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(54) **EASY OPENING VENTING AND RESEALABLE CONTAINER CLOSURE**

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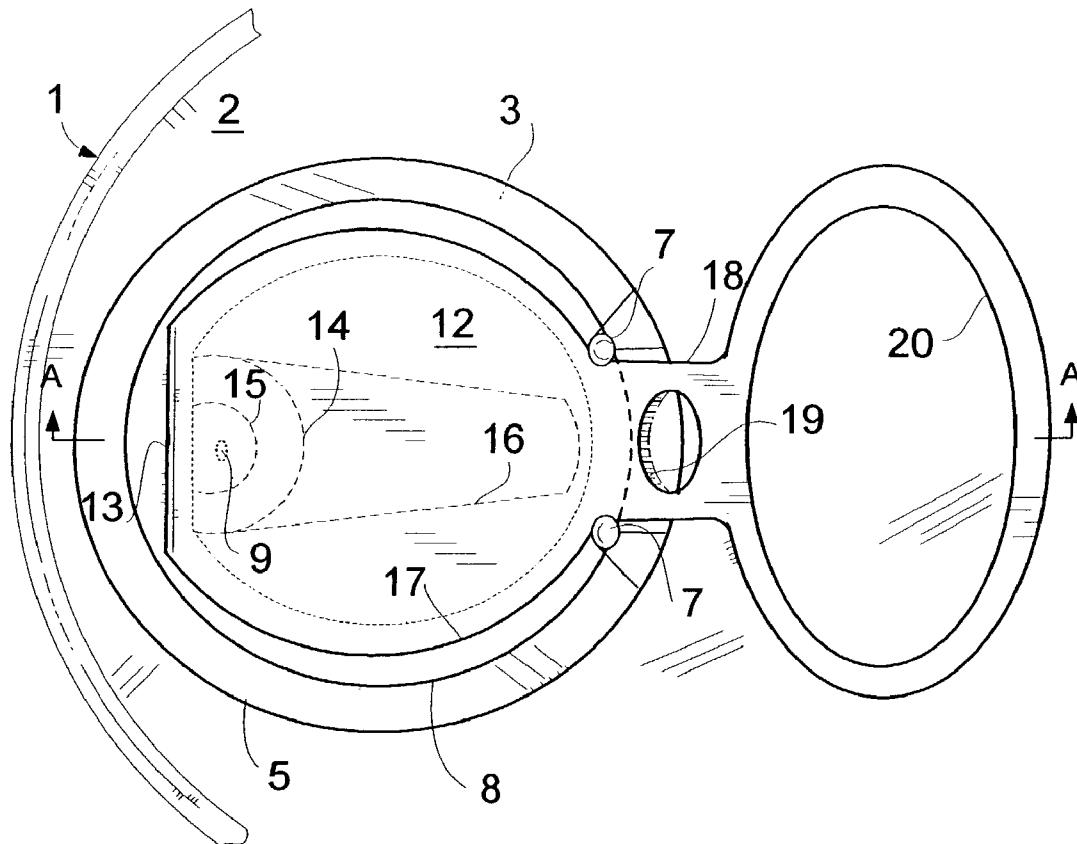
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(57) **ABSTRACT**

A closure, set within an aperture of a container end wall, for gas tight containment of dissociating gasses that emit from carbonated beverage, whereby the container, such as a beverage container, becomes pressurized. The closure device, manufactured of a suitable plastic material, set

within an aperture in a container end wall, includes a rim seal with an annular locking recess surrounding the aperture in the container end wall, providing a liquid and gas-tight seal. The rim seal includes a depending tapered inner wall, protruding into the container interior, with the larger diameter open to the container interior. Additionally, the rim seal is fitted with a narrow strip hinge on a lower aspect, and locking members located on an upper aspect. A sealing panel, having a small diameter gas vent hole, is set within the rim seal, connected by the narrow strip hinge. This panel is formed with a tapered outer depending wall with a like taper to the rim seal, such that the tapers cooperate in sealing engagement. Pressure within the container acts to compress the underside of the sealing panel and more tightly engage the tapers, providing a gas-tight seal. A tab member is connected to the sealing panel on an upper aspect. Lifting the tab separates the sealing relationship with the gas vent hole, exhausting the pressurized gas under the tab cover, resulting in dry venting. The tab also acts as a lever, to rotate the sealing panel from a horizontal sealing position within the rim seal, to an open position, secured within the container interior, thereby providing a pour opening. Returning the sealing panel to an original position within the rim seal, and repositioning the tab to a sealing relationship with the gas vent hole, reseals the container, providing a gas tight seal.



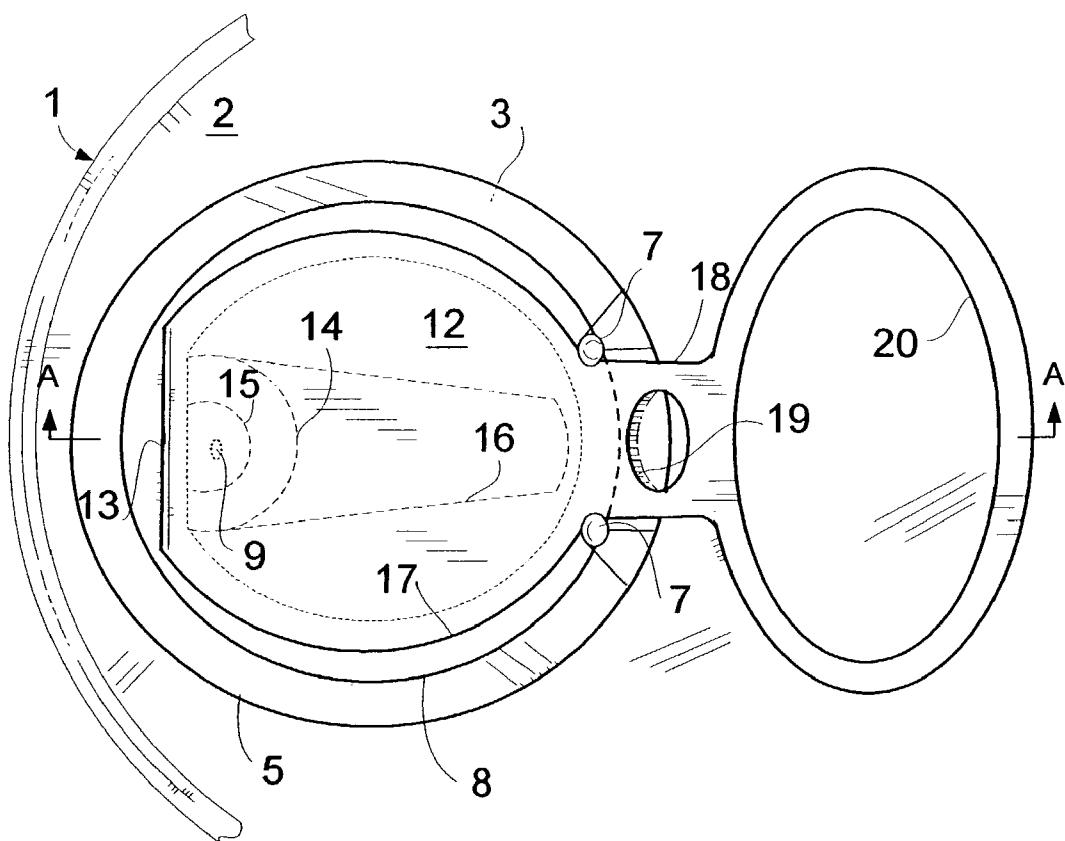


Fig. 1

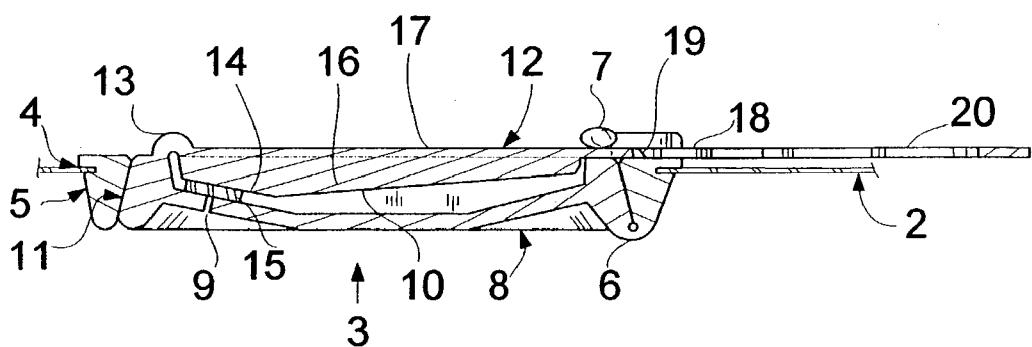


Fig. 2

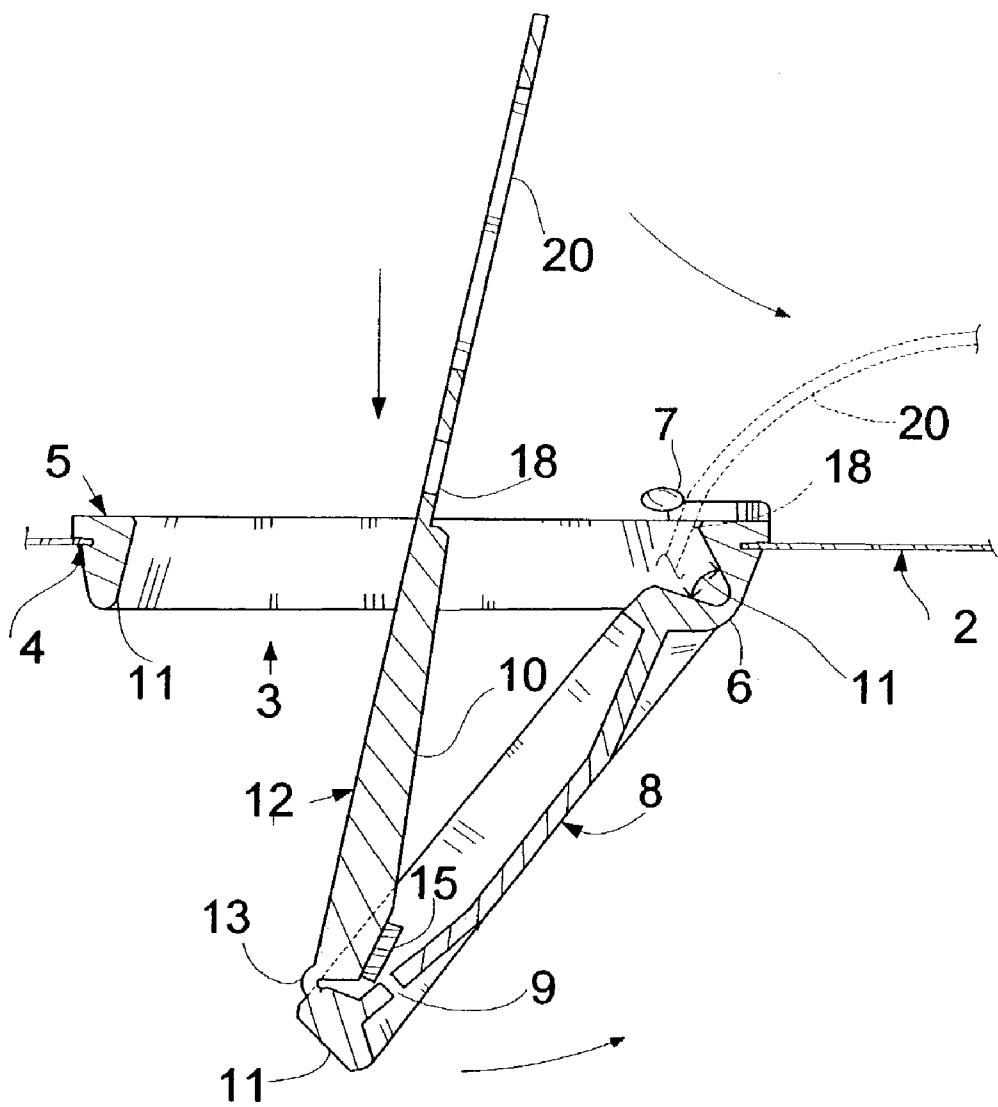


Fig. 3

EASY OPENING VENTING AND RESEALABLE CONTAINER CLOSURE**FIELD OF THE INVENTION.**

[0001] The present invention relates to an end member of a container, such as an aluminum beverage container, having an aperture defining a pour opening set in an end wall of a container. Such a container will be pressurized, caused by dissociating gasses released from the beverage product, resulting in high pressure gasses collecting within the container. Such gasses are required to be contained to protect the freshness of the product.

BACKGROUND OF THE INVENTION

[0002] A search of prior art reveals many patents issued that address the opening, venting and resealing of a container, such as a beverage can. The benefits of a can containing these features would eliminate having the contents splash or eject under pressure during opening.

[0003] Once the can is open, if all the contents are not consumed, any remaining beverage could be resealed, and remain fresh for later consumption. This would eliminate the present practice of disposing of the unconsumed contents, which is wasteful, and can be inconvenient or inappropriate.

[0004] Numerous U.S. Pat. Nos. such as 4,008,832, 4,433, 792, 4,442,950, 4,887,712, and 5,011,037 attest to the desire to provide the public with the aforementioned features.

[0005] Various structures have been proposed, and prior art teaches the incorporation of a central stopper positioned to work in concert with a pour opening to create such a sealing device.

[0006] Examples of a few such patents would incorporate U.S. Pat. No. 3,952,911, Bozek et al. disclosing a plastic rim, having an annular groove seated about the marginal edges defining a pour opening aperture, working in concert with a tab to provide sealing of a container.

[0007] A similar method is disclosed in U.S. Pat. No. 4,580,692, LaBarge et al. where a plastic sealing member is tightly inserted in to a pour opening aperture, having a rupturable overlay at the junction of the plastic sealing members forming an initial seal.

[0008] Vogt, discloses in U.S. Pat. No. 3,952,914, a removable plastic seal element set within the confines of the metal pour opening aperture, and opening in toward the container interior, to be raised back to an original position to effect a seal.

[0009] In U.S. Pat. No. 4,431,110 Roth disclose an upper hinged plastic member, having a plug attached, that, on closing, inserts the plug into an orifice set in a lower sealing member.

[0010] The foregoing examples disclose some of the efforts that have been directed toward providing the public with a resealable container.

PRIOR ART

[0011] Field of search.

[0012] Cl. 220-269, 272, 281, 339, 351.

SUMMARY OF THE INVENTION

[0013] The present invention provides a novel re-closure device for a substantially liquid and gas tight sealing engagement, set within an aperture defining a pour opening in a container end wall. Such a container may contain carbonated beverages of various types. Dissociating gasses being released from the beverage product can result in a pressure of approximately 95 psi. within the container.

[0014] It is an object of this present invention to provide a substantially liquid and gas tight seal, and that this sealing means be available for the initial sealing of a container, and for subsequent resealing of the container, as described within the body of this application.

[0015] It is an object of this invention to utilize the internal pressure within a container to operate against, and place in compression, the interior portion of a sealing member, thereby providing a more effective seal.

[0016] It is an object of this invention to release the internal pressure within a container prior to providing a pour opening in an end wall of such a container.

[0017] Another object of this invention is to selectively contain or release pressurized gasses within a container, and further to provide a mechanism to secure portions of the device in a horizontal sealed position, or a vertical pour open position.

[0018] It is a further object of this invention to control the pressurized beverage spray that sometimes emits on opening such a container, so as to enclose and direct this spray away from a consumer.

[0019] Yet another objective of the present invention is to separately produce a closure, of a suitable elastomeric material, that can be inserted into an aperture set in the end wall of a container, at an appropriate manufacturing operation.

[0020] A marketing advantage included in this device is that after opening, a hidden surface on the underside of the device is revealed for the first time, giving the opportunity to display promotional, or other 'instant winner' type messages

[0021] In a preferred embodiment, the closure device, manufactured of a suitable elastomeric material, includes a rim with an annular locking recess surrounding the marginal edges defining a pour opening, such as to provide a substantially liquid and gas tight sealing engagement. Such rim includes an internal narrow strip hinge, located on a lower aspect of the rim, and locking members, located on an upper aspect of the rim, as will be discussed in greater detail hereinafter.

[0022] The rim includes a tapered inner wall, protruding within the container body, with the larger diameter open to the container interior.

[0023] A sealing panel, set within the aforementioned rim, connected to the rim by the internal narrow strip hinge, having a tapered outer wall with a like taper to the rim inner

wall, such that both elements cooperate in sealing engagement, one with another. The rim and sealing panel could be constructed with one member in a more elastic, and one member in a less elastic state, so that compliance of fit would more easily be achieved. Of note is the internal pressure acting to compress the internal area of the sealing panel, forcing the tapered walls into tighter engagement, providing a more efficient seal.

[0024] Notably, a small diameter gas vent hole is set within the sealing panel, and an external hinge connects the sealing panel to a tab member placed on the upper aspect of the sealing panel. The tab member has four main parts, a rigid portion connected to the external hinge, including a sealing means; a relatively flat covering panel; a narrowed securing portion; and a distal flexible portion forming a lifting end.

[0025] The tab, acting as a lever, supplies the means to manually rotate the device between a closed, sealing position and an open, pouring position.

[0026] With the tab in a closed, sealing position relative to the sealing panel, a gas vent cover and gasket, located on a lower aspect of the tab, covers and seals the previously mentioned gas vent hole. The invention provides tab locks that secure the tab in a closed, sealing position, and an open position, secured within the interior of the container, whereby a pour opening is available.

[0027] Grasping and lifting the flexible lifting end of the tab, rotating about the external hinge, severs a tamper evident strip, disengages the tab locks, and rotates the tab up and outward, away from the container.

[0028] This action progressively separates the gas vent cover and gasket from a sealing position over the gas vent hole, allowing gas under high pressure to exhaust. Since the exhausting process occurs as the tab is only slightly open, any pressurized liquid that could erupt is contained under the covering panel portion of the tab, shielding the consumer, providing a dry venting feature.

[0029] With the pressure released, using a small downward force on the tab, the sealing panel is pushed into the container interior, rotating about the internal strip hinge, forming a pour opening.

[0030] Located at an approximate midpoint of the tab, the narrowed portion interacts with the tab locks, which spread apart and snap back when a small force is applied, to capture the tab within the tab locks, securing the sealing panel in an open position. The flexible lifting end of the tab, now protruding above the rim seal, is in an arcuate position, reducing drinking obstruction while offering a subsequent grasping opportunity.

[0031] Lifting the finger lift, and removing the tab from the tab locks, the sealing panel is raised back into the rim seal, assisted by the self guiding action of the tapers, engaging the tapered walls in their original sealing position.

[0032] Rotating the tab around the external hinge toward the container, and pressing down on the midpoint area between the tab locks, causes the bulbous portion of the tab locks to spread apart and snap back to capture the midpoint area, this rotation also repositions the gas vent cover and compresses the gasket over the gas vent hole, establishing a gas tight seal.

[0033] Subsequent dissociating gasses from remaining beverage re-pressurize the container, once again acting to force the sealing panel into tighter engagement within the rim seal, providing a gas and liquid tight resealed container.

[0034] During the initial opening of the tab, the underside of the tab, hidden to this point, becomes visible. A message can be displayed on this space of the 'instant winner' type, wherein a message becomes available to the consumer. Such methods of promoting and advertising are well known, and are frequently used to offer messages under the sealing caps of plastic container bottles containing beverage products.

BRIEF DESCRIPTION OF THE DRAWINGS

[0035] FIG. 1 is a partial plan view of a container end wall, having in place the arrangement in accordance with this invention in place.

[0036] FIG. 2 is a cross sectional illustration taken through line 'AA' showing the device in an unopened, sealed position.

[0037] FIG. 3 is a cross sectional illustration taken through line 'AA' and shown in a position approximately midpoint between a closed, and an open position.

DETAILED DESCRIPTION OF THE DRAWINGS

[0038] FIG. 1 illustrates a partial plan view of a container 1 and end wall 2, such as an aluminum beverage container, having a permanently attached resealable device, manufactured of suitable elastomeric components, incorporating the principles of this invention.

[0039] Referring to FIGS. 1 and FIG. 2, a device of this invention is shown positioned and attached to a beverage container 1, having an end wall 2, and aperture 3.

[0040] Into this aperture 3 is inserted, in circumferential sealing engagement, rim seal 5, having a depending wall engaging the marginal edge defining the aperture 3, in an annular locking recess 4.

[0041] The inwardly open circumference of rim seal 5 is formed to incorporate a taper 11, dimensioned such as to have the larger diameter toward the container interior.

[0042] Rim seal 5 is provided with a narrow strip hinge 6, and tab lock retaining members 7, of which more details will be provided hereinafter.

[0043] Sealing panel 8 defines a sealing panel dimensioned to fit in re-sealable engagement within rim seal 5, having a depending outer wall with a like taper 11, to engage within tapered inner wall on rim seal 5. Sealing panel 8 is attached to rim seal 5 by a narrow internal positioned hinge 6, enabling sealing panel 8 to rotate between a sealing position within rim seal 5, and into the interior of container 1, to facilitate a pour opening. (FIG. 3) A small diameter gas vent hole 9, is set within sealing panel 8.

[0044] A Tab member 12 is attached to sealing panel 8 by external hinge 13 located on an upper aspect close to an edge.

[0045] Tab 12 has a thin cover member 17, overlaying a circumferential portion of sealing panel 8, being made more rigid in part through reinforcing spine 16, positioned on a lower aspect. A gas vent cover 14 is formed integral with

spine **16**, having a planar area located to cooperate with a similar planar area, on sealing panel **8**. Gas vent cover **14** is separated from sealing panel **8**, by compressible sealing gasket **15**. With sealing panel **8** and tab **12** located in a closed horizontal sealing position, captured within tab locks **7**, compressible sealing gasket **15** is in a state of compression covering gas vent hole **9**, effectively sealing and preventing high pressure gasses from escaping.

[0046] Tab **12** is maintained in the above position through the action of tab locks **7**, having a bulbous inner end to allow interaction with tab midpoint securing area **18**, being spread apart and snapping back over midpoint area **18**, to capture, and lock tab **12**.

[0047] The location of the tab locks **7**, working in conjunction with the location of external hinge **13**, are designed to provide a mechanical advantage at gas vent cover **14**, assisting in multiplying forces compressing compressible sealing gasket **15**, over gas vent hole **9**.

[0048] A frangible tamper proof seal **19**, of semicircular or similar design to assist in starting a tearing apart action when tab **12** is lifted, is positioned at the interface of an edge of rim seal **5**, and midpoint area **18** of the flexible lifting portion of tab **12**.

[0049] Tamper proof seal **19** provides a visual indication that the device has not been previously opened, and also provides resistance feedback indicating it has not been previously torn apart.

[0050] The above description of the interacting members positions relate to an original sealing configuration, and subsequent re-sealing positions. (With the exception of the tamper proof connection.)

[0051] Inherent in this design is the permanent attachment of the device to the container end wall **2**.

[0052] The opening operations will now be described.

[0053] Grasping and lifting the flexible finger lift **20**, of tab **12**, tears apart the frangible tamper proof seal **19**, and disengages midpoint area **18**, from under tab locks **7**. As the rigid portion of tab **12** is rotated about hinge **13** in a direction away from the container end wall **2**, the gas vent cover **14**, and compressible sealing gasket **15**, begin to separate progressively from a sealing position over gas vent hole **9**, (FIG. 3) allowing the high pressure gasses within container to be exhausted. This separation is achieved with compressible sealing gasket **15** still in close proximity to gas vent hole **9**, providing a shielded area for the exhausting gas, and any pressurized liquid that may erupt, under the raising tab **12** and cover **17**, thereby providing dry venting.

[0054] With the high pressure removed from sealing panel **8**, it is now held in place by the frictional characteristics of the tapered walls **11**, and is easily separated by a downward force applied to tab **12**. Continuing to rotate tab **12** to an almost vertical position, being used as a lever, slight downward force is applied. This force is transferred through now open hinge **13**, to sealing panel **8**. (FIG. 3) Sealing panel **8** starts to rotate around internal hinge **6**, into the interior of container **1**. During this downward rotation, the midpoint area **18** of tab **12**, is being positioned adjacent tab locks **7**, wherein a side force applied toward the central axis of end wall **2**, presses and locates the midpoint area **18** into a captured and locked position within tab locks **7**. It will be

noted flexible finger lift **20**, located above the container end wall **2**, flexes into an arcuate position, away from a drinking area, to present an unobstructed pour opening. During the opening sequence as described above, the underside of tab **12** becomes visible. This area, designated by the numeral **10** provides an area that can be used for promotional advertising, or the 'instant winner' games of chance, that are popular with consumers.

[0055] Turning now to FIG. 3 the device of this invention is shown in a midpoint position, and the following description describes events after the tab **12** has been fully rotated into engagement within tab locks **7**, as mentioned above, and a pour opening has been made.

[0056] To reseal the container, flexible finger lift **20**, located above the container end wall **2**, providing a gripping opportunity, is lifted and pulled from the central axis area of container end wall **2**.

[0057] This action disengages the midpoint area **18** from within tab locks **7**. Continuing to rotate tab **12**, sealing panel **8** is lifted into an original position within rim seal **5**, assisted by the self guiding action of the tapers **11**. In this position, temporary protection is provided against a liquid spill, or insect intrusion. To reseal the container to provide a gas tight seal for longer storage of the product, tab **12** is rotated towards the container end wall **2**, into an original, horizontal position, locked in place by tab locks **7**. This rotation repositions compressible sealing gasket **15**, covering and re-sealing gas vent hole **9**, and locates midpoint area **18** over the tab locks **7**. Pressing down on midpoint area **18** between the tab locks **7**, causes the bulbous portion of the tab locks **7** to be spread apart, and snap back to capture midpoint area **18**. Thus tab **12** is secured in a locked, sealing position.

[0058] As before, dissociating gasses build pressure within container **1**, and act upon sealing panel **8** to more tightly engage the tapered walls **11**, providing a substantially liquid and gas tight seal.

[0059] It will be apparent to those skilled in the art that the sealing surfaces as described will remain usable through repeated openings and closings of the container, and that, while the device is illustrated as a circular shape, this is not material to the device, as other shapes may be substituted.

[0060] The particular embodiments of the invention described above for the purpose of disclosing and illustrating the principals involved, are not intended to put limitations on the invention. It may be apparent to those skilled in the art that various changes may be made without departing from the spirit and principles of the invention.

What is claimed is:

1. A closure, set within an aperture of a container end wall, for gas tight, containment of dissociating gasses that emit from carbonated beverage, whereby said container, such as a beverage container, becomes pressurized,

said closure comprising,

a combination of a rim seal portion, having a means for forming a seal-tight fit within an area defined by said container aperture, having an internal opening incorporating a tapered depending wall such that the larger diameter is open to said container interior, having on an upper aspect a retaining means, and on a lower aspect a means to pivotally attach a sealing panel;

said sealing panel having on an external periphery a depending wall with a complementary taper to said rim seal, dimensioned to fit in sealing engagement within said rim seal, located in a first sealing position within and against said rim seal, and having a means to be selectively rotated into a second stored position within said container interior, forming a pour opening;

a tab lift lever connected to said sealing panel proximate one end on an upper aspect, having a combination sealing-enclosing portion, a narrowed central portion, and a distal flexible lifting portion.

2. A closure, as claimed in claim 1, including said closure being composed of an elastomeric material.

3. A closure, as claimed in claim 1, wherein increasing pressure building within said container is utilized to act upon said sealing panel, compressing said tapers into a tighter sealing engagement and preventing release of said pressurized gasses.

4. A sealing panel, as claimed in claim 1, wherein a small diameter gas vent hole is located within said sealing panel, being covered in a first sealing position by engagement with said sealing portion of said tab lift lever, and selectively uncovering and progressively releasing said pressurized gasses, by rotating said tab lift lever into a second, opened position.

5. A tab lift lever, as claimed in claim 4, whereby rotating and returning said tab lift lever to said first sealing position, re-engages said sealing portion of said tab lift lever, such that said small diameter gas vent hole is covered in a seal tight configuration.

6. A tab lift lever, as claimed in claim 1, when rotated to a near vertical position, a small downward force is applied,

rotating said sealing panel from within said first sealing position within said rim seal into said second stored position within said container interior, whereby a pour opening is available, and providing a means to return said sealing panel into said first sealing position within said rim seal.

7. A closure, as claimed in claim 1, having said rim seal retaining means spread apart and snap back to capture and lock a portion of said narrow central portion of said tab lift lever, whereby said sealing panel, through said tab lift lever connection, may be secured in a locked sealing position in a horizontal orientation, and secured in a stored pour open position in a vertical orientation.

8. A closure, as claimed in claim 1, wherein said enclosing portion of said tab lift lever is adapted to overlie said small diameter gas vent hole area, so any gaseous or liquid spray that may emit from said high pressure gasses upon opening, is constrained and shielded, providing dry venting.

9. A small diameter gas vent hole as claimed in claim 4, wherein said small diameter gas vent hole is located in a position close to said connection of said tab lift lever to said sealing panel, and located away from, in relative relationship, said rim seal retaining means, so as to produce a mechanical advantage at said small diameter gas vent hole area, assisting in compressing said sealing portion of said tab in a seal tight connection.

10. An enclosing portion, as claimed in claim 8, wherein said enclosing portion lower surface, hidden until said container is initially opened, becomes visible, and offers a location to display promotional, or other messages, using methods well established to advertise products or offer rewards or prizes.

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