United States Patent [19]

Wochner

[11] **3,709,755**

[45] **Jan. 9, 1973**

[54] **MULTI-STATION LABELLING METHOD**

[75] Inventor: **Fred Joseph Wochner,** Holliston, Mass.

[73] Assignee: **Dennison Manufacturing Company,** Framingham, Mass.

[22] Filed: **Sept. 11, 1970**

[21] Appl. No.: **71,598**

[52] **U.S. Cl.** **156/235,** 156/238, 156/247, 156/542, 156/557, 156/567

[51] **Int. Cl.** **B65c 3/08,** B65c 9/06

[58] **Field of Search** ...53/211, 216; 83/924; 156/156, 156/212, 215, 230, 235, 238, 458, 475, 476, 477 R, 481, 541, 542, 560, 567, 247, 249, 361, 362, 363, 540, 557; 229/93

[56] **References Cited**

UNITED STATES PATENTS

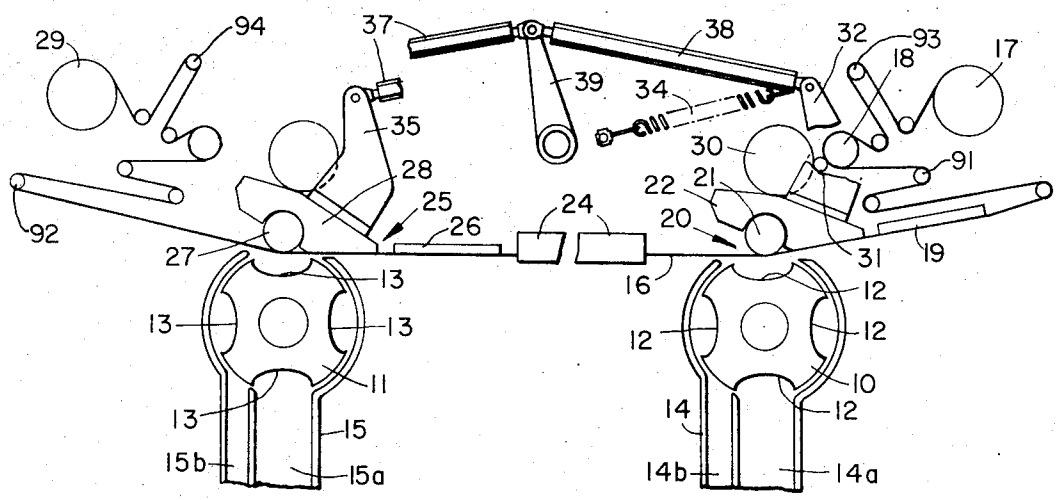
3,565,721	2/1971	Spaulding et al.	156/256
3,064,714	11/1962	Flood	156/542

Primary Examiner—Robert F. Burnett
Assistant Examiner—Robert A. Dawson
Attorney—Sewall P. Bronstein and Donald Brown

[57] **ABSTRACT**

Method and apparatus for applying heat transfer labels from a web or backing strip to a bottle or container. The labels which are positioned one after another on the backing strip are applied to the bottles or containers at a plurality of labelling stations such that at first station a first label from a sequence of labels is transferred and at a second station positioned downstream from the first station a subsequent label of the sequence of labels is then transferred.

8 Claims, 8 Drawing Figures



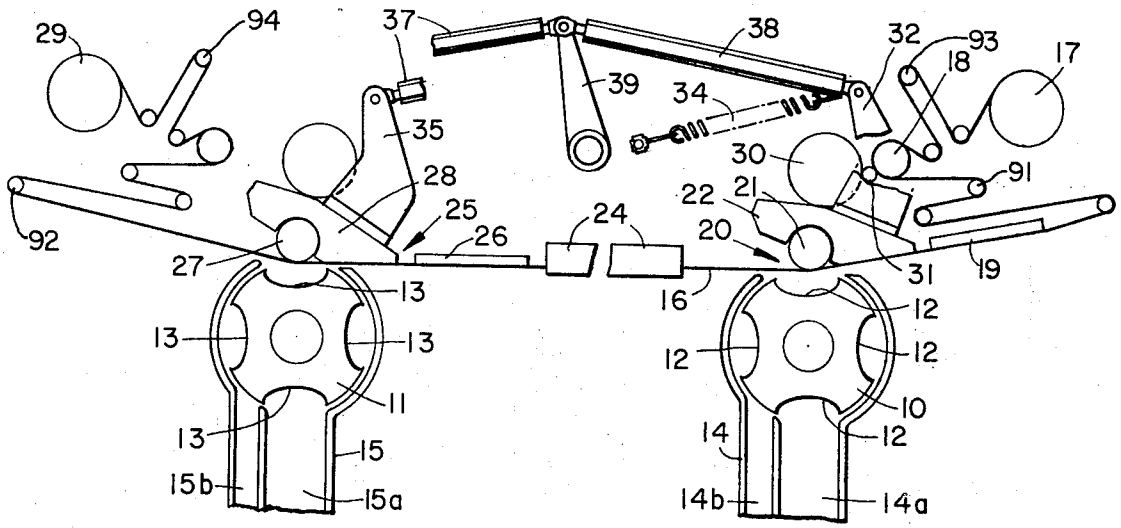


FIG. 1

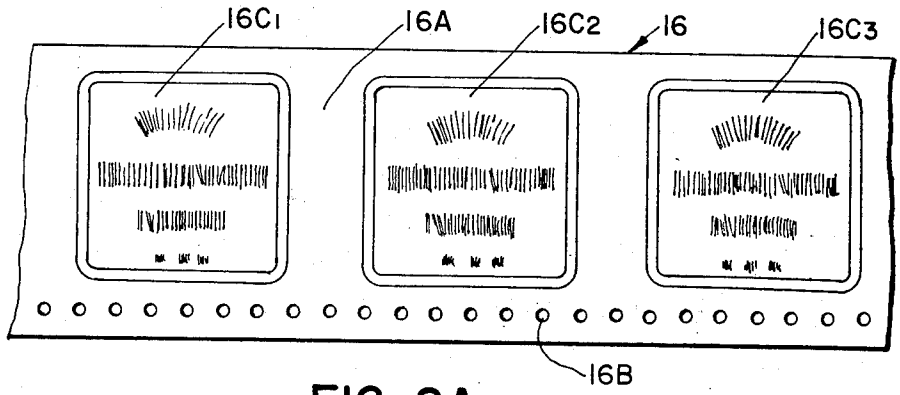


FIG. 2A

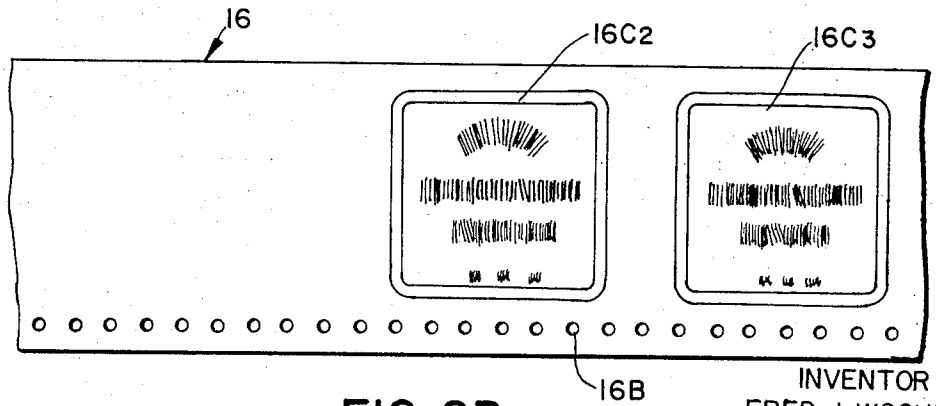


FIG. 2B

INVENTOR
FRED J. WOCHNER

Llike, Thompson & Bronstein
ATTORNEYS

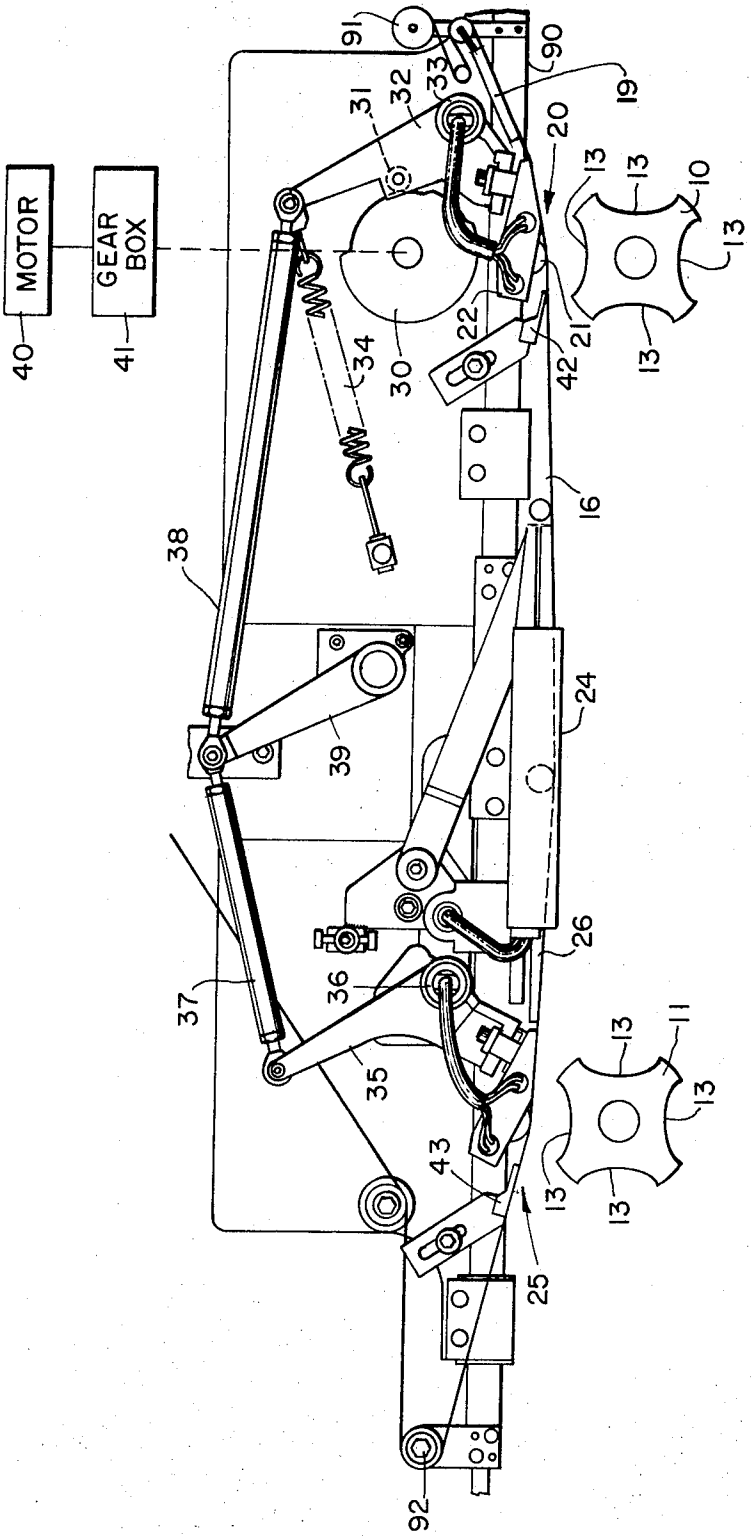


FIG. 3

INVENTOR
FRED J. WOCHNER
BY
Likes, Thompson & Bronstein
ATTORNEYS

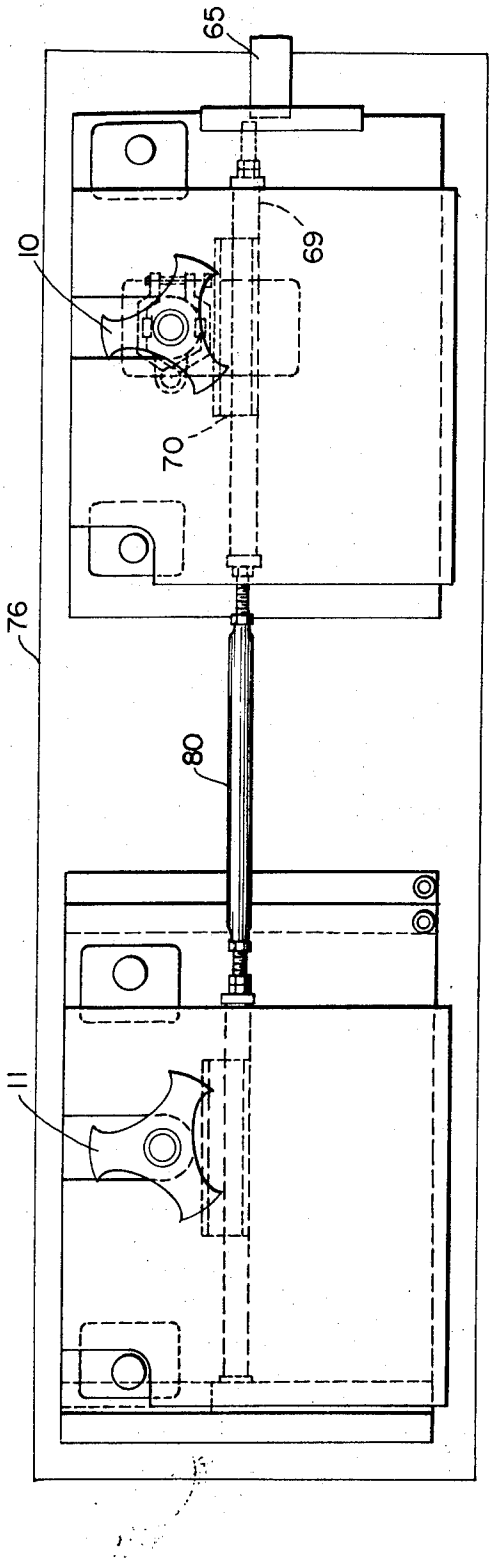


FIG. 4

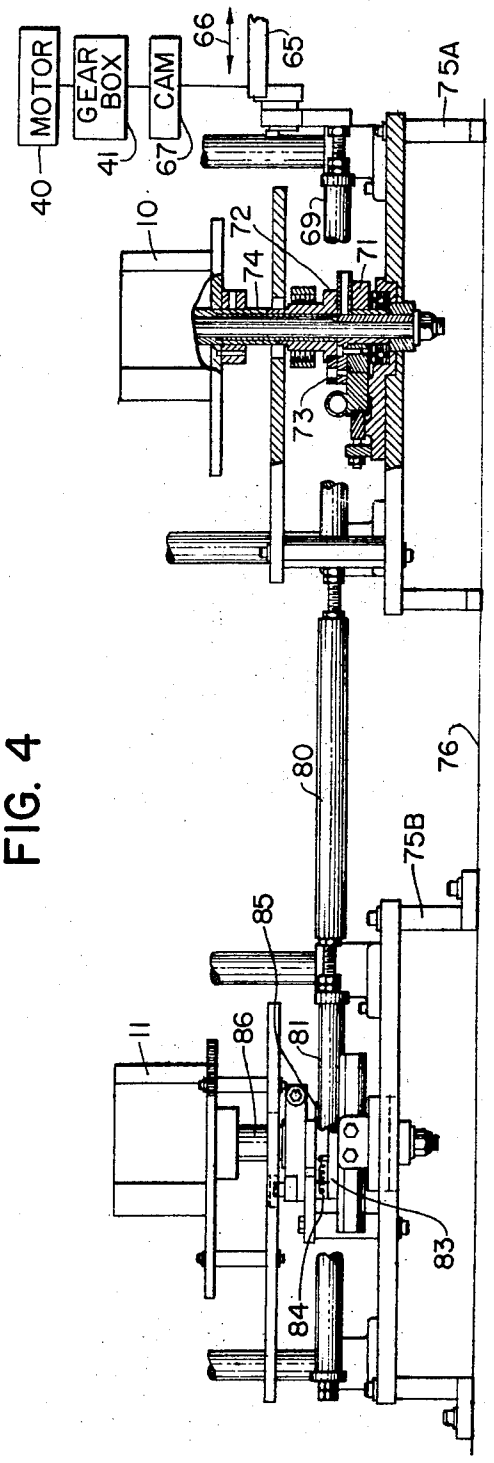


FIG. 5

INVENTOR
FRED J. WOCHNER
BY
Dike, Thompson & Bronstein
ATTORNEYS

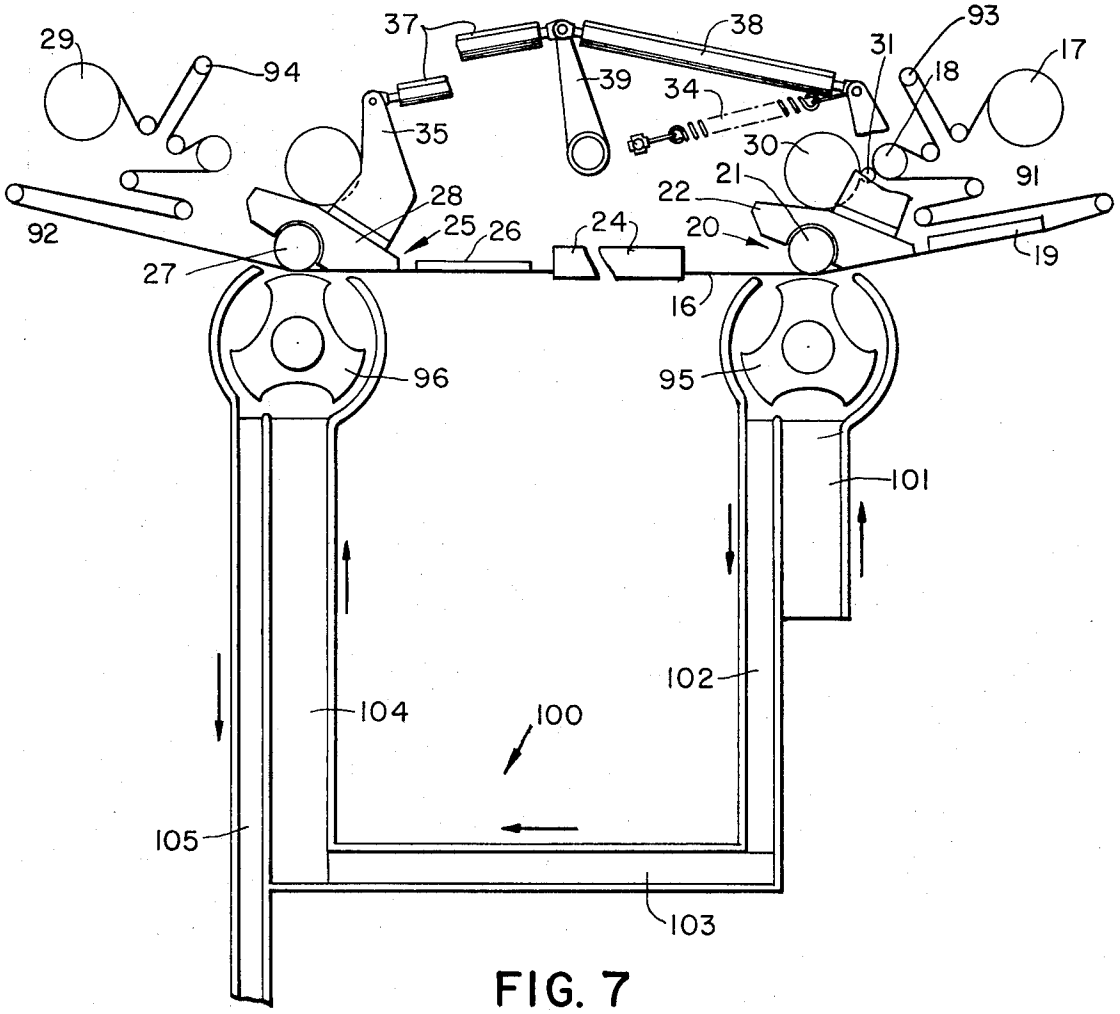


FIG. 7

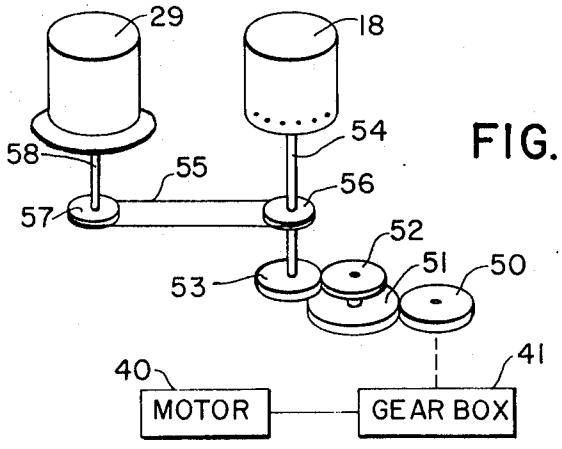


FIG. 6

INVENTOR
FRED J. WOCHNER
BY
Likes, Thompson & Bronstein
ATTORNEYS

MULTI-STATION LABELLING METHOD

FIELD OF THE INVENTION

This invention is related to a method and apparatus (machine) for applying labels to bottles, containers or the like. More particularly, this invention is directed to a new and improved method and apparatus for transferring heat transfer labels from a backing strip to a number of bottles, containers or the like positioned at a plurality of labelling stations.

BACKGROUND OF THE INVENTION

Heat transfer labelling systems have come into wide use over the past few years. Essentially such systems include a conveyor for feeding bottles, a turret for positioning the bottles one at a time at a labelling station, a feed mechanism for transporting labels supported on a backing strip to the labelling station, and means for pressing the label against the bottle as the bottle and the label are moved together. Such systems are shown in U.S. Pat. Nos. 2,981,432; 3,036,624; 3,064,714; 3,208,897; 3,231,448; 3,313,667; and 3,261,734. Label bearing strips for the above systems is shown in U.S. Pat. No. 2,862,832.

Although such systems have been widely used and are most satisfactory in operation, the production rate of these devices are naturally limited by the physical time required to move and position the bottles. Thus, to speed up production, it has become desirable to utilize two labelling machines or systems simultaneously.

Even though this may not be a significant economic hardship to the large company or user it is a significant factor which has limited wider acceptance of heat transfer labelling systems.

This fact of economic life has become quite apparent in trying to sell heat transfer labelling systems in the overseas markets. In countries where capital is scarce, very often the prospective customer can ill afford the cost of the second machine.

In view of the above it has become a necessity that if one is to compete successfully overseas with other types of labelling systems, one must provide a single system (single machine) which will provide substantially the same production rate of two machines operating separately.

THE INVENTION OVERCOMES THE PRIOR ART DISADVANTAGES

The present invention provides a single labelling machine or system which is capable of providing substantially the same production rate of labelled bottles which is heretofore been accomplished by utilizing two separate labelling machines or systems. This has been accomplished by transferring labels from a web or backing strip in a manner such that the first label of a series is applied to a bottle at one station while a subsequent or a second label in the series (either similar or dissimilar to the first label) is applied to a bottle at a second station at a point downstream from the first station.

BRIEF DESCRIPTION OF THE INVENTION

The apparatus of this invention includes a plurality of turrets positioned alongside each other, each of said turrets adapted to receive bottle (e.g., round, oval etc.)

containers or the like, generally constructed of plastic (all of which are henceforth referred to as bottles for convenience). The turrets are adapted to be rotated as disclosed in the aforementioned patents to position the bottles, one at a time, at labelling stations and move the bottles so that a label may be applied.

The turrets are of the type constructed as in the aforementioned patents or may be molded from plastic or the like. The turrets are preferably moved in unison and driven by the same drive mechanism which couples them together such that they move substantially simultaneously to position different bottles at different stations, at the same time, to receive labels.

Labels are preferably provided by a single backing strip or web which is driven in a manner such that in a two turret two station machine, the first label of a sequence of labels is applied at a first station and a subsequent or second label of the sequence is then moved past the first station (skips the first station) and is positioned at a later time at the second station (downstream from the first station) so that a label can be applied to a bottle positioned at the second station. Preferably the first and second stations are positioned with respect to each other and the positioning of the labels on the backing strip so that a label can simultaneously be applied from the backing strip to bottles at the first and second stations. Thus, for example, the odd labels and the even labels of a sequence can be applied at the first and second stations. It should be understood that the turrets are generally positioned more than 1 label distance apart, so long as the turrets are positioned a distance apart whereby one turret is adapted to carry bottles to receive the odd positioned labels on the web and the other turret is adapted to receive the even positioned labels on the web. The labels are separated from the backing strip in the conventional manner, as shown in the aforementioned patents by first applying heat thereto and then pressing the labels (by use of a label pressing means, e.g., a roller) against the bottles as the bottles as well as the strip are moved in the conventional manner. Thus, if one wished to apply different labels at different stations, every other label carried by the backing strip could be different or if one wanted to apply the same labels to the back and front of the same bottles a conveyor may be provided between the two turrets as disclosed herein. It should also be understood that more than two turrets could be operated in this manner, as for example, a three turret, three station machine can be provided. In this case the backing strip would be moved such that every third label carried thereby would be applied at each station.

With the machine of this invention it would also be possible to apply two different labels positioned on a backing strip one above the other at different labelling stations, but in this case, each label of the top and bottom sequence of labels would stop at each labelling station. In this case one turret and the label pressing means could be positioned vertically below the other turret or if the second label is to be applied at a different position on the bottle face, the label pressing means at one station may be positioned below or above the label pressing means of the other station.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top diagrammatic view of the machine according to the invention;

FIG. 2A is a view of the web or backing strip carrying labels;

FIG. 2B is a view of the backing strip of FIG. 2 except that one of the labels has been removed;

FIG. 3 is a top view with certain parts removed showing the operating parts of the machine for applying labels to bottles;

FIG. 4 is a top view with certain parts removed showing the mechanism for rotating the turrets;

FIG. 5 is a side view, partially in section, of FIG. 4;

FIG. 6 is a diagrammatic view showing the gearing for driving the metering and takeup rolls for feeding the labels;

FIG. 7 is a diagrammatic view similar to FIG. 1, except that a conveyor system is shown so that two sides of a bottle may be labelled at two stations.

DETAILED DESCRIPTION OF THE INVENTION

In FIG. 1 there is diagrammatically shown the construction of the apparatus of this invention. The apparatus includes two (4 bottle) turrets **10** and **11** having cutouts **12** and **13** for positioning bottles (e.g., oval bottles) to be labelled. Bottles are transported to and away from the turrets **10** and **11** by conveyors **14** and **15** having belts **14***a* and **14***b* and **15***a* and **15***b*. The strip or web carrying the labels is shown at **16** and is fed from a feed roll **17** through a plurality of dancer and idler rolls (not numbered) to a metering roll **18**. Thence the strip **16** passes over shuttle and idler rolls (not numbered) until it passes over a label preheater **19**. After the label bearing strip is heated it proceeds to labelling station No. **1**, shown at **20** where it is pressed against a bottle by a roller **21** (preferably rubber) carried by a heated platen **22**. To accomplish the labelling operation, the turret is preferably simultaneously moved counterclockwise while the label bearing strip **16** moves to the left of FIG. 1 such that the label is wiped onto the bottle surface. This is the conventional mode of transfer for heat transfer labels as shown in the aforementioned patents.

Thereafter the strip **16** proceeds through a guide **24** to the labelling station No. **2**, shown at **25**. The strip is preheated by a heater element **26** and thence it is passed between a roller **27** and the turret **11** bearing bottle. The roller is supported by a heated platen **28**. The label is applied to the bottles at the second station in the same manner as at the first station. Thereafter the strip, now devoid of labels is passed over a plurality of rolls (not numbered) to a takeup reel **29**. The takeup reel as well as the metering roll are preferably driven in unison off the same drive as will be described later. Preferably the turrets and the rolls are moved in unison to effect a substantially simultaneous transfer of labels at the first and second stations from the strip **16**. The turrets are moved simultaneously as will later be described with reference to **4** and **5**. The mechanism for simultaneously positioning the rolls **21** and **27** is accomplished as shown in FIGS. **1** and **3** by the provision of a cam **30** which engages a cam follower **31** mounted on a lever **32**. The lever is pivoted at **33** such that it is adapted to press the platen **22** and the roll **21** against the label bearing strip **16**. The lever **32** is springloaded against the cam **30** by the provision of a spring **34**. In order to substantially simultaneously move the second roller **27** against the label bearing strip, there is provided a second lever **35** which is adopted to rotate about point **36**. The lever **35** is coupled through rods **37** and **38** and pivot member **39** to the lever **32**. Thus, as the cam **30** rotates it will simultaneously cause both rolls **21** and **27** to move against the label bearing strip to effect a transfer of a label. It should be understood that both rolls can be pressed downwardly by the use of independent cam means and in addition can be moved one after the other in applications where, such as to conserve power or where it is desirable to label first one bottle at station **1** and than another at station **2** or vise versa. The cam **30** is driven from the machine motor **40** through a conventional box gear **41**. As may be observed from FIG. 3, web or strip guide bars **42** and **43** are provided at stations one and two to control the positioning of the strip with respect to the rolls and the bottles.

Reference should again be had to FIG. **1** taken in conjunction with FIGS. **2A**, **2B** and **6** for a description of the motion of the label bearing strip or web **16**. In FIG. **2A** is shown in more detail a portion of the label bearing strip **16**. The label bearing strip is preferably made as disclosed in U.S. Pat. No. 2,862,832, and comprises a paper backing **16***a* having a marginal role of sprocket holes **16***b*. The paper backing **16***a* is provided with a coating of oxidizable wax and print representing labels **16C1**, **16C2** and **16C3** thereon. The wax coating is heat activatable so that after heating and when a label is pressed against a bottle or another article by a roller engaging the back of the strip, a label transfer is accomplished. This type of label backing strip and labels are conventional to the art and are sold by the Dennison Manufacturing Company of Framingham, Massachusetts for use with its Therimage Application System.

If we assume that backing strip of FIG. **2A** is moved to the station **1** shown at **25**, the first label **16C1** of the sequence is transferred by forcing the roller **21** downwardly while simultaneously moving the turret and the strip in the conventional manner as described in the aforementioned U.S. Pat. Nos. 3,064,714 and 3,208,897. After the first label **16C1** is removed from the backing strip **16**, the backing strip is shown in FIG. **2B** wherein labels **16C2** and **16C3** remain. Thereafter the backing strip **16** is moved to the left of FIGS. **1** and **3**, so that the label **16C2** (even numbered label and next adjacent label) is positioned at the second station **25**, (downstream from the first station **20**) and the next label **16C3** (2nd odd numbered label in the sequence) is now positioned at the first station. Now the labels are pressed against bottles at the first and second stations, as the bottles at both stations as well as the web is moved as is conventional as shown by the aforementioned patents.

For simplicity of description, adjacent labels of a sequence of labels are shown as being simultaneously positioned at the first and second stations, however it should be understood that normally the turrets and/or stations are positioned apart such that the bottle surfaces to be labelled are separated by more than one feed length and by an odd number of feed lengths. The term feed length is defined as the length of one label or decoration plus the space between adjacent labels on the web. Thus, there may be more than one even positioned label remaining on the web between the two stations after the odd numbered labels are removed from the web at the first station.

In order to feed the labels such that the first in a series (odd numbered labels) can be transferred at the first station and the second of the series (even numbered labels) can be applied at a second station, that is every other label is applied at different stations, there is provided as shown in FIG. 7 gearing means for driving the metering roll 18 as well as the takeup reel 29. The gearing means shown for accomplishing this is as shown in the aforementioned U.S. Patents and is the same mechanism as presently used in the Model TD-1B Therimage Applicator sold by Dennison Manufacturing Company, and comprises gears 50, 51 and 52, gear 52 being mounted on gear 51 and is movable therewith. By selecting the number of gear teeth for these gears, the feed length or an integral number of feed lengths (e.g., in inches) can be attained.

The gear 52 drives a gear 53 coupled to the shaft 54 of the metering roll 18. To drive the takeup reel 29 there is provided a chain drive 55 coupled to gears 56 and 57. The gear 56 is mounted on the shaft 54 and the gear 57 is mounted on the shaft 58 of the takeup reel 29.

Reference should now be had to FIGS. 4 and 5 which illustrate a mechanism for simultaneously moving two turrets of the two station machine except that instead of four position turrets, two three position turrets are shown bearing the same numbers an in FIGS. 1 and 3. A turret indexing shuttle 65 as shown in FIGS. 4 and 5 is adapted to reciprocate as shown by the two headed arrow 66. The shuttle is driven by the motor 40 through the gear box 41 and thence through the combination of a heart shaped cam arrangement which includes an indexing slide, which is shown as the box 67. The cam, slide, motor, gear box and shuttle are conventional and are a part of the aforementioned Model TD-1B Therimage Applicator and is as shown in U.S. Pat. Nos. 2,981,432, 3,261,734, 3,064,714 and 3,208,897 as well as that shown in the other aforementioned patents. The shuttle 66 drives a tube 69 having a rack 70 attached thereto, which is again conventional as shown in the above mentioned patents. The rack 70 and the tube 69 as an assembly rotates a rack pinion gear 71 to which there is attached a turret ratchet 72. The turret ratchet 72 operates a turret pawl 73 (having the same number of cutouts or detents of bottle holder positions as in the turret) connected to a shaft 74 for rotating the turret 10. The first shaft 74 as well as the tube 69 is supported by a support assembly generally shown at 75A which is mounted on the machine bed 76. In order to drive the second turret 11 in unison with the first turret 10 the tube 69 is extended by the provision of a tube 80 threadedly coupled to a second tube 81 which also has a rack 82 attached thereto. The rack 82 drives a rack pinion gear 83 to which there is attached a turret ratchet 84. The turret ratchet 84 indexes a turret pawl 85 fixedly attached to a turret shaft 86 in order to index the turret 11. The shaft 86 as well as the support for the tube 80 is provided by a support assembly 75B mounted on the machine bed 76. The sequence of indexing, that is the dwell times and the time of movement of both of the turrets is as described in the aforementioned patents and further as disclosed in the Model TD-1B Decorator Applicator previously mentioned as well as in the book entitled *Installation, Operation and Maintenance Manual for the Model TD-1B Decorating System which employs the Therimage Process by Dennison* and which is distributed by the Dennison Manufacturing Company with its Model TD-1B Applicator.

As previously mentioned, the web or strip 16 is moved by the shuttle rolls during the application of a label to the bottle and simultaneously with the rotation of the bottle by the turret so as to permit the label to be rolled onto the bottle. This is accomplished by the provision of, as shown in FIG. 3, a label feed shuttle 90 reciprocated from the motor 40 and gear box 41 by the cam and a slide of the type described with reference to FIGS. 4 and 5. Shuttle rolls 91 and 92 coupled to the shuttle 90 are provided to cause the web 16 to move to the left of FIGS. 1 and 3 when the label is being applied to the bottle in both turrets. The shuttle assembly as well as the shuttle rolls are again conventional as shown in the aforementioned patents as well as in the Model TD-1B Applicator. Dancer rolls are shown at 93 and 94 of FIG. 1 and are the same as disclosed in the patents noted above as well as in the TD-1B Applicator. The dancer rolls are operated and moved as disclosed in the prior art noted above by a cylinder to maintain constant tension on feed and takeup of the web.

In FIG. 7 there is shown the apparatus of this invention, except that instead of a four bottle turret, two three bottle turrets are shown at 95 and 96. This figure also illustrates a conveyor 100 which is adapted to feed bottles to turret 95 and carry them away after they are labelled on one side. The conveyor 100 is also adapted to bring the bottles after they are labelled on one side to the second turret 95 and place them in this turret such that they are in position to be labelled on the opposite side thereof. Thereafter the conveyor is adapted to carry away the bottles from the turret 96. The conveyor 100 includes conveyor belts 101, 102, 103 104 and 105 moving as shown by the arrows to accomplish the above. In addition, if it is deemed desirable, conventional bottle turners and a different configuration conveyor may be utilized to accomplish the same result.

Although not shown in the drawings, the device of this invention can include means for holding the top of the bottle during labelling, means for inflating the bottle during labelling and in the case of certain shape bottles (e.g., round bottles) means for rotating the bottles. These later features are well known in the art as shown in the aforementioned patents.

It will thus be seen that this invention has provided a new and improved method and apparatus for labelling bottles held by more than one turret from a web carrying labels thereon. Since certain changes may be made in carrying out the method as well as in the constructions of the apparatus shown without departing from the spirit and scope of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described, and all statements of the scope of the invention, which as a matter of language might be said to fall therebetween.

I claim:

1. In a method of applying labels to bottles from a web carrying the labels in a predetermined sequence

one after the other such that the first label in said sequence on the web is applied to the bottle at the first station and the next consecutive label upstream in said sequence on the web is applied to a bottle at a second station positioned downstream from the first first station which comprises moving the web and labels carried thereon between the first and second labelling stations in a manner such that the first label in the sequence is positioned at said first station and applied to a bottle and the next label upstream in the sequence is moved past said first station to said second station while remaining on said web where it is also applied to a bottle.

2. In a method according to claim 1 in which the stations are substantially an odd number of feed lengths apart wherein the feed length is defined as the length of one label plus the space between adjacent labels.

3. In a method according to claim 2 in which each station has a separate turret for positioning bottles with respect to the web and in which the turrets are moved in unison.

4. In a method according to claim 3 in which the labels are applied at each station by simultaneously pressing the labels against bottles at both stations while the bottles and the web are being moved.

5. A method of applying labels carried on a web at a plurality of stations to bottles positioned at the stations which comprises moving a web supporting a plurality of removable labels thereon in s predetermined sequence one after the other to the stations such that a label is provided at each of the stations, said labels remaining on the web until removed from the web, thereafter simultaneously moving the bottles at each station and the web at each station while pressing the web along selected positions thereof against the bottles to remove the labels from the web and apply a label to the bottles at each of the stations, and then moving web portions free of labels away from the stations after the labels are removed therefrom.

6. A method according to claim 5 wherein the first label and all odd numbered labels thereafter of the sequence are applied to bottles at one station and the next adjacent or second label of the sequence and all even numbered labels thereafter are applied to bottles at another station which is downstream from the other station.

7. A method according to claim 6 in which the stations are positioned with respect to each other such that they are substantially an odd number of feed lengths apart wherein the feed length is defined as the length of one label plus the space between labels carried on the web.

8. A method according to claim 7 wherein the labels applied at the first station of the plurality of stations and at the next station of the plurality of stations which is downstream from said first station are separated by more than one feed length.

* * * * *