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END CONSTRUCTION FOR CAN

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Fig. 1

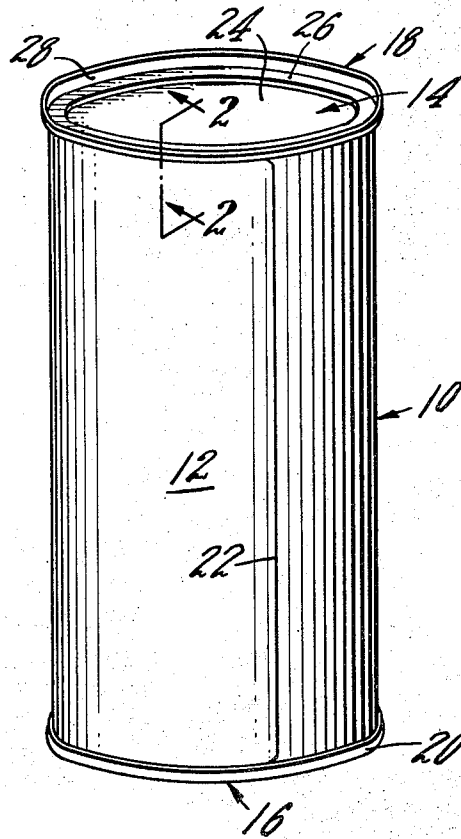


Fig. 2

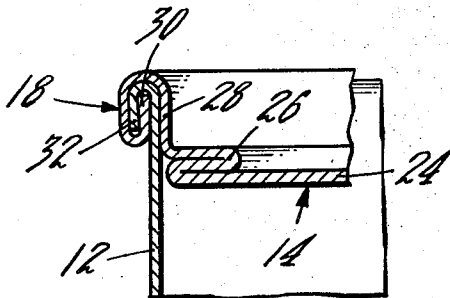
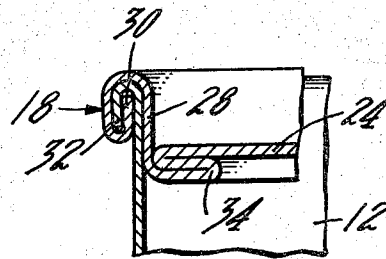


Fig. 3



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END CONSTRUCTION FOR CAN

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The present invention relates to a novel construction for a container end closure and in particular to a one-piece, sheet metal, reinforced end closure for a tubular container body.

Along with the expanding use of sheet metal cans for the packaging of pressure generating products, such as beer and carbonated beverages, has come the need for facilitating the opening of such cans. For example, children constitute a large percentage of the consuming public of carbonated soft drinks in sheet metal cans; but the muscular power required to pierce the end closure of such cans by the well-known punch type can opener is sometimes beyond the capabilities of children.

An obvious answer to this difficulty is to make the closures for the cans of weaker materials, such as aluminum or thinner gage tin plate, that are more readily pierced by a can opener. Aluminum, however, in the gage required to provide adequate strength, is relatively expensive as a can material which reduces its desirability for this purpose. Merely reducing the gage of tin plate to a level that makes it easy to pierce for opening purposes results in a closure having insufficient resistance to buckling, i.e. permanent deformation of the closure at the periphery of its central panel adjacent the double seam, when subjected to the pressure generated within a can containing a product such as beer or carbonated beverages.

It is therefore an object of the present invention to provide a novel construction for a one-piece, sheet metal can closure enabling it to withstand deforming forces generated within a can body to which it is attached.

Another object is to provide a one-piece, sheet metal can closure which may be made from relatively thin gage metal and still withstand buckling when subjected to pressures generated within a can body to which it is attached.

A further object is to provide a relatively thin, easily puncturable one-piece, sheet metal end closure for a can which may be produced efficiently.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

The above objects are accomplished by providing in a sheet metal, can end closure having a substantially horizontally extending central panel connected to but spaced from the flange of the closure by a countersink wall, tightly compressed layers formed from the metal of the closure, which layers lie relatively flat on and around the periphery of the panel and are directed inwardly away from the countersink wall towards the center of the panel.

Referring to the drawing:

FIG. 1 is a perspective view of a can embodying the instant invention;

FIG. 2 is an enlarged fragmentary sectional view taken substantially along lines 2-2 of FIG. 1; and

FIG. 3 is a modified form of the invention shown in FIG. 2.

As a preferred or exemplary embodiment of the instant invention, FIG. 1 illustrates a sheet metal can generally designated 10 having a tubular sheet metal body 12. An upper end closure, generally designated 14, and a lower end closure 16 are secured to the ends of the body 12 in any suitable manner such as the well-known double seams 18, 20. The closure 16 may be of conventional, well-

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known construction or may be the same as the closure 14 to be described more fully hereinafter.

In the embodiment illustrated, the entire can is made of sheet metal, preferably tin plate. Under such circumstances the body 12 is formed from a flat blank, which is formed into tubular configuration and its marginal edges bonded into a longitudinally extending side seam 22. The closures 14, 16 also are made from tin plate and secured to the body as mentioned above.

This procedure is so well known in the art that further description thereof is deemed unnecessary. It is to be understood, however, that it is within the purview of the instant invention to have the body 12 made from other materials, such as fibre or aluminum, and by other means such as drawing and ironing, impact extruding and the like. Further, the securing of the closures to the body may be by suitable means other than a double seam. In some of these other procedures such as impact extruding, the body 12 will be seamless thereby obviating the presence of the side seam 22. Further, although it is preferred that the closure 14 be made from tin plate because of its greater strength and lower cost, the instant invention is equally applicable to aluminum as the material of the closure 14.

The upper end closure 14 includes a substantially horizontally extending central panel 24 (FIG. 2) which extends over and covers the open end of the can body 12. The central panel 24 is recessed within the body 12 so that the horizontal plane in which it lies is below the level of the lower edge of the double seam 18. At its periphery, the panel 24 is bent back upon itself inwardly towards its center and then again outwardly toward the body 12 to form a fold 26. Thus the fold 26 is composed of two layers of metal in contiguous relation overlying and extending inwardly towards the center of the panel 24 in contiguous relation with the periphery of the panel 24. To facilitate doubleseaming, the upper surface of the fold 26 is substantially on the same level as the lowermost edge of the double seam 18. The fold 26 then merges with an upwardly extending countersink wall 28 which in turn merges with a closure flange 30 which is interfolded with a peripheral flange 32 on the body 12 in a well-known manner to form the double seam 18.

In the modified form of the invention shown in FIG. 3 the central panel 24 and the countersink wall 28 are the same as shown in FIG. 2. Also, the interfolding of the closure flange 30 and body flange 32 is identical to that previously described to form the double seam 18. The modification shown in FIG. 3 differs from the preferred form shown in FIG. 2 in that a fold 34 similar to the fold 26 underlies the periphery of the panel 24; or in other words, is on the opposite side of the panel 24 from the closure flange 30 and therefore enclosed within the can 10. Further, in this embodiment the upper surface of the central panel 24 is substantially on a level with the lowermost edge of the seam 18 thereby spacing the entire fold 34 below the seam 18. As shown in FIG. 3, the fold 34 is composed of two contiguous layers of metal extending inwardly towards the center of the panel 24 in contiguous and underlying relation with the periphery of the panel 24.

It is to be understood that other folding configurations such as a combination of that shown in FIGS. 2 and 3 could be used and are therefore within the purview of the instant invention. The essential feature of the instant invention is that the metal of the closure is folded or collapsed into contiguous layers at the periphery of the panel 24, which layers extend inwardly towards the center of the panel 24 in a substantially horizontal direction at a level no higher than the lowermost edge of the double seam. This construction not only permits the closure to be seamed onto the body, but is necessary to

provide the reinforcement or increased resistance of the closure against buckling.

The construction hereinbefore described is readily achieved on the end closure prior to its securement to the can body. In such a condition, the closure flange 30 extends in a substantially horizontal direction on a plane spaced from the horizontal plane on which the central panel 24 substantially lies with the countersink wall 28 disposed therebetween. In the portion joining the base of the countersink wall 28 to the panel 24, a step is formed either inwardly and downwardly away from the flange 30 or inwardly and upwardly towards the flange 30. By suitable dies, this step is then collapsed radially outwardly as tightly as possible, the downward step collapsing into the fold 26 and the upward step collapsing into the fold 34. By forming both a downwardly and upwardly extending step, then collapsing both simultaneously a composite of the folds shown in FIGS. 2 and 3 is obtained. After being provided with the tightly folded contiguous layers of metal, the closure is then assembled to the body in the usual manner.

By means of the instant construction the closure is strengthened or reinforced against buckling in the area most susceptible to this defect, i.e. the area at the juncture of the central panel and countersink wall. It has been found that with such a reinforcement, the end closure can then be made of relatively thin gage metal, much lighter gage stock than has heretofore been deemed necessary to prevent buckling when the closure is to be used on cans containing pressure generating products. This is true whether the material of the closure is tin plate or aluminum. Cans containing such pressure containing products, such as beer and carbonated beverages, may be opened exactly in the same way as similar prior art cans have been opened in the past by fulcruming a punch-type can opener around the double seam. However, with the lighter gage metal permitted by the subject construction a levering force of only a fraction of that required with prior art cans is necessary to pierce the central panel and open the can.

Resistance to buckling can be further augmented by bonding together the layers of metal in the fold and bonding the fold to the contiguous panel portion. This bonding may be accomplished by soldering, welding, an organic adhesive, or the like. Buckling resistance can also be increased by bending the free end, i.e. radially innermost end, of the horizontally extending fold slightly upwardly or downwardly.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a one-piece sheet metal end closure for subsequent attachment to a tubular container body including a central panel, a peripheral flange surrounding said panel and extending in a lateral direction above said panel, and a wall integral with and extending between said panel and said flange in a generally vertical direction; the improvement comprising, a fold in said wall at its lower end adjacent its connection to said panel forming two contiguous layers of metal extending substantially inwardly towards the center of said panel in contiguous relation only with the periphery of said panel, said contiguous metal layers strengthening said wall against deformation when said closure is subjected to forces from within a container body to which it is attached whereby said closure can be made of lighter gage sheet metal.

2. The closure set forth in claim 1 wherein said two layers of metal are disposed on the same side of said panel as said flange.

3. The closure set forth in claim 1 wherein said two layers of metal are disposed on the side of said panel opposite said flange.

4. A container consisting essentially of a tubular body having an end closure secured to a peripheral end of said body; said end closure comprising a peripheral flange secured to said body in an end seam, a central panel recessed within said body and extending across the open end of said body, a substantially vertical wall integral with and connecting said flange and said panel, and a fold in said wall at its lower end adjacent its connection to said panel, said fold consisting of two contiguous layers of metal extending substantially inwardly towards the center of said panel in contiguous relation only with the periphery of said panel, said contiguous metal layers strengthening said wall against deformation when said closure is subjected to forces from within said container body whereby said closure can be made of lighter gage sheet metal.

5. The container set forth in claim 4 wherein said central panel is substantially horizontal and on a level no higher than the lowermost edge of said end seam.

6. The closure set forth in claim 1 wherein said layers of metal extend substantially horizontally inwardly towards the center of said panel.

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