Sept. 2, 1969 B. EDWARDS 3,464,587

STACKABLE CONTAINER

Original Filed Aug. 9, 1967

Fig. 1

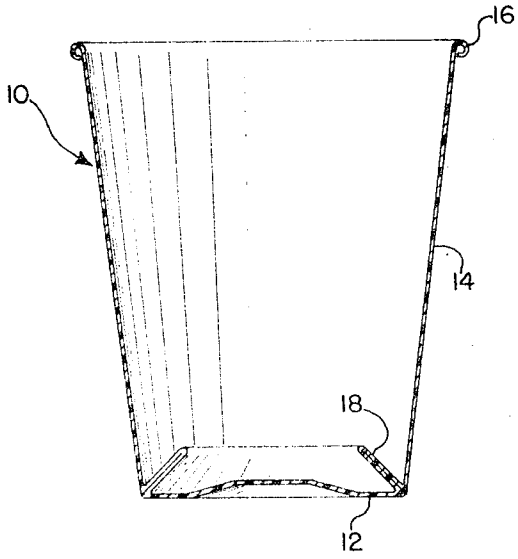


Fig. 2

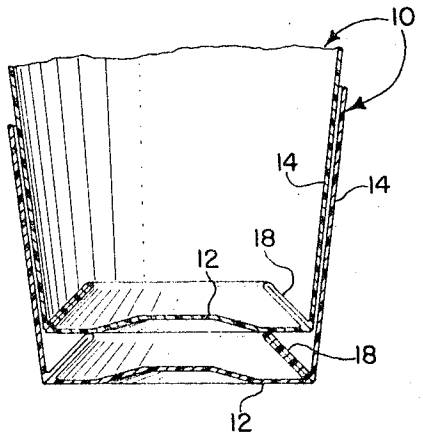


Fig. 3

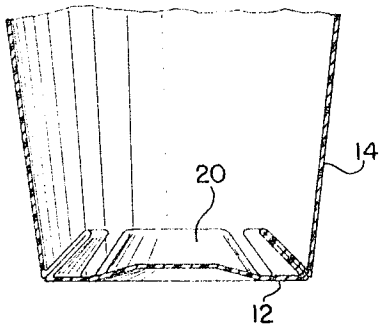
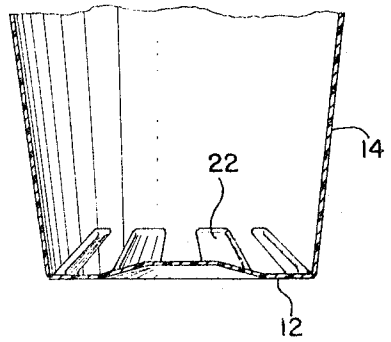


Fig. 4



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STACKABLE CONTAINER

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Original application Aug. 9, 1967, Ser. No. 659,406. Divided and this application Jan. 2, 1969, Ser. No. 789,091

Int. Cl. B65d *21/02, 3/06*

U.S. Cl. 220—97 4 Claims

ABSTRACT OF THE DISCLOSURE

A one-piece nestable thin-walled plastic container of substantially uniform thickness having stacking pleat means of double wall thickness extending upwardly and inwardly from the juncture of the bottom and side wall of the container, the stacking pleat means cooperating with a circumferentially extending stacking surface of the container to positively limit telescoping and thereby prevent jamming between nested containers.

This is a division of application Ser. No. 659,406, filed Aug. 9, 1967.

BACKGROUND OF THE INVENTION

Field of the invention

The present invention relates to the stacking of a plurality of similarly configured containers of thin-wall plastic construction which are of the disposable variety. Stacking in thin-walled containers of the disposable variety. Stacking in thin-walled containers of the disposable variety, where upward of 50–75 containers or more are nested together, is imperative to limit the degree of telescoping between nested containers. Failure to include a stacking configuration or the use of an unworkable stacking configuration in such containers will lead to jamming between adjacent nested containers. This is undesirable not only where individual containers are dispensed from a stack by a vending mechanism where the difficulty or possibility of separating containers may result in the malfunctioning of the vending mechanism but also in "over the counter sales" where it is important for the ultimate consumer to be able to remove individual containers from a stack.

Description of the prior art

It is well known that stacking features can be incorporated into either the side wall or bottom wall of a thin-wall plastic container of one-piece integral construction. One example of a side wall stacking technique is disclosed in my U.S. Patent No. 3,139,213 in which a stacking ring, reversely directed with respect to the divergence of a container side wall, is provided to limit the degree of telescoping between adjacent nested containers. Variations of a reversely tapered stacking ring incorporated into a thin-wall plastic container are shown in my U.S. Patent No. 3,091,360 where the stacking ring is of the interrupted variety, and in my U.S. Patent No. 3,208,631 wherein a plurality of V-shaped stacking protuberances, which may be arranged to cooperate with either the top or bottom margin of the container in a camming arrangement, may be provided. It has also been shown from my U.S. Patent No. 3,223,305 that generally horizontally directed stacking fins or pleats of a double wall thickness may be utilized in a prescribed fashion to limit the degree of telescoping between adjacent nested containers.

In the event one may desire to utilize a stacking facility in the bottom wall of the container, resort may be had to the stacking techniques shown, for example, in U.S. Patent Nos. 2,988,258 or 3,027,596. The bottom stacking techniques disclosed in these last mentioned patents are representative of the two typical forms of bottom stacking approaches from which subsequent developments have been made.

All of the above techniques have not envisioned the use of generally upwardly and inwardly directed stacking pleats of double wall thickness within the interior of a thin-walled plastic container body which cooperate with a circumferentially extending stacking surface in the container body to positively limit the degree of telescoping therebetween.

SUMMARY OF THE INVENTION

It is one object of the present invention to provide a stacking feature or configuration in a thin-wall thermoplastic nestable container body to positively limit the degree of telescoping between it and adjacent like nested containers.

Another object of the present invention is the provision of a thin-wall plastic container having upwardly and inwardly directed stacking pleat means of double wall thickness within the interior of the container which is designed to increase the stacking overlap between adjacent nested containers while at the same time laterally reinforcing or rigidifying the container in the vicinity of the stacking pleat means.

These and other objects and advantages of the present invention are attained by the provision of a one-piece thin-walled seamless thermoplastic container having stacking pleat means formed therein which cooperate with a circumferentially extending stacking surface of the container, the stacking pleat means being located within the interior of the container body and angularly disposed relative to the container axis to positively limit jamming between adjacent nested containers in the stack.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view, partially in section, showing a seamless thermoplastic nestable container embodying one form of stacking pleat means constructed in accordance with the present invention;

FIG. 2 is a side elevational view showing a pair of nested containers, both of them being sectioned, which incorporate the stacking pleat means depicted in FIG. 1 of the drawings; and

FIGS. 3–4 are fragmentary side elevational views of a pair of nested containers, one of the containers in each of the views being sectioned, and showing modified forms of stacking pleat means provided in the containers in the vicinity of the juncture between the bottom and side walls thereof.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Each of the cups or containers to be hereafter described are made into a seamless, thin-walled construction which is on the order of a .002–.034 inch in thickness. Such cups or containers are formed from a thermoplastic material, polystyrene being one preferred example by what has commonly become known as thermoforming techniques wherein a heated sheet of thermoplastic material is drawn to the desired shape by mold members, mold members in combination with fluid pressure either of the positive or negative variety, or pressure forming means solely. It will, of course, be recognized that any of the above thermoforming techniques may be used in producing the various container embodiments which will now be described.

Referring first to the embodiment of the invention illustrated in FIGS. 1–2 of the drawings, there will be seen a one-piece, seamless, thin-walled cup or container **10** of the type referred to above. The cup or container **10** is

formed into a frusto-conical shape which includes a bottom wall **12** which is integrally joined at its periphery or margin to a peripherally continuous side wall **14** diverging upwardly and outwardly from the bottom wall **12** and terminating in a rim portion **16** to define the upper margin of the cup in the vicinity of the open mouth or open upper end thereof. The rim portion **16** is preferably of the rolled or curled rim variety in the sense that it is reversely curved from the upper margin of the container back towards the side wall **14** to provide a rim of increased lateral width relative to the thickness of the side walls to afford necessary lateral rigidity at the open mouth or open upper end of the cup while affording a smooth drinking surface. It will, of course, be recognized that any thickened rim which provides the foregoing advantages may be used if desired. The bottom wall **12** is preferably of the indented bottom variety by its being axially concave upwards so that it will prevent sagging or "oil" canning" of the cup when filled with a liquid.

In accordance with the present invention, the cup **10** is provided with stacking pleat means formed integrally into the cup body, and which cooperates with a circumferentially extending stacking surface as will become apparent hereafter to sack adjacent nested or telescoped containers apart from one another a sufficient distance to prevent jamming therebetween which creates the various heretofore noted disadvantages, thereby making the cups acceptable to consumers by reason of their not becoming stuck or wedged together. The stacking pleat means **18**, in cooperation with the circumferentially extending stacking surface to be presently described, must space the containers apart from one another an axial direction greater than the axial height of the rim portion **16** so that there will be no interference therewith. This is a common problem which any stacking facility must overcome in order to function effectively.

Referring first to the form of stacking pleat means **18** shown in FIGS. 1–2 of the drawing, it will there be seen that the stacking pleat means **18** comprises a reversely bent, double thickness inwardly directed element which extends within the interior of the container from the juncture of the bottom and side wall **12, 14** for a predetermined distance. For the purposes hereof a double thickness stacking pleat is one which has at least double the thickness of the substantially uniform in thickness cup **10** which will vary a few thousandths, more or less.

As shown in the FIGS. 1–2 embodiment, the stacking pleat **18** is annularly disposed or circumferentially arranged in a reversely tapering or back tapered manner with respect to the taper of the side wall **14** of the container. This double wall thickness construction and angular disposition of the stacking pleat **18** will provide a positive interference between adjacent nested containers **10** as shown in FIG. 2, and thus will eliminate jamming or side wall engagement of adjacent containers. In this respect, it will be noted that the stacking pleat **18** of a lower container **10** engages the bottom wall **12** of an upper container **10** as shown in FIG. 2 so as to inhibit jamming or unwanted side wall interference between adjacent containers.

The stacking pleat **18** may project upwardly and inwardly relative to the bottom wall **12** of a container to a limited extent or, as shown may extend upwardly and inwardly for a substantial distance. In the embodiment illustrated in FIGS. 1–2 the stacking pleat **18** when engaged by the bottom wall **12** of an upper container, will

deflect downwardly about a point in the vicinity of the juncture of the bottom wall and side wall **12, 14** respectively of a lower container thus providing a degree of axial resiliency to a stack of containers. In this way it will more nearly act as a shock absorber when a stack of containers is subjected to an axial load, such as by an inadvertent dropping of the stack. With a shorter upwardly and inwardly inclined stacking pleat, vertical deflection will be inhibited or, if there is any, it will be unnoticeable between adjacent containers.

Reference is now made to FIGS. 3 and 4 for two further illustrated embodiments of the present invention. The stacking pleats **20, 22** respectively in the FIGS. 3–4 embodiment each comprise a circumferentially interrupted stacking pleat of double wall thickness which is upwardly and inwardly directed from the juncture of the bottom and side wall of each of the respective containers as illustrated. The interrupted stacking pleat **20** in the FIG. 3 embodiment includes relatively small notches with substantial arcuate extensions of the stacking pleat whereas in the FIG. 4 embodiment, the stacking pleat **22** has the notches and arcuate extensions of the stacking pleat of substantial equal circumferential extent. The length and/or spacing of the extensions or notches as depicted in each of these embodiments may be varied as desired. The notches in each of the stacking pleats **20, 22** provide for the entry of air between adjacent nested cups during separation, thus facilitating cup movement or dropping in a stack of containers, as, for example, in a coin operated beverage machine.

I claim:

1. A one-piece seamless container of thin-wall plastic construction, comprising a bottom wall and a side wall tapering upwardly and outwardly therefrom to an open upper end, said container having an inwardly directed angularly disposed stacking pleat of double wall thickness which extends from the juncture of the bottom and side wall of the container within the interior of the container, said stacking pleat being arranged to cooperate with the bottom wall of a similarly configured superposed container to prevent jamming therebetween.

2. The container as defined in claim **1** wherein said stacking pleat is configured to provide deflection downwardly about a point in the vicinity of the juncture of the bottom wall and side wall of the container when engaged by the bottom wall of the similarly configured superposed container to provide axial resilience to a stack of telescoped containers in addition to preventing jamming therebetween.

3. The container as defined in claim **1** wherein said stacking pleat is circumferentially continuous.

4. The container as defined in claim **1** wherein said stacking pleat is circumferentially discontinuous.

References Cited

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3,203,611	8/1965	Anderson	229—1.5
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U.S. Cl. X.R.

229—1.5