United States Patent [19]

Hanke

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[54] EASY OPENING CONTAINER

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[73] Assignee: **American Can Company**, Greenwich, Conn.

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[21] Appl. No.: **203,327**

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

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

[58] **Field of Search** ..... 220/54, 48, 27; 215/46 A

[56] **References Cited**

UNITED STATES PATENTS

3,195,765	7/1965	Henchert	220/54
3,430,802	3/1969	La Croce et al.	220/54

Primary Examiner—George T. Hall
Attorney—Robert P. Auber et al.

[57] **ABSTRACT**

An improved pull tab for a container end closure. The improvement comprises providing in the front panel of the front non-handle portion of the tab a slit perpendicular to the longitudinal axis of the tab, and two score lines adjoining and perpendicular to the slit and parallel to each other and to the longitudinal axis of the tab. The slit and score lines together partially define a hinged section of the front panel of the tab through which a rivet affixes the tab to the central wall of the container end closure. The slit and score configuration protects the tab from being accidentally lifted and pivoted and from accidentally rupturing the score in the central wall.

2 Claims, 7 Drawing Figures

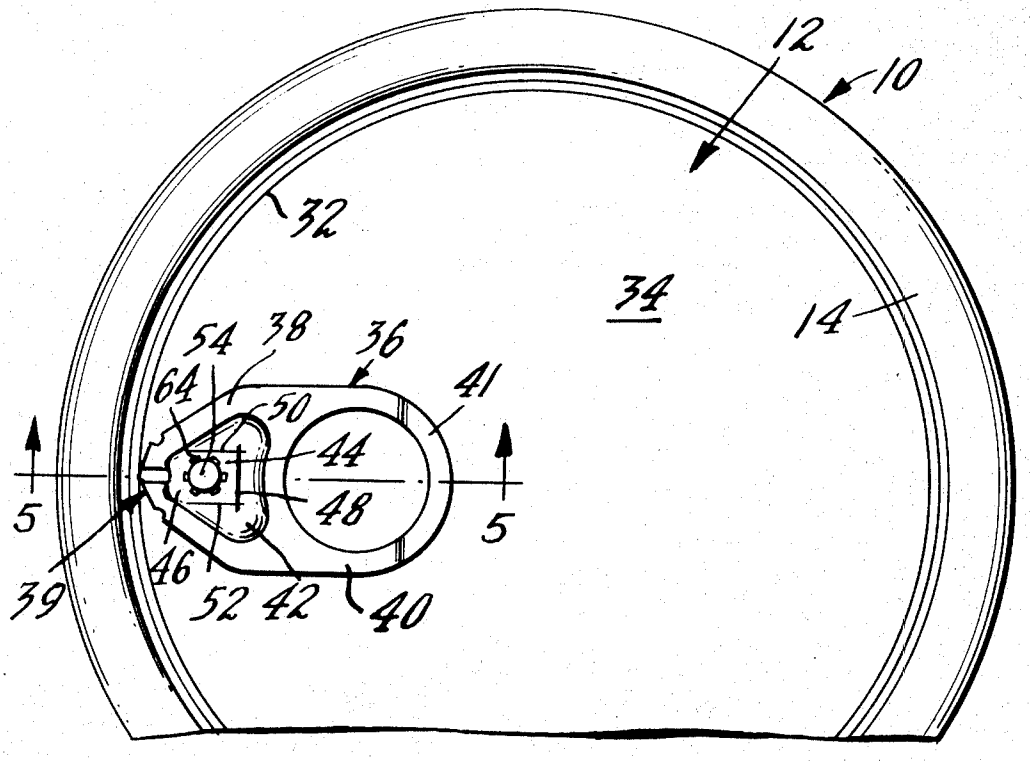


FIG. 1

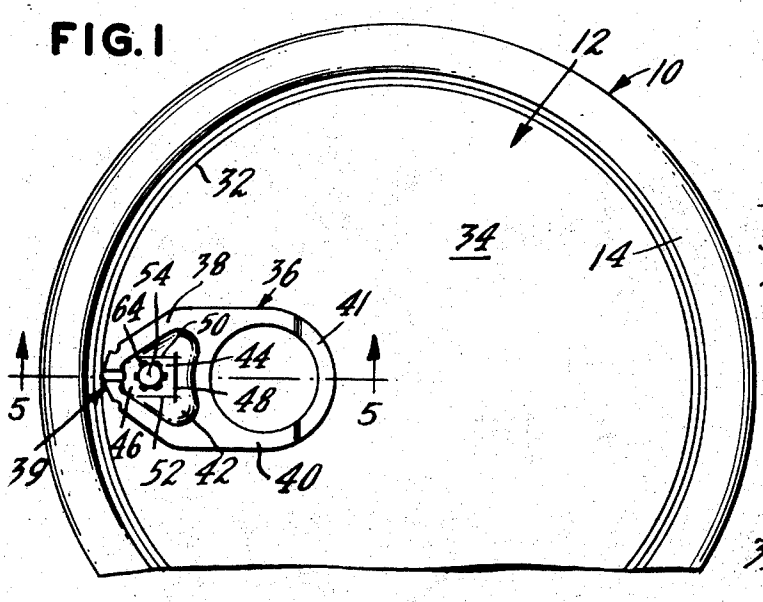


FIG. 2

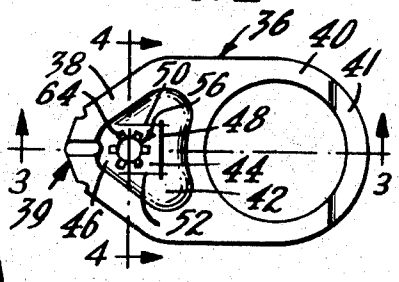


FIG. 7

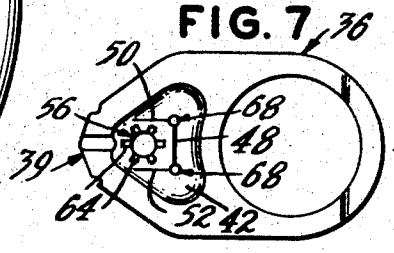


FIG. 4

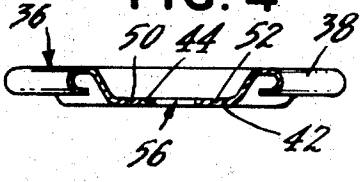


FIG. 3

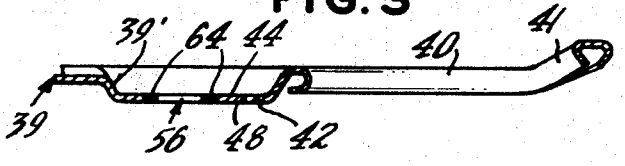


FIG. 5

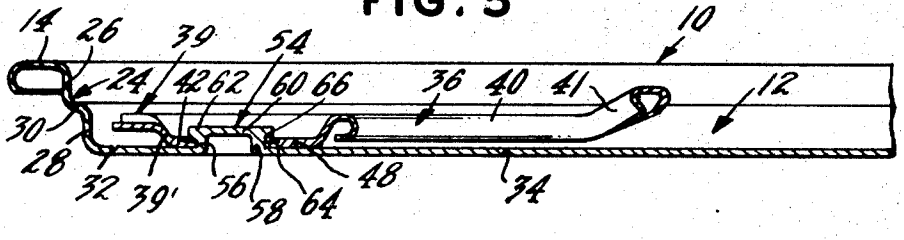
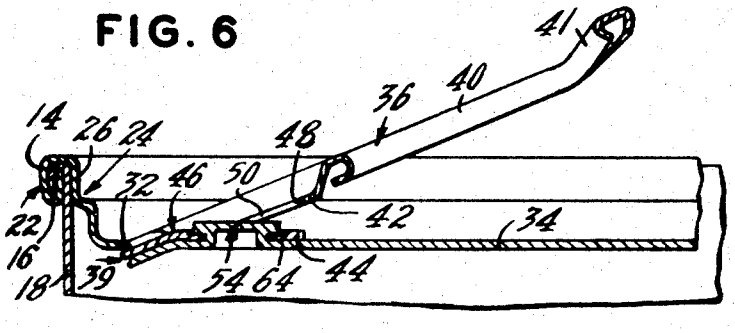


FIG. 6



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EASY OPENING CONTAINER

BACKGROUND OF THE INVENTION

Pull tabs currently affixed to large removable central panels of scored easy-open container end closures are affixed as by means of a rivet positioned at the non-handle or forward ends of the tabs. The tabs are designed so that they are not attached in any way to the central panel rearward of the rivet area. It is felt that very little force should be required to lift the tab handle from the underlying control panel and that no lifting force used should be wasted on separating the handle from the central panel. Rather, all of the force should be transferred to the nose of the tab when the tab is pivoted adjacent its rivet, so that the nose can easily initially rupture the score line at the edge of the removable panel. Another reason for not attaching the tab to the central panel rearward of the rivet area is that if it were so attached, any lifting force exerted on the tab would only needlessly and problematically lift the center of the attached central panel. This lifting of the central panel, called doming or beaming, besides being a waste of energy, makes it difficult to remove the panel from the container because the dome effect makes it difficult to bend or arc the panel concavely backward as is necessary when the tab and attached panel are removed by being pulled substantially diagonally upward and backward away from the initial point of score rupture.

An example of a pull tab designed in accordance with the above is that disclosed in U. S. Pat. No. 3,322,296 issued to N. S. Khoury on May 30, 1967. The pull tab disclosed therein requires little force to lift and pivot and to effect initial rupture of the score because the tab handle is not attached to the underlying removable central panel of the end closure. Rather, there is a C-shaped cut through the front panel of the tab which defines a mounting ear through which a rivet passes and firmly clamps the tab to the underlying central panel. The open portion of the C-cut faces the nose of the pull tab such that when the tab handle rearward of the C-cut is lifted, the portion of the tab adjacent the handle and just to the rear of the C-cut, already separated by the slit, merely lifts away from the mounting ear that is within the C and that remains clamped to the central panel. Thus, the lifting force required to lift the tab handle to a point where the tab nose is in score rupturing position is that necessary to hinge or bend the front panel material that is and remains integral between the ends of the arms or extensions of the C. Because little force is required to rupture the score, the tab is provided with a safety feature, an aperture in its strap or neck portion between its front and handle portions so that if force is accidentally exerted upon the handle, the strap readily hinges and absorbs the force and avoids score rupture.

This is disadvantageous because the handle is now in an upward position exposed to any possible accidental force which this time will cause rupture. Pull tabs of the aforementioned design have been found disadvantageous because their tabs are too easy to lift and pivot and to effect score rupture. Because very little force is required to effect score rupture, many inadvertent accidental openings occur. Such openings can occur during manufacturing processes, for example, when enamels on end closures are being baked or when

end closures are being double seamed to container bodies, or during shipping, stacking or consumer handling. The aforementioned pull tabs are also disadvantageous because they must be made of light flexible materials such as aluminum which are more costly and not as ecologically degradably desirable as standard stiff steel tabs.

The improved pull tab of this invention is advantageous over the aforementioned tabs because it greatly reduces the possibility of accidental openings since more force is required to lift and pivot the tab and to effect score rupture than that required to flex or bend the strap of the aforementioned tab. The force required for the improved tab of this invention is great enough to resist most inadvertent openings yet small enough that it is still easy to manipulate the tab and to rupture the score, without obtaining doming or beaming of the underlying central panel. This effect is obtained by providing a slit and scored configuration as a means of defining the hinged section through which the rivet passes to clamp the tab to the underlying central panel. The slit is in the front panel between the rivet and the handle portion and is substantially perpendicular to the longitudinal axis of the pull tab. The two score lines are in the front panel, one to either side of the rivet, and each adjoining the slit and being parallel to each other and to the longitudinal axis of the tab. With this configuration, accidental force subjected to tab handle must be sufficient to tear the residual metal of the parallel score lines before the force will cause the tab nose to effect score rupture. The improved pull tab of this invention is also advantageous because the tab can be made of steel and therefore is less expensive and is ecologically more rapidly degradable than aluminum tabs.

BRIEF SUMMARY OF THE INVENTION

This invention is an improved pull tab for a container end closure of a type having a substantially flat central wall, a removable central panel in the wall bounded by a score, a pull tab for initiating rupture of the score and means such as a rivet for affixing the pull tab to the removable panel so that the tab is in a position to effect the rupture. The pull tab is of a type having a handle portion at one end and a front portion at the other end, the front portion having a front panel therein and within which there is hinged section bounded by separating means. The hinged section is that through which the rivet affixes the tab to the central wall and is adapted by the separating means to remain attached to the central panel when the handle of the tab is lifted and partially separated from the front panel and is adapted to hinge when the handle is lifted sufficiently that its nose ruptures the score. The improvement of the invention is that the separating means is comprised of a slit between the rivet and the handle portion substantially perpendicular to the longitudinal axis of the tab, and two score lines in the front panel, one to either side of the rivet, each adjoining the slit and each parallel to each other and to the longitudinal axis of the tab.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an enlarged fragmentary top plan view of a container end closure having an improved pull tab in accordance with this invention.

FIG. 2 is an enlarged top plan view of the pull tab shown in FIG. 1.

FIG. 3 is an enlarged sectional view taken along line 3—3 of FIG. 2.

FIG. 4 is an enlarged front sectional view taken along line 4—4 of FIG. 2.

FIG. 5 is an enlarged sectional view taken along line 5—5 of FIG. 1.

FIG. 6 is an enlarged sectional view showing the pull tab of FIG. 5 pivoted to a position wherein initial rupture of the container view showing the pull tab of FIG. 5 pivoted to a position wherein initial rupture of the container end closure has taken place.

FIG. 7 is a top plan view of another embodiment of the improved pull tab of this invention.

DETAILED DESCRIPTION OF THE DRAWING

Referring to the drawing in detail, FIG. 1 shows a portion of a container end closure generally designated 10, made in accordance with the instant invention. End closure 10 has a substantially falt imperforate central wall 12, an edge curled peripheral flange 14 adapted (as shown in FIG. 6) to be interfolded with an end flange 16 of a can body 18 to form a double seam 22. The bottom end of can body 18 is closed by any suitable manner as by seaming a conventional end closure thereto (not shown) or, if desired, by an end wall (not shown) formed as an integral part of body 18.

Central wall 12 and peripheral flange 14 can (as shown in FIG. 5) be joined by a countersink wall 24 which has an upper portion 26 and an inwardly offset lower portion 28 joined by a shoulder portion 30. The general construction and advantages of an easy-open end utilizing a countersink wall are described in U. S. Pat. No. 3,409,166 granted to Leonard LaCroce and Raymond Batchelar on Nov. 5, 1968.

Central wall 12 has indented in it at or adjacent its periphery, a continuous score line 32 which defines a removable central panel 34 that includes most of central wall 12. Central panel 34 has affixed thereto a stiff non-bendable pull tab 36 having a front portion 38 at one end adjacent score line 32 and a handle portion 40 at the other end adjacent the center point of central panel 34. Front portion 38 of tab 36 has a nose section 39 and a front panel 42 within which there is a hinged section 44 bounded and defined on the central wall score line (32) side by a hinged area 46 and on the other sides by separating means including a slit 48 and two parallel score lines 50 and 52.

Pull tab 36 is affixed to removable panel 34 by means such as a rivet 54 formed integral with removable panel 34 and extending through a circular rivet hole or opening 56 (FIGS. 3-5) formed in hinged section 44 of the pull tab 36. Rivet 54 has a cylindrical shank 58 (FIG. 5) which merges at its top into a transverse top wall 60 having about its periphery an annular bead 62 which extends over hinged section 44 of tab 36 around the opening 56 and affixes or clamps tab 36 to removable panel 34.

Also shown in FIG. 1 are a plurality of recesses, designated 64, which can be provided in the upper surface of hinged section 44 around opening 56 to receive metal protuberances 66 (FIG. 5) which interengage with the side walls of recesses 64 and thereby prevent rivet 54 from turning and moving the nose 39 of front portion 38 of tab 36 to a position where it could not effect the rupture of score line 32. The method of forming rivet protruberances 66 and recesses 64, and their characteristics and functions are fully disclosed in U. S. Pat. No. 3,606,076 issued on Sept. 20, 1971 to the same inventor of the pull tab of this invention.

FIG. 2 is an enlarged top plan view of pull tab 36 of FIG. 1 and shows the details of the improved pull tab of this invention. More particularly, FIG. 2 shows hinged section 44 defined by hinged area 46, and by separating means comprising substantially straight slit 48 situated between the affixing means; i.e., rivet 54, and handle portion 40, substantially perpendicular to the longitudinal axis of tab 36, and two score lines 52 and 50 situated one on either side of rivet 54, each adjoining slit 48 and each parallel to each other and to the longitudinal axis of tab 36. FIG. 2 also shows that handle 40 of tab 36 can be turned upwardly at 41 to facilitate placing of a finger therein for grasping and lifting of tab 36.

FIG. 3 is an enlarged sectional view taken along line 3—3 of FIG. 2 and shows slit 48 cut through front panel 42 and defining hinged section 44. FIG. 3 also shows recesses 64 to either side of opening 56 for receiving protruberances 66 of rivet bead 62 when rivet 54 is headed during the end closure manufacturing process. Nose section 39 is shown in a plane raised from that of front panel 42 by virtue of diagonal section 39', the nose being designed to rupture score line 32 is central wall in a manner shown hereinafter.

FIG. 4 is an enlarged sectional view taken along line 4—4 of FIG. 2 and shows front panel 42 and within it, hinged section 44 having an opening 56 for receiving rivet 54 and being defined on either side of opening 56 by score lines 50 and 52. The score lines preferably do not have much residual metal therein but have sufficient residual to prevent them from being inadvertently torn when tab handle 40 is inadvertently lifted.

FIG. 5 is an enlarged sectional view taken along line 5—5 of FIG. 1 and shows pull tab 36 affixed to end closure 10 through opening 56 of front panel 42 by means of rivet 54 whose bead 62 has protuberances 66 which extend into and interlock with the side walls of recesses 64 to prevent tab 36 from rotating and thereby moving nose 39 out of position wherein it can, when pivoted, effect rupture of score line 32.

FIG. 5 also shows edge curled flange 14 adapted to be interfolded with body flange 16 in the manner previously explained and shown in FIG. 6.

FIG. 6 is an enlarged sectional view showing handle 40 of the pull tab of FIG. 5 raised to an upward position, the raising thereof having caused front panel 42 to separate along slit 48 and along score lines 50 and 52 (latter not shown) as they were gradually torn in the direction of nose 39. This separation and tearing action prevents the aforementioned undesired doming of central panel 34 and allows tab 36 to hinge or pivot adjacent hinged area 46 such that diagonal portion 39' (not shown in FIG. 6) bends and stiff tab 36 causes its nose 39 to initially rupture score line 32. The relative ease of separating slit 48 and of tearing the slight residual of score lines 50 and 52 allows hinged section 44 to remain affixed to and to not cause doming of central panel 34. Without such doming, tab 36 can easily be pulled substantially diagonally upwardly and backwardly away from the initial point of rupture of

score line **32** such that tearing of score line **32** continues rather simultaneously back along the semi-circular arc on either side of panel **34** until the entire 360° of the score is torn and tab **36** and central panel **34** are detached and removed from containing body **18**.

FIG. **7** is an enlarged top plan view of another embodiment of the improved pull tab of this invention. The pull tab of this figure differs in that apertures **68** are adjacent the junctions of slit **48** and score lines **50** and **52**. Apertures **68** prevent slit **48** from continuing into front panel **42** and they help direct forces initiated and effected by the lifting of tab handle **40** into the score lines to effect severance of those score lines.

As stated previously, the improvement of this invention lies in the provision of the separating means comprising slit **48** and parallel score lines **50** and **52** which define hinged section **44** in front panel **42**. The slit and scored configuration is an improvement over a purely C-shaped cut around rivet **54** because the slit and scored configuration accomplishes the same objectives as the C-cut; i.e., it makes it easy to pivot the tab and rupture the score **32**, and it prevents doming or beaming of the central panel, yet the slit and scored configuration overcomes the problem of inadvertent ruptures that is present with the C-cut. Whereas the metal of the C-cut is completely cut through all the way around the C and therefore presents little resistance to tab pivoting and rupturing, the improved slit and score provides some resistance in the residual of the score lines that must be overcome before the tab pivots and effects rupturing of score line **32**. Thus, because the slit and scored configuration of this invention provides additional protection against accidental openings, it is an improvement over the conventional C-cut configuration.

I claim:

1. An improved pull tab for an end closure for a container, said end closure being of a type having a substantially flat central wall, a removable central panel in said wall bounded by a score, a pull tab for initiating rupture of said score, and means for affixing said pull tab to said removable panel such that said tab is in a position to effect said rupture, said pull tab being of a type having a handle portion at one end and a front portion toward the other end thereof, said front portion having a front panel within which there is a hinged section bounded by a hinged area and separating means, said hinged section being that through which said affixing means affixes said tab to said central wall and being adapted by said separating means to hinge and partially separate from said front panel when said tab is manipulated to effect said rupture,

the improvement which comprises

said separating means including a slit in said front panel, said slit being between said affixing means and said handle portion substantially perpendicular to the longitudinal axis of said tab, and two score lines in said front panel, one to either side of said affixing means, each adjoining said slit and parallel to each other and to said longitudinal axis of said tab.

2. The improved tab of claim **1** wherein an aperture is provided in said front panel where said slit and each of said score lines adjoin, said aperture being for preventing said front panel from tearing along a continuation of said slit, and helping to direct forces initiated and effected by the lifting of said tab into said two score lines to effect severance of said score lines.

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