Sept. 18, 1956 A. NOVICK 2,763,238

GUMMING MECHANISM FOR WINDOW ENVELOPE MACHINES

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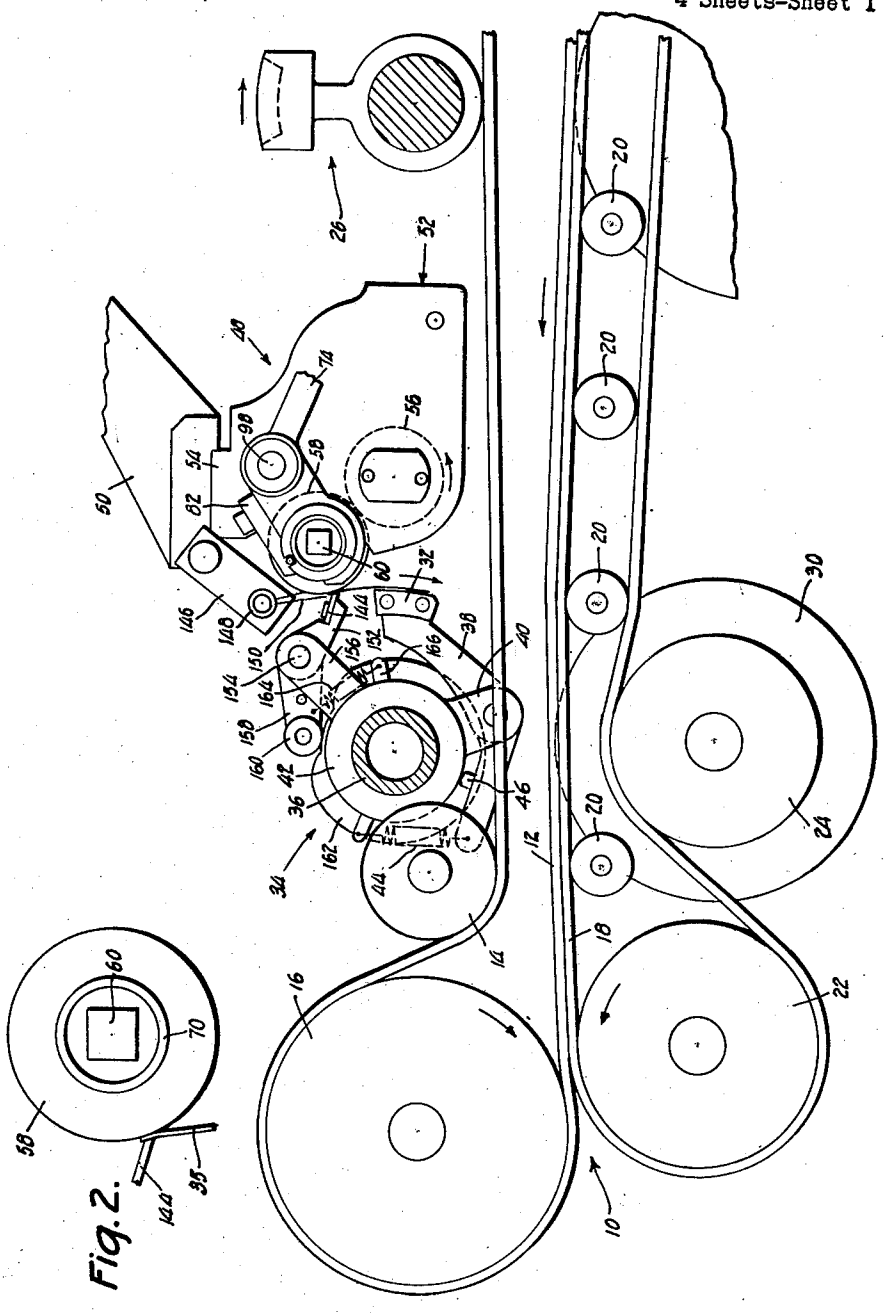


Fig. 1.

Fig. 2.

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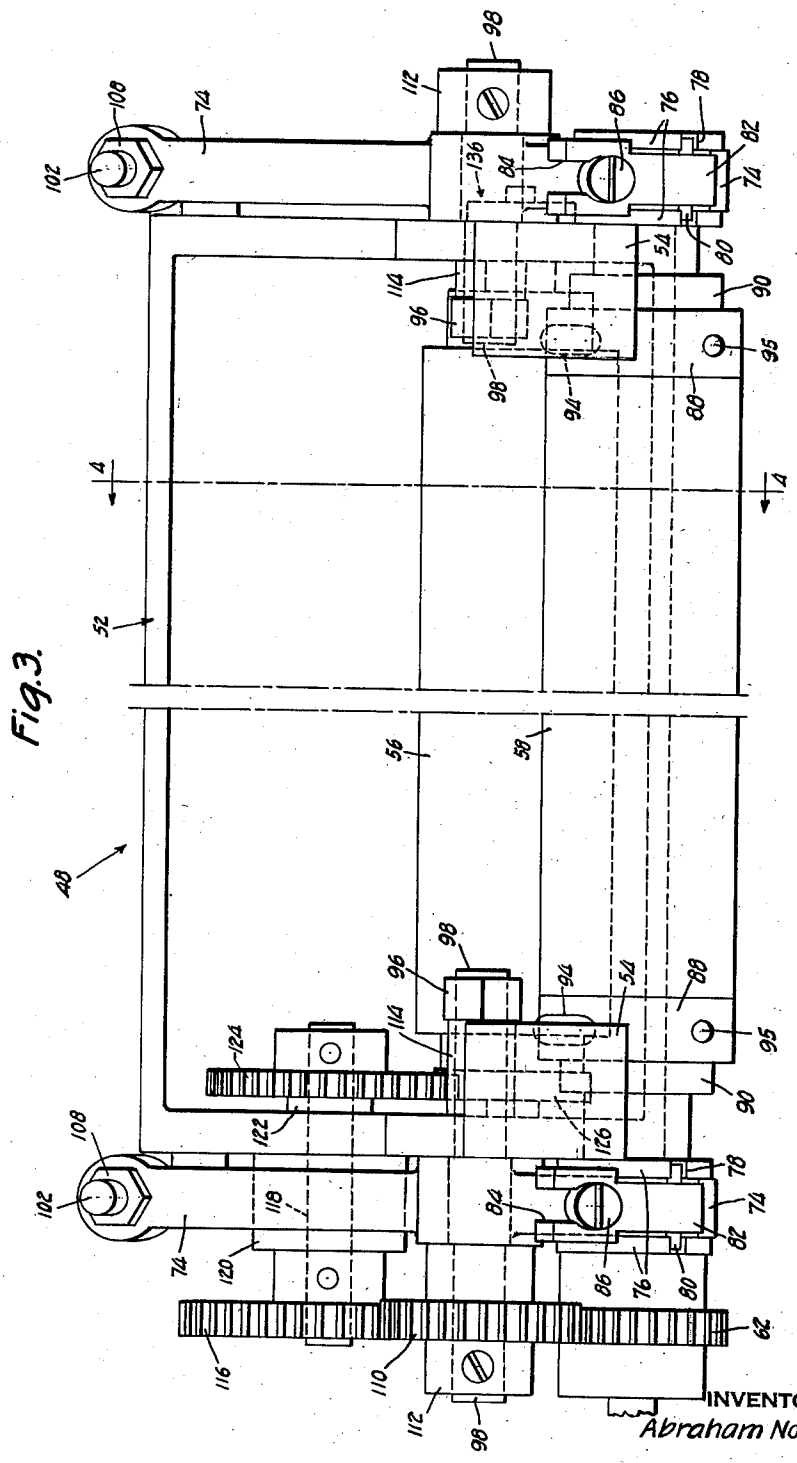


Fig. 3.

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GUMMING MECHANISM FOR WINDOW ENVELOPE MACHINES

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Fig. 4.

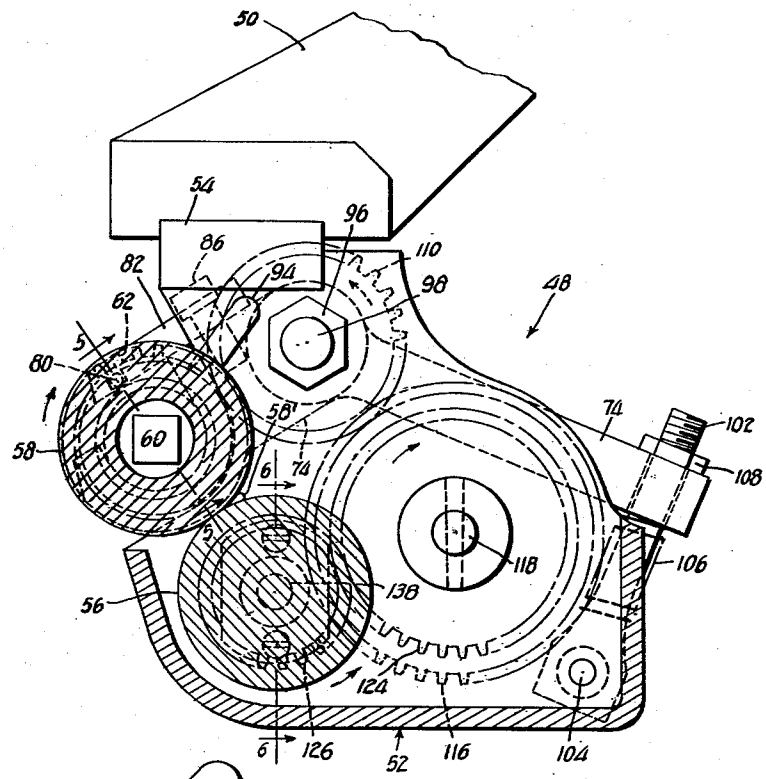
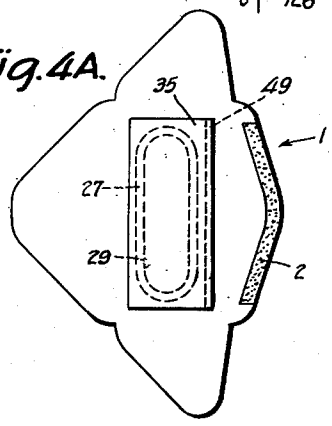


Fig. 4A.



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Filed Dec. 17, 1954 4 Sheets-Sheet 4

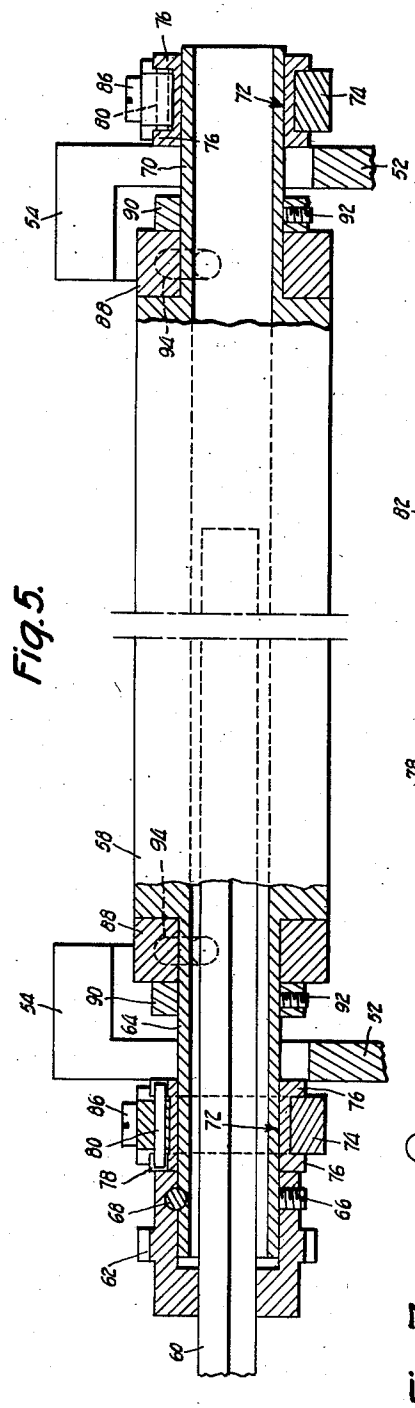


Fig. 5.

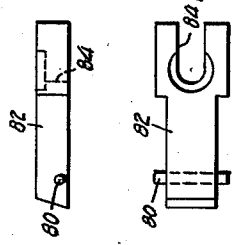


Fig. 9.

Fig. 10.

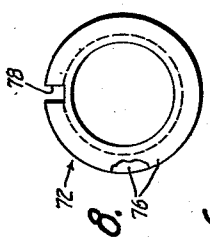


Fig. 8.

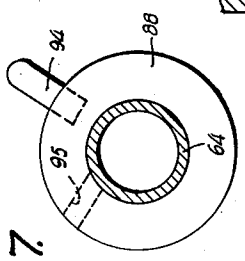


Fig. 7.

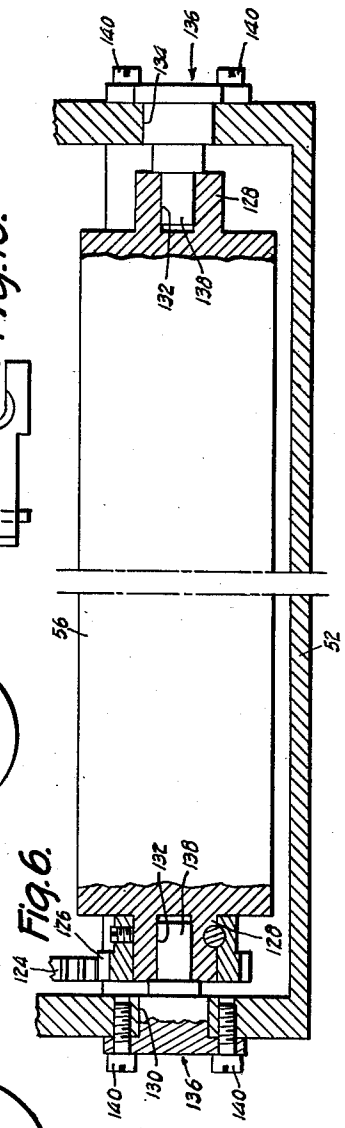


Fig. 6.

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United States Patent Office 2,763,238 Patented Sept. 18, 1956

2,763,238

GUMMING MECHANISM FOR WINDOW ENVELOPE MACHINES

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Application December 17, 1954, Serial No. 475,942

3 Claims. (Cl. 118—262)

This invention relates to gumming mechanism for use in envelope making machines, and has to do particularly with the elimination of gum beads which tend to form at the end of gum rollers and to drip gum onto the work or onto working parts of the machinery. The invention has been contrived in connection with a gummer of the Pearce type. While it is not necessarily confined to gummers of that type, it will be illustratively shown and described in connection with that field of use.

The Pearce gummer is used in connection with the manufacture of the Pearce window envelope. Such an envelope is made from a window blank having a window opening formed with parallel upper and lower edges and generally with rounded end edges, together with a transparent patch which covers the opening and overlaps the body of the envelope at the top, bottom and both ends of the window opening. In accordance with conventional practice, the Pearce patch is of rectangular form, and is united with the envelope body through water soluble adhesive. The adhesive area surrounds the window opening but is spaced outward from the window edges and is spaced inward from the patch edges.

The Pearce envelope departs from conventional practice in that an adhesive strip of very thin adhesive is applied continuously along the upper extremity of the patch and serves to seal the upper edge of the patch throughout its entire length to the envelope body. Since this edge is disposed toward the filler opening of the envelope, the additional adhesive strip prevents possible interference of the patch with the filling of the envelope by the snagging of enclosures, because it leaves no loose edge portion at the top of the patch. It also avoids possible tearing loose and mutilation of the patch at the insertion of the enclosure.

The Pearce method is largely conventional. A web of patch material is fed from a reel and is severed into patch lengths. A patch is rolled onto an adhesively coated area of the blank to cover the window opening in the usual way. The additional strip of very thin adhesive is applied by brushing the trailing margin of each rapidly advancing patch against a slow running adhesive roller which carries a very thin adhesive coating. The thin consistency of the extra strip of adhesive and the scantiness of the application are depended upon to prevent objectionable spreading of the gum beyond the upper or trailing edge of the patch as the patch is rolled and pressed onto the envelope blank. It is found in practice that the process can be dependably carried out without sticking the back of the envelope to the envelope body.

The gummer for applying the extra strip of thin adhesive to the patch involves the employment of a gum box, a pick-up roller in the gum box, and a gum applying roller opposed to the pick-up roller. The patch is carried past the applying roller with its trailing end free, and a cam controlled bar, is caused to press the patch toward the applying roller just as the trailing margin of the patch comes opposite the roller.

The pick-up and applying rollers across the line of centers of the rollers while traveling in a downwardly inclined direction, so that adhesive tends to accumulate at the upper side of the roller bight. The accumulated adhesive creeps toward the roller ends and, in prior Pearce gummers, spreads beyond the ends of the rollers, part of it spreading over onto the outer marginal portions of the ends of the applying roller where it forms adhering beads of adhesive. Since the adhesive beads are carried by the applying roller beyond a horizontal boundary of the gum box, and since a surplus of adhesive is slowly but steadily added to the beads, a dripping of the gum from the beads onto the envelope blanks or onto the blank feeding mechanism occurs from time to time.

The primary object of the invention is to eliminate the dripping of adhesive from the ends of the applying roller beyond the gum box area. To this end it is a feature that non-rotary rings or collars are provided contiguous to the ends of the gum applying roller, onto which the surplus adhesive flows from the roller bight. Since the rings do not turn, the adhesive does not form a bead but simply collects at the lowest portions of the stationary rings and drips back into the gum box.

Further objects and advantages will hereinafter appear.

In the drawing forming part of this specification;

Fig. 1 is a fragmentary view in side elevation of the patch applying portion of an illustrative window envelope making machine embodying the invention;

Fig. 2 is an enlarged detail view showing the trailing margin of a patch pressed against the gum applying roller of the gummer;

Fig. 3 is a plan view of the supplementary gum box and associated parts;

Fig. 4 is a fragmentary sectional view taken upon the line 4—4 of Fig. 3, looking in the direction of the arrows;

Fig. 4A is a plan view of a Pearce envelope blank with the window patch applied;

Fig. 5 is a fragmentary view partly in section, taken on line 5—5 of Fig. 4, and broken away intermediate its end for compactness, showing the gum applying roller and associated parts;

Fig. 6 is a fragmentary view partly in section similar to Fig. 5, taken on the line 6—6 of Fig. 4, showing the gum pick-up roller and associated parts;

Fig. 7 is a detail end view of one of the gum bead eliminating rings or collars;

Fig. 8 is a detail end view of a bearing bushing employed in mounting the gum applying roller; and

Figs. 9 and 10 are side and plan views respectively of a device employed for confining the bushing of Fig. 8 in place and for restraining it against rotary and axial movement.

The illustrative machine is, with the exception that a gummer of the Pearce type has been added, a Smithe wide range window envelope machine of the kind partially illustrated, for example, in Figs. 1 to 8 of Letters Patent of the United States No. 2,191,505, dated February 27, 1940. Reference may be had to said patent for details not completely shown or described herein.

In the illustrative machine window blanks **1** are taken in timed relation from a stack, not shown, and after strips **2** of seal flap adhesive have been applied and dried, the blanks are individualized and delivered in accurately timed and aligned relation for the application of window patches to a belt conveyor **10**. The conveyor **10** comprises upper belts **12** which run beneath guide rollers **14** and around driven end rollers **16**. The conveyor **10** also comprises lower belts **18** which run upon guide rollers **20** around end rollers **22** and over outer guide rollers **24**. The belts **12** and **18** travel at uniform, equal speeds. The confronting active stretches of the belts grip the blanks between them and serve to advance the blanks at uniform

speed along a guide path defined by the active stretches of the belts.

Each blank is carried past conventional gumming mechanism which, through a rotary die gummer 26, applies a strip 27 of adhesive completely around the window opening 29 of each envelope blank in the usual way. The adhesive so applied is continuously spaced outward from the edges of the envelope opening, and it is also continuously spaced inward from the outer boundaries of the area to which the patch will subsequently be applied.

A bed cylinder 30, disposed beneath the blank path, but tangent at its highest point to such path, is driven at a uniform peripheral speed equal to the speed of blank travel. Opposite the bed cylinder a suction patch applier 34 runs tangent to the blank path and serves to apply a patch 35 over the window opening of each traveling blank. The patching mechanism is of conventional construction and may be like that illustrated and described in Patent No. 2,191,505.

A patch web (not shown) is fed out a uniform amount in each cycle from a reel into a severing position, in which its leading end is severed, being then drawn forward by a suction patch applying segment 32. The segment 32 forms part of the rotary patch applier 34 of well known construction. The patch applier 34 comprises a shaft 36 which is driven at uniform speed at the rate of one revolution per cycle. The segment 32 is supported at the trailing end of a lever 38, which lever is fulcrumed on an arm 40 of a rotary collar 42, the collar being rotatably mounted on the shaft 36. The tail of the lever 38 is drawn inward by a tension spring 44 to urge the segment 32 outward, and such inward movement of the lever tail is limited by a stop member 46.

The collar 42 is driven from the shaft 36 at variable speed, through variable speed mechanism (not shown), and since the segment 32 is carried by the collar it is correspondingly driven at variable speed. The segment 32, like the shaft 36, makes one complete revolution in each cycle, but the variable speed connection between the shaft and the segment causes the segment to be slowed down to a state of rest for an instant at the moment of patch severance, and then to be accelerated to average speed for delivering the patch to the envelope blank while the segment travels at average speed. As usual, the suction to the segment 32 is controlled to act on the web before severing, to carry the patch forward after severing, and to surrender the patch upon application of the patch to the envelope blank.

In conjunction with the patch applier 34 there is provided a supplemental gummer 48 of the Pearce type for applying a scanty strip 49 of thin adhesive to the trailing margin of the patch 35. The gummer 48 is supported as a unit from arms 50, which arms are, as usual, mounted with capacity for adjustment laterally of the machine to locate the gummer 48 in different desired positions of transverse adjustment. The gummer 48 comprises a gum box 52 which is rigidly connected through a lug 54 to the arms 50.

A gum pick-up roller 56 runs in the bottom of the gum box 52, being constantly driven at a slow peripheral speed in a counter-clockwise direction (as viewed in Figs. 1 and 4). A cooperative gum applying roller 58 is constantly driven in a clockwise direction at a uniform peripheral speed which may be the same as the speed of the roller 56. In Fig. 4 an exaggerated accumulation 58′ of adhesive is indicated in the upper right-hand bight formed by the rollers 56 and 58. The present invention is designed to avoid the adverse effect produced in prior gummers of the Pearce type by this constantly augmented accumulation of adhesive.

The gummer 48 comprises a square driving shaft 60 (Fig. 5) which passes through a square opening in a spur gear 62. The gear 62 is affixed to a left-hand extension sleeve 64 of the roller 58, being secured thereto by a set screw 66 and a locking pin 68. The roller 58 has a similar right-hand extension sleeve 70 at its opposite end. The extension sleeves 64 and 70 are rotatably supported in bearing bushings 72. Each bushing 72 is supported in a swingable arm 74. These arms will be described and explained presently. Each bushing is formed with circumferential flanges 76 which define a channel between them. Each bushing rests in a notch of the associated arm 74 with the flanges 76 engaging opposite sides of the arm. The flanges restrain the bushings against axial movement relative to the arms. The flanges of a bushing are formed with notches 78 in which the ends of a pin 80 are received for locking the bushing against rotation. The pin 80 is passed through the body of a retaining bar 82 and has its ends exposed at opposite sides of the bar. The bar is formed with a slot 84 in one of its ends. A headed screw 86 has its shank passed through the slot and threaded into the associated arm 74 for securing the bar in fixed position on the arm 74. The bar extends partway across the mouth of the notch and bears in the channel of the associated bushing 72, serving to prevent escape of the bushing from the notch.

Upon each of the sleeve extensions 64, 70 of the roller 58, and immediately adjacent to the body of the roller 58, there are provided stationary gum bead eliminating rings 88. Each ring 88 is of the same external diameter as the body of the roller 58 so that the ends of the pick-up roller 56 can overlap the rings as in Fig. 3. Each ring 88 is pressed toward the associated end of the body of roller 58 by a collar 90 which is secured in place on the associated extension sleeve by a set screw 92. Each ring 88 is provided with a radially extending stop screw 94 for limiting the rotation of the collar. It is not essential that rotation of the collar be completely prevented, but it is important that turning of the collar be at least limited to a small angle. Each stop screw 94 is restrained against forward rotation by a nut 96 on a shaft 98, and against reverse rotation by a lug 54. Each ring 88 is formed with a lubricating passage 95, for conveying lubricant to the bearing surfaces of the ring and the extension sleeve 70 which turns within the ring. The passage 95 extends inward and downward toward the right (Fig. 7) in a location and at an inclination to pass above the center of rotation of the sleeve 70. The passage 95 meets the surface of the sleeve 70 at an oblique angle such that the clockwise rotation of the sleeve surface tends to suck the lubricant in. This avoids the liability of lubricant being repelled and caused to drip into the gum box.

The importance of the non-rotary rings 88 will be appreciated upon inspection of Fig. 4. Without the rings, any adhesive allowed to flow beyond the ends of the circumferential face of the body of the roller 58 would spread on to the end faces of the roller, and would be carried to the left beyond the horizontal boundary of the gum box 52. A gum bead would develop at the junction of the circumferential and end faces to which bead gum would be progressively added from the accumulation in the roller bight. In the region where the roller travels to the left and upward clear of the gum box, gravity and centrifical forces would act conjointly to detach adhesive from the bead and cause it to drip onto the work or onto the machine parts, whenever the bulk of the bead becomes sufficient to cause a drop of adhesive to be detached. Since, however, the rings 88 do not rotate, gum carried directly to the rings by the roller 56, and gum flowing onto the rings from the roller bight is not carried outward across the lip of the gum box. It simply flows by gravity to or nearly to the lowest part of the ring, and drops from there back into the gum box.

The shaft 60, which acts through gearing to drive the roller 56, is also mounted with capacity for adjustment toward and from the roller 56, so that the spacing between the rollers 56 and 58 and the consequent thickness of the gum film which can pass between the rollers 56 and 58 may be nicely regulated. The required range of adjustment is a very narrow one, and hence the drive to

the shaft **60** may be transmitted from a fixed driving gear to a gear fixed on the shaft **60** (not shown) simply by using gears whose teeth fit somewhat loosely.

The levers **74** which carry the bushings **76**, through which the roller **58** and the shaft **60** are supported, are pivotally mounted on the shafts **98**. The shafts **98** pass through the end walls of the gum box and are rotatively supported in said end walls. Threaded rods **102** are pivotally supported on pins **104** which extend outward from lower corner portions of the end walls of gum box **52**. The respective rods **102** extend upward freely through the tails of the levers **74** to urge the roller **58** toward the roller **56**. Nuts **108** threaded on the upper ends of the rods bear against the upper faces of the lever tails to limit approach of the roller **58** toward the roller **56**. By adjusting the nuts a desired fine and uniform clearance can be provided between the rollers **58** and the rollers **56**.

The gear **62**, driven by the shaft **60**, has driving engagement with a gear **110** which is relatively mounted on the shaft **98**. The hub of the gear **110** bears at one side against an enlarged central section of the shaft **98** and is engaged at its opposite side by a collar **112** which is fixed on the shaft **98**. The opposite end of the shaft extends inward from the gum box wall. A spacer sleeve **114**, mounted on the shaft, is pressed toward the gum box wall by the nut **96**. The lever **74** is rockably supported upon an enlarged central section of the shaft **98**. The nut **96** serves to clamp the enlarged section firmly against the gum box wall. The enlargement, however, prevents the application of binding pressure to the lever **74** and to the gear **110**, such as would interfere with their independent turning. The lever and lever mounting as described are found in their entirety at the left side of the gum box in Fig. 3. The same structure is duplicated at the right side of the gum box in Fig. 3, save that no gears are provided at the right side.

The gear **110** drives a gear **116** fast on a shaft **118**. The shaft **118** is rotatably mounted in an embossed portion **120** of the left end wall (Fig. 3) of the gum box **52**. At the right side of said wall the shaft supports a spacing washer **122** and has fast upon it a gear **124**. The gear **124**, which is somewhat smaller than the gear **116**, drives a gear **126** which is fast with the pick-up roller **56** and of somewhat less diameter than said roller. The gear **126** is made fast upon the left hand hub portion **128** of the roller **56** by a set screw **130**.

Right and left end hub portions **128** are formed with bearing bores **132**. Each end wall of the gum box **52** is formed with a bore **134** through which the body portion of a flanged bearing plug **136** is fitted. Each plug **136** includes a bearing pin **138** which fits into the bearing bore **132** at the associated end of the roller **56**. Each bearing plug is secured to the associated gum box wall by headed screws **140**, the screws having their shanks passed through the flanges of the plugs **136** and threaded into the associated gum box wall.

A blower is provided for holding the patch **35** away from the gum applying roller **58** except when a gumming bar **144** is actuated toward the roller **58** to press the trailing margin of the patch against the roller. The blower comprises two stationary arms **146** and a longitudinal tube **148** supported thereby which tube has a series of side discharge passages from which jets **150** of air issue. The tube **148** is connected through a flexible tube (not shown) with a source of air under pressure (not shown).

The gumming bar **144** is carried by arms **152**, which are fast upon a rock shaft **154**. The rock shaft is rockably mounted in stationary arms **156**. The rock shaft **154** also has fast upon it an arm **158** which carries a cam follower roller **160**. The arm **158** is drawn downward to maintain the follower **160** in engagement with a stationary cam **162** by means of a tension coil spring **164**. The spring **164** is connected at one end to the arm **158** and at the opposite end to a stationary pin **166**.

In operation the machine is designed to produce window envelopes of the Pearce type. Individualized window envelope blanks are advanced at a high, uniform speed successively past the rotary window gum applier **26** and over a bed cylinder **30**, the latter being located at a patch applying station. A rotary patch applying segment **32** carries a patch to each blank, rolling the patch onto the blank as the blank travels over the bed cylinder **30**.

A web of patch material is fed from a reel and cut into patches, each patch being transferred as it is cut to the segment **32**. The patch has its leading margins held by suction to the segment **32**, but the rear end of the patch extends clear of the segment. In carrying the patch forward toward the patch applying station, the segment carries the patch past the supplementary Pearce type gummer **48**. The segment **32** carries the leading margin of the blank near to, but out of contact with, the applying roller **58** of the gummer **48**. The trailing portion of the blank is held away from the roller **58** by the blower **146**, **148** until the extreme rear portion of the blank comes opposite the roller **58**. At that time the presser bar acts to override the blower, forcing the trailing margin of the blank against the roller **58**.

The pick-up roller **56** of Pearce type gummer **48** acts constantly to pick up gum from the gum box **52** and to transfer it to the applying roller **58**. An accumulation **58'** of gum develops at the entrance to the bight formed between the rollers **56** and **58**. Since the roller **56** is long enough, however, to extend beyond the ends of the roller **58** and to overlap the non-rotary rings **88** which abut the ends of the roller **58** and coincide circumferentially with the roller **58**, the surplus adhesive which overflows at the ends of the bight is not delivered onto the ends of the rotating roller **58**, but is delivered onto the stationary surfaces of the rings **88** at points which are located well beyond the ends of the roller **58**. Since the rings **88** do not turn, they do not carry the surplus gum up and out beyond the horizontal boundary of the gum box. The surplus gum simply drips from the rings back into the gum box.

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

I claim:

1. A gumming mechanism comprising, in combination, a gum box, gum pick-up means in the gum box, a driven gum applying roller which stands above the pick-up means and in part projects horizontally beyond a boundary of the gum box so that it carries gum from the pick-up means to a position clear of the gum box, and means for preventing the formation of bum beads on the margins of the end faces of the applying roller comprising rings which abut the ends of the applying roller, are coaxial with said roller and are of the same diameter as said roller, and means substantially preventing rotation of said rings, the lowest portions of said rings being disposed to overlie potrions of the gum box.

2. A gumming mechanism as set forth in claim 1, in which the pick-up means consists of a roller which runs substantially tangent to the applying roller and which overlaps the rings in part, running tangent to them also.

3. A gumming mechanism as set forth in claim 1, in which the pick-up means consists of a roller which runs substantially tangent to the applying roller, and which further includes means for rotatively driving the pick-up roller and the applying roller, and means for

relatively adjusting said rollers to change the space between them.

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