May 3, 1960 P. JORDAN ET AL 2,935,225

REFRIGERATED BOTTLE VENDING APPARATUS

Filed May 3, 1955 2 Sheets-Sheet 1

FIG. 1

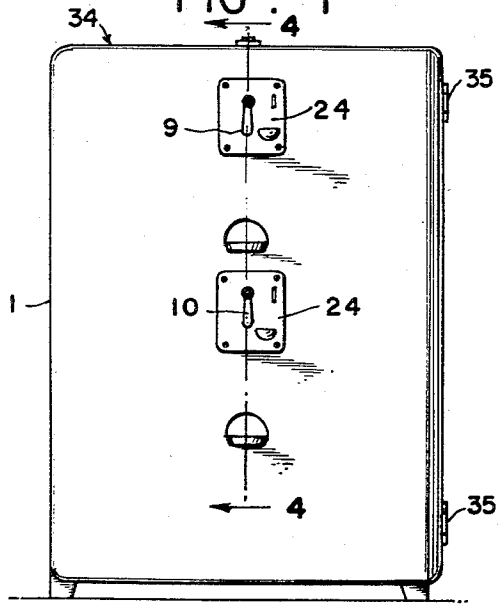


FIG. 3

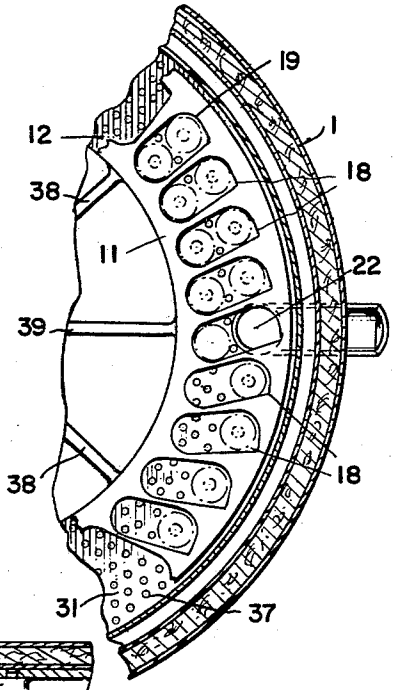
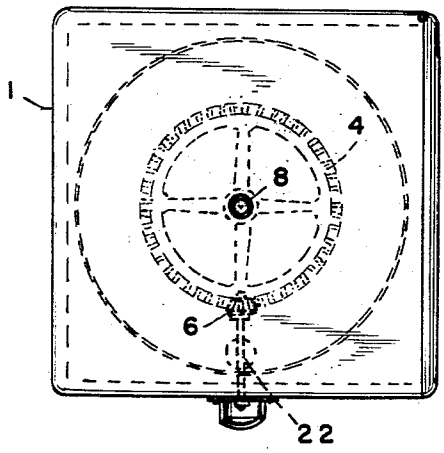


FIG. 2



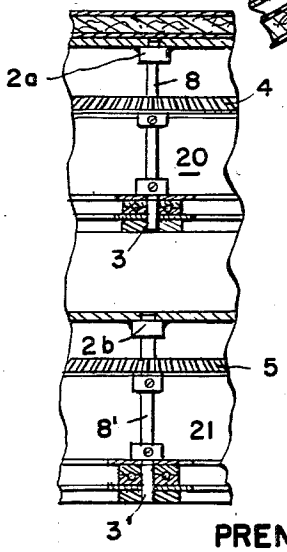


FIG. 5

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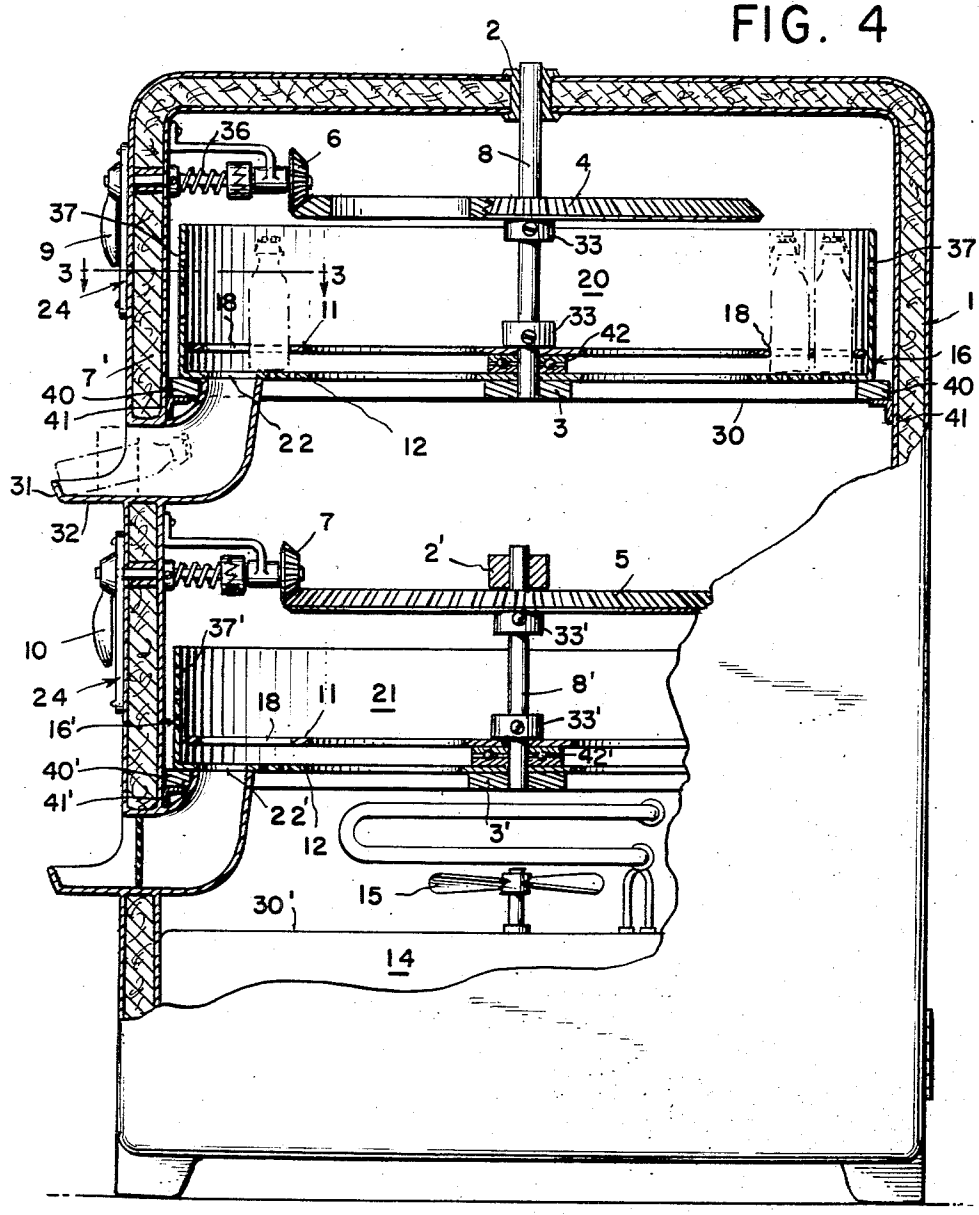
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FIG. 4



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REFRIGERATED BOTTLE VENDING APPARATUS

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1 Claim. (Cl. 221—150)

This invention relates to a refrigerated bottle vending apparatus of the type in which the consumer deposits a coin in the appropriate slot to free a lever movable by hand which places a bottle in proper dispensing relationship to be dropped through a vending chute onto a shelf outside of the apparatus.

More specifically, the refrigerated bottle vending apparatus of the present invention comprises a novel bottle magazine structure providing improved cooling for the bottles and in which the bottles are vertically supported and adapted to be rotatably moved from a cold storage zone to a dispensing position by means of a driving mechanism of simple construction which is operated by the pulling down of the lever outside of the apparatus by the consumer.

The bottle magazine structure comprises a rotating ring having openings for the vertical positioning of bottles circularly positioned in concentric rows about the periphery of the ring and a stationary ring support for the bottles. Below the rotating ring there is positioned a stationary ring in vertical spaced relationship therefrom which supports the circular rows of standing bottles at their bottoms.

The stationary ring and rotating ring each project only slightly beyond the width of the rows occupied by the circularly arranged bottles in the magazine thereby leaving a relatively large free space for cooling air throughout the central portion of the apparatus. A plurality of circular bottle magazines may be provided in a vertical stack within the apparatus casing; each magazine being rotatable about its own fixed shaft, which is preferably vertically disposed at about the center of the casing and each being driven by its own relatively light weight driving ring gear. The stack of the plurality of magazines and their respective driving means provides for a minimum of encumbrance or baffling of the refrigerating air in the apparatus which moves by convection throughout the central vertical section of the casing.

The driving means for the bottle magazine comprises a ring gear fixed to the same driving shaft for rotating the magazine and located above the rotating ring and stationary ring assembly. A spur gear is connected to said ring gear and the spur gear is driven by a lever terminated shaft, the lever of which is outside of the casing so as to be readily operated by the consumer. This driving arrangement is so constructed as to provide a minimum of encumbrance to the fluid coolant circulating within the chamber by convection. Accordingly, a minimum of mechanical interference is had for the cooling of the bottles within the chamber and a direct flow of cooling air from the refrigerating unit suitably placed at the bottom of the apparatus, comes into contact with the bottoms of the bottles stored in the dispensing magazines.

It is further a feature of the invention that the stationary ring is constructed of a foraminous material, such as perforated metal or metal screen, so as to permit maximum cooling of the bottles, by the direct flow of refrigerating air upwardly through the perforations and

by the deflected lateral and downward flow or air about the sides of the stationary ring as well as through the openings in the dispensing ring, as a result of the circular contour of the magazine and its spacing from the sides of the cooling chamber.

A further feature of the invention is the arrangement of receiving pockets for the bottles disposed symmetrically about the perimeter of the rotating ring. The pocket openings in the rotating ring in combination with the vertical spacing of the bottle supporting stationary ring serves to position the coldest bottles of the row in proper dispensing relation for dropping them one by one into the delivery chute. The pockets are elongated in an axially oblique direction to stack a plurality of rows of bottles. A bottle from a back or storage row moves itself into a front or dispensing row when the rotating ring moves due to the levered movement of the spur gear to rotate with relation to the stationary ring. A bottle is dispensed with each levered movement.

The pockets or openings in the rotating ring generally conform as to width to the diameter of the bottles; the length is sufficient to permit two or more rows of bottles to be stacked in the magazine from the outside periphery (front row) of the rotating ring towards the center of the ring, and the back rows of bottles are positioned immediately behind the front row. By obliquely slanting the pockets in a direction away from the direction of movement of the rotating ring, the bottles move towards the front in a successive sequence after each dispensing operation. The rotation of the ring brings each succeeding bottle closer to the dispensing chute during the sliding movement of the bottle over the stationary ring. Thus, as a result of the manual lever action in driving the rotating ring, the coldest bottle (loaded first in point of time) is closest to the dispensing chute and dispensed by the vending operation. This coldest bottle is positioned by the rotation of the rotating ring to move from the back row (loaded last) towards the front row.

It is a further feature of the invention that the bottom stationary ring support, preferably perforated, is formed with a short upturned peripheral flange serving to maintain the outer row of bottles in the upright position. The inner supporting surface of the flange and the supporting inner base of the ring support which comes into contact with the rows of bottles is smooth and polished, so that it is substantially frictionless to assure an easy guided movement of the bottles from a back row to a front row for dispensing. The height of the flange permits access of cooling air between the stationary and supporting rings.

The apparatus of the present invention is not limited to the dispensing of bottles. It is also adapted to dispense a wide variety of packaged items, and more suitably, those of a perishable nature or which require refrigeration in order that they reach the user or consumer in the condition desired. The apparatus is particularly adapted for packaged items or containers the type which can be supported in the vertical position with some degree of stability and which will not suffer damage to their contents when dropped by gravity through the dispensing opening in the stationary ring to the outside ledge. Such items may be packaged ice cream, bottled milk, beer, or other beverages, cartons of frozen confections, etc., which are commonly dispensed by coin controlled apparatus.

An object of the invention is to provide a container magazine of improved construction fabricated from a minimum of structural materials and supporting devices, in combination with a light weight driving means, said driving means comprising a ring gear of narrow thickness supported over the rotating ring of the magazine, driven by a spur gear and manually operated lever ex-

tending through the casing for coin controlled operation by the consumer and said container magazine comprising a rotating ring having peripheral pockets obliquely slanted in a contiguous array for positioning the bottles under refrigeration which are supported on a stationary ring, said stationary ring having its peripheral edge upturned as a guiding flange for the lateral support of the bottles, and provided with an opening for the dispensing by gravity of the bottles from the magazine through a dispensing chute to the outside of the apparatus.

A further object of the invention is to provide new and useful improvements in a refrigerated bottle vending apparatus, more particularly in the efficiency of cooling of said apparatus due to the structural arrangement of the driving means, the bottle magazine and the supports for these which leaves a large free volume for cooling, and due to the foraminous nature of the stationary ring member of the magazine which supports the bottles to permit the unimpeded distribution of the cooling medium or air by convection from the refrigerating unit in a most efficient manner.

Other and further objects will be seen in view of the more detailed description set forth below taken in connection with the accompanying drawings, it being understood that various changes may be made by one skilled in the art, without departing from the scope and spirit of the invention.

In the drawings:

Fig. 1 is a front view of the apparatus in accordance with the invention;

Fig. 2 is a top view, partly broken away to show the relationship of the driving means, stationary ring, and delivery chute;

Fig. 3 is partly in section along line 3—3 of Fig. 4 showing the rotating ring, stationary ring, and delivery chute details of Fig. 1; and

Fig. 4 is an enlarged vertical sectional view along line 4—4 of Fig. 1 showing two independent magazine dispensing units one above the other in the apparatus of the invention; and

Fig. 5 is a section of a detail of the mounting.

As shown in Figs. 1 and 4 the apparatus comprises an insulated casing 1 in which the top bushings 2 and 2' and bottom bushings 3 and 3' each serve to mount the respective independent vertical shafts 8 and 8' for the rotation of the ring gears 4 and 5, respectively. Upper ring gear 4 and lower ring gear 5 are each separately connected to upper spur gear 6 and lower spur gear 7. These upper and lower ring gears are separately driven about their respective shafts 8 and 8' by levers 9 and 10, respectively. Levers 9 and 10, the upper and lower levers respectively are suitably passed through the insulation of the housing 7 in insulation-tight relationship and are readily manipulated through one-quarter of a turn at the lever end to provide the necessary rotary movement of the bottles in a magazine carriage.

Thus, it is seen that each magazine unit is separate, being provided with its own shaft 8 or 8', its own driving ring gear 4 or 5, its own dispensing chute 22 or 22' having an upturned ledge 31 position at the end thereof to stop the bottle at its base 32 after passing through the chute to the outside of the apparatus. The rotating rings 11 and 11' lie within the stationary flanges 16 and 16' of rings 12 and 12' respectively so that each magazine unit and driving means is effectively combined in a single package which is readily removed in the event that a repair to the apparatus is to be made. Further, each magazine is readily loaded by merely opening the front door 34 of the apparatus, the door swinging about the hinges 35 shown at the left of the box in Fig. 1, and dropping the bottles in the pockets 18 in a counterclockwise manner starting from the dispensing opening 22 as shown in Fig. 3.

The upper bottle magazine 20 comprises a rotating ring 11 secured to shaft 8 by hub 3 and the shaft 8 is

driven by the upper ring gear 4 by the lever action of lever 9 and the spring 36 driven clutch engaged spur gear 6. In Fig. 4, the two magazines, 20 and 21, shown in the upper and lower vending sections of the apparatus, are spaced apart a sufficient distance to permit ready access of cooling air to both units. Obviously, a larger number of magazines may be installed utilizing the same fundamental construction of the invention by making the box higher. Remarkably, the efficiency of cooling within the apparatus is not materially diminished by the installation of successive magazines in vertical array, and this may be due to the perforations 37 in the stationary ring. A large free volume is provided also due to the open construction of the rotating ring 11 and the relatively narrow bottom shelf of the stationary ring 12 to leave a large unimpeded volume about the shafts 8 and 8'. This promotes good efficiency of cooling by the refrigerating unit 14 fitted with fan 15 for cooling by convection.

As shown in Fig. 3, the upper flange portion 16 of the upper stationary ring 12 may be suitably perforated as, for example, by stamping of the metal or by making the ring of a strong metal screen. The lower shelf or base portion of the stationary ring 12 is likewise perforated. In this way, unimpeded access of the cooling medium or air is permitted to directly contact the cooling fluid with the containers which are supported on the stationary ring.

As shown in Fig. 4, the ring gears 4 and 5 are mounted tightly by the screw-collar 33 and 33' projection on the separate shafts 8 and 8' journaled in bushings 2, 2' and 3, 3'. The lower mounting for the shafts 8 and 8', mountings 30 and 30' are preferably spider shaped to improve cooling of the magazines and to economize on materials. The ends of the ribs terminate in ring 40 which is attached to the sides of the box by brackets 41 and 41'. To facilitate easy rotation of the rotatable ring 11, the shafts 8 and 8' rest on suitable ball bearing journals 42 and 42' as shown in Fig. 4.

The perforations provided in the inner rotating member 11 to improve the cooling of the bottles in the magazine are preferably in line with the bottle openings in the lower stationary ring in order to facilitate the flow through the perforations of the magazine.

The containers as shown in Figs. 3 and 4 are moved along the circular row in the magazine. The upper flange of the stationary ring 12 serves to laterally support the containers against the inner edge thereof. Concentric rows or files of the containers are provided in the magazine by virtue of the elongated pockets 18 which are contiguously disposed about the circumference of the rotating ring. These elongated pockets 18 are slightly larger than the dimensions of one container in width, slightly larger so that the container is easily passed through the pocket of the opening, and the pockets have the length as desired to provide for files staggered radially, towards the center. As is best seen in Fig. 3, the openings or pockets 18 extend outwardly and are inclined in a direction away from the direction of rotation.

Although the files may extend back for three or more rows of containers, it is preferred that a large free volume in the central portion of the apparatus be maintained by the arrangement in order to provide for the most efficient cooling. Accordingly, a preferred arrangement, in the instance where bottles of beverages are vended, is the arrangement of two rows of bottles in the depth of the magazine or, differently stated, the arrangement in which there are two concentric circular rows of bottles.

Upon moving the rotating ring 11 under the action of the driving ring gear 4, the edge of the pocket 19, through the slight friction encountered sliding over the stationary ring 12 causes the bottle in an inner row to move forward to assume the pocket guided position of the bottle in the outer row just after the rotating ring

has been moved to the vending opening 22 of the stationary ring as shown in Fig. 3.

As shown in Figs. 1 and 4, each magazine unit and driving means is provided with its own coin controlled box 24 and dispensing chute 22 to the outside of the apparatus. The coin controlled box may be of any conventional and suitable type; hence it is only shown schematically.

The magazine units are adapted to hold 48 or 72 bottles, the larger number requiring a change in size in order to accommodate the number of elongated openings in the circle.

It is not necessary in accordance with the invention that the coin box be mounted on the front of the box, since it may also be mounted in one of the sides while still retaining the essential structural features of the spring pressed (ratchet) clutch drive for the pinion gear 6 to the ring gear 4.

The advantage, however, of placing the spring pressed ratchet in the door of the apparatus lies in the ready disconnection of the gear driving unit from the coin controlled mechanism through the retraction of the spring. When the door is locked after loading the magazines with bottles, the spring urges the ratchet in engaging position to bring the spur gear 6 into driving connection with ring gear 4.

An example of a commercial construction of the rotating ring is set forth below in order that there be a clear picture of some of the details of the invention, although it is to be understood that the dimensions herein below set forth can be varied within wide limits as will be apparent to those skilled in the art.

In one commercial construction, the rotating ring 11 is so mounted in the stationary ring 12 that there is about ⅝ inch to ¾ inch clearance between the two at the bottom. This permits the bottles to project that distance through the base of the rotating ring 11 and being supported at all times upon the base of the stationary ring 12.

This stationary ring 12 is mounted rigidly and securely within a standard insulated box which contains the refrigerating unit 14. The rotating ring is turned by means of ring gear 4 suitably attached to the upper part of the rotating ring and a driving spur gear 6 is attached to the casing for actuation by the lever 9 by means of a four-point clutch ratchet which serves as a locking as well as driving means to the manually operated coin mechanism of the type which is mounted on the box.

The driven ring gear 4 has 144 teeth, while the drive gear has 16 teeth. The perimeter of the rotating ring is segmented into thirty-six contiguous pocket divisions, each containing space in the outer perimeter for a cut-out pocket which will accommodate two bottles, one behind and slightly to the left of the other.

The gears are so constructed and arranged that each one-fourth revolution of the lever handle 9 of the coin mechanism 24 will deliver one bottle from the outer circle of bottles. As these outer bottles are vended, the ones in the inner circle will move outward into the outer circle because of slight friction against the base ring of the retaining framework and the backward slant of the pockets. Due to the fact that the rotating ring is provided with openings which extend outwardly and away from the direction of rotation of the rotating ring and out of coincidence with the radii of the ring, the bottles are forced to the outer edge of the magazine on rotation of the ring. The leading and trailing edges of the openings are substantially parallel whereby the rotating movement of the rotating ring causes movement of the inner most bottle in the opening toward the outer portion of the opening. With the dispensing opening in the stationary ring being in communication with the dispensing chute, the bottle brought toward the outer portion of the opening is carried by its movement along the peripheral shelf to the dispensing opening for dispensing to the dispensing chute on the outside of the apparatus. Due to placing two rows in the magazine unit, the unit may contain 72 bottles instead of 36 bottles.

As the revolving ring 11 causes the bottles to move in a clockwise direction, the slight friction at the base of the bottles against the base ring causes the bottles in the inner circle to move into the outer circle as the outer bottles are successively vended through. The opening in the stationary ring 12 at 22 which is just a little larger than the bottles to be vended provides the entry of chute 22 for the bottles to be dropped by gravity to the chute ledge below and outside of the box.

The fan operated cooling device may be any of the commercially available machines which is of sufficient cooling capacity to maintain the temperature as desired. It is preferred to use a cooling unit which will provide a temperature from 33° to about 42° F. in the box and which can be readily set to provide a constant temperature. In boxes of the type commercially used, the cooling unit may be powered by a motor as small as 1/10 horse power, although ¼ to ⅙ horsepower units are preferred.

Although the several units mounted one above the other are shown in Fig. 4 as being mounted directly to the box (see top shaft bearing in Fig. 2), it is within the purview of the invention that the units be readily removable from the box as is shown in Fig. 5. Here the top shaft bearings 2*a* and 2*b* are each suspended from a framework supporting element which is separate from the box itself. Accordingly the dismantling of the units for inspection and repair is facilitated. The apparatus of the invention may be adapted for installation in various kinds and sizes of commercial refrigerated boxes.

The box, similar to a refrigerator box, is fully insulated. The walls and door are packed with approximately two inches of approved insulation. The base ring member of the rigid retaining part of the unit is of stainless steel in order to provide a smooth, non-corrosive, low friction base upon which the bottles slide as they travel to the delivery opening in this same circle. The rest of the unit may be made of galvanized steel, galvaneal or aluminum.

Having thus described our invention, what we claim as new and desire to protect by Letters Patent is:

A refrigerated bottle vending apparatus having a refrigerating unit centrally located at the base and including a fan cooling the bottles supported therein, a ring-shaped bottle magazine, a dispensing chute positioned below said magazine communicating between said magazine and the outside of said apparatus to deliver bottles which are dropped by gravity from said magazine, a centrally located vertical shaft, a spider connected to the side walls of the apparatus, said magazine being supported by said spider, said magazine comprising a lower stationary ring having a peripheral shelf, an upper revolvable rotating ring for moving the bottles along the peripheral shelf of said stationary ring towards the dispensing chute, said lower stationary ring having a slightly greater diameter than said rotating ring on which the bottles are supported, said rotating ring being provided with a plurality of regularly disposed elongated openings which are slightly wider than the base of one of said bottles and longer than the base of two of said bottles, said openings in said rotating ring extending outwardly and away from the direction of rotation of said rotating ring and out of coincidence with the radii of the ring to force bottles to the outer edge of said magazine, the leading and trailing edges of said openings being substantially parallel whereby the rotating movement of said rotating ring causes movement of the innermost bottle in said opening toward the outer portion of said opening, means to actuate said revolvable ring and a dispensing opening in said stationary ring at the outer edge thereof in communication with the dispensing chute whereby the movement of bottles along said peripheral shelf brings a bottle for dispensing to said dispensing opening to be dropped into said chute for

removal of the said bottle, one at a time, to the outside of said apparatus.

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