

No. 615,574.

Patented Dec. 6, 1898.

L. POOLE.  
MOLDING MACHINE.

(Application filed Jan. 25, 1896. Renewed June 6, 1898.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 2.

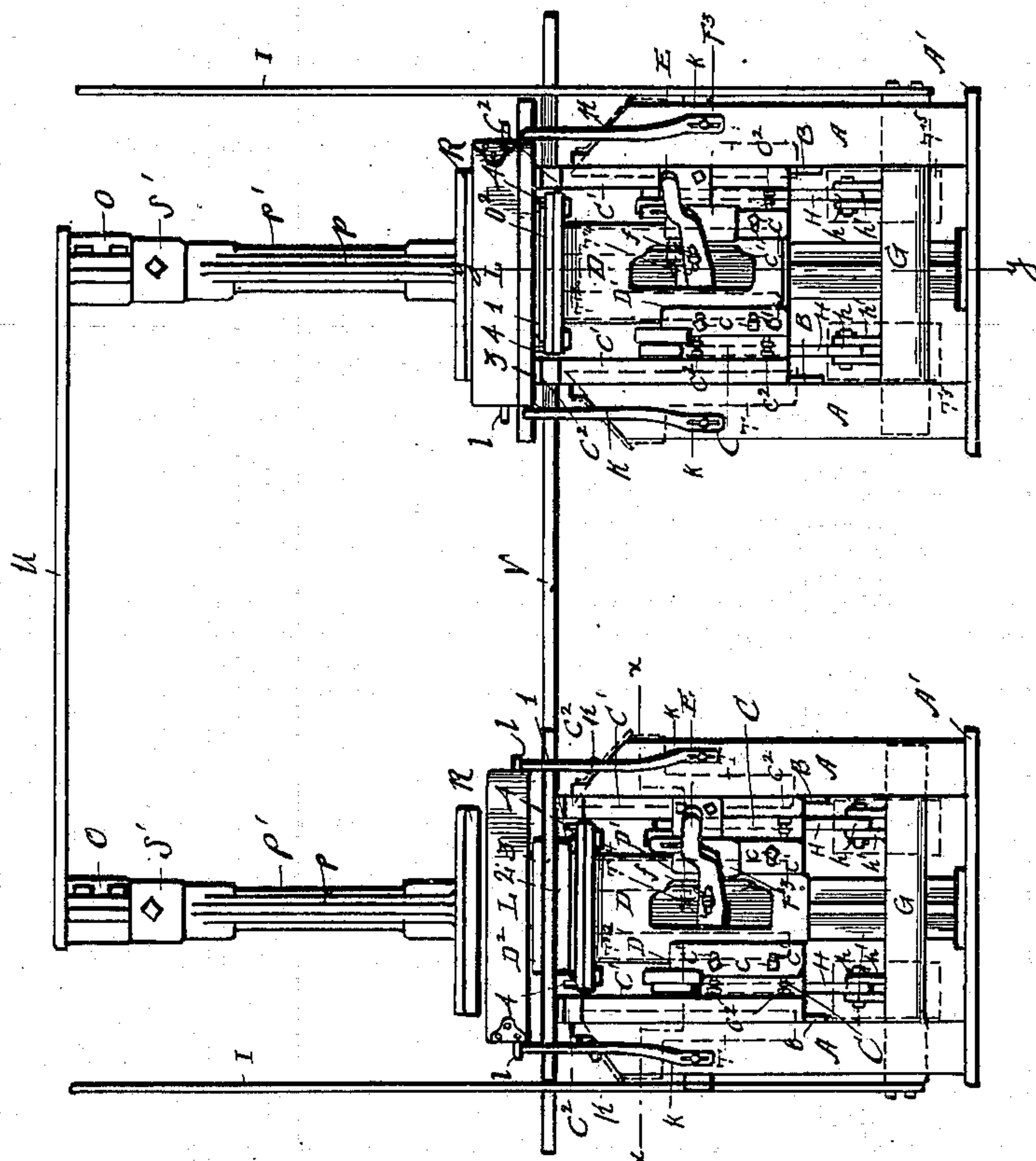
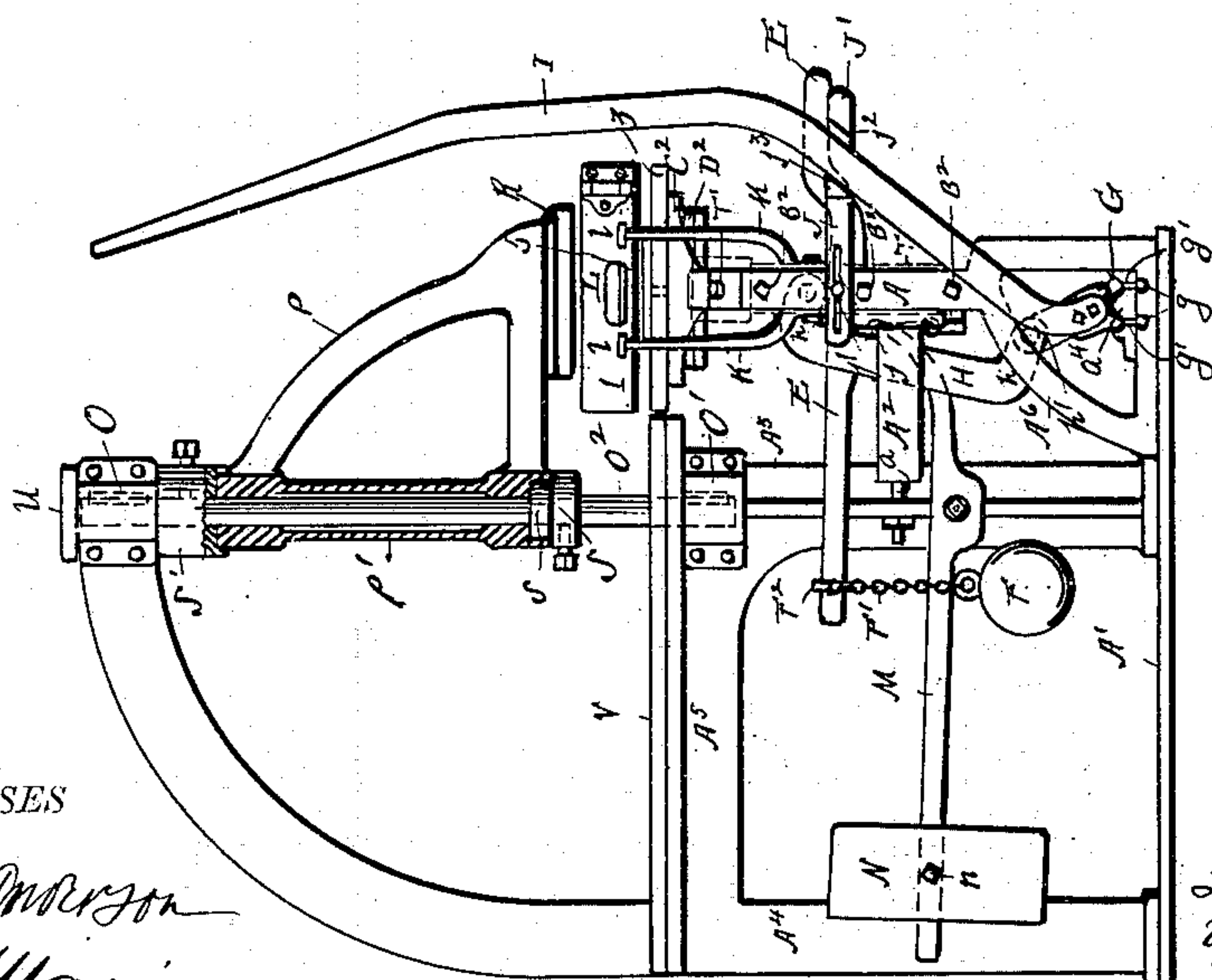


Fig. 1.



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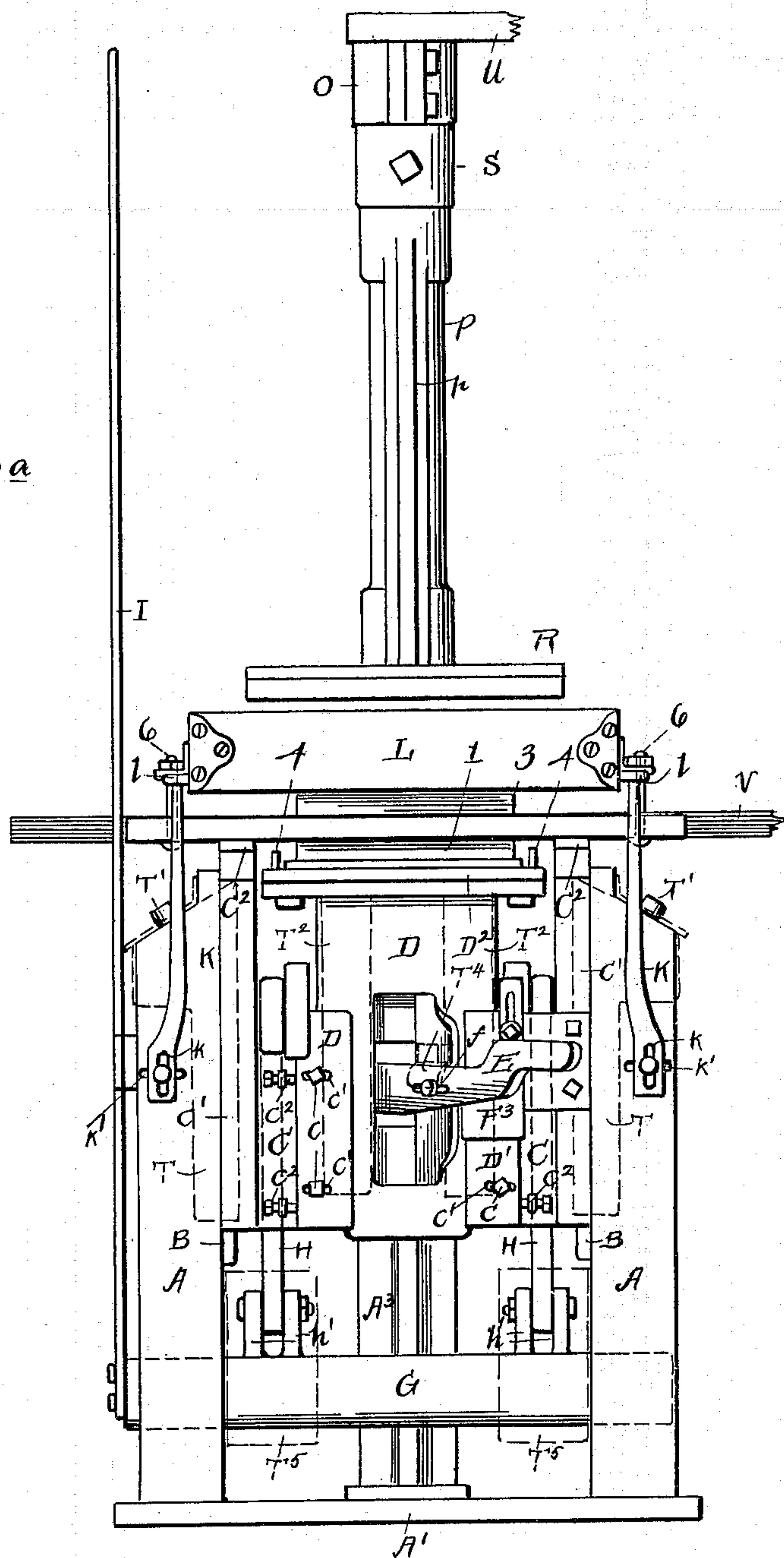
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Fig. 2<sup>a</sup>



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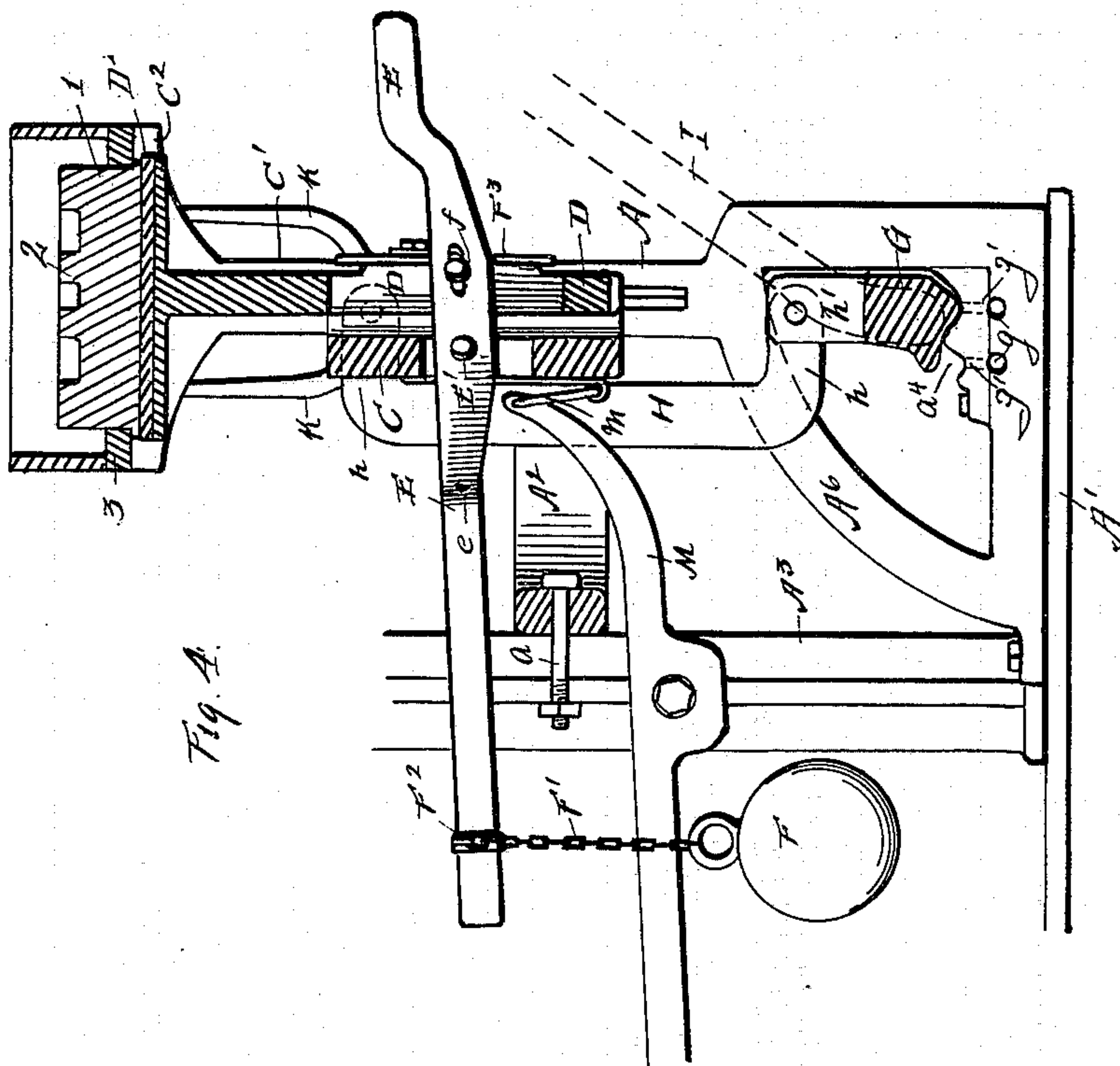


Fig. 4.

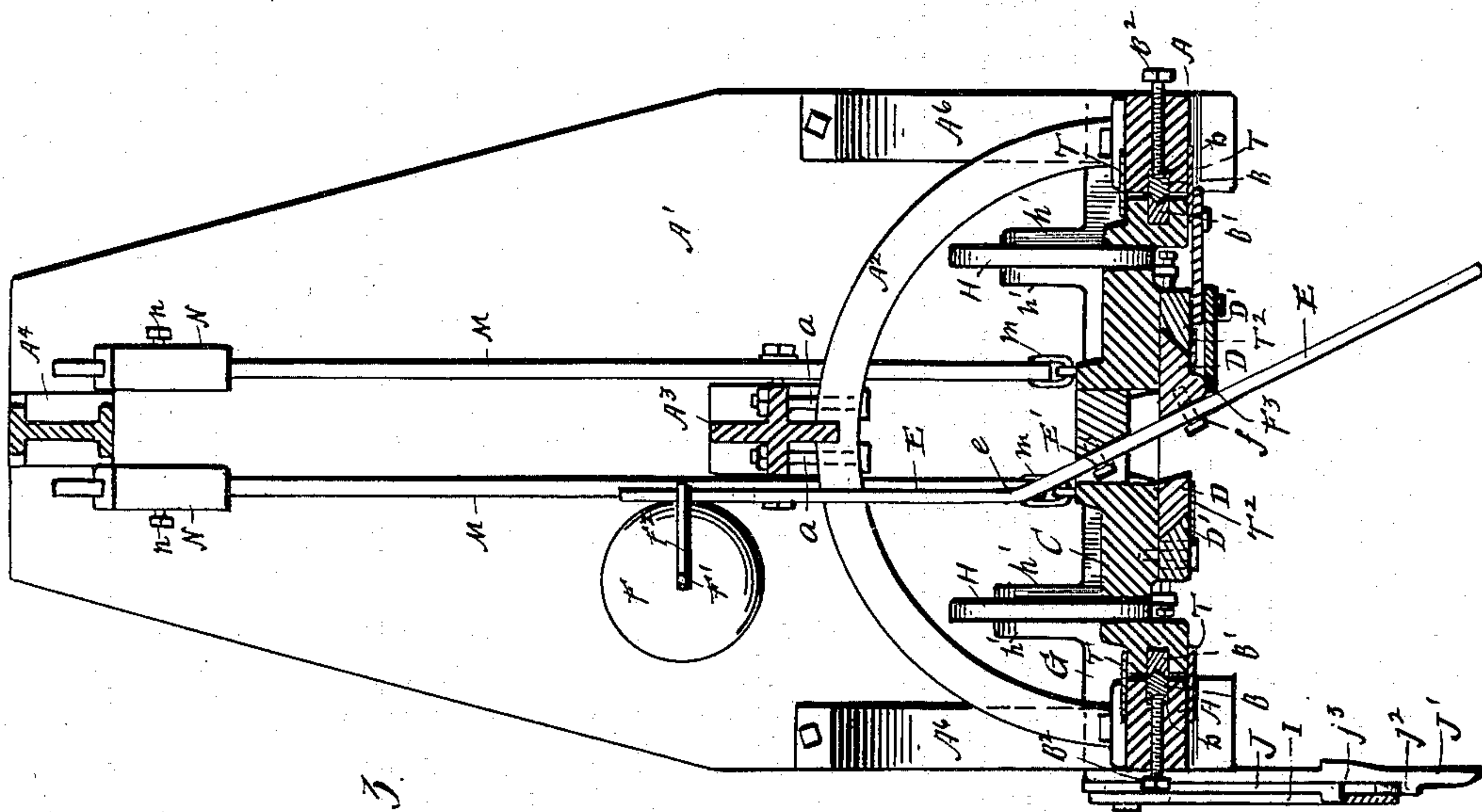


Fig. 5.

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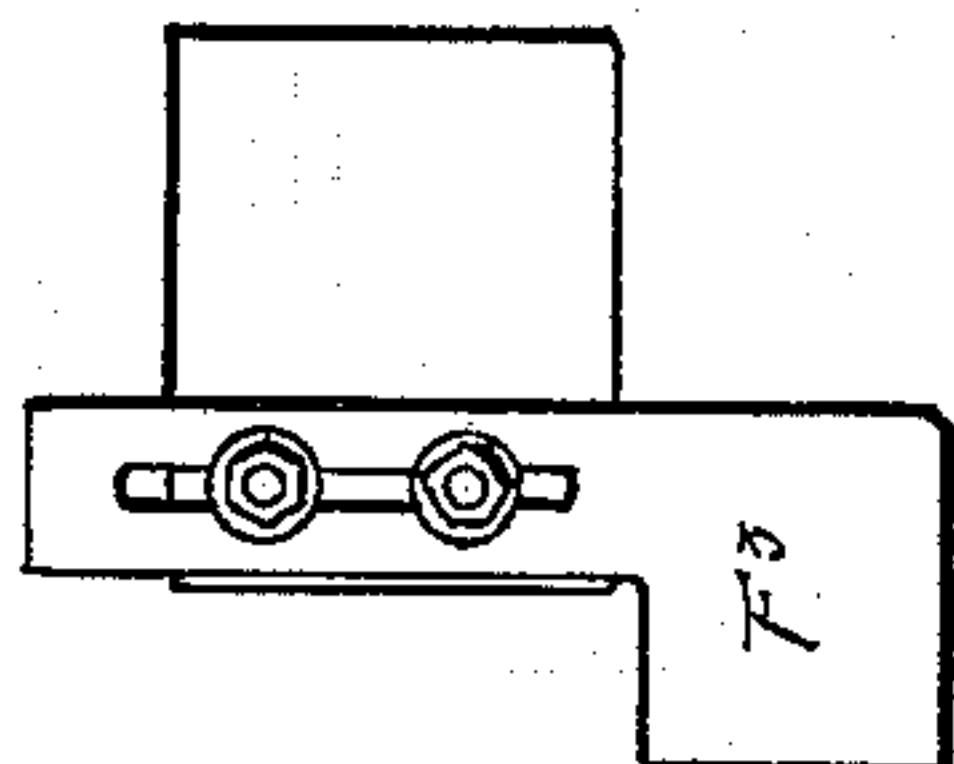


Fig. 9.

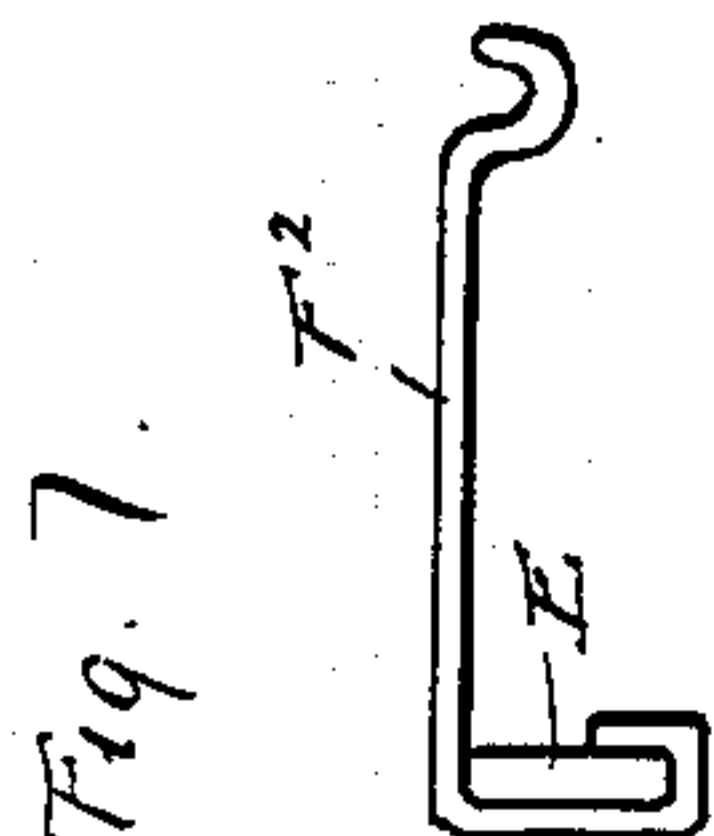


Fig. 7.

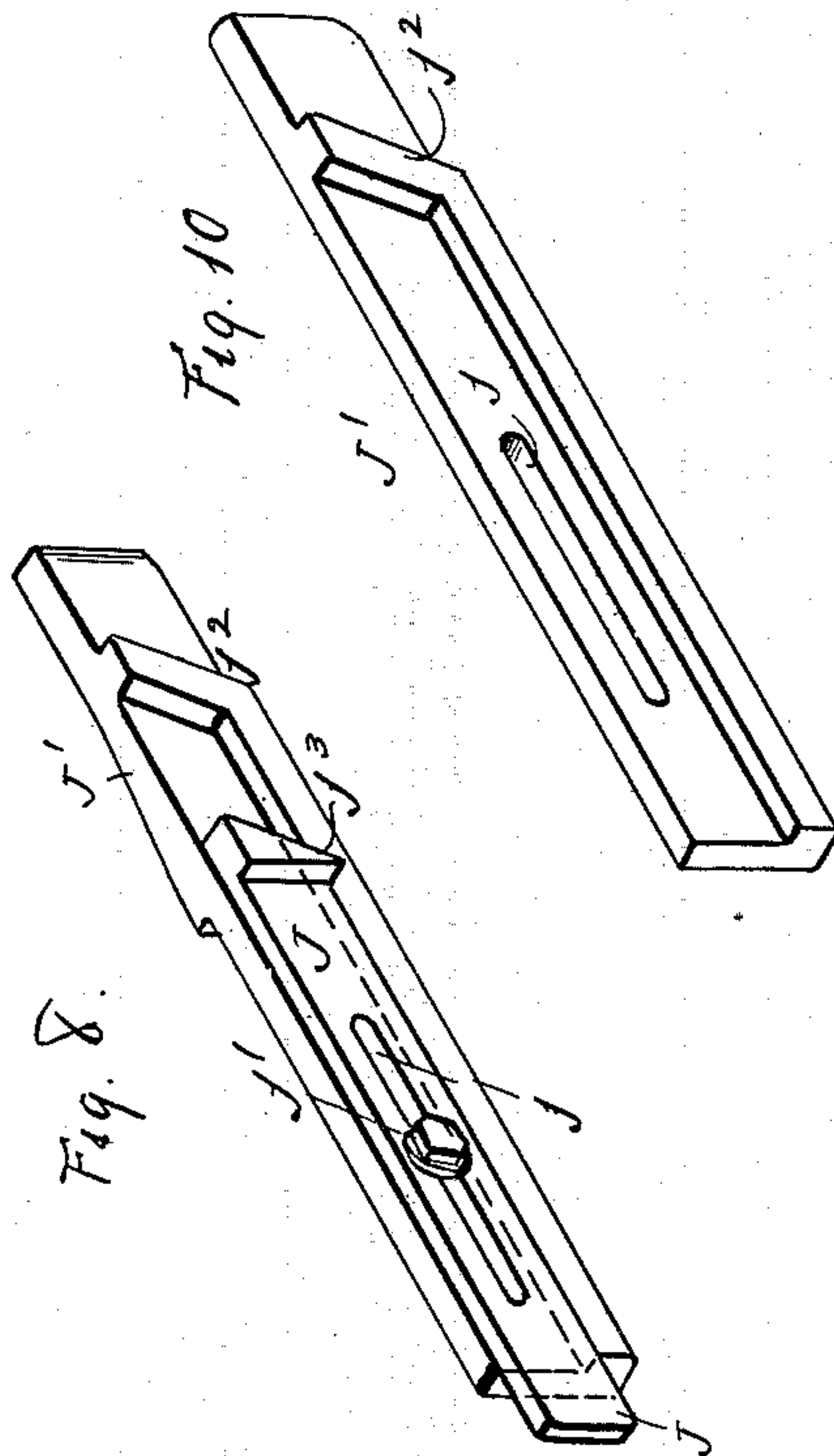


Fig. 8.

Fig. 10.

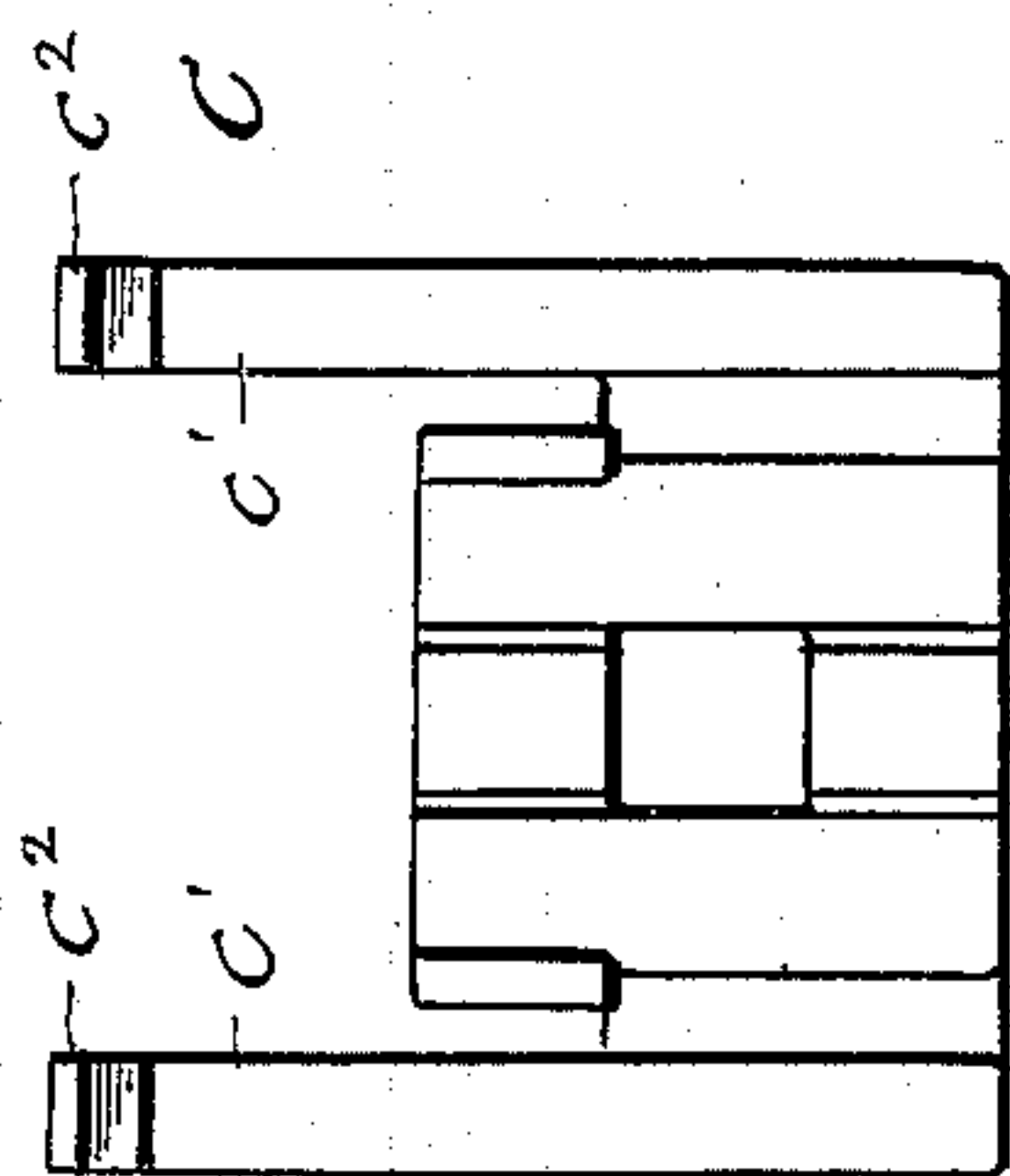


Fig. 5.

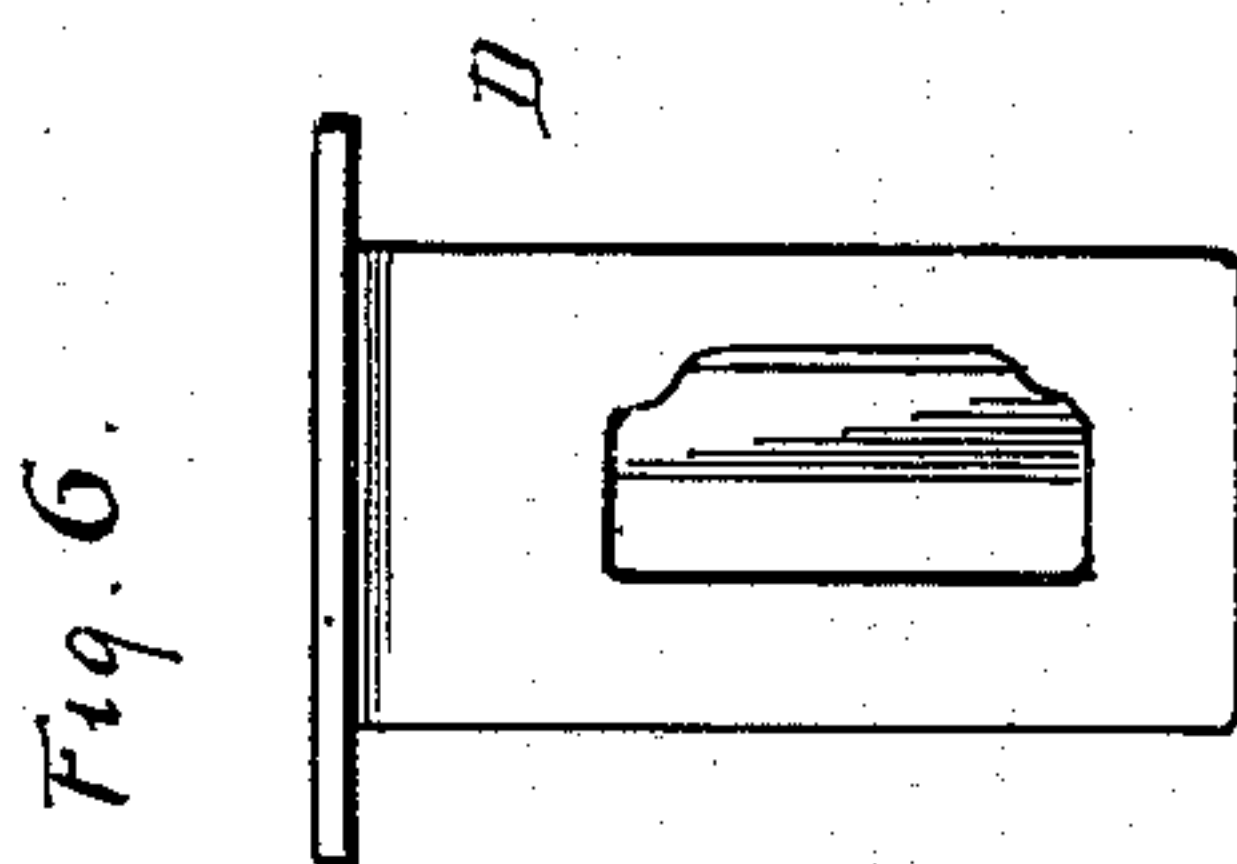


Fig. 6.

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# UNITED STATES PATENT OFFICE.

LORENZO POOLE, OF BELVIDERE, ILLINOIS.

## MOLDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 615,574, dated December 6, 1898.

Application filed January 25, 1896. Renewed June 6, 1898. Serial No. 682,775. (No model.)

*To all whom it may concern:*

Be it known that I, LORENZO POOLE, a citizen of the United States, and a resident of Belvidere, in the county of Boone and State of Illinois, have invented certain new and useful Improvements in Molding-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters and figures of reference marked thereon, which form a part of this specification.

Figure 1 is a side view of the machine with bracket-sleeve in section and plunger and flask-carrier in lowered positions, aprons in dotted lines. Fig. 2 is a front view of same, plunger and flask-carrier being shown raised in machine on the right, aprons in dotted lines. Fig. 2<sup>a</sup> is a front view, on a larger scale, of one of the submachines. Fig. 3 is a section on line *x x*, Fig. 2, aprons in full lines. Fig. 4 is a section on line *y y*, Fig. 2. Fig. 5 is a front view of flask-carrier. Fig. 6 is a front view of plunger. Fig. 7 is an end view of adjusting device for weight *F*. Fig. 8 is a perspective view of catches for lever *I*. Fig. 9 is a front view of catch *F*<sup>3</sup>. Fig. 10 is a perspective view of the catch-plate *J*<sup>1</sup>.

The object of this invention is to provide a molding-machine of improved character; and it consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claims.

The complete machine embodying this invention consists of two duplicate sets of mechanism or submachines which are connected into one structure and each of which is designed to form one-half of the mold. Inasmuch as these two submachines are duplicates, except that one is a right-hand and the other a left-hand machine, but one will be shown and described in detail.

Referring to the accompanying drawings, the letters *A A* designate two parallel front standards or uprights of the frame of one section of the complete machine. These standards are rigidly secured to a suitable bed-plate *A*<sup>1</sup> and are connected together by a back brace *A*<sup>2</sup>, which is bowed or curved to allow free space for the working parts. This

back brace is tied by bolts *a* to an upright *A*<sup>3</sup> of a rear frame, which consists of the uprights *A*<sup>3</sup> and *A*<sup>4</sup> and an arm *A*<sup>5</sup>, connecting said uprights at the top. This rear frame is in central relation to the front standards *A A*. The latter are also braced by the downward and rearwardly extending curved brace-arms *A*<sup>6</sup>.

Each of the standards *A* is formed on its inner face with a vertical groove *b*, in which is seated a male gib *B*, which makes a close fit in said groove and has its outer edge double beveled or of *V* form for the engagement of the female gib *B*<sup>1</sup>. The male gibs *B* are secured in place by means of screws *B*<sup>2</sup>, which pass through the standards and enter the gibs, preventing up-and-down motion thereof and also providing means whereby they may be adjusted toward or away from each other.

*C* designates a vertically-movable flask-carrier whose vertical edges are grooved to seat the female gibs *B*<sup>1</sup>, which are secured therein. The outer edges of these female gibs are grooved to fit neatly the beveled edges of the male gibs. The portion *C* has at each side a vertical extension *C*<sup>1</sup>, having at its upper end a horizontal arm *C*<sup>2</sup>, which is designed to receive and support the stripping or match plates, as the case may require, and the flask.

*D* is a vertically-movable plunger which is fitted to reciprocate in ways or guides *D*<sup>1</sup> of the portion *C* and which carries a plunger pattern-plate *D*<sup>2</sup> upon its upper end between the arms *C*<sup>2</sup> for supporting any pattern or part of a pattern which requires a stripping-plate. The guides *D*<sup>1</sup> are secured to part *C* by means of bolts or screws *c*, which engage elongated slots *c*<sup>1</sup> and are made adjustable laterally by means of screws *c*<sup>2</sup>. Said plunger is operated by means of a lever *E*, which extends through a vertical slot thereof and through an opening of the portion *C*, being fulcrumed to said portion *C* at the back at the point *E*<sup>1</sup>. This lever has its rear arm extended some distance back beyond the upright *A*<sup>3</sup> and is bent or offset, as indicated at *e*. *F* is a counterbalance-weight for said lever, suspended by a chain *F*<sup>1</sup>, whose upper end is attached to a hook device *F*<sup>2</sup>, which is designed to move back and forth on the lever to bring the weight into proper position to counterbalance any pattern that may be



placed on the plunger. Said device  $F^2$  is extended to one side of the lever-arm, so that the weight is suspended from about the same point that it would be were the lever straight and the weight suspended directly therefrom. Under the action of this weight the lever bears against the stud  $f$  in the wall of the plunger-slot, and in this manner supports said plunger and the pattern. The weight on  $F^2$  also has a tendency to twist said lever and hold its forward arm in engagement with a catch-plate  $F^3$ , which is secured to the portion C. The purpose of the catch is to hold the lever E from going down when the sand is pressed on the pattern.

G designates a rocker which is placed between and a little behind the standards A and whose end portions rest upon the bases  $A'$  of said standards, which are hollowed out, as indicated at  $a^4$ , to enable the rocker to move back and forth and at the same time to hold it in place. Directly under and in line with each rocker-bearing the base  $A'$  has a hole  $g$ , which communicates with the bearing-surface by a slot  $g'$ . The purpose of these holes and slots is to permit the escape of any sand that may get underneath the end portions of the rockers and which would otherwise have a tendency to raise one or both ends thereof.

H designates toggle-arms, one of which connects each end portion of the rocker with the part C, the connections with the said part C being upon opposite sides of the center thereof and a short distance below the top. Said toggles are each offset forwardly at both upper and lower ends, as indicated at  $h$ , the lower offset being pivoted between parallel lugs  $h'$  of the rocker, while the upper offsets are similarly connected to the part C.

At one side of the machine is a long bent lever I, which is rigidly connected to that end of the rocker. When said lever is pulled forward, the rocker also moves forward, as will readily appear, bringing the lower ends of the toggles to a point in line, or nearly so, with the gibs. This causes the center section to rise on the gibs and elevate the pattern, which is supported on the plunger, and the flask, which rests on a stripping-plate upon the arms  $C^2$ , as hereinafter more fully described. When the lever is released, the rocker rolls back and the part C returns to its first position. The construction of the rocker is such that its weight causes it to return it to its original position as soon as the lever is released. In order to hold said lever in its forward position with the part C elevated, catches J J' are provided. Said catches consist of two plates having corresponding elongated slots  $j$ , through which passes a set-screw  $j'$ , which secures them adjustably to the standard A. These plates have shoulders  $j^2 j^3$ , adapted to be engaged by the said lever. The shoulder  $j^2$  of the plate J' forms a resting-point for the lever and holds the parts in the positions they occupy while the flask is being filled with sand. After the

mold has been pressed the lever comes back to this shoulder, and by pushing said lever slightly to one side it passes it and comes to rest upon the shoulder  $j^3$  of the plate J. By means of screw  $j'$  either or both plates may be adjusted to vary the stopping-points for the lever.

K designates arms, two of which are secured to each of the standards A and project above the same at their upper ends into position to engage shoulders or sockets  $l$  of flask L. When the lever comes back against the shoulder  $j^2$ , these arms come into engagement with the said shoulders or sockets, and thereby catch the flask, which is held stationary by said arms, while the part C is lowered still farther and draws the pattern from that part of the mold. Said flask-catching arms are made vertically adjustable, as indicated at  $k$ . They are also horizontally adjustable for a long or short plate. This double adjustment may be provided for in the manner shown in Fig. 2<sup>a</sup>, wherein the arms K are shown as having each an oblong vertical slot  $k$ , while the frame to which said arms are secured has elongated horizontal slots  $k'$ . The bolts or screws which secure the arms in place engage these slots, as indicated.

The part C, with the plunger, its counter-balance, pattern, and all parts connected with the same, are counterbalanced as a whole for the purpose of making easy the operation of the lever I by means of levers M and weights N. Two of these levers are employed for each section of the machine. They are fulcrumed to opposite sides of the upright  $A^3$ , and their forward arms are connected by links and eyes  $m$  with the part C. The weights N are made to slide upon the rear arms of said levers and are held in the desired adjustment by means of screws  $n$ .

The upright  $A^4$  is extended above the table of the machine and is curved forwardly to a point in a line with the upright  $A^3$ . Secured at its upper end in a box O of this extension and at its lower end in a box O' of the upright  $A^3$  is an arbor O<sup>2</sup>, upon which is sleeved and journaled a bracket-arm P, which carries the presser-board R, which enters the flask when the latter is raised for the purpose of pressing the sand around the pattern. The arbor is splined or keyed in the boxes, as seen in Fig. 1, in order to make it rigid. The sleeve P' of this bracket-arm has a bearing at its end portions only, the lower end portion being enlarged and internally fitted to receive a bearing-flange  $s$  of an adjustable collar S. An upper collar S' is also provided and is fitted to receive thereon the upper end portion of said sleeve. By adjusting these collars vertically on the arbor the presser-board may be made to enter the flask to any desired depth.

T, Fig. 3, designates cap or cover plates which are for the purpose of keeping dirt and sand out of the main bearings. T' are oil-caps for the said bearings. T<sup>2</sup> are caps which protect the plunger-bearings. T<sup>4</sup> is an apron



which covers the bearing for the lever E upon the plunger. T<sup>5</sup> are aprons which cover the connections of the toggles H with the rocker. The sides of the machine and the openings at each end of the rocker may be protected against the entrance of sand by means of other suitable aprons or guard-plates (not shown) hung over them.

U designates the arm which connects the two machines into one structure. This connection prevents side motion and renders the machines more rigid in operation.

V is a table which covers over the back part of both machines and extends between them. The forward edge of this table comes up against the pattern-plates on arms C<sup>2</sup> and, with the aprons, makes the machine practically sand-proof.

As above stated, the upper end of the plunger D carries a pattern-plunger plate D<sup>2</sup>, to which is secured the pattern plunger or plungers 1, as indicated in Fig. 4, said plungers having the patterns or pattern-faces 2.

3 is a stripping-plate which is secured to the arms C<sup>2</sup>.

4 indicates set-screws in the plate D<sup>2</sup>, which are arranged to impinge against the stripping-plate and limit the up movement of the plunger D, plate D<sup>2</sup>, and pattern-plunger 1, the lever E being raised until these screws meet the bottom of the stripping-plate. The said lever is then pushed into engagement with the catch-plate F<sup>3</sup> and the parts are ready for pressing the sand upon the pattern. When this lever is locked, the pattern will not move up or down except as it is moved by the part C. The stripping-plate has apertures 5 to receive pins 6 on the flask and hold the latter in place, or other suitable devices may be employed for this purpose.

In making a mold the long lever I is first caught on the shoulder j<sup>2</sup>, as before described. The lever E is on the catch-plate F<sup>3</sup> and the press-board is back out of the way. The flask is now filled with sand and the surplus struck off. A bottom board (not shown) is placed on the top of the sand in the flask. The press-arm is now pulled around over the bottom board. The long lever I is next pulled forward, which raises the port C and its adjuncts and forces the bottom board into the flask and presses the mold to the required hardness. The long lever is now let back to the shoulder j<sup>2</sup>, the press-arm is swung back, and the lever E is slipped out of engagement with the catch-plate F<sup>3</sup>. This allows plunger D to fall and withdraws the pattern through the stripping-plate, or that portion of it which is on the pattern-plunger. The lever I is now let back against shoulder j<sup>3</sup>, withdrawing any remaining pattern which is on the stripping-plate on the arms C<sup>2</sup>. The flask is then taken from the machine and turned over, resting on the cleats of the bottom board. The other section of the machine is now operated in the same manner to form the other half of the mold.

In making a mold which requires no stripping-plate the pattern-plates are carried on the arms C<sup>2</sup>. The operation is the same as before described, except that the lever E and plunger D are not brought into operation.

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

1. In a molding-machine, the frame, the vertically-movable flask-carrier, its actuating mechanism, means for counterbalancing said carrier as a whole, the plunger fitted to reciprocate vertically in guides of the said carrier, the counterbalanced lever for operating said plunger, said lever being pivoted on the said flask-carrier and the revoluble, vertically-adjustable presser-board, arranged to swing over the flask substantially as specified.

2. In a molding-machine, the combination with the frame having the parallel front standards A A, and the vertical, male gibs adjustably seated in the grooves of the said standards, of the vertically-movable flask-carrier C, the female gibs seated in the grooved edges thereof, and engaging the male gibs, means for counterbalancing said carrier and for operating the same, a pattern-carrying plunger movable with and also independently of the said carrier, and means for actuating the said plunger independently of the carrier, substantially as specified.

3. In a molding-machine, the combination of the vertically-movable flask-carrier C, having at its upper end the horizontal arms C<sup>2</sup>, and having thereon the ways or guides D', of the vertically-movable plunger D, fitted to reciprocate in said ways or guides independently of the movement of said carrier C, the counterbalanced lever E pivoted to and extending through said flask-carrier and through the said plunger, a bearing on said plunger for said lever, and the catch-plate for said lever, together with means for counterbalancing said flask-carrier and for actuating the same, substantially as specified.

4. In a molding-machine, the combination with the vertically-movable flask-carrier, its counterbalancing lever and weight, the pattern-carrying plunger movable with and also independent of said carrier, and means for actuating said plunger, of the rocker arranged to roll backwardly and forwardly on the bed of the machine, the actuating-lever connected thereto, means for securing said lever in different positions, and the toggles which connect the rocker with the flask-carrier, said toggles having forwardly-offset end portions, substantially as specified.

5. In a molding-machine the combination with the flask-carrier C, having an opening therethrough, and the laterally-adjustable guides, one upon each side of said opening, of the pattern-carrying plunger fitted to reciprocate vertically in the said guides, and having therein a vertical slot, and a stud projecting from one wall of the said slot, the bent lever E fulcrumed to said flask-carrier and



having a slotted connection with said stud, the adjustable counterbalance-weight for the said lever, and the catch-plate for the said lever on the said carrier, substantially as specified.

6. In a molding-machine, the frame having the front standards A, A, connected by the bow-brace A<sup>2</sup>, and the back uprights A<sup>3</sup>, A<sup>4</sup>, connected at the top and tied to said brace, the upright A<sup>4</sup> being extended vertically and forwardly to form a support for the upper end of the arbor on which the presser-board swings, in combination with the arbor and the presser-board swinging therefrom substantially as specified.

7. In a molding-machine, mechanism for forming one-half the mold, comprising essentially a frame having a vertical and forwardly extended overhanging arm at its upper portion, a vertically-movable flask-carrier working in the lower portion of the said frame, the flask supported thereon, the counterbalancing and actuating mechanisms for said carrier, a pattern-plunger movable with and also upon the said carrier, the counterbalanced actuating-lever for said plunger, said lever being pivoted to said carrier, means for holding said flask above the said carrier, when the carrier is depressed and a revoluble presser-board carried by the said overhanging arm and arranged to swing over the flask, in combination with similar mechanism for forming the opposite half of the mold and a rigid connection between the frames of the two sets of mechanisms, substantially as specified.

8. In a molding-machine, the combination with a vertically-movable flask-carrier, the rocker below said carrier and adapted to roll

backwardly and forwardly on the bed of the machine, and the toggles which connect the rocker with the carrier, of the lever I rigidly connected to one end of the said rocker, and the two overlying, independently-adjustable catch-plates J J' secured to the frame of the machine, and having each a shoulder adapted to form a stop for the said lever, substantially as specified.

9. In a molding-machine, the rear frame having one of its standards or uprights extended vertically and overhanging to form an overhanging arm, the arbor secured at its upper end in a box of the said arm, the sleeve on said arbor, the bracket-arm carried by said sleeve, the presser-board carried by said bracket-arm, and the adjustable collars on the arbor which form bearings for said sleeve, substantially as specified.

10. In a molding-machine, the combination of the frame, the vertically-movable flask-carrier, its counterbalance devices, the rocker arranged to move backwardly and forwardly in the base of the frame, the toggles connecting the rocker with said carrier, the lever connected to said rocker, the pattern-supporting plunger fitted to reciprocate on the face of the said carrier, its counterweighted operating-lever pivoted to the said carrier, the flask-catching arms, the revoluble presser-board arranged to swing over the flask, and the sand-guards, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

LORENZO POOLE.

Witnesses:

MAX KUNZE,  
AMOS S. PIERCE.