

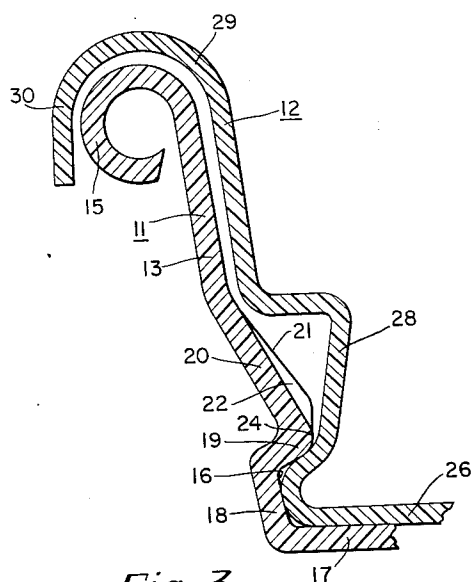
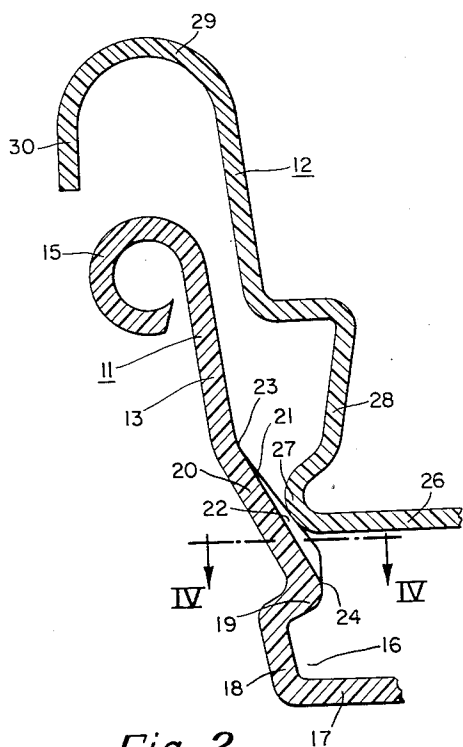
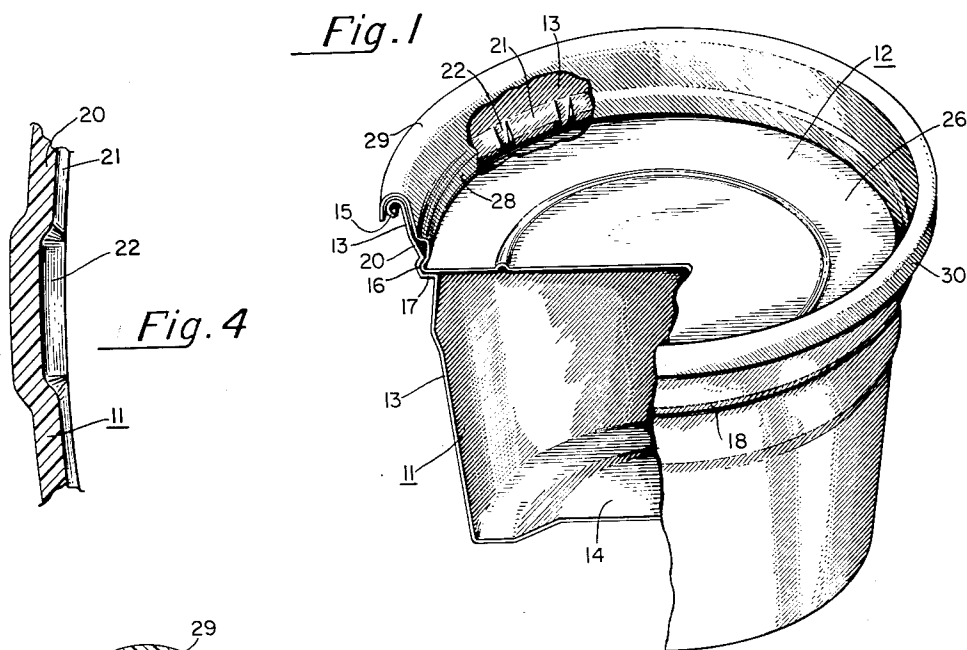
July 26, 1966

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3,262,602

PLASTIC CONTAINER AND LID

Filed June 17, 1964



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3,262,602

PLASTIC CONTAINER AND LID

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Filed June 17, 1964, Ser. No. 375,828
6 Claims. (Cl. 220—60)

This invention relates to thin wall, disposable plastic containers of the type in which foodstuffs, such as cottage cheese and ice cream, are packaged. Containers of this type are generally pressure formed in cavity molds from thin plastic sheet material, with the resulting container being a unitary structure having the configuration of the surface of the cavity in which it is formed. Lids for such containers are also generally pressure formed from sheet plastic material in a manner similar to that by which the containers are formed.

It is essential from the standpoint of product cleanliness and also to prevent product spillage that the lid form a tight, fluid proof seal with the container to which it is affixed. Moreover, the lid must be positively and mechanically locked to the container to preclude accidental dislodgement of the lid during transportation and handling of the filled container. To achieve these ends it has been the practice to form a groove in the side wall of the container near its open end for receiving a sealing bead which is formed in the lid and is adapted to snap into and become mechanically locked in the container groove.

It has been observed that when lids of this character are rapidly applied to their containers, under conditions such as those encountered when using automatic filling and lid placing equipment, a substantial quantity of air may be trapped inside the container when the lid is fully seated. This is due to the inherent interference, i.e. overlap, between the lid sealing bead and the mouth of the container. In some instances the quantity of air involved is such that when the lid is fully in place the air exerts sufficient forces on the lid to cause the lid to blow off, either immediately after the lid is in place or subsequently when the container is subjected to normal handling activities.

It is the principal object of this invention to provide a thin wall plastic container to which a flexible snap-in lid can be applied without trapping an excessive quantity of air in the container.

The invention contemplates a container in which an outwardly tapering region of the container wall immediately above the sealing groove in the wall is provided with venting means which permit air to escape from beneath a lid being applied to the container during that portion of the lid movement in which the lid sealing bead is in contact with the sloping region of the container wall.

It is a further object of the invention to provide the above-mentioned venting means with a minimum of modification of the cavity of the mold in which the container is formed. This objective is achieved through the discovery that entirely adequate venting can be achieved by providing spaced, offset sections in the tapering region of the container wall, with the offset being no greater than the thickness of the container wall.

Other objects, advantages and features of the invention will be apparent from the following detailed description of the invention in which reference is made to the accompanying drawing wherein:

FIG. 1 is a perspective view of a container-lid combination incorporating this invention and from which portions of the structure have been broken away to show the wall structure of the container and the lid;

FIG. 2 is an enlarged vertical sectional view of the

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upper portion of the container wall and a portion of the lid being applied to the container;

FIG. 3 is a view similar to FIG. 2, but illustrating the container with the lid in sealing relationship therewith; and,

FIG. 4 is a fragmentary sectional view through the venting means of the container taken generally as indicated by the line IV—IV in FIG. 2.

Referring particularly to FIG. 1, the container of this invention is identified generally by reference numeral 11 and the lid therefor by reference numeral 12. Container 11 is an integral structure formed of a single sheet of plastic material and which possesses a tapering side wall 13 and a bottom wall 14. Such containers are generally vacuum formed from a single sheet of plastic material, such as polystyrene, which after being softened by the application of heat is drawn or forced into a female mold by means of vacuum, pressure or a combination of vacuum and pressure. The mold used for this purpose has an interior surface having a configuration closely matching the desired final configuration of the container. In other words, any grooves or rings desired in the wall 13 of the container 11 are produced by corresponding grooves or rings in the side wall of the mold. With certain limitations, the container 11 may have any desired configuration.

If desired, container 11 may be provided with a reinforced rim 15 at its mouth by rolling over a portion of the material of the side wall 13. This is usually accomplished in a separate rim rolling operation.

As best shown in FIGS. 2 and 3, the container side wall 13 has formed therein adjacent the open end of the container 11 a lid sealing groove indicated at 16. The groove 16 is provided by forming an outwardly extending annular shoulder 17 in the container wall 13, which is connected to an upwardly extending ring 18 which, in turn, joins with an inwardly extending annular shoulder 19. Sealing groove 16 is defined by lower shoulder 17 and upper shoulder 19. Tapering upwardly and outwardly from shoulder 19 toward the mouth of container 11 is an annular wall region 20 which provides a cam-like inner surface 21 at the mouth of the container 11 which facilitates application of lid 12 as is hereinafter described.

In accordance with this invention cam surface 21 of tapering wall region 20 is provided with vent means in the form of a plurality of spaced recesses 22 which are formed by outwardly offsetting sections of region 20 (see FIG. 4). Recesses 22 preferably commence at the upper edge 23 of tapering wall region 20 and extend down to upper shoulder 19, but terminate at a point, indicated at 24, which is above groove 16 so that the recesses 22 do not encroach upon sealing groove 16.

The purpose of recesses 22 in the tapering region 20 of the container wall 13 is to allow air to escape from the interior of container 11 as a lid 12 is applied thereto.

It will be noted that lid 12 is formed of a single sheet of flexible plastic material, such as polystyrene, and may be pressure formed in a manner similar to the container so as to possess a circular closure disc, or face, 26 and an outwardly projecting annular sealing bead 27 at the periphery of the disc. The lid 12 is formed above the sealing bead 27 with an inwardly and upwardly projecting ring portion 28 which provides clearance for the sealing bead 27 to snap beneath the upper shoulder 19 in container wall 13. Lid 12 may also include, if desired, an upwardly extending annular ring 29 having a depending skirt 30 thereon for covering container rim 15 when the lid is in place on the container.

FIG. 2 illustrates the manner in which lid 12 first engages container 11 as the lid is placed on the container. Suitable equipment, not shown, is employed in most pack-

ing operations for conveying the lid to the container and for thereafter rapidly forcing the lid into and on the container. It will be noted that the inside diameter of wall region 20 at its upper edge is greater than the outside diameter of lid bead 27 and at its lower edge is substantially less than the outside diameter of bead 27. As the lid is forced down on the container, sealing bead 27 contacts the cam-like surface 21 on the tapering region 20 of container wall 13. Inherent flexibility of the lid 12 and flexibility of the container wall 13 permit sealing bead 27 to be forced down over shoulder 19 of the container without any permanent distortion of either the lid or the container. On clearing shoulder 19 the lid bead 27 snaps into groove 16 and wedges tightly therein forming a dual seal with the lower shoulder 17 and the upper shoulder 19 of the container wall, as shown in FIG. 3, thereby assuring positive closure of the container and precluding accidental discharge of the contents of the container.

From the point at which lid bead 27 contacts sloping surface 21 of container 11 there is a tendency for the air which is trapped beneath lid 12 to be compressed within the interior of container 11. However, in accordance with this invention, this entrapped air is permitted to escape through venting recesses 22 during downward travel of the lid toward its seated position. Once the lid bead 27 has been forced down past the lower edge 24 of venting recesses 22 no further venting can take place. Although further downward movement of the lid may compress a small quantity of air trapped in the container 11, there will not be sufficient air trapped to cause deleterious pressures to be built up within the closed container. More importantly, terminating the venting recesses 22 short of seating groove 16 insures that the recesses 22 in no way interfere with sealing engagement of lid bead 27 with container shoulder 19 and a positive and effective seal can thereafter be maintained between the lid 12 and the container wall 13.

From the foregoing it should be apparent that this invention provides a simple, yet effective, means for venting air from a container as a lid is applied thereto. It is of significance to note that in accordance with this invention recesses 22 can be effective to provide the necessary venting action even though the recesses are relatively shallow. Thus, in a typical plastic container in which the wall thickness may range from .015 inch to .025 inch recesses 22 may have a maximum depth of the order of 0.10 inch, less than the thickness of the container wall in the region in which they are formed (see FIG. 4). Moreover, recesses 22 are easily formed and require only minor modifications in the mold cavity in which the container is formed. Tapering region 20 of the container wall would normally be formed by a ring-like member protruding into the container forming cavity. Provision for recesses 22 can be made by milling shallow, spaced indentations in the mold ring. No additions to the mold are required.

What is claimed is:

1. A thin wall, one piece sheet plastic container having an opening at one end thereof, the wall of said container having upper and lower continuous annular shoulders formed therein adjacent the open end of the container and providing an annular groove therebetween, said groove being adapted for receiving the sealing bead of a flexible lid in sealing relationship with the container wall, said container wall having an outwardly tapering region extending from said upper shoulder toward the open end

of the container, said wall region tapering to a diameter greater than the outside diameter of the sealing bead on the lid which the container is adapted to receive, said wall region having vent means formed therein and terminating at the junction of said wall region and said upper shoulder, said vent means being effective to permit air to escape from the interior of the container as a lid is being applied to the container, but only while the sealing bead on the lid is in contact with said tapering wall region, said container providing a reliable lid seal upon insertion of the sealing bead of a flexible lid within said groove due to pressure applied from substantially diametrically opposed directions to said bead about the entire periphery of said lid by said upper and lower continuous annular shoulders.

2. A container as set forth in claim 1 in which said vent means comprises a plurality of circumferentially spaced, outwardly offset sections in said container wall.

3. A container as set forth in claim 2 in which said offset sections in the container are displaced from adjacent sections of the container wall by an amount less than the thickness of the wall sections.

4. The combination of a thin wall, one piece sheet plastic container having an opening at one end thereof, and a flexible one piece snap-in lid for said container, the wall of said container having upper and lower continuous annular shoulders formed therein adjacent the open end of the container and providing an annular groove therebetween, said lid having an annular sealing bead adapted to be received in said container groove between said shoulders, the outside diameter of said bead being greater than the inside diameter of said shoulders in the container, said container wall having an outwardly tapering region extending from said upper shoulder toward the open end of the container, said wall region tapering to a diameter greater than the outside diameter of the sealing bead on said lid, said tapering wall region having vent means formed therein and terminating at the junction of said wall region and said upper shoulder, said vent means being effective to permit air to escape from the interior of the container as said lid is being applied to the container but only while the sealing bead on the lid is in contact with said tapering wall region, said container providing a reliable lid seal upon the insertion of said sealing bead within said groove due to pressure applied from substantially diametrically opposed directions to said bead about the entire periphery of said lid by said upper and lower continuous annular shoulders.

5. The combination container and lid as set forth in claim 4 in which said vent means comprises a plurality of circumferentially spaced, outwardly offset sections in said container wall.

6. The combination as set forth in claim 5 in which said offset sections in the container are displaced from adjacent sections of the container wall by an amount less than the thickness of the wall section.

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