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3,534,883

PULL TAB FOR EASY OPENING CAN END

Filed March 28, 1968

2 Sheets-Sheet 1

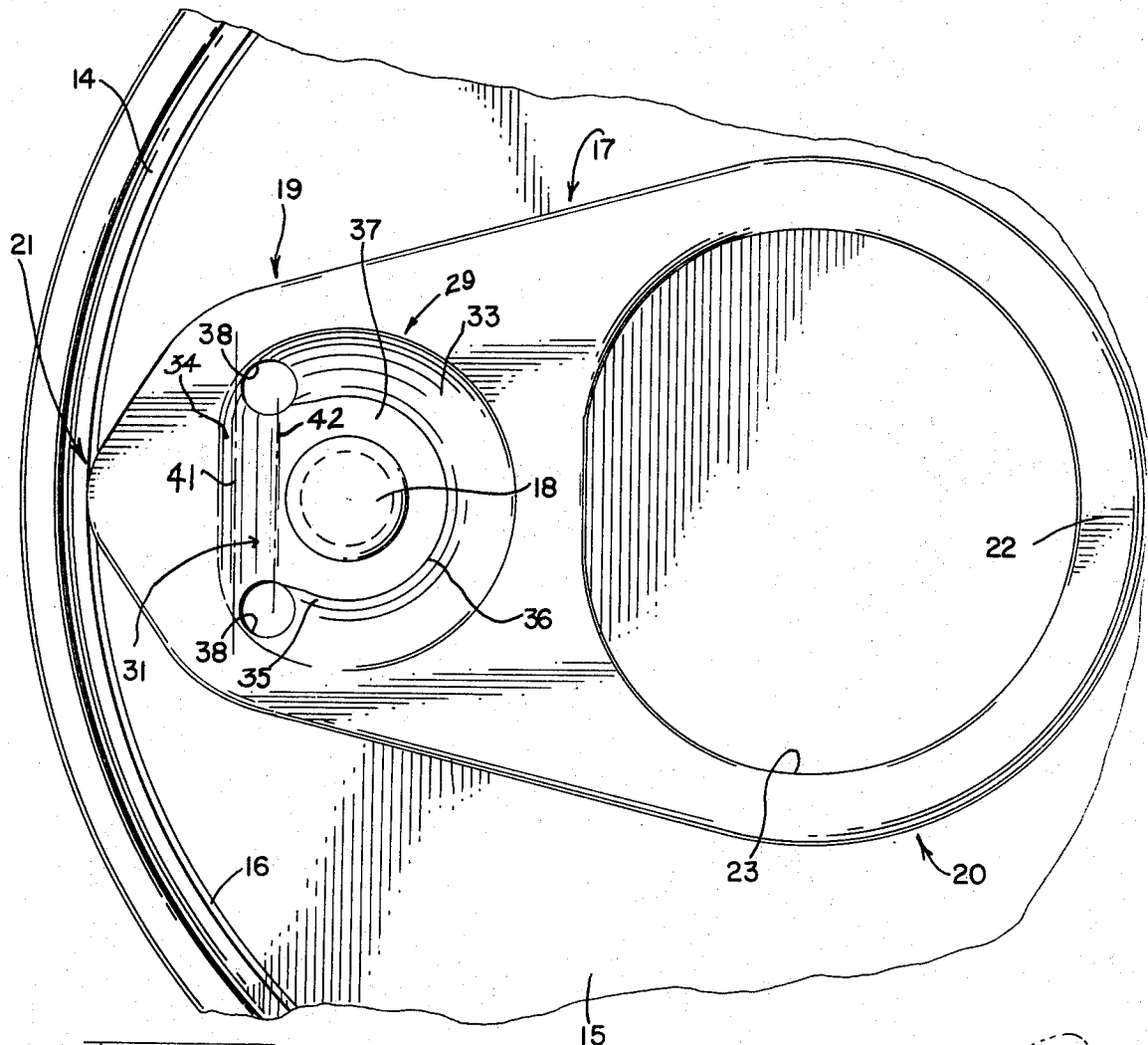


FIG. 1

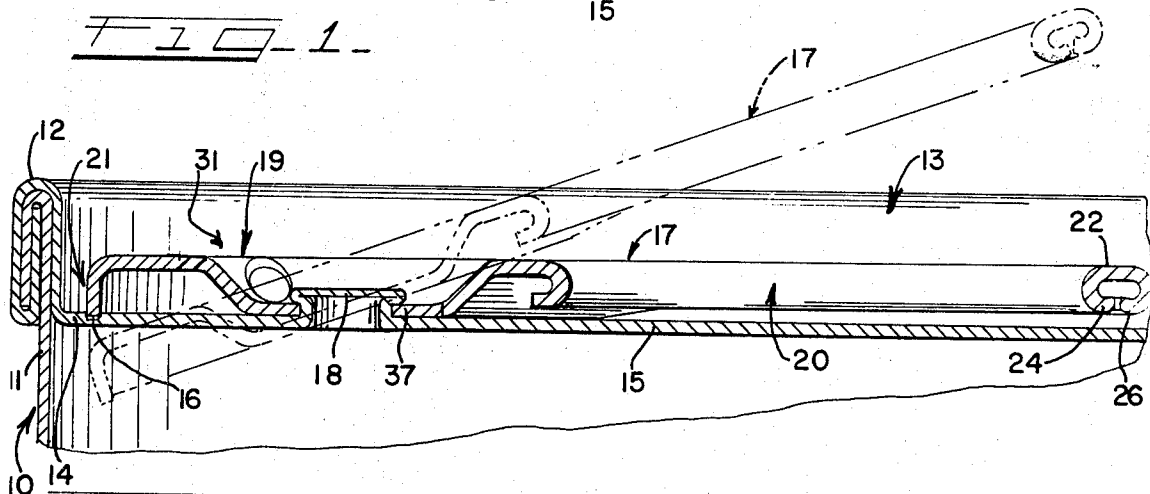


FIG. 2

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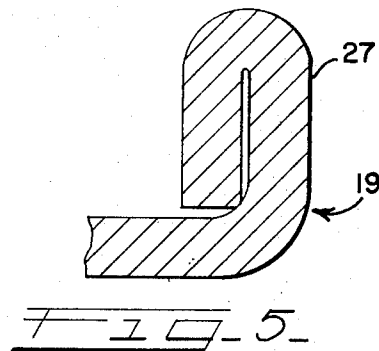
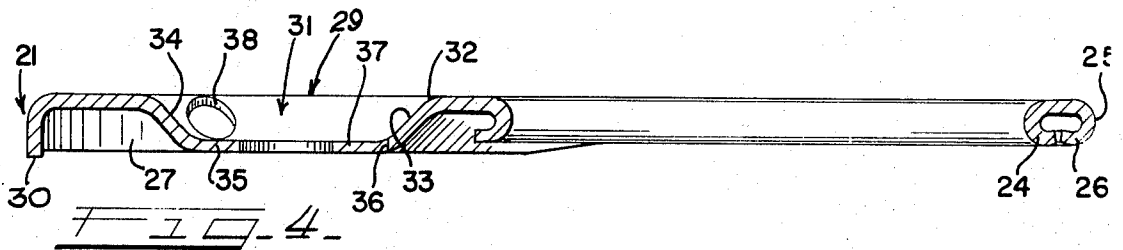
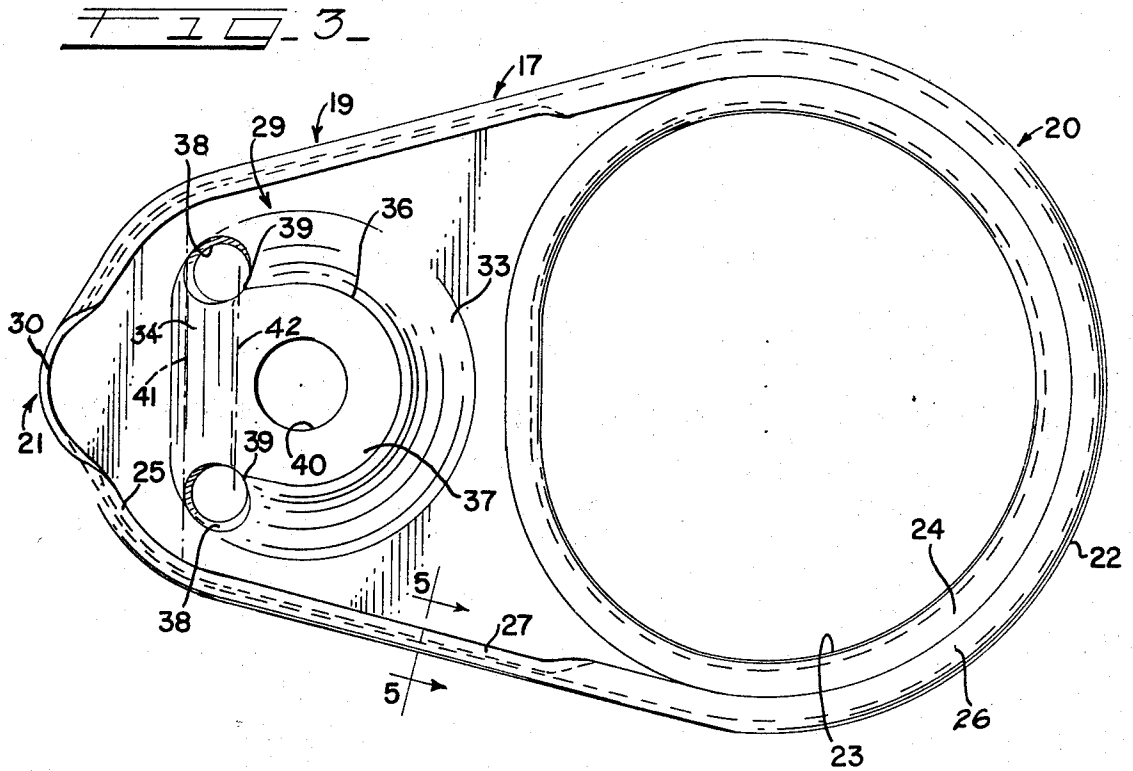
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PULL TAB FOR EASY OPENING CAN END
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6 Claims

ABSTRACT OF THE DISCLOSURE

A pull tab for an easy opening can end having a weakening line defining a removable panel portion in the cover panel of the container. The pull tab is made from one-piece sheet metal and formed with a finger grip portion from which there integrally extends a leading end portion adapted to be hingedly attached to the removable panel portion. A penetrating nose is provided on the leading end portion remote from the finger grip portion. A depending flange extends about the pull tab to impart rigidity thereto to serve as a lever and is bent to form an underlying horizontal hemmed edge about the finger grip and to form an underlying upstanding hemmed edge about the leading end portion whereby the edge resists bending in compression. The upstanding hemmed edge terminates in transversely spaced ends on opposite sides of the nose so that the terminal edge of the depending flange serves to break the weakening line upon pivoting of the tab.

The leading end portion is formed with an attachment portion including an attachment panel formed in the bottom wall of a depression of substantially D-shaped outline. The attachment panel is adapted to be fixed to the cover panel and is defined by a U-shaped cut opening toward the nose. The terminal ends of the U-shaped cut extend substantially tangentially into openings formed and located in a downwardly and inwardly inclined sidewall of the depression to reduce the stresses occurring during hinging of the pull tab about the attachment panel.

The present invention relates in general to new and useful improvements in easy opening containers and, more particularly, to a pull tab particularly constructed for effecting the initial rupture of a removable panel portion from an easy opening container end and the removal of the latter therefrom.

The invention relates more specifically to a pull tab wherein the initial rupture of the removable panel portion is accomplished by a pull tab which serves as a lever to initially rupture the weakening line upon tilting thereof. A pull tab of the foregoing type is formed from a single piece of sheet metal and reinforced by shaping the same to be rigid and resist longitudinal bending. The tab is attached to the removable panel portion to permit tilting thereof to perform its function as a lever. At a leading end portion the pull tab terminates in a penetrating nose which serves to penetrate the weakening line of the removable panel section. Integrally extending from the leading end portion and disposed remote from the penetrating nose is a finger grip portion which may be in the form of a ring or the like.

To rigidify the tab, the prior art devices have been provided with horizontal hemmed edges extending from the penetrating nose. These prior horizontal hemmed edges have been subject to tension stresses upon assuming the bending moments imposed thereon during use of the tab as a lever for separating the removable panel along the weakening line. In view of the relative thinness of the sheet material from which the tab is constructed to render the same economically feasible, the tab might be incapable of assuming the tension stresses and would bend

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and under some circumstances tear, causing the separation of the finger grip and leading end portions.

It is accordingly an object of the present invention to provide a pull tab which may be formed of a minimum thickness of sheet metal and which is reinforced by incorporating an outer peripheral hemmed edge constructed to assume bending moments in compression and to thereby minimize the tendency of the tearing of the pull tab when the latter is used as a lever.

It is a further object to provide a rigid steel sheet metal pull tab for easy opening containers wherein the pull tab includes an attachment portion constructed and arranged for hinging about the removable panel portion in a manner such that no sharp, clearly defined hinge line results and thereby to reduce localized stresses tending to result in tearing of the attachment portion from the pull tab.

The objects of the present invention are accomplished generally by the provision of a pull tab having a hemmed edge which extends continuously along the outer edge of the tab in a manner such that a portion of the hemmed edge which is subject to the greatest bending moment is placed in compression rather than tension as formerly, thereby to reduce the possibility of tearing of the tab. The attachment portion for attaching the pull tab to the panel is provided with an attachment ear defined by a U-shaped cut of which the terminal ends enter to one side of the respective centers of apertures formed in a depression provided in the leading end portion so that the circumference of the aperture is a continuation of the terminal ends of the cut and thereby eliminate localized tension stresses upon hinging of the pull tab about the attachment ear. Moreover, the depression is formed to provide an inclined wall in which the apertures are formed so the attachment ear hinges about hinge lines located generally at the top and bottom of the wall so that the bending stresses are distributed therebetween.

In the drawings:

FIG. 1 is a fragmentary plan view of a can end incorporating the pull tab of the present invention;

FIG. 2 is an enlarged fragmentary vertical sectional view taken along the lines 2—2 of FIG. 1 and showing in phantom the position of the pull tab when it performs its function as a first-class lever;

FIG. 3 is an enlarged bottom plan view of the pull tab of FIG. 1;

FIG. 4 is a cross-sectional view of the pull tab taken generally along the lines of 4—4 of FIG. 3; and FIG. 5 is a cross-sectional view of the hemmed edge taken generally along the lines 5—5 of FIG. 3.

Referring now to the drawings, there is shown an easy opening container 10 which may be in the form of a conventional type of can. The container 10 includes a can body 11 to which there is secured by means of a double seam 12 a can end 13. The can end 13 includes an end or cover panel 14 of which a major portion 15 thereof is removable along a weakening line 16 which may be formed by scoring or the like.

To remove the removable panel portion 15 from the cover panel 14 there is provided a pull tab 17. The pull tab 17 is formed from a single sheet of relatively thin gauge sheet metal and is fixedly secured to the removable panel portion 15 by means of an integral rivet 18 formed in the removable panel portion 15.

As shown in particular in FIGS. 3—5, the pull tab 17 includes a leading end portion 19 having a penetrating nose 21 and an integral finger grip portion 20 located remote from the penetrating nose 21. The finger grip portion 20 may be in the form of a ring 22 having a finger receiving opening 23. The finger receiving opening 23 is defined by a downwardly and outwardly turned edge forming a horizontal hem 24 underlying the ring 22.

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Extending continuously about the edge of the finger grip portion 20 and the leading end portion 19 is a depending flange 25. About the outer edge of the finger grip portion 20 the flange 25 is bent or turned inwardly to define a horizontal underlying hemmed edge 26. The outer hemmed edge 26 cooperates with the inner hemmed edge 24 to rigidify the finger grip portion 20 and at the same time eliminate all exposed sharp edges.

Along the outer edges of the leading end portion 19 the flange 25 is bent upwardly and inwardly to form an upstanding hemmed edge 27 (FIG. 5) which merges with the outer horizontal hemmed edge 26 of the finger ring portion 20. In this manner when the pull tab 17 is used as a first-class lever as illustrated in phantom in FIG. 2 to initially sever the weakening line, as more fully to be described hereinafter, the upstanding hemmed edge 27 is placed in compression, thereby reducing the possibility of tearing or bending across the leading end portion 19.

The upstanding flange 25 terminates on opposite sides of the penetrating nose 21 and presents a terminal edge 30 lying along the weakening line 16. It is to be observed that the nose 21 is generally arcuate, although various other configurations may be used. Moreover, as clearly shown in FIG. 4, the terminal edge 30 of the nose 21 projects below the lower folded edge of the upstanding hemmed portion 27. This relationship of the terminal edge 30 with the lower edge of the hemmed edge 27 insures the engagement of the nose 21 with the weakening line 16 to sever the latter upon lifting of the pull tab 17.

For providing hinging movement of the pull tab 17 relative to the cover panel 14, an attachment portion 29 is provided on the leading end portion 19 and comprises generally a well or depression 31 disposed intermediate the opposing edges of the leading end portion 19. The depression 31 is of substantially D-shaped contour having an inwardly and downwardly inclined side wall 32 including an arcuate section 33 and a linear section 34. The arcuate section 33 opens toward and opposes the nose 21. The side wall 32 merges with a downwardly displaced bottom wall 35 which lies at substantially the same level as the lower turned edge of the upstanding hemmed edge 27.

A U-shaped cut 36 formed as by lancing or the like is provided in the bottom panel and defines an attachment panel 37. The U-shaped cut 36 opens towards and opposes the nose 21. At the juncture of the inclined arcuate wall section 33 and inclined linear wall section 34 there is provided a pair of transversely spaced circular apertures 38. The circular apertures 38 receive the respective terminal ends 39 of the U-shaped cut 36. The attachment panel 37 is provided with a rivet receiving opening 40 which receives the integral rivet 18. It is to be noted that the terminal ends 39 of the cut 36 are located to one side of the center of the apertures 38 and are generally tangential to the circumference of the apertures rather than directed radially into the apertures. Thus, the major portion of the circumferential surface of the apertures 38 forms a substantially uninterrupted continuation of the cut 36 so that no sharp break or crease line occurs between the terminal ends of the cut 36 when the pull tab 17 is tilted. In the absence of a sharp break or crease line, the tension forces occurring during hinging of the attachment panel 37 relative to the remainder of the pull tab 17 are minimized as more fully to be explained hereinafter.

Moreover, the circular apertures 38 break the continuity of the inclined side wall 32 at the juncture of the circular section 33 with the linear section 34, so that upon tilting of the pull tab 17 a hinging action occurs about hinge lines 41 and 42 located approximately at the top and bottom of the inclined linear section 34 as shown in FIG. 3. In this manner the linear wall section 34 serves as a bridge and assumes the bending stresses occurring at the hinge lines 41 and 42. The elimination of a

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bending crease as accomplished by the generally tangential relationship of the terminal ends 39 to the apertures 38 and the bridging action of the linear wall section 34 reduces the tendency of the attachment panel 37 to tear from the remainder of the pull tab 17.

Referring now to FIG. 2, it will be seen that when it is desired to open the can 10 the rear end of the finger grip portion 20 is lifted. As the pull tab 17 is lifted it hinges about the hinge lines 41 and 42 so that relative bending occurs along the linear wall 34 of the depression 31. The attachment panel 37 of course remains fixed to the removable panel 15 by means of the rivet 18. During the initial lifting movement of the pull tab 17, sufficient movement occurs to permit the finger to be inserted into the finger opening 23 prior to the engagement of the nose 21 with the weakening line 16. Thereafter, a sufficient force is exerted so that the nose 21, particularly the lower or terminal edge of the flange 25, is brought into firm contact with the removable panel 15 along the weakening line 16. Upon upward movement of the grip portion 20 through the lever effect of the pull tab 17, a downward pressure is exerted on the removable panel portion 15 immediately adjacent the weakening line 16 sufficient to rupture the end panel 14. After the initial rupture occurs, an upward pulling force is applied on the pull tab 17 to tear the remainder of the unsevered portion of the removable panel portion 15 from the cover panel 14.

What is claimed is:

1. A one-piece sheet metal pull tab for an easy opening container having a weakening line defining a removal panel portion in a panel of the container, said pull tab comprising a leading end portion and an integral finger grip portion, a nose on said leading end portion remote from said integral finger grip portion, said leading end being attachable to said removable panel portion for hinging movement so that said nose is engageable with the removable panel portion along said weakening line, a depending flange extending continuously about the periphery of said leading end portion and said finger grip portion to rigidify said pull tab so that the latter serves as a lever for severing the removable panel portion from the end panel along said weakening line upon hinging movement of said pull tab, said depending flange being turned to form an underlying horizontal hemmed edge along the outer edge of said finger grip portion and turned to form an upstanding hemmed edge along the outer edge of said leading end portion so that said upstanding edge resists bending in compression when said pull tab severs said weakening line, said upstanding hemmed edge along said leading end portion terminating in spaced ends at said nose to provide a flange having a terminal edge projecting below said underlying hemmed edge.

2. The invention as defined in claim 1 wherein said finger grip portion is formed as a ring having a finger aperture and wherein said inner edge defining said finger aperture is turned to form an underlying horizontal hemmed edge.

3. The invention as defined in claim 1 wherein said leading end portion is provided with an opening for accommodating a fastening means for attaching said pull tab to said removable panel portion.

4. The invention as defined in claim 3 wherein said fastening accommodating opening is provided in an attachment panel defined by a U-shaped slot opening toward said nose so that said pull tab is hingedly movable about said attachment panel.

5. A one-piece sheet metal pull tab for an easy opening container having a weakening line defining a removable panel portion in a panel of the container, said pull tab comprising a leading end portion and an integral finger grip portion, a nose formed on said leading end portion remote from said finger grip portion, means for rigidifying said finger grip portion and said leading end portion against relative lengthwise bending so that said

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pull tab may be used as a lever to sever the removable panel portion from said container panel along the weakening line, said leading end portion being formed with a depression including a downwardly and inwardly inclined side wall merging with a substantially planar bottom wall, and an attachment panel for mounting said pull tab on said removable panel portion for hinging movement, said attachment panel being defined by a U-shaped cut formed in said bottom wall of said depression and opening toward said nose, a pair of transversely spaced substantially circular apertures in said inclined side walls of said depression at the respective terminal ends of said U-shaped cut, said apertures being disposed so that an extension of the respective legs of said U-shaped cut is located approximately tangential to the circumference of the respective openings thereby to minimize the formation of a sharp crease line between said terminal ends of said U-shaped cut upon hinging movement of said pull tab about said attachment panel.

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6. The invention as defined in claim 5 wherein said depression is of substantially D-shaped outline including an arcuate section opening toward said nose and a substantially linear section extending between the ends of said arcuate section, and wherein said circular apertures are located substantially at the juncture of said arcuate and linear sections.

References Cited

UNITED STATES PATENTS

3,322,296	5/1967	Khovny	220—54
3,348,726	10/1967	La Cross	220—54
3,381,848	5/1968	Brown	220—54
3,411,662	11/1968	Silver	220—54

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