

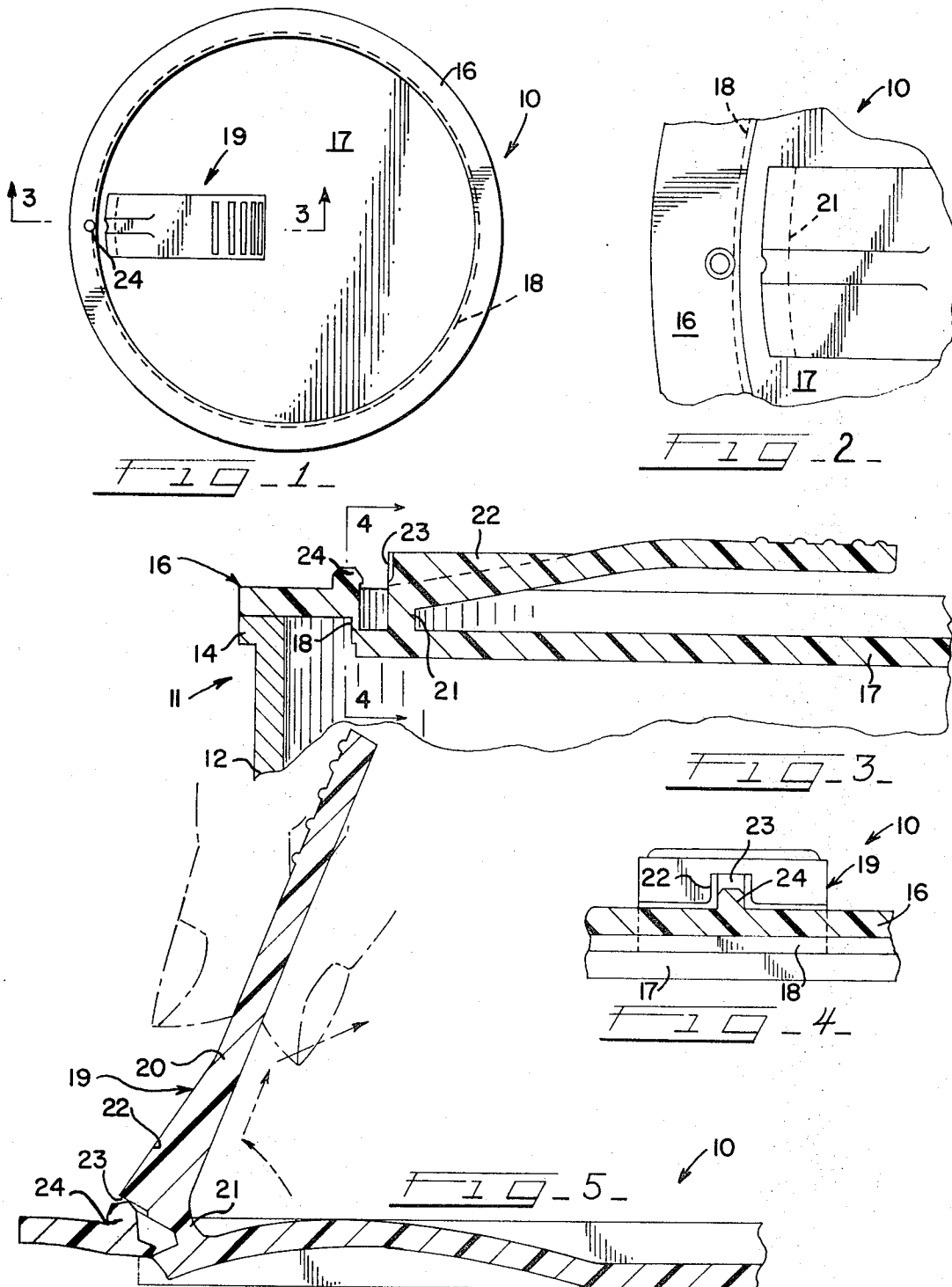
Oct. 6, 1970

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3,532,248

EASY OPENING CONTAINER

Filed Sept. 20, 1968



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3,532,248

EASY OPENING CONTAINER

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Filed Sept. 20, 1968, Ser. No. 761,185

Int. Cl. B65d 17/00, 17/20, 17/24

U.S. Cl. 220—54

3 Claims

ABSTRACT OF THE DISCLOSURE

An easy opening plastic closure for a container which includes a panel attachable to the container and a removable panel portion separable from the panel to provide an opening therein. The removable panel is defined by a weakening line including a thinned wall section of lesser thickness than the remainder of the panel so that the removable panel portion is severable therealong upon being stressed. A finger grip means is attached to the removable panel portion adjacent the weakening line. The finger grip means is tiltable and includes a rigid portion which engages the attachment panel upon being tilted so that the thinned wall section is subjected to a localized concentrated stress causing the weakening line to be severed. The removable panel portion is thereafter separated from the panel along the full length of the weakening line by means of a pulling force applied on the finger grip means.

BACKGROUND OF THE INVENTION

The present invention relates to easy opening containers and, more particularly, to a plastic easy opening closure for the containers and the like.

Plastic easy opening closures of the type to which the present invention relates are generally formed by moulding to provide a panel having a removable panel portion. The closure panel is suitably fixed about an opening provided in a container.

The removable panel portion is defined by a weakening line which is created by thinning the panel wall. The thinned wall may be formed either during molding of the closure unit or by scoring or the like to reduce the thickness of the panel. Finger grip means joins the removable panel portion at a point adjacent the weakening line for applying a pulling force to sever the panel along the weakening line. To achieve a properly functioning plastic easy opening structure or closure, there are two factors which must be considered. These factors relate directly to the weakening line structure.

Firstly, the weakening line must be sufficiently strong to maintain the integrity of the package before opening. For example, the weakening line should be capable of assuming the pressure forces exerted thereon by the product, such as carbonated beverages, contained in the container without rupturing. At the same time the weakening line must be sufficiently weak to permit easy tearing when the removable panel is to be removed. Preferably, the forces should be less than about 15 pounds.

The second consideration relates to the initial tearing of the removable panel from the panel. The tearing of the weakening line occurs as a result of the failure of the weakening line in tension. As is known, plastic materials from which the closures are formed generally have a high tensile strength so that the pulling force applied at the point of attachment is distributed along the total length of the weakening line. This condition requires that a high pulling force be applied to initiate the tear. To create a sufficiently high tensile force to sever the weakening line having the required sealing characteristics, usually requires a high pulling force in

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excess of the 15 pounds mentioned above. However, after the tear has been initiated, considerable less pull or force is required to complete the separation.

To achieve the initial tear or separation of the weakening line with a minimum amount of pull on the finger grip, the pulling force should be applied in a manner so that the separating forces are concentrated in a localized area.

If the initial tear is to be achieved by a tensile stress in a localized area by solely an upwardly directed pull on the finger grip, it would be necessary to attach the finger grip to the removable panel portion with a very small cross-sectional area. However, when the finger grip is attached with a small cross-sectional area, the cross-sectional area is so weak that the pull tab separates from the removable panel prior to severance of the weakening line. If the cross-sectional area is made larger, a greater length of the weakening line assumes the forces so that a greater pulling force must be applied thereby making it more difficult to initiate the tear in the score.

SUMMARY OF THE INVENTION

By the present invention it is proposed to provide a plastic closure structure which overcomes the difficulties encountered heretofore in connection with the separation of the removable panel portion from the panel.

This is accomplished generally by the provision of a finger grip which is mounted on the removable panel portion for tilting movement and includes a rigid member which, upon tilting the finger grip, engages the attachment panel opposite the point of joining of the finger grip to the removable panel portion and applies localized concentrated forces on the weakening line so as to rupture the latter.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a container showing the easy opening plastic closure embodying the principles of the present invention attached thereto;

FIG. 2 is a fragmentary view of the easy opening closure of FIG. 1 and showing, in particular, the finger grip and stress applying arrangement;

FIG. 3 is a cross-sectional view taken generally along the lines 3—3 of FIG. 1;

FIG. 4 is an end view of the finger grip and stress applying arrangement taken generally along the lines 4—4 of FIG. 3; and

FIG. 5 is a cross-sectional view showing the position of the finger grip and localized stress applying arrangement during the initial tearing of the weakening line.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings, the closure 10 embodying the principles of the present invention is shown applied to a container 11 comprising generally a container body 12 which may be of generally cylindrical configuration having a bottom closure (not shown). The container body 12 may be formed of any suitable material such as metal, composition board such as cardboard and the like, plastic or any suitable rigid material. The upper end of the container body 12 may be formed with an outwardly projecting flange 14 to which the easy opening closure 10 may be suitably bonded as by an adhesive, spin-welding or the like.

The easy opening closure 10 is made from plastic and may be formed by injection molding or the like. The closure 10 includes an attachment panel 16 having a marginal portion overlying and bonded to the flange 14 of the container body 12. A removable panel 17, as shown, is depressed or vertically spaced below the attachment panel 16 and is joined thereto by a continuous

vertical wall 18 of substantially lesser thickness than either the attachment panel 16 or removable panel 17 to define a weakening line. The thinned wall 18 may be molded to impart the same structural bond characteristics thereto as the remaining closure structure or be molded to provide a weld line having lesser bond characteristics, as more fully explained in my co-pending U.S. patent application S.N. 719,503 filed Apr. 8, 1968, to which reference is made for a more detailed description. While the weakening line is shown as a vertical wall, it should be clearly understood that the weakening line or thinned wall 18 may also be disposed horizontally with the attachment panel 16 and removable panel 17 in horizontal alignment or vertically displaced relatively to each other.

Moreover, the weakening line 18 may be continuous as shown so that the removable panel 18 is completely separable or it may be formed with spaced ends so as to be only partially removable from the attachment panel 16. It should be readily apparent that the attachment panel 16 and removable panel 17 may be formed of any desired shape, and that closure 10 may be adapted for use with container structures other than the container end structure illustrated.

Extending upwardly from the removable panel 17 adjacent the weakening line 18 is a finger grip portion or pull tab 19 comprising generally a finger grip panel 20 which may be of substantially rectangular outline although any other suitable configuration such as a ring may be used. Integrally connecting the finger grip panel 20 with the removable panel 17 is a downwardly extending flange or post 21. The post 21 may be arcuate and concentric with the circular weakening line 18 and extend for the full width of the finger grip portion 19.

Formed on the upper side of the finger grip portion 19 is an upstanding ridge 22 which terminates in alignment with the outer face of the attachment flange 21. The ridge 22 is formed with a recess 23 which accommodates therein an upstanding lug 24 formed integral with the attachment panel 16 on the opposite side of the weakening line 18. The lug 24 is disposed in close proximity to the weakening line 18 and may be substantially conical in its upper end so as to lie flush against the face of the indentation 23 on the ridge 22 as shown in FIG. 5.

To separate the removable panel 17 from the attachment panel 16, the finger grip portion 19 is tilted about the post 21 as shown in FIG. 5, so that the ridge 22 engages the lug 24. This action causes the lug 24 to be displaced downwardly and to the left and the adjacent outer edge of the removable panel 17 to be displaced in substantially the opposite direction. This causes the stresses to be concentrated on the length of the weakening line 18 disposed between the line of attachment of the lug 24 to the attachment panel 16 and the line of attachment of the finger grip post 21 to the removable panel 17. As illustrated, this length of the weakening line 18 is substantially equal to

the diameter of the lug 24 which is of relatively small diameter so that the stresses are concentrated in only a small increment of the total length of the weakening line 18. In this manner the force required to initiate the rupture in this relatively small area is considerably less than that requires to sever the full length thereof.

After the initial separation of the weakening line 18 by the application of the concentrated stress, the finger grip portion 19 is pulled upwardly so that the remainder of the removable panel 17 may be separated from the attachment panel 16.

It is to be noted that the finger grip portion 19 is joined to the removable panel 17 on a relatively large cross-sectional area of the post 21, so that the stresses imposed thereon during the application of the stretching of the weakening line 18 are distributed over this large area. In this manner the possibility of separating the finger grip portion 19 from the removable panel 17 is minimized.

I claim:

1. An easy opening molded plastic closure for a container, said closure comprising an attachment panel adapted to be attached to the container and having a thinned wall section forming a weakening line which defines a removable panel portion, said weakening line being of lesser thickness than said attachment panel and said removable panel portion, finger grip means including attaching means on said removable panel portion along a length thereof and spaced from said weakening line for tilting movement, a narrow upstanding lug on said attachment panel closely adjacent to said weakening line, said finger grip portion having an end engageable with said narrow upstanding lug upon tilting of said finger grip portion about said attachment means, thereby to create a concentration of stresses on said weakening line along a line substantially narrower than the length of said attaching means whereby said weakening line is initially severed along said narrow line of stress concentration.

2. The invention as defined in claim 1 wherein said removable panel portion lies in a plane vertically spaced from the remainder of said attachment panel, and said thinned wall section forming said weakening line is vertically disposed between the underside of said panel and the upper side of said removable panel portion.

3. The invention as defined in claim 1 wherein said finger grip end is in the form of an upstanding ridge and said ridge includes a recess in which said lug is received.

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U.S. Cl. X.R.

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