

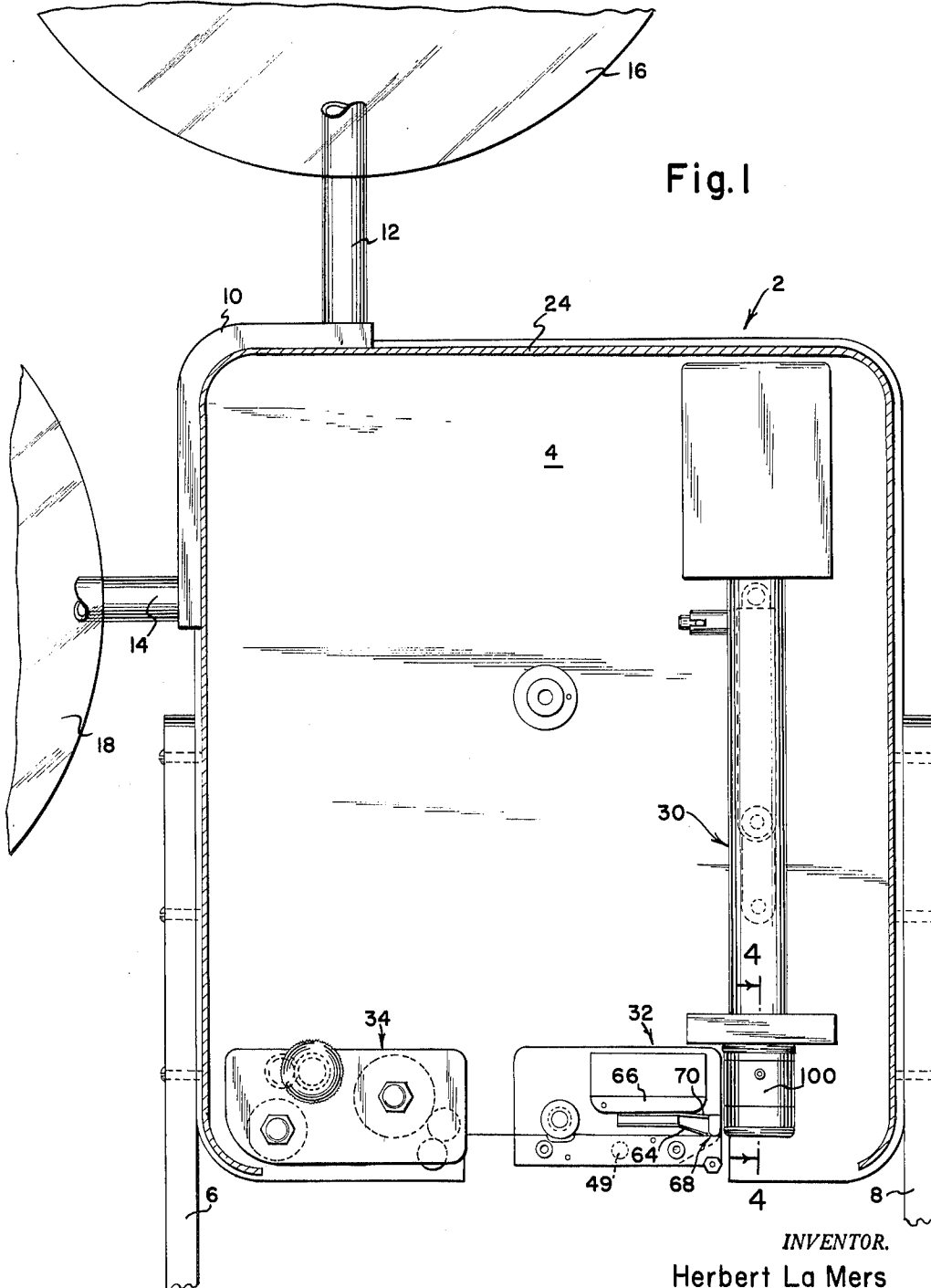
March 15, 1966

H. LA MERS
LABELING MACHINE

3,240,652

Filed March 23, 1961

5 Sheets-Sheet 1



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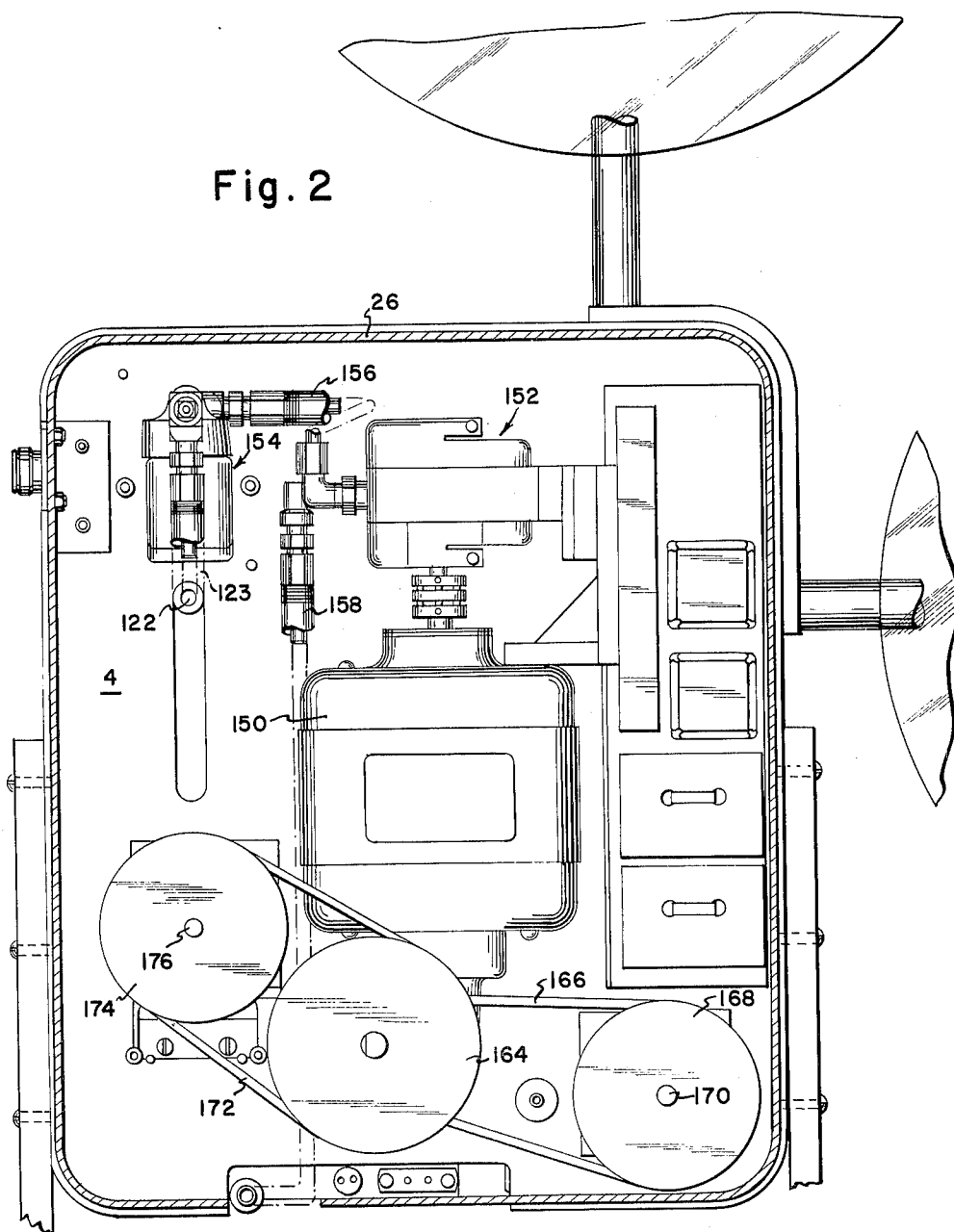
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5 Sheets-Sheet 2

Fig. 2



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5 Sheets-Sheet 3

Fig. 4

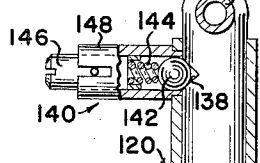
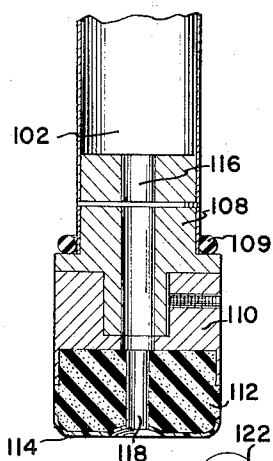


Fig. 5

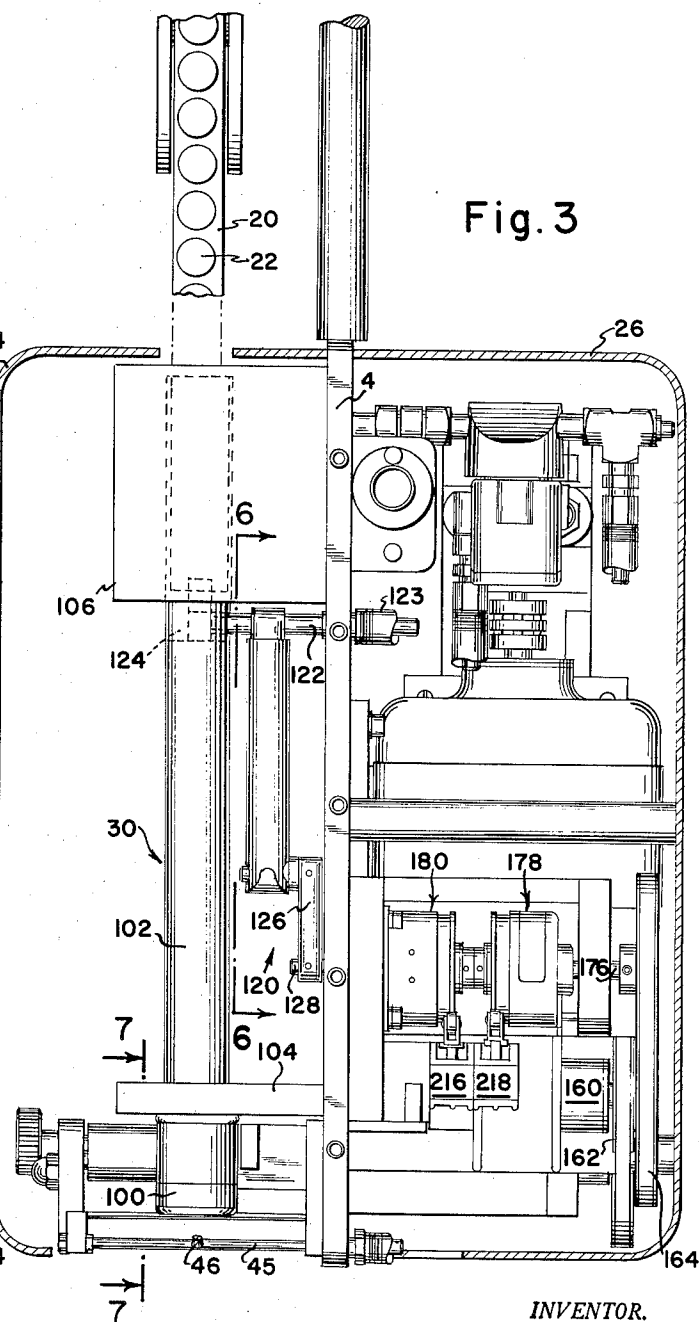
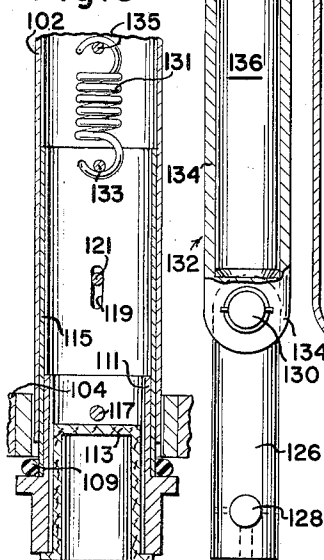


Fig. 3

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5 Sheets-Sheet 4

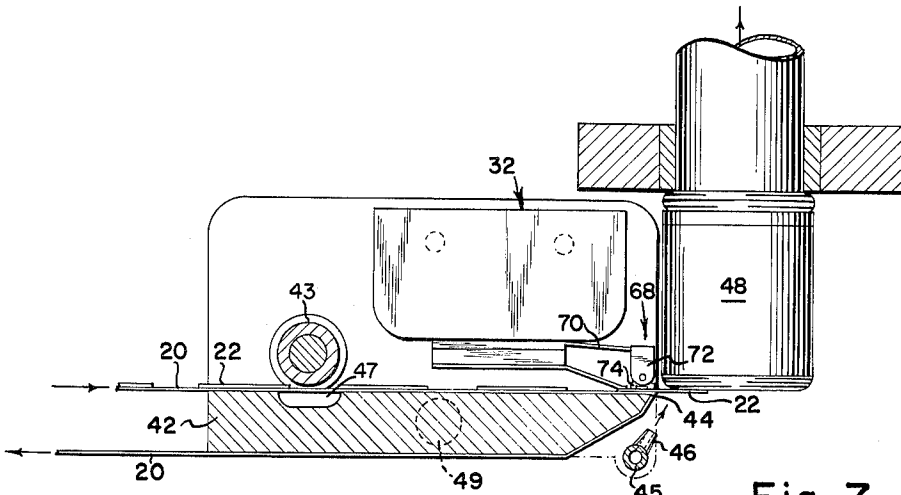


Fig. 7

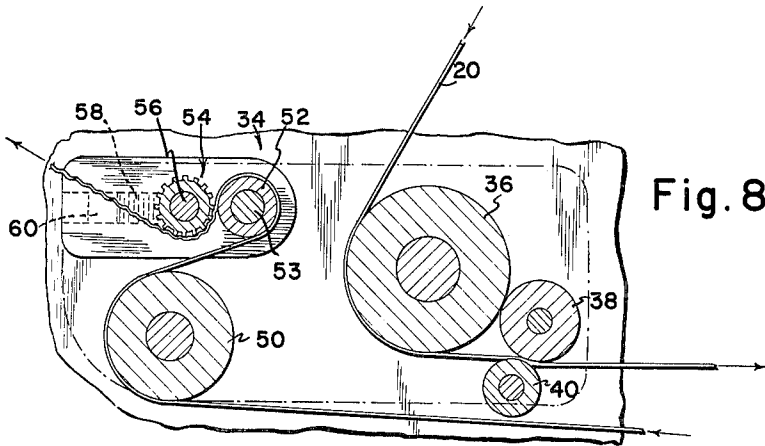


Fig. 8

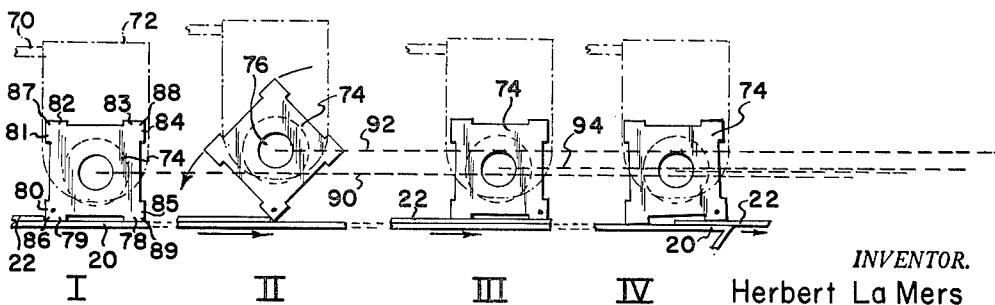


Fig. 9

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5 Sheets-Sheet 5

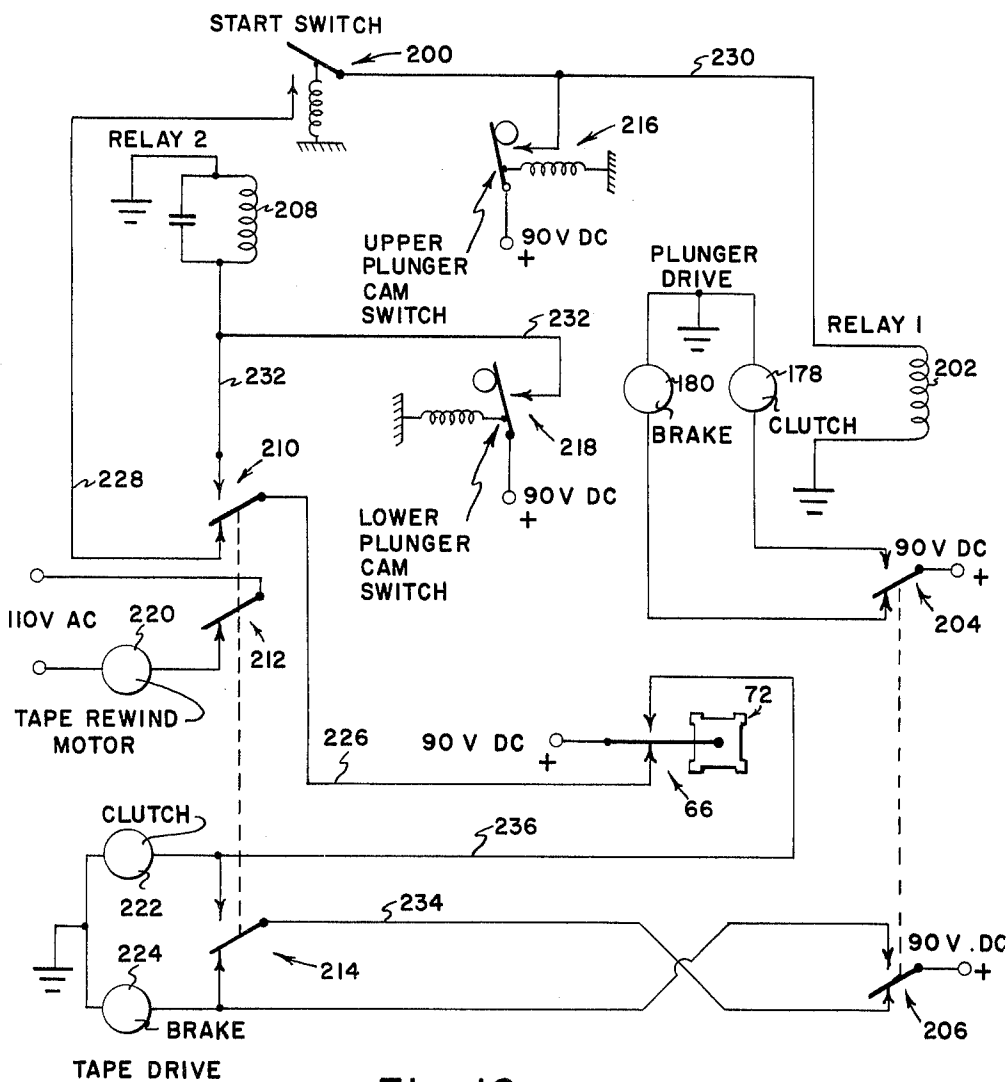


Fig. 10

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1

3,240,652

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Filed Mar. 23, 1961, Ser. No. 97,937

26 Claims. (Cl. 156—361)

This invention relates to label dispensing and applying and, more particularly to methods and apparatus for removing labels from a backing strip or sheet and for applying them to articles.

An object of this invention is to provide improved mechanisms for applying labels to objects. A further object is to provide for the removal of labels from a backing strip and for applying the labels to articles in an improved manner. A still further object is to provide methods and apparatus for applying labels to articles with extreme sensitivity of action. A further object is to carry out the above with labels which are attached by pressure-sensitive adhesive. A further object is to provide for the above with extremely accurate adjustment and control. A still further object is to provide for the above with apparatus which is sturdy in construction, compact, efficient and dependable, and which is adaptable to many different conditions of operation and use. These and other objects will be in part obvious, and in part pointed out below.

In the drawings:

FIGURES 1, 2 and 3 are front, rear and side elevations, respectively, of one embodiment of the invention, with the covers shown in section, and with parts broken away;

FIGURE 4 is an enlarged sectional view on the line 4—4 of FIGURE 1;

FIGURE 5 is a view similar to FIGURE 4, but showing another embodiment of the invention;

FIGURE 6 is an enlarged fragmentary view on the line 6—6 of FIGURE 3, with parts broken away;

FIGURE 7 is an enlarged sectional view on the line 7—7 of FIGURE 3;

FIGURE 8 is a vertical section of the tape-guiding and driving unit of FIGURE 1;

FIGURE 9 is a greatly enlarged developmental and somewhat schematic view representing the operation of the label detecting and switch-operating mechanism; and,

FIGURE 10 is a schematic wiring diagram of the electrical components and circuit.

Referring to FIGURES 1 to 3 of the drawing, a labeler 2 has a central vertical mounting plate 4 (FIGURE 3) supported at its edges (FIGURES 1 and 2) by a pair of uprights 6 and 8 which are attached below to a base, not shown. Rigidly attached to an upper corner of plate 4 is a bracket 10 from which a vertical support 12 and a horizontal support 14 project. These supports 12 and 14 provide the respective mountings for the spindles (not shown) of a supply reel 16 at the top and a wind-up reel 18 at the left. Wound onto reel 16 is a tape 20 (FIGURE 3) which serves as a carrier for labels 22. Each of labels 22 is attached to the tape 20 by a pressure-sensitive adhesive. As will be explained more fully below, the labels 22 are peeled individually from tape 20, and are applied automatically and in turn to a succession of articles such as bottles, cans or packages. The pressure-sensitive adhesive provides the temporary bond holding each label 22 to tape 20, and also provides the permanent bond which holds the label to the article to which it is applied. After the removal of the labels 22, the bare strip 20 is rewound automatically onto reel 18.

Plate 4 also provides a rigid mounting for the other elements of the labeler 2 which are enclosed in a pair of removable covers 24 and 26, shown in section. Mounted within cover 24 is a plunger assembly 30, a tape

2

control and label-removing assembly 32, and a tape-drive assembly 34. The functions of assembly 30 are to receive and hold each label 22 individually as it is removed from strip 20, and to carry the label and affix it to an article. The functions of assembly 32 are to detect and remove each label 22 from the tape 20 in a carefully controlled manner. The functions of assembly 34 are to guide the tape 20 as it is drawn from reel 16, subject the tape and the labels 22 to a label-straightening action, and to draw the tape under tension through and from the zone where the labels are removed.

Referring now to FIGURE 8, the tape 20 with labels 22 attached passes around the bottom of a roll 36 and between a pair of mating rolls 38 and 40; all of these rolls being mounted to be rotated by the movement of the tape. Tape 20 approaches and leaves rolls 38 and 40 substantially horizontally. The axes of the rolls 38 and 40 are out of vertical alignment so that the bight of the rolls extends downwardly from the horizontal in the direction of movement of the tape 20. Hence, labels 22 upon the upper surface of tape 20 are first subjected to downward bending around roll 40 then upward bending around roll 38, as the tape 20 is drawn taut as it leaves the bight, and this action flattens each label.

Referring now to FIGURE 7, the tape 20 is drawn along the upper surface of a plate 42 which terminates at the right in a knife-edge 44. A guide roll 45 insures alignment of the tape 20, when it moves along the plate 42. A cavity 47 disposed beneath the guide roll 45 facilitates threading of the tape 20 along the plate 42. When the labels are applied by a thermoplastic adhesive, plate 42 is heated by an electric heater 49 under the control of a thermostat, not shown, which is adjusted to impart the desired heating to the adhesive through tape 20. As tape 20 is drawn around the knife-edge 44, each label 22 is peeled from the tape. Directly beneath knife-edge 44, there is an air tube 45, with an air jet 46 which projects a small stream of air upwardly at an angle toward the bottom of the label 22 as it is being removed. This stream of air provides support for the label, so as to resist sagging and maintain it in a horizontal position. As will be explained more fully below, air is drawn into the bottom of plunger head 48, and this draws the label against the bottom of the head. The label is then held on the plunger head by the suction or partial vacuum condition until the plunger moves downwardly and attaches a label to an article.

Strip 20 is drawn around the knife-edge 44 and along the bottom of plate 42 back to assembly 34 (FIGURE 8) where it first passes around a roll 50 and then around a roll 52 to a toothed roll 54. Roll 54 is movably mounted on a shaft 56, and is urged toward roll 52 by a pair of spring assemblies 58 at the ends of shaft 56. Each of these spring assemblies includes a compression spring which is held in place by an adjusting screw plug 60, and which urges its end of the shaft 56 to the right. Hence, the toothed roll 54 is pressed against roll 52 with sufficient force to produce a positive drive pinching of tape 20. As will be explained below, roll 52 is motor-driven to impart the feeding action to tape 20, and roll 54 insures the positive drive. In this way, the tape is drawn from roll 16 downwardly through assembly 34, and thence through the label-removing zone. The rollers 36, 38 and 40 are not driven, but they provide sufficient "load" or resistance to movement of the tape to insure that the pulling feed by rollers 52 and 54 will provide the desired tape tension in the label-removing zone.

Assembly 32 (FIGURE 7) includes a tape-contacting leaf spring 64 which is rigidly mounted at its left end, and which has a toe portion riding upon the upper surface of tape 20 and labels 22. Assembly 32 also includes a micro-switch assembly 66 which has a feeler assembly 68

supported upon the end of a switch operating arm 70. The function of feeler assembly 68 is to detect the arrival of a label at the label-removing zone, that is, at the knife-edge 44. Feeler assembly 68 is formed by an inverted U-bracket 72 fixed to the end of arm 70 and a feeler element 74 pivotally mounted in the bracket. As shown best in the developmental FIGURE 9, feeler element 74 is somewhat cubicle in shape, and is rotatably mounted upon a pivot pin 76 which is journaled at the two opposite side faces of element 74 in openings in the adjacent side walls of bracket 72. Each of the other four faces of the feeler element is cut away parallel to the pivot axis to provide a pair of narrow contact surfaces at the edges of the face. The contact surfaces have been numbered clockwise 78, 79, 80, 81, 82, 83, 84 and 85, and the edges between the adjacent intersecting contact surfaces have also been numbered clockwise 86, 87, 88 and 89. For purposes of clarification of the terminology, the contact surface 79 will be considered the "first contact surface" of its face in the sense that a portion of the moving tape 20 will first contact this surface, and surface 78 will be considered the "second contact surface" of this face. The contact surfaces of the other faces will be referred to in similar terminology.

With the feeler element positioned as in the position "I" at the left of FIGURE 9, the two contact surfaces 78 and 79 have been riding on tape 20, but the leading edge of a label 22 has moved into contact with edge 86 of the feeler element. As tape 20 and the label 22 continue to move to the right, the leading edge of a label exerts sufficient force upon edge 86 of the feeler element to turn or rotate the feeler element counterclockwise. During each quarter turn, the feeler element moves to position "II" of FIGURE 9, and then to position "III," wherein it rides upon the surface of the label 22. In a sense, this is a "tumbling" action, with the feeler element turning through an arc of 90° each time that it is engaged by the advancing edge of a label. During each of the "tumbling actions" or quarter-turn movements of the feeler element 74, the axis of the feeler element is moved upwardly from the plane represented by the broken line 90 to the plane represented by the broken line 92, and it then moves down again to the plane represented by the broken line 94. This upward and downward movement of the pivot axis is transmitted through bracket 72 and arm 70 to the micro-switch of assembly 66. As will be explained below, this micro-switch is part of the electrical control circuit, and insures that a label is presented to the plunger head prior to each label-applying stroke. As the feeler element rides off a label, it tips counterclockwise to position "IV" of FIGURE 9, but this does not operate the micro-switch 66.

As indicated above, the plunger assembly 30 includes a plunger head 100 which is removably mounted upon the lower end of a plunger tube 102. Plunger tube 102 is mounted longitudinally by a journal bearing at the bottom in a fixed bracket 104, and a similar journal bearing in the bottom wall of a box 106 at the top of the plunger. The plunger head construction of FIGURE 4 is formed by a metal plug 108 fixed in the lower end of tube 102, and a removable plunger head portion formed by a cylindrical metal base 110, to which is fixed a sponge rubber member 112 which is covered by a layer of flexible plastic 114. A rubber "O" ring 109 positioned on the metal plug 108 provides a resilient stop or bumper against the bracket 104 when the plunger head 100 is in fully elevated position. A central passageway 116 extends through plug 108 and connects with a central bore 118 in the sponge rubber member 112 which is open at the bottom face of the plunger head. During operation, air is drawn in through these passageways and the plunger tube 102, so as to draw the labels individually against the plunger head and hold each while it is being moved downwardly and pressed into place on an article.

Vertical reciprocating movement is imparted to plunger 30 by a crank arm assembly 120, which is shown in FIGURE 3 at the left of plunger tube 102, and is shown in greater detail in FIGURE 6. Assembly 120 is mechanically connected to plunger tube 102 by a rigid tube 122 which terminates within the plunger tube in a cylindrical block 124 which has a central downward opening. Tube 122 projects through a vertical slot in plate 4, and is connected with an air suction tube 123. In this way, tube 122 performs the added function of providing the air suction connection with the top of the plunger tube, so that air is drawn into the center of the bottom face of the plunger head, as discussed above. Assembly 120 has a crank arm 126 fixed to the end of a drive shaft 128, and carrying a crank pin 130 upon which a connecting rod assembly 132 is journaled.

Assembly 132 (FIGURE 6) is formed by a tubular outer connecting rod 134 and a cylindrical inner connecting rod 136. Connecting rod 134 is journaled at its lower end on crank pin 130, and connecting rod 136 is journaled at its upper end on tube 122. Connecting rod 136 has a V-notch 138 near its upper end, and connecting rod 134 has a detent assembly 140 which includes a steel ball 142 which seats into groove 138 to hold the two connecting rods in their nested relationship, as shown. Ball 142 is resiliently held in groove 138 by a spring 144 which is held in place by an adjusting screw 146 threaded into a sleeve 148 fixed to connecting rod 134. Hence, the detent assembly 140 holds connecting rods 134 and 136 in the completely nested position, as shown, but the inner connecting rod 136 may be drawn out of the outer connecting rod 134 by exerting force sufficient to cause ball 142 to ride out of groove 138.

During rotation of the drive shaft 128, the crank arm 126 acts through the connecting rod assembly 132 and tube 122 to move the plunger assembly 30 downwardly and then back up to the position shown. During this movement, the bottom face of the plunger head moves to or beyond the zone where the label is to be applied to an article, so that the connecting rod assembly 132 limits the pressure which is exerted by the plunger head during its downward movement. The connecting rod assembly 132 acts as a unitary structure during the initial downward movement of the plunger assembly. However, when the plunger head encounters resistance to movement of a predetermined magnitude, i.e. on engaging an article to which a label 22 is to be attached, ball 142 rides out of groove 138, and the connecting rod assembly 132 then acts as an unrestrained extensible link during the remainder of the downward movement of the crank pin. During this last-mentioned movement, the plunger head remains stationary, with its face held against the article to which a label 22 has been attached so as to produce a "dwell" period for the attachment of the label. This is important when the adhesive requires time to set. As the rotation of the crank or crank arm 126 continues, the crank pin moves back up to the position where ball 142 encounters and enters groove 138. In this way, the connecting rod assembly 132 acts as a force-limited linkage which disengages immediately when the load is greater than a predetermined value, but which engages to its original operating condition prior to the end of each rotation of crank arm 126.

Referring now to FIGURE 2 of the drawings, a vertical shaft electric motor 150 is rigidly mounted on a plate 4, the upper end of its shaft being connected to drive an air compressor 152. Air compressor 152 draws air up through the plunger head, as described above, through rigid tube 122, a flexible tube 123, a dirt separation chamber 154 and a flexible tube connection 156. Air under pressure is discharged through a tube 158 which extends downwardly and connects to the rigid horizontal tube 45, upon which the air discharge nozzle 46 is mounted. The lower end of the motor shaft is connected through a gear reduction assembly 160 (see also FIG-

URE 3) to a pair of drive pulleys 162 and 164. Pulley 162 has a belt 166 which drives a pulley 168 mounted upon a shaft 170, through which the tape drive assembly is driven. Shaft 170 is adapted to be mechanically connected through a magnetic clutch (not shown) to shaft 53 (see FIGURE 8) of roller 52, and a magnetic brake (not shown) is provided. Pulley 164 has a belt 172 which drives a pulley 174 and a shaft 176, which is adapted to be connected by a magnetic clutch 178 to drive shaft 128 of the plunger-drive assembly. A magnetic brake 180 is operative to hold shaft 128 in fixed position when the brake is energized.

Thus, the single motor 150 provides the drive for the plunger, and also the drive for the assembly which draws the tape through the zone where the labels are removed. Motor 150 also drives the air compressor 152 to create a partial vacuum condition within the plunger tube 102 to produce the suction for drawing the label to the plunger head and for holding the label in place during its movement toward and at the label attaching zone. The stroke of the plunger head during the label applying movement varies, depending upon the relative position of the surface to which the label is applied. The air which is drawn in to produce the suction is discharged through jet 46 to aid in directing the labels to the proper position on the plunger head.

Referring now to FIGURE 10, wherein the electrical control circuit is represented schematically, the elements are given numbers corresponding to those used in the discussion above. However, the following additional components are represented in FIGURE 10: a push button start-switch 200 which is normally open, but which is pressed manually to start a label-applying operation; a "relay 1" having a solenoid 202 and two double-throw switches 204 and 206; a "relay 2" having a solenoid 208, a double-throw switch 210, a single-throw switch 212, and a double throw switch 214; an upper plunger cam switch 216 which is open when the crank arm 126 is positioned so that the plunger is in its fully-elevated position, but which closes when the plunger moves from this position; a lower plunger cam switch 218 which closes only when the crank arm 126 reaches the position wherein the plunger is moved to its fully extended position downwardly; a tape rewind motor 220 which is mounted concentrically with the shaft of reel 18, and automatically turns reel 18 to rewind the tape; and, the tape-drive clutch 222 and the tape-drive brake 224, which have been referred to above, but which have not been shown in the drawings. It should be noted that these are identical in structure with units 178 and 180.

At the end of each cycle, a label 22 is positioned upon the bottom face of the plunger head, and another label is positioned with its leading edge directly above the knife-edge 44. Also, the elements of the electrical control circuit are positioned as represented in FIGURE 10 and electrical power is supplied, as indicated. A new cycle is started by closing the start-switch 200, which completes an electrical circuit from the lower contact of micro-switch 66 through a line 226, the lower contact of switch 210, a line 228, switch 200 and a line 230 to one side of solenoid 202, the other side of which is grounded so as to connect 90 volts D.C. across the solenoid. This opens the circuit of the lower contact of switch 204 so as to de-energize the plunger-drive brake 180, and closes a circuit through the upper contact of switch 204 to energize the plunger-drive clutch 178, so that the plunger drive is started. The initial movement of the plunger drive of shaft 128 closes switch 216 so as to complete a hold-in circuit for relay 1 to the positive side of the D.C. voltage through this switch to line 230. This hold-in circuit maintains solenoid 202 of relay 1 energized until switch 216 is re-opened at the end of the plunger-drive operation. It is assumed that a label is positioned on the plunger head, and an article is positioned to have the label applied to it, and that this label is promptly moved to-

ward and attached to the article. The arrival of the plunger drive crank arm at the bottom of its drive position closes switch 218, so as to connect the positive side of the direct current source through switch 218, and a line 232 to solenoid 208 of relay 2, the other side of which is grounded, so that this solenoid is energized.

The lifting of the armature of switch 210 disconnects lines 228 and 226, thus disconnecting the start switch 200, so that the start switch is rendered inoperative during the remainder of that operating cycle. This prevents accidental interference with the operation by the reclosing of the start switch. The lifting of this armature also completes a hold-in circuit for relay 2 by connecting line 232 to line 226, which is connected to the positive side of the direct current source through the lower contact of micro-switch 66. At this time, the armature of switch 206 of relay 1 is raised so that the tape-drive brake 224 is energized and effective. Hence, the lifting of the armature of switch 214 does not affect this brake, but it does connect the tape-drive clutch 222 through the upper contact of switch 214 and a line 234 to the lower contact of switch 206. Thereafter, when the plunger drive returns to the upper position, so as to re-open switch 216 and de-energize solenoid 202 of relay 1, the dropping of the armature of switch 206 simultaneously releases the tape-drive brake 214, and energizes the tape-drive clutch 222. The dropping of the armature of switch 204 of relay 1 disconnects the plunger-drive clutch 178, and simultaneously energizes the plunger-drive brake 18.

The immediate result of the starting of the tape drive is to draw the tape around the knife-edge 44 (FIGURES 1 and 8) so as to peel a label from strip 20, and this label is delivered to the plunger head. Simultaneously, the drawing of the tape by the tape drive moves a label into contact with the feeler element 72, as shown in position "I" of FIGURE 9, and the continued movement of the edge of the label causes this feeler element to turn one-quarter turn, as discussed above. When the feeler element reaches the position "II" of FIGURE 9, the lower contact of switch 266 (FIGURE 10) opens so as to disconnect the hold-in circuit of solenoid 208 of relay 2, and this relay is then deenergized. During the time that the feeler element is in position "II" (FIGURE 9), the tape-drive clutch 222 is connected through line 236, and the upper contact of micro-switch 66 to the positive side of the direct current source so that the tape-drive continues, even though relay 2 has been de-energized and the armature of switch 214 has dropped away from its upper contact. However, the dropping of the armature of switch 214 initiates the energizing of the tape-drive brake 224 so that the tape-drive is stopped promptly and, in fact, simultaneously with the de-energizing of the tape-drive clutch 222. The turning of the feeler element 72 to position "II" and then to position "III," and the dropping of the armature switch 210, sets up the circuit to the start switch 200, so that the cycle is repeated when the start switch is reclosed. However, if the start switch 200 is held in its closed position, the cycle is repeated immediately. It should be noted that only one pulse of the start-switch is needed to start a cycle of operation, and that additional pulses do not interfere with the cycle.

In the above discussion, it has been pointed out that the tape drive continues until a label has moved into contact with feeler element 72, as shown in position "I" of FIGURE 9. This insures that a label is positioned with its leading edge directly over knife-edge 44 at the end of each cycle. For example, if a label is missing on tape 20, or if, in fact, an extended portion of the tape bears no label, the tape drive continues, and the cycle is not completed until a label has been positioned at the knife-edge. Therefore, at the beginning of the next cycle, the plunger positions the label which it then holds, and another label is delivered to the plunger.

It has been indicated above that rewind motor 220 drives the rewind reel 18. Relay 2 includes switch 212

of the circuit of motor 220, and this circuit is closed when this relay is de-energized, and is opened when this relay is energized. This gives an impulse driving action to the rewind reel. Motor 220 is provided with a friction-clutch drive, and may be provided with additional controls to limit the turning of reel 18.

In the embodiment of FIGURE 5, the metal plug 108 is replaced by a flanged sleeve 111. An inverted cup filter 113 is positioned within this sleeve so as to filter the inflowing air. Sleeve 111 is attached to an inner tube 115 by a pin 117 which is snugly received in the lower end of the plunger tube 102. Inner tube 115 has a pair of slots 119 through which a pin 121 extends, with its ends in plunger tube 102, so as to provide for limited sliding movement between tubes 102 and 115. A tension spring 131 extends between a pin 133 fixed to the inner tube 115 and a pin 135 fixed to the outer tube. Hence, spring 131 holds the inner tube 115 telescoped within tube 102, when the plunger is moved downwardly away from bracket 104. However, when the plunger moves upwardly, the "O" ring 109 engages the bottom of bracket 104 and limits the upper movement of the plunger head 100 and the inner tube 115, and tube 102 moves on upwardly to the top of the stroke. This insures uniform and dependable action in the movement of the plunger head downwardly.

I claim:

1. In apparatus for applying labels from a supply in the form of a carrier strip with labels spaced therealong and attached thereto, the combination of, label-removing means, feed means for passing the strip in label-removing relationship with respect to said label-removing means whereby said labels are removed serially, label-applying means positioned to receive each of said labels after it is removed and operative to apply it to a surface, said label-applying means comprising a plunger having a plunger head which is adapted to receive a label and to move toward the surface of an article or the like thereby to apply the label and drive means for said plunger including means which automatically discontinues the driving movement when the plunger encounters resistance of a predetermined magnitude, and cyclic control means which includes means responsive to the completion of each label-applying operation of said label-applying means thereafter to operate said feed means to feed the carrier strip and to remove another label therefrom, said control means also including means to detect the arrival of the next label to be removed at said label-removing means and to stop the feeding of the carrier strip in response thereto.

2. In apparatus for applying labels from a supply in the form of a carrier strip with labels having pressure sensitive adhesive holding them to the carrier strip, the combination of, means forming a knife edge around which the carrier strip may be drawn to peel the labels from the strip, means for drawing the strip around said knife edge whereby the labels are removed, and label-applying means comprising a plunger having a plunger head to which each label is delivered after it has been removed from the strip and releasable drive means to project the plunger head through a label applying movement with a predetermined driving force

3. Apparatus as described in claim 2 wherein said label-applying means includes power means and a releasable driving connection between said power means and said plunger head whereby the label is projected with sufficient force to apply the label to a surface but said releasable driving connection is released by an excessively greater resistance force.

4. Apparatus as described in claim 2 wherein said means to draw the strip includes a pair of rolls one of which includes teeth which engage the strip, and a spring assembly urging said rolls together.

5. Apparatus as described in claim 4 which includes means to subject the strip and the labels to compression

and bending actions to flatten each label and to create a resistance to movement of the strip toward said knife edge.

6. A power operated label applying device comprising a supply means for a backing strip, a take-up means to receive a backing strip from said supply means, power operated means for moving a backing strip from said supply means to said take-up means, first means for guiding a backing strip from said supply means to said take-up means, said first means including a plate operatively positioned to subject a backing strip to an abrupt change of direction as it moves toward said take-up means whereby labels having a pressure sensitive adhesive coating are removed from the backing strip, a vacuum holding means operatively positioned to receive labels as they are removed from the backing strip, and means to move each label and apply it to an article while the label is held by said vacuum holding means.

7. Apparatus as described in claim 6 which includes air pumping means which directs a stream of air toward the adhesive coated surface of each label as it is being removed from the strip and simultaneously draws air into the vacuum holding means.

8. Apparatus as described in claim 1, wherein said feed means to feed said carrier strip comprises guide means directing said carrier strip toward said label-removing means, and means to positively engage and pull said carrier strip from said label-removing means.

9. Apparatus as described in claim 8, which includes a pair of rolls providing a nip through which said carrier strip passes while moving to said label-removing means and which provides sufficient resistance to the movement of said carrier strip to hold said carrier strip under tension while passing through said label-removing means.

10. Apparatus as described in claim 8, which includes means to impart a label-straightening action to said carrier strip and the labels affixed thereto and to provide resistance to the free movement of said carrier strip.

11. Apparatus as described in claim 8, wherein said label-removing means forms a knife-edge extending transversely of said carrier strip and around which said carrier strip is passed at a sharp angle whereby the labels are peeled from said carrier strip.

12. Apparatus as described in claim 11, which includes, a feeler positioned upon said carrier strip so as to be engaged by the labels to detect the arrival of a label at said knife-edge.

13. Apparatus as described in claim 12, wherein said feeler comprises a feeler element which is adapted to move with the leading edge of each label about an axis whereby to move said axis, and said control means includes an electric switch operated by said movement of said axis.

14. Apparatus as described in claim 13, wherein said feeler element comprises a rotary member having a plurality of label-engaging portions and mounted so that its axis may move away from said carrier strip by the action of the edge label.

15. Apparatus as described in claim 13, wherein said feeler element comprises a substantially cubicle member pivotally mounted upon an axis parallel to said knife-edge and having contact faces which define sharp edges of intersection which engage leading edges of successive labels to cause the movement of said carrier strip to tumble said feeler element one-quarter turn about its pivotal axis thereby to move said pivotal axis away from said carrier strip.

16. Apparatus as described in claim 1, which includes means to withdraw air into said plunger thereby to hold each label by a partial vacuum condition, and means to discharge air against each label as it moves toward its position upon said plunger.

17. Apparatus as described in claim 1, wherein said drive means includes an extensible connecting rod formed by a pair of telescoping elements and detent means holding said elements in telescoped condition, whereby said ele-

ments may be moved from said telescoped condition by disconnecting said detent means.

18. Apparatus as described in claim 17, wherein said elements comprise a ball and spring assembly mounted upon one of said elements with the ball and spring urged to a nesting position in a notch in the other of said elements.

19. Apparatus as described in claim 18, wherein said elements comprise an outer sleeve and an inner cylindrical member and wherein said drive means includes a crank which is rotated to produce a label-applying operation.

20. Apparatus as described in claim 19, which includes a tube rigidly connected to said plunger to provide the driving connection therewith and also to provide an air suction means for producing said partial vacuum condition.

21. Apparatus as described in claim 1, wherein said plunger head includes a filter for the incoming air and a sponge rubber member with a central opening, and wherein said apparatus includes an air compressor which draws the air in through said plunger and discharges the air against the labels as removed from the carrier strip.

22. Apparatus as described in claim 21, which includes a single drive motor for driving said air compressor and said plunger, and wherein said control means includes a pair of micro-switches which are operated by cams mounted upon the shaft of said crank arm and adjusted to operate respectively upon the movement of said crank arm from its position wherein said plunger is fully retracted and the position wherein the plunger is fully extended.

23. Apparatus as described in claim 1, which includes a central rigid mounting plate, and wherein said feed means and said label-applying means are mounted upon one side of said plate, and a motor mounted upon the other side of said plate and connected to drive said feed means and said label-applying means.

24. Apparatus as described in claim 23, wherein said means constituting a supply of labels comprises a label supply reel and mounting means therefore fixed to said plate, and a tape rewind assembly comprising a tape rewind reel with mounting means therefore and including a rewind motor turning said reel.

25. Apparatus as described in claim 1, wherein said control means includes an electrical control circuit comprising a plurality of switches and interconnecting circuit means for carrying on the cycles of operation automatically.

26. Apparatus as described in claim 25, which includes a first relay which is operated to start each cycle by carrying on a label-applying operation and a second relay which is operative to prevent starting of a new cycle after the label-applying operation has been substantially completed and prior to the detecting of the arrival of a label at the label-removing means.

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