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Brown

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[54] **EASY-OPEN CAN END CONSTRUCTION**

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[52] **U.S. Cl.** **220/270**; 220/90.6

[51] **Int. Cl.** **B65d 41/32**

[58] **Field of Search** 220/270, 266, 272, 273, 220/90.6

[56] **References Cited**

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[57] **ABSTRACT**

An easy-open can end having a tear portion circumscribed by a line of weakness and a pull tab connected to the tear portion in which a rib projects from the surface of the tear portion. The rib includes an upstanding sidewall which is positioned in contiguous relation to the line of weakness. The shape of the sidewall and its position with respect to the line of weakness provide shielding of the line of weakness. As a result, when the tear portion is removed from the can end by severing along the line of weakness, the edge of the tear portion is shielded from user-contact by the sidewall.

A process which involves the steps of forming a closed rib in a can end in which the rib provides an upstanding sidewall. A line of weakness is formed in the can end in contiguous relation to the sidewall and the sidewall is provided with a shape which shields the line of weakness. As a result, the edge of the tear portion is shielded from user-contact by the sidewall when the tear portion is removed from the can end by severing along the line of weakness.

9 Claims, 5 Drawing Figures

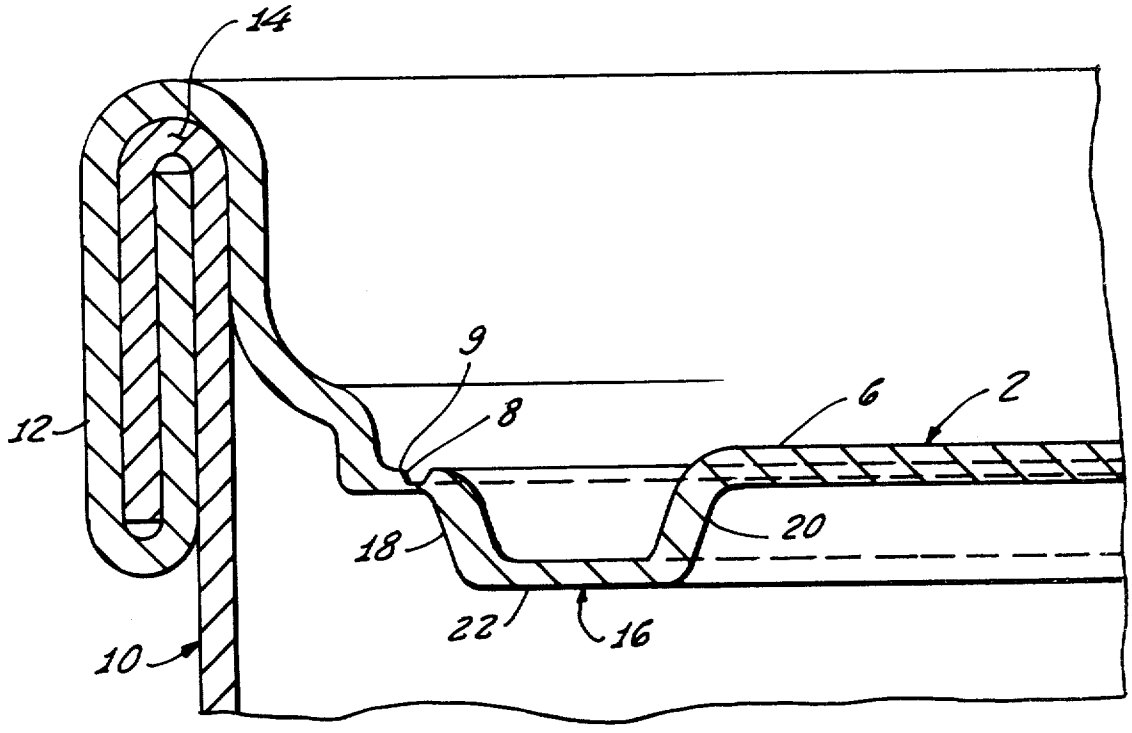


Fig. 1

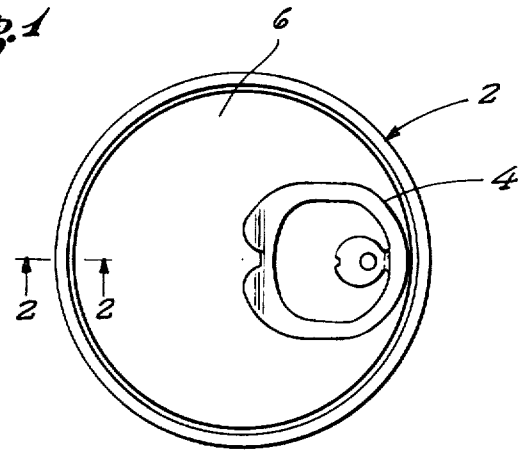


Fig. 2

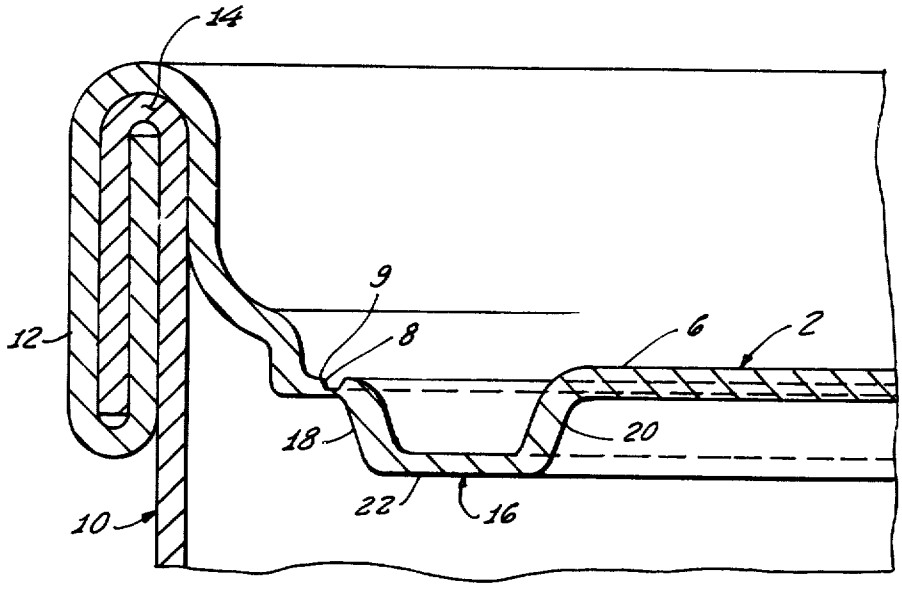


Fig. 3

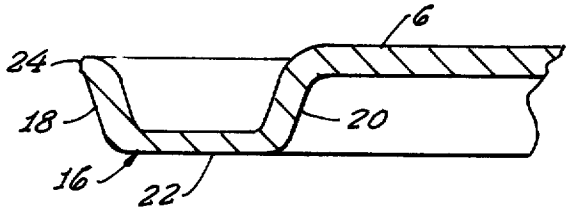


Fig. 4

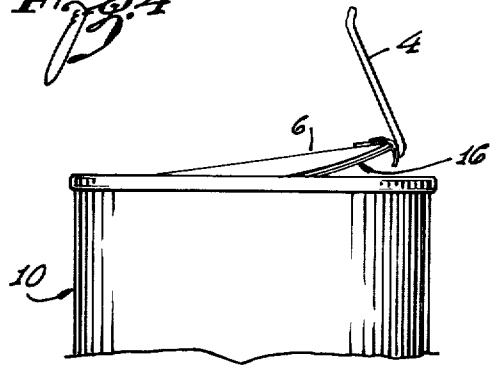
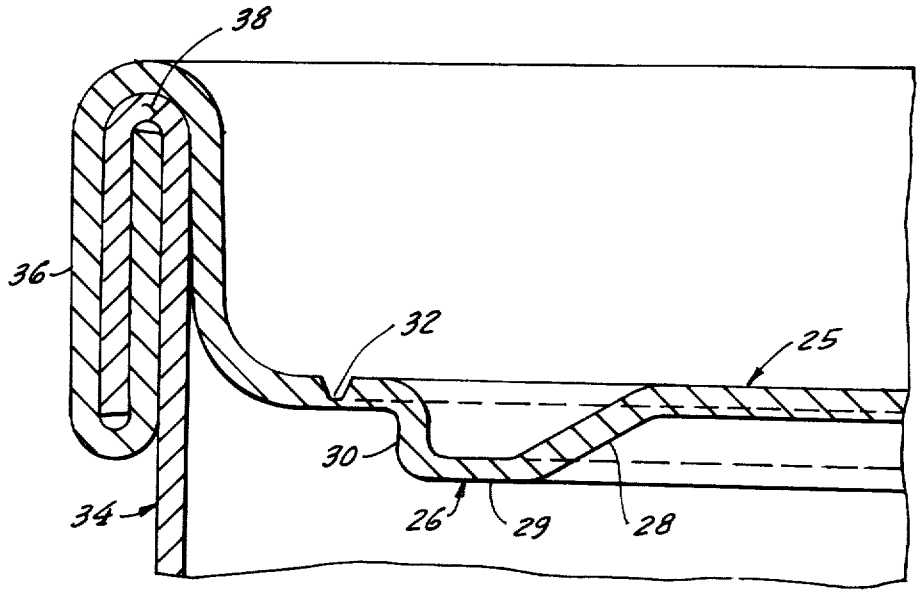


Fig. 5



EASY-OPEN CAN END CONSTRUCTION

BACKGROUND OF THE INVENTION

Since their advent in the early 1960's, the use of easy-open can ends has achieved a phenomenal growth. Due to their relatively low cost and ease in use, easy-open can ends are now used in packaging a wide variety of products ranging from beverages to canned fish.

A minor disadvantage in the use of easy-open can ends results from the fact that the severing of the tear portion from the can end leaves a relatively sharp edge around the tear portion. This presents no danger to an adult; however, a child may accidentally cut himself on the sharp edge.

As a corollary to the wide spread interest in environmental quality, there is a great interest in making consumer products safe for use by children. To make a product safe for use by a child, it is necessary to first know how the child will use the product in an unsafe manner to cause injury to himself. As applied to easy-open can ends, it is, thus, necessary to determine how children might use the can end.

Children frequently lick the underside of the tear portion after its removal from the can end. In a can, for example, containing a pudding, the under surface of the tear portion will have pudding adhered thereto. As a result of licking can ends, many children have received cuts on their tongues. Such cuts can be quite painful and it would be very desirable if an easy-open can end could be designed to reduce this type of injury to children.

A still further type of injury to a child, or also to an adult, in the use of an easy-open can end occurs during discarding of the tear portion when it is picked up by the fingers. In easy-open can end construction now in use, the tear portion is a flat sheet of metal bounded by a sharp edge which results on severing the tear portion from the can end along a line of weakness. Thus, when the tear portion is grasped by the fingers, a frequent source of injury will be a cut finger due to contact with the sharp edge.

In efforts to make can ends safer, it has been proposed to use a plastic material in providing a seal or joint between the tear portion and the balance of the can end. Then, on severing the tear portion from the can end, the edge surrounding the tear portion would be of a soft plastic material. This suggestion has not been followed since there is no procedure presently known for mass producing a can end in which the joint between the tear portion and the balance of the can end is composed of a plastic.

Can ends are mass produced in great numbers from very thin metal stock. Thus, any practical solution to the problem of providing additional safety for children in the use of easy-open can ends must be consistent with manufacturing methods for mass producing can ends from thin metal stock.

SUMMARY OF THE INVENTION

The can end of the present invention provides an easy-open can end that is safer for use by children than previous can ends. Also, the present invention provides a method for producing safer easy-open can ends which readily lends itself to high speed mass production.

The present easy-open can end is similar to previous can ends in that it has a removable tear portion which is circumscribed by a rupturable line of weakness and a pull tab which is connected to the tear portion for removing the tear portion from the can end. However, the can end of the present invention employs a rib that projects from the inner surface of the tear portion which provides an upstanding wall that is positioned in contiguous relation to the line of weakness. Due to the shape of the sidewall and its position relative to the line of weakness, the sidewall provides shielding of the ruptured line of weakness. Thus, when the tear portion is removed from the can end by severing along the line of weakness, the edge of the removed tear portion is shielded by the sidewall from contact by the user.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, which are to be regarded as merely illustrative:

FIG. 1 is a plan view of one embodiment of the invention in which the outer sidewall of a rib projecting from the tear portion of a can end is located in contiguous relation to a line of weakness in the can end;

FIG. 2 is a sectional view of a can end taken along the lines 2—2 of FIG. 1;

FIG. 3 is a detailed view illustrating the edge of the tear portion shown in FIG. 2 after its removal from the can end;

FIG. 4 is a perspective view showing the stiffening provided by the rib projecting from the surface of the tear portion shown in FIG. 2 during its removal from the can end, and

FIG. 5 is a sectional view of another embodiment of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION

As shown in FIG. 1, a can end 2 is composed of a removable tear portion 6 having a pull tab 4 connected thereto. Turning to FIG. 2, which is a sectional view along the lines 2—2 of FIG. 1, the tear portion 6 is circumscribed by a score line 8 which defines a line of weakness in the can end. The can end 2 is connected in a conventional manner to a can body 10 by means of an overlapping seam in which an outer sheet portion 12 is folded over in interlocking relation with an upper sheet portion 14 of the can body.

A rib 16 depends downwardly from the tear portion 6 and defines an outer sidewall 18, an inner sidewall 20, and a joining wall 22 interconnecting the sidewalls. As shown, the outer sidewall 18 is so formed as to intersect the plane of the tear portion 6 at a location which is contiguous to the score line 8. An extension or projection of the surface of the outer sidewall 18 passes very close to the score line 8.

As shown in FIG. 3, the edge 24 of tear portion 6 lies in relatively close relation to a projection or an extension of the sloping outer sidewall 18. Thus, the edge 24 tends to blend into the sidewall 18 to form a relatively dull surface which is not a safety hazard to the user when the severed tear portion 6 is picked up by grasping its edges.

The rib 16 serves a dual purpose in the can ends of the present invention by providing additional rigidity and strength in the peripheral region of the tear portion 6 immediately adjacent to the score line 8. Thus, as the tear portion 6 is severed from the can end, as illustrated in FIG. 4, the tear portion has less tendency to bend. This provides a more uniform transfer of tearing force to the score line 8 as the tear portion 6 is lifted by the

pull tab 4 and a more uniform severing of the tear portion 6 to provide an edge 24 that lies very close to the surface of the outer sidewall 18.

Turning to FIG. 5, which is a sectional view similar to FIG. 2, a further embodiment is illustrated of a can end 25 having a tear portion 27 circumscribed by a score line 32. The can end 25 is connected to a can body 34 in a conventional manner, as described previously, by an overlapping seam formed between an outer sheet portion 36 of the can end and an upper sheet portion 40 of the can body. A downwardly depending rib 26 formed on the can end 25 has an outer sidewall 30, an inner sidewall 28 and an interconnecting joining wall 29. The score line 32 is formed on the upper surface of the can end in close proximity to the outer sidewall 30.

As illustrated, the inner sidewall 28 is sloped outwardly between the inner surface of the tear portion 27 and the joining wall 29 while the outer sidewall 30 is approximately vertical with respect to the plane of the can end 25. Thus, when the tear portion 27 is severed from the remainder of the can end along the score line 32, the outer edge of the tear portion is shielded by the rib 26. If, for example, a child were to lick the under side of the tear portion 27, the child's tongue would be deflected away from the outer edge through contact with the sloping inner sidewall 28. Since the outer sidewall 30 is vertically inclined with respect to the plane of the tear portion 27, there would be little likelihood that the child's tongue would follow around the surface of the rib 26 to come in contact with the cut edge of the tear portion.

I claim:

1. In an easy-open can end having a tear portion circumscribed by a line of weakness and a pull tab connected to said tear portion, the improvement comprising:
- a rib projecting from the inside surface of said tear portion;
- said rib having an upstanding sidewall positioned in contiguous relation to said line of weakness; and
- the shape of said sidewall providing shielding of said line of weakness,
- whereby the edge of said tear portion is shielded by said sidewall when said tear portion is removed from said can end by severing along said line of weakness.

2. The easy-open can end of claim 1 wherein
- said rib has an inner and an outer sidewall, and said outer sidewall is positioned in contiguous relation to said line of weakness to shield said line of weakness.

3. The easy-open can end of claim 2 wherein
- said outer sidewall slopes outwardly and intersects the plane of said tear portion closely adjacent to said line of weakness,
- and an extension of the surface of said sidewall approximately intersects said line of weakness,
- whereby the edge of said tear portion lies closely adjacent to an extension of said outer sidewall when said tear portion is removed from said can end by severing along said line of weakness.

4. In an easy-open can end having a tear portion circumscribed by a line of weakness and a pull tab connected to said tear portion, the improvement comprising:
- a rib projecting downwardly from the under surface of said tear portion;
- said rib having an inner sidewall and an outer sidewall;
- said outer sidewall positioned in contiguous relation to said line of weakness, and
- said outer sidewall having a shape which provides shielding of said line of weakness,
- whereby the edge of said tear portion is shielded by said outer sidewall when said tear portion is removed from said can end by severing along said line of weakness.

5. The easy-open can end of claim 4 wherein
- said line of weakness is a score line on the upper surface of said can end;
- said outer sidewall slopes outwardly and intersects the plane of said tear portion closely adjacent to said line of weakness, and
- the projection of the outer surface of said outer sidewall approximately intersects said score line,
- whereby the edge of said tear portion lies approximately on the projection of said outer sidewall when said tear portion is removed from said can end by severing along said line of weakness.

6. In an easy-open can end having a tear portion circumscribed by a line of weakness and a pull tab connected to said tear portion, the improvement comprising:
- a rib projecting from the inside surface of said tear portion;
- said rib having an inner sidewall and an outer sidewall;
- said outer sidewall sloped abruptly with respect to the plane of said tear portion and positioned in contiguous relation to said line of weakness, and
- said inner sidewall sloped gradually with respect to the plane of said tear portion.

7. The easy-open can end of claim 6 wherein said outer sidewall is approximately vertical with respect to the plane of said tear portion.

8. Easy opening metal food products can construction including a metal can body, an end wall, double seam means connecting the end wall to the can body; the end wall having a recessed corner located below the seam means; an end-panel-defining continuous score line formed in the end wall close to the recessed corner; pull tab means secured to the end panel for tearing the end panel from the end wall; a protective rib formed downwardly in the end wall and extending continuously around the end wall immediately within and adjacent the score line; the rib presenting an upwardly open channel-shape having outer and inner side walls and a connecting web wall; and the rib having an upwardly convex curved wall connecting the score line with the outer rib side wall; whereby the panel when torn from the end wall about said score line presents a dull edge.

9. A metal can end adapted to be seamed to a can body, the can end including an end wall having a seam flange and a recessed corner located below the seam flange, an end-panel-defining continuous score line formed in the end wall close to the recessed corner; pull tab means secured to the end panel for tearing the end panel from the end wall; a protective rib formed downwardly in the end wall and extending continuously around the end wall immediately within and adjacent the main score line; the rib presenting an upwardly open channel shape having outer and inner side walls and a connecting web wall; and the rib having an upwardly convex curved wall connecting the score line with the outer rib side wall; whereby the panel when torn from the end wall about said main score line presents a dull edge.

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