

March 14, 1950

W. S. CONNELL
ARTICLE DISPENSING DEVICE

2,500,664

Filed April 4, 1947

4 Sheets-Sheet 1

Fig. 2.

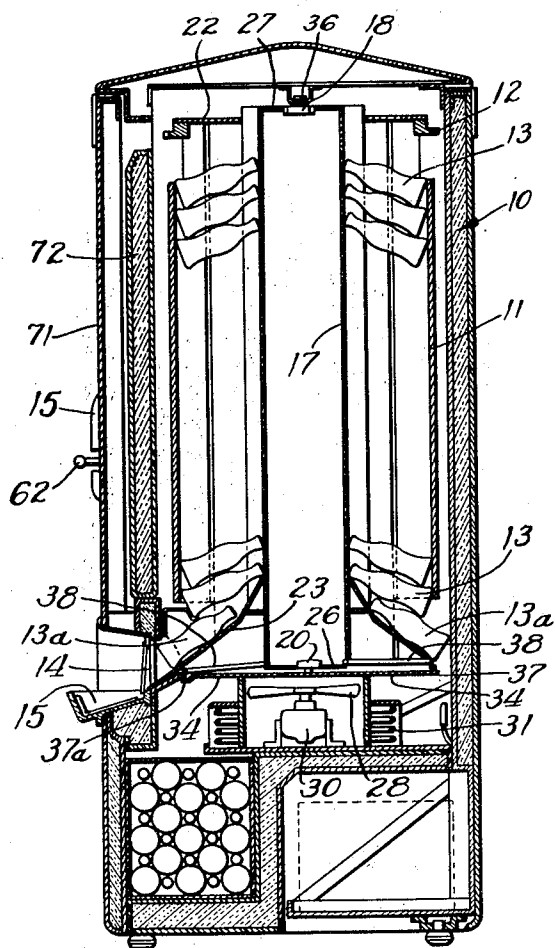
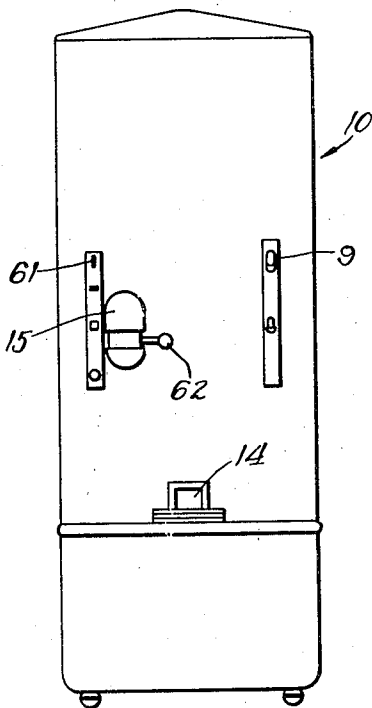


Fig. 1.



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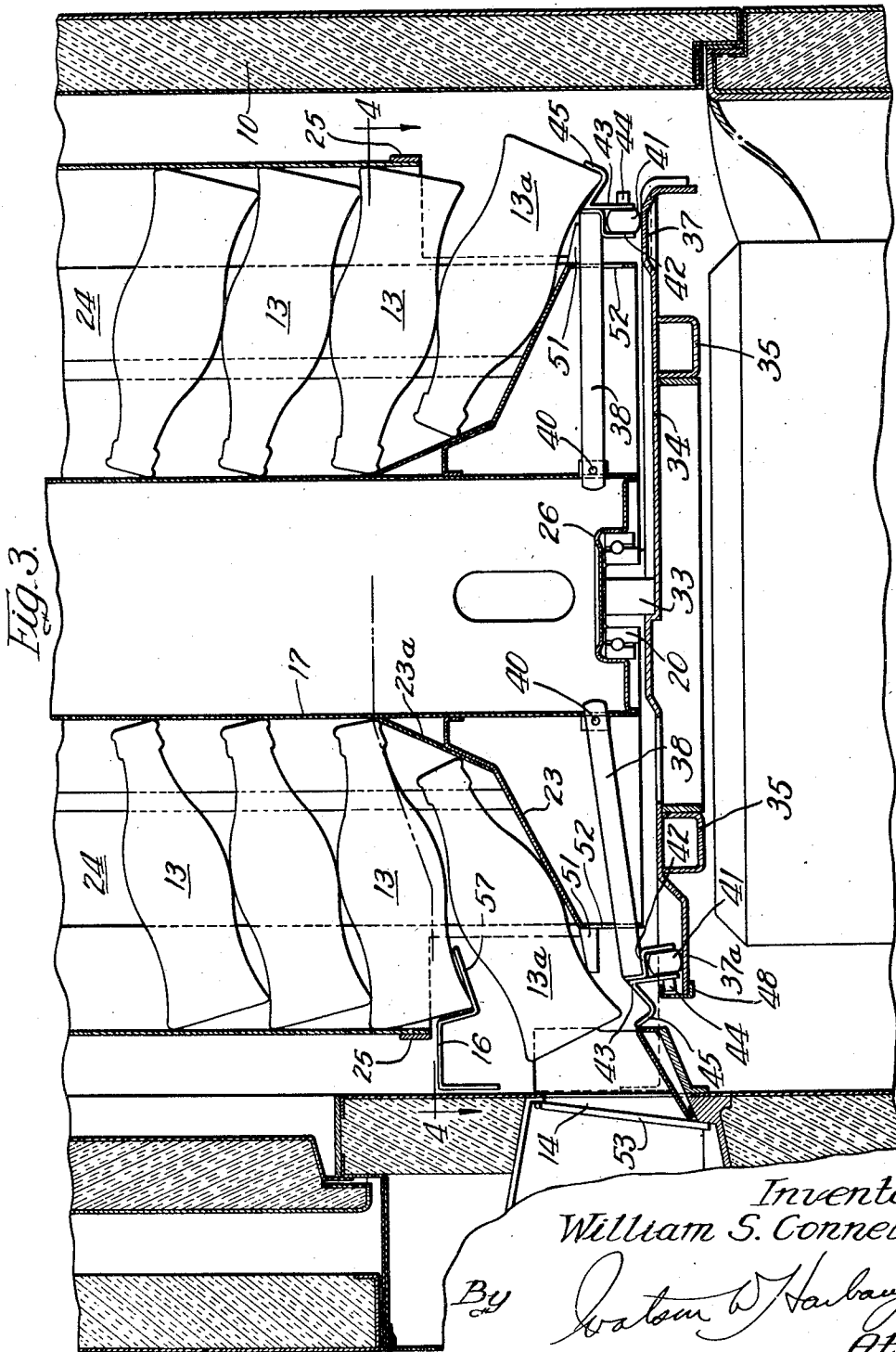
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Fig. 4.

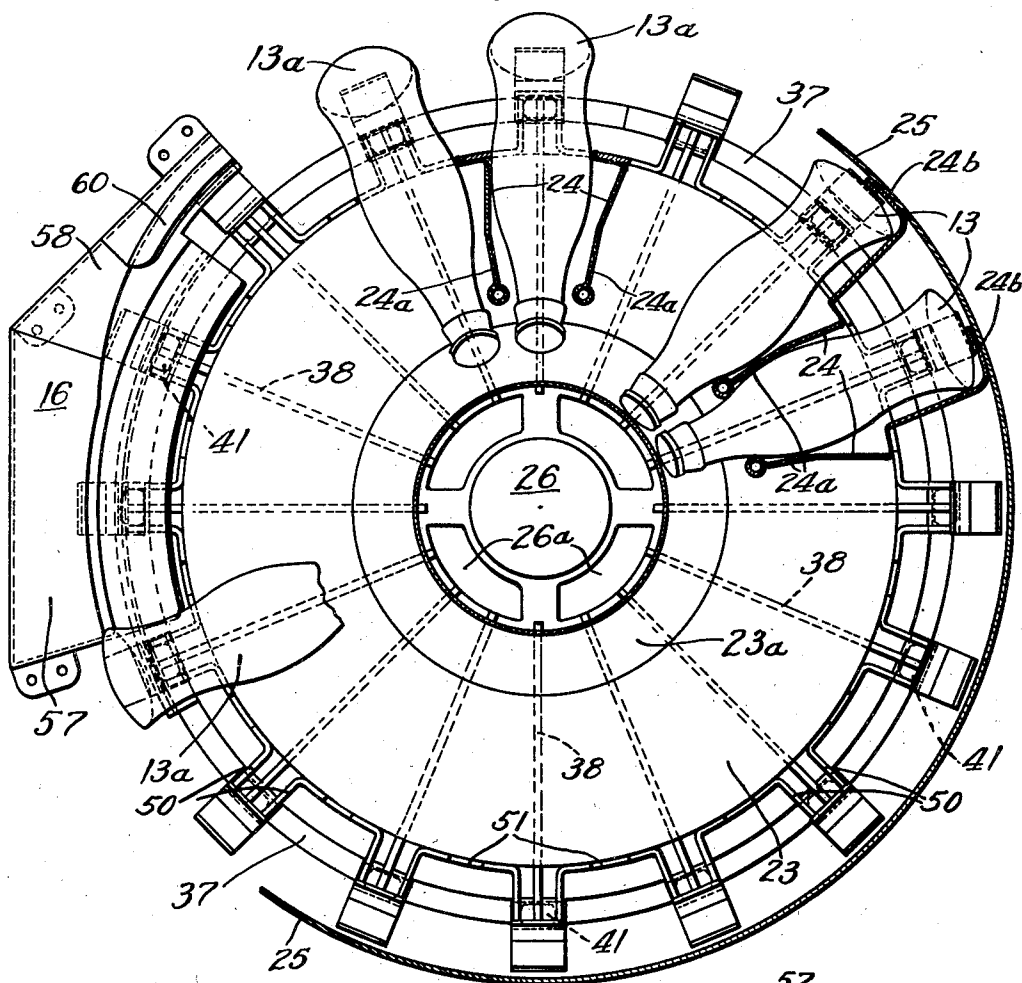
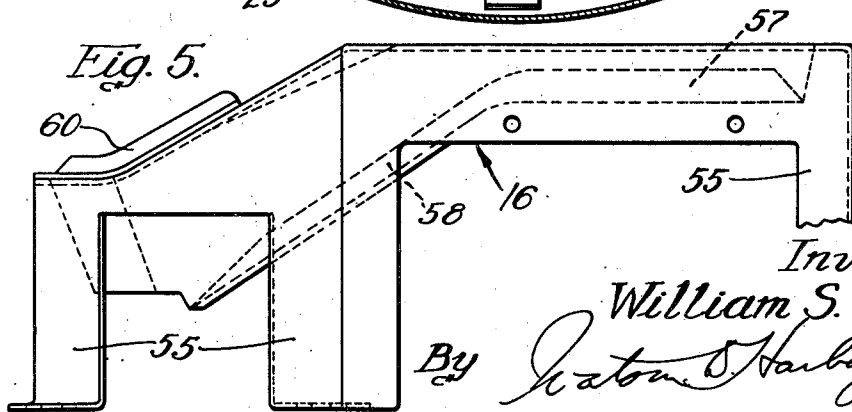


Fig. 5.

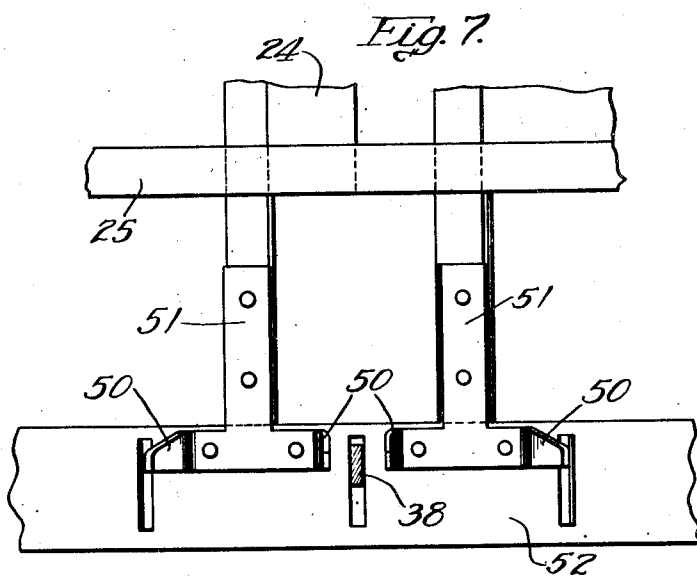
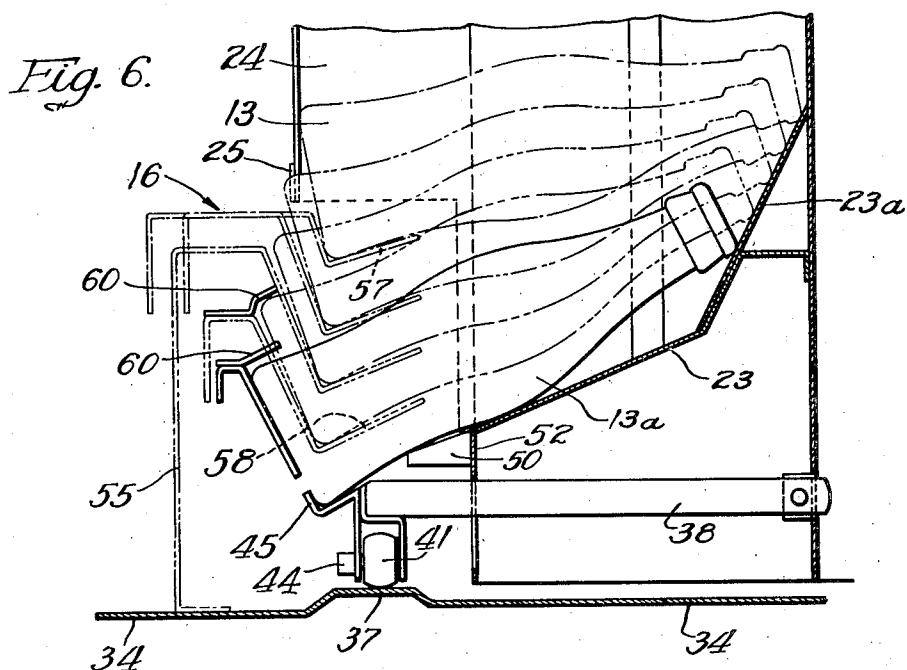


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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,500,664

ARTICLE DISPENSING DEVICE

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Application April 4, 1947, Serial No. 739,388

8 Claims. (Cl. 312-48)

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The present invention relates to an improved dispensing apparatus generally operated or released for manual operation by a coin controlled mechanism to dispense articles one at a time, particularly bottles such as those used in handling soft drinks for public consumption.

Although the dispensing apparatus of this invention can be used equally well for dispensing carbonated or uncarbonated beverages, it is especially desirable for use in dispensing bottled carbonated beverages since one of its features is the transferring of a bottle from a storage drum to a delivery receptacle accessible to the vendee with a minimum amount of agitation of the contents. This dispenser is further characterized by a construction and arrangement of elements by which an unusually large number of bottles are handled with a minimum danger of damage to the bottles and the dispensing mechanism, it being easy to insert the bottles in their stored position and the bottles being conveyed from the stored position to the delivery receptacle without violent handling at any time.

In many respects the dispensing apparatus of this invention is similar to that disclosed in Patent No. 2,247,575, issued July 1, 1941 to Tully De Stefani, reference to which is hereby made, and the application of William S. Connell et al., Serial No. 549,146, filed August 12, 1944, which issued as Patent No. 2,435,177, January 27, 1948, reference to which is hereby made. However, the apparatus of the present invention differs substantially from those disclosed in the patent and application cited particularly in the method of supporting bottles in the drum and the means employed in conveying a bottle from the storage drum to the delivery opening.

One object of this invention is to provide a dispensing apparatus in which a large number of bottles are stored in a relatively small space and which will dispense them one at a time with a minimum of agitation of the contents.

Another object is to provide a dispenser which may be used to dispense bottles having noncylindrical major portions such as those used for "Coca Cola," without danger of the mechanism's becoming jammed.

Another object is to provide a dispenser wherein bottles are stored in stacks in a rotary drum and dispensed one by one from the bottom of each stack, the drum being rotated to the adjacent stack each time a bottle is dispensed and the bottom bottle of the stack being slightly separated from the remainder of the stack so that

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it does not support the weight of the other bottles at the time of dispensing.

Another object is to provide a dispenser in which the bottles are carried at an inclined angle in the drum, the bottom of the drum having a conical skirt down which the bottle being dispensed slides.

Another object is to provide a drum for carrying the bottles at a small angle to the horizontal, the cap ends being higher and the lowermost bottle of each stack being inclined at a greater angle and disposed at a slightly greater radius.

Other and additional objects and advantages of this invention will be apparent to those familiar with the art on reading the specification and the appended claims in conjunction with the drawings, in which:

Fig. 1 is a front view of the cabinet housing bottle dispensing apparatus of this invention.

Fig. 2 is a horizontal section taken through the cabinet of Fig. 1 from one side.

Fig. 3 is an enlarged section of a portion of the mechanism shown in Fig. 2.

Fig. 4 is a horizontal section taken on line 4-4 of Fig. 3, certain bottles being removed from the storage drum.

Fig. 5 is a side view of the bottle lowering ramp.

Fig. 6 is a composite schematic view illustrating the functions of ramp.

Fig. 7 is a view of a portion of the storage drum. Before referring to the details of construction, it will be noted that the general construction is one in which a refrigerated cabinet 10 (Figs. 1 and 2) has a drum 11 mounted therein for rotation about a vertical axis. The periphery of the drum 11 is divided into a plurality of vertically disposed slideways in which bottles 13 are stacked in an inclined position with their bottoms disposed outwardly and their tops inwardly at an angle of approximately 20°.

The bottles 13 are dispensed one at a time from the bottom of the stacks through a discharge opening 14 as the drum 11 is rotated and indexed by an intermittent drive controlled by a coin release mechanism 15. The lowermost bottle 13a in each row is brought successively into discharge position and released, while the bottles 13 above the previously discharged bottle are lowered into place by a ramp 16 as the drum 11 is rotated.

As each bottle 13 is discharged, it moves bottom first outwardly through the discharge opening 14 merely by sliding lengthwise a short distance, without appreciably changing its relative inclined position, to a receptacle 15. From the

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receptacle 15 the bottle can be picked up by the vendee and inserted in the cap lifter 9. The contents of the bottle 13a during the process are not agitated to any substantial degree from the time that the bottle leaves its position on the drum and the time that it has its neck inserted into the cap lifter 9 because the delivered bottle lies in the receptacle 15 at the same angle as that required to insert it in the cap lifter 9 so that the vendee need not rotate the bottle to insert it in the lifter 9.

The drum or storage cylinder 11 comprises a tubular central member 17 supported at the top and bottom by the ball bearings 18 and 20, a substantially flat circular top plate 22 attached to the top of the tubular central member 17, a frusto-conical bottom plate 23 and a plurality of radially extending divider members 24 surrounding the central member 17 and attached to the top plate 22 and the bottom plate 3. These divider members 24 are not attached to the central member 17 but are supported by the top plate 22 and the conical bottom plate 23. At the lower end of the drum 11 a strap 25 extends around the drum 11, being attached to each of the divider members 24. The top of the drum 11 is provided with a gear 12 attached to the periphery of the top plate 22, and a drive shaft (not shown) extends upwardly from the coin release mechanism 15 to a pinion (not shown) which meshes with this gear 12. By this means the drum 11 is rotated from a position where one stack of bottles 13 is indexed over the discharge opening 14 to a position where the adjacent stack is indexed each time a purchase is made.

The end plates 26 and 27 for supporting the central member 17 on the bearings 18 and 20 are provided with openings 26a to allow free circulation of air through the central member 17. A fan 28 driven by a motor 30 is disposed below the central member 17 in the center of a refrigerant expansion coil 31. When this fan 28 is rotating, air is drawn down through the central member 17, passes outwardly over the refrigerant coils 31, from which it flows upwardly past the bottles 13 to the top of the cabinet 10 to pass into the top of the central member 17 and be recycled.

A more detailed description of a refrigeration system for a bottle dispenser of this type is given in the application of Herman K. Johnson, Serial No. 574,764, filed January 26, 1945, reference to which is hereby made.

The bearing 20 (Fig. 3) is carried by a short shaft 33 supported on a fixed base plate 34 perforated at the center for the passage of air to the fan 28. This plate 34 is in turn carried by two channel members 35 which are attached to the sides of the cabinet 10. The upper bearing 18 (Fig. 2) is supported on shaft 36 attached to the top of the cabinet 10.

The outer periphery of the plate 34 is shaped to form a cam track 37 having a low point 37a adjacent the discharge opening 14. A plurality of movable arms 38, one for each stack of bottles 13, are pivotally mounted on pins 40 secured to the central member 17. The outer ends of these arms 38 are supported on rollers 41 attached thereto which roll on the cam track 37 as the drum 11 is rotated. Each roller 41 is supported between two fork pieces 42 and 43 on an axis pin 44, the end of which extends outwardly beyond the fork piece 43. The top end of the fork piece 43 is bent outwardly and upwardly to form a bottle supporting lip 45 which, when

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in the raised position, retains the lowermost bottle 13a of each stack on the conical plate 23. However, when a roller 41 passes onto the low point 37a of the cam track 37 the lip 45 is moved downwardly away from the corresponding bottle 13a so that the bottle 13a is free to slide down the conical plate 23 and through the opening 14 into the receptacle 15. In order to insure that each arm 38 will be positively moved downwardly into the low point 37a, a U-shaped member 48, which follows the contour of the track 37, is provided whose upper portion extends over the top of the pin 44 and thereby serves to positively pull the roller 41 down into the low point 37a.

As the bottle 13a leaves the plate 23 it is supported by two guide members 50 (Fig. 7) each formed integrally with a plate 51 which connects the divider members 24 with a cylindrical member 52 depending from the conical plate 23. These members 50 serve to guide the bottle 13a as it moves downwardly off the plate 23. A door 53 (Fig. 3) hinged at the top normally covers the discharge opening 14 to prevent the escape of cooled air from the dispenser. In sliding through the opening 14 the bottom of the bottle 13a forces this door 53 open and holds it in that position until the bottle 13a is completely out of the dispenser when the force of gravity causes the door 53 to swing closed again.

Thus far it has been shown how the bottom bottle 13a is dispensed from each stack as the drum 11 is rotated from one stack to the next. In order to prevent the bottle 13 next above the bottom bottle 13a from dropping into the bottom position and being dispensed and also to gently lower each bottle 13 to the bottom position, the inclined ramp 16 is provided. This ramp 16, which approximately follows the arc of a circle and preferably extends over the arc encompassing four stacks of bottles 13, is supported on the fixed plate 34 by three legs 55. The upper portion 57 of this ramp 16 is disposed over the dispensing opening 14, the inclined portion 58 sloping downwardly from this point in a clockwise direction to the level of the bottom bottles.

The lower end of the inclined portion 58 is provided with an inwardly projecting plate 60 attached to the top of the ramp 16. This plate 60 starting at a point approximately halfway down the inclined portion 58 of the ramp 16 follows the slope of the ramp 16 and is spaced therefrom a distance equal to the base diameter of a bottle 13. Thus as the drum 11 is rotated, the end of a bottle 13 progressing down the inclined surface 58 will be positively carried downwardly to follow the ramp 16, should the bottle 13 tend to stick.

Thus the upper portion 57 of the ramp 16 passes between the lowermost bottle 13a and the next higher bottle 13 as a stack is brought into the dispensing position supporting the remainder of the stack after the bottle 13a has been dispensed. As the drum 11 is rotated and successive bottles 13a are dispensed, the second-most bottle 13 successively occupies the positions indicated in broken lines in Fig. 6 moving downwardly and outwardly with respect to the ramp 16 until it reaches the bottom position indicated by solid lines. When in the bottom position the bottle is supported by the lip 45 on the arm 38, the lower end of the inclined portion 58 of the ramp 16 being cut off at a level slightly above that of the lips 45.

The conical plate 23 is provided with an upper portion 23a having a greater slope. This upper

portion serves to move the bottle 13 outwardly as the ramp 16 carries it downwardly by bearing against the neck end of each bottle 13 as it is lowered.

After the bottle 13a leaves the ramp 16 and is supported by the lip 45 on one of the arms 38, it progresses step by step to the dispensing position as the drum 11 is rotated each time a bottle 13a is dispensed. Thus each stack of bottles is lowered a distance equivalent to the diameter of a single bottle 13 as that stack travels over the ramp 16.

The cabinet 10 is provided with an armored outer door 71 and an inner insulated door 72. When these doors are opened, access may be had to the drum 11 for charging bottles 13. The door 72 is relatively narrow exposing only a single section of the drum 11, so that each stack of bottles 13 must be charged and the drum 11 rotated to the next station before the corresponding stack is charged. Bottles 13 are inserted between the divider members 24 one at a time by the serviceman who holds the bottle 13 in a substantially upright position, pushes it into the space between two adjacent members 24, and rotates it so that the neck end moves downwardly until the bottle lies on an angle of approximately 15 degrees. When in this position the inner portions 24a (Fig. 4) of the members 24 hold the bottle 13 against rotation in a horizontal plane while the outer portions 24b prevent it from sliding outwardly. Each of the bottles 13, except the lowermost 13a, is supported on the lowermost bottle in weight bearing relationship, the outer edge of the drum 11 holding the bottles 13 at the proper angle.

In practice, servicemen usually fill the drum 11 by inserting sufficient bottles 13 to fill one stack and then depositing a nickel and operating the dispensing mechanism to dispense one bottle 13 and rotate the drum 11 to the next position when the adjacent stack is filled. This procedure is repeated until the drum 11 has turned through a complete revolution and is fully charged with bottles.

The operation of the device of this invention in dispensing bottles may be summarized as follows: When the vendee deposits a coin in the slot 61 (Fig. 1) the release mechanism 15 is actuated to permit the handle 62 to be reciprocated. The vendee then reciprocates this handle 62 driving the drum 11 by means of the gear 12 in a clockwise direction. As the drum 11 is rotated, the bottle 13a (Fig. 4) adjacent the high end of the ramp 16 is carried beneath the ramp 16 into alignment with the discharge opening 14. Just as this bottle 13a is aligned with the discharge opening, the roller 41 supporting the arm 38 reaches the low point 37a in the cam track 37, the member 48 forcing the pin 44 downwardly. When the end of the arm 38 is fully depressed, the lip 45 is drawn away from the bottle 13a as shown in Fig. 3. The bottle 13a then slides by its own weight off of the conical plate 23, guided by the guide members 50, through the opening 14, raising the door 53, and comes to rest in the delivery receptacle 15, the bottle 13a sliding relatively slowly and without rotation so that its contents are not agitated excessively.

Simultaneously with the delivery of the bottle 13a the next higher bottle 13 in the same stack passes on to flat portion 57 of the ramp 16, its weight and that of the remaining bottles in the stack being supported thereby so that the lowermost bottle 13a is free to slide out from below.

As has been described, the other stacks of bottles 13 supported by the ramp 16 move downwardly each time a bottle 13a is dispensed.

Consequently, from the description of the apparatus and its operation, it will be apparent that a dispensing apparatus is provided which can be loaded as fast as bottles can be handled by the serviceman. Furthermore, the bottles when dispensed are handled with a minimum of agitation of the contents with a compact device made up of simple elements whose operations are readily understood by servicemen. It will also be appreciated that a power drive can be substituted for the manual drive represented if automatic operation is desired.

Consequently, having thus described the invention and certain embodiments thereof, it will be readily apparent to those skilled in the art how the various objects are attained and that various changes can be made to accommodate articles of different sizes including bottled milk, uncarbonated beverage bottles and other articles very easily without departing from the spirit of the invention, the scope of which is commensurate with the appended claims.

What is claimed is:

1. A bottle dispensing apparatus comprising a rotatably mounted cylinder having a plurality of vertical openings therein, each for receiving a vertical stack of bottles, a conical skirt attached to the bottom of said cylinder, a plurality of arm members pivotally mounted adjacent the center line of said cylinder below said conical skirt, each having an upstanding projection thereon for retaining the lowermost bottle of each of said stacks on said conical surface, a roller attached to each of said arm members, a nonrotatable circular track for supporting said rollers, said track having a depression at one point thereof equal in depth to the height to one of said upstanding projections, a receptacle accessible to a vendee so disposed that a bottle sliding off said conical surface slides into said receptacle, and said receptacle being fixed with respect to said track on the same radius as said depression, and a fixed ramp member for supporting a bottle above said lowermost bottle in the stack when said lowermost bottle is allowed to slide into said receptacle and for conveying said bottle above said lowermost bottle to the bottom of said vertical opening as said cylinder is rotated.

2. A bottle dispensing apparatus comprising a rotatably mounted cylinder having a plurality of vertical openings therein each for receiving a vertical stack of bottles, a conical skirt attached to the bottom of said cylinder, a plurality of members rotatable with said cylinder each having an upstanding projection thereon for retaining the lowermost bottle of each of said stacks on said conical surface, a roller attached to each of said members, a fixed circular track for supporting said rollers, said track having a depression at one point thereof equal in depth to the height to one of said upstanding projections, a fixed receptacle adjacent said depression, and a fixed ramp member for supporting a bottle above said lowermost bottle in the stack when said lowermost bottle is allowed to slide into said receptacle and for conveying said bottle above said lowermost bottle to the bottom of said vertical opening as said cylinder is rotated.

3. A bottle dispensing apparatus comprising a rotatably mounted drum having a plurality of vertical openings therein, each for receiving a vertical stack of bottles, a conical skirt forming the

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bottom of said drum, a plurality of arm members pivotally mounted adjacent the center line of said drum below said conical skirt, each having an upstanding projection thereon for retaining the lowermost bottle of each of said stacks on said conical surface, a roller attached to each of said arm members, a nonrotatable circular track for supporting said rollers, said track having a depression at one point thereof equal in depth to the height to one of said upstanding projections, and a receptacle accessible to a vendee so disposed that a bottle sliding off said conical surface slides into said receptacle, and said receptacle being fixed with respect to said track on the same radius as said depression.

4. A bottle dispensing apparatus comprising a rotatably mounted drum having a plurality of vertical openings therein, each for receiving a vertical stack of bottles, a conical skirt attached to the bottom of said drum, a plurality of arm members pivotally mounted adjacent the center line of said drum below said conical skirt, each having an upstanding projection thereon for retaining the lowermost bottle of each of said stacks on said conical surface, a roller attached to each of said arm members, a fixed circular track having a depression at one point thereof for supporting said rollers, a receptacle disposed below and at a greater distance from the center of said drum adjacent said depression, and a fixed ramp member for supporting a bottle above said lowermost bottle in the stack when said lowermost bottle is allowed to slide into said receptacle and conveying said bottle above said lowermost bottle to the bottom of said vertical opening as said drum is rotated.

5. In a device of the class described the combination including a rotatable drum for receiving a plurality of vertical stacks of bottles, a conical skirt forming the bottom of said drum for supporting the lowermost bottle in each of said stacks, a nonrotatable receptacle accessible to a vendee, said receptacle being so disposed and inclined with respect to said skirt that a bottle sliding from said skirt to said receptacle moves substantially in a straight line, an arm member for each of said stacks of bottles pivotally mounted on said drum below said conical skirt, said members being rotatable with said drum, a roller attached to each of said arm members, a nonrotatable circular track for said rollers, said track having a depression at one point thereof, said point lying on the same radius as said receptacle, and an upstanding projection on each of said arm members for preventing said lowermost bottles from sliding off of said skirt except when said arm member is positioned over said depression.

6. In a device of the class described the combination including a rotatable drum for receiving a plurality of vertical stacks of bottles, a conical skirt forming the bottom of said drum for supporting the lowermost bottle in each of said stacks, a nonrotatable receptacle accessible to a vendee, an arm member for each of said stacks of bottles pivotally mounted on said drum below said conical skirt, said members being rotatable with said drum, a roller attached to each of said arm members by an axis pin which protrudes beyond said roller, a nonrotatable circular track for said rollers, said track having a depression at one point thereof, said point lying on the same radius as said receptacle, a member associated with said track cooperating with said pin for positively pull-

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ing said roller downwardly into said depression, and an upstanding projection on each of said arm members for preventing said lowermost bottles from sliding off of said skirt except when said arm member is positioned over said depression.

7. In a device of the class described the combination including a rotatable drum for receiving a plurality of vertical stacks of bottles, said bottles other than the lowermost in each stack being supported on the lowermost bottle and against a wall of the drum at an acute angle with respect to a horizontal plane, a conical skirt member at the bottom of said drum for supporting the lowermost bottle of each stack, said skirt member making a slightly greater angle with the horizontal plane than said bottles other than said lowermost bottles of each stack, a nonrotatable ramp member projecting inwardly into said drum for conveying bottles from said stacks to the lowermost position on said skirt member as said drum is rotated, said ramp member having two projections thereon, one passing beneath the base end of said lowermost bottle and the other passing above said base end to move it positively downwardly to a position on said skirt member during the latter part of its movement down the ramp member, and means under the ramp member for releasing the lowermost bottle to permit it to slide off said skirt member.

8. In a device of the class described the combination including a rotatable drum for receiving a plurality of vertical stacks of bottles, said bottles other than the lowermost in each stack being supported on said lowermost bottle and against a wall of the drum at an acute angle with respect to a horizontal plane, a conical skirt member at the bottom of said drum for supporting the lowermost bottle of each stack, said skirt member making a slightly greater angle with the horizontal plane than said bottles other than said lowermost bottles of each stack, a nonrotatable ramp member projecting inwardly into said drum for conveying bottles from said stacks to the lowermost position on said skirt member as said drum is rotated, said bottles being moved downwardly by gravity and outwardly by a second conical skirt member as they travel down said ramp member in order to position said lowermost bottle of each stack farther from the center of said drum than the remainder of the bottles in said stack and means under the ramp member for releasing the lowermost bottle to permit it to slide off said first mentioned skirt member.

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