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Zundel et al.

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[45] **June 12, 1973**

[54] **CONTAINER WITH PERMANENTLY ATTACHED TEAR STRIP AND TAB**

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[73] Assignee: **National Can Corporation,** Chicago, Ill.

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[21] Appl. No.: **221,214**

[52] **U.S. Cl.** **220/54,** 220/48

[51] **Int. Cl.** **B65d 17/20**

[58] **Field of Search** 220/48, 54, 27

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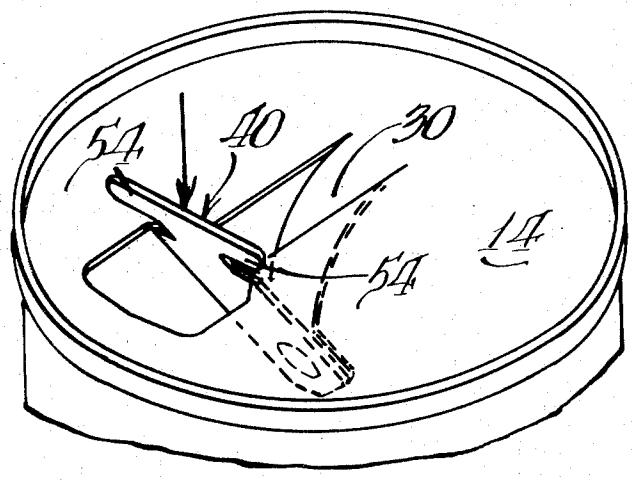
Primary Examiner—George T. Hall

Attorney—Robert J. Doherty

[57] **ABSTRACT**

A container top is formed with a tear strip that has a base end permanently connected to the container wall and a pull tab connected to the tear strip for manual severance of the major portion of the tear strip from the container wall. The pull tab has guide means for receiving severed edges of the container wall so that a major portion of the tab is located within the container when the tear strip and tab are in the fully opened position.

21 Claims, 13 Drawing Figures



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Fig. 1.

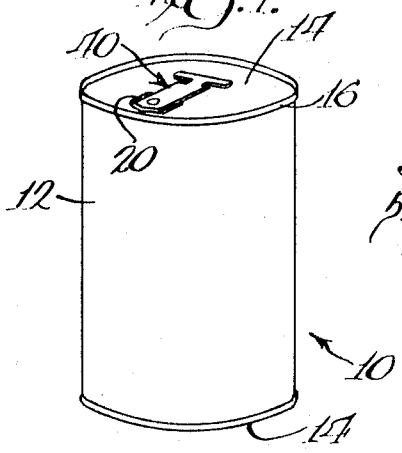


Fig. 2.

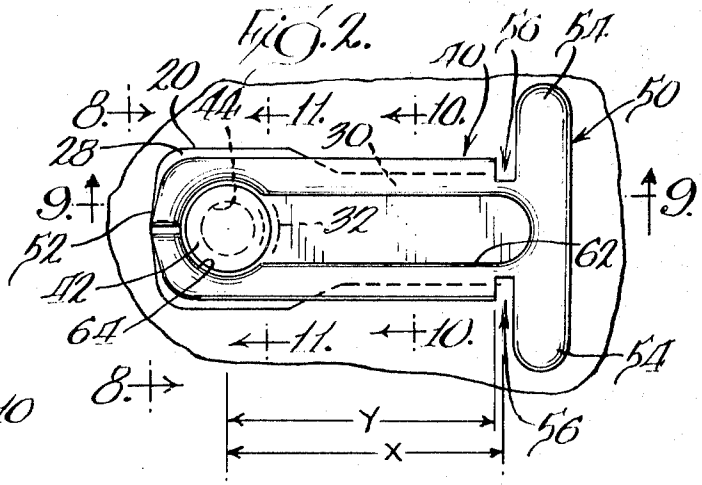


Fig. 3.

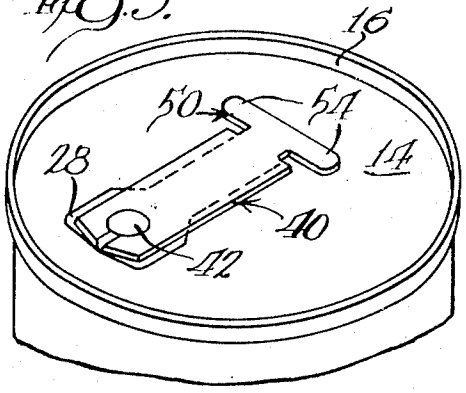


Fig. 4.

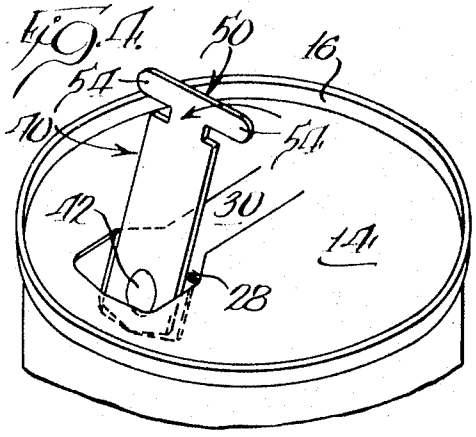


Fig. 5.

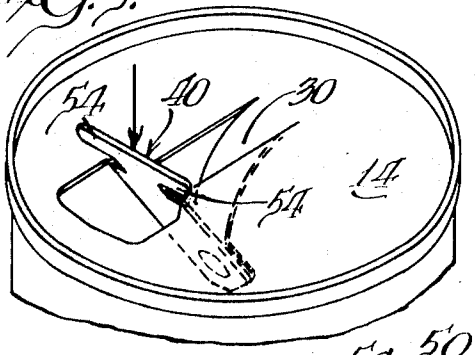
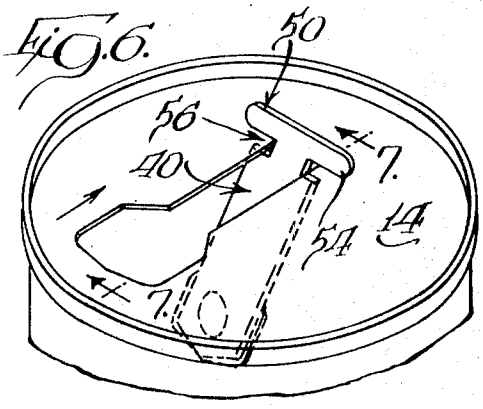


Fig. 6.



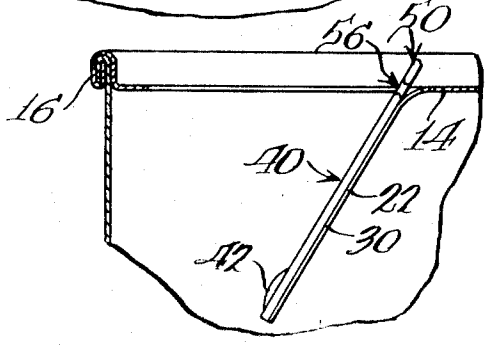


Fig. 7.

Fig. 8.

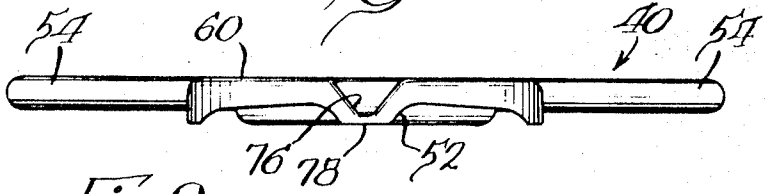


Fig. 9.

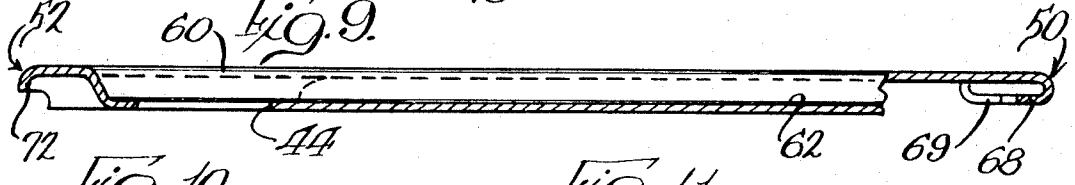


Fig. 10.

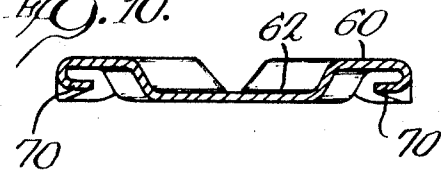


Fig. 11.

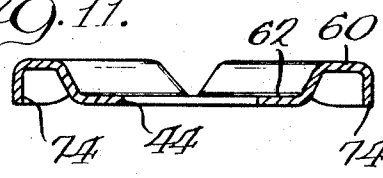


Fig. 12.

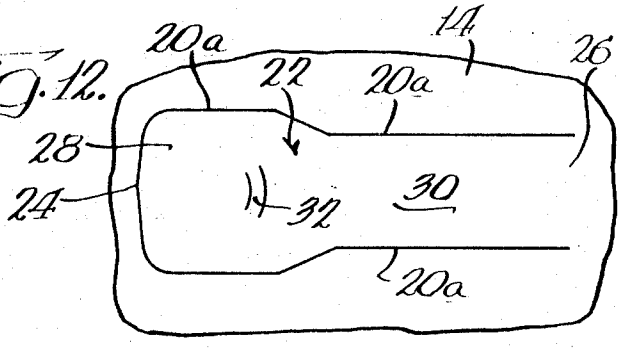
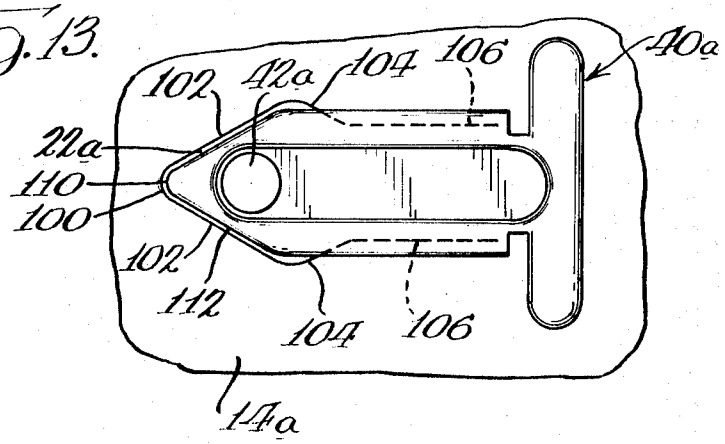


Fig. 13.



CONTAINER WITH PERMANENTLY ATTACHED TEAR STRIP AND TAB

BACKGROUND OF THE INVENTION

This invention relates to a container having a portion of its end wall weakened to serve as a tear strip with a tab attached to the tear strip to serve as manual means for severing the tear strip to form an opening for access to the contents of the container.

The wide spread acceptance of containers that can be opened without the normal can opener has resulted in a rather serious ecology problem. In containers for soft drinks, beer and other beverages, it has become customary to have a weakened score line that serves as a tear strip that can be completely removed by the manipulation of a tab connected thereto. The tear strips with tabs attached thereto are commonly discarded at random and are not as readily gathered up as the containers themselves. As a consequence, the discarded members accumulate in large proportions in areas such as beaches, picnic areas and major highways.

Because of the size of the removed portion of the container, most mechanical cleaning equipment that is normally utilized in beach or picnic areas cannot pick up such members. Thus, in such areas, the tabs and tear strips accumulate in large numbers. Such a condition is not only unattractive but also presents a serious health hazard because the severed edge of the tear strip is normally rather sharp and can cause injury to users of the beach area that are normally bare footed. In fact, the troublesome accumulation of the discarded tear strips and tabs in many beach and picnic areas has led to the consideration of local and state laws prohibiting this type of easy opening container.

SUMMARY OF THE INVENTION

The present invention overcomes the troublesome accumulation of discarded tear strips and tabs by producing a tear strip that has a base end permanently attached to the container wall. The tear strip has a tab that is permanently attached thereto and cooperating means between the tab and the container wall maintain all of the tear strip and a major portion of the tab inside the container in a position where unobstructed pouring or removal of the contents from the container can be accomplished.

More specifically, the present invention contemplates an elongated tear strip defined by a U-shaped score line that terminates at spaced locations on the container end wall to define a permanent connection between the tear strip and the container wall. The tear strip has a reduced portion adjacent its base end and an enlarged portion adjacent the leading or opposite end of the tear strip. When the tear strip is severed, the enlarged end provides the pouring opening in the container end wall while the reduced portion acts as a guide for a tab.

An elongated pull tab has one end permanently connected to the enlarged portion of the tear strip or section and a handle end on the opposite end thereof. The tab has a substantially common transverse dimension along the major portion of its length that is less than the transverse dimension of the enlarged portion of the tear strip and greater than the transverse dimension of the reduced portion of the tear strip. The tab also has guide means between opposite ends thereof for receiving the severed marginal edges of the opening in the container wall after the tear strip has been severed along the weakened line so as to guide the tab along the container wall.

In its illustrated embodiment, the tab is substantially T-shaped and has a common transverse dimension extending the entire length thereof with projections or segments extending outwardly along opposed lateral edges on the handle end of the tab to define a gripping portion for the tab. The transverse dimension of the handle end is greater than the transverse dimension of the enlarged portion and the guide means on the tab consist of recesses or slots in opposed edges of the tab to define the transverse dimension adjacent the handle that is slightly less than the transverse dimension of the reduced portion of the tear strip.

With the tab initially positioned parallel to the container end wall, a pivotal force on the handle end of the tab away from the container wall will cause a rupture of the weakened line at least down to the reduced portion of the tear strip and the rupturing end of the tab will pass through the enlarged portion of the opening defined in the container wall. Thereafter, a downward force on the tab will insure a complete severing of the weakened line and ultimately have the outwardly directed segments of the handle engaging the container wall to align the recesses or slots with the reduced portion of the opening. The tab then can be manipulated so that the opposed marginal edges of the reduced portion of the opening in the container wall are received in the recesses of the tab and the tab can be guided towards the base end of the tear strip to completely expose the enlarged portion of the opening and locate a major portion of the tab and the entire tear strip below the upper surface of the container wall.

According to a specific aspect of the invention, the elongated dimension between the connecting means and the base end of the tear strip is slightly less than the elongated dimension between the connecting means and the recesses or slots in the tab so that the tear strip must be elongated within its elastic limit during alignment of the recesses with the opposed edges of the container wall. With such an arrangement, when the recesses are aligned with the container wall, the inherent elastic memory of the material forming the tear strip will cause the tab to move along the reduced portion of the opening to its ultimate position wherein the tear strip and tab are substantially parallel to each other and extend at an angle downwardly into the container.

BRIEF DESCRIPTION OF SEVERAL VIEWS OF DRAWINGS

FIG. 1 shows a perspective view of a container having an easy open end panel constructed in accordance with the present invention;

FIG. 2 is an enlarged fragmentary plan view of an end panel of the container;

FIG. 3 is an enlarged fragmentary perspective view of the upper portion of the container showing the initial condition of the container end panel;

FIG. 4 shows the position of the tab after the first step of opening the container end panel;

FIG. 5 shows the second position for the tab during the opening operation;

FIG. 6 shows the final position for the tab and tear strip;

FIG. 7 is a fragmentary section taken generally along line 7—7 of FIG. 6;

FIG. 8 is an enlarged end view of the piercing end of the tab as viewed along line 8—8 of FIG. 2;

FIG. 9 is a longitudinal section through the tab taken along line 9—9 of FIG. 2;

FIG. 10 is a transverse section of the tab as viewed along line 10—10 of FIG. 2;

FIG. 11 is a transverse section of the tab as viewed along line 11—11 of FIG. 2;

FIG. 12 is an enlarged plan view of the container end panel prior to connection of the tab and showing the weakened line defining the tear strip; and

FIG. 13 is an enlarged fragmentary plan view similar to FIG. 2 showing a slightly modified form of tab and tear strip.

DETAILED DESCRIPTION

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail two specific embodiments, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated.

FIG. 1 of the drawings shows a container generally indicated by the reference numeral 10 consisting of a cylindrical body portion or wall 12 having opposite end panels or walls 14 connected to the body portion by the usual peripheral flange 16 that defines a rim extending beyond the outer surface of each container end wall 14. The container is preferably made of metal, such as aluminum or steel.

One end wall 14 has a weakened score line 20 (FIG. 12) that defines an elongated tear strip 22 which has a leading end 24 and a base end 26. As more clearly shown in FIG. 12, the weakened line 20 is substantially U-shaped and terminates at spaced points on the container end so that the base end 26 of the tear strip or section is permanently joined to the container wall or end panel 14. The tear section 22 includes an enlarged portion 28 adjacent the leading end 24 and a reduced portion 30 adjacent the base end with the reduced portion 30 having a common transverse dimension defined by parallel segments 20*a* of the weakened line 20, for a purpose which will be described later. The enlarged portion 28 of the tear strip is coined at 32, for a purpose that will be described later.

An elongated pull or opening tab 40 has a handle end and an opposite end, also referred to as the rupturing end. The rupturing or piercing end of the tab is permanently connected to the enlarged portion 28 of the tear strip 22 by connection means 42. In the illustrated embodiment, the permanent connection means has been shown as an integral rivet forming part of the tear strip 22 and extending through an opening 44 in the tab (FIG. 11) with an enlarged portion of the integral rivet overlying the upper surface of the tab.

The tab 40 has been illustratively indicated in FIGS. 1 and 3 through 6 while the details thereof are shown in FIG. 2 and 8 through 11. The tab 40 consists of a handle end 50 and a rupturing or piercing end 52 with the major portion of the elongated tab having a common transverse dimension that is slightly greater than the transverse dimension between the parallel segments 20*a* of the weakened line that defines the reduced portion 30 of the tear strip 22. The handle end 50 of the tab 40 includes enlarged transversely extending segments or fingers 54 (FIG. 2) that result in an overall T-shaped configuration for the tab.

The tab 40 further includes guide means between opposite ends 50 and 52 for receiving severed edges of the container end wall 14 after the tear section or strip has been severed so as to guide the tab along the container wall with opposite ends of the tab located on opposite sides of the end panel 14. The guide means consists of a pair of recesses or slots 56 that are produced on opposed edges of the tab adjacent the outwardly directed fingers or segments 54 to define a reduced area between opposite ends of the tab. The transverse spacing between the bases of the recesses 56 is slightly less than the transverse dimension between the score line segments 20a defining the reduced portion 30, for a purpose that will be described later.

The tab 40 is reinforced throughout its length to produce a substantially planar lever having handle means on one end thereof. The reinforcing means is illustrated in detail in FIGS. 2 and 8 through 11 and will now be described. Considering the tab to have a main planar body portion along the upper surface thereof, which is identified by the reference numeral 60 in FIGS. 8 through 11, the tab is reinforced throughout substantially its entire length thereof by a recess or dished portion 62 that is deformed downwardly from the planar body portion to define an elongated reinforcing trough having an enlarged portion 64 (FIG. 2) adjacent one end thereof in which is formed the opening 44 that receives the rivet 42.

The handle end 50 is reinforced transversely of the elongated dimension of the tab 40 by folding over the entire rear edge 68 (FIG. 9) between opposed free ends of the fingers or segments 54. Likewise, the inner or opposite edges of the fingers are folded over or curled, as shown at 69, so that the entire transverse portion of the handle end is reinforced and includes a double thickness of tab material. The opposed longitudinal side edges of the tab intermediate opposite ends are reversely bent and doubled under as shown at 70 in FIG. 10 so that the major portion of the longitudinal dimension of the tab between the recesses or slots 56 and the piercing end of the tab also has a reinforced doubled edge. In forming the tab, the reinforced double edge is removed to produce the recesses 56.

Adjacent the rupturing end 52 of the tab 40, the reinforcing consists of a downwardly extending flange or end wall 72 and side walls 74 that extend along a portion of the tab on opposite sides of the center of the connecting means 42 to produce a substantially rigid piercing end of the tab that overlies the enlarged portion 28 of the tear strip and is located within the confines of the enlarged portion 28. The leading or rupturing edge 52 also has a downwardly deformed V-shaped portion 76 that defines a rupturing point 78, which will be described later. As can be seen from FIG. 2 the rupturing end or nose portion of the tab has wall segments that extend in opposite directions from the V-shaped deformed portion 76 or piercing point 78 and define a large obtuse angle close to 180°, as is clearly shown in FIG. 2.

The manipulation of the tab and the sequence of steps in opening the container wall or end panel 14 will now be described. Initially, in forming the weakened line in the container wall, the enlarged portion 28 of the tear strip is located in close proximity to the rim 16 of the container. In its initial position, the tab extends

parallel to the upper surface of the container wall **14** and is located entirely below the upper edge of the rim **16.** The first step in opening the container end wall **14** is to pivot the tab generally counterclockwise or away from the container wall from the position shown in FIG. **3** to the position shown in FIG. **4.** During this initial movement, the major portion and possibly all of the enlarged portion of the tear strip or section is severed from the remainder of the container wall **14.** The coining **32** assists in allowing the tear strip to be bent along a transverse line during this pivotal movement.

The next step in the sequence of opening the container end is to produce a downward pushing force in a direction generally along the longitudinal dimension of the tab **40.** During this pushing movement, the remainder, if any, of the enlarged portion **28** and reduced portion **30** of the tear strip **22** are severed along the weakened line **20.** During such downward pushing movement of the elongated tab, the guide means or recesses **56** ultimately become aligned with the container wall **14** which becomes apparent when the segments or fingers **54** engage the upper surface of the container end wall **14.** Thus, the tab and tear strip are then in the position shown in FIG. **5.**

The last step in manipulation of the tab and tear strip is to move the handle portion **50** of the tab along the upper surface of the container wall **14** by applying a force in the direction generally indicated by the arrow in FIG. **6.** In its finally opened position, the tear strip and tab assume the position shown in FIGS. **6** and **7** wherein the tear strip is in a substantially planar condition in engagement with the lower surface of the tab and the tab has its handle end **50** overlying the base end of the tear strip. In this position, it will be noted that substantially all of the tab, with the exception of the handle end **50,** is located below the upper surface of the container end panel while the handle end is located below the free edge of the rim **16.** Also, the entire pouring section, defined by the enlarged substantially rectangular portion of the opening produced by the tear strip is completely unobstructed to allow removal of the contents in a minimum period of time. Furthermore, the only portion of the tab, i.e., the handle end, that is located above the panel end is confined to the open area below the free edge of the rim.

According to another aspect of the invention, it is desirable to construct and configure the tear strip and tab such that the two cooperate to assist in moving the tab to its final position shown in FIG. **6** and also maintain the tab in such position. For this purpose, the elongated dimension between the base end **26** of the tear strip and the connecting means **42,** defined by the dimension X in FIG. **2,** is slightly more than the dimension Y defined between the connecting means and the base of the guide means defined by the recesses **56.** By proper dimensioning, the tear strip will be deformed to an arcuate configuration shown in FIG. **5** and will also be somewhat stretched or elongated within its elastic limit longitudinally of its length while the tab is being moved from the position shown in FIG. **4** to that shown in FIG. **5.** Thus, after the tab is moved to a vertical position from the position shown in FIG. **5,** the elastic memory of the metal or other elastic material forming the container end **14** and having inherent resiliency to return to its undeformed condition will automatically tend to move the tab and tear strip to the final position shown in FIG. **7.**

As was explained above, the enlarged portion **28** of the tear strip that ultimately defines the pouring opening for the container end is substantially rectangular as illustrated in FIG. **12** and merges with tapered walls in the reduced portion of the opening defined by the tear strip portion **30.**

An alternate embodiment or configuration for the opening and the tab are shown in FIG. **13.** In the configuration of FIG. **13,** the opening defined by the tear strip **22*a*** is again of substantially key-holed configuration but the enlarged portion of the key hole tapers to a substantial point **100** and the straight line segments **102** of the weakened line are directed away from the point **100** and define an acute angle therebetween. The direction of the two outwardly directed segments of the weakened line is reversed at a point where the transverse dimension between the score lines is greater than the transverse dimension of the major portion of the tab **40*a***, as indicated at **104** and merges with the parallel segments **106** of the weakened line.

The enlarged portion of the opening defined in the container end wall **14*a*** of FIG. **13** is substantially diamond-shaped or of arrow configuration. Also, in the embodiment illustrated in FIG. **13,** the tab has its opposed edges tapered to a piercing point **110** and the tapered end of the tab is located within the confines of the score line while the major portion of the elongated tab **40*a*** is slightly greater in transverse dimension than the spacing between the parallel segments **106** of the score line and slightly less than the maximum transverse dimension of the enlarged area **22*a***. The advantage of the configuration shown in FIG. **13** is that the tear strip can be severed with a minimum amount of initial force because of the acute angle between the segments **102** of the weakened line.

We claim:

1. In an easy open end panel having a substantially U-shaped weakened line defining a tear strip having a permanent connection with said panel; and elongated tab having opposite ends; connecting means connecting one end of said tab to said strip at a location spaced from the permanent connection of the tear strip to said panel with said tab overlying said tear strip and extending generally parallel to said panel; and guide means on said tab cooperating with the container wall for maintaining opposite ends of said tab on opposite sides of said panel after severing of said weakened line.

2. An easy open end as defined in claim **1,** in which said guide means on said tab includes a reduced transverse area intermediate opposite ends of said tab and in which said tear strip defines a reduced area opening adjacent said permanent connection for receiving said reduced transverse area of said tab.

3. An easy open end as defined in claim **2,** in which said means on said tab includes a handle on one end of said tab having a transverse dimension greater than the maximum transverse dimension of said tear strip.

4. An easy open end panel as defined in claim **2,** in which said reduced area is located adjacent said handle end and said tab has a common transverse dimension along a major portion of its length between said reduced area and said end of said tab.

5. An easy open container comprising a container wall having a weakened line defining a tear section at least partially removable from the container, said tear section having a leading end and an opposite base end with said base end permanently connected to said con-

tainer wall; a pull tab having a handle end and an opposite end; means permanently connecting said opposite end of said pull tab to said tear section adjacent said leading end; and guide means between the ends of said tab for receiving severed edges of said container wall after severance of said weakened line to guide said tab along said container wall.

6. An easy open container as defined in claim **5,** in which said tear portion defines an open area that includes an enlarged portion adjacent said leading end and a reduced portion adjacent said base end, said reduced portion of said open area having a common transverse dimension with said guide means receiving opposed edges of said container wall defining said reduced portion when said tab is in an open position.

7. An easy open end as defined in claim **6,** in which said tab has a transverse dimension along a major portion of its length which is greater than said common transverse dimension with recesses on opposite edges of said tab defining said guide means.

8. An easy open end as defined in claim **7,** in which the longitudinal spacing between said base end of said tear section and connecting means is only slightly greater than the longitudinal spacing between said connecting means and said recesses so that said tear section is elongated within elastic limits during alignment of said recesses with the opposed edges of said container wall.

9. An easy open end as defined in claim **6,** in which said enlarged portion of said tear section is substantially rectangular.

10. An easy open end as defined in claim **6,** in which said enlarged portion of said tear section is of substantially arrow configuration and terminates at a point on said leading end.

11. A tab attachable to a tear portion defined by a weakened line in a container wall comprising an elongated member having a common transverse dimension between opposite edges throughout a major portion of its length; handle means on one end of said tab, said handle means including projections extending outwardly of said opposite edges; and recess means in opposite edges adjacent said handle means for guiding the tab along the container wall.

12. A tab as defined in claim **11,** in which said member is a one-piece sheet of material having means integral therewith for reinforcing and stiffening said tab throughout its length to prevent bending of said tab transversely of its length during rupture of the weakened line in the container wall.

13. A tab as defined in claim **11,** in which said tab has inclined planar edges adjacent said opposite end defining an included acute angle and merging into a piercing point.

14. A tab as defined in claim **11,** in which said tab has inclined planar edges merging to a point and defining an included obtuse angle substantially greater than 90°.

15. An easy open container including a container wall having a weakened line defining an elongated tear strip permanently secured at one end to said container wall and having an enlarged portion adjacent the opposite end defining a pouring opening in said container wall when said weakened line is severed; a tab having a handle end and a tear initiating end; connecting means connecting said tear initiating end of said tab to said enlarged portion of said tear strip with said tab extending generally parallel to said container wall; and means on said tab for maintaining said tear initiating end of said tab within said container after rupture of said weakened line by pivotal movement of said tab away from said container wall so that at least said tear initiating end of said tab is stored within said container.

16. An easy open container as defined in claim **15,** in which said tear strip includes a reduced portion between said enlarged portion and said permanently secured end, said tab has a transverse dimension along a major portion of its length that is greater than the transverse dimension of said reduced portion and less than a major transverse dimension of said enlarged portion, and said means on said tab includes a reduced area between opposite ends of said tab and dimensioned to be received in a reduced portion of the opening produced by rupture of said weakened line.

17. An easy open container as defined in claim **16,** in which said reduced area of said tab is located adjacent said handle end and said handle end has a transverse dimension greater than the major transverse dimension of said enlarged portion to prevent said tab from being forced into said container beyond the reduced area.

18. An easy open container including a container body and a metal end panel connected to said body by a seam that defines a rim extending beyond said end panel, said end panel having a weakened line defining an elongated tear strip having an enlarged portion at one end adjacent said rim and a reduced portion terminating in a base end permanently joined said end panel, said reduced portion defining spaced parallel marginal edges in said end panel when said weakened line is ruptured; an elongated tab having a handle end and a rupturing end; connecting means between said enlarged portion of said tear strip and said rupturing end of said tab, said tab having a transverse dimension along a major portion of its length that is greater than the spacing between said parallel marginal edges in said end panel; and means defining recesses in opposite edges of said tab adjacent said handle end for receiving said parallel marginal edges so that (1) pivotal movement of said handle end will rupture said weakened line along said enlarged portion of said tear portion and (2) downward movement of said tab into said container will sever said weakened line in said reduced portion and align said recesses with said marginal edges to allow said handle end of said tab to be moved along said reduced portion and maintain a major portion of said tab and all of said tear strip below said end panel.

19. An easy open container as defined in claim **18,** in which said tab has an elongated dimension between said recesses and said connecting means that is only slightly less than elongated dimension of said tear strip between said connecting means and said base end so that said tear strip is elongated within its elastic limits while said recesses are being aligned with said parallel marginal edges and release of said tab, when said parallel marginal edges are in, will cause said recesses to move along said parallel marginal edges of said end panel.

20. An easy open container as defined in claim **18,** in which said enlarged portion of said tear strip is of generally rectangular configuration.

21. An easy open container as defined in claim **18,** in which said enlarged portion of said tear strip is of generally arrow configuration.

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