

(No Model.)

5 Sheets—Sheet 1.

R. O. BRIGHAM.
ENVELOPE MACHINE.

No. 511,676.

Patented Dec. 26, 1893.

Fig. 1.

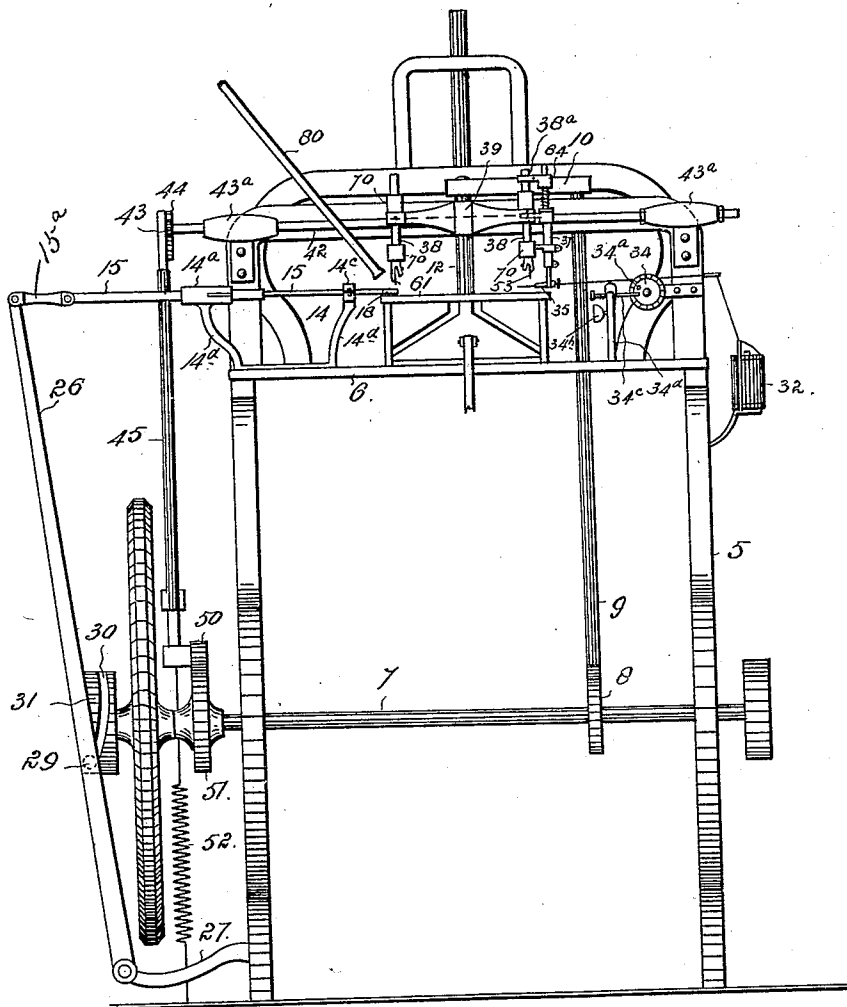
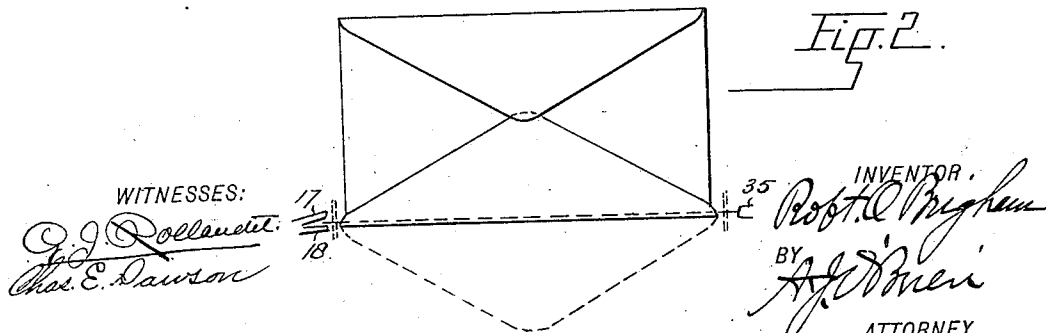


Fig. 2.



(No Model.)

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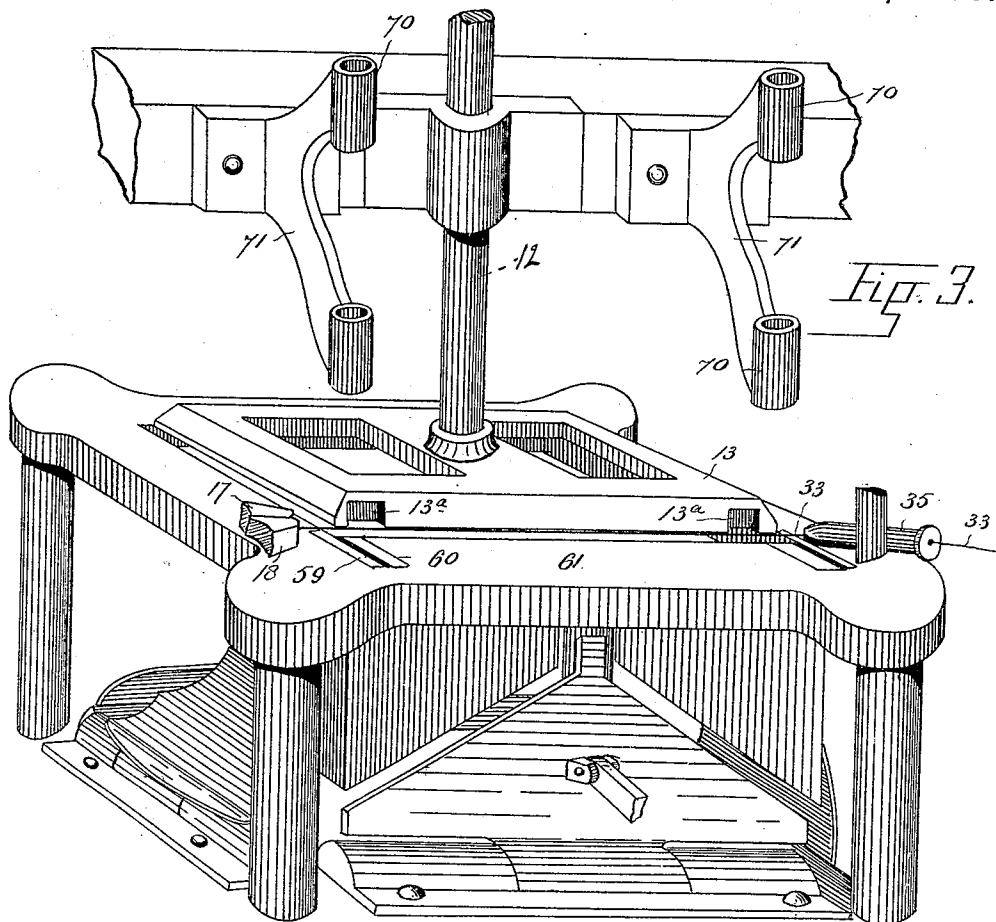


Fig. 3.

Fig. 4.

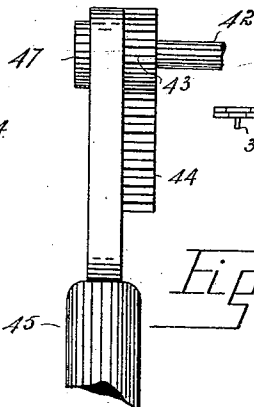
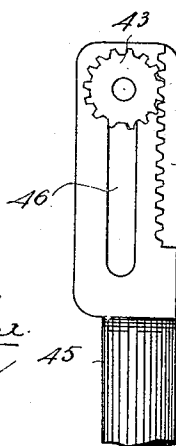
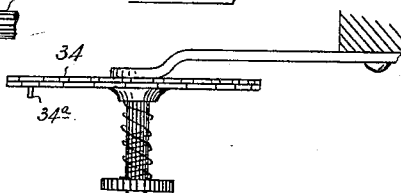


Fig. 6.



WITNESSES:
G. J. Rolland
Chas. E. Dawson

INVENTOR
R. O. Brigham
BY
A. J. Zuer
ATTORNEY.

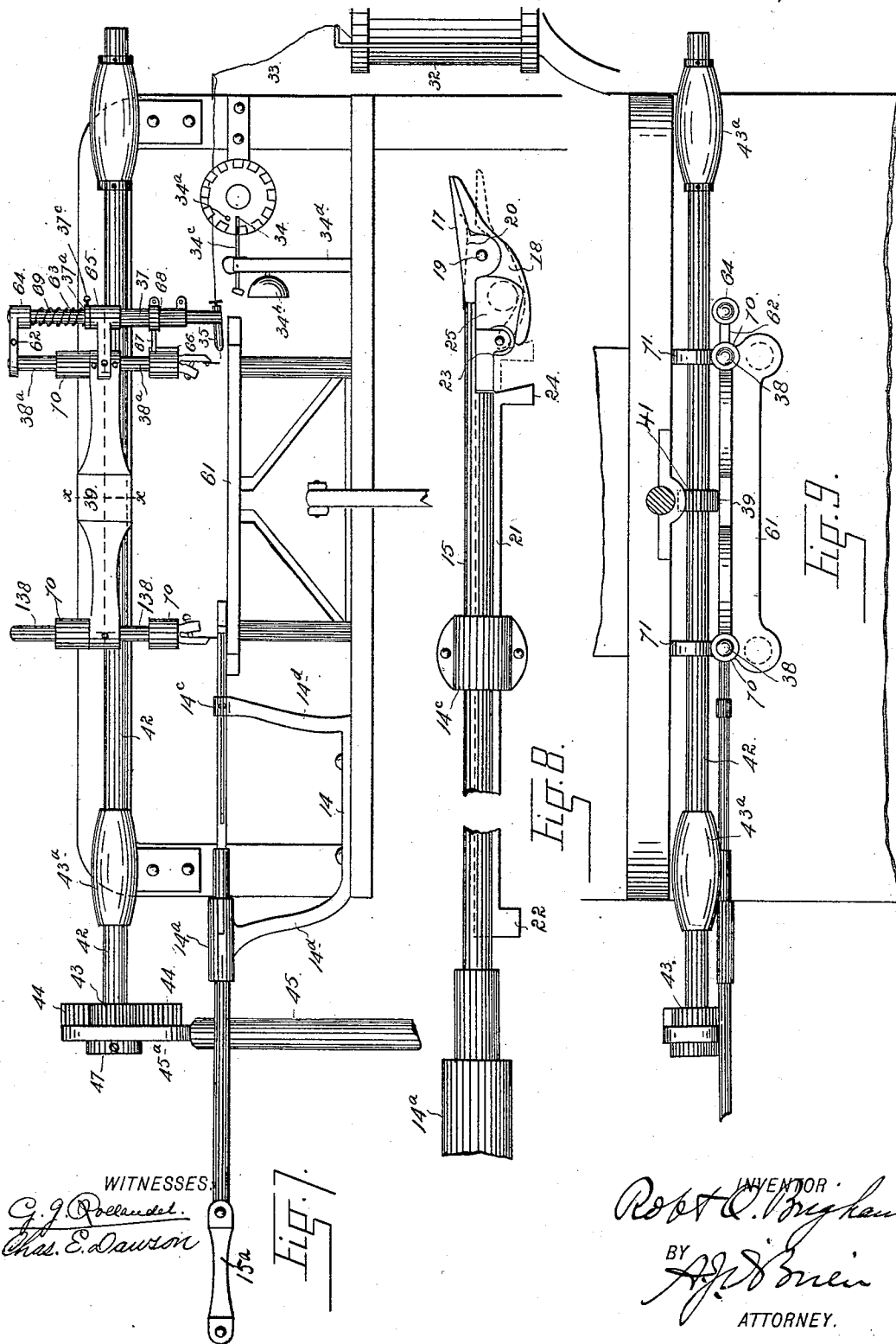
(No Model.)

5 Sheets—Sheet 3.

R. O. BRIGHAM.
ENVELOPE MACHINE.

No. 511,676.

Patented Dec. 26, 1893.



THE NATIONAL LITHOGRAPHING COMPANY,
WASHINGTON, D. C.

(No Model.)

5 Sheets—Sheet 4.

R. O. BRIGHAM.
ENVELOPE MACHINE.

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Patented Dec. 26, 1893.

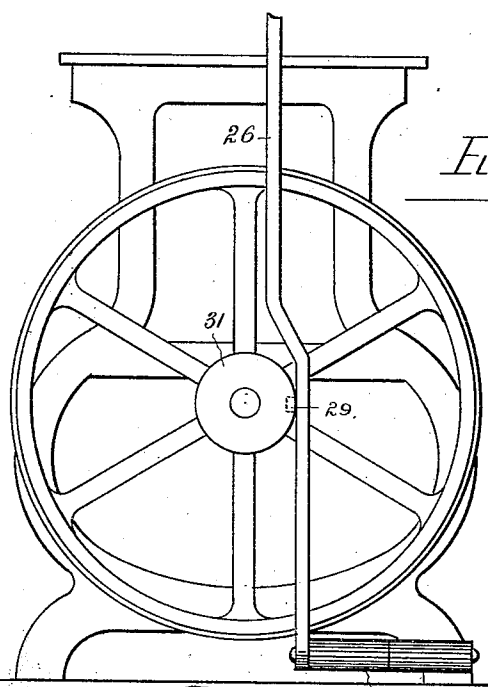


Fig. 10.

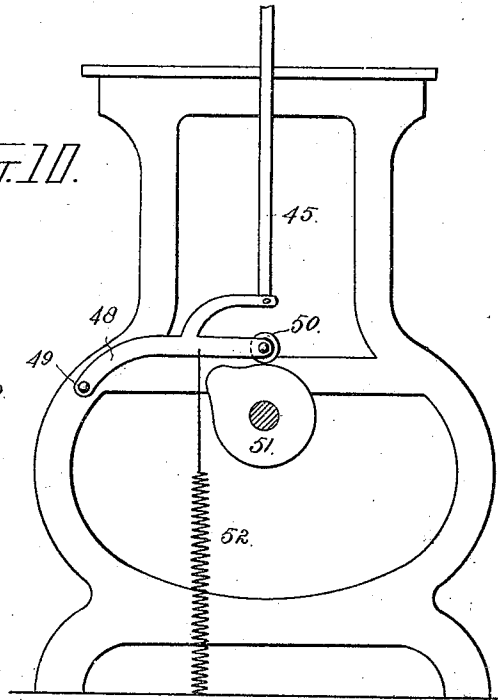


Fig. 11.

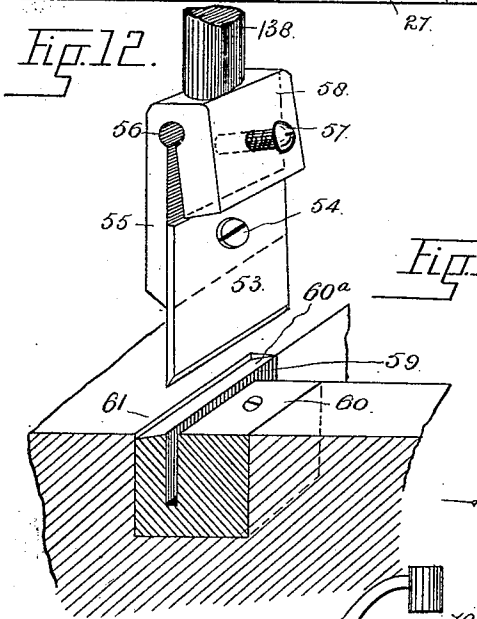


Fig. 12.

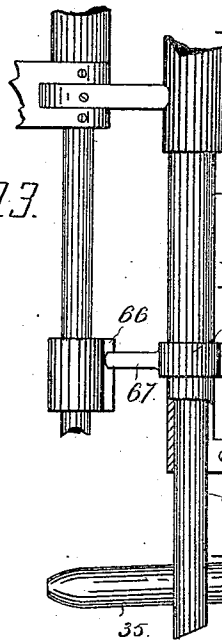


Fig. 13.

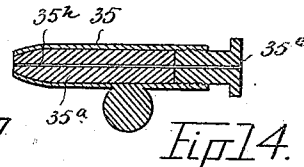


Fig. 14.

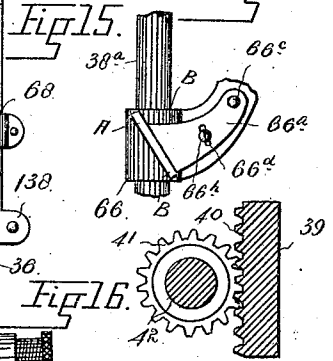


Fig. 15.

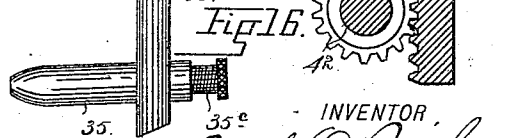


Fig. 16.

WITNESSES:
C. J. Dollander
Chas. E. Dawson

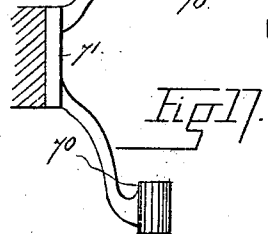


Fig. 17.

INVENTOR,
R. O. Brigham
BY
A. D. Brier
ATTORNEY.

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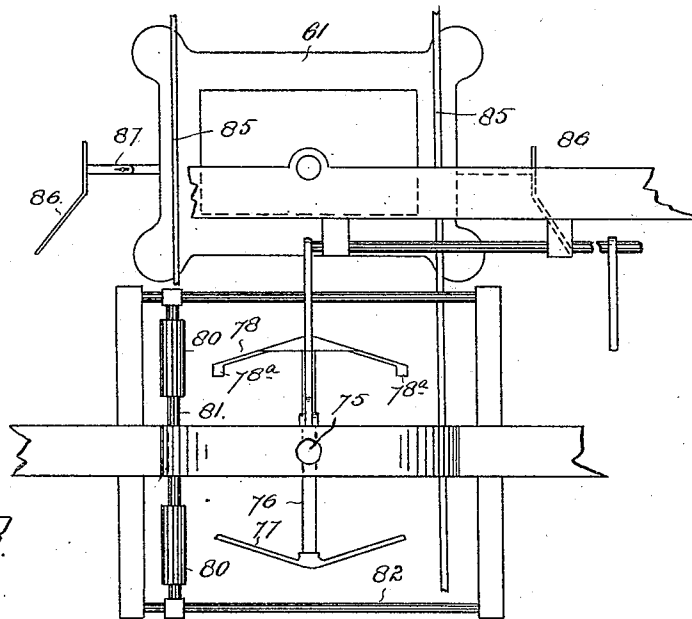


Fig. 18.

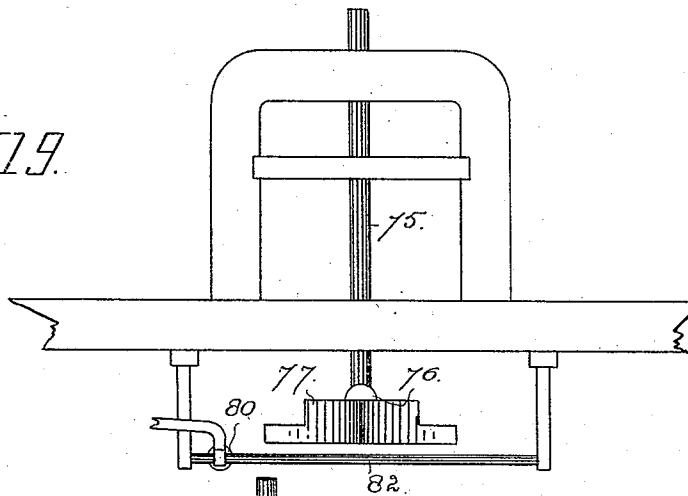


Fig. 19.

Fig. 20.

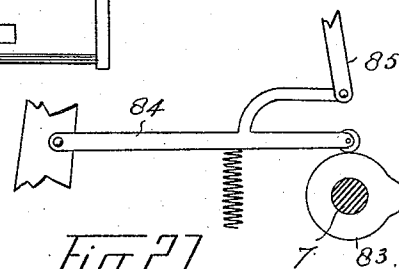
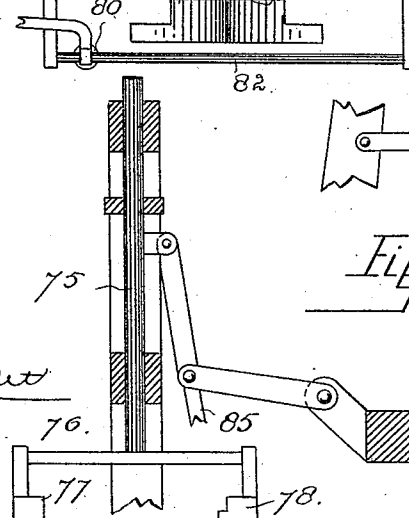


Fig. 21.

WITNESSES:

G. J. Dollard
Chas. E. Dawson

INVENTOR

Robt. O. Brigham
BY
Attorney.

UNITED STATES PATENT OFFICE.

ROBERT O. BRIGHAM, OF DENVER, COLORADO, ASSIGNOR TO THE NOVEL
ENVELOPE OPENER COMPANY, OF SAME PLACE.

ENVELOPE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 511,876, dated December 26, 1893.

Application filed March 31, 1893. Serial No. 468,605. (No model.)

To all whom it may concern:

Be it known that I, ROBERT O. BRIGHAM, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Envelope-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in envelope machines, and the object of the invention is the same as set forth in my previous application Serial No. 452,755, namely, to provide the envelope machine as heretofore constructed, with such attachments or improvements as shall meet the requirements in manufacturing envelopes provided with an opener-thread located in the folding crease of one of the sides and extending between the adjacent corners.

The improvements set forth in my present application are the result of experiments made since filing my previous application, and though the main feature, namely, the reciprocating rod carrying the gripping mechanism, is substantially the same, the location of this rod has been changed since it is now placed above the folders of the machine. It will also be noticed that the means for cutting the thread as well as the actuating mechanism for these cutters is entirely different in my present invention from that shown in the previous case. The device for holding the thread extremity in position for the grippers, together with the means for applying the gum, which holds the thread has also been changed, as well as other details which together with the entire mechanism will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a front view of the machine showing my improvements. Fig. 2 illustrates the envelope with the opener in place, the latter as well as the position of the cutters when the thread is severed, being indicated in dotted lines. Fig. 3 is a perspective

view of the upper part of the machine provided with the folders. Figs. 4 and 5 are two views of the pitman, the rack and the pinion which actuate the shaft, imparting the downward movement to the cutters. Fig. 6 is a top view of the alarm disk over which the thread passes to the holder. Fig. 7 is a front view of the upper part of the machine showing the operating parts on a larger scale. Fig. 8 is a top view of the reciprocating rod carrying the grippers. Fig. 9 is a similar view showing said rod in connection with the cutter frame and the shaft for actuating the cutters. Fig. 10 is a side view of the lower part of the machine. Fig. 11 is a similar view with parts removed, the main shaft being shown in section. Fig. 12 is a perspective view of one of the cutters and the cutter block which it enters when at its lowest limit of movement. This view is on a large scale. Fig. 13 illustrates the thread holder in connection with one of the cutter holders. Fig. 14 is a longitudinal section of the thread holder. Fig. 15 illustrates an inclined cam, which allows the spring-actuated arm carrying the thread holder, a partial rotation. Fig. 16 is a section taken on the line $x-x$ Fig. 7 showing the cogged rack on the cutter frame, and the engaging pinion on the adjacent shaft. Fig. 17 illustrates one of the supporting brackets for the arms or bars carrying the cutters. Fig. 18 is a fragmentary plan view of the machine, illustrating the pickers. Fig. 19 is a front view of the same. Fig. 20 is a side view of the pickers, the frame being shown in section. Fig. 21 is a fragment of the picker-operating mechanism.

Similar reference characters indicating corresponding parts or elements of the mechanism in the several views, let the numeral 5 designate the lower frame-work of the machine to which is attached the top plate 6 and in which is journaled the main shaft 7. Mounted on the shaft 7 is a cam 8 which actuates the pitman 9, the upper extremity of which is attached to a cross-head 10 carrying the bar 12 having the plunger 13 at its lower extremity. Mounted above the top plate 6 of the machine and supported upon a bracket 14 made fast to the top plate is the reciprocating rod 15, which passes through sleeves 14^a and

14^c, in which the arms 14^d of the bracket terminate. The sleeve 14^c is divided, the top part being removable for convenience in assembling the parts. This rod 15 is provided at its free extremity with a stationary jaw 17 and a movable jaw 18 pivoted to the stationary jaw at 19. A small spring 20 attached to the stationary jaw and bearing against the movable jaw from the inside, has a tendency to maintain the jaw 18 in the open position, or that shown by dotted lines in Fig. 8. The rod 15 is longitudinally grooved to receive a slide 21 carrying a lug 22 at one extremity, a roller cam 23 at its opposite extremity, and a lug 24 located near the roller cam. Just before rod 15 reaches its backward limit of movement, the lug 24 engages the sleeve 14^c after which the rod moves far enough to force the cam roller 23 of the slide into a recess 25 in the rear of the pivot 19. When the cam has reached this position the spring has opened the movable jaw. The jaw 18 remains in the open position until the rod has almost reached its forward limit of movement, when the lug 22 engages the sleeve 14^c which forms a stop for the slide, after which the rod moves far enough to draw the roller cam 23 back under the rear extremity of the jaw closing said jaw as shown in full lines in Fig. 8. The outer extremity of rod 15 is pivoted to a link 15^a which link is in turn pivoted to the upper end of an oscillating lever 26 fulcrumed at its lower extremity on an arm 27 rigid on the frame, and provided with an intermediate friction roller 29 engaging a cam groove 30 formed in a collar 31 made fast on the outer extremity of shaft 7. The groove in this collar 31 is of such shape that as the shaft 7 rotates a properly timed reciprocating movement is imparted to rod 15 through the medium of the oscillating lever 26.

The thread 23 used for the openers is drawn from a spool case 32, passes over a roller 34 and through the holder 35 supported upon a vertical rod 36 which is retained within a slotted tube 137, and held in position by a set screw 138. By means of this feature, the thread holder is adjustable vertically. The body of this holder is tubular, its interior being composed of a rubber filling 35^a engaged by a screw plug 35^c located in its larger end. There is a passage way 35 through the holder for the thread, and the filling 35^a is so adjusted that the thread is just drawn straight as it passes through, as no greater tension is required. The movable cutters for severing the thread, whereby it is made of the proper length to form the opener for the envelope, are attached to the bifurcated lower extremities of two vertical bars 38 and 38^a connected by a horizontal bar 39 provided with a cogged rack 40 shown in Fig. 16. The bars 38 and 38^a are made fast to the respective extremities of the horizontal bar 39 by means of set screws or in any other suitable manner. These vertical bars pass through sleeves 70 of the brackets 71 which are made fast to a

stationary part of the frame. The rack 40 of bar 39 is engaged by a pinion 41 made fast on a longitudinal shaft 42 journaled in sleeves 43^a mounted on the stationary frame-work of the machine. Made fast on this shaft near one extremity, is another pinion 43 which engages a cogged rack 44 carried by the pitman 45, the upper extremity 45^a of which is flattened and slotted as shown at 46 to receive the shaft 42, the upper extremity of the pitman being guided and supported between the pinion 43 and a collar 47 made fast to the extremity of the bar by means of a setscrew. The lower extremity of the pitman 45 is pivoted to one arm of a forked bar 48 attached to the stationary frame by means of a pivot 49. The other arm of bar 48 carries a friction roll 50 held in engagement with a cam 51 on the shaft 7 by a coil-spring 52 attached to the bar at one extremity, and to the lower part of the stationary frame at the opposite extremity. It will thus be seen that as shaft 7 rotates, a vertically reciprocating movement is imparted to the bars 38 and 38^a through the medium of the cam 51, bar 48, pitman 45 and shaft 42. The cutters proper consist of edged plates 53 attached by means of set screws 54 to the longer arms 55 of the bifurcated extremities of the bars 38, 38^a. The knife holding arms 55 are made comparatively thin at 56 where they join their respective bars 38 and 38^a to the end that the position of the knives may be adjusted by screws 57 which pass through threaded apertures formed in the shorter arms 58, and bear against the arms 55 whereby the latter may be adjusted to a limited extent by reason of the yielding property of the metal. The knives 53 when at their lowest limit of movement enter slots 59 formed in blocks 60 located in sockets formed in the plates 61. The surface 60^a of each block 60 is beveled to form an edge which co-operates with the edge of knife 53 in cutting the thread as the knife enters the slot 59. Hence the necessity for this adjustable feature of the knife holding arm since it is essential that the knife should pass very close to the supplemental cutting edge of the block in order to get the best results. It will readily be seen that after each act of sharpening the knife it may be necessary to adjust the knife holding arm in order to bring the plane of the knife in suitable proximity to that of the edge of the block. To the bar 38^a is made fast an arm 62 carrying a sleeve 64 through which bar 37 passes. To the lower arm of the bracket 70 through whose sleeves the bar 38^a passes, is attached a plate 66^a carrying a flange 66. This plate is pivoted to the bracket at a point 66^c and is slotted as shown at 66^d to receive a set screw 66^b. The plate is so located on its supporting bracket that its flanged extremity engages the lower sleeve through which bar 38^a passes. The flange 66 of this plate is inclined and projects from the surface of the adjacent sleeve into the path of a pin 67 formed integral with a collar 68

suitably clamped to the bar 37. This pin is held in engagement with the inclined flange 66 by means of a coil-spring 69, surrounding bar 37 and made fast at its lower extremity to a collar 37^a attached to the bar by means of set screw 37^c, its upper extremity being secured to the sleeve 64. From this construction it will be observed that as the bars 38^a and 38 move downward, bar 37 is carried therewith until its lower extremity engages the plate 61, during which movement the pin 67 follows the inclined flange 66 from a position A to a position B, referring to Fig. 15, the bar 37 being thereby given a partial rotary movement. The nose of the thread holder 35 is thus thrown to the position shown in Fig. 3, whereby the thread 33 is carried into the path of the plunger 13 and in such a position as to be placed in the folding line or crease between the flap and the body of the envelope. Just as the thread holder reaches this position, the cutters 53 descend and sever the thread which is carried downward by the plunger with the envelope blank. This mechanism for swinging the thread-holder about its vertical axis to position the thread with reference to the plunger and envelope blank, is necessary for the reason that the thread must be in its proper place, that is, in the line of one of the flat creases when the opener length is severed by the reciprocating cutters, since the last named devices press the opener down to contact with the gummed corners before cutting the thread, and thus fasten the opener to the envelope blank before it is acted upon by the plunger. Hence the necessity for the thread being in the proper position when first acted upon by the cutters and plunger. It must be remembered that the reciprocating cutters do not sever the thread until it is pressed down to the stationary blades when the two sets of cutters act in conjunction, the use of the previous engagement of the movable cutters with the thread being as before stated, to press the thread down to engagement with the gummed parts of the flap.

The tension of the spring 69 may be regulated by adjusting the collar 37^a on its bar, while the inclination of the flange 66 may be controlled by loosening the set screw 66^h and moving the plate 66^a on its pivot. These features place the movement of the thread holder for the purpose just described, entirely under the control of the person in charge of the machine.

In applying the opening thread to the envelope, provision must be made for fastening the extremities of the thread in the two corners adjacent to the folding crease in which the opener is located. It is well known that in the manufacture of ordinary envelopes, the gum is not applied to the extremities of the flaps. Hence it becomes necessary to so modify the ordinary gum-applying device as to meet this requirement. My improvement for accomplishing this object will now be de-

scribed, special reference being made to Figs. 18, 19, 20 and 21. In these views the numeral 75 designates the vertically reciprocating shaft mounted on the frame-work of the machine and provided with a cross bar 76 at its lower extremity to which bar is attached the pickers 77 and 78. The picker 77 is of ordinary construction.

My improvement relates only to the picker 78 which is provided at its extremities with projections or extensions 78^a which reach to the extremities of one of the side flaps, whereby the gum is applied the entire length of the flap's edge. The means for applying the gum to the pickers as well as the mechanism for actuating the pickers is all of ordinary construction.

The numeral 80 designates the gum applying rolls mounted on a bar slidingly supported upon the stationary guide rods 82. The movement of shaft 75 is imparted from the main shaft 7 through the medium of a cam 83, an arm 84, a pitman 85 and others suitable connections. By reason of placing the gum at the extremities of the flap, I find it necessary to modify the construction of the plunger to prevent the possibility of the gum adhering thereto, and holding the thread. Hence I cut away the plunger, forming two recesses, 13^a which occupy positions adjacent to these gummed extremities of the flap when the plunger engages the blank. By this means the plunger is kept free from gum and all possibility of trouble from the sticking of the thread thereto, obviated.

As the person in charge of the machine sits on the side opposite from that where the thread inserting mechanism is located, it is quite important that provision should be made, whereby this person may know whether this part of the machine is performing its proper function in harmony with the other parts. To accomplish this object, I provide a sort of annunciator in connection with the disk 34, over which the thread passes on its way from the thread-holder, as heretofore stated. As illustrated in the drawings, this disk is supposed to be of such size that it makes exactly one revolution for each length of the opener-thread which passes over it. It is provided with a pin or projection 34^a on one side, in whose path as the disk rotates, lies one extremity of a small bar 34^c, which is pivoted on a post 34^d supported on plate 6 and carrying a small gong 34^h, so located that as bar 34^c is released from the engaging pin of the disk, its opposite end returning, strikes the gong, which is sufficiently sonorous to be distinctly audible on the opposite side of the machine. From the description of the function and operation of the reciprocating rod 15 hereinbefore given, it will be understood that every time an opener-length is cut from the thread, a short piece drops from the jaws or grippers of the reciprocating rod.

From the well known capacity of machines

of this class, it will be understood that provision must be made for removing these short pieces, the accumulation of which would otherwise interfere with the working of the machine. To accomplish this I make use of a suction tube 80 whose mouth is located in close proximity to that point of the machine where these thread ends are dropped, while its opposite extremity is connected with suitable suction-inducing mechanism, whereby these small pieces are carried off through the tube as fast as they are dropped by the grippers and any annoyance therefrom, obviously averted.

In Fig. 18 I have shown a simple and efficient means for guiding the envelope blank from the position in which it is left by the pickers, to its position beneath the plunger as it is moved along on the sliding frame or carriage 85. My improvement consists in attaching wings 86 to opposite sides of the plate 61. These wings are supported on arms 87. The wings consist of the parallel parts having extensions outwardly deflected in the direction from which the blanks are received. The parallel parts of the wings are separated by a distance exactly equal to the length of the blank, while the deflected parts receive and guide the blank to its position between the parallel parts. This is a very simple construction but it works effectively and is believed far superior to the means heretofore employed to accomplish the same object.

From the foregoing description, it is believed the operation of the mechanism will be readily understood. The blank envelope, after being properly gummed, is taken from the pickers and placed over the aperture in plate 61 and in the path of the plunger. Rod 15 then moves in the direction of the thread holder with its mouth open until it reaches its forward limit of movement. Then the movable jaw closes upon the thread-end by reason of the engagement of lug 22 of the slide, with the sleeve 14^c in time to stop the slide and allow the rear extremity of the jaw 18 to pass over the cam-roll 23. Rod 15 then moves backward drawing the thread across the blank until the grippers or jaws reach about the position shown in Fig. 3, when by reason of the peculiar shape of the cam groove 30 in collar 31 the rod ceases to move. Bars 38 and 38^a are then moved downward through the interposition of the parts heretofore described, the spring-actuated bar 37 being allowed a partial rotation by the engagement of its projection 67 with the inclined flange or cam 66, whereby the holder 35 carries the thread into the path of the plunger and in position to enter the folding crease of the blank. This position of the thread holder is illustrated in Fig. 3. The bars 38 and 38^a then continue their downward movement until the knives or cutters 53 enter the slots 59 and sever the thread on both sides of the envelope blank. Rod 15 now continues its backward movement,

but the further movement in this direction of the slide 21 is stopped by the engagement of lug 24 with sleeve 14^c. Hence the rear part of the jaw 18 passes to the rear of the cam roll which occupies the position shown by dotted lines in Fig. 8. The jaw 18 is then thrown open by the action of spring 20. The thread-end cut off is then dropped from the jaws and is carried away by the suction tube 80. The cutter bars 38 and 38^a are then raised by the reverse action of shaft 42 caused by the downward movement of pitman 45 and the consequent engagement of rack 44 with pinion 43. Bar 37 and the thread holder are also returned to their normal position. Rod 15 then moves forward again and the operation of the several parts is repeated.

It must be understood that when the cutters 53 first engage the thread, the latter is a short distance above the envelope-blank. It is then carried downward by the cutters and pressed to connect with the gummed flap-ends, since the cutters do not act to sever the thread until their edges reach the horizontal planes in which the supplemental cutting edges of blocks 60 lie.

Having thus described my invention, what I claim is—

1. In an envelope machine, the combination with the folding mechanism and means for holding the thread in position to be grasped, of the reciprocating gripper rod which grasps the thread and places it in suitable proximity to the envelope blank, and reciprocating cutters which sever the thread on either side of said blank, substantially as described.

2. In an envelope machine, the combination with the folding mechanism and a thread holder, of the reciprocating rod having the movable jaw, which grasps the thread and places it in suitable proximity to the envelope blank and the reciprocating cutters for severing the thread on each side of the envelope, substantially as described.

3. In an envelope machine, the combination with the folding mechanism and a thread holder, of the reciprocating rod having the movable jaw and the slide for controlling said jaw, the slide being provided with a lug or projection, whereby its movement is interrupted at proper intervals and the reciprocating cutters which sever the thread on either side of the envelope, substantially as described.

4. In an envelope machine, the combination with the folding mechanism of the reciprocating rod having a movable jaw and a slide attached thereto, the slide being provided at one extremity with a cam adapted to engage the jaw, and having a projection, whereby its movement is interrupted at proper intervals by engaging a stop, means for holding the thread in position to be grasped by the rod, and placed in suitable proximity to the envelope blank and reciprocating cutters suitably separated for severing the thread, on

either side of the blank substantially as described.

5. In an envelope machine, the combination with the folding mechanism and means for placing the opener thread in suitable proximity to the envelope blank, of vertically reciprocating bars carrying cutters adapted to sever the thread at suitable points, on either side of said blank substantially as described.

6. In an envelope machine, the combination with the folding mechanism and means for placing the opener thread in position in front of the envelope flap of the vertically reciprocating bars carrying detachable knives attached to their lower extremities, and adapted to sever the thread on either side of the envelope substantially as described.

7. In an envelope machine, the combination with the folding mechanism and the means for placing the opener thread in suitable proximity to the envelope blank, of the vertically reciprocating bars bifurcated at their lower extremities, and having knives attached to the longer arms of the bifurcations, and adjusting screws located in the shorter arms and bearing against the longer arms, which are of such construction that the knives may be adjusted by turning these screws, and stationary blades which cooperate with the reciprocating knives in severing the thread on either side of the envelope substantially as described.

8. In an envelope machine, the combination with the folding mechanism and means for placing the thread in position, in front of the envelope flap of the vertically reciprocating bars carrying knives, and edged blocks provided with slots which the knives are adapted to enter, the edges of the blocks supplementing the knives in cutting the thread, on each

side of the envelope blank substantially as described.

9. In an envelope machine, the combination with the thread holder supported on a bar having both a vertically reciprocating movement and a partial rotary movement, said bar being provided with a projection, means for imparting to the bar the reciprocating movement and a cam engaging the projection, whereby the rotary movement in reverse directions is imparted to the bar, substantially as described.

10. In an envelope machine, the combination with the horizontally reciprocating gripper rod, the vertically reciprocating cutters, and the movable thread holder actuated from one of the cutter bars, substantially as described.

11. In an envelope machine, the combination with the horizontally reciprocating gripper rod, the vertically reciprocating cutter bars, and the thread holder-bar connected with and actuated from one of the cutter bars, substantially as described.

12. The combination of the reciprocating grippers the vertically reciprocating cutter bars, the thread holder bar provided with a coil spring, normally under suitable tension to turn the bar and a stationary cam which engages a projection on the thread holder bar, and allows the bar to make a partial rotary movement as it is carried downward by the cutter bar, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT O. BRIGHAM.

Witnesses:

CHAS. E. DAWSON,
BUNTON GREGORY.