Nov. 10, 1964 A. P. SCHOLTZ 3,156,374

CAN MACHINE AND METHOD

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Fig. 1.

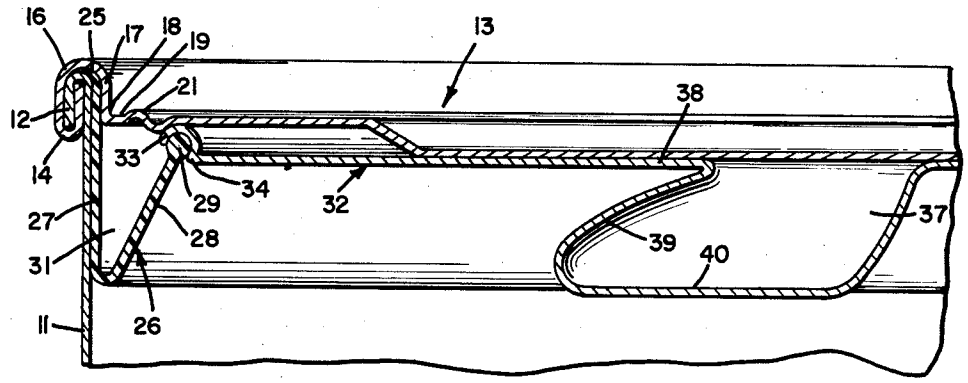
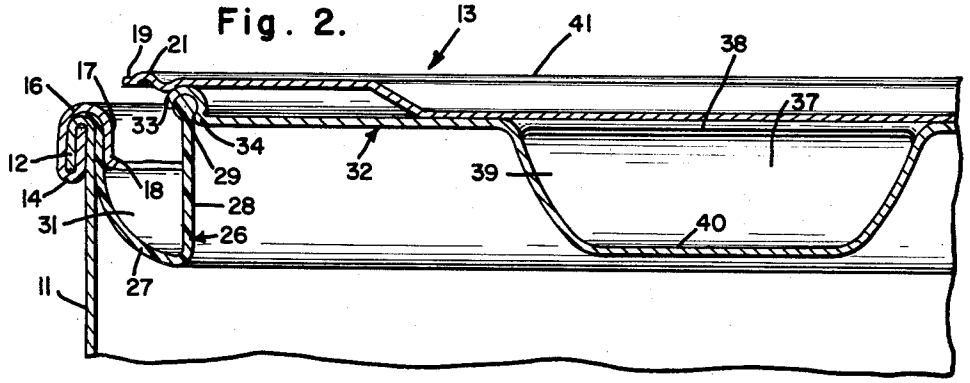


Fig. 2.



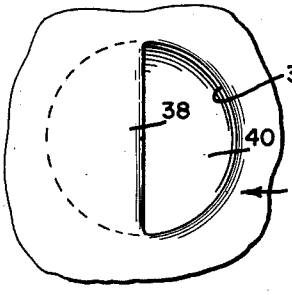


Fig. 3.

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CAN MACHINE AND METHOD

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Fig. 4.

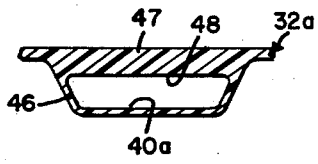


Fig. 4a.

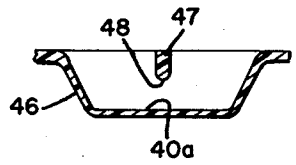


Fig. 7.

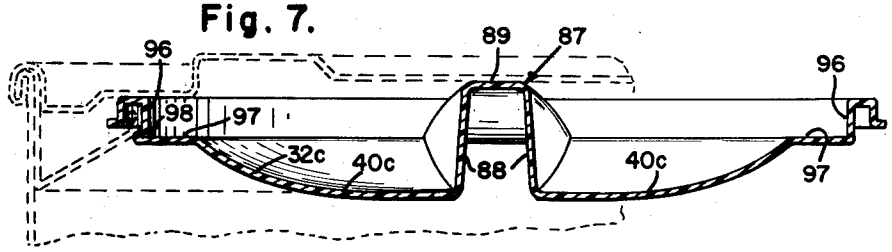
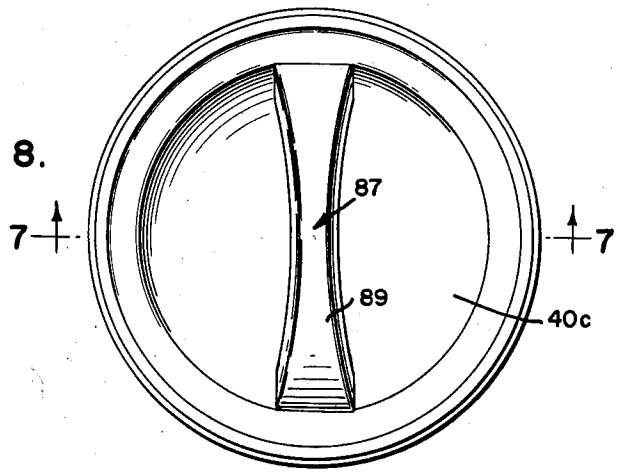


Fig. 8.



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Fig. 5.

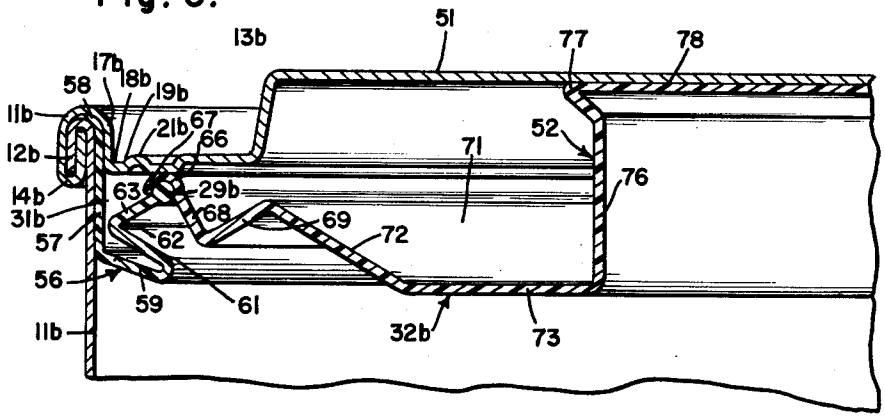
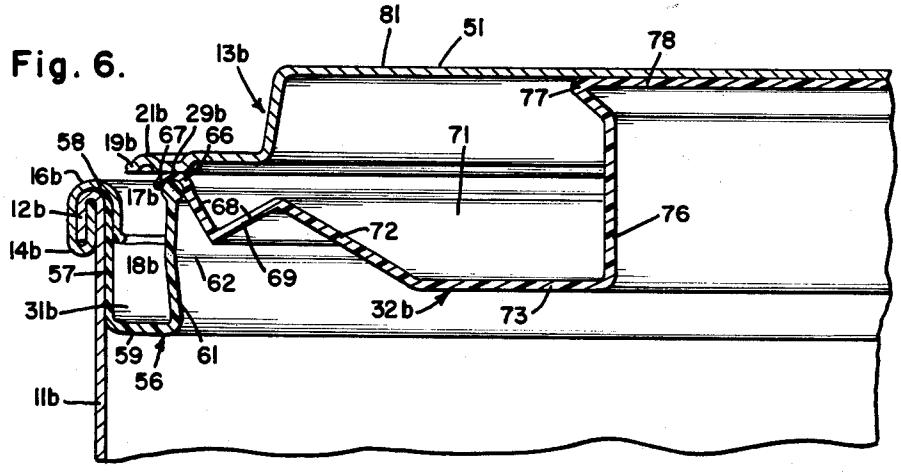


Fig. 6.



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United States Patent Office 3,156,374 Patented Nov. 10, 1964

3,156,374

CAN MACHINE AND METHOD

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Filed May 8, 1961, Ser. No. 123,331
12 Claims. (Cl. 220—29)

This invention relates to a new and improved can construction, and more particularly to a can having an internal collar fitted with a reclosure cap, the can being initially closed with an end over both collar and cap. When the end is removed, as with a can opener, access is obtained to the reclosure cap, which may be removed and reapplied as frequently as desired until the contents of the can are dispensed.

A particular feature of the present invention is the fact that the collar and cap exert upward pressure on the end, which has a number of advantages. During the time prior to removal of the end, the outward pressure prevents the end from bending inward. Further, the construction of the various parts is such that the pressure is applied at least in part at the annular zone where the cap fits on the collar, thus overcoming any tendency for the contents of the can to leak into the headspace above the cap. After the end is severed the pressure raises the cut disc so that it is conveniently removed without danger to the fingers. Further, the cap and that portion which is used to lift the cap are raised to a position where they are readily accessible.

In prior developments in this general field, the collar has been formed of relatively rigid metal or inflexible plastic while the cap or its lift knob or both cap and knob have been formed of a resilient material, such as certain plastics. The present invention is characterized by the fact that the collar is formed of a resilient material, such as a plastic, and the cap may be rigid or flexible.

One advantage of the foregoing construction is a reduction of wastage of material. If the collar is formed of metal, the center of a blank disc must be punched out and, further, the discs must be punched from strips and the space between discs wasted. However, where collars are formed of plastic they may be molded to final shape or a close approximation thereof.

Another advantage of the construction of this invention is a reduction in the complexity of the cap construction and particularly of the lifting means thereof. Further, the plastic material for a relatively rigid cap is generally less expensive than where the cap is flexible.

Still another feature of the present invention is the lifting means for the cap. A central depression is formed in the cap and a cross bar fitted to traverse the depression. Thus the fingers may be inserted under the cross bar and the cap lifted.

A further feature of the invention is the cooperating means on the collar and cap which interfit to hold the cap in place. By reason of the resiliency of the collar a simplified construction may be used consisting of an inwardly curled edge on the cap which snaps over an outwardly biased terminal bead on the collar.

Still another feature of the invention is the provision of a space between the reclosure cap and the can end, which space may be used for advertising circulars or premiums, directions for use of the contents of the can, or other purposes. A small package of additive such as a coloring material or flavor may be placed in the space between the cap and the end to be added to the contents of the can by the consumer as desired.

Further, it will be understood that a premium or the like may be inserted in the head space above the reclosure cap and need not be provided with a sanitary wrapping since it is isolated from the contents of the can.

A still further feature of the invention is the fact that a hermetic seal may be achieved between the headspace and the body of the can. Alternatively, communication may be maintained between the two areas so that the entire can may be vacuumized or gassed; on the other hand, only one of these areas may be so treated.

Still another object of the invention is to provide a can having reclosure means in which the entire interior of the can in contact with the contents may be enameled to prevent raw metal affecting the taste, odor or appearance of the contents.

A particular object and advantage of the invention is the fact that the can end may be severed easily and without leaving ragged, dangerous metal edges. The can may be opened with any known can opener. Even the punch-and-cut blade type can opener operates well with this construction. The angle at which the used holds the blade is not so critical for proper cutting because the shape of the end and the collar direct the blade toward the proper angle. Further, the blade does not tend to go too deep because it contacts the collar and this eliminates one of the principal reasons for ragged edges in the use of punch-and-cut can openers.

A still further advantage of the end construction herein described is the improvement in the end seam achieved by this construction.

Heretofore, various types of reclosure cans have been developed. In many of such constructions the cylindrical wall of the can is opened, as by means of a tear strip opened with a key, and cooperating means provided on the can body and the portion of the body originally above the tear strip and/or the can end itself for reclosure. Such constructions have the disadvantages inherent in key opening cans, such as high cost of manufacture and inconvenience to the consumer in opening the can. They have additional disadvantages in that sealing on reclosure is either ineffective or difficult from an operational standpoint.

In other prior constructions the top of the cylindrical body wall is deformed, as by the rolling of deep beads and the can end likewise deformed by stamping or drawing deep depressions which fit inside and seal against the bead. Thus when the end is cut by a can opener reclosure may be accomplished by pressing the end downwardly until the depression seats against the bead. Such constructions raise serious manufacturing obstacles. Further, because of lack of rigidity of the end, repeated reclosure of the end is not feasible. Another disadvantage of such constructions resides in the fact that the inside diameter of the bead must necessarily be almost as great as the can body diameter, which does not leave much room for the user to pry the end out of the bead and hence further contributes to the inconvenience of use. Additionally, the exposure of the raw edge of the severed end is a hazard to the fingers of the user.

Other prior constructions employ snap-on or friction outer ends, which prevent hermetic sealing of the can and make sterilization of the contents after sealing impossible.

A still further prior construction employs a ring held in the double seam between the end and body and having a central perforation or aperture in which fits a friction plug-type reclosure cap. Removal of such caps requires use of a prying instrument of some type and is generally time and effort consuming. Further, if a tight seal is to be accomplished, considerable force is required to push the cap into the aperture which necessitates a rugged construction and increases the cost of materials and manufacture. The effectiveness of making an air-tight reclosure seal is also less in this type construction than in that hereinafter described.

Accordingly, the present invention affords important advantages over prior reclosure can constructions without material increase in the cost of construction thereof.

Other objects of the present invention will become apparent upon reading the following specification and referring to the accompanying drawings in which similar characters of reference represent corresponding parts in each of the several views.

In the drawings:

FIG. 1 is a fragmentary vertical sectional view of the upper part of a can constructed in accordance with this invention, showing the parts in assembled condition.

FIG. 2 is a view similar to FIG. 1, showing the can end severed and further showing the parts rotated 90° about the axis of the can.

FIG. 3 is a reduced scale fragmentary top plan view showing the lifting means for the cap.

FIG. 4 is a fragmentary vertical sectional view through the center of a modified cap showing a modified lift construction.

FIG. 4*a* is a view similar to FIG. 4, showing the parts rotated 90° about the axis of the cap.

FIG. 5 is a fragmentary vertical sectional view of the upper part of a modified can constructed in accordance with this invention, showing the parts in assembled position.

FIG. 6 is a view similar to FIG. 5, showing the can end severed and further showing the parts rotated 90° about the axis of the can.

FIG. 7 is a sectional view taken along line 7—7 of FIG. 8 and showing a further modified cap construction.

FIG. 8 is a top plan view of the cap of FIG. 7.

The present invention is used with a conventional can having a body 11 formed of a cylinder joined in a side seam (not shown) having an outwardly flared flange 12. A can end 13 has a peripheral inverted trough 14 usually containing a sealing compound (not shown) which fits over the flange 12 and is double seamed thereon to form a conventional end bead 16. It will be understood that in place of the well-known sanitary can construction illustrated and described, other means for attachment of the end to the body may be used.

The shape of the end illustrated herein has certain advantages, although plain ends and other shape ends may be used. Thus, inwardly of bead 16 the end is formed with a short cylindrical wall 17 inside the can body and having at its bottom a rather exaggerated radius 18 and, proceeding inwardly, a ring depression 19 and a ring bead 21. Such construction improves the end seam. Further, the depressed ring 19 and bead 21 tend to locate the blade of the can opener in proper position, namely, at the bottom of the ring 19 and to prevent the blade from being displaced from such portion as it traverses the can. Thus the angle at which the user holds the blade is not critical. Such positioning of the blade is particularly important where the "punch-and-lift" blade-type can opener is used. Further, the collar 26 is located in such position that it is not normally contacted by the can opener blade. However, if it is so contacted, the collar tends to prevent the blade from penetrating downwardly too deeply and puncturing the collar. Further, by reason of the slant of surface 28 the blade is directed toward the outside of the can and thus directed away from the plastic 28 which is more readily injured than the collar 26. The shape of the end 13 improves the seam which can be attained. End 13 may be formed with a central countersunk portion 22 which bears against the central portion of reclosure cap 32. A flat end or a domed end such as illustrated in FIG. 5 may be used.

Collar 26 is secured between the body 11 and end 13 by various means. As herein illustrated, collar 26 has a top peripheral flange 25 which fits partially over flange 12 and is gripped between flange 12 and trough 14 and thus locked in place by the double seam. Below flange 25 the collar has a relatively high wall 27 immediately inside the body 11 in the assembled position of the parts as illustrated in FIG. 1. From the bottom of wall 27, collar 26 slants upwardly inwardly in a stretch 28 which terminates in a bead 29 having a sufficient diameter to

provide easy access to the interior of the can. It will be noted that a trough 31 is formed between wall 27 and slanted stretch 28 which collects particles of metal created when the end 13 is cut by a can opener. The depth of wall 27 is such that the collar is not punctured by the blade of a can opener. Further, if the blade of a punch-and-cut type can opener tends to penetrate too deep or to slant inwardly, the collar 26 tends to direct the blade to a proper depth and angle, thereby preventing ragged edges of metal.

Collar 26 is preferably of a resilient material which is compressed to the position of FIG. 1 when the end 13 is applied but which tends to assume the position of FIG. 2 when the pressure of the end is released. For such purpose, a plastic material such as polyethylene or polystyrene has been found desirable, but other types of plastics may be used.

Cap 32 fits over the inner edge of collar 26. Various means may be used detachably to hold the cap on the collar. Terminal bead 29, although optional, makes it possible to snap on cap 32. Thus cap 32 has a peripheral downward and slightly inward curl 33 having the same inside radius as bead 29. By reason of the resiliency of collar 26 a good fit is readily attained. Inward of curl 33, cap 32 may be formed with an outward projecting shoulder 34 which snaps under bead 29 to hold cap 32 in place. A central depression 37 is formed in the cap and an integral, semi-circular disc 38 extends transversely across the depression 37. Disc 38 has a downward-outward curved and slanted wall 39 which merges with bottom 40 of depression 37. The user's fingers may be curled under disc 38 for removal and replacement of the cap. Other lift means may also be used.

Cap 32 is preferably of a more rigid material than collar 26 and may be constructed of metal such as tinplate and aluminum, or of any rigid or semi-rigid plastic.

In the assembled position of the can shown in FIG. 1, upward pressure is applied to end 13 at the zone above curl 33 and also around the edge of depression 37. This tends to prevent the end 13 from bowing inward. Further, the pressure of end 13 on curl 33 tends to maintain a tight fit of the cap on the collar and prevent leakage between the interior of the can and the head space above the cap.

When the end is cut by a can opener, release of pressure allows the collar 26 to expand to the shape of FIG. 2. This lifts the severed end disc 41 so that it may be taken away without danger to the fingers or need to pry the end disc 41 out of the can. In the position of FIG. 2 the lift means, such as disc 38, is raised to the top of the can and may be reached without inserting the fingers inside the can.

In FIGS. 4 and 4*a* there is shown a modified lifting means for the cap 32*a*. Thus a central, substantially circular depression 40*a* is formed in the center of the cap having downwardly-inwardly curbed walls 46. Extending diametrically across the depression is a thin integral bar 47 which is cut away in an aperture 48 at the bottom to permit the user's fingers to curl under bar 47 to facilitate lifting and replacing the cap.

In FIGS. 7 and 8 is shown a further modified cap. A central depression 40*c* formed with a large radius of curvature is located in the center of cap 32*c*. A pinch-type cross bar 87 extends diametrically across depression 40*c*, being formed with upstanding sides 88 joined by top 89. Sides 88 slant upwardly-inwardly. Further, they diverge outwardly in plan from the center to each end, being farther apart at the outside than at the center. Top 89 is crowned in a large radius of curvature so that at the center top 89 is higher than at either end. The user pinches sides 88 together with thumb and fingers to lift or replace the cap. If sides 88 are made sufficiently thin and the cap is of a flexible material the entire cap bends slightly upwardly when pinched, the deformation of the cap facilitating snapping on or off the container collar. The details of the construction of the cap externally of

depression 40*c* are subject to considerable modification. In the form shown herein there is provided a horizontal annular shoulder 91 which rests upon the bead 92 of collar 93. Externally of shoulder 91 is a short skirt 94 which fits outside bead 92. On the internal edge of shoulder 91 is a short vertical wall 96 which fits against the inside of bead 92 and merges into a substantially horizontal annular surface 97 which in turn merges with depression 40*c*. Nibs 98 may be indented at the juncture of wall 96 and surface 97, the nibs fitting under bead 92 to hold cap 32*c* in place on collar 93. The number and spacing of nibs 98 is subject to modification, it being understood that such nibs are deformable to snap the cover on and off the collar. The other portions of the container may be substantially the same as in preceding modifications and similar reference numerals are used for corresponding parts followed by subscript "*c*."

The finger lift-type cap or plug shown in FIGS. 1, 4 and 7 reduces the amount of space required between the cap and the end. This is desirable not only for economy of material but also when the container is filled with gas or is vacuumized inasmuch as the amount of air which must be evacuated or the amount of gas which must be introduced is reduced. Further, as is apparent, the capacity of the can is increased for a given body diameter and height.

The modification of FIGS. 5 and 6, in many details of construction is similar to that of the preceding modification and corresponding elements are designated with similar reference numerals followed by the subscript "*b*" and not herein described in detail. It will be noted that outer end 13*b* of the can is formed with an upwardly projecting dome 51 which affords room for upwardly projecting lift knob 52 of cap 32*b* and, when used with a superimposed can having a complementary recess (not shown) in the bottom end, facilitates stacking the containers in a display.

Ring or collar 56 may be secured in the can in various ways. As herein illustrated, ring 56 has a cylindrical wall 57 which fits immediately inside the upper end of the can body 11*b* and is provided on its upper edge with a short outwardly flaring flange 58 which is caught in the double seam 16*b* of the end and the body. A substantially horizontal shoulder 59 is formed at the lower end of wall 57 and the depth of wall 57 is sufficient so that shoulder 59 is not punctured by a can opener in normal opening procedures. On the inner edge of shoulder 59 is an upwardly projecting collar 61 which is weakened along a groove 62 about midway of the height of the collar so that, as best shown in FIG. 5, in the assembled position of the container the collar 61 folds outwardly in an annular accordion-type pleat 63. Various means may be used to secure the reclosure cap on the collar. As illustrated in the accompanying drawings, an enlarged bead 29*b* is formed integrally on the upper edge of collar 61.

The cap which may be used for purpose of reclosure is also subject to variation. The cap shown in FIGS. 1 and 4 may be used. In FIG. 5, however, an alternate construction is shown. Thus cap 32*b* has a peripheral rim 66 in the form of a shallow downwardly-facing channel. The outer edge 67 of the rim 66 curls slightly under beads 29*b* for snap engagement therewith. Inwardly of rim 66 the cap slants downwardly-inwardly in stretch 68 and then upwardly-inwardly in stretch 69. A central depression 71 having sloping sides 72 and a horizontal bottom 73 is disposed inwardly of stretch 69. Preferably, the cap is formed with a lift knob 52 and in the form shown in FIGS. 5 and 6 the lift knob has a vertical wall 76 extending up from bottom 73 formed at its upper end with an outwardly projecting slanted bulge 77 and closed off with a flat top 78 which bears against the underside of bulge 51 of end 13*b*.

In the form of the invention shown in FIGS. 5 and 6, when the outer end 13*b* is applied to body 11*b*, collar 61 is compressed and pleated into the form shown in FIG. 5. Thus there is upward pressure against the end 13*b* in the annular zone above the rim 66 of the reclosure cover which tends to seat cap 32*b* firmly on bead 29*b* and to prevent leakage of the contents of the can into the headspace above cap 32*b*. There is a further upward pressure of lift knob 52 against end 13*b*. The application of pressure at the two zones indicated tends to prevent end 13*b* from assuming a concave shape, which is particularly important if the can is vacuumized.

When the end 13*b* is cut by a can opener as shown in FIG. 6, the resiliency of the plastic collar 61 causes it to assume the position shown in FIG. 6, which lifts the severed end disc 81 upwardly so that it may be conveniently removed. In the elevated position of FIG. 6 the lift knob 52 is raised above the top edge of body 11*b* where it may be conveniently reached for the purpose of removing reclosure cap 32*b*. Replacement of cap 32*b* is readily accomplished by rim 66 snapping onto bead 29*b*.

The cap 32*b* may be made of a fairly rigid material such as tinplate or aluminum or other metal, or may be made of a rigid or semi-rigid plastic material while the collar 56 is preferably made of a relatively flexible material such as polyethylene or polystyrene.

Although the foregoing invention has been described in some detail by way of illustration and example for purposes of clarity of understanding, it is understood that certain changes and modifications may be practiced within the spirit of the invention and scope of the appended claims.

What is claimed is:

1. In a reclosure can, a can body, an end, means securing said end to said body, a collar fixed inside said body between said body and said end, said collar being resilient, a cap for said collar, and cooperating means on said cap and collar detachably to hold said cap on said collar in underlying relation to said end, said collar when said end is in place being bent downwardly within elastic limits by said end and the cap is shifted therewith so that when said end is cut off, the pressure of the collar on said end will raise the cut portion of the end and at the same time lift said cap.

2. A can according to claim 1, in which said collar is pre-formed with a pleat whereby said collar is partially folded downward when said end is in place.

3. A can according to claim 1, in which said cap is formed with a central depression and having a substantially semi-circular disc overlying said depression and an undercut wall merging with said disc and the bottom of said depression.

4. A can according to claim 1, in which said cap is formed with a central depression and having an integral apertured transverse lift bar traversing said depression.

5. A can according to claim 1, in which said cap is formed with a central depression and having an integral transverse lift bar traversing said depression, said bar having sides extending up from the bottom of said depression and a substantially horizontal top.

6. A can according to claim 1, in which said cap is lifted above the level of said end seam when said end is cut off.

7. In a reclosure can, a can body, an end, means securing said end to said body, a collar fixed inside said body between said body and said end, said collar being resilient, a cap for said collar, and cooperating means on said cap and collar detachably to hold said cap on said collar, said collar having a wall extending down from said end and immediately inside said body when said can is in assembled condition, and an upwardly-forwardly slanted stretch extending to said cooperating means, said cap bearing against the underside of said end when said end is in place and rising when

said end is severed, said collar flexing outward when said end is severed.

8. In a reclosure can, a can body, an end, an end seam securing said end to said body, a resilient collar, means securing said collar inside said body adjacent said end seam, said collar in the assembled condition of said can having a wall immediately inside said body and having an upwardly-inwardly slanted stretch having an annular terminal bead, a cap having a peripheral curl snapping over said bead, said cap underlying and bearing against said end, said collar, when said end is cut off, flexing upward to lift said cap.

9. In a reclosure can, a can body, an end, an end seam securing said end to said body, a resilient collar, means securing said collar inside said body adjacent said end seam, a cap for said collar, cooperating means on said collar and cap for detachably securing said cap on said collar, said cap being formed with a central depression and having a portion overlying said depression and an undercut wall merging with said last mentioned portion and the bottom of said depression.

10. In a reclosure can, a can body, an end, an end seam securing said end to said body, a resilient collar, means securing said collar inside said body adjacent said end seam, a cap for said collar, cooperating means on said collar and cap for detachably securing said cap on said collar, said cap being formed with a central depression and having an integral, apertured transverse lift bar traversing said depression.

11. A can comprising a can body having an enveloping wall that surrounds the central axis of the can body, a resilient collar secured to the can body and having an upwardly extending flange that lies radially intermediate said wall and axis, said flange terminating adjacent to one end of said body in means forming a neck opening into the interior of the can body, a can end seam-sealed to said body, said can end imposing pressure against the collar flange and deflecting said flange within elastic limits and shifting the flange axially inwardly toward said interior of the can body, said collar flange, upon severance of the can end along a fracture path radially intermediate the collar flange and wall, shifting axially outwardly away from said interior and moving with it the severed part of the can end.

12. A can comprising a can body having an enveloping wall that surrounds the central axis of the can body, a resilient collar secured to the can body and having an upwardly extending flange that lies radially intermediate said wall and axis, said flange terminating adjacent to one end of said body in means forming a neck opening into the interior of the can body, a removable and replaceable cap covering said opening, a can end secured to said body in overlying relation to the cap and closing said can end being severable to obtain access to said cap, said can end imposing pressure against the cap and collar flange and deflecting said flange within elastic limits and shifting the cap and flange inwardly toward said interior of the can body, said collar flange, upon severance of the can end to obtain access to said cap, shifting axially outwardly away from said interior and moving with it said cap and the severed part of the can end.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,156,374 November 10, 1964

Arthur P. Scholtz

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 8, line 13, for "end" read -- and --.

Signed and sealed this 16th day of March 1965.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents