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O'Neill

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[54] **ENVELOPE WINDOW PUNCH**

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Related U.S. Application Data

[62] Division of Ser. No. 864,675, Oct. 8, 1969, Pat. No. 3,682,745.

[52] **U.S. Cl.** **83/589,** 83/633, 83/648, 83/911

[51] **Int. Cl.** **B26d 5/08**

[58] **Field of Search** 83/589, 588, 911, 83/686, 648, 633, 450

[56] **References Cited**

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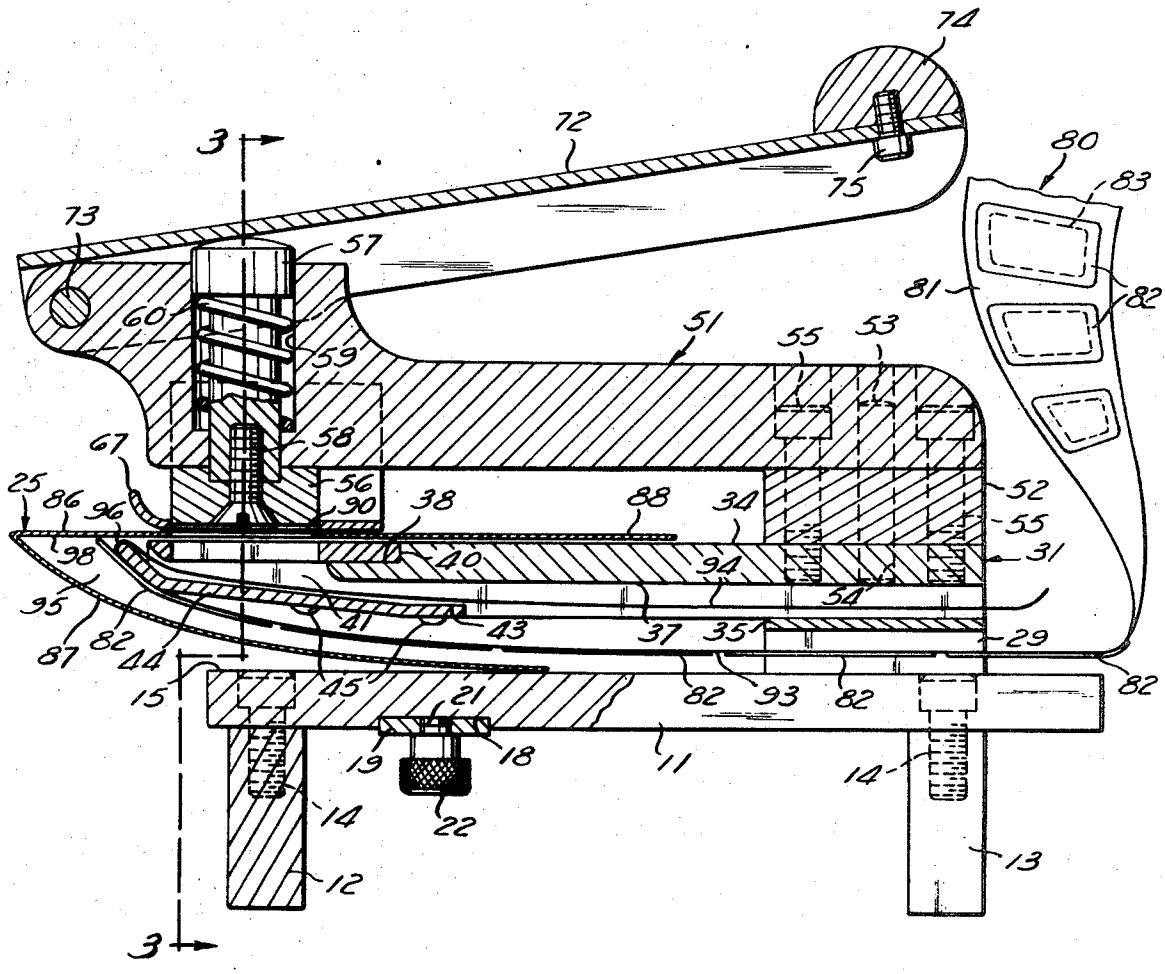
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Assistant Examiner—Leon Gilden
Attorney—Harold F. McNenny, Thomas P. Schiller et al.

[57] **ABSTRACT**

An apparatus is disclosed for producing window envelopes from preformed windowless envelopes. Front and rear wall portions of a preformed envelope are separated, and a window opening is punched in one of the wall portions. A transparent window pane is located in the interior of the preformed envelope between the separated wall portions by a flexible carrier web and is removed from the carrier web within the interior of the envelope by passing the carrier web over a guide plate which abruptly changes the direction of travel of the carrier web. the window pane is removed from the carrier web and affixed to the interior surface of the one wall portion as the envelope is removed from the punching dies. The window panes are adhesively secured to the carrier web in longitudinally spaced apart relation, and the carrier web is fed into and out of the envelope in a direction substantially parallel to the wall of the envelope to which the window pane is to be affixed.

2 Claims, 4 Drawing Figures



2 Sheets-Sheet 1

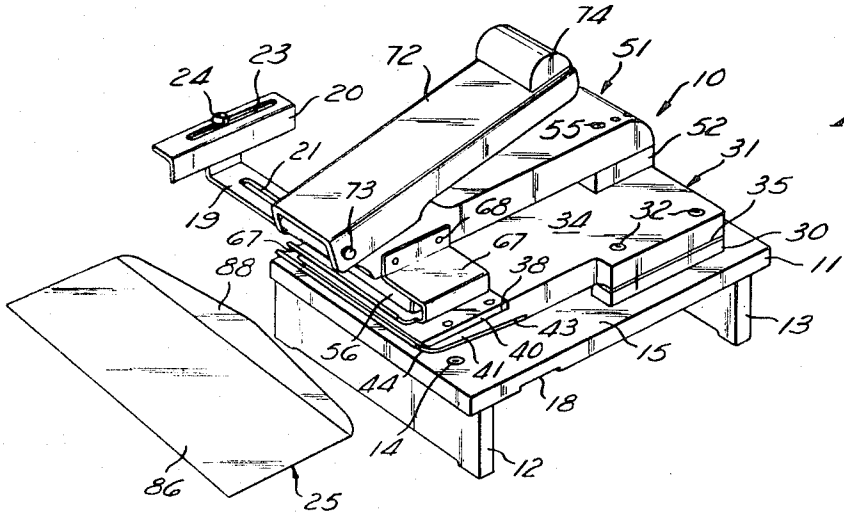


Fig. 1

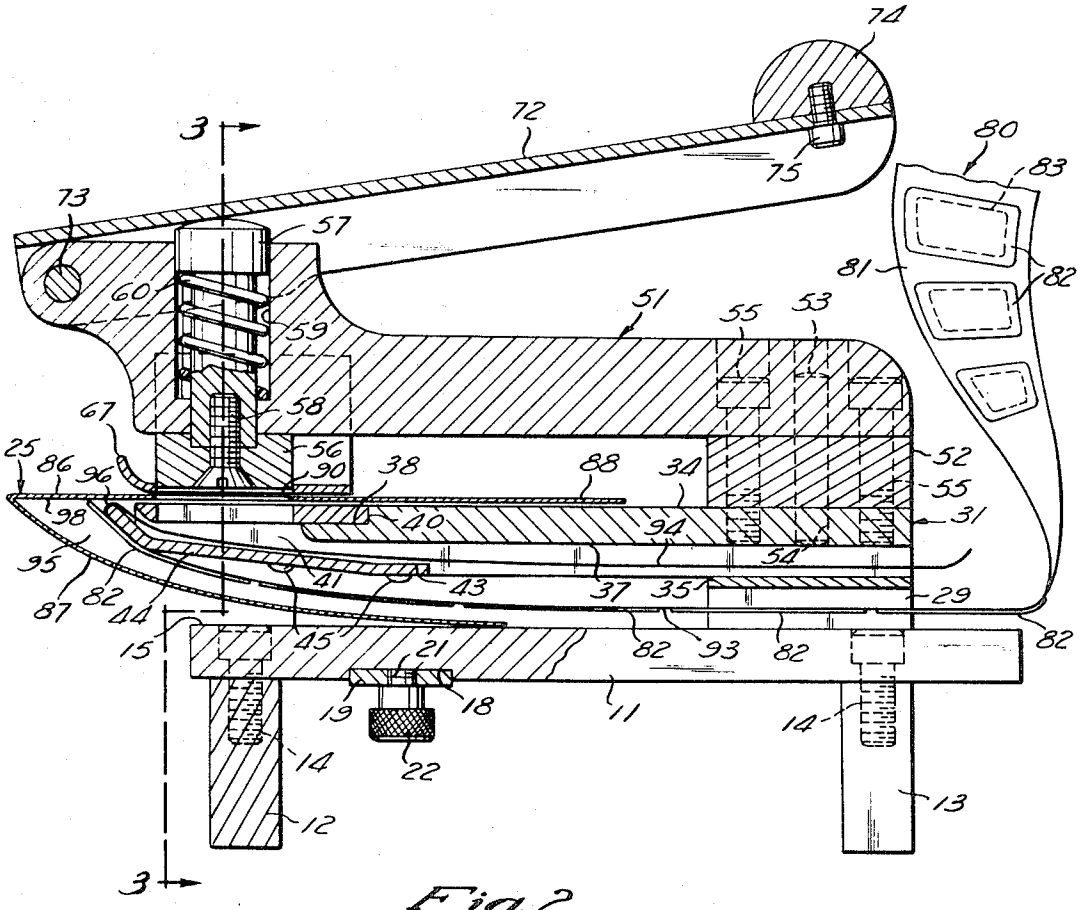
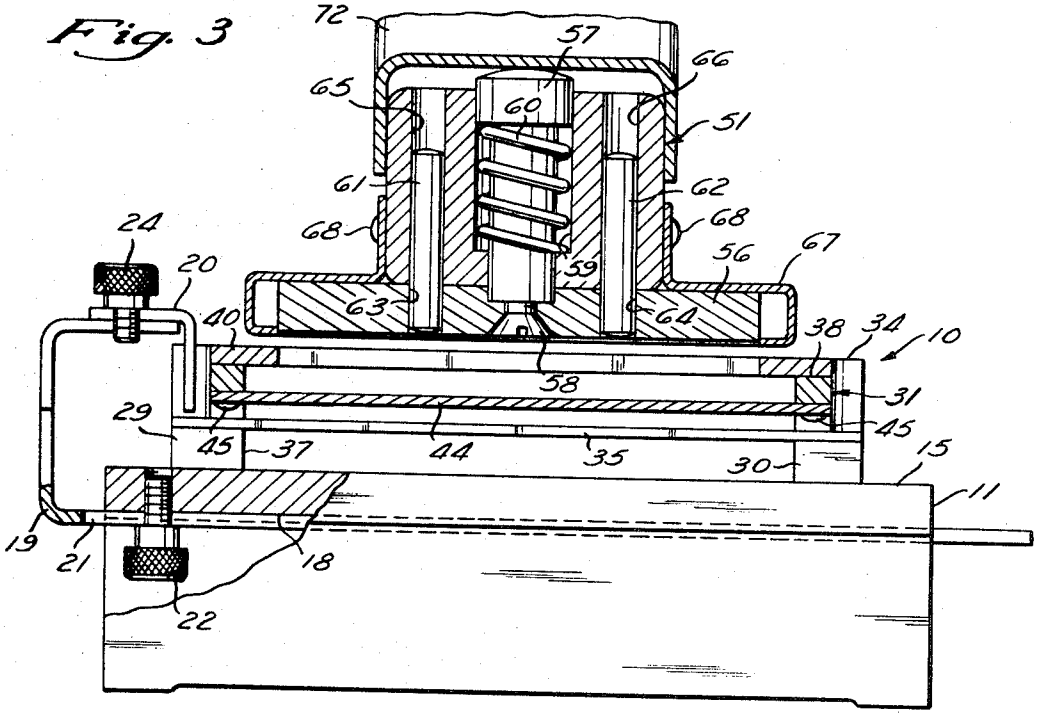


Fig. 2

Fig. 3


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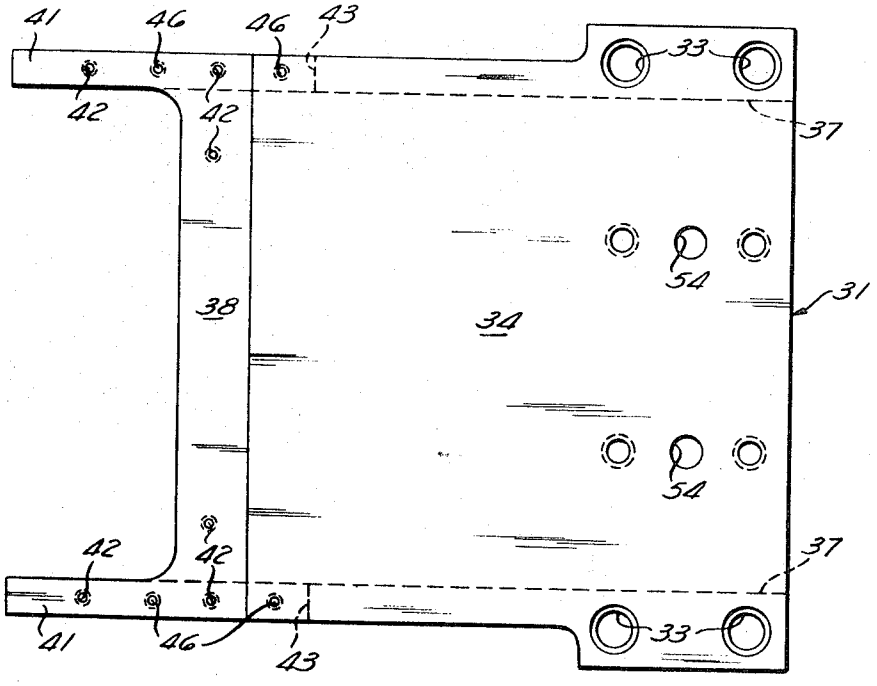

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Fig. 4

ENVELOPE WINDOW PUNCH

CROSS-REFERENCE TO RELATED APPLICATION

This application is a division of application Ser. No. 864,675, filed Oct. 8, 1969, now U.S. Pat. No. 3,682,745.

BACKGROUND OF THE INVENTION

This invention relates generally to an apparatus for producing window envelopes, and more particularly to an apparatus for producing window envelopes from preformed windowless envelopes.

Window envelopes are commonly produced by automated machines which cut a window opening in an envelope blank prior to folding the envelope blank to form an envelope. A window pane is cut from a sheet of pane material, carried to the envelope blank window opening, and affixed thereabout to provide a substantially transparent closure for the window opening. The envelope blank is then folded to complete the formation of the window envelope.

Because such prior art machines require forming the window opening and affixing the window pane prior to complete formation of the envelope, it is presently necessary for consumers to stock both window envelopes and windowless envelopes of various sizes and types, even if the use of window envelopes is rather infrequent. Furthermore, it may be necessary to stock each type and size window envelope with the window located in various positions on the front face of the envelope.

SUMMARY OF THE INVENTION

The present invention overcomes these and other disadvantages of prior art machines for producing window envelopes by providing apparatus for producing window envelopes from preformed windowless envelopes. In this manner, the invention permits consumers to stock only preformed windowless envelopes, and obviates the necessity of stocking a variety of window envelopes, particularly when such window envelopes are used rather infrequently.

According to the invention, a device is provided for forming a window opening in a preformed windowless envelope. According to the invention, the opposed walls of a preformed windowless envelope are separated and a window opening is formed in one of the walls. In a specific embodiment, a punching die is interspaced between the opposed walls to form the opening, and the opening may be formed at any desired location in the wall.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other aspects and advantages of the invention will become more readily apparent to those skilled in the art upon a full understanding of the preferred embodiment of the invention described in detail hereinafter and shown in the accompanying drawings, wherein:

FIG. 1 is a perspective view of a window envelope machine incorporating the principles of the invention, showing a preformed windowless envelope about to be positioned in the machine;

FIG. 2 is a cross-sectional, side elevational view of the machine shown in FIG. 1, with the preformed envelope positioned therein and a window opening formed in the envelope;

FIG. 3 is a cross-sectional view taken along reference view line 3—3 in FIG. 2; and

FIG. 4 is a plan view of the lower die fixture of the machine shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in greater detail, a manually operated window envelope machine 10 is shown which includes a base plate 11 supported by legs 12 and 13. The base plate 11 and the legs 12 and 13 are fabricated from suitable cold rolled steel stock in the illustrated embodiment, and the legs 12 and 13 are each secured to the base 11 by two hexagonal socket head cap screws 14 suitably recessed in the base plate 11 to provide the base plate 11 with a smooth uninterrupted top surface 15. A recess 18 extends laterally across the lower surface of the base plate 11 and slidably receives a support bracket 19 which carries an envelope guide bar 20. An elongated opening 21 extends substantially the entire length of the support bracket 19 and receives a knurled locking screw 22 which is received by a threaded hole (not shown) in the base plate 11 to lock the support bracket 19 in the desired lateral position with respect to the base plate 11. In a similar manner, an elongated opening 23 extends substantially the entire length of the envelope guide bar 20 to permit longitudinal movement of the guide bar 20 with respect to the support bracket 19 and the base plate 11. The elongated opening 23 receives a knurled screw 24 which is threadably received by a threaded hole (not shown) in the support bracket 19 to lock the guide bar 20 in the desired longitudinal position with respect to the base plate 11. The envelope guide bar 20 laterally positions an envelope such as the envelope 25 with respect to the machine 10 in a manner more fully described hereinafter.

Two laterally spaced spacer bars 29 and 30 support a lower die fixture 31 on the base plate 11. Two hexagonal socket cap screws 32 extend through holes 33 in the lower die fixture 31 and through suitable holes in each spacer bar 29 and 30, and are threadably received by threaded holes in the base plate 11 for mounting purposes. Each of these holes 33 is counterbored, and the cap screws 32 are recessed in the counterbores to provide the lower die fixture 31 with a smooth substantially uninterrupted upper surface 34. A separator bar 35 is interposed between the spacer bars 29, 30 and the lower die fixture 31 and extends laterally between the spacer bars 29 and 30 for reasons that will become more readily apparent hereinafter.

The lower die fixture 31 is machined from suitable cold rolled steel stock in the illustrated embodiment. The entire central portion of the lower surface of the lower die fixture 31 is machined to form a recess or groove 37 extending substantially the entire length of the lower die fixture 31. As viewed in FIGS. 2 and 4, the left end of the lower die fixture 31 is provided with a machined recess 38 extending laterally thereacross which receives and supports one end of a lower punching die 40. A portion of the lower die fixture 31 immediately beneath the lower punching die 40 is cut out to permit punchings to fall therethrough in a manner that will become more readily apparent hereinafter. The left and right sides of the die 40 are supported by forwardly extending side portions 41 of the fixture 31. The die 40 is secured to the lower die fixture 31 by countersunk

flat head machine screws (not shown) which extend through suitable holes in the punching die **40** and are threadably received by threaded holes **42** in the die fixture **31**, so that the die **40** may easily be replaced when it becomes worn or when it is desired to punch a different size or shape opening. The lower surface of each forwardly extending side portion **41** is provided with a machined recess **43** (FIG. **2**) for receiving a web guide plate **44**. The web guide plate **44** is secured to each side portion **41** of the lower die fixture **31** by round machine head screws **45** which extend through the plate **44** and are threadably received by threaded holes **46** in the side portions **41** of the fixture **31**.

An upper die fixture **51** is secured to the lower die fixture **31** and spaced therefrom by a spacer plate **52**. Two locating pins **53** extend through alignment holes in the upper die fixture **51**, through the spacer plate **52**, and into alignment holes **54** in the lower fixture **31** to properly align the upper fixture **51** with respect to the lower fixture **31**. Four hexagonal socket head cap screws **55**, only two of which may be seen in FIG. **2**, secure the upper die fixture **51** to the lower die fixture **31**. An upper punching die **56** is secured to an actuating plunger **57** (FIG. **3**) by flat head cap screw **58**, and the die **56** may also be easily replaced when the actuating plunger **57** is slidably received by a stepped bore **59** in the upper die fixture **51**, and a coil spring **60** acts against a head portion of the plunger **57** to bias the plunger **57** and the upper punching die **56** toward an upper or retracted position. Two guide pins **61** and **62** are press fit in bores **63** and **64**, respectively, in the punching die **56** and are slidably received in bores **65** and **66**, respectively, in the upper die fixture **51**. A stamped guard plate **67** is secured to the upper die fixture **51** by machine screws **68** to guide the wall of the envelope that is to be punched and to provide a safety guard for the operator of the machine in a manner that will become readily apparent hereinafter. A stamped actuating lever **72** is pivotally secured to the upper die fixture **51** by the pivot pin **73** so that downward movement of the actuating lever **72** displaces the plunger **57** and the upper punching die **56** from their upper spring biased position. A semicircular handle **74** is secured to the actuating lever **72** by socket head cap screws **75** for the convenience of the operator.

As seen in FIG. **2**, the window envelope machine **10** is further provided with a flexible web product **80** which includes a continuous flexible carrier web **81** and a plurality of pre-cut transparent window panes **82** adhesively mounted thereon in longitudinally spaced apart relation. The carrier web **81** is provided with a suitable release coating, and the window panes **82** are preferably of glassine, although other suitable materials such as cellophane could also be used. Each window pane **82** is provided with a suitable pressure sensitive adhesive coating **83** about its outer peripheral portion securing it to the carrier web **81**.

The preformed windowless envelope **25** shown in FIG. **1** includes a front wall portion **86**, a rear wall portion **87**, and a sealing flap portion **88**. The envelope **25** is preformed so that the front wall portion **86** is connected to the rear wall portion **87**, such as by folding or gluing, along three sides, and the fourth side is arranged to be closed by the flap portion **88**. To form a window opening in the front wall portion **86** and to affix a transparent window pane over the window opening, the preformed envelope **25** is inserted in the window envelope machine **10** in the manner illustrated in FIG. **2**. The front wall portion **86** of the envelope is separated from the rear wall portion **87** by the lower punching die **40** and is positioned between the lower punching die **40** and the upper punching die **56**. The lateral position of the envelope **25** with respect to the punching dies **40** and **56** is determined by the envelope guide bar **20**, so that the window opening and pane can be located wherever desired on the front wall portion **86**. If desired, an adjustable stop means could also be provided to position the envelope **25** longitudinally with respect to the machine **10**.

When the envelope **25** has been properly positioned on the window envelope machine **10** with its front and rear wall portions separated, the handle **74** is manually pressed downwardly so that the actuating lever **72** forces the actuating plunger **57** downwardly against the bias of the coil spring **60**. This forces the upper punching die **56** downwardly to cooperate with the lower punching die **40** to punch a window opening **90** in the envelope **25**. In this manner, the invention forms a window opening in any desired location in one wall of a preformed windowless envelope.

A lower reach **93** of the flexible web product **80** is fed into the window envelope machine with the panes **82** facing downwardly, and an upper reach **94** is fed from the machine **10** with the panes removed therefrom. To minimize the separation of the front wall portion **86** from the rear wall portion **87** to preclude wrinkling or tearing of the envelope **25**, the forward and rearward reaches **93** and **94** are fed into and out of the envelope **25** in a direction substantially parallel to the front wall portion **86** of the envelope. The reaches **93** and **94** of the carrier web **81** are tensioned slightly in any suitable manner, and the direction of travel of the lower reach **93** within the interior of the envelope between the wall portions **86** and **87** is defined by the web guide plate **44**. The guide plate **44** includes an upwardly turned end portion **95** which directs the web product **80** toward the front wall portion **86** to carry a window pane **82** thereto. As the web product **80** with a pane **82** secured thereto approaches the front wall portion **86** of the envelope **25**, the direction of travel of the carrier web **81** is abruptly changed by passage over the rounded end portion **96** of the guide plate **44**. The carrier web **81** is of a somewhat more flexible material than the window panes **82**, so that the abrupt directional change of the carrier web **81** separates the window panes **82** therefrom and the window panes **82** continue in the direction defined by the end portion **95** of the guide plate **44** while the carrier web **81** is fed out of the machine. In this manner, the invention provides apparatus for locating a window pane within the interior of a preformed envelope by a flexible carrier web, removing the pane from the carrier web within the interior of the envelope, and affixing the pane to the interior portion of one wall of the envelope.

After the window opening **90** has been punched in the front wall portion **86** of the envelope **25** in the manner described above, the punching falls on the top surface of the upper reach **94**, and the envelope **25** is manually displaced to the left as viewed in FIG. **2** to remove it from the punching dies of the window envelope machine **10**. As the envelope **25** is being so moved to the left, the flexible web product **80** is simultaneously manually advanced to move the upper reach **94** to the right to carry the punching out of the machine **10** and to

move the lower reach **93** to the left as viewed in FIG. **2.** The speed of movement of the carrier web **81** and of the front wall portion **86** relative to the fixture **31** are substantially equal, so that the window pane **82** is smoothly applied to the interior surface **98** of the front wall portion **86** to provide a transparent closure for the window opening **90.** The pane **82** is positioned on the interior surface **98** of the front wall portion **86** in such a manner that the ahdesive **83** extends around the window opening **90** without being exposed through the window opening. In this manner, the invention provides a method and apparatus for producing a window envelope from a preformed windowless envelope in which the window opening is formed and the window pane is affixed in a single continuous operation. After the envelope **25** is removed from the machine **10** with a window opening formed therein and a window pane affixed thereon, a subsequent window pane is in position for being affixed to a subsequent envelope.

Although a preferred embodiment of the invention has been shown and described in detail, various modifications, rearrangements and additions may be made without departing from the scope of the invention. For example, although a manually operated window envelope machine has been shown incorporating the invention, the principles of the invention can also be applied to apparatus in which the feeds of the envelope and of the flexible web product are determined by suitable web conveyors actuated by manual operation of an actuating lever which also controls movement of the punching dies. Furthermore, the principles of the invention can also be applied to a fully automatic window envelope machine for producing window envelopes from preformed windowless envelopes.

What is claimed is:

1. A machine for forming window openings in a finished envelope, said finished envelope having a front face joined at three edges to a back face so that the front and back faces define an envelope pocket, said machine including a base, a lower die fixture having a smooth upper guide surface and a lower guide surface, attachment means positively securing one end of said lower die fixture in vertically spaced relation to said base whereby the other end of said lower die fixture is spaced vertically above said base and an unobstructed opening is defined between said lower guide surface and said base, said lower die fixture being generally flat and being received within said envelope pocket, said finished envelope front face being guided along said upper guide surface and said finished enveloped back face being received in said unobstructed opening between said lower guide surface and said base whereby said lower die fixture maintains said front and back faces in a separated condition, first cutting die means on said lower die fixture upper guide surface received within said envelope pocket, an upper die fixture associated with and spaced above said lower die fixture whereby said envelope front face is interposed between said upper die fixture and said lower die fixture, and second cutting die means on said upper die fixture for cooperating with said first cutting die means in said envelope pocket to cut a window opening in said front face.

2. A machine according to claim **1** wherein a front portion of said lower guide surface converges upwardly to said upper guide surface to aid in separating the front and back faces of said envelope.

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