APPARATUS FOR THE HIGH SPEED APPLICATION OF PATCHES TO ENVELOPE BLANKS

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4 Claims

ABSTRACT OF THE DISCLOSURE

The surface speed of rapidly moving, spaced-apart blanks is reduced without reducing the rate of succession by decreasing the blank spacing, even to the extent of partial overlapping, while leaving the panel window area exposed, whereby rotating patch gum applicators operate on the blanks at a conventional surface speed while other operations on the blanks may be performed in the envelope machine at higher surface speeds.

BACKGROUND OF THE INVENTION

This invention relates to a method and apparatus for applying patches to moving envelope blanks in modern, very high speed envelope making machines.

In recent years there has been made in the development of envelope machines adapted to produce conventional envelopes at rates in the order of 900 to 1200 per minute. However, when somewhat unusual envelope requirements are to be met, production speeds are often severely reduced, thus substantially increasing manufacturing costs. One such requirement is the inclusion of a patch, such as a glassine, covering a window in the front panel. Several suggestions have been made of devices compatible with high speed envelope machines whereby such patches may be applied without reducing the rate capacity of the machine. However, these devices have tended to be unduly expensive, unreliable, difficult to install and/or difficult to maintain in synchronization with the machine.

The limiting feature in patch application is normally related to the tendency of the patch gum to slacken by rotary applicators under the high centrifugal forces developed at high surface speeds. It has been recognized that the overlapping of blanks in an envelope machine results in a lower linear of surface speed without a reduction in succession rate, however, heretofore it has been considered that high surface speeds were necessary for patch application in order to expose the large blank areas normally required. Therefore, development has moved toward methods of applying the gum at low speed to the patch and then accelerating the patch to blank speed, or arrangements to reduce the tendency of the gum to leave the applicator under centrifugal force when not in contact with the blank.

In practicing this invention, the blanks, normally traveling through the machine in spaced-apart relation at very high speeds, are reduced in speed without decreasing the succession rate. This causes the blanks to decrease in spacing, even to the degree that they overlap, but such overlapping is limited to the extent that the covering or upper flap of the adjacent blank does not overlay the area of the panel to which patch gum is applied. The patch gum may then be applied by suitable, known, relatively low speed apparatus, after which the patch may be applied, preferably at the same reduced surface speed. Subsequently, the blanks may be further decreased in spacing for additional operations such as seal flap gumming, or decollated with attendant acceleration for normal high speed operations such as scoring and folding.

It is the principal object of the present invention to provide a relatively simple, reliable and inexpensive method and apparatus for producing patched envelope blanks in modern rotary envelope machines at very high production rates.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are shown certain embodiments of this invention.

FIG. 1 is a vertical longitudinal sectional view through a vertical portion of a rotary envelope machine embodying this invention.

FIG. 2 is a sectional view of the embodiment of a low speed cylinder 8. The gripping cylinder 8 is suitably adapted by conventional valve structure (not shown) to permit transfer of the blanks at the high surface speed and spaced-apart relation to a vacuum gripping cylinder 9 forming part of a device 10 adapted to reduce the blank spacing, in this example to the extent that a squamiform lapping of the blanks is produced. The device 10, in this example, is of the type disclosed in U.S. Pat. No. 3,096,977 and is arranged with the cylinder 9 on a shaft 11 whereby the cylindrical face 12 of the cylinder 9 engages and supports only the mid-portions of the blanks 2 as they are received from the cylinder 8 and gripped by suction through vacuum ports 13. The blanks are carried on the face of the cylinder 9, in successive, spaced-apart order, into gripping engagement with a pair of laterally spaced braking rollers 14 that are of substantially smaller diameter than the cylinder 9. The braking rollers 14 are fixed on a transverse shaft 15 extending across the face of the gripping cylinder 9. The shaft 15 is cooperatively rotated in the direction of the arrow 16 by suitable drive structure (not shown) so that the peripheral speed of the braking rollers 14 is considerably less than the peripheral speed of the cylinder 9.

Cooperating with the braking rollers 14 are pressure rollers 17 each having peripheral faces 18 which engage...
the undersurface of the blank 2 in alignment with the peripheral faces 19 of the braking rollers 14. This maintains the blanks in driven engagement with the braking rollers 14 whereby the surface speed of the blanks is reduced relative to the peripheral speed of the gripping cylinder 9. The pressure rollers 17 are mounted for free rotation on the forward ends of forked levers 20 which are respectively rockable on pins 21. The pressure rollers 17 are maintained in pressing contact with the blanks 2 through springs 22 bearing against the underside of the levers 20.

With this arrangement, a blank 2 is released from the face 12 by shut-off of the suction when a leading edge of the blank reaches the height between the rollers 14 and 17, so that these latter rollers take over the advancing of the blank at a slower speed. When the blank has been advanced, the trailing portion thereof is raised by a blast of air from a nozzle 23 to permit the following blank, which is maintained against the gripping cylinder 9, to run under the raised portion of the preceding blank, thus producing the desired overlap depending upon the relative peripheral speeds of the gripping cylinder 9 and braking rollers 14.

The braking rollers 14 continuously feed the blanks in the partially overlapped chain toward a window gumming station 24, in this example, through set of forwarding rollers 25 and 26. While the blanks are partially overlapped, but with the panel portion 5 exposed, the blanks are then individually contacted by a gum applicator 27 carried in a pair by a rotor 28. The applicators 27 are supplied with gum by means of transfer rollers 29 which receive the gum from a pickup roller 30 operating in a gum receptacle 31. The applicators 27 preferably are of a shape to conform to the marginal or peripheral area surrounding the window openings 6 and are backed during gum application by a vacuum gripping impression roller 32 which also serves to grip and advance the partially overlapped blanks by means of suitable vacuum ports 33. The rotor 28 may operate at a conventional application speed so that the centrifugal force on the gum adhering to the applicators 27 is not sufficient to cause the gum to fly off into the surrounding machinery or against the traveling blanks. The applicators of this example, apply the gum in a pattern 34 surrounding the peripheral edge of the window opening 6 as shown in FIG. 2.

The impression roller 32, in this example, continues to grip the chain of partially overlapped blanks following application of the gum at 34 and carries the engraved surface 35 of the respective panel portion 5 beneath a vacuum gripping, patch applying roller 36 forming part of an apparatus 37. The apparatus 37 is adapted for cutting and applying patches to window envelope blanks and the like, for example of the type illustrated in U.S. Pat. No. 2,996,922. This apparatus includes a feeding mechanism 38 for feeding a web of patch material 39 to a cut-off mechanism 40 for cutting individual patches 41. A transfer mechanism 42, in the form of a vacuum gripping cylinder, is adapted to receive the cut patches from the mechanism 40 and transfer same to the gripping roller 36 from which the patch is applied over the window opening 6 and on the gum pattern 34 with the impression roller 32 serving as backing.

Following patch application, the respective vacuum port 33 is deactivated permitting the blank leading edge to be received between rollers 43 from which it is directed into a suitable conveyor 44 for transfer into other sections of the envelope machine where additional operations are performed for producing a finished envelope.

It is to be understood that the maintenance of the reduced spacing need not be continued but rather spacing may be increased or decreased as desired subsequent to patch application for performing additional operations on the blanks as dictated by the particular envelope machine. However, the rate of succession of the blanks past a fixed point normally remains the same throughout the envelope forming machinery.

Thus, in the practice of this invention, the spaced apart high speed envelope blanks are reduced in spacing sufficiently to reduce the surface speed to a point where gum application can be made with conventional apparatus, but not to the extent that the preceding or succeeding blank overlaps the portion of the panel where the gum and patch is to be applied. However, it is to be understood that under certain conditions, depending upon the blank configuration, window size and window placement, an underlying portion of a preceding or succeeding blank may extend into the window opening so as to permit greater overlap, and thus lower speed, since the gum is applied only to the exposed area. Unless the adjacent blank extends beyond the gum area at 34, it is immaterial whether the trailing edge of the preceding blank rides above or below the leading edge of the succeeding blank when there is an overlapped condition.

It is to be further understood that while one form of this invention has been illustrated and described, it is not to be limited thereto except insofar as such limitations are included in the following claims.

What is claimed is:

1. Apparatus for applying patches to a progression of moving envelope blanks, each having a forwardly and a rearwardly directed flap portion and a patch receiving panel portion therebetween, said blanks moving along a path at high surface speed and in spaced-apart relation, said apparatus comprising:
(a) a speed reducing device located along said path and including one gripping transfer member and one pair of bight forming members, said gripping transfer member receiving said blanks at said high surface speed and in said spaced-apart relation and being positioned for feeding said blanks between said pair of bight forming members, said bight forming members operating at a predetermined lower surface speed than said gripping transfer member whereupon the surface speed and spacing of said blanks along said path is reduced only to the extent that said panel portion remains uncovered by adjacent blanks sufficiently to permit exposure of a patch receiving area thereon but the rate of blank succession is not reduced,
(b) forwarding members positioned along said path adjacent said bight forming members and adapted to expose said patch receiving area, said forwarding members receiving said blanks from said bight forming members at said reduced speed and driving said blanks along said path at said reduced speed with said patch receiving area exposed,
(c) gumming means located adjacent a portion of said path designated by said forwarding members and including a rotor having at least one shaped gum applicator thereon of lesser gum area than said panel portion, said rotor being operative for applying gum only on said patch receiving area exposed by said forwarding members and at said reduced surface speed, and
(d) a patching device adjacent said path and downstream from said gumming means, said patching device being adapted to apply patches over said patch receiving area.

2. The apparatus as set forth in claim 1 wherein:
(a) said gripping transfer member includes a vacuum gripping cylinder and said bight forming members include contacting braking rollers.
3. The apparatus as set forth in claim 1 wherein:
(a) said shaped gum applicator is structurally arranged to apply gum in a blank window surrounding pattern.
4. The apparatus as set forth in claim 1 wherein:
(a) said forwarding members include an impression
roller receiving and driving said blanks along said
path at said reduced speed and spacing,
(b) said impression roller being adapted to support
said blanks during said gum application and said
patch application.

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