2 Sheets--Sheet 1.

W. LIDDELL.

Envelope-Machine.

No. 161,133. Patented March 23, 1875.

Fig. 1.

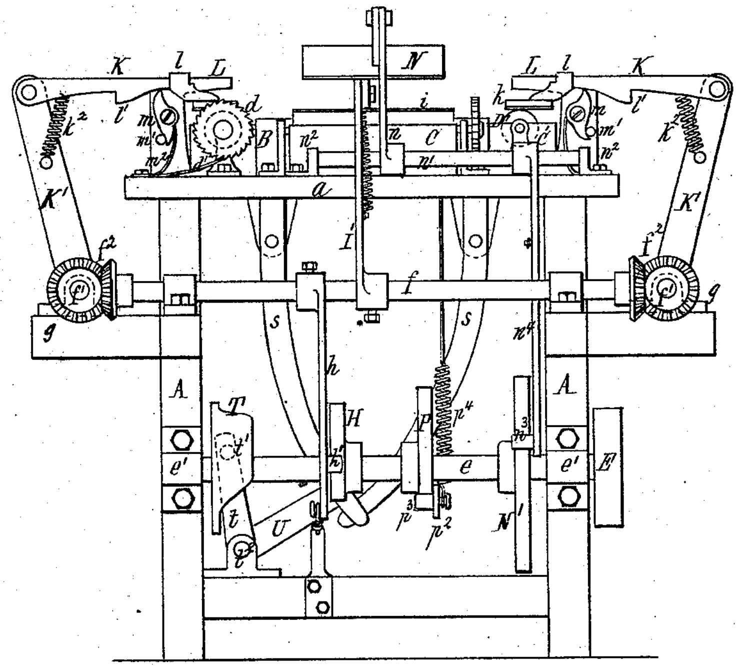
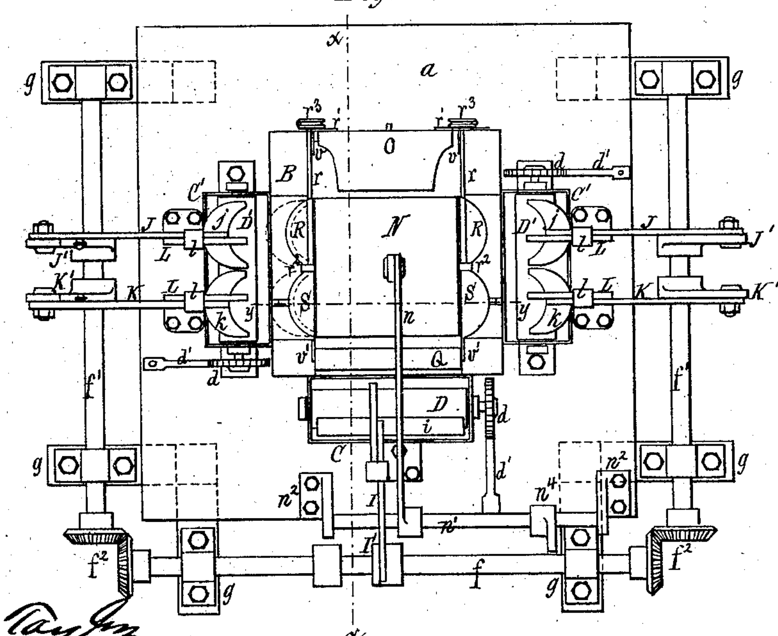


Fig. 2.



Martin Tay Jr
J. J. Thorpe
Witnesses.

William Liddell Inventor

2 Sheets--Sheet 2.

W. LIDDELL.

Envelope-Machine.

No. 161,133. Patented March 23, 1875.

Fig. 3.

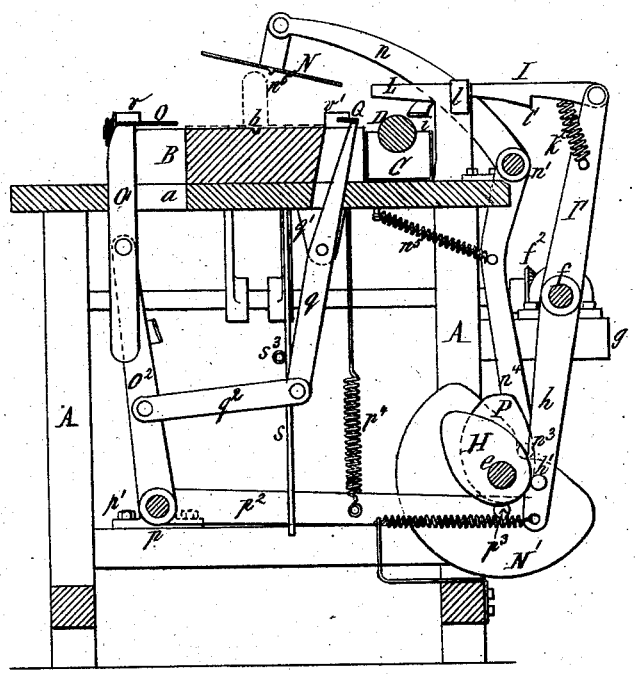


Fig. 5.

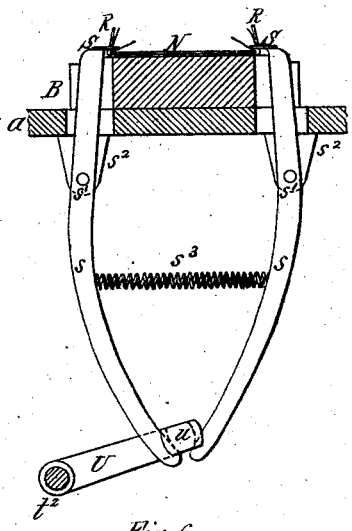


Fig. 6.

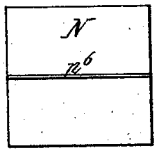


Fig. 7.

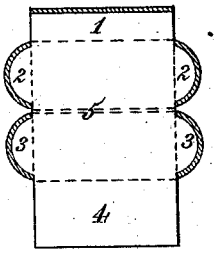


Fig. 8.

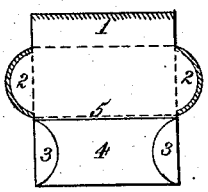
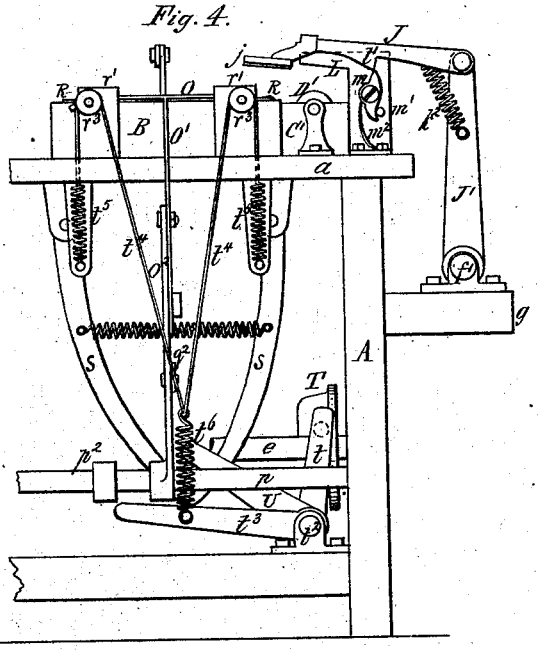


Fig. 4.



Witnesses

Martin Tay Jr.

L. J. Thorp

William Liddell Inventor

UNITED STATES PATENT OFFICE.

WILLIAM LIDDELL, OF BUFFALO, NEW YORK, ASSIGNOR TO MARTIN TAYLOR, OF SAME PLACE.

IMPROVEMENT IN ENVELOPE-MACHINES.

Specification forming part of Letters Patent No. **161,133**, dated March 23, 1875; application filed December 5, 1874.

To all whom it may concern:

Be it known that I, WILLIAM LIDDELL, of the city of Buffalo, in the county of Erie and State of New York, have invented certain Improvements in Envelope-Machines, of which the following is a specification:

My invention relates to a machine for manufacturing envelopes, so constructed that the pocket is secured at the side by an enlarged flap, which folds over and covers the entire side of the pocket, and is provided with three flaps, which overlap, and are secured to the opposite side of the pocket, so that the envelope must be destroyed before the contents can be extracted therefrom.

My invention consists of several mechanical devices for creasing, gumming, and folding a blank of suitable shape, so as to produce the desired envelope, as will be fully understood from the following description.

In the accompanying drawings, consisting of two sheets, Figure 1 is a rear elevation, and Fig. 2 a top-plan view, of my improved machine. Fig. 3 is a vertical section in line *x x*, Fig. 2. Fig. 4 is a fragmentary front elevation of the machine. Fig. 5 is a cross-section in line *y y*, Fig. 2. Fig. 6 is a bottom view of the former-plate. Fig. 7 is a view of the blank from which the envelope is formed. Fig. 8 is a view of the completed envelope.

Like letters designate like parts in each of the figures.

A represents the frame of the machine, and *a* the top plate thereof. B is the rectangular bed-block, arranged on the top plate *a*, and provided with a transverse groove, *b*. C C′ C′ are the mucilage-reservoirs, arranged on three sides of the block B, the two reservoirs C′ C′ being placed opposite each other at the sides of the block for applying the mucilage to the side flaps, while the reservoir C is arranged at the rear end of the block for gumming the end flap of the envelope. D D′ D′ are the mucilage-rollers, arranged, respectively, in the reservoirs C C′ C′, and provided each with a ratchet-wheel, *d*, with which engages a spring bar or dog, *d′*, which permits the said rollers to rotate in one direction only. *e* is the driving-shaft of the machine, supported in bearings *e′*, secured to the main frame; and E, a pulley or gear-wheel, mounted thereon for transmitting motion thereto. *f* f^1 f^1 are three rock-shafts, supported in bracket-bearings *g* attached to the frame A. The rock-shaft *f* is arranged parallel with and above the driving-shaft *e*, and actuated by means of a cam, H, mounted on the latter, and engaging with a roller, *h′*, on an arm, *h*, secured to the shaft *f*. The two rock-shafts f^1 f^1 are arranged at right angles to the shaft *f*, at each end thereof, and in the same horizontal plane therewith, and are geared thereto by two pairs of miter-wheels, f^2. *i* is a flat bar or plate, arranged with the roller D, for applying mucilage to the rectangular end flap of the envelope, marked 1 in Figs. 7 and 8. It is attached to the inner end of a bar, I, which is jointed at its outer end to an arm, I′, secured to the rock-shaft *f*. *j j* are crescent-shaped gumming-plates or mucilage-carriers, arranged on opposite sides of the block B with the rollers D′ D′, for applying mucilage to the side flaps 3 3 of the pocket of the envelope; and *k k*, two similar gumming-plates, arranged side by side with the plates *j j*, for applying mucilage to the secondary side flaps 2 2. The plates *j j* and *k k* are attached, respectively, to the inner ends of horizontal bars J J and K K, jointed at their outer ends to arms J′ K′, mounted on the rock-shafts f^1 f^1. The plates *i j k* are preferably covered on their under side with canvas, leather, or other suitable material, which will cause the mucilage to better adhere thereto. The bars I J K are guided near their inner ends by a shoe, *l*, sliding upon the upper horizontal edge of a standard, L, secured to the top plate *a*, while they are provided on their under side with a tooth, *l′*, having on its inner side an inclined edge, while its outer side forms a vertical shoulder. *m* is a two-armed dog, pivoted to the side of each standard L, so as to bear with its upper arm under the bars I J K, respectively, while its lower arm is held against a stop-pin, m^1, by a spring, m^2.

When the arms I′ J′ K′ are in their outer position, as represented in Fig. 1, the gumming-plates *i j k* rest upon the rollers D D′ D′, the said bars being held down in this position by spiral springs k^2.

N is the rectangular former-plate secured to an arm, n, mounted on a rock-shaft, n^1, which is supported in bearings n^2, secured to the top plate a. The shaft n^1 is actuated by means of a cam, N′, mounted on the driving-shaft e, and engaging with a roller, n^3, on the lower end of an arm, n^4, secured to the rock-shaft n^1. The arm n^4 is held with its roller against the cam N′ by means of a spring, n^5. The cam N′ has approximately the form of a circular segment, so that when the roller n^3 is in line with the shortest radius of the cam N′ the former-plate N is in a raised position, as shown in Fig. 3, while by the rotation of the cam it is swung down upon the bed-block B, in which position it is retained by the roller n^3 riding upon the circular portion of the cam until the envelope is completed, when the former is returned to its elevated position. The former-plate N is provided on its under side with a narrow transverse rib, n^6, fitting in the groove b of the bed-block, for a purpose hereinafter explained. O is a movable plate arranged on the front portion of the bed-block for folding down the end flap 4 of the pocket of the envelope. It is attached to the upper end of a bar, O^1, extending downwardly through a recess in the bed-block and top plate, and pivoted near its center to the upper end of an arm, O^2, so as to move parallel, or nearly so, with the upper side of the bed-block. The arm O^2 is mounted on a rock-shaft, p, supported in bearings p^1 and actuated by a horizontal arm, p^2, attached to said shaft, and engaging by means of a roller, p^3, with a cam, P, mounted on the driving-shaft e. The arm p^2 is held with its roller against the cam P by a spiral spring, p^4. Q is a movable plate arranged at the opposite end of the bed-block, for forming the crease of the end flap 1 of the envelope. It is secured to the upper end of a lever, q, extending down through a slot in the bed-block and top plate, and pivoted to a bracket, q^1, secured to the under side of the latter. The lower arm of the lever q is connected with the arm O^2 by a link, q^2, so that the folding and creasing plates O Q, are actuated simultaneously. R R are two pivoted plates for folding down the two side flaps 3 3 of the pocket of the envelope, and S S two similar plates for forming the crease of the side flaps 2 2. These plates correspond in shape with that of the side flaps which they are designed to fold, and which they support while mucilage is applied thereto, the form shown in the drawing being that of a circular segment, or nearly so, with the inner straight edges of said plates contiguous to the sides of the former-plate. The two folding-plates R R are arranged opposite the front half, and the two creasing-plates S S opposite the rear half, of the plate N. The plates R are secured to shafts r turning in bearings r^1 r^2, the outer bearings r^1 serving at the same time as gage-plates. r^3 are pulleys or wheels mounted on the outer ends of the shafts r, for operating the same. The folding-plates R are actuated by a cam, T, mounted on the driving-shaft e, and engaging with the roller t^1 of an arm, t, secured to a rock-shaft, t^2. The latter carries an arm, t^3, which connects, by means of tapes t^4, with a pin on the wheels r^3, so that when the arm t^3 is depressed by the cam T the folding-plates R are caused to make a half-revolution inwardly, and close against the former-plate N. The plates R are returned to an open position when released, by springs t^5 connecting with the wheels r^3 on the side opposite to the tapes t^4. To prevent undue pressure of the plates R upon the side flaps, a spring, t^6, is interposed between the tapes t^4 and arm t^3. That side of the plates R which comes in contact with the paper is preferably covered with rubber in order to render the folders still more yielding. The creasing-plates S are secured to the upper arms of two levers, s s, pivoted at s^1 to pendent bearings s^2, the lower converging arms of said levers being held together by a spring, s^3, whereby the plates S are retained in an open position. The plates S are closed by an arm, U, carrying a wedge-block, u, which engages between the converging arms of the levers s, so as to force the same apart as the arm is depressed. The arm U is mounted upon the rock-shaft t^2, so that the plates R and S are operated simultaneously by the cam T. Motion being imparted to the shaft e, and the former being in its elevated position, as shown in Fig. 3, the blank from which the envelope is to be formed, cut in the form represented in Fig. 7, is placed upon the block B, with the edges of the pocket end flap 4 against the gage-plates r^1 v, the opposite end of the blank being held against lateral movement by gage-plates v'. The rotation of the cam N′ now causes the former-plate N to be swung down upon the blank on the block B, the rib n^6 of the former depressing the paper into the groove b of the block, whereby the crease marked 5, in Figs. 7 and 8, is formed. The blank is in this manner clamped by the former-plate, with the flaps 2 and 3 resting, respectively, upon the plates S and R. The cam H now causes the arm h to swing outward, whereby the shafts f f^1 f^1 are turned so as to swing the arms I′ J′ K′ simultaneously inward, moving the bars I J K toward the block B. During the first part of the inward movement of said bars, the gumming-plates i j k, attached thereto, are passed over the rollers D D′ D′, so as to take the mucilage therefrom, said rollers being held stationary against this movement by the ratchet-wheels d d'. As the bars continue their inward movement, the teeth l' strike with their inclined side the dogs m, riding up on the same, and thereby elevating the bars and gumming-plates until the teeth l' clear the dogs m, when the bars descend, the mucilage-carriers i j k striking upon the blank in a vertical direction, or nearly so, with their inner edges projecting over the edges of the flaps 1, 2, and 3 sufficiently to apply the mucilage thereto in the required width, as indi-

cated by dotted lines in Fig. 2, and by shade-lines in Fig. 7. This vertical descending movement of the plates *i j k* is of importance, in order to prevent displacement of the flaps by said plates. In their outward movement, the gumming-plates pass over the rollers D D′ D′, and revolve the same so as to bring a different portion of their surface to the top, while the teeth *l′* turn the dogs *m* back on their pivots, so as to clear the same. The cam P now causes the plates O and Q to move inwardly, the former folding down the end flap 4 of the pocket upon the former plate N, while the plate Q forms the crease of the flap 1 against the rear edge of the former-plate. When the flap 4 is completely folded down, the side folders R R are swung inward, pressing the side flaps 3 3 upon the end flap 4, whereby the pocket of the envelope is completed, the folding-plate O being cut out at the sides, so as to expose a sufficient portion of the end flap for securing the side flaps thereto. The creasers S S are closed at the same time as the folders R R, whereby the creases of the side flaps 2 2 are formed. The end folders O and Q, and side folders R and S, are now withdrawn, successively, when the former N is returned to its elevated position, carrying the completed envelope with it, which is withdrawn from the former by the operator in an obvious manner, when the next blank is placed upon the block B, and the operation repeated.

My improved machine can be readily adapted to manufacture envelopes of a different form, or having a different number of flaps from that shown and described, by altering the form or number of the folders and creasers so as to correspond with the requirements of each particular kind of envelope.

In order to adapt my machine to produce envelopes of common construction, having a single closing flap of ordinary size, the side creasers S S and corresponding gummers are left off, the former-plate N is properly reduced in size, and the closing-flap creaser Q arranged near the rear edge of the reduced former-plate.

Instead of reciprocating gummers, rotary gummers may be employed; but I prefer the arrangement shown and described.

What I claim as my invention is—

1. The combination, with the former N, of the folder O, creaser Q, side folders R R, and side creasers S S, substantially as and for the purpose hereinbefore set forth.

2. The combination, with the reciprocating bar of the mucilage-carrier, of the tooth *l′* and spring-dog *m*, substantially as and for the purpose hereinbefore set forth.

3. The combination, with the driving-shaft, end and side gummers, of the rock-shaft *f*, side shafts f^1 f^1, gear-wheels f^2, and connecting-arms for actuating said gummers simultaneously, substantially as hereinbefore set forth.

4. The combination, with the side creasers S S, of the pivoted converging arms *s s*, oscillating arm U, wedge-block *u*, and spring s^3, for actuating said creasers, substantially as hereinbefore set forth.

WILLIAM LIDDELL.

Witnesses:

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T. J. THORP.