July 30, 1940. F. L. SMITHE ET AL 2,209,358

MANUFACTURE OF WINDOW ENVELOPES

Original Filed July 13, 1934 4 Sheets-Sheet 1

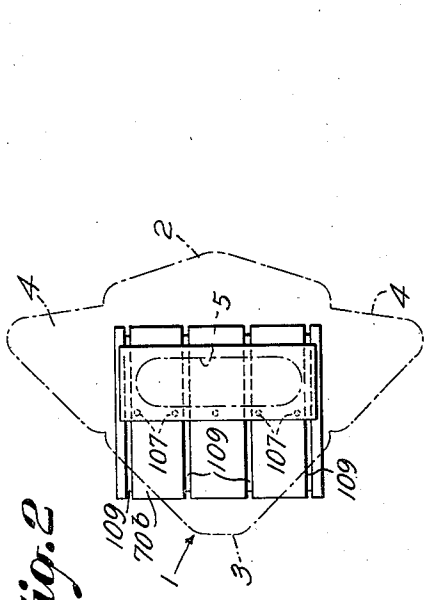


Fig. 2

Fig. 1

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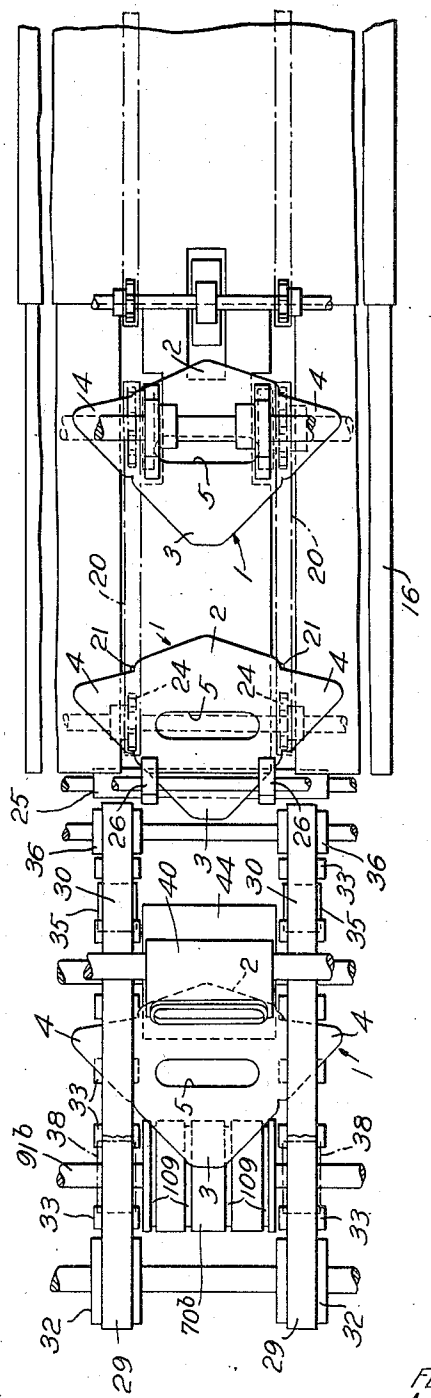
Attorneys

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Original Filed July 13, 1934 4 Sheets-Sheet 2

Fig. 5



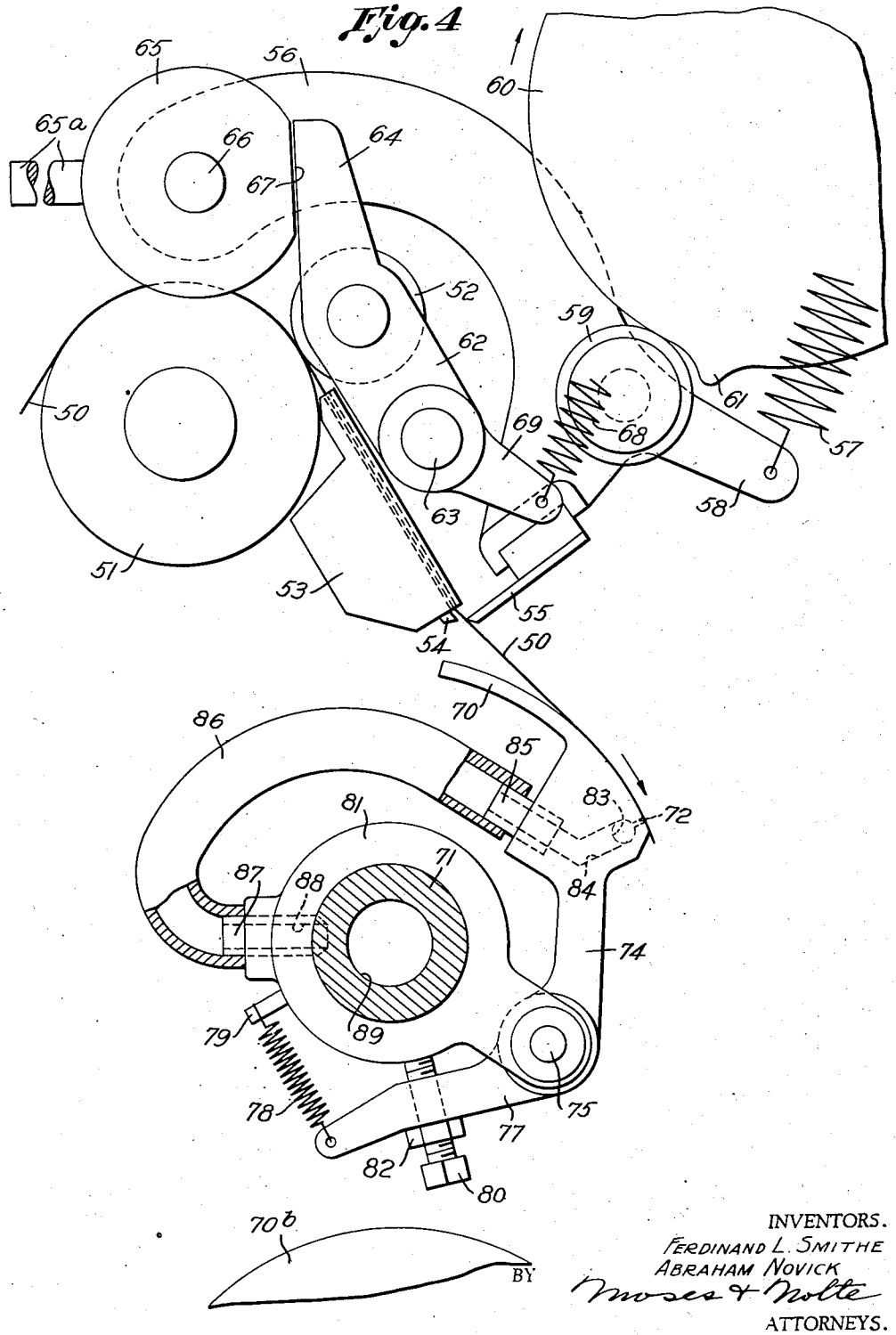
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MANUFACTURE OF WINDOW ENVELOPES

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Fig. 4



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MANUFACTURE OF WINDOW ENVELOPES

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Fig. 6

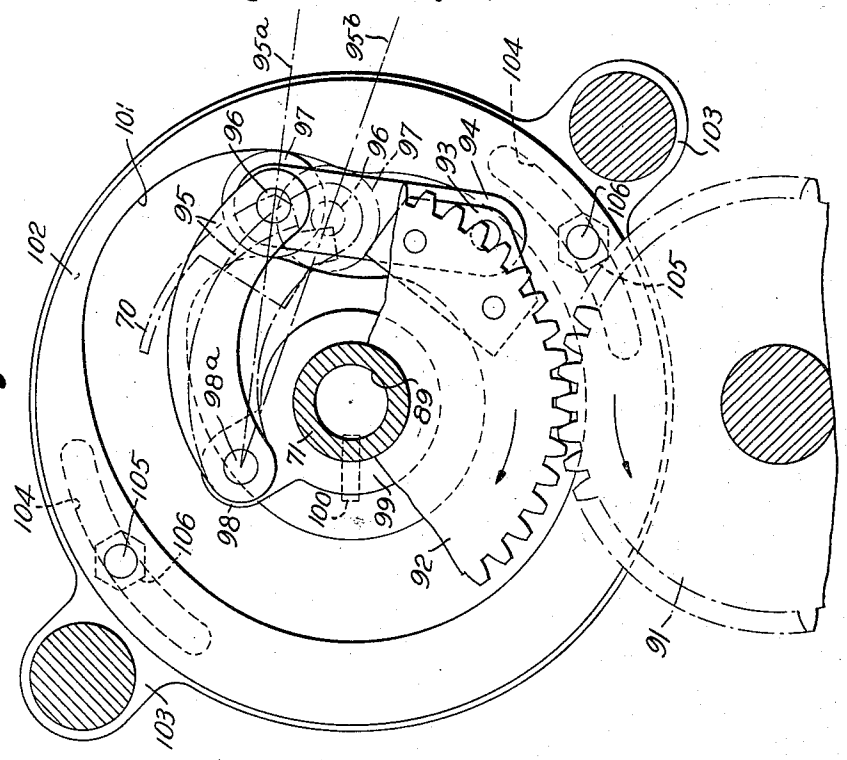
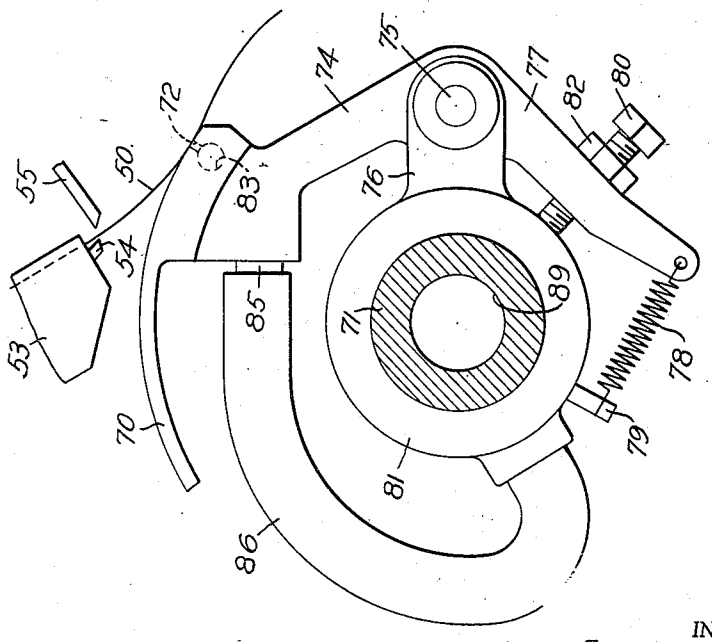


Fig. 5



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Patented July 30, 1940 2,209,358

UNITED STATES PATENT OFFICE

2,209,358

MANUFACTURE OF WINDOW ENVELOPES

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Original application July 13, 1934, Serial No. 734,978. Divided and this application April 26, 1935, Serial No. 18,402. Renewed April 20, 1940

19 Claims. (Cl. 93—61)

This invention relates to the manufacture of window envelopes and has to do with novel mechanism for feeding a window patch to an envelope blank and applying it thereto. The present application is a division of our pending application Serial No. 734,978 filed July 13, 1934, for Manufacture of window envelopes.

One feature of the invention involves provision of a rotary patch applying segment cooperative with a bed cylinder, together with means for yieldingly urging the segment away from its axis of rotation and means for limiting movement of the segment away from such axis.

Another feature of the invention has to do with means for driving the patch applying segment at variable speed.

Still another feature of the invention has to do with the application and control of patch holding suction to the patch applying segment.

A further feature of the invention has to do with the construction of the bed cylinder and associated parts to cause a patch delivered in the absence of an envelope blank to be carried away and disposed of in an orderly manner.

Other objects and advantages will hereinafter appear.

In the drawings forming part of this specification,

Figure 1 is a view in sectional elevation of a machine embodying features of the invention;

Figure 2 is a plan view of a bed cylinder which supports the blank during application of a patch thereto;

Figure 3 is a fragmentary plan view of the mechanism of Figure 1;

Figure 4 is a fragmentary detail view partly broken away illustrating the patch feeding, cutting and applying mechanism;

Figure 5 is a sectional view illustrating the patch transferring and applying segment at a different point in the cycle from that illustrated in Figure 4; and

Figure 6 is a view in sectional elevation illustrating mechanism for variably driving the patch transferring and applying segment.

The envelope blanks 1, each comprising a sealing flap 2 and a bottom flap 3, side flaps 4, and a body portion having a window opening 5 provided therein, are supplied to the machine in any suitable manner, and if envelopes for first class mail are to be produced the sealing flaps are first gummed and dried. If envelopes which do not require to be sealed are to be produced the gumming and drying steps are omitted. In either case the blanks are aligned and accurately timed just prior to the gumming of the window border and the application of a patch thereto.

The parts of the machine preceding this aligning and timing operation are not of importance in connection with the present invention and for that reason the operation will be described beginning with the feeding of the blanks in spaced out relation across a table 16 by means of pins 21 carried by chains 20 which travel in unison and which are adapted to engage in the angles of the blank formed at the junction of the sealing flaps with the side flaps.

The chains 20 travel at their discharge ends upon sprockets 24 and the table 16 terminates a little beyond these sprockets. A feed roller 25 and cooperating feed segments 26 which travel a little faster than the chains 20 act to pull the blanks away from the pins 21 and to feed them between opposed lower and upper conveyors 27 and 28. The conveyor 27 comprises a pair of laterally spaced belts 29 and the conveyor 28 comprises a pair of similarly spaced, opposed belts 30. The belts 29 run upon end rollers 31 and 32, upon a roller table between the end rollers consisting of a series of rollers 33, supported on stub shafts 33b, and upon idler rollers 34 and 35. The belts 30 run upon end rollers 36 and 37 and upon idler rollers 38 and 39. The rollers 33 of the roller table are supported on suitable plates, not shown, at their outer ends, and they are arranged with their axes disposed upon an arc of slight curvature so that the upper stretches of the belts 28 are slightly convex. This convexity of the lower belt contributes substantially to the secure gripping of the blanks between the belts since it causes the belts 30 to exert positive pressure against the belts 28 at all points between the end rollers 36 and 37.

The conveyors 27 and 28 carry the blanks in definitely timed relation past a gumming segment 40 which travels at a peripheral speed equal to the linear speed of the conveyors 27 and 28. Gum is applied to the segment 40 from a gum pot 41 by means of a gum take-up roller 42 which runs in the pot 41 and a gum transfer roller 43 which stands in contact with the roller 42 and tangent to the path of the gumming segment 40. The gumming segment 40 operates between the belts 30 to apply gum to the margins of the blank which border upon the window opening. Opposite the gumming segment 40 provision is made of a bed cylinder 44 which runs in a water receptacle 45. When a gap occurs in the normal sequence of blank delivery gum applied to the bed cylinder 44 is carried into the

water in the receptacle 45. A submerged scraper or brush 46 assists in wiping the gum from the face of the bed cylinder 44 and a further scraper 47 wipes the water from the bed cylinder as the cylinder emerges from the receptacle.

The gummed blank is also advanced by the conveyors 27 and 28 past a patch applying mechanism. This mechanism comprises a supply reel 49 from which a web 50 of transparent patch material is drawn by continuously operating feed rollers 51 and 52. The patch material is fed onto a table 53, the forward edge of which is provided with a shearing block 54 forming one element of a patch severing device. A blade 55 is adapted to co-act with the block 54 being carried by a rocking frame 56 which is normally held up by a spring 57 connected to an ear 58 of the rocking frame and to a fixed frame member (not shown). The rocking frame is provided with a roller 59 which serves as a cam follower for engaging the periphery of a rotating cam 60. The cam 60 is of generally circular contour but is provided with a hump 61 which acts upon the follower 59 to depress the rocking frame at the appropriate time in the cycle of operations to cause a patch to be severed. The roller 52 is journalled in a further rocking frame 62 carried by a rock shaft 63. One member of the frame 62 is provided with a tail portion 64 which engages a disc 65. The disc 65 is rotatably mounted upon a shaft 66. The disc 65 has a flat 67 against which the tail 64 normally rests and this permits the roller 52 normally to co-act with the roller 51. The disc 65 may be turned by means of a handle 65*a* to raise the tail 64 to lift the roller 52 out of engagement with the roller 51 to facilitate the insertion of a fresh patch web. A spring 68 connected to an arm 69 of the frame 62 and to a fixed part of the machine frame acts to urge the frame 62 counter-clockwise and hence to urge the roller 52 toward the roller 51.

The leading end of the web 50 which protrudes beyond the cutting block 54 extends into the path of a patch transferring and applying segment 70 which travels about a hollow shaft 71 and co-operates with a bed cylinder 70*b*. The segment 70 travels into supporting relation to the web and lifts it to the position illustrated in Fig. 5, where the patch web 50 is sucked against it while it is slack. The segment 70 then travels further dragging over the surface of the web to the position in Fig. 4 where the web is taut. In the position of Fig. 4 the cutting device is about to operate. At the instant of path severance the leading edge of the web stands between the leading edge of the cylindrical surface of the segment 70 and a row of suction passages 72 provided in the segment near the leading edge thereof. The segment 70 carries the severed patch around and co-acts with the bed cylinder 70*b* to press the patch in proper position against the gummed envelope blank.

The segment 70 is carried by a rocker arm 74 which is mounted upon a shaft 75 journalled in a crank 76 fast on the shaft 71. A tail portion 77 of the rocker arm 74 is drawn toward the axis of the shaft 71 by a spring 78 connected to such tail portion and to a pin 79 which travels with the shaft. The tendency of the spring 78 is to project the segment 70 outward away from the axis of the shaft 71. The outward limit of movement of the segment is controlled by an adjusting screw 80 which is threaded through the tail portion 77 and which engages a hub 81 of the crank 76. A lock nut 82 is provided for maintaining the screw 80 in adjusted position. With this arrangement the segment 70 is adapted to yield when it engages the envelope blank and hence to apply the patch with light but firm and substantially uniform pressure to the blank. The arrangement disclosed does not ordinarily require resetting for operating upon blanks of different thickness nor is it affected by any moderate amount of wear.

The suction is applied to the passages 72 through passages 83 and 84 formed in the segment 70 and the rocker arm 74. The passage 84 communicates through a nipple 85 with a flexible tube 86. The tube 86 in turn communicates through a nipple 87 with a radial passage 88 of the shaft 71. The passage 88 communicates through the axial passage 89 of the shaft 71 with a suitable source of suction. The flexible tube 86 turns with the shaft 71 and is adapted to yield to accommodate such movements of the segment 70 relative to the shaft 71 as occur in the normal operation of the machine and also such movements as may be produced by adjustment of the screw 80.

After the patch is applied to a blank the blank is delivered by the conveyors 27 and 28 to a subsequent conveyor 90 whereby it is delivered to the other instrumentalities for completing the manufacture of the blank into a finished envelope.

In Fig. 6 disclosure is made of mechanism for driving at variable speed the shaft 71 whereby the segment 70 is carried. The driving means is so constructed and arranged that the segment is caused to come to rest substantially simultaneously with the severing of a patch, and to be thereafter smoothly accelerated to the speed of the envelope blanks so that the segment travels in unison with a blank when applying a patch to it.

A gear 91 is secured to a shaft 91*b*, and rotates at uniform speed, to drive a gear 92, which is journalled on the shaft 71, at uniform speed. The gear 92 has fast upon it a block 93 to which a link 94 is pivotally connected. The link 94 forms one member of a toggle or knuckle, the other member of the toggle or knuckle being a link 95. Both of the links 94, 95 are pivotally connected to a pin which carries a cam following roller 97. The end of the link 95, remote from the pin 96 is pivotally connected, by means of a pin 98*a*, to a crank 98 which extends outward from a collar 99, the collar being made fast to the shaft 71 by means of a pin 100. The roller 97 runs in a cam track 101 provided in a cam 102. The cam 102 is mounted upon a stationary plate 103, being adjustable relative to the plate about the axis of the shaft 71. Marginal portions of the plate 103 are provided with arcuate slots 104 concentric with the shaft 71, and the cam is clamped in place by means of bolts 105 and clamping nuts 106.

If the cam track 101 were circular and concentric with the shaft 71, the gear 92 and the shaft 71 would obviously rotate in unison at all times. The cam, however, is so designed that the uniform rotation of the gear causes the shaft 71 to come to rest for a brief period just as the patch is severed and then to be accelerated to the speed of the envelope blanks. This result is very readily and simply achieved by making a portion of the cam track, bounded by the lines 95*a* and 95*b*. concentric with a point in the circular path of the axis of the pin 98*a*. When the roller reaches the portion of the cam track referred to, it is incapable of moving otherwise than about the center of the pin 98*a*, and hence during this interval the link 95 has only pivotal movement and no bodily or translational movement, The center

of the pin 98a is therefore held stationary with the result that the crank 98, the shaft 71, and the segment 70 are held stationary.

In the ultimate result, the patch segment is driven substantially the same as the patch transferrer disclosed and claimed in Letters Patent of the United States, No. 1,831,575 granted to Abraham Novick on November 10, 1931. Structurally, however, the mechanism of the present application is simpler. The patch segment of the present application, moreover, applies the patch directly to an envelope blank, there being no intermediate transfer of the patch to a separate applying member.

The cam is made adjustable in order to cause the period of rest to occur at the point in the revolution of the segment 70 appropriate to the length of patch employed. When long patches are used, the segment should come to rest a little later in the cycle than when short patches are used, so that the leading edge of the patch will always be located a little in advance of the suction passages 72 at the moment of everance. Different lengths of patches are provided by changing gearing in the driving train of the patch web feeding roller 51.

It is, of course, intended that an envelope blank will always be present and ready to receive a patch at the time that the patch applying segment comes opposite the bed cylinder 70b. It occasionally happens, however, that a gap occurs in the series of blanks. Under such circumstances, it is not desirable to permit the unused patch to get into the machinery. Provision is accordingly made in the bed cylinder 70b of a series of suction passages 107 for securing the patch to the bed cylinder when no blank is present. These suction passages are so located in the bed cylinder that they normally engage a margin of the envelope blank bordering upon the window opening so that the suction is not applied to the patch at all when the blank is present. The suction passages, therefore, have no tendency to disarrange the patch with reference to the blank in normal operation. When the suction passages do take control of the patch, however, in the absence of a blank, the bed cylinder 70b carries the patch around with it until it is intercepted and caused to be stripped off by suitable fingers 108 which lie in circumferential grooves 109 formed in the periphery of the bed cylinder 70b. The unused patch is thus disposed of in an orderly manner.

At times there is a tendency for the envelope blank to adhere to the cylinder 70b and follow the cylinder 44. To avoid this there is provided a stripper 110 which is normally away from the cylinder and is supported by an arm 110a on a shaft 110b. Just before the leading edge reaches the stripper the latter is moved against the cylinder to deflect the blank therefrom and the stripper then returns to its normal position (Fig. 1). This occurs before the window patch reaches the stripper so that the patch may pass around the cylinder to be thrown out in the absence of an envelope blank.

The above disclosure is to be regarded as illustrative and is not intended to exclude embodiment of the underlying idea of means in a window envelope machine which is adapted to deal with whole blanks which are either supplied to the machine with the sealing flaps already gummed, or which are intended to be manufactured into second class envelopes.

We have described what we believe to be the best embodiments of our invention. We do not wish, however, to be confined to the embodiments shown, but what we desire to cover by Letters Patent is set forth in the appended claims.

We claim:

1. In a window envelope machine, in combination, a rotary shaft, a revoluble patch-applying segment driven by said shaft, and characterized by an arcuate patch, supporting and pressing periphery, a rotatable complemental envelope, supporting roll, means yieldingly urging the segment away from the axis of the shaft, into extended position for pressing said patch progressively against said roll, and means for limiting movement of the segment away from the axis of the shaft, when not in patch-pressing relationship with said roll.

2. A window envelope machine, characterized by a rotary shaft, a patch-applying segment driven by said shaft, a complemental roll, and means yieldingly urging the segment away from the axis of the shaft said elements being combined and cooperating as set forth in claim 1, and said machine being further characterized by means for adjustably limiting movement of the segment away from the axis of the shaft, to regulate the patch-applying position.

3. In a window envelope machine, in combination, a rotary shaft, a patch-applying segment driven by the shaft, a segment supporting rock lever pivotally mounted eccentrically of the shaft and having the segment mounted on one arm thereof, spring means urging the lever in a direction to move the segment away from the axis of the shaft and resisting movement of the segment toward the axis of the shaft with yielding force, and adjustable means carried by an arm of said lever for limiting movement of the lever in a direction to move the segment away from the axis of the shaft.

4. In a window envelope machine, in combination, a rotary shaft, a patch-applying segment driven by said shaft, means yieldingly urging the segment away from the axis of the shaft, means for limiting movement of the segment away from the axis of the shaft, and means comprising a flexible tube for placing the interior of the segment in communication with the interior of the shaft whereby patch-holding suction may be applied through the shaft to the segment.

5. In an envelope machine, in combination, a uniformly rotating driving member, a patch carrier, a rotary driven member on which the patch carrier is mounted, a pair of links forming a toggle or knuckle, the first of said links being pivotally connected to the driving member and the second being pivotally connected to the driven member, a stationary track cam, and a cam follower carried by the second mentioned link, the track of said cam having a portion thereof concentric with a point in the path of the axis of pivotal connection between the second link and the driven member.

6. In an envelope machine, in combination, means for feeding envelope blanks at predetermined uniform speed, means for feeding a patch web at predetermined uniform speed, means for severing patches from the web periodically, a patch transferring and applying segment having suction passages in the forward portion thereof, and segment driving means operable to cause the segment to move into supporting relation to the patch web and come to rest with the leading margin of the web covering the suction passages and then to accelerate the segment and cause it to

press against and travel in unison with an envelope blank for applying the patch to the blank.

7. In an envelope machine, in combination, means for feeding window envelope blanks in definitely timed relation, a patch applying member operating in synchronism with the blank feeding means, and means for removing and discharging a patch delivered in the absence of an envelope blank.

8. In an envelope machine, in combination, means for feeding window envelope blanks in definitely timed relation, a rotary patch applying member, a bed cylinder for supporting the blanks during patch applying, including suction means for taking control of a patch delivered in the absence of an envelope blank, and means for removing such patch from the bed cylinder.

9. In an envelope machine, in combination, means for feeding window envelope blanks in definitely timed relation, a rotary patch applying member, a bed cylinder for supporting the blanks during patch applying, including suction means for taking control of a patch delivered in the absence of an envelope blank, said bed cylinder being peripherally grooved, and stripper means disposed in the grooves.

10. In an envelope machine, in combination, means for feeding window envelope blanks in definitely timed relation, a rotary patch applying member, a bed cylinder for supporting the blanks during patch applying, including suction means for taking control of a patch delivered in the absence of an envelope blank, and means for removing such patch from the bed cylinder, said bed cylinder being timed in its operation to cause the suction means thereof to act normally upon a margin of the envelope blank bordering the window opening.

11. In a patch-applying mechanism, means for supporting patching material with a length thereof extending freely beyond said support, a revoluble member, said member having a suction passage for sucking said free extending end against said member as said member revolves with reference to said support, whereby said extending end is drawn taut between said support and the portion of said member at which said suction passage is located, and means coacting with said revoluble member for applying said length of material to a blank.

12. In combination, in a patch applying mechanism, a rotary transfer member including means thereon for applying a slip-tension to the forward end of a length of patch material, means for holding said patch material at a distance back from the forward end thereof, and means for moving said transfer member and holding means relatively to each other so that said patch material is pulled yieldingly taut between said tensioning and holding means prior to its transfer to a blank.

13. In the method of applying a patch to an article to be patched, the step of securing accuracy of registration between said patch and a movable transfer member for the patch, which consists in holding patch material in such manner that a given length of the material extends freely beyond a point of support into the path of movement of the transfer member, and is free to flex in the plane of movement of the transfer member, applying suction to the said free length of patch material from a point of the transfer member as said point is moved in its path in relation to the patch material so that said length is sucked against the surface of the transfer member and as said member continues its movement in relation to the said length a progressively increasing length of the patch material extending from said point of support to the point of suction is placed under tension and partially laid against this surface of said member until at a given point in the cycle of movement of the transfer member substantially the entire length of the said free end is so tensioned, and thereupon releasing said hold on said length at said point of support to permit said length to advance with said transfer member.

14. In combination, in a patch-applying mechanism, means for supporting patching material with a length thereof extending freely beyond said support, the forward edge of said support being adapted to serve as the stationary member of a shearing means, a transfer member including means thereon for clamping the forward end of a patch to said member; means for holding said patching material at a distance back from the forward end thereof over said stationary member, and means for moving said transfer member to place said patch under tension, said means being arranged to cause a dwell in the motion of said transfer member, and a movable shear member movable to sever said patch over said stationary shear member at the time of said dwell.

15. In an envelope machine, in combination, means for feeding envelope blanks in definitely timed relation and in a definite path, a patch transferring and applying segment, means rotating the segment about a fixed axis in timed relation to the blanks and in a path substantially tangent to the blank path, and means yieldingly urging the segment away from the axis about which it is rotated.

16. In a patch delivering mechanism, in combination, a patch cutter, patch web feeding means located in advance of the cutter for thrusting a patch web past the cutter with a length thereof extending freely beyond the cutter, a rotary patch carrier for engaging the free length of the web beyond the cutter and having a suction passage therein for exerting a slip draft upon the web to draw the web taut between the feeding means and the cutter, and means operating the cutter in timed relation to the rotary carrier to sever a patch from the leading end of the web after the web has been drawn taut by the rotary carrier.

17. In a patch delivering and applying mechanism, in combination, a patch cutter, patch web feeding means located to engage the web in advance of the cutting point and to pay out the web to be cut, a rotary patch carrier for engaging the free length of the web beyond the cutting point and having a suction passage therein for causing the carrier to exert a slip draft upon the web to draw taut the leading end portion of the web which extends from the feeding means past the cutting point, and operating means for the rotary carrier and the cutter for causing the cutter to sever a patch from the leading end of the web after the leading end of the web has been frictionally drawn taut by the rotary carrier.

18. A patch applying mechanism comprising, in combination, means for feeding blanks at constant speed, a patch cutter, a patch web feeding means located to engage the web in advance of the cutting point and to pay out the web to be cut, a rotary patch carrier for engaging the free length of the web beyond the cutting point and having a suction passage therein for causing the carrier to exert a slip draft upon the web to draw

taut the leading end portion of the web which extends from the feeding means past the cutting point, and operating means for the rotary carrier and the cutter for causing the cutter to sever the patch from the leading end of the web after the leading end of the web has been frictionally drawn taut by the rotary carrier.

19. A patch applying mechanism as set forth in claim 18 which further includes means for applying adhesive to a portion of the upper surface of a blank, and in which the rotary patch carrier travels beneath the leading end of the web and carries the cut patch downward for application to the gummed portion of the upper surface of the blank.

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