

[54] CHILD-RESISTANT CLOSURE FOR METAL CONTAINER

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[51] Int. Cl.² B65D 41/32
[58] Field of Search 220/269, 270, 271, 272,
220/273; 222/541

[56] References Cited
UNITED STATES PATENTS
3,744,667 7/1973 Frazee et al. 220/269
3,780,902 12/1973 Holc et al. 220/270

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[57] ABSTRACT

In a container for potentially dangerous products, for example automotive products, a metallic end closure is provided having a central panel portion, a displaceable portion defined by a score line included in the central panel portion, an opening tab attached to the displaceable portion proximate the periphery of the central panel portion, the pull ring or handle being radially inward from the point of attachment of the opening tab to the displaceable portion, means on said central panel portion for releasably holding said opening tab substantially flat against said central panel portion and an underlying arcuate channel which permits the handle of the opening tab to nest within the central panel portion thereby resisting opening by hand and providing a child-resistant safety feature in such closures.

12 Claims, 5 Drawing Figures

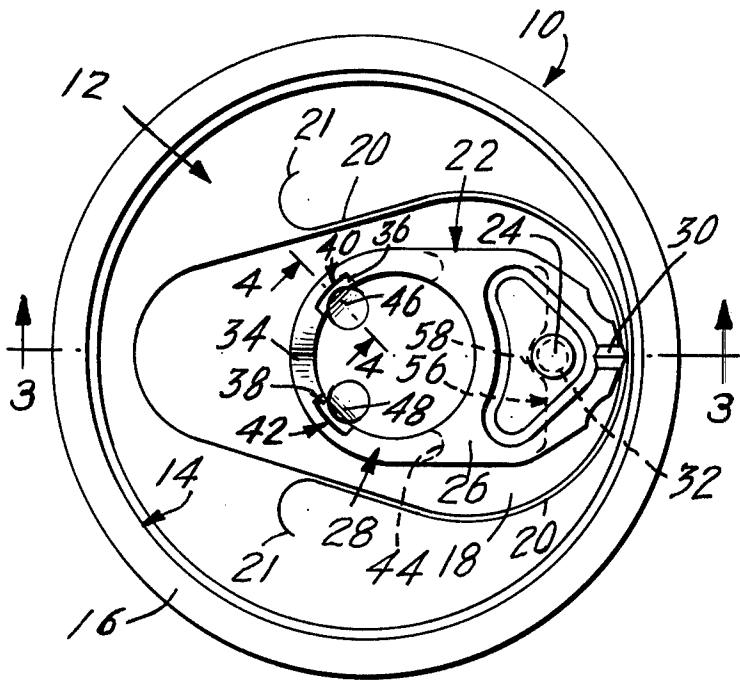


FIG. 1

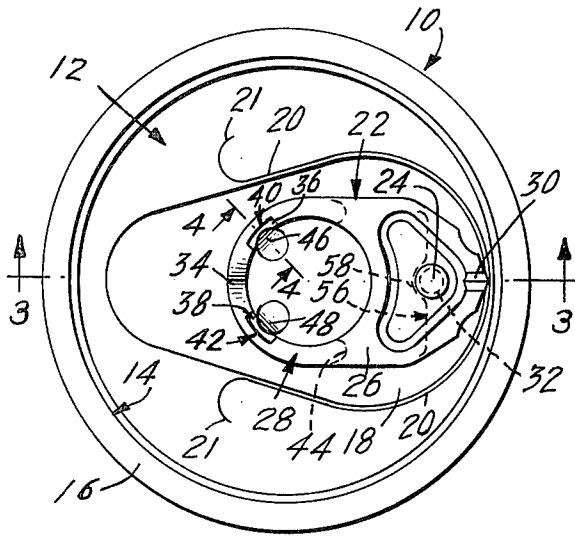


FIG. 2

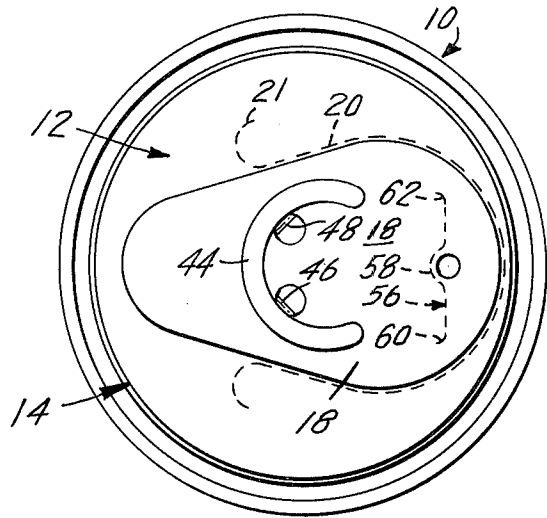


FIG. 3

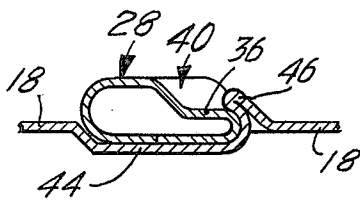
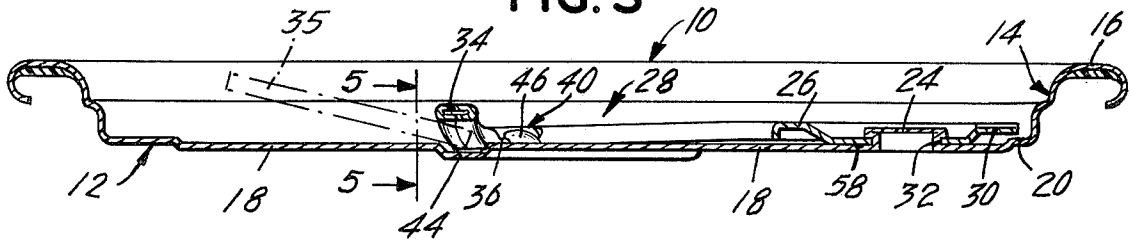


FIG. 4

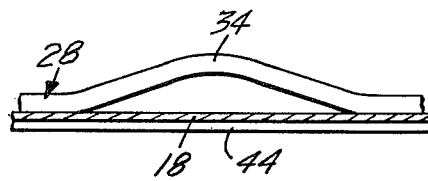


FIG. 5

CHILD-RESISTANT CLOSURE FOR METAL CONTAINER

BACKGROUND OF THE INVENTION

Easy-open containers opened by means of a lifting force exerted on an opening tab secured to the removable portion of the container end are well known in the art. The most common form of such containers are the beer and beverage cans in which the removable portion defines a comparatively small opening through which the contents are dispensed. In another form, the score line is formed to permit substantially complete removal of the central panel. This form of the container is generally termed "full-open" and is suitable for use in the packaging of solid-like or chunk-like products such as processed foods, peanuts, etc. In yet another type, the score line defines a removable portion that is comparatively larger than the small openings for dispensing beer and beverages but is substantially less than in the full-open ends. This larger partial-open end is designed for liquids, particularly liquids such as automotive products such as antifreeze or other gas-line additives.

Containers of these types have enjoyed considerable success in the marketplace, particularly because of the easy accessibility to their contents. However, where the contents are potentially dangerous or harmful, this easy-opening feature in many cases ceases to be an advantage and becomes a disadvantage which limits commercial acceptance as consumer safety considerations become increasingly significant.

Closures used on containers for goods potentially dangerous to young children especially should be relatively difficult for them to open. At the same time, however, they should be sufficiently easy to open by individuals, for example, adults for whose use the goods are intended.

SUMMARY OF THE INVENTION

This invention is directed to closures, of the partial-open type for container for potentially dangerous products such as automotive products, designed to provide a child-resistant feature which is sufficiently difficult to open so that it cannot be normally opened by the average comparatively young child but can be opened without significant difficulty by the average person having reasoning ability after insertion of a small prying tool.

In U.S. Pat. No. 3,780,902 issued Dec. 25, 1972 to Henry Sylvester Holc and Burton Frank Pillnik and commonly assigned herewith, there is disclosed an improved end closure of the easy open type comprising means on the central panel portion for holding the opening tab substantially flat against the central panel portion when it bulges outwardly due to the internal pressure of the containers. This construction is immminently suitable for containers for beverages or beer preventing the opening tab, the free end of which may become lifted away from the central portion during sterilization or other conditions causing outward, bulging of the central panel portion, from being accidentally opened. However, the handle portion thereof is adapted for ease of grasping by the user such as by insertion through the ring of a user's finger and the means holding the tab against the central panel portion are designed to permit the pull ring to be disengaged from the holding means with relative ease. Thus, while suitable for preventing opening of the tab when the central panel bulges outwardly due to internal pressure,

such an end closure is not designed to be child-resistant and does not solve the need for such when potentially dangerous products are to be contained.

In accordance with this invention, a child-resistant opening feature is provided, in an end closure having a central panel portion, a displaceable portion defined by a score included in the central panel portion, and an opening tab attached to the displaceable portion proximate the periphery of the central panel portion wherein the pull ring or handle of the opening tab is radially inward from the point of attachment of the opening tab to the displaceable portion, by the improvement which comprises a pull ring having an angularly raised end; an arcuate channel in the central panel portion underlying the pull ring of the opening tab and means for releasably engaging the pull ring to thereby hold it substantially nested in said arcuate channel, the angularly raised end defining a space between the central panel portion that is insufficient to permit ready grasping by hand.

More specifically, the improvement comprises an arcuate channel in the central panel portion underlying the pull ring of the opening tab. The pull ring portion, having flattened indentations and an angularly raised end, is nested in the arcuate channel and held therein by bosses or hold-down posts on the central panel, disposed on the inside of the pull ring and engaging the flattened indentations therein. The result is an opening tab held substantially flat against the central panel portion with a pull ring portion that is nested with the central panel portion, the angularly raised end defining a space between the central panel that is sufficient to permit insertion of a small prying tool but insufficient to be easily grasped or lifted by the user's fingers.

The present invention will be described and understood more readily when considered with the embodiments of the accompanying drawings, in which:

FIG. 1 is a top plan view of a container end closure of this invention.

FIG. 2 is a bottom plan view of a container end closure of this invention.

FIG. 3 is an enlarged cross-sectional view of the end of FIG. 1 taken along line 3—3.

FIG. 4 is an enlarged partial sectional view of the end of FIG. 1 taken along line 4—4.

FIG. 5 is an enlarged partial sectional view of the end of FIG. 1 taken along line 5—5 of FIG. 3.

Now referring to the drawings, there is shown in FIG. 1 an end closure, generally designated 10 for an easy opening container of the "partial-open" type. End closure 10 may be circular and constructed of steel, aluminum, tin plate or other suitable rupturable material. As seen, end closure 10 is formed with a generally planar central panel portion 12 which merges at its periphery with annular countersink wall 14. The upper end portion of wall 14 merges with outwardly extending curled flange 16 which may be interfolded with the end flange of a container body (not shown) to form an end seam (not shown).

Included in central panel 12 is a displaceable portion 18, which is defined by and included within score line 20. Displaceable portion 18 becomes displaced from central panel 12 when score 20 is completely ruptured. The length of score line 20 is defined by the inwardly curled terminal portions 21 so that upon rupture of the score, the displaceable portion is displaced only to this point effectively inhibiting tearing beyond this point thus defining the partial-open portion of the central

panel which remains attached to the end closure. While the particular embodiment of the invention illustrated shows a displaceable portion on a partial-open end for purposes of illustration, it should be understood that the concept is equally applicable to a panel having a fully removable portion in which case the score line 20 would extend beyond the curling terminals 21 and the portion 18 would be lifted out of the central panel 12 and discarded as well as those instances wherein the score defines substantially all of the central panel 12 resulting in an end of the full-open type.

In order to rupture score 20 and displace portion 18, an opening tab 22 is provided. Opening tab 22 is attached to the displaceable portion 18 proximate the periphery of central panel 12 by a suitable securing means such as rivet 24 which may be integral with and formed in displaceable portion 18.

Opening tab 22 includes a web portion 26, a handle portion or pull ring 28 attached to web portion 26 and a stress concentrating nose portion 30 formed in the web portion 26 and oppositely disposed from pull ring 28. Opening 32 is provided in web portion 26 for the purpose of accepting tab rivet 24 for the attachment of opening tab 22 to displaceable portion 18. The outer edge portion of the displaceable portion may be provided with a "moustache" ancillary score 56 having a curved central portion 58 which passes immediately behind the rivet and extends outwardly from the curved portion and merges inwardly to curled terminal portions 60 and 62 respectively. In this manner the rivet, pull ring and moustache score 56 function to rupture the score line by mechanisms well known in the art, for example as described in U.S. Pat. No. 3,606,076 to Hanke issued Sept. 20, 1971.

Handle portion or pull ring 28, although shown in the drawings as being in the form of a ring may have any suitable shape or configuration desired, such as rectangular, triangular, etc. In such case, of course, the shape of the arcuate channel underlying the pull ring would be changed accordingly to accomplish the nesting relationship necessary for the successful practice of the invention. The handle or pull ring 28 of this invention has an angularly raised end 34 provided to permit insertion of a small prying tool 35 as seen in FIG. 3. Inwardly, angularly flattened portions, generally designated 36 and 38 of the pull ring 28 are provided having indentations, respectively designated 40 and 42 as most clearly seen in FIGS. 3 and 4. An arcuate channel 44, as most clearly seen in FIGS. 2 and 3, is formed in the central panel portion 12 underlying substantially all of the pull ring 28 of the opening tab. This channel provides a nest-like seat for the pull ring permitting it to nest within the channel and permitting a substantial portion of the ring to rest below the plane of the central panel as best seen in FIGS. 3 and 4. To hold the ring tab in this position and to aid in resistance to displacement therefrom, bosses or hold-down posts 46 and 48 are so positioned that they lie within pull ring 28 adjacent either side of the inner edge of the raised end 34 of the pull ring and proximate to the flattened portions 36 and 38. The sides of the posts adjacent indentations 40 and 42 are substantially flat with the upper portions extending into the flattened areas and engaging the indentations as best seen in FIG. 4. Because of the nested relationship of the pull ring 28 in the arcuate channel 44, substantially all of the pull ring is extremely close to the central panel except the angularly raised end 34. As seen in FIG. 5, the space between this upturned end

and the central panel 12 is such that the pull ring, even at the raised end, cannot be readily grasped or lifted by the user for the purpose of permitting insertion of or grasping the by user's fingers. To open the closure, it is first necessary to lift the pull ring by insertion of a small prying tool as for example, a coin, key, screw driver, knife, etc. followed by exertion of suitable force to disengage the posts 46 and 48 from the indentations 36 and 38, after which the pull ring may be lifted in the usual manner with initial rupture of the moustache ancillary score 56 by the nose 30 of the opening tab 22, after which the opening force is applied to the primary score 20 to open the container closure.

The posts 46 and 48 may be formed in the central panel by suitable dimple forming dies simultaneously with the formation of rivet 24 and flattened after assembly of tab 22 in the areas of 36 and 38. The arcuate channel is preferably configured to coincide structurally with the configuration of the pull ring and is preferably formed after forming of the posts and before assembly of the tab 22.

The end closure of this invention has been found to be capable of withstanding abuse and is satisfactory for meeting F.D.A. Testing Procedures for Special Packaging as defined in Section 2(4) of the Poison Prevention Packaging Act of 1970, Sections 295.10 and 295.3 as published in the Federal Register, Vol. 36, No. 225, Nov. 20, 1971, a result that is particularly significant since similar constructions but without the arcuate channel and hold-down posts have not been found to be satisfactory. In representative tests, the closures of this invention have successfully resisted the attempts of 100% of the children tested to open the closure without demonstration as to the proper means for opening and resisted attempts by 99.5% of the children after demonstration of the opening technique. In the adult phase of the testing, the closure was successfully opened by 97% of those tested.

The closures are particularly suitable for use on containers for potentially dangerous products such as gasoline antifreeze, antirust, sealers and lubricants for automotive use, the child-resistant feature thereof being a significant development in the container industry.

It is believed that the foregoing general and detailed descriptions are explanatory of the present invention and it will be apparent that changes and modifications may be made without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. In an end closure for a container having a central panel portion, a displaceable portion defined by a score line included in said central panel portion, and an opening tab including a pull ring attached to the displaceable portion at a point proximate the periphery of the central panel portion with the pull ring of the opening tab radially inward from the point of attachment, the improvement which comprises an arcuate channel formed in the central panel portion underlying the pull ring of the opening tab, the channel being configured to coincide with the pull ring and substantially nesting the pull ring therein, and means for releasably engaging the pull ring to maintain and resist movement of the pull ring from said substantially nested position.

2. An improved end closure as defined in claim 1 wherein the means for releasably engaging the pull ring of the opening tab comprises posts on said central panel portion adjacent the inside of the pull ring.

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3. An improved end closure as defined in claim 2 wherein said pull ring comprises flattened angular indentations engaged by the posts.

4. An improved end closure as defined in claim 3 in which said posts are raised above the plane of the central panel portion.

5. An improved end closure as defined in claim 1 in which said arcuate channel extends beneath substantially the entire pull ring portion of the opening tab.

6. An improved end closure as defined in claim 1 in which said pull ring has an angular raised end portion.

7. An improved end closure as defined in claim 6 in which the angular raised end portion of the pull ring defines a space between the central panel portion that is insufficient to permit grasping or lifting by hand.

8. An improved end closure as defined in claim 7 in which the angular raised end portion of the pull ring defines a space between the central panel portion that permits insertion of a prying tool.

9. An improved end closure as defined in claim 1 in which said closure is metallic.

10. In a metallic end closure for a container having a central panel portion, a displaceable portion defined by a score line included in said central panel portion and

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an opening tab including a pull ring attached to the displaceable portion at a point proximate the periphery of the central panel portion with the pull ring of the opening tab radially inward from the point of attachment, the improvement which comprises a child-resistant opening mechanism comprising a pull ring, having flattened indentations and an angular raised end portion, substantially nested in an arcuate channel in the central panel portion underlying the pull ring and raised posts releasably engaging the indentations of said pull ring to maintain the pull ring in said nested position and to resist movement therefrom, the angular raised end of said pull ring defining a space between the central panel portion that is sufficient to permit insertion of a prying tool but is insufficient to readily permit lifting of the pull ring by hand.

11. An improved end closure as defined in claim 10 in which said displaceable portion remains attached to said central panel portion after opening.

12. An improved end closure as defined in claim 10 in which the displaceable portion is removable from said central panel portion after opening.

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