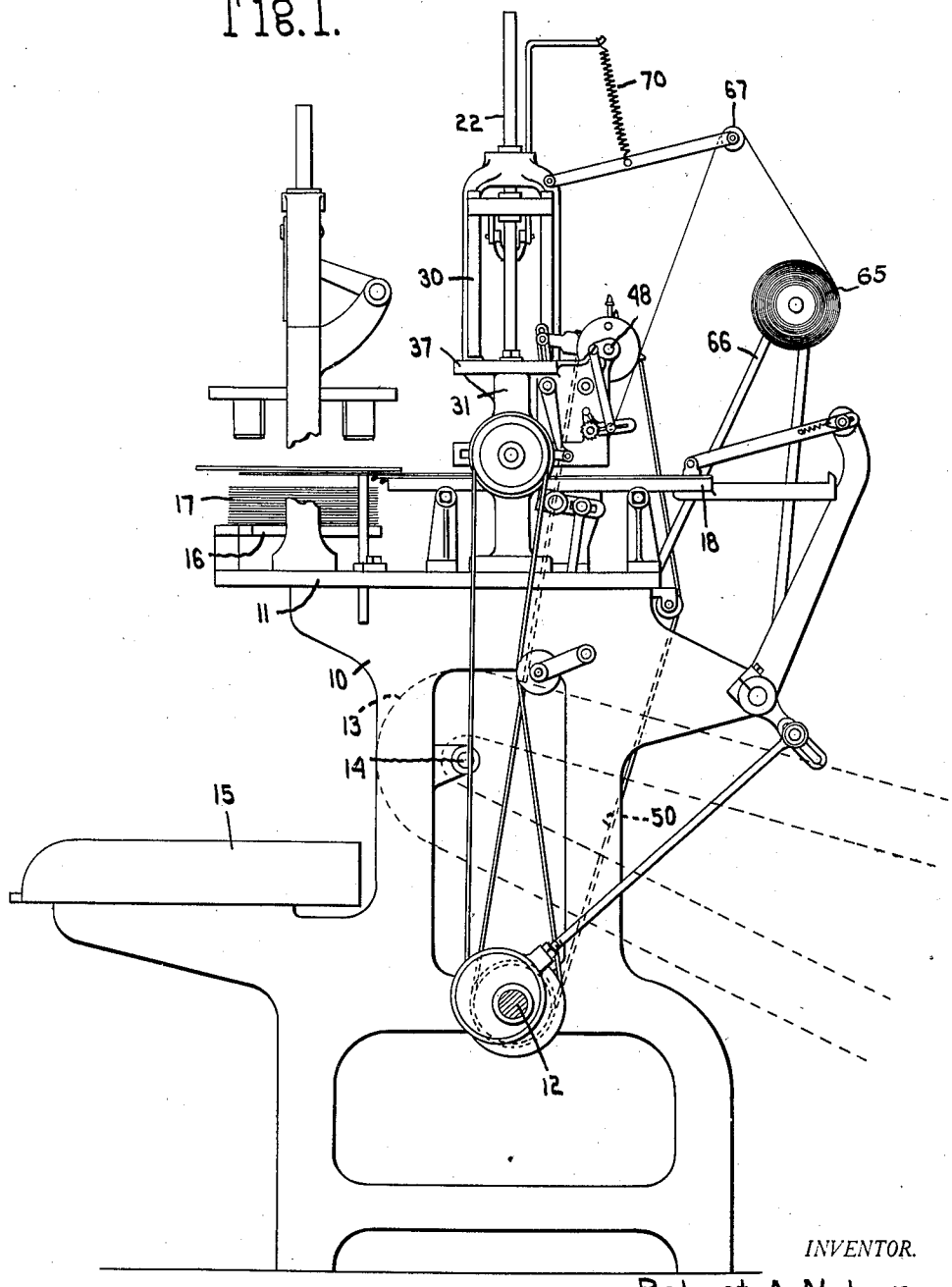
Dec. 3, 1929. R. A. NELSON 1,737,608

WINDOW ATTACHMENT FOR ENVELOPE FOLDING MACHINES

Filed Dec. 23, 1925 6 Sheets-Sheet 1

Fig. 1.



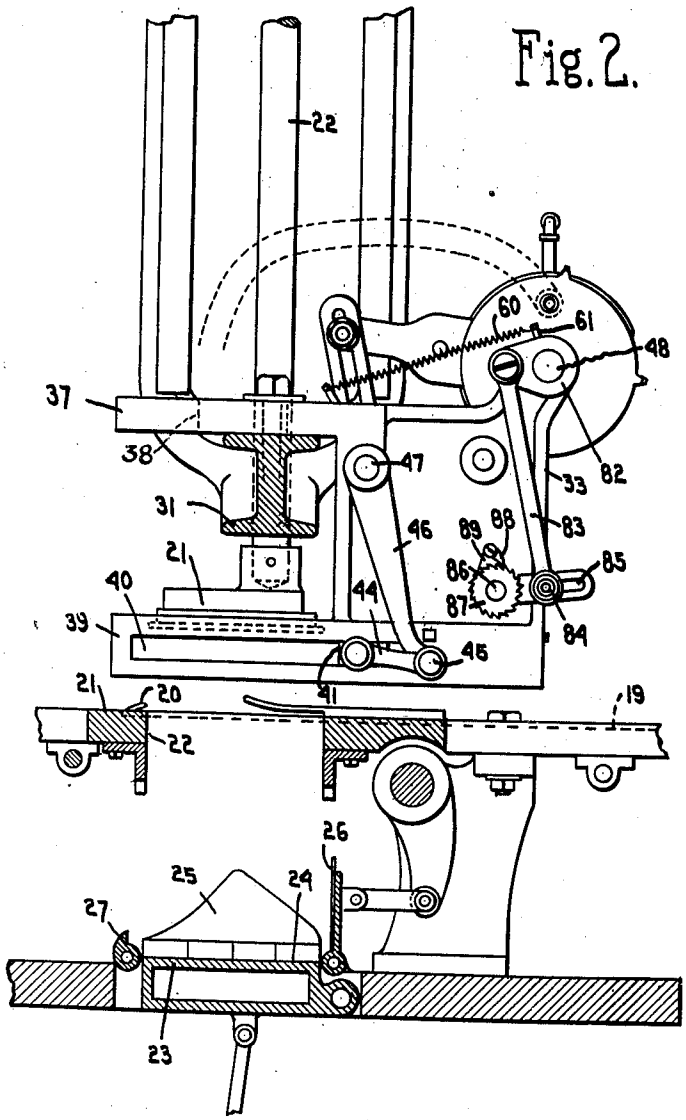
INVENTOR.
Robert A. Nelson
BY
Fay, Oberlin & Fay
ATTORNEYS.

Dec. 3, 1929. R. A. NELSON 1,737,608

WINDOW ATTACHMENT FOR ENVELOPE FOLDING MACHINES

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Fig. 2.



INVENTOR.

Robert A. Nelson

BY

Fray, Oberlin & Fray

ATTORNEYS.

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WINDOW ATTACHMENT FOR ENVELOPE FOLDING MACHINES

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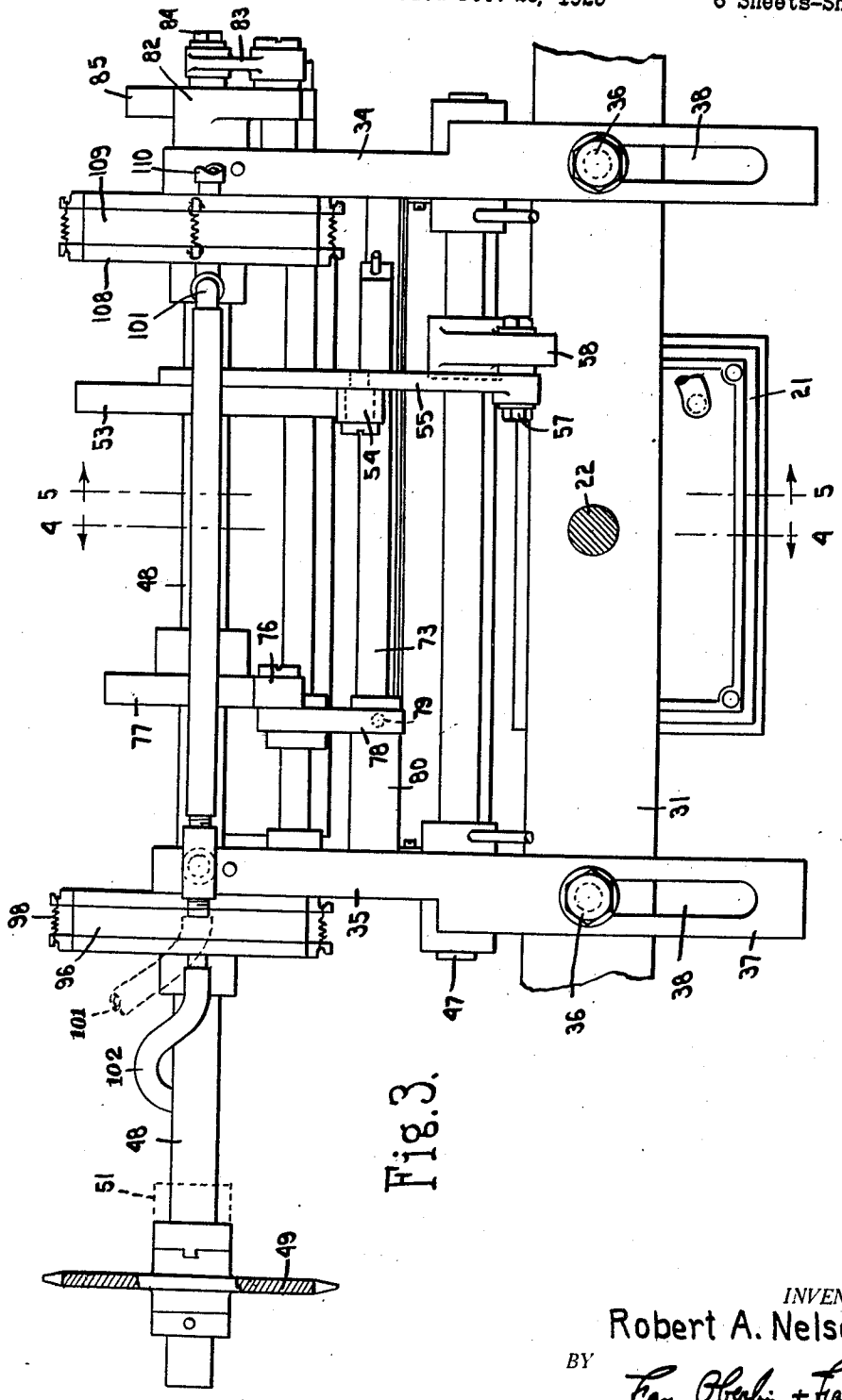


Fig. 3.

INVENTOR.
Robert A. Nelson
BY
Fay, Oberlin & Fay
ATTORNEYS.

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WINDOW ATTACHMENT FOR ENVELOPE FOLDING MACHINES

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Fig. 4.

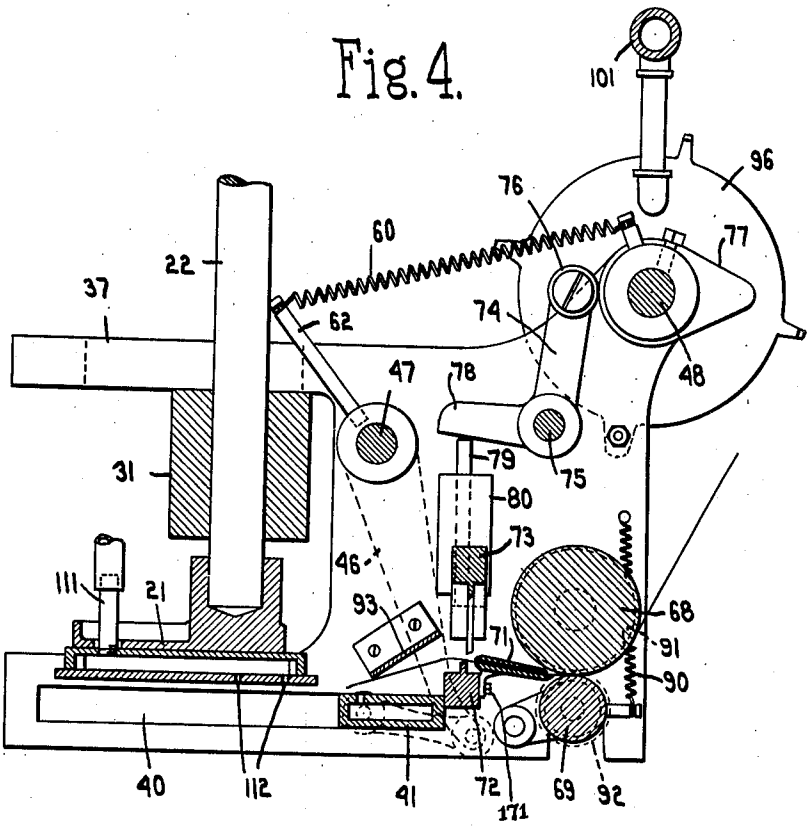


Fig. 6.

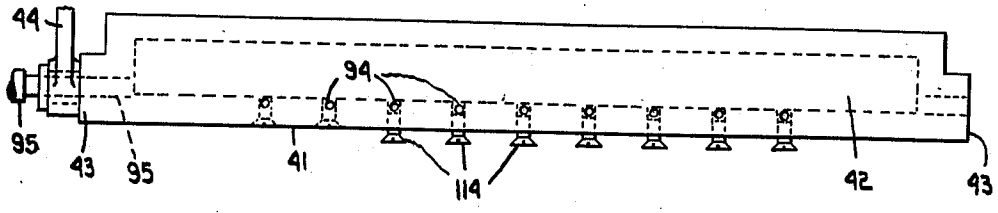
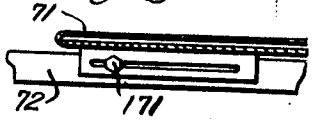


Fig. 15.



INVENTOR.
Robert A. Nelson
BY
Fay, Oberlin & Fay
ATTORNEYS.

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WINDOW ATTACHMENT FOR ENVELOPE FOLDING MACHINES

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Fig. 5.

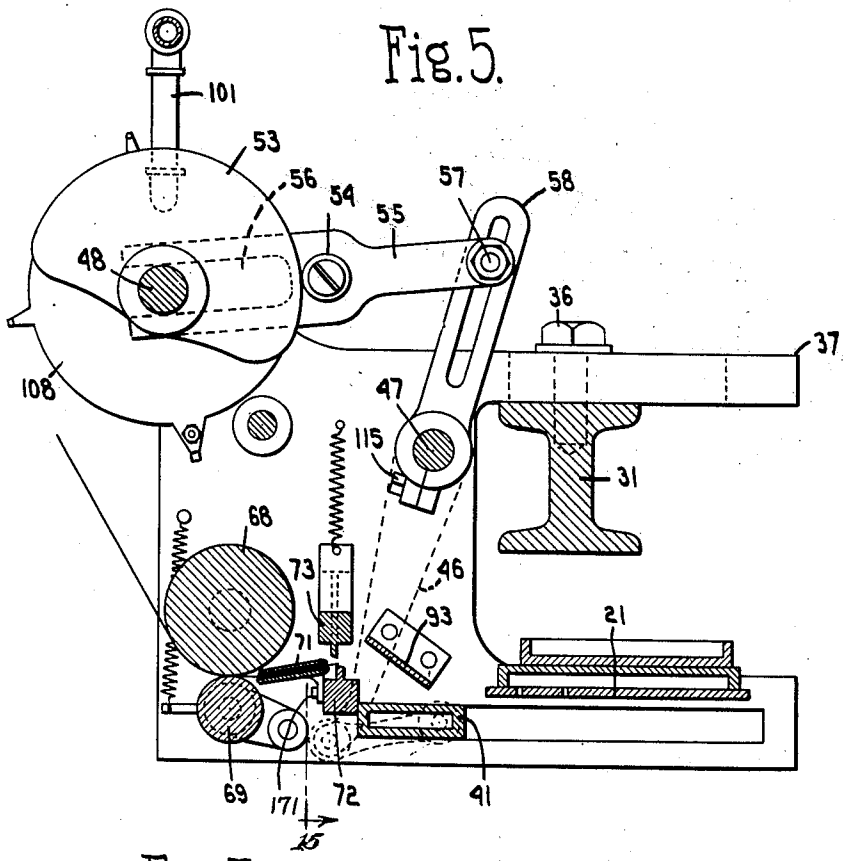


Fig. 7.

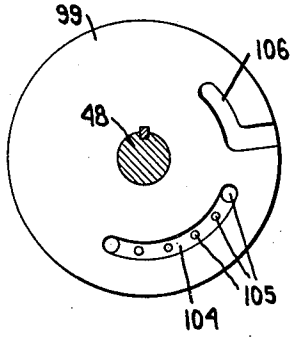
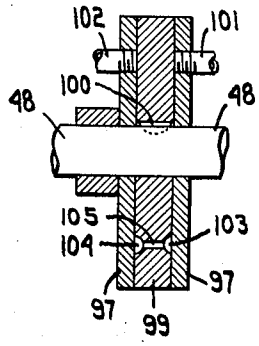


Fig. 8.



INVENTOR.
Robert A. Nelson
BY
Fay, Oberlin & Fay
ATTORNEYS.

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WINDOW ATTACHMENT FOR ENVELOPE FOLDING MACHINES

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Fig.9.

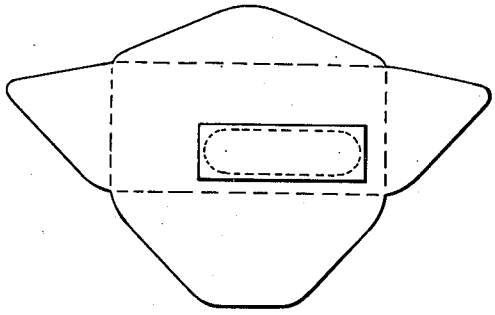


Fig.10.

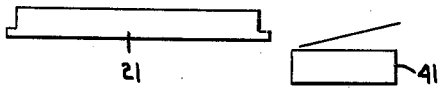


Fig.11.

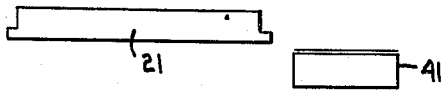


Fig.12.

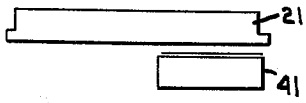


Fig.13.

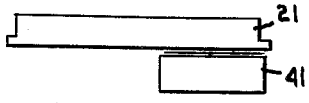
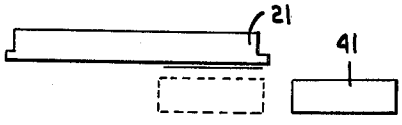


Fig.14.



INVENTOR.
Robert A. Nelson
BY
Fay, Oberlin & Fay
ATTORNEYS.

Patented Dec. 3, 1929

1,737,608

UNITED STATES PATENT OFFICE

ROBERT A. NELSON, OF CLEVELAND, OHIO, ASSIGNOR TO THE STANDARD ENVELOPE MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO

WINDOW ATTACHMENT FOR ENVELOPE-FOLDING MACHINES

Application filed December 23, 1925. Serial No. 77,241.

This invention, relating, as indicated, to envelope folding machines, more particularly concerns the construction of new and improved mechanism adapted to apply transparent window patches to envelope blanks. In machines of this character it is customary to apply the patch to the blank prior to the folding operation. An object of the invention is to provide such mechanism in the form of an attachment device which may be readily assembled on a standard envelope folding machine to convert the same into a machine for both folding and applying the windows of envelopes.

A further object of the invention resides in the provision of mechanism for applying the patches which may be adjusted to accommodate various sizes of patches, and which may also be adjusted to position the patch at any desired location upon the envelope blank. In previous machines the patch-applying mechanism has been capable of handling only one size of patch and positioning the same at only one place on the envelope blank. In the present device the mechanism is very simple in construction, efficient in operation and capable of operating all types of window patches within a reasonable range of size.

A further object of the invention is to provide an improved patch conveyor which transfers the patch from the cutting mechanism to the ordinary plunger of this type of machine. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—

Fig. 1 is a side elevation of one type of standard envelope folding machine showing the device embodied in the present invention attached thereto; Fig. 2 is an enlarged longitudinal vertical section through the present device and the plunger and folding mechanisms of such machine; Fig. 3 is a plan view of the device illustrating the mode of attachment to the machine; Fig. 4 is an enlarged cross-sectional view taken on the line 4—4 of Fig. 3, looking in the direction of the arrows; Fig. 5 is a similar view taken on the line 5—5 of Fig. 3 looking in the direction of the arrows; Fig. 6 is a detailed plan view of the patch conveyor; Figs. 7 and 8 are detail views of the vacuum control mechanism, Fig. 8 being taken on line 8—8 of Fig. 7; Fig. 9 is a plan view of an envelope blank showing the transparent patch applied thereto; and Figs. 10 to 14, inclusive, are diagrammatic views illustrating the sequential steps in the operation of the patch conveyor with respect to the machine plunger. Figure 15 is a sectional view on the line 15 of Figure 5.

The machine illustrated in the accompanying drawings is of the general type found in the patent to Novick, No. 1,039,786, and consists of a standard or framework 10 supporting on its upper end a horizontal table 11, upon which are mounted the mechanisms for feeding, gluing and folding envelope blanks. A main drive shaft 12 is employed to operate the several mechanisms of the machine. The usual type of drier 13 has one end journaled at 14 on a shaft supported transversely of the framework 10 to position the same directly beneath the folding mechanisms to receive the folded envelope and a delivery table 15 is also supported by a framework 10. It is to be understood that the present invention is capable of being incorporated with many types of envelope folding machines and is especially adapted for use with the type employing a vertically reciprocable plunger.

Only a brief description of the several operating elements of the machine in general will be given so as to enable a clear understanding of the cooperation of the present device therewith. At the front side of the table is mounted the ordinary spring pressed blank carrier 16, supporting a number of blanks 17 beneath a suitable glue applying apparatus, not shown. Movable longitudinally of the machine on guideways 18 are intermittently reciprocable blank transferring arms

or bars 19 These bars have at their forward ends suitable hook fingers 20, which are adapted to engage the blank and convey it from the gluing device to a position beneath a vertical plunger 21. Aligned with the plunger 21 is a plate 22. Supported on the members 18 is a vertical aperture 22 through which the envelope blank is pressed by the plunger 21 to position the same upon a folding table 23. This table consists of a member constructed to conform with the outer dimension of the folded envelope. Flap folders 25 are mounted at each side thereof and a back flap block 26 is mounted at one end thereof. Such folders are actuated in the customary manner through suitable links and cams actuated from the drive shaft 12 and a creasing member 27 is positioned at the end opposite from the folder 26 to crease the top flap after the others have been stuck together by the folding mechanisms.

The plunger 21 is carried at the lower end of a vertical shaft 22 supported in a vertically extending frame 30. This frame is mounted on the top of the table 11 and provides a transverse member 31, through which the plunger rod 22 reciprocates. In the operation of the machine the envelope blanks are successively placed beneath the plunger 21 at each reciprocation thereof.

The machine described above is of the plain envelope folding type, and I will now describe the device of the present invention which transforms such machine to provide for the attachment of transparent patches to the envelope blanks prior to the folding operation. Upon the transverse member 31 is detachably secured a framework 33, which is illustrated in the drawings as comprising a pair of spaced ends 34 and 35 between which are carried the mechanisms for feeding and conveying the transparent patches. Each said end member is cut away at its front side for the reception of the member 31 and suitable bolts 36 are used to secure the projecting portion 37 of said ends to the member 31. The portions 37 are provided with elongated slots 38 to permit longitudinal adjustment of the frame 33.

In the lower portion 39 of end members 34 and 35 are formed longitudinal slots 40, in which is movable a transversely arranged patch conveyor 41. This conveyor is best seen in Figs. 4, 5 and 6 and comprises a hollow member having a flattened top 42 and suitable bearings 43 at its ends for the connection of the operating links 44. The links 44 are connected at their other end 45 to operating arms 46 pivotally mounted on a transverse shaft 47 journaled in the end members 34 and 35. Also journaled in the frame 43 is another transverse shaft 48 which projects beyond one side thereof and carries a sprocket 49 which is driven by a chain 50 from the main drive shaft 12 of the machine. At 51 is shown a clutch member which may be used to engage the sprocket 49 with the shaft 48. Secured to the shaft 48, intermediate the frame ends, is an eccentric cam 53 which operates a cam roll 54 to intermittently oscillate the shaft 47. The roller 54 is mounted on an arm 55 which has one end bifurcated, as at 56, to slidingly engage about the shaft 48. The other end of such arm is adjustably connected at 57 to the upper end of a lever 58 secured to the shaft 47. It will be obvious that the patch conveyor 41 will be intermittently reciprocated by means of the mechanism described immediately above upon rotation of the shaft 48, the connection 57 being provided to permit adjustment in the extent of movement of the patch conveyor. Springs 60 are employed to keep the patch conveyor 41 normally retracted from beneath the plunger 21 and also to yieldingly hold the roller 54 against the operating cam 53. These springs are engaged between a projection 61 on the frame and pins 62 provided at the ends of shaft 47.

The patch conveyor, as will appear hereinafter, is provided with suitable suction devices which act to hold the patch to the surface 42 thereof during the interval that the same is being transferred from the cutting mechanism to a position beneath the plunger 21. The transparent patches may be supplied from a paper roll 65 mounted at the rear of the machine on a frame 66. The paper is first led from the roll to an idler 67 and thence to feed rolls 68 and 69 supported transversely of the frame 53. The idler 67 is yieldingly supported by a spring 70 to absorb any sudden jerk imparted to the paper lead to prevent tearing thereof. Between the fed rolls 68 and 69 and the retracted position of the patch conveyor is mounted a guide 71 and a cutting device comprising a fixed blade 72, over which the paper passes, and a movable blade 73, which latter member is operated at the proper interval to sever the desired width of patch. The mechanism for operating the cutter blade 73 consists of a bell crank 74 pivoted to the frame 53 at 75, which has its upper end 76 engaged by a cam 77 mounted on the shaft 48. The other end 78 of the bell crank is adapted to engage a vertically positioned pin 79 which is carried in a boss 80 above the knife 73. The cam 77 is so shaped that it imparts to the crank 74, and consequently to the pin 79, a quick motion which operates the cutting device in a very desirable manner.

The feed rollers 68 and 69 are actuated to intermittently feed the desired length of paper through the guide 71. At one end of the shaft 48 is mounted a crank arm 82, which is connected at its upper end to a link 83. The other end of the link is adjustably connected at 84 to a lever 85 mounted loosely on shaft 86 of the upper feed roll 68. Also mounted

on shaft 86 adjacent the lever 85 is ratchet wheel 87, which is engaged by a pawl 88 carried on a projection 89 of the arm 85. In operation, as the shaft 48 revolves, it will impart to the crank 82 a rotary motion which, during one half of its cycle, is adapted to move the lever 85 in one direction and during the other half thereof to reverse such movement. The pawl 88 will move the shaft 86 to advance the feed roll 68 during only one portion of the movement of the crank 82. By adjusting the connection 84 of the link 83 with respect to the lever 85 it will be obvious that the amount of rotation, and hence the amount of feed of the paper, may be varied. The roller 69, as seen in Figs. 4 and 5, is held by springs 90 to insure positive engagement between the feed rolls and to also prevent any retraction of the paper therebetween. Gears 91 and 92 are mounted at the ends of these rollers to establish driving relation between them. Positioned above the patch conveyor, adjacent the knives 72 and 73, is a deflector plate 93 which serves to guide the severed patch to the top of such conveyor.

As hereinbefore stated the conveyor 41 is hollow in cross-section and a plurality of apertures are provided in the upper surface 42 thereof through which suction may be applied to hold the patch in place on the conveyor. Passing through one of the journals of links 44 is a connection 95 which leads to a suction control cylinder 96 mounted on the shaft 48. This cylinder comprises, as seen in Figs. 7 and 8, a pair of fixed plates 97 which are pressed together by springs 98, and between which is rotatable a disk 99 keyed to the shaft 48, as at 100. In one of the plates 97 is secured the end of a vacuum line 101 and in the other plate 97 is secured a connection 102 which communicates with the connection 95. The connection 101 referred to may be connected to any suitable vacuum source, it being customary in this type of machine to employ a small pump operating from the driving shaft. The plate 99 is provided with a pair of laterally disposed recesses 103 and 104 which are intended to have periodic communication with the connections 101 and 102, respectively. These recesses are located, as seen in Fig. 8, on opposite sides of the plate 99 and have communicating passages 105. The plate 99 is further recessed at 106 in the side having recess 104 to provide a release port to be presently described. In operation, when the shaft 48 brings the disk or plate 99 in a certain position, the vacuum from the conduit 101 will be communicated through the passages 105 to the interior of the conveyor 41. This takes place at the time the patch is being severed from the paper supply by the knife 73 to hold such severed patch in proper position on the conveyor. The suction is retained in such conveyor until in a position beneath the plunger 21 when the release port then is moved opposite the conduit 102. At this time other suction apparatus is placed in operation to pick up the patch from the conveyor 41 and hold it against the bottom side of plunger 21.

Carried on the shaft 48 is a second cylinder 108 comprising a rotatable disk 109 similar in construction to the disk 99. This disk also has ports or recesses similar in construction to those of disk 99, which serve to introduce the vacuum through the connection 101 which extends from the cylinder 96 to the cylinder 108 through the conduit 110. This latter conduit leads to a connection 111, as best seen in Fig. 4. The plunger 21 is hollow and has a plurality of apertures 112 in its lower side, through which suction may be applied to the patch to hold the same thereon. In Figs. 10 to 14 the successive steps have been illustrated diagrammatically, the patch being first severed from the supply roll, then drawn by suction to be held against the conveyor 41, which is moved beneath the plunger 21. The plunger is given a slight lowering movement to place the lower surface thereof closely adjacent the top of the conveyor and then the suction is released from the conveyor 41 and transferred to the plunger 21, at which time the patch will be adhered to the bottom of the plunger. The conveyor may then be withdrawn and the machine operated in the usual manner, that is, to lower the plunger onto the envelope blank to press the same into the folding mechanisms. This lowering movement of the plunger also sticks the patch in the proper position around the opening in the envelope, as seen in Fig. 9.

It has been stated that the present device is capable of operating upon various sizes of patches and also of being able to position such patches at any desired place upon the envelope. These adjustable features are very important and have not been provided in previous machines. To provide for lateral adjustment of the patch the guide 71 may be adjusted sidewise of its support on the knife 72. In Figs. 4 and 5, the guide 71 is illustrated as being detachably secured by bolts 171 to the knife blades 72, and it is intended that either longitudinal slots be provided in the attaching flange of part 71 or that a series of holes be arranged in the member 72 whereby the adjustment referred to above is facilitated. The apertures 94 in the conveyor 41 are opened or closed by a plurality of set screws 114. If the patch is to be applied to one side of the envelope blank only the apertures 94 at that side will be left open. Similar set screws may also be utilized in connection with the apertures 112 of the plunger plate to take care of the lateral adjustment in that member. When it is desired to position the patch either toward the top or the

bottom of the envelope it is necessary to substitute the proper plunger plate with the openings 112 in the desired location. However, the same conveyor may be used, and the movement thereof with respect to the plunger to be taken care of, by the adjustable connection 57 hereinbefore referred to. In making this latter adjustment it will of course be obvious that the screw 115 for locking the arm 58 to shaft 47 will be loosened to insure the correct positioning of the conveyor 41 in its rearmost position.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In a machine of the character described, the combination of a vertical plunger, a horizontally movable conveyor, means for reciprocating said plunger and conveyor intermittently and in timed relation with each other, means for supplying a patch to said conveyor at each reciprocation thereof, and means for transferring said patch from the top of said conveyor to the bottom of said plunger.

2. In a machine of the character described, the combination of a vertically reciprocable plunger, a horizontal movable conveyor, means for reciprocating said conveyor in conjunction with said plunger, feeding mechanism for strip patch material adapted to sever and supply a patch to said conveyor at each reciprocation thereof, means for holding said patch on the conveyor, and means for transferring the patch to the bottom of said plunger.

3. In a machine of the character described, the combination of a vertically reciprocable plunger, a horizontally movable conveyor, means for reciprocating said conveyor in conjunction with said plunger, feeding mechanism for patch material adapted to supply a patch to said conveyor at each reciprocation thereof, suction means for holding said patch on the top of said conveyor, and means for transferring the patch to the bottom of said plunger.

4. In a machine of the character described, the combination of a vertically reciprocable plunger, a horizontally movable conveyor, means for reciprocating said conveyor in conjunction with said plunger, feeding mechanism for patch material adapted to supply a patch to said conveyor at each reciprocation thereof, suction means for holding said patch on said conveyor, and suction means for transferring the patch to the bottom of said plunger.

5. In a machine of the character described, the combination of a vertically reciprocable plunger, a horizontally movable conveyor, means for reciprocating said conveyor in conjunction with said plunger, feeding mechanism for patch material adapted to supply a patch to said conveyor at each reciprocation thereof, means acting upon the under side of the patch for holding the same on said conveyor, and suction means for transferring the patch to the bottom of said plunger.

6. In a machine of the character described, the combination of a vertically reciprocable plunger, a horizontally movable conveyor, means for reciprocating said conveyor in conjunction with said plunger, feeding mechanism for patch material adapted to supply a patch to said conveyor at each reciprocation thereof, suction means for holding said patch on the top of said conveyor, suction means for transferring the patch therefrom to the bottom of said plunger, and means operated from said conveyor actuating means for controlling the suction devices.

7. In a machine of the character described, the combination of a vertically reciprocable plunger, a horizontally movable conveyor, means for moving said conveyor under said plunger during its upper position, feeding means for patch material, a cutting device for severing a patch therefrom, and suction means for positioning said patch on the top of said conveyor.

8. In a machine of the character described, the combination of a vertically reciprocable plunger, a horizontally movable conveyor, means for moving said conveyor under said plunger during its upper position, feeding means for patch material, a cutting device for severing a patch therefrom, and means including a suction device for engaging said patch and holding it on the top of said conveyor.

9. In a machine of the character described, the combination of a vertically reciprocable plunger, a horizontally movable conveyor, means for moving said conveyor under said plunger during its upper position, feeding means for patch material, and cutting device for severing a patch therefrom, means for positioning said patch on the top of said conveyor, and means for transferring the patch to the bottom of said plunger when said conveyor is under the same.

10. In a machine of the character described, the combination of a vertically reciprocable folding plunger, a horizontally movable conveyor, means for reciprocating said conveyor in timed relation with said plunger whereby the former is moved under the latter when in its upper position, and means associated with said conveyor actuating means for varying the extent of its horizontal movement.

11. In a machine of the character described, the combination of a vertically reciprocable

folding plunger, means for successively supplying blanks beneath said plunger, operating mechanism therefor, a window patch applying device, mechanism for selectively connecting said device to said operating mechanism, said device including a horizontally movable conveyor, patch feeding means, and means for reciprocating said conveyor in timed relation with said plunger.

12. In a machine of the character described, the combination of a vertically reciprocable folding plunger, means for successively supplying blanks beneath said plunger, operating mechanism therefor, a window patch applying device, mechanism for selectively connecting said device to said operating mechanism, said device including a horizontally movable conveyor, means for reciprocating said conveyor in timed relation with said plunger, patch feeding mechanism, and means for positioning a patch on said conveyor at each reciprocation thereof.

13. In a machine of the character described, the combination of a vertically reciprocable plunger, means for successively supplying blanks beneath said plunger, operating mechanism therefor, a window patch applying device, mechanism for selectively connecting said device to said operating mechanism, said device including a horizontally movable conveyor, means for reciprocating said conveyor in timed relation with said plunger, patch feeding mechanism, means for positioning a patch on said conveyor at each reciprocation thereof, and means for transferring the patch from said conveyor to the bottom of said plunger whereby the patch is carried by said plunger to the blank in situ.

14. In combination with a vertically reciprocable plunger, a patch applying device comprising a horizontally movable conveyor adapted to move in a plane at right angles to said plunger and in timed relation therewith, patch feeding mechanism, and suction means for holding a patch on the top of said conveyor.

15. In combination with a vertically reciprocable plunger, a patch applying device comprising a horizontally movable conveyor adapted to operate in timed relation with said plunger, patch feeding mechanism, suction means for holding a patch on the top of said conveyor, suction means for holding a patch on the bottom of said plunger, and a common actuating means for operating said feeding mechanism and said plunger and conveyor suction means.

16. In combination with a vertically reciprocable plunger, a horizontally movable conveyor, means for feeding patches one by one to one surface of said conveyor, and tension mechanism for advancing said conveyor beneath said plunger.

17. In combination with a vertically reciprocable plunger, a horizontally movable conveyor, means for feeding patches one by one to said conveyor, means for reciprocating said conveyor including a pivoted arm, means connecting one end thereof to said conveyor, a revoluble cam, means movable with said arm adapted to engage said cam, and tension means for holding said last-named means in engagement with said cam.

18. Mechanism of the character described, comprising a rotating shaft, a reciprocable conveyor, operating connections between said shaft and said conveyor, means for adjusting said connections to vary the extent of movement of said conveyor, and means for continuously feeding patches one by one to said conveyor at each reciprocation thereof, said last named means being actuated by said shaft.

19. Mechanism of the character described, comprising a rotating shaft, a reciprocable conveyor, operating connections between said shaft and said conveyor, means for adjusting said connections to vary the extent of movement of said conveyor, means for continuously feeding patches one by one to said conveyor at each reciprocation thereof, means for feeding a patch to said conveyor at each reciprocation thereof, and means for driving said feed means from said shaft.

20. Mechanism of the character described, comprising a rotating shaft, a reciprocable conveyor, operating connections between said shaft and said conveyor, means for adjusting said connections to vary the extent of movement of said conveyor, means for continuously feeding patches one by one to said conveyor at each reciprocation thereof, means for feeding a patch to said conveyor at each reciprocation thereof, driving connections between said shaft and said feeding means, and means for adjusting said driving connections to vary the amount of feed.

21. Mechanism of the character described, comprising a rotating shaft, a reciprocable conveyor, operating connections between said shaft and said conveyor, means for feeding a patch to said conveyor, and suction means carried by said conveyor for holding the patch thereon.

22. Mechanism of the character described, comprising a rotating shaft, a reciprocable conveyor, operating connections between said shaft and said conveyor, means for feeding a patch to said conveyor, suction means for holding the patch on said conveyor, and means actuated by said shaft for controlling said suction means.

23. Mechanism of the character described, comprising a rotating shaft, a reciprocable conveyor, operating connections between said shaft and said conveyor, means for feeding a patch to said conveyor, and suction means for holding the patch on said conveyor including a plurality of holes in the

top of the conveyor and a source of vacuum leading to said holes.

24. Mechanism of the character described, comprising a rotating shaft, a reciprocable conveyor, operating connections between said shaft and said conveyor, means for feeding a patch to said conveyor, suction means for holding the patch on said conveyor including a plurality of holes in the top of the conveyor and a source of vacuum leading to said holes, and means for automatically controlling said vacuum.

25. Mechanism of the character described, comprising a rotating shaft, a reciprocable conveyor, operating connections between said shaft and said conveyor, means for feeding a patch to said conveyor, suction means for holding the patch on said conveyor including a plurality of holes in the top of the conveyor and a source of vacuum leading to said holes, and means operated by said shaft for controlling said vacuum.

26. Mechanism of the character described, comprising a rotating shaft, a reciprocable conveyor, operating connections between said shaft and said conveyor, means for feeding a patch to said conveyor, suction means for holding the patch on said conveyor including a plurality of holes in the top of the conveyor and a source of vacuum leading to said holes, and a cylinder mounted on said shaft adapted to intermittently control said vacuum source.

27. Mechanism of the character described, comprising a reciprocating patch conveyor having a plurality of holes in one side thereof, a source of vacuum leading to said holes, and means for selectively opening or closing the holes.

28. Mechanism of the character described, comprising a reciprocating plunger, operating means therefor, adjusting devices in said means to vary the extent of said reciprocation means for feeding a patch to said conveyor, and laterally adjustable guiding means for positioning said patch on said conveyor.

29. In combination with a vertically reciprocable plunger, a patch applying device, and means for adjusting said device laterally of said plunger, said device including a horizontally reciprocating conveyor and means for feeding patches thereto at each reciprocation.

Signed by me, this 13th day of November, 1925.

ROBERT A. NELSON.