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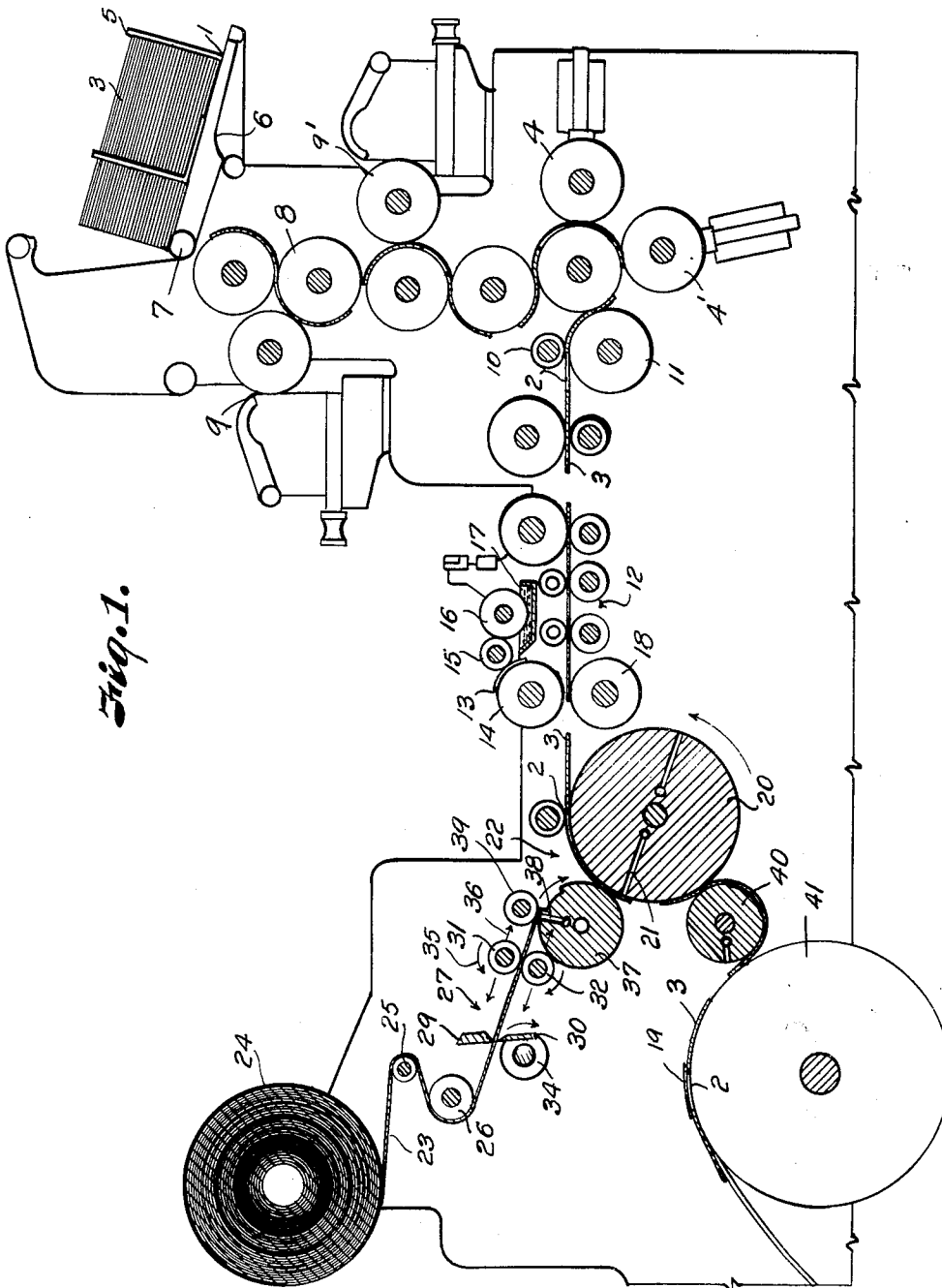
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2,956,484

APPARATUS FOR FORMING PATCHES FOR APPLICATION
TO ENVELOPE BLANKS AND SIMILAR ARTICLES

Filed April 11, 1957

2 Sheets-Sheet 1



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Fig. 3.

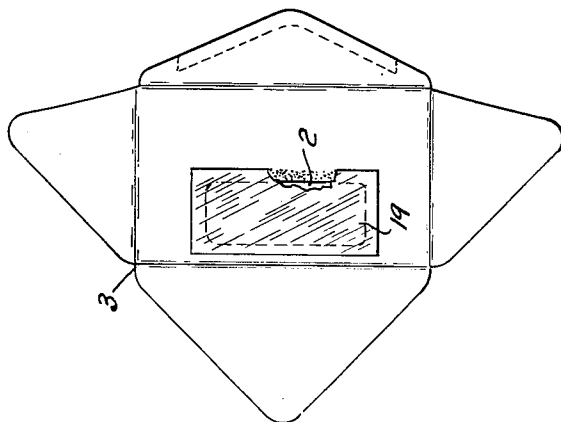
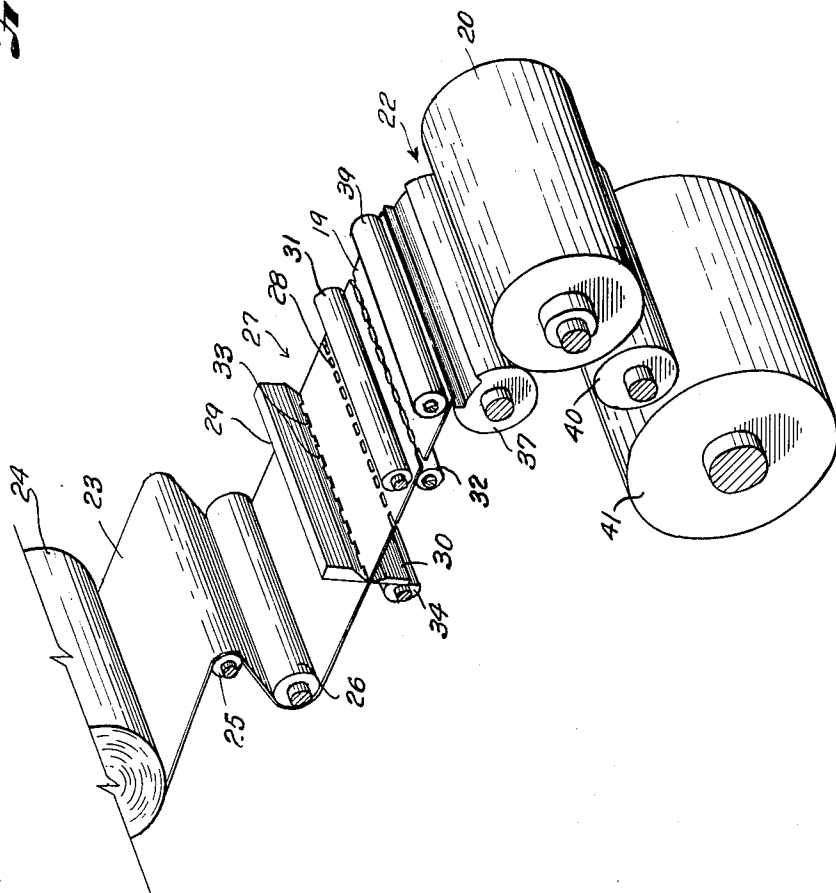


Fig. 2.



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APPARATUS FOR FORMING PATCHES FOR APPLICATION TO ENVELOPE BLANKS AND SIMILAR ARTICLES

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1 Claim. (Cl. 93—61)

This invention relates to an apparatus for forming patches for application to envelope blanks and similar articles, for example, a transparent patch to be applied over the opening of a window blank in the making of window envelopes.

It is desirable that such patches be applied accurately, but heretofore this has been difficult. Most methods have necessitated intermittent feed of the patch material, and it has been difficult to hold such small pieces after they have been severed from a roll of the material and advanced in timed relation with movement of the envelope blanks, particularly in accordance with modern high speed production of envelopes. This is because the patch materials are extremely thin, tend to distort, and curl along their edges. Also, the patches become charged with static electricity, which makes their placement on the blanks even more difficult.

Attempts have been made to correct such difficulties by providing a continuous feed of the material from the roll and utilizing rotary cutters operable in synchronization with feed of the material, but this also failed because of curling and differences in position of the patches when engaged by the transfer rollers.

It is, therefore, a principal object of the present invention to provide an apparatus whereby the patches are severed in a manner for accurate placement at higher speeds, and particularly speed in conformity with modern high speed production of envelopes and similar articles.

Other objects of the invention are to provide an apparatus for severing and applying such patches by feeding a web of the material from a roll, defining weakened lines of severance spaced apart in accordance with the size of the patch, firmly engaging and holding the end of the web prior to severance of a patch, and retaining hold on the patch until it is in place on an envelope blank, all being accomplished by a preferably continuous feed in accurately timed relation with feed of the envelope blanks; to provide an apparatus that is adapted to any type of patch material, such as sensitized paper, cellophane, and other transparent skins or films which may be cut into appropriately sized patches and attached with precision to the envelope blanks, webs of paper, cardboard, textile, synthetic, or other materials adapted for making window envelopes or similar articles; and to provide an apparatus for feed of the patch material in a manner to limit tension on the material that might cause severance of the web before the foremost patch reaches the proper place where severance is to occur.

In accomplishing these and other objects of the invention, as hereinafter pointed out, I have provided an improved apparatus, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is a somewhat diagrammatic longitudinal section through a portion of an envelope machine adapted for the feeding of window envelope blanks, the severing of window patches, and the accurate application of the patches to the blanks.

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Fig. 2 is a diagrammatic view showing the steps of feeding a thin web from a roll of material, forming weakened severance lines transversely of the web, and holding the end of the web while a patch is being severed and carried to a position for application to previously gummed portions of an envelope blank.

Fig. 3 is a plan view of an envelope blank with a patch applied over the window opening therein.

Referring more in detail to the drawings:

1 designates a portion of a machine for manufacturing window envelopes. The envelope blanks may have preformed openings, or the openings 2 may be formed by cutting rollers 4 and 4', one to be equipped with knives to make longitudinal cuts and the other transverse cuts, but in the present instance the knives have been removed and the machine as illustrated is operating with blanks having precut windows. The blanks are carried in a stack 5 on a support 6. Positioned below the stack 5 is means 7 for withdrawing the blanks one at a time from the bottom of the stack and delivering the blanks for travel around a series of rollers 8, during which time the blanks may be printed on the respective side faces thereof by printing mechanisms 9 and 9'. From the series of rollers 8, the blanks are diverted to a horizontal direction for travel between pairs of rollers 10—11 to a window gumming station 12, where the blanks are contacted by a gum applicator 13 carried by a rotor 14. The applicator is supplied with gum by means of a transfer roller 15 which receives gum from a pickup roller 16 operating in a gum receptacle 17. The applicator preferably conforms to the marginal edge surrounding the window opening 2, and is backed by an impression roller 18 so as to apply gum for attachment of a patch 19. The blanks are advanced from the station 12 by a gripping cylinder 20. In the illustrated instance, the cylinder has ports 21 through which suction is created to grip and hold the blank in contact with the peripheral face of the cylinder for carrying the blank therewith to a station 22 where a patch is applied over the window opening and caused to be adhered by the gum to the blank. The feed of the blanks specifically forms no part of the present invention, as other types of blank advancing means may be employed and other suitable methods may be used to apply the gum, since the present invention applies to formation and application of the patch to the window opening.

The patch material is initially in the form of a web 23 that is stored in a roll 24. The web is drawn from the roll over a direction reversing roll 25 and then over and under a driven feed roller 26 which provides friction contact with the web. The web is drawn from the roll 24 as long as sufficient frictional contact is maintained between the web 23 and the roller 26. The web is passed from the driven roller 26 through a station 27 at which the web is provided with transverse lines of weakness that may be brought about by reducing the strength of the material through breaking the fibers or providing spaced apart cuts or perforations, indicated by the line 28. In the illustrated instance, this is effected by blades 29 and 30 between which the web is drawn by means of pulling rollers 31 and 32. The blade 29 is preferably fixed and has a series of spaced apart cutting or perforating teeth 33 which penetrate the material of the web upon actuation of the movable blade 30, so that the weakened line comprises a series of cuts spaced apart across the width of the web to define one or more interconnected patches. The movable blade 30 may be carried on a rotor 34 in offset relation with the axis of rotation to produce a shear action with respect to the fixed blade.

The patches thus defined remain connected with the unperforated portion of the web up to and including

the point of engagement of the perforated portion with the pulling rollers 31 and 32. The perforations may be of any convenient design, for example, as shown in Fig. 2, in which the separating points consist of short cuts separated by relatively small uncut portions, or they may consist of a row of holes punched across the web in any shape or arrangement to be desired, the point being to produce the weakened line 28 on which the endmost patch is subsequently severed after the weakened line 28 has passed the contact point of the pulling rollers 31 and 32.

The pulling rollers 31 and 32 are caused to turn at steady speed in the direction of the circumferential arrows designated 35 to pull the web between the blades 29 and 30. The peripheral speed of the rollers 31 and 32 are in timed relation to the rotor 34 to provide a patch of the required length depending upon the pre-adjusted location of the pulling rollers in the direction of the arrows 36.

The web pulling rollers 31 and 32 also advance the endmost patch to contact by a gripping or suction roller 37 having suction port or ports 38, contact being facilitated by a pressure roller 39. The suction roller 37 operates at a greater peripheral speed than the feed imposed by the pulling rollers 31 and 32, with the effect that the suction roller 37, when engaged with the patch, tends to move the patch at a greater speed, while the rollers 31 and 32 tend to brake the speed of the web. Therefore, as soon as the line of perforations 28 passes the contact point of the rollers 31 and 32, sufficient strain is applied to cause the weakened line of severance to give way and free the patch from the web. However, the freed patch is now firmly grasped by the suction roller 37 and is firmly positioned thereon so that the patch is carried into exact registry with the opening in the blank that is then carried by the suction cylinder 20, previously described. The suction cylinder 20 and suction roller 37 are driven in timed relation, whereby the marginal edges of the patch align with the gummed margins of the opening in the blank and continued movement rolls the patch and blank into sealing contact. With removal of the foremost patch and with the more rapid advance thereof into engagement with the envelope blank, the succeeding patch remains engaged between the slower rotating rollers 31 and 32 and continues to be fed at a slower speed and to continue advance of the web between the blades 29 and 30 so that they produce another weakened line. Thus the succeeding patch remains attached to the web, whereby its advance is under control. However, there is no tendency for the web to tear apart while the weakened portion is advancing from between the blades, because any tension on the web is relieved by the slightly faster feed of the friction roller 26.

The important features are that the pair of pulling rollers 31 and 32 operate continuously in timed relation with the moving blade 30 to thereby determine the length of window patches which is in conformity with the corresponding dimension of the openings in the envelope blanks to which the patches are to be applied. The feed of the web is assisted by the roller 26 and the roller 26 is driven at least at the same rate of speed as the rollers 31 and 32. However, since the feed of the web by the roller 26 is initiated through friction caused by the partial envelopment of the roller 26, it is advisable to choose a peripheral speed for the roller 26 slightly greater than the traveling speed of the web as imparted by the rollers 31 and 32, in order to insure the web

being pulled off the roll 4 under any conditions. Should a slackness occur in the web between the roller 26 and the mechanism at the station 27, the advance of the web will automatically come to a stop, because the friction of the web on the roller 26 becomes insufficient to continue the feed. The roller 26 then turns idly until the slackness is used up through continued operation of the rollers 31 and 32. This is important insofar as these rollers 31 and 32 exert their pull on the part of the web which has been acted upon by the blades 29 and 30, and feed by the roller 26 must be kept sufficiently loose to prevent premature separation of a patch between the mechanism at the station 27 and the rollers 31 and 32.

The rotary blade 30 and the stationary blade 29 operate on the principle of a crosscutter, and, as above set out, are positioned at such angles to each other that they will insure vertical or shear cuts through the web. If the length of the patches is to be made smaller or greater, a slightly oblique cut will result, however, this does not impair the end effect of producing the perforations.

After application of the patch, the blank is transferred from the gripping or suction cylinder 20 to a gripping or suction roller 30, which in turn transfers the blank with the patch thereon to the periphery of a discharge roller 41, which continues travel of the envelope blank to subsequent gumming and forming portions of the machine (not shown).

From the foregoing, it is obvious that I have provided a simple apparatus for applying patches to envelope blanks, wherein the patches and blanks are kept under control so that the patches are accurately applied to the envelope blanks.

What I claim and desire to secure by Letters Patent is:

An apparatus for forming patches in predetermined length from a continuous web of uncut material for application to envelope blanks, said apparatus including means for weakening the material of the web transversely thereof, a feed roller having a frictional face over which the web of material is looped for frictionally feeding the web from the roll when the web is tightened about said frictional face, a driven roller for engaging one face of the web, a cooperating roller engaging the opposite face of the web and having its point of engagement in registry with the point of engagement of the driven roller to grip the web therebetween to pull the web through said means for weakening the web in timed relation with actuation of the weakening means to define the length of a patch and to apply a holding force on the web simultaneously with pulling of the web through the web-weakening means, said frictional face of the feed roller having a slightly higher surface speed than the surface speed of said pulling rollers whereby feed of the web by said feed roller is dependent solely upon the said pulling rollers, and a gripping cylinder for engaging the web after passage between the said pulling rollers for curving the web about the gripping cylinder and applying a differential pulling force on the web as it is advanced by the pulling rollers to detach a patch on said weakened portion of the web as the weakened portion passes from between the engaging points of the pulling rollers.

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