Feb. 7, 1967 M. L. HULSE 3,302,823

PULL-TAB, QUICK-OPENING CONTAINER

Filed Nov. 9, 1964 2 Sheets-Sheet 1

Fig. 7

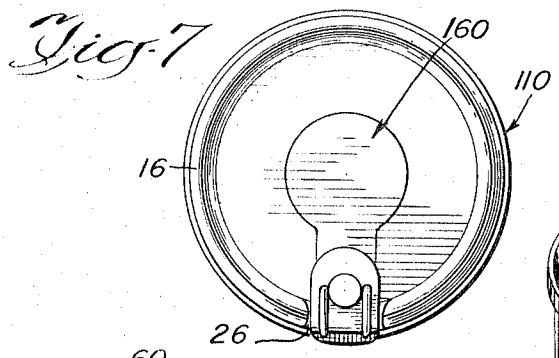
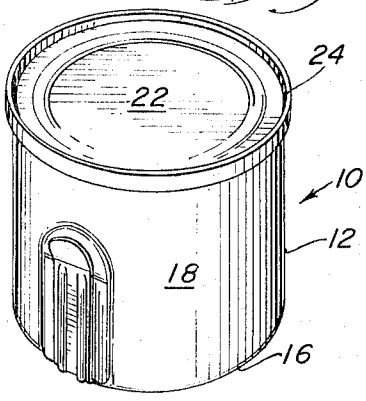


Fig. 1



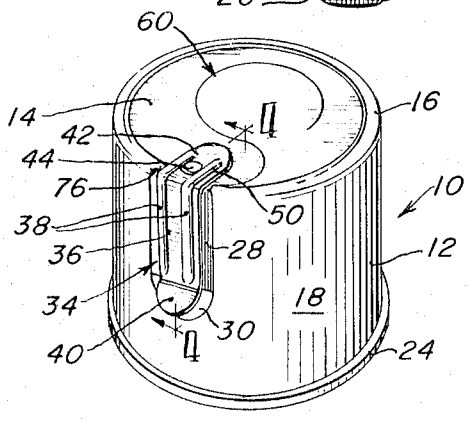


Fig. 2

Fig. 4

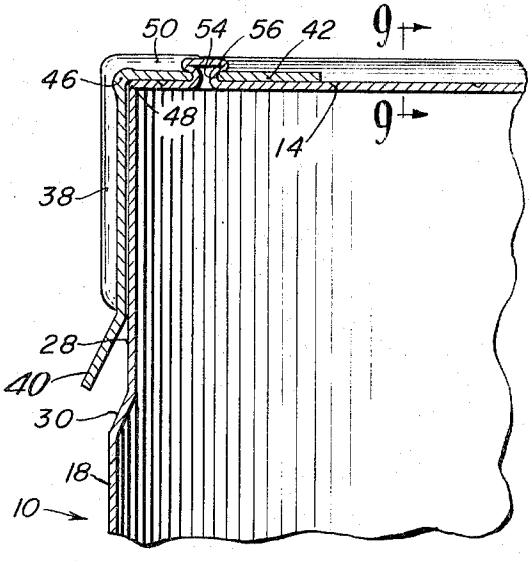
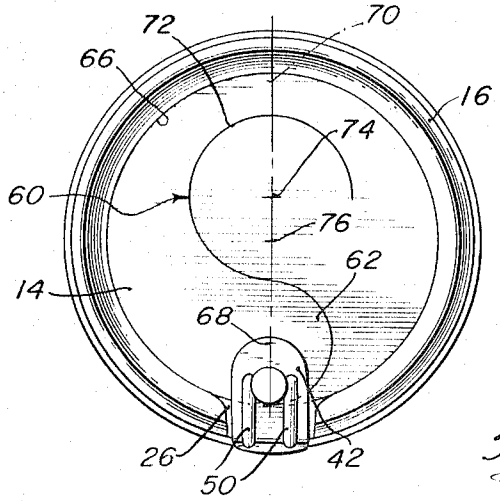


Fig. 6



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Fig. 3

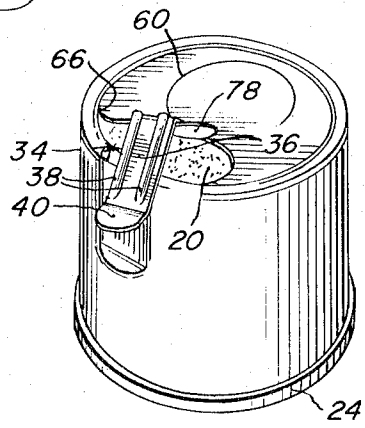


Fig. 8

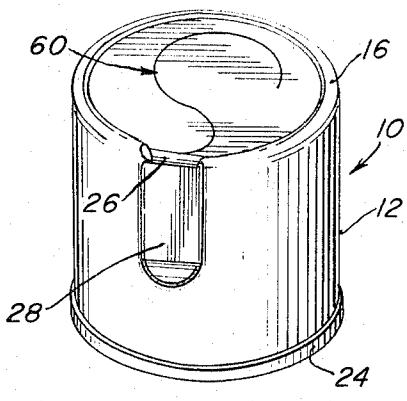


Fig. 9

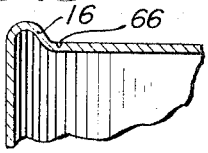


Fig. 3A

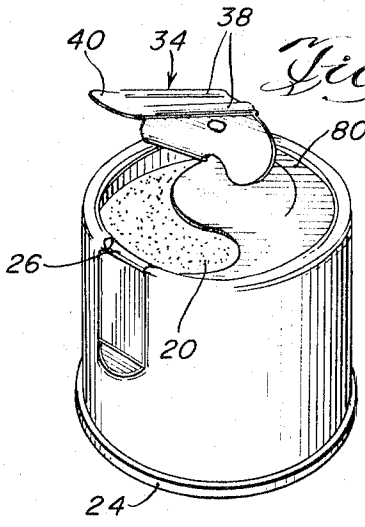


Fig. 3B

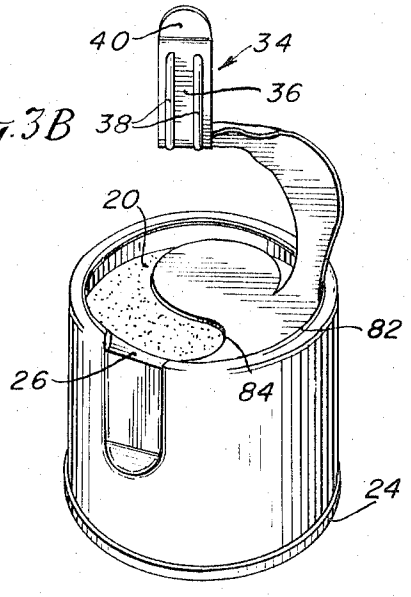
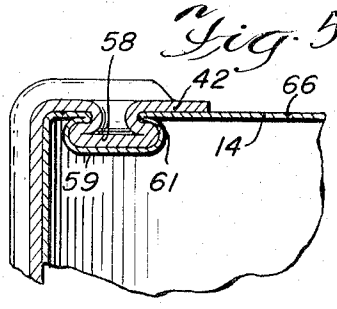


Fig. 5



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3,302,823

PULL-TAB, QUICK-OPENING CONTAINER

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13 Claims. (Cl. 220—54)

This invention relates generally to containers which are readily opened and more particularly is concerned with a metal canister or container which is easily and quickly opened without tools and with the pull-tab opener means of said container.

The so-called "tin" or "tin can" has been a part of civilized living for many generations and its uses are so universal that there is practically no known comestible eaten or drunk by man or animal that has not been packed, stored or transported in such containers. Likewise an almost infinite variety of other substances of inedible character have also been marketed in these canisters. The progress in the art of metal canisters has been quite substantial in recent years, perhaps most dramatically in beverages for human consumption, where flavor, freshness, and carbonation must be maintained. The advances in the art have not been limited to beverages, however, and the novel structure of this invention is thus of such scope as to be applicable to containers for any appropriate substances.

The reason for mentioning beverages is that in this field, especially, the quick opening can has been emphasized. Containers of food are almost universally opened at a location where food is being prepared, and hence opener means or tools are usually close at hand. Beverages, on the other hand, are normally consumed in surroundings less mundane than kitchens, and tools for opening cans are not always available. Piercing tools have been suitable for opening beverage canisters in the field, and in recent years such canisters have been provided with quick opening means that utilize tabs which are fastened to a lid of the canister and connected to a scored or weakened area which can be pulled out when desired.

The invention is concerned with canisters having tab means which can be used to pull a portion of the canister away from the remainder for the purpose of exposing a greater area than exposed by the usual beverage tab means, and hence the invention is applicable to canisters containing solids as well as liquids. This achievement forms a general object of the invention, but, more specific objects will be set forth hereinafter.

The invention is intended to solve the usual problems encountered in modern canister packaging, and hence, it is not deemed necessary to consider these in great detail since all of them surely must be considered in providing a practical and successful quick opening canister. Just to mention a few: the canister must be strong enough to withstand handling, storing, packing and the internal or external pressures to which it is subjected, without being weakened by the pull-tab opener means and its associated structure; the pull-tab opener means must be strong enough to easily open the container and give access to its contents; the structure must be simple and efficient in use and operation so as to enable a child to operate the same; the structure must be economical to manufacture by high speed machinery, and without expensive tools and dies.

This invention is applicable to the so-called extruded or drawn type of metal container in which there is a seamless cylindrical or other tubular body having an integral end wall formed during the formation of the container. There is thus only one open end to this kind of container, as opposed to more familiar types in which the body of the container is formed of a rectangular sheet of metal joined along a seam to form a cylindrical sleeve, having lids or end closures secured at both ends by soldering, rolling, crimping or the like. The extruded or drawn type of container will be referred to hereinafter as a drawn metal container. The open end of the drawn metal container is closed by a lid or closure which is secured by conventional means, that is, crimping, rolling or the like, this being done after the material which is to be carried in the container has been packed therein. Until recently, such containers have had a relatively short axial length, and comestibles such as baby foods have been sold in such canisters. Longer containers have appeared and are now in general use. The drawn metal container body has been used with closures which are replaceable, but the invention is primarily directed to such cans which are fully sealed by the end closure.

The end wall of the drawn container is normally the bottom of the completed package, since it stands on this end wall while being filled, and the closure is secured to the open end. There have been quick opening structures associated with metal containers which could be applied to the type of closure which is secured over the open end of the drawn metal container, but each has certain disadvantages which are overcome by the invention herein as will more readily be apparent from the description. Many of the features of the invention are achieved by virtue of the manner in which the pull-tab opener means are secured and the modifications made to the container to accommodate the opener.

An important object of the invention, therefore, is to provide pull-tab opener means for a drawn metal container which is secured to and intended for the purpose of opening the bottom wall of the container instead of the top thereof.

Another object of the invention is to provide a drawn metal container having a sleeve configuration modified by the provision of a flattened area on its side wall for the accommodation of a relatively strong tab of L-shaped configuration, the vertical arm, usually a long portion of the tab, being normally disposed at the flattened area and the horizontal arm, usually a short portion, overlying and being secured to a weakened section of the bottom wall of the container, to provide powerful leverage in operating the tab.

Another object of the invention is to provide a drawn metal container combined with a quick opening structure in which in addition to a flattened configuration on the side wall, the annular rim which forms the junction between the side wall and the bottom wall is modified to accommodate the angular configuration of the pull-tab means at its bend to enable the same to hug the container on the bottom wall as well as the side wall.

Still a further object of the invention is to provide a structure of the character described in which the pull-tab is a rigid lever capable of exerting substantial force upon the bottom wall of the container during use, without bending, breaking or tearing of the lever.

Another object of the invention is to provide a novel scoring arrangement in combination with the pull-tab means of the invention which will enable the user fully to open the container with a relatively short pull.

Still another object of the invention is to provide a construction of the character described in which there are novel and improved means for securing the pull-tab opener means to the canister without solder or rivets.

Other objects of the invention will become apparent from the description which follows, in connection with which preferred emobidments of the invention have been described in considerable detail and illustrated in the accompanying drawings from a description of which the method of construction, practice and operation of the invention should be clear to those skilled in this art.

In the said drawings in which like characters of refer-

ence will be used throughout the several figures of the drawings in order to designate the same or similar parts:

FIG. 1 is a perspective view of a drawn metal container of the type with which the invention is concerned, and having pull-tab opener means of the invention associated therewith, the view illustrating the top of the container.

FIG. 2 is a view similar to that of FIG. 1 but showing the bottom of the container.

FIG. 3 is a view similar to that of FIG. 2 but showing the container in the process of being opened by the use of the pull-tab.

FIG. 3A and 3B are views similar to that of FIG. 3 but showing two further stages of opening of the container.

FIG. 4 is a sectional view through the container along the line 4—4 of FIG. 2 and in the direction indicated, showing one method of fastening the tab to the can bottom.

FIG. 5 is a view similar to that of FIG. 4 but showing an improved form of structure for securing the tab.

FIG. 6 is a top plan view of the container of FIG. 2, more clearly to show the configuration of the lines of weakening thereof.

FIG. 7 is a top plan view similar to that of FIG. 6, but showing a modified form of the invention.

FIG. 8 is a perspective view of a sheet metal container formed by drawing or extruding in accordance with the invention.

FIG. 9 is a fragmentary sectional view taken generally along the line 9—9 of FIG. 4 and in the direction indicated.

Generally the invention is characterized by the provision of a pull-tab opener means in the form of an L-shaped lever which is secured to the bottom wall of a drawn metal container, with the vertical part of the lever closely engaged to a flattened area formed on the side wall of the container and the horizontal part of the lever engaged over the edge of the bottom wall and upon the bottom wall and secured thereto. The invention is further characterized by the provision of a novel configuration of weakened section provided as by scoring on the bottom wall in such a manner that when the pull-tab is operated the entire end wall is pulled free in a very short distance, the pull-tab being secured to a portion of this weakened section, preferably by means of a novel connection that does not use rivet or solder means.

Looking now at the drawings, the reference character **10** is used to designate generally a drawn metal container, this container comprising a structure of two parts. One part consists of a tubular body **12** usually of cylindrical configuration, but not necessarily limited thereto, having an integral transverse bottom wall **14** which is connected to the body **12** along an annular beaded edge **16** that is continuous in the conventional drawn container, but is interrupted in a container constructed according to the invention. Reference hereinafter to the body **12** will be intended to include the bottom wall **14**, hence for the purpose of distinguishing between the body as a whole and the cylindrical part excluding the end wall, the cylindrical wall will be considered the side wall of the body and will be designated **18**.

Continuing with the description of the container **10**, when formed, the end which is opposite the bottom wall **14** will be open, so that the body **12** is in the form of a cup-like structure. The open end is normally trimmed or otherwise cut and/or formed to provide a clean edged vessel, some material such as a prepared food or the like (designated generally **20** in FIGS. 3, 3A and 3B) is placed in the body **12**, and an end closure **22** is sealed thereto. The end closure **22** is the second part of the container, and it is sealed to the body **12** by crimping, rolling, soldering or the like technique, thereby forming the well-known rolled edge shown at **24**. The configuration or formation of the rolled edge **24** forms no part of the invention herein.

All quick opening structures for metal containers of which I am aware are secured to lid or end closure formations of the same type as **22**. The invention herein has the quick opening structure secured to the bottom wall **14** for opening the same.

As previously mentioned the beaded edge **16** is not continuous but is interrupted in accordance with the invention, along a short circumferential arc **26**, best shown in FIG. 6. It should be appreciated that the beaded edge **16** is not of the same configuration as the rolled edge **24** since the latter edge is a roller junction between two completely independent pieces of metal, while the former is a bent or creased corner junction between two surfaces of the same piece of metal. Accordingly it is much easier to form the interrupted space **26** in the beaded edge **16** than in the edge **24**. Practically all drawn metal containers have their bottom walls dished to assist in stacking the containers, to prevent damage to the bottom, etc.

The body **12** of the container **10** has a flattened segment **28** formed in its side wall extending from the bottom wall **14** to a point spaced axially therefrom, at which point there is an angled formation **30** connecting the flattened segment axially with the cylindrical wall **18**. The segment **28** is preferably formed as a chord of the cylinder constituted by the remainder of the wall **18** so that the pull tab lever which is described below may have a portion thereof disposed in the resulting space and for the most part be enclosed in a volume which is defined by the segment **28** and the cylindrical surface which would be a continuation of the wall **18** if the segment **28** were not present. This means that the structure of the invention has substantially no protrusions, enables the container to be handled, labeled, and packed with conventional machinery in conventional cartons, and, perhaps what is even more important, stacked without any problems. The flat space **26** of course accommodates the pull-tab as will be described.

The pull-tab opener means of the invention comprises a sturdy lever designated generally **34** of L-shaped configuration. The vertical arm **36** of the lever **34** is usually the longer, and has a pair of strengthening ribs **38** formed therein. It extends coaxially with the body **12** overlying and preferably closely engaging against the segment **28**, with its bottom end **40** rounded and bent at a slight angle from the remainder of the arm **36** to enable the user to insert a finger tip thereunder for lifting the same.

The pull-tab lever **34** has its horizontal, usually short arm **42** engaged upon the bottom wall **14** and fastened thereto by means of a suitable fastening structure designated generally **44**, the corner **46** of the pull-tab lever **34** being disposed in the space **26** and engaging against the corner **48** of the body **12**. Obviously the body **12** will have a slightly different configuration of the junction between the side wall **18** and the bottom wall **14** at the space **26** than the rounded configuration produced by the beaded edge **16** as shown in FIG. 9, or a rolled edge (not shown), hence the designation "corner" for the particular location at the space **26**. The ribs **38** continue onto the short arm **42** as shown at **50**, and hence the lever **34** is rigid and will not bend during use.

The lever **34**, or pull-tab as it could more familiarly be considered in this art, is preferably made of heavier gauge metal than the container, and in practically all cases will be from the same alloy or metal. In the case of the arrangement of FIG. 5, the container may be much thinner than the material of the lever.

As thus far described, the invention has numerous advantages since it enables the lid or end closure **22** to be attached to the body **12** simply and without the need for building handling machinery to accept complex structures. In other words, the logical way to secure a quick opening device to a can is to secure the device to the lid before attaching the lid to the remainder of the can, and this being the case, if the lid with its opening device is to be attached automatically, the machine will be com-

plex. In accordance with this invention, the quick opening device is on the bottom, does not prevent the can from easily moving along a flat surface or conveyor, and the lid is a simple flat member easily handled by high speed automatic machinery. Insofar as the user is concerned, the invention provides a rigid, robust lever easily manipulated to open the container, instead of a small, flat tab which is flexible and difficult to manipulate. Because of the lever action, it is obvious that a substantial tearing force can be applied at the horizontal arm 42 for opening the container. Because of the arrangement for securing the pull-tab lever 34, there is a minimum of protruding parts. With the structure described, the manufacturer of the container forms the segment 28 and the space 26 during the extrusion or drawing process, and fastens the lever 34 in place thereafter. Such fastening may be by any desired method, such as for example independent rivet, solder, metal weld or by means of an integral blind end rivet-like formation. Although the latter is preferred, and a novel version of the latter will be described in connection with the invention because it provides added advantages to the invention, the others will enable the user to enjoy the benefits of the remainder of the structure taught by this invention.

Any desired kind of weakened section may be used on the bottom wall to which the pull-tab lever 34 is secured, although a particular type of weakened configuration will be described hereinafter which gives added advantages to the invention.

Considering first the manner in which the arm 42 is secured, one structure is shown in FIG. 4, using known metal forming techniques. A hole 54 is formed in the lever 34 and a portion of the metal of the end wall 14 is extended through the hole 54 and flattened to form the blind rivet 56. This structure is known and used, but has disadvantages in several regards. In the first place, it requires punching a hole in the lever 34, which is another manufacturing operation. In the second place it requires a substantial metal pimple to be extended through a hole, much as a die punches a hole, so that the chances of punching a hole in the can are increased. Third, it weakens the can because the metal has been strained, and the rivet 56 is easily pulled out by the tab. Finally, in order to assure good connection, the can must be heavier gauge than could otherwise be used.

In FIG. 5, a preferred structure is illustrated that overcomes the advantages, using a heavier gauge metal for the pull-tab or lever 34 than the canister. The lever arm 42 is upset or dimpled downward into the end wall 14 of the container, producing a cylindrical formation nested within a conforming cylindrical configuration formed of the wall 14. This telescoped formation is flattened and mushrooms as shown to form an inwardly directed blind end hollow rivet 58 engaged in a conforming boss 59. Neither member is perforated. The fold 61 of the rivet pinches an annular rim around the boss 59 and pulls on the rim instead of the boss, when the lever 34 is pulled up. This is strong and effective, and provides no external protrusion from the container.

With respect to the weakened section, as noted in FIGS. 2, 3, 3A, 3B, 5 and 6, it is preferred that there be a score line 60 which is of S-shaped configuration, having a geometrical configuration best seen in FIG. 6. There is a small diameter portion 62 which commences just under the short arm 42, joining the scored circle 66 which is formed just inside the beaded edge 16. The center of this small diameter portion is at 68, lying on a diametrical line shown as a dot-dash centerline 70. The large diameter portion 72 of the score line 60 connects with the small diameter portion 62 on the center line 70 and has its radius centered at the point 74 also lying on the center line and spaced radially from the geometric axis 76 of the can 10. Other slight modifications of this configuration can be made, but the one described gives the best results because it rapidly opens the entire bottom 14 with but a short upward pull of the lever, as shown in FIGS. 3, 3A, and 3B. An examination of these three figures shows that the first movement of the lever upward pulls open the area 78 defined by the small diameter portion 62 of the S-shaped score line 60 and score line 66, after which the portion 80 outside the line 60 follows. In the final movement, FIG. 3B, the last part of the edge of the wall 14 comes free as shown at 82 taking with it the generally circular piece within the large diameter part 72 of the score line 60. Since the movement for pulling the strip off is started in the middle of the area 78 and finished when the circular score line has parted less than the circumferential distance to the point 84, and since a large metal member is being pulled away with its attendant leverage upon the remainder of the wall 14, the upward movement of the fingers of the user raising the pull-tab lever 34 is much less than the distance which would be required in pulling away a narrow tear strip of the known variety.

In FIG. 8, there is illustrated the canister body 12 as it is extruded or drawn, and before the lever 34 is attached. Any kind of lever associated with this canister will give advantages which have been described, even without the particular configuration of score lines, but obviously the particular structure preferred is the lever 34 and the score lines as shown. For example, canister 110 in FIG. 7 has a key-hole shaped score line 160 to open the canister end, and will utilize the teachings of the invention with great benefits.

Variations of the invention are capable of being made without departing from the spirit or scope of the invention as defined in the appended claims.

What it is desired to secured by Letters Patent of the United States is:

1. A canister having a pull-tab opening device secured thereto for opening the canister, comprising: a seamless, tubular metal body having a transverse bottom wall integral with said body and across one end and an open opposite end adapted to seat an end closure thereacross, said integral bottom wall having a severable removal area which is defined by intersecting lines of weakening, one line being circular enclosing the area to be removed from the bottom wall, including at least a substantial area of the bottom wall and a second line which describes a tortuous, medial path extending in a substantially diametric direction through the said area commencing at said intersection of the two lines so as to facilitate the opening in the bottom wall with a minimal amount of pressure and distance of pull, and a pull-tab opener secured to the removal area on said bottom wall adjacent said intersection and having its longitudinal axis oriented in said diametric direction whereby pull thereon will be in said direction starting at said point of intersection.

2. A canister as described in claim 1 wherein the second line of weakening generally describes an S.

3. A canister as described in claim 1 wherein said second line of weakening includes two arcs of different radii of curvature, the smaller of which intersects said first line of weakening.

4. A canister as described in claim 1 in which said tubular body has an axially extending recess in its external circumferential surface extending from the bottom edge of said canister and terminating at a point spaced axially therefrom, for the accommodation of the pull-tab opener; and said bottom wall joins said body in an annular bead having an interruption therein to provide a recess for the accommodation of the pull-tab such that when secured, the pull-tab does not extend below the bottom edge of the bead.

5. A quick-opening canister comprising:

a tubular seamless metal body having an open top end;

an integral bottom wall across the bottom end of the body in which a severable removal area is defined

by intersecting lines of weakening, one of which is in the configuration of a segment to be removed from the bottom wall and includes a substantial portion of the bottom wall, and a second of which describes a tortuous, medial path through the segment and intersects said one line of weakening so as to facilitate the opening in the bottom wall with a minimal amount of pressure and distance of pull; and,

an L-shaped pull-tab lever having one arm secured to the removal segment on the bottom wall adjacent said intersection of the two lines and the other arm disposed parallel with the axis of and adjacent to the tubular body, the bottom wall and body being conjoined along an annular bead; said lever having the juncture of said arms thereof overlying the juncture of said bottom wall and body.

6. A quick-opening canister as described in claim 5 in which said bead has an interruption space forming a recess therein, said one arm extending to said recess without protruding beyond the upper edge of the bead.

7. A quick-opening canister as described in claim 6 wherein the second arm has strengthening means along the length thereof and extending across said juncture of the two arms.

8. A quick-opening canister comprising:

a tubular body having a recess in its external surface, said recess extending from the bottom edge of said canister and terminating at a point spaced axially therefrom, for the accommodation of a pull-tab lever;

an integral bottom wall in which a severable removal area is defined by a line of weakening which is in the configuration of a segment which is to be removed from the bottom wall and which includes a substantial area of the bottom wall, said bottom wall joining said body in a bead having a recess for the accommodation of a pull-tab lever such that the lever does not extend below the bottom edge of the bead; and

an L-shaped pull-tab lever having one arm secured to the removal segment on the bottom wall and being disposed within the recess in the bead and the other arm disposed parallel to and within the recess of the tubular body.

9. A quick-opening canister, as described in claim 8, wherein the integral bottom wall contains a second line of weakening which intersects the first and which describes a tortuous, medial path through the removal segment so as to facilitate the opening of the bottom wall with a minimum amount of pressure and distance of pull.

10. A quick-opening canister, as described in claim 9, wherein the second line of weakening describes an S.

11. A quick-opening canister, as described in claim 10, wherein said second line of weakening includes two arcs of different radii of curvature, the smaller of which intersects said first line of weakening.

12. A quick-opening canister adapted to have a pull-tab opening device secured thereto for the opening of the canister, comprising:

(i) a tubular body having a concavity, axially oriented, of a depth in excess of the thickness of the pull-tab; and

(ii) an end wall attached to said body in which a severable removal area is defined by a line of weakening which is in the configuration of a segment which is to be removed from the end wall and which includes a substantial area of the end wall, said end wall joining said body in a bead providing a recess for the accommodation of the pull-tab such that when secured the pull-tab does not extend beyond the edge of the bead;

(iii) a pull-tab lever engaged in the recess and secured to said segment;

(iv) and said removal area including a portion of substantially S-shape configuration.

13. In a quick-opening canister comprising a seamless tubular metal body having a bottom wall integral therewith provided with a severable removal area defined by a line of weakening, which is in the configuration of the area to be removed and said bottom wall is joined to said body along a bead having a recess for accommodating a pull-tab lever for tearing off the removal area, a pull-tab lever for use with said canister comprising an L-shaped metal lever having a short arm and a long arm, said short arm being secured to said removal area by a joint comprising a pair of telescopically engaged hollow formations each having an annular circumferential wall, said walls being compressed one upon the other in the interior of the canister, said lever formed of a metal selected to have a substantially heavier gauge than that of the bottom wall and characterized by a high shearing modulus and rigidity so that the lever can be lifted selectively to tear off said area preferentially to separation of the lever from the sheet metal member, the long arm extending in the axial direction of the body and contiguous thereto, with the short arm extending through said recess.

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