May 8, 1945. W. D. KIMBALL ET AL 2,375,305

LABELING MACHINE

Original Filed Oct. 8, 1941 2 Sheets-Sheet 1

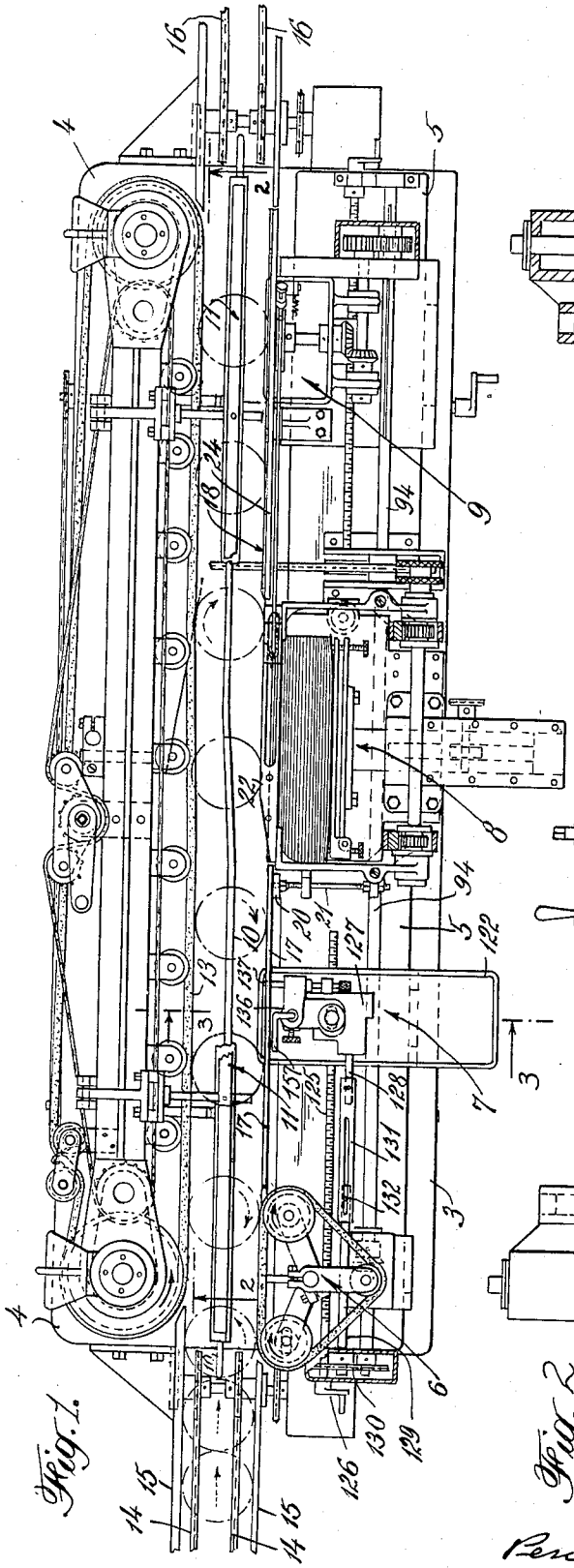


Fig. 1.

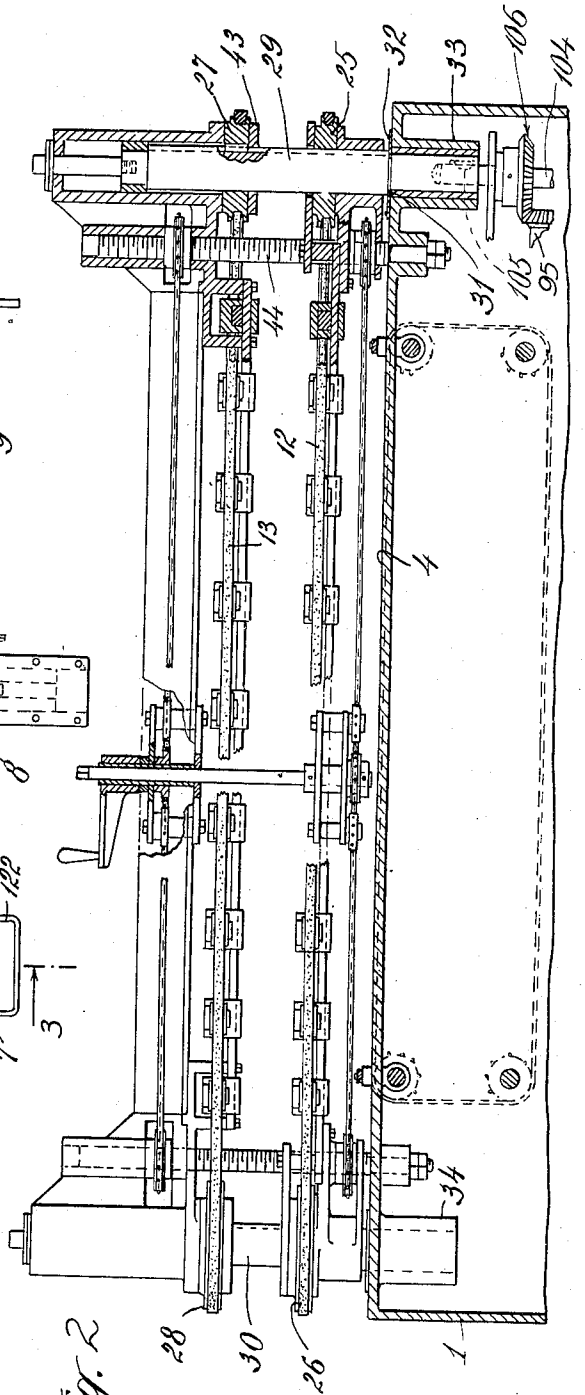


Fig. 2.

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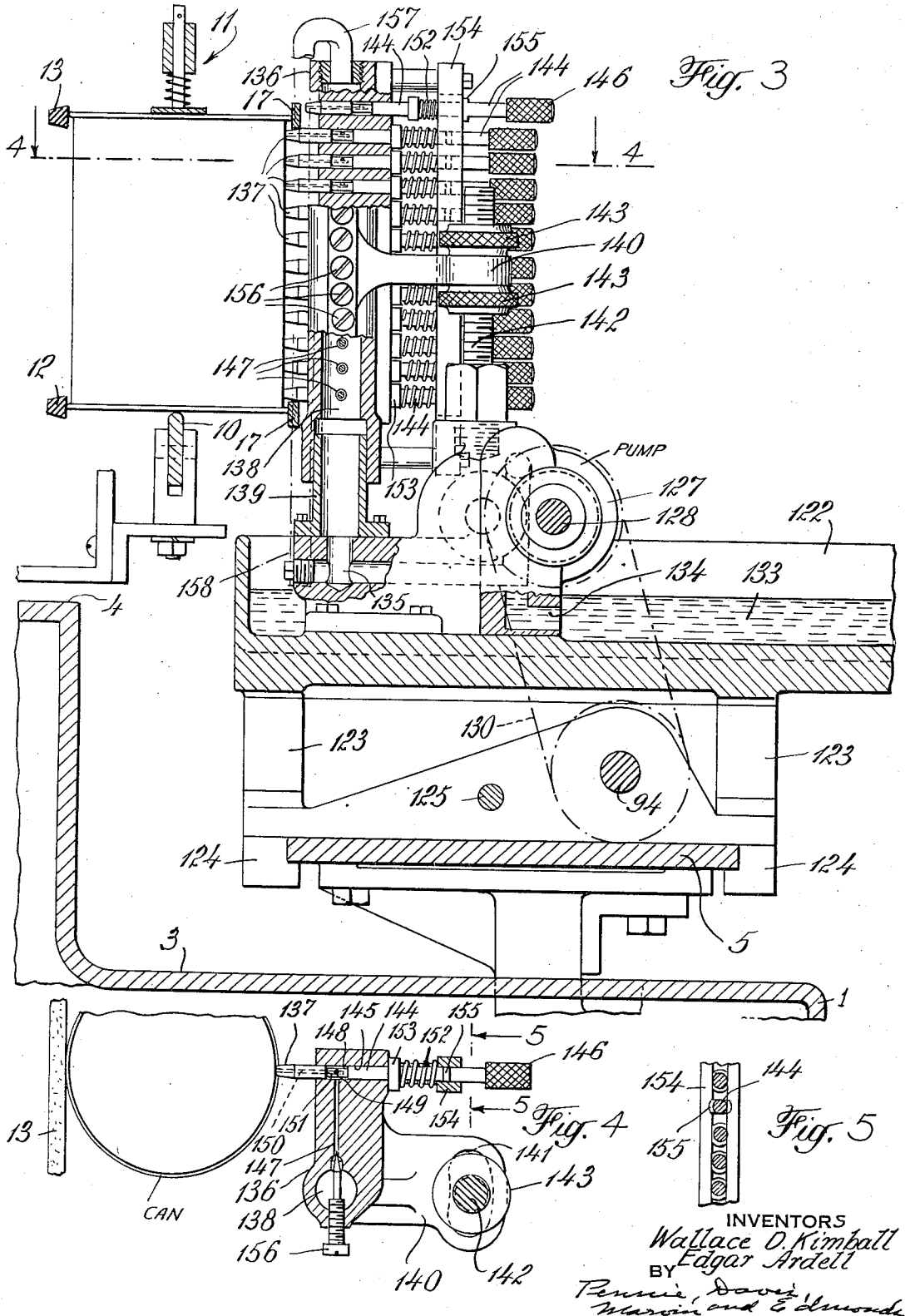


Fig. 3

Fig. 4

Fig. 5

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LABELING MACHINE

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Original application October 8, 1941, Serial No. 414,196. Divided and this application February 24, 1944, Serial No. 523,720

8 Claims. (Cl. 91—12)

This invention relates to machines for labeling cans, bottles and the like, and more particularly to machines of the kind in which the articles are moved through it in upright position, or substantially upright position. Still more particularly, the present invention relates to the mechanism for applying the pick-up adhesive to the articles, this application being a division of our copending application, Serial No. 414,196, filed October 8, 1941, and relating to a generally improved construction of labeling machine of the vertical type.

The cans or bottles to be labeled usually come from a cooking process or a filling machine and then, after receiving their labels, are sent to the casing apparatus where the articles are packed in cases either for shipment or storage. The cans are fed to the labeling machine at a high rate per minute and the casing apparatus is also capable of high speed operation, and an object of the invention is to provide a label machine which will place the labels on the articles at the necessary high rate per minute, and which will place the labels accurately in position without passing "shiners" or unlabeled articles through the machine.

In applying the pick-up adhesive or gum to the articles, by means of which the outermost or foremost label in the magazine is picked off from the label supply and caused to adhere to the can or bottle, the vertical type labeling machine presents problems not present in the horizontal type. One of these is the problem of uniform application of pick-up adhesive throughout the length of the can, or the height of the space to be occupied by the label. The object of the present invention is to provide a pick-up gum applying device or mechanism which solves this problem, and which is also easily adjustable to operate upon articles of different height, and in addition quickly adjustable to obtain the proper deposit of the adhesive upon the surface of the can and the correct amount thereof to suit labels having different characteristics as to thickness, printed or embossed surface, etc.

There is illustrated in the accompanying drawings by way of example a vertical labeling machine embodying the improved pick-up gum applying device of our invention, and from a consideration of these drawings in connection with the following detailed description, our invention will be understood.

In these drawings:

Fig. 1 is a plan view of the improved labeling machine;

Fig. 2 is a longitudinal vertical section taken on line 2—2 of Fig. 1;

Fig. 3 is a transverse vertical section drawn to an enlarged scale taken on line 3—3 of Fig. 1 through the gum applying mechanism;

Fig. 4 is a view in horizontal section taken on line 4—4 of Fig. 3; and

Fig. 5 is a fragmentary section taken on line 5—5 of Fig. 4.

Referring now to the accompanying drawings, the machine has a hollow frame 1 substantially square in transverse section. Frame 1 has at the front a flat top portion 3 (Figs. 3 and 1) and at the rear of this and elevated somewhat, there is a flat shelf portion 4 (Figs. 3 and 2). Above the flat portion 3 there is supported in horizontally adjustable but vertically fixed position an elongated plate 5 which extends longitudinally from end to end of the machine and upon which are mounted can-timing mechanism 6 at the entrance end of the machine, a pick-up gum applier 7, a label magazine 8 and a lap end pasting mechanism 9, as well as the various members which constitute the can guides.

Above shelf portion 4 of the frame are mounted the supporting track 10, on which the cans or bottles are supported in their travel through the machine, the top guide 11 for guiding the tops of the articles and the carrier belts 12 and 13, by means of which the cans are conveyed through the machine supported on bottom track 10 and in rolling contact with the can guides which are on the opposite side of the can trackway from the carrier belts. These can guides will be described in detail later on.

It will be understood that as the cans move past the gum applier 7, a small quantity of adhesive is applied lengthwise of the surface of the can and in extent corresponding to the width of the label used, and that, upon the next revolution of the can this adhesive is brought into contact with the front end of the foremost label in label magazine 8 which is thereby picked off the label supply and wrapped around the can as the can continues to move past the label magazine. Lap end paste is applied to the rear end of this label by the pasting mechanism 9, which causes this end of the label to adhere to the can or more commonly to the front end of the label which it overlaps.

The cans are supplied to the left hand or entrance end of the machine by means of a positively driven conveyor comprising, for example, a pair of conveyor chains 14 which are driven preferably from the labeling machine. The in-

coming cans are carried on these chains and guided by means of side guides 15. At the delivery end of the machine a similar pair of conveyor chains 16 is provided preferably operated from the labeling machine and provided with suitable side guides forming a conveyor, by means of which the labeled cans may be carried to the next operation in the line, for example, to a case-packing machine.

The can guides referred to above are made up of several different elements at different portions of the can trackway. At the entrance end of the machine these guides comprise upper and lower parallel rails or bars 17 against which the beads of the cans roll. The front end of the upper rail 17 is substantially opposite the front end of the timing mechanism 6 (Fig 1) while the front end of lower rail 17 is substantially opposite the rear end of this mechanism.

These two rails are supported at their front ends by brackets which extend at their rear or right-hand ends to the label magazine 8. Their support at this end comprises a vertical bar 20 (Fig. 1) which in turn is supported at its lower end by two spaced rods 21. These two rods are supported on the side of the label magazine 8 one above the other (Fig. 1).

The can guide rails 17 deliver the beads of the cans into a pair of vertically spaced magazine rails 22 and 23 (the latter not being visible), one positioned at the top edges of the labels and the other positioned at the bottom edges of the labels. From the rear of the label magazine 8 until the cans are delivered to the outgoing conveyor chain 16, the can guide consists of a flat metal plate 24 on the surface of which a roll-down pad 18 of soft resilient material such as sponge rubber is mounted. The bodies of the cans roll over this pad and by it the labels are smoothed out flat on the can surface.

Referring now more particularly to Fig. 2, the carrier belts 12 and 13 are of the V-type and are supported by pulleys at opposite ends of the machine. The pulleys for lower belt 12 are indicated at 25 and 26 and those for upper belt 13 at 27 and 28. Pulleys 25 and 27 are mounted on a vertical rotary post 29 at the right hand end of the machine, and pulleys 26 and 28 are mounted on a similar post 30 at the left hand end of the machine. These pulleys are slidably keyed to the posts upon which they are mounted so as to rotate with the posts but to be vertically movable thereon to permit the adjustment of the carrier belts.

These posts 29 and 30 are mounted in the machine frame at their lower ends only, these ends being reduced in diameter to form a shoulder 31 (see right hand of Fig. 2) which supports the posts on a washer 32 which rests on the upper surface of shelf 4. The reduced lower end portion of each of the posts is received in a bearing bushing within bosses 33 and 34, respectively, formed on the lower side of shelf 4.

The carrier belts 12 and 13 are driven from a shaft 95 (driven by a motor, not shown) by means of a driving connection between this shaft and the right hand rotary post 29. This connection comprises a short vertical shaft 104 (Fig. 2) the upper end of which projects into a hole drilled in the lower end of post 29 and is keyed thereto by means of key 105. Shaft 104 is driven from shaft 95 by means of the beveled gearing 106.

The gum applier 7, shown in detail in Figs. 3, 4 and 5, is mounted on a gum or adhesive receptacle 122 which has a base 123 arranged to slide upon the upper surface of lateral adjusting plate 5. This base has members 124 at the bottom which engage both the side edges and the bottom margins of the plate and support the base and adhesive-applying mechanism in longitudinally slidable relation on the plate.

It will be understood that since the can makes one complete revolution between the gum applier 7 and the front end of the label magazine 8, it is necessary to readjust the longitudinal position of gum applier 7 on its supporting plate 5 whenever there is a change in the diameter of the cans to be labeled. To accomplish this adjustment a long screw 125 having a crank 126 at its left hand end is arranged in threaded engagement with the slidable base 123 of the gum pot 122. This screw is journaled in a bracket on plate 5 which prevents longitudinal movement of the screw.

The gum pot has a gum pump 127 mounted within it, the shaft of the pump being indicated at 128. In order to drive the pump shaft and at the same time permit longitudinal adjustment of the gum applier, a short shaft 129 (Fig. 1) is journaled at the left hand end in a bracket on plate 5 and driven from a long shaft 94 by means of a chain 130 and suitable sprockets. Shaft 94 is continuously rotated by driving mechanism, not shown. Shafts 129 and 94 are parallel and shaft 129 is connected with pump shaft 128 by an extensible connection formed by means of a slotted sleeve 131 which telescopes over the right hand end of shaft 129 and is coupled to shaft 128. A pin 132 fixed in shaft 129 engages the slot in slotted sleeve 131.

The gum or adhesive 133 in the gum pot 122 is maintained in melted condition and at a suitable temperature by means of an automatically controlled electric heater (not shown) mounted in the base of gum pot 122. This liquid adhesive is drawn into the pump through passageway 134 and delivered through passageway 135 to a vertical gum head 136 which is provided with a series of adhesive-applying nozzles 137 by which the adhesive is applied to the can in a vertical row of spots.

Gum head 136 has a vertical gum distributing passageway 138 extending from top to bottom and at the bottom this passageway is enlarged and arranged to fit tightly over a nipple 139 which is secured to the base of pump 127 over the discharge end of passageway 135. By means of this connection with nipple 139 the gum head may be pivotally adjusted to swing nozzles 137 into the proper position with relation to the path of the cans so as to cause the gum to be deposited on their surface in proper amount without causing movement of the nozzles 137 which are spring mounted in order to enable them to be quickly cut in and out of operation for cans of different height, as will be presently described. Nozzles 137 are adjusted in and out in relation to the path of the cans not only to obtain proper deposit of adhesive but also to enable the trackway to accommodate cans of different diameters. The connection with nipple 139 is also slidable vertically so that the gum head may be adjusted to center the nipples between the beads of the can as shown in Fig. 3.

To accomplish both of these adjustments the gum head is provided with an arm 140 projecting laterally from its side, and this arm is provided with a curved slot 141 which receives a vertical post 142 which is mounted in fixed position on the top of pump 127. Threaded onto this post above

and below arm 140 is a pair of knurled lock nuts 143. By manipulating these nuts the gum head can be pivoted about nipple 139 to properly adjust the nozzles 137 with relation to the surface of the cans, and the gum head can also be shifted vertically and then locked again in its readjusted position.

As may be seen best in Fig. 4, the nozzles 137 are positioned at one side of the gum distributing passageway 138. They each comprise a slender rod 144 which closely fits a guideway shown in the drawings as a hole 145 drilled through the gum head, this rod being tapered at its left hand end (Fig. 4) to form a nozzle, and provided with a knurled handle 146 at its opposite end. The gum is conveyed from the distributing passage 138 to each of the nozzle-positioning holes 145 by a transverse passage 147.

To enable the nozzles to be thrown out of action to accommodate shorter cans than shown in Fig. 3, for example, or in case it is desired to place fewer spots of adhesive upon the cans, or to place more adhesive near the ends of the can than at the center, the nozzle rods 144 are shiftable in their holes 145 so as to withdraw the nozzle tips 137 from operative position, the top nozzle of Fig. 3 being shown in such withdrawn position. It is desirable to automatically cut off the supply of adhesive to the nozzle tip simultaneously with this withdrawal of the nozzle. To accomplish this and to convey the adhesive from the cross passages 147 to the nozzle tips, each of the nozzle rods 144 is reduced in diameter as shown at 148 (Fig. 4) forming a space for the adhesive to pass from passage 147 to a transverse hole 149 in rod 144 which connects with a longitudinal bore 150 that conveys the gum to the tip of the nozzle.

In reducing the diameter of rod 144 at 148, shoulder 151 is formed which, as the rod 144 is shifted outwardly, closes passage 147 and cuts off the supply of gum.

The nozzle rods 144 are each held in operative position by means of a helical spring 152, one end of which engages a collar 153 on the rod, and the other end of which engages a stationary slotted bar 154 which is secured in fixed parallel relation to gum head 136. Each of the nozzle rods 144 has a pair of projecting lugs 155 which, when the nozzle rod is pulled outwardly and turned 90° by means of knurled handle 146, will engage the margins of the slot in slotted bar 154, as shown in Figs. 5 and 4, and hold the nozzle rod in its outward or inoperative position.

In a vertical labeling machine it is difficult to apply the adhesive uniformly throughout the height of the can on account of the variation in hydrostatic pressure of the adhesive between the bottom and top of the can. To overcome this difficulty, each of the individual nozzle passages 147 at the point where it communicates with the vertical distributing passage 138 is provided with an adjustable needle valve 156. Hence by correctly setting each of these individual needle valves from the bottom to the top of the gum head 136 to cause the nozzles to deposit spots of gum of equal size, the adhesive applier will always produce a uniform distribution. When these valves are once correctly set, they do not have to be adjusted thereafter when changing from one height can to another, inasmuch as the nozzle cut off is independent of these needle valves.

Another consideration of importance in labeling machines is the maintenance of uniform temperature in the adhesive spots from one end of the can to the other. If the temperature of the top spots of adhesive, for example, is lower than that of the bottom spots, the top spots of adhesive will have a lower viscosity than the bottom spots and will not spread out as thin when the label is wiped onto the can, but will form decided lumps underneath the label.

To overcome this, the adhesive 133 which is maintained at a constant appropriate temperature is circulated by pump 127 through the distributing passageway 138 at a much greater rate than that at which the gum is withdrawn through the nozzle passages 147. That is to say, the adhesive is continuously recirculated through the passageway 138 and thence out at the top of the gum head through a conduit 157, the lower end of which 158 delivers the gum substantially at the level of the body of gum 133 in the receptacle 122. By constantly recirculating the gum in this way, the gum head 136 throughout its length and nozzles 137 are maintained at a substantially uniform temperature.

By means of the present invention, we have provided a vertical labeling machine which has proved to be unusually successful commercially both in its speed of operation (the number of cans labeled per minute), in its adaptability to the labeling of cans of different types, with or without beads at both ends, and bottles of different types, and to the labeling of bottles or cans differing widely in size, that is, both diameter and height.

The machine lends itself to unusually rapid adjustment for operation on articles of different size, and the adjustments to obtain proper operating conditions on any particular size of article can also be obtained quickly. The machine also is of rugged construction and operates successfully at high speed with a minimum of attention.

It will be understood that the machine illustrated and described above has been chosen to exemplify our invention rather than to define or limit it, and that the scope thereof is set forth in the appended claims, and that changes may be made in the construction of the machine without departing from the spirit of such invention. It will be further understood that the term "can" as used in the appended claims is intended to include not only metal cans within the ordinary meaning of the term, but also bottles and other round objects capable of being labeled in the machine. It will also be understood that the improved pick-up gum applying mechanism may, if desired, be used in connection with a horizontal labeling machine.

We claim:

1. In a labeling machine, a gum-applying device comprising a gum head having a series of spaced parallel bores therein, spring biased nozzle members slidable in said bores, and passages in said head for supplying adhesive to said nozzle members.

2. In a labeling machine, a gum-applying device comprising a gum head having a series of spaced parallel bores therein, nozzle members slidable in said bores, stop means to limit the outward movement of the nozzle members in their respective bores, resilient means urging the respective nozzles against said stop means, and passages in said head for supplying adhesive to said nozzle members.

3. In a vertical labeling machine, a gum head, a plurality of longitudinally slidable nozzle members carried thereby, said nozzles being individually slidable in said head to simultaneously remove the nozzle from operative position and cut off the supply of adhesive thereto, and individual

passages for conveying adhesive to each of said nozzle members, said passages each having a valve for adjusting the amount of adhesive admitted to each of said nozzles.

4. In a vertical labeling machine, a gum head, a plurality of longitudinally slidable nozzle members carried thereby, and individual passages for conveying adhesive to each of said nozzle members, said nozzles being individually slidable in said head to simultaneously remove the nozzle from operative position and cut off the supply of adhesive thereto.

5. In a labeling machine, a trackway for cans, means for conveying cans along said trackway, a gum-applying device having a gum head, a series of gum-applying nozzles carried thereby, a mounting for supporting said gum head for pivotal movement about an axis which is parallel to the axes of the cans moving along said trackway, the said nozzles being displaced from the axis of said mounting so that movement of the gum head about said pivot causes said nozzles to approach or recede uniformly toward or from the path of the cans on said trackway to adjust said nozzles in operative position, and means associated with said mounting for securing the gum head in adjusted position on said pivot.

6. In a labeling machine, a trackway for cans, means for conveying cans along said trackway, a gum-applying device having a gum head, a series of gum-applying nozzles carried thereby, a mounting for supporting said gum head for pivotal movement about an axis which is parallel to the axes of the cans moving along said trackway, said mounting also permitting movement of said gum head in a direction lengthwise of said axis, the said nozzles being displaced from said pivotal axis so that movement of the gum head about said pivot causes uniform lateral adjustment of said nozzles with respect to the path of the cans on said trackway, axial movement of said gum head causing uniform adjustment of said nozzles laterally of said trackway but at right angles to the first adjustment, and means associated with said mounting for securing the gum head in adjusted position.

7. In a labeling machine, a can trackway, a gum-applying device comprising a gum head adjacent said trackway, a plurality of guideways in said head extending towards said trackway, a gum-applying nozzle member mounted to slide in each of said guide ways, spring means coacting with said nozzle members to bias them toward said trackway, and passages in said head for supplying adhesive to said nozzle members.

8. In a labeling machine, a can trackway, a gum-applying device comprising a gum head adjacent said trackway, a plurality of aligned, spaced giudeways in said head extending towards said trackway, an elongated gum-applying nozzle member mounted to slide in each of said guide ways, spring means coacting with said nozzle members to bias them toward said trackway, and passages in said head for supplying adhesive to said nozzle members.

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