Sept. 7, 1965 E. T. WAHLBOM 3,204,867

BOTTLE STORAGE DEVICE

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Fig. 1

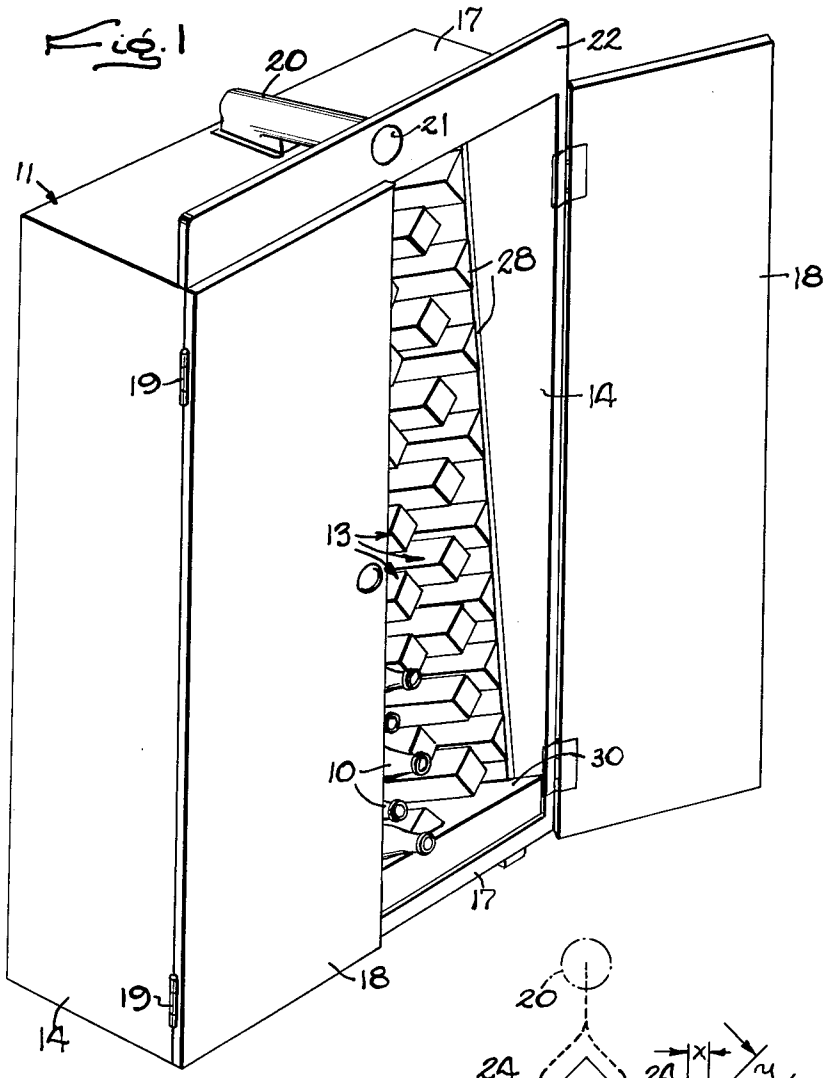
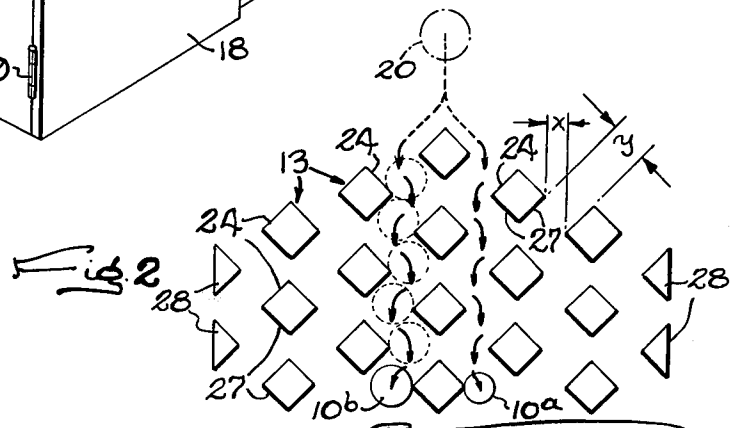


Fig. 2



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Fig. 3

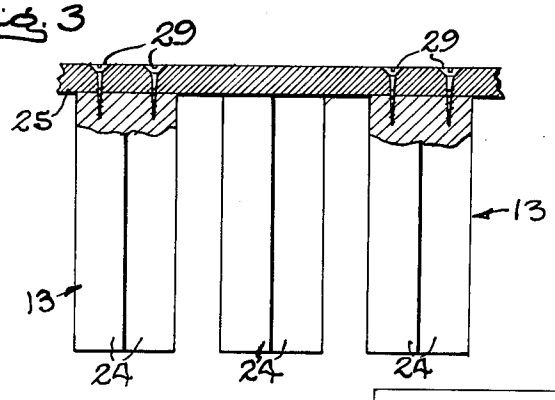


Fig. 4

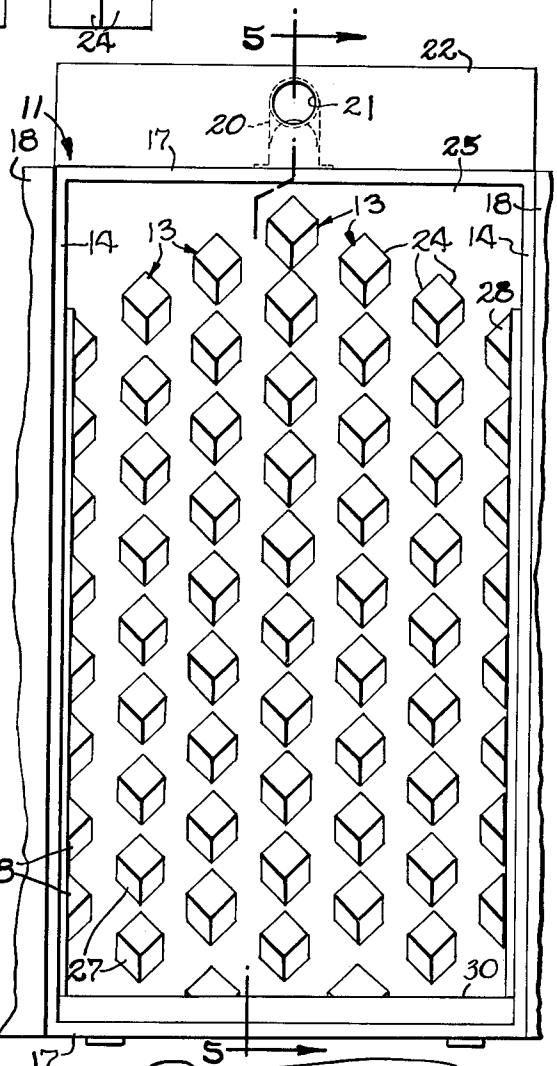
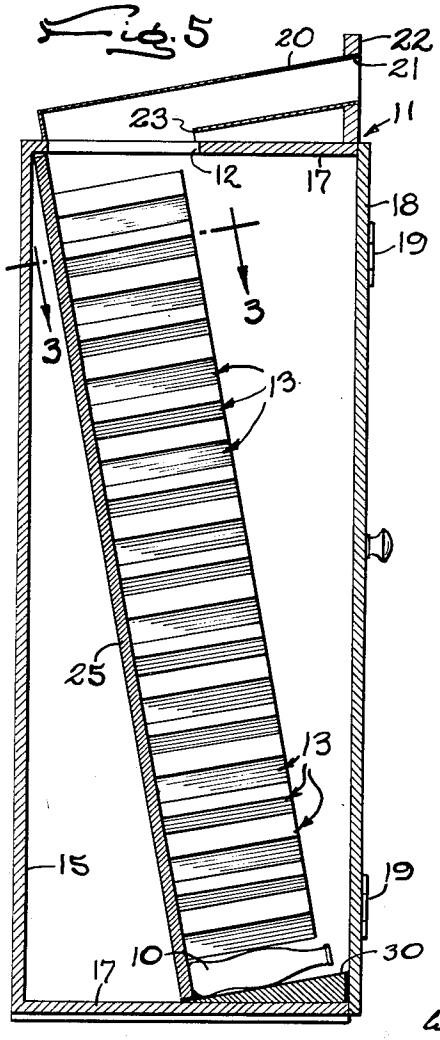


Fig. 5



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Fig. 6

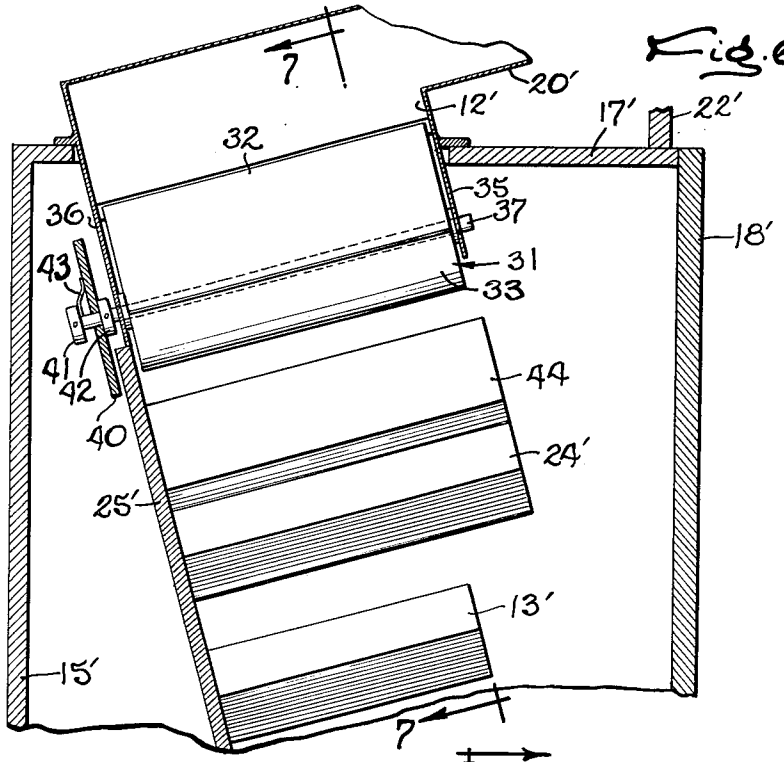
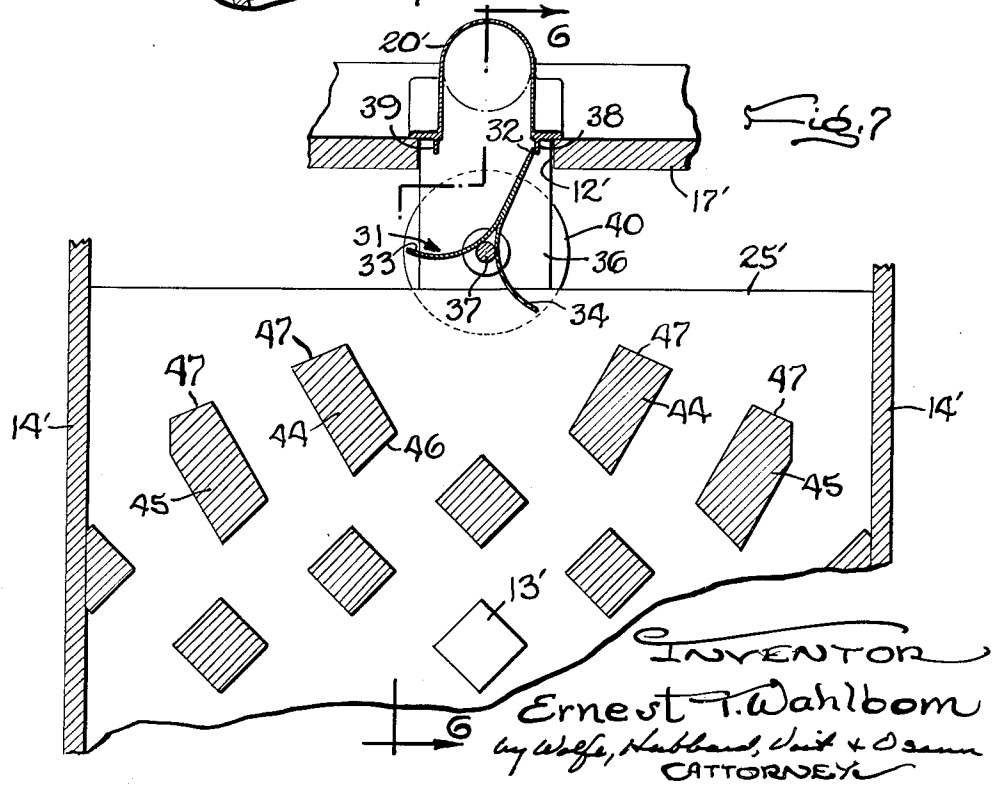


Fig. 7



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BOTTLE STORAGE DEVICE

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8 Claims. (Cl. 232—43.3)

This invention relates to storage devices and, more particularly, to devices for storing empty bottles of the type used for soft drinks dispensed by an automatic vending machine and left at the place of use until they are picked up by a service man. In the past, it has been the practice to store the bottles in open wire racks on the side of the machine or in cases stacked beside the machine.

The primary object of the present invention is to provide an attractive and relatively inexpensive enclosed storage device for replacing the unsightly racks and cases while maintaining a comparable storage capacity and without increasing the effort required of the users to insert the bottles in the device.

A more detailed object is to utilize an enclosed cabinet having an opening at the top for receiving empty bottles, with deflectors arranged in a novel manner inside the cabinet to prevent breakage of the bottles gravitating toward the bottom of the cabinet while providing storage space between the deflectors.

Another object is to arrange the deflectors to accommodate a range of different bottle sizes.

A further object is to mount the deflectors in a novel manner to prevent endwise movement of the bottles out of the plane of the deflectors and to reduce spilling of any liquid remaining in the bottles.

Still another object is to insure the even distribution of bottles throughout the cabinet thereby to utilize all the space available for storage.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

FIGURE 1 is a perspective view of a storage device partially filled with empty bottles and embodying the novel features of the present invention.

FIG. 2 is a schematic front view of the deflectors and the paths followed by the gravitating bottles.

FIG. 3 is an enlarged fragmentary sectional view taken in a plane parallel to the tops of the deflectors and along the line 3—3 of FIG. 5.

FIG. 4 is a somewhat enlarged fragmentary front view of the storage device shown in FIG. 1 with the doors open.

FIG. 5 is a sectional view taken along the line 5—5 of FIG. 4 with the doors closed.

FIG. 6 is a view similar to the top portion of FIG. 5 on an enlarged scale and showing a modified form of the invention.

FIG. 7 is a fragmentary sectional view taken along the line 7—7 of FIG. 6.

As shown in the drawings for purposes of illustration, the invention is embodied in a device for storing empty bottles **10**, the device being intended for use in conjunction with an automatic soft drink vending machine (not shown) to replace the unsightly racks or cases usually provided to store the bottles dispensed thereby until they are picked up by a service man. In most instances, there is no objection to having the bottles stored in full view, but in some locations, such as lounges and the like, open storage of empty bottles is highly undesirable and often the reason for refusal of permission to install vending machines in such locations.

To replace such racks and cases, the present invention contemplates the provision of an attractive and relatively

inexpensive enclosed storage device which provides a comparable storage capacity without increasing the effort required of the users to insert the bottles in the device. To these ends, the device includes a cabinet **11** having an opening **12** (FIG. 5) at its top for receiving empty bottles and dropping the latter into the cabinet onto deflectors **13** arranged therein to guide the bottles without breakage toward the bottom of the cabinet and into storage space between the deflectors.

In this instance, the cabinet **11** is of rectangular cross-section and comprises upright side walls **14** and a rear wall **15** (FIG. 5), horizontal top and bottom walls **17**, and doors **18** hinged at **19** on the forward edges of the side walls to close the open front of the cabinet. The bottle opening **12** preferably is centered longitudinally of the top wall **17** adjacent the rear edge thereof and is slightly larger than the longitudinal cross-section of the bottles to be stored, being elongated in a front-to-rear direction as shown in FIG. 5

A tubular chute **20** is mounted on top of the cabinet with an open forward end **21** fast in and opening through an upright shield **22** extending across the front edge of the top wall and with an opening **23** in its lower side disposed over the opening **12** in the top wall. This chute is inclined downwardly and rearwardly whereby bottles inserted in the open end slide downwardly and rearwardly to drop into the cabinet gravitate toward the bottom of the cabinet.

To prevent breakage of bottles upon impact with the bottom or with bottles already stored therein, the deflectors **13** are constructed and mounted in the cabinet to guide the bottles along zigzag paths thereby breaking the fall of the bottles and reducing the impact force to a safe amount. For this purpose, the deflectors are formed with upwardly facing sides **24** of inverted V-shape and are arranged in vertical rows horizontally spaced to prevent free passage of bottles between the rows. The deflectors in adjacent rows, however, are staggered vertically whereby bottles deflected to one side by one deflector strike the adjacent, oppositely facing side of the next lower deflector in the adjacent row and are deflected in a similar manner back under and past the first deflector.

Specifically, the deflectors **13** comprise flat-sided, parallel bars or pegs of diamond-shaped cross-section projecting outwardly from a supporting panel **25** adjacent the rear wall of the cabinet. Preferably, the sides intersect at angles of ninety degrees, and the upper sides slope downwardly at forty-five degree angles. The horizontal spacing x (FIG. 2) of the adjacent corners of the pegs in adjacent rows is less than the diameter of the bottles to prevent free falling, and the spacing y of the upwardly inclined underside **27** of each peg from the downwardly inclined and preferably parallel upper side of the next lower peg is greater than the diameter of the bottles. It will be seen that by a proper correlation of these two spaces the storage device may be made to accommodate more than one size of bottle. For example, the dimension x may be made less than the diameter of the relatively small, standard soft drink bottle 10^a (see FIG. 2) while the spacing y is slightly greater than the diameter of "king-size" bottles 10^b.

With this arrangement, bottles dropped into the cabinet **11** fall onto the pegs **13** and drop between two rows of pegs, striking an upper side **24** of the top peg in one row and being deflected inwardly toward the oppositely inclined side **24** of the next lower peg in the adjacent row, this side-to-side deflection continuing until the bottle settles on the bottom of the cabinet or on the bottles already in the cabinet. To insure that the outer rows as well as the inner rows are filled, the vertex of the top peg in the center row in the forms shown in FIGS. 1 through 5 is

centered below the opening 12 to direct roughly half of the bottles to each side (see FIGS. 2 and 4), and the rows of pegs are made progressively shorter toward each side. Thus, when the rows closest to the center are filled, bottles directed to the sides merely roll over the inner rows and fall into the next row. Pegs 28 split longitudinally in half and fastened to the inner sides of the walls 14 coact with the outer rows of full pegs 13 to define the outer two zig-zag paths.

Some soft drink bottles have a larger diameter at their lower ends than intermediate their ends with the result that the bottles tend to tilt downwardly and forwardly relative to the longitudinal axes of the deflectors and therefore tend to slide forwardly in moving toward the bottom of the cabinet. To prevent such sliding, the pegs are inclined upwardly and forwardly from the back panel 25 as shown most clearly in FIG. 5. Herein, the pegs are secured to the panel by screws 29 (FIG. 3) and are perpendicular to the panel, and the latter is inclined downwardly and forwardly in the cabinet to achieve the desired incline of the pegs. The angle of the panel is approximately ten degrees in FIGS. 1 through 5. A bottom panel 30 forms a floor in the cabinet perpendicular to the back panel. It will be evident that the inclines of the pegs and the floor also reduce or eliminate spilling of the small amounts of liquid which often remain in the bottles. Half pegs 28a (FIGS. 1 and 4) fast on the panel 30 insure that the bottles on the panel remain in the front-to-rear attitude shown in FIG. 5.

A primary consideration with a device such as this is the cost of manufacture. By using lumber of square cross-section for the pegs 13, 28 and tilting the panel 25 rather than cutting the ends of the pegs at angles, the cost of labor and materials is held to a minimum. The panel 25, 30 and the cabinet 11 itself preferably are composed of plywood.

A modified form of the invention is shown in FIGS. 6 and 7 wherein corresponding parts are indicated by corresponding primed reference numbers. In this instance, the top peg in the cabinet is replaced by a tiltable feeder gate 31 which distributes the bottles evenly on both sides of the center of the cabinet and, in addition, reduces the velocity of bottles falling through the opening 12' and holds each bottle long enough to permit the bottle to settle into a proper attitude for entry into and passage between the pegs 13'.

For these purposes, the gate 31 comprises two sheet metal plates joined together along corresponding edges to form the vertex 32 of the gate, and curving downwardly and outwardly on each side of the vertex to form two elongated tray positions 33 and 34 of arcuate cross-section. To mount the gate in the cabinet, two parallel arms 35 and 36 project downwardly into the cabinet from the front and rear edges of the opening 12' as shown in FIG. 6, and a shaft 37 spanning the lower end portions of the arms is journaled therein for rotation about an axis paralleling the longitudinal axes of the pegs 13'. In this instance, the rear panel 25' is disposed at an angle of approximately fifteen degrees with the vertical so that the pegs and the shaft 37 are inclined upwardly and forwardly at angles of fifteen degrees with the horizontal.

The feeder gate 31 is fast on the shaft 37 with the trays 33 and 34 on opposite sides of the shaft and the vertex 32 disposed above the shaft between two stop flanges 38 and 39 (FIG. 7) depending from the opposite sides of the bottle chute 20'. With the gate positioned as shown in FIG. 7, the next bottle dropped into the cabinet falls into the tray 33 and, due to the weight of the bottle on the left side of the gate axis, rotates the gate counterclockwise until the vertex 32 engages the stop 39, at the same time dumping the bottle on the left side of center. The next bottle falls into the tray 34, rotates the gate clockwise until the vertex engages the right-hand stop 38, and then is dumped on the right of center to gravitate through the pegs.

To increase the mass of the feeder gate 31 and thereby delay the tilting action until the bottles have had an opportunity to settle in the trays, a heavy metal disc 40 is mounted on the inner end of the shaft 37 for rotation therewith thereby to serve as a flywheel for the gate. Herein, this disc is telescoped loosely onto the shaft and disposed between two axially spaced rings 41 and 42 on the shaft. On one of the rings are one or more springs 43 that press frictionally against the adjacent side of the disc and press the latter against the other ring 42.

With this arrangement, the disc 40 increases the inertia of the gate sufficiently to prevent immediate tilting of the gate under the weight of a bottle dropped into one of the trays. Accordingly, the velocity of the bottle is reduced and the bottle settles onto the tray before being released. This insures that the longitudinal axis of the bottle is substantially parallel to the axes of the pegs 13' before the bottle is released, and prevents bottles from striking the pegs with excessive force that could cause bouncing, skewing, and possible jamming of the bottles between the pegs.

The proper orientation of bottles is particularly important where bottles of different sizes are to be stored, since the pegs must be spaced to accommodate both large and small bottles. Thus, the smaller bottles are less positively controlled by the pegs and are more likely to tilt and jam if released at high speed and in different attitudes into the cabinet.

It will be seen that the yieldable friction coupling between the disc 40 and the shaft 37 permits the disc to rotate relative to the gate 31 in case a bottle is inserted into the cabinet with a force that might damage the gate. The gate then tilts immediately under the force of the bottle and the springs 43 initially slide relative to the disc and then pick up the disc gradually with a smooth action.

Also illustrated in FIG. 7 is a modified form of the top row of pegs 44 and 45 which tend to stabilize smaller bottles gravitating through the cabinet after the middle two rows are filled. In this instance, the undersides 46 of the modified pegs are substantially parallel to the adjacent sides 24' of the standard pegs 13', as in the original form, and the upper sides 47 of the modified pegs are inclined downwardly and outwardly at angles substantially less than the corresponding angles of the standard pegs, that is, less than forty-five degrees. Accordingly, bottles roll over these pegs more slowly than they do in the form shown in FIGS. 1 through 5 and, therefore, enter the outer rows more slowly and are less likely to bounce out of the proper attitude before entering the rows.

It will be noted in FIG. 6 that the upper pegs 44, 45 also are longer than the lower pegs in the modified form. This is to insure that longer bottles are firmly supported against tilting forwardly out of the pegs at the top of the cabinet. The greater incline of the pegs in the modified form also increases the tendency to slide the bottles rearwardly as they gravitate through the cabinet.

It will be seen that the storage cabinet described above may be manufactured at a relatively low cost and, when finished, is much more attractive in appearance than open racks or stacked bottle cases. Further, bottles are loaded in the cabinet simply by sliding them into the chute 20 to drop into the cabinet. The deflectors break the fall of the bottles sufficiently to prevent breakage, and leave enough storage space for a large number of bottles. The capacity of the cabinet illustrated herein is more than six cases of standard soft drink bottles. Moreover, little, if any, spilling results either during or after the fall because of the upward tilting of the open ends of the bottles.

I claim as my invention:

1. A device for storing bottles of diameters within a

predetermined range, said device including, in combination, an upright cabinet having a door-controlled opening in one side thereof, a generally upright panel on the opposite side of said cabinet spaced from said opening and inclined upwardly and away from the opening, a plurality of deflectors comprising pegs of diamond-shaped cross-section each being fast at one end on said panel and perpendicular thereto to project toward said one side, said pegs being arranged in vertical rows with vertices facing upwardly and with the adjacent edges of pegs in adjacent rows horizontally spaced apart a distance less than the smallest diameter in said ring, and the pegs in adjacent rows being vertically staggered to space the opposed generally parallel sides of adjacent pegs apart a distance at least as great as the largest diameter in said range, and a second opening for admitting bottles into said cabinet through the top thereof in generally horizontal positions to drop onto said pegs and gravitate between the latter along zigzag paths, the vertex of the top peg in one of said rows being centered below said second opening at a predetermined level closely adjacent the opening, the vertices of top pegs on each side of said one row being spaced progressively lower than said predetermined level from said center row toward each side of said cabinet.

2. A device for storing bottles of diameters within a predetermined range, said device including, in combination, an upright cabinet having a door-controlled opening on one side thereof, a generally upright panel on the opposite side of said cabinet spaced from said opening, a plurality of generally parallel deflectors of inverted V-shaped cross-section each fast at one end on said panel and projecting horizontally toward said opening, said deflectors being arranged in vertical rows with the adjacent edges of the deflectors in adjacent rows horizontally spaced apart a distance less than the smallest diameter in said range to prevent free falling of bottles between the rows, and the deflectors in adjacent rows being vertically staggered to space the adjacent sides of adjacent deflectors apart a distance at least as great as the largest diameter in said range, means for releasing bottles into said cabinet through the top thereof and onto said deflectors in positions generally paralleling the deflectors to gravitate through the latter along zigzag paths, the vertex of the top deflector in one of said rows being generally centered in said cabinet and beneath said releasing means with the top deflector in the other rows spaced progressively lower than said one deflector toward the side walls of said cabinet, said bottles being stored in said cabinet in the bottom thereof and in the spaces between said deflectors.

3. A device for storing bottles of predetermined diameter including, in combination, an upright cabinet, means at the top of said cabinet for releasing bottles into said cabinet in generally horizontal positions, a generally upright panel in said cabinet adjacent the rear thereof, and a plurality of elongated generally parallel deflectors of inverted V-shaped cross-section arranged in generally vertical rows within the cabinet and each fast at one end on one side of said panel and projecting outwardly therefrom, the deflectors in each pair of adjacent rows being vertically staggered and laterally spaced apart to define a zigzag path for the gravitation of bottles between said rows, and the top deflectors in said rows being disposed at progressively lower levels from a point beneath said releasing means toward the side of said cabinet thereby to deflect bottles laterally toward the side of said cabinet.

4. A device as defined in claim 3 in which said releasing means comprise an opening generally centered in the top wall of said cabinet, and a tiltable feeder gate mounted in said cabinet below said opening to receive bottles dropped therethrough and direct successive bottles toward opposite sides of the center of said cabinet while reducing the velocity of the bottles.

5. A device as defined in claim 4 in which said feeder gate is constructed to hold said bottles momentarily to permit the latter to become properly oriented with respect to the axes of said deflectors before releasing the bottles onto the deflectors.

6. A storage device as defined in claim 1 in which the longitudinal axes of said pegs are inclined upwardly from said panel to urge the bottles toward the panel during such gravitation.

7. A storage device as defined in claim 1 in which the top peg in each of said rows is formed with an outwardly and downwardly inclined surface sloping at an angle substantially less than 45 degrees, and the upper surfaces of the lower pegs slope downwardly at angles of approximately 45 degrees.

8. In a device for storing bottles of diameters within a predetermined range, said device including, in combination, an upright cabinet having a door-controlled opening in one side thereof, a generally upright panel on the opposite side of said cabinet spaced from said opening, a plurality of elongated generally parallel pegs each fast at one end on said panel and projecting toward said one side, and means for releasing bottles into the top of said cabinet in positions generally paralleling said pegs, said pegs being arranged in upright rows with the adjacent rows horizontally spaced apart a distance less than the smallest diameter in said range, and the pegs in adjacent rows vertically staggered to increase the actual spacing of the pegs to a distance at least as great as the largest diameter within said range whereby bottles released onto the tops of said rows gravitate through the cabinet along zigzag paths.

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