Sept. 28, 1954

J. HALAHAN ET AL

2,690,102

WINDOW ENVELOPE MACHINE

Filed April 12, 1950

3 Sheets-Sheet 1

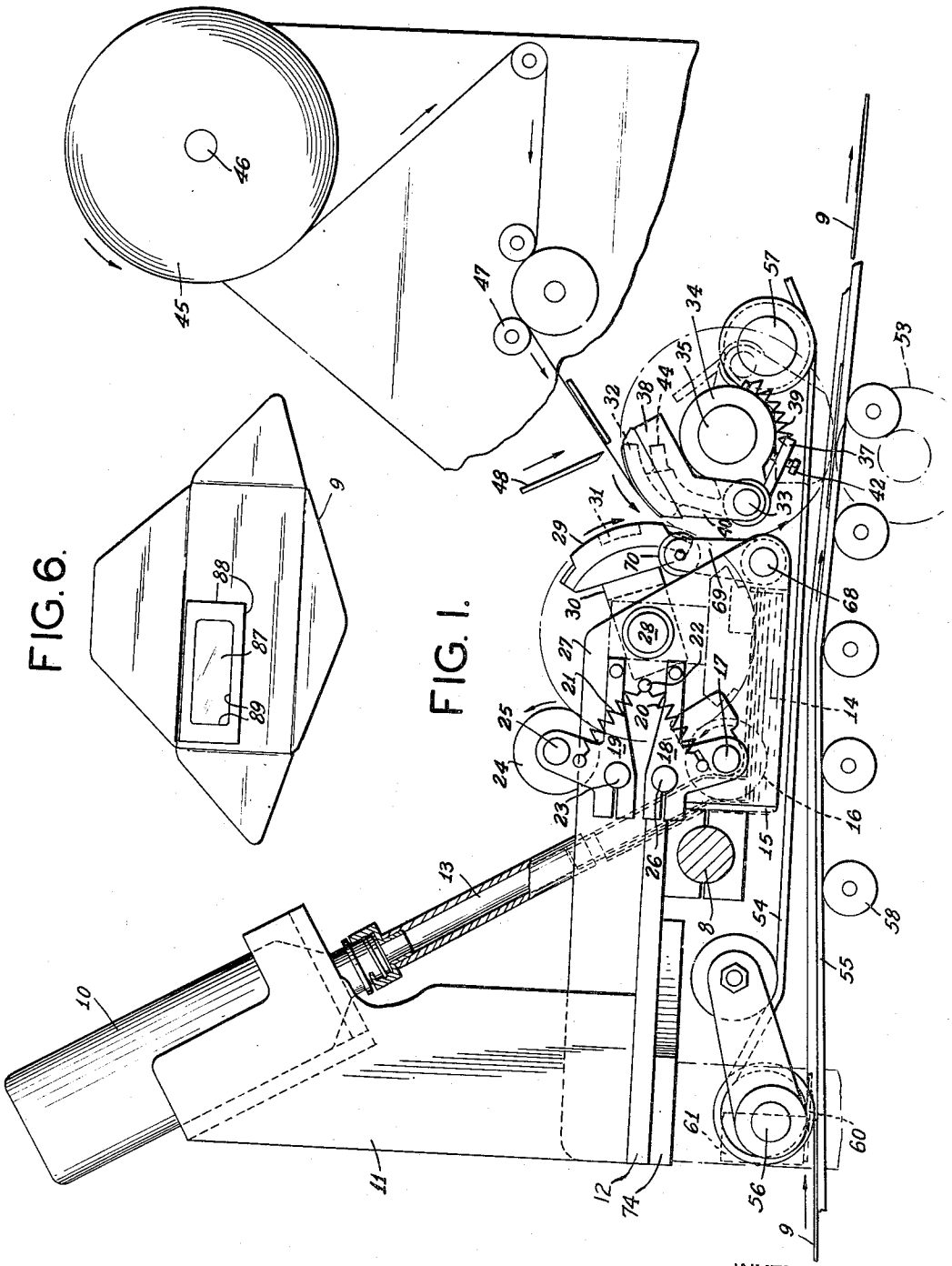


FIG. 1.

FIG. 6.

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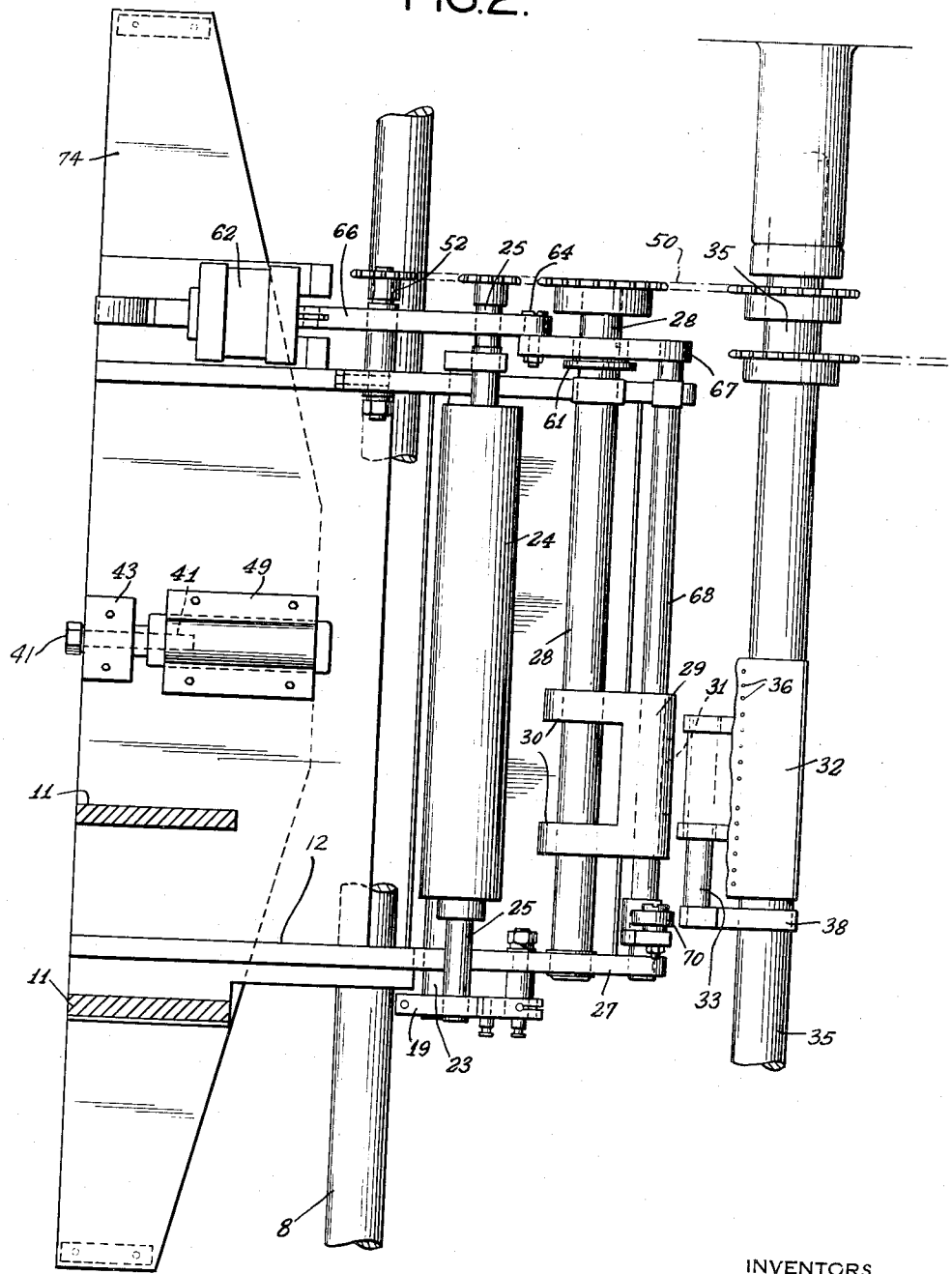
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FIG.2.



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WINDOW ENVELOPE MACHINE

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FIG. 3.

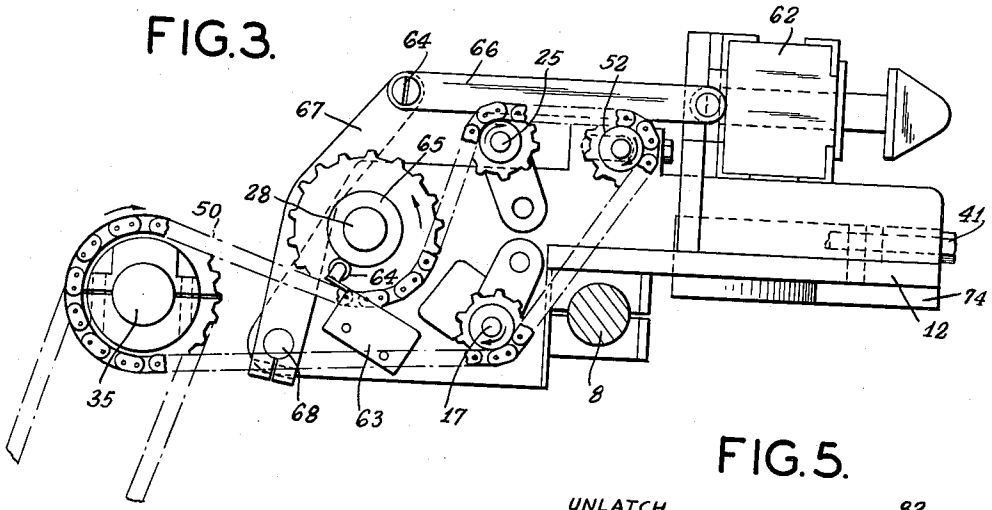
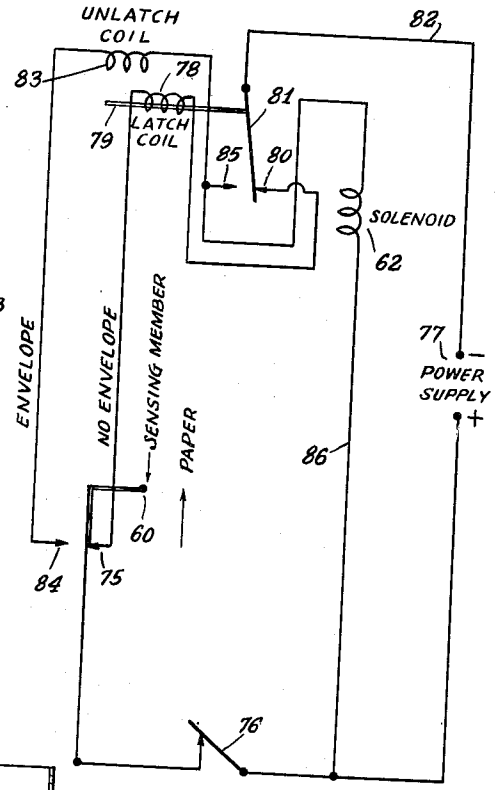


FIG. 5.



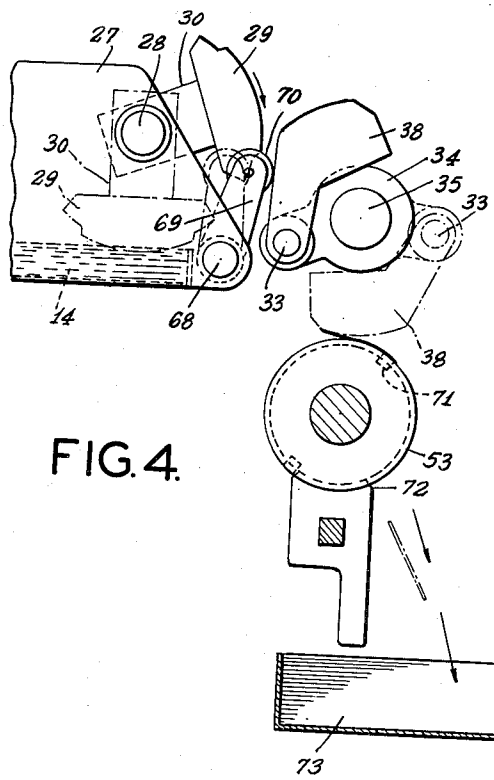


FIG. 4.

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2,690,102

WINDOW ENVELOPE MACHINE

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Application April 12, 1950, Serial No. 155,473

4 Claims. (Cl. 93—61)

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This invention has to do with envelope making and more particularly with window envelopes.

Window envelopes are generally of two types. In one type, the window for viewing the address is formed by oiling, or otherwise treating a portion of the opaque envelope to make it translucent or transparent. According to another and more widely used method, a portion corresponding to the window is cut out of the envelope blank and a patch of transparent material, such as glassine or the like, is stuck over the cut-out portion.

According to the last mentioned method, moist glue is applied around the edges of the cut-out portion of the blank to a point short of where the edges of the glassine patch will extend. It has been found necessary to do this because if the moist glue is permitted to extend up to the point where the edges of the patch contact the envelope blank, excess glue will be squeezed out when the patch is pressed against the blank. This excess glue may cause portions of the envelope to stick to one another as well as to succeeding envelopes in the machine.

It has also been found that in envelopes manufactured with the glue set back from the edges of the patch, there is a tendency for these free edges of the glassine to protrude from the body of the envelope and foul matter being inserted into the envelope. This was a serious problem, particularly when automatic insertion equipment was utilized.

In order to overcome these difficulties, it has been proposed to employ thermoplastic adhesives and heat seal the edges of the glassine patch to the cut-out portion of the envelope blank. However, such process requires expensive equipment and slows down the operation of envelope making machines.

According to the present invention, high speed envelope making machines are operated at their standard speed and window patches are fastened over the cut-out portion of an envelope so that the entire contacting surfaces of the patch and envelope adhere uniformly to each other without any loose peripheral edges. No heat is employed in sealing the one to the other.

The mechanism that is the subject of this invention may conveniently be provided in the form of an attachment to a standard window envelope machine, and it is in this connection that it will be described, only so much of the existing machinery being shown as is necessary to understand the invention.

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According to the invention a highly volatile liquid solvent is applied by a moistening roller to the absorbent surface of a rotating shoe from which the excess moisture is removed by another roller. The shoe then contacts a window patch carried on an applicator. The side of the patch contacted is normally dry but becomes tacky by the action of the solvent. The moistened patch is then applied over the cut-out in an envelope to complete the window forming operation. From there on the blank may be moved on through the existing machinery to be formed into a completed envelope or be subjected to any other desired operation.

According to a feature of the invention the portions of the patch made tacky by the solvent correspond throughout to those portions that will be pressed against the envelope blank, thereby insuring that the patch and envelope throughout their contacting surfaces stick to one another with no loose peripheral edges.

According to another feature of the invention, a sensing device is operated in conjunction therewith and if for any reason there is a misfeed of envelope blanks into the machine, a member is operated to prevent moistening of a patch on the applicator.

These and other features of the invention will be described in detail in connection with the following drawings, in which:

Fig. 1 is a side elevation partly in section of the device;

Fig. 2 is a top plan view of the device partly in section;

Fig. 3 is a side elevation of a part of the device opposite from that seen in Fig. 1;

Fig. 4 is a schematic view showing the operation of the mechanism for preventing the moistening shoe from contacting the patch applicator;

Fig. 5 is a diagram of the electrical circuit to control the mechanism shown in Fig. 4; and

Fig. 6 is a plan view of a window envelope blank with a patch sealed thereto.

As can best be seen in Fig. 1, a bottle or other container 10 is suitably supported by a bracket 11 upstanding from a sliding plate 12. By means of conduit 13, liquid 14 from bottle 10 is maintained at a predetermined level in a reservoir 15. The liquid used is preferably a highly volatile solvent, such as acetone, alcohol, toluene, etc.

A knurled moistening roller 16, mounted on a rotating shaft 17 in side support 18, is partially immersed in liquid 14 in reservoir 15. Above roller 16 a squeeze roller 24 on a rotating shaft

25 rests in a side support 19. Forward of rollers 16 and 24 and extending from a support 27, a rotating shaft 28 supports a shoe 29 connected to the shaft by arms 30 (Fig. 2). The face of shoe 29 is of liquid absorbent material, such as felt, and has a cut-out portion 31 corresponding to the cut-out portion in an envelope blank 9.

The face of shoe 29 surrounding cut-out portion 31 has substantially the same dimensions as the frame of a window patch in the finished envelope. As employed in this description and claims, the portions of the window patch that are stuck around the cut-off portion in the envelope will be designated as the frame. While rectangularly shaped frames are here disclosed, it should be kept in mind that if the window patch is oblong the frame will be oblong and if a circular patch, the frame will be circular, etc.

Usually, the face of shoe 29 will carry a layer of liquid substantially coextensive with the frame of a patch. In some cases, it may be found desirable to have the area of the shoe face slightly larger than the frame of the patch so as to be certain that every portion of the patch that is ultimately to come in contact with the body of the envelope will be made tacky. The tacky portions of the patch that are not utilized dry so rapidly that they do not interfere in any way with the manufacture of the envelope. In the prior machines using wet adhesives it was important, as previously pointed out, that a portion less than the frame of the patch be moistened because if the adhesive leaked past the edges of the patch, the envelopes stuck to one another.

While, as here disclosed, shoe 29 is moistened by roller 16 and the moistened shoe contacts a patch, other means, such as separate rollers, could be used to apply liquid to the shoe or patch.

If cut-out portion 31 in shoe 29 were eliminated, one whole side of the patch would be moistened. While this process would produce satisfactory window envelopes, it would be wasteful of solvent as well as necessitate slowing down somewhat the operation of the machine in order to permit the relatively large expanse of the window made tacky, but not utilized, to dry.

Side supports 18 and 19 are movable about pivots 23 and 26. To maintain suitable resilient contact between shoe 29 and rollers 16 and 24, springs 20 and 21, extending from a common stud 22 on support 27, are respectively connected to side supports 18, 19.

A shaft 33 supports a patch applicator 32 connected to the shaft by a support 40. A clamp arm 34 extending from shaft 35 is pivotally connected to shaft 33. The face of applicator 32 has a plurality of air holes 36 (Fig. 2) along one edge, whereby suction can be provided through connection 44 for holding a patch to the applicator in the well-known manner. Applicator support 40 is resiliently held by a depending arm 37 and a spring 39. A stop screw 42 threaded in the arm 37 limits the angular movement of the applicator. A bracket arm 38 is mounted adjacent applicator 32 and fastened to shaft 33. The bracket operates as one with applicator support 40 and its function will be later described in connection with the misfeed cycle.

A supply of material suitable for making windows, such as a roll of glassine paper 45, is supported on shaft 46. Almost any transparent paper having sufficient strength will serve as the window material. By transparent is here and in the claims meant to include any degree of translucency which permits the address to be easily read. One side of glassine 45 has been previously treated to have a normally dry waterproof adhesive coating, such as shellac. It is not necessary to have a coating on the window material as long as it is chemically constituted that the application of a volatile solvent to its surface will make it temporarily tacky. One such material is ethyl cellulose in which toluene was used as the solvent. Feed roll mechanism 47 feeds the end of glassine 45 towards applicator 32. A patch removing means, e. g. a knife 48 is intermittently operated to sever a patch of glassine of the proper dimensions which is held by suction with the adhesive side out on applicator 32. The feeding, cutting and applying of a patch are all done in a manner well known to those experienced in the art.

The device is driven from the existing machinery by means of a sprocket chain 50 mounted on one end of main drive shaft 35. As seen in Fig. 3, chain 50 engages sprocket wheels mounted on the ends of shafts 17, 25 and 28 to drive rollers 16, 24 and shoe 29. While rollers 16 and 24 are shown as being driven, it would be possible to eliminate the drive for either or both of them and permit them merely to rotate freely when contacted by shoe 29. Since the relative position of the shoe and rollers is adjustable, an adjustable idler wheel 52 is included to maintain suitable tautness in chain 50.

Belts 54 and 55 carry envelope blanks 9 into the device in the direction of the arrow, Fig. 1. The belts are driven in the well-known manner by wheels 56, 57 and run over a series of idlers 58 and a pressure roller 53.

By means of a slidable frame 12 disposed on bed plate 14 and bar 8 the distance between the respective axial centers of the moistening shoe 29 and patch applicator 32 may be adjusted. One end of a screw bolt 41 extends through a clearance opening in a boss 43 fastened to the frame 12 with its free end portion threaded in a suitable nut 49 fastened to bed plate 14. By turning screw 41, it will be seen that frame 12 will be moved relative to plate 14 to compensate for any reduction in the thickness of the felt facing on the shoe due to its repeated intimate engagement with the patch applicator.

A normal cycle of operation is as follows:

A plurality of envelope blanks 9 having cut-out portions are carried in a line one after the other by belts 54, 55. As the blanks enter the device they encounter a sensing member 60 of micro-switch 61. Switch 61 is actuated as long as member 60 can detect the presence of an envelope blank on its way into the machine.

As shoe 29 is rotated, it is moistened by contacting the surface of roller 16 and excess solvent is removed from the face of shoe 29 by squeeze roller 24. Meanwhile applicator 32 has picked up a patch, normally dry adhesive side facing out, whose frame is moistened by contacting shoe 29. The solvent renders the normally dry adhesive side tacky and the patch is immediately pressed around the border of the cut-out portion of an envelope blank which, at that moment, is positioned on pressure roller 53 beneath applicator 32 (dotted line position of applicator, Fig. 1). The frame of the patch is stuck to the envelope without leaving any free edges. If any portions of the patch have been made tacky and are not stuck to the envelope, these portions return to their normally dry state, as the solvent evaporates almost immediately.

In the case of a misfeed (no envelope blanks)

member 60, not being able to detect the presence of an envelope blank, operates switch 61 which is in circuit with a solenoid 62 and another micro-switch 63 (Fig. 3). Switch 63 is operated by cam follower 64 and cam 65 mounted on shaft 28. Cam 65 is timed with respect to applicator 32 so that switch 63 is operated just after the applicator has pressed a patch against an envelope blank and has started around on a new cycle.

There is connected to solenoid 62 a linkage mechanism comprising arms 66, 67 and a rod 68 attached to one end of arm 67 which extends through to the other side of the machine as seen in Fig. 1. A lever arm 69 is connected to the other end of rod 68 and has a member suitable for contacting bracket 38 such as roller 70. When the circuit is closed and the solenoid energized, arm 69 is moved into the position shown in solid lines, Fig. 4, by means of the linkage mechanism and in this position, roller 70 separates shoe 29 from applicator 32 by engaging bracket 38 (which revolves as one with applicator 32). Applicator 32 is resiliently mounted on support 40 so that roller 70 pushes it back preventing a patch carried on the applicator from being moistened by shoe 29. The dry patch on the applicator is carried down to the lower position, shown in dotted lines, Fig. 4, where it is picked up by pressure roller 53 which has suction applied to its surface by means of holes 71. The use of suction in applicator 32 and roller 53 is well known, the suction in the applicator being momentarily shut off as the applicator meets the pressure roller. This is also true in the normal cycle of operation. The dry patch is carried around on pressure roller 53 until it is engaged by a scraping mechanism 72 which cooperates with the surface of roller 53 to remove the patch therefrom permitting it to drop into a waste box 73.

Referring to Fig. 5, the electrical circuit controlling the operation of roller 70 in case of a misfeed will be explained.

Sensing member 60, not encountering an envelope blank, closes contact 75 of micro-switch 61. Contact 76 of micro-switch 63 is momentarily closed by cam 65 just as applicator 32 leaves its patch applying position. The feeding of envelope blanks past the sensing member is also timed to take place with the closing of contact 76. A latch circuit is closed from source of power 77, contact 76, contact 75, latch coil 78, contact 80, armature 81 and conductor 82 back to the power supply. Mechanical latch 79 is thereupon operated to close contact 85 and the solenoid circuit is energized, source of power 77, conductor 86, solenoid 62, contact 85, armature 81, conductor 82. The subsequent opening of contact 76 does not affect the operation of the mechanical latch since it can only be unlocked by the energization of unlatch coil 83.

In the normal cycle of operation with an envelope blank contacting member 60, contact 84 is closed and contact 76 is momentarily closed as previously described. Unlatch coil 83 is energized over a circuit which includes contact 76, contact 84, coil 83, contact 85, armature 81 and conductor 82 to source of power 77. The energization of coil 83 releases mechanical latch 79 to close contact 80. The circuit for solenoid 62 is thereby opened and the solenoid deenergized.

Fig. 6 shows envelope blank 9 with a patch 87 applied thereto. It is to be noted that the frame of patch 87 is uniformly stuck to the body of the envelope blank surrounding the cut-out and in particular that peripheral edges 88 of the patch adhere to the blank, and edges 89 of the cut-out portion stick to the patch. Furthermore, there is no discoloration or disfigurement at the portions of the patch and blank contacting one another.

While a preferred embodiment of the invention has been disclosed, it is to be understood that modifications and changes will be suggested to those skilled in the art and it is intended to cover all such embodiments and to limit the invention only as defined in the appended claims.

What is claimed is:

1. In a machine for sealing the frame of a transparent patch around a cut-out portion in an envelope, a supply of patches having a coating of normally dry adhesive on one side, a supply of envelope blanks, a container for a volatile liquid solvent, a liquid reservoir, means connecting said container and reservoir to maintain the liquid in the reservoir at a predetermined level, a first rotatable roller in said reservoir, a second rotatable roller positioned above said first roller, a rotatable shoe having a liquid absorbent material on its face, the shape and area of said face corresponding to the frame of a patch, means for cyclically operating said shoe to contact the first roller and then the second roller to remove solvent therefrom, a resiliently mounted rotatable patch applicator adjacent the shoe, means for removing one patch at a time from the supply and depositing it on said applicator with the adhesive side out, means for cyclically operating the applicator whereby a patch on the applicator is contacted by the face of the shoe to have its frame made tacky by the solvent, a rotatable pressure roller beneath said applicator and in contacting relation therewith, and means for moving an envelope blank between said applicator and pressure roller whereby a patch is applied over the cut-out portion in the envelope blank.

2. The device according to claim 1, a pivotally mounted roller adjacent the shoe, a bracket rigidly connected to the applicator and positioned to be engaged by said last-mentioned roller, a sensing member cooperating with the envelope blank moving means to detect the presence or absence of envelopes, a switch controlled by said sensing member, a second switch operated each time the shoe makes a revolution, a solenoid, linkage connecting the solenoid to the pivotally mounted roller, a circuit including said two switches and the solenoid whereby when said first switch is operated by the failure of the sensing member to detect an envelope and when the second switch is operated the circuit is closed and the pivotally mounted roller engages the bracket to move the applicator clear of the shoe.

3. In a machine for affixing a window patch over a cut-out portion in an envelope blank, a supply of envelope blanks, a supply of window patches having a dry adhesive facing, a reservoir for a volatile liquid solvent, a rotatable shoe provided with a liquid absorbent facing and having an area at least equal to the area of each of said window patches, roller means for conveying solvent to the absorbent facing on said shoe, a yieldably mounted rotatable patch applicator, a rotatable roller beneath said applicator for cooperative engagement therewith, means for periodically depositing a window patch on said applicator, said shoe and applicator being cyclically coactable for applying solvent to the patch carried by said applicator, means for feeding an envelope blank between said applicator and said roller whereby said window patch is brought into ad-

hering contact with said envelope blank, means for biasing said patch applicator radially out of its normal path of rotation, and a sensing device correlated with said envelope feeding means for actuating said biasing means.

4. The device set forth in claim 3, and in which said biasing means operable by the sensing device comprises a switch controlled by said sensing device, a solenoid, linkage connecting the solenoid to the biasing means, a circuit including the switch and the solenoid whereby when the switch is operated the circuit is closed energizing the solenoid which operates the linkage to move the biasing means into the path of rotation of the patch applicator.

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