United States Patent

Curry

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[54] **COMBINED CONTAINER AND CLOSURE**

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[52] **U.S. Cl.** .....**220/39 R**, 215/43 R, 220/42 A, 220/74

[51] **Int. Cl.** **B65d 41/04**

[58] **Field of Search** ...220/42 A, 39 R, 74; 215/43 R; 85/32 V, 35; 264/242

[56] **References Cited**

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[57] **ABSTRACT**

This disclosure relates to a container of thermoformed plastic material and a metallic closure, the closure being of a conventional construction and including a plurality of inwardly directed threads, the container having a body terminating in an upper end in a radially outwardly directed shoulder terminating in a downwardly directed peripheral skirt, the latter of which includes a plurality of vertical flutes, whereby upon the snap application of the closure to the container the flutes are deformed by the screw threads forming a self-threaded closure.

17 Claims, 5 Drawing Figures

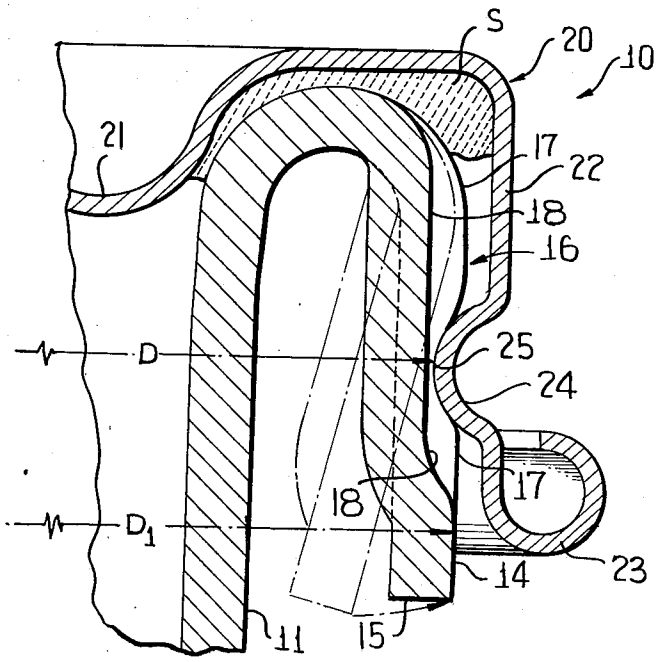

FIG. 1

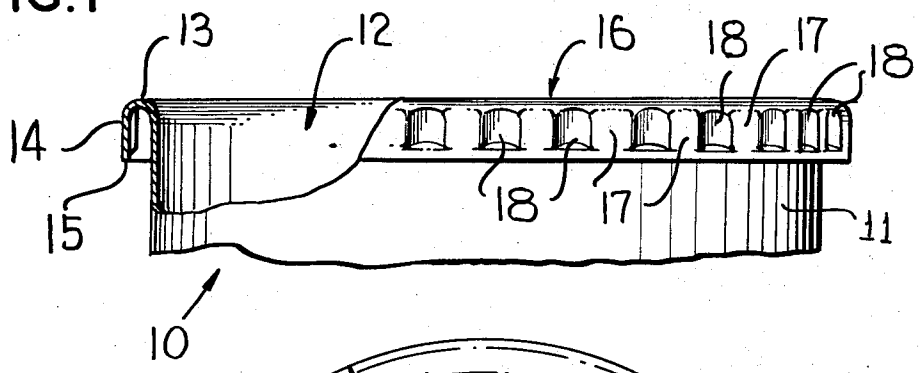

FIG. 2

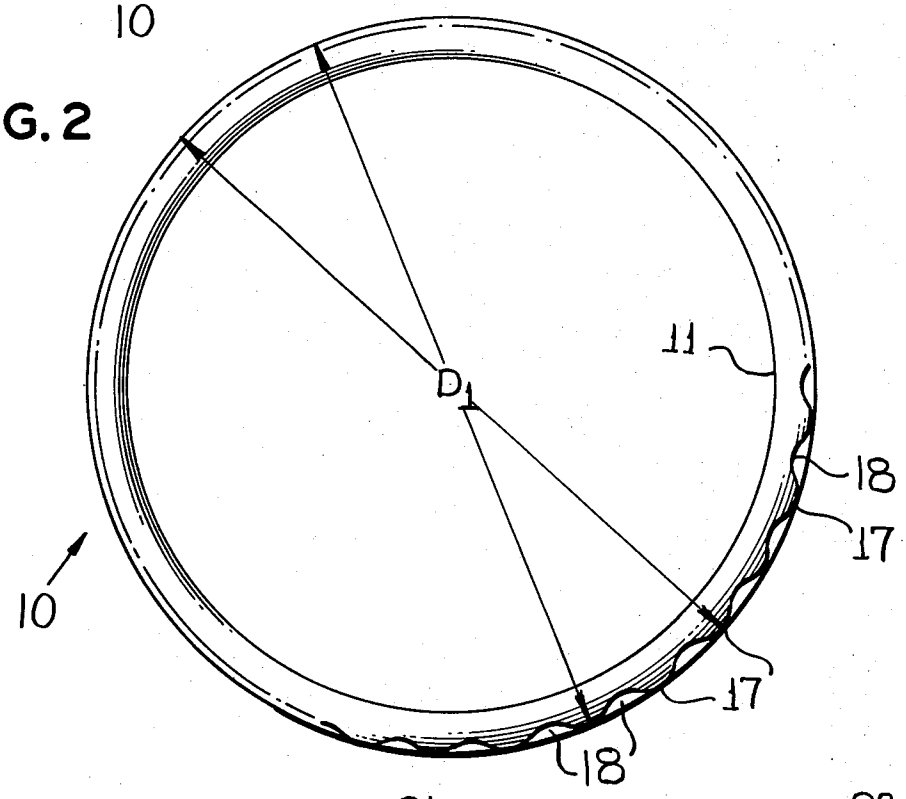

FIG. 3

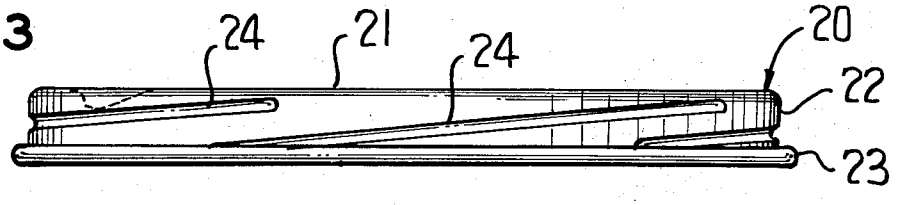

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FIG. 4

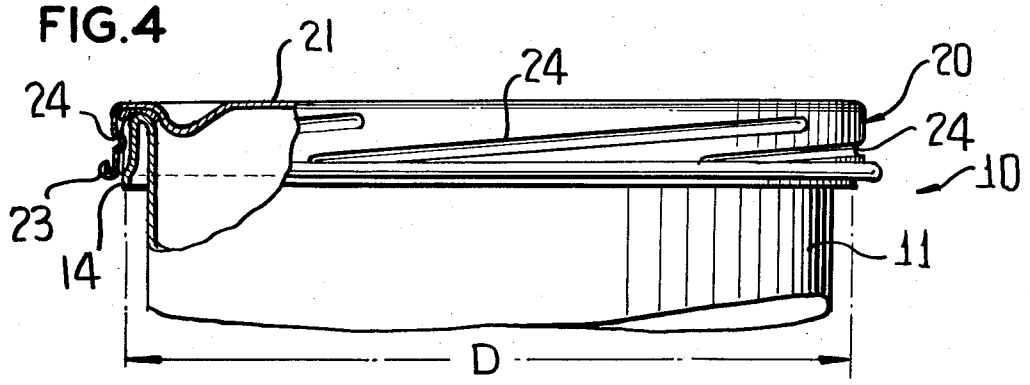
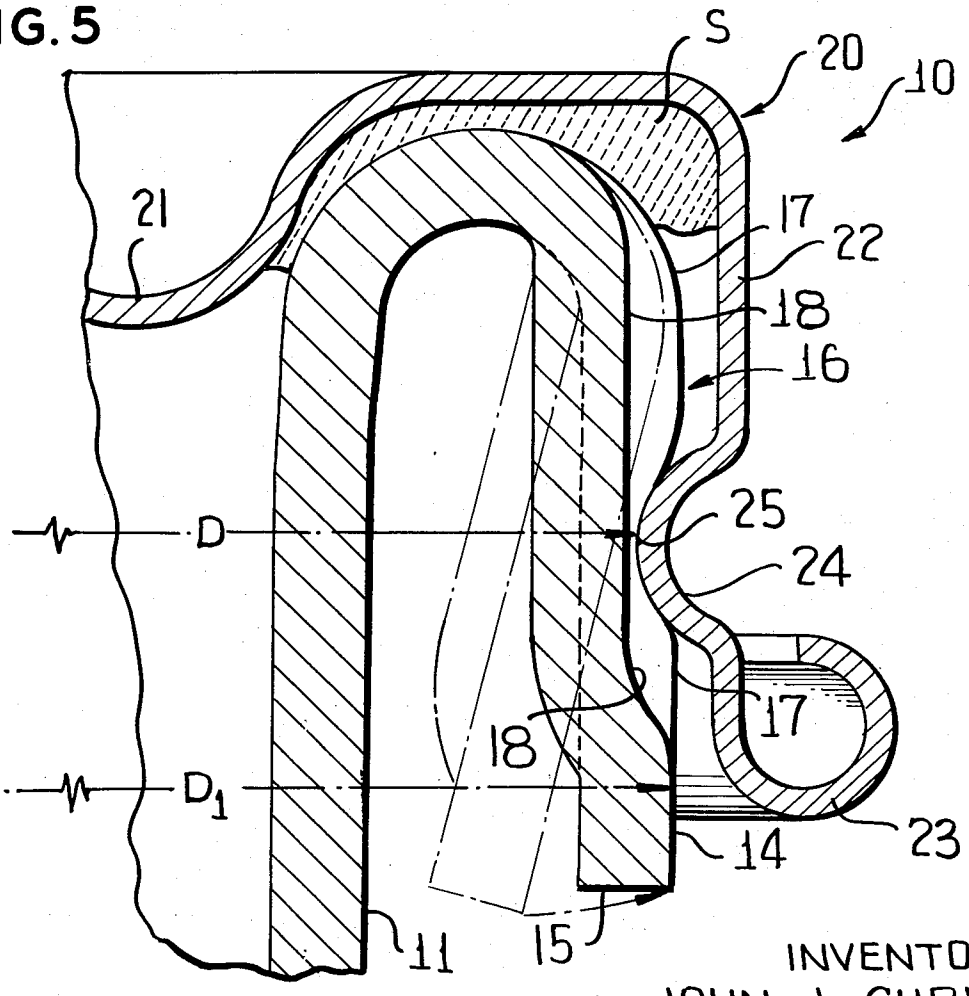


FIG. 5



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COMBINED CONTAINER AND CLOSURE

A primary object of this invention is to provide a novel closure of a conventional construction and including a plurality of inwardly directed threads, the container having a body formed at an upper end with a radially outwardly directed shoulder terminating in a downwardly directed peripheral skirt, the outer neck finish of which includes a plurality of vertical flutes, whereby upon the snap application of the closure to the container the flutes are deformed by the screw threads forming a self-thread closure.

Still another object of this invention is to provide a peripheral skirt of a wall thickness sufficiently thin to permit the latter to yield under its inherent flexibility in a radial outward direction to facilitate the formation of relatively deep grooves across the flutes of the peripheral skirt.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more readily understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawing.

IN THE DRAWING

FIG. 1 is a fragmentary side elevational view of a container constructed in accordance with this invention with a portion thereof broken away for clarity.

FIG. 2 is a top plan view of the container of FIG. 1 and more particularly illustrates the fluted or knurled periphery of the skirt.

FIG. 3 is a side elevational view of a conventional multi-threaded cap.

FIG. 4 is a fragmentary side elevational view of the assembled cap and container with a portion thereof broken for clarity, and illustrates the manner in which the threads of the cap form grooves in the flutes of the peripheral skirt.

FIG. 5 is a highly enlarged fragmentary sectional view of an upper portion of the container and an outer periphery of the cap, and more clearly illustrates the formation of one of the grooves in one of the knurls to form a self-formed helical thread permitting the cap to be removed by a conventional manual twisting operation.

Referring particularly to FIGS. 1 and 2, a novel container constructed in accordance with this invention is generally designated by the reference numeral **10**, and is preferably constructed from thermo-formed injection molded, blow molded, hot drawn, or similar forming process utilizing polyethylene, polystyrene or similar polymeric or copolymeric material. The container **10** includes a generally cylindrical body **11** having at its upper end an open mouth **12**. The upper end of the container body **11** includes a radially outwardly directed radius portion **13** terminating in a downwardly directed peripheral skirt **14** having a terminal edge **15**. About the entire circumference of the peripheral skirt **14** are disposed a plurality of flutes, generally designated by the reference numeral **16** formed of lands and valleys **17** and **18**. The lands and valleys **17** and **18**, respectively, are disposed perfectly vertically, but in accordance with this invention they may likewise be offset to the longitudinal axis of the container **10**.

Referring particularly to FIG. 3, a metallic cap or closure generally designated by the reference numeral

20 includes an end panel **21**, a peripheral skirt **22** and a radially outwardly upwardly and inwardly turned curl **23**. The peripheral skirt **22** of the closure **20** includes a plurality of inwardly directed conventional threads **24**.

As is best illustrated in FIG. 4, the closure or cap **20** is illustrated in assembled relationship upon the container **10**. The diametric distance D is lesser than the diametric distance D1 between the lands **17**. Therefore, when the cap **20** is merely pushed downwardly upon the peripheral skirt **14**, the latter temporarily deflects inwardly as is illustrated in phantom outline in FIG. 5 of the drawing. At this time, the lands **17** of the flutes **16** are in forceful contact with the high side of the threads **24** and are slightly deformed. Due to the resilient reboundable nature of the material from which the container **10** is constructed the peripheral flange **14** is continually urged outwardly in the direction of the unnumbered headed arrow in FIG. 5 to be continually causing the material of the lands **17** to be depressed by the more rigid material of the threads **24**. Due to this continual inherent force of the peripheral flange **14** tending to return to its normal position (FIG. 1) the lands **17** of the flutes **16** are progressively provided with grooves **25**, as is shown in solid outline, in FIG. 5, thus forming "self-threads" **25** in the lands **17** of the flutes **16**.

After the closure is applied, the material of the lands **17** flow into the grooves or valleys **18** and the material of the skirt **14** sets either gradually by aging or rapidly under heated conditions to make the self-threads **25** permanent.

When it is desired to eventually remove the closure **20**, it is merely necessary to rotate the same manually in a conventional manner whereupon the grooves **25**, due to the formation thereof into helical threads in the manner heretofore noted, permit the closure **20** to be readily removed and if desired re-applied by a similar twisting operation.

From the foregoing it should be readily noted that though the peripheral skirt **14** is initially devoid of helical threads **25**, the same are inherently formed thereon due to the more rigid nature of the threads **24** and the reboundable nature of the peripheral skirt **14** which causes the progressive recession or compression of the plastic material to form the threads **25**. Thus a special forming operation to create threads is unnecessary. Of course, if found necessary or desired sealing compound S may be provided or as an alternative a liner may be substituted therefor.

I claim:

1. A container having a neck finish particularly adapted for interlocking engagement with threads of a closure, said neck finish being formed with circumferentially spaced and generally axially extending groove means for receiving material of said neck finish deflected by engagement of a closure thread therewith.

2. The container of claim **1** wherein said neck finish is resiliently connected to the remainder of said container.

3. The container of claim **1** wherein said neck finish is formed on a separate skirt hingedly connected to and radially spaced from the remainder of said container.

4. The container of claim **3** wherein said skirt is axially coextensive with other portions of said container.

5. A combined container and closure comprising a container of a single piece construction having a neck finish, said neck finish being integral with and of the same material as said container, said neck finish being constructed from deformable material adapted to be self-threading upon the application of a closure thereto, said closure including an end panel and a peripheral skirt constructed from material less deformable than that of said neck finish, said peripheral skirt being internally threaded and being disposed in external telescopic relationship to said neck finish, and the threads of said closure being disposed in grooves formed by said threads bearing against and permanently deforming portions of said neck finish.

6. The combined container and closure as defined in claim 5 wherein said neck finish has a predetermined diameter which is greater than the diametric distance across said closure.

7. The combined container and closure as defined in claim 6 wherein said container neck finish is defined by a depending peripheral skirt in spaced relationship to a body wall of said container.

8. A method of forming a permanently self-threading container and closure comprising the steps of providing a container body of a single piece construction having a neck finish constructed from deformable material and having a predetermined exterior diameter, providing a closure having an end panel and an interiorly threaded peripheral skirt constructed from material less deformable than that of said neck finish and having a diametrical distance across said threads less than said predetermined exterior diameter, and applying the closure to the neck finish with the peripheral skirt thereof in external telescopic relationship to the neck finish whereby the latter becomes permanently deformed and self-threaded due to forces applied thereagainst by the closure threads.

9. The method as defined in claim 8 including the step of heating the neck finish to accelerate the self-threading thereof.

10. A container of a single piece construction having a neck finish, said neck finish being integral with and of the same material as said container, said neck finish being of a predetermined original nondeformed exterior configuration, and permanently deformed means for forming permanent indentation means in portions of said neck finish exterior.

11. The combined container and closure as defined in claim 5 wherein said container is defined by a body wall in radially spaced relationship to a depending peripheral skirt, said depending peripheral skirt defines said neck finish, and an exterior surface of said depending peripheral skirt includes said grooves.

12. The combined container and closure as defined in claim 11 wherein an interior surface of said depending peripheral skirt is devoid of said grooves.

13. The combined container and closure as defined in claim 11 wherein said grooves are threaded.

14. The method as defined in claim 8 wherein the provided container body is formed to include a body wall in radially spaced relationship to a depending peripheral skirt which defines the neck finish, and an exterior surface of said depending peripheral skirt becomes self-threaded by the closure threads.

15. The container as defined in claim 10 wherein the container is defined by a body wall in radially spaced relationship to a depending peripheral skirt, said depending peripheral skirt defines said neck finish, and an exterior surface of said depending peripheral skirt includes said grooves.

16. The combined container and closure as defined in claim 15 wherein an interior surface of said depending peripheral skirt is devoid of said grooves.

17. The combined container and closure as defined in claim 15 wherein said grooves are threaded.

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