April 5, 1966 W. E. TAYLOR 3,244,315

PULL TAB TEAR STRIP

Filed Dec. 20, 1963

Fig. 1

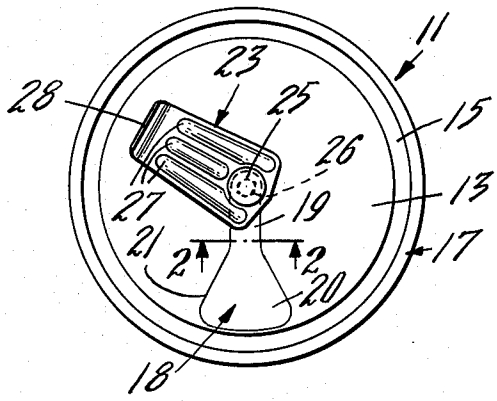
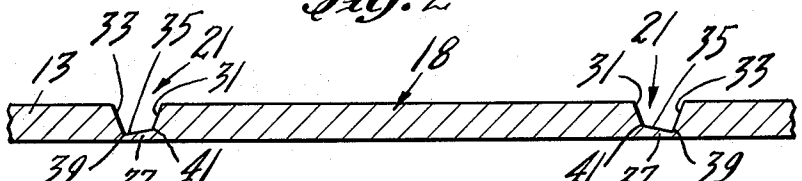


Fig. 2



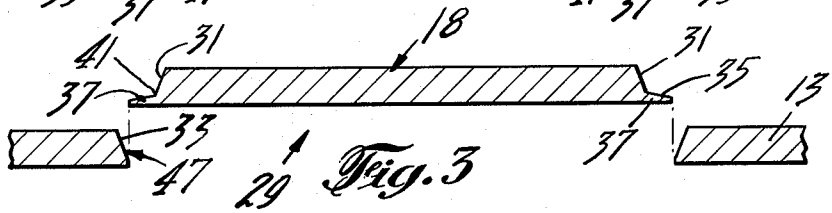


Fig. 3

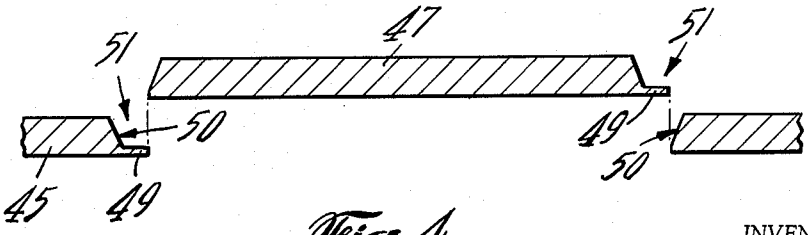


Fig. 4

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PULL TAB TEAR STRIP

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This invention relates to metal cans which are provided with opening features which require the removal of a scored metal section, and has particular reference to a score of improved construction which is designed to direct the tearing action in such manner as to insure that the torn metal edge which remains on the container after the opening action has been effected is smooth and free of thin, sharp fins which might tend to cut the consumer.

At the present time, many cans are provided with scored removable sections which are outlined by scores which are produced either by scoring rolls or scoring dies. When the cans are made of tin plate or coated steel, these scoring tools are provided with relatively sharp V-shaped scoring edges. Such sharp edges, however, are subject to rapid wear and provide serious maintenance problems. It has been found possible, especially when the cans are made of a softer metal such as an aluminum alloy, to provide more consistently uniform scores if the scoring dies are formed with scoring edges which comprise a pair of spaced, gently converging side edges which are joined by a horizontal front edge of considerable width, since the wide front edge is not as susceptible to wear as is the sharp V-shaped edge. Such blunt edged tools are capable of producing sharp scores in the metal without excessive wear.

However, the score produced by these wide score edges has a thin bottom web of uniform thickness and substantial width, and it is impossible to predict where the actual tearing action which ruptures this web will take place. Usually, such tearing action occurs at one end of the thin bottom web of the score, but frequently it occurs on the side of the score adjacent the removable metal section of the container. As a result, all or a major portion of the thin bottom web remains on the container, and, since it is much thinner and thus much sharper than the full-thickness metal of the container, it in effect becomes a projecting thin sharp fin which presents a cutting hazard to the consumer throughout the life of the container.

The present invention solves this problem by providing a score wherein this thin bottom web, instead of being of uniform cross-sectional thickness, tapers gradually in cross-sectional thickness from a section of greatest thickness to a section of least thickness. Since this latter section offers least resistance to tearing, the tearing action is invariably located in it, with the result that the location of the tear is completely predictable. Thus, by locating this area of least thickness on the side of the thin bottom web away from the removable section of the container, the tear is spaced away from the removable area with the result that the resultant thin bottom web fin always remains attached to and is discarded with the removable section after the container has been opened.

As a result, the edge of the metal which remains on the container is of maximum thickness and has a greatly reduced cutting potential.

An object of the invention, therefore, is to provide a score which produces a clean smooth edge on the container after the opening operation has been effected.

Another object is the provision of a score wherein accurate control of the location of the tear in the scored metal is obtained.

Still another object is the provision of such a score which is adaptable to many types of scored container opening features, including tearing strips which are formed in can

body or end members, and removable sections of many shapes which are formed in the can end panels.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings:

FIG. 1 is a top plan view of a can end embodying the present invention;

FIG. 2 is an enlarged fragmentary sectional view taken substantially along the line 2—2 in FIG. 1, parts being omitted and parts being broken away;

FIG. 3 is a view similar to FIG. 2 but showing the position of the tear in the bottom web of the score when the removable section of the end closure is torn out; and

FIG. 4 is a view corresponding to FIG. 3 but showing how the tear may be positioned in a conventional score having a thin bottom web of uniform thickness.

As a preferred and exemplary embodiment of the instant invention, FIG. 1 shows a metal can end **11** having a substantially flat central panel **13** which preferably is surrounded by an annular reinforcing groove **15**. The end **11** is made from a suitable tearable metal, such as an aluminum alloy, which is of substantially uniform thickness so that its upper and lower surfaces are parallel to each other. The marginal edge portion of the end **11** is secured to the upper end of a conventional can body in an upwardly extending double seam **17** of conventional construction.

The central panel **13** is provided with a removable tear out section **18** which is generally of elongated, key-hole shape and comprises a narrow inner portion **19** which extends radially from the center of the panel **13** and terminates in a wider outer portion **20**. The tear-out section **18** is defined and completely enclosed by an endless score **21** which is preferably formed in the upper surface of the panel **13** of the can end **11**.

A lift tab **23** is secured to the narrow inner portion **19** of the removable section **18** by means of an upwardly drawn rivet **25** which is formed integral with the metal of the can end **11** and extends through a circular hole **26** in the lift tab **23** and is flattened or expanded outwardly over the edge of the lift tab **23** around the hole **26** to firmly secure the lift tab **23** to the removable section **18**.

It will be understood that other methods can be used to secure the lift tab **23** to the can end **11**. As suggested alternatives, the lift tab **23** can be welded or soldered to the inner portion **19** of the tear out section **18**. The illustrated riveted construction is, however, the construction which is in general commercial use at the present time.

The lift tab **23** is preferably reenforced against bending by suitable ribs or corrugations **27** so that when the finger of the consumer is inserted beneath the free, outer upturned end **28** of the lift tab **23** and the lift tab pulled upwardly, the portion of the score **21** which surrounds the rivet **25** is broken, thus breaking the inner portion **19** of the removable section **18** loose from the surrounding portion of the end panel **13**. Thereafter, continued lifting of the lift tab **23** results in an extension of the tear throughout the length of the score line **21** and ultimate complete detachment of the removable section **18** from the can end **11** to thereby create a dispensing opening **29** (see FIG. 3) through which the contents of the container may be poured.

The score line **21** may be indented into the can end **11** prior to the attachment of the lift tab **23** by a suitable scoring die (not shown) which compresses and displaces the metal of the can end **11** and forms a groove therein which comprises the score **21** and is defined by a pair of laterally spaced oppositely inclined side walls **31, 33** which are formed respectively in the removable and non-

removable portions of the end panel 13, and a connecting bottom wall 35 of substantial width which inclines outwardly and downwardly from the side wall 31 to the side wall 33 so that the thinned, residual bottom web 37 of the score 21 is thickest adjacent the base of the wall 31 and gradually decreases in cross-sectional thickness so that it is thinnest adjacent the base of the wall 33. As best seen in FIG. 2 the walls 31, 33, which are slightly inclined away from each other, intersect the wall 35 in sharp angular corners 39, 41.

Because of this construction and because of the fact that the bottom web 37 is thinnest just below the corner 39, when the lift tab 23 is lifted the rupture of the bottom web 37 occurs in the thinnest portion of the web 37 in substantial vertical alignment with the corner 39, as seen in FIG. 3. As a result, substantially all of the bottom web 37 remains attached to the tear out section 18 in the form of a thin fin (see FIG. 3) and is discarded when the section 18 is thrown away. The key-hole shaped dispensing opening 29 which is produced in the can end 11 by removal of the tear out section 18 is thus surrounded by an edge 47 (see FIG. 3) which is of the full thickness of the metal of the end 11, and which provides an edge which is much less apt to cut the consumer when he drinks directly from the can than would be the edge if the fin formed by the residual thin bottom web 37 were attached to it.

This latter condition is disclosed in the left hand portion of FIG. 4, which figure illustrates the condition of a conventional can end 45 after the removable section 47 has been torn out. The conventional end of FIG. 4 is similar to that of FIGS. 1 to 3 in all respects except for the fact that the bottom web 49 of the score 51 is of uniform thickness instead of being of nonuniform thickness, as in the score of the instant invention. As a result of this uniform thickness of the bottom web 49, no control is had over the location of the line of rupture, with the result that the rupture may occur on either side of the bottom web 49 and frequently transfers from one side of the bottom web 49 to the other. As a result, after the removable section 47 has been torn out, some portions of the bottom web 49 remain attached to the edge 50 which surrounds the opening 49 (as seen at the left in FIG. 4) while in other areas the bottom web 49 remains attached to the torn-out section 47 (as seen at the right in FIG. 4). In some opened containers, the first condition, which is undesirable in that the bottom web 49 which remains attached to the can end provides a finned edge which is much thinner and sharper than the unfinned edge, obtains throughout most of the length of the score 51. This undesirable condition is completely eliminated in the improved score of the instant invention, which insures that the opening in the can end is always surrounded by an unfinned edge.

It will be understood, of course, that the instant invention is not limited to use with scored areas of any particular configuration, nor is it limited to use with scored areas which are disposed in any particular area of the can, but instead, is generally adaptable to every score, whether produced by a scoring roller or a scoring die, wherein for any purpose it is desired to accurately control the location of the line of rupture.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. A metal container part having a removable section formed therein and set off from a nonremovable section of said container part by a score, said score comprising a groove which is indented into said container part and is formed with a pair of laterally spaced side walls and a transverse bottom wall which extends from the base of one of said side walls to the base of the other of said side walls, said bottom wall comprising one surface of a thin web which forms the base of said groove, said web being of non-uniform cross-sectional thickness and having its thinnest area located at the base of one of said side walls, whereby when said removable section is displaced from the plane of the nonremovable section of said container part said thinnest area of said web is ruptured.

2. The container part of claim 1 wherein said thinnest area of said web is disposed adjacent the non-removable section of said container part, whereby when said thinnest area is ruptured said web will remain attached to said removable section.

3. The container part of claim 2 wherein said web tapers gradually in cross-sectional thickness.

References Cited by the Examiner

UNITED STATES PATENTS

D. 195,604	7/1963	Fraze	222—541
3,039,482	6/1962	Goldberg	220—89
3,151,766	10/1964	Hencher	220—54

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