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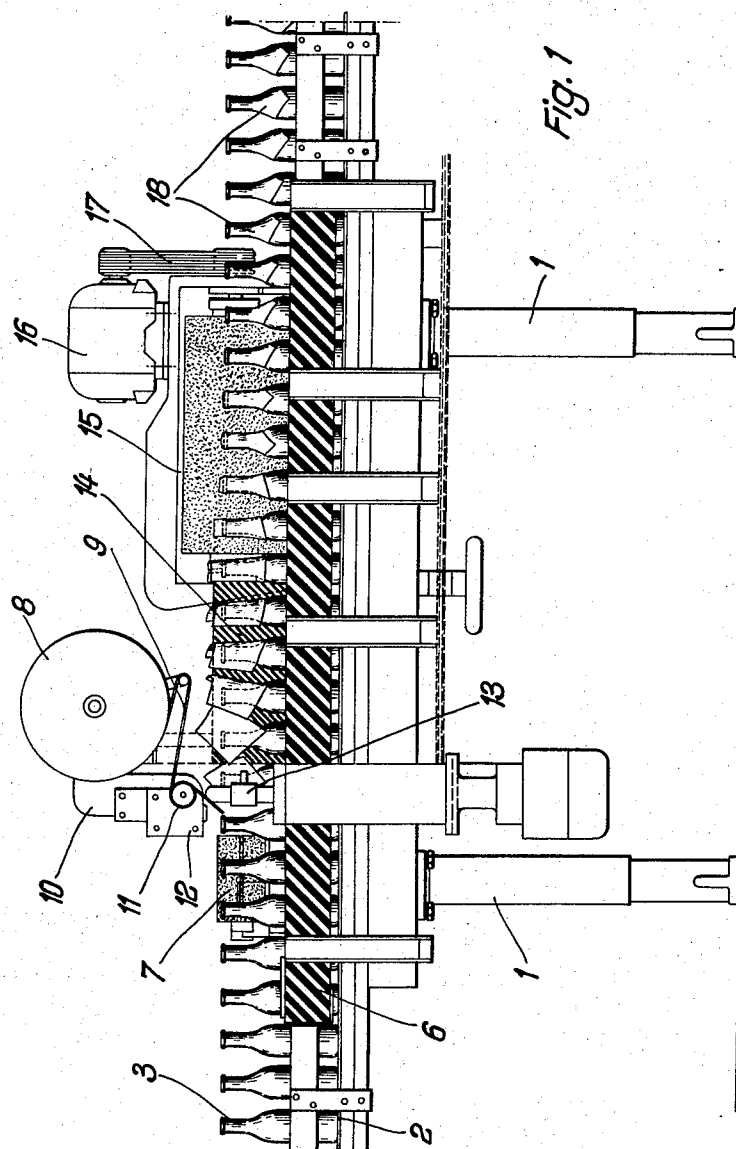
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2,867,957

BOTTLE CAP MOUNTING APPARATUS

Filed July 29, 1955

5 Sheets-Sheet 1



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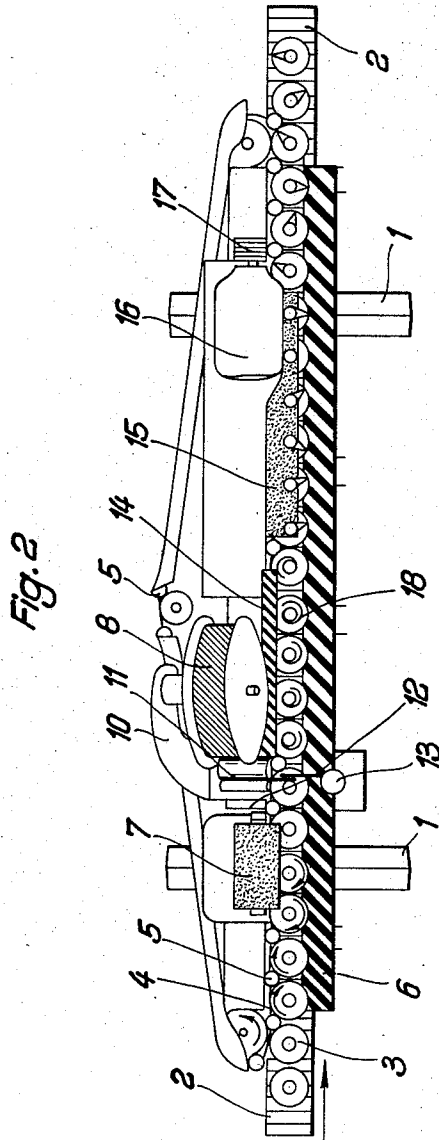
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5 Sheets-Sheet 2



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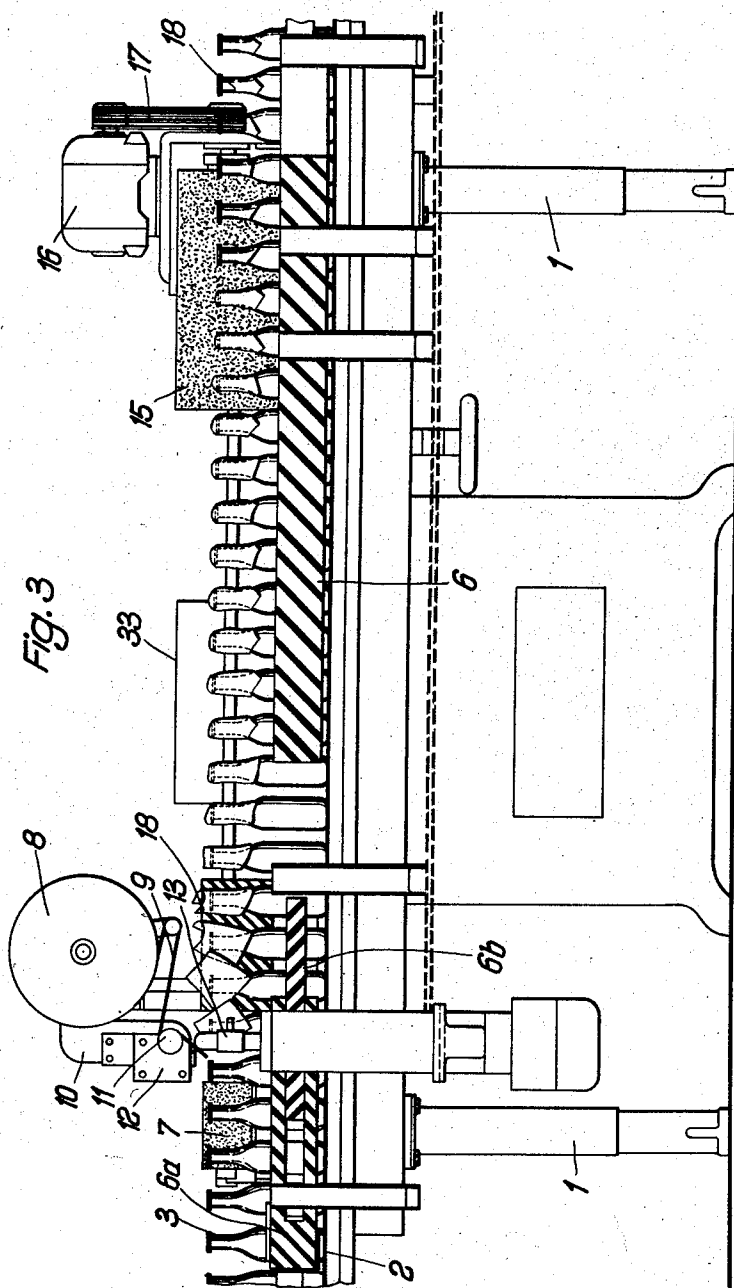
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5 Sheets-Sheet 3



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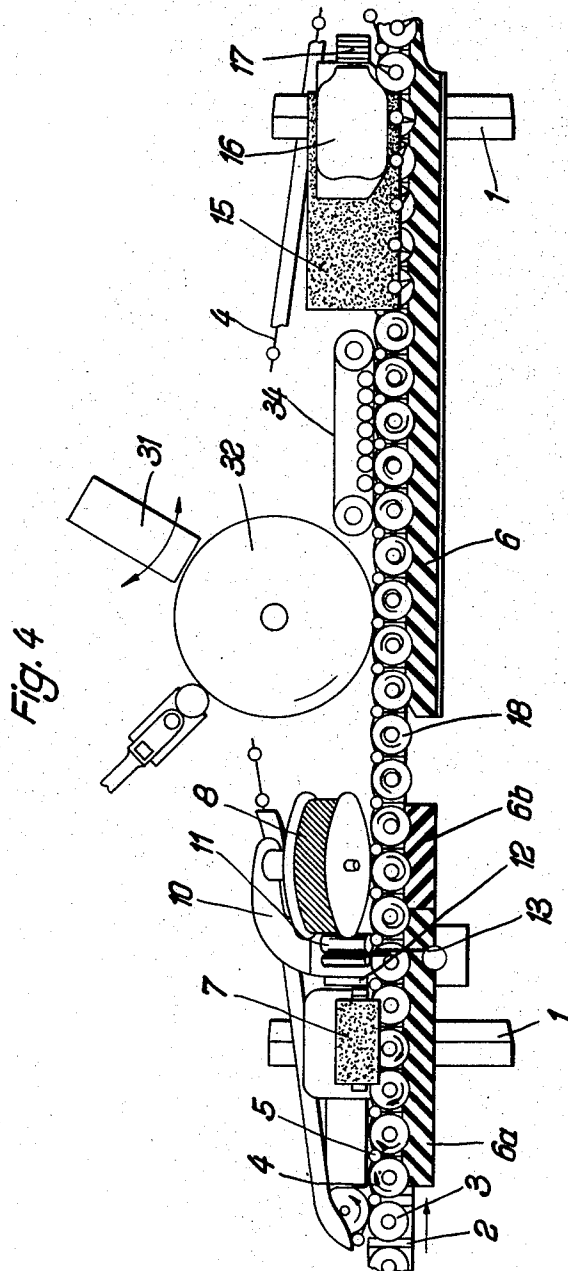
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5 Sheets-Sheet 4



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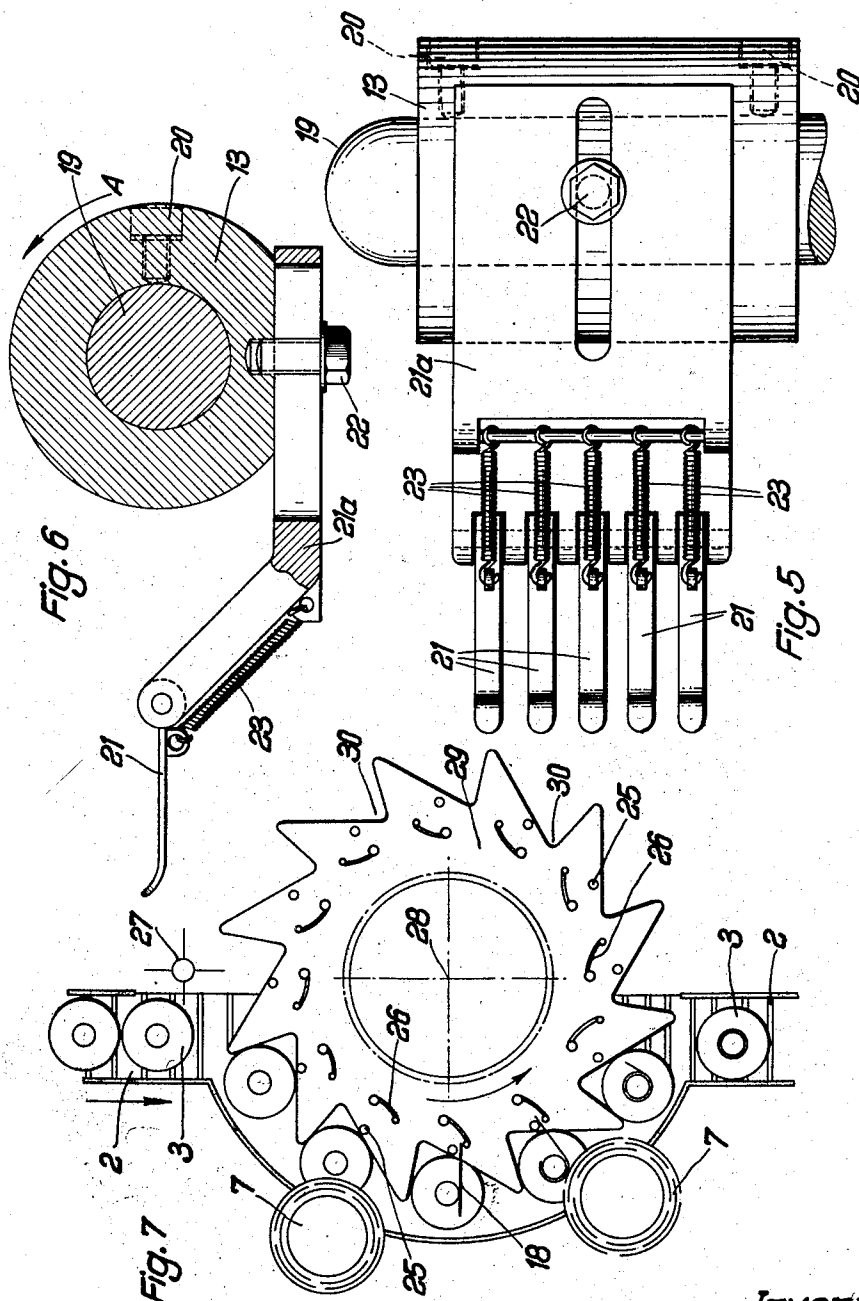
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BOTTLE CAP MOUNTING APPARATUS

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5 Sheets-Sheet 5



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BOTTLE CAP MOUNTING APPARATUS

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17 Claims. (Cl. 53—296)

The present invention relates to apparatus for mounting caps on the tops of bottles and is more particularly concerned with apparatus for applying caps, preferably of metal foil on the neck and top of bottles.

The principal object of the present invention is to provide apparatus for conducting bottles in an upright position while mounting and pressing on the neck and top of such bottles caps, particularly those formed from endless strips of metal foil onto the upright portion of bottles.

A further and important object of the invention is to provide an apparatus which is substantially automatic in operation and having a high degree of productivity for applying caps to bottles and which apparatus feeds the cap material from an endless roll onto the top and neck of the bottle with the tape being severed, positioned on the bottle, pressed thereon and then smoothed whereupon the capped bottle is ready for immediate packing.

A still further object of the invention is to provide an apparatus for applying capping to bottles which apparatus can be easily and quickly adjusted to supply caps from an endless roll which caps can be given a variety of desired forms and placed on the bottles at various positions as desired.

Further objects of the invention will be in part obvious and in part pointed out from the following description of the accompanying drawings, in which:

Fig. 1 is a front elevation of a bottle-capping apparatus constructed according to the invention.

Fig. 2 is a corresponding plan view.

Fig. 3 is a view similar to Fig. 1 of an apparatus embodying a labelling device.

Fig. 4 is a corresponding plan view of the machine of Fig. 3.

Fig. 5 is a diagram showing the cap-applying mechanism in greater detail viewed from the side.

Fig. 6 is a plan view of Fig. 5; and

Fig. 7 is a diagram of a second form of construction, relating to the feeding of the bottles.

Referring to Figs. 1 and 3, the bed 1 of the machine a conveyor belt 2, the upper run of which moves in a straight line and has the bottles 3 standing thereon. The movement of the upper run of conveyor 2 and of the bottles arranged thereon is from left to right as viewed in Figs. 1 to 4.

A laterally arranged roller chain 4 (Figs. 2 and 4) with rollers 5 ensures the exact spacing of the bottles 3 from one another. Furthermore, a stationary wall 6 of resilient material, such as rubber, is arranged opposite this roller chain 4. This arrangement causes the bottles to turn about their own vertical axes (clockwise as viewed in Figs. 2 and 4) as soon as they move between the chain 4 and the resilient wall 6. The wall 6 may be arranged to be longitudinally displaceable, that is section 6b can be slid from section 6a thereof. In this manner the conveying of the bottles for a distance after the cap has been affixed thereto is made possible. This is particularly necessary when a labelling device is used

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in the bottle capping apparatus, since in this case the lower points of the cap should lie, as far as is possible, over the center of the label.

Moreover, the wall 6 may be mounted resiliently transversely to the longitudinal direction of travel so that an adjustable bearing pressure on the passing bottles can be obtained.

The bottles firstly move past a dispenser 7 which applies glue, or, if gummed material is being used for the caps, water, to the neck of the bottle at a predetermined level, so that the approaching corners of the caps may be cemented on.

The capping material 9, which may be metal foil, is disposed on a roll 8 which is supported by a carrier 10. These, together with a conveyor roller 11 and a severing device 12, form a feeding station. The construction is such that the parts 8 to 12 may be adjusted in their inclined position relative to the axes of the bottles 3. In this manner it is possible to introduce the capping pieces 13 in a more or less inclined position. In addition the angle between the severing device 12 and the feeding device of the capping material may be made adjustable in order to change the orientation of the point of the cap.

A hand-shaped cap-applying device 13 (Figs. 5 and 6) is provided opposite the feeding station for the capping material. This device rotates in the direction of the arrow A (Fig. 6) about a vertical spindle 19. As soon as the capping piece 13 has reached the region of the neck of the bottle in a predetermined position, it is pressed on by the laying-on and brushing-on action of the cap-applying device 13. As soon as this pressing-on operation has taken place, the severing device 12 cuts the capping piece from the material 9. The severing device can cut pieces having a curved profile, or can cut pieces having a square, rectangular or rhomboid shape.

The hand-shaped cap-applying device 13 has five fingers 21 which are used for the laying-on and the brushing-on. They each act under the influence of a spring 23 and press the capping piece on to the upper part of the bottles. Thereupon the bottles with the cemented capping piece 13 come into the region of the actual enveloping station 14 (Figs. 1 and 2) which is preferably constructed as an elastic wall or brush and which, together with the elastic wall 6, produces the complete enveloping of the top and neck of the bottle. The enveloping station 14 is followed by a smoother (Figs. 1 to 4) which may consist for example of a brush 15 rotating about a horizontal axis. The drive for this brush 15 is effected by a motor 16 through V-belts 17.

In this manner the caps are applied, fixed and smoothed on the upper portions of the bottle without the bottles leaving the conveyor belt 2. The latter moves in a straight line past the individual stations. This provides an extremely high output for the entire apparatus.

The cap-applying device 13 is constructed for treating different sizes of bottles; that is it is displaceable in height on its axis of rotation, spindle 19 and held thereto by bolts 20. In addition the fingers 21 with their support 21a and the springs 23 are laterally displaceable relative to the spindle 19 by adjustment of screw 22. Thus the laying-on and brushing-on actions of the cap applying device 13 can be adapted to various sizes and shapes of bottles. Finally, the support 21a may also be swivelled or rotated about the fixing screw 22. In this manner the laying-on and brushing-on actions of device 13 may also be adapted for use when bottles having a specially shaped neck are to be treated.

In the construction shown in Fig. 7 the bottles are also treated in an upright position. Once again a conveyor belt 2 is provided for transporting the bottles to the feeding and spacing and capping device for the

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bottles, and is continued at the end of the enveloping section. Between the two sections of belt 2 however, the conveyor comprises an engaging device in the form of a star wheel 29 rotatable about an axis 28. The star wheel 29 has received pockets 30 on its outer periphery for the bottles 3. In order that the bottles may be regularly inserted into the pockets 30, a rotating feeder 27 is provided. As each bottle enters into a pocket 30 of star wheel 29, it leaves the conveyor belt 2 and after travelling in a semi-circular arc it is again transferred to the belt 2. In moving round the arcuate path the bottles first pass a dispenser 7. Then the severed capping pieces 18 coming from the roll 8 are brought into the region of the necks of the bottles 3 by rollers 11. Until the capping pieces pass a second dispenser, which may be a brushing-on device 7', they are mechanically supported (in addition to their initial adhesion to the bottle necks) by supporting members 25, 26; the former (supporting members 25) being firmly disposed on the star wheel 29, while the latter (supporting members 26) are displaceable and are controlled in a suitable manner, for example, by a cam mechanism (not shown). Thus the supporting members 25, 26 hold the capping pieces for a while, after the bottles have again moved on to the conveyor belt 2.

In the construction according to Fig. 7 the bottles 3 execute a semi-circular movement. However, it can be arranged that the bottles execute a full circular movement, in which case the delivery of the capped bottles will take place adjacent to the feeding points.

In the construction according to Figs. 3 and 4 a labelling device 33 which is known per se, is inserted between the feeding station for the capping pieces and the smoothing device 15. In this case the labels come from a stack container 31 and are brought by a suction roller 32 into the region of the bottles 3 on a level with the body of the bottle and are rolled on. Then the bottles, thus having had a label applied, come into the region of an endless driven belt forming an additional pressing-on device 34 for the labels. Subsequently, the bottles are fed to the smoothing device 15.

In order to allow the bottles to pass with their caps arranged in a predetermined position on the bottles into the labelling device 33, the wall 6 is sub-divided into two relatively displaceable parts 6a and 6b with part 6b slidable in a recess in part 6a. According to the amount by which the part 6b is longitudinally displaced relative to the part 6a, the bottles are turned more or less. It will be appreciated that the rotation of the bottles about their vertical axes ceases at the termination of wall 6, i. e. at the end of part 6b. In this way it is possible to arrange the lowest point of the bottle caps over the center of the labels.

What I claim is:

1. An apparatus for mounting of caps, preferably of metal foil, on bottles comprising a liquid dispenser, a feeding mechanism for supplying capping material, a severing device for cutting capping pieces from said material, a roller for delivering one of said capping pieces to each bottle, a cap-applying device, an enveloping device, a smoothing device, a conveyor for moving said bottles in an upright position and means for rotating the bottles about their vertical axes past and in contact with said dispenser and said cap-applying, enveloping and smoothing devices whereby said caps are each applied to a bottle.

2. An apparatus as claimed in claim 1, and means comprised in said conveyor which carries said bottles in a straight line past the individual said devices.

3. An apparatus as claimed in claim 1, and a rotating engaging device which is arranged to engage the bottles and carries said bottles over an arcuate path past the individual said devices.

4. An apparatus as claimed in claim 1, in which a resilient wall extends along said conveyor and a laterally

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accompanying roller chain holds said bottles at fixed spaced intervals and pressed against said resilient wall thereby.

5. An apparatus as claimed in claim 1 in which a resilient wall extends along said conveyor, said resilient wall is longitudinally adjustable and is mounted resiliently transversely to the longitudinal direction of movement of the bottles, and a laterally accompanying roller chain holds said bottles at fixed spaced intervals and pressed against said resilient wall thereby.

6. An apparatus as claimed in claim 1, in which the cap-applying device is hand-shaped and includes laying-on and brushing-on fingers, a vertical spindle about which said fingers rotate and press the approaching capping piece onto the neck of the bottle, whereupon the capping piece can be separated from the capping material by the severing device.

7. An apparatus as claimed in claim 1, and means comprised in the feeding and severing device for the capping material which means is adjustable to vary the inclination of said feeding and severing device relative to the axes of the bottles.

8. An apparatus as claimed in claim 1, and means comprised in the feeding device for the capping material and the severing device which means provide mutual angular adjustment of the feeding device and the severing device relative to each other.

9. An apparatus as claimed in claim 1, in which the enveloping device is in the form of an elastic wall positioned for contacting one side portion of the bottle when rotated thereby.

10. An apparatus as claimed in claim 1, in which means mechanically support said capping pieces in addition to their initial adhesion to the bottles until the operation of the enveloping device.

11. An apparatus as claimed in claim 1, in which said severing device cuts capping pieces having a curved profile.

12. An apparatus as claimed in claim 1, in which said severing device cuts capping pieces having a geometrical configuration which is square, rectangular or rhomboid in shape.

13. An apparatus as claimed in claim 1, in which the conveyor includes a straight conveyor belt, a continuously rotating engaging device in the form of a star wheel which removes the bottles from said straight conveyor belt and, after moving them in an arcuate path, returns them to said straight conveyor belt, said engaging device having supporting members for the capping pieces, and two dispensers the second of which is a brushing-on member are positioned adjacent said arcuate path.

14. An apparatus as claimed in claim 1, in which the conveyor includes a straight conveyor belt, a continuously rotating engaging device in the form of a star wheel which removes the bottles from said straight conveyor belt and, after moving them in an arcuate path, returns them to said straight conveyor belt, said engaging device having supporting members for the capping pieces, and two dispensers, the second of which is a brushing-on member, are positioned adjacent said arcuate path and some of said supporting members are positively controlled.

15. An apparatus as claimed in claim 1, in which the dispenser is an adhesive dispenser.

16. An apparatus as claimed in claim 1, in which the capping material is gummed and the dispenser includes a damper.

17. An apparatus as claimed in claim 1, in which a labelling device is provided between the feeding point for the capping material and the smoothing device.

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