NESTABLE CONTAINER WITH BOTTOM STACKING

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ABSTRACT OF THE DISCLOSURE
A nestable container of thin-wall plastic construction having a stacking protuberance in the bottom wall thereof to limit the extent of telescopic association of a plurality of stacked containers.

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to the field of nestable thin-wall plastic containers of the disposable variety incorporating stacking means in the bottom wall thereof having a configuration which prevents jamming between adjacent telescopically arranged containers.

It is well known that such thin-walled nestable or open mouth plastic containers will jam or stick together when stacked in nested relationship and subjected to normal handling functions, thereby preventing their ultimate use. It is possible to incorporate a stacking facility in the side wall of such containers as shown in my Patent 3,139,213, and this technique overcomes the jamming problem noted, and thus has been widely employed throughout the plastic container industry in the U.S. and other countries of the world. In some instances, it is desirable to incorporate a stacking facility at a place other than the container side wall to provide more area for printing of the container, and to maintain a smooth side wall shape for aesthetic purposes. Where this is desired, resort must be had to rim stacking or stacking means incorporated in the bottom wall of a container. Rim stacking may be successfully employed with certain types of containers, usually those which do not have a substantial volume or capacity due to the limitations placed on the axial height of the rim area. In the final analysis, rim stacking cannot be successfully employed over the wide range of container sizes which have been distributed in the market place, and thus bottom stacking techniques are the most likely alternative to the side wall stacking techniques of my aforesaid patent.

Description of the prior art

Several types of bottom stacking have been proposed for seamless thermoplastic containers such as, for example, those techniques which have been disclosed in U.S. Patent Nos. 2,988,259 and 3,027,596. These patents disclose representative forms of bottom stacking means in seamless thermoplastic containers which are typical of the two basic forms from which subsequent developments have been made. In some cases, the bottom stacking constructions of the prior art have not always met industry desires of an easily formed, consistently functioning stacking device which does not interfere, to any great extent, with the volume or capacity of the container. Even in those cases where the bottom stacking device may not be such that it conserves the volume or capacity of the container, the prior art bottom stacking techniques have either been too difficult to remove from mold parts or have been easy to remove from the mold parts and yet have not functioned as stacking devices in a consistent manner required by industry standards.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide an improved stacking device in the bottom wall of a thin-wall thermoplastic nestable container.

Another object is to provide a thin-wall plastic container having a bottom stacking device which is not difficult to form, consistently functioning as a stacking device and yet does not interfere, to any great extent, with the volume or capacity of the container.

A further object of the present invention is to provide a bottom stacking means in a thin-walled seamless thermoplastic container which, in other forms of the present invention, is easy to remove from molding machinery and yet provides a stacking function consistent with industry standards.

These and other objects and advantages of the present invention are attained by the provision of a stacking protuberance formed in the bottom wall of a seamless, nestable container of thermoplastic material, the stacking protuberance including an upper stacking shoulder and a lower stacking shoulder which are connected by an intermediate wall section, at least portions of the intermediate wall section being upwardly and inwardly directed relative to the lower stacking shoulder, and the upper stacking shoulder in the vicinity of the upwardly and inwardly directed portions of the intermediate wall section being both radially outwardly and inwardly offset relative to the lower stacking shoulder to provide a shelf portion which engages the lower shoulder of a similarly configured container to limit the extent of telescopic association of such containers and thereby prevent jamming.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary perspective view, partially in section, showing a seamless thermoplastic nestable container embodying one form of bottom stacking device constructed in accordance with the present invention;

FIG. 2 is an enlarged fragmentary sectional view showing a pair of nested containers each incorporating the stacking device depicted in FIG. 1 and being arranged in stacked relationship relative to one another;

FIG. 3 is a fragmentary perspective view showing the bottom section of a seamless thin-wall nestable plastic container which includes a modified form of stacking device in the bottom wall thereof;

FIG. 4 is an enlarged fragmentary section view similar to FIG. 2, but showing stacking of the containers by way of the stacking means disclosed in FIG. 3 of the drawings;

FIG. 5 is a fragmentary perspective view similar to
3,442,420

FIG. 3, and showing yet another modified form of the present invention;

FIG. 6 is an enlarged fragmentary sectional view similar to FIGS. 2 and 4, and showing stacking of containers by utilizing the stacking form shown in FIG. 5 of the drawings;

FIG. 7 is a fragmentary perspective view, partially in section, similar to FIG. 3 of the drawings and showing another form of stacking device coming within the purview of the present invention;

FIG. 8 is an enlarged fragmentary sectional view similar to FIG. 2 which utilizes the stacking means shown in FIG. 7 of the drawings;

FIG. 9 is a fragmentary perspective view, partially in section, similar to FIG. 3, but showing yet another modified form of stacking device incorporated in the bottom wall of a container;

FIG. 10 is an enlarged fragmentary sectional view similar to FIG. 2 which provides stacking of the containers by utilizing the means shown in FIG. 9 of the drawings;

FIG. 11 is a fragmentary perspective view partially in section, also similar to FIG. 3 illustrating still another form of stacking device coming within the scope of the present invention;

FIG. 12 is an enlarged fragmentary sectional view showing stacking of a pair of adjacent containers in the same manner as FIG. 2, but utilizing the stacking means shown in FIG. 11 of the drawings;

FIG. 13 is a fragmentary perspective view, partially in section, after the fashion of FIG. 3, and depicting another stacking embodiment of the present invention;

FIG. 14 is an enlarged fragmentary sectional view also similar to FIG. 2 of the drawings which utilizes the stacking means illustrated in FIG. 13;

FIG. 15 is a fragmentary perspective view, partially in section, similar to FIG. 3 showing the last illustrated form of stacking device constructed in accordance with the present invention; and

FIG. 16 is an enlarged fragmentary sectional view similar to FIG. 2 of the drawings, and showing stacking of a pair of nested containers utilizing the stacking means illustrated in FIG. 15 of the drawings.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The general form of cup or container 10 which incorporates the stacking facility of the present invention is illustrated in FIG. 1 of the drawings. The cup or container 10 is preferably made into a seamless, thin-wall construction from a thermoplastic material such as polyolefin, and is formed into a frusto-conical shape including a bottom wall 12, and a peripherally continuous side wall 14 which diverges upwardly and outwardly therefrom and which terminates in a rim portion 16 in the vicinity of the open mouth or open upper end of the container 10. While the side wall 14 may incorporate various types of finger gripping rings or protuberances to facilitate grasping as well as thermally insulate the hand of the user, there may be a desire to retain the smooth side walls shape as illustrated in the drawing when utilizing the stacking facility of the present invention.

In accordance with the present invention, the stacking means or facility 18 is formed integrally with the bottom wall 12 of the container by conventional thermforming techniques. As depicted in the form of the invention shown in FIGS. 1-2, the stacking facility or means comprises a protrusion formed in the bottom wall 12 of the container which includes a lower external stacking shoulder 20 at the outermost peripheral extent of an end wall section 22 which is generally aligned with, but radially spaced from, the bottom wall 12, an upper internal stacking shoulder 24 axially upwardly spaced from and both outwardly and inwardly offset from a plane parallel to the container axis containing the lower external stacking shoulder 20 and an intermediate connecting wall section 26 which is upwardly and inwardly directed relative to the lower stacking shoulder 20 and interconnects the lower and upper stacking shoulder 20, 24 respectively to each other. A downwardly and outwardly directed connecting wall 28 integrally joins the stacking protuberance by way of its upper stacking shoulder 24 to the bottom wall 12 of the container.

As readily depicted in FIG. 2 of the drawings, this stacking arrangement enables containers to be nested one within the other without jamming or sticking therebetween due to the manner in which the stacking protuberances of superposed containers cooperate with one another to limit the extent of telescopic association of adjacent nested containers. In particular, it will be noted that the lower stacking shoulder 20 of the uppermost container in FIG. 2 of the drawings rests upon a supporting shelf which is defined by the generally inwardly and outwardly directed upper stacking shoulder associated with the lowermost container. The arrangement of parts limits the extent of telescopic association of adjacent nested containers, and virtually makes impossible any jamming or sticking therebetween during normal handling and functions encountered in the storage, transportation and dispensing of plastic containers.

In the form of the invention just described, the stacking protuberance does not interfere, to any great extent, with the volume or capacity of the container, and this is an important factor in determining the ultimate usage of a particular stacking facility. Specifically, it will be noted that the lower stacking shoulder 20 and its end wall section 22, the upper stacking shoulder 24, and the intermediate connecting wall section 26 define the outer boundaries of a recess 30 formed in the stacking protuberance 18 of each container 10, the recess being of sizable proportions to receive a quantity of liquid therein. It will be recognized that were each stacking means or protuberance 18 not provided with the recess 30, a substantial reduction in the volume or capacity of the container would result. It will be appreciated, therefore, that the stacking means or protuberance 18 does not only provide a consistently functioning stacking device but does so without causing a substantial reduction in the volume or capacity of the container.

Reference is now made to the other forms of the invention illustrated in FIGS. 3-16 of the drawings, and in describing the various embodiments, similar reference numerals will be employed to identify parts corresponding with the FIGS. 1-2 embodiment, and also including a different letter suffix for each form of the invention shown to distinguish from the FIGS. 1-2 embodiment and the various other embodiments shown in FIGS. 3-16.

Considering the form of invention shown in FIGS. 3-4, it will be noted that the stacking means or protuberance 18a formed in the bottom wall of the container 10a differs from the FIGS. 1-2 embodiment in that the height and shape of the intermediate wall section 26a is materially different. Specifically, the axial height of the intermediate wall section 26a of the stacking protuberance 18a is less than the axial height of the connecting wall section 28a which will cause the end wall section 22a and the lower external stacking shoulder 20a to be positioned axially above and out of alignment with the bottom wall 12a. This arrangement will permit a smaller stack height for containers incorporating this particular stacking protuberance over the form of invention shown in FIGS. 1-2 as will be evident. A further distinguishing feature from the FIGS. 1-2 embodiment relates to the inclined or back tapered intermediate wall section 26a which structurally differs from the first upwardly direct portion and then inwardly directed portion of the intermediate wall section 26.

In the form of invention shown in FIGS. 5-6, it will be noted that the stacking means 18b of each container is
formed by utilizing a radially directed slot within an inverted frusto-conical area of the stacking means. As best seen in FIG. 6 of the drawings, the portions of the stacking protuberance 18b which surrounds the radially extending slot 30b define the end wall section 22b and its peripherally extending lower shoulder 20b, the intermediate section 26b, and that juncture of the intermediate section 26b with the upper stacking shoulder 24b. In this form of the invention, the axial height of the intermediate wall section 26b is inclined or back tapered with respect to the container axis in the same manner as the FIGS. 3-4 embodiment as well as providing a smaller axial height than that of the connecting wall portion 28b. This form of the invention indicates that slight structural modifications could be made in the stacking means or protuberance to give an entirely different visual effect, and yet retain all of the advantages of the embodiments previously discussed.

FIGS. 7-8 depict another modified form of invention which differs materially in appearance from those embodiments above discussed. However, it will be noted that the stacking means or protuberance 18c of each of the containers 10c in the FIGS. 7-8 embodiment also includes the lower and upper stacking shoulders 20c, 24c respectively and the intermediate wall section 26c joining the shoulder. The only difference of this embodiment from those previously discussed is the manner in which the stacking means or protuberance 18c is directed or projects outwardly away from the bottom wall 12c in this form of the invention. Hence, it will be understood that the stacking means or protuberance of the present invention may be either inwardly or outwardly directed after the fashion of the FIGS. 1-2 embodiment, for example, or may be outwardly directed relative to the bottom wall.

Considering next the embodiment of the invention shown in FIGS. 9-10, it will be noted that, except for the upper shoulder 24d and the connecting wall 28d, the remainder of the stacking structure is similar in shape to the FIGS. 3-4 embodiment. This embodiment makes it apparent that the upper stacking shoulder, or for that matter the lower stacking shoulder, need be not horizontally or radially directed and still accomplish its intended function in the environment of the present invention. In this case, the upper stacking shoulder 24d would include part of the connecting wall 28d even though the lower stacking shoulder 28d of the uppermost container does not come into contact therewith. Further, it will be recognized that the upper stacking shoulder 24d in this embodiment provides a line of contact with the lower stacking shoulder 24d which is all that is necessary in achieving the overlapping interference desired in this present invention.

The next two forms of the invention represented by FIGS. 11-12 and FIGS. 13-14 are somewhat similar in that the stacking protuberances in each instance are tilted or inclined with respect to the axis of the containers to provide the overlapping function for stacking purposes. In the FIGS. 11-12 embodiment, the stacking protuberance 18e of each container 10e is radially inwardly directed whereas in the FIGS. 13-14 embodiment, the stacking means or protuberance 18f is radially outwardly directed. In either 24e, the tilting or inclination of the stacking protuberance will provide an overlapping between at least portions of the upper and lower stacking shoulders associated with adjacent containers to provide stacking interference which is greater than the material thickness of the container at the point of overlap or contact. Thus, although there are portions of cooperating stacking shoulders which do not come into engagement with each other, it makes no difference in what position the containers are oriented relative to one another since in any case the stacking interference or overlapping of the type mentioned will be provided.

While the FIGS. 13-14 embodiment will conserve the volume or capacity of the container, the same will not be true of the FIGS. 11-12 embodiment. However, in both of the embodiments, the stacking protuberances 18e and 18f can be easily removed from the molding apparatus since there is no annular or peripheral undercut involved from the standpoint of stripping containers having such protuberances from their mold parts.

The last described embodiment illustrated in the drawings is shown in FIGS. 15-16. In this particular instance, there are a plurality of stacking protuberances 18g for each container 10g, each stacking protuberance 18g having the lower stacking shoulder 20g, the upper stacking shoulder 24g, and the intermediate wall section 26g. It will be noted that the lower stacking shoulder 20g and the upper stacking shoulder 24g of adjacent stacking protuberances 18g are joined to each other by way of a second intermediate wall section 32 which finds no counterpart in previously discussed embodiments. However, in this form of the invention, there is no connecting wall portion between the upper stacking shoulder of any stacking protuberance and the bottom wall of the container except for the stacking protuberance at the far left in FIG. 16 of the drawings. The stacking protuberance 18g at the far right in FIG. 16 of the drawings is joined to the bottom wall 12g through the intermediate wall section 26g.

The least optimum stacking position is shown for a pair of nested containers in FIG. 16 of the drawings, and it should be recognized that when this occurs, the bottom wall 12g to the far right as viewed in FIG. 16 will cooperate with the upper stacking shoulder 24g of a lowermost container in limiting the extent of telescopic association of adjacent containers. At any other position, the stacking protuberances 18g are designed on adjacent containers to effectively limit jamming or stacking of the containers in the same manner as described in the previous embodiments.

The thin-wall character of the material which is on the order of .01" in thickness and its inherent flexibility which is derived from the thermoplastic material will provide a certain amount of resiliency in various forms of the invention where the structure of the stacking protuberance will work with and not against this desired result. It is conceivable that there could be various stacking configurations which, although constructed in accordance with the present invention, will not take advantage of the flexibility of the material to provide a shock absorbing technique for the container that is subjected to the normal handling functions. This is, however, a very desirable result, and should be utilized in all instances where possible.

Various embodiments of the invention have been shown herein, and it will be understood that these are for illustrative purposes only and that changes in structure will have no doubt occur to those skilled in the art, and will be understood as forming a part of the invention.

I claim:

1. A seamless container of thermoplastic material having a bottom wall and a side wall which diverges upwardly and outwardly therefrom to an open upper end, and a stacking protuberance formed in the bottom wall of said container including an upper stacking shoulder and a lower stacking shoulder connected by an intermediate wall section, at least portions of the intermediate wall section being upwardly and inwardly directed relative to the lower stacking shoulder, said upper stacking shoulder in the vicinity of the upwardly and inwardly directed portions of said intermediate wall section being both radially outwardly and inwardly offset relative to the lower stacking shoulder to provide a shelf portion which engages the lower shoulder of a similarly configured container to limit the extent of telescopic association of said containers and thereby prevent jamming, said intermediate wall section first extending upwardly from the lower stacking shoulder and then inwardly toward the container axis, the inwardly directed portions of the intermediate wall section and the inwardly offset portions of the upper stacking shoulde being superposed relative to one another.
2. The container as defined in claim 1 wherein the protuberance is axially inwardly directed from the juncture of the bottom and side wall of the container.

3. The container as defined in claim 1 wherein the lower stacking shoulder is axially spaced upwardly from the bottom wall of the container.

4. The container defined in claim 1 wherein the lower stacking shoulder is transversely aligned with the bottom wall of the container.

5. The container as defined in claim 1 wherein the upper stacking shoulder is radially displaced relative to the lower stacking shoulder.

References Cited

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