

(No Model.)

2 Sheets—Sheet 1.

T. FLYNN.
PAPER BOX MACHINE.

No. 417,012.

Patented Dec. 10, 1889.

Fig. 1.

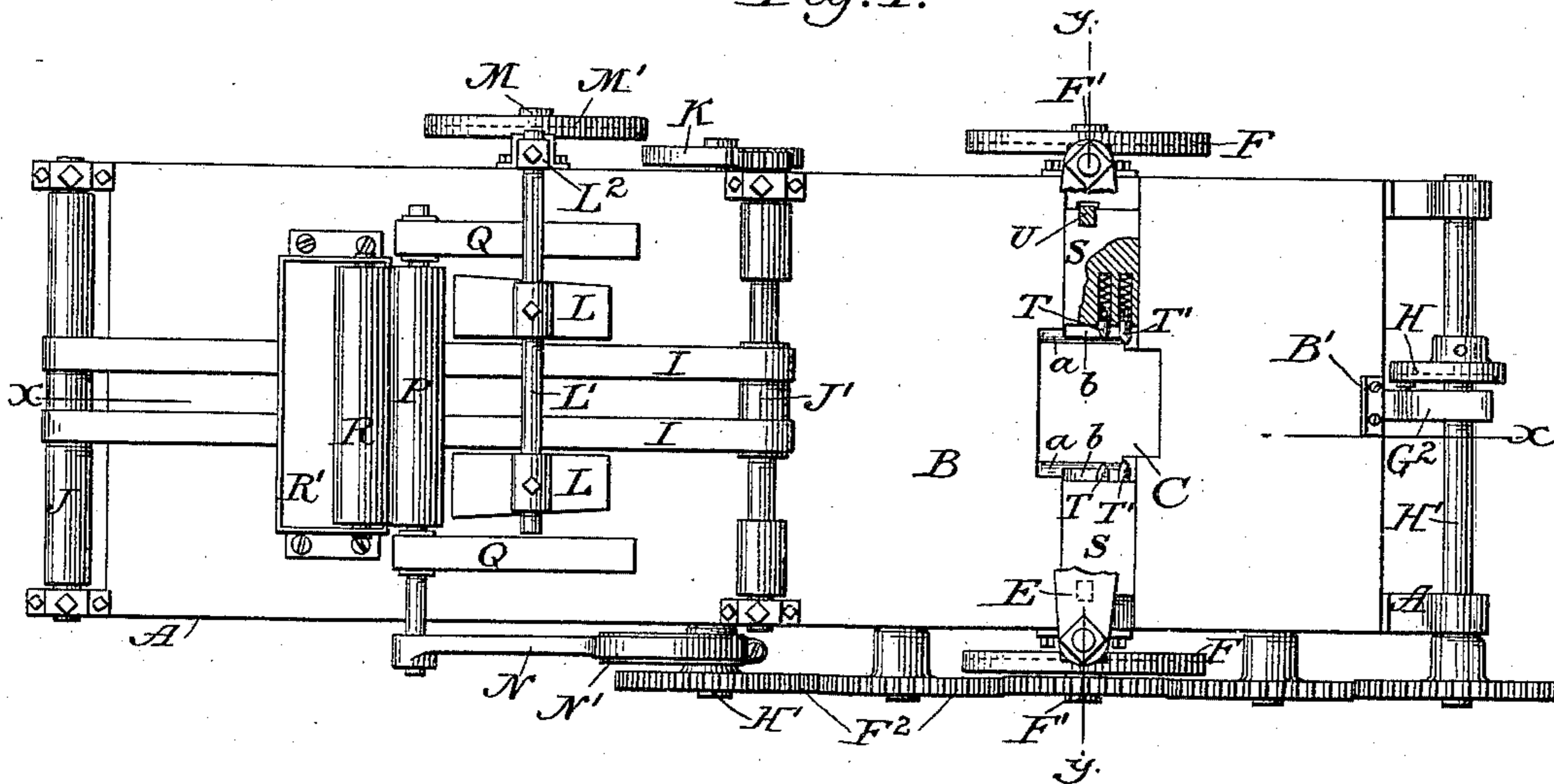
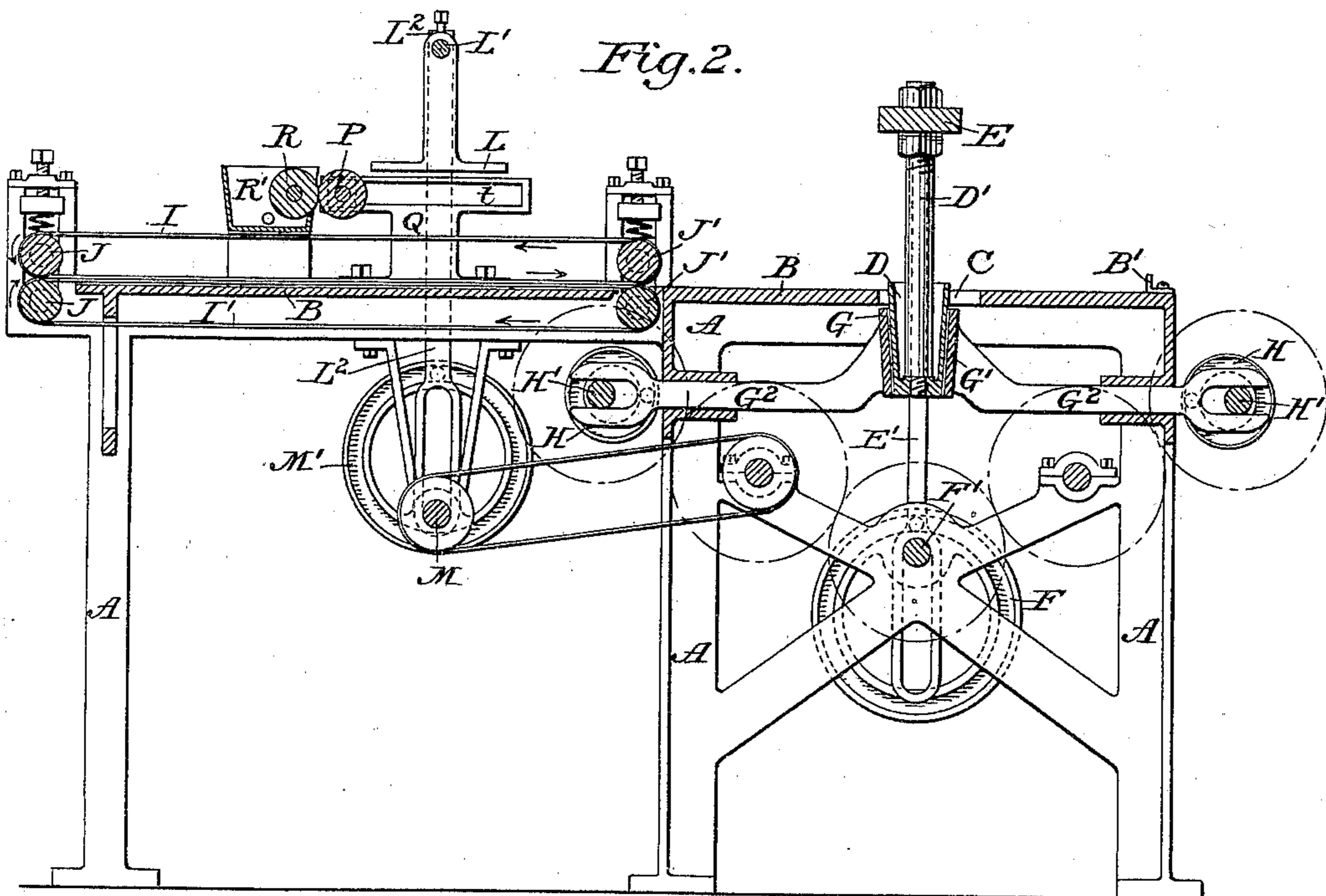


Fig. 2.



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Fig. 3.

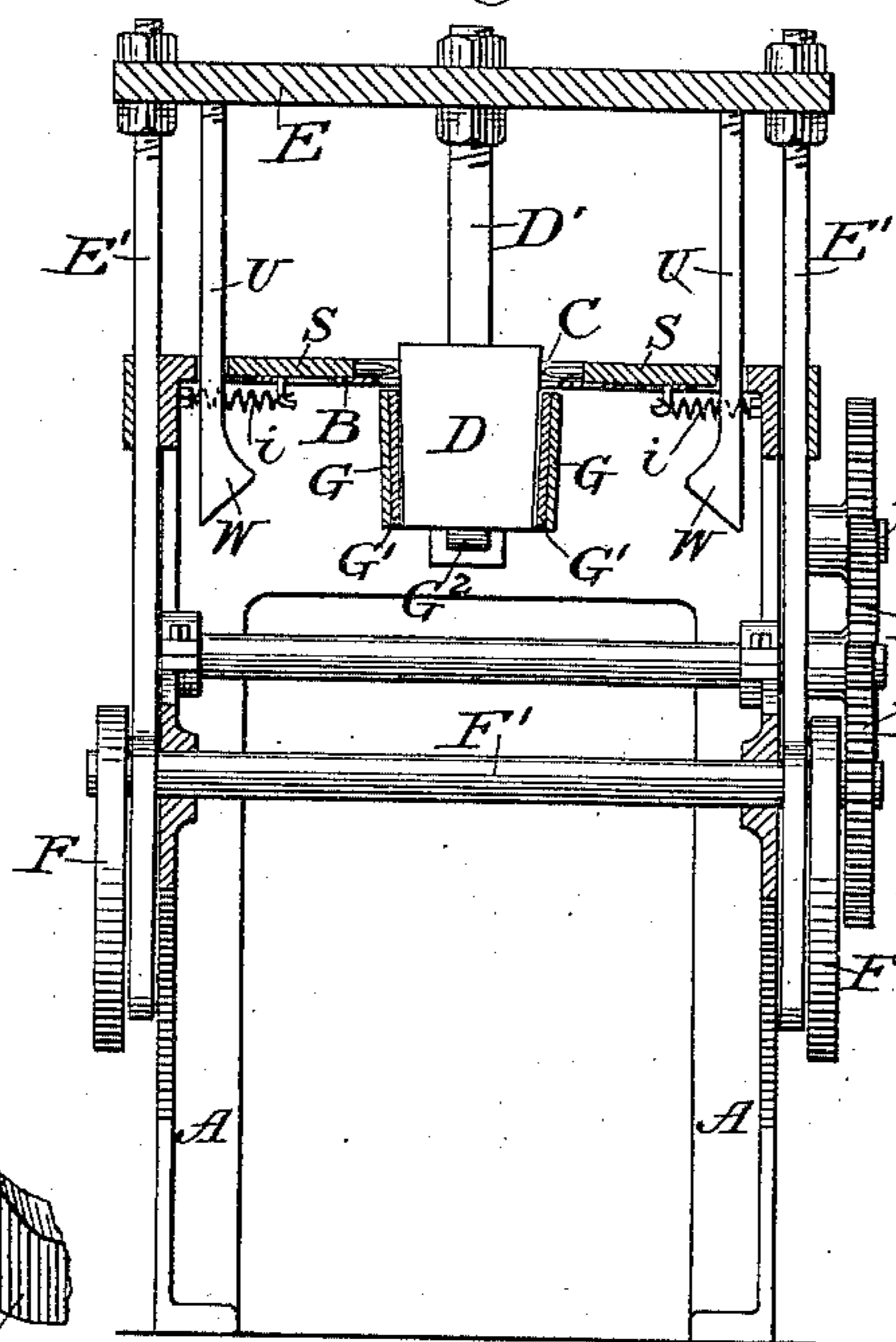


Fig. 4.

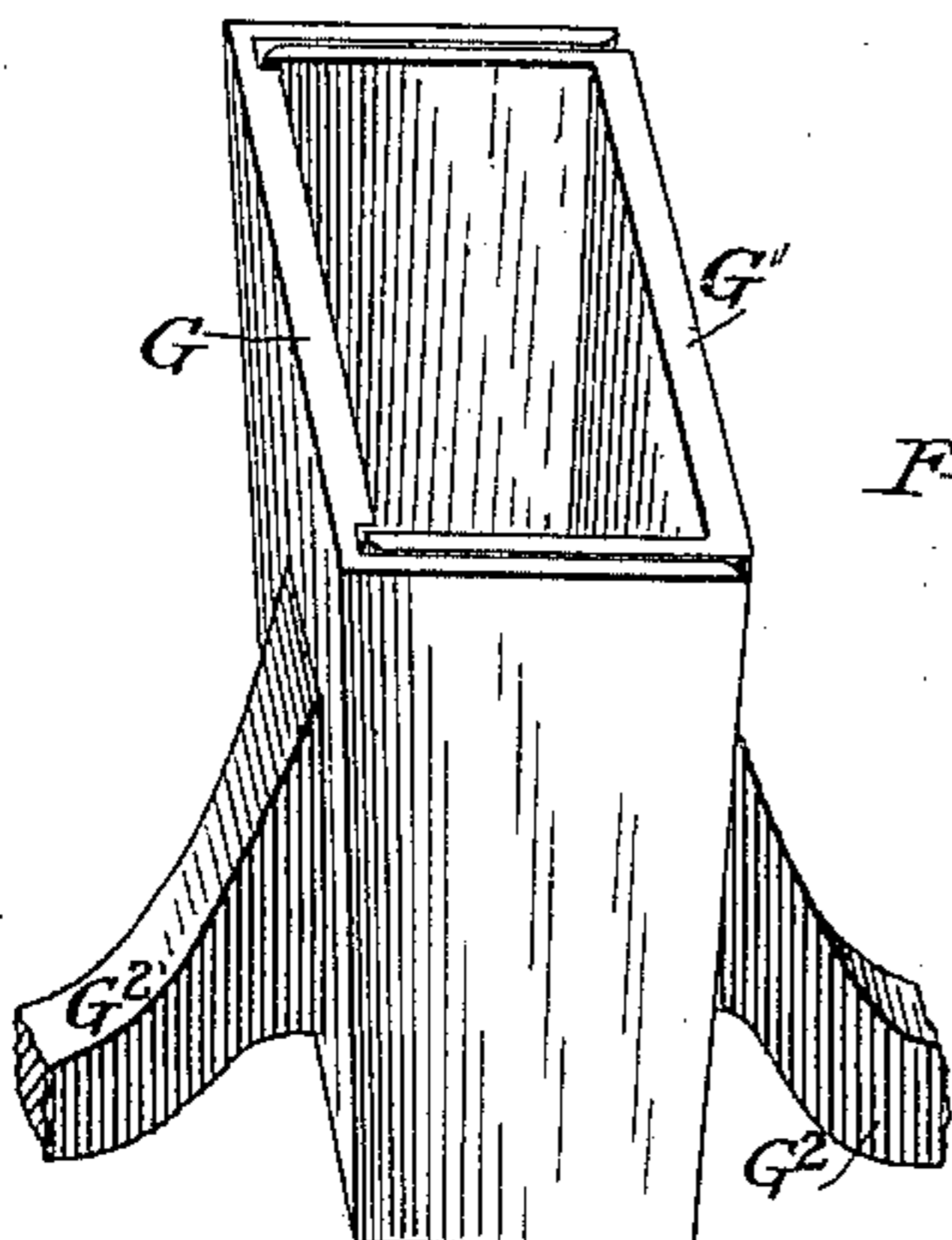


Fig. 5.

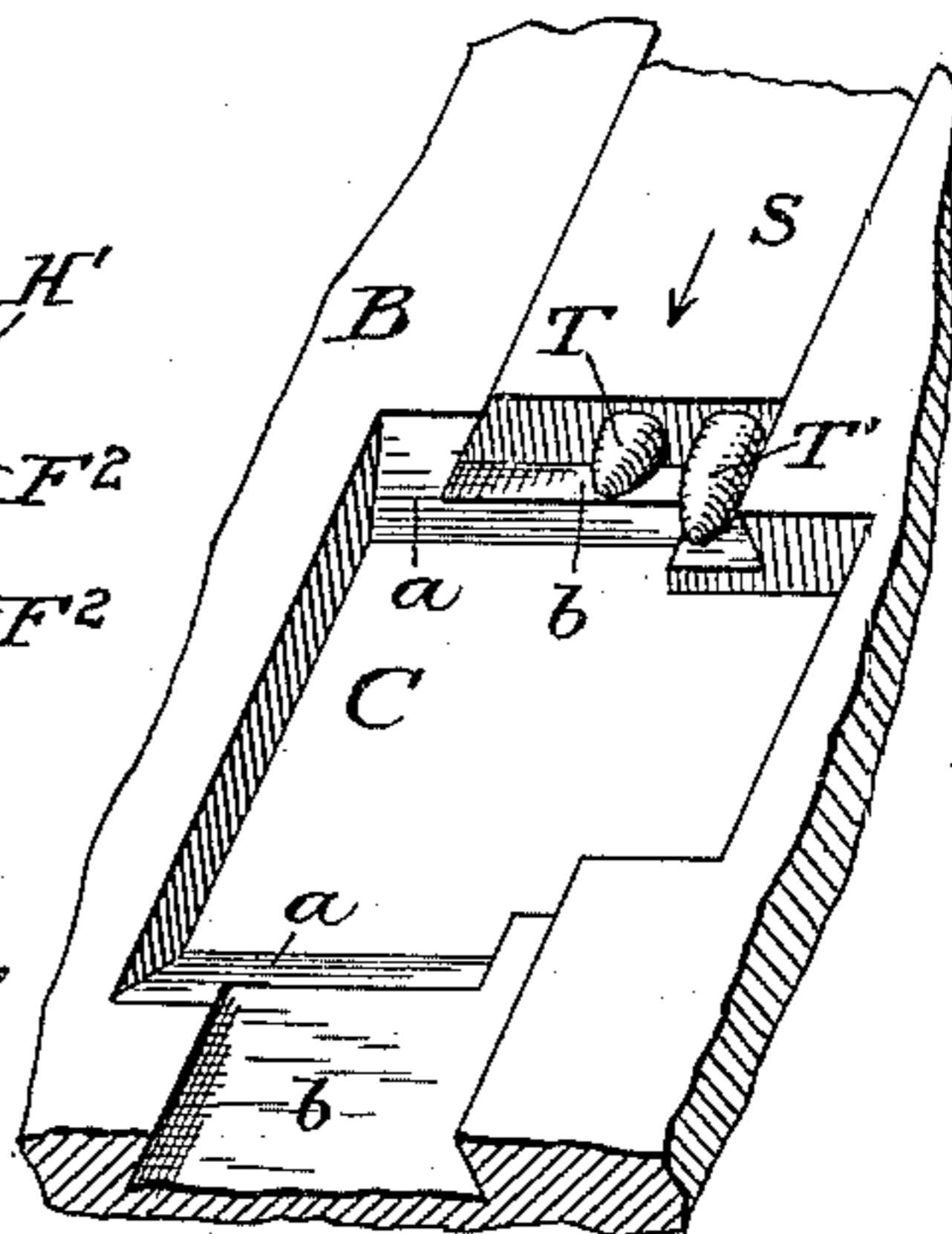


Fig. 6.

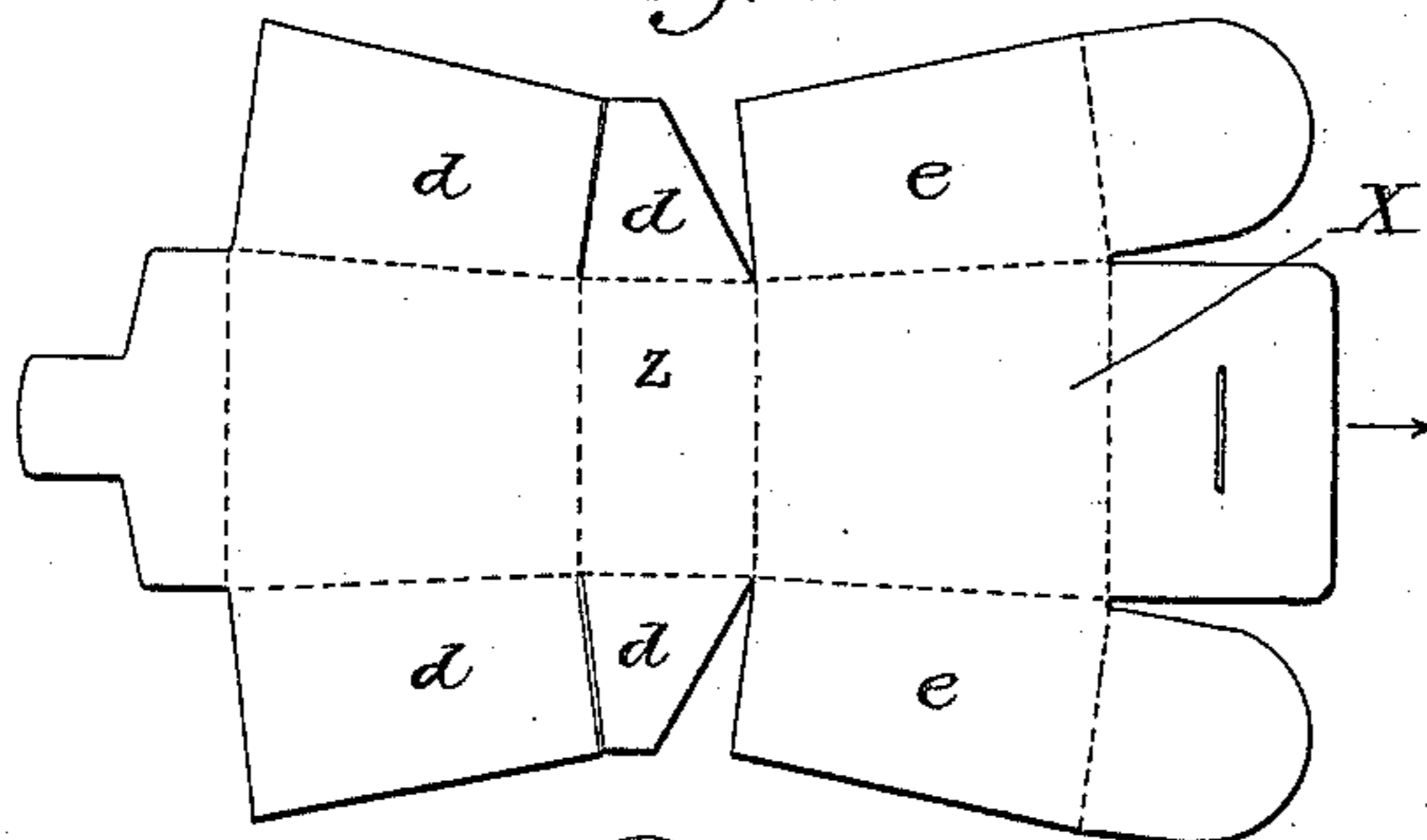


Fig. 7.

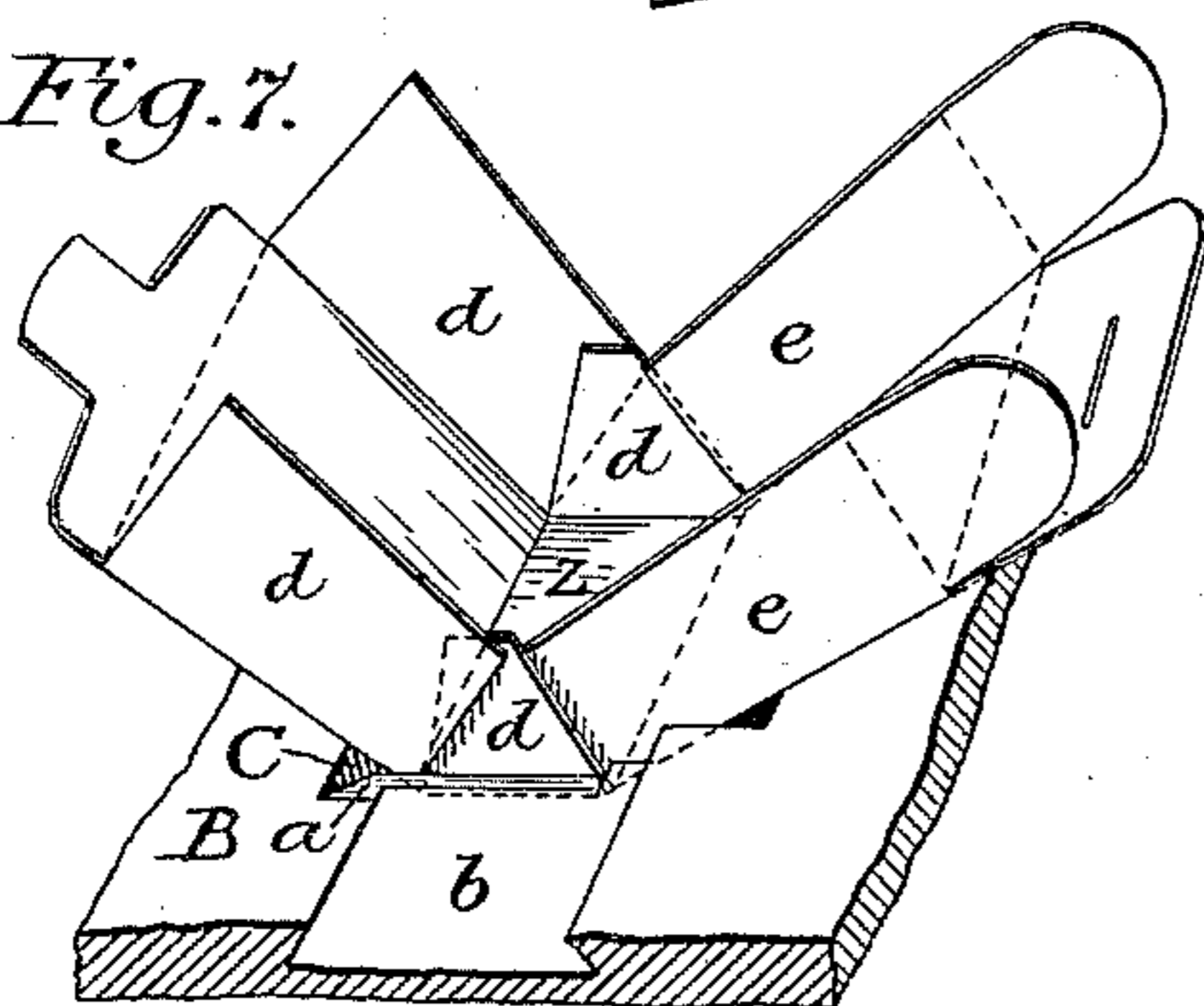
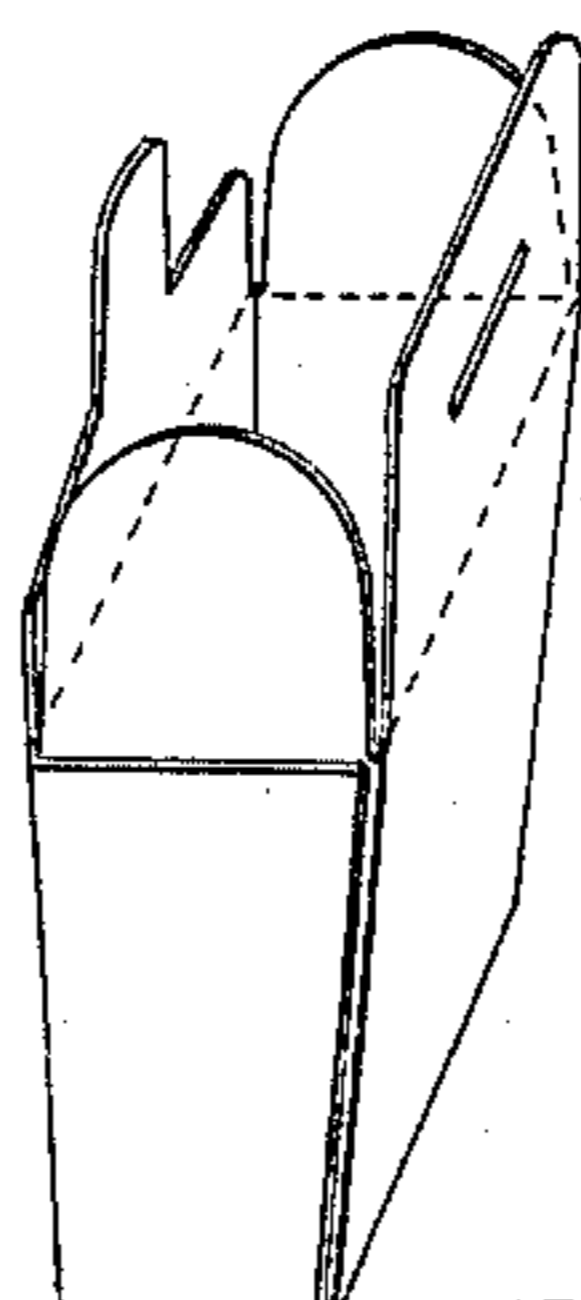


Fig. 8.



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UNITED STATES PATENT OFFICE.

THOMAS FLYNN, OF NEW YORK, N. Y.

PAPER-BOX MACHINE.

SPECIFICATION forming part of Letters Patent No. 417,012, dated December 10, 1889.

Application filed December 5, 1888. Serial No. 292,728. (No model.)

To all whom it may concern:

Be it known that I, THOMAS FLYNN, of the city, county, and State of New York, have invented certain new and useful Improvements in Paper-Box Machines; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to machinery for the manufacture of paper boxes; and it consists in the novel combination and arrangement of the several operative parts of a machine for pasting, folding, and forming a suitable paper or card-board blank into a finished box, as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan view of my improved machine; Fig. 2, a central vertical section in line $x x$ of Fig. 1; Fig. 3, a transverse vertical section in line $y y$ of Fig. 1; Fig. 4, a detail, in perspective, of the lower clamping-frames closed together; Fig. 5, a similar detail of a portion of the top of the table, illustrating the form of the folding-aperture therein and the movement of the edge-closing slides and pins, one of said slides being removed; Fig. 6, a plan view of the paper blank ready for folding; Fig. 7, a perspective view of the blank when partly forced down into the folding-aperture, whereby the folding in of its ends and sides is initiated; and Fig. 8, a view in perspective of the folded box complete as delivered from the machine.

Similar letters indicate like parts in all of the figures.

A A represent the frame-work supporting the operative parts of the machine, and B the table over which the paper blank is carried to the folding-aperture.

C is the folding-aperture, whose length corresponds to that of the bottom of the box to be formed and whose width is somewhat greater than that of the box. The two end walls $a a$ of this aperture are beveled, as shown in Figs. 1 and 5, to facilitate the folding in of the wings of the blank to be carried down through it.

D is a plunger whose form and dimensions correspond with those of the interior of the

box to be formed, and which is adapted to enter and pass down through the aperture C. This plunger D is fitted upon a rod D' , depending from a cross-head E, mounted upon two vertically-moving standards $E' E'$, (see Fig. 3,) adapted to reciprocate in suitable ways on either side of the table B, and which are actuated by means of eccentrics F F on a transverse rotating shaft F' , mounted under the table and geared to a prime motor.

S S are slides mounted to reciprocate horizontally in suitable ways $b b$, formed in the top of the table B at each end of the forming-aperture C, as shown in Figs. 1 and 5. The inner end of each slide S is fitted with two spring-actuated yielding pins T T', of unequal length, the shorter pin T being made to project at about the middle of the end and the longer pin T' between it and the farther side of the opening in the direction in which the blank moves. These slides are simultaneously forced inward to bring their ends and the pins projecting therefrom against the blank at the moment the blank is doubled up into the aperture C by the descent of the plunger by means of two fingers U U, dependent from the cross-head E of the plunger, and which terminate in enlarged beveled ends W W, which are made to bear against the outer ends of the slides to move them, the return of the slides when the plunger moves up being automatically produced by means of springs $i i$, (see Fig. 3,) attached to the slide.

The plunger D, when lowered so as to project down through the folding-aperture C, is clasped between two clamping-frames G G', (see Figs. 2, 3, and 4,) made to reciprocate horizontally immediately under the table, so as to close from opposite directions upon the plunger to embrace the same, the sides of the one frame G being made to overlap those of the opposite frame G' as they come together, as shown in Fig. 4 of the drawings. These two clamping-frames are severally mounted upon horizontal bars $G^2 G^2$, (see Fig. 2,) sliding in suitable ways, and are actuated so as to close simultaneously over the plunger in synchronism with its descent through the folding-aperture C by means of eccentrics H H' upon transverse shafts $H' H'$, mounted to

rotate in the frame below the level of the table parallel with the shaft F', to which they are severally geared.

The blank X (see Fig. 6) to be folded is fed forward over the table B and delivered in proper position over the folding-aperture C by means of parallel pairs of tapes or endless belts I I and I' I', carried over rollers J J J' J', arranged in pairs and mounted so as to bring their points of contact on a level with the top of the table, as shown in Figs. 1 and 2. These rollers are all geared mediately to the shaft F' by a train of wheels F², (see Figs. 1 and 3,) to rotate in unison and in synchronism with the movements of the plunger, their movement being arrested while the plunger enters the forming-aperture C and until it clears the same by means of an interrupted gear-wheel K, (see Fig. 1,) interposed in the train connecting the rollers with the shaft F'. The tapes in each pair are placed in position to engage the central portion of the blank.

A stop B' is formed on the outer end of the table to arrest the blank so soon as it is properly in register over the forming-aperture C.

The gumming device consists of the gumming-pads L L, secured to a cross bar or head L', which is mounted to project transversely over the table, and tapes from a vertically-reciprocating standard L², fitted in suitable ways on one side of the table and actuated by an eccentric on a shaft M, geared mediately to the shaft F'. (See Fig. 2.) The gumming-pads L L are adapted to coat the lateral folds d d of the blank X with the paste or glue as they are brought into contact therewith by the dropping of the cross-head L. They are freshly coated with the paste or glue after each movement of the cross-head by means of a traveling roller P, made to reciprocate back and forth under the gumming-pads when they are elevated. This roller is mounted on pedestals Q Q under the two ends of the cross-head L', these pedestals being formed with horizontal ways t, (see Fig. 2,) in which the ends of the roller travel freely, and the roller is carried back and forth therein while the cross-head L' is in its elevated position by means of a connecting-arm N, pivoted to an eccentric N', (see Fig. 1,) geared mediately to the shaft F'. When at rest, the traveling roller P is brought into contact with a feed-roller R, mounted in a paste-vessel R', and which operates to transfer the paste therein to said roller P. This feed-roller R may be geared mediately to the driving-shaft F', to be slowly turned thereby.

In the operation of the machine the blank X, cut in proper form, substantially as shown in Fig. 6, is fed in between the rollers J and J' and the upper and lower endless tapes I and I', which pass around said rollers, and extend thence over the rear end of the table B. The blank X, caught and held between the tapes, will be carried forward by them until the lateral wings d d of the blank are in register

with the gumming-pads L L, when, by reason of the interrupted gear-wheel K in the train by which the tape-rollers J J and J' J' are driven, the further movement of the blank is arrested until the gumming-pads have descended into contact with said lateral wings d d of the blank and rise to clear the same. In the meantime, while the one blank is thus brought to a standstill and gummed, the blank next in advance is forced down by the descent of the plunger D through the forming-aperture C. The plunger bearing upon the portion Z of the blank designed to constitute the bottom of the box presses it down into the aperture C. (See Fig. 7.) As it is carried down, the side wings or flaps e e of the blank, which are free from glue, will, by reason of the contact therewith of the longer pins T' T' of the two slides S S, which are forced inward as the plunger descends by the operation of the ends W W of the fingers U U, be turned in against the plunger as the end itself is turned up. The gummed end flaps d d will next be turned in against the outside of the side flaps e e by the pins T T, and finally the gummed side flaps d d will be turned in by the ends of the slides S S against the end flaps d d and side flaps e e, the folding in of the flaps being assisted by the beveled walls a a of the aperture C and by the continued movement of the plunger. When the pins T and T' have carried the folded flaps against the plunger, they yield to permit the continued advance of the slides which carry them. Thus, while the sides are folded in, the flaps which form the ends of the box are turned in and made to overlap with their gummed faces superimposed in proper order, and being thus folded in upon the plunger are carried down below the table and caught between the clamping-frames G, G', which operate to press them firmly together to fix them and perfect the form of the finished box. So soon as the box is thus pressed the frames open, the plunger rises, and the slides move back, leaving the box free to drop into a receptacle beneath. While the plunger is rising the feeding-tapes I I' are again set in motion and the gummed blank carried forward into position over the forming-aperture, while a fresh blank is carried under the gumming-pads, the traveling gumming-roller being made to pass in the meantime under the gumming-pads to recharge them.

I claim as my invention—

1. The combination, in a paper-box-folding machine, of a table having a forming-aperture therein, a reciprocating plunger passing down through said aperture, folding-slides moving from opposite directions upon the table toward said aperture synchronically with the plunger, and means, substantially as described, for actuating the plunger and slides, all substantially in the manner and for the purpose herein set forth.

2. The combination, in a paper-box-folding machine, of a table having a forming-aper-

ture therein, a reciprocating plunger passing down through said aperture, folding-slides moving from opposite directions upon the table toward said aperture synchronically with the plunger, means, substantially as described, for actuating the plunger, and spring-actuated pins projecting from the inner ends of said slides, substantially in the manner and for the purpose herein set forth.

10 3. The combination, in a paper-box-folding machine, of a table having a forming-aperture therein, a reciprocating plunger passing down through said aperture, and clamping-frames moving from opposite directions under the table to close and overlap upon said plunger, substantially in the manner and for the purpose herein set forth.

15 4. The combination, in a paper-box-folding machine, of a table having a forming-aperture therein, a reciprocating plunger passing down through said aperture, folding-slides moving from opposite directions upon the table toward said aperture and having spring-actuated fingers projecting from their inner
25 ends, clamping-frames moving from opposite directions under the table to close and overlap upon said plunger, and means, substan-

tially as described, for operating the plunger, slides, and clamping-frames, all substantially in the manner and for the purpose herein set forth. 30

5. The combination, in a paper-box-folding machine, of the table having a forming-aperture therein, the reciprocating plunger passing down through said aperture, the endless
35 conveying-tapes moving upon said table, the gumming-pads reciprocating vertically to and from the table, the paste-receptacle, the feed-roller therein, the travelling roller reciprocating horizontally to and from the feed-roller and under the gumming-pads when in
40 their elevated position, the driving-shaft, and the gearing, substantially as described, connecting the moving parts mediately with the driving-shaft, all substantially in the manner
45 and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOMAS FLYNN.

Witnesses:

A. N. JESBERA,
E. M. WATSON.