United States Patent

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[54] **CONTAINER WITH REMOVABLE PANEL PORTION**
7 Claims, 4 Drawing Figs.

[52] **U.S. Cl.** **220/54**
[51] **Int. Cl.** **B65d 17/24**
[50] **Field of Search** 220/54, 48; 215/46.5

[56] **References Cited**

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ABSTRACT: A container having a removable panel portion in one of its walls defined by a score line around the periphery of such portion and having a pull tab attached to the removable portion at its starting end and a plurality of parallel ribs downwardly embossed in the removable portion adjacent its starting end substantially parallel to a line tangent to the score line at such starting end, and additional parallel ribs downwardly embossed in the removable portion adjacent its terminal end substantially normal to a line tangent to the score line at such terminal end.

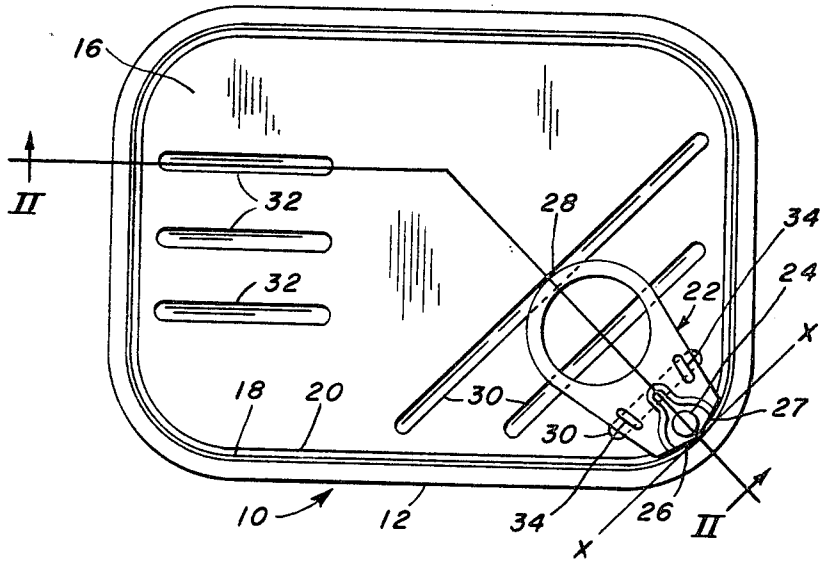


FIG. 1.

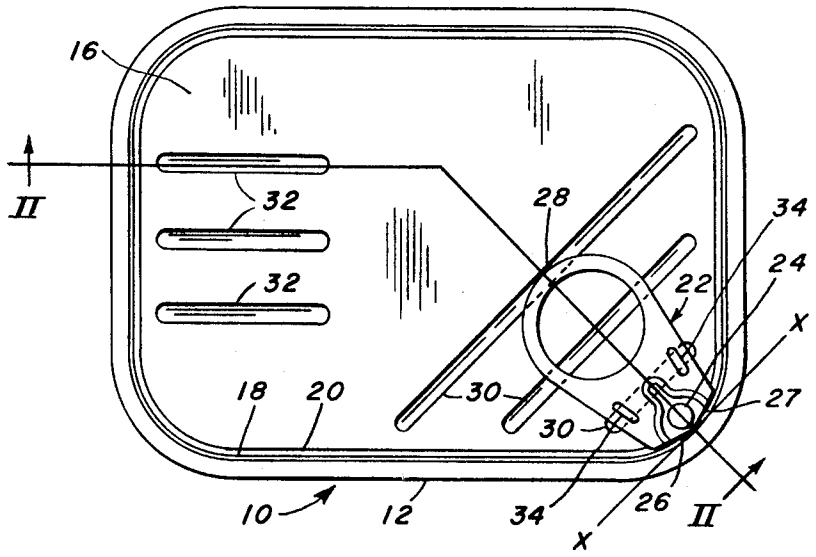


FIG. 2.

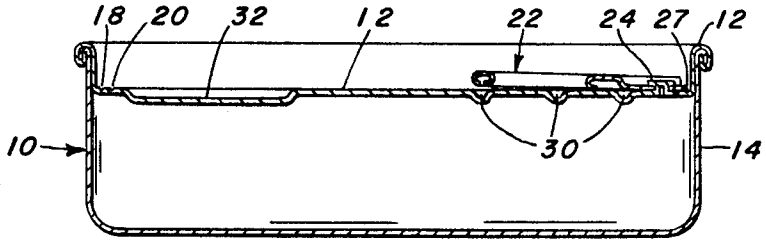


FIG. 3.

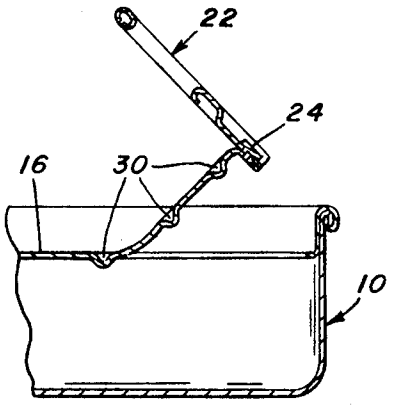
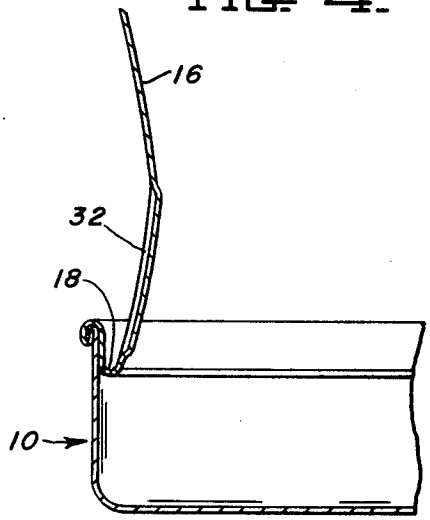


FIG. 4.



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CONTAINER WITH REMOVABLE PANEL PORTION

BACKGROUND OF THE INVENTION

Containers having walls made of deformable material have been provided with large removable portions of the full pull-out-panel type which are defined by lines of weakness around the outer periphery thereof and having tabs affixed to the removable portions for rupture of the lines of weakness, as shown in U.S. Letters Pat. No. 3,409,166 and 3,404,801. Removal of such full pull-out-panel portions is typically effected by lifting the tab to initiate rupture of the line of weakness adjacent the attachment of the tab to the removable panel portion and then pulling the tab to sever the remainder of the line of weakness around the removable portion. It has been found that in such large removable portions, and particularly in those made of thin-gauge material, the pulling force exerted on the panel by the tab sometimes deforms the panel and causes it to dome or buckle adjacent the tab which makes it difficult to sever the lines of weakness. Such a removable portion may also tend to curl near its terminal end which makes it difficult to completely separate such portion from the container, and may cause the end of the panel portion to spring back upon severance thereof to flip part of the contents of the container out of the container, or off the panel portion if adhering thereto.

SUMMARY OF THE INVENTION

This invention provides a container wall having a removable panel portion therein which is defined by a line of weakness around the outer periphery of the removable portion and has a tab affixed to such portion near the edge thereof in its starting end, the removable panel portion having means adjacent its starting end for reinforcing the portion parallel to a line drawn tangent to the line of weakness at such starting end. The removable portion may also be provided with means adjacent its terminal end for reinforcing such portion normal to a line drawn tangent to the line of weakness at such terminal end.

Accordingly, an object of the invention is to provide means for controlling the direction of bending a removable portion of a container panel during opening thereof.

Another object of the invention is to provide embossed ribs in a removable portion of a container panel to assure ease of opening of such a container.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects and advantages of the invention will be more fully understood and appreciated with reference to the following specification and drawings appended thereto wherein:

FIG. 1 is a plan view illustrating a container provided with a removable portion in the top panel thereof in accordance with the invention;

FIG. 2 is a cross-sectional view of the container taken along line II–II of FIG. 1;

FIG. 3 is a fragmentary cross-sectional view similar to FIG. 2 illustrating initiation of opening of the container; and

FIG. 4 is a cross-sectional view similar to FIG. 2 illustrating completion of opening of the container.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to the drawings, a preferred embodiment of the invention is illustrated in the form of a rectangularly shaped container **10** having a top wall or panel thereof made of metal, preferably aluminum or aluminum alloy of a relatively thin gauge in the range of 0.007 inch to 0.012 inch and having a peripheral flange **12** adapted to be secured by conventional means such as seaming to a sidewall **14** of the container **10**. A rectangularly shaped full pull-out-panel portion **16** defined by a score line **18** or other line of weakness around the periphery thereof is provided in the container wall for gaining access to the contents of such a container. Score line **18** is formed closely adjacent peripheral flange **12**, and an antifracture score line **20** which is shallower, or has a thicker residual, than the removable panel defining score line **18** may be provided inwardly of, and adjacent to, score line **18** as shown.

A pull tab **22** is disposed over full pull-out-panel portion **16** and affixed thereto near its edge in what will be referred to as the starting end of the panel portion **16**, by conventional means such as integral rivet **24**. With a square or rectangular container, as illustrated, the starting end of removable portion **16** is located in a corner thereof to facilitate opening of the container. To initiate opening of such a corner-located starting end of a panel, there need only be initial rupture of a short length of the score line at such corner, and severance of the score line **18** can be progressive thereafter. Tab **22** has a nose end **26** overlying the removable panel portion **16** adjacent score line **18** and a handle end **28** in the shape of a ring inwardly of score line **18** and overlying panel portion **16**. Tab **22** is preferably formed of sheet metal such as aluminum or aluminum alloy and has a curled bead around the ring and along the sides of the tab. The nose end **26** of tab **22** is recessed around the attachment portion to provide a wall which is substantially flush with the panel portion **16** of container **10**, and may have reinforcement ribs **34** adjacent such recessed area. The nose **26** of the tab **22** may also be provided with upwardly turned lips **27** along the edge thereof to reinforce the nose and provide a concentration of force at its end.

It is a feature of the invention that removable panel portion **16** be provided with reinforcing means for resisting bulging or doming of the portion **16** during opening. In the preferred embodiment, reinforcing is provided in the form of three parallel ribs **30** embossed in portion **16** adjacent the starting end of the portion and the attachment of tab **22** thereto, interiorly of the area of such attachment, and disposed substantially parallel to a line X–X drawn tangent to score line **18** at such starting end of the panel, and in particular, tangent to score line **18** at the point of initial rupture thereof. Ribs **30** reinforce removable panel portion **16** along the length of such ribs across and adjacent the starting end of portion **16** to resist bending of the panel portion **16** in a direction perpendicular to the ribs while permitting the panel portion to bend parallel to the ribs. Preferably, ribs **30** are downwardly embossed in panel **16**, but may also be upwardly embossed therein. When downwardly embossed as illustrated, a space is provided under the innermost end of tab **22** by the innermost rib to facilitate insertion of a finger or finger nail under the end of tab **22** to lift the same. Moreover, a container having downwardly embossed ribs in removable panel portion **16** can be filled so as to substantially eliminate any air space between the container's contents and the top panel than can a container having upwardly embossed ribs in the removable panel portion. In fact downwardly embossed ribs usually produce no air spaces whatsoever in a filled and sealed container.

According to the invention, successive ribs **30** are of progressively greater length as disposed further from the rivet attachment with each rib extending substantially across the width of the removable panel portion **16** adjacent its starting end.

Reinforcing means may also be provided in panel portion **16** adjacent its terminal end to resist bending or curling of the portion adjacent such terminal end parallel to a line drawn tangent to the score line at the terminal end of the panel portion. For a rectangular panellike container **10** illustrated in FIGS. **1** and **2**, such a tangent line would be colinear with score line **18** along the short side of container **10** at the terminal end of panel portion **16**. With a round or oval removable portion, the reinforcing means would be provided to resist bending of the panel portion parallel to a line drawn tangent to the line of weakness at the point of terminal rupture thereof.

In the form selected for illustration, reinforcement in the panel portion **16** adjacent its terminal end is provided by three parallel ribs **32** downwardly embossed in panel portion **16** and aligned perpendicular to score line **18** across the terminal end

of the portion. It is noted, however, that the orientation of such embossments is not critical as long as they provide resistance to curling of the panel portion parallel to score line **18** as hereinabove described. For example two sets of parallel ribs perpendicular to each other and disposed diagonally to score line **18** along the short side of container **10** distal tab **22** would also provide the desired reinforcement in panel **16**. As with ribs **30**, ribs **32** may be either upwardly or downwardly embossed in removable portion **16**.

Referring to FIG. **3**, commencement of the severance of score line **18** to remove panel portion **16** is illustrated showing bending of portion **16** adjacent the attachment of tab **22** to the panel parallel to reinforcing ribs **30**, but with resistance being provided by ribs **30** against bending or doming of the panel portion perpendicular to ribs **30**. It is observed that panel portion **16** is shown as being substantially straight along the length of ribs or perpendicular to the plane of the paper with no doming therein. By preventing doming of panel portion **16** perpendicular to ribs **30**, an upwardly directed pulling force applied to tab **22** is transmitted in the form of a similar upwardly directed force on panel portion **16** adjacent the score line to place the score line in shear rather than in tension as would happen if portion **16** were permitted to dome. Inasmuch as substantially less force is required to sever a score line in shear than in tension, prevention of bending of the panel portion **16** perpendicular to ribs **30** assures an opening device which may be opened with a minimum of force. It is noted opened ribs **30** do not prevent bending of portion **16** parallel to the ribs. Such bending of the panel portion permits progressive severance of the score line during opening. As severance of removable portion **16** progresses from its starting end to its terminal end, the direction of pull will be turned or adjusted as tearing proceeds around the corner of container **10** adjacent the starting end of panel **16** so that thereafter the pulling force will be substantially directly toward the terminal end of panel portion **16**.

FIG. **4** reveals panel portion **16** as it is finally separated from container **10**. It is seen in FIG. **4** that the terminal end of panel portion **16** is substantially flat as reinforced by ribs **32**. In the absence of reinforcement in portion **16** normal to a line tangent to the score line at the point of final severance, the portion would tend to curl towards the terminal end thereof as severance approaches such terminal end, rather than rupture the score line. Consequently, if panel portion were permitted to bend or curl, severance of the score line at the terminal end of the portion could be difficult and might require flexing of the removable portion several times to effect such severance. Moreover, if the panel portion is curled when the score line finally ruptures across the terminal end thereof, the end of the panel may spring back or return to a relatively straight unstressed shape when such final rupture is effected, and such spring back might flip some of the contents of the container out of the container. According to the present invention, the reinforcing in panel portion **16** adjacent its terminal end eliminates such curling and spring back, thereby avoiding any difficulty in separating a removable portion from a container.

While a specific embodiment of the invention has been selected and illustrated for description, it will be appreciated by those skilled in the art that various modifications can be made therein within the scope of the invention and the claims appended hereto. For example, the container could have a round, square or oval end wall and may have various shapes of large removable panels therein. The tab could also be any of the many tabs known in the art for attachment to a removable panel to effect removal thereof. It is also contemplated that the reinforcement ribs or other structure in the removable panel could be of various configuration and orientation which would provide the desired reinforcement in the removable panel portion.

What we claim is:

1. In a generally rectangular container panel of deformable sheet material and having a removable portion therein defined by a line of weakness around the periphery thereof, said portion having a starting end and a terminal end, and having a tab disposed thereover and attached thereto at said starting end for severance of said portion, the improvement comprising said tab being attached to the starting end of the removable portion in a rounded corner thereof closely adjacent the line of weakness, and further including means in said removable portion for reinforcing the same across and adjacent its starting end substantially parallel to a line tangent to said line of weakness at the starting end and interiorly of the area of attachment of said tab to said portion, and means in said removable portion for reinforcing the same adjacent its terminal end substantially normal to a line tangent to the line of weakness at said terminal end.

2. A container panel as set forth in claim **1** in which said means for reinforcing the removable portion adjacent its starting end comprises at least three parallel ribs embossed in the starting end of said removable portion.

3. A container panel as set forth in claim **2** in which said ribs are downwardly embossed in said portion.

4. A container panel as set forth in claim **1** in which sheet material has a thickness in the range of 0.007 inch to 0.012 inch.

5. A container panel as set forth in claim **1** in which said tab has a nose end with an outer edge substantially aligned with the line of weakness along said rounded corner for acting on said removable portion along said line of weakness.

6. A container panel as set forth in claim **1** in which said means for reinforcing the removable portion adjacent its terminal end comprises at least three ribs embossed in the removable portion adjacent said terminal end.

7. A container panel as set forth in claim **6** in which the ribs adjacent the terminal end of the removable portion are downwardly embossed therein.