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[21] Appl. No. **34,131**
[22] Filed **May 4, 1970**
[45] Patented **Nov. 9, 1971**
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[56] **References Cited**
UNITED STATES PATENTS
3,289,880 12/1966 Wilkich 220/48
3,446,389 5/1969 Brown 220/48
Primary Examiner—George T. Hall
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[54] **EASY-OPENING DEVICE FOR A CONTAINER END**
6 Claims, 8 Drawing Figs.
[52] U.S. Cl. **220/48,**
220/44, 222/541
[51] Int. Cl. **B65d 17/00**
[50] Field of Search **220/48, 54,**
27, 44; 222/541; 215/46

ABSTRACT: This disclosure relates to an easy-opening container end in which the opening device remains attached to the end after opening, and which includes a V-shaped opening flap in the container end which is forced or plunged into the container by means of a lever tab which has a line of weakness in its upper surface between its handle end and its nose end so that upon opening, the handle end of the tab may be depressed to a nonobstructing position on the container end without closing the pouring orifice in the end.

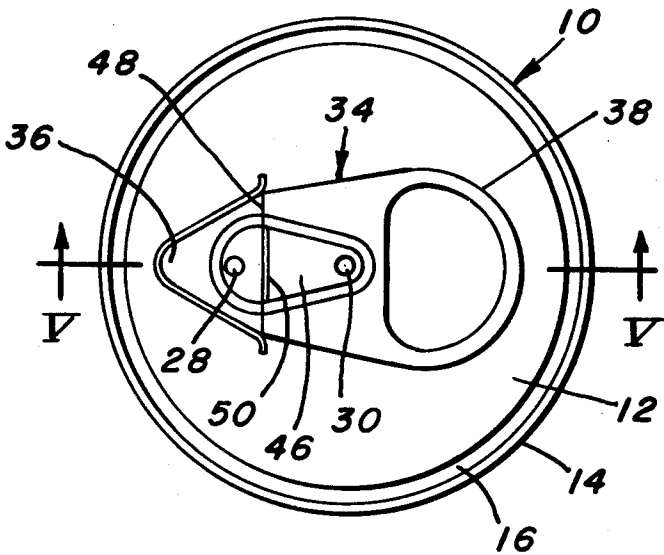


FIG. 1.

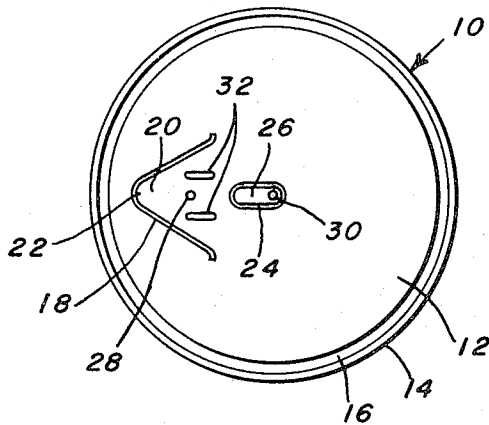


FIG. 2.

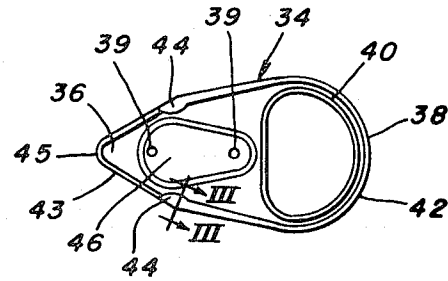


FIG. 4.

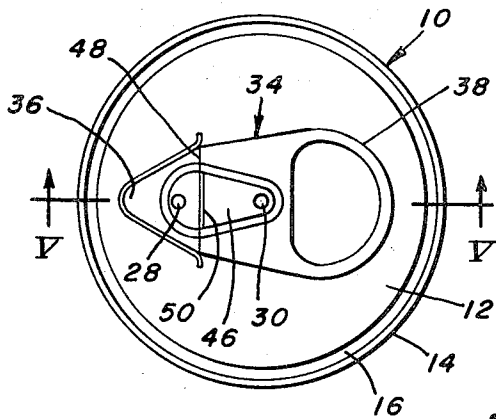


FIG. 3.

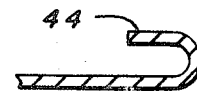
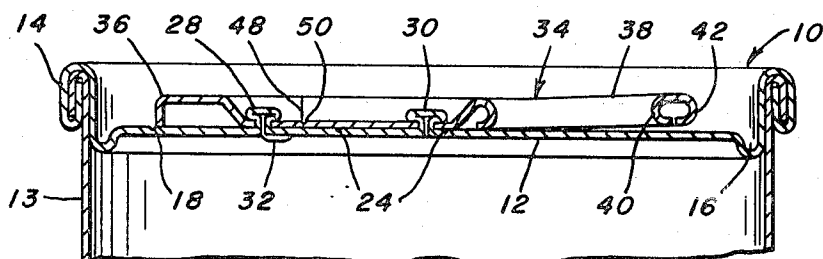


FIG. 5.



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FIG. 6.

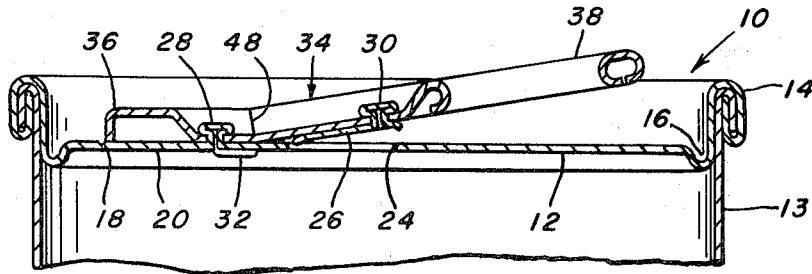


FIG. 7.

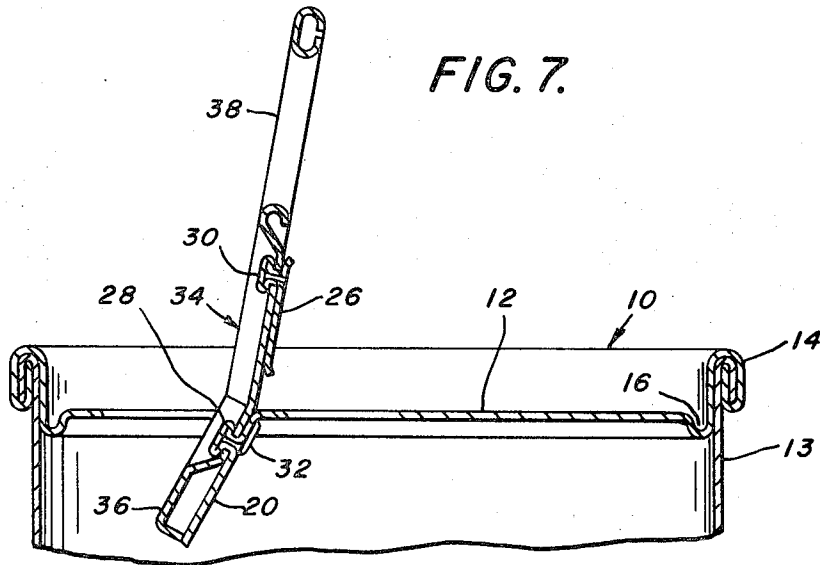
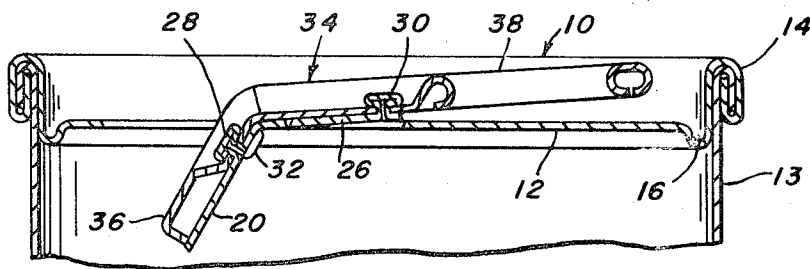


FIG. 8.



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EASY-OPENING DEVICE FOR A CONTAINER END

BACKGROUND OF THE INVENTION

Integral easy-opening devices for beverage cans are quite popular because they eliminate the necessity of a separate opener or tool to form a pouring orifice in the can end. However, the heretofore known easy-opening beverage cans which have separable pull tabs and tear strips can cause a litter problem through careless disposal of the pull tabs and tear strips. While stray cans are easily seen and collected, the relatively small pull tabs and tear strips are not easily seen or readily picked up. Various nonremovable easy-opening devices have been tried as shown in Brown U.S. Pat. No. 3,446,389, Brown U.S. Pat. No. 3,326,406, Wilkich U.S. Pat. No. 3,289,880 and Quimby et al. U.S. Pat. No. 3,269,586, but none of these have been completely satisfactory. Accordingly, an improved easy-opening device which remain secured to the can upon opening is desired.

SUMMARY OF THE INVENTION

This invention provides a container end which has V-shaped score therein defining an opening flap with its apex adjacent the periphery of the end, and a tab which has a nose end overlying and affixed to the opening flap and a handle end toward the center of the container end. The tab has a transverse line of weakness in its upper surface between its handle end and its nose end so that the tab can be bent or folded away from the line of weakness. The end may also have a second score which defines a vent portion to which the handle end of the tab may be attached. To open the can, the handle end of the tab is lifted to sever the vent portion from the end and rupture the "V" score which defines the opening flap. Continued lifting of the tab plunges the nose end of the tab and the opening flap into the can to leave a pouring orifice therein. The handle end of the tab can then be depressed to a nonobstructing position on the end, leaving the opening flap and the nose end of the tab in the can.

Accordingly, an object of the invention is to provide an easy-opening device which remains attached to the can end after end after opening.

Another object of the invention is to provide a nonremovable easy-opening device which forms both a pouring orifice and a vent opening in a can end.

BRIEF DESCRIPTION OF DRAWINGS

The above and other objects and advantages of the invention will be more fully understood and appreciated with reference to the following description and appended drawings wherein;

FIG. 1 is a top plan view of a container end of the invention showing the scores and rivets before attachment of a tab to the end,

FIG. 2 is a bottom plan view of a tab for attachment to the container end of FIG. 1,

FIG. 3 is a fragmentary cross-sectional view of the edge of the tab of FIG. 2 taken along line III-III,

FIG. 4 is a top plan view of the container end of FIG. 1 after attachment of a pull tab of FIG. 2 to the end,

FIG. 5 is a cross-sectional view of the container end of FIG. 4 taken along line V-V,

FIG. 6 is a cross-sectional view similar to FIG. 5 in which opening has been initiated,

FIG. 7 is a cross-sectional view similar to FIGS. 5 and 6 in which opening has been substantially effected, and

FIG. 8 is a cross-sectional view similar to FIGS. 5, 6, and 7 with opening completed and the tab depressed to a nonobstructing position on the container end.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to FIG. 1, a sheet metal end 10 for a can or other container is illustrated before a tab is attached to the end. Preferably, the end is made of aluminum or an alloy thereof

and comprises an end wall 12 with a peripheral seam 14 therearound which may be joined to a container body by conventional methods. A peripheral groove 16 may also be provided adjacent the seam 14 to strengthen the end against reversal or outward doming. To provide a pouring orifice in the can end, a V-shaped score line 18 is formed in the end wall 12 to define a flap 20 which can be depressed into a can to which the end is attached. Preferably the rounded apex 22 of the flap is adjacent the periphery of the container end, and the ends of the score flare outwardly as illustrated. A second score line 24 may also be formed in the end wall 12 to define a removable tear portion 26 which is adapted to provide a vent opening in the container. This second score 24 may be given a variety of configurations such as a triangle, circle or the like, with the one selected for illustration being designed for ease of opening and adequate size for rapid venting.

End 10 further includes two integral upstanding hollow rivets 28 and 30, one in the opening flap 20 and one in the end of the vent portion 26 distal the opening flap for attachment of a tab to the vent portion and flap. Additionally, embossments or other reinforcing means may be provided in the opening flap on opposite sides of rivet 28 to reinforce the flap adjacent its base. Such embossments may have various shapes, with the ones illustrated being in the form of small downwardly embossed ribs 32 which are parallel to a line through rivets 28 and 30 and to the axis of the tab which is secured to the rivets. The embossed ribs 32 are designed to limit bending in the flap 20 during opening so that the flap will hinge or bend only along the line of its base through the ends of score 18. If flap 20 were permitted to bend closer to the rivet 28, the size of the pouring orifice would be reduced in size and might be smaller than desired.

Turning to FIGS. 2 and 3, a tab 34 is illustrated for attachment to can end 10. Tab 34 may be formed from sheet metal, preferably aluminum or an alloy thereof, and has a triangular-shaped nose end 36 and a handle end 38 with a large aperture in it to facilitate gripping by the user. The tab 34 further has a downwardly recessed central area 46 with two small holes 39 in it for receiving rivets for attachment of the tab to a can end. To strengthen tab 34 and avoid sharp edges, the sheet metal of the tab may be curled under around the large aperture and along the outer edge of the tab to form beads 40 and 42 respectively. The nose end 36 is also reinforced by means of a downwardly directed flange 43 which may have a sharp point 45 on the end of the tab nose to facilitate rupture of the score 18 at the apex 22 of the flap 20 in the can end 10 (FIG. 1).

Reentrant flanges 44 are provided on the bottom of the tab 34 intermediate the bead 42 and flange 43 along both sides of the tab. These reentrant flanges 44 provide a hinge element for depressing the handle end of the tab to a nonobstructing position on a can end. Preferably, the reentrant flanges 44 are parallel to the plane of the tab and, upon attachment of the tab to a container end, will be parallel to such a container end wall. With reentrant flanges 44 parallel to a container end wall, the hinge elements are more readily bendable, and depression of the handle end of the tab to a nonobstructing position on the end requires less force by the user. As shown, the reentrant flanges may be slightly wider than the bottom edge of the curled bead 42 in order to provide suitably strong hinge elements.

Referring to FIGS. 4 and 5 with tab 34 attached to a can end 10 by means of rivets 28 and 30, the tab further has a transverse line of weakness in its upper surface between its handle end 38 and its nose end 36. The line of weakness may be formed by a cut 48 through the upper walls of the tab on both sides of the recessed central panel 46, and by a score line 50 in the upper surface of the central area. The reentrant flanges 44 (FIG. 2) on the underside of the tab are preferably not weakened. With such a line of weakness between the handle end and nose end of the tab, the tab will be substantially rigid against bending when lifted during opening, but will bend and can be folded relatively easily in the opposite direction away

from the line of weakness. Accordingly, a rigid lever tab is provided for opening a can end, but a tab which can have its handle end 34 depressed to a nonobstructing position on the end after opening.

Referring to FIGS. 6 through 8, the manipulation of the tab 34 to open can end 10 is progressively illustrated. It is seen in FIG. 6 that initial lifting of the handle end 38 of the tab exerts an upward force on the rivet 30 to rupture the score line 24 around the vent portion 26 to sever the vent portion from the end and form a vent for air to enter the can and for gases to escape from the can. Since the vent is located under the tab, the vent opening is shielded by the tab and accidental spraying of the contents of the can on the user during opening is prevented. During the initial lifting of the handle 38, the tab 34 is substantially rigid, and the flange 42 around the nose 36 of the tab exerts a downward force on the flap 20 adjacent score 18. Inasmuch as the transverse line of weakness is in the upper surface and walls of the tab, this line does not materially affect the rigidity of the tab during lifting. The material in such upper surfaces and walls are in compression during lifting and not affected by such weakening. At most, the tab 34 may bow or bend slightly as shown in the FIGS. 5 and 6. Continued lifting of the handle 38 of the tab 34 effects rupture of the score 18 around flap 20 and hinges the nose end of the tab and the opening flap into the can as illustrated in FIG. 7. A pouring orifice and a vent orifice are thereby provided in the end wall.

After the pouring orifice and vent orifice have been provided, it is next desired to move the handle end 38 of the tab to a position in which it will not interfere with pouring or drinking from the can. This is done by simply pushing the handle end 38 downward against the end wall 12 as shown in FIG. 8. For this purpose, the end is preferably designed so that the flap 20 is stronger or more unyielding against bending than is the tab. Consequently, the tab 34 bends or folds along the line of weakness between its handle end and its nose end, and flap 20 remains depressed in the end rather than hinge upward to again fill the pouring orifice in the end. Locking means, not shown, may also be provided to lock the opening flap in its opened position when the handle end of the tab is depressed against the end wall 12, but such locking means is not generally required.

Whereby particular embodiments of the invention have been described for purposes of illustration, it will be apparent to those skilled in the art that numerous variations can be made in the details of the invention. For example, the tab could be made in a variety of configurations such as with a

raised terminal end on its handle to facilitate gripping during opening. The line of weakness in the central portion of the tab could also be formed by cutting or lancing through the material along such line. Means could also be provided to lock the nose end of the tab in the container after opening, and the vent opening and opening flap could be given various other shapes.

It is therefore seen that in accordance with the invention an integral easy-opening device is provided on a can end, whereby after opening is effected by lifting the tab, the tab remains in a nonobstructing position on the can end and is not strewn on the ground to cause a litter problem.

What is claimed is:

1. In a container wall an easy-opening device comprising:

a. a V-shaped score in the container wall defining an opening flap having its apex toward the periphery of the container wall; and

b. a tab including a nose end overlying the opening flap and affixed thereto and a handle end toward the center of the container wall, said tab having a transverse line of weakness in its upper surface between said handle end and said nose end whereby, upon lifting of the handle end of the tab to rupture the score and plunge the nose end of the tab and the flap into a container to which the end is secured, the handle end of the tab can be depressed to a nonobstructing position on the end without closing the pouring orifice which has been formed.

2. An easy-opening device as set forth in claim 1 in which said tab is made of sheet metal and has a reinforcing configuration along both sides thereof extending from said handle end into said nose end, said reinforcing configurations having a cut line in their upper walls to form said line of weakness.

3. An easy-opening device as set forth in claim 2 in which the upper surface of said tab between said reinforcing configurations is scored along said line of weakness.

4. An easy-opening device as set forth in claim 1 which includes a tear strip in the container wall adjacent the handle end of the tab and secured thereto to provide a vent opening in the end.

5. An easy-opening device as set forth in claim 1 which said tab has an aperture in its handle end to facilitate gripping the tab by the user.

6. An easy-opening device as set forth in claim 1 in which said tab has a downwardly projecting point on its nose end adjacent the apex of the opening flap to initiate rupture of the V-shaped score.

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