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 [73] Assignee **The Dow Chemical Company**
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3,321,104 5/1967 Edwards..... 220/97
 3,396,868 8/1968 Fitzgerald..... 220/97
 3,420,397 1/1969 Miller..... 220/97

Primary Examiner—George T. Hall

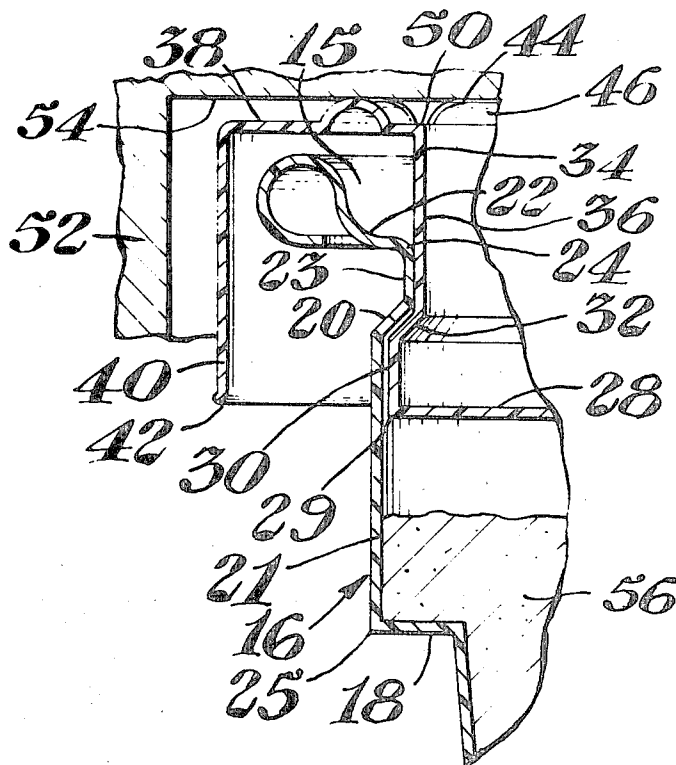
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[54] **CONTAINER**
6 Claims, 4 Drawing Figs.

[52] U.S. Cl. 220/60,
 220/97
 [51] Int. Cl. B65d 43/10,
 B65d 21/00
 [50] Field of Search..... 220/60, 97;
 215/41

[56] **References Cited**
UNITED STATES PATENTS
 3,179,283 4/1965 Amberg..... 220/60

ABSTRACT: A thin walled thermoplastic container for packaging food and dairy products as, for example, yogurt, sherbets and ice creams, salads, cottage cheese and other like products. The tub includes a high profile stacking shoulder which renders like tubs nestable in one another. The lid is a novel snap-in lid which presents a small shoulder about the top of the lid rim. The shoulder keeps the lids in a stack prior to their being utilized to cap tubs but permits the lids to be readily disengaged from one another by automatic coin feeding and to be readily separable from a capping device in a capping operation.



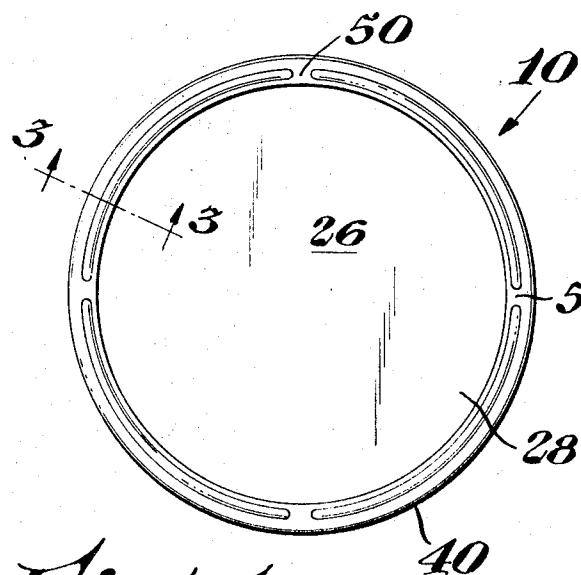


Fig. 1

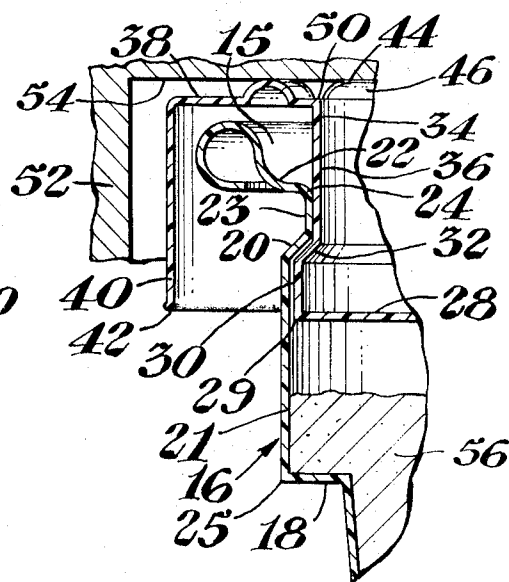


Fig. 3

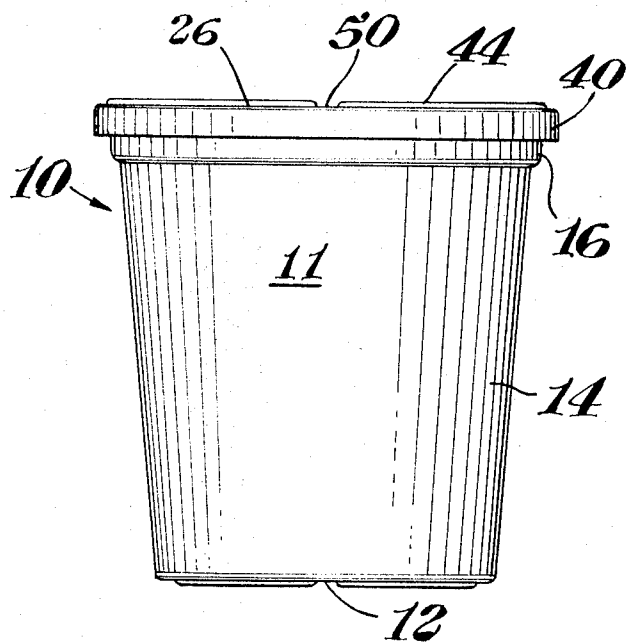


Fig. 2

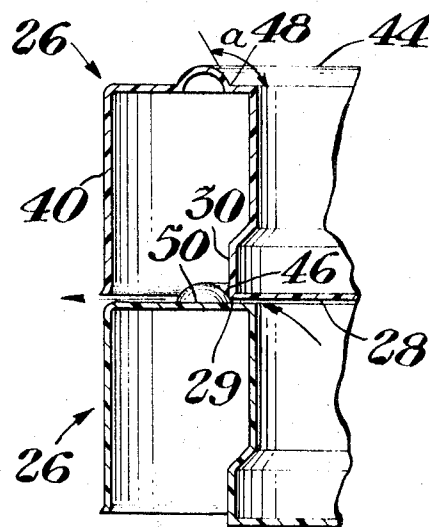


Fig. 4

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CONTAINER

DISCLOSURE OF THE INVENTION

This invention relates to a nestable thin walled container for the packaging of yogurt, sherbets and ice creams, salads, cottage cheese and other like products. The tubs and lids of the container are particularly well adapted to be handled in stacks and dispensed one at a time for filling and capping. More particularly, this invention relates to a lid having a novel stacking detail, (the more conventional lids being like that shown in U.S. Pat. No. 3,396,868, for example) and is adapted to be coin fed by automatic equipment in a capping operation.

It has also been found that the present lid could obtain a sealed fit without the lid having an extensive depth, that is, fitting down fully within the entire stacking ridge area of a conventional tub, the lid of the aforesaid U.S. Pat. No. 3,396,868 being illustrative of the deeper fit of a typical prior art lid.

Accordingly, it is one of the principle objects of this invention to provide a new and improved lid having a stacking detail which permits the lids to be coin fed on automatic equipment, to maintain themselves in alignment when in a stack and avoid the necessity of filling the entire stacking ridge area of a tub when engaged therewith, therefore allowing greater product fill in the tub.

Briefly, a novel stackable snap-in coverall lid for nestable tubs is provided. The lid includes about its upper periphery an interrupted stacking ring having an inclined inside shoulder. This permits the lids to maintain a stable stack while being readily coin feedable. It also prevents a partial vacuum being created between a lid and a capping device. The lid also seals in the tub without going fully into the stacking ridge area of the tub thereby permitting a greater product fill than would otherwise be possible.

Yet additional objects and advantages of the present invention are even more apparent when taken in conjunction with the accompanying drawing in which like characters of reference designate corresponding material and parts throughout the several views thereof, in which:

FIG. 1 is a top view of a container including a lid illustrating the principles of the present invention;

FIG. 2 is an elevational view thereof;

FIG. 3 is an enlarged fragmentary cross-sectional view thereof taken along the reference line 3-3 of FIG. 1, and including a fragmentary section of a capping device; and

FIG. 4 is an enlarged fragmentary cross-sectional view, like FIG. 3, only showing a pair of lids in a stacked relationship.

Referring more particularly to FIGS. 1-3 each nested container 10 includes a tub 11 which has a bottom wall 12 and extending upwardly therefrom, an outwardly inclined sidewall 14. At the upper extent of the sidewall 14 is a circumferentially extending combined lid receiving area and stacking ridge 16. Ridge 16 includes a shoulder 18 extending generally horizontally outwardly from the sidewall 14 to outer edge 25. Extending generally vertically upwardly from edge 25 is a circumferential portion 21. Inclined inwardly from vertical portion 21 and thus at an angle reverse (as respects the vertical from that of sidewall 14) is a face section 20. Face section 20 merges with a shelf 22 via a vertical portion 23 at upper edge 24 of the latter. Shelf 22 extends outwardly and upwardly from the upper edge 24 and merges with rim 15 about the upper peripheral extent of the tub 11.

With this arrangement, the outer edge 25 of the shoulder 18 extends outwardly of upper edge 24 so that a shoulder 18 can seat on shelf 22 of a next lower container to provide a positive stack between two such containers when nested together.

A lid 26 is adapted to snap-fit within the stacking ridge 16 area of the tub 11 and overlap the tub rim 15. Lid 26 includes an annular base 28 where, at its peripheral extent 29, it is joined with a circumferential generally vertical section 30. Section 30 preferably conforms in angular disposition with the upper part of vertical portion 21 of stacking ridge 16. Extend-

ing from vertical section 30 is an upwardly and inwardly inclined section 32 conforming generally in angular disposition with face section 20 of the tub 11. Extending upwardly from section 32 is a generally inverted U-shaped lid rim 34. Rim 34 includes an upwardly extending vertical leg 36, adapted to abut vertical portion 23 of the tub, an outwardly extending bight portion 38 and downwardly extending leg 40 which extends substantially below the rim 15 and face section 20. A lip 42 can be provided for easy grasping of the bottom of the lid for opening.

Included circumferentially about the bight portion 38 is a protruberance or stacking ring 44 which extends slightly above the upper extent of the bight portion 38. This stacking ring can be semicircular in shape, as shown, or perhaps take the shape of a truncated triangle or any other configuration which will provide an effective inclined inside shoulder 46, as hereinafter described. The beneficial effects of shoulder 46 of stacking ring 44 are shown most clearly in FIG. 4. The juncture of the annular base 28 and section 30 of the lid defines an outer edge 29 which will be held against the shoulder 46 when a plurality of lids 26 are stacked one on top of the other. In other words, the diameter of the area defined by the circumferential inside corner 48 at the lower end of the shoulder 46 preferably has the same or is only slightly larger than the diameter of the area defined by the outer edge 29 about the annular base 28. In FIG. 4 the diameter is the same so that the bottom of base 28 is spaced upwardly slightly from bight portion 38 to allow ready venting as described hereinafter in more detail. Likewise, the height of the stacking ring 44 should be greater than the thickness of the base 28 but generally not higher than that necessary to give the shoulder 46 a gentle inclination about as illustrated. An angle α of about 120° , plus about 40° or minus about 20° , has been found preferable. In such a configuration the lids 26 can be readily disengaged from one another in a stack for automatic coin feeding with very slight effort. Until they are so disengaged, the abutment of the edge 29 against the shoulder 46 is sufficient to keep the lids in a stacked arrangement.

Stacking ring 44 can include flatter interruptions 50 therearound. This gives two significant advantages. First, it will permit ready dropping of a filled capped container 10 from a capping device 52. Second, it will enhance coin feeding of the lids to a capping device.

As for the first feature, when a lid 26 is placed on a filled tub 11, the lid is customarily snapped into place by a capping device 52 shown partially in FIG. 3. In engaging lid 26 surface 54 of the capping device rides on the top of stacking ring 44. In the past water or other fluid products often got between surface 54 and the top of stacking ring 44 and formed a seal which created a partial vacuum between the lid 26 and capping device 52. As a result the lid often would not readily release from the capping device and thereby interrupt the filling and capping lines operation. Early attempts to solve this problem included drilling holes in the bell of the capping device directly about the ring 44. However, this was expensive. The interruptions 50 instead provided venting passageways which avoid the possibility of a partial vacuum being generated and expediently and without additional significant costs solved the problem of lid hang up in the capping device.

Interruptions 50 also permit ready venting of air between nested lids as illustrated by arrows in FIG. 4, so that a vacuum effect is avoided therebetween which otherwise tends to hold the lids together and make more difficult the coin feeding operation. With the aforesaid diameters being approximately equal, the material thickness of the lid section 30 will cause the edge 29 to ride slightly up on shoulder 46 to allow free venting. In any event, venting is enhanced by interruptions 50.

It has been found that it is sufficient for the lid 26 to seat within stacking ridge 16 of the tub so that the annular portion 28 extends only partially down the length of vertical portion 21 of the stacking ridge. Thus the base 28 of the lid can be substantially spaced upwardly from the shoulder 18 and still

have an effective seal lid. This is because interengagement of the lid and tub primarily occurs between the corresponding portions 32 and 20, and 34 and 23 of the lid and tub, respectively. By the lid being located at a shallow depth, greater volume product capacity for a given tub is achieved. Note that packaged product 56 in FIG. 4 extends upwardly into stacking ridge area 16 which would otherwise have been occupied by a lid in accordance with prior art teachings.

Great flexibility in the use of thermoplastic materials in forming the container 10 is possible. For example, the container 10 can be thermoformed from copolymers, homopolymers, blends or multilayers of high impact polystyrene, acrylonitrile-butadiene-styrene, polyethylene, saran or other thermoplastic materials.

While certain representative embodiments and details have been shown for the purpose of illustrating the invention, it will be apparent to those skilled in the art that various changes and modifications can be made therein without departing from the spirit and scope of the invention.

We claim:

1. A snap-in thermoplastic lid for a container, said lid comprising an annular base joined at its outer edge with a generally inverted U-shaped rim, said rim defined by two generally vertical legs traversed by a bight portion, a stacking ring extending generally circumferentially about said bight portion and presenting along its inside dimension a shoulder inclined upwardly and outwardly from said bight portion, wherein the outer edge of said annular base defines an area the diameter of which is at least as great as the area defined by the circumferential inside corner at the lower end of said shoulder, said stacking ring being interrupted about its circumference to provide at least one venting passageway, whereby when one said lid is stacked with another like lid the bottom of the annular base of the upper lid is spaced upwardly from the bight portion of the lower lid to allow ready venting therebetween and through said venting passageway so that separation of the stacked lids can be readily accomplished.

2. The lid of claim 1 wherein the angular inclination of said shoulder from said bight portion is about 120° plus about 40° or minus about 20°.

3. A thermoplastic container including a tub and a lid snap-fitted therein, said tub having a bottom wall, a circumferential sidewall extending upwardly and generally inclined outwardly from said bottom wall and ending in a peripheral rim at its upper extent, a circumferential stacking ridge including said rim and a portion of said sidewall immediately therebelow, said stacking ridge being defined by a tub shoulder at its lower end and by a shelf at its upper end, the outer extent of said tub shoulder being greater than the inner extent of said shelf whereby the tub shoulder of one such container can seat on the shelf of a next lower like tub to provide a positive stack between two such tubs when nested together, said lid comprising an annular base joined at its outer edge with a generally inverted U-shaped rim, said rim defined by two generally vertical legs traversed by a bight portion, a stacking ring extending generally circumferentially about said bight portion and presenting along its inside dimension a lid shoulder inclined upwardly and outwardly from said bight portion and presenting along its inside dimension a lid shoulder inclined upwardly and outwardly from said bight portion, wherein the outer edge of said annular base defines an area the diameter of which is at least as great as the area defined by the circumferential inside corner at the lower end of said lid shoulder, said stacking ring being interrupted about its circumference to provide at least one venting passageway, whereby when one said lid is stacked with another like lid the bottom of the annular base of the upper lid is spaced upwardly from the bight portion of the lower lid to allow ready venting between the two and through said venting passageway so that separation of the lids from a nested stack can be readily accomplished.

4. The container of claim 3, wherein said lid and said tub have complimentary sidewall sections.

5. The container of claim 4, wherein the sidewall sections of said lid have a total vertical depth less than the vertical depth of said tub stacking ridge from the tub rim so that the annular base of said lid is spaced upwardly from the shoulder of said tub stacking ridge.

6. The container of claim 5 wherein the angular inclination of said lid shoulder from said bight portion is about 120° plus about 40° or minus about 20°.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,589,552 Dated 29 June 1971

Inventor(s) Charles E. Fitzgerald and Robert J. McCormick

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In column 4, Claim 3, lines 18 through 20, delete "and presenting along its inside dimension a lid shoulder inclined upwardly and outwardly from said bight portion".

Signed and sealed this 2nd day of November 1971.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Acting Commissioner of Patents