COINED BEAD FOR IMPROVED FILL CHARACTERISTICS

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12 Claims

ABSTRACT OF THE DISCLOSURE

The cooperation of an end unit with a container body and the fill characteristics of the container may be improved by providing the end unit with a bead coined or pressed therein generally surrounding the end panel thereof.

This invention relates in general to new and useful improvements in end units for cans and like containers, and more particularly to end units of the easy opening type.

The normal easy opening end unit has a tendency to buckle under pressure and this buckling, in turn, exerts a tensile force on the chuck wall of a magnitude to pull the chuck wall radially inwardly away from the body. In certain instances, the chuck wall is pulled away from the body sufficiently to break the seal between the end unit and the body. Another undesirable result is that this uncontrollable buckling will occur to the extent that the end unit has an unsightly appearance and the pull tab which is normally attached thereto unduly projects therefrom so as to interfere with stacking and packaging.

The buckling of the end panel under pressure is normally due to the existence of excess material resulting from the scoring of the end panel to define a tear panel or strip. In the past, the undesired buckling effect of the excess metal has been greatly reduced or eliminated by providing in the end panel beads which absorb the excess metal. The beads, however, normally have a tendency to retain the planar condition of the end panel and prevents the controlled bulging of the end panel to provide for an increased capacity of the can.

In accordance with this invention, it is proposed to make no attempt to eliminate the excess metal in the end panel due to the formation of score lines therein, and at the same time to provide additional metal in a manner to extend the mechanical dome of the end panel and minimize the chuck wall distortion.

In accordance with this invention, the additional metal provided in the end panel results from the forming of a coined bead area surrounding the end panel with this coined bead area functioning as a hinge to limit the buckling or doming of the end unit to the end panel and thereby hold to a minimum the radial tensile forces applied to the chuck wall.

A further object of this invention is to provide a novel easy opening end unit for cans and like containers wherein the normal loose metal in the end panel resulting from the forming of score lines therein to define tear strips is utilized to provide a mechanical dome by the provision of additional loose metal under controlled conditions by the forming of a coined bead surrounding the end panel.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings:

In the drawing:

FIGURE 1 is a plan view of a can of the easy open-
ing type having an end unit formed in accordance with this invention.

FIGURE 2 is a bottom plan view of the end unit of FIGURE 1 prior to the application thereof to a can body.

FIGURE 3 is an enlarged fragmentary transverse sectional view taken along the line 3—3 of FIGURE 2 and shows the specific section of the outer portion of the end unit.

FIGURE 4 is an enlarged fragmentary vertical sectional view taken along the line 4—4 of FIGURE 1 and shows the domed configuration of the end unit as it exists as a part of a filled can.

Referring now to the drawing in detail, it will be seen that there is illustrated a can which is formed in accordance with this invention, the can being generally referred to by the numeral 10. The can 10 includes a conventional body 11 which has the lower end thereof closed in a conventional manner by an end unit (not shown). The upper end of the body 11 is closed by an end unit which is formed in accordance with this invention and is generally referred to by the numeral 12. The end unit 12 is secured to the body 11 by means of a conventional double seam 13 in the customary manner.

Referring to FIGURES 2 and 3 in particular, it will be seen that basically the end unit 12 is of a conventional construction and includes a central end panel 14, which is joined to the customary chuck wall 15 by means of a shock absorbing bead 16. Radially outwardly of the chuck wall 15, the end unit 12 is provided with the customary curl 19 to facilitate the forming of the double seam 13.

The end unit 12, being of the easy opening type, has a readily removable tear portion 17 which is defined by a score line 18. The tear portion 17, which is formed in the end panel 14 and is removable therefrom by a tearing action, is provided at the staving end thereof with an integrally formed rivet 20 which is utilized to form a pull tab 21 therein. The end panel 14 is also provided with a pair of protected beads 22, there being one bead 22 on each side of the tear portion 17.

It is to be understood that the score line 18 is formed by a stamping with the metal being displaced as opposed to being removed. The displaced metal results in the looseness of the end panel 14. The looseness of the metal of the end panel 14 results in a buckling thereof under slight pressures. Unless this buckling is controlled, it is undesired and in the past attempts have been made to eliminate the looseness of the end panel by various methods including the formation of metal absorbing beads in the end panel.

In accordance with this invention, it is proposed to utilize the loose metal of the end panel 14 to effect a mechanical doming of the end panel in the filled can. Furthermore, the doming of the end panel which is possible with the loose metal resulting from the forming of the score line 18 is enhanced by the provision of additional loose metal in the end panel. A bead 23 is coined in the end unit 12 surrounding the end panel 14 and intermediate the end panel 14 and the shock absorbing bead 16. The coining operation is preferably formed from the underside of the end unit 12 whereby the thinning of the metal at the coined bead 23 is not apparent. The metal displaced in the forming of the coined bead 23 is primarily displaced radially inwardly into the end panel 14 to provide for a controlled looseness of the end panel 14 whereby a mechanical dome will result in the end unit when it becomes part of a closed container.

Referring now to FIGURE 4 in particular, it will be seen that the end panel 14 is domed so as to increase the
capacity of the can 10. It is to be understood that this doming is uniform. It is also to be noted that the domed end panel 14 is hinged relative to the remainder of the end unit 12 because the coined bead 23, due to the thinning of the metal in the formation thereof, functions as a hinge. This hinging of the domed end panel 14 minimizes the radial inwardly directed forces applied to the chuck wall 15 by pressure within the can 10 on the end unit and eliminates the pulling away of the chuck wall 15 from the body 11 which has occurred in other easy opening end units.

Although only a preferred embodiment of the invention has been specifically illustrated and described herein, it is to be understood that minor variations may be made in the unit end in general and the configuration of the coined bead in particular without departing from the spirit and scope of the invention, as defined by the appended claims.

I claim:
1. In an end unit for cans and like containers of the type including an end panel and a peripheral attaching portion; the improvement comprising an area of reduced thickness disposed intermediate said end panel and said attaching portion, said area of reduced thickness being of a material width as compared to a conventional weakening line type score.

2. The end unit of claim 1 wherein the material displaced in the forming of said area of reduced thickness has been absorbed in said end panel and said end panel has loose material facilitating the controlled doming of said end panel.

3. In an end unit for cans and like containers of the type including an end panel and a peripheral attaching portion; the improvement comprising an area of reduced thickness disposed intermediate said end panel and said attaching portion, the material disposed in the forming of said area of reduced thickness having been absorbed in said end panel and said end panel having loose material facilitating the controlled doming of said end panel, said end unit being of the easy opening type and said end panel having a tear portion defined therein by a score line, and material disposed in the forming of said score line supplementing said material disposed in the forming of said area of reduced thickness.

4. The end unit of claim 1 wherein said area of reduced thickness is in the form of a bead.

5. The end unit of claim 1 wherein said area of reduced thickness is in the form of a downwardly opening bead.

6. The end unit of claim 1 wherein said area of reduced thickness is in the form of a bead and the material displaced in the forming of said area of reduced thickness has been absorbed in said end panel and said end panel has loose material facilitating the controlled doming of said end panel.

7. The end unit of claim 1 wherein said area of reduced thickness extends entirely about said end panel and forms a hinged connection between said end panel and said attaching portion.

8. The end unit of claim 1 wherein said area of reduced thickness is upwardly bowed and the material displaced in the thinning of said area being from the underside of said end unit.

9. The end unit of claim 1 wherein a shock absorbing bead surrounds said area of reduced thickness.

10. The end unit of claim 1 wherein said end unit forms an end closure of a container having a product under pressure therein and said end panel is outwardly domed to provide a controlled increase in capacity of said container.

11. An end unit for cans adapted to be filled with a product under pressure, said end unit comprising a peripheral attaching portion attachable to one end of said can, a central panel portion coaxially disposed within said peripheral attaching portion, means integrally connecting said central panel portion with said peripheral attaching portion, a coined bead formed along the juncture of said connecting means and said central panel portion, said coined bead displacing material inwardly so that said central panel portion flexes relative to said connecting means and independently of said attaching portion when said end unit is attached to said can to form a dome and thereby to increase the capacity of said can.

12. An end unit for cans and like containers wherein said end unit is of the type including a peripheral attaching portion and an end panel with said end panel having a removable panel portion defined by a score line; the improvement residing in said end unit being of a construction wherein said end panel has loose material facilitating the controlled doming of said end panel, said loose material being partially of a result of the forming of score line and partially due to controlled localized thinning of said end unit.

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