N. E. FUNK.

ENVELOP MACHINE.

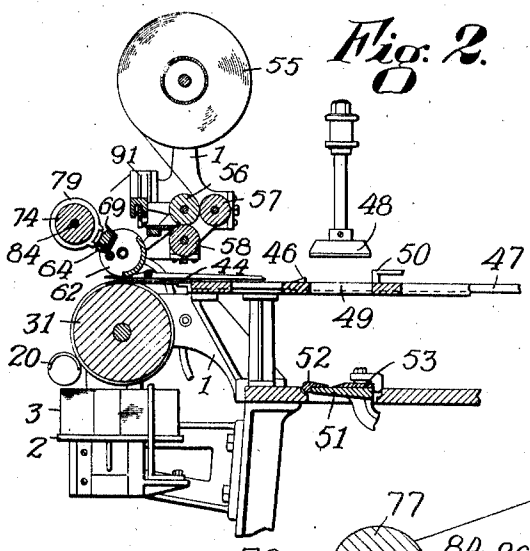
APPLICATION FILED MAR. 8, 1916.

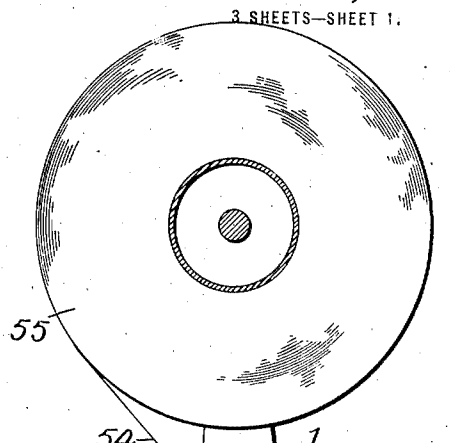
1,372,223.

Patented Mar. 22, 1921.

3 SHEETS—SHEET 1.

Fig. 2.





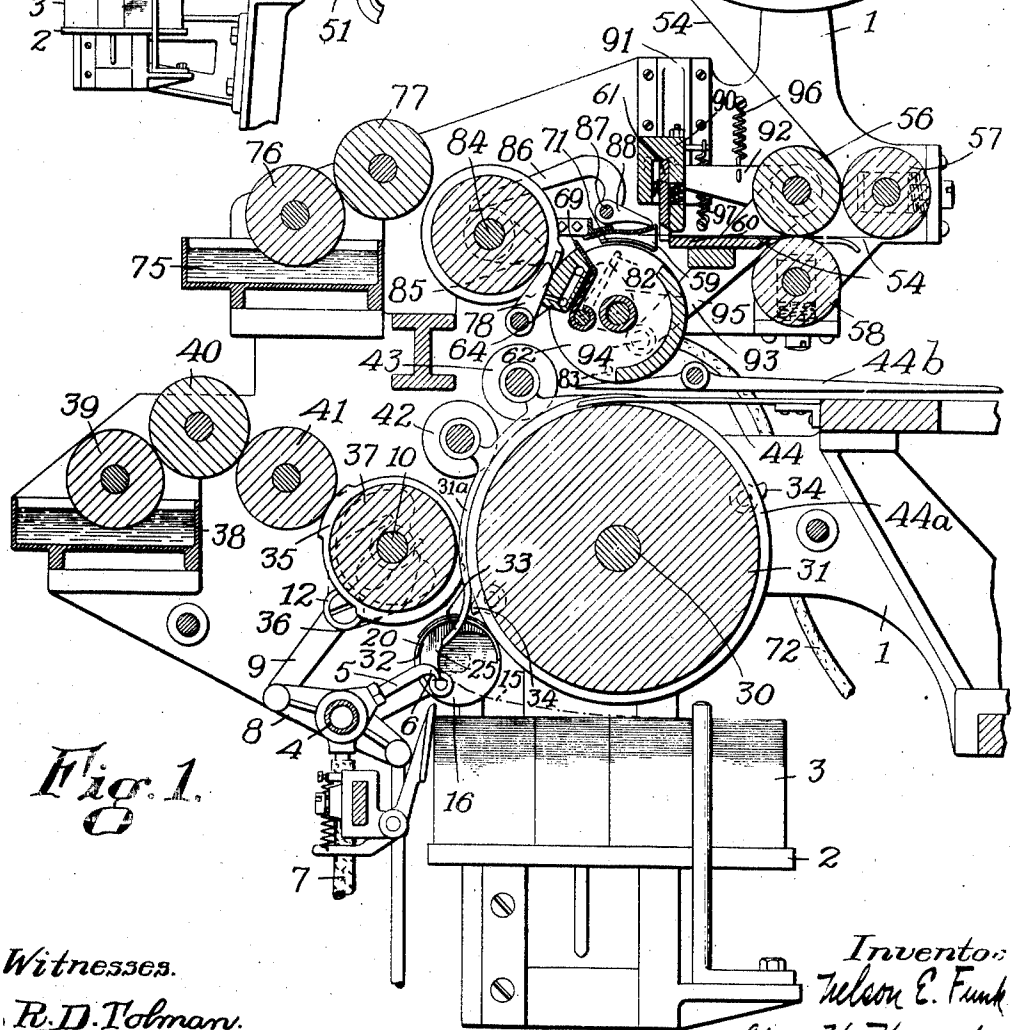


Fig. 1.

Witnesses.

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3 SHEETS—SHEET 2.

Fig. 3.

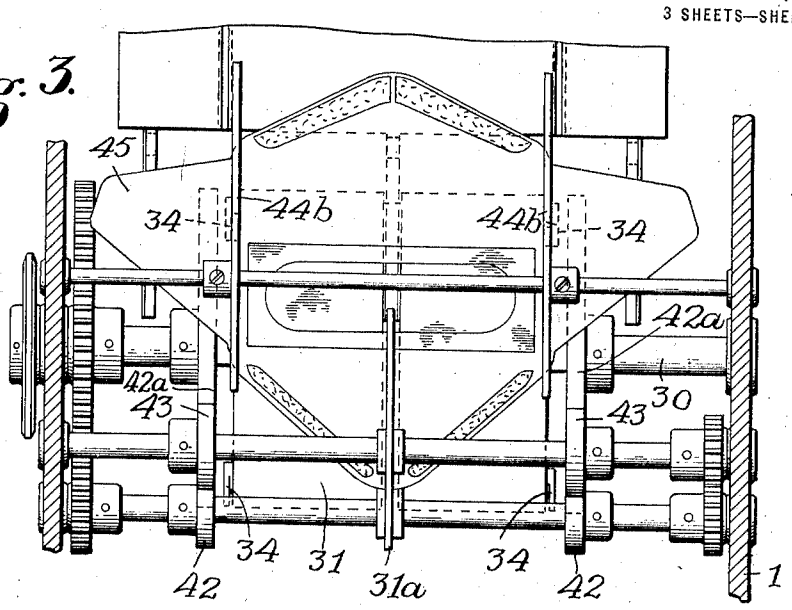


Fig. 4.

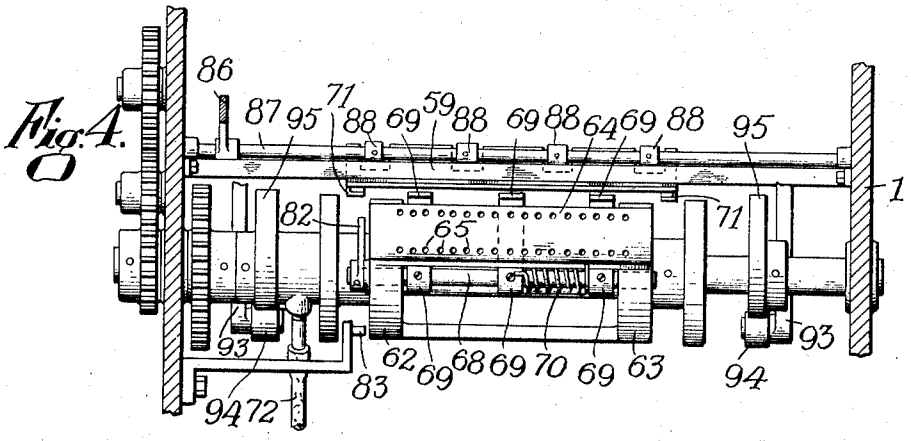
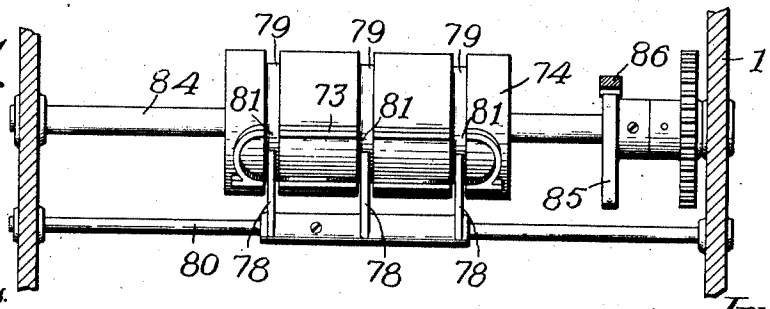


Fig. 5.



Witnesses.

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3 SHEETS—SHEET 3.

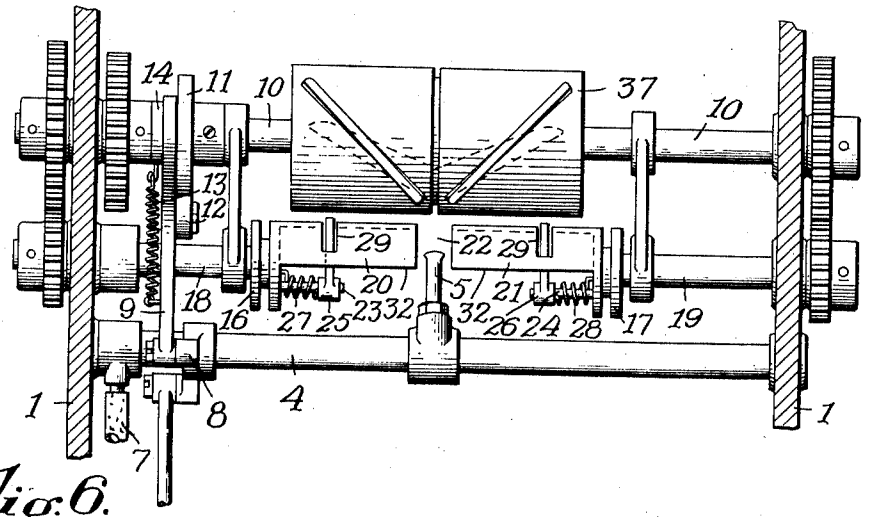


Fig. 6.

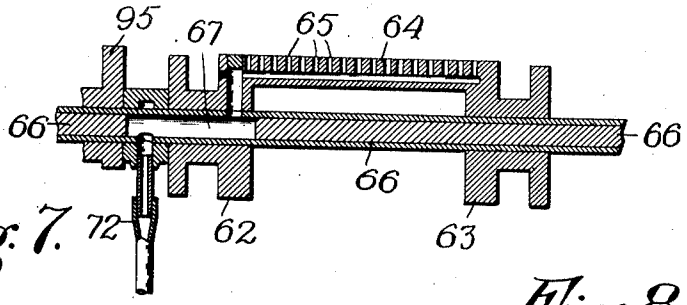


Fig. 7.

Fig. 8.

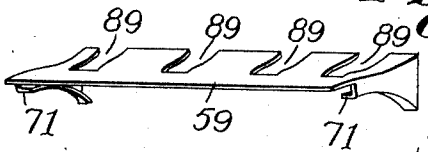


Fig. 9.

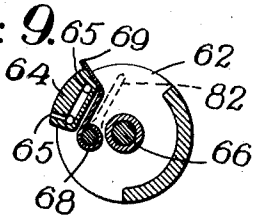
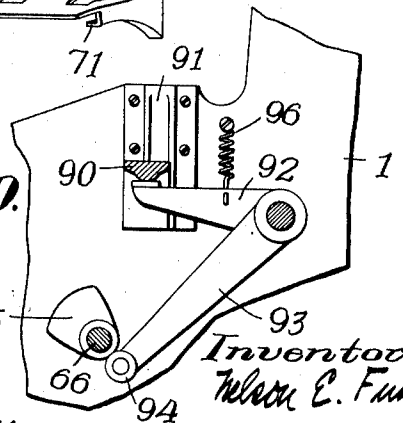


Fig. 10.



Witnesses.

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UNITED STATES PATENT OFFICE.

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ENVELOP-MACHINE.

1,372,223. Specification of Letters Patent. Patented Mar. 22, 1921.

Application filed March 8, 1916. Serial No. 82,908.

To all whom it may concern:

Be it known that I, NELSON E. FUNK, a citizen of the United States, residing at Montclair, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Envelop-Machines, of which the following is a specification accompanied by drawings forming a part of the same.

One object of my present invention is to combine in a single machine the mechanisms of both the rotary and the plunger types of envelop machines, whereby I secure the smoothness of operation and rapidity of the rotary type and the accurate registration and perfect folding of the plunger type. This object I accomplish by coördinating the movement of a rotatable blank advancing mechanism with a reciprocating blank forwarding carriage.

Another object of my present invention is to provide means for applying a transparent patch to cover a window opening in the blank during the continuous movement of the blank and, further, to provide means for the accurate registration of the patch.

These objects, among others, I accomplish by means of the construction and arrangement of parts as hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 represents a vertical sectional view of so much of an envelop machine as embodies my present invention.

Fig. 2 is a vertical sectional view, on a smaller scale, of a portion of the patch applying mechanism and the folding mechanism for completing the envelop after a transparent patch has been applied thereto.

Fig. 3 is a plan view of an envelop blank having a patch applied thereto, said blank being shown in position relative to certain blank forwarding mechanisms.

Fig. 4 is a detached view of a portion of the patch applying mechanism.

Fig. 5 is a detached view of the mechanism for applying to the transparent patch a narrow strip of gum by which the patch is attached to the envelop blank.

Fig. 6 is a detached view of the mechanism for raising the blanks individually from a pile of blanks and forwarding them to the blank gumming mechanism.

Fig. 7 is a longitudinal central sectional view of the patch holder for controlling the position of the transparent patch and carrying it into registration with the opening in the blank.

Fig. 8 is a detached perspective view of the stationary guide for holding the patch as it is severed from a continuous strip in position to be seized by the patch holder.

Fig. 9 is a detached view, shown in section, of the rotatable patch holder, and

Fig. 10 is a detached view of a portion of the patch severing mechanism.

Similar reference characters refer to similar parts in the different figures.

In the machine illustrated in the accompanying drawings, and hereinafter described, is provided mechanism for taking the envelop blanks successively from a pile of blanks and forwarding them by a continuous movement into a position in which the blanks are engaged by a reciprocating carriage and transferred to creasing and folding mechanisms. Means are also provided to apply adhesive material to the back and seal flaps, by which the envelop blank is suitably gummed without interrupting its continuous movement.

The mechanism for selecting a blank from the pile of blanks and advancing the blank by a continuous movement, during which its flaps are gummed, forms no part of my present invention, similar mechanisms having been proposed in the type of machines known as rotary envelop machines. The reciprocating creasing plunger and the hinged flap folding mechanism are also in common use in the type of machines known as plunger envelop machines. So far as I am aware, however, it is broadly new to combine in a single machine rotatable blank advancing means during which the blank is gummed and a reciprocating forwarding mechanism by which the blank is fed to creasing and folding mechanisms, such, for example, as that now in common use in the plunger type of envelop machines.

That part of my invention which relates to the patch applying mechanism comprises novel means for securing the registration of a patch as it is severed from a continuous strip of transparent paper, novel means for holding the patch between its registration and its application to the blank to cover an opening therein, and novel means for ap-

plying gum to the patch, as hereinafter described.

In the accompanying drawings, I have shown only those parts of the operative mechanism which are directly concerned in performing the functions of selecting the individual envelop blanks from a pile of blanks, applying gum to the flaps of the blank, providing a gummed patch and applying the same to cover the opening in the blank, and finally folding the blank, the actuating mechanism by which these operative parts are connected with a common driving shaft being omitted for the sake of greater clearness, and as not being involved in my present invention. It will be understood, however, that the several operative parts are actuated from a common driving shaft to perform their several functions, as hereinafter described, by connecting mechanism which will be understood by persons familiar with envelop making machines.

Referring particularly to Fig. 1 of the drawings, which represents in sectional view the assembled mechanisms, which act upon the blank for gumming the blank and applying a transparent patch to cover the opening therein, 1 denotes a portion of the supporting framework and 2 a table upon which a pile of blanks 3, having openings therein, are supported. Carried by a hollow shaft 4 is a suction tube 5 having an open end or nozzle 6 adapted to contact with the seal flap of the topmost blank in the pile 3. The suction tube 5 communicates with the hollow shaft 4 from which air is exhausted through a flexible tube 7 at the proper period in the operation of the machine by means of a pump or other suitable device, not shown. The hollow shaft 4 is provided with an arm 8 pivotally connected with a bifurcated link 9 which straddles a shaft 10. The shaft 10 carries a cam 11 which acts against a cam roll 12 on the link 9. The cam roll 12 is held against the cam 11 by means of a spring 13, Fig. 6, which connects the link 9 with a loose collar 14 on the shaft 10. The cam 11 is suitably shaped to impart a swinging motion to the suction tube 5 in order periodically to carry its nozzle 6 into contact with the seal flap of the topmost blank in the pile 3, and to raise the same above the pile into a position to be seized by the blank forwarding mechanism, the pump or other suction device being adapted, as will be well understood, to make and break the vacuum in the shaft 4 to cause the topmost blank to be raised and released at the proper periods of time to correspond with the movements of the blank forwarding mechanism, which will be hereinafter described. The topmost blank of the pile 3, when raised by the suction tube 5, assumes a position indicated by the broken line 15, Fig. 1, with the raised end of the blank between the disks 16 and 17 on the shafts 18 and 19, Fig. 6. Each of the disks 16 and 17 is provided with a curved wing piece 20 and 21 projecting toward each other and curved concentrically with the disks 16 and 17, with a narrow gap between their free ends to provide a space for the swinging suction tube 5. Supported upon studs 23 and 24, projecting inwardly, eccentrically, from the disks 16 and 17, are curved levers 25 and 26 to which the tension of the torsional springs 27 and 28 are applied to cause the free ends of the levers to project through openings 29 in the wing pieces 20 and 21.

Mounted upon a shaft 30 directly above the pile of blanks 3 is a cylinder 31 having its outer periphery running in close proximity to the peripheries of the disks 16 and 17 and wing pieces 20 and 21, but at a less peripheral speed. As the topmost blank is raised in the position shown by the broken lines 15, Fig. 1, the edges 32 of the wing pieces 20 and 21 strike the under side of the raised blank and turn it upward against the periphery of the cylinder 31 and between the cylinder and guide 33. The curved outer surfaces of the levers 25 and 26 are pressed by the torsional springs 27 and 28 against the surface of the blank. As the disks 16 and 17 and wing pieces 20 and 21 run at a higher peripheral speed than the cylinder 31, the frictional contact of the levers 25 and 26 with the blank cause it to slide over the surface of the cylinder 31 until it is brought against the projecting stops 34, thereby registering the blank on the cylinder 31. As the blank moves upward by the rotation of the disks 16 and 17 and cylinder 31, its seal flap and back flap are brought into contact with gumming dies 35 and 36 carried upon a roll 37 mounted on the shaft 10, and receiving a supply of gum from the gum box 38 by means of a gum roll 39 and transfer rolls 40 and 41. The advance movement of the blank beneath the curved guide bar 31[a] caused by the rotation of the cylinder 31 and the rolls 42 and 43 carries the blank beneath a rotary patch applying mechanism, and into an extended position upon the guide rods 44 in the position shown at 45, Fig. 3, where it is engaged by the hooks 46 of a reciprocating carriage 47 and carried beneath a creasing plunger 48, Fig. 2. When the blank has been brought in position beneath the creasing plunger 48, it is suitably registered over a rectangular opening 49 by means of the carriage hooks 46 and gage pins 50 in the manner common in plunger machines. The downward movement of the creasing plunger 48 forces the blank upon a folding bed 51 where it is folded by flap folders 52 and 53 in the usual manner. The end flaps of the blank project beyond the ends of the cylinder 31 and

are engaged by rolls 42ª, 42ª carried on the shaft 30 and spaced from the ends of the cylinder 31. The rolls 42 and 43 coöperate with the rolls 42ª, 42ª to advance the blank. From the position of the blank as raised by the suction tube 5 to its position as shown at 45, Fig. 3, ready to be engaged by the hooks 46 of a reciprocating carriage 47, the movement of the blank is continuous and it is advanced by rotative elements only. From the position of the blank as shown at 45, Fig. 3, to that of the folded envelop on the folding bed 51, the blank is advanced by the reciprocating carriage 47, and the creasing and folding are accomplished by the means employed in the plunger type of envelop machine, whereby more accurate registration of the lines of fold are secured than by the folding mechanisms necessarily employed in rotary envelop machines.

During the movement of the blank into the position shown at 45, Fig. 3, a transparent patch is applied to cover the opening in the blank, by means of a patch applying mechanism, illustrated in sectional view in Fig. 1 and in detail view in Figs. 4, 5, 7, 8, 9 and 10. Referring to Fig. 1, the transparent patches are severed from a continuous strip 54 which is taken from a coil 55 supported by the framework of the machine. The continuous strip 54 is conducted between the feed rolls 56 and 57 and between the rolls 56 and 58 by which the advancing end of the strip is projected into a sheet metal guide 59, shown in perspective view in Fig. 8, and past a cutting mechanism, consisting of a stationary knife 60 and a vertically reciprocating knife 61, by which the individual patches are severed from the continuous strip. The width of the continuous strip 54 is equal to the length of the patches to be applied to the blank, and the feeding mechanism is arranged to project the advancing end of the continuous strip past the cutting mechanism a distance equal to the desired width of the patch. Beneath the guide 59 is a patch holding mechanism consisting of the disks 62 and 63, Figs. 4 and 7. Carried by the disks 62 and 63 is a patch holding block 64 having two rows of suction ducts or openings 65. The disks 62 and 63 are mounted upon a shaft 66 having an interior chamber 67 with which the ducts 65 communicate, as shown in Figs. 7 and 9. Journaled in the disks 62 and 63 is a shaft 68, Fig. 4, carrying the three bent arms 69 which are normally held against the rear side of the patch holding block 64 by means of a torsional spring 70. The tips of the bent arms 69 project beyond the outer surfaces of the patch holding block 64 and, as the arms pass the patch guide 59, they pass through the space between the flanges 71 of the guide and, contacting with the rear edge of the severed patch, force it forward as it rests on the flanges 71, thereby squaring and registering the position of the patch against the tips of the arms 69. When the patch has been thus registered, a vacuum is produced in the chamber 67 through a flexible connection 72 with a pump or other suction device, causing the patch to be held upon the outer surface of the patch holding block 64 which, at the proper period, is brought beneath the patch. The patch, held by suction, is carried by the rotation of the patch holding block 64 into contact with a gumming die 73 carried upon the periphery of a cylinder 74. The gumming die 73 receives gum from a gum box 75 by means of the gum roll 76 and a transfer roll 77. As gum is applied to the patch by the rolling contact of the gumming die 73 with the patch as it is held upon the patch holding block 64, the patch is released from adhesion to the gumming die by means of stripping fingers 78, Fig. 5, running in grooves 79 in the cylinder 74, and supported in position by a shaft 80 upon which the fingers 78 are mounted. The gumming die 73 is shaped to correspond with the contour of the openings in the envelop blank and is provided with gaps 81 corresponding with the grooves 79 to provide for the passage of the fingers 78. As the disks 62 and 63 rotate, the patch holding block 64, carrying the patch held thereon by suction, rolls the patch upon the blank as the latter passes between the patch holding block 64 and the cylinder 31. As the patch holding block 64 approaches the blank, the bent arms 69 are retracted by means of a lever, 82, Fig. 4, carried by the shaft 68, which contacts with a fixed stop 83 held by the framework of the machine, causing the shaft 68 to be rotated against the tension of the torsional spring 70 in order to depress the tips of the bent arms 69 within the periphery of the patch holding block 64. The cylinder 74 carrying the gumming die 73 is mounted upon a shaft 84 which also carries a cam represented by broken lines 85, in Fig. 1. The cam 85 acting upon a lever 86 serves to rock a shaft 87 and depress the fingers 88 through openings 89, Fig. 8, in the edge of the patch guide 59 in order to depress the rear edge of the patch to insure its contact with the tips of the bent arms 69. The reciprocating knife 61 is carried in a frame 90 which slides vertically in ways 91 by means of a two armed lever 92—93, the latter carrying a cam roll 94 which is held against a cam 95 on the shaft 66. The cam roll 94 is held against the cam by the tension of a spring 96. The rocking motion of the two armed lever 92—93 serves to lift the knife carrying the frame 90 and permit it to be depressed to sever the patch by the tension of a spring 97.

The operation of the machine is as follows:—Each envelop blank as it is raised by

the suction tube 5 is wrapped upon the periphery of the revolving cylinder 31 and forwarded by a continuous movement beneath the guide bar 31ª, through the coöperation of the side rolls 42ª, 42ª and the rolls 42 and 43, during which movement its flaps are gummed by the dies 35 and 36 on the cylinder 37. The free ends of the guide rods 44 extend into grooves 44ª in the cylinder 31 and act as strippers to insure the delivery of the blank from the cylinder 31. As the blank passes beneath the patch applying mechanism, a gummed patch held by suction on the block 64 is rolled upon the blank to cover the opening therein, the blank having been registered on the cylinder 31 by the stops 34.

As the blank is projected by the rotative forwarding means upon the guide rods 44, it is held in extended position by the bars 44ᵇ spaced above the guide rods 44. In this extended position the rear edge of the blank is seized by the hooks 46 of the horizontally reciprocating carriage 47, and the blank is brought against the gage stops 50 in proper position to be forced by the plunger 48 through the opening 49 upon the folding bed 51, where the envelop is completed by the folders 52 and 53.

I claim,

1. In an envelop machine, a cylinder over which the envelop blank is passed, a rotative patch holding block for coöperation with said cylinder, said block being provided with suction devices by which a gummed patch is held thereon, and said block being adapted to apply the patch to the blank on said cylinder, and a guide adjacent the path of said suction devices for supporting a patch in position to be engaged thereby.

2. In an envelop machine, a cylinder over which the envelop blank is passed, a rotative patch holding block for coöperation with said cylinder, said block being provided with suction devices by which a gummed patch is held thereon, and being adapted to apply the patch to the blank on said cylinder, a guide adjacent the path of said suction devices for supporting a patch in position to be engaged thereby, and means for registering the patch in said guide relatively to said patch holding block.

3. In an envelop machine, a rotating cylinder over which the envelop blank is passed, a rotative patch holding block for coöperation with said cylinder, said block being provided with means for engaging a gummed patch, and being adapted to apply said patch to the blank on said cylinder, a guide above said block for supporting a patch, means for feeding patches successively to said guide, means for registering the patch in said guide, and means for forcing an edge of the patch into the path of the registering means.

4. In a patch attaching device, in combination, with a rotary blank bed carrying precut gummed window envelop blanks; a rotary patch bed adapted to coöperate therewith and roll patches into engagement with said gummed blanks; said patch bed having air suction means for securing the patches thereto; and means for advancing patch material to said patch bend and auxiliary patch material advancing means adapted to cooperate with the aforesaid patch bed and press the patches down upon the air-suction devices on the patch bed.

5. In a patch attaching device, in combination with a rotary blank bed carrying precut window envelop blanks; means for gumming the said blanks; means for rolling patch material into engagement with the gummed blanks, said means comprising a rotary patch bed, said patch bed having air suction means for maintaining the patches in position thereon; means for advancing patch material to the patch bed; and means associated therewith for timing the application of patches to said bed, whereby the patches are properly registered on the blanks.

6. In a machine of the class described, a cylinder over which a blank is passed, a rotative patch holding block coöperating with the aforesaid cylinder and provided with suction devices by which a patch is held thereon, said block being adapted to roll the patch onto the blank carried by the cylinder during the rotation of the block, and a guide for supporting the patch in position to be engaged by said suction devices.

7. In an envelop machine, a cylinder over which the envelop blank is passed, a rotative patch holding block for coöperation with said cylinder to apply a patch to the blank thereon, said block being provided with suction devices for holding a patch thereon, and a guide for supporting a patch in position to be engaged by said suction devices.

8. In an envelop machine, a cylinder over which the envelop blank is passed, a rotative patch holding block for coöperation with said cylinder to apply a patch to the blank thereon, said block being provided with suction devices for holding a patch, a guide for supporting a patch in position to be engaged by said suction devices, and means for registering the patch in said guide relatively to said patch holding block.

9. In an envelop machine, a cylinder over which the envelop blank is passed, a rotative patch holding block for coöperation with said cylinder to apply a patch to the blank thereon, said block being provided with suction devices for holding a patch, a guide for supporting a patch in position to be engaged by said suction devices, means for registering the patch in said guide relatively to said patch holding block, and means

for forcing the patch into the path of said registering means.

10. In an envelop machine, a rotating patch holder having means for engaging a patch, means for supporting a patch in position to be engaged by said patch holder, and a yielding lever carried by said patch holder and projecting beyond the plane of the supported patch, whereby the patch is moved on its supporting means simultaneously with the movement of the patch holder.

11. In an envelop machine, a rotating patch holder having means for engaging a patch, means for supporting a patch in position to be engaged by said patch holder, a yielding lever carried by said patch holder and projecting beyond the plane of the supported patch, whereby the patch is moved on its supporting means simultaneously with the movement of the patch holder, and means for periodically retracting said yielding lever.

12. In an envelop machine, means for feeding a continuous strip of transparent patch material, means for severing the strip into individual patches, a guide for supporting each patch, rotative mechanism for carrying the patch into contact with an envelop blank, means for pushing the patch from said guide into alinement with said rotative mechanism, and means for depressing the rear edge of the patch into the path of said pushing means.

13. In an envelop machine, a rotating patch holder provided with means for engaging a patch, a guide adjacent to said patch holder for supporting the patch, means for pushing the patch from said guide over the patch holder, means for applying gum to the patch by a rolling contact, and means for stripping the gummed patch from the gum applying means during its rolling contact with the patch holder.

Dated this twenty-sixth day of February, 1916.

NELSON E. FUNK.

Witnesses:
E. PARSONS,
E. W. HARDING.