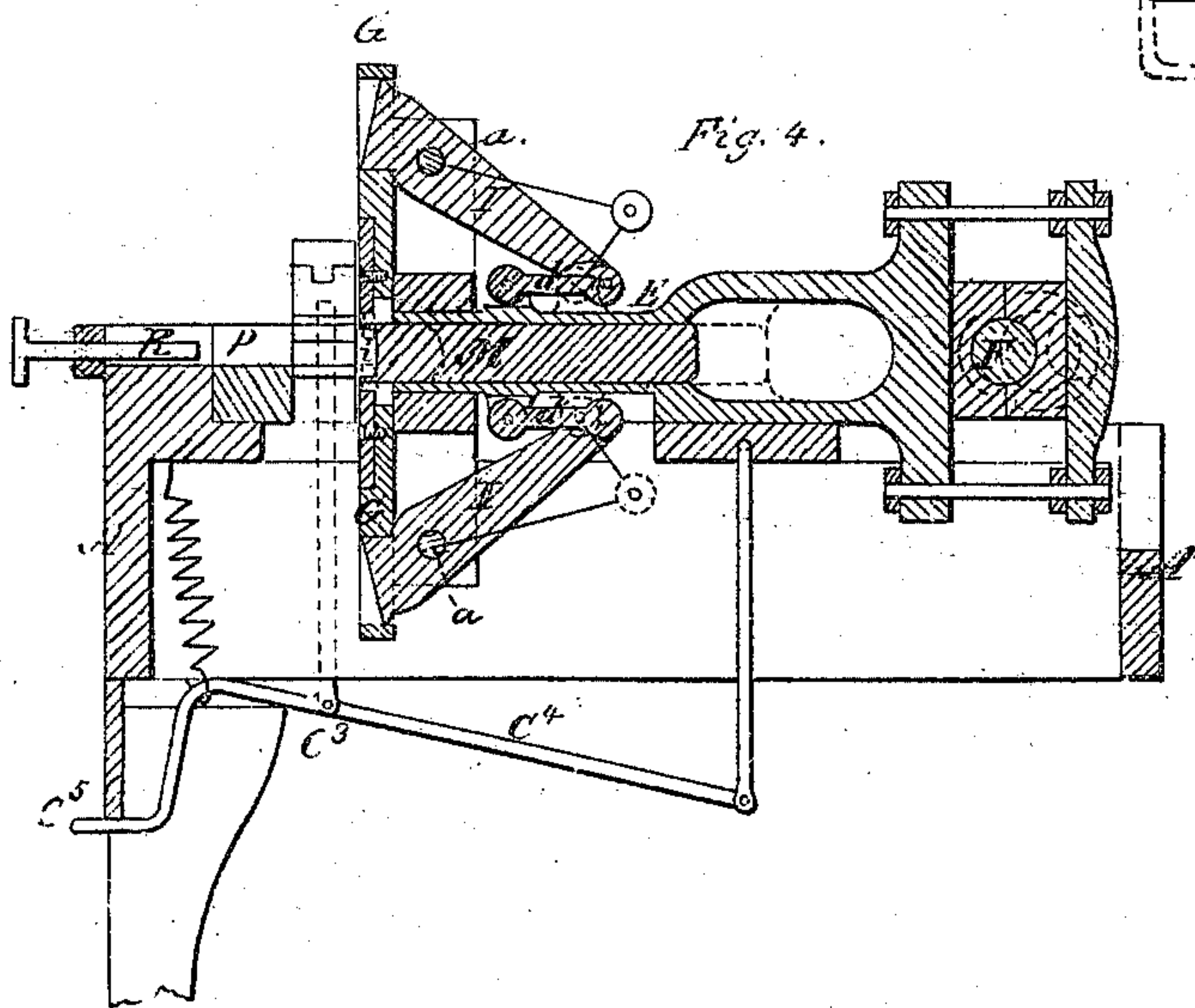
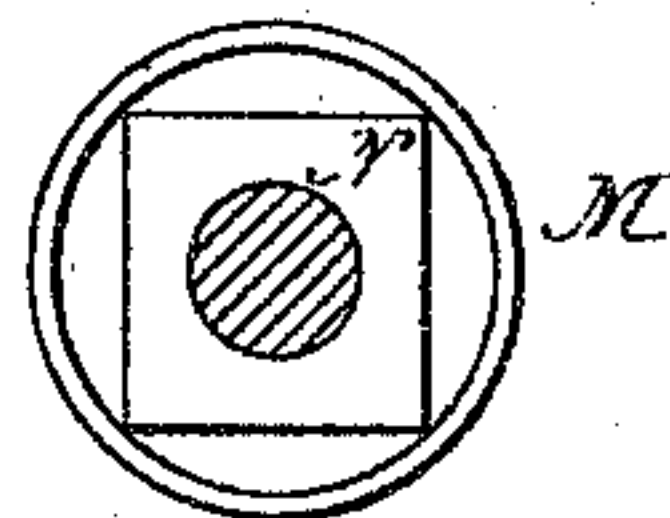


Fig. 6.



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# UNITED STATES PATENT OFFICE.

O. C. BURDICT, OF PROVIDENCE, RHODE ISLAND.

## IMPROVED BOLT-HEADING MACHINE.

Specification forming part of Letters Patent No. 97,351, dated November 30, 1869.

*To all whom it may concern:*

Be it known that I, O. C. BURDICT, of Providence, in the county of Providence and State of Rhode Island, have invented a new Improvement in Bolt-Heading Machines; and I do hereby declare the following, when taken in connection with the accompanying drawings and letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a top view; Fig. 2, a side view; Fig. 3, a forward-end view; Fig. 4, a longitudinal central section; Fig. 5, a sectional view, on line *xx*, through the clamping-dies; Fig. 6, an enlarged end view of the upsetting-die; and in Fig. 7, a front view of the heading or swaging dies.

This invention relates to an improvement in the bolt-heading machine for which Letters Patent were granted to me, dated September 3, 1867; and the invention consists in the upsetting-die or plunger, constructed with a circular recess in its operating end, of a diameter equal to the diameter of the head of the bolt across the angles, so that the extent of the angles being thus defined will not be forced by the swaging-dies so as to form a burr at the said angles, the plunger or upsetting-die first passing between the swaging-dies to upset the head, then retreating for the swaging-dies to operate.

In order that others skilled in the art may construct and use my invention, I will fully describe the same as illustrated in the accompanying drawings.

A is the frame of the machine; B, the driving-shaft, supported in bearings C and driven by the application of power thereto through the pulley D, or in any convenient manner. E is the follower, operated by an eccentric, F, on the driving-shaft, as seen in Fig. 4. G G and G' G' are the four die-holders, arranged in guides H so as to move freely toward a common center.

On suitable bearings *a* are arranged levers I, one for each of the die-holders, the shorter arm of the said levers working in a recess in the said die-holders, as seen in Figs. 3 and 4, the longer arm of the said lever connected to the follower by links *d*, (see Fig. 4,) where the

follower is represented as being thrown forward to draw back the die-holders. When, by the operation of the machine, the follower is drawn back, then the links throw up the longer arm of the levers, as denoted in Fig. 4, and consequently drive toward each other the several die-holders; and, if the machine continues to operate, each full movement of the follower causes an advance and retreat of the die-holders. By the link-connections *d* and attachment of the levers to the die-holders it will be seen that the operation is positive, and without the intervention of springs or their equivalents, as used in my former machine.

To each of the die-holders, respectively, are attached dies *f* and *f'*, here represented as for a square bolt. Two of the dies *f* are of the width of the narrowest diameter of the bolt-head. The other dies, *f'*, are wider than the narrowest diameter of the bolt-head; so that when the dies advance to each other the two narrow dies pass between the two broader dies, as seen in Fig. 7, and thus prevent, to a great extent, defects in the angle of the head; for in machines in which the dies are of equal width, and are arranged so as to exactly meet at their angles, the metal of the head being swaged will force itself out at the angles, and thus form imperfect angles—a defect which increases as the machine is used.

To hold the bolt or blank while the head is being formed, I arrange a pair of clamping-dies, L, (see Fig. 5,) in slides L', each of the said slides operating to move the dies equally to and from the center, as denoted in Fig. 5. To thus operate the said dies, I arrange in the heads A vertical slides B', from which a toggle-link, C<sup>1</sup>, extends to the slides L'.

The two said slides B' are connected together by rods C<sup>2</sup>, extending down and united at C<sup>3</sup> to a lever, C<sup>4</sup>, (see Fig. 4,) to which is attached a treadle, C<sup>5</sup>, to which the foot may be applied, to draw down the slides B' and close the dies L, as denoted in Fig. 5. The holding-dies thus operating free themselves entirely from the headed bolt, leaving it centrally between the two, from which it may be readily and easily removed.

In the follower E the upsetting-die or plunger M is arranged, (see Fig. 4,) the working-end of the said plunger being recessed, as at *i*,



about the depth of the head to be formed, the said recess being of a circular form, as seen in Fig. 5, enlarged, the diameter being the same or no more than the largest diameter of the bolt-head N, so that in upsetting the metal the head at the angles will only be of the required diameter, thus removing from the angles the surplus metal, which, if permitted to expand beyond the angles, would, by the operation of the swaging-dies, form a burr at the angles.

The arrangement of the machine is such that the operative parts are worked by a single cam or eccentric movement, the plunger or upsetting-die driving forward between, opening the swaging-dies to upset the metal, then the upsetting-die returning while the swaging-dies approach each other to form the head. This operation is several times repeated, in order to form a perfect head.

The blank to be headed is dropped between the clamping-dies into a space, P, and so as to rest against an adjusting-screw, R, and extend sufficiently far through the swaging-dies to allow sufficient metal to form the head.

I do not claim any of the parts described, except in combination, as hereinafter specified.

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

The combination of the upsetting-die M with the swaging-dies *ff* and *f' f'*, when the said die M is arranged so as to pass between the swaging-dies, so as to upset the head, in the manner substantially as set forth.

O. C. BURDICT.

Witnesses:

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