Nov. 20, 1962 C. A. FLOOD 3,064,714

APPARATUS FOR APPLYING INDICIA TO ARTICLES

Filed Jan. 8, 1960 3 Sheets-Sheet 1

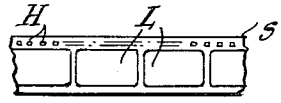


Fig. 1

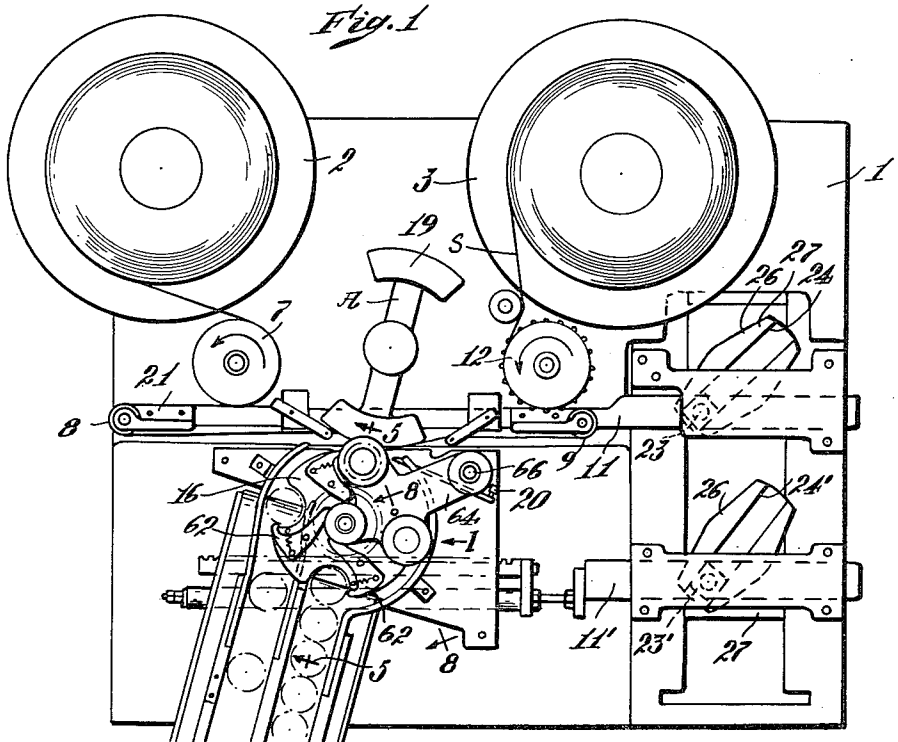


Fig. 3

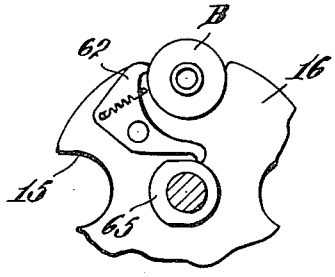


Fig. 4

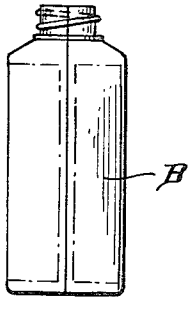


Fig. 2

INVENTOR.
Carl A. Flood
BY
Roberts, Cushman & Woodward
ATT'YS

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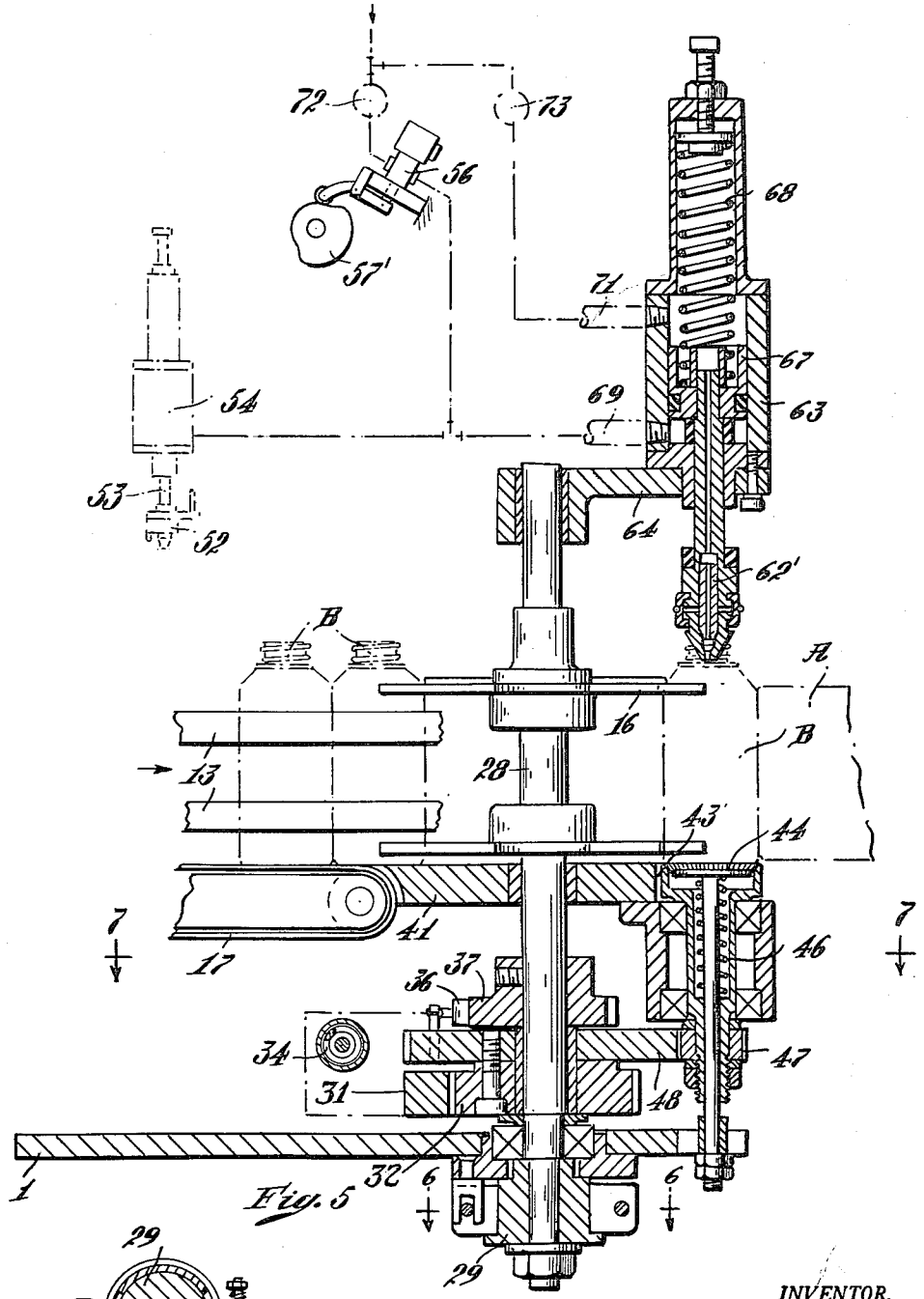


Fig. 5

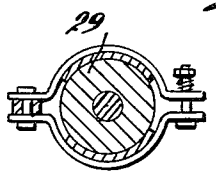


Fig. 6

INVENTOR.
Carl A. Flood
BY
Roberts, Cushman & Grover
ATT'YS

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APPARATUS FOR APPLYING INDICIA TO ARTICLES

Filed Jan. 8, 1960 3 Sheets-Sheet 3

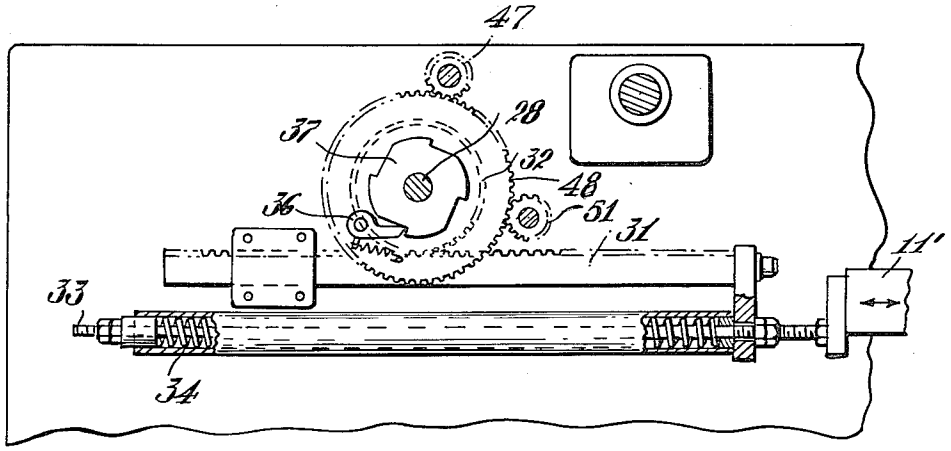


Fig. 7

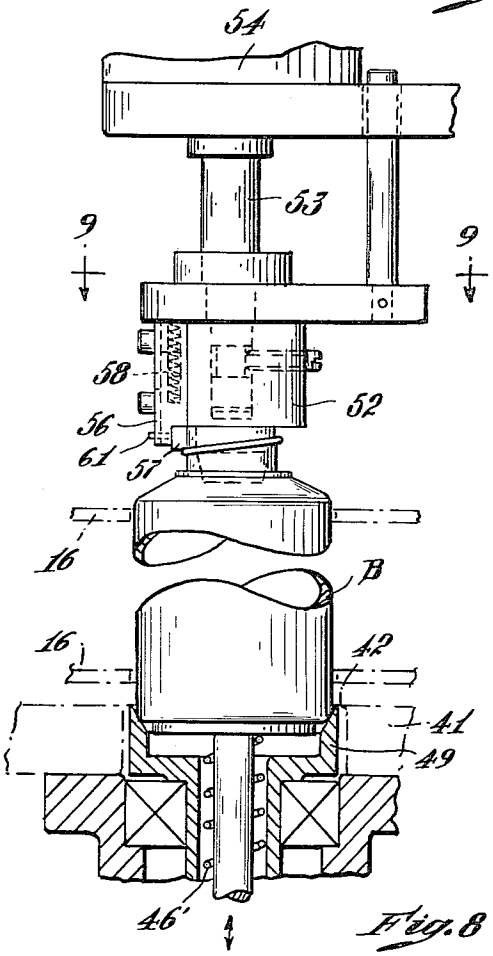


Fig. 8

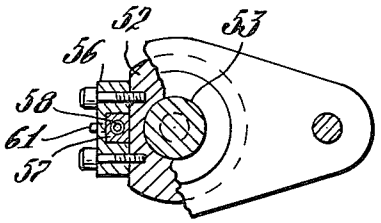


Fig. 9

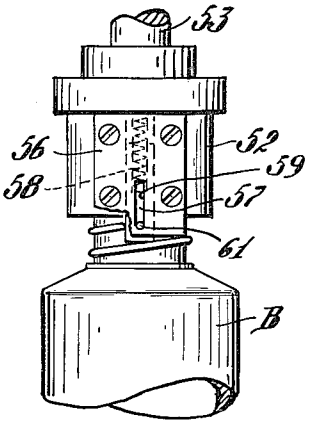


Fig. 10

INVENTOR.
Carl A. Flood
BY
Roberts, Cushman & Grover
ATT'YS

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APPARATUS FOR APPLYING INDICIA TO ARTICLES

Carl A. Flood, Framingham, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass., a corporation of Massachusetts

Filed Jan. 8, 1960, Ser. No. 1,376
10 Claims. (Cl. 156—542)

While this invention is useful in applying indicia to articles of various kinds, it is especially useful in labeling bottles.

Objects of the invention are to provide apparatus which applies indicia automatically, which orients the articles in a predetermined position to receive the indicia, which is adapted to apply indicia to collapsible articles such as plastic bottles, which positions the bottles so that the indicia is not applied over the seams which ordinarily extend along opposite sides of bottles, which is simple and economical in construction, which is convenient and rapid in operation, and which is durable and reliable in use.

In one aspect the invention involves apparatus comprising an applicator, a turret or other conveyor for feeding articles to the applicator along a predetermined path, and means disposed along the path in advance of the applicator for turning the articles relatively to the conveyor to present to the applicator a predetermined side of each article. Preferably the articles are turned to predetermined position by means of a turntable and a stop engageable with a part of the article for stopping the rotation of the article in the desired position. More specifically the articles are pushed to the applicator over a horizontal surface having an opening therein, with a rotor in the opening for turning the article to desired position, the opening being large enough to permit the article to seat on the rotor.

In another aspect the apparatus comprises guide means along the aforesaid path for retaining the articles on the feeding means, the guide means having a gap at the applicator through which the applicator applies indicia to the articles, together with spring means at the gap for preventing movement of the articles through the gap.

In still another aspect the apparatus involves fluid-pressure means for inflating collapsible articles while receiving indicia, the aforesaid means including a nozzle movable from retracted position to an operative position where it communicates with an opening in the article at the indicia-applying station, a spring yieldingly urging the nozzle to operative position, fluid-pressure means for moving the nozzle to retracted position against the action of the spring, and a valve for controlling the inlet to the nozzle, the valve being closed when the nozzle is in retracted position and open when the nozzle is in operative position.

For the purpose of illustration a typical embodiment of the invention is shown in the accompanying drawings in which:

FIG. 1 is a plan view of a label strip for use in the apparatus;

FIG. 2 is a side view of one kind of bottle which can be labeled by the improved apparatus;

FIG. 3 is a plan view of the apparatus;

FIG. 4 is an enlarged plan view of a part of the apparatus;

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

FIG. 6 is a section on line 6—6 of FIG. 5;

FIG. 7 is a fragmentary view looking in the same direction as in FIG. 3 but at a lower level below the table over which the articles are pushed, namely at such a level as indicated by the line 7—7 of FIG. 5;

FIG. 8 is a side view of the bottle indexing means;

FIG. 9 is a section on line 9—9 of FIG. 8; and

FIG. 10 is a side view from the left-hand side of FIG. 8.

The particular embodiment of the invention illustrated in the drawings is especially adapted to transfer labels from a strip S to bottles B. While any heat-transfer label strip may be employed, the strip is preferably made as disclosed in Patent 2,862,832, granted December 2, 1958 and as illustrated in FIG. 1 where the label strip comprises a paper backing S having a marginal row of sprocket holes H, the backing being coated with oxidized wax adhesively to hold the labels L printed on the wax coating with ink which is heat activatable so that when a label is pressed against a bottle or other article by means of a hot applicator engaging the back of the strip S the label is transferred from the strip to the article.

As illustrated the machine comprises a main frame 1 carrying the mechanism for feeding the label strip S from a feed roll 3 to a take-up reel 2 past an applicator A. The label strip feeds over an idler roll 7, thence over two rolls 8 and 9 at opposite ends of a reciprocating carriage 11 and thence over a feed roll 12 to the take-up reel, the carriage being reciprocated back and forth to synchronize the speed of the portion of the strip S between the rolls 8 and 9 with the speed of the applicator A and the surface speed of the bottles at the label-applying station.

The bottles B are fed to and from the label-applying station through chutes 13 and 14. At the label-applying station is a turret 16 having peripheral recesses 15 to receive the individual bottles. In the feed chute 13 the bottles are pressed against the turret so that a bottle enters each empty recess as the recess passes the chute and as each bottle reaches the delivery chute 14 it is discharged through that chute. The bottles are fed to and from the turret by conveyor belts 17 and 18. The applicator A has raised portions 19 the circumferential lengths of each of which is preferably equal to the length of each label and the labels are fed to the label-applying station in synchronism with the rotating applicator so that the leading edge of the raised portion 19 engages the leading edge of the label and as the two move in unison the label is pressed against the bottle at the label-applying station, the bottle being rotated in synchronism with the applicator. At the label-applying station there is a gap between the guides 13 and 14 through which the labels are applied and to keep the bottles from moving through the gap a leaf spring 20 projects into the gap (FIG. 3).

When the carriage 11 is stationary the label strip S is advanced by the drive roll 12 at a constant continuous speed. However the advance of the label strip past the label-applying station should be arrested after each bottle has been labeled while the next bottle is being brought into position to be labeled. This is accomplished by moving the carriage back and forth lengthwise of that portion of the path of the label strip extending from the roller 8 to roller 9.

As shown in FIG. 3 the carriage 11 carries the rollers 8 and 9 by means of two brackets one of which is designated by reference character 21. Mounted on the rear side of the carriage is a cam follower 23 sliding in a slot 24 on the front side of an adjustable cam 26 which is rotatably mounted on a slide 27 which slides horizontally in a U-shaped guideway in the frame 1. The turret 16 is actuated by a similar carriage 11' similarly mounted on the lower end of the slide 27 and carrying a similar cam follower 23'.

This mechanism is described and claimed in my copending application Ser. No. 729,216 filed April 17, 1958 now Patent Number 2,981,432 and the description need not be repeated for a full understanding of the present invention.

The turret 16 is mounted on a shaft 28 journalled in

the main frame 1 (FIG. 5). Engaging the lower end of the shaft is a friction brake 29 to prevent overthrow of the turrent as it is advanced step by step (FIGS. 5 and 6). The shaft 28 is rotated step by step by a rack 31 and pinion 32 (FIG. 7). The rack 31 is reciprocated by the carrier 11' (FIGS. 3 and 7) through the medium of a plunger 33 and spring 34. Mounted on the pinion 32 is a gear 48 carrying a dog 36 engaging a ratchet 37 fast to the shaft 28. When the rack reciprocates to the right it advances the turret one step and as it reciprocates to the left the dog 36 slides over the ratchet 37. Should the turret jam on the advance stroke the spring 34 is compressed without advancing the rack 31.

Under the turret 16 is a table 41 having two openings 42 (FIG. 8) and 43 (FIG. 5) at an indexing station I (FIGS. 3 and 8) and the applicator station (FIG. 5) respectively. As the bottles are pushed over the table 41 by the turret they are moved into the openings in the table when the turret pauses between steps. In the opening at the applicator station is a cup-like rotor 44 which is pressed upwardly against the bottom of the bottle by means of a spring 46. The rotor 44 is rotated by means of a pinion 47 meshing with the gear 48 fast to the pinion 32 (FIG. 5). In the opening 42 at the index station is a similar rotor 49 (FIG. 8) rotated by a pinion 51 meshing with the gear 48. Thus as the carriage 11' reciprocates to the left during each pause of the turret the bottles at the indexing and applicator stations are rotated in the counterclockwise direction as viewed from above, the rate of rotation being equal to that of the applicator A and the speed of the label strip past the applicator station. The upper surface of the rotor 44 is knurled to prevent slippage (FIG. 5) but the rotor 49 should be smooth to permit slippage when the rotor is indexed to the proper position.

Inasmuch as bottles usually have longitudinal seams along opposite sides it is desirable to present the bottles to the applicator so that the labels do not overlap these seams. Thus the bottles are turned at the indexing station I so that when they reach the applicator station they will be properly orientated to receive a label between the seams.

This is preferably accomplishd by means such as shown in FIGS. 8, 9 and 10. This means comprises a head 52 which is pressed down against the top of the bottle at the indexing station by means of a plunger 53 depressed by a spring in air cylinder 54 (like spring 68 in air cylinder 63, FIG. 5) controlled by a valve 56 operated by a cam 57' (FIG. 5) so that the head is raised by air pressure during each advance of the turret and depressed by the spring during each pause of the turret. Slidably mounted on one side of the head 52 under a plate 56 is a stop 57 pressed downwardly by a spring 58. Extending outwardly from the stop 57 through a slot 59 is a pin 61 to limit the downward movement of the stop 57. As shown in FIGS. 8 and 10 the stop 57 is offset from the center of the head 52 far enough to clear the neck of the bottle but not far enough to clear the threads on the neck. Thus when the head returns to the position shown in FIGS. 8 and 9 the stop 57 rides down along the thread on the bottle neck until its leading side engages the end of the thread as shown in FIG. 10, whereupon the rotating bottle is stopped in the desired angular position and is held in this position by means of one of the spring pressed dogs 62 (FIGS. 3 and 4), these dogs being retracted by means of a cam 65 to permit the bottles to be delivered to the exit belt 18 and remaining retracted until they pass the belt 17 where another bottle is inserted into the empty recess in the turret.

In labeling collapsible bottles they should be inflated while the labels are being applied and this may be accomplished as shown in FIG. 5 by an air nozzle 62' reciprocable in a casing 63 mounted on an arm 64 fast to a post 66 (FIG. 3). The upper end of the nozzle 62' carries a piston 67 slidable in the casing 63, the nozzle being pressed downwardly to the operative position shown in

FIG. 5 by means of a spring 68. The casing 63 has two inlets 69 and 71, the inlet 69 being supplied through the aforesaid valve 56 and a pressure reducing valve 72 and the inlet 71 being supplied through a pressure reducing valve 73. The pressure at the inlet 69 should be greater than that at 71 so as to lift the nozzle against the action of the spring 68 and the air pressure above the piston 67. The cam 57 opens the valve 56 during each advance of the turret to lift the nozzle and cause the piston 67 to close the inlet 71. When the turret stops the valve 56 is closed thereby permitting the spring 68 to move the nozzle to operative position in which air enters the bottle through inlet 71 and the nozzle 62'.

It should be understood that the present disclosure is for the purpose of illustration only and that this invention includes all modifications and equivalents which fall within the scope of the appended claims.

I claim:

1. For applying indicia to articles, apparatus comprising an applicator, a support having a top surface, means for pushing the articles over said surface along a predetermined path leading to the applicator, said surface having an opening therein along said path, a rotor in said opening for turning each article about its axis to present to the applicator a predetermined side portion of each article, and a stop engageable with a part of the article for stopping the rotation of the article in a predetermined position thereof.

2. For applying indicia to articles, apparatus comprising an applicator, a support having a top surface, means for pushing the articles over said surface along a predetermined path leading to the applicator, said surface having an opening therein along said path, a rotor in said opening for turning each article about its axis to present to the applicator a predetermined side portion of each article, the opening being large enough to permit the article to seat on the rotor, means for pressing the article against the rotor, and a stop engageable with a part of the article for stopping the rotation of the article in a predetermined position thereof.

3. For applying indicia to articles, apparatus comprising an applicator, a support having a top surface, means for pushing the articles over said surface along a predetermined path leading to the applicator, said surface having an opening therein along said path, a rotor in said opening for frictionally turning each article about its axis to present to the applicator a predetermined side portion of each article, and a stop engageable with a part of the article for stopping the rotation of the article in a predetermined position thereof.

4. For applying indicia to a bottle having a protuberance on its outer periphery, apparatus comprising an applicator, means for feeding a bottle to the applicator along a path extending transversely of its axis, a rotor engageable with the bottom of the bottle for rotating the bottle about its axis to present a predetermined side portion of the bottle to the applicator, a head located above the rotor and movable downwardly to engage the top of a bottle to press the bottle against the rotor, and a stop movable from a retracted position adjacent said path to an operative position where it engages said protuberance while the bottle is rotating, thereby to stop the rotation of the bottle in a predetermined position thereof, said movable stop being mounted on said head.

5. For applying indicia to a bottle having a thread on its outer periphery adjacent its mouth, apparatus comprising an applicator, means for feeding a bottle to the applicator along a path extending transversely of its axis, means for rotating the bottle about its axis to present a predetermined side portion of the bottle to the applicator, and a stop movable from a retracted position adjacent said path to an operative position where it engages the end of said thread while the bottle is rotating, thereby to stop the rotation of the bottle in a predetermined position thereof.

6. For transferring indicia from a label-carrier strip to circular articles, apparatus comprising an applicator having a segmental surface rotatable about an axis to press the label-carrier strip against the articles with rolling pressure, means for feeding articles to the applicator along a path transverse of said axis, means along said path in advance of the applicator for turning each article about its axis to present a predetermined side portion of the article to the applicator, means at the applicator for rotating each article in synchronism with the movement of the cooperating segmental surface of the applicator past the article while contacting the label-carrier strip, and means for operating said turning means and rotating means conjointly.

7. For transferring indicia from a label-carrier strip to circular articles, apparatus comprising an applicator having a segmental surface rotatable about an axis at a predetermined speed, means for feeding articles to the applicator along a path transverse of said axis, means along said path in advance of the applicator for turning each article about its axis to present a predetermined side portion of the article to the applicator, means at the applicator for rotating each article in synchronism with the movement of the cooperating segmental surface of the applicator past the article while contacting the label-carrier strip, means for operating said turning means and rotating means conjointly, said turning means and said rotating means each comprising cup-shaped rotors.

8. For applying indicia to hollow collapsible articles having openings in them, apparatus comprising means for feeding the articles to an indicia-applying station, an applicator for applying indicia to the articles at said station, fluid-pressure means for inflating each article while receiving indicia, said last means including a nozzle movable from retracted position to an operative position where it communicates with said opening in the article at said station, a spring yieldingly urging said nozzle to operative position, fluid-pressure means for moving the nozzle to retracted position against the action of said spring, and a valve for controlling the inlet to said nozzle, the valve being closed when the nozzle is in retracted position and open when the nozzle is in operative position.

9. Bottle indexing mechanism for labeling machines, including means for frictionally rotating a bottle, a retractable head engageable with a top portion of the bottle to hold the bottle during rotation, a stop member carried by the head, the stop member being positioned to seat upon an exterior thread of the bottle adjacent to the bottle top, such stop member being movable relative to the head so as to ride along said thread as the bottle is rotated, the stop member having a surface positioned to engage and stop the end of the bottle thread, to stop the bottle in a predetermined position.

10. A heat transfer labeling machine including a rotatable turret for carrying bottles to successive index and label transfer stations, means at the index station for rotating a bottle around its own axis to a predetermined angular position, a rotor at the transfer station for rotating a bottle around its own axis to receive the label, means for transferring a label to this rotating bottle, at the transfer station, a reciprocating driver, a connection between the driver and the turret whereby motion of the driver in one direction advances the turret and motion of the driver in the opposite direction leaves the turret stationary, and gearing connecting the driver and rotor for imparting to the rotor an oscillating rotary movement comprising rotation in one direction which corresponds to rotation of a bottle during transfer, the rotation of the rotor in this direction being during the motion of the driver in the direction which leaves the turret stationary, and alternate oppositely directed idle rotation, the said oppositely directed idle rotation of the rotor being during the motion of the driver in the direction which advances the turret.

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