

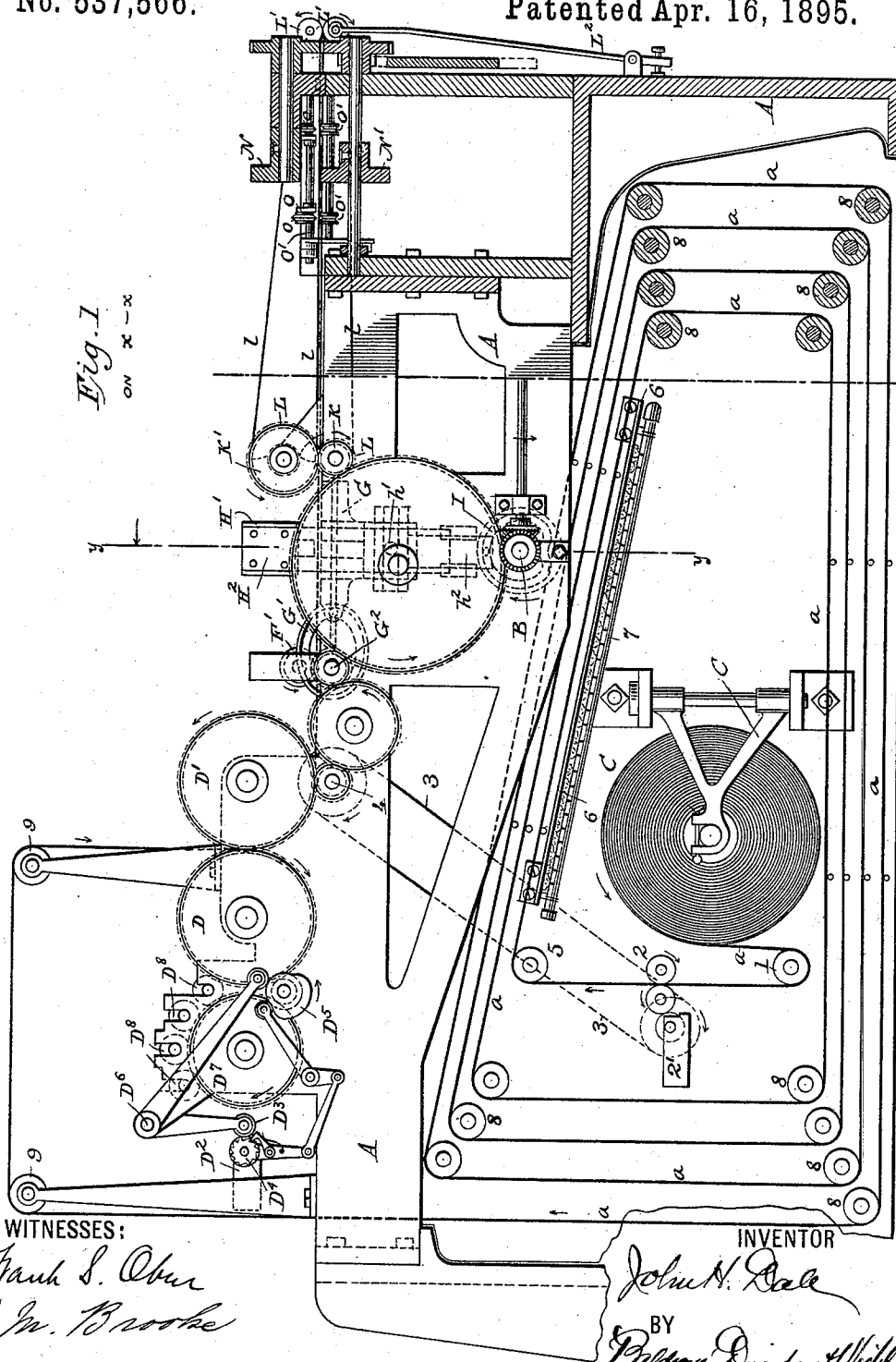
(No Model.)

4 Sheets—Sheet 1.

J. H. DALE.
MACHINE FOR MAKING ENVELOPES.

No. 537,566.

Patented Apr. 16, 1895.



WITNESSES:

Frank S. Ober
C. M. Brooke

INVENTOR

J. H. Dale

BY

Riddell, Davidson & Wright
ATTORNEYS.

(No Model.)

4 Sheets—Sheet 3.

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Fig. 3.
ON y-y

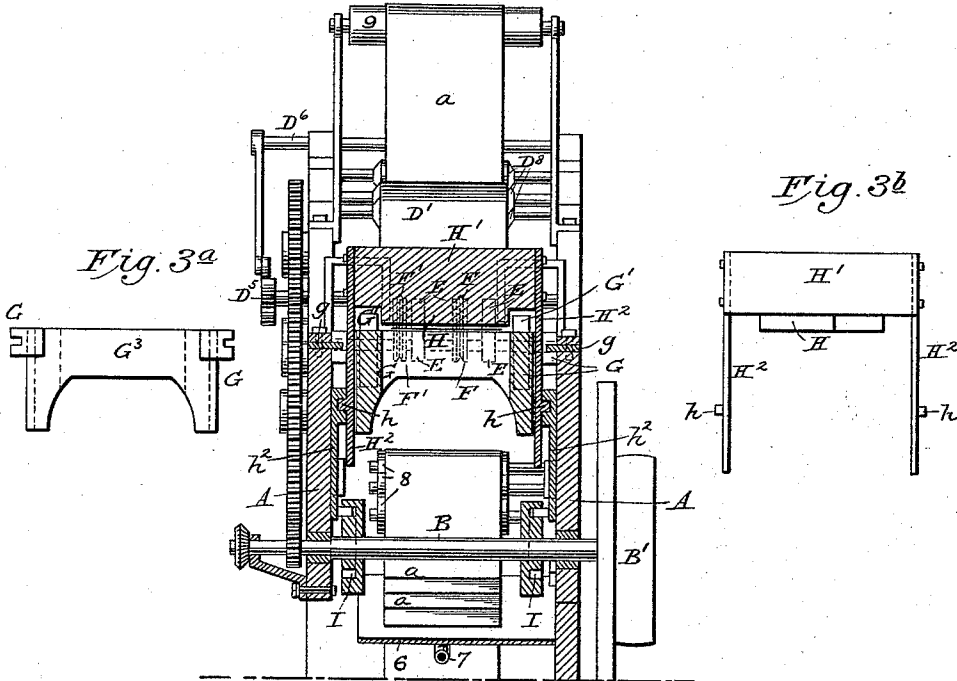


Fig. 4.

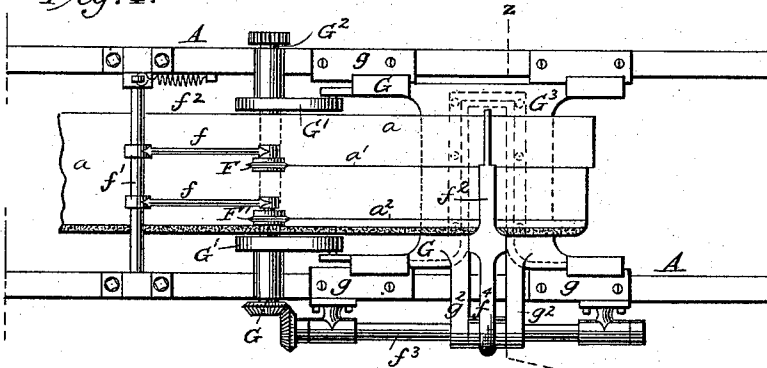
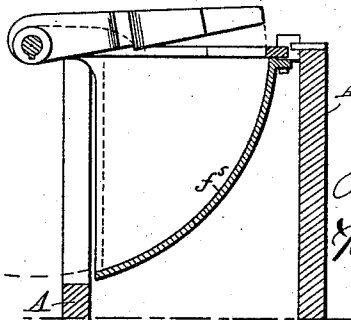


Fig. 5.

ON z-z



WITNESSES:

Frank S. Ober
C. M. Brooke.

INVENTOR

John H. Dale

BY

Raldene Davidson Wright
ATTORNEYS

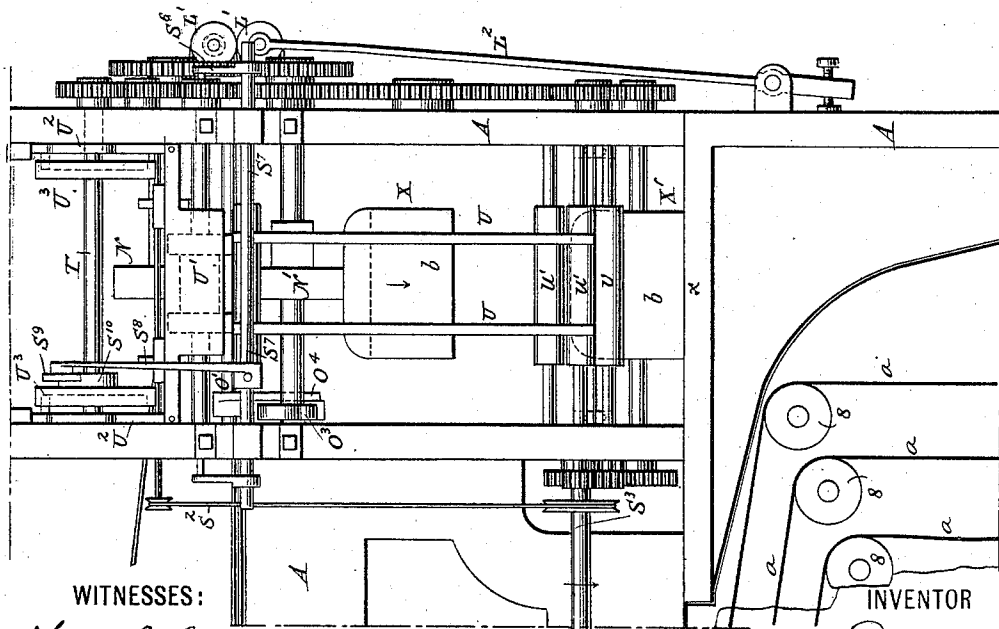
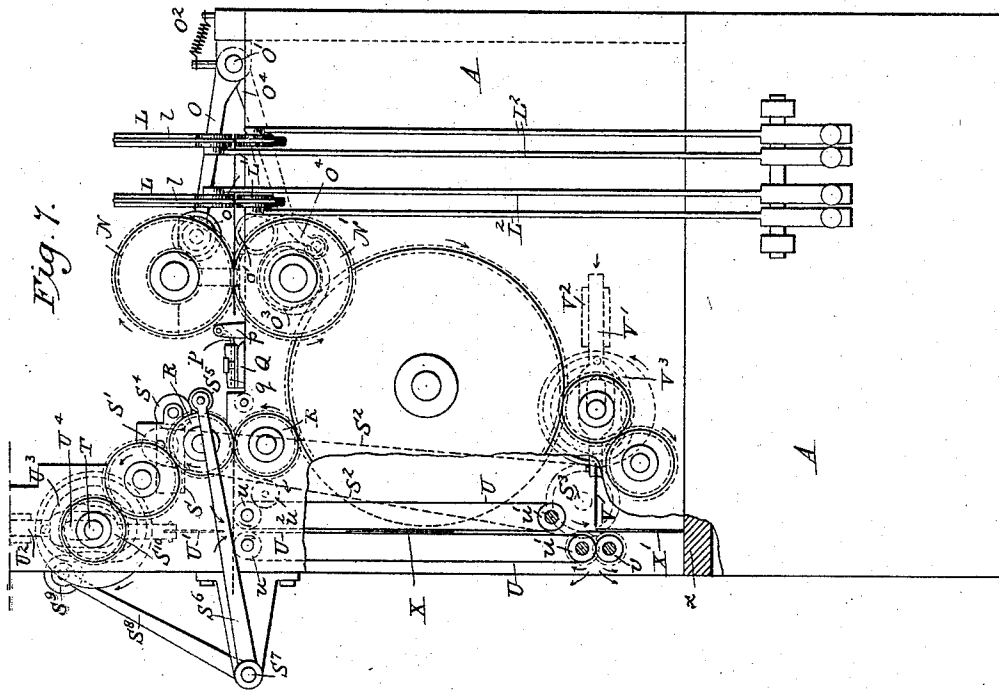
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WITNESSES:

Frank S. Ober.
C. M. Barocke.

Fig. 6.

INVENTOR

John H. Dale

BY

Ralston, Davidson & Wright
ATTORNEYS.

UNITED STATES PATENT OFFICE.

JOHN H. DALE, OF NEW YORK, N. Y., ASSIGNOR TO PETER B. SWEENEY, OF
SAME PLACE.

MACHINE FOR MAKING ENVELOPES.

SPECIFICATION forming part of Letters Patent No. 537,566, dated April 16, 1895.

Application filed May 26, 1894. Serial No. 512,561. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. DALE, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Machines for Making Envelopes, of which the following is a specification.

The object of my invention is to gum, print and manufacture envelopes from a continuous roll of paper at one operation, preferably in a single machine, and to this end, the invention consists of certain improved organizations hereinafter specifically described.

The general operation of the machine is substantially as follows:—The paper from a roll is gummed along one edge (the edge that forms the closing flap of the envelope) the gum being dried by causing the paper strip to travel through a suitable distance exposed to the air, and if desired, one or more heating devices may be provided over which the paper strip is drawn, or the space through which the paper strip, after being gummed, travels may be inclosed and suitably heated. The paper roll then passes through the printing devices, and the desired matter is printed upon that face of the strip which forms the back and front of the envelope. The envelope blanks are then severed from the strip by a transverse cut of such shape as to form small side flaps at each edge of the portion which forms the face of the completed envelope, and after these side flaps are folded over, and their then exposed faces gummed or pasted, the back is folded up against them and finally the closing flap of the envelope is properly folded down.

In the operation of the machine the creases which mark the lines upon which the back of the envelope is folded, and the closing flap of the envelope is folded, are preferably impressed into the paper as it leaves the printing rolls, and prior to the severance of the envelope blank from the strip.

The accompanying drawings illustrate my invention in the form now best known to me, and one that is practical and efficient for the economical, rapid and perfect manufacture of envelopes of the class indicated. Obviously, however, the details of construction may be more or less varied by those skilled in

the art, without departing from the principles of my invention.

In the accompanying drawings, Figure 1 is a side elevation of the machine partly in section on the line X X of Fig. 2. Fig. 2 is a plan view of the machine; Fig. 3, a transverse section on the line Y Y of Fig. 1; Figs. 3^a and 3^b, detail views showing parts of the mechanism by which the severance of the envelope blank from the continuous strip is effected. Fig. 4 is a plan view; Fig. 5, a transverse section on the line Z Z of Fig. 4, of the modification of the blank severing mechanism and illustrates the organization which I prefer, and which is specifically claimed. Fig. 6 is an elevation on an enlarged scale of the side of the rear end of the machine, *i. e.*, of the right hand end as seen in Fig. 1. Fig. 7 is an end elevation of the rear end of the machine; and Figs. 8, 9, 10, 11, 12, and 13 are views illustrating the envelope blank in different stages of the formation of the envelope.

In the various views, A indicates the frame work, B the main driving shaft, and B' the driving pulley. The necessary gearing and shaft connections for accomplishing the movements or operation hereinafter described are plainly illustrated and as such construction is obvious, detailed description is unnecessary.

The directions of rotation of the different gears and rolls are indicated by arrows.

C indicates the roll of paper which is shown as mounted beneath the machine, its spindle being mounted in swinging brackets C' having suitable supports on the frame work of the machine. The continuous paper strip *a* passes under a pulley 1, and thence between pasting rolls 2, the paste being supplied from a paste box 2' by a roll running therein, and driven by a belt 3, from a pulley on a driven shaft 4. The paper then passes over a pulley 5, and thence preferably over the surface of the plate 6 heated by a gas burner or other device 7. The gummed strip then passes over rollers 8, and other heaters may, if desired, be arranged along its path and finally passes from the last roller 8 up to the top of the machine, and over rollers 9, between the printing roll D and impression roll D'. The rolls 8 are disposed on opposite sides of the roll of paper and so located that the strip passes over

the inner rolls 8 first and entirely around the paper roll a number of times, the different parts of the strip surrounding the paper roll being concentric, or substantially so. By this arrangement the ungummed face of the strip is always toward the rolls over which it passes and the gum on the outer face of the strip has full opportunity to dry and never comes in contact with any of the rolls. The rolls D, D' are driven in the direction indicated by the arrows.

The ink fountain is indicated at D² and ink is distributed therefrom to a ducking roll D³ by a roll D⁴, running in the ink and worked by a pawl and ratchet and suitable connecting links or levers from the cam D⁵. The ducking roll D³ is carried at the ends of arms extending from a rock shaft D⁶ from which another arm projects that is operated upon by the cam D⁵ so that at intervals the roll D³ is pressed against the roll D⁷ from which the ink is distributed by rolls D⁸ to the surface of the inking roll D. The paper strip *a* passes under the impression roll D' and is thence drawn horizontally forward by feeding rolls E E. On the same shafts with the drawing and feeding rolls E E are creasing rolls F F, and F' F'. As shown in the drawings, the upper creasing roll of each pair is formed with an annular creasing edge, and the lower roll is formed with a corresponding annular recess. The rolls F F form the crease *a'*, which marks the line on which the back and front of the envelope are folded against each other, while the creasing rolls F' mark the line *a''* on which the closing flap of the envelope is folded. As the paper strip passes forward from the creasing rolls, the envelope blank indicated in Fig. 8 is severed therefrom, and such severance of the blank may be accomplished in the following manner: A frame G, moving on ways *g g* is reciprocated parallel with the movement of the paper, by cams G' on the shaft G², that carries the lower drawing and creasing rolls. The forward speed of reciprocation of this frame is exactly equal to the speed of movement of the paper strip. The cross-piece G³ of this frame, over which the continuous strip passes, has formed therein a die of the shape indicated by the dotted lines *g'*, Fig. 2, such shape being that required to give formation to the side of the blank indicated in Fig. 8. The frame also carries a vertically reciprocating cutter or male die H, under which the paper passes, carried by cross-piece H' supported by side bars H² sliding in ways H³ in the frame, and having projections *h* which engage transverse grooves or recesses in vertical sliding bars *h*² on the main frame and reciprocated vertically by cam grooves I I in disks on the main shaft B, driven as indicated in the direction of the arrow. As the paper strip passes forward therefore, the severing mechanism moves with it at the same speed, and the downward reciprocation of the cutter H is so timed as to sever the blanks in-

dicated in Fig. 8 at the proper intervals. The severed blank *b* is caught between a lower roll K, and an upper D-shaped roll K', and also between tapes *l l*, passing over pulleys L L on the shafts carrying the roll K and D-roll K'. At the rear end of the machine these tapes *l l* pass over idle rolls L' L' carried by adjustable spring arms L², pivoted on the rear end of the machine, the purpose being of course to maintain a proper tension on the tapes. The tapes *l l*, and rolls K K' are driven at a greater speed than that at which the continuous strip is carried along, and consequently the envelope blank is carried forward away from the paper strip at a greater speed until it reaches the stop M. When the blank comes to rest at M, it has passed under a D-roll N and is drawn out horizontally at right angles to its forward movement, in the direction indicated by the arrow in Fig. 2, by the rotation of such roll co-operating with its mate N' beneath the blank—that is to say, the blank is moved laterally from the path or line in which the strip or blank has been moving.

Arms O O, carrying creasing rolls *o o* extend from the side of the main frame over the envelope blank when it is in position against the stop M. These rolls co-operate with other creasing rolls *o'* beneath the blank, and the arms upon which the creasers *o* are mounted are attached to a rock shaft O', which by a spring O² is normally held so as to elevate the creasing rolls. As the D-roll N draws the blank at right angles to its former movement, a cam O³ on the shaft carrying the roll N' operates upon an arm O⁴ carried by the rock shaft O', and throws the upper creasing rolls down upon the blank, and as the blank is drawn forward the creases *a³ a³*, Fig. 9, are formed on each side thereof and mark the lines upon which the small side flaps attached to the back of the envelope are folded inwardly into position as indicated at Fig. 10. As the blank is forced or drawn forward by the D-roll N it passes under an apron or shield P secured to a rod supported in studs *p*, and over the face of a plate Q on each side of which are inclined folders *q* that turn over the side flaps *a⁴ a⁴*, Fig. 9, into the position shown in Fig. 10, where they are ready to receive the paste or gum indicated in Fig. 11. As the blank passes through these folders, the forward edge of the closing flap *a⁵* is caught between rolls R R and is further drawn forward, the paste at this movement being applied to the exposed faces of the overfolded flaps *a⁴*, and this may be accomplished as follows:

S indicates the paste boxes; S', the rollers running therein; S², the belt for driving the same from a pulley on the shaft S³. The paste is transferred to the idle paste rollers S⁴ and from them to the pasting rolls S⁵, carried in the ends of arms S⁶ connected with a rock shaft S⁷, from which extends an arm S⁸ carrying a small roll S⁹, that is acted upon

by a cam S^{10} on a shaft T. The movement is so timed that the pasting rolls S^5 on the arms S^6 are thrown down upon the overfolded flaps a^4 as they emerge from the folders q . The paste is applied thereto as indicated at Fig. 11, and the cam S^9 causes the elevation of the pasting rolls at the proper moment. The blank is carried forward by the rolls R R until the folding line a' is brought immediately beneath a vertical reciprocating blade U' , and over the bite of tapes U. These tapes at the top pass around folding rolls u , driven by gear u^2 from wheel on shaft of roll R, and at the bottom around driven rolls u' operated by a gear on the shaft S^8 . The blade U' is carried by a vertically sliding frame U^2 moving in vertical ways in the main frame, and reciprocated vertically by a cam U^3 on the shaft T. The side pieces of the reciprocating frame are provided with elongated slots at U^4 through which the shaft T passes. The downward movement of the blade U' is so timed that when the blank comes into the position last described, the blade descends upon it, and folds it on the line a' forcing the edge of the fold upon the bite of the tapes U, between which the blank shown at X is carried down into the position shown at X', where its bottom, *i. e.*, the bottom edge of the completed envelope rests upon the table or part x of the main frame. The envelope at this stage is indicated in Fig. 12.

A horizontal reciprocating blade V carried by a frame V' , moving in ways V^2 is reciprocated by a cam groove V^3 and when the envelope has reached the position of rest last referred to, the blade V is moved forward in the direction indicated by the arrow, and folds the closing flap on the line a^2 , the edge of this fold being forced into the bite of one of the lower tape rolls u' , of the corresponding roll v , so that the closing flap is folded down into the position indicated in Fig. 13, and the completed envelope is ejected from the machine.

The blank severing devices which I prefer to employ are shown in Figs. 4 and 5. In this construction the upper creasing rolls are carried at the ends of arms $f f$ attached to a rock shaft f' on which a spring f^2 acts to normally press the rolls against the paper strip. The arrangement of cams G' for reciprocating the frame G is as before described, but instead of using a vertically reciprocating cutter or male die, I employ a revolving cutter whose edge is shaped to correspond with the die. This revolving cutter is connected with the shaft f^3 , by an arm f^4 having a spline and feather connection with the shaft, and the shaft is driven by bevel gears from the shaft G^2 that carries the cams. The horizontally reciprocating frame G has two arms g^2 which slide on the shaft and in which the shaft f^3 has bearings, one arm being arranged on each side of the cutter arm f^4 . I prefer to arrange under the die a curved

shield f^5 . The die is indicated in Fig. 4 by dotted lines as being formed in a removable plate attached to frame G by screws. With this arrangement I sever the envelope blanks by a shearing cut.

The operation of other parts of the machine is the same as already described.

I claim as my invention—

1. In an envelope machine, the combination, substantially as set forth, of paper roll carrying devices, and paper strip drawing or feeding devices, means for continuously gumming the edge of the paper strip that forms the closing flap of the envelope, as it is continuously drawn from the roll, means for drying the gum, mechanism for then severing the envelope blanks by a transverse cut that forms the flaps $a^4 a^4$, means for folding over said flaps, means for printing or depositing paste thereon, and means for completing the folding of the envelope.

2. In an envelope machine, the combination, substantially as set forth, of paper roll carrying devices, paper strip drawing or feeding devices, means for gumming the edge of the strip that forms the closing flap of the envelope and drying the same, means for printing that part of the strip forming the back and front of the completed envelope, mechanism for then severing the envelope blanks by a transverse cut that forms the flaps $a^4 a^4$, means for folding over said flaps, means for printing or depositing paste or gum thereon, and means for completing the folding of the envelope.

3. In an envelope machine, the combination, substantially as set forth, of means for drawing a continuous strip of paper having the edge that forms the closing flap of the envelope gummed, means for forming the longitudinal creases a', a^2 , means for severing the envelope blanks from the strip by transverse cuts that form the end flaps $a^4 a^4$, means for creasing the line on which said flaps fold, means for folding the flaps over, means for depositing paste on the exposed faces of the flaps after being folded over and means for folding the blank on the crease lines $a' a^2$ to complete the envelope.

4. In an envelope machine, the combination, substantially as set forth, of means for drawing a continuous strip of paper whose edge shall form the closing flap of the envelope, means for cutting envelope blanks therefrom by a transverse cut that forms the end flaps $a^4 a^4$, means for folding said flaps over and then depositing paste thereon, and means for folding the blanks on the lines $a' a^2$ to complete the formation of the envelope.

5. In an envelope machine, the combination, substantially as set forth, of means for drawing longitudinally a continuous strip of paper whose edge shall form the closing flap of the envelope, means for forming the longitudinal creases $a' a^2$ in the strip, means for severing the envelope blanks by a transverse cut that

forms the flaps $a^4 a^4$, means for moving the severed blanks at an angle to the movement of the continuous strip, means for forming during such latter movement the creases $a^3 a^3$ in the blank, means for folding over the flaps $a^4 a^4$ and depositing paste on the exposed faces thereof, and means for folding the blanks on the lines $a' a^2$, to complete the envelope.

6. In an envelope machine, the combination, substantially as set forth, with the paper strip drawing devices, of the longitudinally reciprocating frame carrying the die over which the paper passes and the revolving correspondingly shaped cutter, the shaft for operating the cutter and sliding connections between the shaft and the reciprocating frame and revolving cutter.

7. In an envelope machine, the combination, substantially as set forth, of means for drawing longitudinally a continuous strip of paper whose edge shall form the closing flap of the envelope, means for forming the longitudinal creases $a' a^2$ in the strip, means for severing the envelope blanks by a transverse cut that

forms the flaps $a^4 a^4$, means for moving the severed blanks at an angle to the movement of the continuous strip, means for forming during such latter movement the creases $a^3 a^3$ in the blank, means for folding over the flaps $a^4 a^4$, means for pasting the blank to secure the flaps $a^4 a^4$, and for folding the blanks on the lines $a' a^2$ to complete the envelope.

8. In an envelope machine the combination, substantially as set forth, of means for drawing longitudinally a continuous strip of paper, means for severing the envelope blanks by transverse cuts that form the side flaps, means for then moving the severed blanks laterally away from the line of movement of the continuous strip, and mechanisms for pasting and folding the blanks to complete their formation.

In testimony whereof I have hereunto subscribed my name.

JOHN H. DALE.

Witnesses:

EDWARD C. DAVIDSON,
C. M. BROOKE.