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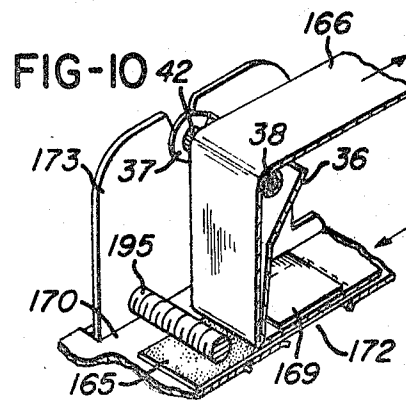
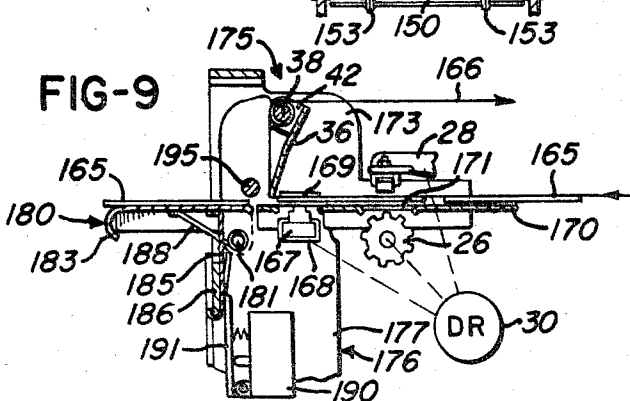
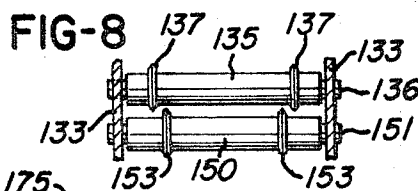
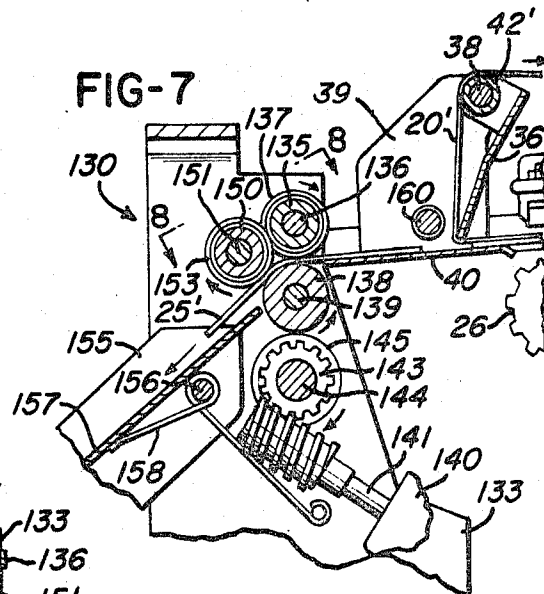
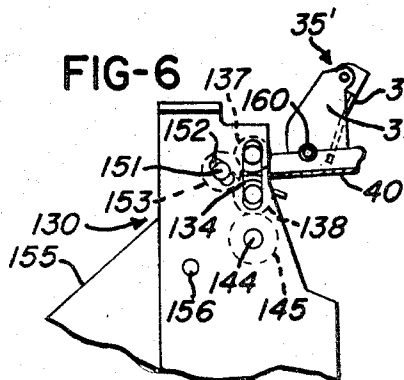
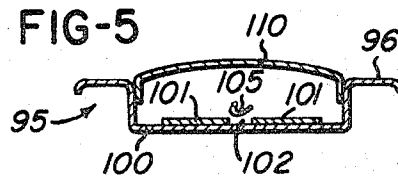
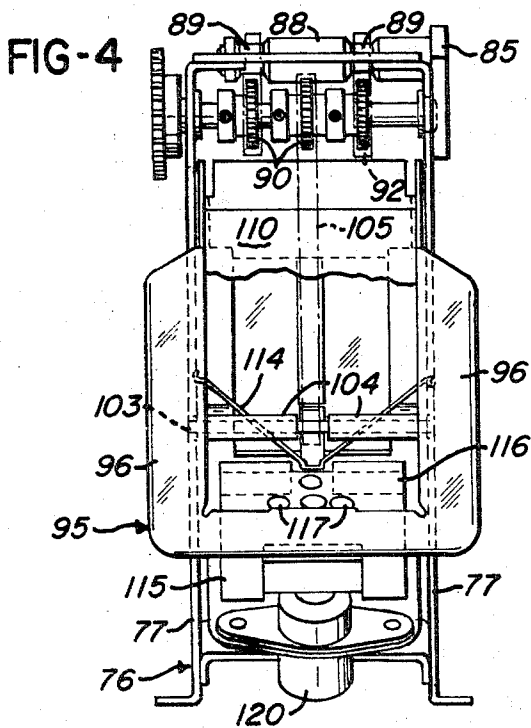
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3,556,898

LABEL PRINTING AND DISPENSING APPARATUS

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2 Sheets-Sheet 2



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LABEL PRINTING AND DISPENSING APPARATUS
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9 Claims

ABSTRACT OF THE DISCLOSURE

A power actuated printer successively prints variable information on pressure sensitive adhesive labels carried by a backup tape. Immediately after each label is printed, it is removed from the tape by a drive which pulls the tape through a separator, and guide means directs each label to an application station by engaging a small area of the adhesive coating of the label after it is stripped from the backup tape.

BACKGROUND OF THE INVENTION

The present invention relates generally to label printing and issuing apparatus as disclosed in U.S. Pat. No. 3,447,992 and in Allen et al. Pat. No. 2,948,466, both of which are assigned to the same assignee as the present invention. That is, the apparatus of the invention is ideally suited for use in an automatic computing scale system as shown in the above patent and which is constructed to weigh food products or other articles and to issue a printed label thereon having both the weight and the computed value of the article. Scales of this character are particularly useful for food markets of the self-service type which sell commodities such as meat in pre-packaged form, the printed label being attached to the package before the package is placed in the display case ready for selection by a customer.

In the apparatus disclosed in the above application, each stripped label is transferred from the stripping means and applied to the article corresponding to the information printed on the label in response to presenting of the article to a transfer mechanism. In some installations, however, it has been found desirable to transfer each pressure sensitive label automatically to the application station immediately following the successively performed printing and stripping operations so that each label will be awaiting the presenting of the article and thus can be applied to the article in minimum time.

SUMMARY OF THE INVENTION

The present invention is directed to printing and issuing apparatus for pressure sensitive adhesive labels and incorporates improved means for guiding or delivering successive pressure sensitive labels from a mechanism which separates each label from a backup tape to an application station where each label can be quickly and conveniently applied to the package or article corresponding to the information printed on the label. The invention provides the important feature of high speed delivery of each printed label from the stripping means to the application station so that each label will arrive at the application station in advance of the corresponding article.

In accordance with the invention, the guiding or delivery means has a surface of small area for contacting the adhesive side of each label and thereby providing for positive movement of each label while maintaining the established orientation of the label as it is removed from the backup tape. In one embodiment, the guiding means is formed by a spool-like roller having a pair of circumferential ribs or flanges with peripheral knife-like rims which effect line contact with the adhesive side of

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each label. In another embodiment, the guiding means incorporates an endless conveyor in the form of a chain having articulated links which provide the small area surface for engaging the adhesive side of each label.

In each embodiment, the feature of an interlock switch is provided for controlling the printer and tape drive. This switch is actuated in response to application of each label to its corresponding article to prevent the issue and delivery of the next successive label before the preceding label is applied to the article corresponding to the information printed on the label.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of one form of apparatus constructed in accordance with the invention and showing somewhat schematically the general arrangement of the major components;

FIG. 2 is a fragmentary perspective view of the label dispensing apparatus shown in FIG. 1;

FIG. 3 is a vertical section of the apparatus shown in FIG. 2;

FIG. 4 is a front elevation of the apparatus shown in FIG. 2, with a portion of the chute broken away;

FIG. 5 is a section generally on the line 5—5 of FIG. 3;

FIG. 6 is a fragmentary elevational view of apparatus constructed in accordance with another embodiment of the invention;

FIG. 7 is an enlarged fragmentary vertical section of the apparatus shown in FIG. 6;

FIG. 8 is a section generally on the line 8—8 of FIG. 7;

FIG. 9 is a vertical section similar to FIG. 7, showing another modification of apparatus constructed in accordance with the invention; and

FIG. 10 is a fragmentary perspective view of the apparatus shown in FIG. 9.

DESCRIPTION OF PREFERRED EMBODIMENTS

The label printing and issuing apparatus shown in FIG. 1 generally includes a frame 15 which may also be the main support frame of the printer shown in the above patent. The frame 15 supports a spindle 16 on which a roll 18 of backup tape 20 is mounted for free rotation. The tape 20 is provided with two longitudinally extending rows of uniformly spaced perforations 21 (FIG. 2) and carries a series of pressure sensitive labels 25 having a top adhesive surface adjoining the tape 20 (FIG. 1).

The tape 20 with the labels 25 thereon is directed from the roll 18 to a space between a series of printing or type wheels 26 and a hammer 28 where each successive label receives printing information relating to the weight, price per pound and computed price of the article placed on the scale as mentioned above. The type wheels 26 are set, and the hammer 28 is actuated by a main printer drive 30 so that the hammer strikes the top side of the tape 20, causing the type impression of the preset wheels 26 to mark the labels 25. It is to be understood that a label of practically any shape can be used, including a rectangular, square or oval shaped label, and in each case, the perforations 21 are positioned in precise relationship with the labels 25 for accurate indexing of each successive label with respect to the printing mechanism.

Beyond the printing station for the labels, the tape 20 is directed and advanced into a stripping mechanism 35 which comprises a plate 36 (FIG. 3) having ears 37 hinged for movement on a shaft 38 supported by parallel spaced side plates 39 extending upwardly from a bottom support plate 40. The plate 36 may be pivoted to provide an enlarged opening for conveniently inserting the tape 20 between the plate 36 and the bottom support plate 40. The bottom edge 41 of the plate 36 is provided with a

relatively short radius around which the tape 20 is directed and then travels upwardly over a roller 42 mounted on the shaft 38.

As the backup tape 20 proceeds around the sharp edge 41, the labels 25 are successively stripped from the tape 20, and each label extends outwardly onto the bottom support plate 40. After the tape 20 is separated from the labels 25, it wraps the roller 42 and travels rearwardly generally parallel with and spaced above the run of the tape 20 carrying the labels 25.

A tape feed or drive mechanism 55 is mounted at the rear of the frame 15 and is adapted to drive the tape 20 from which the labels have been removed by pulling the tape and labels past the type wheels 26 and through the separator 35 in successive increments immediately after the labels are printed. The tape drive mechanism 55 includes a rotatable drum 56 removably retained on a shaft by a knob 57 and having circumferentially spaced pins 58 precisely spaced in accordance with the size of the labels 25 to engage the perforations 21 of the backing tape 20, which wraps approximately 180° around the drum 56.

An electric motor (not shown) drives the shaft supporting the drum 56 and is controlled by a switch (not shown) actuated in response to the movement of an elongated arm 60 connected to the upper end of a rocker arm 62 pivotally supported by a shaft 63. A roller 65 is mounted on the lower end of the rocker arm 62 and engages the peripheral surface of a cam 66 mounted on a shaft 67 driven by the main printer drive 30.

As a label 25 is released from the backup tape 20 at the bottom of the stripping plate 36, the label is directed to a label dispensing mechanism 75 which includes a frame 76 removably mounted on the main frame 15 (FIG. 2). The frame 76 has parallel spaced vertical side plates 77 rigidly connected by a plurality of cross members 78. A shaft 80 (FIG. 3) is supported in aligned bearings mounted on the upper portions of the side plates and is driven by an electric motor 82 located between the side plates 77 and having an output shaft 83 connected to the shaft 80 by a chain drive 84. The motor may be connected to run continuously as long as the rest of the system is turned on, or it may be connected to run in a cycle corresponding to that of the main drive 30.

An arm 85 (FIGS. 2 and 4) is mounted on one of the side plates 77 and extends rearwardly to support a cantilevered shaft 86 (FIG. 3) extending parallel to the shaft 80 and positioned adjacent the stripping plates 36. A roller 88 (FIG. 4) is mounted on the shaft 86 and has two axially spaced circumferential grooves 89. Three sprockets 90 are mounted on the shaft 80 with the two end sprockets aligned with the corresponding grooves 89 of the roller 88. An endless articulated ladder chain 92 (FIG. 3) is directed around each of the end sprockets 90 on the shaft 80 and the corresponding groove 89 of the roller 88 and has a lower run resting on the upper surface of the support plate 40.

A chute 95 (FIG. 2) having an outwardly projecting flange portion 96 slopes downwardly from the upper portion of the frame 76 and is pivotally mounted on the side plates 77 by a pin 98 (FIG. 3) located below the shaft 80. A torsion spring 99 on pin 98 biases the chute clockwise as viewed in FIG. 3 against a stop (not shown). The chute 95 includes a generally flat bottom wall 100 (FIG. 5) which supports two parallel spaced flat plates 101 defining a slot 102 therebetween. A shaft 103 (FIGS. 3 and 4) is supported adjacent the lower end portion of the plates 101, and a pair of rollers 104 (FIG. 4) are mounted in axially spaced relation on the shaft 103. An endless ladder chain 105 is directed around the shaft 103 and the center sprocket 90 mounted on the shaft 80 and has a lower run normally lying within the slot 102. The spacing between the rollers 104 is such that their adjacent ends define a slot which receives the chain 105 to retain it below the surface of the rollers.

A slightly crowned cover plate 110 (FIGS. 2, 3 and 5) is pivotally connected to the flange portion 96 of chute 95 by a wire 111 (FIG. 3) extending through aligned holes formed within ears projecting downwardly from the upper end of the cover plate and aligned holes formed within the flange portion 56 of the chute 55. A V-shaped wire 114 (FIGS. 3 and 4) is positioned adjacent the lower end portion of the plate 110 and has a center portion positioned directly under the rollers 104 and slightly above the bottom run of the chain 105 for stripping purposes as described hereinafter.

A pressure pad 115 (FIGS. 2-4) is mounted on the lower end portion of the frame 76 and has a flat upper surface 116 in which is formed a series of holes 117 extending to a cavity 118 formed within the pad. An electric motor 120 (FIG. 3) is mounted below the pressure pad 115 between the side plates 77 of the frame 76 and includes an upwardly extending shaft 121 which supports a centrifugal impeller 122 positioned adjacent the bottom of the cavity 118. When the impeller is rotated, a suction is produced within the cavity 118 causing air to flow downwardly through the holes 117.

An interlock switch 125 (FIG. 3) is mounted on one of the side plates 77 of the frame 76 and has an actuating lever 126 which is operated by an arm 128 rigidly connected to the under surface of the chute 95. The switch 125 is connected to control the main printer drive 30 so that a label 25 is not printed and removed from the backup tape 20 until the preceding label is applied to the corresponding article.

In operation, immediately after a label 25 is printed by the actuation of the hammer 28 against the type wheels 26, the rocker arm 62 is rotated by the cam 66, causing the arm 60 to actuate the motor for driving the drum 56. Rotation of the drum through a predetermined angle causes the printed label to be stripped from the backup tape 20 as the tape advances around the lower edge 41 of the stripping plate 36.

As the label extends out onto the guide plate 40 with the adhesive side up, the leading edge portion of the label is picked up by the lower runs of the chains 92 which are driven by the motor 82 at a speed equal to or sufficiently faster than the movement of the tape 20 to pick up the label without buckling. As a result of the adherence of the adhesive side of the label to the small area of the links of the two endless chains 92, the label is carried forwardly on top of the support plate 40 until the links of the driven chain 105 engage the adhesive side of the label and will pull the label from the chains 92 and carry it quickly downwardly on the upper surface of the plates 101 of the chute 95.

When the label reaches the lower end of the plates 101, the leading edge portion of the label engages the wire 114 which strips the label from the chain 105 and directs it downwardly onto the upper surface 116 of the pressure pad 115 where the label is retained by the suction produced by the impeller 122 driven by the motor 120 which is energized whenever the motor 82 is energized. Then as the package or article corresponding to the information printed on the label is presented and pressed downwardly against the chute 95, the chute pivots on the pin 98 against the bias of the torsion spring 99 so that the article is pressed against the upwardly facing adhesive side of the label retained on the surface 116 of the pressure pad 115. The downward movement of the chute 95 actuates the interlock switch 125 and thereby resets the drive 30 for printing and stripping the next successive label.

A major advantage of the construction shown in FIGS. 1-5 is in connection with the use of labels of relatively small lateral dimensions with respect to the width of the chute 95, in that the chain 105 provides a positive orienting action on each label as it is delivered from the top of the chute to the pickup station. FIGS. 6-8 show another embodiment of the invention having special use in the handling of labels of such relative dimensions that they

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can be guided by the sides of a chute as they slide by gravity to the pickup station.

In FIGS. 6-8, the label dispensing mechanism 130 cooperates with a feeding and stripping mechanism 35' of substantially the same construction shown in FIGS. 1-3 and therefore identified by the same component reference characters. The mechanism 130 includes a frame 132 which is constructed similarly to the frame of the label dispenser disclosed in the above patent, but includes parallel spaced side plates 133 in which are formed vertically extending aligned slots 134. A spool-like roll 135 is supported by a shaft 136 extending through the slots 134 and includes a pair of circumferential flanges 137 with knife-edged peripheral rims. The roll 135 rests upon a resilient cylindrical roll 138 mounted on a shaft 139 which also extends through the aligned slots 134.

A motor 140 is supported between the side plates 133 and has an upwardly projecting output shaft 141. A worm gear 142 is mounted on the shaft 141 and drives a gear 143 mounted on a laterally extending shaft 144 rotatably supported by the side plates 133. A pair of resilient rolls 145 are rigidly mounted on the shaft 144 on opposite ends of the gear 143 and drive the resilient roll 138 on the shaft 139.

Another spool-like roll 150 (FIG. 7) is supported by a shaft 151 extending within inclined slots 152 formed in the side plate 133 and has a pair of circumferential flanges 153 with knife edged peripheral rims similar to the flanges 137 on the roll 135. The flanges 153, however, are spaced closer together to interfit between the flanges 137 as shown in FIG. 8 so that the flanges 137 engage the resilient roll 138. A downwardly sloping chute 155 is constructed substantially the same as the chute shown in the above patent and is pivotally supported by a shaft 156. The chute 155 has a flat sloping wall 157 with its upper end adjacent the roll 138 and is biased upwardly by a torsion spring 158 mounted on the shaft 156.

A machine screw 160 (FIG. 7) is supported by aligned holes formed within the side plates 39 of the stripping mechanism 35' and is positioned directly above the support plate 40 adjacent the plate 36. Thus when a label 25' is stripped from the tape 20' and advanced onto the plate 40, the threads of the screw 160 engage the adhesive surface of the trailing end portion of the label and prevent it from traveling upwardly with the backup tape 20' around the roller 38. Since the threads of screw 160 are relatively sharp, they provide the desired small area contact with the adhesive surface of the label, as compared, for example, with a rod, at the same time providing the desired controlling action on the delivery of the label to its application station defined by the support plate 40. The leading edge portion of the label 25' which is advanced onto the support plate 40 enters the nip between the flanges 137 of the roll 135 and the driven roll 138, and then passes under the flanges 153 of the roll 150, which direct the label downwardly onto the upper surface of the chute wall 158 with the adhesive side of the label facing upwardly.

The sharp rims of the flanges 137 and 153 of the rolls 135 and 150, respectively, produce essentially line contact with the adhesive side of the label 25' and thus do not provide sufficient contact area to cause the label to wrap on one of the rolls and prevent it from sliding down the chute 155. The label is applied to its corresponding article by pressing the article against the chute 155 in substantially the same manner as a heat sealed label is applied with the apparatus shown in the above patent.

FIGS. 9 and 10 show another embodiment of the invention which is particularly suited for dispensing relatively large pressure sensitive labels 165 carried by a backup tape 166 and on which the name of the article or commodity is printed. For this printing operation, a commodity key 167 (FIG. 9) is employed in addition to the type wheels 26 and hammer 28 and is carried within a frame 168 which is moved upwardly by an actuating

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mechanism connected to the main drive 30 so that the key 167 engages each label 165 against a backup plate 169.

In the embodiment shown in FIGS. 9-10 a support plate 170 has a slot 171 located above the type wheels 26 and a slot 172 located above the commodity key 167. In a manner similar to the embodiment shown in FIG. 2, parallel spaced side plates 173 project upwardly from the base plate 170 for supporting the shaft 38 on which the roller 42 and stripping plate 36 are mounted. The label issuing or dispensing mechanism 175 in FIGS. 9-10 includes a frame 176 having parallel side plates 177 which are spaced to receive the side plates 173 therebetween. The label application member 180 is in the form of a chute pivotally mounted on a shaft 181 supported by the side plates 177, and it has a flat upper surface joining a curved nose surface 183.

An arm 185 projects downwardly from the under surface of the application member 180 and is normally held against a cross member 186 of the frame 176 by a torsion spring 188 mounted on the shaft 181. An interlock switch 190 is mounted on one of the side plates 177 of the frame 176 and has an actuating lever 191 engaging the lower end portion of the arm 185. The switch 190 serves the same purpose as the switch 125, that is, to control the operation of the main printer drive 30 which, in turn, controls the tape feed mechanism 55 as described above.

A machine screw 195 is supported by the side plates 173 directly in front of the lower edge of the stripping plate 36 and serves the same purpose of guiding each label 165 as the screw 160 in the embodiment shown in FIGS. 6-8. Thus immediately after a label 165 is printed with the information on the type wheels 26 and on the commodity key 167, the tape drive mechanism 55 is actuated so that the label is extended outwardly onto the upper surface of the application member 180 until the trailing edge of the label 165 engages the threads of the screw 195. When the article corresponding to the information printed on the label is wiped or passed downwardly across the nose surface 183 of the member 180, the label is pulled from the screw 195 and pressed by the surface 183 onto the article. This pressing force causes the member 180 to pivot downwardly and thereby to actuate the switch 190 to reset the drive 30 for printing the next successive label.

From the drawings and the above description, it can be seen that apparatus constructed in accordance with the invention provides desirable features and advantages. For example, one important feature is that after each pressure sensitive label is removed from the backup tape, its delivery to the application station is controlled by a member which contacts a small area of the adhesive side of the label, thus assuring that the label is positively delivered to the application station without undesired change of its orientation as it is removed from the backup tape. As a result, the successive labels can be conveniently and quickly applied to their corresponding articles with a predetermined orientation.

In the embodiment shown in FIGS. 1-5, the driven endless conveyors or chains 92 and 105 provide the small area surface for engaging the adhesive side of the labels 25. In the embodiment shown in FIGS. 6-8, the rims of the spool-like rolls 135 and 150 provide the small area adhesive contacting surface and cooperate with the driven roll 138 to direct the label downwardly on the chute 155 to the application station at the lower end of the chute. The label dispensing mechanism shown in FIGS. 9 and 10 employs the small area of the threads of the screw 195 for engaging the adhesive side of each label to control the delivery of each label to the application station formed by the member 180 and retain it there until the corresponding article is wiped across the rounded nose surface 183.

Another important advantage provided by the invention is that each pressure sensitive label is automatically and quickly delivered to the application station immediate-

ly after the label is printed so that when the corresponding article is presented, the label can be immediately applied to the article without any delay. Thus the delivery of each label to the application station does not depend upon presenting the corresponding article, and each pressure sensitive label may be applied simply by lightly pressing the article against the chute 95 or 155 or wiping the article across the member 180. Furthermore, the light wiping or pressing movement of the article against its label serves to actuate the interlock switch which controls the main printer drive 30 to permit the next successive label to be printed, separated from the tape and delivered to the application station.

While the forms of apparatus herein described constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise forms of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. Apparatus for dispensing successive labels each having a pressure sensitive adhesive coating on one side thereof from a backup tape on which the labels are secured in spaced relation by their adhesive coating, said apparatus comprising means defining an application station for receiving successive such labels, stripping means spaced from said application station and arranged for travel of the tape therepast, drive means for engaging the tape following travel thereof past said stripping means, means for pulling the tape past said stripping means, means forming a label support surface extending generally from said stripping means to said application station, said stripping means positioned in relation to said support surface to strip each successive label from the tape in response to travel of the tape past said stripping means and to advance the stripped label onto said support surface with the adhesive coated side facing upwardly and the opposite bottom side engaging said support surface, a power driven conveyor positioned above said support surface, and said conveyor having means forming a driving surface of small area for engaging the upwardly facing adhesive coated side of each stripped label and being effective to slide the label along said support surface to said application station.

2. Apparatus as defined in claim 1 including a downwardly sloping chute, means located adjacent the lower end portion of said chute for defining said application station, said power driven conveyor comprises an endless conveyor having a run extending downwardly adjacent said chute, and a motor for driving said conveyor.

3. Apparatus as defined in claim 2 including a perforated pressure member positioned at said application station, and a motor driven fan positioned to produce suction adjacent said member for retaining each label on said member in position for receiving an article pressed downwardly against said pressure member.

4. Apparatus as defined in claim 2 wherein said conveyor comprises an endless chain, and a pair of driven endless chains extending from said stripping means to said chain having said run adjacent said chute.

5. Apparatus as defined in claim 1 wherein said power driven conveyor comprises at least one endless chain conveyor having articulated links for engaging the adhesive coated side of each label.

6. Apparatus as defined in claim 1 wherein said power driven conveyor comprises a first guide roller positioned above said upper surface and having a pair of circumferential flanges for engaging the adhesive coated side of each stripped label, a second guide roller positioned generally below said support surface for contacting said op-

posite side of each stripped label, and a motor for driving at least one of said guide rollers in a direction to advance each label from said stripping means toward said application station.

7. Apparatus as defined in claim 6 including a third guide roller having a pair of circumferential flanges with peripheral rims each effective to produce line contact with the adhesive surface of each stripped label said support surface including a downwardly slopping guide chute with a lower end portion defining said application station, and said third guide roller being positioned below said first guide roller to direct each stripped label downwardly onto said chute.

8. Apparatus for dispensing successive labels each having a pressure sensitive adhesive coating on one side thereof from a backup tape on which the labels are secured in spaced relation by their adhesive coating, comprising means defining an application station for receiving successive such labels, stripping means spaced from said application station and arranged for travel of the tape therepast, drive means for engaging the tape following travel past said stripping means, said stripping means being positioned to strip each successive label from the tape and to advance such stripping label towards said application station in response to travel of the tape therepast, and a screw located between said stripping means and said application station and having threads defining a limited surface for engaging only a small area of the adhesive surface of each such stripped label for controlling the delivery of such label to said application station.

9. Apparatus for successively printing and dispensing pressure sensitive labels having an adhesive coating on one side in contact with a backup tape, comprising means for printing the opposite side of each label with variable information, stripping means for separating each label from the tape following printing thereof, power operated means for engaging a portion of the tape from which the labels have been removed and operable to pull the tape through said stripping means for releasing the labels therefrom, means defining an application station spaced from said stripping means, means forming a label support surface extending generally from said stripping means to said application station, said stripping means positioned in relation to said support surface to strip each successive label from the tape in response to travel of the tape past said stripping means and to advance the stripped label onto said support surface with the adhesive coated side facing upwardly and the opposite bottom side engaging said support surface, a power driven chain conveyor having a run positioned above said support surface, and said conveyor comprising articulated links forming a surface of small area for engaging the upwardly facing adhesive coated side of each stripped label and being effective to slide the label along said support surface to said application station.

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