[54] RECLOSABLE EASY OPENING CONTAINER

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[57] ABSTRACT
The improvement in an easy opening type of container of a container end with a resilient reclosure device made of a material such as certain resilient plastics, and having a resilient lip portion airtightly connected to the container end with apertures in the lip portion and the container end aligned, and a resilient removable portion having plugs airtightly and removably engageable with the apertures in the lip portion and having a pull tab connected thereto to facilitate removal, the lip portion and removable portion initially being airtightly bonded together to provide an excellent seal prior to original opening.

7 Claims, 8 Drawing Figures
RECLOSEABLE EASY OPENING CONTAINER

BACKGROUND OF THE INVENTION

This invention relates in general to an improvement in easy opening containers. In particular, it pertains to the pop-open member which is a part of the container end. Pop-open containers, such as are widely used for beer, soft drink and other beverages, have gained extreme popularity because of the convenience which they afford the consumer. Indeed, in this country use of the old "church key" type of opener is nearly a thing of the past.

Numerous improvements and variations have been made in the pop-open type of container and it seems apparent that in some form they are here to stay. However, some serious problems still exist, and this invention is directed to solving such problems.

In the most common type of easy opening container end, a portion of the metal defined by score lines is removed upon application of a pulling force exerted through a pull tab attached to the scored section. After the container is opened a bare and occasionally sharp metal edge is exposed. When consumers drink directly from the can, which is a common practice, there is a risk of injury to the upper lip from contact with the bare metal edge.

Another common problem of such beverage cans is the storage of beverage in opened, but unfinished, containers. Because of the absence of adequate reclosures, the contained beverage spoils during storage. The problem does not arise if all the beverage in a given container is consumed at one sitting. However, if the beverage is saved for later use, it will be found that the carbonation is lost giving a flat taste and in some cases food odors in the refrigerator have spoiled the taste.

Another problem to which a specific feature of this invention is directed is the breaking off of pull tabs from the container end without having completed the opening of the container. In some cases, the rivet will break or the scored portion will break adjacent the rivet from excessive bending in a futile attempt to tear the end along the score lines, thus rendering the tab detached and non-effective.

SUMMARY OF THE PRESENT INVENTION

My invention provides an easy opening type of container which successfully overcomes these problems. In my invention, I use a resilient material such as a resilient plastic to form a lip portion to cover the metal edge in the container end, and thereby eliminate the risk of injury to the drinker. My invention also provides a reclosure which allows storage of a contained product which is unused immediately after opening. A snap type mechanical seal between a resilient reclosable portion and the resilient lip portion of my reclosure is provided and is of ample effectiveness as a seal during storage after partial use, such as typical refrigerator storage.

With some sort of reclosure devices, a problem of pressure loss might exist during storage prior to original use. However, this problem is overcome by my invention in which the resilient removable portion is initially bonded by, for example, an integral plastic bond, to the resilient lip portion which is airtightly connected by firm connection to the container end. An excellent initial seal, which is necessary for beverage storage at ambient temperatures, under shipping conditions, is made possible by the aforementioned bonding and firm connection.

My invention also eliminates the aforementioned problem of tabs breaking off prior to completion of the opening. Use of a resilient reclosure rather than the common metal scored section prevents the metal breakage which occurs adjacent the tab by excessive bending near the tab. A preferred embodiment of my invention has a pull tab which is integral with the removable portion which further reduces the possibility of breakage.

Another specific advantage of my invention resides in the possible ease of production by the can maker. The reclosure devices may be molded in one piece and simply pressed into apertures in the metal ends of the containers. Thus, numerous steps including scoring and riveting may be by-passed.

Accordingly, it is an object in my invention to provide an easy opening container overcoming the aforementioned problems.

It is another object of my invention to provide a container of the easy opening type having a flexible lip portion about the container end aperture means such that the raw metal edge will not be exposed to the lips of the drinker.

It is a further object of my invention to provide an easy opening container which is both convenient for drinking therefrom and is readily reclosable to prevent the beverage therein from going flat and gaining an off taste while stored in a refrigerator.

It is yet a further object of my invention to provide a reclosable easy opening container having the aforementioned advantages and having a resilient removable portion initially bonded to a resilient lip portion to maintain the desired pressures even when the can is stored for lengths of time or shipped at ambient temperatures.

It is still another object of my invention to provide a reclosable easy opening container with reclosure means having two resilient portions, one being airtight connection to a container end and the other being reclosably removable, and the portions being initially airtightly attached by bond means integral with both of said portions.

It is another object of my invention to provide an easy opening container having a pull tab which does not break off prior to completion of opening the container.

It is a further object of my invention to provide an easy opening container having a container end which is easily produced by the can manufacturer.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other important objects of my invention will become apparent from the following description and from the drawings showing preferred embodiments wherein:

FIG. 1 is a fragmentary perspective view of an unopened easy opening beverage container having the reclosure device of this invention.

FIG. 2 is a top plan view of a portion of the apparatus shown in FIG. 1.

FIG. 3 is an enlarged fragmentary sectional view of Section 3-3 as shown in FIG. 2, but with the metal end removed.
FIG. 4 is a side elevation of the reclosure device showing the opening operation. An indication of the seam location is included.

FIG. 5 is a side elevation as in FIG. 4, but with the removable portion of the reclosure device removed to facilitate pouring or drinking.

FIG. 6 is a side elevation as in FIG. 4, but with a removable portion poised to reclose the container.

FIG. 7 is a side sectional view as in FIG. 3, but with the removable portion inverted to its position in FIG. 6 and inserted such that the container is reclosed.

FIG. 8 is a fragmentary side sectional view of another preferred embodiment of my invention.

**DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS**

Referring in detail to the figures and particularly to FIG. 1, an easy opening type of container is designated by numeral 11. The container has sidewalls 12 and a container end 13 joined to walls 12 by seam 14. Attached to container end 13 is reclosure means 15 having a resilient lip portion 16 and a resilient removable portion 17. Integral with resilient removable portion 17 is pull tab 18 which is used in removing removable portion 17 from lip portion 16 to prepare the container for pouring or drinking.

As shown in FIGS. 2 and 3, resilient lip portion 16 has a top surface 21 which is above and adjacent to container end 13. Top surface 21 includes edges 22 about each of two apertures defined by lip portion 16. The function of edges 22 will be described further hereinafter.

FIG. 3 is an enlarged sectional view of Section 3—3 as shown in FIG. 2 and the two figures together show a preferred embodiment of my invention prior to the original opening of this easy opening container. Container end 13 of this preferred embodiment defines aperture means consisting of two container apertures. Lip portion 16 has protrusions 23 extending respectively through two of the container apertures. Protrusions 23 of lip portion 16 define locking groove means 19 thereabout which if container end 13 is inserted into the respective container apertures.

Lip portion 16 defines lip aperture means which in the case of this preferred embodiment consists of lip apertures 20. Lip apertures 20 are aligned with the container apertures such that the beverage within container 11 may exit the container therethrough.

As shown most clearly in FIGS. 3 and 4, resilient removable portion 17 is bonded by bond means 24 to edges 22 of lip portion 16 at top surface 21. Bond means 24 make removable portion 17 an airtight cap over lip apertures 20. In a preferred embodiment of my invention, bond means 24 is integral with lip portion 16 and removable portion 17, that is, the same material forms lip portion 16, bond means 24 and removable portion 17. Indeed, if the reclosure is made from material such as plastic, as I have done, lip portion 16, bond means 24 and removable portion 17 may be molded together in a single mold. This provides the aforementioned ease in making a container of this invention as opposed to the old system which required several steps including scoring a container end and riveting a pull tab to the scored portion. In making this preferred embodiment of my invention, a mold forms the entire reclosure, including lip portion 16, bond means 24, removable portion 17 and pull tab 18, and after being thus formed the reclosure may simply be snapped in aperture means formed in the metal of the container end.

FIGS. 2 and 3 clearly show the details of removable portion 17. Removable portion 17 is substantially planar and lying in a horizontal plane when the can is in an upright position. In the preferred embodiments shown in the figures, pull tab 18 is attached to the end of the elongated removable portion 17 which is near the center 25 of container end 13. Further, pull tab 18 is integral with the remainder of removable portion 17 and thus provides the strength and reliability earlier mentioned. In FIGS. 1 through 4, plug means 25 protrude from the upper surface 26 of removable portion 17. In the embodiment shown plug means 25 are integral with the remainder of removable portion 17. Plug means 25 are in positions corresponding to lip apertures 20. As shown in the figures, plugs 25 have bulging portions 26 which during reclosure fit snugly into snap grooves 27 which are defined by lip portion 16 about each of the lip apertures 20 below top surface 21. Plugs 25 are essentially complementary to snap grooves 27 and are airtightly engageable with snap grooves 27 such that removable portion 17 may be reclosably connected to lip portion 16. Plugs 25 and snap grooves 27 may be readily engaged such that the reclosing of an easy opening container is a convenient operation. Since both lip portion 16 and removable portion 17 are of resilient material, their engagement is sufficient to prevent loss of carbonation and to prevent off flavors from being exposed to the contained beverage.

Referring now to FIGS. 3 through 7, the operation of the preferred embodiment of my invention is illustrated. FIG. 3 shows the reclosure of my invention in the initial stage, that is prior to the original opening. Removable portion 17 is airtightly bonded to lip portion 16. Bond means 24 and the connection of lip portion 16 to container end 13 by locking groove means 19 are sufficient to provide an excellent seal such that under ambient temperatures and shipping conditions there will be no leakage.

Referring to FIG. 4, the initial stages of the original opening are illustrated as the finger of the opener is inserted in pull tab 18. Bond means 24 is broken by the exertion of a pulling force through pull tab 18.

FIG. 5 illustrates the easy opening container of my invention with removable portion 17 removed such that the container is in condition for drinking or pouring. It is readily seen that lip apertures 20 are aligned with the container apertures such that the enclosed beverage will flow from the container.

FIG. 6 illustrates removable portion 17 inverted and in position above lip portion 16 such that plugs 25 are aligned with lip apertures 20. Upon exertion of a downward pushing force using a finger, the user may readily reclose the easy opening container of my invention.

FIG. 7 is a sectional view illustrating the snap connection of a removable portion 17 to lip portion 16. Note that bulging portions 26 of plugs 25 are tightly engaged within snap grooves 27 of lip portion 16.

FIG. 8 shows another preferred embodiment of my invention. In this embodiment, it is not necessary to invert removable portion 17 from the original attitude in which it is initially bonded to lip portion 16 in order to insert plugs 25 into lip portion 16. Bond means 24 attaches edges 22 of lip portion 16 to plugs 25, which are on undersurface 28 of removable portion 17 rather
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than on the upper surface as shown in FIGS. 1 through 4 and 6. Lip portion 16 may be airtightly sealed to container end 13 in a number of ways. However, in the preferred embodiments shown, protrusions 23 extend through container apertures and container end 13 and locking groove 19 in lip portion 16 grip container end 13 about the container apertures. Since locking grooves 19 are fairly deep it is possible to get an excellent airtight seal between the resilient lip portion 16 and container end 13 without the use of any sealing compound. However, compounds may be used and indeed, other configurations differing from the preferred embodiments shown may be used to form a sufficient airtight connection between container end 13 and lip portion 16. In the preferred embodiments shown, it will be noted that protrusions 23 are generally tapered. This tapering facilitates the can manufacturer's insertion of reclosure 15 into the apertures of container end 13 by acting as a pilot.

It will be noted that in FIGS. 3, 4 and 6, plugs 25 appear to be solid, while in FIG. 8, plugs 25 are hollowed. Resilient removable portion 17 may have either hollow plugs or solid plugs, and both which work satisfactorily.

Pull tab 18 may be integral with removable portion 17 as is shown in the preferred embodiments. However, it may be connected to removable portion 17 in some other manner.

In the preferred embodiments shown in the figures, reclosure 15 is off-center has two apertures which are radially aligned. The aperture farthest off-center is a flow aperture for the contained beverage. The smaller aperture near the center of container end 13 is a vent aperture which functions primarily to allow inward air passage as the liquid flows out the flow aperture. It will be noted the apertures are similar in shape. This is not necessary as differing shapes may be used. Circular apertures are preferred because the airtight seal upon reclosing is quite satisfactory using that configuration. However, triangular configurations, or other regular or irregular configurations may be used. While the preferred embodiments show two apertures, a single aperture or more than two apertures are within the limits of my invention. A single aperture would normally be larger than the flow aperture of the emboidment shown and would normally be elongated so that the near center portion could provide the venting function during drinking or pouring.

The reclosure may be made of a wide variety of plastic or other resilient materials. I have used polyvinyl chloride in initial testing with success. Other materials include low and high density polyethylene, polypropylene, certain polyesters of phthalic acid and ethylene glycol such as Mylar, certain nylons such as nylon 6-6, nylon 6, nylon 6-10, nylon 11 and nylon 12, styrene acrylonitrile copolymer, styrene butadiene acrylonitrile terpolymer, polyacetal, ionomer, polyallomer, and mixtures of any of the above with chlorinated polyolefins. Preferred materials include, polyvinyl chloride, high density polyethylene and isotactic polypropylene. The requirement for a material is that it be resilient such that it will form a good seal upon reclosing and yet have enough "give" that it is possible to snap the reclosure portion to the lip portion with ease.

While in the foregoing specification this invention has been described in relation to certain preferred embodiments thereof, and many details have been set forth for purpose of illustration, it will be apparent to those skilled in the art that the invention is susceptible to additional embodiments and that certain of the details described herein can be varied considerably without departing from the basic principles of the invention.

I claim:

1. In an easy opening type of container, having a container end wall with container aperture means and an opening device for sealing said aperture means, said opening device including a resilient lip portion airtightly connected to said container end and having a top surface adjacent to said container end, said lip portion defining lip aperture means corresponding to said container aperture means and aligned therewith, said lip portion further defining snap groove means about said lip aperture means and below said top surface; a removable portion having opposite surfaces with resilient plug means on one surface thereof and a pull tab at one end thereof, said plug means corresponding to said lip aperture means and having bead portions complementary to and received in said snap groove means such that said removable portion may be reclosably connected to said lip portion; and bond means integral with the opposite surface of said removable portion and lip portion, said bond means airtightly connecting said removable portion to said lip portion about said lip apertures.

2. An easy opening container as defined in claim 1, in which said container end wall and said resilient lip portion define a pair of apertures.

3. An easy opening container as defined in claim 1, in which said resilient lip portion is connected to said container end wall by means of locking groove means in said lip portion which receives said container end wall about said container aperture means.

4. An easy opening container as defined in claim 3, in which said pull tab is integral with said removable portion.

5. In an easy opening container, of the type having a side wall and a container end wall, said container end wall being provided with aperture means therethrough for drinking or pouring, such aperture means having one peripheral edge portion near said seam and another peripheral edge portion near the center portion of said container end wall said end wall defining two container apertures generally off-center of said end wall and radially aligned; a resilient lip portion airtightly connected to said container end and having a top surface above and adjacent to said container end wall, said lip portion defining two apertures corresponding to said container apertures and aligned therewith, said top surface including edges about each of said lip portion apertures, said lip portion further defining snap grooves about each of said lip portion apertures below said top surface such that said lip portion apertures are larger below said top surface than at said top surface; a substantially planar resilient movable portion having two plugs on one surface thereof, and a pull tab at one end thereof, said plugs corresponding to said lip portion apertures and having circumferential bead portions complementary to and airtightly engageable with said snap grooves such that said movable portion may reclose said lip portion apertures after the first opening of said movable portion; and bond means integral with a surface of said movable portion.
that is opposite said plugs to airtightly convert said removable portion to the edges defining said lip portion apertures.

6. An easy opening container as defined in claim 5, in which said two lip portion apertures consist of a flow aperture farthest off-center and a smaller vent aperture near the center of said container end wall.

7. An easy opening container as defined in claim 6, in which said pull tab is integral with the end of said removable portion nearest the center of said container end.

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