RESEALABLE EASY OPEN END FOR CONTAINERS

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ABSTRACT
An easy-open beverage container which can be selectively reclosed and reopened, after it has been opened. A unitary opening and reclosure structure attached to the end wall by a hinge connection permitting selectable movement of the unitary member on a first path normal to the end wall and on a second path parallel to the wall. The end wall having a selectively separable region of predetermined weakness forming an openable panel recessed a limited distance below the level of the wall. A portion of the openable panel retained to the wall by a hinge formed by a disruption in the separable region on predetermined weakness. The recessed region being surrounded by a platform and side wall located a limited distance from the openable panel.
RESEALABLE EASY OPEN END FOR CONTAINERS

DESCRIPTION OF PREFERRED EMBODIMENTS

[0001] Turning now to the embodiments shown in FIGS. 1-6, there is shown generally at 10 a beverage container provided with an end wall 11 according to the present invention. Placed within a portion of the end wall 11 is a resealable portion 50. Within the reseal portion 50 and defined by a selectively separable region of predetermined weakness 17, is an openable panel 16 that is immediately surrounded by a platform 25 FIGS. 1 and 2, and a side wall 35. This region 17 typically is a score stamped into the end wall 11 defining a relatively thin fragile score line which can be fractured to separate the panel 16 from the remainder of the reseal portion 50 of the wall 11; details of such selectively separable regions are well known in the art. The separable region 17 is interrupted by an un-scored region 29, FIGS. 1, 2, and 3 providing a hinge connection between the panel 16 and the platform 25, FIG. 2, surrounded by the side wall 35 in the reseal region 50 of the end wall 11. Such hinge connections are also known in the art, and form no part of the present invention.

[0002] A tab opening and reseal member 14 is attached to the end wall 11 by a rivet 15 integrally formed in the end wall and extending upwardly through an opening 12 in the tab 14, (FIG. 2). The rivet connection 15 with the tab portion 12 secures the tab 14 to the wall 11, but is sufficiently loose to allow for a pivoting movement of the tab in a plane parallel to the end wall.

[0003] The forward portion 19 joins the extended finger portion 21 of the unitary opening and reseal tab 14. A downwardly directed arm 23, FIGS. 4 and 5, is optionally added on the underside of the extended finger portion 21 of the tab 14 for engagement with a portion of the reclosure locking connection 35. When the tab 14 is in the position shown in FIG. 4 the tab nose point 21 is directed in the vicinity of the selectively separable region of predetermined weakness in the end wall 11 that forms the openable panel 16. This weakened region 17 forming the openable panel 16 can pass beneath the extended finger portion 21 of the tab 14 alternatively may be directed along the concave portion 38, FIGS. 2, 3, and 4, formed in a portion of the reseal portion 50 of the end wall 11 adjacent the weakened region 17 during the stamping operation that also forms the end wall 11.

[0004] The tab 14 further includes a handle portion 30 disposed across the rivet 15 from the extended finger portion 21. The handle portion 30 has an integral reclosure 28 formed in the present embodiment by a depression stamped in the handle portion 30 and extending a short distance below the surrounding edge portion 36 (FIG. 2) of the reclosure storage portion 24 in the end wall 11 (FIG. 2). The overall shape of the reclosure 28 of the tab 14 should substantially conform to the shape of the reseal portion 50 of the end wall 11 in as much as the reclosure is intended to fit snugly within the side wall locking engagement portion 35, FIGS. 1 and 2, surrounding the opening 41 formed in the end wall 11 when the panel 16 is separated and displaced from the end wall 11.

[0005] When the recessed panel 16 is separated and displaced from the end wall 11 the downward extent of the reclosure 28 causes the surrounding edge to be spaced upwardly a short distance from the outer surface of the end wall 11 thereby facilitating grasping and manipulating the handle control portion 22 of the handle 30 to either open or close the container. In addition, the up-turned end of both the assist lift 39 (FIGS. 4 and 5) and handle control portion 22 of the tab 14 will aid in manipulating the tab.

[0006] Turning now to the operation of the embodiment described, it is assumed the container 10 encloses a carbonated beverage so that the end wall 11 is under a significant pressure. This fluid pressure acting on the relatively thin and flexible end wall 11 substantially limits the flexibility of the end wall; because fracture of the separable region 17 is initiated by flexing the end wall 11 in the vicinity of the separable region 17, this pressure is preferably released as the first phase of the opening process. This pressure release is accomplished by manually pressing down the finger portion 21 for flexing and rupturing the relatively weakened portion 17 in the immediate vicinity of the contact point of the tab finger portion 21 and the weakened region 17. Assisting in bringing the concentration of pressure and stability to the tab forward finger portion 21 of the tab 14 is an extended arm portion 23 formed on the underside of the finger portion 21. When moved into engagement with a portion of the side wall 35 surrounding the panel 16 the extended arm 23 will aid in flexing the region of predetermined weakness releasing fluid pressure from the container 10 resulting in the separation of the openable panel 16 from the reseal portion 50 of the end wall 11.

[0007] The container may now be opened by manually lifting the tab assist edge 39, and the tab handle control portion 22 upwardly from the end wall 11. In a direction to swing the tab along a plane substantially normal to the end wall, as shown in FIG. 5. The forward portion 19 (FIG. 1) of the tab 14 functions as a hinge, forcing the finger portion 21 and the underlying arm 23 downwardly into engagement with a portion of the underlying locking engagement portion in the side wall 35 of the end wall 11 and the selectively separable region 17. The combined downward force of the arm 23 and finger portion 21, applied to the recessed portion of the end wall 11 in the vicinity of the selectively separable region 17, causes the separable region to flex and fracture releasing the initial pressure and thereafter immediately separating the panel 16 from the recessed portion of the end wall 11 in a manner known to those skilled in the art. Continued swinging movement of the handle 30 forces the now opened panel 16 downwardly about its hinge connection 29, so that the panel moves below the end wall 11 toward the interior 40 of the container 10. Once the container is fully opened in this manner, the tab 14 preferably is manually returned to its initial position shown in FIG. 3, with the tab 14 substantially parallel to the end wall 11. The contents of the container may now be poured or consumed directly through the pour opening 41 in the end wall 11.

[0008] Reclosure of the opened container 10 is illustrated in FIG. 6. When reclosure is desired, the tab 14 is manually pivoted by the handle control portion 22 along a plane substantially parallel to the end wall 11 approximately one half-turn about the rivet 15 as illustrated by the arrow 45 in FIG. 3, placing the handle portion 30 over the opening 41 in the end wall 11. Simply pressing down on the repositioned handle portion 30 depresses and seats the reclosure 28 in the opening 41, while placing the locking engagement portion 31, which is optionally coated with a flexible fluid-tight material, and the cooperative engagement portion of the side wall 35, that may also be coated with a flexible fluid-tight material, into locking engagement with each other resoling the container 10 and preventing any unwanted ingress and egress. The
integrated handle control portion 22 and the finger assist portion 39 formed at the edge of the handle 30, surrounding the reclosure 28, provides an additional finger engagement portion for exerting upward force on the tab portion 14, resulting in the separation of the cooperative locking portions 31 of the reclosure 28 and the cooperative locking engagement portion of the side wall 35 of the end wall 11 disengaging the reclosure 28 from the opening 41. The tab 14 can then be pivoted about the rivet 15 on a plane parallel with the end wall 11 as shown by the arrow 46 to expose the opening 41 thereby opening the container 10.

[0009] FIG. 6 shows details of the reclosure 28 in engagement with the end wall 11. FIGS. 4, 5 and 6 show one technique for providing a fluid-tight seal with the reclosure 28 whereby the openable panel portion 16, which defines the opening 41 of the end wall 11, and the hinge portion 29 retaining the openable panel 17 are moved by the finger portion 21 of the tab 14 to a point below the level of the recessed portion of the end wall 11 and bent downward into the interior of the container 10. The space found between the end wall 11 and the level of the recessed score 17 forming the openable panel 16 (FIG. 2) is a uniquely contoured cooperative tab locking engagement portion 35 completely surrounding the score portion 17 in the end wall 11. The cooperative locking engagement portion 31 of the reclosure 28 is pressed downward into snap-fit within the cooperative engagement portion 35 of the side wall which securely seats the reclosure 28 on the platform 25 surrounding the separable region 17 sealing the opening 41 in the end wall 11.

[0010] The hinge portion 29 of the selectively separable region of weakness formed in the recessed portion of the end wall 11 retains the openable panel 16 to a portion of the of the wall 11 thus prohibiting it from separating from the end wall and completely entering the interior 40 of the container 10. When the openable panel 16 is in this position, the panel 16 and the hinge 29 are both completely prevented from being an obstruction to the seal of the container opening 41; thereby providing simultaneous reclosure of the opening 41 and the recessed portion 50 of the end wall 11 (FIG. 6).

1. Selectably reclosable easy opening apparatus for a container, comprising:
   a container wall having a recessed region,
   a selectively openable panel defined in said recessed region at least in part by a selectively separable region of predetermined weakness formed in the container wall; said openable panel being recessed to lie a limited distance below the surface of said container wall;
   said recessed openable panel being immediately surrounded by a platform portion and a side wall; whereby said recessed selectively separable region of predetermined weakness forming said openable panel, said platform portion and said side wall all remaining contiguous connect to and surrounded by said container end wall; said openable panel being retained to said platform portion by a hinge portion of said selectively separable region of predetermined weakness;
   a unitary opening member pivotally attached to said wall by a rivet formed in said container wall in vicinity to said recessed area; said unitary member having a hinge connection permitting selectable movement of said member on a first path substantially normal to said container wall; said pivotable attachment allowing the unitary opening and reclosure member to undergo movement on a second path substantially parallel to said container wall;
   said opening and reclosure member having a finger portion extending a limited distance into said recessed portion of said wall and overlaying said openable panel in a position to apply force downwardly against the openable panel in response to movement of the opening and reclosure member about said hinge connection along said first path; thereby separating said separable region and displacing said openable panel downwardly relative to said recessed portion of said wall, so that an opening is formed in said wall by separation and downward displacement of said openable panel; said unitary opening and reclosure member having a reclosure portion formed therein and confronting the container wall at a location displaced from said openable panel while said finger portion overlies said recessed openable panel; and, said reclosure portion being located on the opening and reclosure member in relation to said pivotal attachment so as to be selectively registrable with said opening on said second path after said opening is formed;
   so that the container may be opened by hinging the opening member on said first path, and thereafter may be reclosed by pivoting the opening and reclosure member on said second path and urging said reclosure portion into removable engagement with said recessed opening therein.

2. Apparatus in claim 1, further comprising:
   means defining a structurally weakened pressure venting region on said panel within said region of predetermined weakness defining the panel; and a vent rupturing means on said finger portion of said opening and reclosure member aligned with said pressure venting region and, said finger portion of said opening and reclosure member having an extended arm means formed into the underside of said finger portion between said rivet rivet member and a nose portion of said opening and reclosure member for alignment and engagement with a select region of said recessed side wall portion surrounding said openable panel, thereby providing a movement resistant wedge to said finger portion as the nose portion engages the weakened venting region within said selectively separable region of predetermined weakness forming said openable panel said recessed portion of said end wall; thus simultaneously applying pressure on the select portion of said region of predetermined weakness causing the region to flex thereby fracturing and releasing fluid pressure from within the container before applying more force to the selectively separable region of predetermined weakness forming the openable panel in said recessed portion of said container wall;
   so that the container may be opened by hinging the opening and reclosure member on said first path, and thereafter may be reclosed by pivoting the opening and reclosure member on said second path and urging said reclosure portion into sealing engagement within the recessed region surrounding said opening in said wall.

3. Selectably reclosable easy opening apparatus for a container, comprising: a container wall;
   a selectively openable panel defined in said wall at least in part by a selectively separate region of predetermined weakness formed within a selectable recessed portion in said wall;
   an opening member attached to said wall by a rivet formed on the container wall, said rivet attachment allowing.
pivoting movement of the opening member on a path substantially parallel to the container wall;
said opening member having a first end portion which overlies at least a portion of the openable panel, having a second portion in spaced apart relation to said first end portion, and having rivet hinge means located between said first and second end portions and operative to move at least a portion of said first end portion into said recessed portion in said wall forming said opening and downwardly to engage the underlying openable panel as said second end portion is moved outwardly away from the container wall, so as to separate the selectably separable region and displace the openable panel away from the container wall and thereby forming an opening in the container wall;
a reclosure member located on said opening member in facing relation to the container wall and displaced from said openable panel while said first end portion of the opening member overlies the openable panel;
said reclosure member being disposed in predetermined relation to said rivet attachment so as to be aligned with said opening by pivoting said opening member on said path after said opening is formed;
so that the container may be opened by moving the first end portion into engagement with the openable panel, and thereafter may be reclosed by pivoting the openable member around the rivet to align the reclosure member with the opening; and
a pressure venting region on the container wall at a location contiguous to said selectably separable region of predetermined weakness defining said panel and positioned for engagement by the first end portion of the opening member as the second end portion is moved outwardly from the container wall to fracture the venting region and thereby release fluid pressure from within the container.

4. Apparatus as in claim 3 wherein:
said reclosure portion of said unitary opening and reclosure member disposed on the container wall is operative to engage said recessed region in said end wall, and said openable panel portion formed therein, before and after said panel has been opened.

5. Apparatus in claim 1 wherein:
said reclosure portion having a locking engagement means being operative to engage a cooperative engagement means on said side wall surrounding said recessed region of said end wall when the reclosure portion is pressed downwardly to reclose the opening; said reclosure portion of said unitary opening and reclosure member being coated with a flexible fluid tight material; a portion of said reclosure portion resting on said platform portion surrounding said recessed opening in said wall of the reclosed opening; said reclosure portion being released to reopen the opening when manually lifted upwardly by a handle lift means on said reclosure portion of said unitary opening and reclosure member;
said platform portion being coated with a flexible fluid tight material whereby said reclosure portion lying over said opening in said wall and said surrounding side wall forms a flexible fluid tight seal in the recessed portion of the end wall; whereby said reclosure portion when pressed downwardly into locking relationship with said side wall surrounding said opening in said wall is concurrently lying over said hinge portion of said openable panel, said panel, said opening and said platform in said recessed portion of said end wall.

6. Apparatus in claim 2 wherein:
said unitary opening and reclosure member being operative to pivot said member along a first path parallel to said end wall whereby said reclosure portion is in engagement with said recessed region of said end wall sealing off said recessed region from any contamination of said openable panel area prior to said panel being opened; said opening and reclosure member thereafter being operative to pivot along a second path for opening said openable panel and on a third path pivoting said reclosure portion for realignment of said reclosure with said opening in said recessed region for resealing said opening after the panel is opened.

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