LABEL APPLYING MACHINES

Ralph E. Doane, Chicago, and Wayne F. Ridenour, Oak Park, Ill., assignors to Cheshire Mailing Machines, Inc., Chicago, Ill., a corporation of Illinois

Application August 23, 1950, Serial No. 181,044

5 Claims. (Cl. 216—28)

This invention relates to improvements in machines for applying a label to a flat article such as a magazine, newspaper, catalogue, flyer or tabloid, and has particular reference to a mailing machine wherein the mailing pieces are fed in partial overlapping relationship to a label applying head.

Heretofore, machines for applying an address label to a magazine or other periodical have been characterized by mechanism for feeding an individual mailing piece on to a chain conveyor having lugs for transporting the mailing piece to a label applying or printed impression head for the application thereto of an address label or printed impression, the mailing piece then being removed from position at the label applying head on to a delivery conveyor. The starting and feeding of each piece was sometimes occasioned by damage to the edges of each mailing piece, and in order to avoid battering of the edges by this method of feeding, such machines had to be operated at speeds which were not entirely economical.

The mailing machines of the prior art have sometimes been characterized by a feed hopper for a stack of mailing pieces, a shuttle table having a lug engaging the back edge of the bottom-most mailing piece being employed to feed the bottom-most mailing piece between a pair of feed rollers which moved the mailing piece on to a conveyor bed for transport by lug-bearing chains. The shuttle table and its lug and the feed rollers all had a tendency to mar the exposed surfaces of each magazine or mailing piece. Furthermore, the three and four color work to be found in magazine covers has been accompanied by the use of inks which exhibit a smearing tendency when the magazines have been slipped or fed from a stack at the feeding hopper on to the chain conveyor, and the effort expended in fine color work for the front and back covers of the magazine has sometimes been lost by the smearing arising from the operation of the mailing machines of the prior art.

In lieu of shuttle feeders other arrangements have been employed for feeding the individual mailing pieces to the feed rollers, such as vacuum feeders or needle feeders, all of which had definite limitations as to the weight or thickness of each mailing piece capable of being fed, but irrespective of which kind of feeding arrangement was employed to feed the mailing pieces to the feed rollers, such machines had the additional disadvantage of employing feed rollers with the attendant difficulties recited above.

The mailing machine according to the present invention is preferably characterized by mechanism for moving the magazines or similar flat articles while they are stacked one against another in substantially vertical position thereby reducing the weight of the magazines as would be occasioned by vertically stacking the magazines one on top of another, the magazines being removed from the moving stack in partial overlapping relationship by a lap-feed conveyor for the application to each article or magazine of a label of any suitable kind. The machine according to the present invention is preferably characterized by means for accelerating each magazine in the plane of each magazine prior to removing each by the lap-feed conveyor, to the end that the lower edge thereof will not be battered by the lap-feed conveyor; and further, to the end that the amount of slipping of one with respect to another will be held to a minimum and thereby avoid the possibility of smearing thereof. The invention may further be characterized by control of the feed mechanism by the removal by the lap-feed conveyor of an individual magazine from the stack, so that at all times the stack is in position for the withdrawal therefrom of individual magazines in partial overlapping relationship.

With the foregoing considerations in mind, it is a principal object of this invention to apply address labels to a magazine or other mailing piece without the necessity of stopping and re-starting each mailing piece for the address label applying operation, to the end that the edges of each mailing piece will not be battered or damaged. A further object is to afford mechanism for feeding mailing pieces in overlapping relationship with only a small area of each mailing piece exposed sufficiently large in size for applying an address label to such exposed area, so that the amount of slippage of one magazine with respect to another will be held to a minimum to avoid smearing of the color work thereon.

Still another object is to feed the magazines in such overlapping relationship that the speed of travel of each magazine is reduced to a minimum, yet providing an hourly or daily production which is as great or greater than possible heretofore.

Yet another object is to provide mechanism for accelerating each mailing piece from rest up to the speed of a lug-bearing conveyor chain to the end that each piece will not be damaged by the conveyor lugs.

Other objects and important features of the invention will be apparent from a study of the following description taken together with the drawings which together illustrate a preferred embodiment of the invention and what is now considered to be the best mode of applying the principles thereof. However, the invention is not intended to be limited by the embodiment herein disclosed, and the scope of the invention is intended to be limited only by the spirit and breadth of the appended claims.

In the drawings:

Figure 1 is a general front view of a lap-feed label applying machine according to the present invention; Figure 2 is a general plan view thereof, the position of the mailing head for applying the address labels being shown in phantom outline; Figure 3 is a view taken along the line 3—3 of Figure 2 and along the line 3—3 of Figure 7, looking in the direction of the arrows, showing the clutching and driving mechanism for the feed shelf conveyor; Figure 4 is a substantially back elevation view of the upper portion of the lap-feed conveying mechanism, and the forward-most portions of the feed shelf and the feed shelf conveyor, looking from the back of the machine to the front as seen in Figure 1; Figure 5 is a view similar to Figure 4, showing the upper portion of the lap-feed mechanism and details of the rotary label applying head, Figures 4 and 5 being capable of being matched along the line A—A in Figures 4 and 5; Figure 6 is an enlarged partly elevational and partly sectional view of a portion of the feed shelf and the feed shelf conveyor for delivering mailing pieces to the lap-feed conveyor mechanism, and showing details of the adjusting mechanism for the stop fingers of the feed shelf; Figure 7 is a plan view of a portion of the feed shelf and the feed shelf conveyor, certain parts being broken.
away to show details of the adjusting mechanism for the stop fingers;

Figure 8 is a section taken along the line 8—8 of Figure 7 showing details of construction of the label applying head for applying a pasted and severed address label to a mailing piece being conveyed by the lap-feed conveyor of Figures 4 and 5;

Figure 9 is a section taken along the line 9—9 of Figure 7 showing details of the mechanism for swinging the paste roller away from the label applying roller, details of the paste reservoir also being shown;

Figure 10 is a detailed side elevation view of a portion of the lap-feed conveying mechanism looking from the right to the left as seen in Figure 1, the position of the label applying head being shown in phantom outline;

and

Figure 11 is a circuit diagram for controlling the magnetic clutches shown in Figure 3.

General description of machine

Referring now to Figures 1 and 2 of the drawings, the mailing machine according to the present invention is supported on a framework consisting of longitudinally extending base members 20, a pair of horizontal frame members 50 which are spaced parallel to each other, and which are connected together by vertical frame members 22. The framework thus far described provides a support for a feed shelf 23, a lap-feed conveyor 24, and a delivery conveyor 26.

The feed shelf 23 is provided with a conveyor 27 in the form of a plurality of block chains which travel around sprockets indicated generally as a group at 28 and 29, sprockets 29 being driven by a motor 30a through a variable speed drive 31, the speed drive 31 being connected by a chain 32 to turn a drive sprocket 33, see also Figure 3.

The conveyor chains 27 are each designated by the numbers 27a to 27d and are adapted to move a plurality of articles 34, such as magazines or other flat articles on to the lap-feed conveyor 24, whence they are moved in partial overlapping relationship with respect to each other past a label applying head indicated generally at 36 which is supported, as will be described in more detail as this specification proceeds, upon a pair of vertical support plates 30, see also Figure 10. It will be noted that the articles 34 are stacked against the lap-feed conveyor 24, each of the articles 34 resting upon a lower edge thereof and inclined slightly from the vertical so that the foremost of the articles will tend at all times to bear against the lap-feed conveyor 24. A motor and variable speed drive 37 drives a chain 38 which is trained around sprockets 39 and 41 to drive the lap-feed conveyor 24 and the label applying head 36 in perfect synchronism. As seen generally in Figure 1, the lap-feed conveyor is inclined from the vertical, and thereby moves the articles 34 in partial overlapping relationship in a generally upward direction from the feed shelf 23.

The label applying head 36 is adapted to apply a label, such as the perforated address label employed in the mass mailing of nationally circulated periodicals or the like, upon each article 34, whence each article 34 is moved by the lap-feed conveyor 24 on to the delivery conveyor 26. The delivery conveyor includes pairs of spaced sprockets 42, 43 which are connected by a pair of web plates 40, see Figure 2, to provide a flat bed and support for a number of conveyor belts 44 and 46. As shown in Figure 1, the angles 42 are supported at each end upon the vertical standards 22, while the angles 43 are supported at the left end upon one of the vertical standards 22 and at the right end upon the side frame plates 30. The conveyor belts 44 are trained around drive pulleys 47 and idler pulleys 48, and power is supplied to drive the belts 44 by a motor 49 and a variable speed drive 51 connected by a drive chain 52 which is trained around sprockets 53 and 54. The belts 46 are trained around the idler pulleys 48 and idler pulleys 56 supported on an idler shaft 70 journaled at 75 to the side frames 30, see Figure 10. The belts 44 are adjusted in tension by idler pulleys 59 mounted at the end of an arm 61 also pivoted to the underside of the angles 42, and the tension of the belts 46 is likewise adjusted by tension idler pulleys 59 mounted at the end of an arm 61 also pivoted to the underside of the angles 42. The articles 34 which are moved by the delivery conveyor 26 may be suitably guided by side guide plates 50, see Figure 2, which are adjusted according to the width of the articles 34 by spacer bolts 55 which are locked in position by adjusting nuts 56a bearing against the vertical legs of the flanges 42 and 43.

It will be seen from the description thus far that the articles 34 will be fed by the conveyor chains 27 of the feed shelf 23 on to the lap-feed conveyor 24, where they are labeled individually by the label applying head 36, the articles then being fed by the lap-feed conveyor 24 onto the delivery conveyor 26.

Details of feed shelf and feed conveyor

Referring now particularly to Figures 2, 3, 4, 6 and 7 of the drawings, the feed shelf 23 includes a channel shaped plate member 62 which overlies the vertical legs of the frame members 50 viewed from Figure 8. A channel shaped plate member 62 is held in place by cap bolts 63. The plate 62 thus provides a support for the group of conveyor chains 27 which are of the block type in order to present a substantially smooth surface to the underside of the articles 34.

As shown also with respect to Figures 2 and 3, the magazines or flat articles 34 are moved on block chains 27a to 27d inclusive, between side guides 60 which are capable of being adjusted according to the width of the magazines 34 in transverse slots 65, any suitable means being provided for holding the side guides 60 to the plates 62.

As shown in Figure 3, the drive sprocket 33 for the feed chains 27a to 27d is fast upon a shaft 64 which turns in a journal 66 held to the side frames 21 by the cap bolts 63. Sprocket 33 turns with a magnetic clutch 67 which cooperates with a moving clutch member 68 having a sliding key fit with a hollow shaft 69 encircling the shaft 64. A magnetic clutch 71 is mounted on the other end of the shaft 64 adjacent the opposite side frame 21 and cooperates with a moving clutch member 72 which has a sliding key fit with a second hollow shaft 73, the hollow shafts 69 and 73 being offset from each other at 74. The moving clutch member 68 is adapted to move into clutching engagement with the magnetic clutch 67 to drive sprockets 29a and 29b and their associated block chains 27a and 27b. Likewise, the moving clutch member 72 is adapted to move into clutching engagement with the magnetic clutch 71 to drive the sprockets 29c and 29d together with their associated block chains 27c and 27d.

The articles 34, which are moved by the block chains 27a to 27d inclusive, are adapted to move along adjustable stop bars 76 having stops 77 fastened to the ends thereof, see also Figures 4, 6 and 7. The adjustable stop bars 76 together with their stops 77 are capable of being adjusted longitudinally with respect to each other to define a curve in the articles 34 as they move along the feed shelf 23. The stops 77 will thus provide a curved cross-section through each of the articles when such cross-sections are taken on a horizontal plane. The stop bars 76 and the stops 77 may likewise be moved together as a unit to adjust the position of the first one of the articles 34 with respect to the lap-feed conveyor 24. To this end each of the adjustable stop bars 76 is held by screws 78 to a stop bar mounting 79. As shown in Figure 6, the adjustable stop bars 76 may also be supported on a tie bar 75 holding the frames 21 in spaced-apart relationship. The stop bar mounting 79 in turn rests upon an individually movable rack bar 81, and the stop bar mounting 79 and the rack bar 81 are held for movement within a stop bar guide 82 having vertically
depending limbs 83, 84, see also Figure 7. A ring 86 is brazed to the depending limbs 83 and 84, as at 87, and each guide 82 is held in position to a tie bar 88 spacing the said side frames 21, 21 by means of a set screw 89 threaded into each ring 86 and bearing against the tie bar 88.

As seen with particular reference to Figure 6, each stop bar mounting 79 is formed with a downward extending arm 91 which forms a support for an adjusting screw 92 adapted to bear against the right end of the rack bar 81. The other end of the stop bar mounting 79 is likewise provided with a downward extending arm 93 having a spring guide 94 mounted thereon. An abutment 96 is welded to the forward end of the stop bar guide 82 and is provided with a similar spring guide 97, a spring 98 being held between the abutment 96 and the arm 93. The spring 98 is of the compression type and tends to move the abutment 96 and the arm 93 apart. It will be seen that the position of each stop bar 76 and the stop bar mounting 79 may be suitably adjusted with respect to the rack bar 81 by turning the adjusting thumbscrew 92 as desired.

Referring also to Figure 7, a housing 99 is bolted to the outside face of one of the side members 21 and a set screw 101 engages the tie bar 88 which extends through the side frame 21 and into the housing 99. The housing 99 affords a support for a ball crank 102 and a worm 103 turned thereby. A worm arm 104 is turned by the worm 103 and is fast upon a pinion shaft 106 having a long pinion 107 integral therewith. The pinion 107 meshing with rack teeth 108 formed on the underside of one of the rack bars 81, and it will be seen that by rotating the ball crank 102 the stop bars 76 may be moved to the left or the right, as seen in Figures 6 and 7, as a unit, thereby adjusting the position of the first article 34 with respect to the lap-feed conveyor mechanism.

Details of lap feed conveyor mechanism

Referring now to Figures 1, 4, 5, and 10, the lap feed conveyor 24 is driven by the endless chain 38 which is trained around sprocket 35 of the adjustable speed driving mechanism 37, the sprocket 39, and the label head sprocket 41. The sprocket 39 is fast upon a shaft 109, see Figure 4, journaled in the side frame 30. A gear 111, also fast upon the shaft 109, meshes with a gear 112 fast upon a shaft 113 journaled in the side frame 30 at the lower end of the lap feed conveyor 24. A pair of drive sprockets 114 are fast on the shaft 113, and conveyor chains 116 are trained around the sprockets 114.

The sprocket chains 116 are spaced from each other as shown in Figure 10, and turn upon idler sprockets 117 mounted on the idler 70 which journals in bearings 75 to the side frames 30 adjacent the upper end thereof, see also Figure 5. As shown in Figure 4, the chains 116 may be suitably adjusted in tension by swinging idler sprockets 120 mounted on an arbor 125 which is adjusted with respect to the side frames 30. The conveyor chains 116 are provided with evenly spaced lugs 121, which are of a height sufficient to engage each article or magazine 34 as it is fed by the feed shelf conveyor chains 27a to 27d, inclusive, toward the lap-feed conveyor chains 116.

As shown in Figure 10, the articles 34 are supported on flat resilient metal strips 122 which provide a resilient bed for the articles 34 as they move along the lap feed conveyor 24. As shown in Figures 4 and 5, the side frames 30 are properly spaced by tie rods 123, and the metal strips 122 are resiliently supported on brackets 124 secured to the tie rods 123. The brackets 124 include a pair of spaced arms 126, 127, and the arm 126 is drilled to receive the pins 128 which is tapped into the space of the pins 122. The pin 128 has a portion of reduced diameter 129 which is fitted into a drilled hole in the arm 127. The reduced end 129 of the pin 128 is provided with a pair of stop nuts 131, and a spring 132 is bottomed at one end on the arm 127 and at other end on the pin 128. It will be apparent that the strips 122 may be permitted to yield slightly against the force of the spring 132, and according to the pressure applied by the label applying head 36 against the articles as they move in partial overlapping relationship on the lap-feed conveyor 24.

It will be noted that the strips 122 may be individually adjusted on each of the brackets 124 so that a desired amount of curvature may be introduced into each mailing piece 34 while being conveyed, and also so that the amount of projection of the lugs 121 between the strips 122 may be varied as desired.

Means are provided for accelerating individual articles which have been moved along the feed shelf 23 by the feed shelf conveyor chains 27a to 27d, inclusive, to the speed of the conveyor chains 116, so that the lugs 121 thereof will not batter nor injure the edges of the articles 34. To this end a star wheel 133 is keyed to a shaft 134 journaled in the side frame plates 30. The star wheel 133 is provided with teeth 136 which engage each individual mailing piece 34 and accelerate each from a position of rest to a speed corresponding to the speed of the lugs 121, so that at the time the lugs 121 will have engaged the lower edge of the individual article 34 its speed will have been brought up to that of the lugs 121.

The star wheel 133 is given an intermittent motion by means of a Geneva stop mechanism which includes a Geneva crank 137 made fast to the shaft 169. The Geneva crank 137 has three evenly spaced pins 138 in slots 139 of a Geneva wheel 141, also fast to the shaft 134 supporting the star wheel 133. The Geneva wheel 141 is adapted to be intermittently rotated by the engagement of one of the crank pins 138 in one of the slots 139 to provide an intermittent motion of the Geneva wheel 141 which varies from a position with rest to maximum angular velocity and then back to a position of rest, the action being repeated by the engagement of a succeeding crank pin 138 with a succeeding slot 139 in the Geneva wheel. The teeth 136 of the wheel 133 are so disposed with reference to the slots 139 of the Geneva wheel that when the teeth 136 have achieved their maximum velocity by the action of the Geneva stop mechanism, the lugs 121 will at such time of maximum velocity of the star wheel 133 engage the article or magazine 34.

Feed shell conveyor control mechanism

Referring now to Figures 3, 4, 7 and 11, mechanism is provided for controlling the movement of the articles 34 on the conveyor chains 27a to 27d, and so that the conveyor chains 27a to 27d are controlled by the presence of an article 34 which is in position for removal from the feed shelf 23 by the lugs 121 of the lap-feed conveyor chains 116. That is to say, the feed conveyor chains 27a to 27d are moved by the action of the articles 34 in being removed by the lugs 121 of the lap feed conveyor chains 116. To this end sensing fingers 146 and 147, see Figure 11, cooperate respectively with switches 148, 149, switch 148 only being shown in Figure 4. The sensing finger 146 is so arranged with respect to the switch 148 that the contact of a mailing piece 34 with the sensing finger 146 causes the switch 148 to open. As seen in Figure 11, the switch 148 is connected in circuit with a selenium rectifier and with a slip ring 151 to supply power to the winding of the magnetic clutch 71. The switch 149, which is actuated by the sensing finger 147, is likewise connected in circuit with the selenium rectifier to supply power to slip rings 152 to the winding of the magnetic clutch 67. It will be remembered, see Figure 3, that the magnetic clutch 71 controls the movement of the sprockets 124 and operates the chains 27c and 27d, and it likewise will be remembered that the magnetic clutch 67 controls the rotation of the sprockets 29a and 29b and the operation of the chains 27a and 27b.

The stop fingers 77, which are so disposed with refer-
ence to the lap feed conveyor chains 116, are arranged to give a desired amount of curvature to the articles or magazines 34, and in order to maintain the curvature of the strips as they are advanced by the feed of the conveyor chains 27a to 27d, the sensing fingers 148 and 147 are thus adapted to control the movement of the conveyor chains 27a to 27d to maintain such curvature, and to position the magazines 34 for removal by the lugs 121 of the lap feed conveyor chain 116. Thus, when the switch 148 is closed by the movement of the first of the magazines 34 by the medium of the star wheel 133 and the lugs 121 of the conveyor chains 116, the winding of the clutch 67 will likewise be energized to cause the conveyor chains 27a to 27b to be moved. Since the magazines 34 must at all times be in position against the flexible strips 122 and against the magazine support plates 120, the magnetic clutches 67 and 71 will be energized with pulses of current as may be determined by the closing of the switches 148 and 149. Thus at all times the desired curvature of the magazines 34 will be maintained to insure that the lugs 121 will engage a lower edge of each of the strips as they are advanced by the chains 27a to 27d along the feed shelf 23.

In the case where magazines are fed along the feed shelf, the stitched or folded edge is thicker than the cut or trimmed edges, and in order to maintain the proper feed, the pair of chains nearest the folded edge will be required to move through a greater distance for each magazine than the other pair of chains. Such differential movement of each pair of chains is of course irrespective of whether any desired curvature is made in each.

General description of label applying mechanism

The articles 34 which are thus removed from the feed shelf 23 are conveyed in a generally vertical direction by the lap feed conveyor 24, see Figure 1, and are adapted to pass under a flexible roller 153 supported on a shaft 154 held in adjustable journals 156 on the side frames 30. The resilient roller 153 is thus adapted to override the articles 34 as they move in partial overlapping relationship along the adjustable strips 122 of the lap feed conveyor 24, in such a fashion as to place a slight amount of pressure thereon.

Referring now to Figures 5, 8 and 9 of the drawings, the articles which have been moved along the lap-feed conveyor 24 in partial overlapping relationship with respect to each other then move past the label applying head 36, see also Figure 1, for the application to each individual article of a severed and pasted label 157, see also Figure 2. As shown in Figures 5, 8, and 9, the label applying head 36 includes a main frame 161 having a rib 162 formed thereon. The main frame 161 and the rib 162 are provided with supports 163 and 164 for bearings 166 and 167. The bearings 166 and 167 are supported on a sleeve 168 which is keyed to a shaft 169 journaled at one end in a bearing 171 in one of the side frames 30 and journaled at the other end in a bearing 172 supported on a bracket 173 supported by the other side frame 30, see Figure 10. The bracket 173 is held in proper spaced relationship with respect to the other side frame 30 by a tie bar 174. As seen also with respect to Figure 10, the shaft 169 is adapted to be turned by the sprocket 41 which is driven by the drive chain 38.

The frame 161 is closed by a cover plate 176 which is supported on the frame at a plurality of points as by cap bolts 177. The frame 161 and the cover plate 176 thus define a housing 178 for bearing a pin roller 179, a rotating knife support 181, a label applying roller 182, and a paste applying roller 183, see also Figure 9, to feed, sever and apply paste to individual labels 157 which are applied from a rolled strip 184 thereof mounted on a supply reel 186 supported on a standard 187 and a spindle 188 secured to the frame 161 in any convenient manner. As seen in Figure 5, the strip 184 contains evenly spaced perforations 189, which lie on either side of appropriate intelligence 191, as for example the address of a mailing piece, the pin 192 being located around a pin 192 struck out at an angle of 45° to the substantial plane of the housing frame 161, and supported on an abutment 193 secured in any convenient manner to the upper side of the frame 161. The strip 184 is guided over the pin roller 179, and pin 194 extending from the pin roller 179 are arranged to feed the strip 184 around the periphery thereof. The strip 184 is then guided over a stationary knife frame 196 supported on a gib 197 which is adjustable with respect to a stationary gib support 198 by means of an adjusting screw 199. The strip 184 which has thus been fed by the pin roller 179, is moved past the rotating knife support 181, which has a plurality of knives 201 extending radially from the periphery thereof. As seen in Figure 8, the knives 201 may be held in slots 202 of the knife support 181 in any convenient manner, and it is preferable to adjust the knives 201 by the means of adjustment 203, not shown. The strip 184 which has been advanced by the pin roller 179 is thus severed by the knives 201 into the individual address labels 157, as seen in Figure 2, and the individual address labels 157 are then held by suction to a raised pad 203 of the label applying roller 182. As shown in Figure 8, the raised pad 203 has a plurality of suction openings 204 therein and the suction pressure applied thereto may be achieved by suitable mechanism as shown in an application of Wayne F. Ridenour, Ser. No. 89517, filed April 25, 1949, for Improvements in Mailing Machines, now Patent No. 2,606,681 patented Aug. 12, 1952.

The individual address labels 157 rotate with the label applying roller 182 past the paste applying roller 183 which applies a film of adhesive to the address label. The label 157 and the label applying roller 182 continue their rotation together whereby the severed and pasted label 157 is applied to the mailing pieces which have been fed in partial overlapping relationship by the lap feed conveyor 24, see particularly Figure 5.

The housing 178 which is defined by the frame 161 and the cover plate 176 is adapted to be rotated as a unit together with the pin roller 179, the knife support 181, the label applying roller 182 and the paste applying roller 183 upon the shaft 169 as a turning center, so that the position of the label applying roller 182 may be adjusted to accommodate different thicknesses of the mailing pieces 34. The housing 178 which is adapted to be rotated about the shaft 169 as a turning center is held in position by an arm 206 extending generally upward therefrom from the frame 161, see Figure 5. The arm 206 is bifurcated to receive a pin 207 which is cross drilled for a sleeve 208 having a flange 209 extending therefrom. A rod 211 having a head 212 is tapped into a ring 210 supported on the tie bar 174, and is threaded to hold an adjusting nut 213. A spring 214 is held between the head 212 and the flange 209 and normally tends to urge the arm 206 against the adjusting nut 213. It will be seen that the resiliency of the spring 214 allows the housing 178 to move slightly in a counterclockwise direction as seen in Figure 5, to accommodate slight variations in thickness of the articles 34 as they are moved along the lap feed conveyor 24. It will also be apparent that the nut 213 may be adjusted in position to rotate the frame 178 in either direction in accordance with the average thickness of the mailing pieces 34.
Details of construction of pin feed roller

Referring particularly to Figure 8, the pin roller 179 is adapted to be rotated in timed relationship to the main drive shaft 231 and driven through the medium of a gear train which includes a gear 216 keyed to the sleeve 168 which turns with the shaft 169. The gear 216 meshes with a gear 217 fast to a shaft 218 supported on a bearing 219 held in the rib 162 and a bearing 221 supported in the main frame 161. A pinion 222 is fast to the shaft 218 and meshes with a gear 223 fast on an idler shaft 224 which is journaled in a bearing 226 held in the rib 162 and a bearing 227 supported in the frame 161. A gear 228 is fast on the idler shaft 224 and meshes with a pin wheel drive gear 229 made fast to a strip throw-out shaft 231 turning in a bearing 232 supported in the eye plate 176. The strip throw-out shaft 231 is counter-bored as at 233 to receive a pin roller drive shaft 234 which is supported on bearings 236 held in the main frame housing 161, the pin roller drive shaft 234 being additionally supported within the counter-bore 233 of the strip throw-out shaft 231 upon needle bearings 237.

A driving connection is afforded between the strip throw-out shaft 231 and the pin roller drive shaft 234 as and as shown in Figure 8 a flanged sliding throw-out clutch sleeve 238 is slidably keyed to the strip throw-out shaft 231. A strip throw-out ratchet 239 is fastened by a set screw 241 to the flanged sleeve 238, and a spring 242 is held between a flange 243 formed on the strip throw-out shaft 231 and the sliding throw-out clutch sleeve 238 to urge the flanged sleeve 238 to the right as seen in Figure 8. The throw-out clutch sleeve 238 is milled with a number of radial slots 244 which correspond with the number of ratchet teeth 239 and, which are adapted to be engaged by pins 246 spaced evenly around a stationary clutch member 247 keyed to the shaft 234. A collar 248 is formed on the shaft 234, and the pin roller 179 is formed with a hub 249 which bears against the collar 248, and is held in place by a knurled nut 251 threaded to the end of the shaft 234 and bearing against a collar 252 having a sliding connection to the shaft 234 at a pin key 253. It should be noted that the number of ratchet teeth on the throw-out ratchet 239 correspond to the number of pins 194 on the pin 179, and that the number of pins 246 in the stationary clutch member 247 likewise correspond to the number of pins 194 on the pin roller 179. It will be noted that the bias of the spring 242 is in a direction to urge the radial slots 244 into matching engagement with the pins 246 whereby a driving connection will be afforded through the gear train 216, 217, 222, 228 and 229 to drive the pin roller 179 and withdraw the strip 184 from the supply reel 186.

Means are provided for dispensing the driving connection to the pin roller 179 whereby the throw-out sliding clutch member 238 is moved to the left as seen in Figure 8, when the articles 34 are being moved at irregularly spaced intervals along the lap feed conveyor 24. Referring now to Figure 5, a switch frame 254 is mounted upon one of the side frames 30, and is provided with a switch actuator 256 having a sensing finger 257 which will rotate in the dotted line position shown when the magazines 34 are being fed at regularly spaced intervals. The sensing finger 257 is of a dimension less than the exposed length of two regularly spaced magazines, so that if the lugs 121 of the lap feed conveyor chain 116 fail to move the magazines 34 a sensing finger 257 will rock in a clockwise direction, as seen in Figure 5, to actuate a switch finger 258. A solenoid 259, see Figure 8, is secured to the top of the frame 161 of the housing 178 and is provided with a moving armature 261 which is biased to a release position by means of the rocking switch fingers 256 and 258 in a clockwise direction, as seen in Figure 5, the solenoid 259 is energized to cause its armature 261 to contact one of the ratchet teeth 239. Since the ratchet teeth 239 are beveled and rotate with the strip throw-out shaft 231, the sliding clutch throw-out member 238 will be moved to the left, thereby making the clutching connection between the radial slots 244 and the pins 246 inoperative, thereby causing the pin roller 179 to stop the feed movement of the perforated strip 184. It will be seen that when the magazines 34 are once more fed at regularly spaced intervals, the switch fingers 256 and 258 will resume their dotted line position as seen in Figure 5 to deenergize the solenoid 259 and cause the armature 271 thereof to be moved upward by the bias of the spring 262. The clutching connection is once more provided by the radial slots 244 and the pins 246 to drive the feed roller 479 for feed movement of the perforated strip 184.

Details of construction of rotating knife support

The rotating knife support 181 is driven by the cockpit of the gears 216 and 217, the gear 217 being fast upon the shaft 218. The rotating knife support 181 is held in position on the shaft 218 as by the retaining nut 263 shown in Figure 8. A driving connection is provided between the rotating knife support 181 and the shaft 218 by means of a hub 264 keyed to 266 to the shaft 218. The hub 264 is provided with a radial extension 267 which extends within a radially extending slot 268 formed in the rotating knife support 181, see also Figure 5, and as shown, the radial extension 267 is spaced from the walls of the slot 268 formed in the rotating knife support 181.

The position of the radial extension 267 with respect to the walls of the slot 268 is adjusted by cap screws 269 which thread into the knife support 181, the head of said screws 269 bearing against the radial extension 267. It will thus be seen that the angular position of the knife support 181 may be adjusted in either direction a slight amount so that the knives 201 will sever the strip 184 which has been fed by the pin roller 179 along the stationary knife 196 at the perforation 189.

Details of label applying roller

Referring again to Figure 8, the label applying roller 182 is driven by the main drive pinion 216 which meshes with an idler pinion 217 mounted on a shaft 272 turning in bearings 273 and 274 supported in a flange 275 formed as a part of the rib 162. The idler pinion 271 meshes with a driving gear 276 fast upon a shaft 277 supported upon bearings 278 and 279 located respectively in the rib 162 and the housing frame 161. The label applying roller 182 is in the form of a hollow drum having a hub 282 keyed to the shaft 277. The annulus 281 is formed with evenly spaced flats 283 to which the raised pads 203 are secured in any convenient manner. The hub 282 of the roller 281 supports a stationary filler block 284, and a closure plate 286 for the open end of the annulus 281 is also supported upon the hub 282 in abutting relationship with the stationary filler block 284. The closure plate 286 and the stationary filler block are held in position by a washer 287 bearing thereagainst and held in position by a nut 285 threaded to the end of the shaft 277. The stationary cylindrical block 284 and the closure plate are held against rotation by means of an arm 287, see Figure 5, supporting cap bolts 288 tapped into closure plate 286 and the stationary cylindrical filler block 284. As seen with respect to Figure 5, the arm 287 is provided with a yoke 289 which surrounds a pin 291 extending through the gib support 198.

A pair of arcuate pad segments 292 and 293 partly encircle the stationary filler block and may be adjusted in position angularly with respect to each other by means of adjusting screws 294 tapped therein, and angularly movable in slots 295 in the closure plate 286. The arcuate pad segments 292 and 293 thus define an arcuate shaped recess 297 which is subjected to a source of vacuum pressure connected to a fitting 298 which is in communication with the recess 297, the source of vacuum
pressure thereby creating a suction against the openings 204 in the pad 203 as it revolves with the cut and severed label 157. The arcuate pad segments are so adjusted angularly that the suction pressure against the severed labels is relieved when the pads 203 rotate against the magazine 34 with the severed and pasted label therebetween.

Details of paste applying mechanism

Referring to Figures 8 and 9, the cut and severed label 157 which revolves with the raised pad 203 of the label applying roller 182 is moved past the paste applying roller 183 in contact with the application thereto of a film of adhesive prior to rolling the label 157 upon each individual article 34. Referring now to Figures 8 and 9, the sleeve 168, which is keyed to the shaft 169, also has fast thereto a gear 301 which is spaced from the gear 216 by a sleeve 302. The gear 301 is held in position by a washer 303 and a locking nut 304 threaded to the end of the sleeve 168. The gear 301 meshes with a gear 306 fast to a shaft 307 journaled in bushes 305, which are supported in a hollow stationary axle shaft 308. A housing 309 supports one end of the axle shaft 308 and swivels with the hollow axle shaft 308 about a trunnion 311 formed on the closure plate 176. The other end of the hollow axle shaft 308 is supported in a housing member 312 which swivels about a trunnion 313 on the housing frame 161 together with the housing 309. Referring now to Figure 9, a glue reservoir 314 is secured to the underside of the housing member 312 by cap bolts 316. The reservoir 314 thus defines walls 317 and 318 which enclose the paste roller 183. As shown with particular reference to Figure 9, the paste roller 183 is made fast to the shaft 307 by means of a key 319, the wall 318 being held in abutting relationship with respect to the roller 183 by means of countersunk screws 321 to prevent endwise movement of the paste roller 183 on the shaft 307. The periphery of the paste roller 183 is provided with spaced circumferentially extending slots 322, and a scraper knife 320 is slidably adjustable in a groove 323 formed in the wall portions 317 and 318 of the paste reservoir to meter the thickness of paste film carried by the roller 183 as it turns within the paste reservoir 314. As shown in Figure 5, the scraper knife 320 may be adjusted in position by adjusting nuts 324 bearing against an ear 326, the adjusting nuts 324 being supported upon a stud 327 extending from one edge of the paste reservoir 314. Means are provided for swiveling the paste roller about the trunnions 311 and 313 to remove the periphery of the paste roller 183 from contact with the raised pad 203 when the pin roller 179 has been disengaged by an irregular spacing of the magazines as they are conveyed along the lap feed conveyor mechanism 24. To this end a sensing finger 328 is adapted to contact the magazines 34 as they move along the lap feed conveyor 24. The sensing finger 328 is pivotedly mounted on a switch frame assembly 329, and the sensing finger 328 is so arranged that when it rocks in a clockwise direction as seen in Figure 5, as may be occasioned by irregular feeding of the magazines 34, a switch finger 331 is actuated to close a circuit to a solenoid 332 mounted on the cover plate 176, see also Figure 8. The solenoid 332 has an armature 333 which is retracted upon energization of the solenoid 332 to rock a bell crank 334 pivoted to support 336 held to the cover plate 176. The end of the bell crank 334 remote from the armature 333 bears against a push rod 337 connected to a lug 338 struck out from the paste reservoir 314. The push rod 337 is supported on bosses 339 and 341 supported on the cover plate 176. The movement of the push rod 337 is opposed by a spring 342, one end of the spring 342 abutting the boss 339, and the other end of the spring 342 abutting an adjustable collar 345 threaded to push rod 337. A nut 343 is threaded to the push rod 337 and adjusts the position of the paste roller 183 with respect to the raised pad 203 in accordance with the thickness of the paste film carried by the paste roller 183 as it rolls over the severed label 157 carried by the raised pad 203.

It will be seen that upon movement of the finger 328 in a clockwise direction, as may be occasioned by irregular spacing of the magazines 34, the switch 331 will be closed to energize the solenoid 332 and rock the bell crank 334 to move the paste roller 183 out of contact with label 157.

It will be noted from the foregoing that when the switch 254 is causing disengagement of the pin roller 179 from its driving means, a severed label 157 will not be held by one of the raised pads 203 of the label applying roller 181, and that by operation of the switch 331, the paste roller 183 will be brought out of contact with the pad which is unoccupied by a severed label 157, so that a film of adhesive will not be applied to the raised pad 203. It will be apparent that the raised pads are kept free from adhesive which would occur if not for the presence of the solenoid operated mechanism for removing the paste roller 183 from proximity to the raised pad 203.

Summary

From the foregoing description of the invention, it will be apparent that there has been provided a new and different machine for applying labels to flat, flexible articles such as nationally distributed newspapers or the like. The machine according to the present invention is characterized by the feeding of each individual article with complete freedom from the operation of any mechanism which would tend to smear or otherwise injure the articles. By the provision of the lap feed conveyor mechanism described, it is possible to transport or convey the same number of articles past a label applying head with a greatly reduced linear speed. It will be apparent that by the provision of a label applying head having a plurality of raised pad portions for applying the label, the rotational speed of the label applying head will be lowered in accordance with the lowered linear speed of each of the articles or magazines. It will be likewise apparent from the foregoing description that the articles may be placed upon a feed shelf in substantially vertical position, transported along said feed shelf and be removed therefrom by one or more overlapping relationships at a speed which is greatly less than the speed required of such individually transported magazines or articles in the machines of the prior art. By the use of an accelerating device, such as the star wheel 133, the mailing pieces 34 may be individually accelerated to the speed of a rapidly moving conveyor mechanism with a consequent lessening of injury of each magazine at the edges thereof.

While the unique features and improvements of the present invention are shown as incorporated in a preferred embodiment of the invention, and in a form which the invention may assume in practice, the scope of the invention is not intended to be limited by the precise embodiment shown nor otherwise than by the spirit and breadth of the claims here appended.

We claim:

1. In a machine for applying a label to an individual flat article such as a large magazine or the like, a feed shelf having said articles disposed thereon in substantially vertical position while resting on the lower edges thereof, means for moving said articles in a substantially vertical path in contiguous relationship with respect to each other along said feed shelf, means for conveying said articles away from said feed shelf in partial overlapping relationship with respect to each other, a label applying head for applying a label to said articles whilst being conveyed past said label applying head in such partial overlapping relationship, and means driving said conveying means and label applying head in synchronism.
2,715,975

2. In a machine for applying a label to an individual flat article such as a large magazine or the like, a feed shelf having said articles disposed thereon in substantially vertical position while resting on the lower edges thereof, means for moving said articles in contiguous relationship with respect to each other along said feed shelf, means for conveying said articles in a substantially vertical path away from said feed shelf in partial overlapping relationship with respect to each other, means for accelerating an article in a foremost position on said feed shelf to the speed of said conveying means, a label applying head for applying a label to each article whilst being conveyed past said label applying head in such partial overlapping relationship, and means driving said conveying means and label applying head in synchronism.

3. In a machine for applying a label to an individual flat article such as a large magazine or the like, a feed shelf having said articles disposed thereon in substantially vertical position while resting on the lower edges thereof, means for moving said articles in contiguous relationship with respect to each other along said feed shelf, means for conveying said articles in a substantially vertical path away from said feed shelf in partial overlapping relationship with respect to each other, a label applying head for applying a label to each article while being conveyed in such partial overlapping relationship comprising a continuously rotating feed roller having perforation engaging pins extending from the periphery thereof for engaging the perforations of an interally perforated strip and advancing the same, a continuously rotating label applying roller, a stationary knife interposed between said feed roller and said label applying roller across which said strip is fed, a continuously rotating roller having a knife thereon cooperating with said stationary knife for severing a label from said strip to be carried by said label applying roller, said label applying roller holding a severed label to the periphery thereof for the application of a label to each of said articles while being conveyed in such partial overlapping relationship, and means driving said conveying means and label applying head in synchronism.

4. In a machine for applying a label to an individual flat article such as a large magazine or the like, a feed shelf having said articles disposed thereon in substantially vertical position while resting on the lower edges thereof, means for moving said articles in contiguous relationship with respect to each other along said feed shelf, means for conveying said articles in a substantially vertical path away from said feed shelf in partial overlapping relationship with respect to each other, a label applying head for applying a label to each article while being conveyed in such partial overlapping relationship comprising a continuously rotating feed roller having perforation engaging pins extending from the periphery thereof for engaging the perforations of an interally perforated strip and advancing the same, a continuously rotating label applying roller, a stationary knife interposed between said feed roller and said label applying roller across which said strip is fed, a continuously rotating roller having a knife thereon cooperating with said stationary knife for severing a label from said strip to be carried by said label applying roller, said label applying roller holding a severed label to the periphery thereof for the application of a label to each of said articles while being conveyed in such partial overlapping relationship, and means driving said conveying means and label applying head in synchronism.

References Cited in the file of this patent

UNITED STATES PATENTS

1,263,515 Biehler April 23, 1918
1,273,796 Biebly July 23, 1918
1,515,265 Miles Nov. 11, 1924
1,949,158 Gay Feb. 27, 1934
2,165,732 Kleineberg June 27, 1939
2,195,111 Kegley Mar. 26, 1940
2,262,798 Elliot Nov. 18, 1941
2,274,075 La Bomard Feb. 24, 1942
2,331,230 Rippl et al. Oct. 5, 1943
2,345,310 Willoughby Mar. 28, 1944
2,483,458 Fischer et al. Oct. 4, 1949
2,518,011 Hoppe Aug. 8, 1950
2,543,220 Ardell Feb. 27, 1951
2,606,681 Ridenour Aug. 12, 1952

FOREIGN PATENTS

198,857 Great Britain June 14, 1923
442,115 Great Britain Feb. 3, 1936