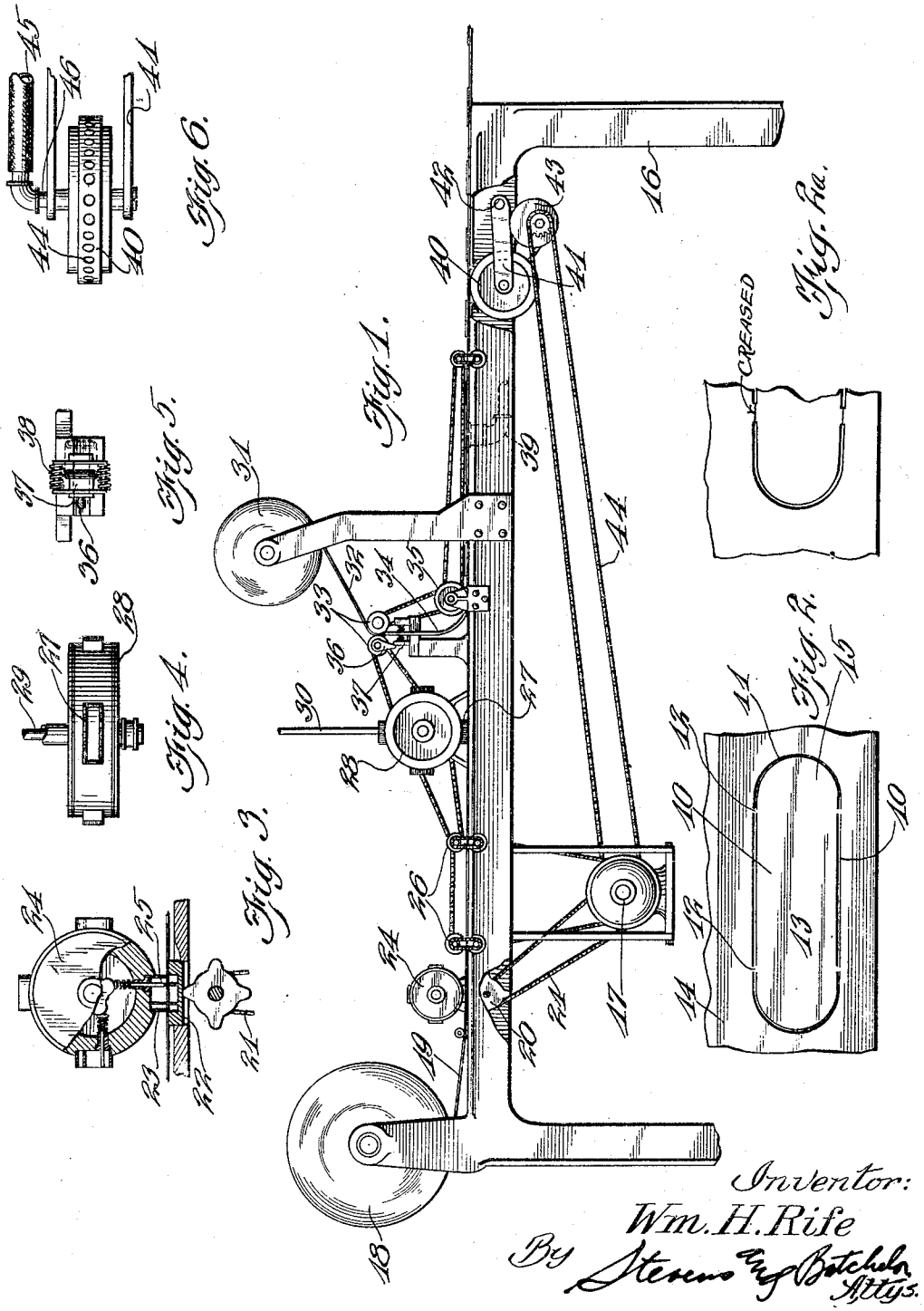
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METHOD FOR PRODUCING WINDOW ENVELOPES

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METHOD FOR PRODUCING WINDOW ENVELOPES

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This invention relates to the envelope-making art, and more particularly to the production of window envelopes, and my main object is to produce an envelope of this kind by a novel method.

A further object of the invention is to provide a method for which standard envelope making means and machinery are readily adaptable.

A still further object of the invention is to produce an envelope of the window type without weakening the envelope sheet initially by the cutting of the window opening therein.

Another object of the invention is to so treat the envelope sheet that the window opening therein may be formed while the sheet is reinforced with the window sheet.

A final but nevertheless important object of the invention is to adapt the same in every respect to the high speed traveling web method of producing window envelopes.

With the above objects in view and any others that may suggest themselves in the specification and claims to follow, a better understanding of the invention may be had by reference to the accompanying drawing, in which—

Figure 1 is an elevation of a typical machine which may be employed to produce a novel window envelope;

Fig. 2 is a fragmental plan view of the envelope sheet showing the manner in which the same is prepared prior to treatment for the window sheet; and Fig. 2*a* is a similar view of a modification;

Fig. 3 is an illustration of a cutting die;

Fig. 4 is a plan view of a gumming element;

Fig. 5 is a plan view of a severing device; and

Fig. 6 is a plan view of a suction gripper.

In the art of producing window envelopes, modern methods involve the use of traveling webs both for the envelope sheet material and the window sheet material, so that by the elimination of reciprocating parts to handle the material greater speed is obtained. The methods commonly employed involve first the perforation of the envelope sheet with the window opening, then the gumming of the stock surrounding the latter, then the cutting-off of a strip from the window sheet, and finally the pressing of this strip upon the envelope sheet over the gummed area which contains the window opening. While methods along this line have proved more or less efficient, the fact remains that the envelope sheet is run in a more or less weakened condition from the moment it is cut with the window opening, since the latter occupies a considerable portion of the envelope area. This condition frequently causes warping of the envelope stock, while in motion, and interferes with the proper laying of the gum film for the window strip. Consequently, many imperfect envelopes result, and occasional clogging of the machinery occurs. Also, the envelope's opening is entirely made before the envelope sheet is doubled, or reinforced in any way, so that whatever error may occur in the cutting operation it is suffered by the single ply of the envelope, resulting in curling or other uneven action of the stock in the region of the opening.

In my method, the outstanding feature is that the window opening in the envelope sheet is not made until the end of the operation. Assuming that the envelope sheet web travels in the usual manner, I provide suitable means to partially perforate the same as shown in Figure 2. Here a form is shown similar to the conventional window opening, but it is noted that the stock is slitted-straight on the sides as indicated at 10, and with substantially semi-circular cuts 11 at the ends, the slits 10 being separated from the cuts 11 by very short-stock portions 12. For purposes of clearness, the perforations in Figure 2 have been exaggerated in width, but it is understood that they will be made by a very sharp die so as to be practically invisible. Thus, the window blank 13 of the envelope sheet 14 is positively supported by its connections 12 with the sheet, so as to be considered integral with the latter, and the fineness of the perforation cuts lends frictional support between the contiguous edges of the blank 13 and the sheet 14, so that the blank

is not only supported by the sheet but itself lends body to the sheet whereby to resist any tendencies of the sheet to warp or deform. In other words, the partially severed blank may be considered largely as if it were still in the same piece with the envelope sheet as far as reinforcing the latter is concerned.

After the envelope unit is cut as described above, I cause a film of gum to be deposited about the perforated area, either on the envelope or the window strip, and then the window strip to be applied, these two functions to be effected by any suitable means. Finally, I cause the blank 13 to be gripped by mechanical or suction means whereby to sever it from the envelope sheet and leave the latter with an opening covered by a window. As an extra inducement for the removal of the blank 13 I prefer to depress the frontal end portion thereof during the perforating operation or at any time prior to the window applying operation, so that the mechanical or suction gripper may be applied with greater facility to the deflected tongue 15 of the blank, insuring the successful removal of each blank during the travel of the stock at high speed.

As a matter of example, I have illustrated in Figures 1 and 3 to 6 a typical means for creating the envelope by the process just described. Thus, 16 denotes the frame of the machine, 17 an electrical motor serving as the power source, and 18 a roll from which the envelope sheet stock is drawn, the web being denoted at 19.

For the perforating operation, I provide a rotating cam 20 connected by a chain 21 to the motor drive, this cam controlling the vertical position of the die 22. The punch is indicated at 23, and is quadruplicated in a rotatable support 24, so that the punch may treat four envelope units during every revolution and therefore be consistent with the speed requirement of the machine. For purposes of illustration I have included a cam-operated plunger 25 in each punch to press down on the forward tongue 15 of the envelope sheet blank 13 whereby to deflect the same as the sheet is perforated for the purpose described. Where the envelope stock is of a strong or fibrous nature, the plunger 25 will include a blade or other suitable element to score or crease the stock portions 12 along the perforation line, as indicated in Figure 2*a*, to aid the severing of the said portions on a straight line when the waste blank is removed.

The envelope sheet 19 is carried along in the forward direction between suitable guide rollers 26 so as to move under a gum pad 27 having the appearance of an open rectangle, which is suitable for the application of gum about the zone of the blank 13. Or a like unit may be applied to gum the window material instead. As in the case of the cutter, the gum pad 27 is also quadruplicated or used in any less or greater number by being carried in a drum unit 28 having an internal gum feed 29 rising in the form of a column 30 to a suitable gum vessel or reservoir.

The window sheet stock is carried on a roll 31 and extends in the form of a web 32 between guide rollers 33 and down along a guide wall 34 to be pressed by a roller 35 upon the envelope web 19. As the roller 35 secures its grip upon the window sheet, a cam 36 carried by one of the guide rollers 33 operates a horizontally movable cutter 37 against the tension of springs 38, severing the strip from the web 32. The roller 35 now irons the window strip firmly upon the envelope web 19 in the proper place over the zone of the blank 13. It is understood, however, that while the window strip becomes firmly pasted to the envelope web 19, it is entirely free of the blank 13, since no gum has been deposited upon the latter.

The doubled web now proceeds to a point where a simple vacuum element 39 or a suitable mechanical gripper (not shown) is applied to draw down upon the blank 13 and sever the same from the web 19. However, for purposes of example I prefer a vacuum drum 40 rotatably hung in arms 41 pivotally mounted on a horizontal rod 42 carried by the machine frame 16. The arms 41 are periodically raised by an eccentric 43 driven by a chain 44 from the motor, and when this occurs, the periphery of the drum 40 is in intimate contact with the under side of the envelope web. The drum is calculated to rise into contact at such time as the frontal tongue 15 of a given envelope blank arrives directly over the drum 40. The latter has a series of peripheral perforations 44 and at the time of its rise opens communication into a powerful suction conduit 45 by way of its hollow center shaft 46, so that the tongue 15 is immediately attracted to the periphery of the drum and the rolling of the drum in an onward direction with the travel of the web draws downwardly upon the blank 13 whereby to neatly sever it at the adhering points 12 with a shearing or gradual action.

Thus, by the above method and means the envelope sheet is made with a clear opening after the window has been affixed thereto. It will be observed that at the outset, the partial perforation of the envelope will not materially weaken the same, and that the laying and securing of the window sheet amply reinforces the stock of the web to make its forward travel even and safe and also to strengthen it against the drawing tendency of the blank removing action. It will be understood that I have only illustrated the mechanical means shown in the drawing as one application of my method; and I do not make any claim for novelty in any of the apparatus shown, since many other ways may oc-

cur to the skilled artisan in the envelope-making field to put my method into practice. I therefore desire to claim my method as novel when used in connection with any apparatus suitable therefor.

I claim:—

1. The method of producing a window envelope comprising the perforation of the envelope stock at intervals along a course corresponding to a window-opening contour, applying a coating of adhesive to the stock outside of said course, applying a window sheet over the area defined by said course and the coated portion, pressing the window sheet upon the stock, and removing the stock blank defined by the course of perforations.

2. The method of producing a window envelope comprising the perforation of the envelope stock at intervals along a course corresponding to a window-opening contour, applying a coating of adhesive adjacent said contour, applying a window sheet over the area defined by said course and surrounding the course, said coating of adhesive being applied between said surrounding area and the corresponding and contiguous area of the window sheet, pressing the latter upon the envelope stock, and removing the stock blank defined by the course of perforations.

3. The method of claim 1, and the scoring of the stock between the perforations.

4. The method of claim 1, and the creasing of the stock in line with and between the perforations.

5. The method of claim 1, and the deflection of a portion of the said stock blank before the window applying operation to facilitate the removal of said blank.

6. The method of claim 1, said perforation being more extensive along a portion of the course whereby to define a free blank portion, and the deflection of the latter before the window applying operation to facilitate the removal of the blank after said window applying operation.

7. The method of claim 1, said perforation being more extensive along an end portion of the course whereby to define a free tongue of the blank at such portion, and the deflection of the leading edge of the tongue before the removal of the blank to facilitate its removal.

8. The method of claim 1, wherein the envelope stock comprises a moving web, said perforation being more extensive along the frontal end portion of the course whereby to define a free tongue of the blank at such portion, and the deflection of the tongue before the window applying operation to facilitate the removal of the blank after said window applying operation.

In testimony whereof I affix my signature.

WILLIAM H. RIFE.