United States Patent

Franek et al.

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[54] **CAN ENDS**

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[52] **U.S. Cl.** **220/66,** 220/27

[51] **Int. Cl.** **B65d 7/42**

[58] **Field of Search** 220/66, 67, 54, 27; 113/121, 113/80

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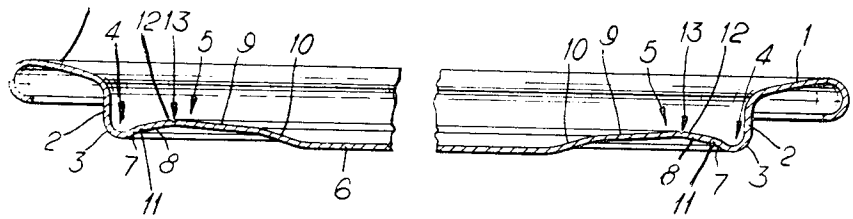
Primary Examiner—George T. Hall

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[57] **ABSTRACT**

A sheet metal end for a container has a chuck wall which fits in a container and a seam-forming panel by which the end is end seamed to the container. The lower end of the chuck wall merges into a radiused portion which defines a channel and in accordance with the invention the radiused portion merges into a raised zone of the end through contiguous first and second portions which slope upwards from the radiused portion to a third portion which is contiguous with the second portion and merges into a central portion of the end. The second portion slopes upwards less steeply than the first portion. The third portion may be connected with the central portion through a fourth portion which slopes downwards less steeply than the third portion. A score for easy opening may be provided in a convex portion connecting the second and third portions.

10 Claims, 3 Drawing Figures



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Fig. 1.

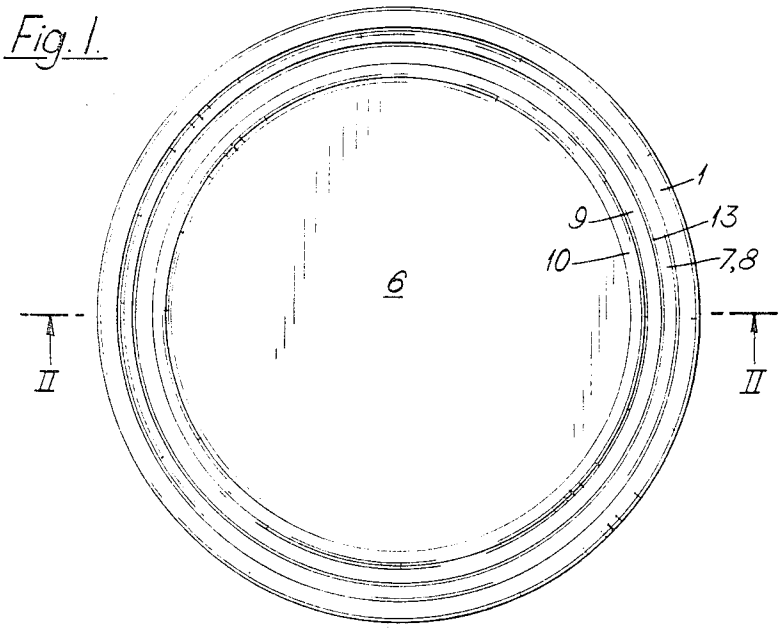


Fig. 2.

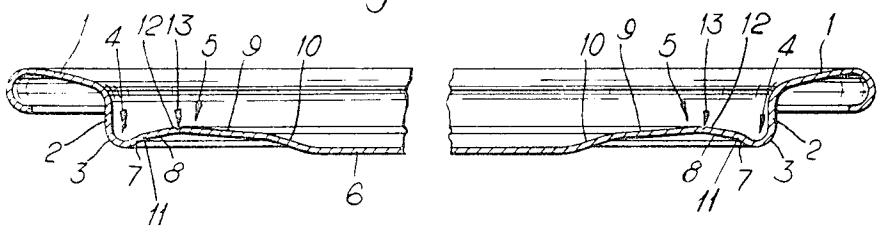
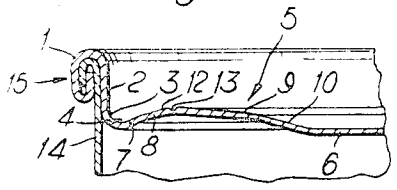


Fig. 3.



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BACKGROUND OF THE INVENTION

This invention relates to sheet metal ends for containers, the bodies of which may be made of metal, paperboard, or plastic material and may be of circular or of noncircular cross section.

The invention is particularly concerned with a container end of the kind which comprises a seam-forming panel which extends laterally from one end of a chuck wall, the opposite end of which merges into a radiused portion defining a channel, said radiused portion itself merging into a raised zone of the container end.

Objects of the invention are to provide a container end of the above-mentioned kind having, as compared with known container ends of the said kind, characteristics as follows:

a. improved resistance to peaking, this being the term given to the tendency for local distortion to occur when the end is subject to conditions of internal pressure in the container to which the end is applied;
b. improved resistance to distortion of a score line when this is provided to facilitate easy opening of the container by means of a pull tab attached to the end; and
c. the use of a minimum of material to form the end.

SUMMARY

According to the invention a container end of the kind above referred to is characterized in that the raised zone includes contiguous first and second portions which slope upwards from said radiused portion to a third portion of the raised zone contiguous with said second portion thereof, the third portion sloping downwards towards and merging into a central portion of the container end, said second portion sloping upwards less steeply than said first portion.

In one embodiment of the invention the length of the first portion, considered in the direction of slope thereof, is shorter than that of the second portion.

The junction between the first and second portions, and/or that between the second and third portions, is preferably effected by a convex portion of small radius.

When the end is to be of the easy opening kind a score is formed in the convex portion between the second and third portions, to facilitate opening by a pull tab attached to the end.

The invention also comprehends a container having an end thereof closed by the container end.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan of a container end according to the invention;

FIG. 2 is a broken view to an enlarged scale, in section on line II—II FIG. 1; and

FIG. 3 is a section through a part of a container an end of which is closed by the end illustrated in FIGS. 1 and 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1 and 2, the container end, which is made of any suitable sheet metal, for example from tinplate or aluminum, comprises a seam-forming panel 1, of known form, which extends laterally from one end of a chuck wall 2 the opposite end of which merges into a radiused portion 3 defining a channel 4. The portion 3 itself merges with a raised zone 5 of the container end, zone 5 being raised from the general plane of a central portion 6.

In accordance with the invention, the raised zone 5 includes contiguous first and second portions 7, 8 respectively which slope upwards from the radiused portion 3 to a third portion 9 contiguous with the second portion 8. The third portion 9 slopes downwards towards, and merges into, the central portion 6. As can be seen from FIG. 2, the second portion 8 slopes upwards less steeply than the first portion 7. In the embodiment shown in the drawings the third portion 9 is contiguous

with a fourth portion 10 which also slopes downwards towards the central portion 6 but which is more steeply inclined than is the third portion 9. The length of the first portion 7, considered in the direction of slope thereof, is in this example shorter than that of the second portion 8, (though it need not be shorter). The junction between the first and second portions 7 and 8 is effected by a convex portion 11 of small radius; similarly, the junction between the second and third portions 8 and 9 is effected by a convex portion 12 of small radius. Preferably, each said radius is of the order of 0.020 inch.

A container end constructed as just described is found to have an improved resistance to peaking as compared with known kinds of container ends.

When the container end is to be of the easy opening kind, a score 13 is provided in the convex portion 12 to facilitate easy opening of the container end by a pull tab, not shown, which may be of any suitable kind attached to the container end.

We have found that this form of container end offers, as compared with known kinds of container ends, an improved resistance to distortion of the convex portion 12 when the container end is for example dropped, or subjected to pressure inside the container to which the end has been applied. Further, we have found that this form of the container end is such that it can be satisfactorily handled by appropriate machinery; that it can be stored conveniently; and that it can be subjected to heat and other treatments required for sterilization without adverse consequences thereon due to pressures inside the container or other thermal effects.

FIG. 3 illustrates a part of one end of a container 14 closed by the container end described with reference to FIGS. 1 and 2, the end being secured to the container by a conventional double end seam 15.

When the container end is to be of the easy opening kind, the pull tab, not shown, is arranged to lie wholly below the level of the top of the finished seam 15.

The container end is formed by apparatus (not shown in the drawings) including a punch plug, shaped to form the top surface of the end and cooperating with a die shaped to form the bottom surface.

The following considerations are among those governing the radius of the portion 3 and the slopes and lengths of the first and second portions 7 and 8. First, it is required to protect the convex portion 12 as much as possible from distortion due to any accidental deformation of the finished seam 15. This is achieved by making the radiused portion 3 and convex portion 11 such that they will deform comparatively easily in the manner of hinges, in response to the deformation of the seam 15. For this reason the radius of the portion 3 and the radius of the portion 11 are made as small as possible. This "hinging" effect is enhanced by making the length and slopes of the portion 7 and 8 as great as possible.

The second requirement is that of maximum possible peaking resistance, and this is achieved by making the radius of portion 3 as small as possible and the slope of the portion 7 as great as possible.

However, the radius of portion 3 must be large enough to satisfy practical limitations on surface strain and the need to preserve the integrity of any lacquered surface on the inside of the container end. In addition, the slope of the portion 7 is limited by the need for that part of the punch plug which forms the channel 4, and of the corresponding part of a seaming chuck used subsequently, to have sufficient mechanical strength. The length and slopes of the portions 7 and 8 are also limited by the desirability of using a minimum of material in their formation.

A further requirement limiting the length and slopes of the portions 7 and 8 is that of restricting the height of the convex portion 12 above the bottom of the channel 4. Additionally, in the case of a scored end, there is a minimum safe radial distance between the score line 13 and chuck wall 2 and the design must be such that this requirement also is satisfied.

In the drawings the container end is shown as being circular; the container end may, however, as mentioned above, be non-circular.

We claim:

1. A sheet metal end for a container, comprising a seam-forming panel extending laterally from one end of a chuck wall the opposite end of which merges into a radiused portion defining a channel, said radiused portion itself merging into a raised zone of the container end, characterized in that the raised zone includes contiguous first and second portions which slope upwards from the said radiused portion to a third portion of the raised zone contiguous with said second portion thereof, the third portion sloping downwards towards and merging into a central portion of the container end, said second portion sloping upwards less steeply than said first portion.

2. A container end according to claim 1, wherein the length of the first portion considered in the direction of slope thereof is shorter than that of the second portion.

3. A container end according to claim 1, wherein the third portion is connected with the central portion by a fourth portion which slopes downwards to the central portion from the third portion with a slope which is more steep than that of the third portion.

4. A container end according to claim 1, wherein the junction between the first and second portions is effected by a convex portion of small radius.

5. A container end according to claim 1, wherein the junction between the second and third portions is effected by a convex portion of small radius.

6. A container end according to claim 5, wherein a score is formed in the convex portion between the second and third portions to facilitate easy opening of the end by a pull tab attached thereto.

7. A container end according to claim 1, wherein the junctions between the first and second portions and the second and third portions are effected by convex portions of small radius.

8. A container end according to claim 7, wherein a score is formed in the convex portion between the second and third portions to facilitate easy opening of the end by a pull tab attached thereto.

9. A container end according to claim 7, wherein the length of the first portion considered in the direction of slope thereof is shorter than that of the second portion.

10. A container end according to claim 9, wherein the third portion is connected with the central portion by a fourth portion which slopes downwards to the central portion from the third portion with a slope which is more steep than that of the third portion.

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