

No. 670,390.

Patented Mar. 19, 1901.

M. JENSEN.

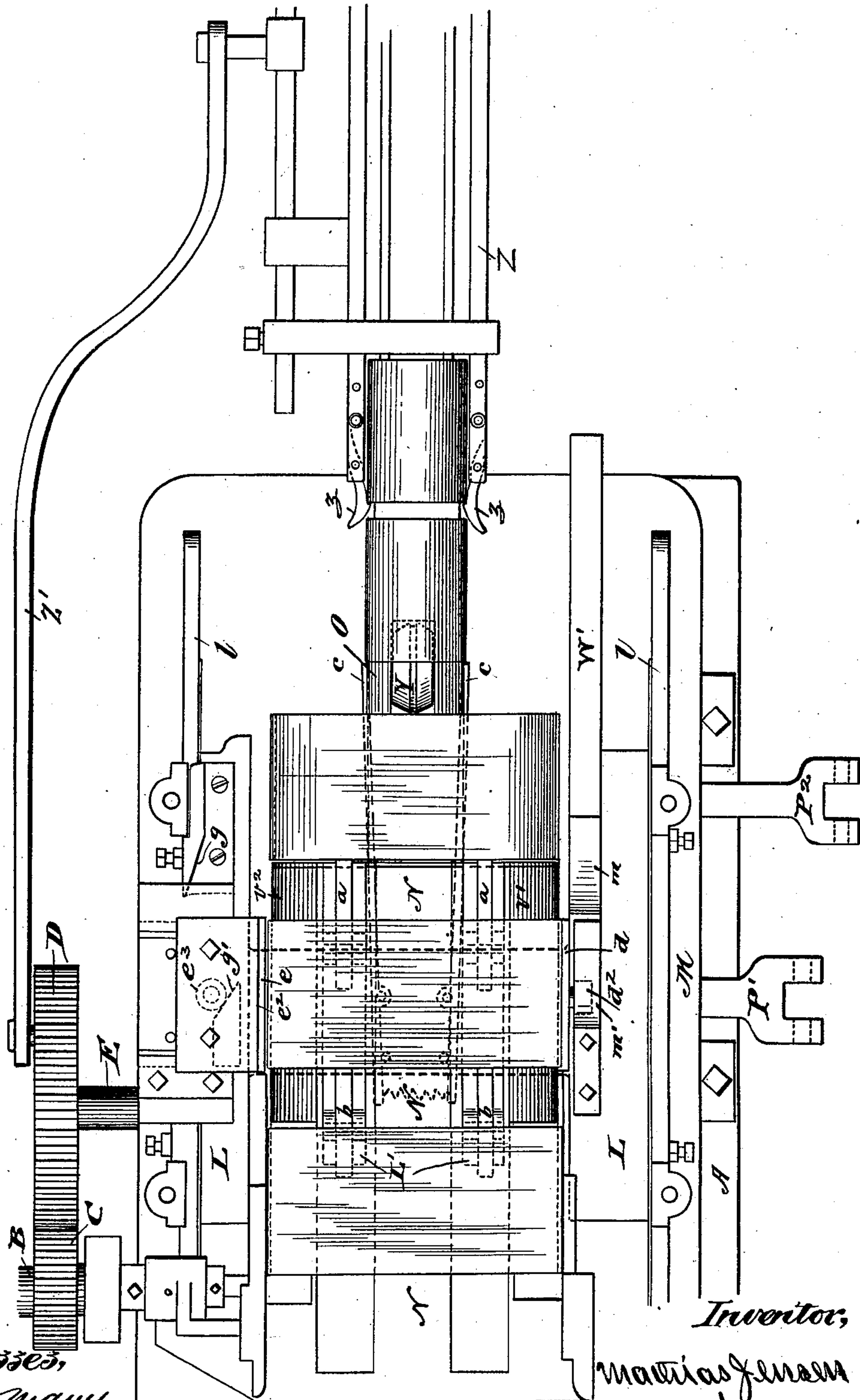
MACHINE FOR FORMING SHEET METAL CAN BODIES.

(Application filed Feb. 1, 1896.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



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Fig. 7.

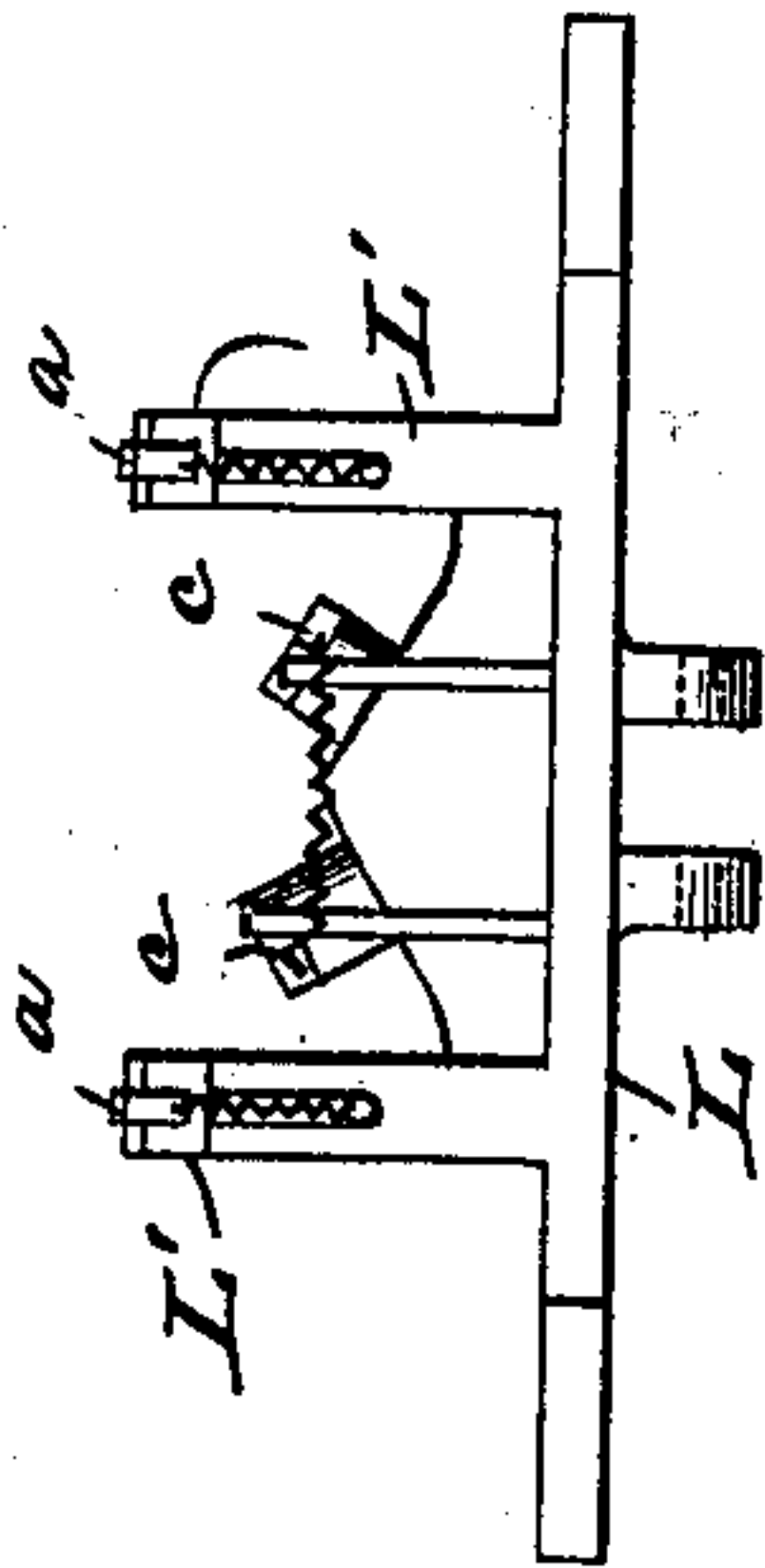


Fig. 8.

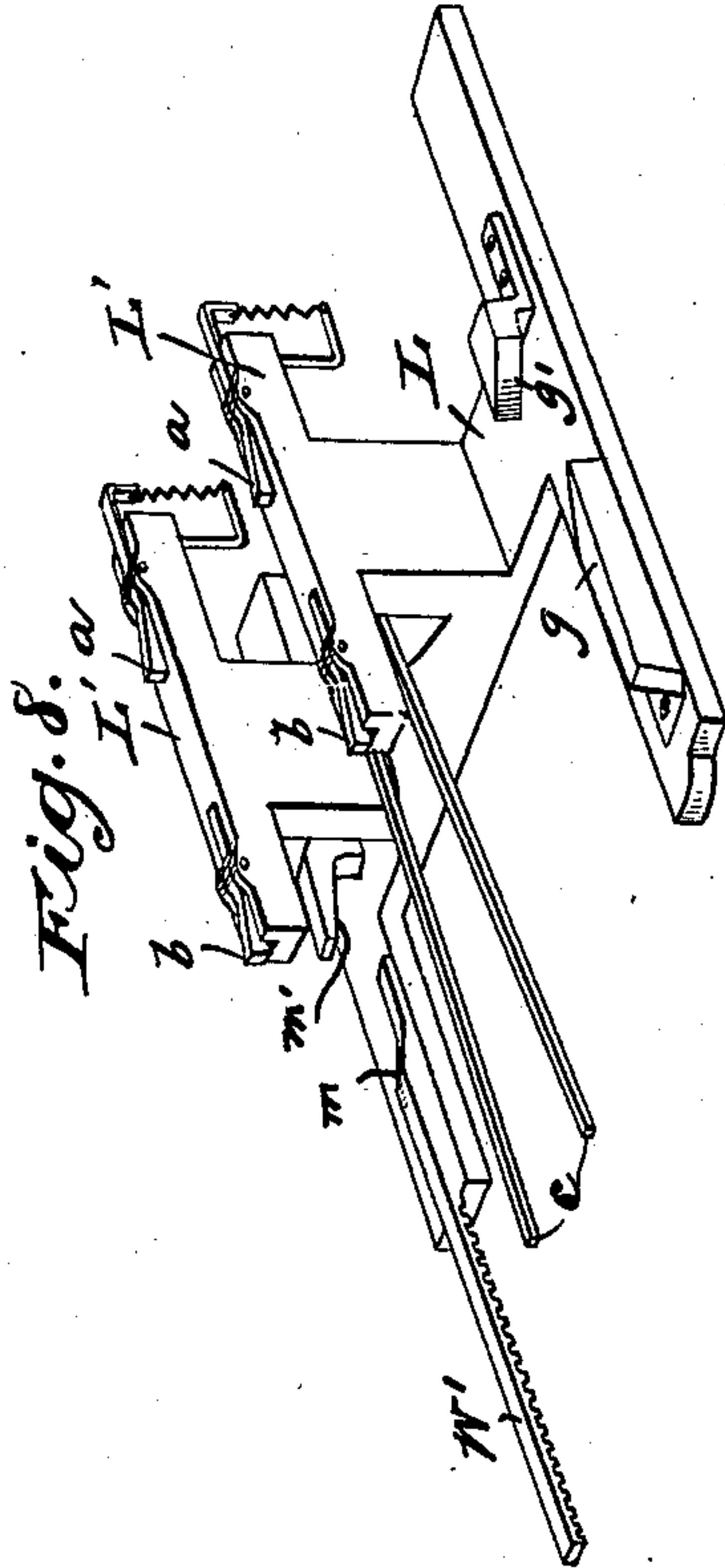
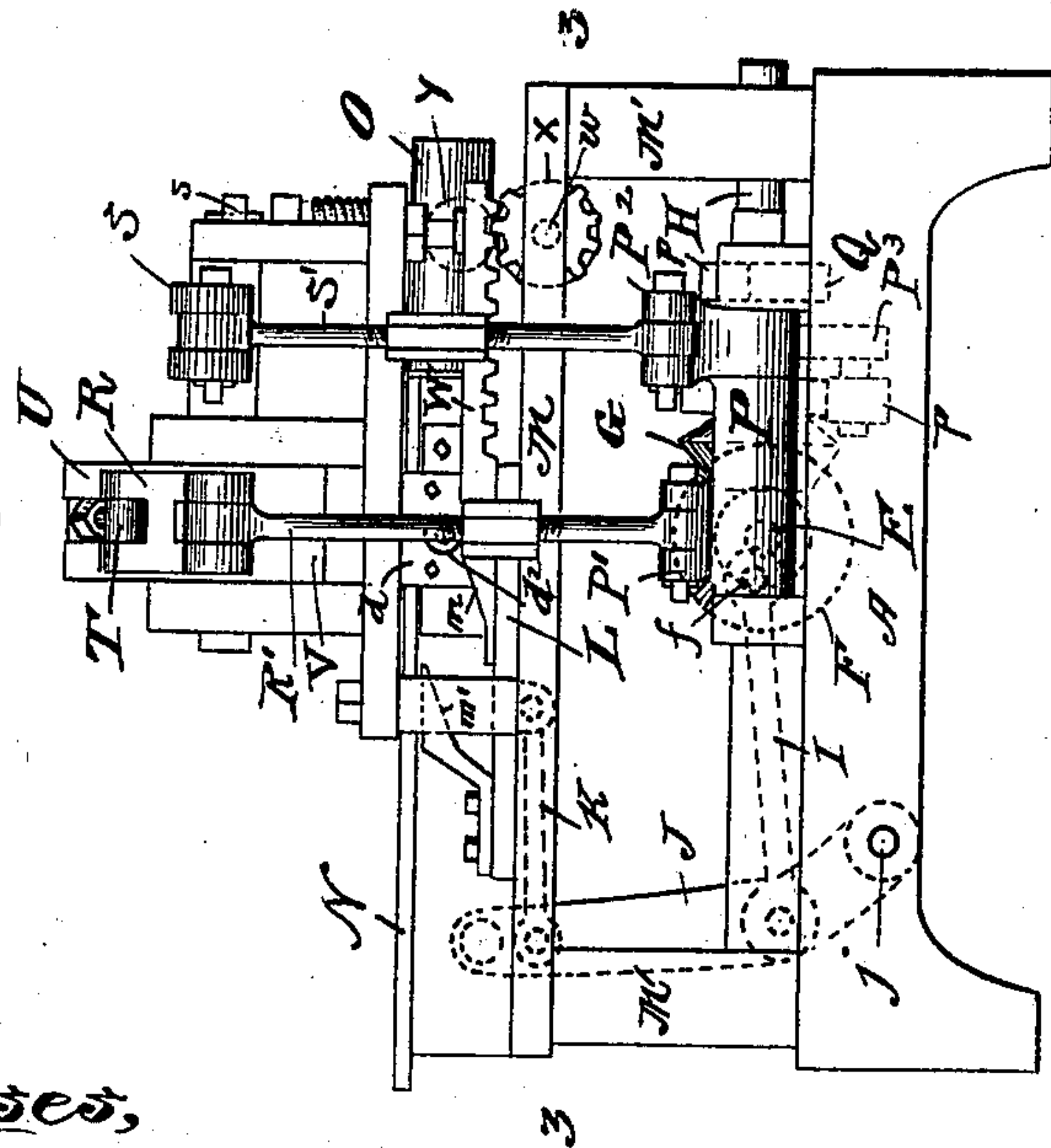


Fig. 9.



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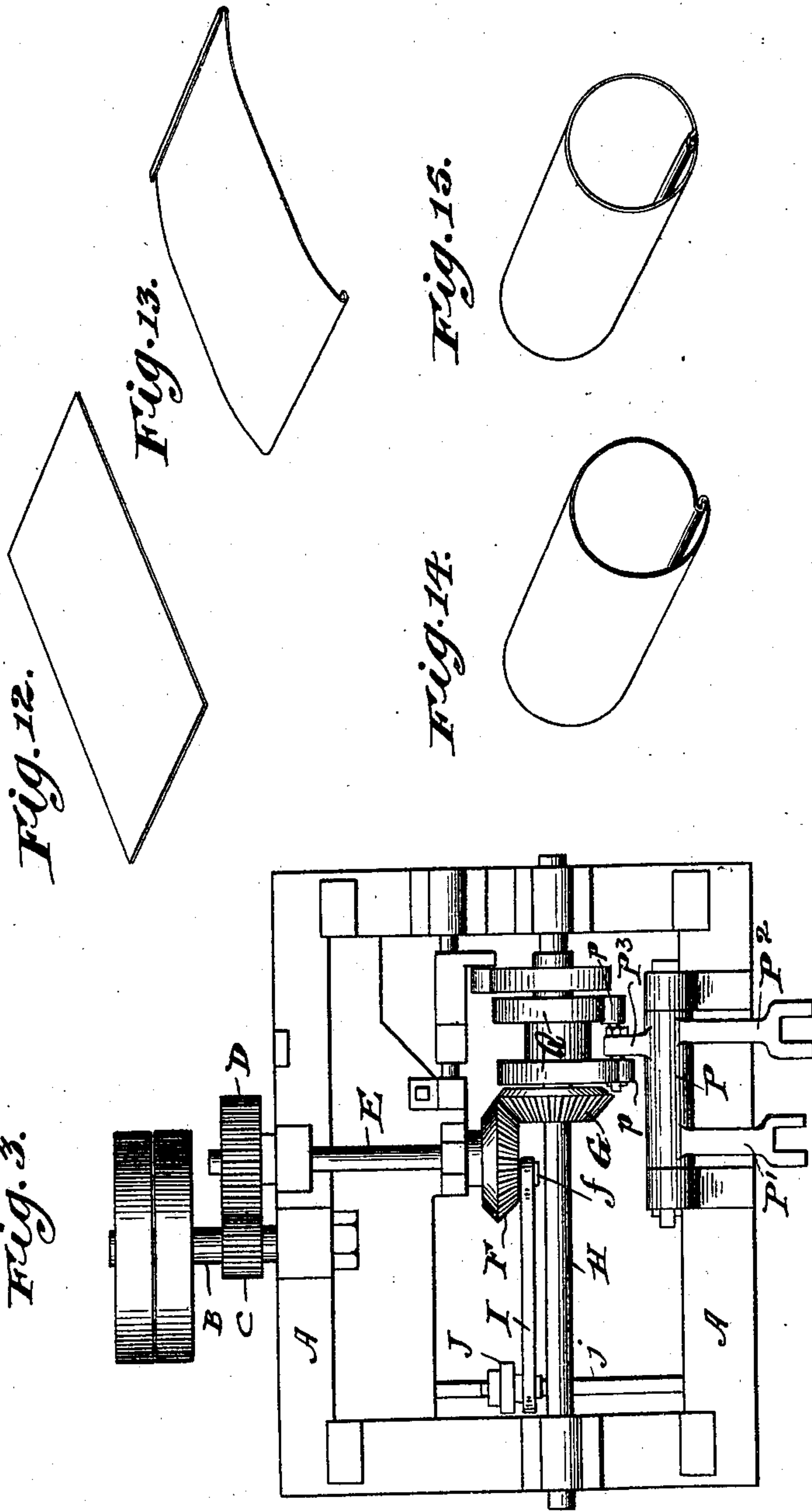
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5 Sheets—Sheet 3.



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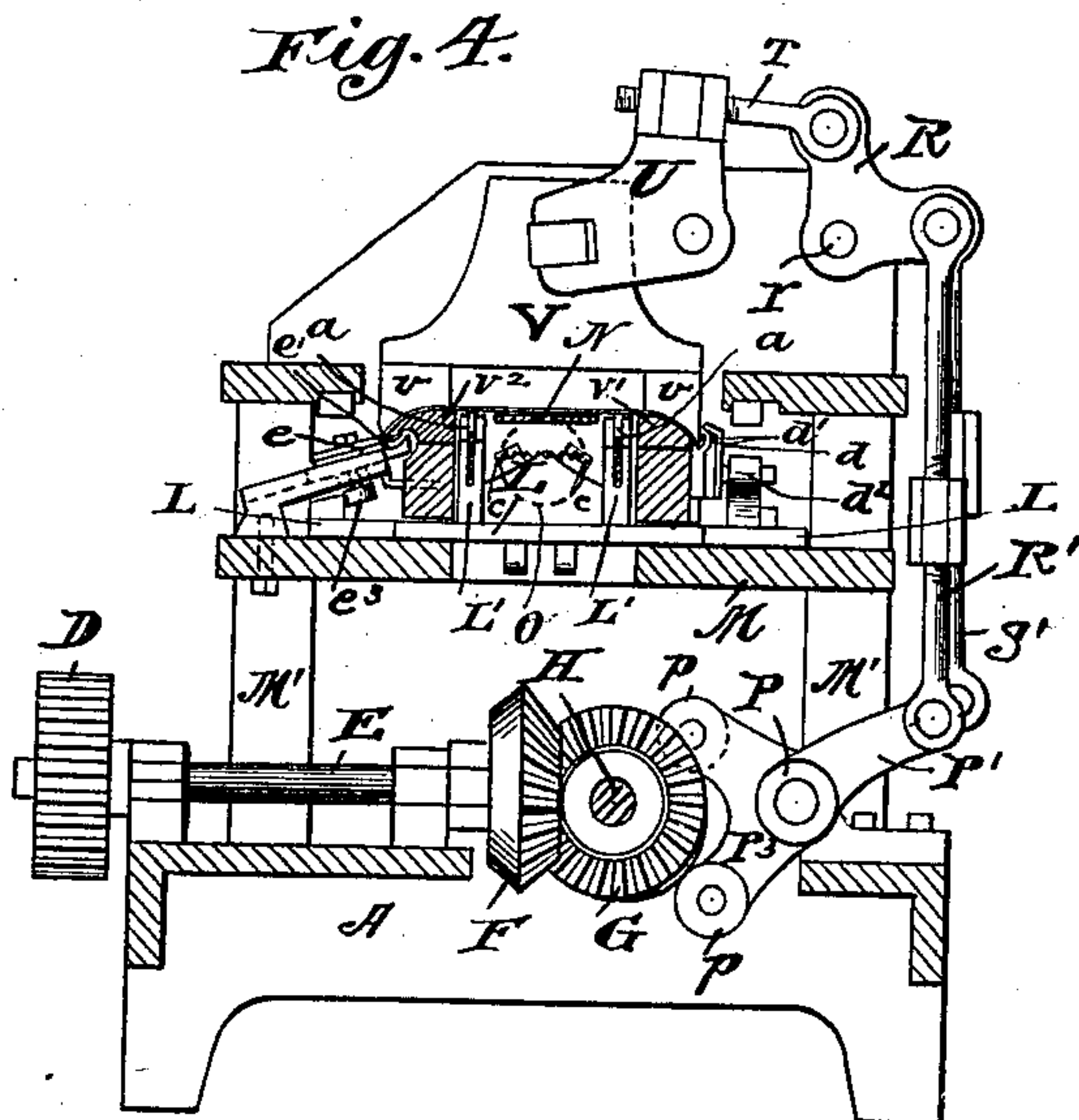


Fig. 9.

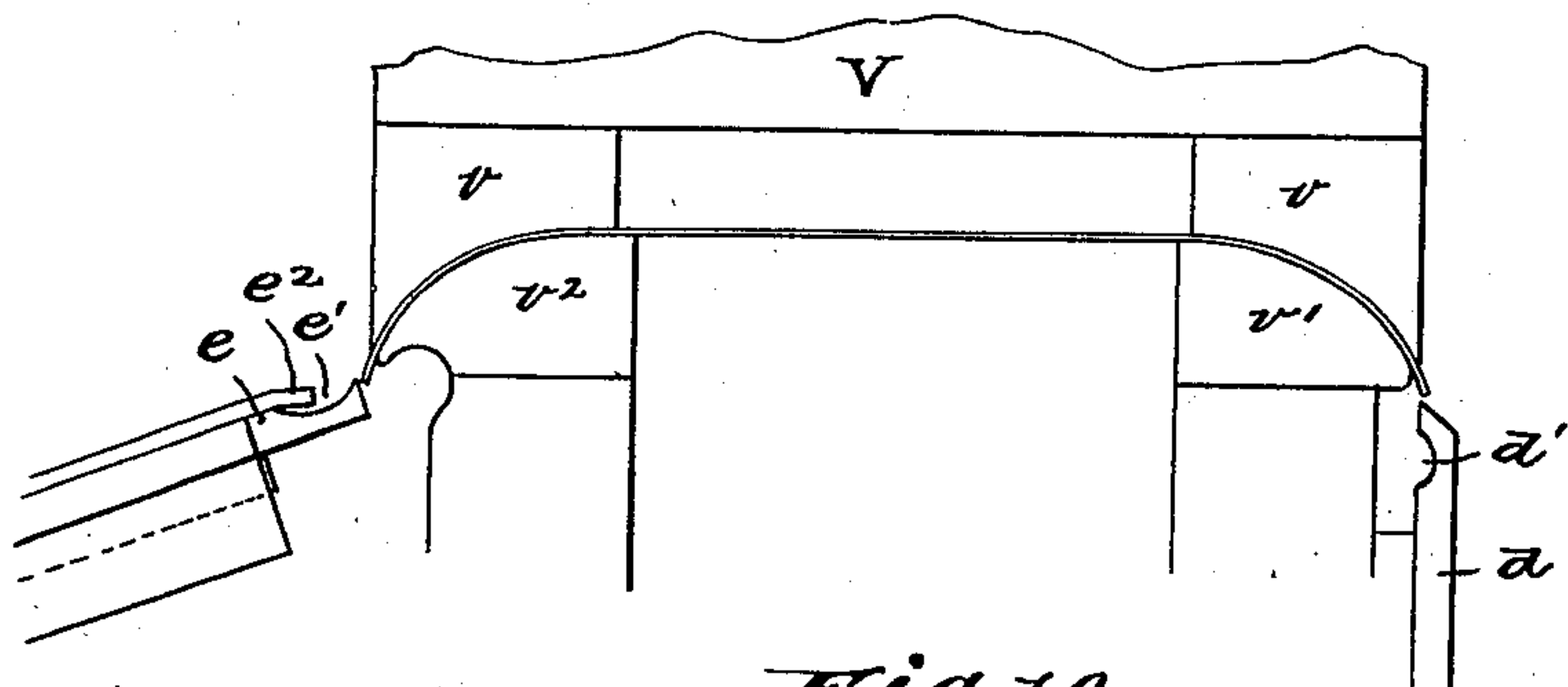


Fig. 10.

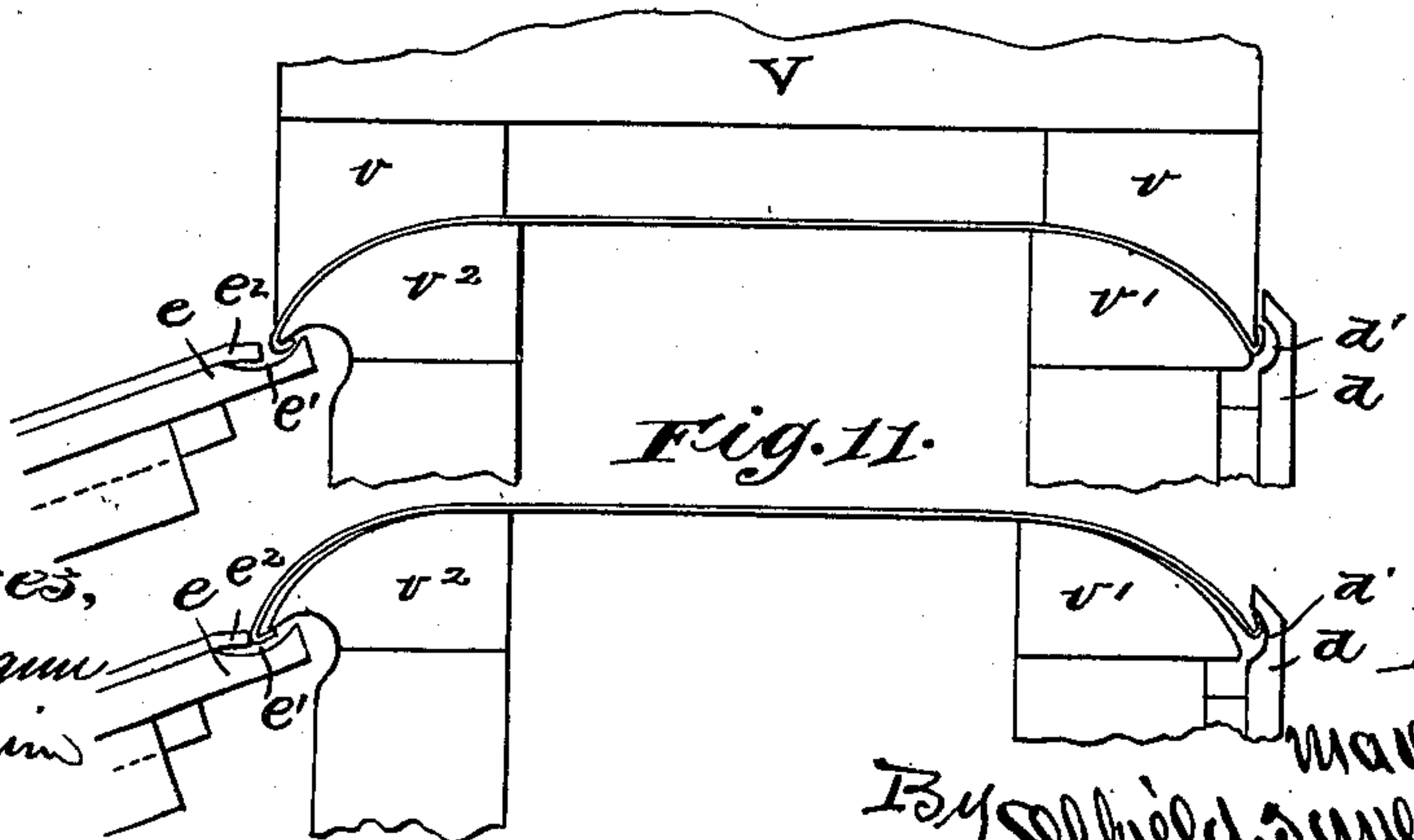


Fig. 11.

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Fig. 5.

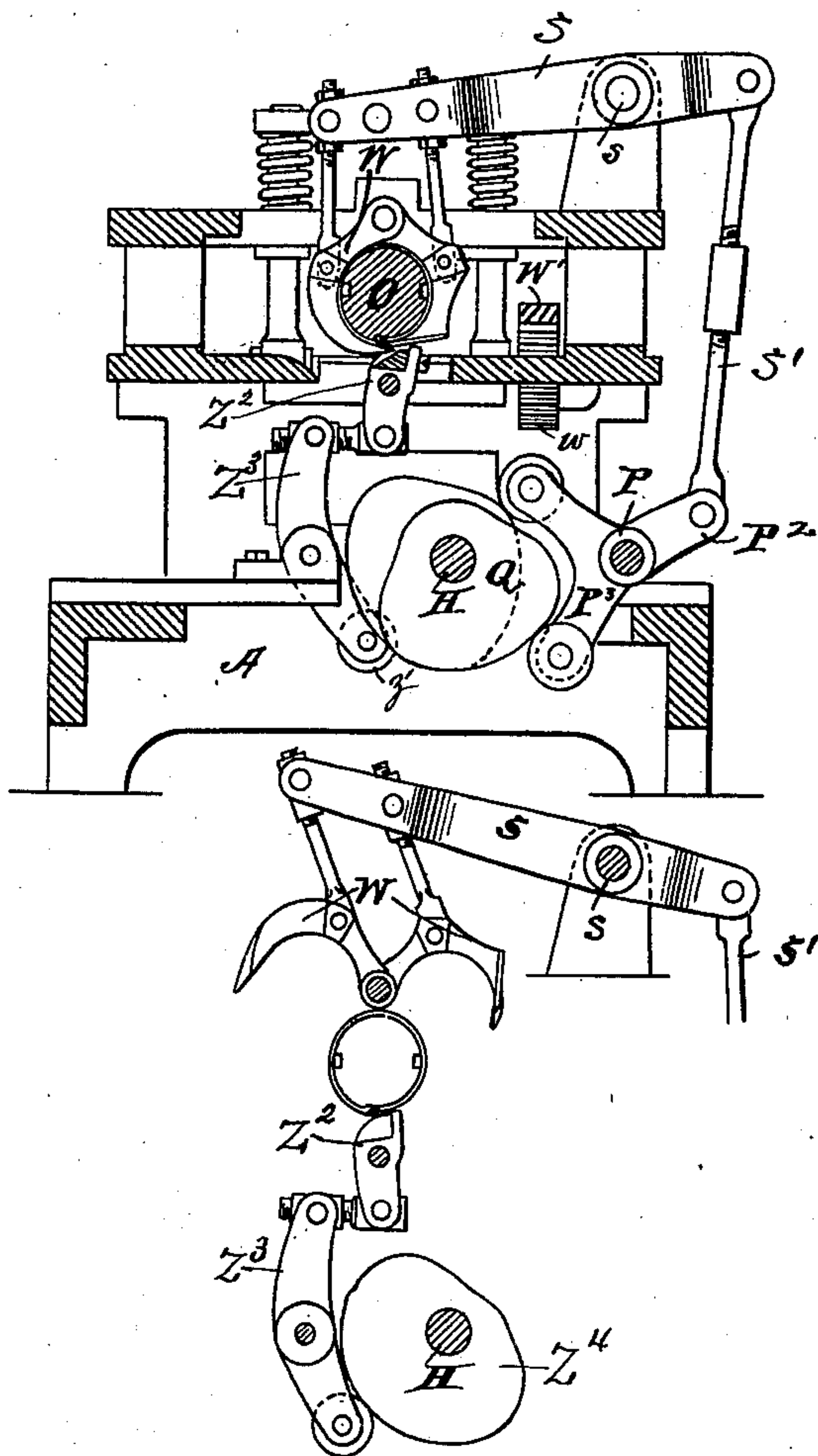


Fig. 6.

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UNITED STATES PATENT OFFICE.

MATHIAS JENSEN, OF ASTORIA, OREGON.

MACHINE FOR FORMING SHEET-METAL CAN-BODIES.

SPECIFICATION forming part of Letters Patent No. 670,390, dated March 19, 1901.

Application filed February 1, 1896. Serial No. 577,700. (No model.)

To all whom it may concern:

Be it known that I, MATHIAS JENSEN, of Astoria, Clatsop county, Oregon, have invented certain new and useful Improvements in Machines for Forming Sheet-Metal Can-Bodies, of which the following is a specification.

This invention relates to that class of machines wherein sheet-metal blanks are formed into can-bodies, and has for its object to simplify the construction and increase the capacity of said machines.

The machine comprises in the preferred form a stationary horn, around which the sheet-metal blanks are formed into can-bodies, a constantly-reciprocating carriage for feeding forward the sheet-metal blanks, an intermittently-reciprocating clamp for holding a blank while its edges are being bent, folding-steels for folding the edges of the blank in opposite directions, whereby they may be interlocked, folding-tongs for bending the blank around the stationary horn, mechanism for simultaneously actuating the reciprocating clamp and folding-tongs, whereby a blank is formed around the horn at the same time the edges of a following blank are being bent by the folding-steels, pressure-rolls for pressing the interlocked edges to form the side seam of the can-body, and suitable mechanisms for actuating the several parts in due order and sequence.

In the accompanying drawings, Figure 1 is a plan view with parts omitted and other parts broken away. Fig. 2 is a side elevation. Fig. 3 is a plan view below the line 3 3 of Fig. 2. Fig. 4 is a transverse sectional view showing a blank with the edges thereof bent and the mechanism for bending them. Fig. 5 is a transverse section showing the mechanism for forming the blank around the horn and pressing the seam formed by the overlapping edges of the blank. Fig. 6 is a detail view of the bending and locking mechanism for the sheet-metal blank. Figs. 7 and 8 are respectively an end view and a perspective view of a reciprocating carriage. Figs. 9, 10, and 11 are sectional details showing the manner of bending the edges of the sheet-metal blanks. Fig. 12 is a perspective view of a sheet-metal blank. Fig. 13 is a perspective view of a sheet-metal blank after the operation of bending the edges thereof.

Fig. 14 is a perspective view of a can-body before the seam has been pressed. Fig. 15 is a perspective view of the completed can-body.

In the drawings, A represents the main frame, upon which is journaled the driving-shaft B, having a pinion C enmeshed with a gear D on the outer end of the shaft E, which shaft has a beveled gear F secured thereto and enmeshing with a corresponding beveled gear G on the longitudinal shaft H. A pitman I has one end pivotally connected to a crank-pin *f* on the gear F and its opposite end pivotally secured to a lever J, which lever is pivoted at *j* to the main frame. A link K connects the upper end of lever J with a reciprocating carriage L, which carriage travels between suitable guides *l* on a table M, mounted on the posts *M'*. A feed-table N has secured to its forward end the forming-horn O and is slotted to receive the upwardly-projecting rails *L'* of the carriage L. A bell-crank P is pivoted on the main frame A and has two outwardly-projecting arms *P'* and *P*² and a forked inwardly-projecting arm *P*³, said latter arm having rollers *p* in engagement with a double cam Q on shaft H. Bell-crank R and lever S are pivoted at *r* and *s* and are connected to the arms *P'* and *P*² of bell-crank P by links *R'* and *S'* and are thereby actuated simultaneously. Bell-crank R is connected by the eyebolt T to a bell-crank U and thereby to a vertically-reciprocating plunger V, said plunger having curved dies *v*, that serve to bend and hold the ends of a sheet-metal blank over stationary dies *v'* and *v*², secured on table M. To the inner end of lever S are secured folding-tongs W for forming the blank around the horn O, said tongs being of a well-known construction.

The carriage L has secured thereto a rack-bar *W'*, enmeshing with a gear *w* on the shaft of one of a pair of seam-pressure rolls X Y, which rolls are of known construction and need no special description. The dogs *a a* and *b b*, mounted on the rails *L'* of the carriage L, serve to feed the sheet-metal blanks to and from the bending-dies, and fingers *c c* on carriage L advance the can-body after it has been folded around the horn. On the table M and on opposite sides of the reciprocating plunger are mounted in suitable slide-ways a vertically-movable folding-steel and

an inwardly-movable folding-steel operated by cams on the reciprocating carriage and adapted to engage and bend the exposed edges of a sheet-metal blank when held between the dies on the plunger and the dies on the table M. The vertically-movable folding-steel d has a recess d' to receive the bent edge of the blank when the plunger is raised, and the inwardly-movable folding-steel e has the recess e' and a stop-plate e^2 for a like purpose, thereby forming guides for the blank as it is fed forward by the dogs $b b$. The folding-steel d has an antifriction-roller d^3 , which is engaged by the cam m on the carriage on its backward stroke to raise the folding-steel and bend the edge of the blank and engaged by the cam m' on the carriage on its forward stroke to return the folding-steel to its normal position. These folding-steels instead of being provided with grooves might have their edges bent or offset from their body portions. The inwardly-moving folding-steel e has the antifriction-roller e^3 , which is engaged by the cam g on the carriage on its backward stroke to advance the folding-steel and bend the edge of the blank and engaged by the cam g' on the carriage on its forward stroke to return the folding-steel to its normal position.

A reciprocating frame Z, having dogs z to engage the can-bodies, is actuated by a pitman Z' at proper intervals to remove the can-bodies from the horn.

In order to prevent the hooked edges of the body from disengaging, a presser Z^2 is pivoted in such position that its upper end can be made to bear against the interlocking seam. Said presser is operated by a pivoted lever Z^3 , having a roller z' , bearing on a cam Z^4 on shaft H, so that said lever Z^3 is rocked at proper intervals to move the upper end of the presser against the seam. This presser comes into action after the folding-tongs are released.

The folding-steels engage the edges of the blank and produce the hooks therein during the forward movement, and after their acting edges have passed by the steels serve to retain the hooked edges and guide the blank while it is being advanced into the position to be bent around the horn.

The simplicity and directness of action of these parts enable the machine to be operated very rapidly. The machine has, therefore, much greater capacity than machines whose edge-folding or hook-forming devices operate by a succession of steps.

In operation the constantly-reciprocating carriage on its forward stroke advances the blanks to positions in the machine where they are simultaneously acted upon by mechanisms to hold one blank while its edges are being oppositely bent, while a previously-bent blank is being formed around a stationary forming-horn, said bending and forming action taking place while the carriage is on its backward travel. The carriage on its succeeding forward stroke causes the completed can-

body to be discharged from its position on the stationary horn and at the same time brings forward to the bending and forming mechanisms two more blanks. It will be seen, therefore, that the several operating parts are so arranged and driven that no time is lost between the successive actions of feeding forward, edging or forming the hooks, bending the blank around the horn, pressing the seam, and discharging the formed body.

I claim—

1. In a machine of the class described, in combination a clamp for holding the blank with its edges exposed, and a single bending-plate for each edge, said plates having rectilinear reciprocating movement and adapted to wipe over the exposed edges of the blanks and bend said edges into the form of hooks during a single forward stroke, substantially as described.

2. In a machine of the class described the combination with a clamp for holding the blank with its edges exposed, of reciprocating folding-plates one for each edge of the blank, said folding-plates being adapted to wipe over the exposed edges of the blank and form them into hooks by a single forward movement, and being provided with recesses in their acting faces adapted to receive the edges after they have been turned, and to form guides therefor while the blanks are being discharged, substantially as described.

3. In a machine of the class described, the combination with a clamp for holding the blank with its ends exposed, of rectilinear reciprocating folding-plates with straight faces, said faces being offset from the body of the plates and adapted to wipe over and bend the exposed edges of the blank during their forward stroke, leaving the bent edges thereof beyond and free of said offset faces, substantially as described.

4. In a machine of the class described, the combination with a clamp for holding the blank with its ends exposed, of two folding-plates, said plates having rectilinear reciprocating movement in planes intersecting each other and being adapted to fold the exposed edges in opposite directions whereby they may be interlocked, said folding being performed during a single stroke of the plates, substantially as described.

5. In a machine of the class described, the combination with a clamp for holding the blank with its ends exposed, of two simultaneously-reciprocating folding-plates whereby said ends are oppositely bent into the form of hooks during a single rectilinear stroke of the plates and suitable mechanism for operating said folding-plates, substantially as described.

6. In a machine of the class described the combination with a clamp for holding the blank with its ends exposed, of two simultaneously-reciprocating folding-plates, one for each end of the blank and adapted to be moved in right lines and to wipe over the ex-

posed ends whereby to turn said ends during a single forward movement and a reciprocating carriage having cams whereby to actuate said reciprocating folding-plates, substantially as described.

7. A machine for making sheet-metal can-bodies, comprising in its construction a stationary horn around which the blanks are formed, a constantly-reciprocating carriage for feeding the blanks forward, a clamp for holding a blank with its edges exposed, of two intermittently-reciprocating plates for bending the exposed edges of the clamped blank in opposite directions into the form of hooks whereby they may be interlocked, folding-tongs for forming a previously bent blank around the horn, rolls for pressing the interlocked edges of the blank and means for simultaneously actuating the bending and forming mechanisms, substantially as described.

8. In a can-body-forming machine, the combination with a constantly-reciprocating carriage having dogs to engage the sheet-metal blanks to feed them forward, two slidable plates and cams whereby said plates are caused to wipe over and bend into hook shape in opposite directions the exposed edges of the blank while clamped upon a stationary part of the machine, and means for reciprocating the carriage, substantially as described.

9. In a can-body-forming machine, the combination with a stationary horn, of a constantly-reciprocating carriage for feeding forward blanks, stationary dies over which the blank is delivered by the carriage, a vertically-movable clamp adapted to descend and hold the blank upon the stationary dies with its edges exposed, and two slidable plates adapted to wipe over the exposed edges of the blank and by a single forward stroke to bend the edges oppositely to form hooks whereby they are adapted to be interlocked, substantially as described.

10. In a can-body-forming machine, the combination with a stationary horn, of a constantly-reciprocating carriage for feeding forward sheet-metal blanks, stationary dies over which a blank is delivered by the carriage, a vertically-movable clamp adapted to hold the blank upon the stationary dies, with its edges exposed, two plates adapted to be reciprocated in planes that intersect each other whereby to bend the exposed edges of the blank oppositely during the forward movement and means for actuating the plates, substantially as described.

11. In a can-body-forming machine, the combination with a stationary horn, of a constantly-reciprocating feed-carriage for advancing sheet-metal blanks, means for clamping a blank with its edges exposed, slidable plates adapted to be forced against and beyond the exposed edges of the blank whereby to bend them oppositely during the forward movement and means for actuating the plates consisting of projections on the plates adapted to be engaged by cams on the carriage, substantially as described.

12. In a machine of the class described, the combination with a stationary horn, of a constantly-reciprocating carriage for feeding forward sheet-metal blanks, a clamp for holding a blank with its edges exposed, movable plates one for each edge for oppositely bending the exposed edges of the blank, folding-tongs for forming a previously-bent blank around the horn, means for simultaneously actuating the clamp and folding-tongs, consisting of a driven cam, a bell-crank lever actuated by the cam and suitable connections between the bell-crank and reciprocating clamp and folding-tongs, substantially as described.

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Witnesses:

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