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[54] REINFORCEMENT INSERT FOR CONTAINER  
PLUG  
1 Claim, 5 Drawing Figs.  
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220/42, 220/24.5  
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B65d 41/00  
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24.5, 42 B, 60, 53; 215/48, 51, 41; 229/43

ABSTRACT: A container component including a panel with an opening and a plastic opening tab having a recessed plug portion which fits into the opening and which is reinforced against upward bulging due to the internal pressure of the container. The bottom wall of the recess is reinforced by a flat insert which is placed within the recession to engage at its peripheral edge the sidewall of the recession and be over the bottom wall of the recession.

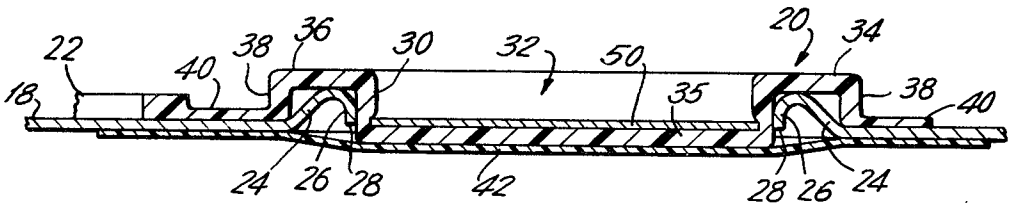


FIG. 1

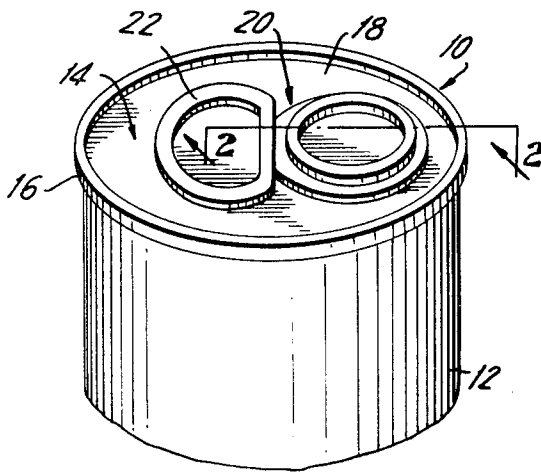


FIG. 4

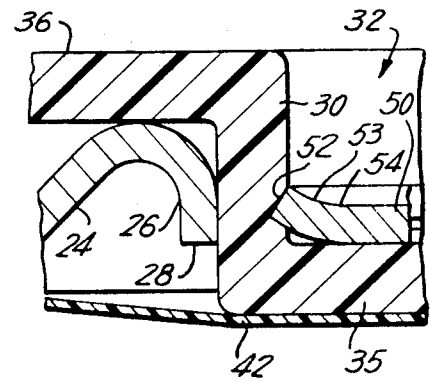


FIG. 2

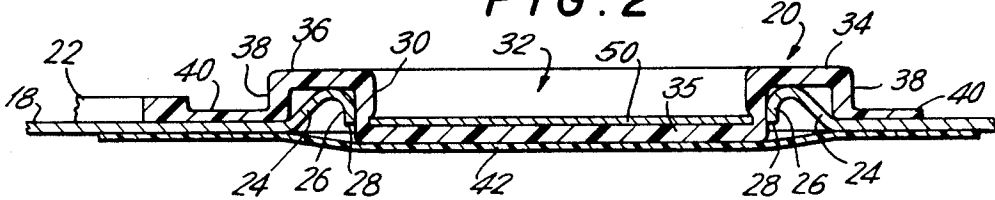


FIG. 3

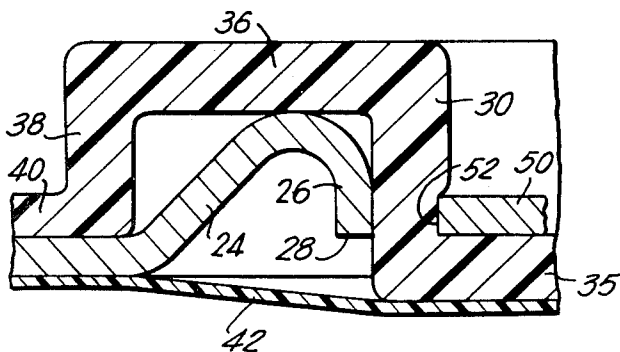
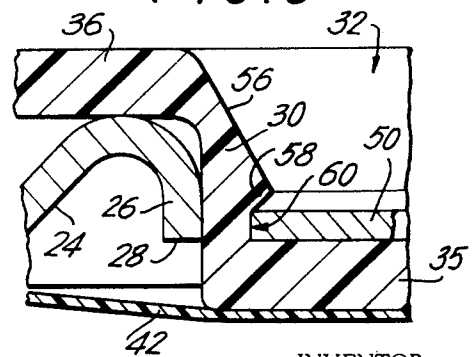


FIG. 5



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## REINFORCEMENT INSERT FOR CONTAINER PLUG

## BACKGROUND OF THE INVENTION

In recent years cans which can be opened without openers or other implements have become popular because of their convenience. Such cans generally have an end closure with a removable area defined by a score line. A rivet integral with the removable area secures an opening tab to the area so that the user can manipulate the tab to detach the removable area from the rest of the end closure. The contents of the can are then accessible to the user and in the case of a can used to package beverages or other liquids, the opening caused by the removal of the removable section serves as a pour opening.

Such containers have been commercially successful because of their convenience, however, they have several inherent disadvantages. For one, they are often difficult for some users to open because of the force that must be applied to the tab to rupture the score. This is particularly true to some women and most small children must ask an adult to open the can for them. In the canning of juices and soft drinks and other products which are consumed largely by children, the convenience of the tab-opening can has been minimized because the young consumer cannot open the can without help.

Another disadvantage of such cans is that when opened, an exposed raw metal edge is always created on the removed section and on the periphery of the opening. These edges can be hazardous to the user, particularly when the user is a child.

Still another disadvantage of such cans is that once opened, they cannot be reclosed. Thus, in the case of carbonated beverage, the consumer would normally use all of the product once the can is opened because no option is given the consumer to preserve the carbonation of any unused product.

The above disadvantages have been overcome by providing a can end with an opening which is closed by an opening tab of resilient material such as plastic and with a plug portion which fits into the opening. In order to provide an hermetic seal, a severable patch which is of a material which is substantially impervious to the product and the atmosphere such as metallic foil, plastic or plastic laminate, is generally adhered to the bottom of the plug portion and to the underside of the panel on the area thereof surrounding and adjacent to the opening. An upward pull on the tab will cause the patch to sever and the plug portion to be lifted out of the opening to provide a dispensing orifice.

Although a container which is closed by a plastic-opening tab and a patch does not have the disadvantages found in the scored container, it is not without disadvantages of its own.

The patch is usually heat sealed to the bottom of the plug portion by heat which is transmitted through the bottom wall of the plug portion and therefore the bottom wall is usually quite thin to facilitate the transmission of heat. The patch should also be thin (preferably 4 mils or less) so as to be easily severable during the opening operation. This combination of thin materials can cause the plug portion to bulge upwardly when the internal pressure of the can is high. Internal pressures reach very high values when the product is heat treated and this is especially true when the product is beer or carbonated beverage. The canning processes can, therefore, result in a container having an opening tab which bulges upwardly to be susceptible to inadvertent detachment during rough handling which will occur during storage and shipment.

Further, the upward bulge of the plug portion caused by a pressure buildup tends to pull the sidewall of the plug portion inwardly so that the plug portion loses all or some of its frictional grip at the edge of the opening under the action of the internal pressure. This adds to the tendency of the opening tab to become detached inadvertently.

Still another disadvantage of such an opening feature is that in the case where the patch is made of plastic material the plug and patch are obviously not as impervious to gas transmission as a removable portion of a scored metal end. Gas transmission through the plug prevents effective preservation of the

product. For example, it limits the time during which the carbonation of beer and carbonated beverage can be retained.

## SUMMARY OF THE INVENTION

It is the object of the present invention to prevent the internal pressure of a container from causing an upward bulging of an opening tab at the plug portion which portion is inserted into an opening of the container. A rigid, substantially flat insert is placed on or in the plug portion so that it reinforces the plug portion against upward bulging and resists transmission of gases through the plug portion.

## BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a fragmentary view in perspective of the upper portion of a can made in accordance with the present invention;

FIG. 2 is a view, partly in section, and in an enlarged scale taken substantially along the line 2-2;

FIG. 3 is a fragmentary view, partly in section, showing the engagement between the plastic plug of FIG. 1 and the opening in an end closure in a scale larger than that of FIG. 2;

FIG. 4 is a view similar to that of FIG. 3, but showing another embodiment of the present invention; and

FIG. 5 is a view similar in that of FIG. 4 but showing still another embodiment of the present invention.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 shows a container indicated generally as 10, having a can body 12, and an end closure 14 which may be joined to the can body 12 in a conventional end double seam 16. The bottom of the can, which is not shown, can be closed with any kind of end closure which may also be secured to the can body 12 in a conventional double seam.

The end closure 14 includes a flat central panel 18 and an opening tab 20, having a handle portion 22 which may be pulled by the user to open the can 10. The central panel 18 has an opening which is rimmed by an upwardly projecting bead 24, which as shown in FIG. 2, has a friction wall 26 having on its bottom a downwardly facing raw edge 28.

The friction wall 26 is engaged by a sidewall 30 of a plug or recessed portion 32 of the opening tab 20. The recessed portion 32 is defined by an annular upwardly projecting bead 34 which rims the recessed portion 32 and by a horizontal bottom wall 35. The bead 34 includes the sidewall 30 which extends upwardly from the periphery of the bottom wall 35, a horizontal wall 36 which extends outwardly from the top of the sidewall 30 and an outer wall 38 which extends downwardly from the outer periphery of the horizontal wall 36. The horizontal wall 36 engages the top of the bead 24 when the recessed portion 32 of the opening tab 20 is fully inserted into the opening defined by the bead 24. The upwardly extending bead 34 is joined at its periphery, more particularly at the bottom of the outer wall 38, to a flat web portion 40 which is integral with the handle portion 22.

In order to assure an hermetic seal at the opening tab 20, a patch 42 which is substantially impervious to gas and the product, is adhered to the bottom wall 35 and to the underside of the central panel 18 in the area thereof adjacent to the bead 24. The patch 42 also serves to shield the raw edge 28 from the product. Since the edge 28 is the only part of the underside of the end closure 14 which is not likely to be coated to prevent chemical reaction with the product it is desirable that it be shielded from the product and the patch 42 does this.

The present container is opened by pulling upwardly on the handle portion 22 of the opening tab 20 to pull upwardly on the bottom wall 35 and the portion of the patch 42 which is adhered to it. The patch 42 is thereby forced against the raw edge 28 so that the patch severs at the edge 28 and the opening tab 20 is freed from the can 10.

It has been explained that the internal pressure of the can tends to bulge the bottom wall 35 upwardly. This has the effect of pulling the sidewall 30 inwardly so that it is not frictionally engaged at the friction wall 26. If high enough, the in-

ternal pressure can then force the plug 20 upwardly far enough that the patch 42 will engage and be severed by the raw edge 28 of the bead 24. Even if the internal pressure is not high enough to cause the tab 20 to become detached from the can, it may be high enough to bulge the bottom wall 35 upwardly far enough to lessen the frictional retaining force between the sidewall 30 and the friction wall 26. This will make the opening tab 20 susceptible to an inadvertent detachment during shipment or storage.

In order to prevent the upward bulging of the bottom wall 35 and the undesirable consequences set forth above, a rigid plate 50 is provided as shown in FIG. 3. The plate 50 is positioned in the recession 32 so that peripheral edge 52 thereof is force fitted within the sidewall 30. The plate 50 lies on the top of the bottom wall 35 so that pressure on that wall will be directly transmitted to the plate 50 which, because of the tight fit between the peripheral edge 52 thereof and the sidewall 30, will not move upwardly. The tight fit between the edge 52 and the sidewall 30 also prevents that wall from being distorted inwardly because of a bulge in the bottom wall 35. Thus, the plate 50 reinforces in two ways. It strengthens the bottom wall 35 against upward bulging and it reinforces the sidewall 30 against inward displacement. Providing an adhesive between the plate 50 and the bottom wall 35 will also aid in holding the plate 50 down on the wall 35 during an upward bulge thereof but it has been found that a tight fit between the edge 52 and the sidewall 30 can obviate the use of adhesive.

FIG. 4 shows a second embodiment of the present invention. It is similar to the embodiment of FIG. 3, the essential difference being that the plate 50 has a peripheral marginal portion 53 which is bent upwardly as at 54 so that the edge 52 faces outwardly and upwardly and an upward movement of the plate 50 will be resisted by the sidewall 30 acting downwardly on the edge 52. The upward bend of the peripheral marginal portion 53 of the plate 50 reinforces against an upward bulging for the additional reason that an upward force on the plate 50 will tend to flatten the peripheral marginal portion 53 and urge the edge 52 outwardly and into the vertical wall 30. The vertical wall 30 and friction wall 28 will resist an outward movement of the edge 52 and thereby act against an upward bulge of the plate 50.

Still another advantage to the embodiment of FIG. 4 is realized because an upward pressure on the plate 50, in flattening the peripheral marginal portion 53 of the plate 50, will urge the vertical wall 30 outwardly against the friction surface 28. The frictional engagement between the wall 28 and sidewall 30 will therefore become tighter with an increase in internal pressure.

A third embodiment is shown in FIG. 5. In that embodiment

the vertical wall 30 includes a beveled portion 56 which merges at its bottom portion with an annular bead 58. The annular bead 58 and the bottom wall 35 define the top and bottom respectively of an annular groove 60 in the sidewall 30. The peripheral portion of the plate 50 fits within the groove 60 and is secured from upward movement by the bead 58. The bevel 56 permits the plate 50 to be pressed down into the recessed portion 32 because the wall 30 is gradually compressed until the plate 50 passes below the bead 58 and the bead 58 then snaps inwardly to secure the plate 50 in position as shown in FIG. 5.

In each of the three embodiments the metal plate 50 resists gas transmission which would otherwise be possible through the bottom wall 35. Plastic, of course, is not as fluid impervious as is metal and gas transmission can be a problem in the case of certain products.

One method by which all of the embodiments shown can be produced economically is to use the piece of metal removed when the opening is punched out of the end closure 14 for the plate 50. This is possible as long as the upwardly projecting bead 24 and the sidewall 30 of the recessed portion 32 are appropriately dimensioned.

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 being merely a preferred embodiment thereof.

I claim:

1. A container component comprising:

a panel, said panel having an opening defined therein;

a bead surrounding said opening, said bead having a friction wall at its inner portion;

a plastic opening tab, said opening tab comprising a recessed portion having a bottom wall and a sidewall extending upwardly from said bottom wall, the outside surface of said sidewall engaging said friction wall and the lower portion of the inside surface of said sidewall having an annular groove defined therein;

a reinforcing plate positioned within said annular groove in said recessed portion so that the peripheral edge thereof engages tightly against said sidewall within said annular groove therein to prevent said bottom wall from being bulged upwardly when said component is secured to a container subject to the internal pressure of a product contained therein; and

a patch impervious to said product and the atmosphere adhered to the bottom of said panel and said bottom wall.

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