

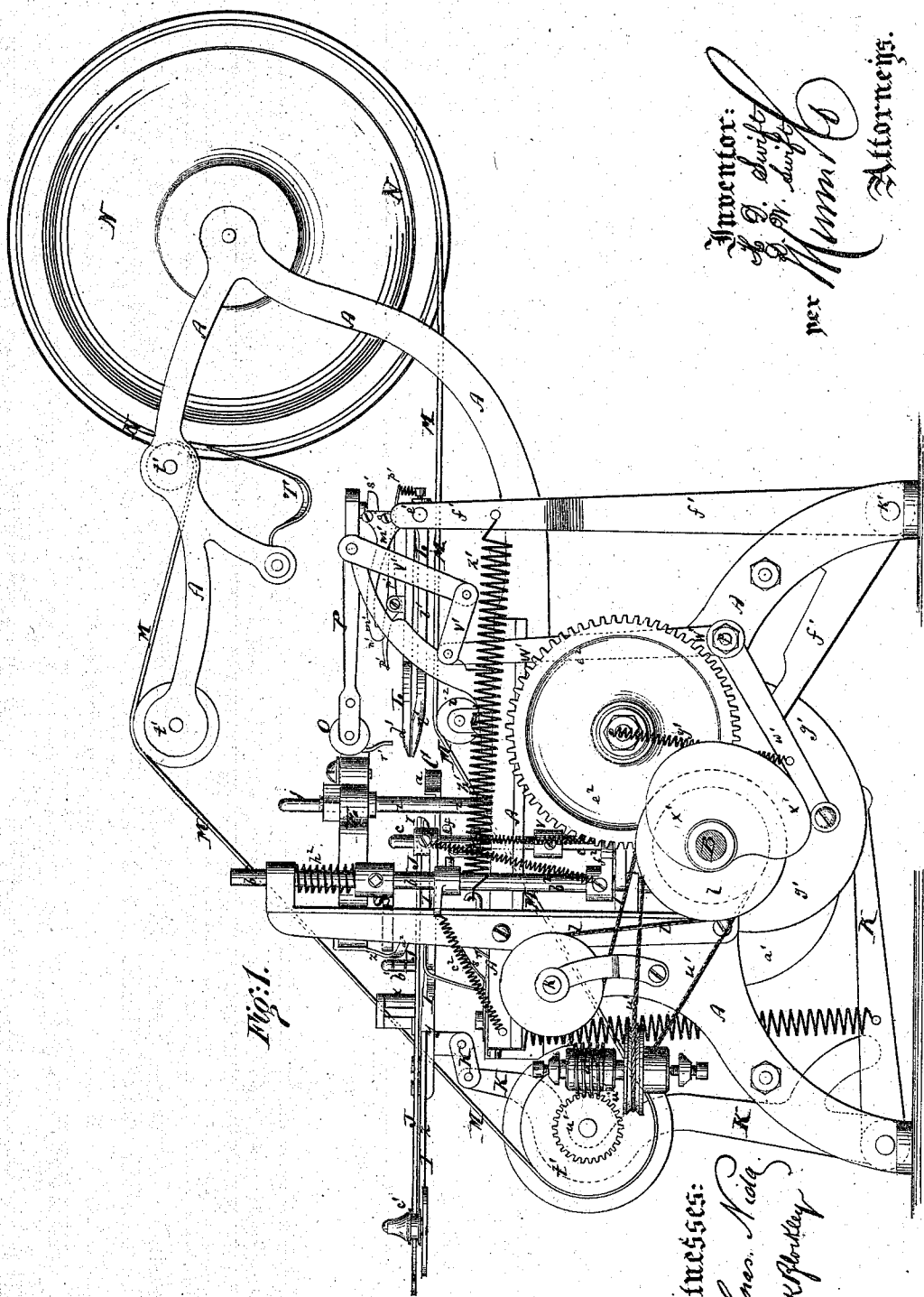
H. D. SWIFT & D. W. SWIFT.

No. 115,381.

Patented May 30, 1871.

Inventor:
L. D. Swift
G. W. Swift
Mm/10
per
Attorneys.

Witnesses:
 Pres. Nida
 Frank Bentley

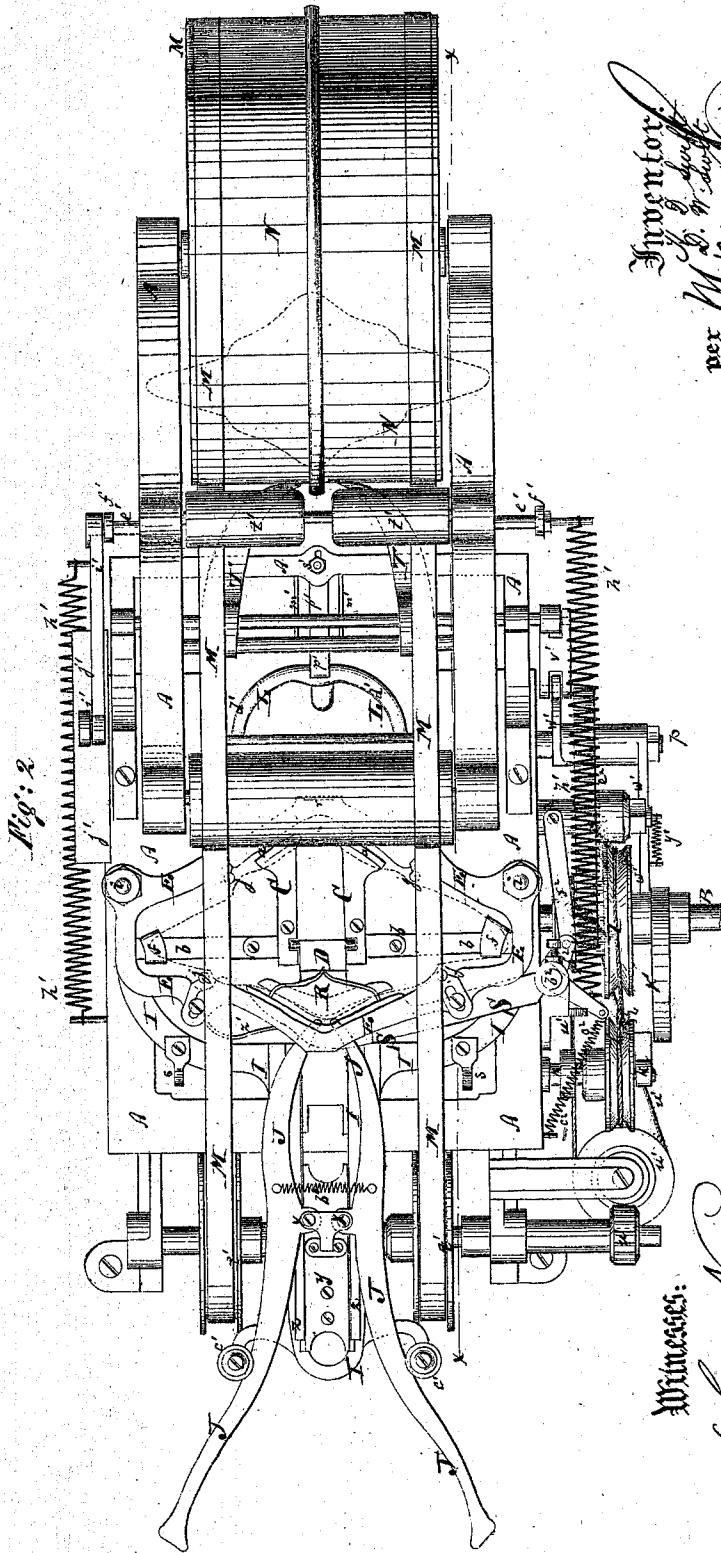


H. D. SWIFT & D. W. SWIFT.

Improvement in Envelope-Machines.

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Inventor:
H. D. Swift & D. W. Swift
per Wm. I. Co.

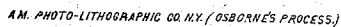
Attorneys.

Witnesses:

Chas. Nida.
Franklin

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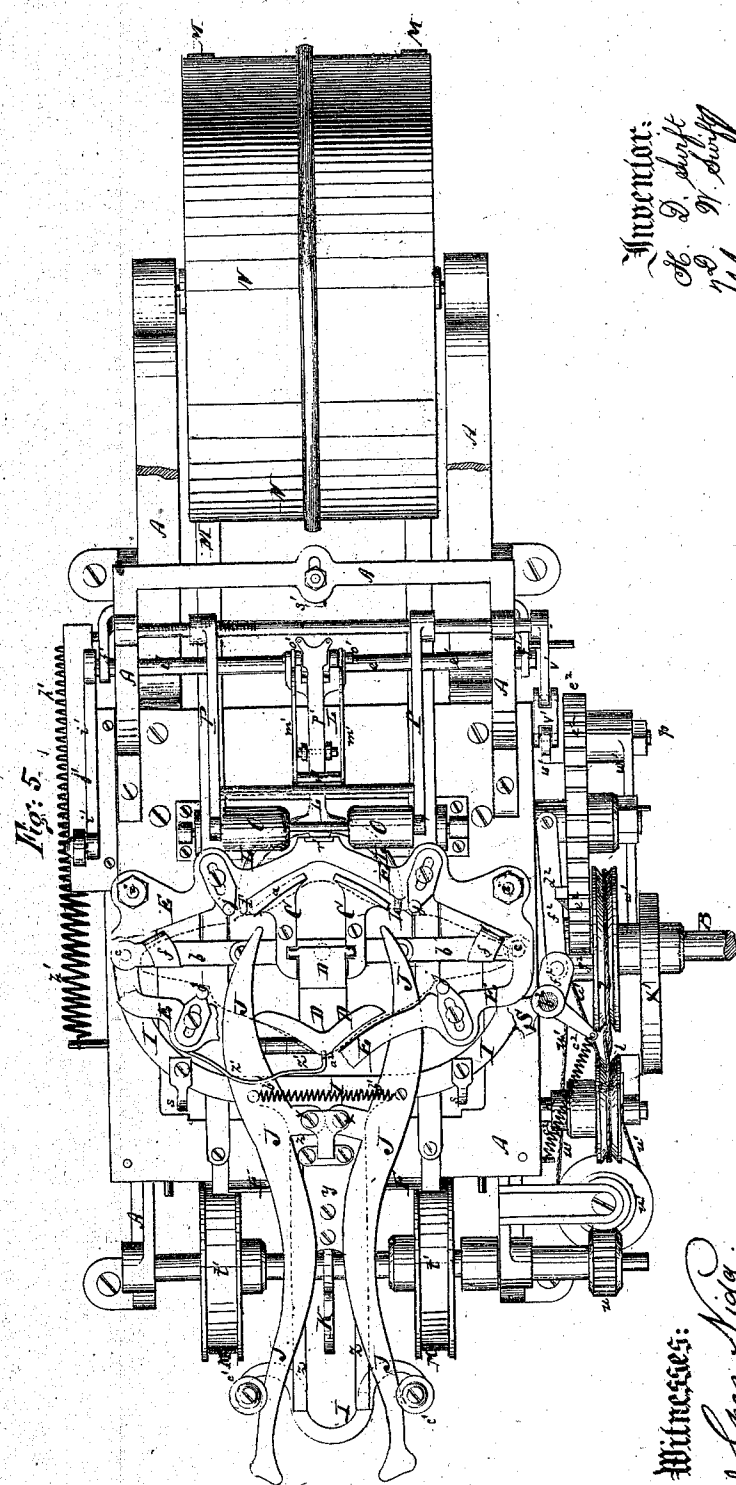


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Inventor:
H. D. Swift
D. W. Swift
per Messrs. Ho
Attorneys.

Witnesses:
Chas. Nida
Frank H. H. H.

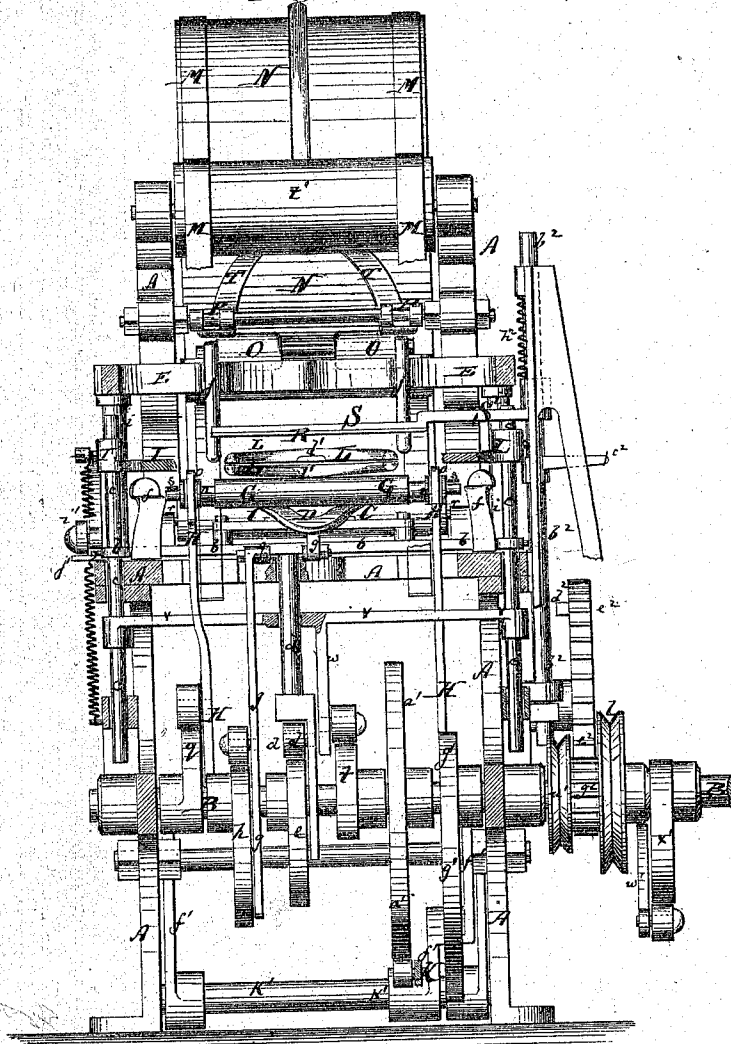
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Fig. 6



Witnesses:

Chas. Nida
Paul M. Hookley

Inventor

H. D. Swift
D. W. Swift
per *Merrill*

Attorneys.

UNITED STATES PATENT OFFICE.

HENRY D. SWIFT AND DANIEL W. SWIFT, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN ENVELOPE-MACHINES.

Specification forming part of Letters Patent No. 115,381, dated May 30, 1871.

To all whom it may concern:

Be it known that we, HENRY D. SWIFT and DANIEL W. SWIFT, of Worcester, in the county of Worcester and State of Massachusetts, have invented a new and Improved Machine for Gumming Envelopes; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to a new machine for gumming the sealing-flaps of envelope-blanks in rapid succession, and in such precise manner as to insure perfect accuracy throughout the operation of gumming, conveying, and drying the blanks. The invention consists in the application of intermediate supports for the blanks which sustain the latter while the main support is moving down to be gummed; also, in the connection of the impelling mechanism with such intermediate support, the said mechanism operating to alternately raise and lower the support to facilitate the removal of the same from under and its insertion between the lowermost blank and those above. The invention consists, further, in the use of a small stop for sustaining the sealing-flaps during the several motions of the said supports, and in the application to the machine of an oscillating blade, which is thrown between the blanks to sustain the upward pressure of the gummer. The invention also consists in the use of self-acting tweezers for withdrawing the gummed blanks from the supports and depositing the same in proper succession upon the feed-aprons. Furthermore, the invention consists of various details of arrangement, as hereinafter more fully set forth.

In the accompanying drawing, Figure 1 represents a side elevation of our improved gumming and drying machine. Fig. 2 is a plan or top view of the same. Fig. 3 is a vertical longitudinal section of the same, the line *xx* in Fig. 2 indicating the plane of section. Fig. 4 is a detail vertical section on the same plane as Fig. 3, showing certain parts in different positions. Fig. 5 is a horizontal section of the machine, the line *yy* in Fig. 3 indicating the plane of section. Fig. 6 is a vertical transverse section of the same, the line *zz* in Fig. 3 indicating the plane of section.

Similar letters of reference indicate corresponding parts.

A in the drawing represents the frame-work of our improved machine, said frame-work being made of metal, wood, or both, of such suitable form and dimensions as to sustain the working parts of the machine in the most profitable manner. In the lower part of the frame A is hung transversely the driving-shaft B, which receives rotary motion, by means of a belt or otherwise, from suitable mechanism, and serves to impart motion to all the movable mechanism of our machine. C is a metal plate or bed, shaped so as to constitute a support for the middle portions of envelope-blanks, it being provided with projecting flanges *a* at one side for properly and steadily retaining such blanks in position. This plate or bed C is secured upon a cross-bar, *b*, which has its ends fitted upon uprights or posts *c c*, on which it can slide up and down. A vertical arm, *d*, projects downward from the cross-bar *b*, and is connected with a cam, *e*, on the shaft B, whereby said cross-bar, together with its plate or bed C, receives reciprocating motion in a vertical direction. From the cross-bar *b*, near the ends of the same, project also small tablets *f f*, which serve to sustain the ends of the envelope-blanks. The plate C may be made removable from the cross-bar, and the tablets adjustable thereon, to permit the adaptation of the machine to different-sized blanks. To the front part of the plate C is pivoted a plate, D, which is provided with a V-shaped projecting-rib constituting the gumming-pad. By means of a rod or arm, *g*, the plate D is connected with a cam, *h*, of the shaft B, and is, by the same, alternately swung down to receive the gum, as in Fig. 3, and up, as in Fig. 4, to apply the same. In the latter position the plate D is in line with C or above the latter, and constitutes, together with the same, and with the tablets *f*, the support of the envelope-blanks. On vertical posts *i i*, which project from the frame A, is placed and secured a horizontal endless bar or frame, E, above the platforms C D, and provided with a series of vertical pins, *j j*, that serves to hold a package of envelope-blanks properly in place above the said platforms, so that they may be steadily fed down if successively removed from below. The pins *j j* may

be made adjustable. F is the gum-trough or receptacle, fixed transversely to the frame A. Within it is placed a roller, K, which is rotated by means of a belt, *l*, from the shaft B, duly scraped by a scraper, *m*, and thereby always prepared to transfer gum to the gumming-roller G. The ends of the roller G are hung in thimbles *n n*, which are held in forked arms *o o* of an oscillating frame, H, that turns on a transverse pivot, *p*, and is actuated by a cam, *q*, on the shaft B. The thimbles *n* are flattened where they fit the forks *o*, so that they may slide but not revolve therein. The oscillating motion of the frame H carries the roller G from the roller *k* to the gumming-pad D, its extremes of position being respectively shown in Figs. 4 and 3, the latter figure showing it somewhat rolled back from the upper part of D. During this motion the roller G moves over S-shaped guide-fingers *r r*, and is held onto the same by guide-springs *s s*, shown in Fig. 3. While in contact with the roller *k*, the roller G is revolved by the same to have its surface evenly gummed. Its motion over the fingers *r* and along the springs *s* causes it to rotate on its own axis while traveling from *k* to D. It reaches the latter plate when the same is swung down, as in Fig. 3, and moves over the projecting rib, covering the same with gum, and rolling, while in contact with said rib, to evenly apply the gum. It will be seen that the thimbles slide in the forks *o* during the vibration of the frame H, and do not interfere with the rotation of the roller G; also, that the sliding motion of said thimbles is caused by the formation of the fingers *r*. I is a horizontal plate, which is made slightly adjustable in a vertical direction, being supported by a cam, *t*, of the shaft B. The plate I is arranged above the gum-trough, but lower than the frame E, as shown. It is supported by the upright posts *c c*, on which the cross-bar *b* slides loose, and which are connected by a cross-bar, *v*, whence an arm, *w*, extends downward to the cam *t*. The vertical reciprocating motion imparted to the plate I by means of the cam *t* is very slight, being merely intended to clear one thickness of paper, as hereinafter more clearly set forth, although it opens nearly an inch. J J is a pair of horizontal tongs, or rather tong-shaped plates. The same are, by means of pins *x x*, pivoted to the slide *y*, which moves longitudinally between a pair of parallel rails, *z z*, which is affixed to the plate I. The slide *y* receives reciprocating motion in a longitudinal direction by means of a jointed elbow-lever, K, which is oscillated by a cam, *a*¹, on the shaft B. The front or inner ends of the tongs or plates J are, by a spring or springs, *b*¹, drawn together, as in Fig. 2, whenever the said plates are drawn back. The outer ends of the tongs or plates J, which are bent apart, are held in contact with the edges of friction-rollers *c*¹ *c*¹ that are affixed to the back part of the plate I. When the slide *y* is moved forward with the tongs J, as in Fig. 5, the rear ends of said tongs will

be forced toward each other by the rollers *c*¹, so that their front or inner ends are spread apart. When the tongs are thus spread apart, as in Fig. 5, the plate I is at first in its most elevated position, as is also the bed C, in which position the tongs J are slightly above the level of the bed C, as in Fig. 4. But while the tongs are still spread and forward, the bed C is drawn down to have its portion D gummed, (see Fig. 3,) and then moved up again. The plate I is next lowered to bring the surfaces of the plates J on a level with the bed C, and in this lowered position the tongs are drawn back and contracted. When the tongs are back, as in Fig. 2, they are lowered. Thus they are also pushed forward and radially elevated while being spread apart. L is a pair of tweezers, arranged in front of the bed C. The upper arm or jaw *d*¹ of said tweezers is rigidly affixed to a cross-bar, *e*¹, which is secured between two upright pivoted levers, *f*¹, which receive oscillating motion by a cam, *g*¹, on the shaft B, and by springs *h*¹. The cross-bar *e*¹ is pivoted in the levers *f*¹, and carries a projecting arm, *i*¹, which rests with its end on a horizontal table, *j*¹, being held down on the same by its weight and that of the tweezers. By the arm sliding on the table *j*¹ the upper jaw of the tweezers is constantly held in a horizontal position, while the levers *f*¹ swing on their pivot *k*¹. The lower jaw *l*¹ of the tweezers is so pivoted to the cross-bar *e*¹ that it can swing independently on the same. It has affixed to it an upwardly and inwardly projecting frame, *m*¹, which has an inner cross-piece, *n*¹, and another cross-piece, *o*¹, at its front end. A spring-catch, *p*¹, is pivoted to ears which project from the upper jaw. A spring, *q*¹, tends to draw the jaw closed. When the tweezers are moved inwardly toward the bed C the rear end of the spring-catch *p*¹ strikes a stop, *r*¹, which is suspended from the frame E, and causes said catch to release the pin *o*¹ of the movable jaw. The tweezers are then closed by the spring *q*¹, and move outward in such closed position until the cross-piece *n*¹ of the frame *m*¹ strikes another stop, *s*¹, of the frame A. This causes the lower jaw to swing open, and the spring-catch to snap over the pin *o*¹, whereby the tweezers are retained open. In such open position the tweezers move back again toward the bed C, to be there closed, as aforesaid. M is a pair of endless aprons, which is placed over a series of rollers and pulleys, *t*¹ *t*¹, and also around a large drum, N, at the front end of the machine. One set of pulleys, *t*¹, receives a slow rotation by worm-gear and belt *u*¹ from the shaft B, so that the aprons move slowly but continuously with their lower part toward and around the drum N, with their upper parts away from the same. Under the tweezers L the aprons are straight, as shown. O is a roller, hung to a rocking frame, P, which is pivoted to a part of the frame A above the tweezers L. The frame P is, by means of links *v*¹, connected with a lever, *w*¹, which is vibrated by a cam, *x*¹, of the shaft B and by a spring, *y*¹. The motion thus impart-

ed to the frame P causes the same to swing the roller O down upon the aprons M, and a roller, i^2 , under the same, whenever the tweezers L are moving away from the bed C, as in Fig. 4, and to elevate said roller clear of aprons and tweezers whenever the latter move toward the bed C, as in Fig. 3. From the frame E is suspended an arm, e' , which is provided with or forms a small shoulder, a^2 , on a level with the tongs J, and in a line with the middle line between the same. Somewhat above the tongs J is a knife-blade, R, secured to a vibrating horizontal lever, S, which projects from a vertical pin or pivot, b^2 . The latter is, by a spring, c^2 , so turned as to hold the blade R vertically in line with and above the gummer D. But about once during every six revolutions of the shaft B a stop, d^2 , on a wheel, e^2 , which gears into a pinion, g^2 , on the shaft B, strikes an arm, f^2 , of the pivot b^2 , and turns the same, carrying the blade R clear of the envelope space. Immediately after this the blade is again thrown forward by the spring c^2 . The pivot b^2 is vertically adjustable in its bearings, being held down by a spring, h^2 , and is, therefore, together with the blade R, yielding to pressure from below. Directly back of the drum N is secured to the frame A a cradle, T, under the aprons M, as shown, so that all matter carried around said drum will be dropped into the cradle, the drum revolving in the direction of the arrow shown in Fig. 3.

It is evident that the cams, gear-wheels, belts, and springs herein specified as moving mechanisms may be varied in their arrangements and substituted by equivalents readily devised.

The operation of the machine is as follows: The envelope-blanks, properly cut, are, in considerable numbers, placed upon the platform or bed C, when the same is elevated, the blade R being withdrawn, and also the tongs J. The machine being now set in motion by revolving the shaft B, the first movement will be that of the blade R, which is thrown into the heap of envelopes, so as to be between those immediately on C and the upper bulk. The object of the blade R is to receive the pressure from below of the gumming-pad. Being made vertically yielding by means of the springs h^2 , the blade will always fit its purpose, even if there are more or less blanks between it and the gummer. After, say, six blanks have been gummed, the blade R is swung out, and immediately thrown back into the pile of blanks, to re-enter the same above those blanks where it was last, and in this manner it is always automatically adjusted to its proper place. Supposing the surface of the gummer D to be covered with gum, the next movement is that the said gummer will be turned obliquely downward on its pivot, so that it will, by means of its adhesive coating, draw the flap of the lowermost blank slightly down with it. At the same time the united tongs J will, in their lower position, move ahead, and enter between the said lowermost blank and pile of blanks

above, and will then gradually spread and become elevated, so as to relieve the bed C of the load of blanks, supporting the same in its stead. At the same time also, and before the bed C commences to descend, the tweezers L have moved toward it, and have grasped the blank, which is already isolated from the others by the elevated tongs J. The bed C now descends, and the tweezers move off with the gummed blank. The whole lot of ungummed blanks now rests on the spread tongs J, and all parts are in the position shown in Figs. 3 and 5. The gumming-roller G moves now over the face of the gummer D. The next movement of the machine re-elevates the bed C, and when the same is nearly up to the blanks, the plate D is swung up on its pivot to gum the under side of the flap of the lower blank, and to cause the same to adhere to it. The tongs are now withdrawn, and gradually lowered to gently deposit all blanks upon the bed C before they move off. The plate D is next swung down to draw down the gummed flap and provide an entrance for the closed tongs J between the lower blank and those above. While the gummer draws down the gummed flap, the corresponding flaps of the upper blanks are supported by the shoulder a^2 , which prevents the gummer from drawing more than one blank. The tongs now enter between the lower blank and those above, separating said lower blank, raising the others off so as to enable the tweezers to take the one prepared, and all parts to repeat the stated operation. The tweezers carry each blank they take ahead to the full end of the stroke of the frame f^1 ; when they are quite forward the roller O is carried down upon the aprons, and clamps the blank against the roller i^2 , retaining it momentarily while the tweezers open. The blank is now fairly deposited on the aprons, and is, by the same, slowly carried around the drum N to dry the gum on its sealing-flap by exposure to the air. The tweezers move again toward the bed C for taking the next blank, the roller O flying up immediately after it came down.

The drying apparatus herein described, which also acts as a conveyer for depositing the finished blanks in the cradle T, may also be used on other machinery, such as printing-presses, &c., to convey paper from the machinery to any desired place.

The aprons M are far enough apart not to be in the way of the gummed portions.

The drum N has a projecting rib in the middle of its edge to cause the gummed flap to bulge out and be exposed to the air.

The points of the tongs J have runners on their under sides, so that they will readily pass between and separate the proper blanks.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The vibrating blade R, arranged on an envelope-gumming machine, as described, to constitute a divider for the envelopes, and a resistance-plate for the gummer, as set forth.

2. The arm z' , carrying the shoulder a^2 , arranged, in combination with the bed C and swinging gummer D, for holding the edges of the ungummed blanks, substantially as herein shown and described.

3. The tongs J, made vertically adjustable to lift the blanks off and replace them on the bed C, substantially as herein shown and described.

4. The rollers c^1 c^1 , for spreading and the spring b^1 for closing the tongs J, combined, substantially as herein shown and described.

5. The reciprocating slide y , combined with pivoted tongs J, rollers c^1 , and springs b^1 , substantially as herein specified.

6. The stop d^2 on the wheel e^2 , combined with the blade R for moving the same at intervals, substantially as herein shown and described.

7. The blade R, applied to the vertically-adjustable pin b^2 , to be made yielding, substantially as herein shown and described.

8. The fingers r and springs s , combined with

the revolving gumming-roller G, substantially as and for the purpose herein shown and described.

9. The vibrating gummer D, combined with the reciprocating bed C and gumming-roller G, all arranged to operate together as specified.

10. The conveying-tweezers L, connected with the guide-arm i^1 and table j' , to be held in proper direction, as specified.

11. The frame m' , spring-catch p' , and spring q' , combined with the jaws d^1 and v' of the tweezers L, to operate the same, substantially as herein shown and described.

12. The roller O on the vibrating frame P, arranged, in connection with the aprons M and tweezers L, to retain the blanks on the aprons, substantially as herein shown and described.

HENRY D. SWIFT.

DANIEL W. SWIFT.

Witnesses:

JAMES H. WALLS,

J. HENRY HILL.