

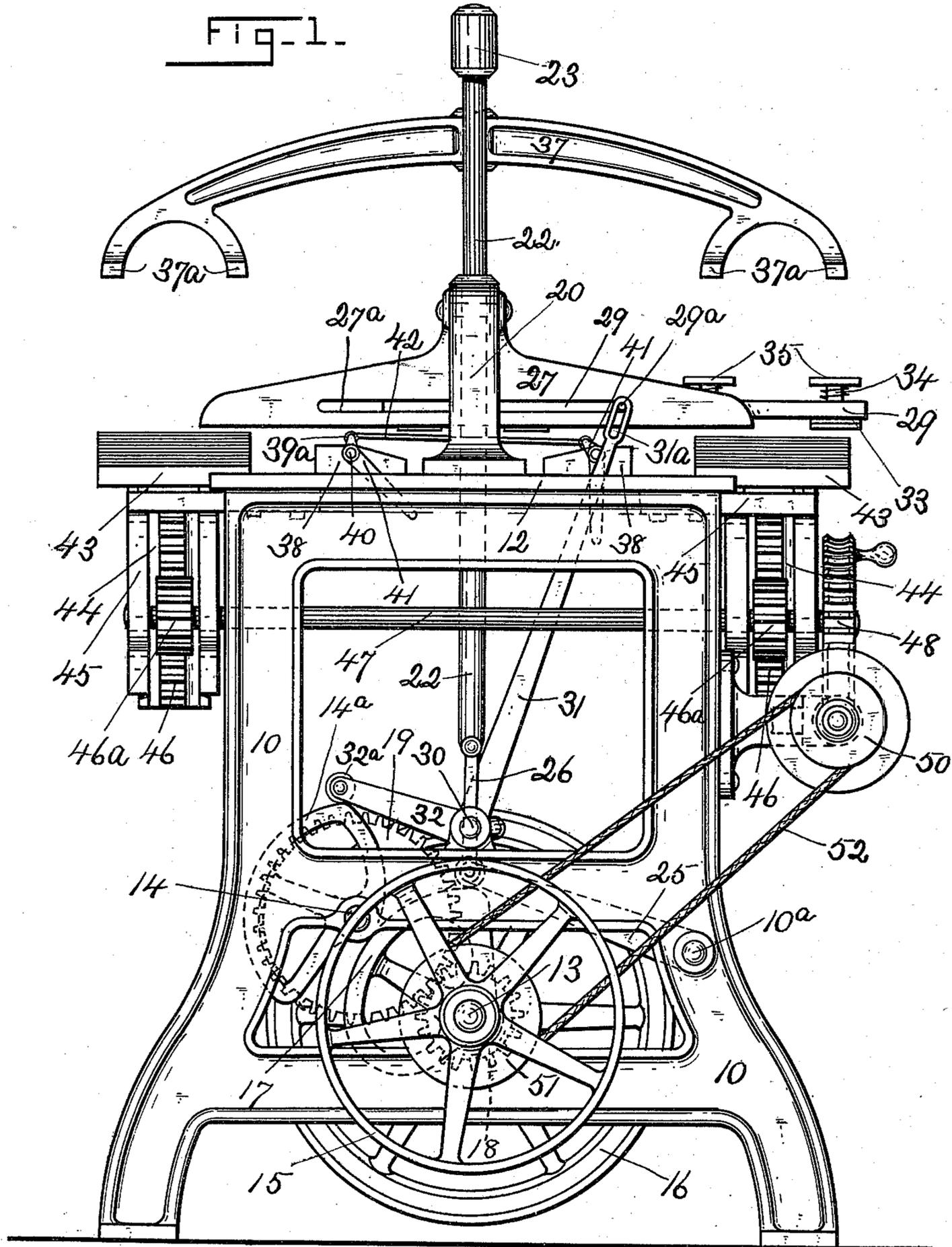
(No Model.)

5 Sheets—Sheet 1.

J. D. ROBERTSON.
ENVELOPE MACHINE.

No. 556,026.

Patented Mar. 10, 1896.



Witnesses
Alonzo M. Luther
Allen Tenny.

Inventor
James D. Robertson
By Attorney
Frank H. Allen.

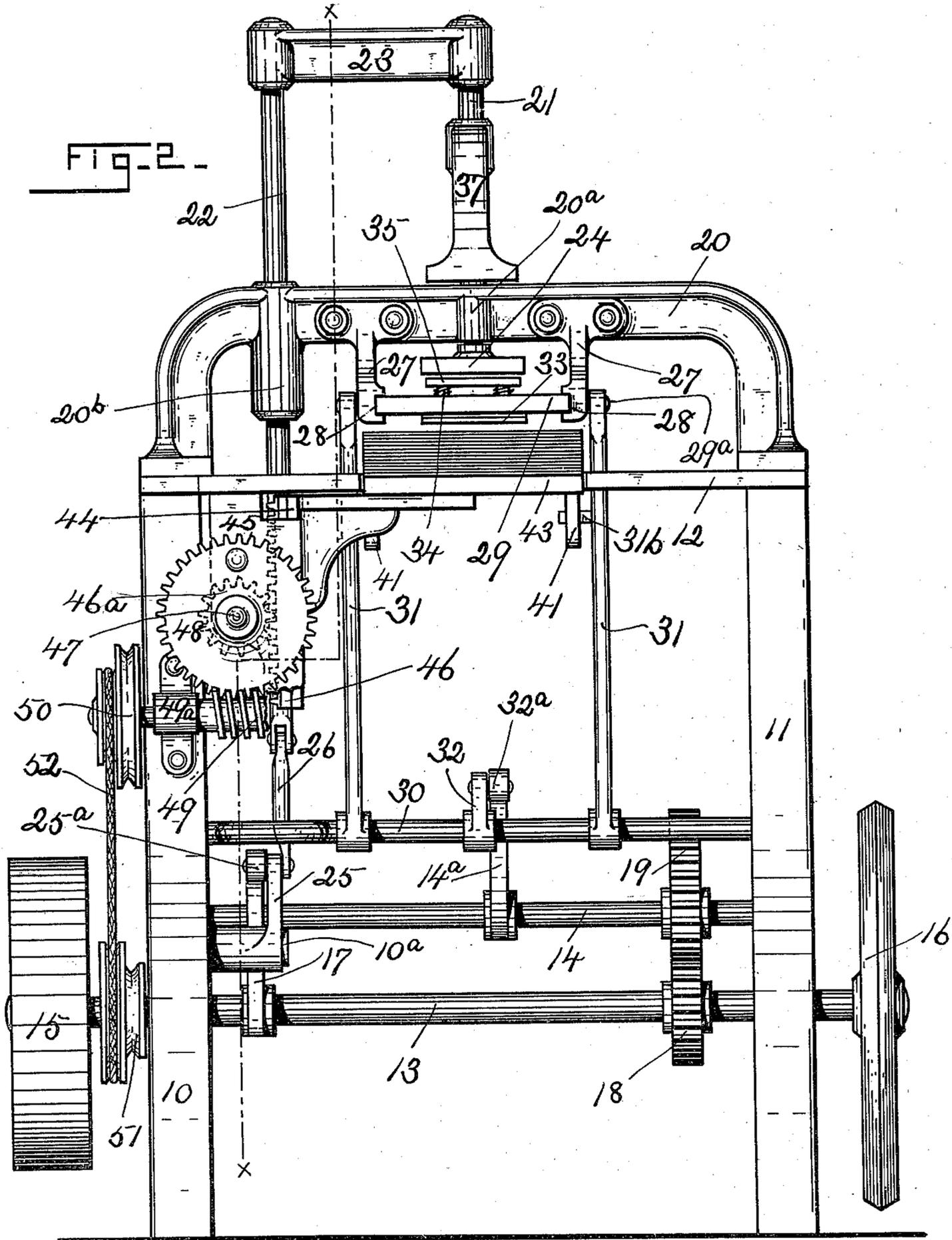
(No Model.)

5 Sheets—Sheet 2.

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(No Model.)

5 Sheets—Sheet 3.

J. D. ROBERTSON. ENVELOPE MACHINE.

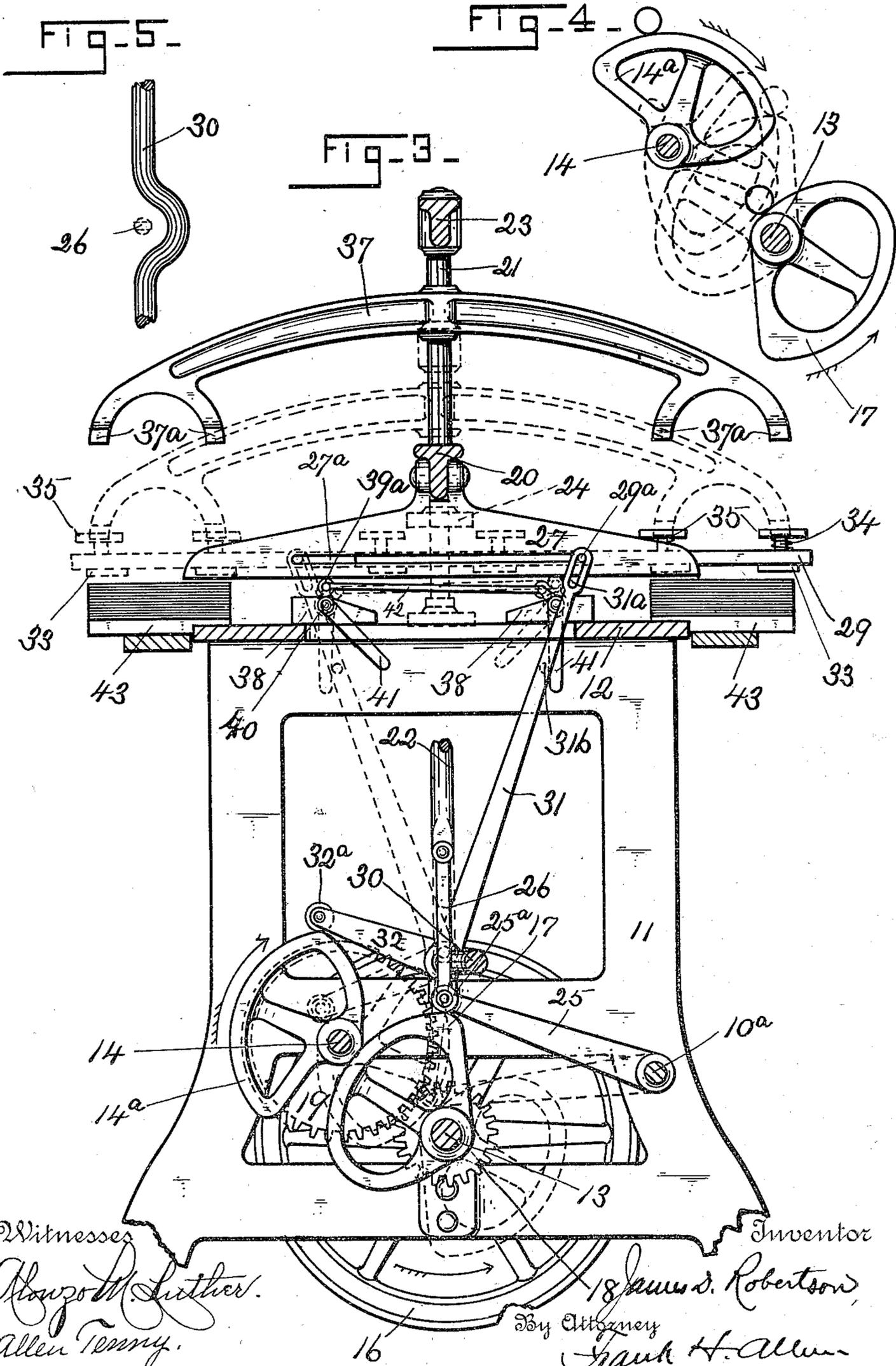
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FIG-5-

FIG-4-

FIG-3-



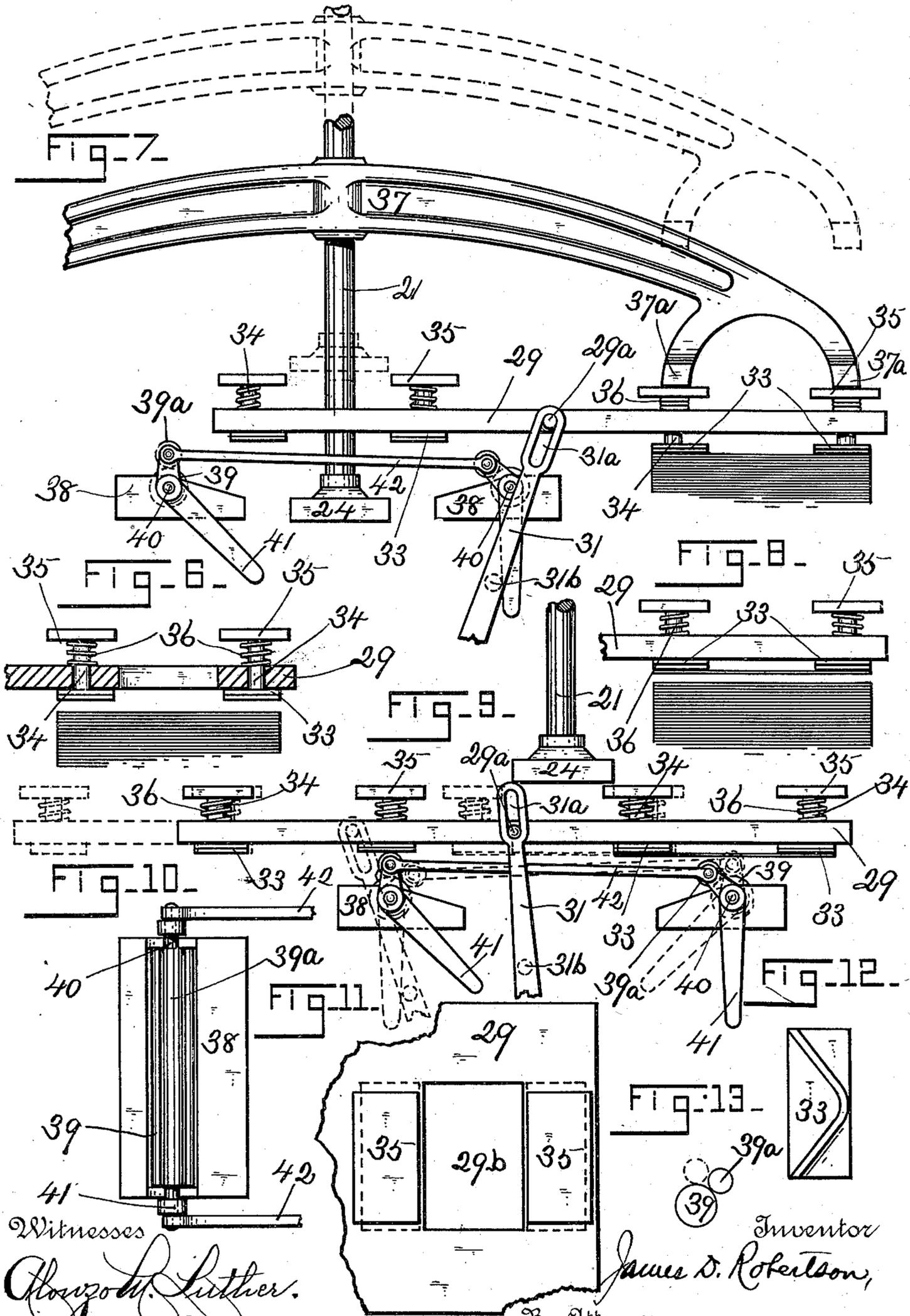
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5 Sheets—Sheet 5.

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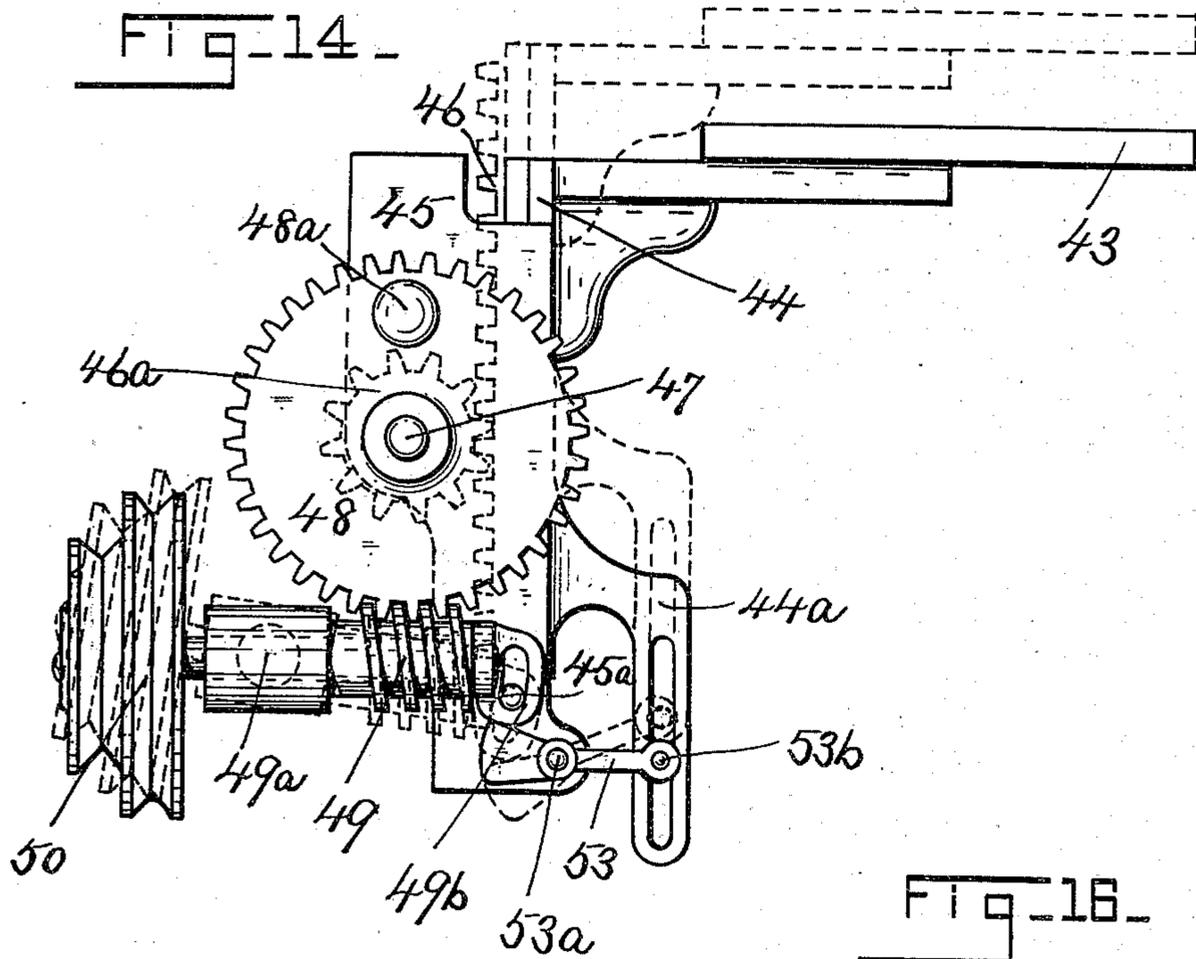
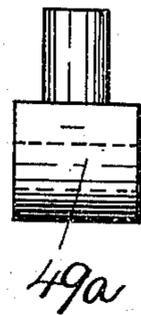
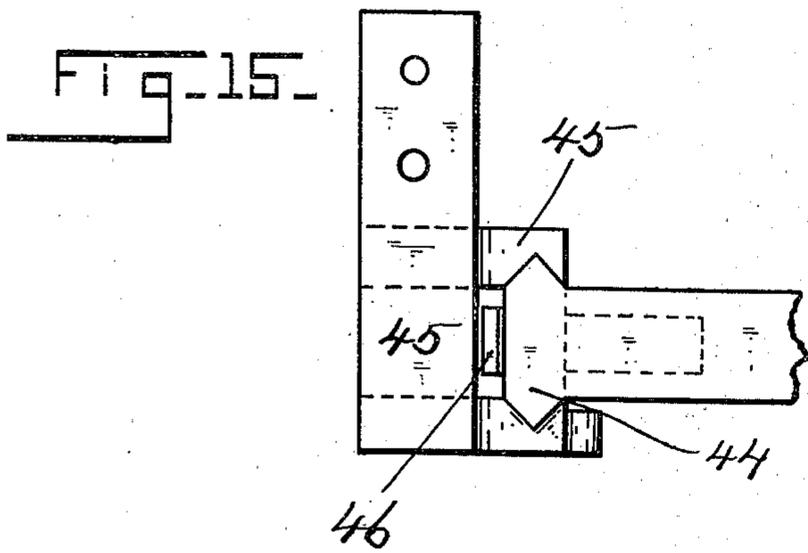


FIG. 16.



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UNITED STATES PATENT OFFICE.

JAMES D. ROBERTSON, OF NORWICH, CONNECTICUT.

ENVELOPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 556,026, dated March 10, 1896.

Application filed January 19, 1895. Serial No. 535,692. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. ROBERTSON, a citizen of the United States, residing at Norwich, in the county of New London and State of Connecticut, have invented certain new and useful Improvements in Envelope-Machines, which improvements are fully set forth and described in the following specification, reference being had to the accompanying five sheets of drawings.

This invention is in the class of envelope machinery in which a vertically-reciprocating plunger serves to "break up" the blanks after they have been separately "gummed and picked" from a pile mounted upon an "elevator," said blanks being then fed or carried to the proper position beneath the plunger to be operated upon in the descent of the latter.

The immediate object of this invention is to improve the mechanism for and operation of gumming, picking and feeding the blanks, and also to provide certain new and improved means to check the upward travel of the said elevator after a supply of blanks carried thereby has been exhausted.

To assist in the explanation of my invention the accompanying drawings have been provided, illustrating the same.

Figure 1 is a side elevation of an envelope-machine embodying my improvements, illustrating also sufficient of the mechanism of such machine to show the office and operation of said improvements. Fig. 2 is an end elevation of the machine of Fig. 1. Fig. 3 is a vertical sectional view of said machine, taken on line *xx* of Fig. 2. Figs. 4 and 5 illustrate, detached, certain of the mechanism of said machine. Figs. 6, 7, 8, and 9 illustrate the means for and operations of gumming, picking, and carrying the blanks. Fig. 10 is a plan view of one of the gum-boxes. Fig. 11 is a plan view of one end of the carrier. Fig. 12 is a plan view of the under side of one of the pickers. Fig. 3 illustrates the peculiar manner of operation of the paste-rolls. Fig. 14 illustrates in elevation the blank-supporting elevator. Fig. 15 is a detail view illustrating in plan the construction of said elevator, and Fig. 16 is a detached view of a certain bearing connected with said elevator and explained in detail hereinafter.

In this class of envelope machinery so-

called "carriers" are employed, which (as the name implies) "carry" or transfer the blanks, one at a time, from the pile on the elevator to the proper point beneath the plunger to be "broken up." When the machine is run at the usual speed the carriers are obliged to move very rapidly from and back to the pile of blanks in order, respectively, to deposit a blank beneath the plunger and then move backward out of the path of said plunger as the latter descends. Heretofore the speed of the machine has been limited for the reason that it is impracticable to carry the blanks through space above a given rate, and where movable gum-rolls are employed the too rapid movement of the same tends to throw the paste.

A machine fitted up with my newly-invented improvements may be run at a much higher speed than is now possible, while the speed of the carriers is greatly decreased from that now necessary, and at the same time all throwing of paste is prevented.

My improved manner of feeding the blanks is accomplished by providing a double system of elevators, each of which supports a pile of blanks in substantially the usual manner. A double form of carrier is also provided, which, when in operation, removes the blanks alternately from each of said piles to the proper position to be operated upon by the plunger.

Referring now particularly to the drawings, the reference-numbers 10 and 11 denote the main frames of my envelope-machine, and 12 the machine-bed supported upon said frames. Frames 10 and 11 are each provided with suitable bearings for the support of the main shaft 13 and for a shaft 14 parallel thereto. Shaft 13 bears upon one end an ordinary driving-pulley 15 and upon its opposite end a hand-wheel 16. Shaft 13 also bears the plunger-cam 17 and a spur-gear 18, by means of which latter motion and power are transmitted to the shaft 14, the latter shaft bearing a spur-gear 19, which meshes with the gear 18, the relative sizes of said gears 18 and 19 being respectively as one to two. (See Figs. 1, 2 and 3.) Shaft 14 bears also what I have here termed the "carrier-cam" 14^a, the particular office and operation of which I shall refer to later.

Extending across the top of the machine-

bed and at right angles to the frames 10 and 11 is a yoke 20, in which are provided vertically-extending bearings 20^a and 20^b for the reception respectively of the plunger-rod 21 and for a rod 22 parallel thereto. The upper end of rod 22 is secured to one end of a bar 23 and the upper end of rod 21 is correspondingly secured to the opposite end of said bar. To the lower end of plunger-rod 21 is secured the usual plunger or former 24.

To impart a vertically-reciprocating motion to the plunger 24 by means of cam 17 a lever 25 is provided, hung at one end on a stud 10^a projecting from the inner side of frame 10, the free end of which lever engages said cam by means of a cam-roll 25^a supported thereon, and said free end of lever 25 is connected by means of a link 26 to the lower end of rod 22.

It will be seen by reference to the drawings that rotary motion of cam 17 will cause a rocking motion to be imparted to lever 25, and by means of the link 26 the rocking of said lever 25 will cause a vertically-reciprocating motion to be imparted to the rod 22 and to the parts rigidly connected thereto—viz., bar 23, rod 21, plunger 24, and also to a certain arm located thereon, the use and description of which will be hereinafter fully described.

Having now described the manner in which motion is imparted to the plunger 24, I will proceed to describe my improved system of gumming, picking, and feeding the blanks to said plunger to be broken up thereby.

Depending from yoke 20 and fixedly secured thereto by bolts or otherwise are two parallel frames 27, one of which is located on each side the plunger-rod bearing, which latter is approximately midway the length of yoke 20. Frames 27 extend in a direction at right angles to the yoke 20 and parallel to the main frames 10 and 11 and have cut therein, in their confronting faces, suitable grooves or ways 28 for the reception of the carrier 29. Carrier 29 is formed as a plate of rectangular shape and has a horizontally-reciprocating motion in its ways, and this motion is imparted thereto by means of the carrier-cam 14^a already mentioned, the following-described mechanism being provided for communication of power and motion from said carrier-cam 14^a to the carrier 29. Supported by and between frames 10 and 11 and extending parallel to shafts 13 and 14 is a rock-shaft 30, which bears thereon two upwardly-extending parallel arms 31, the upper free ends of which pass through suitable openings in bed-plate 12 and straddle the frames 27, as will be readily seen from Fig. 2. Shaft 30 is shown in the drawings as in direct alignment with the link 26, and in order that it may not interfere with the link 26 said shaft is bent (see Figs. 3 and 5) to clear the path of said link. Also fixedly located on shaft 30 is a lever 32, the free end of which engages the cam 14^a through the medium of a roll 32^a. It will now be understood by reference to the drawings that rotary motion of cam 14^a will result in the

rocking of the lever 32 and its shaft 30 and that motion of the latter will cause arms 31 to be correspondingly swung. Cut in the frames 27 are horizontally-extending slots 27^a of a length equal at least to the amount of travel of said carrier, and extending through each of said slots from opposite sides of the carrier 29 (from a point approximately midway the length of the latter) are pins 29^a. Each pin 29^a is sufficiently long to engage one of the arms 31, and a slot 31^a is cut in the free end of each of said arms for the reception of its pin 29^a.

It will now be seen that when arms 31 are swung, in the manner already described, through the pins 29^a the carrier 29 will be caused to travel horizontally in its ways 28 of frames 27, the direction and amount of such travel being of course dependent upon the direction in which arms 31 are rocked and upon the amount of such rocking motion.

The fact has already been mentioned that the carrier of my improved machine conveys blanks alternately from two piles thereof. Each pile of blanks is supported in the usual manner upon an elevator, said elevators being located at opposite ends of the machine and in general construction are of a pattern well known in this class of machinery.

To gum and pick the blanks from the two piles mentioned, carrier 29 is provided with two sets of gummers or pickers, (one set for operation with each of said piles of blanks,) the general construction and operation of which are as follows:

Referring now particularly to Sheet 4, Figs. 6, 7, and 8, the number 33 denotes the gummers or pickers. Each picker consists of a body portion having formed thereon a rib, the outline of which conforms to the outer edge of the envelope-flap which the gummer is to gum and pick, Fig. 12. Two of the pickers are provided in each of the said sets, and the same are so located relatively to each other that both flaps of the blank to be operated upon will be engaged by the ribs of the pickers near their outer edges in the usual manner. When the pickers 33 are properly assembled in the carrier 29, they are located beneath said carrier, and to support the same each picker has extending upwardly therefrom one or more studs 34. Stud 34 extends through holes provided therefor in the carrier-plate 29, and are of a length considerably greater than the thickness of the carrier-plate. Said studs 34 are provided on their upper ends with enlarged heads or may be secured to the under side of plates 35, as shown in the drawings. Located between the plates 35 and the carrier-plate 29 (encircling studs 34) are spiral springs 36, the expansive tendency of which serves to force upward the plates 35 and hold the pickers 33 up against the under side of the carrier-plate 29.

I have already referred to a certain arm secured to the plunger-rod. This arm is denoted by reference-number 37, is parallel to

frames 27, and is secured midway its length to the plunger-rod 21. The ends of the said arm are of such length that they are in vertical alignment with each pile of blanks. In the drawings each end of arm 37 is shown as forked in such manner that each section 37^a of these forks may at the proper time engage one of the plates 35.

The two sets of pickers are so located on the carrier 29 relatively to each other that when one set of said pickers is in position to pick up a blank from its pile the companion set of pickers has carried a blank to the proper position beneath the plunger 24 to be operated upon thereby, and in order that the plunger may be allowed to descend upon the blank thus in position openings 29^b are cut in the carrier 29 between the pickers of each set of proper size to permit the plunger to pass therethrough, Fig. 11.

By reference to Figs. 1 and 6 it will be seen that one end of the carrier 29 is in proper position over a pile of blanks to enable the pickers to pick therefrom the top blank, (assuming that said pickers have been previously gummed.) In Fig. 3 (dotted lines) and Fig. 7 (full lines) the plunger-rod 21 has descended, and in so doing it has caused arm 37 to travel downward until its sections 37^a have come into engagement with plates 35 and (as shown in full lines, Fig. 7) such downward movement will have forced the pickers into engagement with the top blank of the said pile. The plunger 24 has been correspondingly lowered, and, it is assumed, has "stripped" the blank from the pickers now resting at the central portion of the machine. When rod 21 again moves upward, the plates 35 are forced upward to their highest position by the springs 36, carrying with them the top blank, Fig. 8. The complete machine is so timed that carrier-plate 29 remains at rest until plunger 24 has reached a sufficient height (see dotted lines in Fig. 7) to be out of the path of the plates 35, and when said position has been reached carrier 29 begins to move forward, Fig. 9, until the blank just picked has been carried to the proper position beneath the plunger to be operated upon thereby in its next downward movement, this last-named position being shown in Figs. 3 and 9, (dotted lines,) the former of said figures showing the companion set of carriers now in proper position over its pile of blanks to have its upper blank picked at the next downward movement of the arm 37.

To more clearly explain the manner in which plunger 24 and carrier 29 are timed relatively to each other, it will be seen by reference to Fig. 3 that at each revolution of cam 17 complete downward and return movement will be imparted to plunger 24. Cam 14^a is so shaped that during the greater portion of this movement of the plunger the roll 32^a of arm 32 rides on a portion of cam 14^a concentric to shaft 14. Hence no motion will be imparted to carrier 29. (In Fig. 4 the cams of Fig. 3 are shown

in the relative positions which they assume upon a half-revolution of shaft 17.) As soon as the plunger has been sufficiently elevated to clear the path of the carrier the cam 14^a serves to rock the arm 32, (dotted lines, Fig. 3,) and thus imparts the already-described motion to the carrier, transferring the latter to the position shown in dotted lines, Fig. 3, where it remains until the completion of the next downward and return movement of the plunger.

It will be readily understood from the timing of shafts 13 and 17 that two complete movements of the plunger are accomplished to one complete movement of the carrier.

I have provided the following-described mechanism by means of which gum or paste is deposited upon the pickers.

The reference-number 38 denotes my paste-boxes, the same being supported upon plate 12 and located one on each side of the path described by the plunger 24. In each paste-box 38 is journaled a paste-roll 39 extending in a direction at right angles to the path of the carrier 29. The shaft 40 of each paste-roll 39 is preferably extended through the side walls of the boxes and bears upon each end angle-arms 41, or said arms may be supported upon studs in horizontal alignment with said shafts 40. The shorter sections of the angle-arms 41 of each paste-box have journaled between them a paste-roll 39^a the circumferential surface of which has frictional contact with the circumferential surface of the roll 39, and also said circumferential surface of the rolls 39^a (under certain conditions) is in the same horizontal plane as the path described by the lower face of the ribs of picker-plates 33. The free ends of the said shorter sections are also joined by means of rods 42, thus connecting the said arm of one box to the corresponding arm of the companion box. The longer sections of angle-arms 41 extend radially from the shaft 40 in a downward direction and are for a purpose hereinafter described.

It will now be readily understood by reference to Figs. 1, 3, 7 and 9 that when angle-arms 41 of one paste-box are rocked the roll 39^a of said paste-box is caused to travel upon the circumference of its roll 39, and by reason of the rocking of the supporting-section of its angle-arm 41 corresponding movement will be imparted through rods 42 to the roll 39^a of the companion box. By reference particularly to Figs. 7 and 9 it will be seen that the length of rod 42 is such that when one of the rolls 39^a is in vertical alignment with its roll 39, as in Fig. 9, the companion roll 39^a is rocked downward out of vertical alignment with its roll, the positions assumed by roll 39^a relatively to roll 39 being shown in outline in Fig. 13. Assuming that the various parts are in the positions illustrated in Figs. 1, 3, 7 and 9, in which the rolls of the paste-box at the left of the plunger are in vertical alignment, as just stated, it will be seen that at the next movement of carrier 29 the pickers 33 from

which a blank was last stripped will pass directly over and in frictional contact with the roll 39^a, (see Fig. 9,) the pickers thus receiving a supply of paste therefrom. By reason
5 of the connecting-rods the companion roll 39^a is rocked downward out of the path of the companion pickers, and as a result the blank being then carried to position under the plunger passes over said last-named roll 39^a without
10 being pasted.

It will now be apparent that by properly rocking the rolls 39^a the same will be caused to gum that set of pickers which are traveling to the position over its pile of blanks necessary to pick therefrom the top blank, and
15 that such rocking of rolls will remove the companion roll 39^a out of the path of the blank then being carried to position under the plunger.

To automatically control the paste-rolls 39^a
20 I have provided one or both of the arms 31 with pins 31^b, so located on said arms as to engage at the proper times the longer sections of the angle-arms 41.

By reference to Fig. 9 it will be seen that
25 the pin 31^b of arm 30 when rocked will engage the longer section of angle-arm 41 soon after the completion of the gumming of the pickers, and that such engagement of the pin 31^b and arm 41 will finally rock said arm
30 sufficiently to reverse the positions of the respective rolls 39^a, this last result being accomplished just at the completion of the travel of the carrier 29. In the reverse movement
35 of said carrier, arm 31 engages the longer section of the companion arm 41 (now supposed to be in the position shown in dotted lines, Fig. 9) and forces it into the position shown in full lines.

In connection with this invention I have
40 provided means for controlling the upward travel of the elevators after the blanks supported thereby have been used up.

The elevators, briefly described, consist of platform portions 43, on which are downwardly-depending portions 44, which travel
45 in suitable ways or guides in supporting-frames 45, Fig. 15, secured to the machine. A rack 46 is provided on each portion 44, and meshing with the rack of each elevator is a
50 spur-gear 46^a. Gears 46^a are mounted upon a shaft 47, which latter is supported in bearings in frames 45, and on one end of said shaft is a worm-gear 48. Gear 48 is driven
55 by a worm 49, the shaft of which is peculiarly supported, as will be explained. On the shaft 49 are one or more groove-pulleys 50, and on the main shaft 13 are similar pulleys 51, and connecting the pulleys 50 and 51 is a belt 52.
60 When shaft 13 is set in revolution motion from the pulleys 51 is carried by belt 52 to the pulleys 50, which latter correspondingly set in motion the worm 49 and that in turn the worm-gear 48. Gear 48, revolving shaft
65 47 and its gear 46^a, causes said gears to drive the elevator slowly upward as the blanks are removed therefrom.

Referring now to Sheet 5, the shaft of worm

49 is supported near one end by a swiveled bearing 49^a, and at its other end by a bearing 49^b, which is slotted to receive a stud 45^a
70 fixedly secured to frame 45. Bearing 49^b rests upon one end of a peculiarly-shaped lever 53, which latter is pivotally secured at 53^a to the said frame 45. The other end of
75 lever 53 supports a pin 53^b, which enters a slot provided to receive the same in a downwardly-extending arm 44^a of the portion 44.

By reference to Fig. 14 it will be readily seen that when the elevator has traveled upward to the proper height (the height at which
80 the blanks are exhausted) the end of the slot of bracket 44^a will come in contact with the pin 53^b of arm 53, and continued upward movement of said bracket will rock said arm until the worm 49 will have been lowered sufficiently (the worm-shaft being rocked in its
85 bearing 49^a) to disengage the said worm from its gear 48. The upward feed of the elevator will then be checked and said elevator will drop by gravity to its lowest position, when the
90 upper end wall of the slot in arm 44^a will rock the lever 53, and thus force the worm into mesh with gear 48 again, when the elevator will begin to feed upward again. The tension of belt 52 seeks constantly to hold the worm
95 49 in operative engagement with its gear 48, and only a slight support from lever 53 is necessary beneath the movable bearing 49^b to hold the parts in mesh. When, however, such support is removed by the swinging of lever
100 53, as above explained, the continued rotation of the worm acts to force its threads out of operative engagement with the teeth of gear 48. The lever 53 is screwed or riveted to its
105 support sufficiently tight to provide a considerable degree of friction, so that said lever will remain in its elevated or depressed position until again moved by the engagement of its pin 53^b with one end of slot 44^a.

By the proper manipulation of a handle 48^a
110 on gear 48 the rack and attached elevator may be quickly adjusted to any desired elevation during the time when the worm and its gear are out of mesh.

My improvements when applied to an envelope-machine make it possible to greatly
115 increase the capacity of said machine without any liability of the throwing of paste, &c., as recited at the beginning of this specification, while at the same time they are not expensive
120 to produce, and being simple in construction may be readily assembled.

Having described my invention, I claim—

1. In combination with a vertically-reciprocating plunger, and a co-operating folder-throat, blank-supports located at opposite
125 sides of said throat, and mechanism for successively carrying blanks from said piles to said throat at each alternate descent of the plunger.

2. In combination, a reciprocating plunger, blank-supports at opposite sides of said plunger, a blank-carrier having at each end pickers as set forth, mechanism for moving said

pickers to a position under the plunger, paste-
rolls located between the plunger and blank-
supports, and mechanism for moving said
rolls into and out of the path of the carriers,
5 all substantially as specified.

3. In combination, in an envelope-machine,
a vertically-movable blank-support, means
including a pivoted worm-shaft as set forth,
and a worm-gear, for elevating said support,
10 and mechanism for automatically forcing said

worm into mesh with its gear and for per-
mitting the same to be released, consisting of
a lever 53 having one of its ends located be-
neath the pivoted worm-shaft and its other
end in a slotted portion of the blank-elevator, 15
all substantially as specified.

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