EASY-OPEN PULL-TAB CONSTRUCTION FOR A CONTAINER

Inventors: John Joseph Luviano, Rydal, Pa.; Vinson S. Potts, Cherry Hill, N.J.


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ABSTRACT
A container end of the easy-opening type including a pull-tab construction comprising a first strip of adhesive tape adhering to and disposed over an opening in the outer surface of the end, and a second strip of adhesive tape adhering to the inner surface of the end and having an at least partially preformed aperture in substantial alignment with the opening.

17 Claims, 21 Drawing Figures
1 EASY-OPEN PULL-TAB CONSTRUCTION FOR A CONTAINER

BACKGROUND OF THE INVENTION

This invention relates to the use of an adhesive tape in a container end of the easy-opening type including a pull-tab construction.

It has become common practice in the packaging industry to package various products in containers which permit product removal without the aid of a mechanical tool, such as a can opener. Such containers have been designated as being of the easy-opening type, and generally include, in one end thereof, a tab member which may be grasped by the fingers of the consumer and pulled to gain access to the contents of the container.

The most popular pull-tab constructions used have included substantially rigid sealing members and metallic bonds produced by the integral formation of the pull-tab with the container end or by a distinct metal bonding operation, such as soldering or welding. While such pull-tab constructions have been, and are, extensively used, they leave much to be desired. For example, the pull-tab is frequently sharp and sufficiently rigid, thereby presenting a risk of injury to the consumer. Moreover, the pull-tabs are for the most part non-resealable, i.e., once the metallic bond is broken, the container cannot be resealed as may be desired when only a portion of its contents are consumed.

For these reasons, and others, including economy, the container industry has developed pull-tab constructions which rely upon flexible tape and non-metallic bonds. The tab itself may comprise a tape with an adhesive coating of sufficient bonding capability to seal hermetically the contents of the container under a pressure of 100 to 130 psi. Alternatively, an adhesive layer may be applied to the container end separately from the pull-tab.

In certain instances a single piece of tape has been used as the pull-tab. Generally, such pull-tab constructions have not had sufficient strength to withstand the pressure differential of from 100 to 130 psi characteristic of a carbonated beverage container.

In other instances a dual tape construction has been used wherein one strip of adhesive is disposed over the opening in the container end and affixed to the exterior face of the end while a second strip, co-extensive with the first strip, is affixed to the interior face of the end. In this construction, a resealing capability is provided which additionally affords a stronger, more pressure resistant hermetic seal. Furthermore, the exposed raw edge of the opening in the container end is sealed off from the contents of the container thereby preventing any internal contamination.

To open a container in which the dual tape construction is utilized, the inner tape must be torn or ruptured as the pull-tab, or outer tape, is removed from the container end. Generally, this requires a good adhesive bond between the inner tape and the outer tape as well as the selection of an inner tape which will rupture or tear.

Containers including adhesive tape pull-tab constructions which permit resealing after a portion of the container's contents have been removed have also been subject to criticism since it has not been possible for a purchaser to detect visually whether such a container had, prior to purchase, been opened and part of its contents pilfered or somehow contaminated. Because of the easy access of containers displayed for sale by retailers, as in a supermarket, for example, this problem has diminished the full acceptance by the trade and purchasing public of adhesive tape pull-tab constructions which can reseal the container. To the best of our knowledge, the prior art has not provided an effective pilfer detection means for use with such pull-tab constructions.

SUMMARY OF THE INVENTION

It is a general object of this invention to provide an improved pull-tab construction.

And it is a more specific object of this invention to provide a pull-tab construction which permits pilfer detection.

In accordance with these and other objects, there is provided a container end of the easy-opening type comprising an end panel including an inner surface, an outer surface, and a preformed opening exposing a raw panel edge extending from the inner surface to the outer surface. An outer resealable adhesive tape means covers the opening and adheres to the outer surface adjacent the raw panel edge. An inner adhesive tape means adheres to the inner surface adjacent the raw panel edge. The inner adhesive tape means includes an aperture sufficiently preformed so as to expose the contents of the container when the pull-tab is removed through the at least partially preformed aperture of the inner adhesive tape means without substantial rupturing or tearing of the inner adhesive tape means.

In one embodiment, the aperture in the inner tape means is only partially preformed, as for example by a plurality of perforations or slits in substantial alignment with the raw panel edge exposed by the preformed opening in the container end. By providing an approximate and slotted perforation or slit extending through the entire thickness of the inner tape means along a portion of the aperture in the inner tape means, removal of the outer tape means will result in pulling an integral flap of the inner tape means through the opening in the container end without substantial rupturing of the inner tape. This flap portion, which forms part of a plug covering the partially preformed aperture in the inner tape means, may then be grasped between the fingertips of the consumer to remove the plug and complete the opening of the container. If this plug is seen to be missing after the outer tape means are removed, the consumer will be on notice that the contents of the container may have been pilfered, since the removal of some of the contents from the container will require that the flap of the inner tape means be pulled. Of course the consumer can still reseal the container with the outer tape means even though he has removed the plug and achieve an hermetically sealed container. By providing the partially preformed aperture in the inner tape means with a lesser area than the opening of the end and enclosing the preformed aperture within the edge of the preformed opening of the end, the rim of the preformed aperture will be forced outwardly through the opening so as to prevent any communication between the contents of the container and the raw edge of the end surrounding the preformed opening. The rim as well as the plug which will adhere to the outer tape means through the opening will also establish a double thickness pressure resistant seal.

In another embodiment of the invention, the aperture in the inner tape means is completely preformed so as to have a lesser area than the opening in the container end to be enclosed within the panel edge. Under the pressure from within the container, the rim of the completely preformed aperture will be forced outwardly through the opening and sealed with the outer tape means to prevent communication between the edge and the contents of the container. The rim will also adhere to the outer tape means through the opening to provide a more pressure resistant seal. Pilfer detection is achieved by replacing a wax seal over a portion of the outer tape means and the outer surface of the container end. When the outer tape means is pulled off, the wax seal is broken thereby indicating that the container has been pilfered.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a container embodying the invention before the container is opened;

FIG. 2 is a perspective view of the container of FIG. 1 after the first step in opening the container has been performed;

FIG. 3 is a partial perspective view of a modified container after the first step in opening the container has been performed;

FIG. 2a is a perspective view of a modified container after the second step in opening the container has been performed.
FIG. 4 is a top plan view of the container end of FIG. 1; FIG. 5 is a bottom plan view of the container end of FIG. 1; FIG. 6a is a bottom plan view of the container end of FIG. 4, representing various steps in forming the container; FIGS. 10 and 11 are top plan views of container ends having differently shaped openings; FIG. 12 is a bottom plan view of another embodiment of the invention; FIG. 13 is a cross-sectional view taken along section line B-B of FIG. 12 before the end is applied to a container body; FIG. 14 is a cross-sectional view taken along section line B-B of FIG. 12 after the end has been applied to the container body; FIG. 15 is a cross-sectional view taken along section line B-B of FIG. 12 after opening the container; FIGS. 16 and 17 are bottom plan views of the container ends constructed in accordance with the embodiment of the invention of FIG. 12 but having differently shaped openings; FIG. 18 is a top plan view of the ends of FIGS. 12, 16 and 17 including pilfer detection means; and FIG. 19 is an enlarged cross-sectional view of FIG. 18 taken along section line C-C of FIG. 18.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIGS. 1-3, there is disclosed a sheet metal container 20 of the easy-opening type comprising a container body portion 22 and an end 24 double-seamed thereto to form a chime 26. The can body 22 may be integral or seamed in accordance with methods well known in the art. As shown in FIG. 1 and in accordance with the objects of this invention, the exterior of a pull-tab construction comprises an outer sealing or tape means in the form of an outer piece of a flexible resealable adhesive tape 28 adhesively sealed to an outer surface 30 of an end panel 32. The outer tape 28 covers an elongated dispensing opening 34 which remains concealed while the tape 28 adheres to the surface 30 outwardly of the opening 34. In order to facilitate removal of the outer tape 28 from the outer surface 30 to expose the opening, a pull-tab portion 36 which does not adhere to the outer surface 30 is provided. The pull-tab portion 36 may be provided on a non-tacky side of the outer surface 30 and keep the fingertips free of a sticky adhesive. The pull-tab portion 36 may be rough or ripped so as to provide a greater coefficient of friction and thus facilitate a good grip for removal.

Once the tape 28 as shown in FIG. 1 is removed from the end panel 32 as shown in FIG. 2, the opening 34 in the end panel 32 which extends from the outer surface 30 to an inner surface is exposed along with an inner sealing or tape means in the form of an inner piece of adhesively coated, flexible resealable tape 38. It may be seen that the piece of tape 38 includes a partially preformed opening 40 defined by perforations or slits 42 which have been precut through the thickness of the inner tape 38 in a discontinuous manner so as to partially preform a plug portion 44 disposed within the preformed aperture. An elongated and arcuate perforation 42a adjacent the chime 26 permits a flap portion 45 on the partially preformed plug portion 44 to be pulled upwardly through the opening 34 under the influence of the adhesive bond between the outer tape 28 and the inner tape 38. However, the strength of this bond is such that the outer tape 28 and the inner tape 38 will separate without substantially altering the outer surface of the tape 38. Once the flap portion 45 is pulled upwardly through the opening 34 as the outer tape 28 is lifted, the flap portion 45 may be grasped between the fingers and pulled upwardly to remove the plug portion 44 to complete the formation of the plug aperture 40 as defined by the perforations 42.

Once the plug portion 44 has been pulled upwardly and clear of the end 24, the container 20 will appear as shown in FIG. 3. It will be noted that the area of the now completely formed aperture 40 is somewhat less than and enclosed within the periphery of the opening 34 formed by the raw edge 46 of the aperture in the can top. As will be explained below, a rim of the inner tape 38 surrounding the now completely formed aperture 40 and located outwardly of the edge 46 is forced upwardly through the opening 34 under the influence of pressure within the container so as to seal off the raw edge 46 from the contents within the container 20.

The opening resulting from the raised flap portion 45 is not sufficiently large to permit a substantial flow of the contents from the container 20. Thus, to receive the contents, it is necessary to extract the entire plug portion 44. Once the plug portion is removed, the container 20 would be as shown in FIG. 3. Consequently, it is possible to determine visually, upon removal of the outer tape 28, whether the container 20 had been tampered with.

In order better to appreciate the relationship between the outer tape 28, the inner tape 38 and the opening 34, reference is now made to FIGS. 4 and 5. It has been found that the elongated nature of the opening 34 permits the maximum adhesive contact of the elongated outer tape 28 and the elongated inner tape 38 with the end panel 32. Thus, the aperture 34 is elongated by tapering gradually outwardly from a reduced width at a vent portion 50 to a dispensing portion 52. The flap portion 45, defined in part by an elongated perforation 42a, covers a substantial portion of the dispensing portion 52.

Referring now to FIGS. 6-9, the method of opening the container 20 will now be set forth. As FIG. 6, the pull-tab construction is in the hermeneutical sealing position on the end 24. In this position, the outer tape 28 is adhesively bonded to the outer surface 30 of the end panel 32 surrounding the opening 34. The inner tape 38 is adhesively bonded to the inner surface 49 along a panel adhering portion 51 surrounding the opening 34 and outwardly of the panel edge 46. In addition, the outer tape 28 is adhesively bonded to the inner tape 38 through the opening 34 to provide a more pressure resistant seal. As shown, the pull-tab construction is ready for opening by grasping the pull-tab portion 36 between the fingertips.

In FIG. 7, the pull-tab portion 36 is raised off the end panel 32 along with the flap portion 45 which is adhesively bonded thereto. At this time, the small aperture 40a which was previously covered by the flap portion 45 is opened. However, there has been no tearing or rupturing of the inner tape 38.

The continuity of integral connections between the plug portion 44 of tape 38 and the panel adhering portion 51 of the tape 38 remain undisturbed.

As the opening process continues in FIG. 8, the outer tape 28 is completely removed from the end 24. However, the inner tape 38 remains over the opening 34. In fact, the inner tape 38 remains in substantially the same position and condition as shown in FIG. 7 except for the breaking of the adhesive bond between the outer tape 28 and the inner tape 38 which is weaker than the integral connection between the plug portion 44 and the panel adhering portion 51. No substantial tearing or rupturing of the inner tape 38 has yet occurred.

In FIG. 9, the opening of the container is completed with the removal of the plug portion 44 by pulling on the flap portion 45. The rim 48 which has been forced upwardly into the opening 34 under the influence of internal pressure remains adhesively bonded to the raw edge 46 of the opening 34. Consequently, there can be no contact between the remaining contents of the container 20 and the raw edge 46.

In FIGS. 1-9, the flap portion 45 of the inner tape 38 is located adjacent the chime 26 and over the dispensing portion 52 of the opening 34. However, the flap portion 45 may be located near the center of the end 32 over the vent portion 50 of the opening 34 as shown in FIGS. 2a and 5a. This may be accomplished by forming an elongated and arcuate slit or perforation 42aa in the inner tape 38 which forms an edge for an aperture 40aa aligned with the vent portion 50. In the embodiment of FIGS. 1-9, the location of the perforation 42aa is such that the outer tape 28 may be pulled free of the flap portion 45 without tending to rip the inner tape 38 at the perforation 42.
adjacent the elongated perforation 42a. However, the location of the perforation 42aa in the embodiment of FIGS. 2a and 5a is such that removal of the outer tape 28 will tend to rip the inner tape 38 at perforations 42 adjacent the elongated perforation 42a. In order to prevent this tearing or rupturing, it may be desirable to utilize a stronger inner tape 38 in the embodiment of FIGS. 2a and 5a as compared with the inner tape 38 in the embodiment of FIGS. 1–9. In the alternative, the perforations 42 may be separated by a greater distance in the embodiment of FIGS. 2a and 5a as compared with the embodiment of FIGS. 1–9 to prevent the undesirable rupturing as the outer tape 28 is removed.

In FIGS. 10 and 11, end panel alternative openings 34a and 34b have been shown. Both the openings 34a and 34b may be characterized as elongated and increasing from a lesser width near the center of the end 32 to a greater width near the chime 26. Both the openings 34a and 34b may also be characterized as permitting substantial adherence between the elongated outer tape 28, shown as removed and therefore not seen, and the outer surface 30.

In another preferred embodiment of the invention, the aperture of the inner tape is completely preformed so as to permit complete access to the contents of the container once the outer tape is removed. As shown in FIG. 12, a completely preformed elongated aperture 140 is provided in an inner piece of tape 138 which adheres to an inner surface 149 of an end panel 132. Since the area of the aperture 140 is less than the area of an opening 134 which extends from the outer surface of the end 124 to the inner surface 149 and is enclosed within the edge 146 shown in FIGS. 13–15 of the opening 134, the edge 146 may be sealed off from the contents of the container in accordance with the teachings of this invention. Furthermore, the inner tape 138 will adhere to the outer tape 128 to provide a more pressure resistant seal.

Referring now to FIG. 13, it will be seen that the inner tape 138 will not be forced into the opening 134 in the absence of internal pressure within the container. This aspect of the inner tape 138 has been shown by illustrating the end 124 with the inner tape 138 and the outer tape 128 in place before the end 124 has been double-seamed to a container body. Thus, the pressure on the inner tape 138 is no greater than the pressure on the outer tape 128 and the rim 148 surrounding the completely preformed aperture 140 will not be adhesively bonded to the edge 146 or the outer tape 128. However, once the end 124 is double-seamed to a container body 122 as shown in FIG. 14 and pressurized contents enclosed therein, the pressure on the inner tape 138 will exceed the pressure on the outer tape 128. This pressure differential will then force the rim 148 into bonding engagement with the edge 146 to prevent any communication between the contents of the container and the edge 146.

In order to open the sealed container 120 as partially shown in FIG. 14, the consumer need only grasp a pull tab portion 136 of the outer tape 128 and pull the outer tape 128 away from the outer surface 130 of the end panel 132. Once the outer tape 128 has been removed, the container 120 will appear as shown in FIG. 15 with the inner tape 138 remaining in adherence with the inner surface 149 and the edge 146.

It will be appreciated that the use of completely preformed apertures in the inner tape 138 will permit the use of apertures of differing configuration. More particularly, as shown in FIGS. 16 and 17, the aperture may be formed in two discrete portions, a vent portion 150a or 150b and a dispensing portion 152a or 152b. Both the vent portions 150a or 150b comprise substantially circular apertures. The dispensing portion 152a is substantially circular also but the dispensing portion 152b is elongated. It has been found that the elongated aperture of the dispensing portion 152a and the elongated aperture 140 are preferred wherein the pull-tab construction will be subjected to high internal pressure existing in the container for the following reasons. Where a completely preformed aperture in the inner tape is utilized, the full force of the pressure within the container is formed by the seal provided by the outer tape alone. Consequently, it is desirable that the outer tape have a substantial adhesive area between the edge of the opening in the end and the edge of the outer tape. It will be seen, that for an elongated piece of tape, an elongated aperture will provide the maximum adhesive area between the edge of the opening and the edge of the tape.

Since the embodiment illustrated in FIGS. 12–17 utilizes the completely preformed aperture 140 in the inner tape 138, the opening of the container 122, as mentioned previously, is a single step operation. The second step required in the partially preformed aperture embodiment of FIGS. 1–11 is absent along with its inherent puller detection function. In order to provide the puller detection function in accordance with one of the objects of the invention, a wax bead 154 forms a seal between the outer tape 128 and the outer surface 130 of the end panel 132. The breaking of the seal provided by the bead 154 serves as an indication that the outer tape 128 has been removed.

In the foregoing specification, the term tape has been utilized to specify both the inner and outer sealing members of the disclosed easy-opening pull-tab construction. The term tape is intended to encompass any substantially flexible strip of material which is adhesively bonded to the end panel of a container. For example, the backing of the tape may be a plastic or a metallic foil and the adhesive may be a hot melt adhesive such as No. S–64 manufactured by Bemis Associates Inc., 294 Pleasant Street, Watertown, Massachusetts. As another example, the tape may comprise the pressure sensitive adhesive tape described in U.S. Pat. No. 3,389,827 - Aberc et al., which is herein incorporated by reference. The flexibility, the strength, the adhesion, the thickness, and the permeability of this pressure sensitive adhesive tape have been found to be particularly suitable in practicing the invention. Other tapes suitable for use in practicing this invention will readily occur to those skilled in the art.

It should be understood that the present invention is not to be considered limited to any of the specific embodiments herein described but may be used in other ways without departing from the spirit of the invention and the scope of the following claims.

What is claimed is:

1. A container end of the easy-opening type comprising:
   an end panel having an inner surface, an outer surface, and a preformed opening exposing a panel edge extending from said inner surface to said outer surface along the periphery of said opening;
   an outer resealable adhesive tape means covering said opening and adhering to said outer surface adjacent said panel edge; and
   an inner adhesive tape means having an at least partially preformed aperture, said inner tape means adhering to said inner surface outwardly of said panel edge and said outer tape means along a rim of said aperture extending inwardly of said panel edge and being separable from said outer tape means as said outer tape means is removed from said end panel without substantial rupturing of said inner tape means, said aperture being sufficiently preformed so as to expose the contents of said container through said opening when said outer tape means is removed from said outer surface.

2. The container end of claim 1 wherein said aperture is only partially preformed and said inner tape means includes a flap portion closing said at least partially preformed aperture and adhering to said outer tape means so as to be partially pulled through said opening when said outer tape means is pulled off said end panel.

3. The container end of claim 2 wherein said at least partially preformed aperture is of lesser area than and enclosed within the periphery of said opening.

4. The container end of claim 1 wherein said aperture is completely preformed and is of lesser area than and enclosed within the periphery of said opening.
5. The container end of claim 1 wherein a wax bead forms a pilfer detection seal between said outer tape means and said outer surface.

6. A container end of the easy-opening type comprising:
an end panel including an inner surface, an outer surface, and a preformed opening exposing a panel edge extending from said inner surface to said outer surface along the periphery of said opening; and
a two-step opening tab means including
a resealable adhesive outer tape means covering said opening and adhering to said outer surface adjacent said panel edge adapted to be removed during a first opening step; and
an adhesive inner tape means adapted to be removed during a second opening step comprising a panel adhering portion adhering to said inner surface adjacent said panel edge, a partially preformed plug portion covering a partially preformed aperture and adhering to said outer tape means, and an integral connection therebetween, said connection being of sufficient strength so as to remain when said outer tape means is removed from said outer surface and separated from said plug portion.

7. The container end of claim 6, wherein said plug portion comprises a preformed flap portion covering and adhering to said outer tape means through said opening and adapted to be pulled only partially through said opening when said outer tape means is pulled off said end panel.

8. The container end of claim 7, wherein said at least partially preformed aperture is of lesser area than and enclosed within the periphery of said opening.

9. The container end of claim 8, wherein said panel adhering portion includes a rim portion surrounding said at least partially preformed aperture, said rim portion extending into said opening and adhering to said outer tape means when subjected to substantial internal pressure on said inner surface of said end panel so as to seal off said panel edge.

10. A container end of the easy-opening tape comprising:
an end panel including an inner surface, an outer surface, and a preformed opening exposing a panel edge extending from said inner surface to said outer surface along the periphery of said opening;
a resealable adhesive outer tape means covering said opening and adhering to said outer surface adjacent said panel edge; and
an adhesive inner tape means having a plurality of perforations forming the periphery of a partially preformed aperture, said plurality of perforations being in substantial alignment with said panel edge, said outer tape means adhering to said inner tape means through said opening and forming a sufficiently weak bond to permit separation of said outer tape means from said inner tape means as said outer tape means is removed from said end panel without substantial rupturing of said inner tape means.

11. The container end of claim 10 further comprising a pull-tab portion adapted to be held between the fingers and formed from part of said outer tape means.

12. The container end of claim 11, wherein said inner tape means comprises a plug portion bounded by said perforations and adhering to said outer tape means through said opening, one of said plurality of perforations bounding said plug portion adjacent said pull-tab portion being elongated and arcuate so as to form a flap on said plug portion adapted to be pulled partially through said opening as said outer tape means is removed from said end panel.

13. The container end of claim 12, wherein said opening has a reduced width adjacent said pull-tab and said flap portion.

14. The container end of claim 13, wherein said opening has a reduced width near the center of said end panel.

15. The container end of claim 11, wherein said inner tape means comprises a plug portion bounded by said perforations and adhering to said outer tape means through said opening, one of said plurality of perforations bounding said plug portion remote from said pull-tab portion being elongated and arcuate so as to form a flap on said plug portion adapted to be pulled partially through said opening as said outer tape means is removed from said end panel.

16. The container end of claim 15, wherein said opening has a reduced width adjacent said pull-tab and opposite said flap portion.

17. The container end of claim 16, wherein said opening has a reduced width near the center of said end panel.