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INTERFITTING STACKABLE BOTTLES OR SIMILAR CONTAINERS

Filed July 5, 1968

2 Sheets-Sheet 1

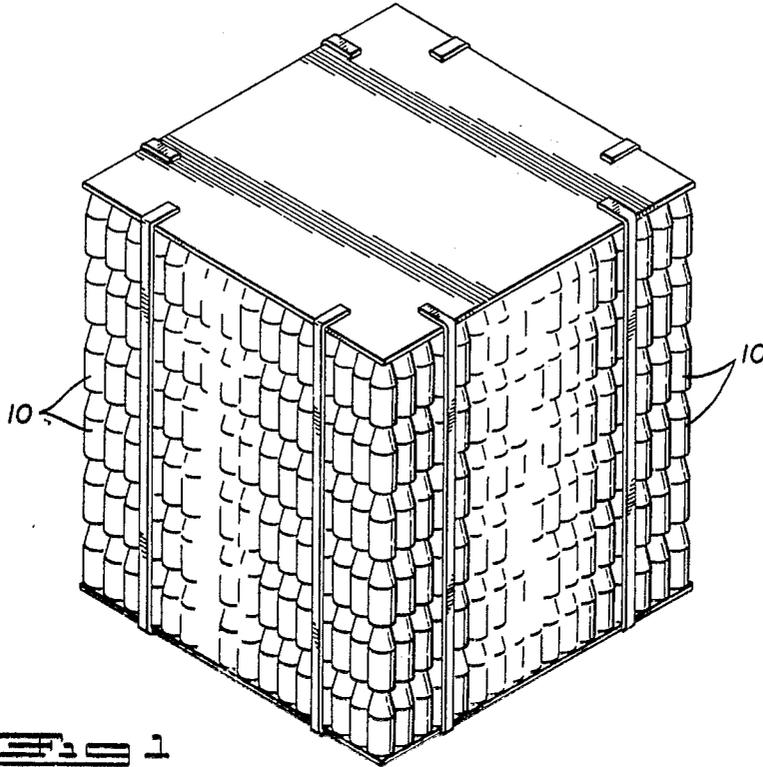


Fig. 1

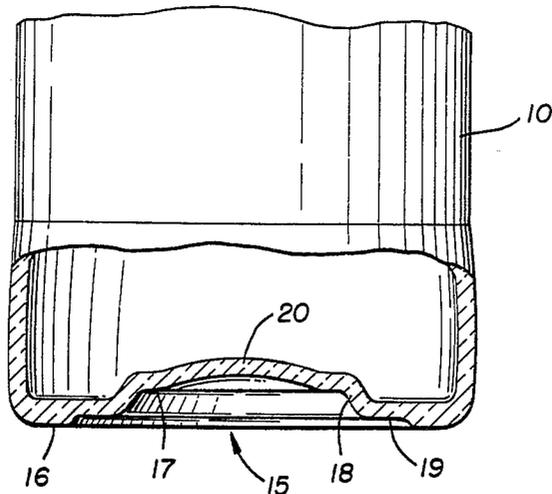


Fig. 4

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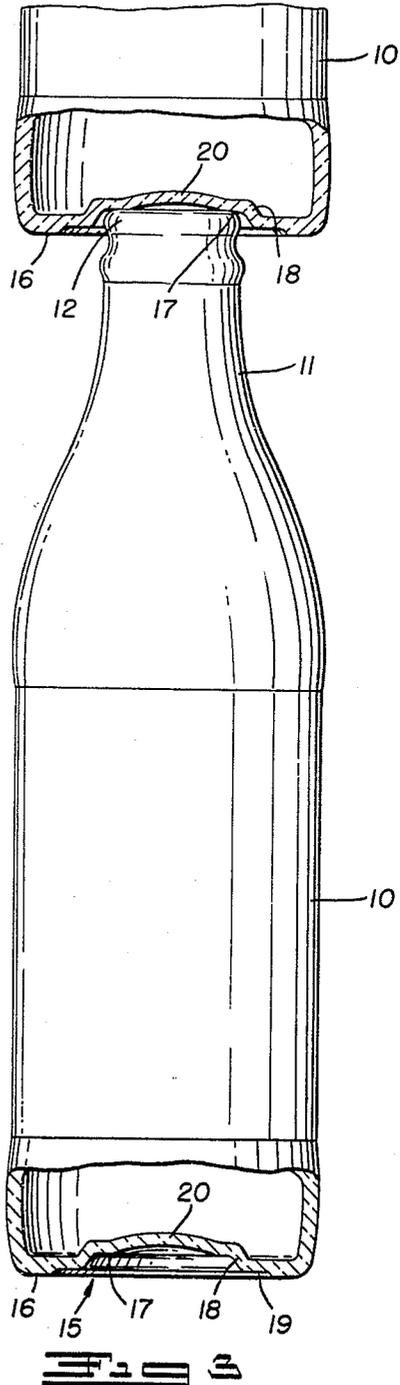
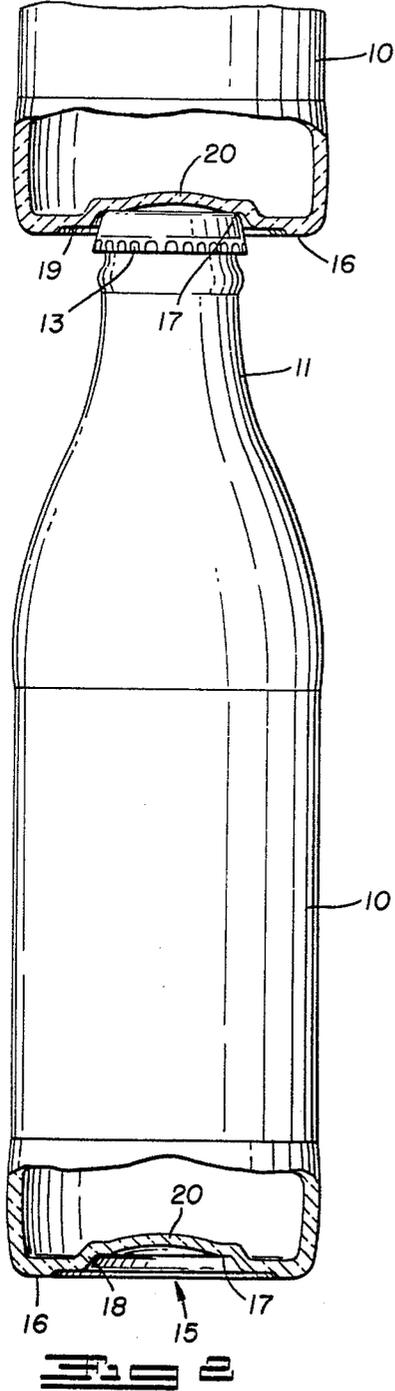
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2 Sheets-Sheet 2



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**INTERFITTING STACKABLE BOTTLES OR
SIMILAR CONTAINERS**

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6 Claims

ABSTRACT OF THE DISCLOSURE

A bottle, preferably of glass, comprising a body with a standard top or neck finish and with a special shaped bottom having a downwardly opening cavity to fit over the upper end of the top or neck finish on a lower identical bottle in stacking. The top or neck finish may be of the type to receive a crown cap or a screw cap and the cavity in the bottom is so designed that it will receive the top finish or neck whether it is capped or uncapped thereby facilitating stacking whether the bottles are filled or empty.

The main object of my invention is to provide an economical stackable glass bottle which will permit bulk handling of such glass bottles in much the same manner that metal containers can be handled, thereby eliminating expensive packaging material and substantially reducing the cost of supplying those bottles to the user.

As indicated, the bottle can be any of the usual types and can have any of the various standard top or neck finishes, the one illustrated herein being of the type commonly known as a beverage bottle with a neck or top finish known as a crown finish for receiving a crown or crimped cap pressed on the finish, as is common in the beverage industry. However, the neck or top finish could be designed to receive a screw cap or any of the common types of caps used in capping commercial glass containers.

The bottom portion of the bottle, according to this invention, has a special downwardly opening cavity for receiving the top finish of a lower similar bottle in stacking whether the top is capped or not. Around the cavity at the bottom is an annular flat peripheral supporting surface on which the bottle usually rests during use. The cavity is so designed as to mate with a finish or cap on a lower bottle, thus centering the upper bottle over the top of the lower bottle. The cavity is shallow and upwardly within the cavity is an annular seating surface or ring for seating on the top finish or cap of the lower bottle. Upwardly within the cavity beyond the annular flat seating ring is a dome formation which permits variation in the weight of the glass in the bottom of the bottle without distorting the annular flat seating ring.

In the accompanying drawings, I have illustrated a preferred embodiment of the invention and in these drawings:

FIGURE 1 is a schematic perspective view showing interfitting stackable bottles embodying my invention combined into a bulk package of cubical form.

FIGURE 2 is a view in side elevation, but cut away, indicating two stacked interfitting bottles embodying my invention, the neck of the lower bottle being shown with a cap thereon.

FIGURE 3 is a similar view but showing the lower bottle uncapped.

FIGURE 4 is an enlarged view of the bottom portion of the bottle, showing it partly in elevation and partly in section.

With detailed reference to the drawings, an example of a bottle having the preferred interfitting structure for

stacking is illustrated in FIGURES 2 to 4 and a bulk cube package of a large number of such bottles is illustrated in FIGURE 1.

The glass bottle 10 is shown as being of a general form used in the beverage industry with a neck 11 having an upper bead finish 12 of the standard type designed to receive an ordinary crown cap 13. However, as indicated, the top finish may be such that it will receive other types of caps. The bottom portion of the bottle, however, is formed in accordance with my invention so that it will stack with an adjacent lower bottle.

Thus, the bottom portion is provided with a downwardly opening cavity, indicated generally by the numeral 15, which extends throughout most of the area of the bottom but is relatively shallow, extending a minimum distance axially upwardly into the bottle. Around the cavity is an annular flat supporting peripheral surface area 16 which is the surface on which the bottle can rest and will be disposed upright. Upwardly within the cavity 15 is an annular flat seating ledge or ring 17 and it will be noted that this ring is coaxial with the surface area 16 and is spaced axially inwardly thereof. This surface 17 is connected to the surface 16 by a tapering guide shoulder 18 and an annular recess 19. Inwardly of the seating ring surface 17 is a central dome-portion 20 which extends farther into the bottle.

With this bottom structure, it is possible to stack the bottles, as indicated in FIGURES 2 and 3, whether the bottles are capped, as in FIGURE 2, or uncapped, as in FIGURE 3. In either instance, the downwardly opening cavity 15 will receive and center the upwardly projecting neck of the lower bottle. The cap 13 or lip 12 will be guided into the cavity and centered by the tapered guide shoulder 18. The seating ring 17 of the cavity of the upper bottle will seat on the edge of the cap 13 or on the lip 12 of the lower bottle. This will provide a substantial support for the upper bottle from the lower bottle with little tendency for the upper bottle to tip relative to the lower bottle. The tapered shoulder 18 will tend to keep the upper bottle centered on and in axial alignment with the lower bottle. The dome 20 will not be engaged by the cap or top finish of the lower bottle but is important to provide this as means for permitting variations in glass charges in the manufacture of the bottle while still permitting the formation of the flat seating ring surface 17 without variation.

By stacking one bottle 10 above the other, an entire group of bottles can be stacked, one above the other, for any convenient height for economical handling and shipping, for example, as indicated in FIGURE 1.

In the past, efforts to make a bottle with a stacking interfitting structure have not been successful, due to that fact that the bottle has been designed with too deep a bottom cavity which caused production problems in producing the glass; has required a greater volume of glass, adding to the increased cost of the bottle, and caused thin outer edges on the bottle resulting in excessive breakage. Further, a deep indentation in the center of the bottom of the bottle has meant a lower production speed, adding to the cost of making the bottle.

My invention uses a shallow cavity area 15, slightly tapered at 18, for acting as a guide with an adjacent finish or cap, a flat surface 17, which is the actual seating ring, and domed portion 20, which permits variation in the glass weight while retaining the flat seat 17. Slight variations in the glass forming and blowing is accommodated by varying the radii of the domed portion 20 and permitting shrinking of the bottle as it is made, thus retaining the true and flat seating ring 17. Because of the shape of the dome 20 and the fact that the depression or cavity is shallow, the glass weight is approximately the same as an

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ordinary flat bottom bottle, and the wall weight and distribution can remain consistent with high speed production practices. Thus, no additional expense is encountered in using the bottle of my invention over the standard bottle as the slight additional glass displacement is minimum.

In the mass distribution of glass bottles for high volume operations, it has been necessary in the past, to place each bottle in a convenient cushion pocket inside a shipping container, the shipments being broken down into small units such as one dozen to several multiples in a single shipping unit. Partitions were necessary between adjacent bottles to keep bottles from striking, scratching, or breaking. Often the shipping container becomes a reused container which means emptying the container at a customer's plant, salvaging the container, and reloading the container after the bottle has been cleaned, packed, and a cap applied. All of this amounts to a considerable expense in the production of the bottle as well as additional weight and shipping costs between the glass manufacturing facility and the ultimate customer's plant.

Further, the shipping case originally built at the glass plant becomes the ultimate case to the consumer, either store or individual. The bottle again must be packed in its cushioned separators, often having upper and lower cushion pads, and the case sealed and placed on pallets or in bulk in either cars or trucks for transfer to the end consumer. Considerable handling is encountered in handling small units as the cases must be opened, the bottles removed and placed upon display shelves in stores for retail distribution.

The object of the stackable bottle of my invention is to eliminate all of the handling in packing, unpacking, repacking, and final unpacking. By interlocking the bottles by means of the self-centering stacking cavities, bottles can be shipped in bulk as shown in FIGURE 1. A plurality of bottles 10 making up a convenient pattern can be placed on a thin paper bottom or can be left as individual bottles on the bottom. A second and multiple row of bottles can be stacked on top of the other to any convenient working height. Each row can be strapped by means of filament tape so that the bottles lock together as a group, each bottle interlocked to its adjoining row by means of the self-centering cavity. In order to keep the bottles clean during storage, a thin cover can be placed over the stack of bottles and all held together by means of easy to remove filament tape. This type of load permits bulk transfer of the bottles, securely locked together against shifting and breakage in shipment, the entire bulk load being easy to handle by conventional handling equipment and being transported in conventional transportation equipment. At the customer's plant, it is merely necessary to strip the filament tape, remove the dust cover, and the bottles can then be removed row by row by automatic equipment and placed into suitable cleaning and filling machinery. As the bottles are capped after filling, they can be reloaded in a bulk pattern, as shown, for transportation to the ultimate consumer or be placed in module carriers which will become a portion of the consumer's display shelving for ultimate display and distribution to the bottle consumer which is the general household purchaser. By eliminating the expensive packaging material and substituting an inexpensive means of packaging through the use of the self-centering and interlocking feature of the cavity in the bottom of the bottle, great reductions can be made in shipping and handling cost.

My invention thus relates several parts, first in the design of the bottom of the bottle and the technical features of interlocking with the finish of adjacent bottles. The dome in the bottom is essential for high speed production in maintaining a true and accurate seating ring for square stacking and proper fitting of one bottle over the top of the other bottle.

Further invention is in the end use of the product in order to produce an easy and simple way to secure a

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bulk package which can be handled by conventional handling equipment and can be mechanically and automatically loaded and unloaded at the glass manufacturing plant and the consumer's plant. Further importance is in the use of my invention to eliminate expensive packaging material, thus reducing the total cost of the product which means substantial savings to the user of the bottle as well as the ultimate consumer of the end product.

The type of recess in the bottle has proved to be adequate for fulfilling the premise as outlined above, however, it is not intended that the design be confined to exact proportions as shown, in that on certain types of glassware the cavity may be increased or decreased to make the interfit tighter or looser. Further, it is not the intention to confine this interfit to the common screw or crown finish; rather it can be applied to any type of glass finish so that bottles of all types may have the interfitting stackable feature to take advantage of bulk distribution. The advantages of interfitting stacking are apparent not only in the household for storage in refrigeration units or upon shelves, but also in retail distribution areas where the bottles can interlock in display shelving. The slight or shallow cavity is essential, in order to provide not only stacking but also ease of removal of one bottle from another so that a row of bottles is not pulled down by having to move a bottle a great distance in a vertical direction in order to interlock an upper from a lower bottle and which the consumer may not do. The slight recess of the self-centering cavity has proved to be adequate for locking and yet easy enough for ready removal from a stack.

Several systems are now in commercial use for bulk packaging of bottles but due to the fact that bottles are not interlocking or interfitting for stacking and must have their finish protected from abrasion by the bottom of the bottle, it is necessary to place separators between the various layers of glassware. Such separators are often hand fed into the stack, thus requiring an operator at all times, and in addition, considerable expense for providing a separator of sufficient strength to prevent one bottle pushing down upon the other bottle. The interfitting stacking feature eliminates the independent row separators, thus permitting the stacking of the bottles to be on a fully automated process which makes possible the elimination of an operator for the stacking of the bottles. The wrapping of a filament tape around the various rows of bottles can be accomplished automatically so that the unit load of bulk bottles can be done on automatic equipment, thus eliminating costly packing labor now common in most bottle plants. By proper sealing of the tapes, the bottles are securely locked together so that there is no movement of the bottles during subsequent handling and thus providing a compact package.

If the bottles are going into long periods of storage, such as outdoor storage or inside of a warehouse, it might be desirable to cover the stack with a corrugated shipping container or wrapping the stack in plastic film to keep the bottle surfaces clean from dust and dirt and also permit storing of the bottles in open areas and eliminate the expense of constructed warehouses.

Thus, my invention meets several objectives, one in providing a more convenient package, permitting stacking in shelves and refrigerators; second, in providing a design which can be produced economically at high production speeds; third, in lending itself to bulk packaging with a minimum of packaging material and yet locking together to form a solid and rigid shipping unit; and fourth, in permitting storage and warehousing with a minimum of protective covers or materials. Further, the design of the bottle is such that it permits automatic loading and unloading of the bulk unit formed therefrom eliminating manual help now common in this type of operation. The net result is substantial savings in the manufacture of the bottle due to elimination of expensive

and cumbersome packaging material, substantial savings in shipping costs due to lighter packaging materials, elimination of excessive costs in warehousing by packing with a minimum of protective barriers and materials, permitting bulk module distribution to the ultimate consumer, and eliminating rehandling necessary when small unit cartons or shipping containers are employed.

Having thus described my invention, what is claimed is:

1. A container comprising a body having an upwardly extending neck of annular cross section with an annular top finish on the upper extremity thereof and having a bottom with an upwardly recessed shallow cavity therein to permit vertical stacking of a plurality of such axially aligned identical containers with the neck of a lower one fitting axially upwardly into the bottom cavity of the one next above; said cavity being of substantially lesser axial extent than the neck so that when the containers are stacked there will be no contact of the bottom of an upper one with the neck or body contour of a lower one except at the annular top finish of the neck, which may or may not be capped, said cavity being of a horizontal area substantially greater than the top finish and having a flat annular seating surface axially upwardly within the cavity with which said top finish or cap engages and a dome portion axially inwardly beyond said seating surface and connected thereto and which permits variations in the weight of the material on the bottom while still providing the flat annular seating surface and a depending annular guide shoulder for guiding the top finish of the lower container into the cavity of an upper container, said guide shoulder surrounding said flat annular seating surface and connected thereto at an outward annular joint having a diameter substantially greater than that of the to finish so that the finish, with or without the cap, can

rest on the flat annular seating surface without interengaging with the guide shoulder throughout its annular extent.

2. A container according to claim 1 in which the top finish is in the form of an annular outwardly projecting bead on the neck which may carry the cap.

3. A container according to claim 1 in which the bottom has an annular peripheral supporting surface surrounding the cavity and the seating surface and concentric therewith for resting on a flat surface to support the container upright.

4. A container according to claim 3 in which the annular supporting surface is joined to the concentric flat annular seating surface by the annular guide shoulder which is inwardly and upwardly tapered.

5. A container according to claim 4 in which an annular recess is provided between the annular supporting surface and the tapered annular guide shoulder.

6. A plurality of substantially identical bottles as set forth in claim 1 disposed in a vertical stack of axially aligned bottles with the top finish of a lower bottle extending upwardly into the downwardly opening cavity of the bottle next above.

References Cited

UNITED STATES PATENTS

2,960,248 11/1960 Kuhlman 215—10

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U.S. Cl. X.R.

215—10