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Della Vite

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[54] **BOTTLE LABELLING MACHINE**

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[51] **Int. Cl.** **B65c 9/20**

[58] **Field of Search** 156/569, 570, 571, 572; 118/1, 8

[56] **References Cited**

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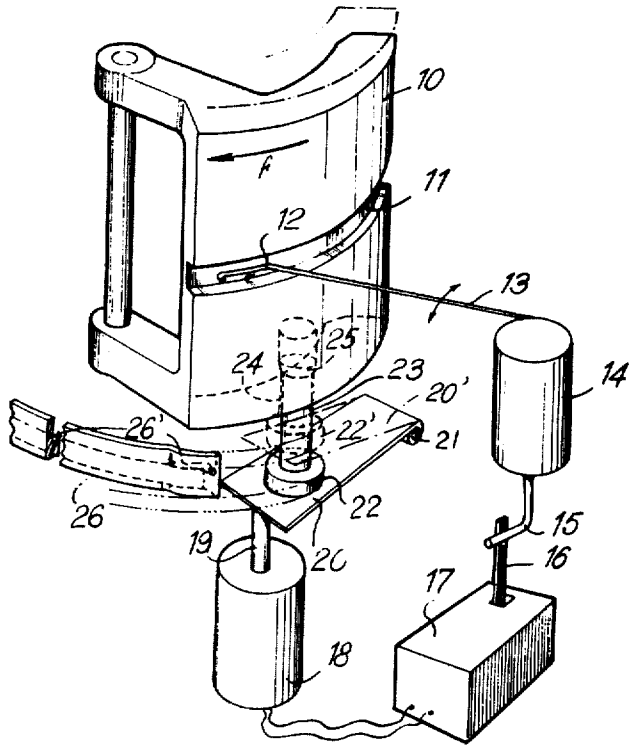
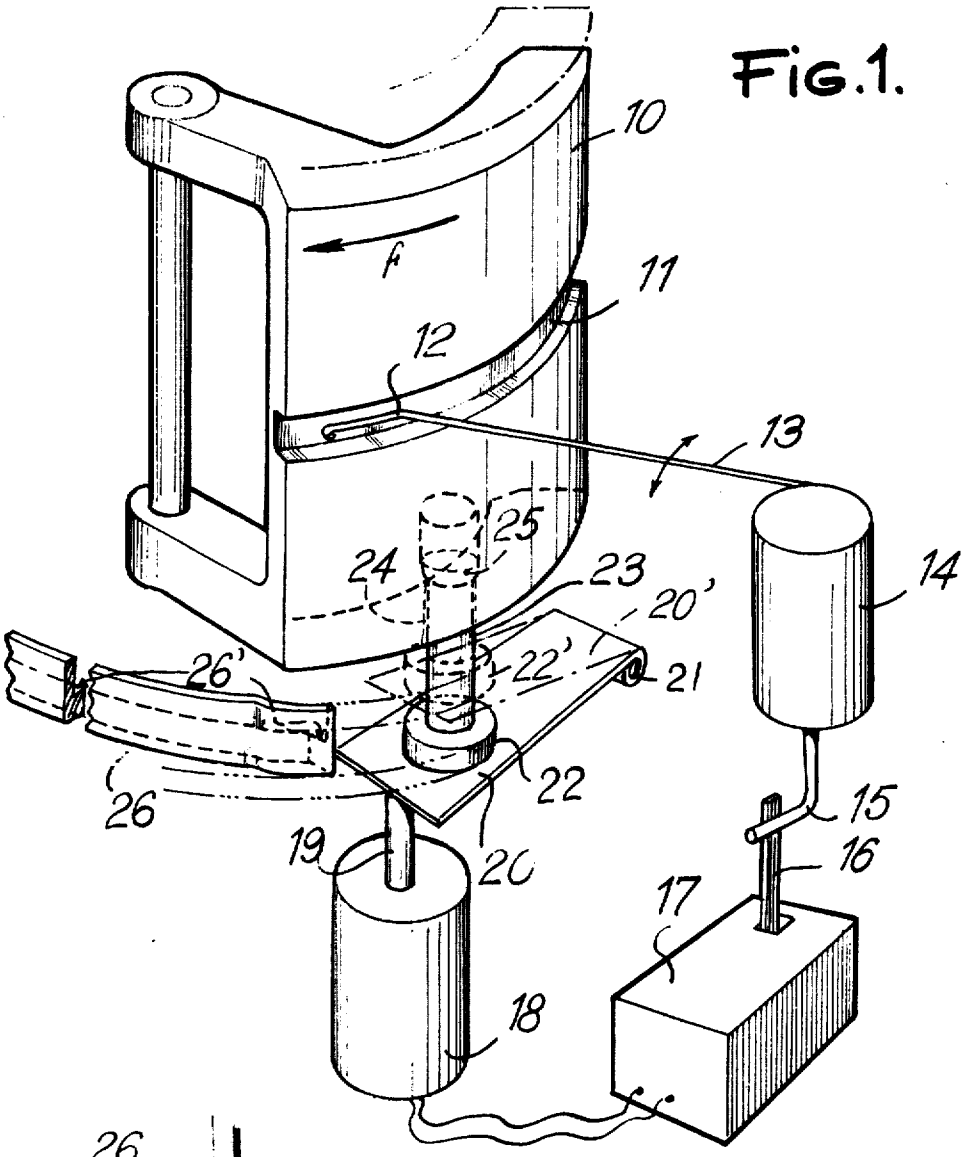
Primary Examiner—Robert F. Stahl

[57] **ABSTRACT**

In an installation for applying gummed labels to bottles and the like, a transfer cylinder adapted to receive gum-free labels and then deliver same during the gumming of the unprinted side of the label, said transfer cylinder being characterized in that it comprises a number of adjacent segments along generatrices of its cylindrical outer surface, said segments being rotatably solid with one another and each provided, along a fraction of its circumference corresponding substantially to a label length, with means adapted to control its backward movement towards the cylinder axis when the segment considered does not carry any label.

9 Claims, 3 Drawing Figures




10
F
11
12
13
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19
20
20'
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23
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25
26
26'

FIG. 1.

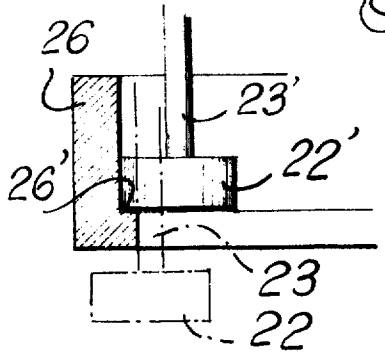
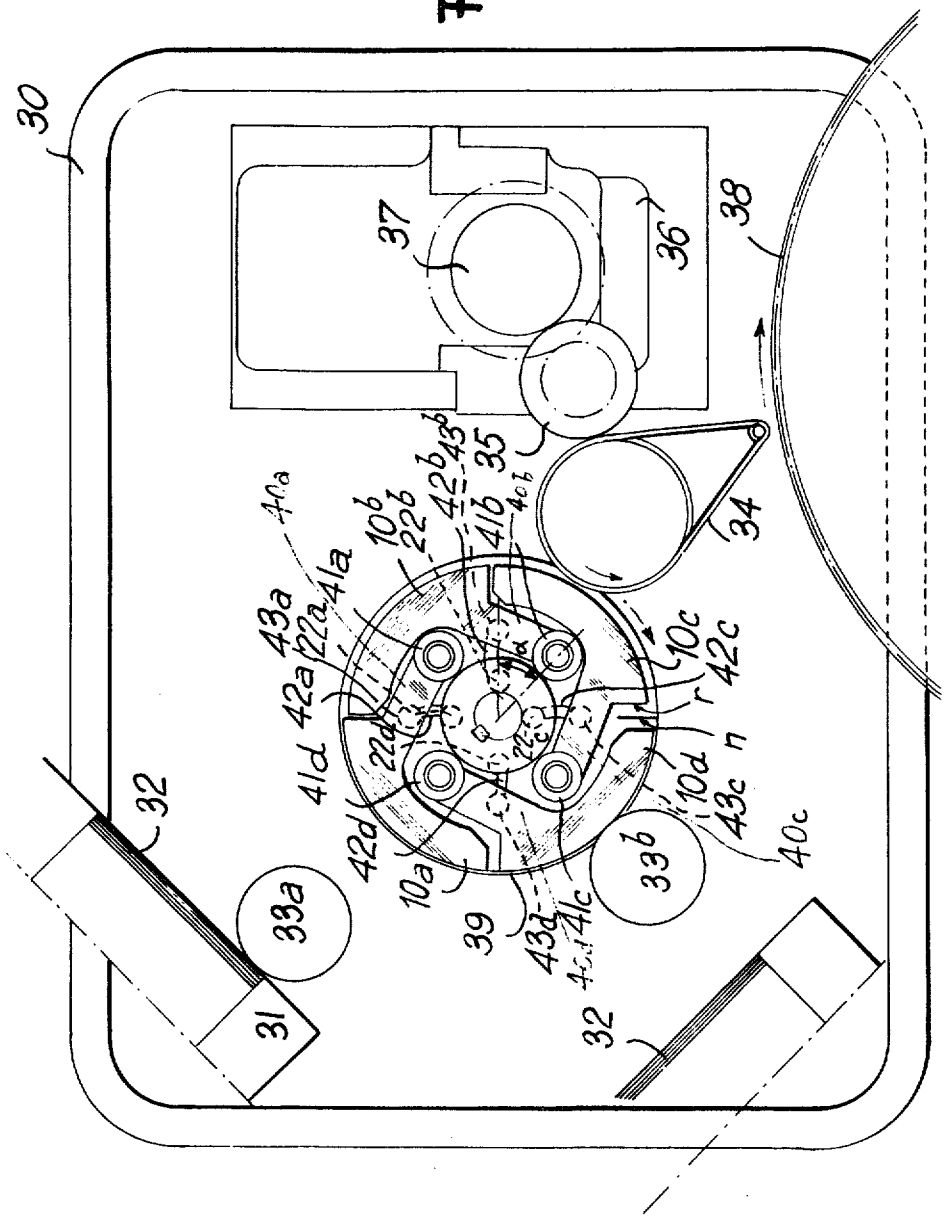

26
23'
22'
26'
23
22

FIG. 1A

Fig. 2.



BOTTLE LABELLING MACHINE

This invention relates in general to installations for feeding labels from a dispensing magazine filled with adhesive-free or "dry" labels to a rotary apparatus called "turret", designed for applying these labels, after these have received the necessary layer of adhesive during their movement, separately to bottles travelling past said turret and carried by a conveyor belt.

An installation of this type comprises a plurality of apparatus operating in proper timing relationship to one another; one of these apparatus, called the transfer cylinder, revolves permanently, receives on its surface the adhesive-free or dry labels retained temporarily thereon for example by a vacuum effect, with their unprinted or back side facing outwards; the labels which are gummed as they leave this cylinder are then picked up by another apparatus adapted to transfer them to the turret; the labels are attracted, generally by suction, by this turret, with the adhesive-coated or gummed side facing outwards.

Thus, the transfer cylinder receives dry labels and delivers labels during the coating or gumming thereof; to this end, it revolves in front of a gumming device having the function of spreading the adhesive only on the unprinted face of the label, and to subsequently transfer the gummed labels to the aforesaid turret. Therefore, the gumming device must be capable of depositing adhesive on each label without applying it to any point of the transfer cylinder surface.

This coating or gumming of the transfer cylinder surface is as much to be feared that, as a consequence of fortuitous incidents always unavoidable in such installations, it may happen that the zone of said transfer cylinder which at a given time moves past said gumming device be free of any label.

It is the essential object of this invention to suspend, under these specific circumstances, any relative engagement between the transfer cylinder and the gumming device until another label is present in front of the gumming device, this result being obtained by using simple yet efficient means.

It is another object of this invention to provide a transfer cylinder adapted to receive gum-free labels and to subsequently deliver same during the gumming of the inprinted label side, this transfer cylinder being characterized in that it comprises a number of angularly adjacent segment disposed along generatrices of the cylindrical surface of the cylinder constituted there by, said segments, rigidly assembled during their rotation and having each a length corresponding substantially to the label length, comprising means adapted to cause each segment to recede individually towards the cylinder axis when this segment does not carry any label.

Preferably, said last-named means consist essentially of a groove formed in each segment so as to provide a substantially unbroken circular groove extending along the whole circumference of the transfer cylinder surface, the end of a very sensitive spring-loaded feeler constantly registering with said groove so as to bear either against a label or against the bottom of said groove whereby, in this last case, said feeler can control the operation of electric, mechanical or pneumatic means causing the slight backward radial movement of the relevant segment towards the cylinder axis.

Other features characterizing this invention will appear as the following description proceeds with reference to the accompanying drawing illustrating diagrammatically by way of example a typical form of embodiment of this invention; in the drawing:

FIG. 1 is a diagram showing a feeler system for controlling the backward movement of a segment of the transfer cylinder towards the cylinder axis when no label is carried by the outer surface of said segment;

FIG. 1A is a part-sectional view of a detail, and

FIG. 2 is a plan view from above showing in diagrammatic form the various apparatus constituting a label transfer installation, from a dispensing magazine to the turret, the segmented transfer cylinder according to this invention being shown in section.

Referring first to FIG. **1**, there is shown in perspective one of the fractional, angularly adjacent segments **10** of the transfer cylinder, assumed to be mounted for rotation, about a vertical axis, in the direction of the arrow *f*. At substantially mid-height the outer surface of this segment comprises a groove **11** constituting the extension of similar grooves formed in the other segments of the transfer cylinder, so as to constitute a continuous circular groove.

Registering with this groove is the bent end portion **12** of a very sensitive feeler comprising a thin rod mounted on pivot pin **14** responsive to a return spring (not shown) of moderate force which constantly urges the feeler against the segment **10**. When a label is carried by this segment the bent portion **12** of this feeler slips on the relatively rigid label while compressing slightly the return spring; if, as shown in FIG. **1**, no label is carried by the segment, the bent portion **12** is urged against the bottom of the groove **11** by the spring action.

The pivot pin **14** carries on the other hand a bent rod **15** having its end disposed in front of the contact blade **16** of a microswitch **17**. In the assembly illustrated in FIG. **1** this microswitch **17** is adapted to control the energizing circuit of the coil of an electromagnet **18**, the outer end of the plunger **19** of this electromagnet pivotally engaging one end of a blade **20** pivoted at its opposite end to a horizontal pin **21**.

The top surface of this blade **20** is slidably engaged by the lower face of a roller or like follower **22** carried by the lower end of a depending rod **23** engaging, and vertically movable within, a recess **24** formed in the body of the segment; during the greater part of a revolution of the transfer cylinder this follower roller **22** is suspended in the space and its rod **23** is retained in its recess **24** by a lateral stop **25**.

Just after the blade **20**, in the direction of rotation *f* of the transfer cylinder and at a level slightly above said blade but under the segment, is a cam member **26** shown in radial section in FIG. **1A**.

The function of the above-described feeler-responsive control system will be readily understood from the following description of its mode of operation, in which description the relative positions of blade **20** and cam member **26**, and also the contour of this member, will be explained in detail.

When a label is carried by the segment, for example by pneumatic or suction effect, the feeler system remains inoperative since the microswitch remains open; blade **20** is in its lowermost position and roller **22** slides thereon and is suspended also in its lowermost position; as this roller continues its movement with the segment

it leaves the blade **20** and clears the cam member **26** without engaging same, and the label is duly gummed (positions **22** and **23** of FIG. 1A).

If no label is present on the segment considered, as this segment moves past the feeler arm **13**, the bent end portion **12** thereof is caused to resiliently engage the bottom of groove **11**; thus, pivot pin **14** rotates the clockwise direction as seen from the top in FIG. **1** and the blade **16** engaged by rod **15** closes the circuit controlled by microswitch **17**. Thus, the coil of electromagnet **18** is energized and the plunger **19** thereof is thrown upwards; as a result, the blade **20** is moved to position **20'** shown in dash and dot lines in FIG. **1**. Then, when the roller **22** engages this blade **20** it is raised and follows an upward path (this roller being then at **22'** as shown in dash lines in FIG. **1**); the position and contour of cam member **26** are then such that when the roller **22** leaves the blade **20** it engages the cam face of said member **26** while revolving about its axis, and thus remains in an upper position shown at **22'** and **23'** in FIG. 1A, due to the presence of shoulder **26'** at the bottom of said cam member.

The contour and cross-sectional shape of this cam member are such that:

on the one hand, the roller **22** travels throughout the cam member **26** in its upper position (due to the action exerted by shoulder **26'**),

on the other hand, the cam member **26** firstly causes the roller **22** to recede by at least one millimeter towards the axis of rotation of the transfer cylinder, thus producing the desired inward radial movement of segment **10** since the roller **22** and segment **10** are radially rigid with each other through the rigid rod **23**; then, the cam member causes the follower roller **22** to move away from said axis until it escapes from said cam member **26** and resumes its lower position, the segment simultaneously resuming its initial position with respect to the enveloping or peripheral surface of the transfer cylinder due to the action exerted by a suitable return spring (not shown) the position of which will be explained presently. But at this time the complete segment **10** has cleared the gumming device and been safely protected against any undesired gumming.

Either of the above-described modes of operation (i.e. with or without the presence of a label) will take place again irrespective of the specific transfer-cylinder segment moving past the feeler.

In the foregoing the manner in which each segment of the transfer cylinder can be caused to recede by a few millimeters in the absence of a label has been explained, when this segment moves past the gumming device. However, considering the arcuate configuration of each segment this backward movement, as thus described, might be attended by a kind of tilting movement of the segment of which one portion of the outer surface might recede less than another portion with respect to the gumming device. Under these conditions some compensation means should preferably be provided whereby the backward movement of the segment takes place parallel to the enveloping surface of the transfer cylinder.

The complementary means provided to achieve this result will now be described with reference to the modified form of embodiment illustrated in FIG. **2** wherein, it may be pointed out, the follower rollers **22** are not positioned as in the case of FIG. **1**, as seen in plane view from above; however, the basic principle of the operation of the assembly is the same in either case.

In FIG. **2**, the various apparatus constituting the installation and co-acting between two label-dispensing magazines and the turret of an installation for gumming labels and applying them to bottles are shown. Only the transfer cylinder according to this invention is shown more in detail in horizontal section.

It is assumed that this installation, monted on a base plate **30**, is supplied with plain or gum-free labels **32** from two dispensing magazines **31**. In front of each magazine **31** is a pick-up roller **33** mounted for rotation about its axis and continuous reciprocation between the relevant magazine **31** and the transfer cylinder **39**. These pick-up rollers **33** are of any known and suitable type. In the Figure it is also assumed that while the pick-up roller **33*a*** picks-up a label from its magazine **31** the other pick-up roller **33*b*** delivers a label to one segment of the transfer cylinder, and vice-versa.

On the other side of this last-named cylinder a belt-and-drum device **34** is shown, wherein the drum surface is constantly coated with adhesive and revolves in front of the transfer cylinder; this device **34** is adapted to gum each label and then transfer the gummed label by means of its belt or belts to the turret **38** of the installation. This device may advantageously be of the type described and illustrated in the French Patent Application filed on Oct. 24, 1969, n° 69.36503.

The gumming surface of this device **34** is coated with a suitable adhesive or glue supplied from a glue-box **36** through the medium of a pair of intermediate or feed rollers **37** and **35**. This glue-feed system may be of the type described and illustrated in the French Patent Application filed on Sept. 26, 1969, n° 69.32884.

FIG. **2** further shows by way of example but not of limitation that the transfer cylinder **39** is comprised in this case of four equal and adjacent segments **10*a***, **10*b***, **10*c*** and **10*d*** associated with rollers **22*a***, **22*b***, **22*c*** and **22*d*** respectively for controlling, as already explained hereinabove, the backward movement of anyone of these segments in case no label were present thereon when the segment moves past the feeler (not shown).

Each segment **10*a*** . . . **10*d*** is supported by a horizontal arm **40** extending laterally within the transfer cylinder **39** and has its inner end mounted on a pivot pin **41**; each arm **40** is operatively connected to the relevant roller through the medium of a curved crankpin **42** and a roller **43** adapted to move vertically with said arm. The angular shift α of rollers **22** in relation to pivot pin **41** of each segment is calculated to ensure the backward movement of this segment parallel to the enveloping surface of the transfer cylinder when this movement is required as a consequence of the absence of label on the segment involved.

In FIG. **2** it will be noted that the two segments **10*a*** and **10*d*** are in their operative or outer position while segments **10*b*** and **10*c*** are retracted, with the rollers **22** of these segments in the corresponding retracted positions. Actually, the segment **10*c*** moving past the label gumming pick-up device can effectively move to this recessed position, and the next segment **10*b***, if it is also label-free, will begin its backward movement at least before the segment **10*c*** has cleared completely said gumming device.

The spring means for urging the retracted segments to their operative or outer positions may advanta-

geously be fitted around the pivot pin 41 of each segment.

I claim:

1. In an installation for applying gummed labels to bottles and the like; comprising transfer cylinder means rotatable about a fixed axis to receive successive gum-free labels at a first station and to successively deliver received labels to a second station spaced from the first station for gumming the labels, said transfer cylinder means including a plurality of segments each having an exposed surface for transporting a label in contact therewith between said stations and for holding labels in contact with gum-applying means at the second station, support means rotatable about said fixed axis including means to mount said segments for rotation about said axis and for individual pivotal movement between a normal position at said second station to apply gum to a label and a radially inwardly retracted position at said second station spaced away from the gum-applying means, and sensing means including camming means, said camming means including a member mounted on a segment and a member positioned at said second station, one of said members being movable with respect to the other member when the segment approaches the second station between a first position for non-engagement with said other member when the segment is at the second station to allow the segment to assume said normal position and a second position for the movable member to engage with said other member in response to the absence of a label on the segment after the segment has moved from the first station to positively move that segment to the retracted position before said exposed surface reaches the second station, the exposed surface of each of said segments being provided with a recessed portion, said recessed portion being covered when a label is positioned on the surface, said sensing means including a movable feeler element normally biased to enter said recessed portion at a location between the first and second stations.

2. Transfer cylinder according to claim 1, wherein said exposed surfaces of the segments when in said normal positions define segments of a cylinder of revolution concentric with said fixed axis, and said segments are pivotally mounted for generally radial inward movement to said retracted position, said recessed portions of the exposoed surfaces thereof comprising axially aligned annular grooves.

3. Transfer cylinder according to claim 2, wherein all of the segments are substantially identical.

4. Transfer cylinder according to claim 1, wherein said sensing means includes camming means having a plurality of elements including a cam member and a cam follower roller to retract a segment in the absence of a label, one of said elements being mounted on each of said segments, another of the elements being positioned in coacting relationship between the first and second stations.

5. Transfer cylinder according to claim 4, wherein said cam element is mounted adjacent the path of movement of said segments, each of said segments including a cam follower roller mounted for movement between an inoperative position and an operative position for coacting engagement with the cam member to retract the respective segment.

6. Transfer cylinder according to claim 5, characterized in that each segment is supported by a horizontal arm extending laterally within said cylinder and pivoted about a vertical pin, said arm being operatively connected to the roller controlling the backward movement of said segment through a curved crankpin adapted to move vertically in relation to said arm, said roller being spaced angularly in relation to the pivot axis of said arm.

7. Transfer cylinder according to claim 5, wherein said cam follower roller is mounted on a segment for movement in an axial direction between the inoperative and operative positions and being normally urged toward the inoperative position, and said sensing means also includes a blade mounted for movement between a normally inoperative position and an operative position to move said cam follower roller into an operative position in response to the absence of a label.

8. Transfer cylinder according to claim 7, wherein said blade is pivotally mounted, and said sensing means also includes actuator means having a movable plunger connected with said movable blade.

9. Transfer cylinder according to claim 8, wherein said actuator means comprises electric circuit means including a microswitch connected with said feeler element and electromagnetic means for moving the plunger.

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