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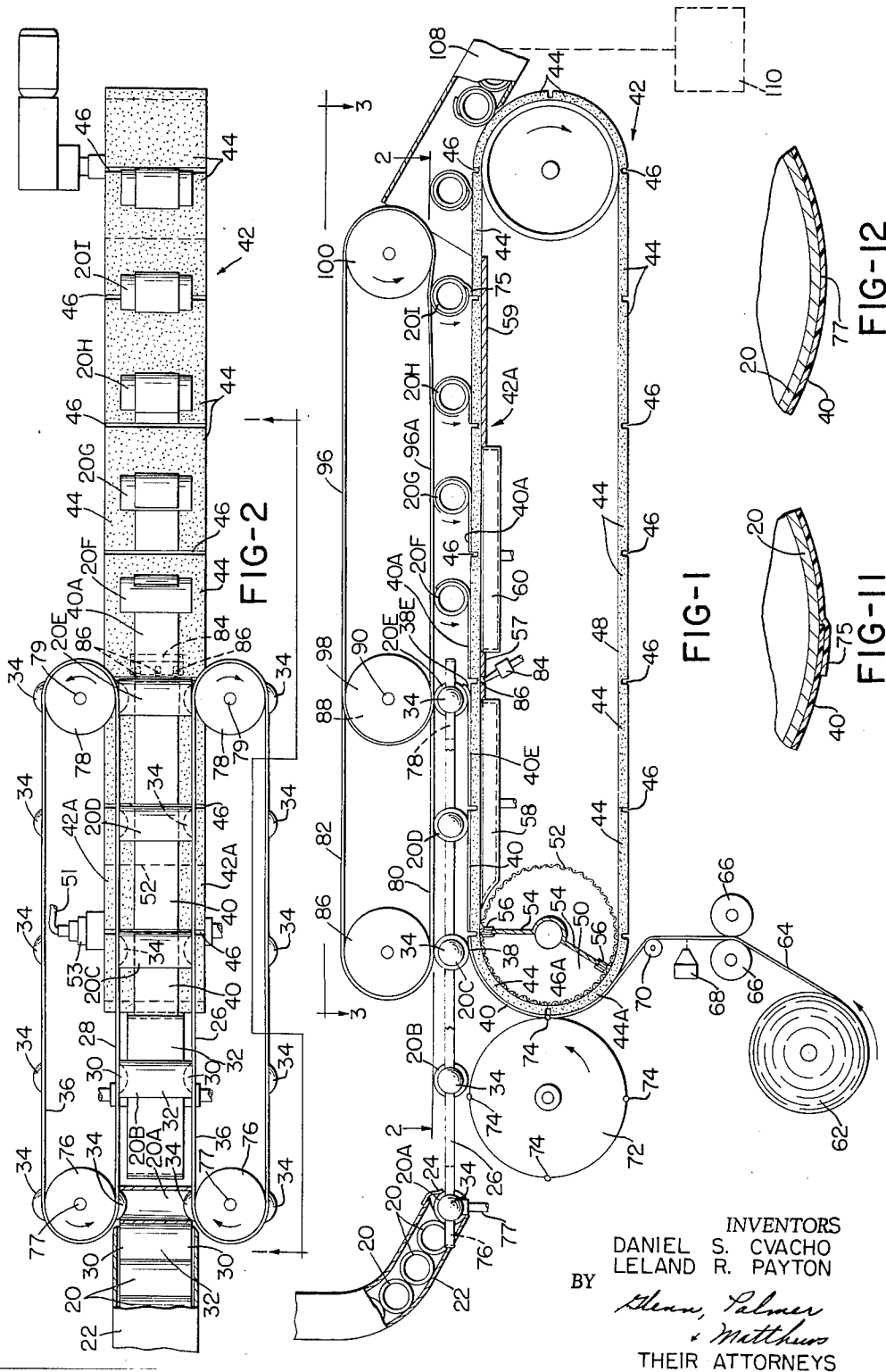
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3,235,433

METHOD AND APPARATUS FOR APPLYING LABELS TO CONTAINERS

Filed May 15, 1962

3 Sheets-Sheet 1



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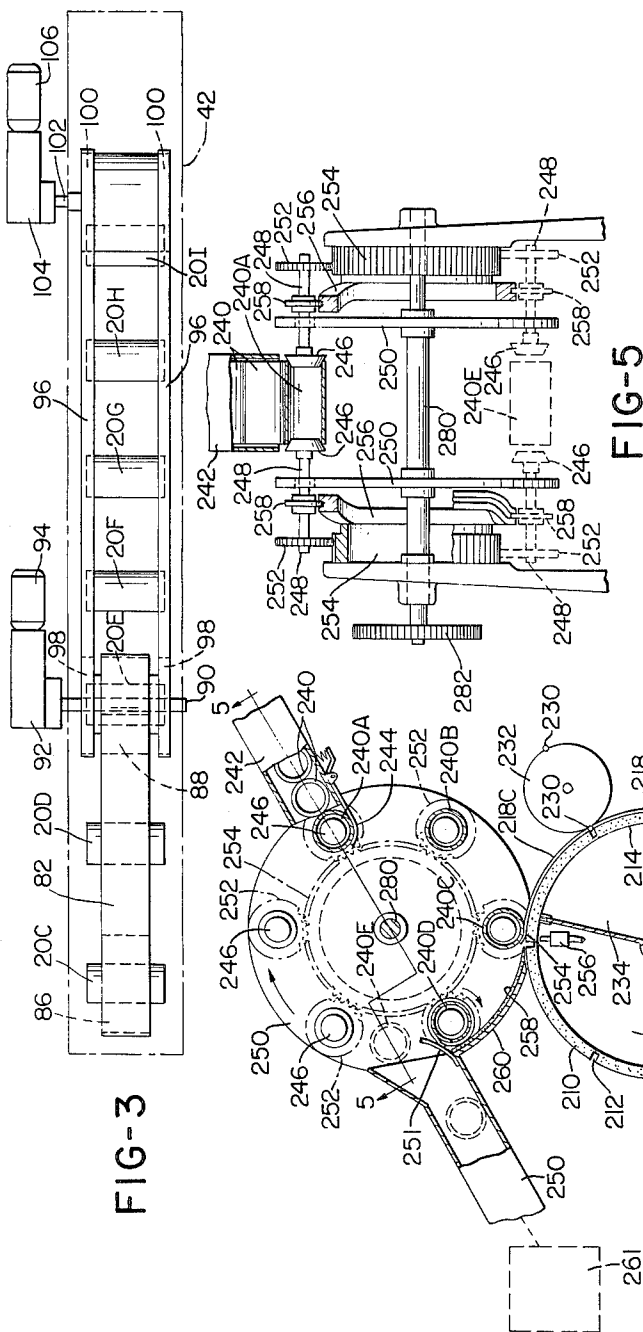
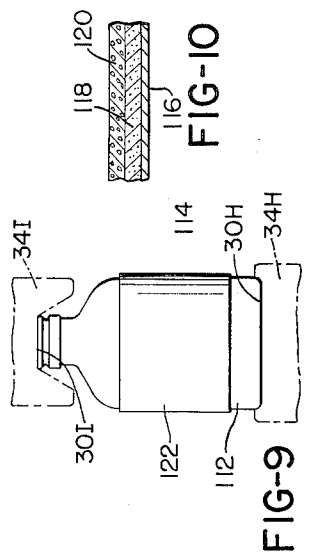
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3 Sheets-Sheet 2



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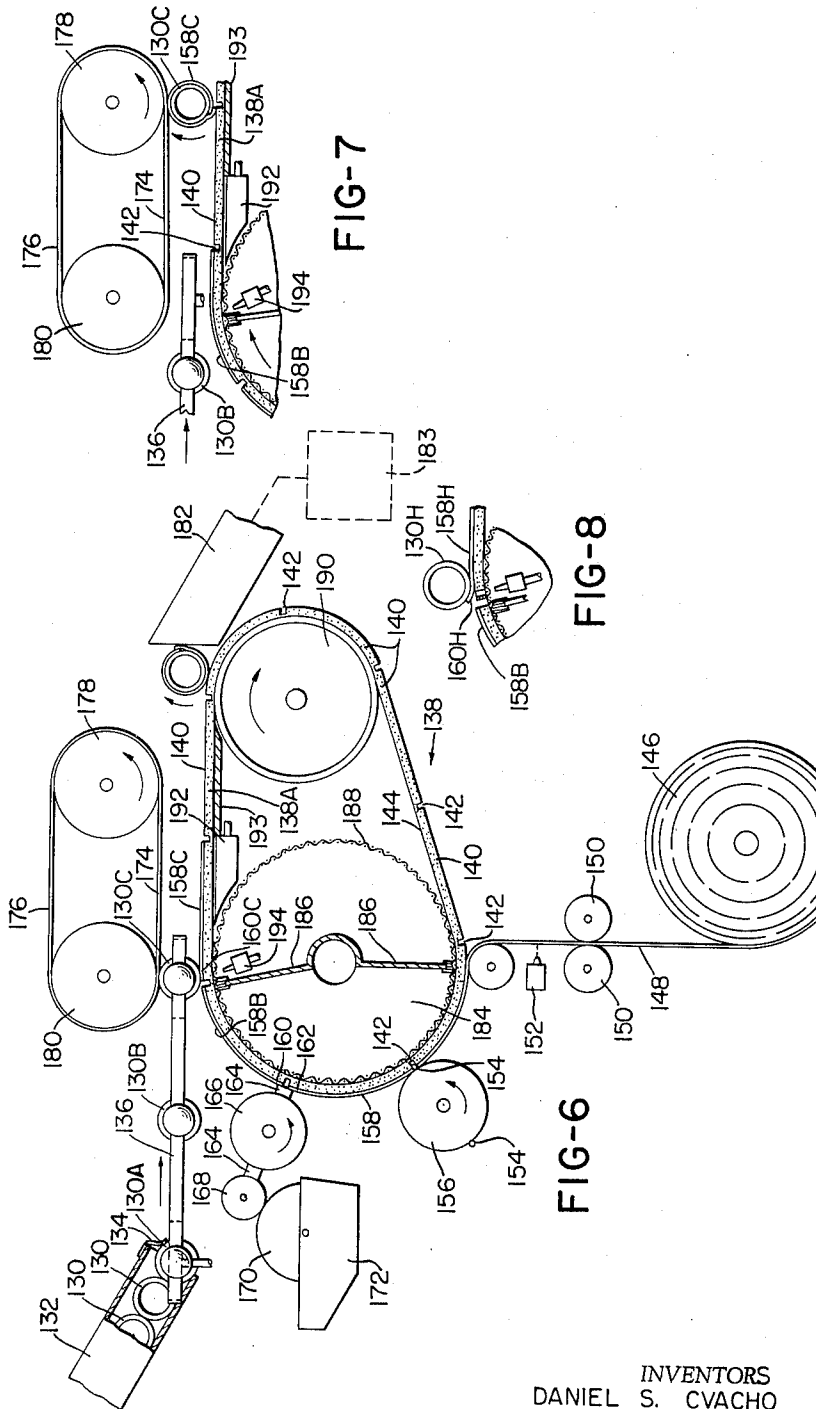
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3 Sheets-Sheet 3



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METHOD AND APPARATUS FOR APPLYING LABELS TO CONTAINERS

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Filed May 15, 1962, Ser. No. 194,819
15 Claims. (Cl. 156—229)

This invention relates to methods and apparatus for applying labels to containers, and to containers produced by such methods and apparatus.

According to one of the features of this invention, label producing material in strip form is automatically cut into labels, and containers are automatically brought into contact with such labels in a manner automatically to secure the labels to the container.

According to another feature of this invention, containers are fed through feed means, such as a chute and the like, to a receiving or conveying means which properly spaces the containers from each other and then delivers them to label applying means where the labels are applied and secured to the containers.

According to another feature of this invention, containers are brought into contact adjacent respective edges of labels, and the containers are then moved or rotated to apply the labels to the containers.

According to another feature of this invention, labels are applied to the exterior surface of containers and are secured thereto by a heat shrinking procedure.

According to another feature of this invention, containers are supported at the ends of the containers and are rotated, and labels are applied to said containers and are wrapped around said containers while being rotated.

According to another feature of this invention, apparatus is provided to apply heat sensitive labels to heated containers to secure said labels to said containers.

Many other features of this invention are disclosed in this application.

Accordingly, it is an object of this invention to provide apparatus for applying labels to containers having one or more of the features herein disclosed.

Another object of this invention is to provide methods for applying labels to containers having one or more features herein disclosed.

Another object is to provide containers with labels applied thereto and having one or more features herein disclosed.

Other objects of this invention are apparent from this description, the appended claimed subject matter, and/or the accompanying drawings, in which:

FIGURE 1 is a diagrammatic representation of an embodiment of this invention, taken substantially along the line 1—1 of FIGURE 2.

FIGURE 2 is a diagrammatic plan view substantially along the line 2—2 of FIGURE 1.

FIGURE 3 is a diagrammatic plan view substantially along the line 3—3 of FIGURE 1, with some of the background omitted.

FIGURE 4 is a diagrammatic vertical cross section of another embodiment of this invention.

FIGURE 5 is a diagrammatic cross section taken substantially along the line 5—5 of FIGURE 4.

FIGURE 6 is a diagrammatic cross section of another embodiment of this invention.

2

FIGURE 7 is a view of a portion of FIGURE 6 at a later stage in the process of applying a label to a container.

FIGURE 8 is a cross section of a slightly modified portion of FIGURE 6.

FIGURE 9 is a diagrammatic view of an embodiment of a container to which a label has been applied according to this invention.

FIGURE 10 is an enlarged cross section of a strip or lamination of the character which may be applied to the embodiment of FIGURE 9 in the form of a label.

FIGURE 11 is an enlarged cross section of a portion of a cylindrical can with an overlapping label applied thereto.

FIGURE 12 is a cross section similar to FIGURE 11, but in which the label has been applied with substantially abutting label ends.

The labels herein described, and/or the label strip from which the labels are made, may be a single film, or a laminated film. The specific character of the material for the labels or strip may be varied to meet various requirements in the practice of this invention.

For example, if the labels are to be applied to unheated containers, such as at room temperature, then the labels may be made with a surface which suitably clings or adheres to the container surface. Alternatively, the labels or strip may be treated so the labels may be applied to the container in a manner to cause them to adhere or be secured to the unheated containers in a suitable condition.

When the film is to be applied to unheated containers, such as cylindrical cans or cylindrical bottles, such as bottles now known as throw-away glass cans or throw-away glass bottles, then the film used may be made of a plastic such as polyvinyl chloride, polyethylene, or similar plastic material. An example of a suitable film made of polyvinyl chloride is heat shrinkable PVC Reynolon, manufactured by the Reynolds Metals Company, Richmond, Virginia. If desired, the material may be suitably oriented. For example, it may be oriented in one or more directions, such as in the direction of the length of the strip. If desired, a suitable solvent or adhesive may be applied to the leading edge, the trailing edge, or both the leading edge and trailing edge of the label, or it may be applied to the entire attaching side of the label if desired. However, the natural adhering properties of the film may be used. The label may then be placed on or wrapped around the container, so the edge or edges adhere to the container, for example, in substantially abutting edge relationship, or in edge overlapping relationship. Thereafter the label may be heated to shrink the label tightly on the can or bottle.

Alternatively, the container, such as a can or bottle, may be in a heated condition while the label is being applied, and the polyvinyl chloride, polyethylene, or similar film may be applied directly to the heated container. The film then adheres to the container as it is being wrapped on the container, or is being applied thereto in any other manner. Any other type of film of a similar nature may be used in lieu of the polyvinyl chloride or polyethylene film.

The label film may be made of a material which is adhesive under compression, and the labels may be applied to the containers while the containers are in the heated or unheated condition, as desired. A suitable pressure may be applied to cause pressure adhesion during the label applying step. This step may then be

followed by a heat adhering step, if desired, further to secure the labels to the containers.

Labels having a metallic foil surface may be used, such as an aluminum foil surface. For this purpose, the attaching side of the label to be adhered to the container may be coated with a wax material or any other thermo-sensitive adhesive. The label may be applied to the container while the container is in heated condition substantially in the same manner as described in connection with the plastic labels. Laminations having a metal foil such as an aluminum foil, a layer of wax, and a layer of porous paper, etc., may also be used to produce labels according to this invention and a suitable example of such a lamination is Reyseal 012, manufactured by the Reynolds Metals Company, Richmond, Virginia.

For further details concerning heat sealable labels and the use of heated containers, see the copending application of Reynolds Metals Company, Docket No. 3927-P George A. Rutledge, Inventor, SN. 194,774, filed May 15, 1962.

The strip material used in all of the embodiments herein disclosed may have label decoration or the like, such as printing, embossing, etc. In the case of the foil labels or other labels, such printing, etc. may be placed on the outer surface of the labels. In the case of the plastic labels, the printing or other marking may be on the outside or the inside. Such printing may be produced on the inside surface of the labels by coloring matter which does not change the physical characteristic of the inner surface. Such inside printing is protected from scuffing and the like after the label is applied to the container.

Certain words are used in this application which denote direction, relative position, etc., for the sake of brevity and clearness of description. However, it is to be understood that such words are used in connection with the specific illustrations used in the accompanying drawings, and that the embodiments of the invention in actual use may have other directions, relative positions, etc., and still come within the scope of the description and of the claimed subject matter of this application. Examples of such words are "upper," "lower," "vertical," "horizontal," etc.

Referring now to FIGURES 1-3, containers 20 may be fed gravitationally down a feeding means or chute 22, so that the lowermost container 20A is arrested by a resilient tongue 24 in readiness to be removed therefrom by the receiving and conveying means or conveyors 26 and 28.

Containers 20 may be cylindrical or cylindraceous metallic cans having ends 30 and cylindraceous label receiving surfaces 32. These containers may be made of aluminous material.

The conveyors 26 and 28 may have rubber or rubber-like knobs or cups 34 which enter ends 30 of the containers.

The knobs or cups 34 serially remove the lowermost container 20A as they pass to the lower end of the chute 22. This automatically spaces the containers as they are being transported as indicated by the reference numerals 20A, 20B, 20C, etc. This automatic spacing of the containers 20A, 20B, 20C, etc., permits the conveyors 26 and 28 automatically serially to apply containers, such as 20C, etc., on the desired portion 38 of each respective label 40.

Label transporting or conveying means may be provided in the form of an orbital conveyor 42 which may be a porous band conveyor. This conveyor 42 may be constructed of a plurality of rubber or rubber-like label supporting pads 44 which are separated from each other by the grooves 46. If desired, any suitable material may be used to form the backing 48 for the pads 44. Such backing 48 may be different from, or integral

with the pads 44, as desired. The combined backing 48 and pads 44 may be sufficiently porous or perforated, if desired, so a vacuum in chamber 50 of the rotatable drum 52 may be effective to hold the labels 40 against the porous pads 44 until such labels 40 are properly applied to the containers.

If desired, a stationary curtain 54 may be provided to separate the chamber 50 from the remainder of the interior of the drum 52, and may include resilient end seals 56 to maintain the vacuum in chamber 50.

The vacuum in chamber 50 may be produced by the suction line 51 and rotary joint 53.

Additionally, if desired, a vacuum box 58 may be placed along the space immediately adjacent to the drum 52, as indicated in FIGURE 1. If desired, an additional vacuum box 60 may be used or may be omitted as desired to maintain the unwrapped portions 40A of the labels properly in place, until they are properly wrapped around the containers 20F, etc.

If desired, the upper run 24A of the conveyor 42 may be supported substantially throughout the run to maintain such run 42A substantially straight. The vacuum boxes 58 and 60, if used, may be used to aid in supporting the upper run 42A. Also, if desired, straight supporting members 57 and 59 may be provided to support and maintain the remainder (or all) of the upper run 42A in straight condition. Any other type of support may be used. The backing 48 of belt 42 may be sufficiently thick and strong to resist wear as it travels over surfaces 57, 58, 59, and 60 or the like.

Means may be provided to feed label forming strip material and labels on the label conveying means, or conveyor 42, as desired. For example, a roll, spool, or other supply 62 of label strip means or material may feed the label strip 64. The strip 64 may pass the registering rolls 66 and an electric eye 68 which may be responsive to any suitable marking or other target on the strip 64, and which may control the rate of feed of the strip, or other feed factor, in a manner to feed the label pattern of the strip 64 correctly on the conveyor 42 to insure correct placement of the labels on the containers. The strip 64 may then pass the idler roll 70 and may be applied to the adjacent pad 44A, where the strip may be subjected to vacuum from chamber 50. A cutting roll 72 may have hot cutting wires 74 which cut the strip 64 in the adjacent groove 46A. Sufficient wires 74 are provided to produce a cutting action at every groove 46 as it passes adjacent the cutting wheel roll 72. The severed label 40 may come in contact with the adjacent container 20C near the leading edge 38 of the label 40. The conveyors 26 and 28, which move on horizontal planes, by means of the horizontal pulleys 76 and 78, and vertical shafts 77 and 79, carry and space the containers 20A, 20B, 20C, 20D and 20E rightward. A container, such as 20C, is applied to the leading edge 38 of the respective label 40 and is carried along by both conveyors 26 and 28 which support the ends 30 of the containers. Also the containers 20C, 20D, and 20E, or the like, are supported by the upper run 42A of the conveyor 42. The containers 20C, 20D, and 20E are downwardly pressed by the lower run 80 of a rubber or rubber-like V-belt 82. The lower run 80 of this belt 82 moves rightwardly at the same speed as the upper run 42A of the conveyor 42. The straight run of the conveyors 26 and 28 also move at the same speed as the upper run 42A of the conveyor 42. In this manner, the containers 20C, 20D and 20E are maintained against the respective leading edges of the respective labels 40. Adjacent the right terminal of the lower run 80 an air blast from jet means such as the nozzle construction 84 may pass through suitable openings 86 in the leading edges of pads 40 or in the adjacent groove construction 46, the support 57 and the backing 48 of belt 42, to cause the leading edge 38E of the respective label 40 initially to be wrapped around the container 20E.

The leading edge 38E may be caused to adhere to the

container 20E by the blast from the nozzle construction 84 and additionally by any adhesive or clinging force between the leading edge 38E and the container 20E, such as an electrostatic charge on the surface of the label. However, such adhesive force may be alternately produced by the application of adhesive to the necessary leading end or trailing edge of the label, as is illustrated in the embodiments of FIGURES 4 through 7, or such adhesive force may be due to the high temperature of the containers which may have been fed to any of the various embodiments herein disclosed. This high temperature causes the label to adhere because of the activation of the thermo-sensitive components of the label itself or of the thermo-sensitive adhesive which may have been applied.

The belt 82 may pass over a suitable pulley construction 86 at the left end and a suitable pulley construction 88 at the right end of the belt 82, which may be a driven pulley. For example, the pulley construction 88 may be mounted on and keyed to the shaft 90, which may be driven by a transmission connected to the belt drive of belt 42 or it may be a worm gear drive 92 and/or motor 94 in synchronism to produce a rightward movement of the lower run 80 in synchronism with the upper run 42A, as previously described.

A pair of rubber or rubber-like belts 96 may pass over idler pulleys 98 at the left end and driven pulleys 100 at the right end. The pulleys 100 may be mounted on a shaft 102, which may be driven by a transmission or gear reduction 104 and may be driven by a motor or the like 106. The lower runs 96A of the belts 96 move rightwardly at a slower speed than the rightward movement of the upper run 42A of the conveyor 42. This causes the containers 20F, 20G, 20H, and 20I to have a counter-clockwise rotational motion produced in them by this differential movement of the lower run 96A and the upper run 42A, so that the labels 40A, etc., are gradually wrapped around the containers 20F-20I, so eventually the labels are completely wrapped around the containers, as indicated at 20I. In the specific illustration there is an overlap of the label ends 75, but the labels may be only partially wrapped around the containers or substantially completely wrapped with substantially abutting ends 77, as illustrated in the enlarged views, FIGURES 11 and 12, respectively. These views show cylindrical cans 20 (or the like, such as bottles, etc.) with overlapped label ends 75 or abutting ends 77.

The containers with the wrapped labels may then be discharged down the conveyor or chute 108, which may discharge or convey the containers to a temperature modifying space 110 or the like, which may be a heating space, such as a heating chamber if a shrinking operation is required. Alternatively, the space 110 may be a cooling chamber, if a cooling operation is required.

The embodiment of FIGURES 1-3, as well as the embodiments of FIGURES 4-8, etc., may also be constructed to receive cylindrical or cylindraceous bottles or the like, such as the cylindrical bottles 112 of FIGURE 9, which may be fed down a chute, such as chute 22, while still being in a partially heated condition after they are being manufactured at the factory.

The bottles 112 may be removed from the cooling lehr or passageway of the bottle factory when they are at a temperature of about 160° F. The end supporting knobs or cups 34 of FIGURES 1, 2 and 3 and the corresponding knobs or cups of the other embodiments may be modified as indicated at 34H and 34I with suitable heat resistant material to support the bottom end 30H and the upper end 30I of the bottle 112. The strip material for the labels may be a lamination, for example, such as shown in FIGURE 10. The lamination 114 may include an aluminum foil 116 having a suitable wax or wax-like substance 118 and a porous paper 120, and an example of such a lamination is available under the trade name as Keyseal, elsewhere described. This lamination may be fed substantially as shown in FIGURE 1 and may be

cut by cutting knives instead of hot wires 74. The lamination may be merely aluminum foil 116 and any suitable wax-like material, without the porous paper 120, if desired.

The label 122 may be applied to the bottle 112 substantially in the same manner as shown and described in connection with FIGURES 1-3 and to be shown and described in connection with FIGURES 4-8. The label 122 may be extended partially around the circumference of the bottle 112, or it may be an overlapping label, such as shown in FIGURE 11, or it may be a substantially butting end label, such as shown in FIGURE 12.

FIGURES 6-8 show embodiments somewhat similar to that shown in FIGURES 1-3.

These embodiments may apply labels to containers of the same character as in FIGURES 1-3.

Containers 130 may be fed gravitationally down the feeding means or chute 132. The lower-most container 130A may be held in place by a resilient tongue or the like 134. Conveyors 136, substantially of the same character as conveyors 26 and 28 of FIGURES 1-3, receive, space and transport containers 130A, 130B and 130C and deliver them to the label transporting means or conveyor 138. The conveyor 138 may be substantially the same in general character as the conveyor 42 in that it may have rubber-like label carrying pads 140 separated by grooves 142 and which may be carried by a backing 144 which may be integral with the pads 140 or of a different material, substantially identical to FIGURES 1-3. Label strip material may be supplied by any suitable means, such as a roll, spool or the like 146, which delivers the strip 148 with printed labels with the printing either on the outer or inner surface of the labels, in all of the modifications. The strip material 148 may pass the registering rolls 150 and the electric eye 152 which may govern registering control mechanism of well known type to regulate the placing of the printed or otherwise decorated labels correctly on the pads 140. The strip material 148 may be cut by the hot wires or knives 154 on label cutting disc 156. The hot wires 154 may cut the labels at the grooves 142. Thereafter the labels, which may now be indicated by the reference numeral 158, may have either the trailing edge 160 or the leading edge 162 or both the leading and trailing edges 162 and 160 supplied with adhesive, if such adhesive is required, by the adhesive daubing brush 164, which may be carried by a wheel 166 into contact with the adhesive applying wheel 168 and wheel 170 carried in the adhesive tank 172.

The adhesive applying mechanism shown may be omitted, if the nature of the labels or of the containers, or both, are such that no such adhesive application is required. The respective container 130C may be applied to the trailing edge 160C of the label 158C by the conveyors 136. The conveyors 136 may terminate at this point and release the container 130C where the container 130C is pressed downwardly by the lower run 174 of the belt 176. The belt 176 may be supported on the pulleys 178 and 180. The pulley 178, for example, may be driven by a transmission or motor, so the lower run 174 travels rightwardly at a higher speed than the upper run 138A of the label carrying conveyor 138. This higher speed of the lower run 174 causes the container 130C to have a clockwise rotation imparted to it, so the label 158C is wrapped around the container 130C as shown in FIGURE 7. This may be accomplished as quickly as desired, depending on the ratio of the speeds of the lower run 174 of belt 178 as compared to that of the upper run 138A of belt 138. A relatively short run 174 is shown for the belt 176, but such run 174 may be of any length desired or necessary to produce the complete wrapping of the label.

Thereafter, the labeled containers are delivered to the chute 182 for cooling or heating, as required, depend-

ing upon the nature of the labels, in the space or room 183.

If desired, a vacuum may be maintained in the vacuum chamber 184 in a manner similar to chamber 50 of FIGURES 1-3. A dividing partition 186 may be provided for the perforated drum 188 which supports one end of the label carrying belt 144.

A suitable pulley 190 may support the other end of the belt 138. An additional vacuum chamber 192 may be provided if desired or if necessary to maintain the label 158C in place. A support or supports 193 may support the lower run 138A where required.

A suitable air blast nozzle 194 may be provided to blow a blast of air through openings in adjacent openings in the pads 140, to cause an initial wrapping of the trailing end 160C of the label 158C as it is moved past the blast nozzle 194. However, if the adhesive or clinging nature of the label 158 is sufficiently strong, such blast is not needed.

In FIGURE 8, the container 130H is being applied to the label 158H a small distance rightward from the trailing edge 160H, so there is no likelihood of the container 130H being applied to the leading edge of the leftward label 158B.

The adhesive applying mechanism 164, 166, etc. shown in FIGURE 6 may be applied to the embodiment of FIGURES 1-3, is desired.

The embodiments of FIGURES 6, 7 and 8 may be used to apply labels to heated or unheated containers and to any type of containers herein described, such as metallic cans, bottles, glass bottles, etc.

In the embodiment of FIGURES 4 and 5, a strip supply such as a spool or roll 200 supplies label material or strip 202 past an electric eye 204, which properly governs the speed of feed to produce proper registering of the labels, and printed material. The strip 202 may then pass the registering rolls 206 and the idler roll 208 to apply the material to the rubber or rubber-like pads 210 which are spaced by the grooves 212. The pads 210 may be supported by suitable backing material 214 as previously described. The leading edge 216 of the label 218 may have adhesive applied by the brush 220 which is carried by the wheel 222. The adhesive brush or brushes 220 may have adhesive applied thereto by the adhesive idler 224 and the dipping roll 226 in the adhesive trough 228.

The label 218 may be cut by the hot wire 230 carried by the cutting wheel 232 which has the necessary number of cutting hot wires 230. Knives may be used when required. A vacuum chamber may be provided at 234 in the drum 236 which is separated by the stationary wall 238 substantially identical in general character to the separating walls heretofore described at 54 and 186. Containers 240 are fed down the chute 242. The lowermost container 240A is held by the spring actuated tongue 244 until the container 240A is engaged by the insulating rubber cups or knobs 246. The knobs 246 are carried on shafts 248 which in turn are carried on the wheels 250.

Rotation is imparted to the containers 240 and to the knobs or cups 246 and shafts 248 by the gears 252 which roll around the stationary ring gears 254.

The cups 246 are moved inwardly and outwardly by means of the stationary cams 256 which are engaged by the discs 258 in such a manner that the cups 246 are moved inwardly to grasp the container 240A and to carry it with the cups 246 pressed inwardly past the positions 240B, 240C, 240D. The cups 246 are pulled outwardly at the station or position 240E by the cams 256 to release the labeled container 240E and deliver it into the chute 250 for shrinking, heating or cooling in the space or room 261, if required.

A flexible flap 251 permits the containers to be moved past the flap 251 and catches the containers as they are released at position 240E to cause them to fall into the chute 250.

The shafts 248 rotate the containers 240 clockwise as they travel past the positions illustrated in FIGURE 4. When position 240C is reached, the container engages the leading edge 254 of the label 218C. An air blast at nozzle 256 is provided to pass through suitable openings in the drum 236, to curl the leading edge 254 around the container 240C. Thereafter, the container 240 is moved and rotated past a felt surface 258 which is carried by the stationary curved plate 260. The label 218C is curled around the container 240C as it moves upwardly to the position 240D. This combined rotation of the container 240C by the gearing 252 and 254 heretofore described, causes the label to be wrapped completely or partially around the container to any desired extent. As illustrated, the label has been completely wrapped around in an overlapping condition as shown adjacent the resilient flap 252. In this manner the labels are applied to the containers which may then be heated, cooled or otherwise treated to insure the adhesion of the label to the container.

The wheels 250 may be driven by a shaft 280, which may be driven by a gear 282, or the like, to produce a substantially continuous motion of the wheels 250 and of the carrying shafts 248, as is obvious.

In all of the embodiments, the film applied to the containers may be of the character heretofore described. That is, it may be polyvinyl fluoride film or the like, or a foil lamination, such as shown in FIGURE 10. The containers may be metal cans, such as aluminum cans or the like. The containers may also be glass bottles or "glass cans" or "throw-away bottles." The containers may be heated or unheated as may be required by the nature of the label being applied thereto. The labels may be such that they cover only a portion of the cylindraceous side wall or the labels may be with overlapped edges, or the labels may be with substantially abutting edges as desired.

The shrinkable film may have the label patterns printed thereon shorter than when used for the stretch register of the apparatus. Register is achieved by controlling the stretch of the label as it passes from the feed roll 62, 146, or 200, past the electric eye 68, 152 or 204, past the registering rolls 66, 150 or 206 and on to the drum 52, 188 or 210. Thus the cut line of the label is placed on such drum in respect to the cut slot, knife or other severing means 46, 142 or 212, on the drum and which is synchronized with the rotary knife 74, 154 or 230 to cut labels of the correct length and in the correct registered position properly to be applied to the respective container.

For example, with respect to FIGURES 1-3, the label patterns in the feed roll 62 have been printed shorter than they are when are finally applied to the containers 20. The labels 40 are stretched by controlling the stretch of the labels on strip 64 as they pass from the feed roll 62, past the registering rolls 66, past the electric eye 68, past the idler roll 70, and on to the porous pads 44 where they are maintained in stretched condition by the vacuum in chamber 50. The strip 64 may pass the registering rolls 66 and the electric eye 68 which may be responsive to any suitable marking or other target on the strip 64, as previously described. The electric eye 68 may control the rate of feed of the strip, or other factor with respect to the conveyor 42 in a manner to feed the label pattern 40 of the strip correctly on the conveyor 42 in properly stretched condition to insure the correct stretch and placement of the labels on the containers 20. The control of gearing and transmissions by an electric eye, per se, is well known in the electric eye control industry, and hence can be applied to the control of the relative movement of the registering rolls and the conveyor 42 to produce the desired stretch and register for the labels 40. Hence the strip 64 may pass the idler roll 70 and may be applied to the adjacent pad 44A, where the strip may be subjected to vacuum

from chamber 50 and where the stretched labels 40 on the strip 64 will be held in stretched condition against the porous pad by the vacuum until such stretched labels are properly applied to the respective containers 20. The vacuum boxes 58 and 60 maintain the unwrapped portions of the labels 40 properly stretched and in place until they are properly wrapped around the containers at 20F. etc. The containers 20 with the stretched wrapped labels 40 on them may be discharged down the conveyor or chute 108 into the temperature modifying space 110 where they may be heated or cooled, as required by the condition of the containers.

The same stretching procedure may be performed on the apparatus of FIGURES 4 and 5, where the feed roll 200, electric eye 204, registering rolls 206, idler roll 208, porous pads 210, vacuum chamber 234, etc., perform a stretching operation of the labels on the strip 202, and then apply them to the containers 240, in a manner which is obvious from the foregoing description in connection with FIGURES 1-3.

Likewise, in the embodiment of FIGURES 6, 7 and 8, the feed roll 146, registering rolls 150, electric eye 152, the illustrated idler roll, the porous pads 140, the vacuum chamber 184, etc., perform a stretching operation on the labels on the strip 148 and then apply them to the container 130, in a manner which is obvious from the foregoing description in connection with FIGURES 1-3.

It is thus to be seen that new and useful labeled containers have been provided, and that these labeled containers have been produced by new and useful apparatus and methods.

While the form of the invention now preferred has been disclosed according to the requirements of the statutes, other forms may be used, all coming within the scope of the claims which follow.

What is claimed is:

1. A method comprising: stretching a label strip while feeding said strip on an orbital conveyor; cutting said strip on said conveyor to form stretched labels on said conveyor; feeding respective containers into contact with a respective portion of a respective label; and moving another portion of said respective container into contact with another portion of said respective label.

2. A method comprising: feeding and tightening a label strip on an orbital conveyor; cutting said strip on said conveyor to form labels on said conveyor; feeding respective containers into contact with a respective portion of a respective label; and rotating said respective container to move another portion of said respective container into contact with another portion of said respective label.

3. A method comprising: printing labels on a strip of shrinkable material somewhat shorter than the length of said labels when applied to containers; and stretching a portion of said strip as it is about to be applied to said containers; cutting said stretched portion into stretched labels; maintaining said labels in stretched condition after being cut; and applying said stretched labels to said containers while said labels are maintained in stretched condition.

4. A method of applying labels to containers which comprises: feeding a strip of material having labels formed thereon somewhat shorter than in actual use; stretching said strip and holding said stretched strip in stretched condition on a conveyor as it is being fed; cutting said strip on said conveyor into stretched labels on said conveyor and controlling the stretching of said labels while being applied on said conveyor to achieve register of said labels on said containers.

5. In combination: an orbital conveyor with label carrying means; label strip feed means to feed said label strip on said label carrying means; cutting means to cut said label strip into labels on said label carrying means; feed means to feed respective containers in contact with

a respective portion of a respective label while on said label carrying means; jet means actuating said respective portion initially to cause the adjacent edge of said respective label to adhere to said respective container; and means to move another portion of said respective container into contact with another portion of said respective label.

6. In combination: an orbital conveyor with label carrying means; label strip feed and stretching means to feed and stretch said label strip on said label carrying means; cutting means to cut said label strip into labels on said label carrying means; feed means to feed respective containers in contact with a respective portion of a respective label while on said label carrying means; and rotating means to rotate said respective container to move another portion of said respective container into contact with another portion of said respective label.

7. A combination according to claim 6 in which said rotating means includes an orbitally movable member moving at a speed different from the speed of said orbital conveyor.

8. A combination according to claim 6 in which said rotating means includes a rotatable member for rotating each of said respective containers.

9. In combination: a rotatable, endless, flexible, porous band conveyor having an inner surface and an outer surface and cutting notches on said outer surface; stationary vacuum chamber forming means engaging a portion of said inner surface to form a strip and label attracting vacuum zone on said outer surface; label strip feeding means to feed a label strip on said outer surface in said vacuum zone; strip cutting means cooperating with said notches to cut said strip into respective labels in said vacuum zone and having closely adjacent leading and trailing ends in said vacuum zone; container feed conveyor means to feed respective containers against said leading edges of said respective labels; means to apply adhesive to said leading edges while said respective labels are in said vacuum zone; and adhering means to cause said respective labels to adhere to said respective containers.

10. A combination according to claim 9 in which a stationary wall has stationary ends forming a sealing engagement with spaced portions of said inner surface to form said vacuum chamber between said wall and said portion of said inner surface; and in which said containers are cylindraceous and have opposed ends and said container feed conveyor means includes opposite endless conveyors having container end engaging and supporting members engaging both of said ends to feed and support said containers; and in which said strip feeding means includes registering rolls and an electric eye to stretch said label strip and to register said labels with said containers; and in which said adhering means includes pressing means to press said containers against said labels and to rotate said containers to attach said labels to said containers.

11. In combination: a rotatable, endless, flexible, porous band; vacuum chamber means contacting one side of said band as said band passes said vacuum chamber means; means for applying respective labels to the opposite side of said band as said band passes said vacuum chamber means; and container feed means having container end engaging and supporting members for both ends of said containers to feed and support respective containers against said respective labels; and means to adhere said respective labels to said respective containers.

12. A combination according to claim 11 in which means are provided to move said supporting members toward and away from the ends of said containers.

13. A combination according to claim 11 in which means are provided relatively to rotate said supporting members with respect to said container feed means.

14. A combination according to claim 11 in which

11

means are provided to move said supporting members in synchronism with said porous band.

15. In combination: an endless conveyor having a vacuum producing surface; means for placing a label strip on said surface; means for stretching said strip before placing said strip on said surface; cutting means for cutting said strip into labels on said surface; container feeding means means for feeding respective containers against respective labels while said labels are stretched on said surface; and means for causing relative rotational movement between said containers and surface to secure said respective labels to said respective containers.

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12

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