

Aug. 2, 1966

W. F. STREMKE, JR

3,264,161

AUTOMATIC LABELLING MACHINES

Filed April 30, 1962

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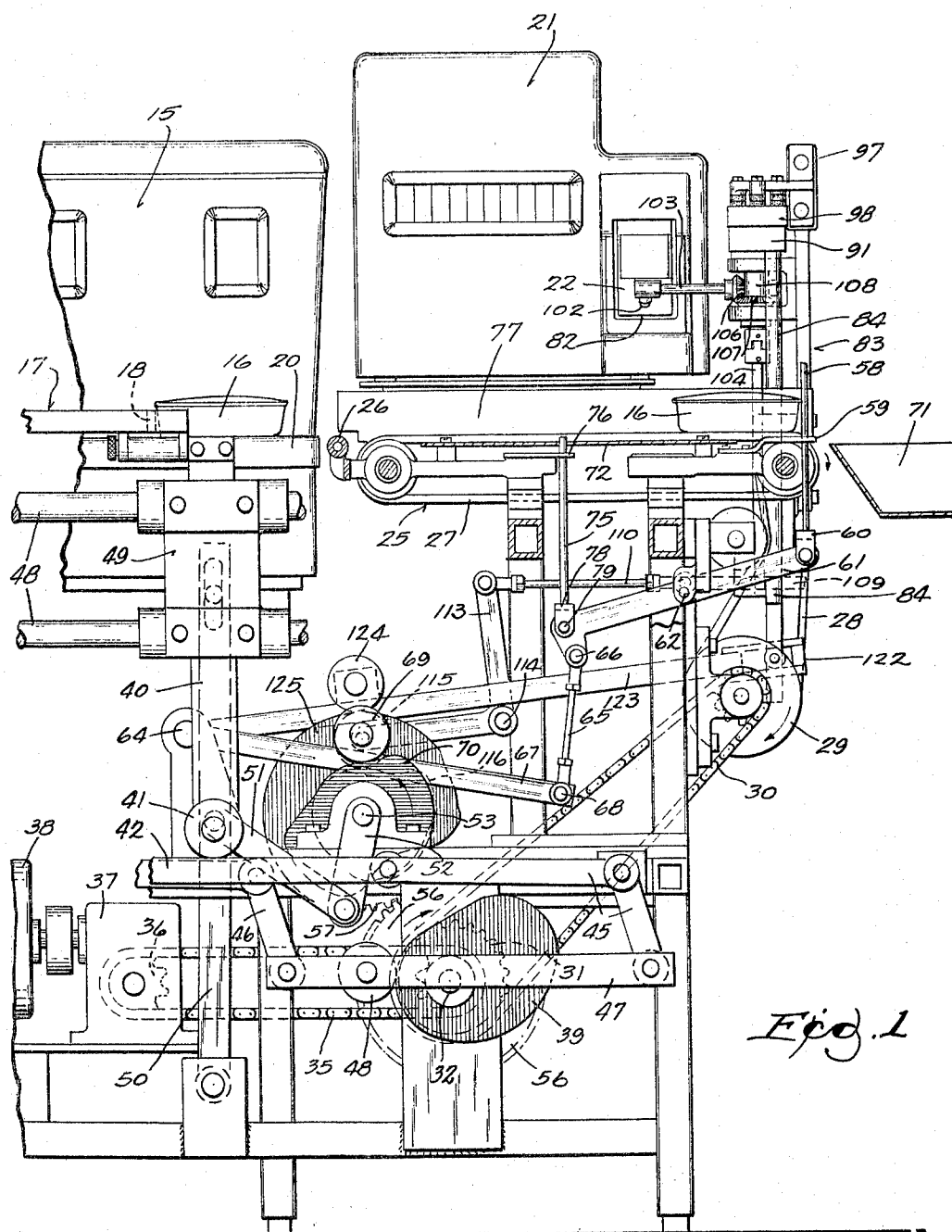


Fig. 1

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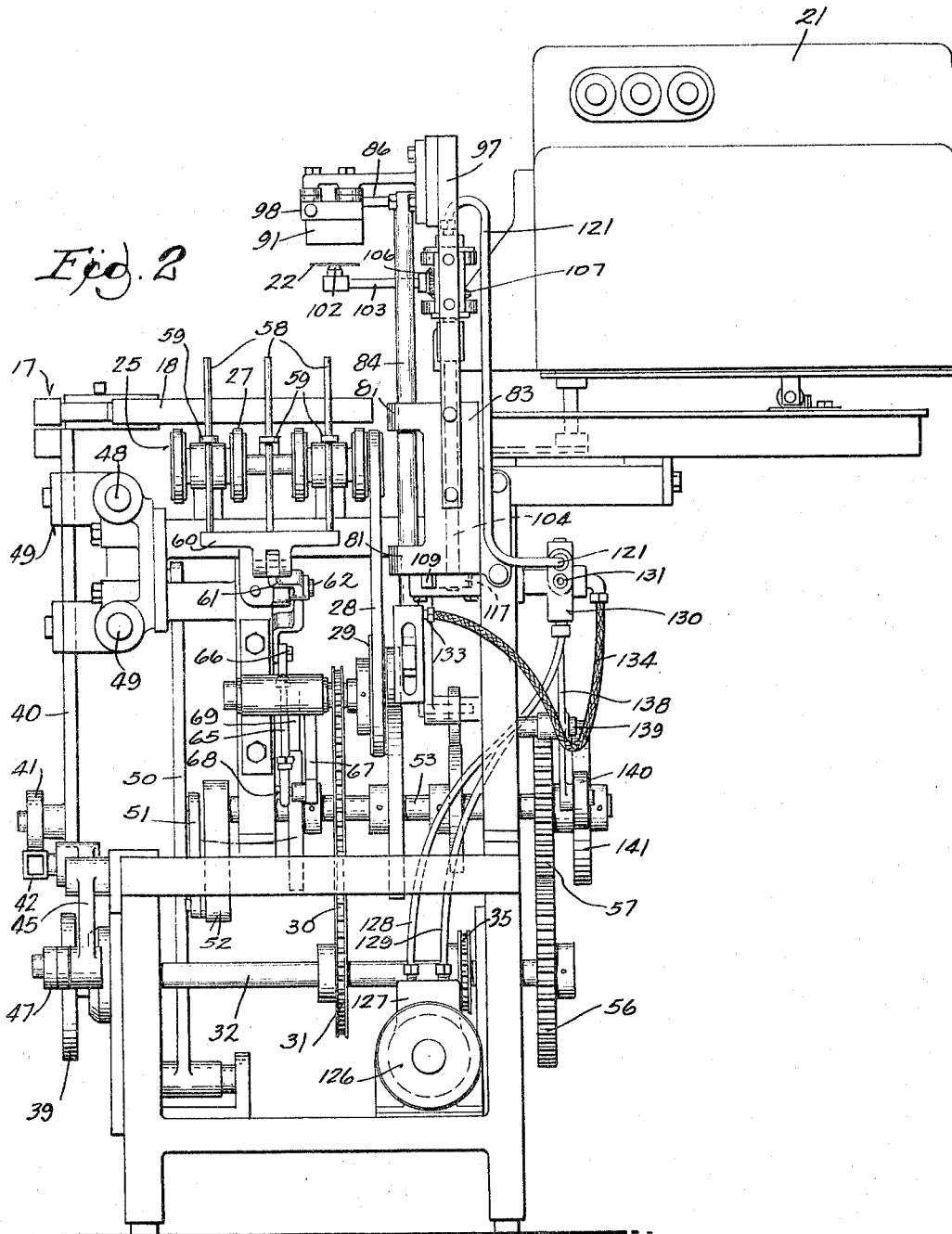
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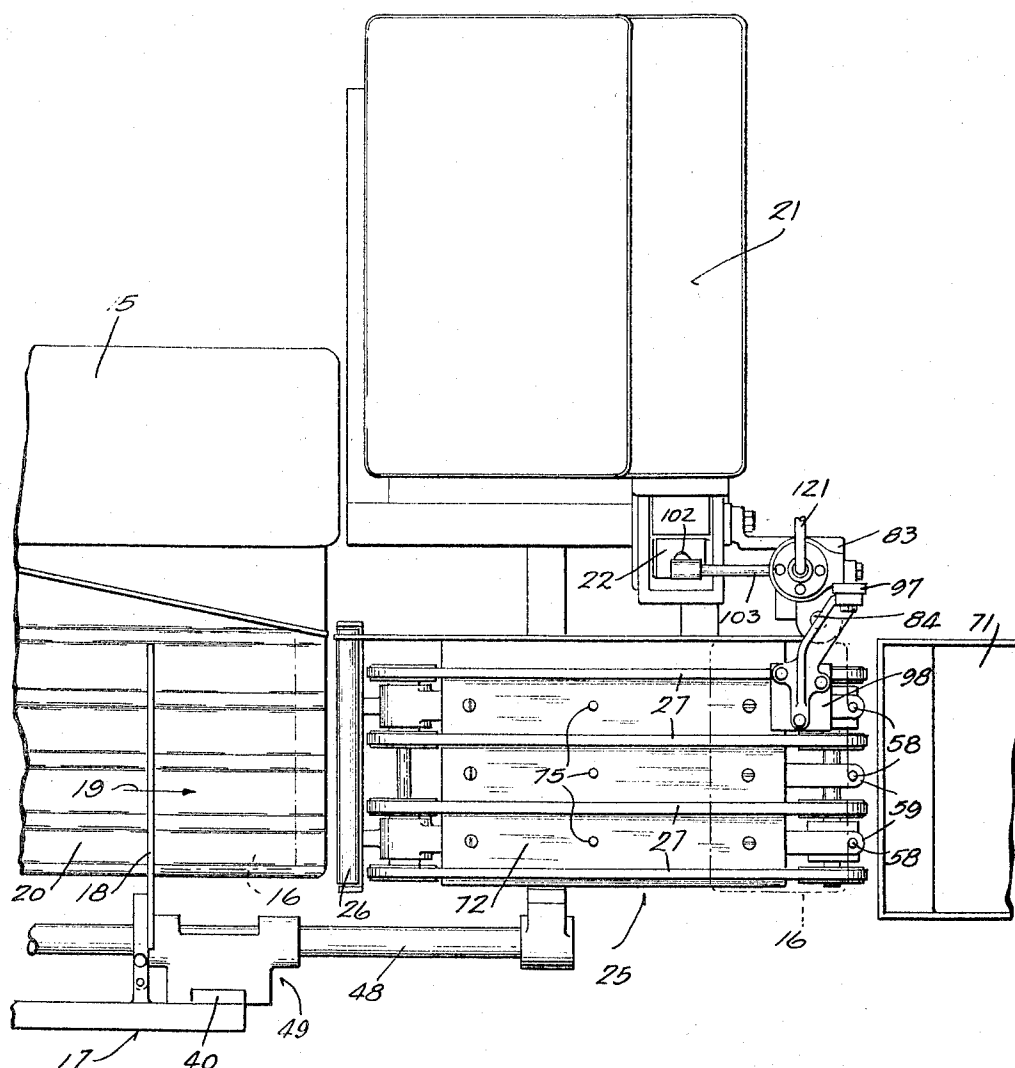


Fig. 3

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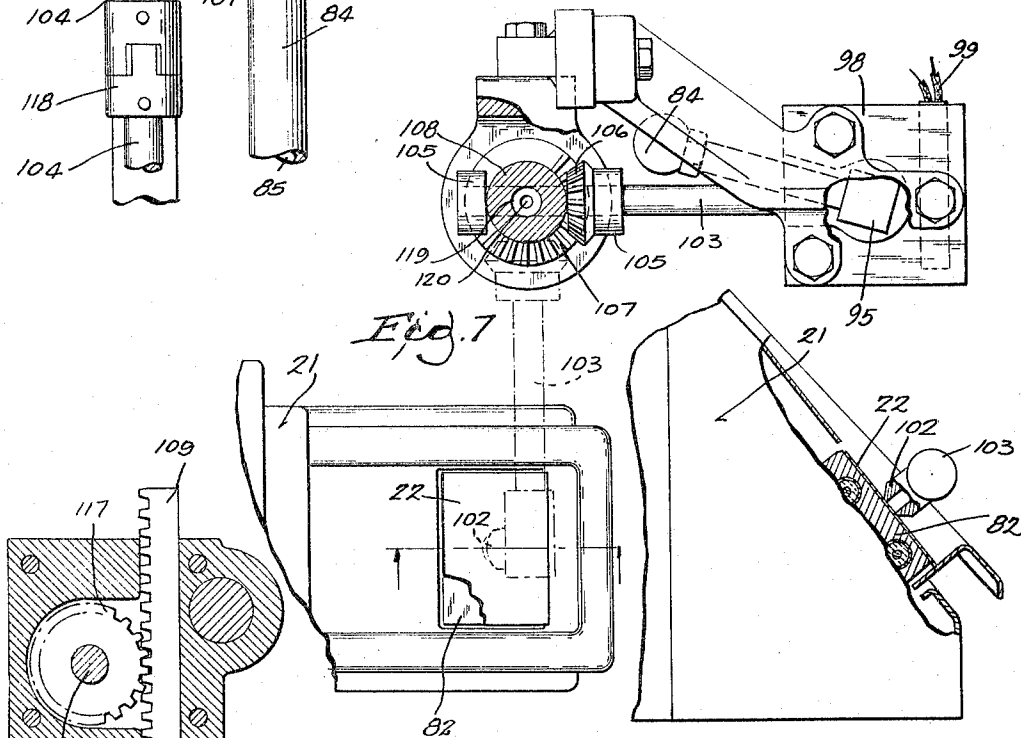
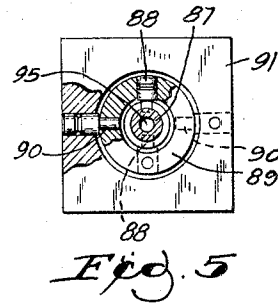
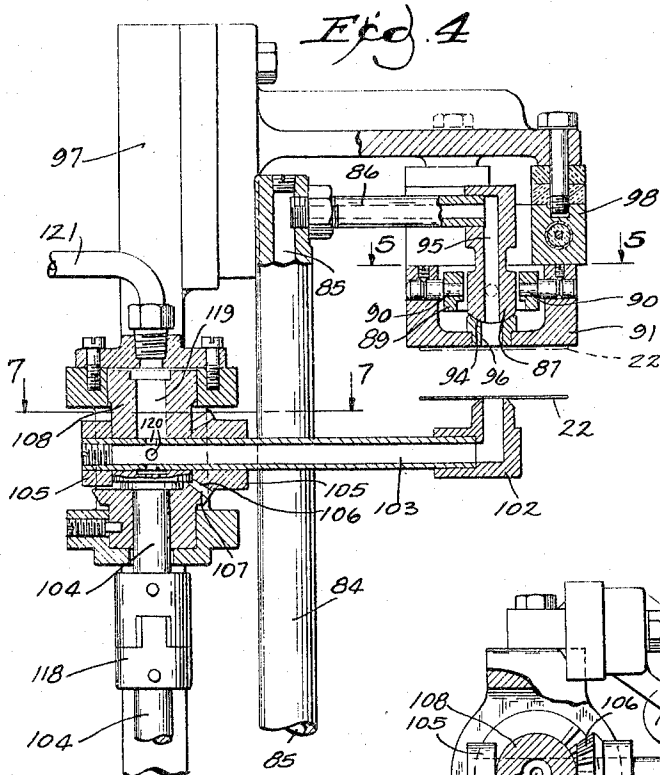


Fig. 8 INVENTOR.
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AUTOMATIC LABELLING MACHINES

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Fig. 9

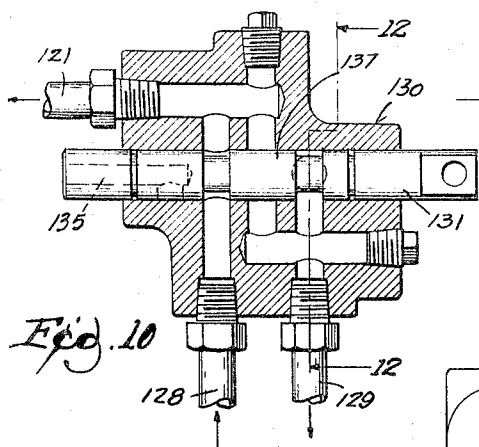
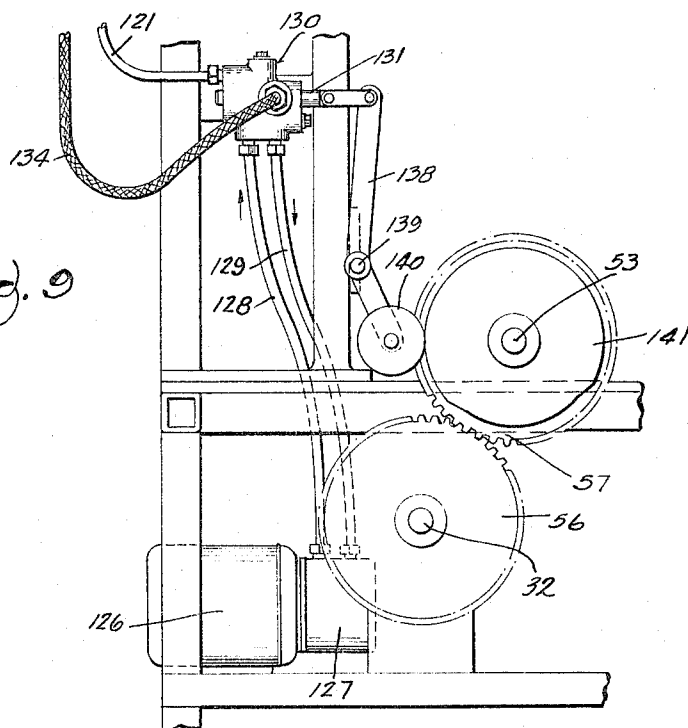


Fig. 10

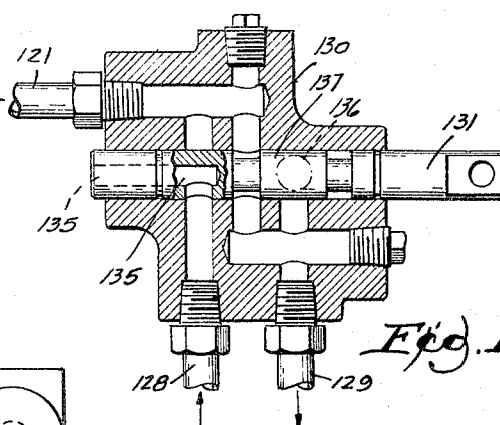


Fig. 11

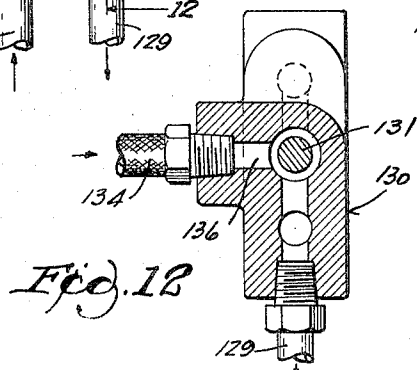


Fig. 12

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3,264,161

AUTOMATIC LABELLING MACHINES
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7 Claims. (Cl. 156—360)

This invention relates to improvements in automatic labelling machines.

This invention constitutes an improvement with respect to the label applicator and the package conveyor shown in the copending application of William F. Stremke et al., Serial No. 51,588, filed August 26, 1960, on an Automatic Labelling Machine, now U.S. Patent No. 3,194,710. Only those parts of the machine which embody the improved structure will be described herein, reference being made to the prior application aforesaid for details of the machine in general.

The disclosed improvement in the label applicator provides for secure holding of the label in the course of its transfer to the package from the label issuing machine and for better adherence of the label to the package. This is accomplished in the disclosed structure in which one or more vacuum actuated nozzles transfer the label from the label issuing machine to the package. The vacuum nozzle holds the label securely during the transfer thereof. The label applicator has a universal joint which facilitates conforming the label to the configuration of the package and also incorporates a heater to maintain the adhesive of the label in a thermoplastic condition.

Apparatus embodying the present invention also utilizes a belt or apron conveyor to advance packages from the scale to the label issuing machine and to a position to receive a label from the label applicator. Package stops are actuated in timed coordination with the operation of sweep arms which convey the package to and from the scale for the sequential positioning and advance of the package with respect to its various positions.

Other objects, features and advantages of the invention will appear from the following disclosure in which:

FIG. 1 is a fragmentary view of apparatus embodying the invention, partly in side elevation and partly in vertical section. Parts of the machine are broken away to expose details of construction.

FIG. 2 is an end elevation of the machine shown in FIG. 1.

FIG. 3 is a fragmentary plan view of the portion of the machine shown in FIG. 1.

FIG. 4 is a view, partly in elevation and partly in cross section, of the label transfer and label applicator vacuum nozzle mechanism.

FIG. 5 is a cross section taken along the line 5—5 of FIG. 4.

FIG. 6 is a horizontal cross section taken through the actuator for the label transfer nozzle.

FIG. 7 is a plan view, partly in horizontal cross section on line 7—7 of FIG. 4, of the label transfer and applicator mechanism, the same being shown in operative relationship to the discharge apron of the label issuing machine.

FIG. 8 is a fragmentary cross section taken along the line 8—8 of FIG. 7 and through the label issuing machine discharge apron.

FIG. 9 is a fragmentary view showing the mechanism for actuating the pneumatic valve for control of the vacuum in the label transfer and applicator nozzles.

FIG. 10 is an axial cross section taken through the pneumatic valve aforesaid and showing the valve stem in its position to apply pneumatic pressure to the pickup nozzle and vacuum to the applicator nozzle.

FIG. 11 is a cross section similar to FIG. 10, but showing the valve stem in a position to apply vacuum

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to the pick-up nozzle and to vent the pressure side of the pump.

FIG. 12 is a cross section taken along the line 12—12 of FIG. 10 showing the valve stem in position to place the applicator nozzle under vacuum.

In general construction and most detail, the automatic labelling machine of the present invention embodies the features shown in the prior application aforesaid. There is a package weighing scale 15, to which wrapped packages 16 are conveyed by the sweep arm assembly 17 which includes one or more sweep arms 18 which push the packages in the direction of arrow 19 in FIG. 3 across the scale platform 20. The packages dwell on the scale while a weight determination is made.

The weight of the package is measured by the scale 15 and on the basis of this measurement, a computer will energize the label issuing machine or printer 21 which will issue a label 22 which will have printed thereon weight and price information appropriate to the package 16. Apparatus of this type is shown in United States Patent 2,948,466 in which the transfer of the package from the scale to the label issuing machine is entirely manual.

In the pending application aforesaid, the sweep arm assembly 17 was provided with another sweep arm similar to that shown at 18 and which advanced the package 16 beyond the scale and to a label receiving position adjacent the label issuing machine 21. According to the present invention, however, a belt or apron conveyor 25 receives and further conveys packages pushed by the sweep arm 18 over an intermediate transfer roller 26. The apron conveyor 25 consists of a series of laterally spaced belts 27 which are continuously driven by the drive belt 28 (FIG. 1) which receives power from the pulley 29, which is in turn driven by chain 30 from a sprocket 31 on the main transverse drive shaft 32.

Shaft 32 receives power from a chain 35 driven by the sprocket 36 on speed reducer 37 coupled to electric motor 38. In this embodiment of the invention, the automatic labelling machine may be independent of the machine which wraps the packages. In this respect, the device may differ somewhat from the one shown in the pending application aforesaid in which the wrapping machine is provided with a power take-off for operating the various movable parts of the labelling machine.

Shaft 32 carries a cam 39 which actuates the sweep arm drive mechanism which is substantially the same as that shown in the prior application. The sweep arm assembly includes a post 40 having a wheel 41 at its lower end which rides on a track 42 which is raised and lowered on a pantograph assembly which includes bell cranks 45, 46 and a tie rod 47 provided with a cam follower roller 48 which rides on cam 39. Accordingly, track 42 is raised and lowered in accordance with the configuration of the cam, as is also described in the prior application.

The sweep arm mechanism is mounted to reciprocate on the guide rods 48 on which sweep arm carriage 49 is guided. The carriage is reciprocated by a lever 50 connected by pitman 51 to the crank arm 52 on cam shaft 53. Cam shaft 53 is driven from shaft 32 by intermeshing gears 56, 57. Accordingly, it rotates in time with the rotation of shaft 32.

In order to arrest the forward movement of the package 16 at its label receiving position, a gate consisting of a series of stop pegs or stems 58 is mounted for vertical movement in guide brackets 59. The lower ends of the stems are mounted on a common yoke 60, which is in turn actuated by a lever 61 pivotally connected at its midpoint to the frame of the machine on the pin 62.

Lever 61 is actuated by a link 65 pivotally connected to one end of the lever on the pin 66 and to a cam-operated lever 67 on pin 68. Cam lever 67 swings about

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fixed pin 64 and carries a cam follower roller 69 which rides on cam 70 on cam shaft 53. Accordingly, the posts 58 function as a gate and will rise and lower with respect to the path of the package 16 in accordance with the contour of the cam 70. In operation, the posts or gate 58 sequentially arrest movement of the package 16 while the label 22 is applied thereto and thereafter will retract to permit the apron or belt conveyor 25 to discharge the package 16 from the machine into a bin 71 or a discharge conveyor. While the posts 58 arrest movement of the package 16, the belts 27 will slip thereunder. The weight of the package 16 is supported by a smooth apron 72 over which the belts 27 freely slide.

A second set of stop or gate posts 75 may optionally be provided. These are guided for vertical movement in the brackets 76. The lower ends of posts 75 are connected to a common yoke 78 which is in turn pivotally connected to lever 61 on pin 79, at the opposite end of lever 61 from the connection to posts 58. Accordingly, posts 75 alternate with the posts 58 to arrest movement of the package 16 at an intermediate holding position or station indicated by reference character 77. Stop posts 75 function as somewhat of an escapement mechanism to delay the travel of the package on the belt conveyor 25.

Apparatus embodying the present invention incorporates improved mechanism for picking up and transferring the label 22 from the heated discharge apron 82 of the label issuing machine 21. As in the prior application aforesaid, the label 22 is discharged from machine 21 with its printed side down and its thermoplastic adhesive coated side uppermost. According to the present invention, a label transfer mechanism including a vacuum pickup nozzle and a vacuum applicator nozzle transfers the label from the apron 82 to the package.

For this purpose there is mounted adjacent the label issuing machine 21 a mounting bracket 83 having slide bearings 81 for the vertical guidance of an applicator guide stem or post 84. Guide stem 84 is hollow as shown in FIG. 4 and is thus provided with a vacuum duct 85 which communicates through a hollow transverse stem 86 with a vacuum nozzle 87. Nozzle 87 carries on a gimbal connection a pressure platen 91. As best shown in FIG. 5, nozzle 87 has axial trunnions 88 which pivotally support a gimbal ring 89 which has transverse axial trunnions 90 which pivotally support the pressure platen 91. Accordingly, the pressure platen 91 is free for universal movement with respect to the vacuum nozzle 87. To accommodate for such movement, nozzle 87 has a spherical terminal surface 94 concentric with the articulate motion of the pressure platen 91. Platen 91 is in sealed communication with the vacuum duct 95 of the nozzle 87 through the bushing 96 which has an annular spherical surface complementary to that of the nozzle 87.

Above the uppermost position of the applicator nozzle 87 is a fixed position heater shoe 98 heated electrically as indicated by the electric wiring 99 in FIGURE 7. Shoe 98 is supported on bracket 97 in turn supported on bracket 83. The pressure platen 91 receives heat by conduction from the shoe 98 when the applicator nozzle 87 is in its uppermost position, as shown in FIGURE 4. As is hereinafter described in more detail, label 22 is held by vacuum to nozzle 87, post 84 is drawn down axially to press the label against the package 16. Pressure platen is free to tilt to conform to package configuration.

The label 22 is initially picked up from the heated apron 82 and transferred to the applicator nozzle 87 by the pickup nozzle 102, which is mounted on a hollow stem 103 and which is movable from its position adjacent the apron 82 shown in FIGURE 8 to its position adjacent applicator nozzle 87 shown in FIGURE 4. In the course of this movement, the stem 103 rotates through 90° about the axis of turning shaft 104 and also rotates through about 130° about its own axis.

Stem 103 is provided with collars 105 to fix its position with respect to mounting sleeve 108. One of collars

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105 is provided with a bevel gear 106 which coacts with a stationary bevel gear sector 107 to rotate the stem 103 about its axis concurrently with its rotation about the axis of shaft 104. Shaft 104 is fixed to a sleeve 108 in which the stem 103 is journaled and confined by the respective collars 105. Shaft 104 is turned about its own axis by rack 109 (FIGURES 1 and 6) which is reciprocated by a pitman 110, which is in turn actuated by bell crank 113 having a fixed pivot 114 and a cam follower roller 115 which follows the contours of cam 116 on cam shaft 53. Accordingly, the bell crank 113 will oscillate about its pivot 114 in response to the contour of cam 116 and the rack 109 will be actuated in accordance therewith to oscillate the shaft 104 through pinion 117 coupled to the shaft 104. A flexible coupling 118 may optionally be provided in the shaft 104.

Accordingly, stem 103 will be concurrently moved between its positions shown in broken and full lines in FIGURE 7, and, at the same time, will rotate about its own axis. In initial position shown in broken lines in FIGURE 7 (full line position in FIGURE 8), nozzle 102 is co-planar with the label 22 on the heated apron 82. In this position, vacuum is applied to the nozzle through the pneumatic line 121 and through the hollow stem 103.

For this purpose, sleeve 108 is also provided with a pneumatic duct 119 and the stem 103 is provided with a series of communicating apertures 120. Accordingly, when vacuum is applied to the line 121 with the nozzle in its broken line position shown in FIGURE 7, the adhesive side of the label will be drawn pneumatically against the nozzle. Nozzle 102 desirably has a tapered edge, so as to reduce to a minimum the area of contact between the nozzle and the label.

As the shaft 104 turns in response to movement of the rack 109 (as actuated by cam 116), the stem 103 will rotate from its broken line position to its full line position in FIGURE 7 in the course of which the nozzle will also be turned upright as shown in FIGURE 4 and the label 22 will be directly beneath the applicator nozzle 87. At this point, the pneumatic line 121 for pickup nozzle 102 is subject to pneumatic pressure and vacuum nozzle 87 is subject to sub-atmospheric pressure so that the label is blown off of nozzle 102 and is sucked onto nozzle 87. Accordingly, the label will then occupy its dotted line position shown in FIGURE 4 with its adhesive side down and its printed side up and against the heated shoe 91.

When the stem 103 again rotates to its broken line position shown in FIGURE 7, applicator nozzle post 84 descends to apply the label to the package 16. At this point in the cycle of machine operations, the package is directly beneath the applicator nozzle 87.

The post 84 is connected by means of an adjustable coupling 122 (FIGURE 1) to a lever 123 pivoted on fixed pin 64 and is provided with a cam follower roller 124 which follows the contour of cam 125 on cam shaft 53. Cam 125 raises and lowers the applicator nozzle post 84 in time with machine operations to lift the applicator nozzle 87 to a position above the arc of movement of stem 103 to receive the next label 22 from the transfer nozzle 102 in the course of further machine operations.

FIGURES 9-12 show the apparatus for sequentially applying air pressure and vacuum to pickup nozzle 102 and for applying vacuum to the applicator nozzle 87. Motor 126 drives an air compressor pump 127 having a pressure line 128 and vacuum line 129. These lines are connected to a pneumatic valve which includes a body 130 and a shiftable valve stem 131. Also connected to the valve body is hose 121, which selectively applies pressure or vacuum to the pickup nozzle 102 and line 134 which applies vacuum to the duct 85 in the push rod 84 for applicator nozzle 87. The connection 133 from the line 134 to the end of hollowed push rod 84 is shown in FIGURE 2.

Pump 127 is in constant operation. With the valve stem 131 in its position shown in FIGURE 11, line 121 is connected to the vacuum line 129 through the internal porting of the valve body 130 and pickup nozzle 102 is under suction. At the same time, the pressure line 128 is vented through the vent duct 135 in the stem 131. The port 136 which communicates with line 134 is blocked by valve stem spool 137 so that the applicator nozzle 87 is at atmospheric pressure. This is the condition which obtains while the pickup nozzle is picking up the label 22 and is moving it from its dotted line position to its full line position in FIGURE 7.

When the parts are in said full line position, valve stem 131 is shifted to its position shown in FIGURE 10. Applicator nozzle line 134 is now connected through duct 136 to the vacuum line 129. Spool 137 has moved to block the connection between vacuum line 129 and the duct 121 to the pickup nozzle 102, but the line 121 is now exposed to the pressure of line 128 to blow the label 22 off of the nozzle 102 and into the vicinity of applicator nozzle 87, the suction of which draws the label tightly against the heated platen 91.

Valve stem 131 is operated by a bell crank 138 which has a fixed pivot at 139 and a cam follower roller 140 which follows the contour of cam 141. Cam 141 is mounted on cam shaft 53 so that the operation of the pneumatic valve 130 is timed with all other operations, the function of which depends upon the position of the shaft 53.

From the foregoing, it is clear that the vacuum transfer mechanism will pick an appropriate label 22 off the platen 82 and transfer it to the package which has been advanced by the belt conveyor 25 in time with the operations of the vacuum label transferring mechanism and in time with the operation of the sweep arms 18. Heat from the platens 82 and 91 will keep the adhesive thermoplastic until the label is pressed against the package.

What is claimed is:

1. Apparatus for removing a label from a label issuing machine and for applying it to a package, comprising:

- (a) a pickup vacuum nozzle,
- (b) means to shift said pickup nozzle from a label pickup position proximate said machine to a transfer position remote from said machine,
- (c) an applicator vacuum nozzle to which the label is transferred from the pickup nozzle at said transfer position,
- (d) means to advance said applicator nozzle and label against said package,
- (e) said pickup vacuum nozzle having a shift stem, the means to shift the pickup nozzle comprising means to move the stem to invert the label in the course of its transfer from the apron to said transfer position.

2. In package labelling mechanism having a scale to weigh a package, a label issuing machine responsive to the scale to issue a label with information based on package weight, said label issuing machine having a label discharge apron, the improvement to automate the operation of said mechanism and comprising: a package conveyor to advance a weighed package from the scale to a label receiving position adjacent the label issuing machine, label transport mechanism to transfer said label from the discharge apron to the weighed package and including a transfer nozzle, means for moving said nozzle from said apron toward said package, a source of vacuum for said nozzle by which the nozzle is actuated to hold the label on the nozzle, vertically movable pressure

means for pressing said label against said package, and timing means to lift and lower said vertically movable pressure means in time with said package conveyor so that the pressure means is elevated when the package conveyor advances the said package therebeneath.

3. The mechanism of claim 2 in which said pressure means is universally movable to adjust to the configuration of the package.

4. In package labelling mechanism having a scale to weigh a package, a label issuing machine responsive to the scale to issue a label with information based on package weight, said label issuing machine having a label discharge apron, the improvement to automate the operation of said mechanism and comprising: a package conveyor to advance a weighed package from the scale to a label receiving position adjacent the label issuing machine, label transport mechanism to transfer said label from the discharge apron to the weighed package and including a vertically movable applicator vacuum nozzle over the package label receiving position, a transfer vacuum nozzle, means for moving said transfer vacuum nozzle from said apron to a transfer position adjacent said applicator nozzle for transfer of the label from the transfer nozzle to the applicator nozzle, and means timing the movements of the applicator vacuum nozzle and the transfer nozzle so that the applicator vacuum nozzle is in an elevated position when the transfer nozzle is in its transfer position.

5. The mechanism of claim 4 in combination with means for moving said transfer vacuum nozzle to invert a label in the course of its transfer from said apron to said transfer position.

6. In package labelling mechanism having a scale to weigh a package, a label issuing machine responsive to the scale to issue a label with information based on package weight, said label issuing machine having a label discharge apron, the improvement to automate the operation of said mechanism and comprising: a package conveyor to advance a weighed package from the scale to a label receiving position adjacent the label issuing machine, label transport mechanism to transfer said label from the discharge apron to the package and including a vacuum actuated transfer nozzle, means to move said transfer nozzle to said apron to transfer a label from said apron to a transfer position intermediate the apron and the package, and vacuum actuated applicator means for receiving said label from the transfer nozzle at said transfer position and for conveying said label to said package.

7. The mechanism of claim 6 in combination with means for moving said transfer nozzle to invert the label in the course of its transfer from said apron to said transfer position.

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