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Cudzik

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[54] **EASY-OPEN CONTAINER AND METHOD OF MAKING SAME**

[75] Inventor: **Daniel F. Cudzik,** Richmond, Va.

[73] Assignee: **Reynolds Metals Company,** Richmond, Va.

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[52] **U.S. Cl.** ..... **220/40 R,** 215/337

[51] **Int. Cl.** **B65d 41/06**

[58] **Field of Search** 215/337, 332, 329, 217, 215/222, 357; 220/40

[56] **References Cited**

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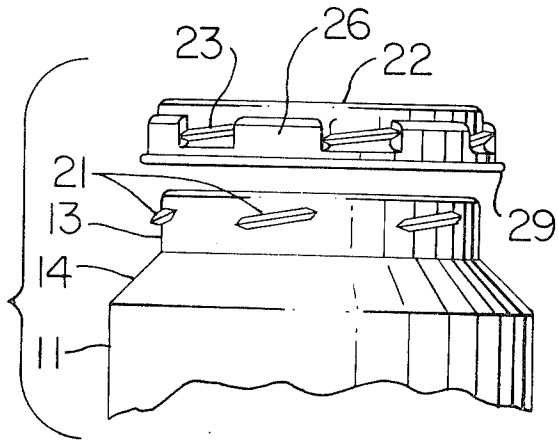
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Primary Examiner—William I. Price
Assistant Examiner—Ro E. Hart

[57] **ABSTRACT**

An easy-open container and method of making same is provided wherein such container has a container body which has a top right circular cylindrical portion which has a plurality of angularly spaced apart thread segments. A quick-release cap is provided and has a cooperating plurality of angularly spaced apart thread segments in perfect threaded engagement with the thread segments of the top portion and an axially compressed resilient sealing means is provided between the cap and the cylindrical portion.

11 Claims, 5 Drawing Figures



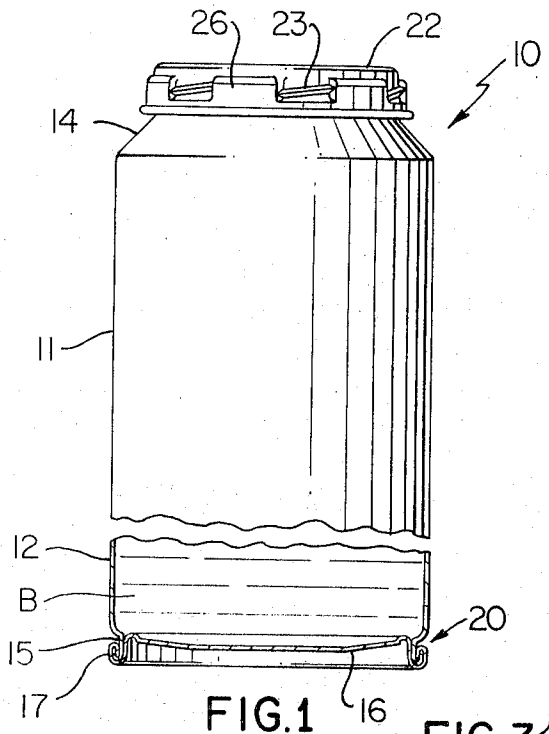


FIG.1

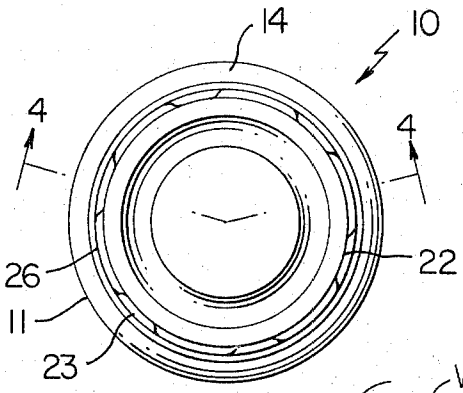


FIG.2

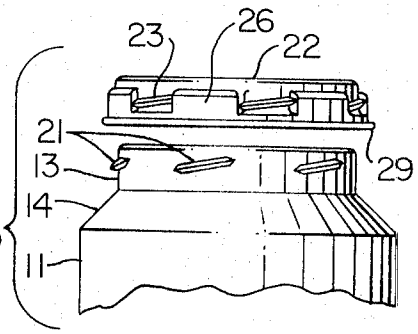


FIG.3

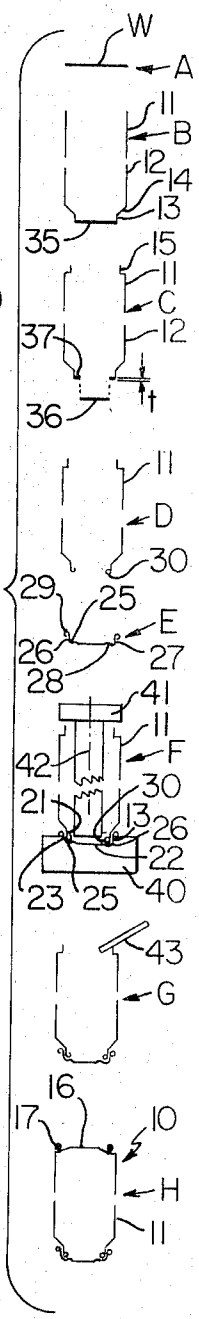


FIG.5

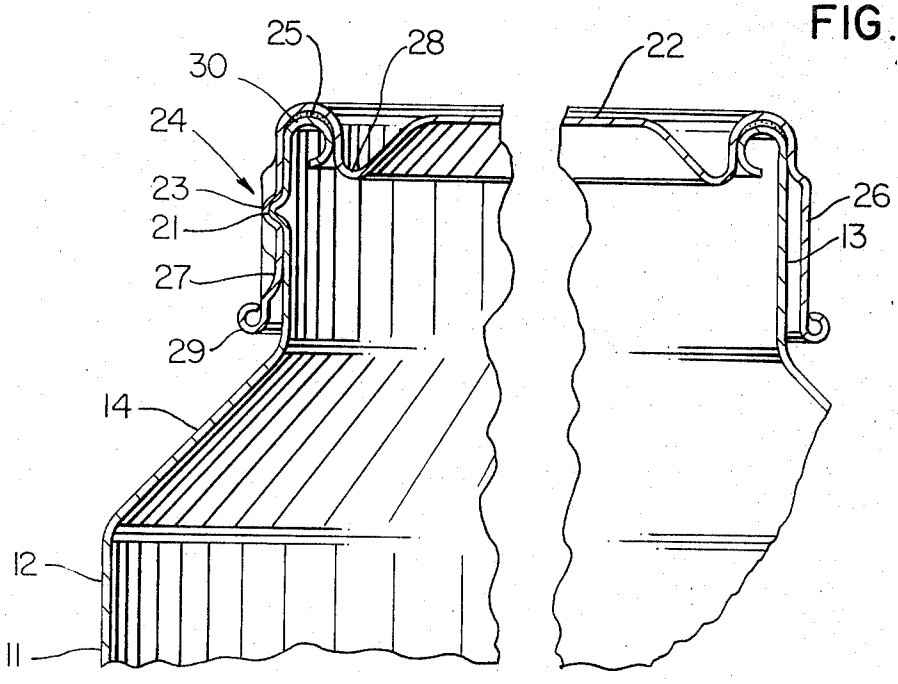


FIG.4

EASY-OPEN CONTAINER AND METHOD OF MAKING SAME

BACKGROUND OF THE INVENTION

There are numerous easy-open containers in current use which have reclosable closure caps. In general, these containers are comparatively expensive to manufacture and often use an excessive amount of material in order to provide a vessel capable of containing products, such as a carbonated beverage, for example, at pressures greater than ambient.

To provide greater structural integrity therefor some of these present containers have single piece bottoms and side walls wherein the side walls are seamless walls. Usually each of these present containers which has a single-piece side wall and bottom wall is made from a sheet metal blank by drawing and ironing the metal arranged concentrically around a bottom-wall defining central portion and inherently the bottom wall of the final container has an excessive thickness which increases the overall cost of the container unnecessarily.

SUMMARY

This invention provides an improved easy-open container and method of making same wherein such container is of simple construction, has optimum structural integrity and is economical to build because it uses a minimum amount of material. The container comprises a container body having a top right circular cylindrical portion and a plurality of angularly spaced apart thread segments on the right circular cylindrical portion with a quick-release cap being provided and having a cooperating plurality of angularly spaced apart segments in perfect threaded engagement with the thread segments of the top portion and such cap has an axially compressible resilient sealing means between the cap and the cylindrical portion.

Other details, uses, and advantages of this invention will be readily apparent from the embodiments thereof presented in the following specification, claims, and drawing.

BRIEF DESCRIPTION OF THE DRAWING

The accompanying drawing shows a present preferred embodiment of this invention, in which

FIG. 1 is a view in elevation with parts in cross section and parts broken away illustrating one exemplary embodiment of the container of this invention;

FIG. 2 is a top plan view of the container of FIG. 1;

FIG. 3 is a fragmentary view in elevation of the upper portion of the container of FIG. 1 and showing the closure cap therefor positioned in exploded relation above such container;

FIG. 4 is an enlarged fragmentary cross-sectional view of the top portion of the container of FIG. 1 taken essentially on the line 4—4 of FIG. 2; and

FIG. 5 is a schematic presentation illustrating a series of method steps which may be employed to make, fill with a product, and close the container of FIG. 1.

DESCRIPTION OF ILLUSTRATED EMBODIMENTS

Reference is now made to FIG. 1 of the drawing which illustrates one exemplary embodiment of a container of this invention which has a quick-release resealable cover cap and such container is designated generally by the reference numeral 10. The reclosable container 10 is particularly adapted to contain a product such as a product under pressure and in this example the container 10 is presented as containing a consumable product in the form of a carbonated beverage which is designated generally by the reference letter B.

The container 10 comprises a container body which is designated generally by the reference numeral 11 and such body has a right circular cylindrical main part 12 and a right circular cylindrical top portion 13 with the portions 12 and 13 being connected by a frustoconical transition portion 14, see FIG. 4. The parts 12, 13 and 14 are made as a single unit and have a substantially uniform thickness throughout. The main body 12 has a necked or reduced diameter bottom portion 15 also of right circular cylindrical configuration and a bottom wall 16 is fixed to the portion 15 in a fluid-tight manner so that the container is capable of withstanding comparatively high internal pressures.

The bottom wall 16 has a thickness which is preferably no greater than the thickness of the container body 11 and hence its uniform thickness portions 12–14 and wall 16 is fixed in position using seaming or flanging equipment of the type commonly used in the art to define a bottom chime or bead 17. The bead 17 is such that its outer circumferential surface is within the maximum peripheral or circumferential outline of the main body portion 12 and as illustrated at 20 in FIG. 1.

As seen particularly in FIG. 3 the top portion 13 of body 11 has a plurality of angularly spaced apart male helical thread segments 21; and, the container 10 has a quick-release resealable closure cap 22. The cap has a cooperating plurality of angularly spaced apart thread segments in the form of female thread segments 23 each of which is in threaded engagement with an associated thread segment 21 as shown at 24 in FIG. 4.

The container 10 also has an axially compressible sealing means 25 of approximately annular configuration and arcuate as viewed in cross section. The sealing means 25 may be made of any suitable compressible resilient material such as an elastomeric material, or the like, so that with the cap 22 in threaded engagement over the portion 13 of container body 11 the sealing means 25 provides a fluid-tight seal.

The construction and the cooperating arrangement of the portion 13 of container 10 and the associated cap 22 are such that in the event the entire contents of the container 10, such as a beverage B, are not used after the cap 22 has been initially removed then such cap may again be threaded into engagement over the top portion 13 to compress the sealing means 25 and again provide a fluid-tight seal for container 10.

As seen particularly in FIGS. 1, 3 and 4 the cap 22 has a plurality of angularly spaced bulged portions 26 therein which, as will be apparent from FIG. 2, correspond in number to the plurality of male helical thread segments 21 in the portion 13 and hence the same plurality of thread segments 23 in the cap 22. The bulged portions 26 are provided in a tubular skirt 27 comprising the cap 22; and, the skirt 27 extends downwardly from a recessed top portion 28 of the cap and terminates in an annular bottom bead 29.

The cap 22 is in a fluid-tight sealed realtion when its helical thread segments 23 are threadedly engaged with

the helical thread segments **21** of the right circular cylindrical portion **13** and the threadedly engaged segments cause the compressible sealing means **25** to be axially compressed against a bead-like flange **30** of substantially semi-toroidal configuration which defines the top of the right circular cylindrical portion **13.** The cap **22** is rotated counterclockwise, as viewed in FIG. **2,** relative to the container body **11** until the bulged portions **26** are rotated into vertical alignment with the helical thread segments **21** whereupon the cap **22** may be simply lifted vertically and removed from the container body **11.**

Any desired number of helical thread segments **21** may be provided on right circular cylindrical portion **13** with a corresponding number of helical thread segments **23** being provided on the cap **22;** however, in this example, a plurality of **6** thread segments are provided on portion **13** and cap **22.** Each of the thread segments **21** on the top portion **13** extends through an angular distance or angle of 30° and each end of each thread segment **21** is spaced an angular distance of 30° from the near edge of its most closely adjacent thread segment **21.** The thread segments **23** in the cap **22** are similarly arranged with the bulged portions **26** being interposed between each closely adjacent pair of thread segments **23.** With this arrangement the threaded cap **22** may be released simply by rotating it through an angle of 30° whereupon the cooperating thread segments **23** are unthreaded from their associated portions **21** and the bulged portions **26** are precisely aligned thereover allowing the cap **22** to be lifted vertically away from the container **10.**

With the cap **22** in threaded engagement with the top portion **13** of the container **10,** the helical thread segments **21** and **23** are in perfect threaded engagement throughout; and, this is due to the fact that the thread segments **21** and **23** are made in a simultaneous manner and as will be discussed in detail hereinafter in connection with the method of this invention.

Having described the detailed construction of the container **10** and its quick-release resealable cover cap **22** the detailed description will now proceed with a description of method steps which may be employed to define such container and cap and for this description particular reference is now made to FIG. **5** of the drawing.

A workpiece, preferably in the form of a flat circular sheet-like workpiece W made of a suitable metallic material is provided as shown at location A and such workpiece may be suitably formed, preferably by drawing and ironing, to define a container body which for simplicity will be designated by the reference numeral **11** throughout its various stages of forming presented in FIG. **5** even though the completed container body of container **10** is also designated by the reference numeral **11.** In addition, wherever possible during the description of the method employed to form the workpiece W and for easy correlation with the completed container **10,** reference numerals which are identical to various component portions of the completed container **10** will also be utilized for the components of the container construction or body being formed.

The container body **11** formed from workpiece W has a comparatively large diameter main body portion **12,** a right circular cylindrical portion **13,** and a frustoconical transition portion **14** as shown at location B and a transverse wall **35** of substantial thickness defines the terminal outermost end of the right circular cylindrical portion **13.** The construction shown at B may be defined by one or more forming operations, such as, drawing and ironing operations, for example.

The central portion of the transverse wall **35** is then severed using any suitable severing or cutting means and removed as shown at location C so that the body **11** has an inwardly directed flange means or annular flange **37.** In addition, in applications, such as this, where it is desired to define the container **10** having a reduced diameter or necked-in portion at the opposite end of its main portion **12** for attachment of a bottom wall having a corresponding reduced diameter, a portion **15** is also formed in the container body.

The container body **11** is then suitably reformed as shown at location D and the inwardly directed flange means of flange **37** is formed into a bead-like configuration or bead **30.**

A cap structure is suitably made as illustrated at E with such cap structure having a tubular wall or skirt **27** extending downwardly from a recessed top portion **28** and the skirt terminates in an annular bead **29.** The tubular wall or skirt **27** is formed so as to define a plurality of six bulged portions **26** therein and the bulged portions are constructed and arranged as shown in FIGS. **3** and **4.** During the process of forming the cap, sealing means in the form of an annular thickness of compressible sealing means **25** is also suitably bonded to the inside surface of such cap.

As seen at location F, the cap structure **22** is then placed in telescoped relation concentrically around the right circular cylindrical portion **13** of the container body **11** with the resilient sealing means **25** engaging bead-like flange **30.** The cap structure **22** and the container body **11** are held in axially compressed relation between cooperating die means or dies **40** and **41** which operatively associate with and engage the cap structure **22** and container body **11** respectively. The dies **40** and **41** have suitable cooperating helical thread segment-defining means therein and are relatively rotatable about a central axis **42** over a predetermined angle to form the thread segments **21** in the cylindrical portion **13** and the thread segments **23** in the cap structure **22** in a simultaneous manner. Because of the simultaneous forming of the thread segments **21** and **23** by the dies **40** and **41** these thread segments are in perfect threaded engagement while the sealing means **25** is also held in fluid-tight compressed condition.

As explained earlier, the bulged portions **26** are formed in the cap structure **22** during the separate forming of such cap. These bulged portions **26** are suitably held within the dies **40** and **41** and the helical thread segment-defining portions are also suitably constructed and arranged so that the thread segments **21** and **23** are defined in spaces around the cap **22** between the bulged portions **26.**

The cooperating dies **40** and **41** are then moved apart and the container construction is filled with an associated product and such product, described herein as a carbonated beverage B, may be introduced therein as illustrated at G through a suitable nozzle **43** or the like. The filling is achieved with the container construction in an inverted position.

A bottom wall or closure **16** for the filled container construction may be made using any suitable end closure forming machine. The bottom wall **16** is suitably fixed on the container construction as illustrated at H

and any suitable apparatus such as a seaming or mechanical flanging apparatus of known construction may be used for this purpose whereby a fluid-tight bottom bead or chime **17** is provided and the now filled and sealed container **10** is ready for shipment.

The unique method of this invention enables the walls of container **10** to be made of a substantially uniform thickness throughout which is compatible with the product to be contained therewithin. The main body of such container is a seamless body having a thickness which is controlled by the precision process of drawing and ironing. Further, as illustrated at location C in FIG. **5**, the method steps employed are such that once the central portion **36** of the transverse wall **35** is severed a substantial amount of thick material is eliminated from the container body and such material is material which is easily recycled and reused while the flange portion **37** is further drawn and ironed. Thus, the overall cost of the container **10** is kept at a minimum because it does not employ a bottom wall of excessive thickness, inasmuch as the separately made bottom wall **16** may be made of comparatively smaller thickness.

Although any suitable material may be used to define the various components of container **10** such components are all preferably made of the same material and such material may be in the form of a metallic material which is preferably a metallic material containing aluminum.

While present exemplary embodiments of this invention, and methods of practicing the same, have been illustrated and described, it will be recognized that this invention may be otherwise variously embodied and practiced within the scope of the following claims.

What is claimed is:

1. An easy-open container comprising, a container body having a top right circular cylindrical portion, a plurality of angularly spaced apart thread segments on said top portion, a cap having a cooperating plurality of angularly spaced apart thread segments in threaded engagement with said thread segments of said top portion, each of said thread segments of said cylindrical portion being surrounded above and below by parts of said cap defining an associated thread segment of said cap so that said thread segments of said cylindrical portion and said cap are in substantially perfect threaded engagement throughout due to having been made simultaneously, and axially compressed resilient sealing means between said container cap and cylindrical portion.

2. A container as set forth in claim **1** in which said cap and top portion are made of a metallic material.

3. A container as set forth in claim **1** in which said thread segments are helical thread segments and said sealing means is bonded to said cap and enables resealing of said cap upon removal and reinstallation thereof.

4. A container as set forth in claim **3** in which said top portion has an inwardly turned bead-like flange and said sealing means is urged against said bead-like flange.

5. A container as set forth in claim **3** in which said sealing means is a plastisol.

6. A container as set forth in claim **3** in which said plurality of angularly spaced apart thread segments consist of a plurality of six thread segments and each thread segment extends through an angle of 30° and each end thereof is spaced 30° from an adjacent thread segment.

7. A container as set forth in claim **3** in which said cap has a plurality of angularly spaced apart bulged portions therein corresponding in number to said plurality of thread segments of said top portion, said bulged portions being adapted to be rotated in alignment over thread segments projecting outwardly from said right circular cylindrical portion to enable removal of said cap from said right circular cylindrical portion.

8. A container as set forth in claim **3** in which said container body comprises a cylindrical main portion and a frustoconical transition portion extending between said main portion and said top right circular cylindrical portion with said portions being made as a single unit and having a substantially uniform thickness throughout.

9. A container as set forth in claim **8** and further comprising a bottom wall fixed to the bottom edge portion of said main portion with said bottom wall having a substantially uniform thickness throughout.

10. A container as set forth in claim **9** in which said container body, cap and bottom wall are made of a metallic material containing aluminum and have a substantially uniform thickness.

11. A container as set forth in claim **10** in which said bottom wall is attached to said main body portion by a mechanically swaged circumferential bead arranged within the peripheral outline of said main body portion.

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