

[54] CONTAINER END AND FORMING METHOD

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[51] Int. Cl. B21d 51/26

[58] Field of Search 113/121 C, 15 A, 15 R;
220/54, 90.6

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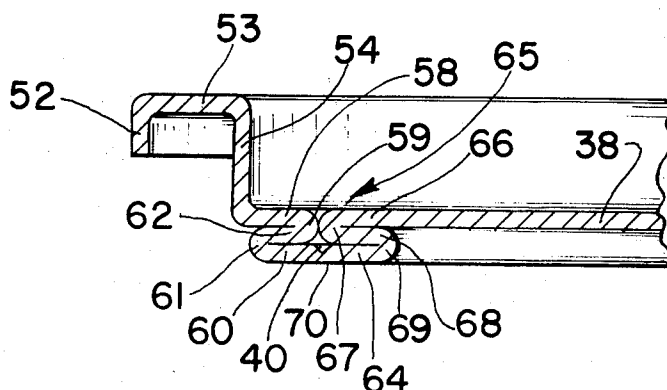
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[57] ABSTRACT

This invention relates to a can end construction wherein two folded countersink portions are provided in opposed contiguous relationship to each other and the connecting portion bridging such countersinks is weakened as by scoring. When the weakened score is ruptured thus removing the central panel, both the raw edges formed by such rupture are in part protected by folded portions of each respective countersink. Contacting portions of the opposed countersinks also may overly and protect the scored line as well.

3 Claims, 7 Drawing Figures



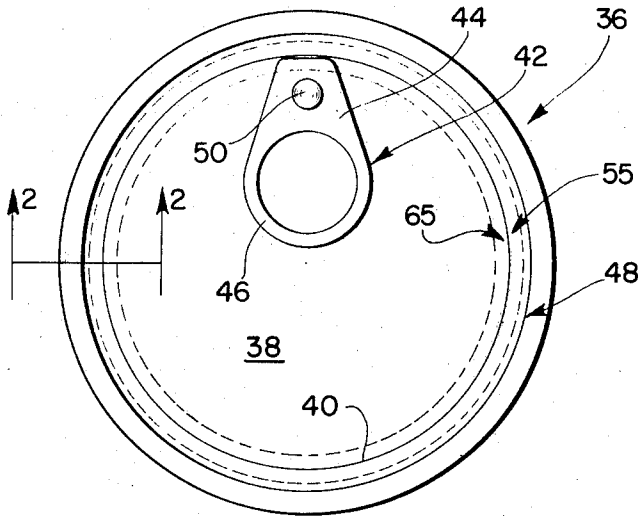


FIG. 1

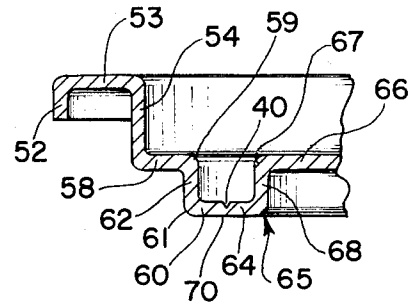


FIG. 3

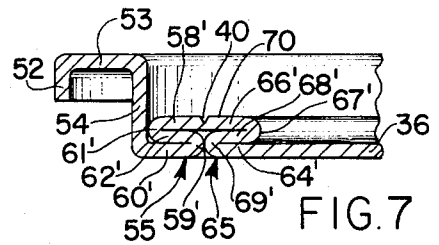


FIG. 7

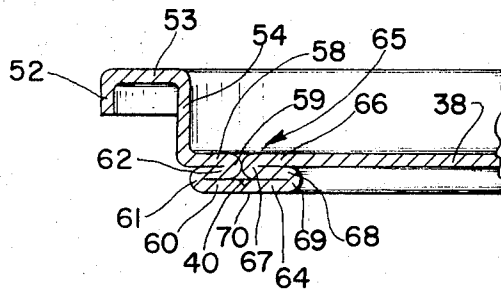


FIG. 2

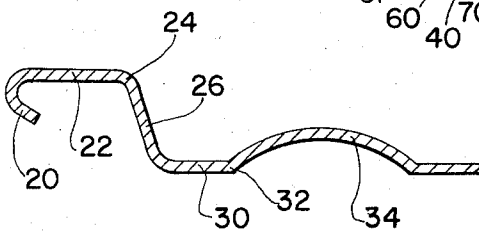


FIG. 5

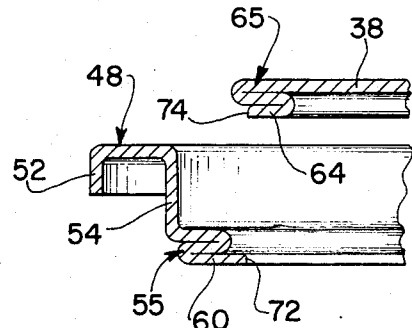


FIG. 6

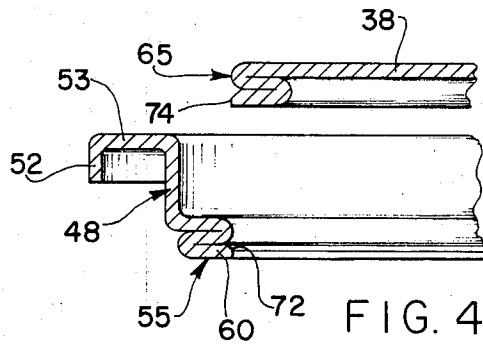


FIG. 4

CONTAINER END AND FORMING METHOD

BACKGROUND OF THE INVENTION

The present invention generally relates to a can end, and more particularly to a can end in which that portion of the end commonly known as the countersink or the chuck wall portion of the end is of greater than single-ply thickness, resulting in a can end sometimes referred to herein as a "folded countersink end." Such folded countersink constructions are known and have been utilized primarily in the past with closures formed of weaker materials, such as aluminum or thinner gage tin plate so that such may be more readily pierced by a can opener. Such closures were previously subject to buckling ie permanent deformation of the closure at the periphery of its central panel adjacent to the double seam when subject to the pressure generated within a can containing a product such as beer or carbonated beverages. Container ends having such folded countersink constructions are known and disclosed in such prior art publications as U.S. Pats. Nos. 1,146,327, dated July 13, 1915; 2,700,355, dated Jan. 25, 1955; and 3,186,583, dated June 1, 1965 and which names the present inventor A. P. Zundel as patentee.

It has also been proposed in line with the recent trend toward consumer convenience features which has arisen in all fields of merchandising, to provide easy open containers of the folded countersink construction, wherein a manually removable section is incorporated in the countersink center panel of the top end member. One such construction is shown in U.S. Pat. No. 3,303,958 issued Feb. 14, 1967 to W. E. Taylor. In such proposed construction, the removable section is defined by a score line which, when ruptured during the opening operation, produces raw edges which remain on both the container and the removed closure portion. While the raw edge so produced on the closure end portion remaining on the container by reason of its connection by the double seam is protected by reason of its alignment and shielding by the folded countersink portion, the raw edge present on the detached portion of the closure remains unprotected.

This unprotected raw edge frequently is objectionable in that it has a tendency to cut the hand of the consumer and more particularly if the user of the container is a child then more seriously the tendency is present for the child to lick contents such as puddings, toppings, fruits, desserts, etc., remaining on the underside of the container closure therefrom and thus present the possibility of tongue, lip and mouth injuries to such child. To some extent this problem has been alleviated through educational programs and warning notices placed on the containers by the food packers and the manufacturers supplying such containers but the presence of such raw edge remains of concern to such enterprises. It is also possible that such ends once discarded may be later picked up or otherwise encountered, e.g., in recycling or sanitary land fill procedures and accordingly present a secondary hazard in this manner.

SUMMARY OF THE PRESENT INVENTION

The present invention solves these problems by simultaneously providing a multi-layered fold in the container end which fold is located relative to both the periphery of the container end remaining section and the

periphery of the scored removable section so that not only the raw edge remaining on the container is protected, but further the raw edge remaining on the removable container closure is protected as well. Such protection is brought about by shielding effect produced by disposing folded portions of the present novel end construction in overlying or underlying relationship with the raw edge portions produced by the complete opening thereof.

An object of the invention, therefore, is the provision of a scored easy open container end which is constructed so as to prevent injury to both the hand and oral regions of the consumer after the container has been opened.

A further object is the provision of such a container end wherein the raw edge present on the periphery of a container closure which is produced when the container is opened is effectively shielded by an adjacent folded portion of the closure.

Still another object of the present invention is the development of a high speed, reliable and low cost production process for the formation of the novel container closure construction of the present invention.

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 drawing, discloses preferred embodiments thereof.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a plan view of the container end embodying the principles of the present invention;

FIG. 2 is a cross-sectional view on an enlarged scale taken along the line 2—2 in FIG. 1;

FIG. 3 is a cross-sectional view on an enlarged scale of that portion of the container end shown in FIG. 2 and shows an intermediate step in the process of forming the container end construction shown in FIG. 1 and FIG. 2 of the drawing;

FIG. 4 is a cross-sectional view similar to FIG. 2, but wherein the removable panel of the container end has been severed from that portion designed to remain attached to a container body;

FIG. 5 is a schematic view of a can end, showing various regions of the can end for purposes of illustrating the common terminology applicable to portions of can ends;

FIG. 6 is a cross-sectional view similar to FIG. 4, but showing a modified form of the invention; and

FIG. 7 is a cross-sectional view similar to FIG. 2, but showing a modified form of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Before referring to the invention in greater detail, a number of terms to be used herein will be defined, it being understood that such terms are conventional and well known to those skilled in the can making art. In considering a conventional can end before the same is affixed, by means of a conventional double seam, to the end of a container, the following terms are used, and the areas to which these terms refer are illustrated by the numbers shown in FIG. 5.

Thus, the outermost curve is referred to as the curl 20 and proceeding inwardly as shown in FIG. 5, the following areas respectively are encountered: a seaming panel 22, a seaming panel radius 24, a chuck wall 26,

a chuck wall radius 28, a chuck panel 30, a chuck panel radius 32, and a bead 34. It will thus be understood that portions of such construction conventional, namely the bead 34, may be eliminated when utilizing the construction of the present invention.

Referring now in greater detail to the drawing, FIG. 1 shows a can end 36 attached to a conventional cylindrical can body by means of a conventional double seam construction. The can end 36 is provided with a central panel 38 which is designed for complete removal from the container to which the can end is joined. The periphery of the central panel 38 is defined by a circular score line or weakened portion 40 formed in the can end 36 in a manner which will be hereinafter more fully brought out. A ring pull 42 is affixed to the central panel 38 and is positioned so that the point 44 thereof is located slightly above end line with a segment of the score line 40 so that an upward pivotal pull on a direction towards the edge of the container on the ring portion 46 of the ring pull 42 will force the point 44 through the remaining portions of the score line and thus initially and partially sever the central panel 38 from the peripheral ring portion 48 of the can end 36. Subsequent direct upward force on the ring pull serves to completely sever the central panel 38 from ring portion 48. The ring pull is attached to the central panel by means of a rivet 50 as is well known in the art.

The peripheral ring portion 48 is composed of a curl 52 and a seaming panel 53 contiguous thereto and which together with peripheral portion of the container will form the means by which the can end 36 is double seamed to the container. Connected to the seaming panel 53 is a first countersink 55 by means of a chuck wall 54. Such countersink 55 may be located directly beneath the chuck wall 54 as shown thus assuring proximate positioning thereof to the container wall or may be alternatively spaced therefrom by a connecting portion (not shown) of the peripheral ring portion 48.

The countersink 55 includes an upper run 58 and a lower run 60 connected to each other by means of an intermediate or reverse run 62. The U-shaped connecting portions joining runs 58 and 60 to run 62 are respectively designated as folds 59 and 61. The runs 58, 62 and 60 are disposed in generally parallel planes directed generally normal to the plane of the chuck wall 54 and further being generally parallel with the major extent of the can end 36. Runs 58 and 62 and runs 62 and 60 respectively are also in closed contact with each other.

The lower run 60 in turn extends inwardly of the first countersink and in part forms the lower run 64 of a second countersink 65 which in turn is located inwardly of countersink 55 and in opposed position thereto. Countersink 65 includes in addition to lower run 64 an upper run 66 and an intermediate or reverse run 68 interconnected to each other by means of a U-shaped fold 67. Such reverse run 68 is in turn connected to the lower run 64 by means of a U-shaped fold 69.

Turning now to FIG. 7 of the drawing a modified form of the invention is shown wherein the uninterrupted connecting portion 70 joining the separate countersinks 55 and 65 from each other is disposed uppermost in contrast to its lowermost disposition in FIG. 2 of the drawing. In such modified form the countersink 55 includes an upper run 58' and a lower run 60' connected to each other by means of an intermediate or reverse run 62'. The U-shaped connecting portions

joining runs 58' and 60' to run 62' are respectively designated as folds 59' and 61'. The runs 58', 62', and 60' are disposed in generally parallel planes directed generally normal to the plane of the chuck wall 54 and further being generally parallel with the major extent of the can end 36. Runs 58' and 62' and runs 62' and 60' respectively are also in closed contact with each other.

The upper run 58' in turn extends inwardly of the first countersink and in part forms the upper run 66' of a second countersink 65 which in turn is located inwardly of countersink 55 and in opposed position thereto. Countersink 65 includes in addition to upper run 66' includes a lower run 64' and an intermediate or reverse run 68' interconnected to each other by means of a U-shaped fold 67'. Such reverse run 68' is in turn connected to the lower run 64' by means of a U-shaped fold 69'.

The disposition of the countersinks 55 and 65 is such that their respective lower runs 60 and 64 in the form of the invention shown in FIG. 2 and respective upper runs 58' and 66' in the form of the invention shown in FIG. 7 form an essentially straight uninterrupted connecting portion 70 between the two countersinks. The score line 40 is provided in the connecting portion 70 and located intermediate thereof and as previously described comprises the mechanism by which the ring portion 48 and central panel 38 segments of the can end 36 are separated from each other. Such separation which occurs by the breaking of those remaining portions of connecting portion 70 lying opposite the score 40 also necessarily separates countersinks 55 and 65 from each other, countersink 55 remaining with the container and countersink 65 remaining with the removable portion of the can end.

The tearing of score 40 results in raw edges 72 and 84 being formed at the terminal points of lower runs 60 and 64 respectively as best shown by FIG. 4 of the drawing. It should be pointed out that severing of the score 40 in the modified form of the invention shown in FIG. 7 of the drawing also results in raw edges 72 and 74 produced at the terminal points of upper runs 58' and 66' respectively. Such raw edges, however, by reason of their proximate positioning to folds 59 or 59' and 67 or 67' respectively are protected thereby. Thus in any contact across the severed portion of either the peripheral ring portion 48 of the container as by reaching into the container to spoon out contents or the central panel 38 as by scraping any contents adhering thereto therefrom, the potential for cutting injury to the user is eliminated or its severity effectively reduced by the shielding effect of the folds 59 or 59' and 67 or 67' respectively.

Turning now to FIG. 3 of the drawing, the novel method by which one form of double countersink end is produced is best shown. FIG. 3 depicts a portion of a can end blank prior to folding into the configuration of FIG. 2 wherein the metal constituting the blank has been partially shaped so as to present a generally vertical orientation to the intermediate or connecting runs 62 and 68 of countersinks 55 and 65 respectively while permitting connecting portion 70 to remain essentially horizontally. This intermediate configuration permits horizontal tooling support of and ready vertical access to the connecting portion 70 and thus enables scoring tooling to produce score 40 therein without reducing high speed sequential formation of the present can end construction. The can blank after scoring in score 40

and as shown in FIG. 3 is then folded into the configuration shown in FIG. 4 in a further step of a multiple station metal forming press which are commercially available. While no detailed description of the intermediate configuration necessary for the production of the embodiment depicted in FIG. 7 of the drawing is included, it should be brought out that such is essentially similar to that shown in FIG. 3 except that the connecting portion 70 is upwardly stepped from the main surface of the can end 36.

It should be pointed out that such configuration also permits the score 40 to be formed anywhere along the intermediate extent of connecting portion 70, thus enabling more or less protection to be given to either of the raw edges produced upon opening. Thus if it is desired to more completely protect the raw edge 74 remaining on the removable central panel 38 then the score 40 may be shifted to the right of its central portion depicted in the drawings and such alternate position would in turn place protecting fold 67 outwardly of raw edge 74 as shown in FIG. 6 of the drawing. This construction is particularly useful in conjunction with individual serving pudding cans and the like wherein there is a greater likelihood of cutting occurring from the removed end than that portion of the end remaining attached to the container.

Another important feature of the invention is the protection afforded the score 40 by the overlying positioning of upper runs 58 and 66 wherein the folds 59 and 67 thereof are brought into intimate contact with each other upon the bending or crushing of the can blank shown in FIG. 3 to the completed end construction shown in FIG. 4. Such bending action may also include a deformation of the folds 59 and 67 so as to assure intimate engagement there between and thus provide protection to the score 40 from dirt, corrosive or weakening atmospheric conditions, and direct physical shock from shipment and handling.

It is thus apparent that the present can end construction and its novel method of production meet the objects of the inventions set out herein above and that the can end construction affords a considerable edge in safety over prior art constructions and furthermore presents a more aesthetically pleasing and functionally stronger and cleaner end.

It is apparent that the various modifications above described and shown e.g. score line placement, apply equally in regard to the embodiments shown in FIGS. 2 and 7 of the drawing. It will also be apparent that various changes may be made in the form, construction and arrangement of the preferred embodiments dis-

closed herein, may be made without departing from the spirit and scope of the invention as set forth and claimed as follows.

I claim:

1. The method of forming a container having a central removable panel comprising; partially forming a can end blank into a configuration comprising a horizontal curl portion around the periphery thereof, a vertical seaming wall connected to an inner edge of said curl portion, a horizontal first upper run, a first vertical intermediate run connected thereto at a first foldable corner, a horizontal lower run in turn connected at one end thereof to said first intermediate run, a second vertical intermediate run connected to the other end of said lower run, said second intermediate run in turn connected to a horizontal second upper run, at a second foldable corner, forming a weakened line in said lower run intermediate opposite edges thereof and thereafter; deforming said first and second vertical intermediate runs so that said intermediate runs are generally parallel to said horizontal lower run on one side thereof and said first and second foldable corners are located in close proximity to said weakened line on opposite sides thereof.

2. The method set forth in claim 1 wherein said weakened line is formed in the upper portion of said lower run and wherein said reforming crushes said first and second foldable corners into deformed contact with each other and overlying said weakened line.

3. The method of forming a container having a central removable panel comprising; partially forming a can end blank into a configuration comprising a horizontal curl portion around the periphery thereof, a vertical seaming wall connected to an inner edge of said curl portion, a horizontal first lower run, a first vertical intermediate run connected thereto at a first foldable corner, a horizontal upper run in turn connected at one end thereof to said first intermediate run, a second vertical intermediate run connected to the other end of said upper run, said second intermediate run in turn connected to a horizontal second lower run, at a second foldable corner; forming a weakened line in said upper run intermediate opposite edges thereof and thereafter; deforming said first and second vertical intermediate runs so that said intermediate runs are generally parallel to said horizontal upper run on one side thereof and said first and second foldable corners are located in close proximity to said weakened line on opposite sides thereof.

* * * * *

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