Sept. 8, 1959 K. C. WHITEFIELD 2,903,155

BOTTLE DISPENSING APPARATUS

Filed March 2, 1956 3 Sheets-Sheet 1

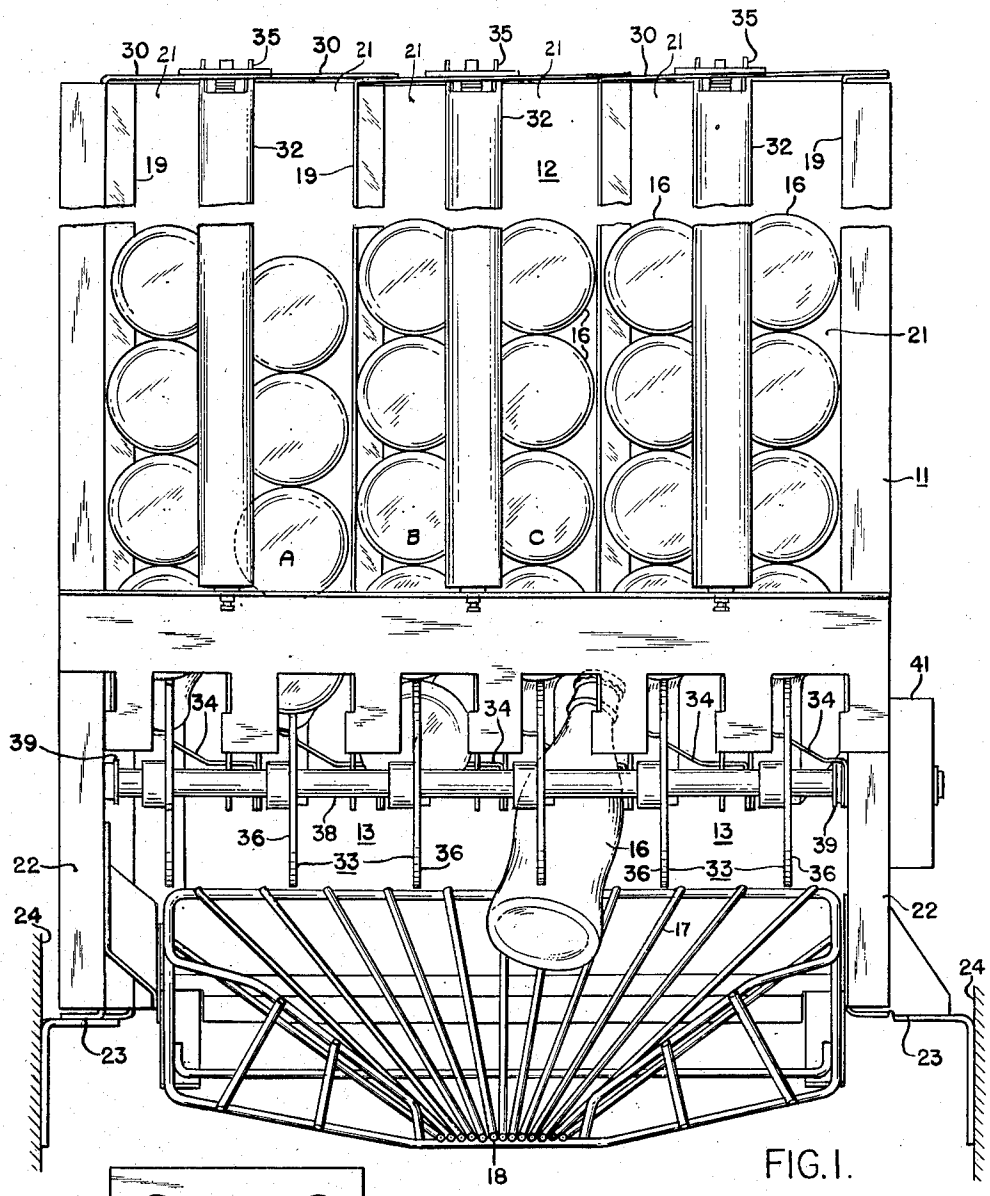


FIG. 1.

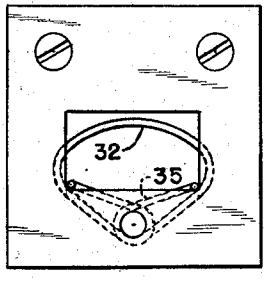


FIG. 10.

INVENTOR
KYLE C. WHITEFIELD

William J. Foley

ATTORNEY

Sept. 8, 1959 K. C. WHITEFIELD 2,903,155

BOTTLE DISPENSING APPARATUS

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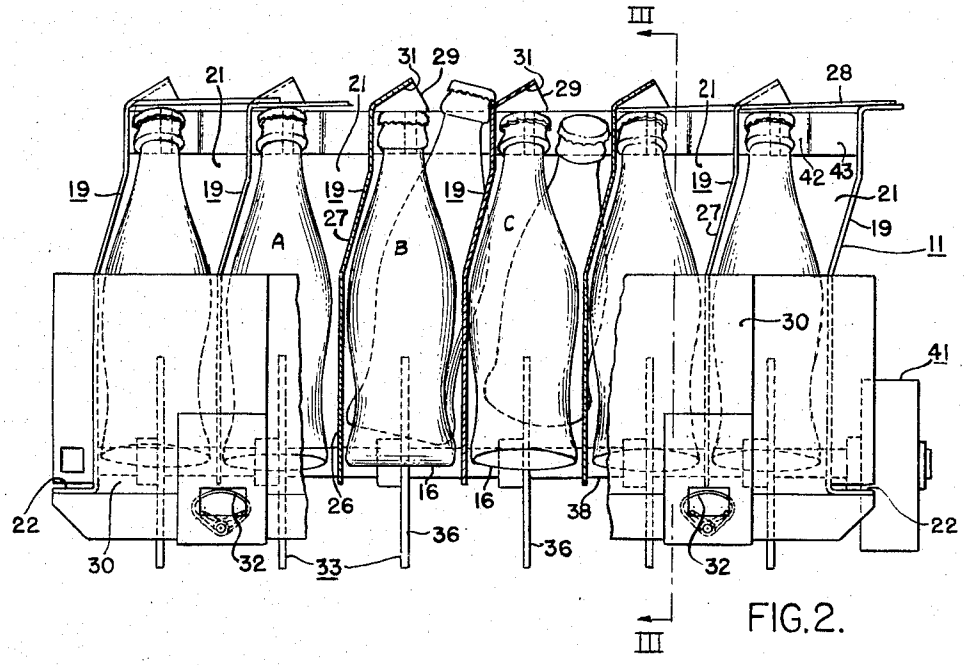


FIG. 2.

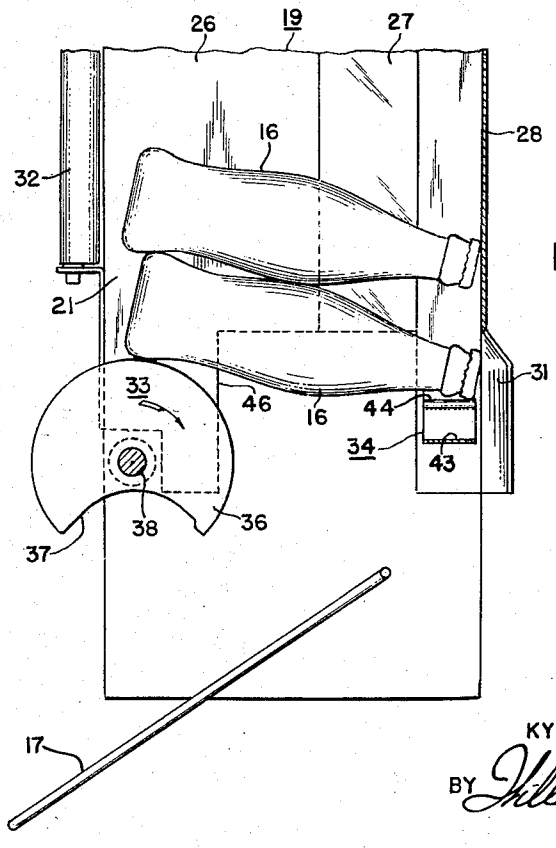


FIG. 3

INVENTOR
KYLE C. WHITEFIELD
BY William J. Foley
ATTORNEY

Sept. 8, 1959 K. C. WHITEFIELD 2,903,155

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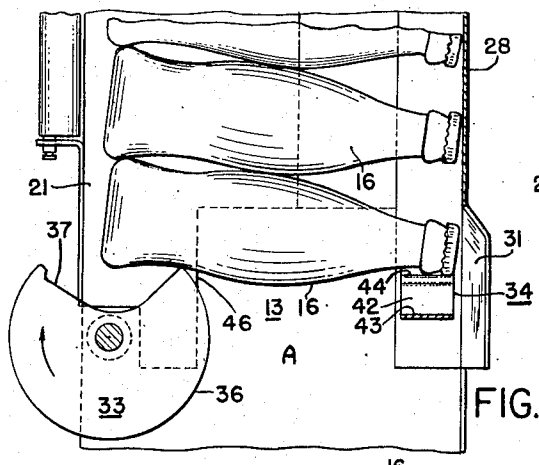


FIG. 4.

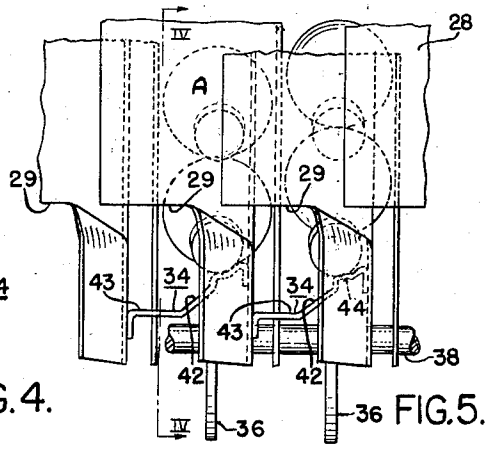


FIG. 5.

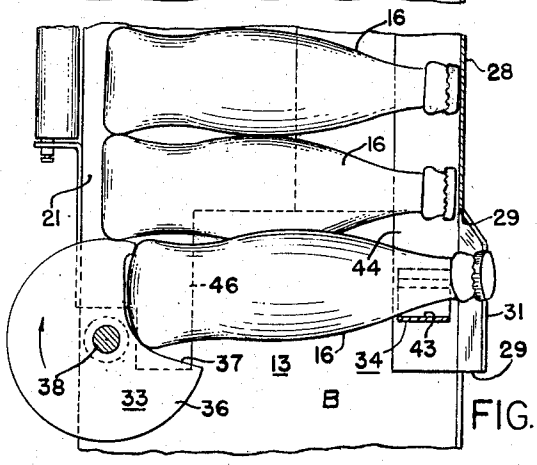


FIG. 6.

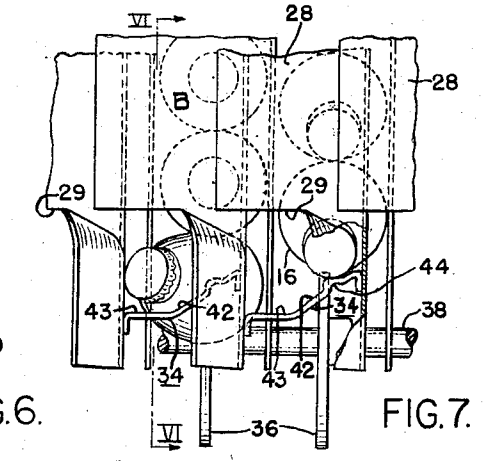


FIG. 7.

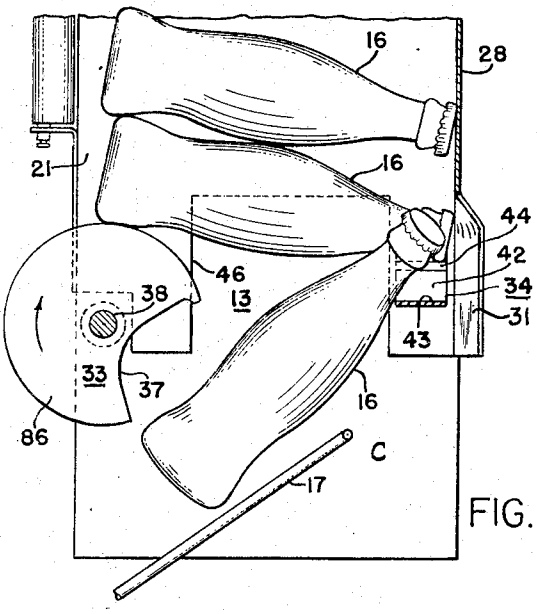


FIG. 8.

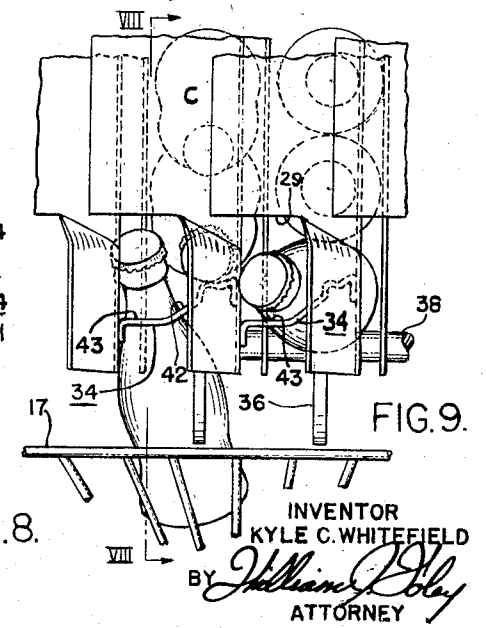


FIG. 9.

INVENTOR
KYLE C. WHITEFIELD
BY William J. Daley
ATTORNEY

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2,903,155

BOTTLE DISPENSING APPARATUS

Kyle C. Whitefield, Longmeadow, Mass., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Application March 2, 1956, Serial No. 569,072

6 Claims. (Cl. 221—115)

This invention relates to bottle dispensing apparatus and more particularly to an improved storage magazine for such apparatus and means for releasing or dispensing bottles from the magazine.

This invention constitutes a refined application of and an improvement on the dispensing principle described and claimed in an application by James C. Howard entitled, "Dispensing Apparatus," Serial No. 569,071, filed March 2, 1956 and assigned to the assignee of this application.

The invention is particularly useful in coin controlled vending apparatus for bottled beverages and the like. It is the principal object of this invention to provide an improved storage and dispensing means for such vendors.

It is another object of this invention to provide a storage magazine structure that is simply and inexpensively constructed and that is capable of storing a large quantity of bottles in a comparatively small space to reduce the overall size of the vendor cabinet.

It is a further object of this invention to provide an improved mechanism for dispensing individual bottles from the storage magazine.

These and other objects are effected by the invention as will be apparent from the following description and claims taken in connection with the accompanying drawing forming a part of this application, in which:

Fig. 1 is a partial front elevation view of the bottle storage magazine and dispensing means of this invention;

Fig. 2 is a plan view of the magazine shown in Fig. 1 with portions broken away to show the arrangement of the bottles in the storage compartment;

Fig. 3 is a vertical sectional view through one of the bottle storage compartments taken along the line III—III of Fig. 2 and showing the relationship of the bottles to the dispensing mechanism;

Fig. 4 is a vertical sectional view through the same storage compartment shown in Fig. 3 but illustrating the position assumed by the bottles and the dispensing mechanism at a different stage of the dispensing operation;

Fig. 5 is a rear elevation view of the dispensing region of the magazine and illustrating the storage compartment shown in Fig. 4 and another storage compartment adjacent thereto;

Figs. 6 to 9 are complementary sections, in pairs, of the compartments shown in Figs. 4 and 5 and illustrate still further stages of the dispensing operation; and

Fig. 10 is a plan view of one of the bottle retaining members employed in the magazine.

In the drawings the numeral 11 designates generally a bottle storage magazine embodying the features of this invention and having a storage area 12 in the upper portion thereof and a dispensing region 13 at the bottom thereof. The dispensing region 13 contains the dispensing mechanism which individually releases bottles 16 from the storage area 12 and permits the bottles 16 to descend by gravity onto a wire ram 17, which directs

the bottles to a centrally located discharge area 18 at the bottom front of the magazine 11.

Structurally, the magazine 11 comprises a plurality of vertically arranged, substantially parallel partition members 19 (see Fig. 2) which divide the storage area 12 of the magazine 11 into a plurality of bottle storage compartments 21. The partition members 19 are spaced apart a distance substantially equal to the width of the bottles 16, so that each compartment 21 houses a vertical stack of substantially horizontally disposed bottles. The two outside partition members 19 form the side walls of the magazine 11 and may, if desired, be provided with stiffening flanges 22 at their front edges. Suitable means, such as the brackets indicated at 23 (see Fig. 1) are provided for mounting the magazine 11 within a cabinet structure indicated at 24. As shown in Fig. 2, each partition member 19 is shaped in such a manner that the rear portion thereof is offset from the front portion and closely follows the neck line of the bottles stored in the compartments 21. The compartments 21 are thus defined by the partitions 19 which have a forward region 26 with straight sides for housing the lower or butt end of the bottles 16, and an offset rear region 27 housing the top or neck end of the bottles 16. The straight forward portions 26 of the partition members 19 maintain the stack of bottles 16 in each compartment vertically aligned with their neck ends adjacent the offset portion of each partition member 19. This rearward offset region of each storage compartment 21 is utilized, in a manner which will hereinafter be described, as the neck end of each bottle 16 undergoes a lateral movement during the dispensing operation.

The partition members 19 are provided with rear sections 28 bent substantially at right angles to their main portions. The partition rear sections 28 extend the full vertical length of the partition members 19 and are arranged in overlapping fashion to form the back wall of the magazine 11. Top sections 30 are also formed in a similar overlapping manner forward of the offset line to strengthen the upper portion of the magazine and maintain the spacing between the partition members 19. The overlapping areas of partition sections 28 and 30 may be secured together by any suitable means, such as by welding. Portions of partition rear sections 28 near the lower edge thereof in the dispensing region 13 of the magazine 11, are cut out, as at 29, to permit the neck end of a bottle to protrude through the rear wall of the magazine as the bottle undergoes a dispensing operation. For reasons which will later become apparent, the material adjacent the side of each opening 29 is bent rearwardly at an acute angle to the axis of the bottle to form a cam surface 31 which is engageable by the neck end of a bottle in the dispensing region 13.

The bottles 16 are inserted neck end first into the open front ends of the storage compartments 21 and rest therein in vertical stacked relationship. The bottles 16 are prevented from accidentally moving back out of the compartments 21 by retaining members 32 which extend vertically along the front edge of every other partition member 19. Each retaining member 32 partially blocks the entrance of the open side of two adjacent compartments 21. Each retaining member 32 is pivotally mounted on a vertical axis and biased by a spring 35 (see Fig. 10) to the position shown in Figs. 1 and 2. These members 32 swing to one side when engaged by a bottle being inserted in one of the compartments 21 and thereafter spring back to the position shown in Figs. 1 and 2 to retain the bottles in position.

The lower or dispensing region 13 of the magazine 11 houses the dispensing mechanism which, for each compartment 21, includes a releasable support 33 for the forward or butt end of the bottle 16, and a stationary sup-

port 34 for the rearwardly disposed neck end of the bottle 16. Throughout most of the dispensing operation, which is hereinafter described, only the lowermost bottle 16 in each compartment 21 is carried by the releasable support 33 and the stationary support 34. The remaining bottles in the compartments 21 are stacked upon and carried by the lowermost bottle.

The releasable support 33 for each compartment comprises a dispensing wheel or disc 36 having a cut out portion 37, as shown in Fig. 3 of the drawing. All of the dispensing discs 36 are carried by a common drive shaft 38 passing through their centers and are fixed in spaced relation thereon with the plane of each disc 36 lying substantially midway between the front edges of the partition members 19 forming the compartments 21. The shaft 38 is journalled in bearings 39 carried by the two outer partition members 19 which form the sides of the magazine. The shaft 38 is driven by suitable means which, in the embodiment shown, includes a geared electric motor indicated diagrammatically at 41. The dispensing discs 36 are secured to the shaft 38 with their notched-out portions 37 angularly displaced from one another in such a manner that every partial rotation of the shaft 38 in a single direction will bring a different disc 36 into dispensing position to provide sequential dispensing of individual bottles from the storage compartments 21. In the case of a magazine having six storage compartments 21 and six vending discs 36, each disc 36 will be angularly displaced from the adjoining disc by 60°, and one complete revolution of the shaft 38 will cause a bottle to be dispensed from each compartment 21.

The stationary support 34 for each compartment 21 consists of a sheet metal member which spans the rearmost portion of the compartment and is secured to the partition members 19. The stationary support 34 is provided with an inclined portion 42 disposed directly beneath the neck ends of the bottles 16 that are confined in the compartment 21. This inclined portion 42 joins a horizontal portion 43 which extends to the opposite side of the compartment 21. The inclined portion 42 has formed thereon an upstanding rib 44 which prevents the neck end of the bottle resting on this inclined portion from descending the incline by gravity and under the weight of the bottles above until the bottle is forced thereover.

The action of the vending mechanism is illustrated in Figs. 4 to 9. In Fig. 4 the dispensing disc 36 for the compartment illustrated is in a position in which the cutout portion 37 thereof is just beginning to receive the butt end of the lowermost bottle 16. The neck end of this lowermost bottle 16 rests on the inclined portion 42 of the stationary support 34 and is retained in this position by the rib 44. Fig. 5 shows how this compartment and the bottles 16 therein appear as viewed from the rear of the magazine 11. The compartment and bottles to the left in Fig. 5 correspond to the compartment shown in Fig. 4.

In Fig. 6 the dispensing disc 36 is shown rotated in clockwise direction approximately 60° from the position shown in Fig. 4 and to a position in which the butt end of the lowermost bottle 16 is fully contained within the cutout portion 37 of the disc 36. It will be noted that in rotating to this position the disc 36 has caused the lowermost bottle 16 to move longitudinally toward the rear of the magazine (to the right as viewed in Fig. 6) and the neck end of this lowermost bottle 16 protrudes through the opening 29 in the magazine rear wall section 28. In assuming this position, the cap on the neck end of the lowermost bottle 16 has, by virtue of the longitudinal movement of the bottle, been forced into engagement with the cam surface 31 at the flared edge of opening 29. This cam surface 31 has imparted to the neck end of the bottle a lateral or sidewise motion causing the bottle to override the lip 44 on the inclined portion 42 of the stationary support 34. The neck end of this lowermost bottle has descended the inclined portion 42 and rests on the horizontal portion 43 of this support, as is shown most clearly by the lower left-hand bottle of Fig. 7.

With the neck end of the lowermost bottle 16 displaced from beneath the neck end of the next lowermost bottle, the lowermost bottle is free to pivot on and slide off of the stationary support 34 without interference between the neck ends of these two bottles. This final dispensing position is illustrated in Figs. 8 and 9. The dispensing disc 36 has rotated to a position (approximately 60° from the position shown in Fig. 6) in which the butt end of the lowermost bottle drops free of the cutout portion 37 of the disc and this lowermost bottle tilts on and slides off of the stationary support 34 and onto the ramp 17, which guides it to a dispensing opening in the vendor cabinet. During this final lowering and releasing of the lowermost bottle, the neck end of the next lowermost bottle is lowered onto the inclined portion 42 of support 34 and comes to rest against rib 44. The rib 44 prevents the neck end of this next bottle from descending the incline 42 and interfering with the neck end of the bottle being dispensed.

Figs. 4 to 9, in addition to illustrating the sequence of motions which the bottles of any one compartment undergo in being dispensed, also correspond to the individual positions of the bottles in several side-by-side compartments in the magazine illustrated in Figs. 1 and 2. In other words, the bottles in the compartment shown in Fig. 4, identified as compartment A, are in the same positions as the bottles in compartment A of Figs. 1, 2 and 5. Likewise, Fig. 6 shows bottles in the same positions as the bottles in compartment B of Figs. 1, 2 and 7, and Fig. 8 shows bottles in the same positions as the bottles in compartment C of Figs. 1, 2 and 9. In compartment C, the lowermost bottle is falling onto the ramp 17, having been released by the dispensing disc 36.

It will be noted (see compartments B and C of Fig. 2) that the lateral movement of the neck end of the lowermost bottle as it is approaching dispensing position causes a portion of this bottle intermediate its ends to move out of the compartment in which it is stored and actually occupy a region of the adjacent compartment. Each partition member 19 is cut away at 46 in the dispensing region 13 of the magazine to permit the lowermost bottle in each stack to move to this position. Because bottles are dispensed from the compartments 21 in series sequence, there will be space available for the bottle being dispensed to move partially into the adjacent compartment by virtue of a bottle having just been dispensed from the adjacent compartment.

Fig. 9 is a further illustration of this feature of the invention whereby a bottle being dispensed partially occupies space in the adjoining storage compartment. In Fig. 9, the lower left hand bottle 16 has been released by the dispensing mechanism and is sliding down onto the ramp 17. The lowermost bottle in the right hand compartment has its neck end laterally displaced from beneath the remaining bottles stacked in this compartment and a portion of this lowermost bottle occupies space in the left hand compartment vacated by the bottle just dispensed. The stationary support rib 44 in the left hand compartment prevents the next bottle in this compartment from descending the inclined portion of the stationary support and the butt end of this bottle is supported on the solid section of the dispensing disc 36, which keeps this bottle up out of that region of the left hand compartment which is occupied by the bottle in the right hand compartment.

This feature of permitting bottles to occupy spaces in adjacent compartments is an important part of this invention for it enables a magazine to be constructed which occupies considerably less space than would normally be required for utilization of a vending principle in which

the bottles undergo lateral displacement during dispensing. With this invention, the storage compartments **21** need be separated only by the thin partition members **19** and the width of the compartments **21** need be only as great as the width of the bottles to be dispensed.

From the foregoing, it will be apparent that this invention provides an improved magazine structure for bottle dispensing machines. It is also apparent that the invention provides an improved dispensing arrangement with a minimum of movable means for releasing bottles from the magazine in a manner which insures smooth operation and gentle handling of the bottles and their contents.

It is obvious that the vending magazine and dispensing structure of this invention could be used in conjunction with suitable coin-controlled apparatus and housed in a suitable refrigerated cabinet. These elements are well known and well understood in the art and could be easily adapted to the structure described above by any skilled person. In adapting the mechanism disclosed to a coin-controlled vendor, it is of course obvious that the drive motor **41** would be connected to a suitable electrical circuit for controlling the motor **41** and causing it to rotate the dispensing drive shaft **38** one-sixth of a revolution each time a bottle is to be delivered from a magazine. If it is desired to employ this invention in a vendor having less than the six storage compartments shown in the preferred embodiment, say for example, four compartments, then the shaft **38** would be turned a greater amount, 90° in this case, to dispense one bottle and, in a four compartment dispenser, the cutout portion **37** of each dispensing disc **36** would be displaced from the adjacent disc by 90°.

While the invention is shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof.

What is claimed is:

1. In bottle dispensing apparatus, the combination of a magazine for storing bottles in stacked relationship, stationary means for supporting one end of the lowermost bottle in the stack, means for supporting and releasing the other end of said lowermost bottle, said supporting and releasing means being adapted to impart longitudinal movement to said lowermost bottle and to thereafter release said other end of the lowermost bottle to permit said other end of the bottle to move downwardly, and cam means carried by said magazine and positioned within the path of longitudinal movement of said lowermost bottle, said cam means being constructed and arranged to impart lateral movement to said one end of the lowermost bottle on said stationary support to cause said one end of the lowermost bottle to move from beneath the next lowermost bottle as said lowermost bottle is moved by said supporting and releasing means.

2. In bottle dispensing apparatus, the combination of a magazine for storing bottles in stacked relationship, stationary means for supporting one end of the lowermost bottle in the stack, means for supporting and releasing the other end of said lowermost bottle, said supporting and releasively means being adapted to impart longitudinal movement to said lowermost bottle and to thereafter release said other end of the lowermost bottle to permit said other end of the bottle to move downwardly, means impeding lateral movement of said lowermost bottle, and cam means positioned within the path of longitudinal movement of said lowermost bottle, said cam means being constructed and arranged to impart lateral movement to said one end of the lowermost bottle on said stationary support for causing said one end of the lowermost bottle to override said impeding means and move from beneath the next lowermost bottle when said bottle is moved by said supporting and releasing means.

3. In bottle dispensing apparatus, the combination of a magazine for storing bottles in stacked relationship, a stationary support for one end of the lowermost bottle in the stack, means for supporting and releasing the other end of said lowermost bottle, said supporting and releasing means being adapted to impart longitudinal movement to said lowermost bottle, said stationary support having a first portion disposed beneath the bottles stacked in the magazine and a second portion disposed below and laterally displaced from beneath said first portion, means for retaining a bottle on the first portion of the stationary support, and cam means positioned within the path of longitudinal movement of the lowermost bottle for imparting lateral movement to said one end of the lowermost bottle to cause said one end of the bottle to move from the first portion of the stationary support to the second portion of the stationary support.

4. In bottle dispensing apparatus, the combination of a magazine for storing bottles in stacked relationship, a stationary support for one end of the lowermost bottle in the stack, means for supporting and releasing the other end of said lowermost bottle, said supporting and releasing means being adapted to impart movement to said lowermost bottle, said stationary support having a first portion disposed beneath the bottles stacked in the magazine and a second portion disposed below and laterally displaced from beneath said first portion, means for retaining a bottle on the first portion of the stationary support, said retaining means comprising a raised projection on said stationary support, and cam means positioned within the path of movement of the lowermost bottle for imparting lateral movement to said one end of the lowermost bottle to cause said one end of the bottle to override said projection and move from the first portion of the stationary support to the second portion of the stationary support.

5. In bottle dispensing apparatus, the combination of a magazine for storing bottles in stacked relationship and having a dispensing region at the bottom thereof, said magazine having a plurality of vertical partition members dividing the magazine into vertical compartments arranged in contiguous side-by-side relationship, and dispensing means disposed in the dispensing region of said magazine for releasing individual bottles from the bottom of said magazine, said dispensing means comprising a member for releasably supporting one end of the lowermost bottle in each of said compartments, means for supporting the other end of the lowermost bottle in each compartment and for causing that end to move laterally from beneath the adjacent end of the next lowermost bottle in the same compartment as the lowermost bottle is dispensed from the compartment, whereby the said other end of the lowermost bottle in each compartment is free to slide off of its support without interference from the adjacent end of the next lowermost bottle when said one end of the lowermost bottle is released, the construction of said partition members within the dispensing region of the magazine being such as to permit the lowermost bottle in one compartment to move to a position in which it occupies a portion of the dispensing region of an adjacent compartment, whereby said lateral movement of the lowermost bottle is permitted.

6. In bottle dispensing apparatus, the combination of a magazine for storing bottles in stacked relationship and having a dispensing region at the bottom thereof, said magazine having a plurality of vertical partition members dividing the magazine into vertical compartments arranged in contiguous side-by-side relationship, and dispensing means disposed in the dispensing region of said magazine for releasing individual bottles from the bottom of said magazine, said dispensing means comprising a member for releasably supporting one end of the lowermost bottle in each of said compartments, means for supporting the other end of the lowermost bottle in each compartment and for causing that end to move laterally from beneath the adjacent end of the next lowermost bottle in the same compartment as the lowermost bottle is dispensed from the compartment, whereby the said

other end of the lowermost bottle in each compartment is free to slide off of its support without interference from the adjacent end of the next lowermost bottle when said one end of the lowermost bottle is released, the partition members between each pair of compartments having an opening therein in said dispensing region for permitting the lowermost bottle in one compartment to move to a position in which it occupies a portion of the dispensing region of an adjacent compartment, whereby said lateral movement of the lowermost bottle is permitted.

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