

(No Model.)

2 Sheets—Sheet 1.

P. H. KNIGHT.
PAPER BOX MACHINE.

No. 428,677.

Patented May 27, 1890.

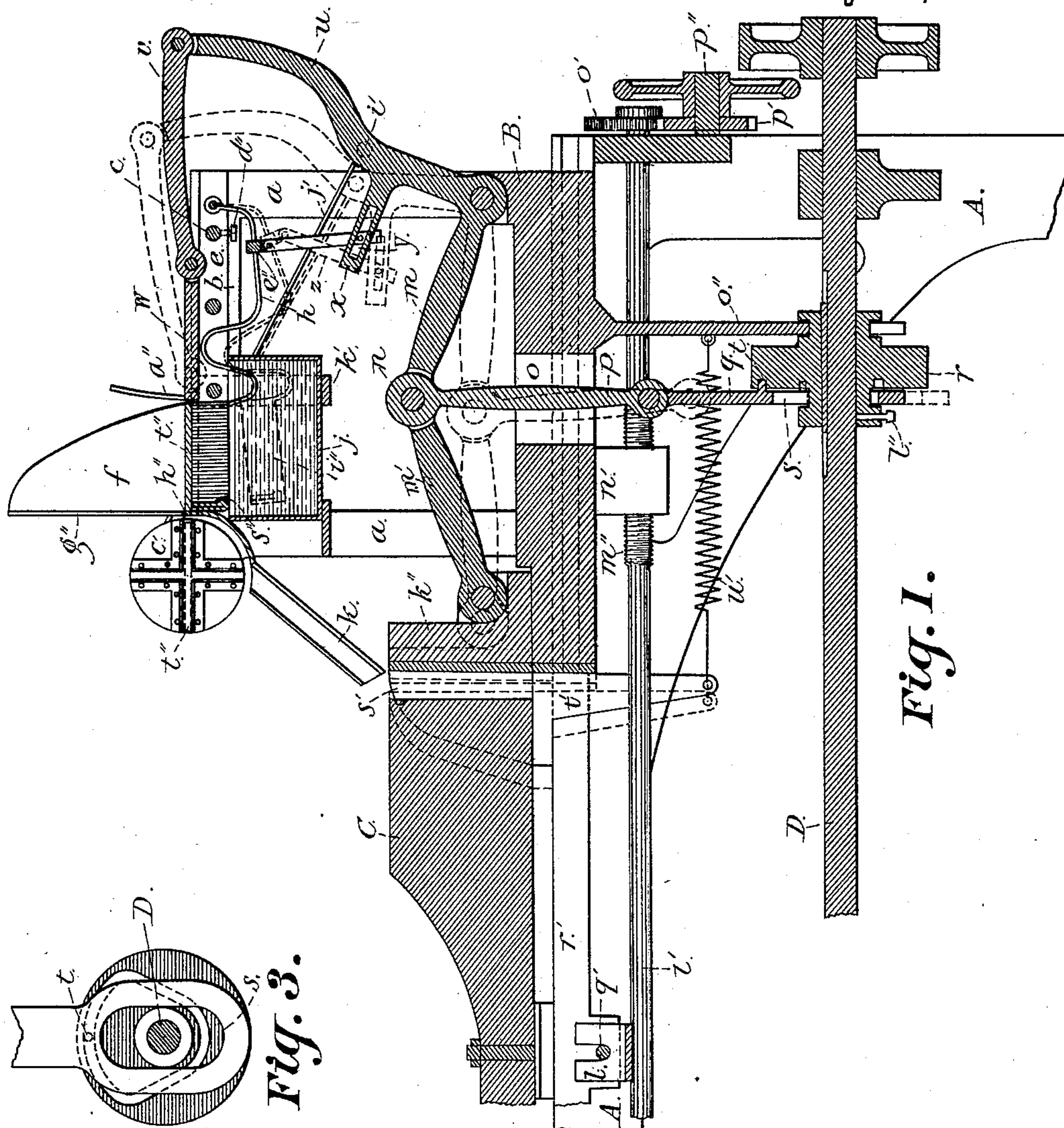


Fig. 1.

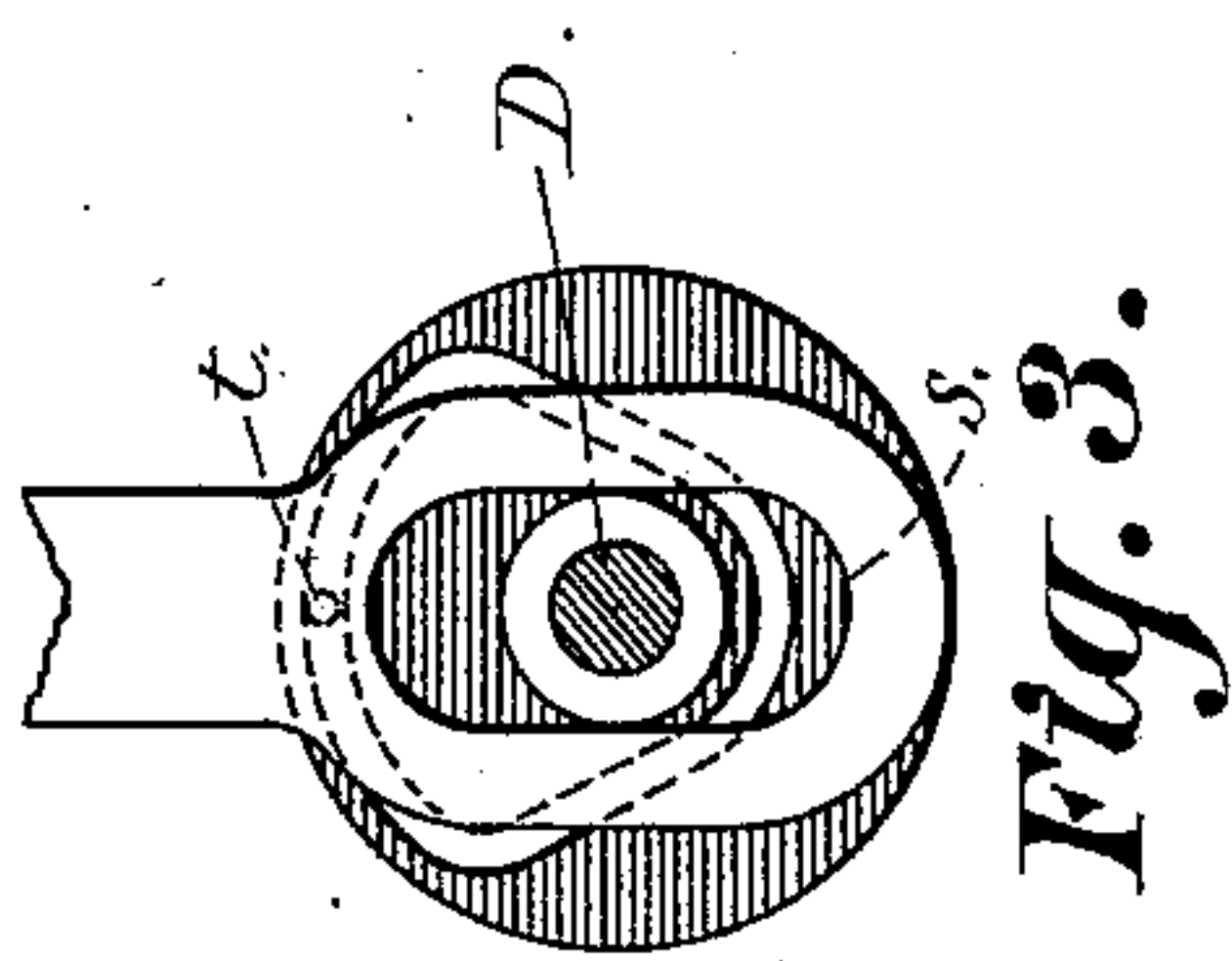


Fig. 3.

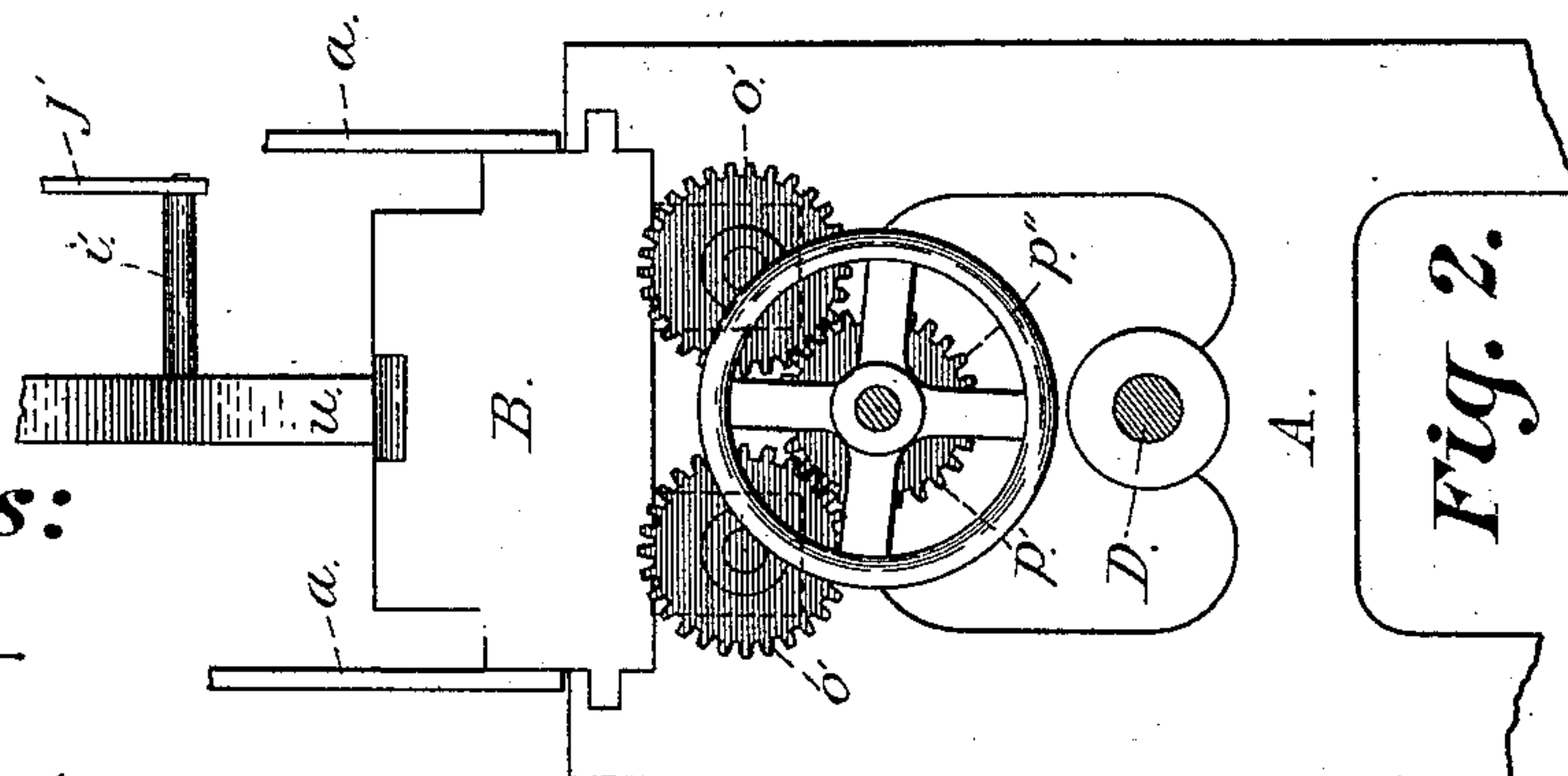


Fig. 2.

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Elgin L. Verrill.

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2 Sheets—Sheet 2.

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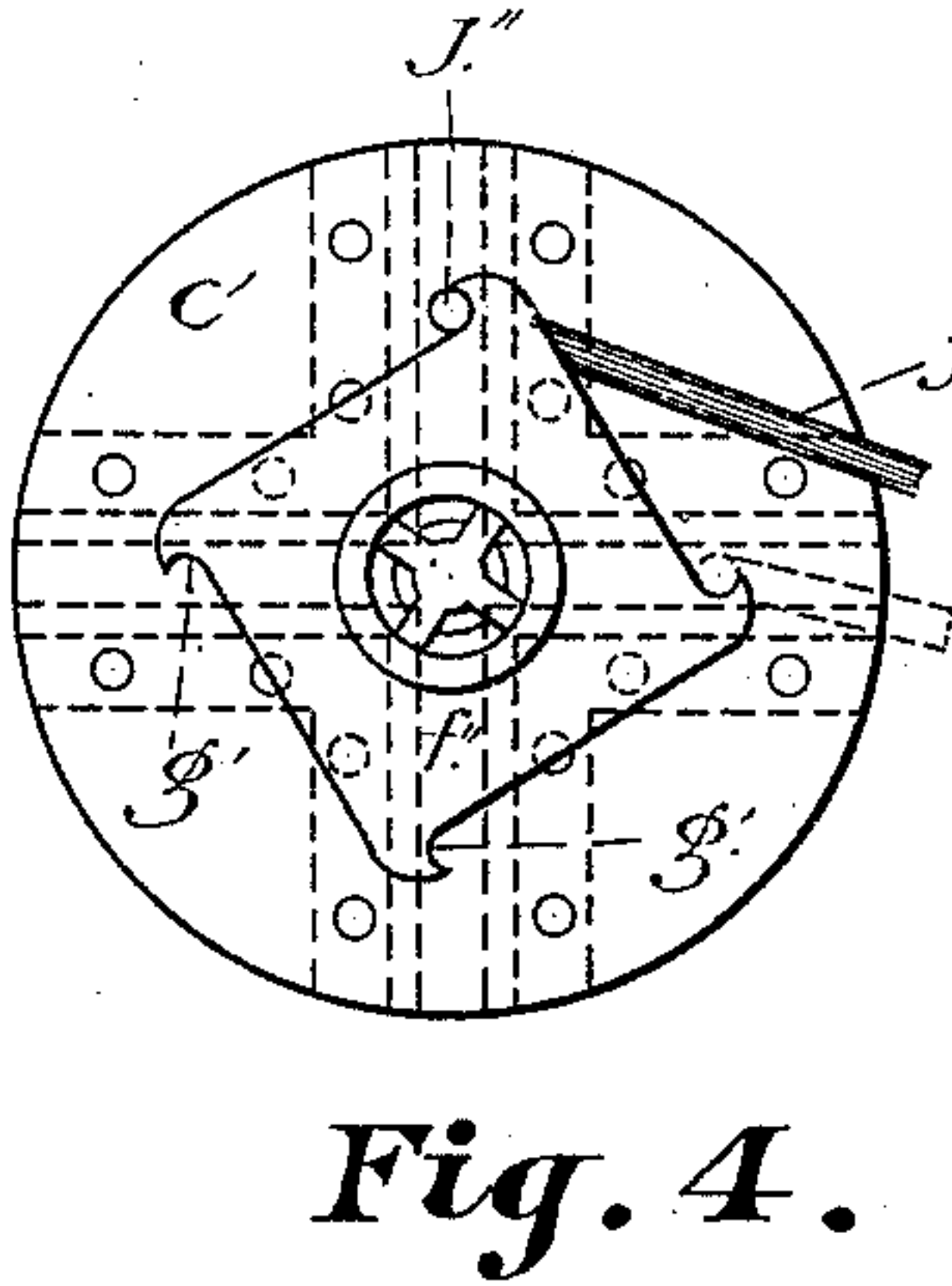


Fig. 4.

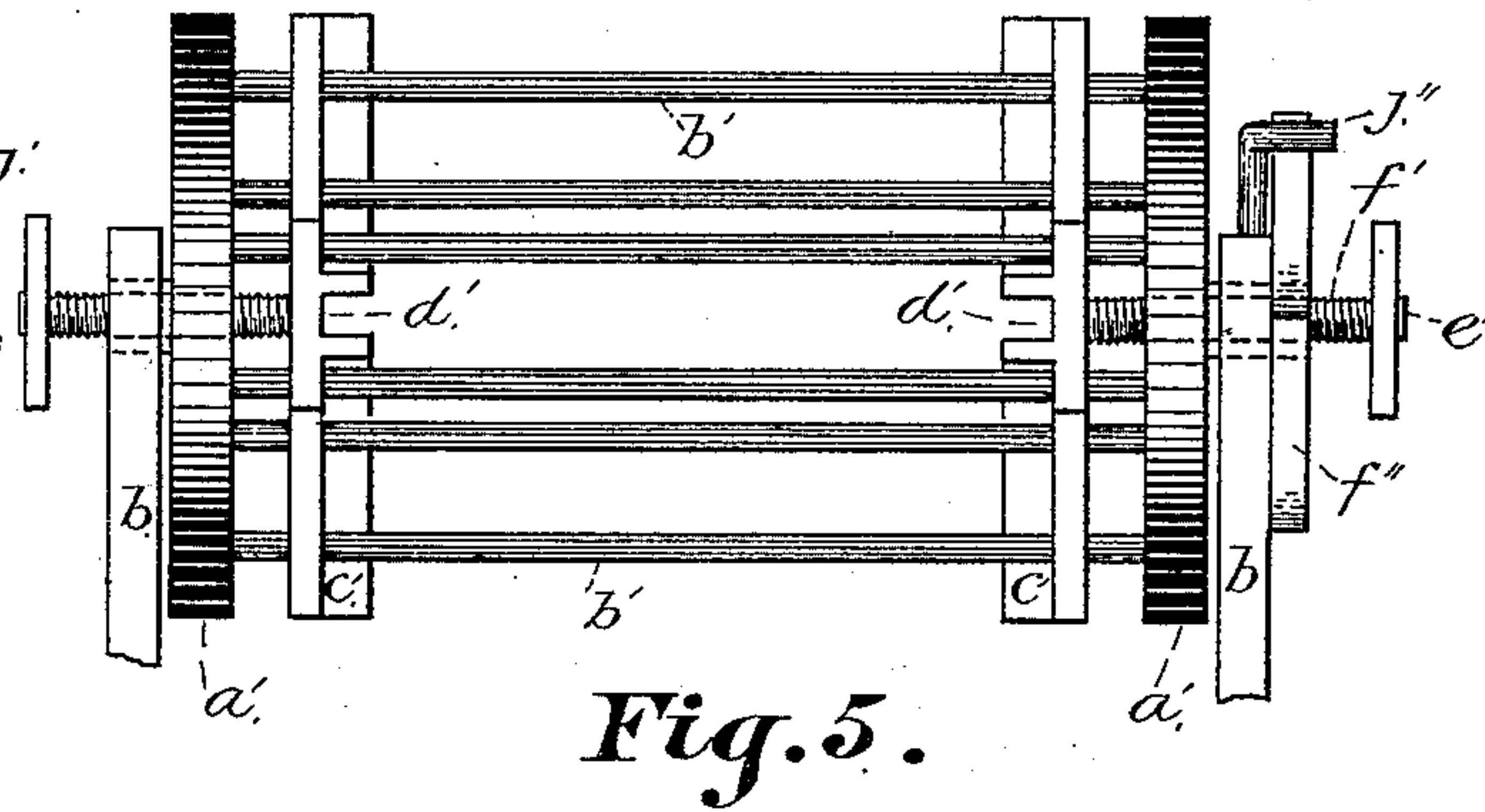


Fig. 5.

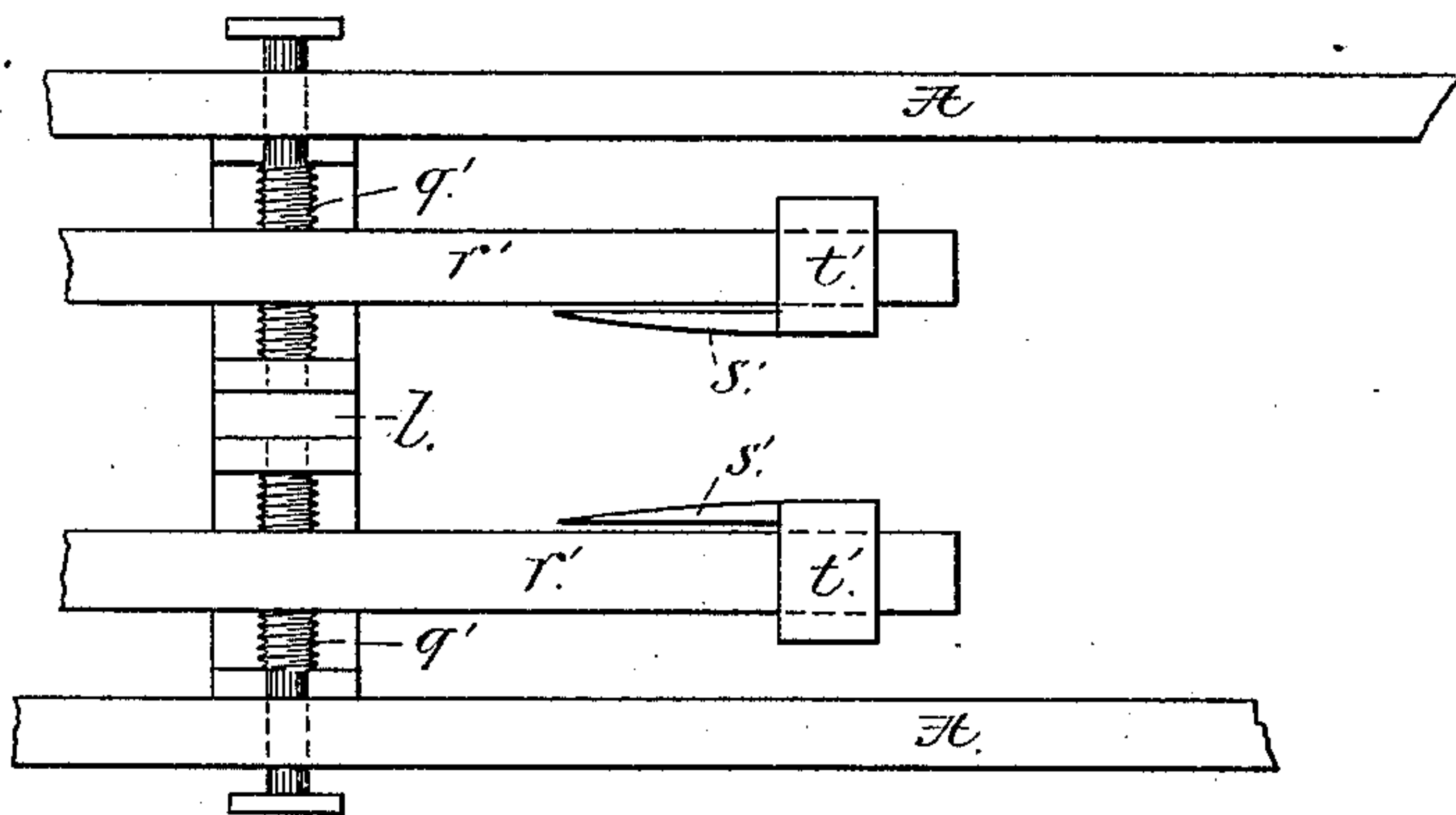


Fig. 6.

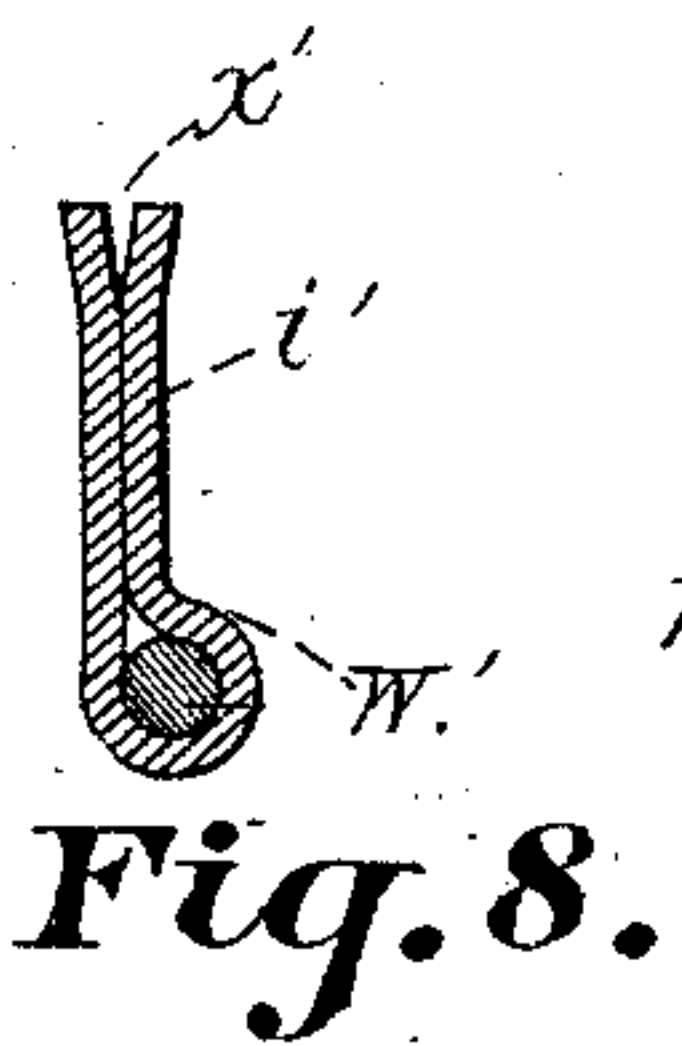


Fig. 8.

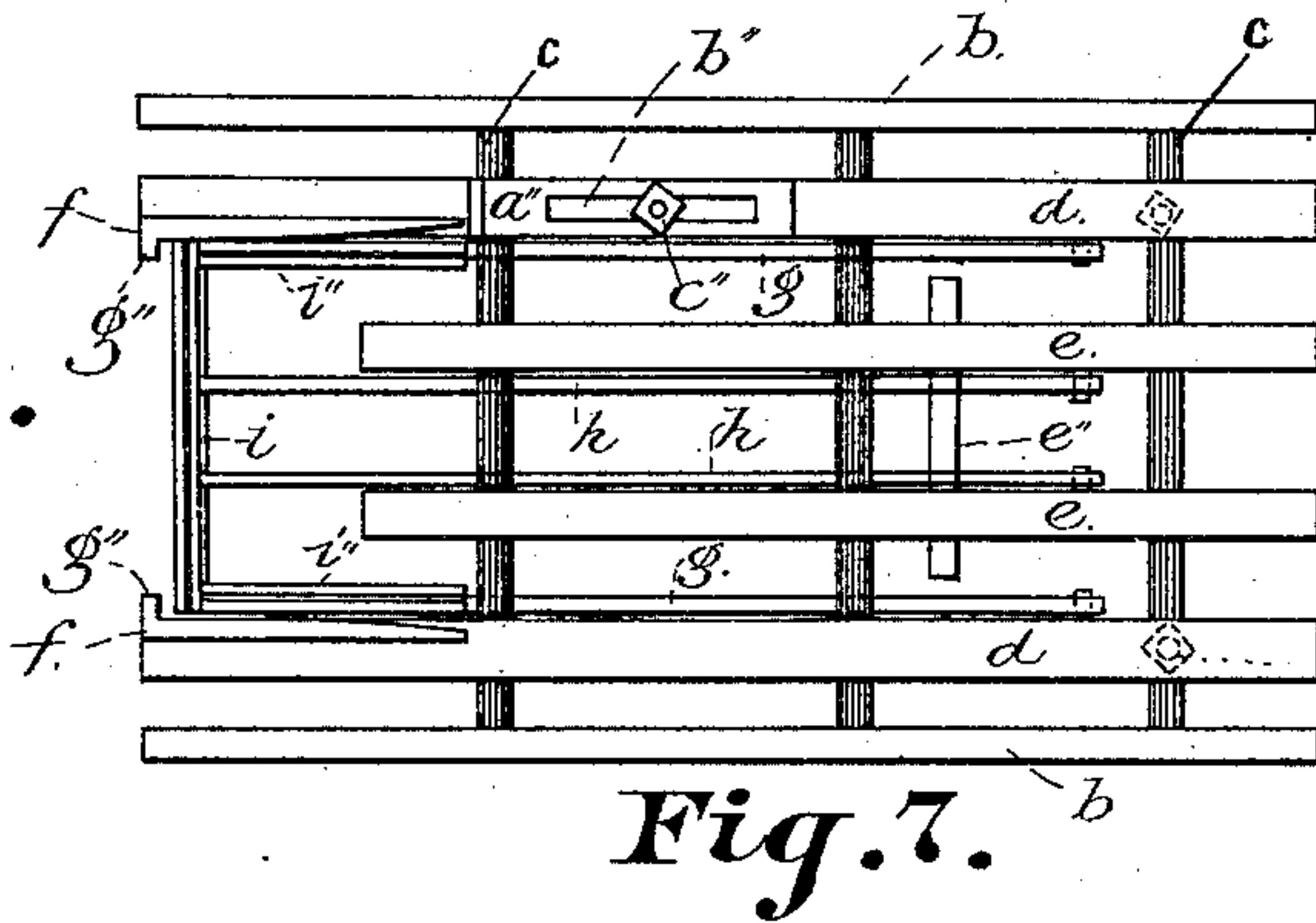


Fig. 7.

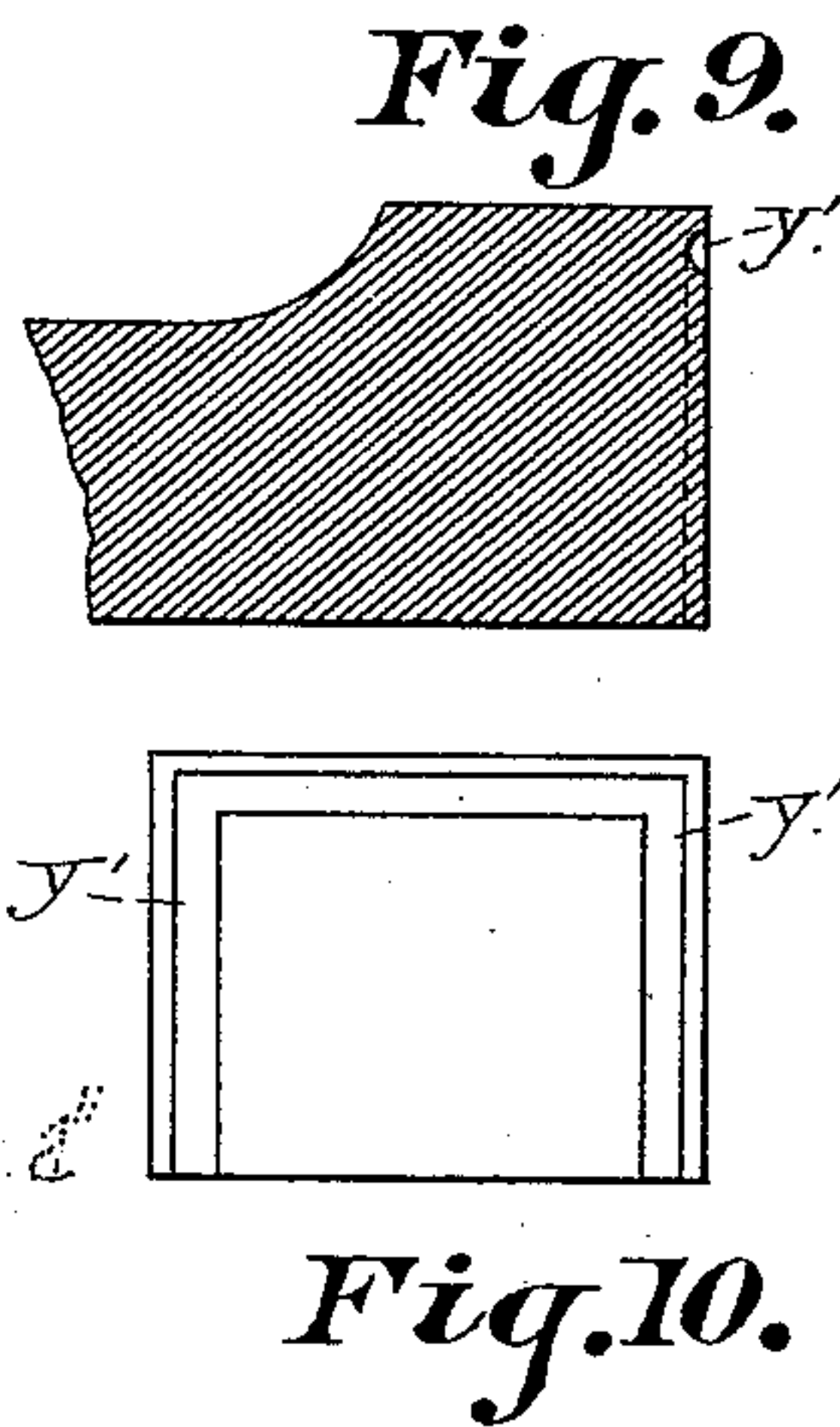


Fig. 9.

Fig. 10.

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UNITED STATES PATENT OFFICE.

PATRICK H. KNIGHT, OF GRAY, MAINE.

PAPER-BOX MACHINE.

SPECIFICATION forming part of Letters Patent No. 428,677, dated May 27, 1890.

Application filed January 7, 1890. Serial No. 336,169. (No model.)

To all whom it may concern:

Be it known that I, PATRICK H. KNIGHT, of Gray, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Paper-Box Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which 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 of reference marked thereon, which form a part of this specification.

My invention relates to improvements in paper-box machines, and more especially to machines for setting up boxes which are composed of a body part having narrow flanges turned in at the edges and an end blank pasted thereon.

Its object is automatically to apply paste to the end blank, convey it to the end of the body-blank, which is in position on the mold-block, and then press it against the said body-blank. It is designed to apply both ends at the same time, and therefore the mechanism at each end of the mold-block is the same, excepting that the power-shaft and the shafts by which the carriages are adjusted extend throughout the entire length of the machine.

It consists of a suitable supporting-frame, a mold-block set on said frame at the center of the top, a power-shaft journaled in said frame, a carriage adapted to slide back and forth on said frame and mounted on said carriage, a paste-pan, pasters, end-blank holder, rotary drum, chute, feeding-plunger and presser-plunger, and means for operating these several parts.

It further consists in an improved mold-block, improved pasters, adjustable flanges to guide the end blanks, and improved mechanism for adjusting the carriages on the frame so as to make boxes of different lengths, all of which, together with other details, will be more fully described hereinafter.

In the drawings herewith accompanying and making a part of this application, Figure 1 is a longitudinal section of the mechanism at one end of the mold-block. Fig. 2 is an end view with parts broken off. Fig. 3 is a

detail of the cam on the power-shaft for giving a reciprocating motion to the mechanism. Fig. 4 is an end view of the rotary drum from that end where it is operated. Fig. 5 is a view of the drum, showing adjustable grooved holders. Fig. 6 is a detail in plan view showing adjustable flanges and means for adjusting same. Fig. 7 is a plan of the carriage-frame, showing ways for the feeding-plunger, pasters, end-blank holder, and means for adjusting said holder. Fig. 8 is a cross-section of a paster. Fig. 9 is a longitudinal section of a part of the block. Fig. 10 is an end view of said block. The same letters refer to like parts.

In said drawings, A represents the supporting-frame of the machine; B, a carriage adapted to slide on said frame; C, a mold-block rigidly set on top of the machine-frame at its center, and D the power-shaft journaled in said frame. Said carriage has a frame composed of standards *a* attached to its sides, side bars *b* attached to said standards, and cross-tie rods *c* uniting said side bars. Adapted to slide on said ties *c* are two beams *d*, which may be locked in any given position by keys *d'*. Between beams *d* are two ways *e*, set on the cross-ties *c* for the feeding-plunger to travel on. Rigidly attached to the said beams *d* are the parts *f*, which form the sides of the blank-holder. Said parts *f* have flanges *g* extending inwardly, said flanges not extending quite down to the top of the beams *d*, but leaving a space *h* sufficient for the passage of a single blank. An angle-plate *a'*, having a slot *b'*, and held in place by a bolt *c'*, so as to slide back and forth on beams *d*, prevents the blanks from moving in a backward direction, while the flanges *g* prevent all except the bottom one from moving. Pivoted to the inner sides of the beams *d* are bent rods *g*, which carry on their free ends the side pasters *i'*, and pivoted to the insides of the ways *e* are the bent rods *h*, which carry on their ends the cross-paster *i*, which has a shoulder *w'*, on which the ends of the side pasters rest, said side-pasters having their ends cut under therefor, as shown at *s*. The two rods *h* are connected by a plate *e''*, for the purpose hereinafter described.

Directly beneath the blank-holder is sus-

pended a paste-pan *j*, one end resting in a pivoted swing *k'*, in order to facilitate the removal of the pan.

Journalled in the carriage-frame is a rotary drum having the ends *a'* and the tie-rods *b'*, connecting said ends *a'*. These rods *b'* pass through plates *c'*, which have grooves *d'* at right angles to each other. These plates *c'* are adjusted to receive blanks of different sizes by means of the presser-screws *f'*, which pass through the sides *a'* and are swiveled in the outsides of said plates. Rigidly set on the journal of said drum is a plate *f''*, having four projecting hooks *g'* equidistant from each other.

Mounted on the carriage-platform B are the toggle-arms *m* and *m'*, having hinge-connection *n*. The arm *m'* has pivoted to the end thereof the presser-plunger *k''*, which is arranged to slide on said platform, and the arm *m* is pivoted to the rear of said platform. The hinge *n* has the link *p*, extending downwardly through a hole *o* in the platform, said link being connected with the cam-wheel *r* on the power-shaft by the cam-shaft *q*, whereby said toggles receive a vertically-reciprocating motion. The toggle-arm *m* has a lever-arm *u*, extending upwardly and carrying on its upper end the pivoted link *v*, to which is pivoted the feeding-plunger *w*, said plunger being adapted to slide back and forth on the ways *e*, aforesaid. Extending out from the lever *u* is a projection *x*, having therein a slot *y*.

Connecting the projection *x* and the plate *e''* is a link *z*, whereby the pasters are raised and lowered in the paste-pan. Extending out from the side of the lever *u* is a projection *i'*, to which is pivoted an arm *j'*, extending upwardly to the drum and having a hook on its free end adapted to engage with the hooked projections *g'* on the plate *f''*, whereby said drum is revolved as the lever *u* swings to and fro.

Between the sides of the main frame A, and supported on a cross-beam *l*, are two rods *r'*, upon which slide the sleeves *l'*, which carry upwardly-extending flanges *s'*. These flanges *s'* are constantly held against the face of the presser-plunger by a spring *u'*, and they are adjustable sidewise by means of the threaded screws *q'* passing through threads in said bars *r'*.

The carriage itself, together with the mechanism mounted thereon, is adjustable on the main frame in order to enable the same machine to make boxes of different sizes. For this purpose shafts *l'* are journaled in the main frame, said shafts having thereon the screw-threads *m''*, adapted to run in a threaded lug *n'*, extending downwardly from the bottom of the carriage-platform. At one end of shafts *l'* are cog-wheels *o'*, which mesh with a power cog-wheel *p'*, whereby shafts *l'* are caused to revolve and the carriages made to advance or recede, according as the said

shafts *l'* are revolved toward the right or left, and the thumb-screw *l''* in the cam on the power-shaft being loosened the said cam slides on the power-shaft to correspond with the movement of said carriage.

The pasters consist of a thin sheet of metal bent around a rod, which in the case of the side pasters may be the end of the rods *g*, the two edges of said sheet of metal being separated at the top to form a shallow cup *x'* to take up a small quantity of paste. It sometimes happens that a small quantity of paste is pressed out when the end blank is pressed against the end of the body-blank. In order to take this waste paste and to prevent it from collecting on the end of the mold, a small groove or channel *y'* is made in the end of the mold-block, extending around the block at the point where the edge of the flange on the end of the body-blank would come when said blank is placed thereon.

The operation of my improved machine may now be readily understood. A quantity of end blanks *l''* is placed in the blank-holder *f* and the machine set in position shown in Fig. 1. The power-shaft is then revolved and the cam draws down the toggle-arms, driving the presser-plunger forward against the mold. At the same time lever-arm *u* is driven forward. The feeding-plunger striking against the lowest of the blanks in the holder and forcing it through into the drum, the link *z* draws down the pasters to receive a fresh supply of paste, and the rod *j'* moving up till the hooked end *j''* engages with the hook which happens to be at the top of the plate *f''*. The parts are then in the positions shown by dotted lines in Fig. 1. As the cam continues to revolve, the toggles are again raised, the presser and feeding-plungers are drawn back, the drum is turned one-quarter round by the hook on the end of rod *j'*, and the pasters are forced up against the next blank in the holder. The blank in the drum when turned into a vertical position falls into the chute *k* and thence to the end of the mold.

Having thus described my invention and its use, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a paper-box machine having a suitable supporting-frame, the combination, with a reciprocating presser-plunger, a reciprocating feeding-plunger, end-blank holder, paste-pan and pasters, and mold for the body-blank, of a rotary drum adapted to receive the end blanks as they are driven out from the holder and give them a vertical position, and mechanism for operating these several parts, substantially as described, as and for the purposes set forth.

2. In a paper-box machine having a suitable supporting-frame, the combination, with a reciprocating presser-plunger, a reciprocating feeding-plunger, end-blank holder, paste-pan and pasters, and mold for the body-blank, of a rotary drum adapted to receive the end

blank after it is pasted as it is driven out from the holder, and a chute leading from said drum to the end of the mold for the body-blank, and means, substantially as described, 5 for operating these several parts, as and for the purposes set forth.

3. In a paper-box machine, a mold-block for the body-blank having a groove in its ends at the point where the edge of the flange of the 10 blank comes to take up waste paste, substantially as and for the purposes set forth.

4. In a paper-box machine, the combination, with beams placed between the sides of the machine-frame and adjustable laterally 15 by a screw-bolt passing through them, of guides for the end blanks having sleeves adapted to slide on said beams, and springs which constantly hold said guides against the face of the presser-plunger, substantially as 20 and for the purposes set forth.

5. In a paper-box machine, a paster formed by bending a thin sheet of metal around a

suitable base, thence extending the sides upwardly and separating the upper edges to form a cup to take up a quantity of paste, as 25 and for the purposes set forth.

6. In a paper-box machine having a suitable supporting-frame, the combination, with carriages mounted so as to slide in said frame and bearing the pasting mechanism and hav- 30 ing threaded lugs extending downwardly, of shafts having threads thereon adapted to work in the said lugs, said shafts being journaled in said frame and having cogs at one end which mesh with a driving cog-wheel, sub- 35 stantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

PATRICK H. KNIGHT.

Witnesses:

ELGIN C. VERRILL,
EDWARD C. REYNOLDS.