

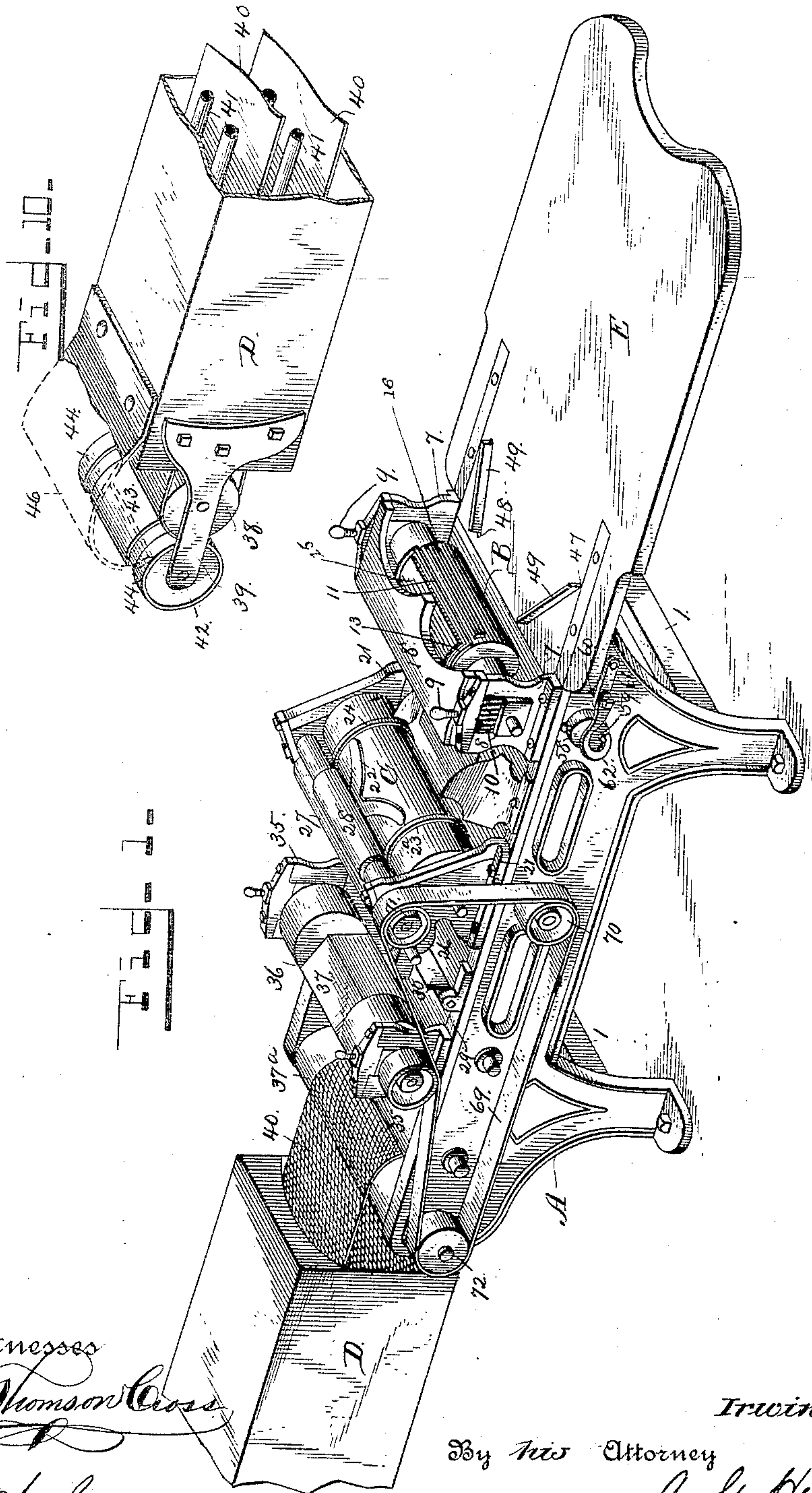
(No Model.)

4 Sheets—Sheet 1.

I. T. EHST
ENVELOPE MACHINE.

No. 437,813.

Patented Oct. 7, 1890.



Witnesses
Thomson Cross
C. H. Sommers

Inventor
Irwin T. Ebst.

By *his* Attorney
A. G. Kaufman

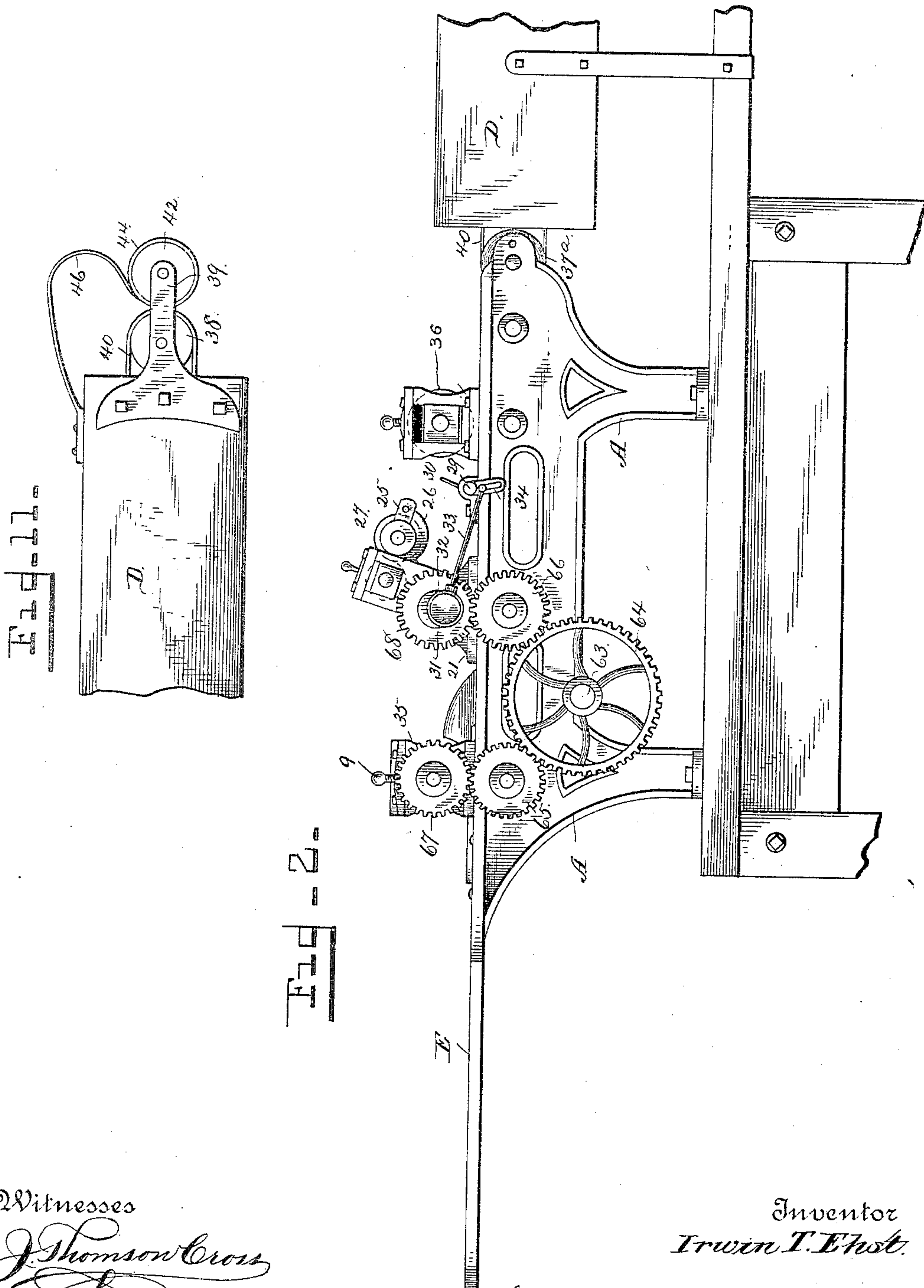
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ENVELOPE MACHINE.

No. 437,813.

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Witnesses

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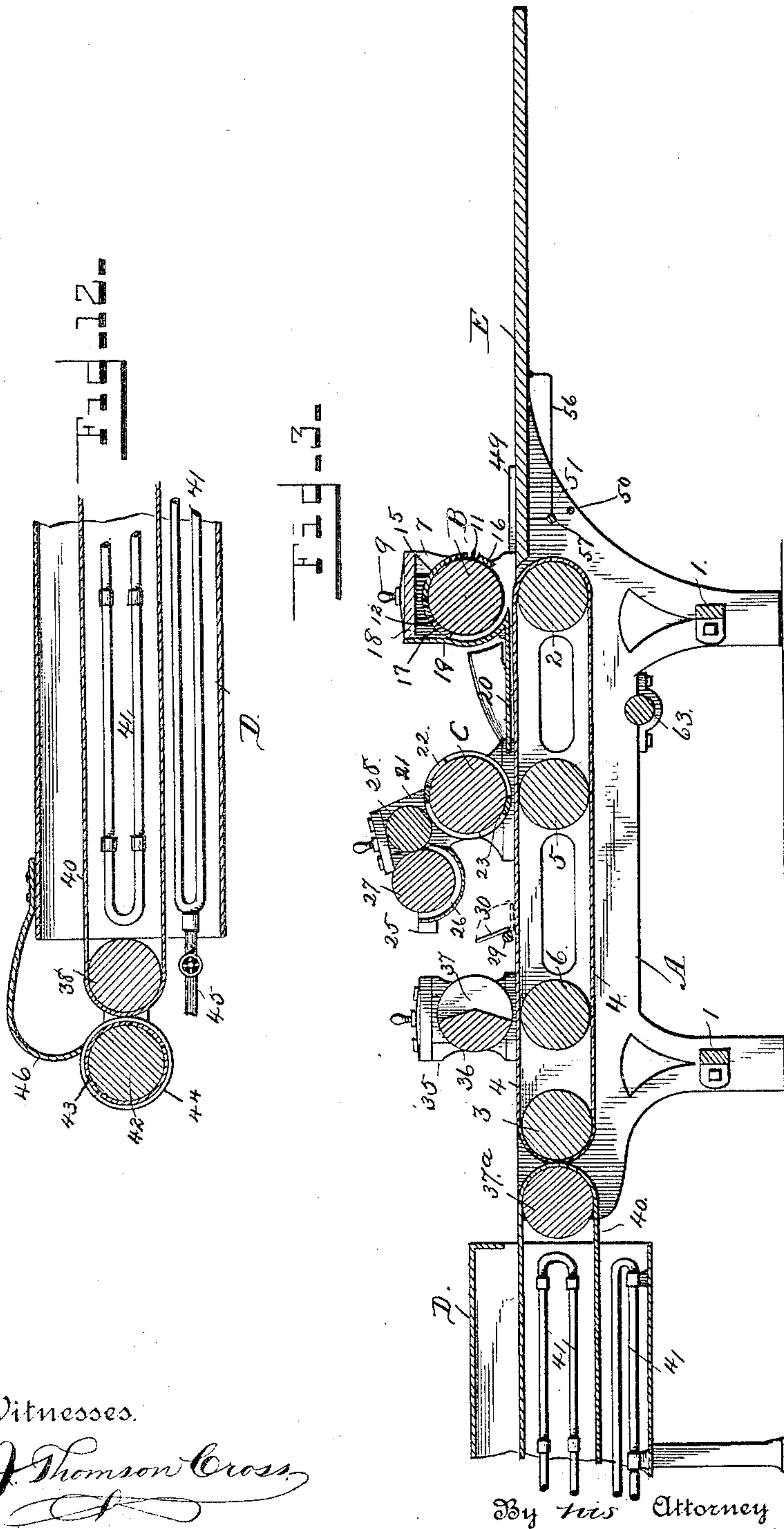
I. T. EHST.

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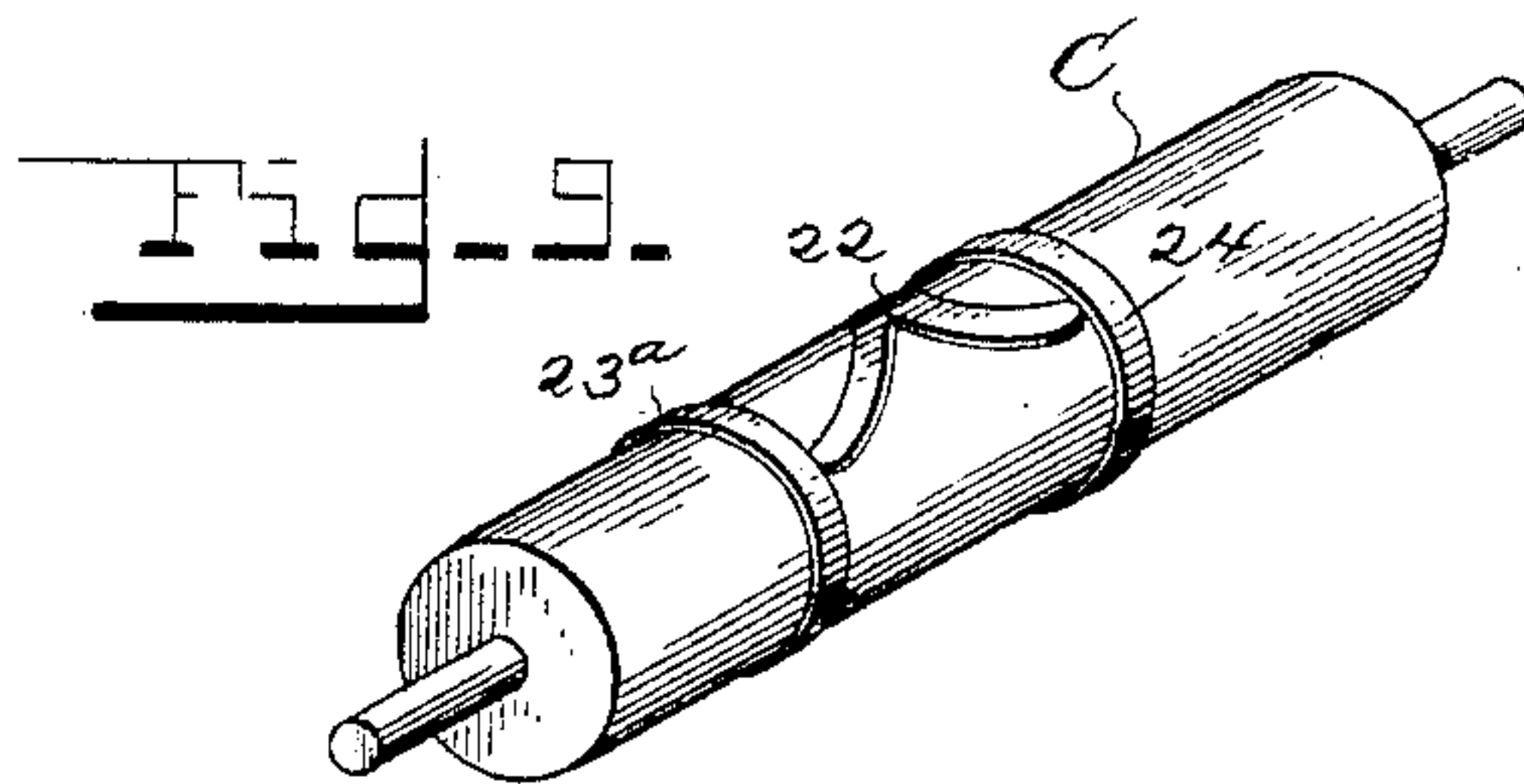
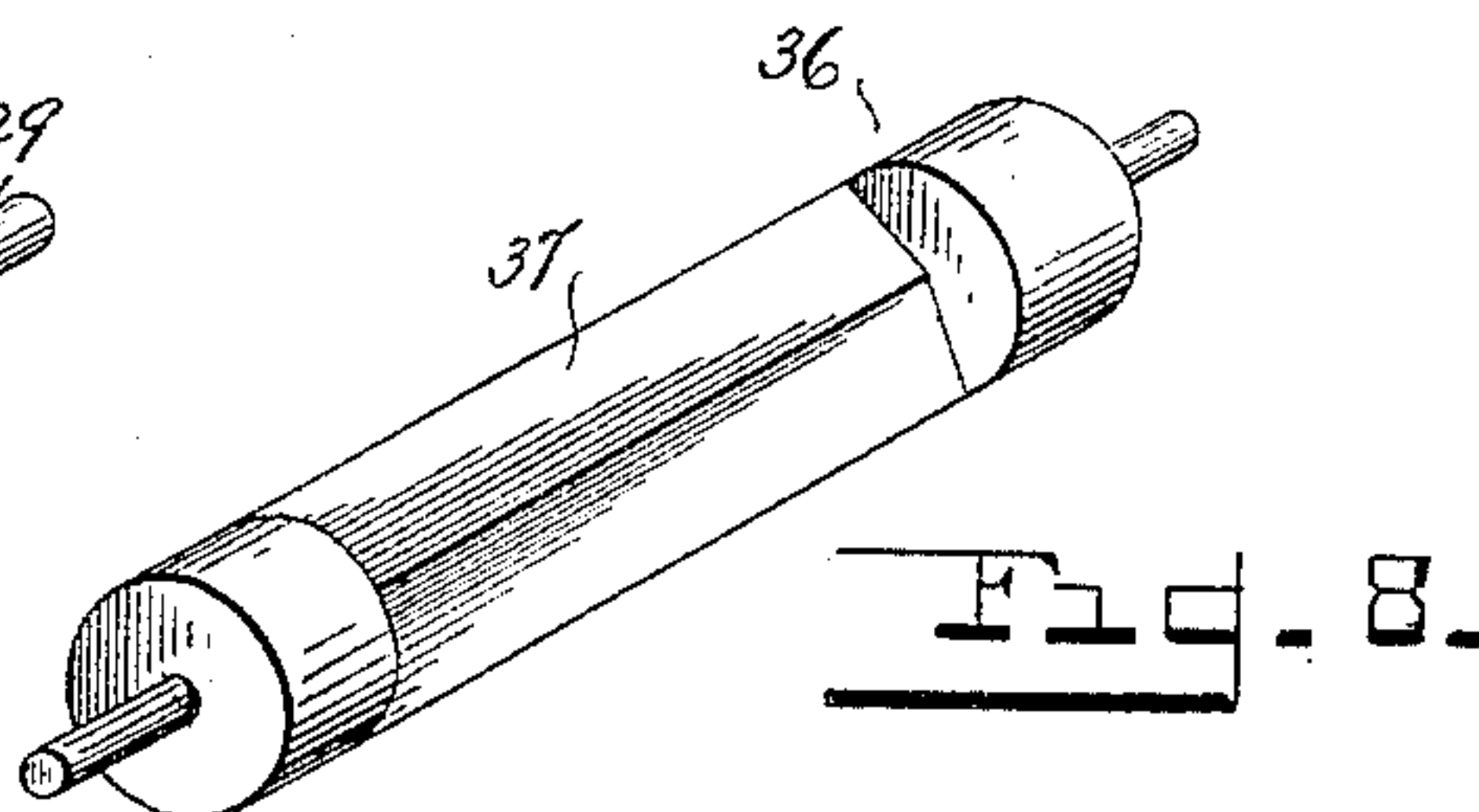
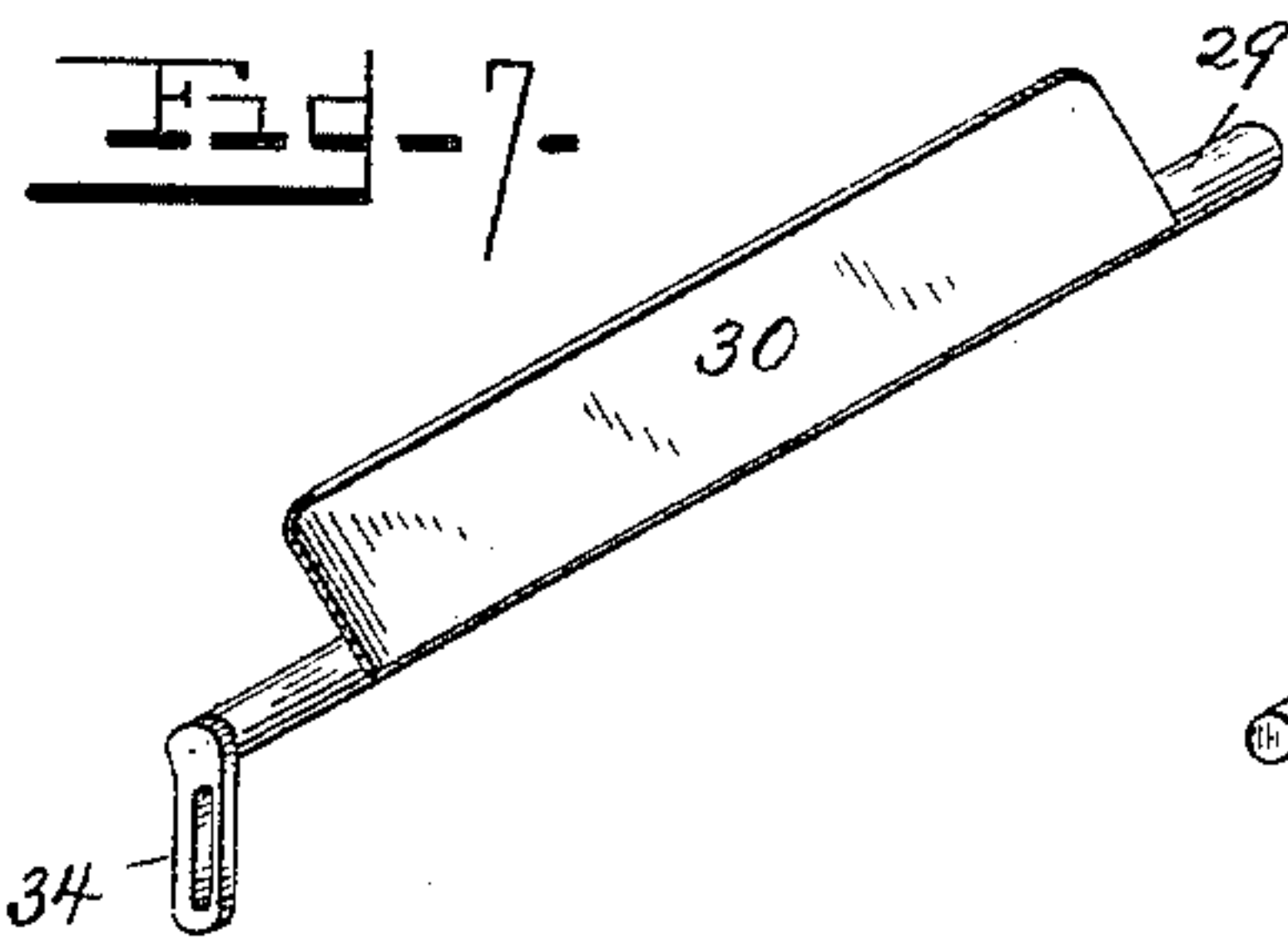
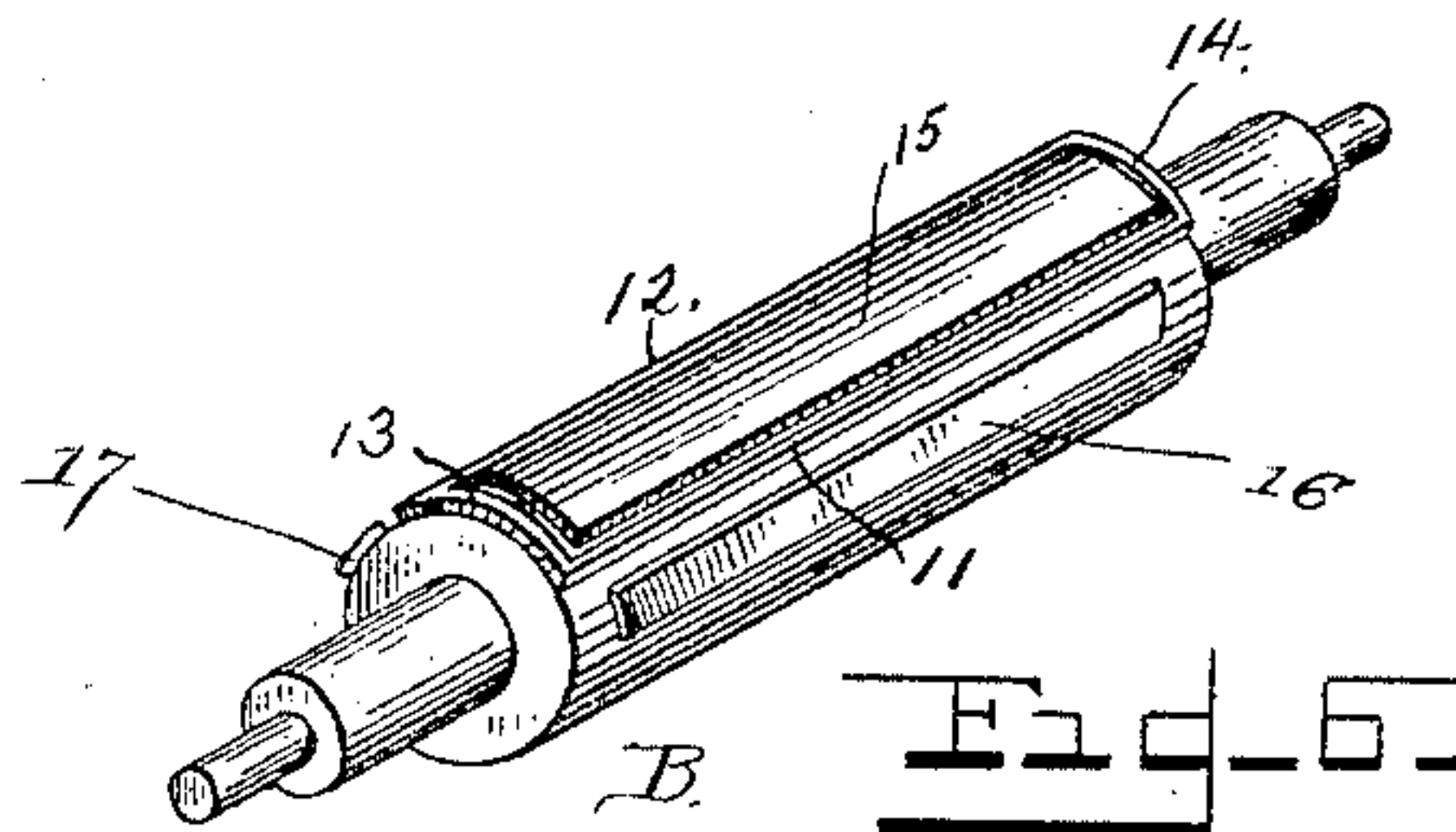
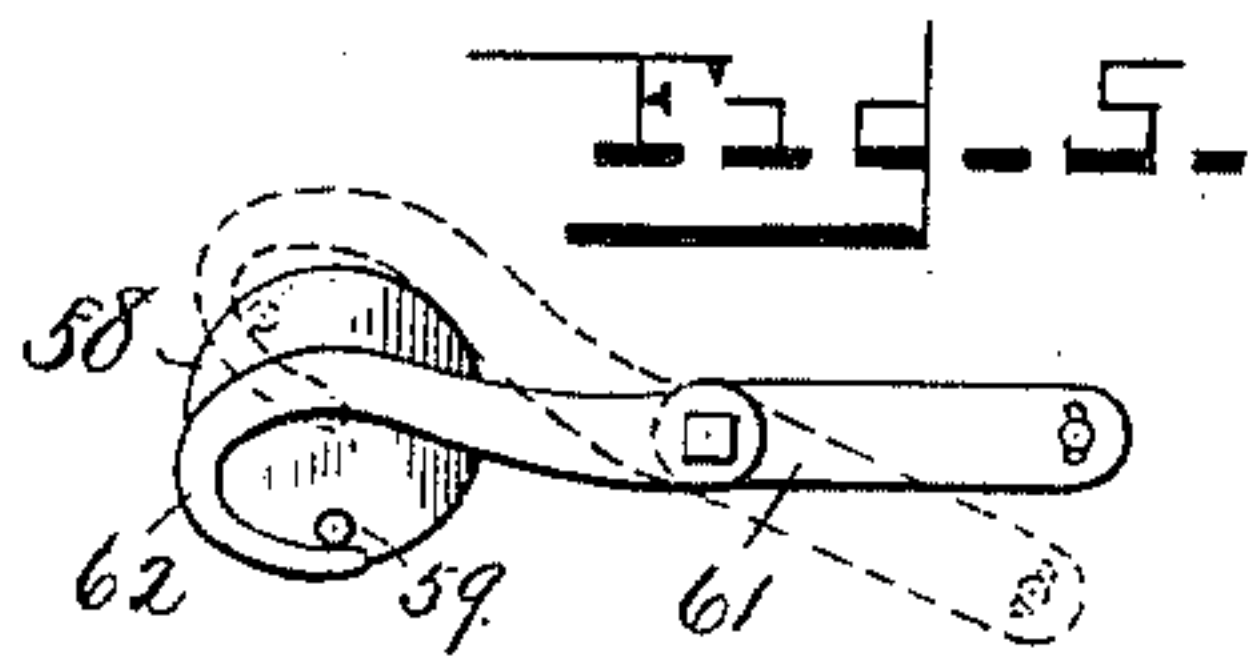
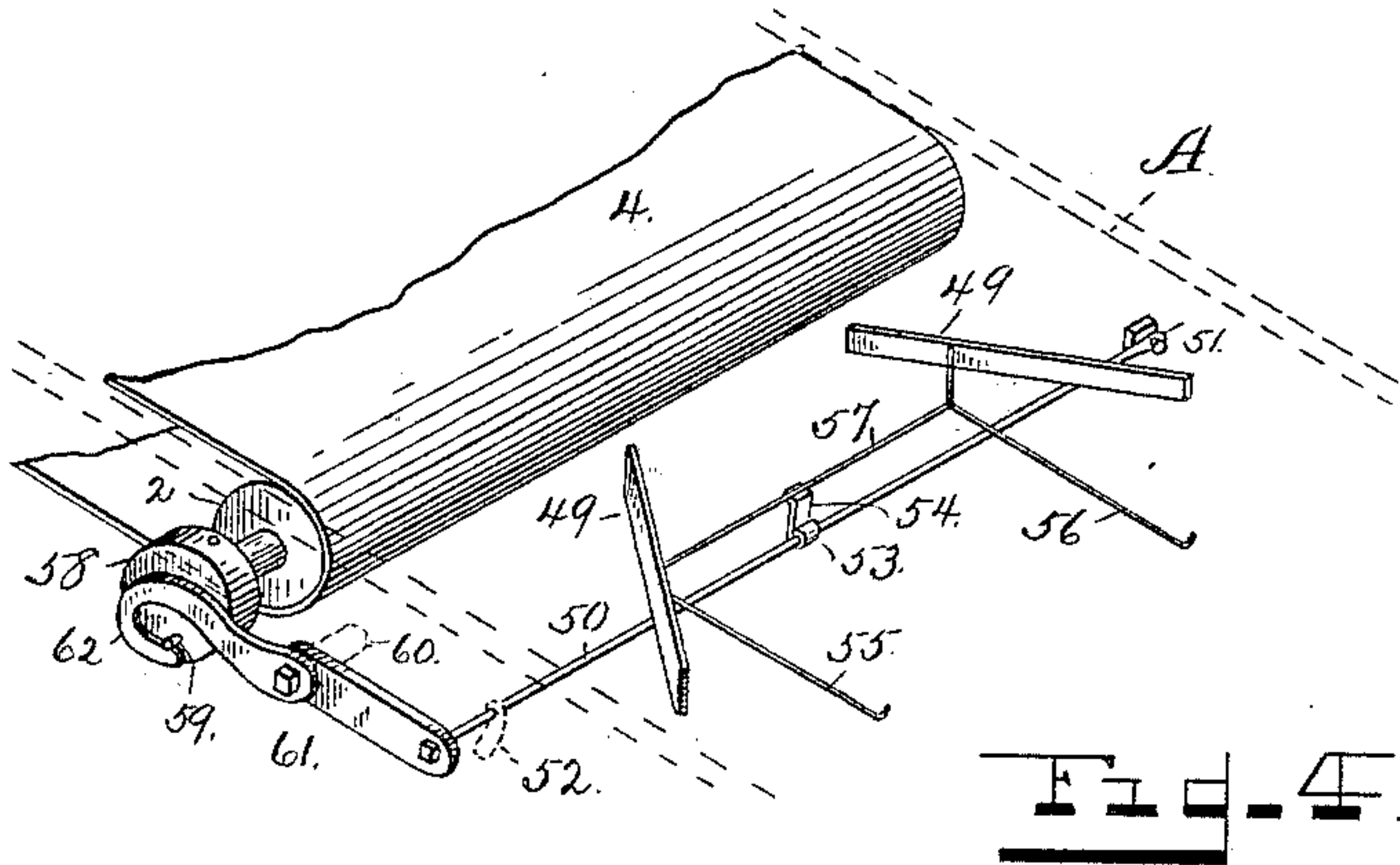
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4 Sheets—Sheet 4.

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UNITED STATES PATENT OFFICE.

IRWIN T. EHST, OF BOYERTOWN, PENNSYLVANIA.

ENVELOPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 437,813, dated October 7, 1890.

Application filed April 17, 1889. Serial No. 307,552. (No model.)

To all whom it may concern:

Be it known that I, IRWIN T. EHST, a citizen of the United States of America, residing at Boyertown, in the county of Berks and State of Pennsylvania, have invented new and useful Improvements in Envelope-Machines, of which the following is a specification.

My invention has relation to improvements in machines for folding and pasting envelope-blanks; and the object is to simplify and improve existing mechanism heretofore used in the trade. Hereinafter I have fully and specifically described my improved machine, therein explaining the principle thereof and a preferred mode of applying the principle, so as to distinguish the construction from other inventions of the art.

I have also clearly illustrated the construction of my invention in the accompanying drawings, wherein—

Figure 1 is a perspective of the machine, showing the drying-box broken off. Fig. 2 is a side view in elevation, the reverse side to that illustrated in Fig. 1 being shown. Fig. 3 is a vertical and longitudinal central section of the machine and a portion of the drying-box. Fig. 4 is a perspective in detail of the adjustable feeding-guides and operating mechanism. Fig. 5 is a view of the rocking lever which reciprocates the feeding-guides, the movement of the rocking lever being shown in dotted lines. Fig. 6 is a perspective of the feed and crimping roller. Fig. 7 is a view of the vibrating plate to fold over the under flap of the envelope-blank. Fig. 8 is a perspective of the press-roller. Fig. 9 is a perspective of the paste-applying roller. Fig. 10 is a perspective of the delivering end of the drying-box, showing the wire belt, heating-tubes, and the delivering mechanism. Fig. 11 is a side view of a portion of the drying-box and end view of the rollers. Fig. 12 is a longitudinal section of the drying-box, showing the arrangement of the heating-pipes and belt therein.

A designates the frame of the machine, which may be of any suitable construction to receive the various mechanical elements to be borne by it. The side pieces of the frame are formed with legs having feet adapted to be bolted to the floor or other foundation, and

the opposite sides are secured together in their relative positions by substantial cross-pieces 1, fixed between opposite legs. The construction thus constitutes a box-frame having an open top. In the frame are formed bearings, in which are mounted the journals of the belt drums or rollers 2 3, the same being arranged near the respective ends of the frame. About these belt-drums is arranged a carrying-belt 4, having its upper line traveling on a horizontal plane substantially level with the top of the frame. To support the upper line of the carrying-belt 4, intermediate rollers 5 6 are arranged between the end rollers, which carry the belt in a straight line without sagging, and, being directly under the paste-applying roll and the rear presser-roll, also serve as elements to sustain the pressure when the envelope passes between the respective rolls and the face of the belt.

On the frame at the front end are mounted and secured box-housings 7, in which are arranged adjustable bearing-boxes 8, the adjustability being attained by caps having a set-screw 9 let through them and pressing on an elastic pad 10, arranged over the bearing-box substantially as shown. In these bearings are mounted the journals of the creasing-roller B. This creasing-roller consists of a cylinder having arranged and secured therein parallel strips of metal 11 12 and similar end strips 13 14, constituting a rectangular frame set in the face of the roller conforming in size and relative position to the size of the envelope to be made and folded. On the face of the crimping-roller, in the space between the crimping strips or blades, is secured an elastic sheet or cushion 15, the face of which sets flush with the edges of the crimping-blades, substantially as shown in Figs. 3 and 6 of the drawings, and on the roller parallel with each of the side pieces of the crimping-frame are narrow elastic strips 16 17. These strips and the pad 15 form elastic or yielding bearings for the envelope-blanks on either side of the blanks or strips 11 and 12 of the crimping-frame, thus holding the blank against slipping while the crimping-strips operate. The crimping-roller also constitutes the feed-roller, the pad or cushion 16 serving to draw the flap of the envelope-blank under the roll until the crimping-frame strikes on the proper

line of crimp. Over the top of the crimping-roller B is secured a cross-piece 18, having its ends fastened to the box-housings, substantially as shown in the drawings, and to the cross-piece is secured the plate forming the former. This plate is made of a metal sheet having a vertically-arranged curved part 19, fastened at its upper end to the edge of the cross-piece 18, and having its lower part 20 extended and arranged on a horizontal plane slightly above the plane of the carrying-belt, as best shown in section in Fig. 3. The part 20 in width corresponds to the length of the envelope to be folded. On each side of the bottom plate of the former are secured the side-folders, consisting of metal plates secured to the sides of the frame of the machine in an inclined position in the direction of their length and curved in vertical direction, so that they form a tapering space between them and have the functional capacity of gradually raising the end flaps of the envelope-blanks and eventually turning them over and folding them on the lines of the crimp made by the crimping-roller, in which position they are presented to the paste-applying roller.

In the standards 21 on the machine-frame are arranged bearing-boxes in which the journals of the paste-applying roller C are mounted. The paste-applying roller C consists of a cylinder, on the face of which are secured paste-pads 22 23, having the forms, respectively, of the outer lines of the back and sealing flaps of the envelope. The paste-pads may be of rubber or other suitable elastic or yielding material. These paste-pads are secured to the roller in such relative position that each in turn will apply a line of paste to the face edge of a presented blank. On the paste-applying roller, in alignment with the ends of the envelopes, but arranged to press thereon, are two annular rings 23^a 24, made of rubber or other yielding and elastic substance. These rings serve to carry the blank through under the roller, and as they project above the face of the roller prevent the paste which may by any cause reach the face of the roller from being laid on the surface of the envelope.

The standards 21 are extended vertically and also laterally. To the lateral extensions 25 is secured the paste-trough 26, having mounted therein the paste-roller 27, and in the vertical extensions in adjustable bearings is mounted the second paste-roller 28, which bears with its face on the roller 27 and roller C, taking the paste from the former and applying it to the paste-pads of the latter.

It will be perceived from the foregoing description and reference to the drawings that the blank is carried under the paste-applying roller with the paste-flaps laid substantially flat and extended. To turn the flap over on the line of crimp, I provide the back-flap turner, which consists of a shaft 29, mounted across the frame, and a turning-leaf 30, secured on the face of the shaft. The shaft is

given a partial revolution, so as to turn the leaf to more than a vertical direction and to turn it down to horizontality, as shown in Fig. 3 of the drawings. The blank, as it comes from the paste-applying roller, because of the crimp will ride with its pasted back flap raised from the carrying-belt, and the end of the flap striking against the turning-leaf is turned over on the crimp-line and is struck down on the turned-down end flaps. The shaft of the turning-leaf is arranged slightly above the face of the carrying-belt in order that when the stroke is made and the leaf is returned to its upper position the envelope will readily pass under the shaft on the way to receive the action of the pressing-roller, and so that the paste-line on the sealing-flap will not leave its mark on the shaft.

The requisite movements of the turning-leaf are imparted by the following-described mechanism: On the extended journal of the paste-applying roller C is mounted an eccentric 31, on which is arranged the usual strap 32, to which is connected the rod 33, having its end adjustably connected to a slotted arm 34 on the end of the shaft of the turning-leaf by a bolt or screw, as shown. By adjusting the end of the rod in the slot of the arm the proper movement of the leaf is easily obtained.

In bearing-box housings 35 in adjustable bearings, as shown, is mounted the presser-roller 36. This roller has its middle portion cut away nearly to the axial center in order that the face of the circular part will press down on the envelope, thus sealing the back flap to its place, and passing over this part is turned with the cut-away portion over the pasted sealing-flap, which passes freely under the space between that part of the roll and the carrying-belt. The roll is thus kept clean and free from paste.

In the rear end of the machine is mounted a drum or roller 37^a to carry one end of the wire belt which extends through the drying-box. The drying-box D is a metallic case having open ends and carrying on the end a drum or roller 38, mounted in bearing-pieces 39, secured to the sides of the drying-box. On the drums 37^a and 38 is arranged a wire-woven belt 40, which carries the envelope through the casing or drying-box. To dry the paste used in sealing the back flap and that on the sealing-flap of the envelope, I arrange in the drying-box steam or hot-air pipes 41, the radiations of which completely dry the paste while the envelopes are passing through the drying-box. In extensions of the bearing-pieces 39 is mounted a roller 42, having a central yielding covering 43, of felt or similar material, and annular end coverings 44, of rubber or elastic material, contacting with the wire belt on the roller 38, the coverings 44 being slightly thicker than the central covering, in order that the roller may be turned with certainty whether the envelopes are being fed or not. Otherwise the speed of the roller

would slacken after each envelope had passed and the efficiency of the machine be impaired.

The heating-pipes are heated from any proper source. I have shown the source as
5 from a pipe 45, connected to the pipes arranged in the drying-box. The heating-pipes may be of two series, one arranged below the under line of the belt and the other between the lines of the belt, as shown, or they may
10 consist of a single series arranged either between the lines of the belt or under the belt. On the end of the drying-box is a turning-blade 46, curved to the shape shown in Figs. 10 and 11. The turning-blade serves to stop
15 the envelopes in their progress and turns them back, so that the envelope slides back or is carried back by the roller 42 until its sealing-flap side is presented to the pinch of the roller and belt. The sealing-flap is turned
20 down, and in the passage between the roller and belt the envelope is pressed ready for packing. A receptacle (not shown) may be set under the end of the machine to receive the finished envelopes.

25 On the front end of the machine is secured the feeding-table E, having its upper surface laid on a plane relative to the feed, but adapted to carry the blanks to the height of the roller and belt. In this table are two slots
30 47 48, arranged from their outward ends toward the central line of the table, substantially as shown in Fig. 1 of the drawings. In these slots are arranged vertically-reciprocating gages 49, to serve to direct the envelope-
35 blank to the machine. To reciprocate the gages 49 to positions above and below the face of the table, a bar 50 is loosely pivoted to the side of the frame under the table, as at 51, the free end of the bar being projected be-
40 yond the outer face of the frame through a slot 52. About the middle of the bar 50 is a short standard 53, having a seat 54 formed at its upper end. To the under face of the table are hinged or similarly fastened two bars
45 55 56, having their faces or inner ends struck up vertically and secured to the gages, substantially as shown. The bars 55 56 are connected by a cross-bar 57, which rests on the seat of the standard 53, and thus supports
50 the frame with the gages. On the end of the journal of the roller 2 is a small pulley or disk 58, having a pin 59 eccentrically fixed thereon. The disk is adjustably mounted on its shaft and fixed in any desired position by a set-
55 screw. On the side of the frame of the machine is a bearing 60, on which is fulcrumed a rocking lever 61, having one end attached to the bar 50 and the other end formed into a hook 62, which engages with the pin on the
60 disk 58. The lever movements move the bar 50 and raise the gages or permits them to drop below the face of the table. The weight of the gages and their frame tilts the lever, as shown in Fig. 5 in the dotted lines, so that
65 the pin does not engage the hook until it passes beyond the vertical radius, when its descent carries the lever to the position shown

in full lines in same figure, and then leaves the hook and the gages drop down. The relation of the mechanisms should be such that
70 the gages are depressed or drop down at the instant the blank is caught by the machine.

Motion is imparted synchronously to the mechanism by the following arrangement of gearings and pulleys, &c.: A driving-shaft 63,
75 having any suitable connection to the power, is mounted under the machine, carrying a gear-wheel 64, meshing, respectively, with gears 65 66 on the shafts of the rollers 2 and
80 5, which in turn mesh, respectively, with gears 67 68 on the shafts of the crimping and paste-applying rollers, substantially as shown in Fig. 2. The eccentric on the shaft of the paste-applying roller moves the turning-leaf,
85 as has already been specified.

On the side of the frame, opposite to the gearing above described, a belt 69 is arranged on pulleys 70 71 72 on the shafts of the rollers 5 28 and end roller of the wire belt and
90 passed under the pulley of the presser-roller, as shown in Fig. 1. This arrangement drives the whole mechanism in unison, and the parts being adjusted in their relation to each other so that each in its turn will perform its function at the time and in the manner designed
95 the blank from its insertion requires no further manipulation. The roller 42 is moved by its contact with the face of the wire belt on the end roller which supports it.

The operation of the machine is as follows:
100 The envelope-blank is presented on the table between the guides and is taken between the crimping-roller and the carrying-belt. At the instant the blank begins to move forward the guides drop down, leaving a plane surface for
105 the blank to travel on. The crimping-frame crimps the blank, which is carried by the belt under the bottom plate of the formers, and as it passes thereunder the side formers turn the end flaps over and down on the face part of
110 the blank. The belt carries the blank thus folded to the paste-applying roller, which pastes the back and sealing flaps. After leaving the paste-applying roller the back flap is turned over and down by the turning-leaf,
115 under which the envelope passes and is caught by the presser-roller, which seals the parts thus laid together and allows the sealing-flap to pass free under the cut-away part of the roller, and then carried on to the wire belt,
120 which carries it through the drying-box, to be thoroughly dried while being so carried. The wire belt carries the envelope with the sealing-flap open until the opposite side is forced against and partially upon the turn-
125 ing-blade, so that the blank is caught in the bight of the belt and roller, folds the sealing-flap down, and as the envelope complete passes between these it is pressed ready for packing.

Having thus described my invention, I pro-
130 ceed to specifically distinguish it from other inventions by particularly pointing out and distinctly claiming the parts, improvements, and combinations, as follows:

1. The combination, in an envelope-machine, of the feed-roller having raised pads which grasp the blank, separated from each other to permit the flap portion of the blank to be fed under the roller, a feed-table formed with slots arranged in front of the feed-roller and at inclines approaching toward the inner ends, gages fitted in the slots and arranged to descend by gravity below the face of the table the moment the feed-roller begins to grasp the blank, a lever which receives motion from some moving part of the machine, and connections between the lever and the gages, whereby they are raised through the said slots, substantially as described.

2. The combination, in an envelope-machine, of a feed-table formed with slots arranged at inclines approaching toward the inner ends, vertically-reciprocable gages fitted in the slots, a frame hinged to the under side of the table and connected to the gages, a lever to lift the frame, a lever fulcrumed on the machine and one arm attached to the lifting-lever and the other end formed with a hook, and a rotary disk having an eccentrically-arranged pin to engage the hook of the lever, whereby the gages are lifted above the table and permitted to descend below the face thereof by gravity, substantially as described.

3. The combination of the carrying-belt mounted on rollers in the frame of the machine, with the front roller directly under the crimping-roller, and the crimping-roller provided with a rectangular metallic crimping-frame in its face and cushions within the said frame and along the sides thereof whereby the envelope-blank is fed to the machine and simultaneously crimped, substantially as described.

4. The combination of the carrying-belt having its front supporting-roller arranged directly under the crimping-roller, the feed and crimping roller provided with a rectangular metallic frame and cushions, and the folders consisting of the former and angularly-arranged side-folders, substantially as described, and for the purpose specified.

5. The combination, in an envelope-machine, of the traveling belt 4, the paste-applying roller transversely arranged in proximity thereto, and the turning-leaf attached to the rock-shaft 29, arranged transversely

above the belt, and said rock-shaft being adjustably connected to and actuated by the paste-applying roller, substantially as described.

6. The combination of the paste-applying roller provided with an eccentric on its extended journal, a connecting-rod on the eccentric, and a shaft mounted on the machine behind the paste-applying roller, provided with a turning-leaf, and a depending slotted arm adjustably connected to the connecting-rod, substantially as described, and for the purpose specified.

7. The combination, with the traveling belt, of the roller 42, having the yielding coverings in contact with the belt and the central yielding covering 43, and the concave turning-blade 46 above said roller and with its lower edge in proximity thereto, substantially as described.

8. The combination, with the drying-box and the woven-wire belt mounted therein, of the roller provided with a yielding middle covering and elastic end bands thicker than the middle covering to bear against the face of the belt on its supporting-drum and the turning-blade arranged to rest with its edge upon the said roller, substantially as described, and for the purpose specified.

9. The combination, with the crimping-roller, the paste-applying roller, and the pressing roller, of the endless belt mounted on rollers at the end of the frame of the machine, and intermediate rollers under the upper line of the belt, arranged directly under the paste-applying roller and the pressing-roller, substantially as described.

10. The combination of the crimping-roller, the paste-applying roller, the turning-leaf, the pressing-roller, and the endless belt arranged in the bed of the machine to bear with the upper surface against all the rollers and form a platen for the turning-leaf, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two attesting witnesses.

IRWIN T. EHST.

Witnesses:

ISAAC F. YOST,

LEWIS P. G. FEGLEY.