Dec. 1, 1964 H. SCHMIDT 3,159,522

APPARATUS FOR LABELING BODIES, PARTICULARLY BOTTLES IN UPRIGHT POSITION

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Fig. 1

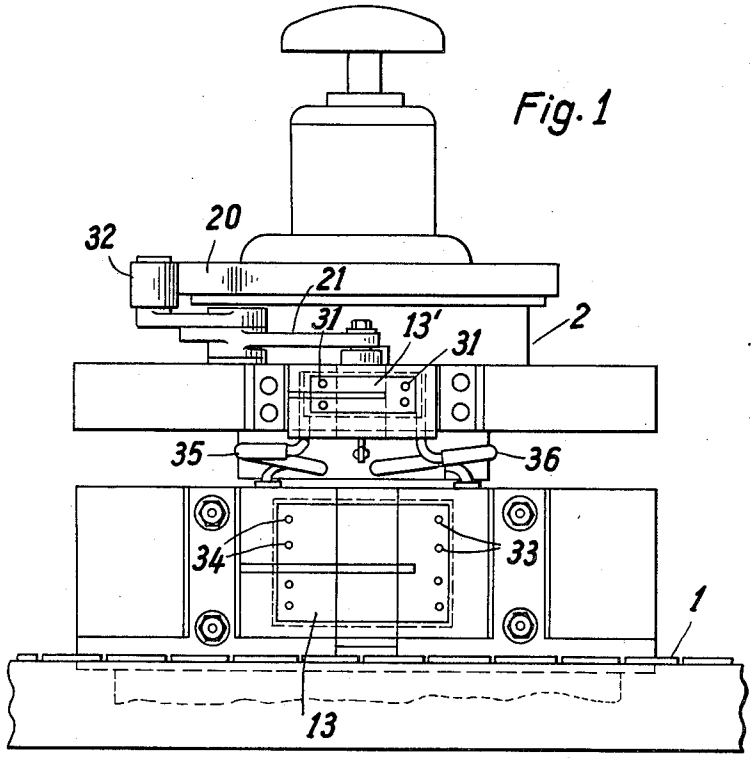
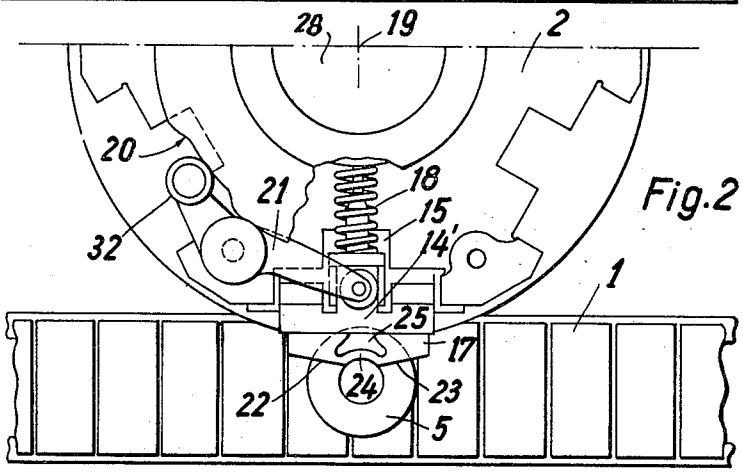


Fig. 2



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Fig. 4

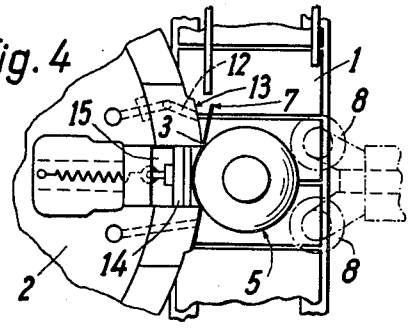


Fig. 3

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APPARATUS FOR LABELING BODIES, PARTICULARLY BOTTLES IN UPRIGHT POSITION

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Fig. 5

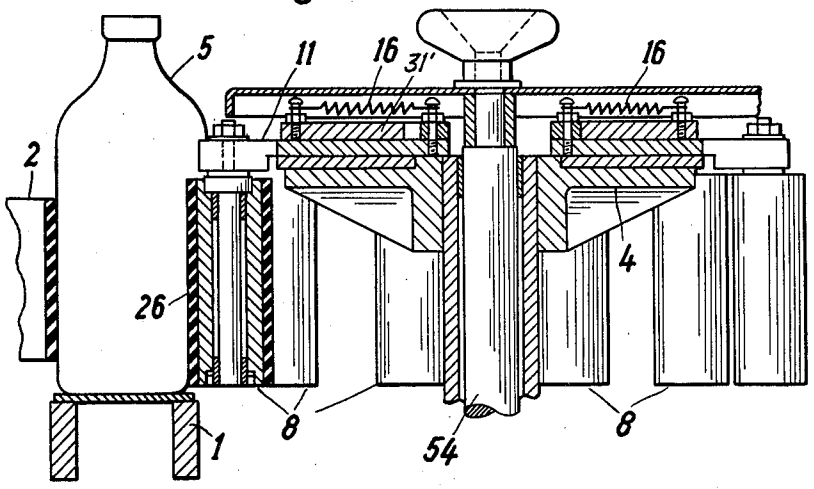
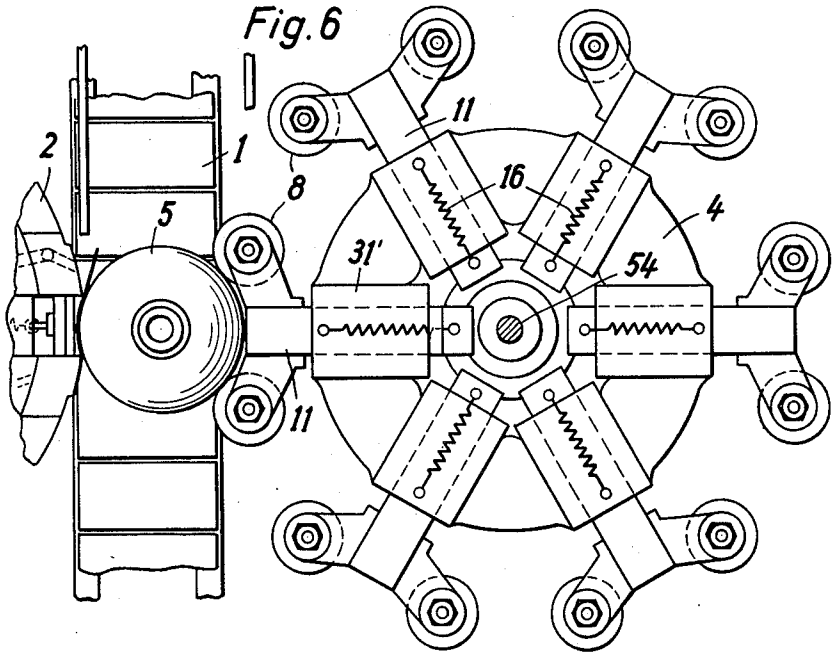


Fig. 6



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Fig. 7

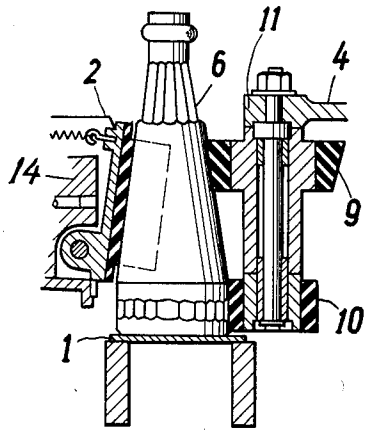
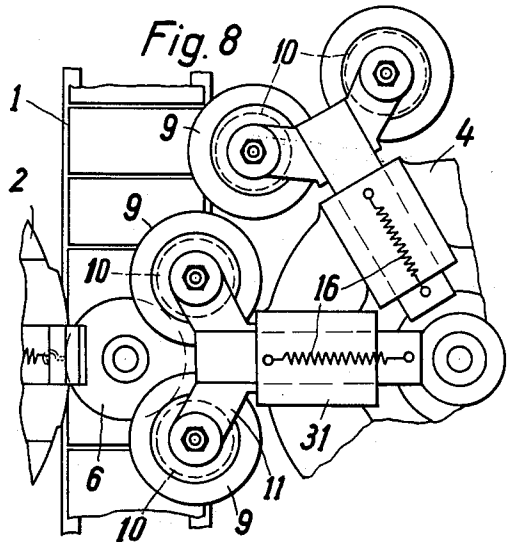


Fig. 8



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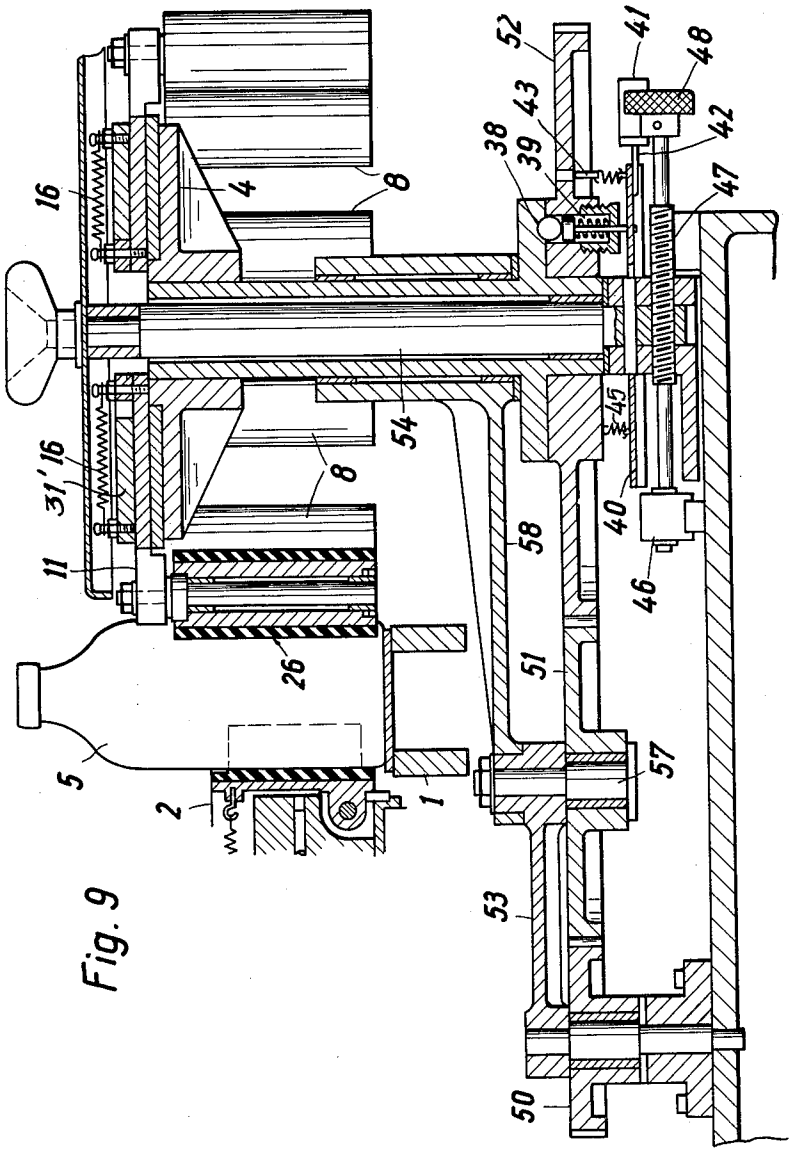


Fig. 9

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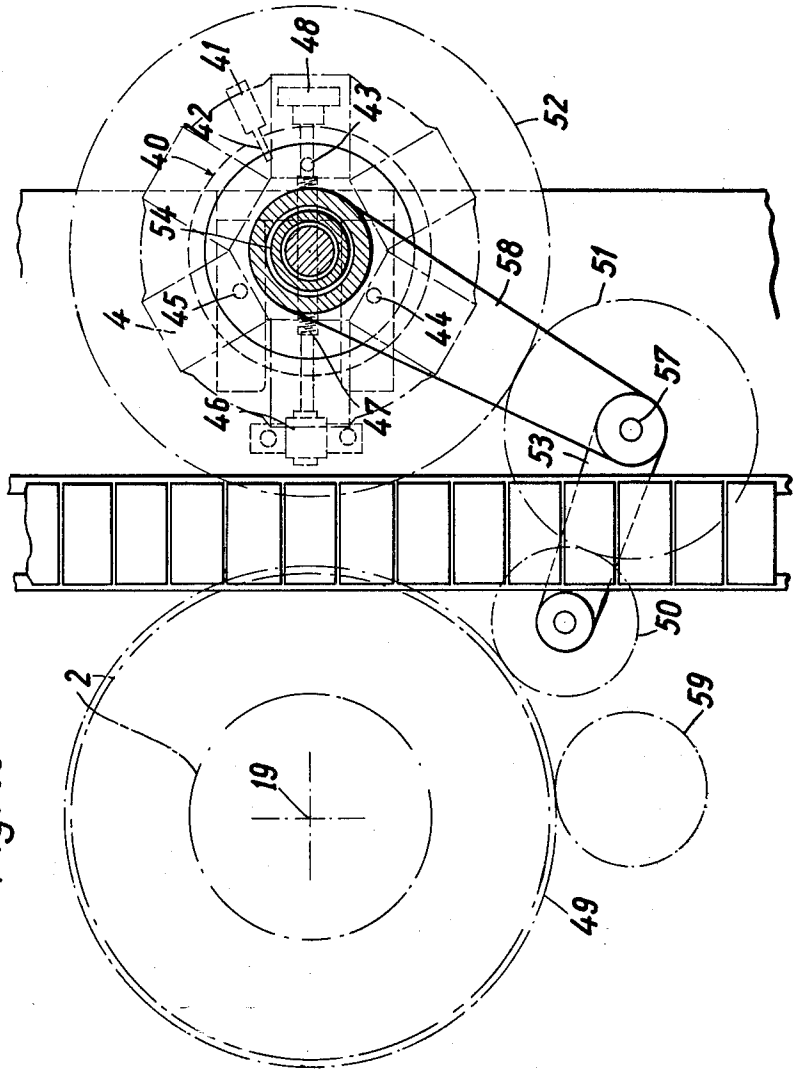


Fig. 10

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United States Patent Office

3,159,522

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3,159,522
APPARATUS FOR LABELING BODIES, PARTICULARLY BOTTLES IN UPRIGHT POSITION

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Claims priority, application Germany Mar. 3, 1960
14 Claims. (Cl. 156—444)

The present invention relates to an apparatus for the continuous labeling of bodies in upright, or vertical, position and, more particularly, to apparatus for the labeling of bottles which are conducted on a conveyor to a moving drum which carries labels on its periphery.

In known devices for the attachment of labels to vertically positioned bodies, especially bottles, rotating drums with label-receiving surfaces are used. The labels are continuously fed to these surfaces from a magazine. The bottles, which are conducted past the label-applying drum by means of a conveyor, receive the labels (provided with an adhesive on their backs) by a rolling of these bottles between the drum and a stationary or movable outer support. This process is not suitable for a clean and exact application of the labels when a high efficiency or large capacity of the labeling device is required. In such cases, the labeling process easily is disturbed by such phenomena as shifting of the labels, formation of creases or folds on application, and insufficient adhesion of the label to the bottle.

The invention relates to a system which avoids the above-mentioned disadvantages. An additional advantage of the present invention resides in the fact that it permits, in a particularly foolproof manner suited for high-capacity operation, the application of body and neck labels over a considerable portion of the bottle and even over its entire circumference.

According to the invention, these advantages are gained by the provision of a system for the labeling of vertically positioned bodies, particularly of bottles, which are conducted by a conveyor to a rotating drum provided along its periphery with angularly spaced label-receiving surfaces, wherein the bodies are fed by means of the conveyor into line contact along part of their circumference with an edge extending in the direction of their axes; simultaneously, catch prongs, preferably formed with two rotatable bodies, e.g., rollers, with axes parallel to each other and to an axis of the body and disposed on a rotating carrier, take up the body and move it synchronously with the rotating drum along the latter's periphery, whereby the label, previously provided on its back with an adhesive in any conventional manner, is held along the clamping edge and against the label-receiving surface (e.g., by means of a vacuum) and is released only after complete unwinding of the label on the body.

It has been established that, by retaining the label between the clamping edge of the respective label-receiving surface of the labeling drum and the body to be labeled, an unshiftable positioning of the start of the label on the periphery of this body is accomplished; thus the further movement of the label in the course of the labeling process can be carried out without even the slightest relative motion at the clamping edge. In this manner, a clean and crease or fold-free attachment of the label is assured, even at extremely high-speed operation of the labeling device.

The accompanying drawing illustrates preferred embodiments of the invention. However, it should be understood that these are given merely by way of explanation, not of limitation, and that numerous changes may be made in the details without departing from the spirit and the scope of the invention as hereinafter claimed.

In the drawing,

FIG. 1 is a front-elevational view of the labeling drum, seen in the direction of the angularly spaced label-receiving surfaces thereof;

FIG. 2 is a plan view of the device shown in FIG. 1;

FIG. 3 is an enlarged side-elevational view of the labeling drum, partially in section;

FIG. 4 is a plan view of a portion of the arrangement shown in FIG. 3, showing the bottle to be labeled at the time of the attachment of the label;

FIG. 5 is an axial section through the carrier of the clamping device pressing the bottle against the cylinder;

FIG. 6 is a plan view of the clamping device shown in FIG. 5;

FIG. 7 is a partial section through the cooperating parts during labeling, in a modified embodiment designed for labeling carafes;

FIG. 8 is a plan view of the arrangement shown in FIG. 7;

FIG. 9 is an axial section through the carrier of the pressure rolls showing a safety device to prevent overloading; and

FIG. 10 is a plan view in schematic representation of the drive of the pressure roll carrier.

Referring now to these drawings, it can be seen that a conveyor means such as the device 1 conducts the objects to be labeled (e.g., bottles 5) into the region of labeling drum 2, the latter forms part of the label-applying means shown particularly in FIGS. 2–4. The bottles 5 are pressed by the pressure rolls 8 (FIG. 6) against the label-holding surfaces 13 of drum 2, these surfaces being supplied with adhesive labels. The pressure rolls 8 are journaled for rotation about respective axes parallel to the bottles and to drum 2 on forked carriers 11. The latter are slidable in radial guides 31 of a rotating support 4 and are loaded by springs 16, so that they can be pressed back upon contact with bottles 5 in radial direction against springs 16, whereby the rolls 8 urge bottles 5 against the label-holding drum 2.

The bottles are conducted by means of conveyor 1 in such a manner that the bottles 5 come to rest between elastic-covered pressure rolls 8 and drum 2, whereby, in the manner shown in FIG. 4, inserts 14, disposed in drum 2, are pressed radially inwardly against the action of springs 18. Consequently, inserts 14, which are provided with an elastic covering 17 of rubber or the like extending over the area of the bottles to be covered by the label flush with the peripheral surface of drum 2, permit a penetration of part of the periphery of bottle 5 into the periphery of drum 2. The insert 14 is housed in a preferably rectangularly shaped and radially situated guide channel 15 while its label-holding surface 13 (provided, for example, with a vacuum) is formed with an edge 3 for clamping the label 7 to the periphery of the bottle 5. The line of contact between clamping edge 3, running parallel to the axis of the bottle, and the label insures that the bottle 5 does not carry out any relative motion with respect to the label-holding surface of the drum periphery, from the moment of the start of that clamping contact along edge 3 until complete deposition of the label.

The radially slidable inserts or pressure members 14 are angularly spaced about the periphery of drum 2 in such a manner that they are approximately in the center of their respective label-holding or receiving surfaces 13, whereby the outer surfaces of inserts 14 are held, outside of the area of the bottles coming in contact therewith in the manner described above, flush with the periphery of drum 2 or with the label-holding surfaces 13 disposed thereon, by the springs 18. The outer surface of inserts 14 has a cushion-like cover 17, made of an elastic material (e.g., preferably rubber). Within the area of the part making contact with the bottle, the cushion-like

cover 17 preferably is provided with a cavity 25 in its interior which leaves a comparatively thin-walled peripheral part 24 bearing on the bottle so that the cover 17, as is shown in FIG. 2, easily can be pressed at 24 and conformed to the periphery of the bottle to be labeled.

The inserts 14 are connected to rocker arms 21, especially insofar as they serve for the application of body and/or neck labels on bottles 5, as is shown in FIG. 2. These rocker arms 21 are controlled by a stationary cam 20, around the axis 28 of which the drum 2, carrying the arms, rotates. Cam 20 is constructed in such a manner that the follower roller 32, disposed on the end of each rocker arm 21, fitting it, permits radial displacement of the respective insert 14 in its radial guide channel 15 in drum 2, by the springs 18, at such a time when the corresponding label-acceptor surface 13 just is within the area of a bottle 5 to be labeled.

The cushion 17 of label acceptor 13 thereby can be slightly wedge-shaped, in the manner shown in FIG. 2 and may consist of the portions 22 and 23, which are contiguous with the thin-walled part 24 of the cushion 17 outwardly thereof. Thus the central portion can be relatively highly deformable while the outer or flanking portions are less deformable.

To hold the labels by vacuum, bores 31–34 (FIG. 1), which open at the label-receiving surfaces 13, are provided. These bores lead to a stationary vacuum or fluid-pressure source, by means of hoses 35 and 36, in a manner known per se.

In order to enable labeling of peripheral surfaces of bottles whose generatrices are at an angle with respect to the axis of the bottle, especially for body and neck labels or for applying labels on so-called carafes 6 (FIG. 7), the inserts 14′ are provided with swingable flaps 30, swinging about pivots 30′ at right angles to the axis 19 of the axle 28 of cylinder 2. These flaps 30 are provided with label-acceptor surfaces 13′ or with rubber cushions 17′ forming them. As is shown in FIG. 3, the flaps 30 are loaded by springs 37 which tend to pull the flaps to the inside in a radial direction. This results in an almost normally directed pressure on the surface of bottle 5 upon application of the body label, whereby flap 30 automatically assumes such a position which facilitates a uniform distribution of the pressure on the label to be applied.

For labeling carafes 6, it is opportune to use pressure rolls which consists, as shown in FIGS. 7 and 8, of at least two members 9 and 10, at least one of which may be conical. These sections are provided with an elastic covering, exactly like coverings 26 of the cylindrical pressure rolls 8 in FIG. 9. The manner in which the conical sections 9 and 10 are mounted on the carrier (see FIG. 7) is, in principle, the same as, or similar to, that by which the cylindrical rollers 8 are mounted upon the carriers 11 in FIGS. 5 and 6. The conical members (9) can be complementary to conical portions of the body as illustrated in FIG. 7. Particularly for the application of such labels which cover a substantial portion of the periphery of the carafe, it is recommended to blow one end of the label 7, in a manner known per se, or even both ends onto the surface of the carafe directly after pressing it onto the carafe with the aid of the insert 14 by means of air blown out from openings 12, 33, or 31, 34, respectively, while the bottle 5 is supported by rollers 8. Thus, even the application of comparatively long labels can be carried out in a dependable manner, whereby the back of the label, provided with an adhesive, is blown evenly onto the surface of the carafe. Since the label 7 is clamped between edge 3 of the label-acceptor surface and the bottle surface, as stated above, the label cannot shift on the bottle during the process.

To forestall with certainty operational failures due to locking or toppling of the bottles and also to forestall with certainty damage to, or destruction of, machine parts, FIGS. 9 and 10 show that driving of the star-shaped carrier 4, carrying the pressure rolls 8, can be accomplished by way of at least one safety rest sphere 38, which, upon overload of the roller star 4, carries out an axial displacement against the action of spring 39, whereby a safety switch 41 is actuated by way of plate 40 which is movable elastically in axial direction. This safety switch 41 is provided with a swingable feeler pin 42 which actuates the switch. Pin 42, upon displacement of sphere 38, is set under stress by plate 40 which is suspended at at least 3 points 43, 44 and 45, so that, by means of switch 41, the drive of the machine can be switched off directly thus stopping the machine.

In the interest of labeling bodies having different dimensions, the axle 54 of carrier 4 of the pressure rolls 8, 9 and 10 is adapted to be movable in the direction of axle 19 of drum 2 by means of an adjusting device 46 to 48, which preferably is operated manually. By rotating the hand wheel 48, axle 54 of carrier 4 can be moved closer to, or further from, drum 2, by means of screw 47, journaled in pillow block 46, in a straight line.

In order to enable driving of carrier 4 in spite of the adjustability of its axle 54, just stated above, the drive of carrier 4 is accomplished by means of a gear 50 which meshes with the drive gear 49 of drum 2 and is fixedly mounted in the machine frame. An intermediate gear 51 meshes with this gear 50, said gear 51 not being stationary but being disposed on the pivot 57 of a pair of arms 53 and 53. The intermediate gear 51 constantly meshes with driving gear 52 of carrier 4, since it is held in an unchanging axial distance from axle 54 by guide 58. Gear 51 transmits the torque of the drive to carrier 4 without regard to the position of the latter's axle 54. This torque is transmitted to carrier 4 from drive gear 59 of the machine by way of drive gear 49 of drum 2 to the stationary gear 50 and thence to carrier 4 so that the drum 2 and the carrier are rotated in opposite senses.

In principle, care must be taken in carrying out the labeling process according to the invention, that the conveying of the bodies to be labeled is accomplished through guard rails installed on both sides of the conveyor means 1 and extending all the way to the transfer point on the labeling machine, so that the bodies can be brought exactly to the point on which the edge, effecting the clamping of the label on the one side, and the pressure rolls, on the other, moved toward each other. It further is opportune to cause the conveyor to run at a speed higher than the circumferential speed of drum 2 or carrier 4, respectively.

Moreover, the operation of the device according to the invention can be carried out in such a manner that, during the time that the label is clamped by edge 3, the body label is blown onto the bottle and is brushed on by means of additional brush rollers, known per se and not shown in the drawings.

I claim as my invention:

1. In an apparatus for affixing labels to upright bodies, in combination:

conveyor means for displacing a succession of said bodies along a transport path, said bodies each having a substantially vertical axis and an outer periphery disposed around said axis; said surfaces having generatrices extending generally in the direction of their respective axes;

label-applying means disposed along said transport path, said label-applying means including a first support, a drum mounted on said first support for rotation about a substantially vertical axis along one side of said path, said drum being provided with a plurality of label-receiving peripheral surfaces angularly spaced about its axis and successively engageable with bodies displaced along said path, each of said surfaces being formed with at least one edge extending along a generatrix of body engaged thereby and bearing thereon for clamping a label against its periphery, and

holding means at each of said label-receiving surfaces for temporarily holding a label thereon;

pressure means disposed opposite said label-applying means along said path for urging each of said bodies into engagement with a respective label-receiving surface, said pressure means including a second support, a carrier journaled on said second support for rotation about a substantially vertical axis, a plurality of angularly spaced pressure members on said carrier bearing on the bodies engaged by the respective label-receiving surfaces for clamping said bodies against the respective edges thereof in a position of each of said bodies intermediate said label-applying and pressure means;

and drive means for rotating said drum and said carrier in opposite senses.

2. The combination according to claim 1 wherein said drum is provided with a plurality of angularly spaced radially displaceable members bearing said label-receiving surfaces, and spring means biasing said members outwardly.

3. The combination according to claim 2, further comprising relatively stationary cam means mounted on said first support, and cam follower means on said drum engageable with said cam means and associated with a respective one of said label-receiving surfaces for releasably securing the respective member against displacement by its spring means in a position of the label-receiving surface out of engagement with a respective body.

4. The combination according to claim 1 wherein each label-receiving surface is provided with a relatively resiliently yieldable central portion deformable by the respective body and a pair of relatively less yieldable outer portions flanking said central portion.

5. The combination according to claim 4 wherein each of said members is provided with an elastic cushion forming said label-receiving surface, said coating being formed with an internal cavity at said central portions.

6. The combination according to claim 4 wherein said outer portions diverge outwardly from said body and join said central portion along edges extending generally in the direction of the generatrix of the respective body.

7. The combination according to claim 4 wherein at least one of said outer portions of each of said label-receiving surfaces is provided with a plurality of suction apertures forming said holding means, further comprising

blower means at each of said surfaces for applying a label about the periphery of the respective body.

8. The combination according to claim 3 wherein each of said members is provided with a flap pivotal about an axis transverse to the axis of the respective body and lying generally in the direction of displacement of said bodies, said flap being formed with the respective label-receiving surface, and spring means urging said flap against the respective body whereby said flap is displaceable into a position conforming to the configuration of the body.

9. The combination according to claim 1 wherein said carrier is provided with a plurality of radially displaceable arms, each carrying a pair of pressure rollers journaled thereto about substantially vertical axes and bearing on said bodies at two peripherally spaced locations thereon.

10. The combination according to claim 9 wherein each of said rollers is provided with at least one conical portion engageable with a complementarily shaped conical portion of a body to be labeled.

11. The combination according to claim 9 wherein each of said rollers is provided with a resiliently yieldable layer.

12. The combination according to claim 1 wherein said drive means comprises a transmission positively coupling said label-applying means and said pressure means.

13. The combination according to claim 12 further comprising a common base for said first and second supports and adjusting means on said base for relatively displacing said carrier and said drum toward and away from each other.

14. The combination according to claim 1 wherein said drive means comprises a gear rotatable about the axis of said carrier, further comprising coupling means yieldably interconnecting said gear with said carrier for simultaneous rotation therewith, and switch means operatively connected to said coupling means for inactivating said drive means upon relative rotation of said carrier and said gear.

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