

No. 749,905.

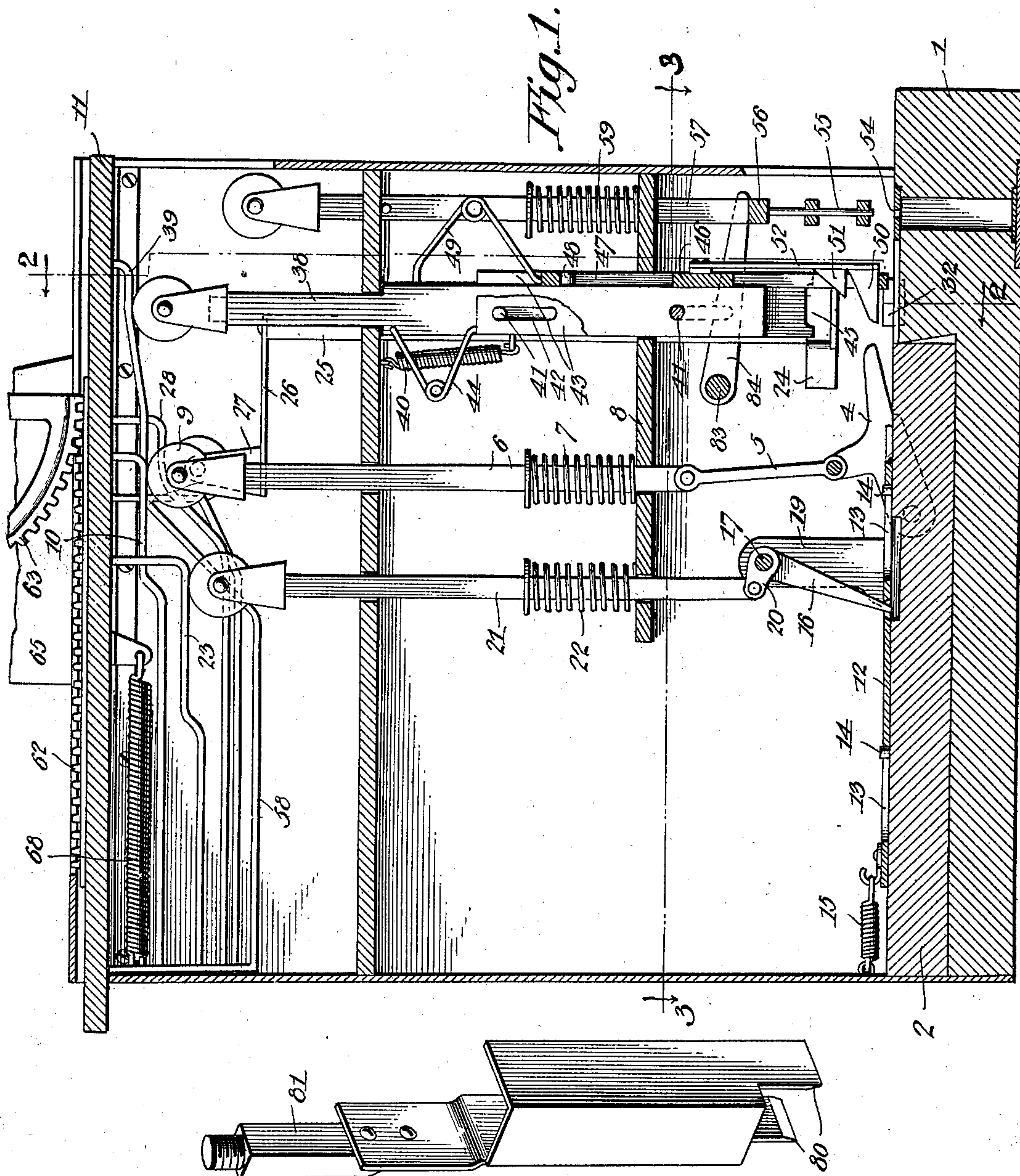
PATENTED JAN. 19, 1904.

S. D. RUTH.
PAPER CUTTING AND FOLDING MACHINE.

APPLICATION FILED JUNE 2, 1903.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses
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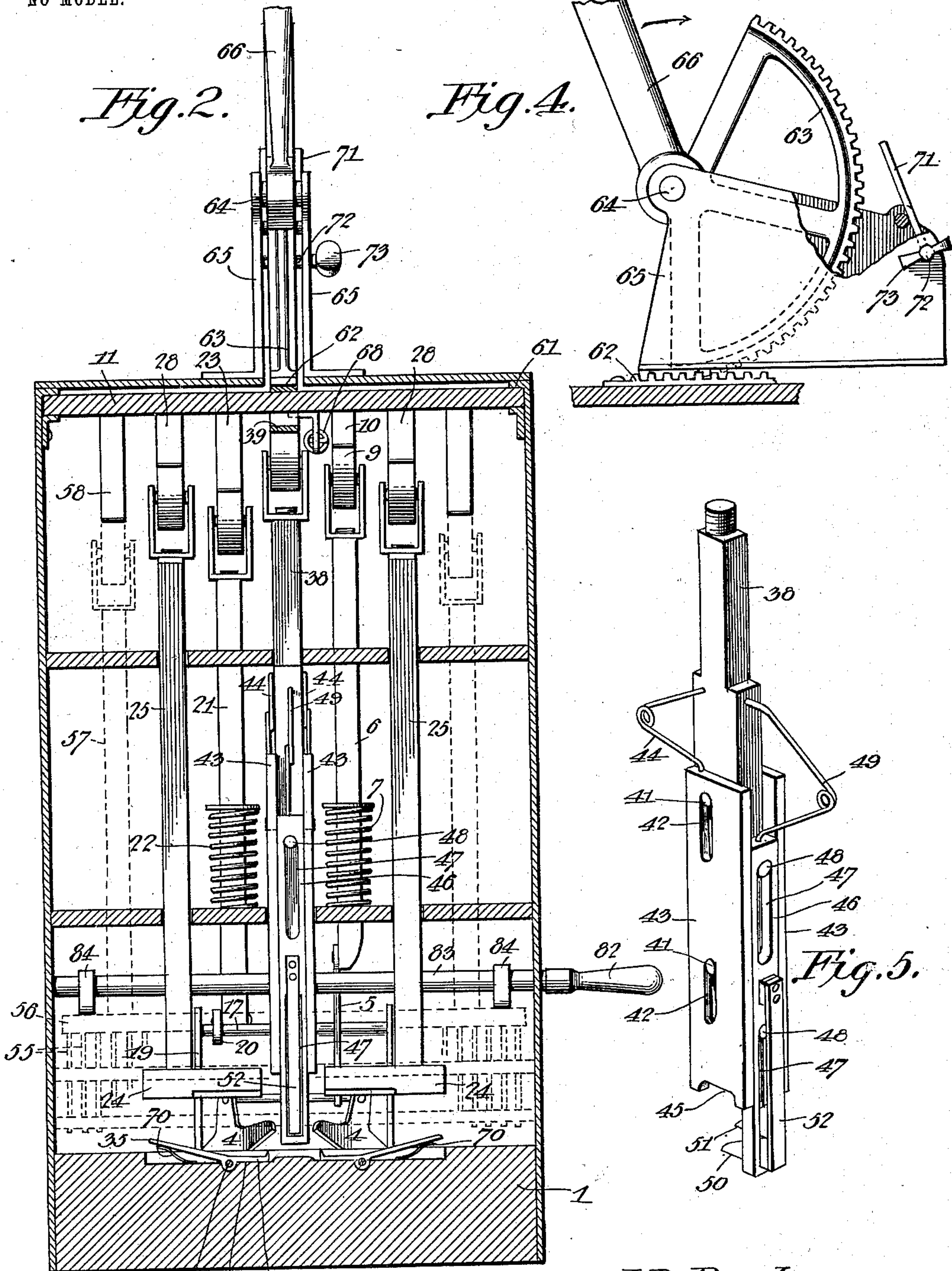
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3 SHEETS—SHEET 2.

Fig. 2.

Fig. 4.



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3 SHEETS—SHEET 3.

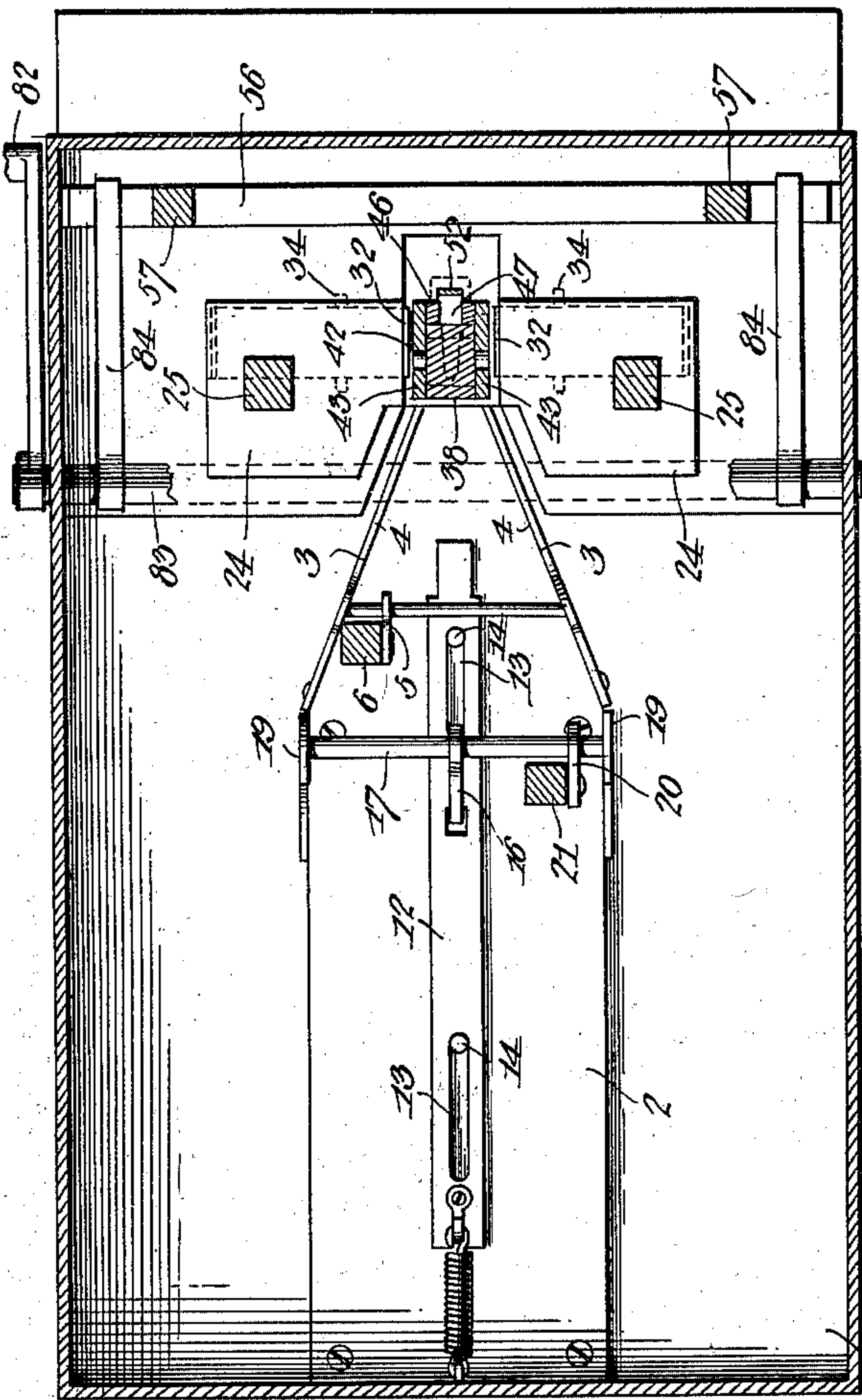


Fig. 3.

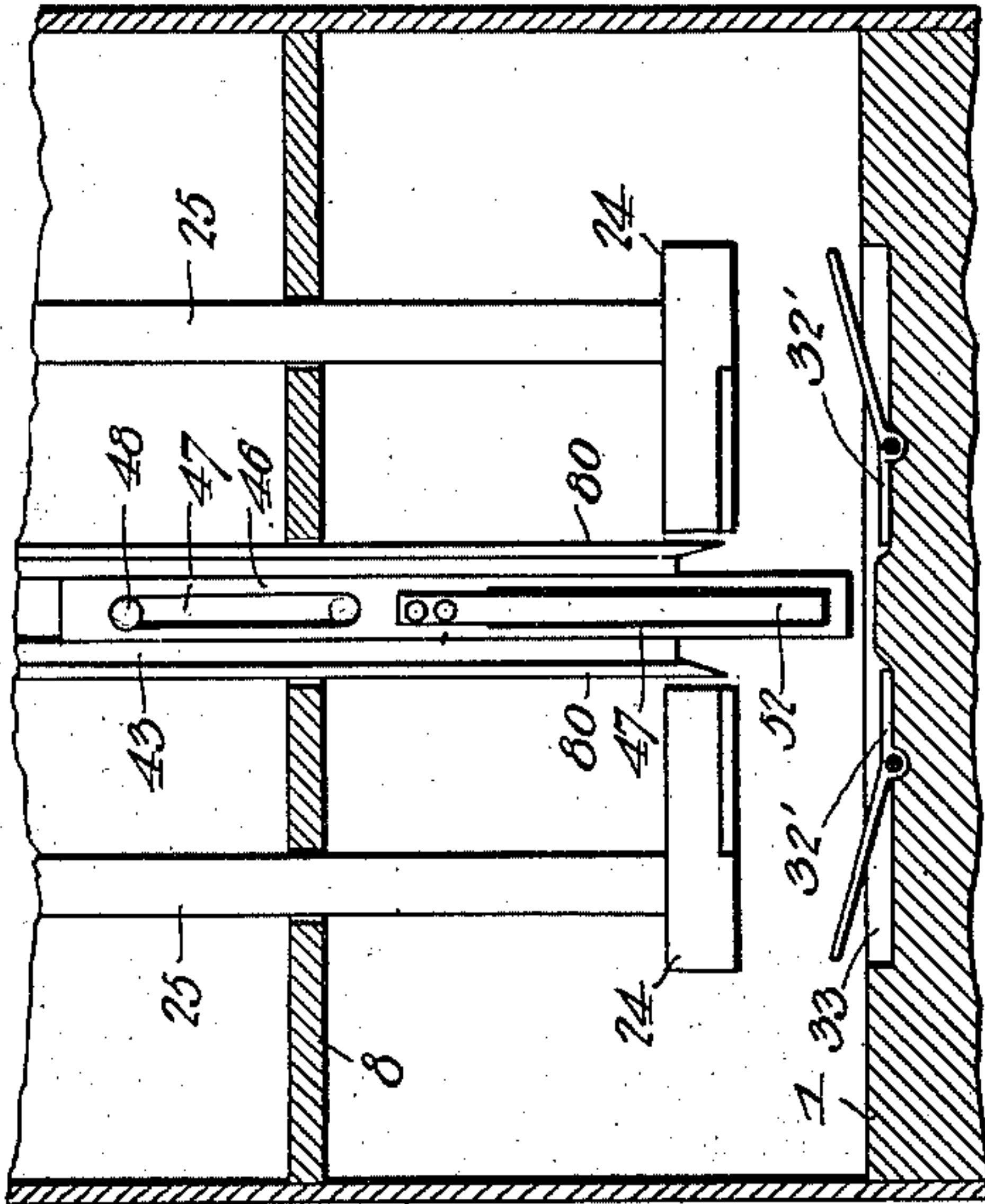


Fig. 7.

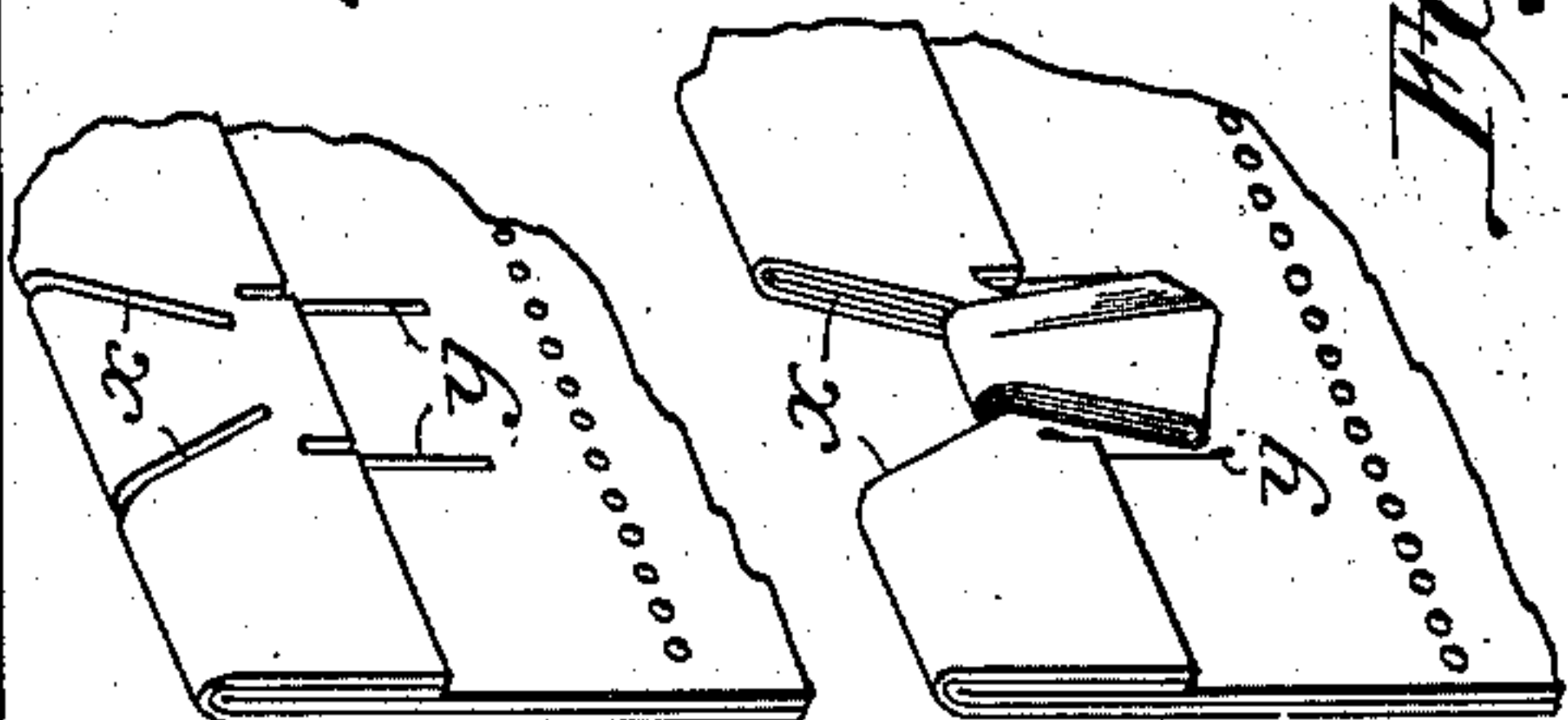


Fig. 9.

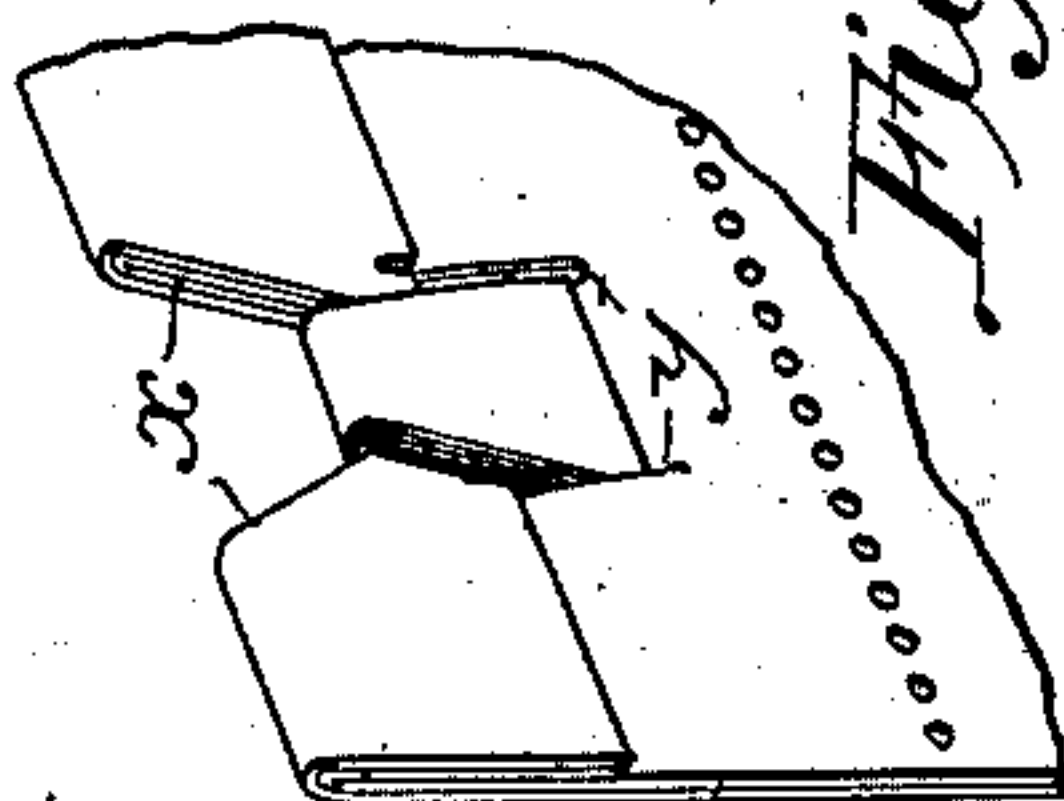


Fig. 11.

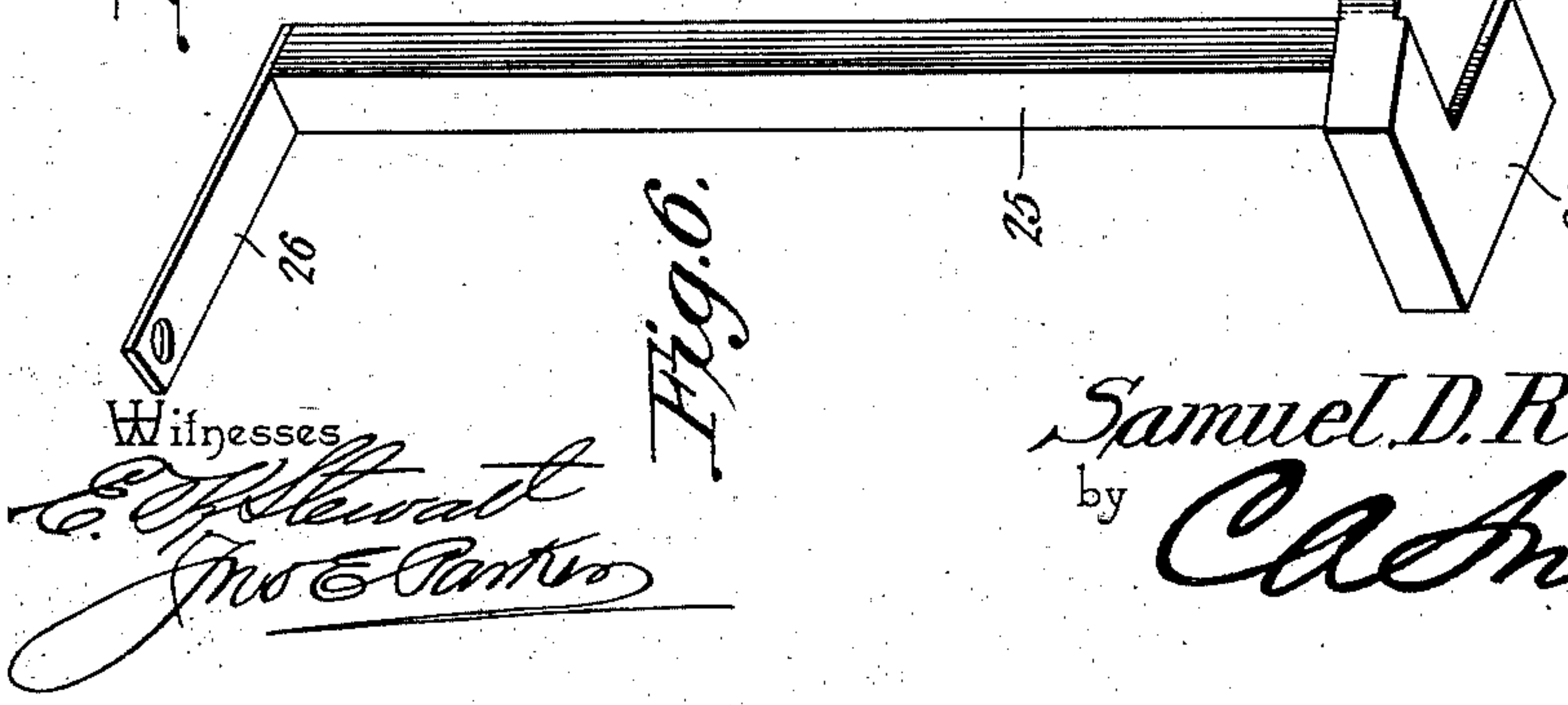


Fig. 6.

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UNITED STATES PATENT OFFICE.

SAMUEL D. RUTH, OF BEATRICE, NEBRASKA.

PAPER CUTTING AND FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 749,905, dated January 19, 1904.

Application filed June 2, 1903. Serial No. 159,791. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL D. RUTH, a citizen of the United States, residing at Beatrice, in the county of Gage and State of Nebraska, have invented a new and useful Paper Cutting and Folding Machine, of which the following is a specification.

This invention relates to certain improvements in paper cutting and folding machines, and has for its principal object to provide a device for securing together envelopes, sheets of paper, folded circulars, and the like by the formation of incisions at the edges of the sheets or envelopes, and thence bending back and securing the tongue or tongues formed by such incisions.

A further object of the invention is to provide a machine for securing envelopes, circulars, and the like for mailing purposes, and at the same time there will be formed in such envelop or circular a row of perforations, incisions, or indentations of such nature as to permit the ready detaching of the end portion of the envelop by the person receiving the mail.

A still further object of the invention is to provide a device of this character in which provision is made for operating either the cutting and folding mechanism and the perforating attachment at one operation or permitting the operation of the cutting and folding mechanism without using the perforator, the perforations being unnecessary where sheets of paper are to be secured together as a substitute for eyelets or other forms of paper-fasteners.

With these and other objects in view, as will more fully appear hereinafter, the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of a paper cutting, folding, and perforating machine

constructed in accordance with the invention. Fig. 2 is a transverse sectional elevation of the same on the line 2 2 of Fig. 1. Fig. 3 is a sectional plan view of the machine on the line 3 3 of Fig. 1. Fig. 4 illustrates in detail the operating member of the machine. Fig. 5 is a perspective view of a portion of the mechanism for folding and securing the tongue in place. Fig. 6 is a detail perspective view of one of the paper-clamping devices. Fig. 7 is a view corresponding in part to Fig. 2 and illustrating a slight modification of the invention. Fig. 8 is a detail perspective view of a pair of the cutting-knives employed in the modified structure. Fig. 9 shows the manner in which the slits and perforations are formed in the paper. Fig. 10 is a view showing the tongue of paper partly folded. Fig. 11 shows the completed article, the side portions of the wedge-like tongue having been introduced through the parallel incisions in the paper.

Similar characters of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The device forming the subject of the present invention is designed to be used for the securing together of a number of superposed sheets of paper for the fastening of envelopes or folded circulars to take the place of eyelets, adhesive material, and other forms of paper-fasteners, and it may be used in offices for securing a number of sheets of paper together or in sending out printed matter where in order to lessen the amount of postage the envelopes or circulars must be fastened in such manner as to permit ready inspection by the postal authorities.

On a suitable base 1 is secured a plate 2, one end of the latter being provided with converging side walls 3, forming cutting edges, which in connection with pivoted knives 4 serve to form a pair of convergent incisions α in the paper or envelop. These incisions form a wedge-like tongue, which is afterward bent over by a suitable slide, and its opposite side is inserted in a pair of parallel incisions γ , formed in the paper at a point adjacent to the tongue. The two knives 4 are pivoted to pins projecting from the side walls of the plate 2 and are connected by a link 5 to vertically-

movable rod 6, which are normally held in an elevated position by a small helical compression-spring 7, the lower end of which bears on a cross-bar or plate 8. The upper end of the
 5 bar 6 is provided with a small roller 9 for contact with a cam 10, carried by a movable slide 11, and when the slide is reciprocated this cam forces the knives downward and forms the convergent incisions in the paper.

10 Resting on top of the plate 2 is a slidable tongue 12, having slots 13, into which enter small pins 14, projecting from the top of the plate and serving as guides. This tongue is normally held in an inoperative position by a
 15 spring 15, and in order to force it forward to engage with the paper tongue there is employed a rock-lever 16, carried by the rock-shaft 17 and adapted to suitable bearing-openings in standards 19 at opposite sides of the
 20 plate 2. The rock-shaft is provided with a second arm 20, which is connected to a vertical bar 21, normally held in elevated position by a spring 22, although the spring 15 may be utilized for the purpose. The upper end
 25 of the bar 21 is provided with an antifriction-roller bearing against a cam 23, carried by the slide 11, and are timed with respect to the cam 10 has to operate only after the cutting-knives have been depressed to form the convergent
 30 incisions in the paper.

At a point adjacent to each of the knives 4 is a paper-clamping block 24, which engages with and holds the paper and envelop in position during the cutting operation. Each of
 35 these blocks is carried by a vertically-guided bar 25, which at its upper end is provided with a spring 26, formed of a strip of metal connected at one end to the bar and at its opposite end to a bifurcated bracket 27, carrying
 40 a small roller in engagement with a cam 28, also carried by the slide 11. These paper-clamps are depressed at the beginning of the operation, being practically the first part of the mechanism to be actuated, and as they fulfil
 45 another purpose aside from clamping the paper, as described hereinafter, the springs 26 will permit of the necessary yielding movement in order to prevent mutilation of the paper and to permit the machine to accommodate
 50 itself to paper of different thickness.

In order to form the parallel incisions *y* in the paper, one edge of each of the clamping-blocks 24 is sharpened to form a cutter, and coacting therewith is a secondary cutter 32,
 55 arranged in a small recess 33 in the bed-plate 1 and pivoted at a point intermediate of its length on a pin 34. The cutting edge projects upward in proper position with respect to the cutting edge of the clamping-block, and
 60 each of these cutters is provided with a laterally-extending arm 35, which on the downward movement of the clamping-block is depressed and forces the cutting edge upward, the knife passing through the paper and slightly raising
 65 the same. In this case the working contact

of the clamping-block takes place through the paper, but it will of course be understood that the arms 35 may be continued out a sufficient distance to permit their operation by
 70 an auxiliary means, such as additional cams on the slide 11. The operation of this mechanism is to slightly raise the outer side of the paper or that portion outside the parallel incisions, as well as to cut such incisions, so
 75 that the opposite inclined edges of the paper tongue may be more readily inserted.

38 designates a vertically-guided bar having at its upper end a small roller bearing against a cam 39 on the slide 11 and normally
 80 held in an elevated position by a small spring 40. On the opposite sides of this bar are projecting pins 41, extending into slots 42, formed in opposite slides 43. The slides are normally held elevated by small springs 44
 85 and their lower ends are recessed, as indicated at 45, so as to permit the ready introduction of the inclined tongue into the parallel incisions formed in the paper. This bar 38 carries a vertically-movable slide 46, having slots
 90 47 for the reception of pins 48, projecting from the front face of the bar 38. The slide 46 is held elevated by a spring 49 and its lower portion is provided with a vertically-disposed slot to permit the passage of two
 95 angular blocks 50 and 51, carried by a flexible strip 52, the upper end of which is secured to the slide 46. The lowermost of the blocks is designed to form a folding mandrel for the paper tongue immediately before its introduction
 100 through the parallel incisions, while the upper block forms a cam to be engaged by the lower end of the bar 38 in order to force the lower block outward against the action of the spring 52, and thus disengage it
 105 from the paper.

The perforating mechanism comprises a female die 54 and male dies 55 of any desired number arranged in a row across the front
 110 portion of the machine, the male dies being carried by a transverse bar 56, to which is connected a pair of vertical bars 57, having small antifriction-rollers adapted to bear against cams 58, and these cams are so situated
 115 as to come into play only after all the other operations have been completed, so that should the perforations not be desired the operation can be stopped when the inclined tongue has been inserted through the incisions. The two
 120 bars 57 are provided with springs 59, which serve to maintain them and the male die in elevated position, so that the paper may be readily inserted into the machine.

The slide 11 is arranged in suitable guide-ways 61 at the top of the machine, and on the
 125 upper surface of said slide is a rack 62, engaged by a gear-segment 63, mounted on a suitable shaft 64. The shaft 64 has bearings in the parallel plates 65, and to said shaft is secured an operating-handle 66, which may be
 130 grasped when the machine is to be used.

In the operation of the mechanism as thus far described the gear-segment is turned to move the slide 11, and the cams 28 thereupon depress the bars 25 and force the clamping-blocks 24 into engagement with the paper. When the movement of the blocks is complete, the cutting-knives 32 have been elevated and forced through the paper to form the parallel incisions. During this operation the bars 6 have been depressed by the cams 10 and have formed the convergent incisions α in the edge of the paper. These knives remain in depressed position during the forward movement of the tongue 12, and the forward edge of the latter engages the paper and forces the tongue backward on the body of the paper; but before this operation is complete the cam 39 has acted on the bar 38 and moved the lower block 50 into a position immediately under the tongue. The tongue and paper when bent over then rest on the block 50, and as the bar 38 continues its movement downward the slides 42 are moved downward into engagement with the paper at a point within the parallel incisions without obstructing the latter, the recesses 45 of the lower edge of said slides being of approximately the same length as the incisions. The horizontal wall of the recessed portion will, however, engage with the opposite sides of the wedge-like tongue and force the same downward over the bending-block 50, the tongue assuming approximately the position shown in Fig. 10 and its inclined edges being then in readiness to pass through the incisions. Continuing the downward movement of the bar 38, cam 39 forces a pin near the lower end of said bar into engagement with the cam-block 51, forcing the latter toward the front of the machine against the resistance offered by spring 52. This moves the lower bending block or anvil out from under the tongue and permits the bar to continue its downward movement until it comes into contact with the paper tongue. The inclined sides of the tongue are gradually forced through the parallel incisions and under the small cutting-knives 32. This completes the operation, and the parts are then allowed to return to normal position by releasing the segment and permitting the retractile spring 68 to withdraw the slide. As the parts move forward the knives 32 will be withdrawn from the parallel incisions by small springs 70, leaving the paper to be removed from the machine. Should it be desired to form perforations in the paper, the operating-lever 66 is moved to its fullest extent and the male dies are forced downward through the paper to form the perforations. When the perforations are not required, provision is made against accidental movement of the dies by the employment of the stop-arm 71, carried by a small pivot-pin 72. The pivot-pin is mounted in suitable openings in the side plates 65 and at one end is provided with a

thumb-piece 73, by which the arm is turned into the path of movement of the operating-lever 66, and thus stop the operation of the machine before the perforating-dies can act, or by dropping the stop to a substantially horizontal position the lever may move to a greater angle and effect the operation of the perforating-dies.

In constructing the machine certain modifications may be resorted to without departing from the invention, and in Figs. 7 and 8 I have illustrated one slight modification wherein the bar 38 forms a guide for a pair of cutting-knives 80, the shank portion of which is bent to embrace the opposite sides of the bar, and the upper end of such shank portion is provided with a vertically-extended bar 81, which may be operated by means of an additional cam on the slide 11. When these cutting-knives are used, the knives 32 are dispensed with and simple lifting-plates 32' are employed in lieu thereof. The knives are moved downward to cut the parallel incisions, and as the clamping-blocks descend the pivoted plates 32' are forced upward to lift that portion of the paper beyond the incisions, and thus open the latter for the more ready insertion of the sides of the paper tongue.

In some cases, especially where the paper is extremely heavy, it is found difficult to force the male perforating-dies through the material by means of the operating-lever, and in order to assist in the operation I employ an auxiliary lever 82, arranged at one side of the machine and connected to a rock-shaft 83, which extends transversely across the frame and is provided with a pair of rocker-arms or cams 84, adapted to engage with the transverse bar carrying the male dies.

In constructing the machine the parts herein shown may be duplicated in order to form as many tongues as required in a single operation; but for the sake of convenience only one set of operating mechanisms has been shown.

Having thus described the invention, what is claimed is—

1. In a device of the class specified, the combination with knives for forming convergent incisions, of knives for forming parallel incisions, means for raising the material at the outer wall of such parallel incisions, means for bending the tongue formed by the convergent incisions, and means for introducing the opposite sides of the tongue through the parallel incisions.

2. In a device of the class specified, cutting-knives for forming convergent incisions, pivotally-mounted blades for the formation of parallel incisions and for elevating the material at the outer walls of such parallel incisions, means for bending the tongues formed by the convergent incisions, and means for forcing the sides of said tongue through the parallel incisions.

3. In a device of the class specified, the com-

5 combination with a recessed bed-plate, of a pair
 of strips of metal each provided at one end
 with a cutting edge and the opposite end of
 each being bent upward to extend above the
 10 upper surface of the bed-plate, clamping-
 blocks having cutting edges adapted to coact
 with those of the strips, said cutter-blocks
 causing operative movement of the strips by
 indirect contact with the upwardly-extending
 15 portions of the strips, means for forming con-
 vergent incisions in the edge of the paper,
 means for bending the so-formed tongue, and
 means for forcing the side portions of said
 tongue through the parallel incisions.

15 4. In a device of the class specified, a re-
 cessed base, a pair of pivoted strips disposed
 within the recesses, cutting edges arranged
 at one end of each strip, an upwardly-bent
 arm at the opposite end of each strip, yield-
 20 ably-mounted clamping-blocks having cutting
 edges coacting with those of the strips, said
 blocks being adapted to move the cutting-
 strips to operative position by indirect con-
 tact with the upwardly-bent arms and the
 25 lower portion of each block being recessed to
 permit upward movement of the strip, means
 for forming convergent incisions in the paper,
 means for bending the tongue formed by such
 incisions, and means for forcing the opposite
 30 edges of said tongue, through the parallel in-
 cisions.

35 5. In a device of the class specified, means
 for forming convergent incisions, means for
 forming parallel incisions, means for bending
 the tongue formed by the convergent inci-
 sions, a vertically-movable bar for engaging
 the tongue and moving the same through the
 parallel incisions, a spring having indirect
 connection with said bar, an inclined bend-
 40 ing-anvil carried by the spring, and a cam-
 block also carried by the spring at a point
 above the anvil and adapted to be engaged by
 said bar on the downward movement of the
 latter.

45 6. In a device of the class specified, the com-
 bination with means for forming convergent
 incisions, of means for forming the parallel
 incisions, means for bending the tongue formed
 by the convergent incisions, means for forc-

ing the opposite sides of such tongues through 50
 the parallel incisions, means for perforating
 the article being operated upon, and a single
 operating mechanism common to all of such
 means.

55 7. In a device of the class specified, the com-
 bination with means for forming incisions and
 for bending the tongue, of a bed-plate having
 female dies, a transverse bar, a plurality of
 male perforating-dies carried thereby, verti- 60
 cal bars carrying the transverse bar, a mov-
 able slide, and cams carried by said slide and
 serving as an operating means for all of the
 movable parts of the machine.

65 8. In a device of the class specified, the com-
 bination with a bed-plate, means for forming
 convergent incisions, means for forming the
 parallel incisions, means for bending the
 tongue formed by the convergent incisions,
 means for inserting the opposite sides of said 70
 tongue through the parallel incisions, means
 for perforating the paper, a slide, and a plu-
 rality of cams carried by the slide, said cams
 being so disposed as to permit of the opera-
 tion of the perforating means after the tongue
 has been inserted, and an adjustable strip for 75
 limiting the movement of the slide, substan-
 tially as specified.

80 9. The combination with a bed-plate, of
 means for forming convergent incisions, means
 for forming parallel incisions, means for bend-
 ing the tongue formed by the convergent in-
 cisions, means for forcing the opposite sides
 of such tongue through the parallel incisions,
 a perforating means, a movable slide, a plu-
 85 rality of cams carried by the slide and serv-
 ing to operate all of such means, a rack car-
 ried by the slide, a gear-segment engaging
 with the rack, an operating-handle connected
 to the gear-segment, and a stop adjustable
 into and out of the path of movement of said 90
 operating-lever.

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

SAMUEL D. RUTH.

Witnesses:

HOWARD V. MILLER,
 ARCHIE SHULTZ.