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E. C. FRAZE

3,250,426

PRE-PUNCTURING TAB

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Fig. 1

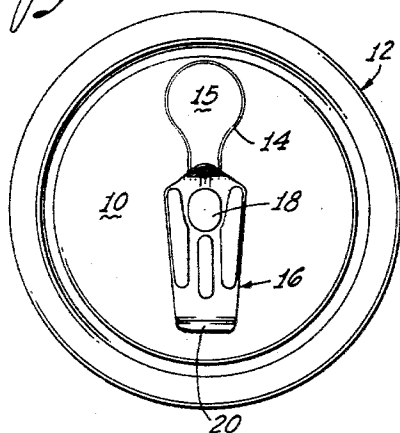


Fig. 2

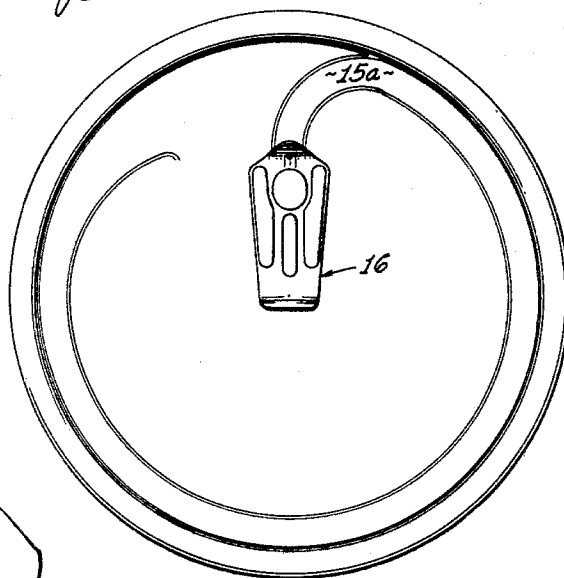


Fig. 3

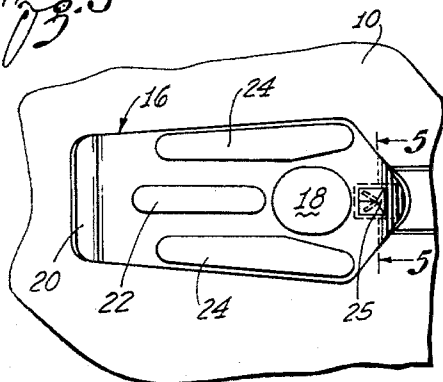


Fig. 4

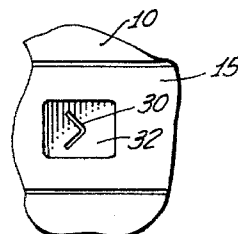


Fig. 5

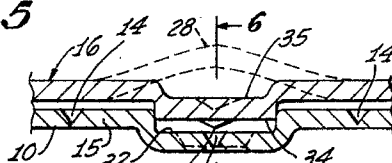


Fig. 6

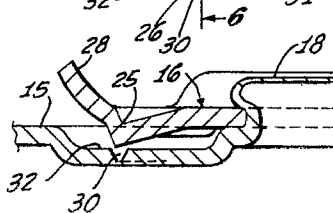
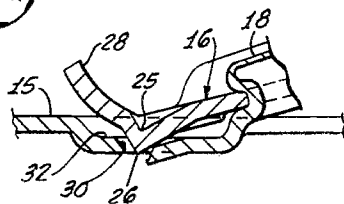


Fig. 7



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## PRE-PUNCTURING TAB

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12 Claims. (Cl. 220—54)

This invention relates to a container having a manually removable tear strip for access and more particularly relates to such a container wherein a primary content is held under pressure by a gaseous fluid.

One example is a metal can containing a carbonated soft drink or containing a beverage such as beer which is inherently charged with carbon dioxide. When such a pressurized liquid with a gaseous content is exposed by the sudden creation of an aperture in the container wall, the gaseous content expands abruptly with explosive force. If the can is apertured gradually by cautious severance of the tear strip the relatively small aperture that is initially formed serves as a nozzle opening for jet expulsion of the gas-impregnated liquid and the jet stream may have a trajectory of several feet.

The same difficulty is encountered when the primary content is solid granular material. Coffee, for example, is commonly confined in metal cans together with pressurized inert gas to prevent oxidation of the coffee granules. When severance of a tear strip suddenly creates a substantial opening in such a coffee can, the confined gas tends to make the whole granular mass expand vigorously with consequent spillage of the coffee.

Broadly described, the present invention meets this difficulty by mounting puncturing means on a tab that serves as a handle for initiating severance of the tear strip. In the preferred practice of the invention, the puncturing means is so positioned on the tab as to perform the puncturing operation at an early stage in the severance of the tear strip, the tab being manipulated in the usual manner without any special attention to the puncturing means.

The invention has special utility in a container construction wherein the tab serves as a second class lever to fulcrum at one end to initiate severance of the tear strip. Such an embodiment has been selected for the present disclosure and will provide adequate guidance for those skilled in the art who may have occasion to apply the teachings of the invention to other specific tab forms.

When a tab is employed to serve as a second class lever to fulcrum at one end to initiate severance of a tear strip, a minor portion of the tab including its fulcrum end overlaps one end of the tear strip with the minor portion attached to the tear strip and with the fulcrum end extending beyond the connection. While the puncturing means may be a pointed member mounted on the tab, the puncturing means may economically be simply a downwardly pointed offset in the sheet material of the tab. With the tab overhanging the puncturing means, the tab serves as a baffle or guard to control the gaseous discharge and to limit the extent to which the released fluid is projected into space.

The preferred practice of the invention is characterized by the further concept of weakening the container wall in the region of the puncturing means to facilitate the puncturing of the container. By way of example, the invention teaches that the container wall may be weakened advantageously by a V-shaped line of scoring, one advantage being that the puncturing means may be pointed with a taper to conform at least approximately to the angle of the V-shaped score.

The preferred practice of the invention is further characterized by the concept of forming a recess in the wall of the container in the region where the puncturing opera-

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tion is to occur. Such a provision has a number of unexpected advantages.

One advantage is that with the tab completely overlapping the recess, the tab is given better control over the released gaseous fluid. Another advantage is that the tab cooperates with the recess to form an expansion chamber to reduce the violence of the released flow. Still another advantage is that with the container wall weakened at a particular point in the recess, the recess may cooperate with the tab to guide the puncturing means accurately to the weakened point. For this purpose it is merely necessary to form an offset in the sheet material of the tab to function as a downward projection of the fulcrum end of the tab for guiding cooperation with the recess in the container wall. A still further advantage is that the recess in the wall of the container prevents accidental puncturing before the tab is operated.

The features and advantages of the invention may be understood from the following description and the accompanying drawing.

In the drawing which is to be regarded as merely illustrative:

FIG. 1 is a plan view of the top wall of a beverage container embodying the invention;

FIG. 2 is a similar view of a coffee can embodying the invention;

FIG. 3 is an enlarged portion of FIG. 1 showing the tab and a portion of the leading end of the tear strip;

FIG. 4 is an enlarged fragment of FIG. 3 with the tab removed showing how the tear strip may be formed with a recess and with a V-shaped score in the bottom of the recess;

FIG. 5 is a greatly enlarged section taken along the line 5—5 of FIG. 3;

FIG. 6 is a fragmentary section taken along the line 6—6 of FIG. 5 showing the puncturing means in its normal retracted position; and

FIG. 7 is a similar section showing how the puncturing means punctures the container wall.

FIG. 1 shows the end wall 10 of a metal can, generally designated 12, of the type that is commonly employed to confine a liquid beverage together with pressurized carbon dioxide. The end wall 12 is scored along the closed or continuous line 14 to form a tear strip 15 of a well known configuration and a suitable tab, generally designated 16, is attached to what may be termed the leading end of the tear strip to function as a second class lever for initiating severance of the tear strip from the can top.

In the construction shown, the tear strip 15 is attached to the tab 16 by a hollow rivet 18 that is formed in the metal of the tear strip and in a well known manner extends through an aperture in the tab in overlapping engagement with the tab. The free end 20 of the tab is folded to avoid a sharp edge and is slightly bent upward to facilitate manual gripping of the tab. In the construction shown, the tab 16 is stiffened longitudinally by a central longitudinal rib 22 and by two flanking longitudinal ribs 24 that straddle the rivet 18.

It is apparent that a minor portion of the tab 16, including the fulcrum end of the tab, overlaps the leading end of the tear strip 15 and adjacent areas of the can top on both sides of the tear strip. This minor portion of the tab is attached to the tear strip by the hollow rivet with the fulcrum end of the tab extending beyond the connection to the tear strip. When the tab functions as a second class lever to initiate severance of the tear strip, the free end 20 of the tab is lifted to cause the tab to rock about its fulcrum end for exerting upward pull on the hollow rivet 18 to initiate severance of the tear strip. After the lever action is completed, the tab

16 serves as a handle for pulling the rest of the tear strip away from the can tap.

When the free end of the tab 16 is lifted, the tab fulcrums about the fulcrum end to exert sufficient outward pull on the hollow rivet to cause the leading end of the tear strip to be torn away from the can top, and, care is taken that the fulcrum force is localized on the tear strip so that a suitable puncturing means on the underside of the tab will be effective where the fulcrum force is localized.

While the puncturing means may take various forms in various practices of the invention, a feature of this embodiment is that the puncturing means comprises simply a downward offset 25 in the sheet material of the tab, which offset forms a puncturing point 26. Beyond the offset 25 the end portion 28 of the tab is turned upward, as best shown in FIG. 6 to avoid interfering with the puncturing action, i.e., to insure that the fulcrum action will initially occur at the puncturing point 26. As indicated by three converging lines in FIG. 3, the downward offset is of triangular configuration, the lower side of the offset tapering to the puncturing point 26.

In the preferred practice of the invention, the sheet material of the container wall is weakened to facilitate the puncturing operation. As shown in FIG. 4, the container wall in this particular embodiment of the invention is weakened by scoring along a V-shaped line 30. It is contemplated that the puncturing point 26 on the tab 16 will substantially register with the apex of the V-shaped score 30 and that the angle formed by the V-shaped score will at least approximate the taper of the downwardly projecting offset of the tab.

As heretofore indicated, a feature of the preferred practice of the invention is the provision of a depression in the container wall in the region where the puncturing action is to occur. As best shown in FIG. 4, the tear strip 15 may be formed with a somewhat rectangular recess 32 for this purpose, the V-shaped score 30 being in the bottom of the recess. A further feature of the particular embodiment of the invention is that the underside of the tab 16 is formed with a downward projection 34 (FIG. 5) to cooperate with the recess 32 for the purpose of accurately guiding the puncturing point 26 into register with the V-shaped score 30. For this purpose, the sheet material of the tab is offset downward with consequent formation of a depression 35 on the upper or outer side of the tab. It is to be noted in FIG. 5 that the downward projection 34 includes the offset that forms the puncturing point 26 and it is to be particularly noted that the projection 34 of the tab is dimensioned for close guiding contact with the side walls of the tear strip depression 32 for guidance of the puncturing point with high reliability.

The manner in which the invention serves its purpose may be readily understood from the foregoing description. Normally, i.e. prior to use, the tab 16 lies flat on the can top with the puncturing point 26 safely spaced from the V-shaped score 30. Thus the depression 35 serves the purpose of preventing puncturing of the can by accidental impact against the flat tab. When the free end of the tab is lifted to initiate the severance of the leading end of the tear strip, the puncture point 26 is guided to the V-shaped score 30 to puncture the container wall as shown in FIG. 7. It is to be noted that the tab overhangs the puncturing point 26 in all directions to serve as a baffle in the path of escape of the gaseous fluid. The highly pressurized gas bleeds off rapidly so that the pressure inside the can is sufficiently lowered to prevent explosive spillage as the severance of the tear strip proceeds to expose the liquid content of the can.

It is contemplated that the tab 16 will form with the recess 32 an expansion chamber for the discharging gaseous fluid, the chamber serving to reduce the violence of the discharge stream. It is apparent that the end portion 28 of the tab may be as close as desired to the rim of the

recess 32 when the tab is in the position shown in FIG. 7 thereby to restrict to any desired degree the escape of gaseous fluid from the expansion chamber.

In actual practice, the user does not need to pay any attention to the puncturing action since it occurs automatically when the tab is used to initiate the severance of the tear strip. The puncturing action not only occurs automatically but also is automatically timed to insure reduction of the internal fluid pressure before the severing operation is advanced to the point of freely exposing the liquid content of the can.

FIG. 2 which shows the top of a coffee can is largely identical with FIG. 1 as indicated by the use of corresponding numerals to indicate corresponding parts. The only difference is in the configuration of the tear strip, the tear strip 15a in FIG. 2 extending around the circumference of the can in a well known manner.

My description in specific detail of the selected embodiment of the invention will suggest various changes, substitutions and other departures from my disclosure within the spirit and scope of the appended claims.

I claim:

1. In a container wherein a primary content is held under pressure by a gaseous fluid, the combination of: scoring in a wall of the container forming a tear strip; a tab connected to the tear strip to serve as a handle for manually tearing the tear strip for access to the primary content; and means carried by the tab and operable by manipulation of the tab to form a vent aperture in the wall of the container for release of gaseous fluid from the container to reduce the fluid pressure in the container before the tab severs the tear strip to the extent of substantially exposing the primary content.
2. In a container for confining a primary content under pressure by a gaseous fluid wherein scoring in a wall of the container outlines a tear strip and wherein a tab to serve as a second class lever to fulcrum at one end to initiate severance of the tear strip from the remainder of the metal wall has a minor portion including its fulcrum end overlapping one end of the tear strip with the minor portion attached to the tear strip and with the fulcrum end extending beyond the connection to the tear strip, the improvement comprising: said fulcrum end of the tab being provided with means to puncture the tear strip in response to the fulcrum pressure of the tab to form a vent opening to release gaseous fluid from the container to reduce the fluid pressure in the container prior to substantial exposure of the primary content by severance of the tear strip said puncture means being spaced inwardly from the edges of the fulcrum end whereby the fulcrum end covers the vent opening to serve as a baffle over the vent opening when the vent opening is initially formed.
3. The improvement set forth in claim 2 in which said tear strip is weakened in the region of said puncturing means to facilitate puncturing of the tear strip.
4. In a container for confining a primary content under pressure by a gaseous fluid wherein scoring in a wall of the container outlines a tear strip and wherein a tab to serve as a second class lever to fulcrum at one end to initiate severance of the tear strip from the remainder of the metal wall has a minor portion including its fulcrum end overlapping one end of the tear strip with the minor portion attached to the tear strip and with the fulcrum end extending beyond the connection to the tear strip, the improvement comprising:

said fulcrum end of the tab being provided with means to puncture the tear strip in response to the fulcrum pressure of the tab to release gaseous fluid from the container to reduce the fluid pressure in the container

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prior to substantial exposure of the primary content by severance of the tear strip;  
 said tear strip having a depression in the region of the puncturing means;  
 the material of the tear strip being weakened in a portion of said depression to facilitate puncturing of the tear strip; and  
 the fulcrum end of the tab having a projection on its underside for cooperation with the recess in the tear strip to guide the puncturing means to the weakened portion of the depression.

5. The combination set forth in claim 4 in which said tab completely covers the depression in the tear strip whereby the fulcrum portion of the tab serves as a baffle to control the projection of the released gaseous fluid and cooperates with the depression to form an expansion chamber for the released gaseous fluid.

6. In a container for confining a primary content under pressure by a gaseous fluid wherein scoring in a wall of the container outlines a tear strip and wherein a tab to serve as a second class lever to fulcrum at one end to initiate severance of the tear strip from the remainder of the metal wall has a minor portion including its fulcrum end overlapping one end of the tear strip with the minor portion attached to the tear strip and with the fulcrum end extending beyond the connection to the tear strip, the improvement comprising:

the material of the fulcrum end of the tab being offset to a point directed towards the tear strip to serve as means to puncture the tear strip to form a vent opening therein for release of gaseous fluid from the container before substantial exposure of the primary content occurs by severance of the tear strip, said offset point being spaced inward from the peripheral edges of the fulcrum end of the tab to cause the fulcrum end of the tab to overhand the vent opening when the vent opening is first formed.

7. In a container having a wall of sheet material confining a fluid under gaseous pressure, wherein scoring in said wall outlines a tear strip and a tab connected to the tear strip overlaps the leading end of the tear strip to be swung manually outward from the container wall for lever action to initiate severance of the tear strip, the improvement comprising:

means on the underside of the tab spaced from the connection of the tab with the tear strip to form a vent aperture in said wall under the tab in response to swinging movement of the tab, said aperture forming means being at a location on the tab to form the vent aperture in advance of severance of the tear strip.

8. In a container having a wall of sheet material confining a fluid under pressure wherein scoring in said wall outlines a tear strip and a tab is connected to the tear strip by a hollow rivet formed in the leading end of the tear strip with the hollow rivet extending through an aperture in the tab in overlapping engagement with the rim of the aperture for severance of the tear strip in response to lifting of the tab, the improvement comprising:

means spaced from said hollow rivet and extending downward from the underside of the tab to form a vent aperture in said wall under the tab in response to lifting of the tab, said aperture forming means being at a location on the tab to form the vent aperture in advance of severance of the tear strip.

9. In a container wherein a content is held under pressure by a gaseous fluid, the combination of:

a tear strip formed in the wall of the container;  
 a tab attached to the tear strip to serve as means for manually tearing the tear strip for access to the content,

said tab providing a lever means with a handle end and a working end; and

means on the underside of said lever means nearer to the working end than to the handle end to form a vent aperture in the wall of the container for release of gaseous fluid from the container to reduce the fluid pressure in the container before the tab tears the tear strip.

10. A combination as set forth in claim 9 in which the working end of the lever overhangs the aperture forming means to intercept the fluid initially released from the vent aperture.

11. In a container wherein the content is held under pressure by a gaseous fluid, the combination of:

a tab attached to the wall of the container and having a handle end to permit the tab to be swung upward from the wall of the container;

means on the tab responsive to the initial upward swing of the tab to form a vent opening in the wall of the container to release gaseous fluid from the container to reduce the fluid pressure in the container;

means on the tab responsive to further upward swing of the tab to form a pouring aperture in the wall of the container after the fluid pressure is reduced in the container; and

a portion of the tab being positioned relative to the vent aperture forming means to intercept the fluid initially discharged from the vent opening.

12. In a container wherein a primary content is held under pressure by a gaseous fluid, the combination of: scoring in the wall of the container forming a tear strip;

a lever connected to the tear strip to initiate severance of the tear strip by lever action, said lever having a handle portion and a fulcrum portion;

means on the fulcrum portion of the lever to puncture the wall of the container for release of gaseous fluid from the container to reduce the fluid pressure in the container before the lever severs the tear strip to the extent of substantial exposure of the primary content;

said puncturing means projecting downward from the fulcrum end of the tab; and

the wall of the container being formed with a depression under the puncturing means to space the puncturing means from the material of the wall until the lever is operated.

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