

(No Model.)

4 Sheets—Sheet 1.

G. L. JAEGER.

MACHINE FOR APPLYING FASTENING STRIPS TO BOXES.

No. 442,526.

Patented Dec. 9, 1890.

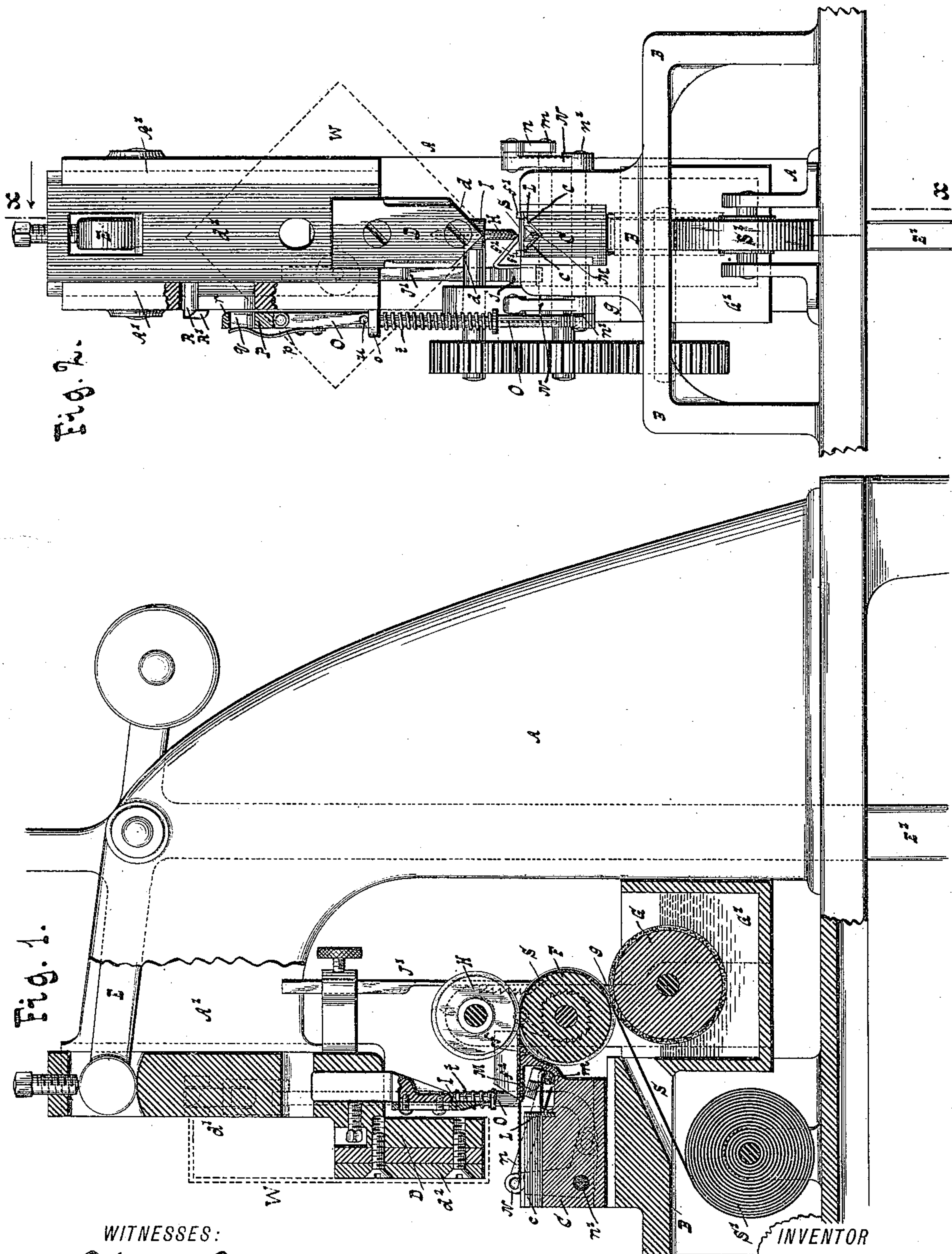


Fig. 1.

Fig. 2.

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BY

*Van Santvoord & Hauff*

his ATTORNEYS

(No Model.)

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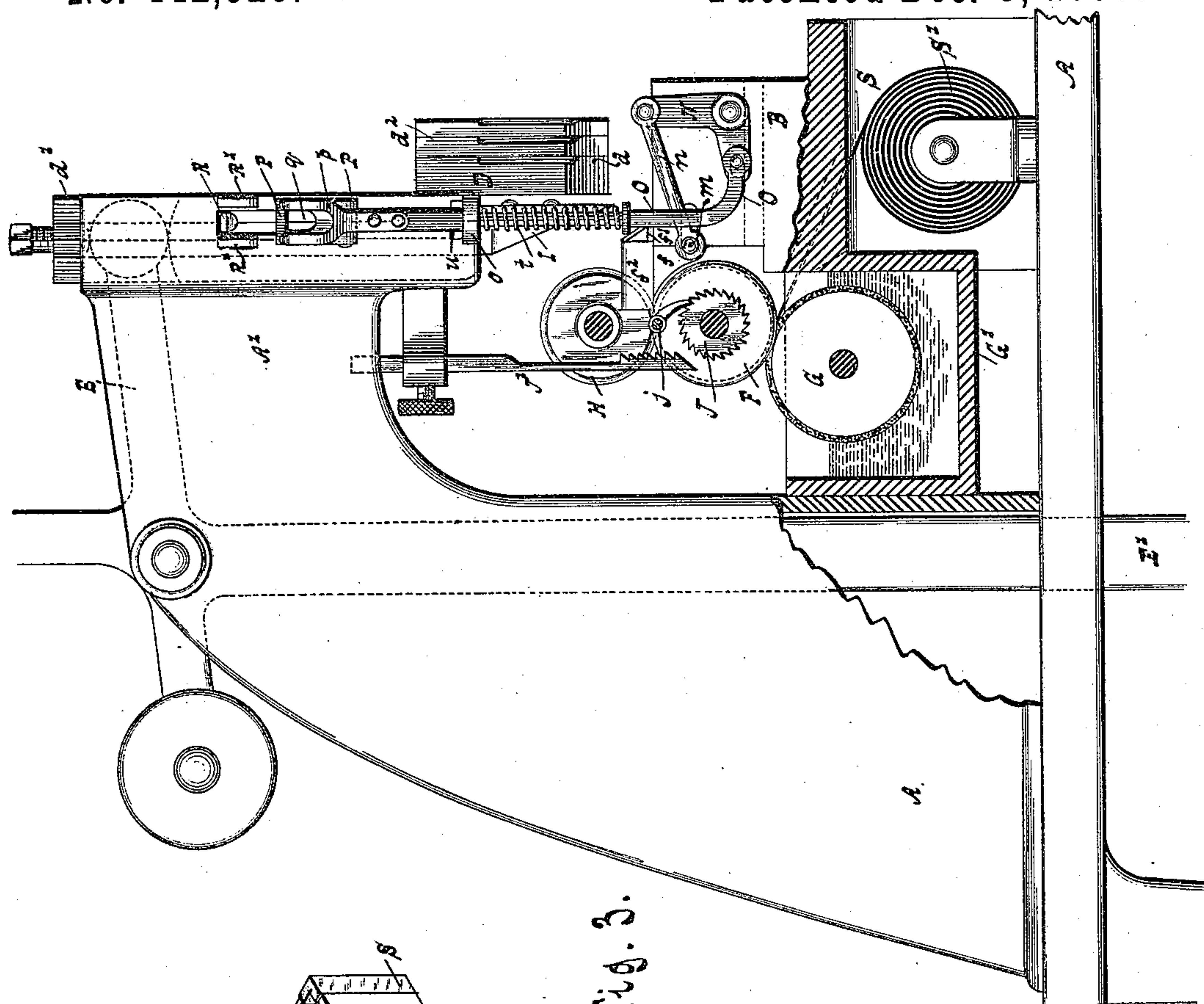


Fig. 3.

Fig. 4.

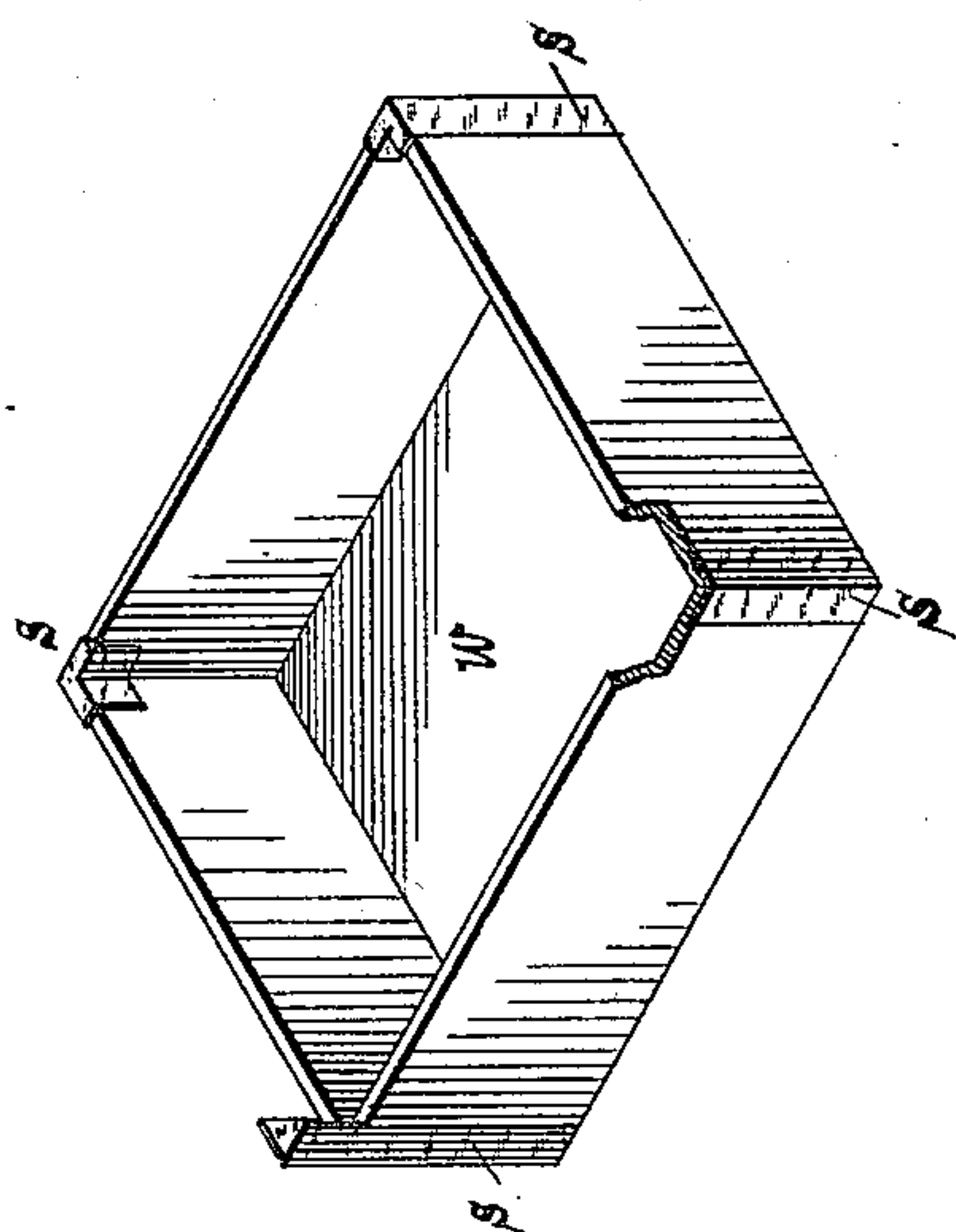


Fig. 5.

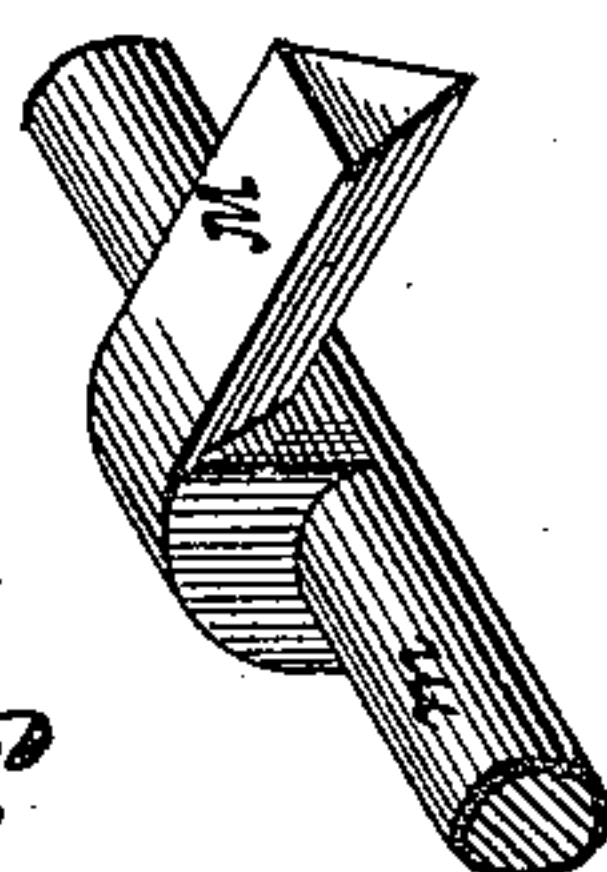
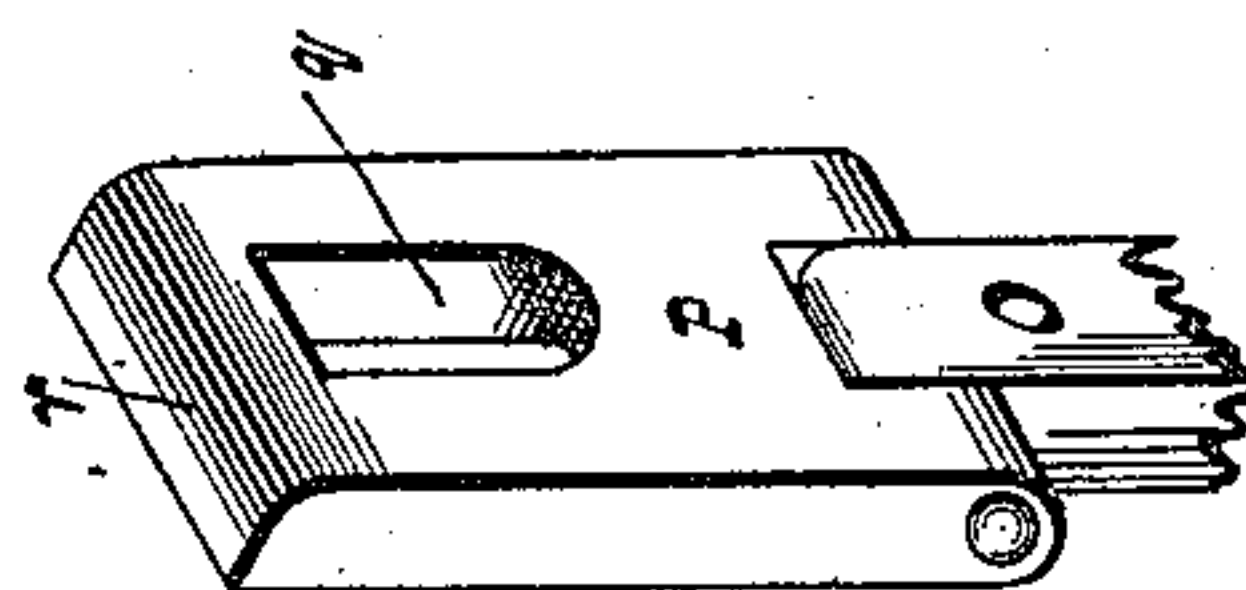


Fig. 6.



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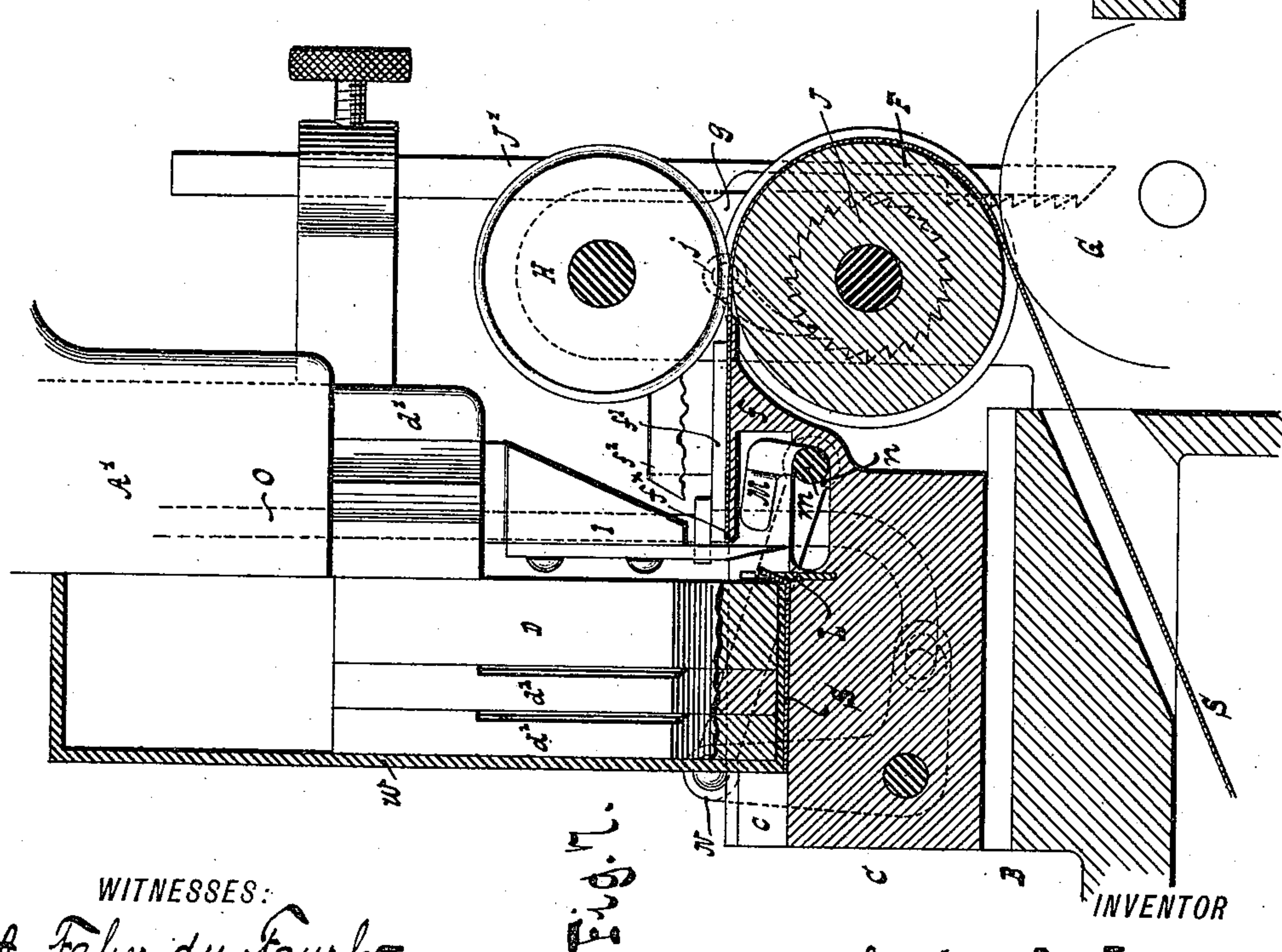
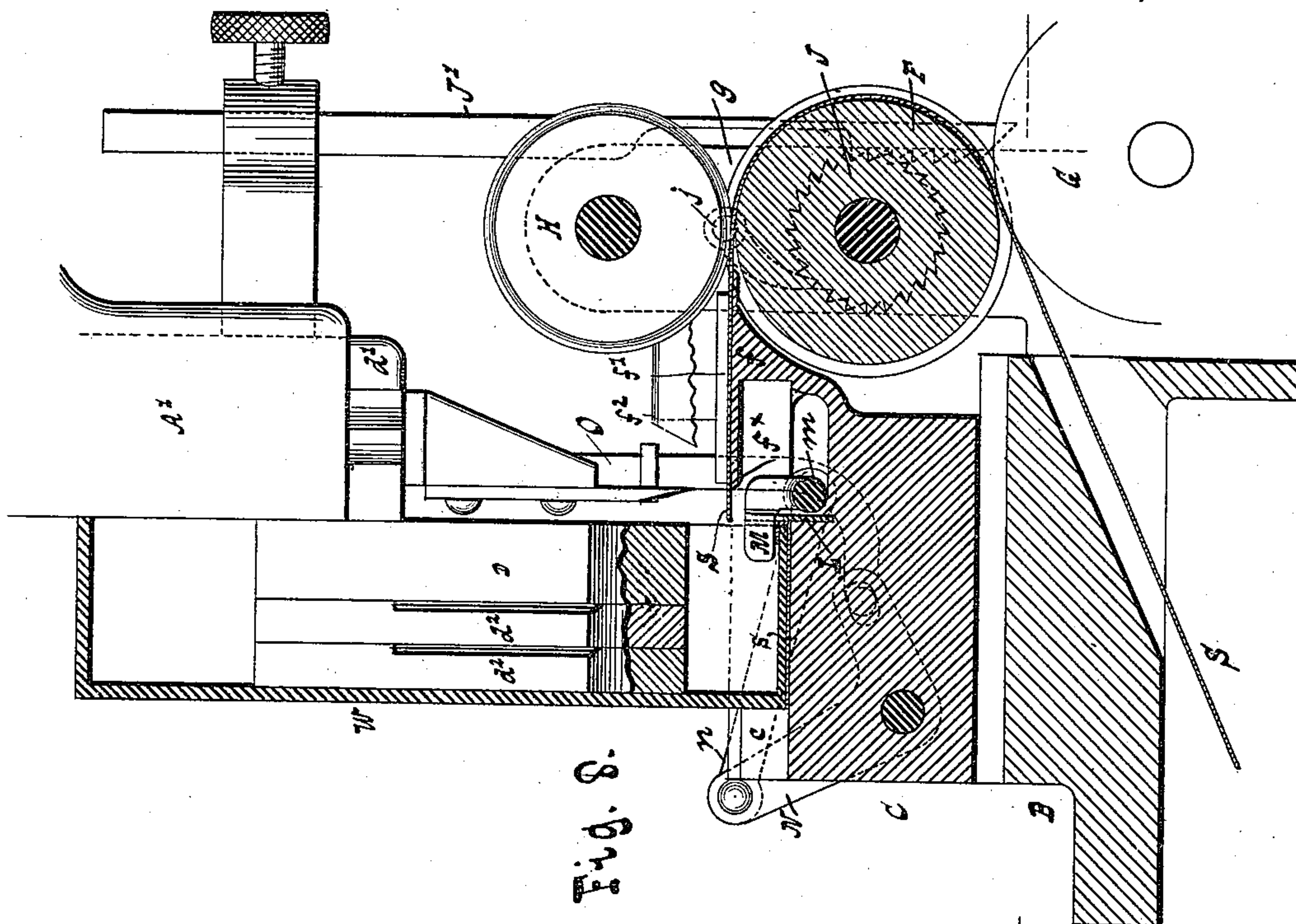
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WITNESSES:

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(No Model.)

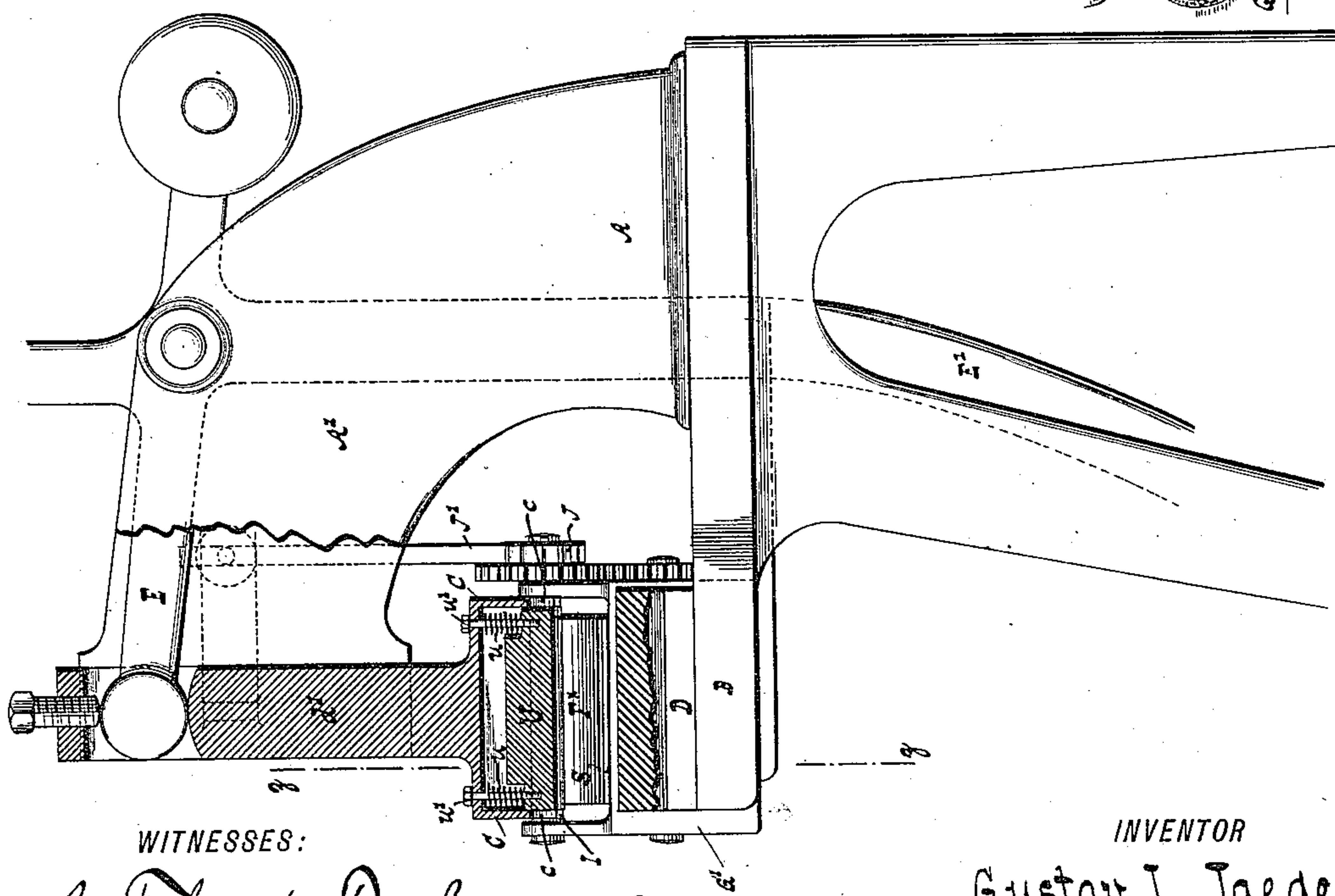
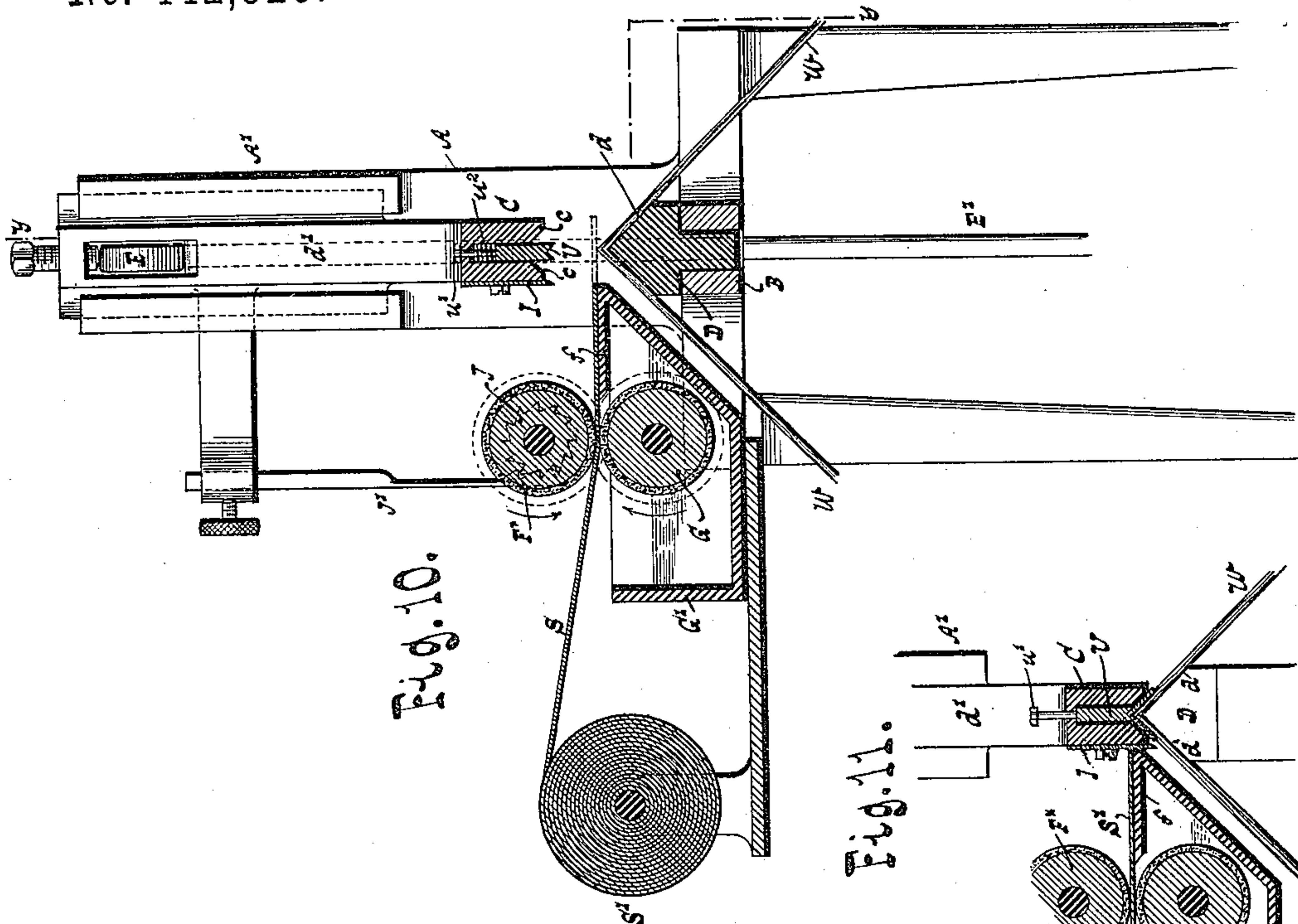
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Fig. 9.

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# UNITED STATES PATENT OFFICE.

GUSTAV L. JAEGER, OF NEW YORK, N. Y.

## MACHINE FOR APPLYING FASTENING-STRIPS TO BOXES.

SPECIFICATION forming part of Letters Patent No. 442,526, dated December 9, 1890.

Application filed September 23, 1887. Serial No. 250,535. (No model.)

*To all whom it may concern:*

Be it known that I, GUSTAV L. JAEGER, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Machines for Applying Fastening-Strips to Boxes, of which the following is a specification.

My invention relates to a machine for applying fastening-strips to boxes; and it consists in certain mechanism for intermittently feeding the strip directly between a punch and die, mechanism for cutting the same to any particular length to correspond with the depth of the box operated upon, means for applying the several strips to the box, and devices for turning inward and downward one end of the strip to secure the same to the inner surface of the sides of the box, all of which is fully pointed out in the following specification and claims and illustrated in the accompanying drawings, in which—

Figure 1 represents a vertical section in the plane  $x x$ , Fig. 2, of a machine embodying my invention. Fig. 2 is a sectional front elevation of the same. Fig. 3 is a sectional side elevation. Fig. 4 is a perspective of a box with the fastening-strips applied. Figs. 5 and 6 are perspective views of detail parts, said views being drawn to a larger scale than the preceding figures. Figs. 7 and 8 are vertical sections illustrating the operation of the machine. These figures are also drawn on an enlarged scale. Fig. 9 is a vertical section in the plane  $y y$ , Fig. 10, of a modified form of machine, said figure being drawn on the same scale as Fig. 1. Fig. 10 is a vertical section in the plane  $z z$ , Fig. 9. Fig. 11 is a sectional elevation of part of the operating mechanism in a different position from that shown in Fig. 10.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates a frame suitably constructed to sustain the operating parts of the machine, and B is a table forming part of the frame, which table is properly made to receive and support a die C. The cheeks  $c c$ , Fig. 2, of said die form an angle of ninety degrees with each other to adapt the die for the reception of the corner of the box, as W, Fig. 4, to which the fastening-strips are to be applied. The punch D is lo-

cated above the die and is provided with cheeks  $d d$ , Fig. 2, extending parallel with those of the die C. Said punch is movable in the direction of its length, its shank  $d'$  being guided in vertical ways formed in an overhanging portion A' of the frame A, and it is moved toward and from the die C by any suitable mechanism, such, for instance, as shown in the drawings, by a weighted bell-crank lever E E', Figs. 1, 2, and 3, which is pivoted to the frame and is vibrated by the foot of the operator. It will be observed that the punch projects outward from its shank, which permits the box W to be placed thereon in the proper position without interference, as best seen in Figs. 7 and 8.

The fastening-strip S is fed directly between the punch and die by any suitable feeding device. In the example illustrated it is drawn from a roll S', best located directly beneath the table B, by a feed-roll F, which rotates in contact with a combined feed and paste roll G, located within a paste-fount G'. The shafts of both rolls have suitable bearings in a standard  $g$ , Figs. 1, 2, 7, and 8, extending vertically from the paste-fount. If the fastening strip has been previously supplied with a dry coating of mucilage, water is supplied to moisten the same by the paste-roll G. The feed-roll F is so located that the strip S passing from the same is on a level with the upper surface of the die C, to which it is fed. The inner end of the die is prolonged, Figs. 1, 7, and 8, to form a flat support  $f$  for the fastening-strip S, and suitable parallel guides, as  $f' f'$ , located on the upper surface of the die C, are provided to keep the strip central with the die as it moves toward and over the same. A presser-plate  $f^2$  holds the fastening-strip down upon the support  $f$ .

A creasing device, such as a roll H, having moderately-keen edges, rotates above the feed-roll F and engages with the fastening-strip, forming therein a continuous central depression or crease. This crease facilitates the bending of the strip, and also acts to guide the paper into a correct position as the corner of the box comes into contact therewith.

The cutter I, which can be in the form of a keen edged knife or chisel, is located in proximity to the rear of the punch and severs



the fastening-strip into definite and equal lengths.

It will be observed that the shafts of the creasing-roll and the feed and paste rolls are connected by suitable gears, as shown in Fig. 2.

To protect and securely fasten the lower free edges of the box, the fastening-strip (see Fig. 4) is usually carried over said edges and secured in the interior of the box. In view of this the fastening-strip must be cut into pieces somewhat longer than the depth of the box, and for this purpose the cutter I is set at the proper distance from the rear end of the punch.

A motion toward and from the fastening-strip can be imparted to the cutter I by any suitable mechanism; but in the example shown in the drawings I have secured the cutter directly to the shank  $d'$  of the punch, such being the most convenient way of obtaining the requisite motion. The cutter passes directly in front of a sharp edge  $f^*$ , Fig. 8, of the support  $f$ , whereby the strip is severed.

The usual devices for effecting the adjustment of the cutter with regard to the strip are provided. The cutter is best set to act slightly in advance of the punch D, so as to sever the fastening-strip before it is engaged by the latter, whereby the severed length is prevented from being crumpled.

To intermittently feed the fastening-strip forward through the desired distance, any suitable feeding device can be employed. In the example shown in the drawings (see Fig. 3 especially) a ratchet-wheel J is rigidly secured to the shaft of the feed-roll F, which ratchet-wheel is in a position to be engaged by a toothed bar  $J'$ , which is adjustably secured to the shank of the punch D, and consequently moves with the same. The bar  $J'$  may be hinged or provided with a thin portion, as shown, so that it can yield on its descent to clear the teeth of the ratchet-wheel J, which is held stationary during this stroke of the bar  $J'$  by a pawl  $j$ , pivoted to the standard  $g$ . In the upward stroke of the toothed bar  $J'$  the teeth thereof engage with the ratchet-wheel to rotate the same, thereby actuating the feed-roll F to move the fastening-strip.

On inspection of Fig. 7 it will be noticed that the punch D intersects the path of the fastening-strip, and consequently the feed must be so timed that the strip will not come into contact with the same. This is accomplished by so setting the toothed bar J with respect to the ratchet-wheel  $J'$  that it does not engage the same until the proper time. (See Fig. 8.)

To adapt the machine for boxes of any particular depth, plates  $d^2$  are provided, which can be secured by screws to the punch D, so as to bring the top or free edge of the box always in the same vertical plane, which is necessary to preserve equal lengths of the overlapped portions of the severed strips, and

also for the correct operation of the device which performs this overlapping. With varying depths of boxes the feed must be varied correspondingly, which can be accomplished by adjusting the position of the toothed bar  $J'$  with respect to the ratchet-wheel J. By setting the same lower less teeth are caused to engage with the ratchet-wheel and a smaller feed is the result, and vice versa. The adjustment of the feed can also be effected by using ratchet-bars  $J'$ , each having thereon a particular number of teeth to correspond to a particular length of feed desired.

To carry over and to lay the fastening-strip in the corner of the box devices as follows are employed: At the inner ends of the die cheeks  $c$ , or in a position a trifle beyond the edge of the box when the latter is in the die, is formed a ledge or projection L, which extends outwardly from said cheeks and engages with the fastening-strip S just beyond the edge of the box as the latter descends in the die, whereby said strip is turned about the edge of the box to occupy a position approximating that shown in Fig. 7. This ledge or projection L, I shall hereinafter term the "strip-turner" L. When the end of the fastening-strip is thus turned it is in a position in which it can be engaged by a folder M, Figs. 1, 2, 5, 7, and 8, on the subsequent withdrawal of the punch D. This folder completes the turning or bending of the strips and lays the bent-over portion upon the interior of the sides of the box.

The folder is provided with two cheeks, forming an angle of ninety degrees with each other to correspond to the angles of the box. It is secured to a shaft  $m$ , having bearings in a slot extending horizontally through the die and table. To the ends of said shaft  $m$  are rigidly attached links  $n$ , which connect said shaft with the vertical arms of crank-levers N N, that are secured to the opposite ends of a rock-shaft  $n'$ , having bearings in the table. The horizontal arm of one crank-lever N has a pin-and-slot connection with a rod O, Figs. 2 and 3 especially, which extends upwardly and is vertically guided in a box  $o$  on the frame of the machine. To the upper end of the rod is hinged an arm P, (see, also, Fig. 6,) which is normally held in line with the rod by a spring  $p$ , bearing upon the arm. In said arm P is a slot  $q$ , which can receive a pin R, secured to the shank  $d$  of the punch D. This pin, engaging the arm P at the upper end of the slot, carries the same upward with it until a cam-surface  $r$ , Fig. 6 especially, on said arm engages with stationary cams  $R'R'$ , whence the hinged arm is swung outward and clear from the pin. A retractor—such as a spring  $t$ , encompassing the rod O, and confined between a shoulder on the same and the box  $o$  on the frame A—immediately withdraws the rod O on its release from the pin. A stop  $u$  on the rod O engages with the box  $o$  and checks the falling motion of the rod. During the rising motion



of the rod the folder M is carried forward toward the box W, and at the same time gradually turned downward or oscillated with the shaft *m*, whereby it is caused to engage the free end of the fastening-strip S and to lay the same within the box, as described, Fig. 8. During the fall of the rod O the folder is returned to its normal position, Fig. 7.

The oscillating motion of the shaft *m*, and consequently that of the folder M, is the result of the change in inclination of the links *n n* during the vibration of the crank-levers N N, Figs. 7 and 8. This oscillatory movement of the folder, combined with its translatory movement, causes the strip to be neatly and securely laid within the box.

The object of releasing the rod O, which actuates the folder, before the return or downward stroke of the punch D is to allow the folder to reach its normal position, Fig. 7, before the descent of the punch, as it will be seen from Fig. 8 that the folder operates during the upward stroke of the punch—i. e., when the same is out of the path of said folder.

It is evident that other mechanism can be employed to successfully actuate the folder, and consequently I do not wish to restrict myself to that described.

To prevent the fastening-strip from peeling off when the box is handled while in use, I cause the outer face of the strip to lie flush or a little below the faces of the box, (see Fig. 4,) so that they cannot catch into foreign bodies. This is done by making the cheeks *c c* of the die C of approximately one-half the width of the strip, and then causing the punch to descend with sufficient force to compress the material of the box, and thus force the strip inward and flush with the sides of the box. The same can be done in the case of the overlapping portion of the strip by causing the folder to act with sufficient force.

A machine embodying in its construction a device for feeding and fastening strips transversely is illustrated in Figs. 9, 10, and 11. In this machine the die C is made movable, and the punch D is rigidly secured to the table B and forms an anvil or support for the box, as before, said box being applied thereto, as shown in Figs. 10 and 11. The feeding device for propelling the strip directly between the punch and die is located on one side of the punch and feeds a strip having a width corresponding to the required length or depth of the strip as applied to the box. In the example shown in the drawings, Figs. 9, 10, and 11, the feeding device consists of two feed-rolls *F*<sup>x</sup> and G, one of which is located in a paste or water fount G'. The feed-rolls are actuated from the reciprocating die by a ratchet-wheel J and toothed bar J', but may be driven by any other suitable means. The strip S is fed over a support *f*, which can be conveniently formed on the paste-fount, and the inner side of which is parallel to and almost in line with a flat cutter I, attached to the corresponding side of the die C. At the

beginning of the downward stroke of the die C the feed-rolls *F*<sup>x</sup> and G are actuated and feed the strip S between the punch and die, that is over the corner of the interposed box W. (See dotted lines, Fig. 10.) After the completion of the feed the descending cutter I severs the strip. To additionally support the strip while being severed and to hold it firmly upon the interposed box, I make use of a clamp U, which is fitted loosely in a central longitudinal recess in the die, and is subjected to the action of springs *u*<sup>2</sup>, which tend to force it outward from the die to the position shown in Figs. 9 and 10, in which position its motion is arrested by stops *u' u'* engaging the die. In the outer end of the clamp is a longitudinal groove corresponding to the corner of a box. As the die descends toward the box the clamp U engages with the strip and holds it firmly while the strip is being severed by the cutter I. On the further movement of the die the clamp yields until its outer end lies flush with the cheeks *c c* of the die, Fig. 11. In this position its inner end engages with the end of the recess, and the clamp consequently forces an unyielding and operative portion of the die when said die is in engagement with the strip, Fig. 11.

Instead of having one long clamp, several short clamps could be arranged in the length of the die to produce the same effect.

I would have it understood that I do not herein claim the combination, with a die and support co-operating to lay the fastening-strip upon the corner of a box, of a yielding clamp fitted in the die and provided with diverging faces constructed to hold the strip against the corner of the box while said strip is being severed; neither do I claim the combination, with said above-named devices, of a feeding device for feeding the strip between the die and support and a cutter for severing the strip; nor yet the combination, with such above-mentioned mechanism, of a stop for said clamp and a spring made to engage the clamp, all of said combinations being described and claimed by me in an application for Letters Patent filed January 26, 1888, Serial No. 262,005.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a punch and die co-operating to lay the fastening-strip upon the corner of an interposed box, of a cutter for severing the strip into suitable lengths, a feed-roll, a ratchet-wheel on the arbor of said roll, and a yielding adjustable rack-bar carried by the punch or die and engaging with the ratchet-wheel during its movement in one direction only, substantially as shown and described.

2. The combination, with a punch and die of the folder M, the rod O, connected with the folder, a hinged arm on said rod, a spring acting on the same, a cam, as R', for tripping the hinged arm, a connection between the



hinged arm and the punch, and a retractor acting on the rod O, substantially as shown and described.

3. The combination, with a punch and die,  
5 of the folder M, the rod O, connected therewith, a hinged arm on said rod, a spring acting on the arm, a cam, as R', for tripping the hinged arm, a pin-and-slot connection of the arm with the punch, and a retractor acting on  
10 the rod O, substantially as shown and described.

4. The combination, with the folder M,

mounted on a transversely-movable shaft, of the crank-levers N, links n, connecting the shaft with the same, and a rising and falling  
15 rod O, connected with one of the crank-levers, substantially as shown and described.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

GUSTAV L. JAEGER. [L. S.]

Witnesses:

W. C. HAUFF,

A. FABER DU FAUR, Jr.