

(No Model.)

2 Sheets—Sheet 1.

F. H. SMITH.

MACHINE FOR UPSETTING EYE BARS.

No. 387,823.

Patented Aug. 14, 1888.

Fig. 1.

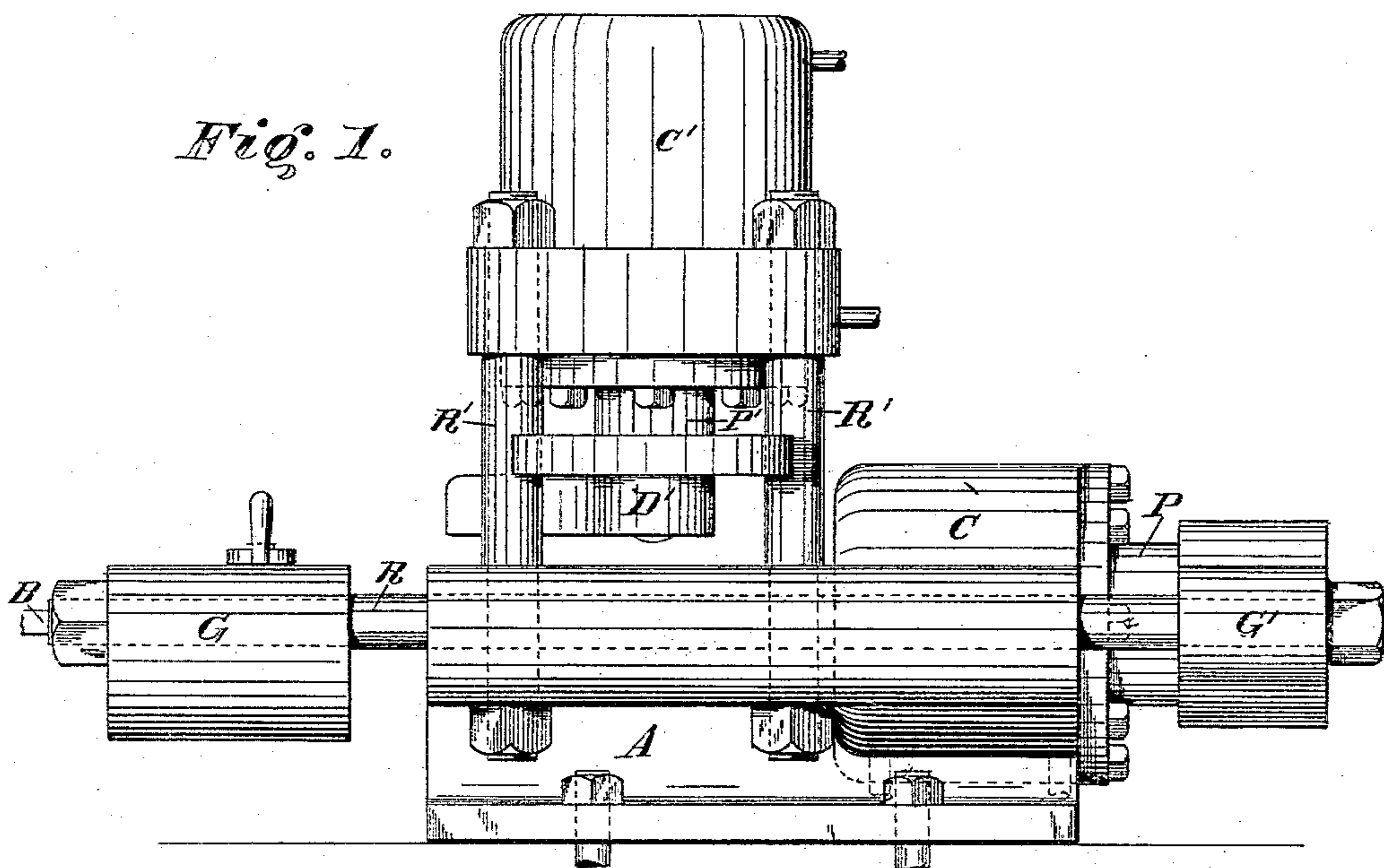


Fig. 2.

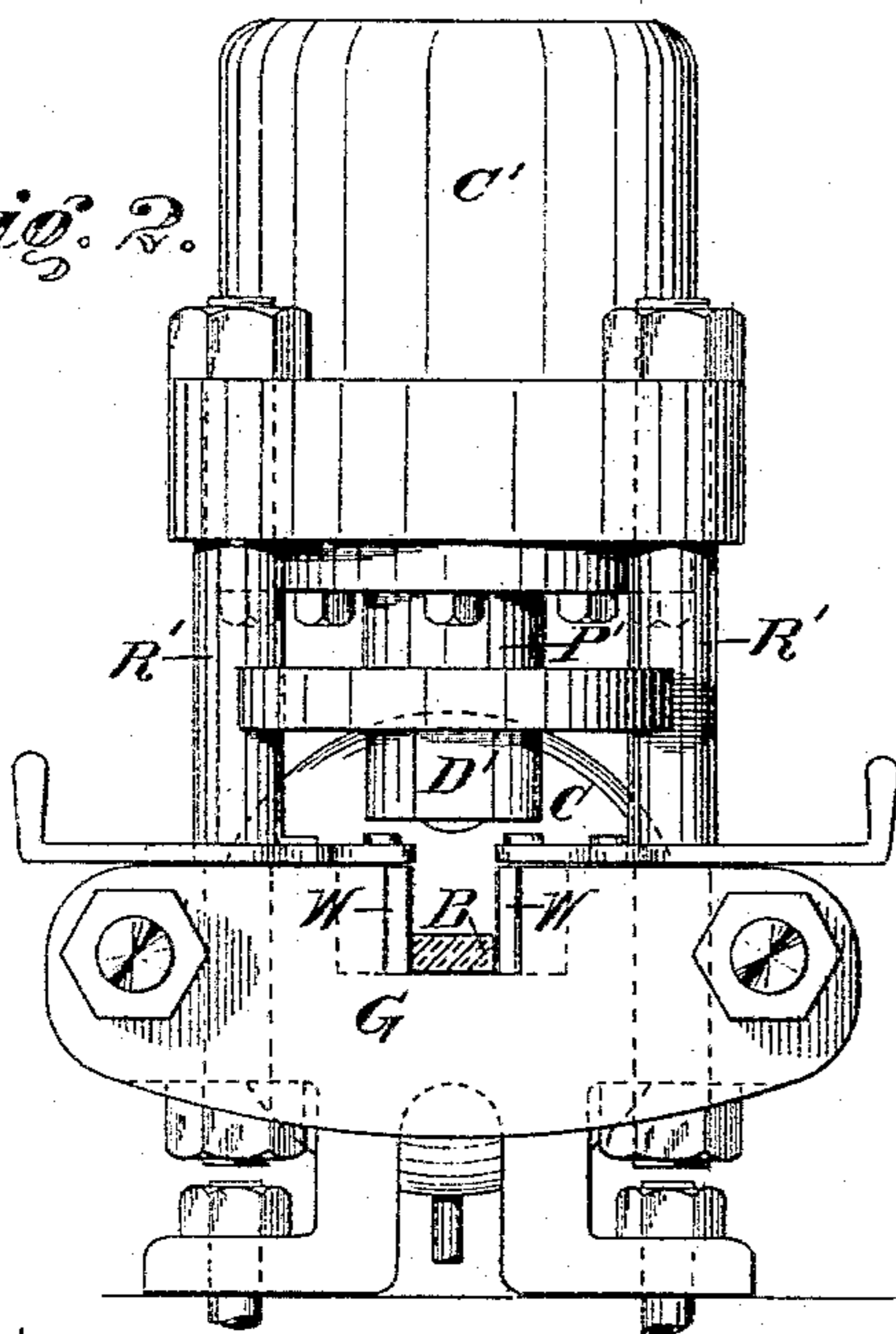
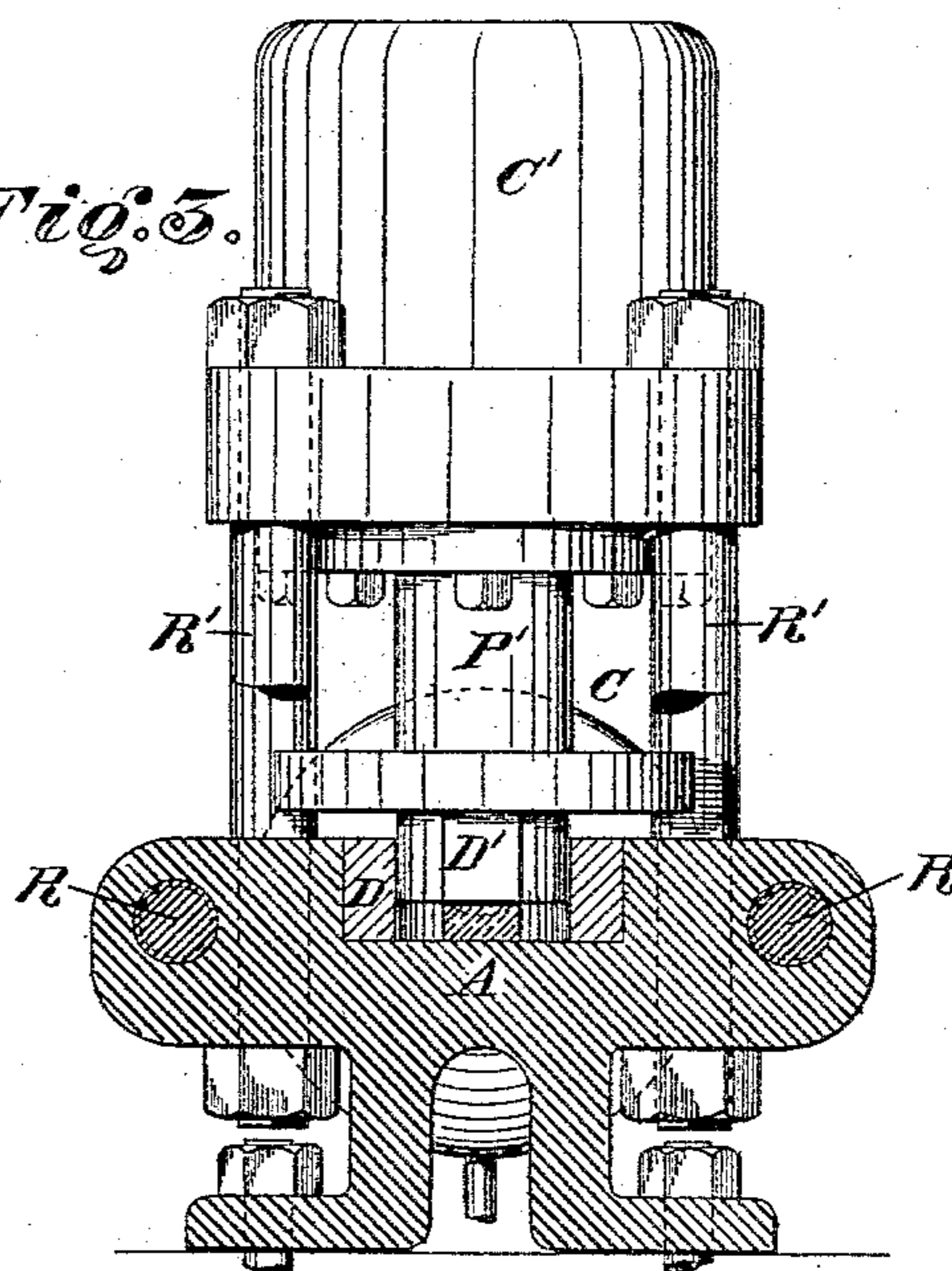


Fig. 3.



Witnesses.

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Fig. 4.

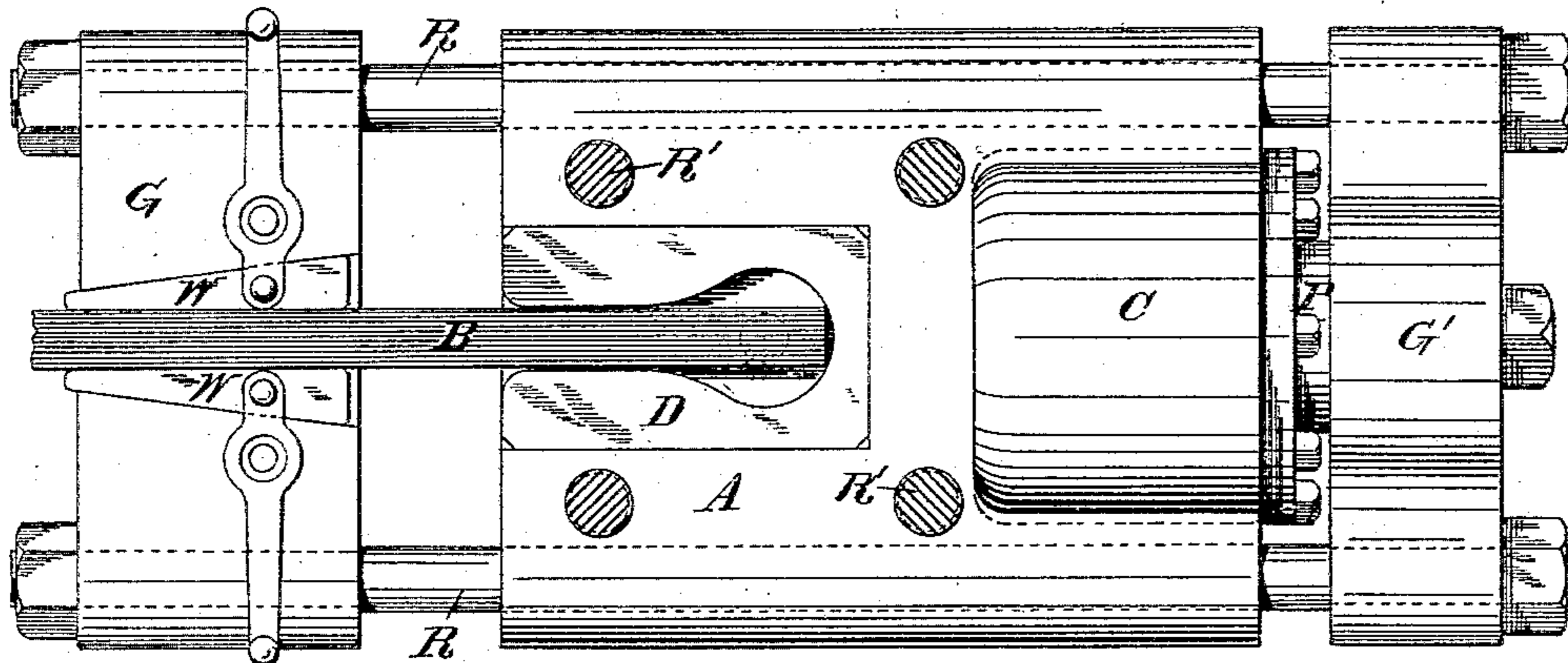
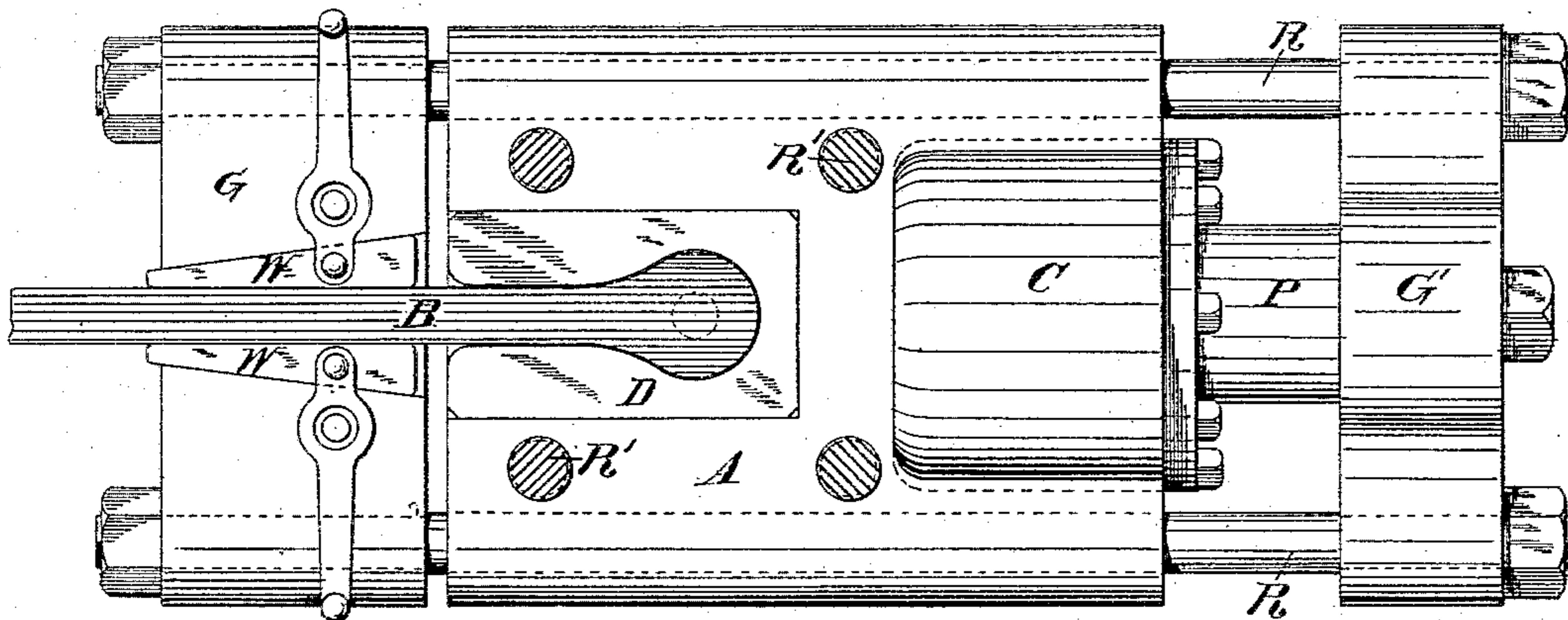


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

FREDERICK H. SMITH, OF BALTIMORE, MARYLAND.

MACHINE FOR UPSETTING EYE-BARS.

SPECIFICATION forming part of Letters Patent No. 387,823, dated August 14, 1888.

Application filed December 2, 1887. Serial No. 256,804. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK H. SMITH, a citizen of the United States, residing in the city of Baltimore and State of Maryland, have
5 invented certain new and useful Improvements in Upsetting and Die - Forging Enlarged Ends on Metallic Bars for Use as Eye-Bars, and for other Purposes, and these improvements are explained in the following
10 specification and shown in the accompanying drawings.

Figure 1 is a side view of my improved apparatus, showing the horizontal and the vertical movements at half-stroke. Fig. 2 is a
15 front view of the same, showing the vertical movement at half-stroke. Fig. 3 is a front view of the same, showing the vertical movement on the full downward stroke, and in this figure the front gripping cross-head and the
20 front portion of the anvil and of the female die are removed in order the better to show how the compressing male die slides down vertically within the female die. Fig. 4 is a
25 plan view of the bed of the anvil, showing the horizontal movement at the beginning of its stroke; and Fig. 5 is also a plan view showing the horizontal movement at the end of its
30 stroke, and in both these plan views the overhead portion of the apparatus is omitted, in order the better to show the female die and the action of the gripping cross-head which forces the bar to do its own upsetting.

In all the figures similar letters refer to similar parts.

35 A is the anvil upon which the forging is to be done.

D is the female die within which the forging is to be done.

40 G is the gripping cross-head, which grips the bar B by means of the wedges W W, and R R are the side rods, which slide through lugs on the anvil and connect the gripping cross-head G with the rear cross-head, G'. The horizontal piston P is attached to the rear
45 cross-head and works within the horizontal cylinder C, which is preferably cast as a part of the anvil, but may be cast separately.

50 P' is the overhead vertical piston which actuates the vertical compressing male die D', and C' is the vertical cylinder within which this piston moves, while R' R' are the rods which connect this cylinder to the anvil.

In operation the bar to be forged is properly heat-softened at its end, and this end is then placed within the shaping-chamber of the
55 female die on the anvil, with the body of the bar extending out through the front channel of the female die and across the gripping cross-head, where it is gripped and held by the
60 wedges, as seen in Fig. 4. The vertical compressing male die is then lowered down into the female die until it rests on the heated bar. The rear cross-head is then driven rearward by the piston P, either steadily or intermit-
65 tently or reciprocally, and carries with it the sliding rods, the gripping cross-head G, and the bar B, which is thus forced endwise through the front channel of the female die into the
70 shaping-chamber, in which the hot metal upsets and accumulates and fills the female die, as seen in Fig. 5. The vertical compressing male die is raised and lowered during or
75 after the upsetting with a rapidity and force suited to the metal under treatment, after which the bar is jarred and lifted out. When
80 operating on thin bars liable to buckle where unsupported in between the anvil and the grips, the upsetting is effected by several short strokes, reversing and taking fresh grips each time, thus exposing only very short lengths of
85 unsupported bar outside of the die. Within the die the bar is steadied against any lateral displacement during the upsetting by the small bulbous protuberance shown on Figs.
90 1 and 2 as projecting downward from the center of the vertical compressing-die, which bulb presses into the hot metal in the position shown by the dotted circles in the center of the shaping-chambers on Figs. 4 and 5, and
95 thus steadies the bar without seriously impeding the flow of hot metal. Variations in the sizes or other peculiarities of the bars may require that this bulb should vary in shape, or should protrude from the bottom of the shaping-chamber, or be omitted altogether. The
100 completion of the bar can be expedited by using the male compressing-die to drive a sledge-hammer into the center of the hot head while it is still in the female die, thus at once expanding it radially, and also half-punching
the eye-hole ready for the drill-press. The power to be used in the cylinders to move the piston may be hydraulic or air, gas, steam, or other, and one kind may be used in one cylin-

der and another kind in another cylinder, or alternately in the same cylinder if the work requires slow compression at one stage and rapid hammer-blows at another. In many existing shops there are steam-hammers which can easily be used to actuate the vertical compressing male die of my apparatus, and thus dispense with a special cylinder therefor, as the anvil, together with the horizontal cylinder, can be placed under such steam-hammer and removed again. Screw or other power can also be used, instead of cylinder-power, for either or both the vertical and horizontal movements, and my first five claims admit this.

I am aware that other inventors have used or designed methods and apparatus for die-forging eye-bars in which the heated metal of the bar has been upset back upon itself into a shaping-chamber by using the back of the shaping-chamber as a movable upsetter, as seen in the Kloman Reissue, No. 4,911, and by other forms of upsetters; but in all these cases the metal is upset into a flush-die having a horizontal plane of separation, or a die with a broken periphery, and the hot metal flows over the top of the die, or into the closing-joints thereof, and thus prevents the dies from closing, and makes necessary the removal of the head to other apparatus for trimming and proper condensation. In another application of even date I have shown and described another invention in which the heat-softened end of the bar is driven backward into a shaping-chamber in a female die and upset therein under a vertical compressing male die. In that invention and in all others known to me the bar itself is held stationary and has its heat-softened end upset backward into the shaping-chamber through the back thereof, whereas in this present invention the bar itself is moved and upsets its own heat-softened metal into the shaping-chamber through the front thereof, thus producing a clean head with unbroken outline.

Having thus described my invention and pointed out wherein it differs from others, I desire to claim the following as new and useful improvements in upsetting and die-forging enlarged ends on metallic bars for use as eye-bars, and for other purposes.

1. In combination with an anvil, a horizontal receiving female die consisting of a shaping-chamber with a front channel, a vertical compressing male die fitted to slide down and up within the shaping-chamber and the front channel of the female die, and a front gripping cross-head.

2. In combination with an anvil, a horizontal receiving female die consisting of a shap-

ing-chamber with a front channel, a vertical compressing male die fitted to slide down and up within the shaping-chamber and the front channel of the female die, a front gripping cross-head, and a rear cross-head connected therewith by rods.

3. In combination with an anvil, a horizontal receiving female die consisting of a shaping-chamber with a front channel, a vertical compressing male die fitted to slide down and up within the shaping-chamber and the front channel of the female die, a front gripping cross-head and a rear cross-head connected therewith by rods, a rear horizontal cylinder, and piston fitted to actuate the rear cross-head and connecting-rods and front gripping cross-head.

4. In combination with an anvil, a horizontal receiving female die consisting of a shaping-chamber with a front channel, a vertical compressing male die fitted to slide down and up within the shaping-chamber and the front channel of the female die, a front gripping cross-head, an overhead vertical cylinder, and piston fitted to actuate the vertical compressing male die.

5. In combination with an anvil, a horizontal receiving female die consisting of a shaping-chamber with a front channel, a vertical compressing male die fitted to slide down and up within the shaping-chamber and the front channel of the female die, a front gripping cross head and a rear cross-head connected therewith by rods, an overhead vertical cylinder, and piston fitted to actuate the vertical compression male die.

6. In combination with an anvil, a horizontal receiving female die consisting of a shaping-chamber with a front channel, a vertical compressing male die fitted to slide down and up within the shaping-chamber and the front channel of the female die, a front gripping cross-head and a rear cross-head connected therewith by rods, a rear horizontal cylinder, and piston fitted to actuate the rear cross-head and connecting-rods and front gripping cross-head, an overhead vertical cylinder, and piston fitted to actuate the vertical compressing male die.

7. In combination with mechanism for ramming endwise a metal bar, and thus upsetting its heat-softened end within a shaping-chamber, a bulbous protuberance in the center of the said shaping-chamber for the purpose of steadying said bar against lateral displacement during upsetting.

FREDERICK H. SMITH.

Witnesses:

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