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[54] **CONTAINER AND CLOSURE COMBINATION**

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[52] **U.S. Cl.** ..... **220/43 R**, 220/42 A, 220/42 C

[51] **Int. Cl.** **B65d 43/04**

[58] **Field of Search** ..... 220/42 A, 43, 42 C, 220/39 R, 40 R; 229/43, 5.5, 93; 150/.5

[56] **References Cited**

UNITED STATES PATENTS

2,780,385	2/1957	Tupper	220/43 R
3,032,927	5/1962	Kobs	220/42 C X
3,351,227	11/1967	Collie	220/60 R
3,422,984	1/1969	Foster	220/60 R X
3,609,263	9/1971	Clementi	220/60 R
3,128,005	4/1964	Sherlock	220/39 R
3,386,611	6/1968	Crute	220/40 R
1,762,310	6/1930	Rutkowski	229/43
2,054,897	9/1936	Darling	220/43 R
2,064,042	12/1936	Von Till	220/42 A
2,104,540	1/1938	Hoffman	229/5.5 X
2,306,255	12/1942	Scott	229/5.5
2,790,576	4/1957	Lawrence	150/.5 X
2,802,593	8/1957	Slaughter	220/42 A
2,857,947	10/1958	Powers	150/.5
3,321,124	5/1967	Bank	229/43
3,378,163	4/1968	Griffith	229/43 X
3,557,998	1/1971	Collie	150/.5
1,415,986	5/1922	Burton	220/43 R
2,334,225	11/1943	Socke	220/43 R
2,901,098	8/1959	Tupper	220/42 C
3,460,711	8/1969	Al-Roy	220/60 R
2,887,117	5/1959	Rosholt	220/60 R

FOREIGN PATENTS OR APPLICATIONS

650,162	9/1928	France	220/43 R

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[57] **ABSTRACT**

This disclosure relates to a container of thermoformed plastic material having a metallic closure, the closure being of a conventional construction and including a channel terminating in a relatively rigid peripheral skirt, the container having a body terminating at an upper end portion in a bead having a peripheral skirt normally disposed upon the upper end portion of the container body, and the peripheral skirt of the closure being of an internal diameter less than the predetermined maximum diameter of the container peripheral skirt whereby the container body peripheral skirt is deflected inwardly by the closure peripheral skirt to a diameter less than the predetermined maximum diameter thus increasing the firctional purchase between contacting surface portions of the peripheral skirt due to the inherent tendency of the resilient container peripheral skirt to rebound radially outwardly toward its predetermined maximum diameter. In addition, the container peripheral skirt includes an exterior surface formed with circumferentially spaced axially extending lands and valleys, and being constructed from pressure-deformable material whereby the lands are depressed at the contacting surface portions of the skirts as the container peripheral skirt rebounds toward its normal position thus producing a "self-threading" or "self-locking" feature of the invention.

2 Claims, 5 Drawing Figures

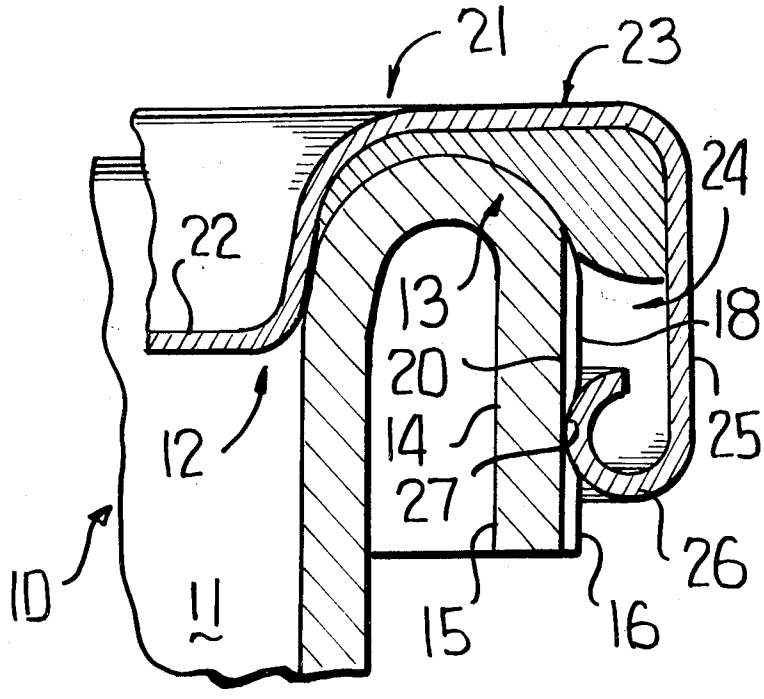


FIG. 1

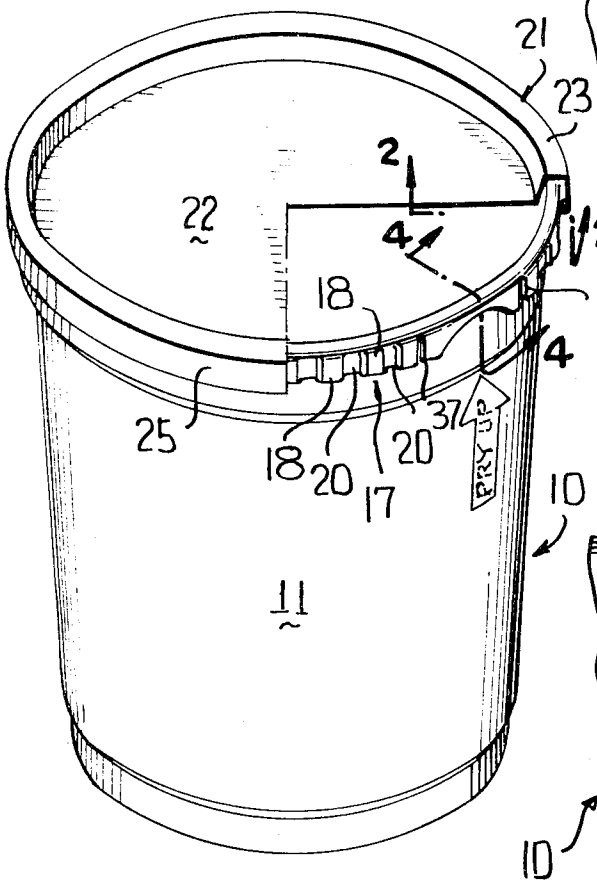


FIG. 2

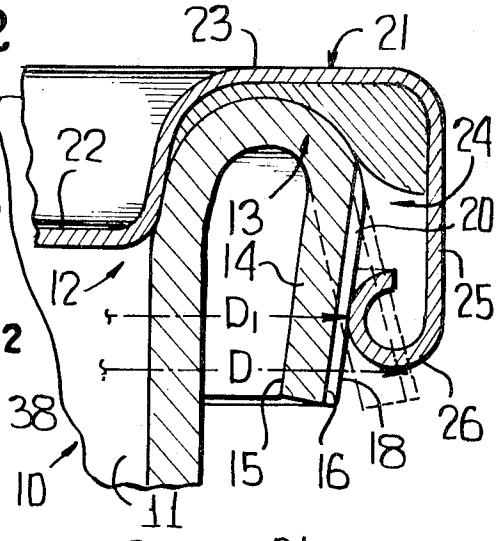


FIG. 3

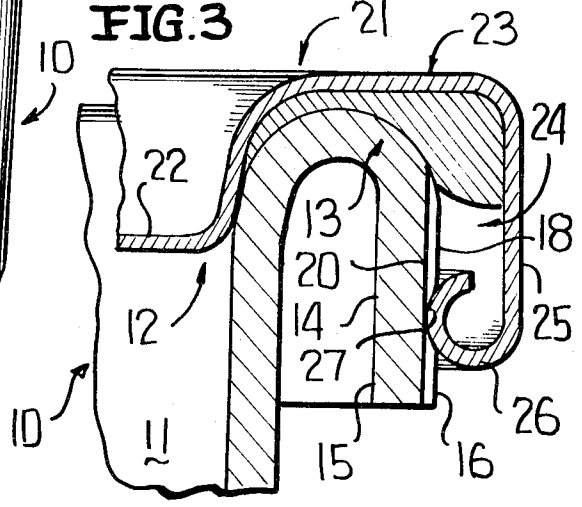


FIG. 4

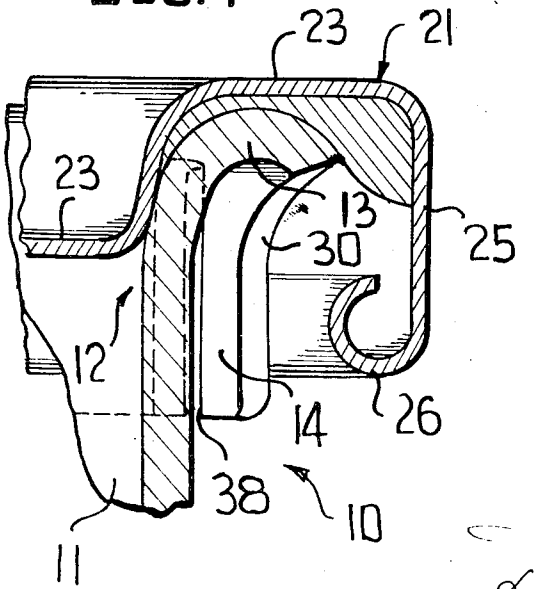
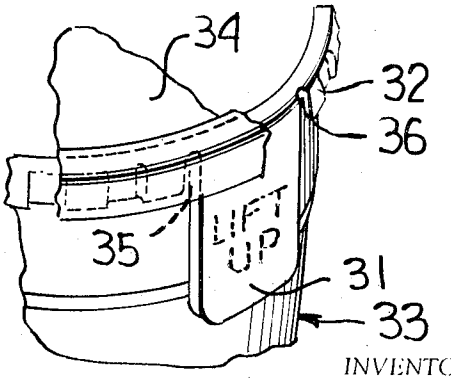


FIG. 5



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CONTAINER AND CLOSURE COMBINATION

A primary object of this invention is to provide a novel closure of a relatively rigid construction which includes a channel terminating in a relatively rigid peripheral skirt, a container having a body formed from resilient material and provided at an upper end thereof with a radially outwardly directed shoulder terminating in a downwardly direction peripheral skirt, the peripheral skirt having an exterior surface normally of a maximum diameter greater than that of the diameter of an internal surface of the closure peripheral skirt whereby upon the snap application of the closure to the container the container peripheral skirt is deflected inwardly to a diameter less than the predetermined maximum diameter thereof thus increasing the frictional purchase between contacting surface portions of the peripheral skirts due to the inherent tendency of the resilient container peripheral skirt to rebound radially outwardly toward its predetermined maximum diameter.

A further object of this invention is to provide a novel combination of the type aforesaid wherein the container peripheral skirt is constructed from pressure-deformable material whereby upon continued outward deflection thereof the outer surface is depressed by the more rigid peripheral skirt of the closure to obtain self-locking or interlocking between the peripheral skirts.

Still another object of this invention is to provide a novel combination of the type described wherein the exterior surface of the container peripheral skirt is preferably formed with circumferentially spaced and generally axially extending valleys and lands, the latter of which are deformed upon the outward deflection of the container peripheral skirt.

Still another object of this invention is to provide a novel combination of the type heretofore described wherein tab means formed as an integral extension of the container peripheral skirt are provided for removing the closure, and the container peripheral skirt additionally includes a slot fromed therein opening through a lowermost peripheral edge thereof for providing an access area for a person's fingers to facilitate the removal of the closure from the container body.

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

IN THE DRAWING

FIG. 1 is a perspective view of a container and closure of this invention with a portion of the closure removed for clarity, and illustrates an outer peripheral skirt of the container provided with a plurality of circumferentially spaced lands and valleys.

FIG. 2 is an enlarged fragmentary sectional view taken generally along line 2—2 of FIG. 1, and illustrates the container and closure immediately after same have been snap secured together.

FIG. 3 is an enlarged fragmentary sectional view taken along line 2—2 of FIG. 1, and illustrates the manner in which one of the lands has been depressed under the influence of the outward deflection or rebound of the container peripheral skirt during storage, shipment and/or display.

FIG. 4 is a fragmentary enlarged sectional view taken generally along line 4—4 of FIG. 1, and illustrates a downwardly opening slot in the container peripheral skirt for the receipt of a person's fingers to facilitate the removal of the closure by grasping and drawing upwardly the peripheral skirt thereof.

FIG. 5 is a fragmentary perspective view of another container and closure, and illustrates a peripheral skirt of the container being provided with a tab for facilitating the removal of the closure.

Referring particularly to FIGS. 1 through 3 of the drawing, a novel container constructed in accordance with this invention is generally designated by the reference numeral **10**, and is preferably constructed from thermoformed, injection molded, blow molded, hot drawn, or similar forming processes utilizing polyethylene, polystyrene or similar polymeric or copolymeric material. Irrespective of the particular material from which the container **10** is constructed, in keeping with this invention the material must be resilient and also capable of deformation when subjected to pressure, for a reason which will appear more fully hereinafter.

The container **10** includes a generally cylindrical body **11** having a bottom wall (not shown) and an upper end portion **12** terminating in upwardly, outwardly and downwardly directed wall **13**, of which the downwardly directed portion **14** defines a peripheral skirt having inner and outer surfaces **15, 16**, respectively.

About the entire circumference of the peripheral skirt **14** are disposed a plurality of flutes, generally designated by the reference numeral **17** (FIG. 1) formed of lands and valleys **18** and **20**, respectively. The lands and valleys **18, 20** thus impart a generally undulating configuration to the exterior surface **16** of the peripheral skirt **14**, and though illustrated as being disposed perfectly vertically or axially, the same may be offset to the longitudinal axis of the container body **11**.

A metallic closure or lid, generally designated by the reference numeral **21**, includes an end panel **22**, a radially upwardly outwardly and inwardly directed bead **23** defining a downwardly opening channel **24** with the downwardly turned portion of the bead **23** defining a peripheral skirt **25** terminating in an inwardly upwardly and outwardly directed curl **26**.

As is best illustrated in FIG. **2**, the closure **21** is illustrated immediately after being assembled upon the upper end portion **12** of the container **10**. Prior to being applied to the upper end portion **12**, the peripheral skirt **14** is normally disposed more radially outwardly, as indicated in phantom outline in FIG. **2**, with the dimension D indicating the diametric distance between diametrically opposite lands **18** of the exterior surface **16**. The dimension D1 indicates the innermost minimum diameter of the curl **26**. Due to the greater distance D compared to the distance D1, when the closure **21** is pushed downwardly upon the upper end portion **12** of the container **10**, the peripheral skirt **14** is deflected radially inwardly in a progressive manner until such time as the closure **21** is fully seated, with this position being shown in FIG. **2**. Since the closure **21** is constructed from relatively rigid material the diameter D1 remains substantially unchanged while the resilient nature of the material from which the container **10** is constructed permits the deflection of the peripheral skirt **14** to the position illustrated in FIG. **2**. At this time the lands **18** of the flutes **17** are in forceful

contact with the curl **26** due to the resilient reboundable nature of the material of the container **10** which continually urges the peripheral flange **14** outwardly in the direction of the initial position (phantom outline in FIG. 2) thereof. This force continually causes the material of the lands **18** to be depressed by the more rigid material of the curl **26** resulting in the formation of a groove **27** in each of the lands **18** in the manner shown in FIG. **3.** Thus, during a length of time dependent upon the resilience and deformable nature of the material of the container **10** the initial pure frictional interlock between the lands **18** and the curl **26** (FIG. **2**) is transformed into a mechanical interlock between the eventually formed grooves **27** and the curl **26,** thus producing a "self-threading" or "self-interlocking" feature of the invention. The desirability of the latter is, of course, readily obvious since exotic capping machinery is unnecessary yet the mechanical interlock is far superior than pure frictional purchase. Moreover, once the lands **18** have been deformed to form the grooves **27,** the grooves **27** remain as shown since the material is compressed beyond its elastic limit and continued reclosure of the lid and container may be achieved with the same interlock between the grooves **27** and the curl **26** being effected each time.

In order to remove the closure **21,** the same may be pried upwardly in a coventional manner, but in accordance with this invention, a portion of the peripheral skirt **14** is slotted at **30** to form a generally downwardly opening arcute slot of a sufficient depth to permit a person's fingers to be inserted therein and provided access area for grasping the curl **26** to lift the same upwardly in the manner readily apparent from FIG. **4.**

In lieu of the slot **30** the container **10** may be provided with a lifting tab **31** (FIG. **5**) formed as an integral extension of a peripheral skirt **32** of a container **33** corresponding identically to the container **10** of FIG. **1** except for the tab **31.** In this embodiment the tab **31** is gripped and lifted upwardly to force a lid **34** away from its seated position. Preferably the tab **31** is in part defined by a pair of slots **35, 36** extending upwardly into the peripheral skirt **32** so that the tab **32** may be hinged or pivoted sufficiently to dislodge the closure **34** from the container **33.**

In further keeping with this invention, the flexibility of the peripheral skirt **14** may be varied by providing the same with a plurality of circumferentially spaced slots about the entire periphery thereof. Two such slots **37, 38** are illustrated adjacent the slot **30** but additional slots (not shown) are positioned about the peripheral skirt **14.** These slots are preferably formed in the valleys **20** by a partially or totally removing the material thereof.

While preferred forms and arrangements of parts have been shown in illustrating the invention, it is to be clearly understood that various changes in details and arrangement of parts may be made without departing from the spirit and scope of this disclosure.

I claim:

1. A container including a body 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, permanently deformed indentation means in portions of said neck finish exterior for engaging a closure, said neck finish being defined by upwardly, outwardly and downwardly directed wall portions relative to said body with said downwardly directed wall portion carrying said indentation means, a closure having a relatively rigid peripheral skirt of an internal diameter less than a predetermined maximum diameter of said downwardly directed wall portion whereby said downwardly directed wall portion is deflected inwardly by said closure peripheral skirt to a diameter less than said predetermined meximum diameter thus increasing the frictional purchase between contacting surface portions of said peripheral skirt and said downwardly directed wall portion and thereby forming said permanently deformed means, and said closure peripheral skirt terminates in an inwardly upwardly and outwardly directed curl which forms said permanently deformed means.

2. A container including a body 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, permanently deformed indentation means in portions of said neck finish exterior for engaging a closure, said neck finish being defined by upwardly, outwardly and downwardly directed wall portions relative to said body with said downwardly directed wall portion carrying said indentation means, said downwardly directed wall portion has a downwardly opening slot formed therein and opens through a lowermost peripheral edge thereof for providing an access area for a person's fingers to facilitate the removal of a closure from said container body, a closure having a relatively rigid peripheral skirt of an internal diameter less than a predetermined maximum diameter of said downwardly directed wall portion whereby said downwardly directed wall portion is deflected inwardly by said closure peripheral skirt to a diameter less than said predetermined maximum diameter thus increasing the frictional purchase between contacting surface portions of said peripheral skirt and said downwardly directed wall portion and thereby forming said permanently deformed means, said closure peripheral skirt terminates in an inwardly upwardly and outwardly directed curl which forms said permanently deformed means.

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