

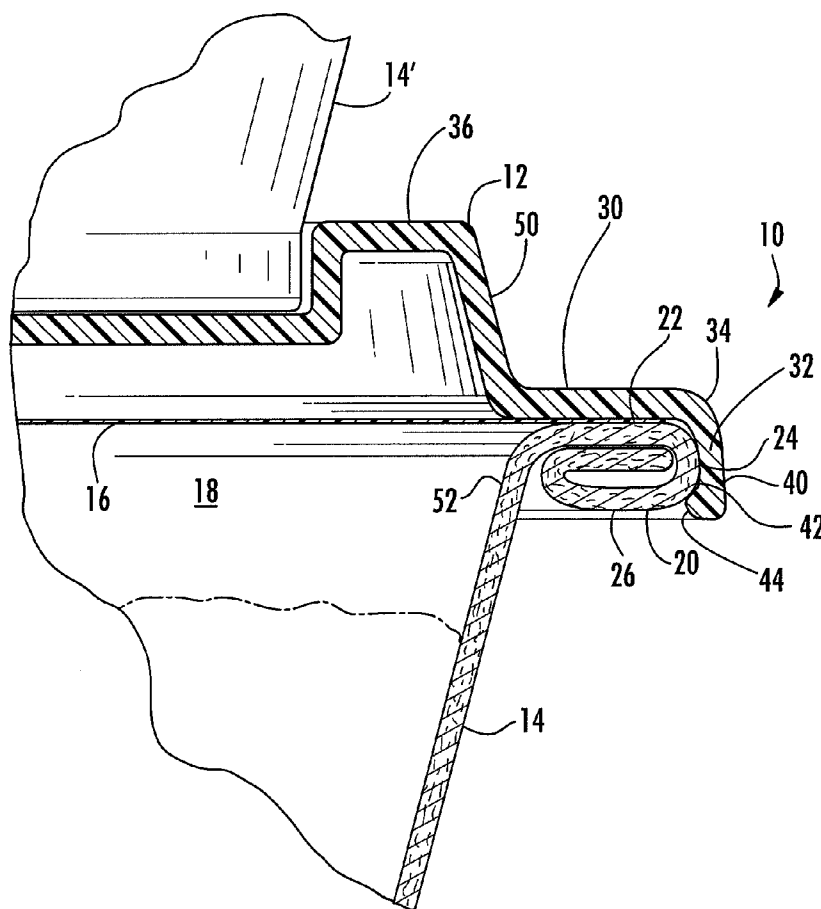
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(57) **ABSTRACT**

There is provided an interference-fit overcap for a container with a removable membrane. The overcap includes a skirt that provides an interference-fit with the rim of the container surrounding an opening in the container when the membrane is attached to the container. The overcap also includes a circumferential ring extending from the overcap in a direction opposite the skirt. The circumferential ring has an outside surface that is dimensioned to produce an interference fit with an inner wall of the container after the membrane has been removed. Thus the overcap may be securely attached to the container both before the membrane is removed and after the membrane is removed, such that the contents of the container may be sealed by the overcap after the membrane is removed.

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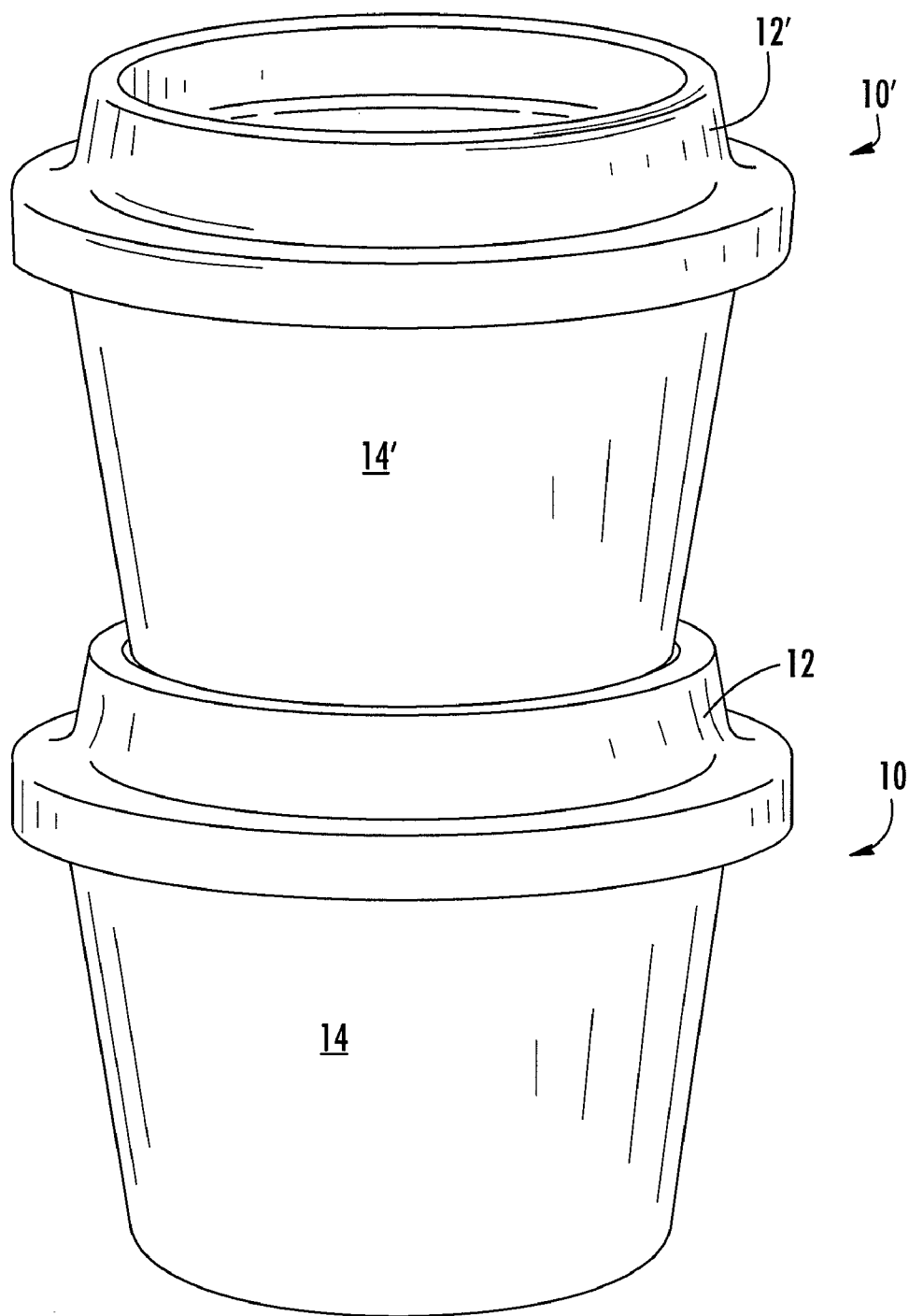


FIG. 1

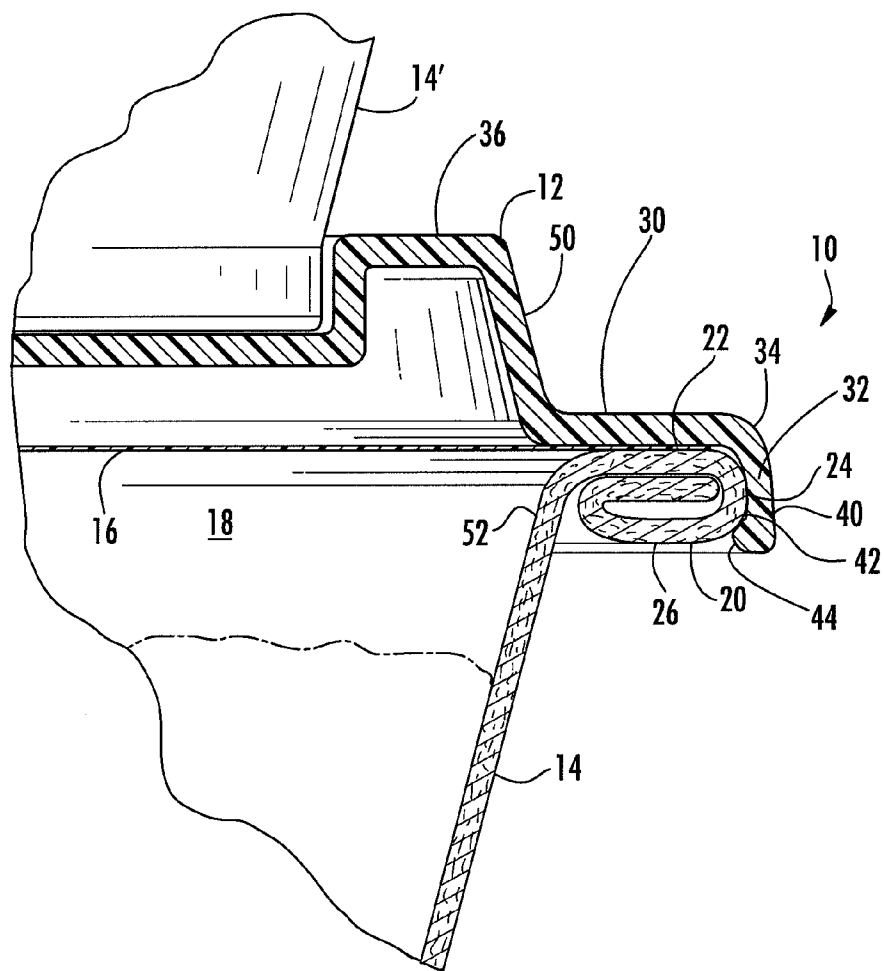


FIG. 2

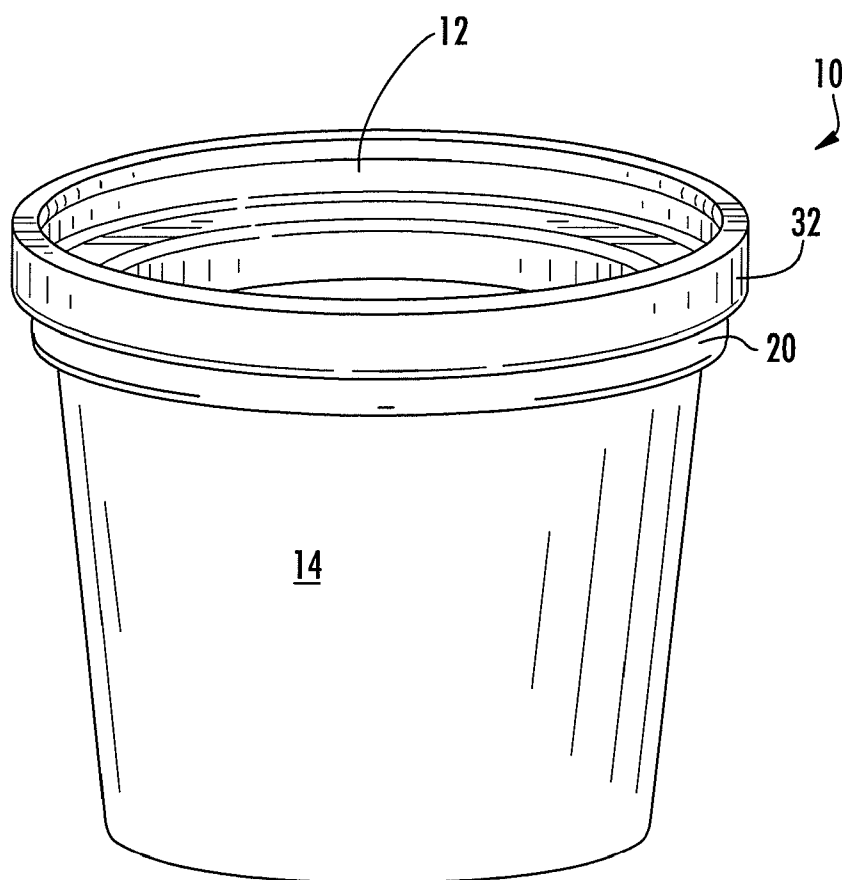
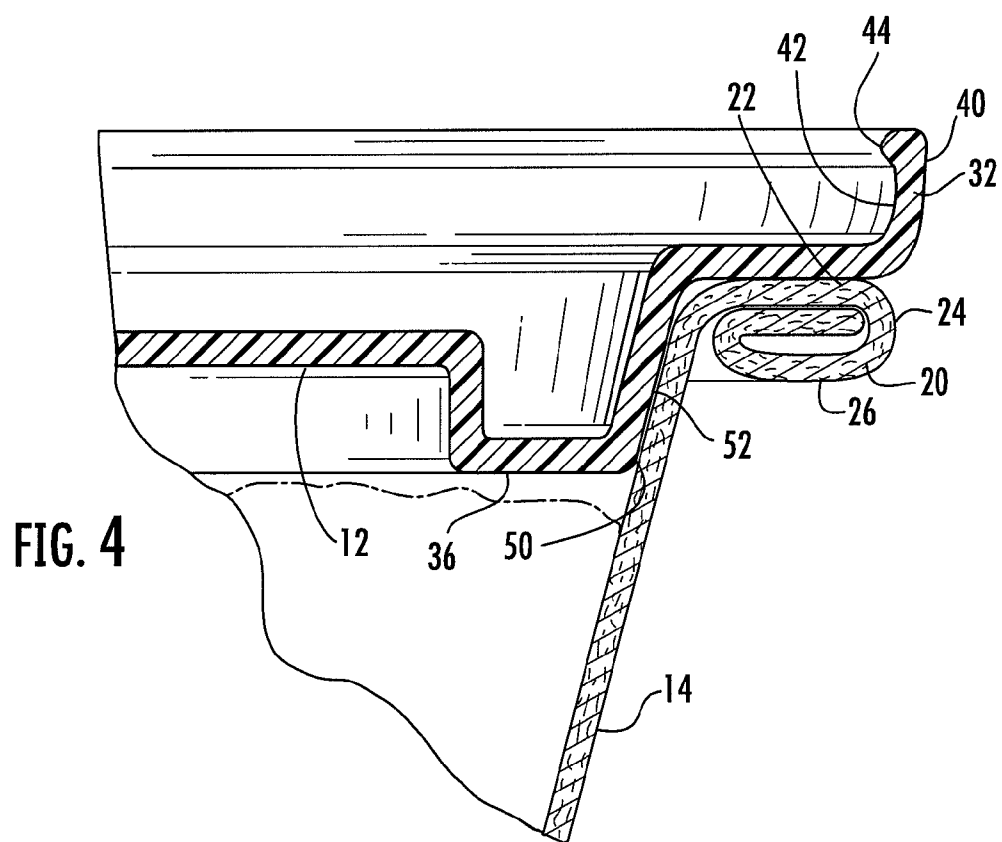


FIG. 3



DUAL FUNCTION OVERCAP FOR A CONTAINER WITH A REMOVABLE MEMBRANE

FIELD OF THE INVENTION

[0001] The present invention relates generally to containers with overcaps. More particularly the invention relates to overcaps for containers with a removable membrane.

BACKGROUND OF THE INVENTION

[0002] Containers that store perishable goods, such as food products, often include a sealed membrane to minimize the transfer of oxygen, moisture, or contaminants into the container. The membrane is removed by the customer when the container is first opened, and the membrane is discarded. An overcap is provided for re-closing the container after the initial opening. The overcap engages a rim (e.g., a rolled bead or a flange) on the top of the container in such a way that a snap-fit or interference-fit connection exists to retain the overcap in place on the container.

[0003] When the membrane is located directly below the overcap, both overcap and membrane provide a sealing barrier over the opening prior to the first opening of the container. Once the membrane has been removed, the overcap provides the only barrier for the remaining product during subsequent storage. Therefore, the overcap should securely connect to the container to reseal the stored product.

[0004] While a membrane is attached to a container, it often extends outwardly to the surface of the container to which the overcap attaches. In such a situation, the overcap is dimensioned to create a tight fit with the container surface and the membrane. However, once the membrane has been removed and the overcap replaced, the overcap may not create a tight fit with only the container surface because of the missing membrane. A loose fit may allow oxygen, moisture, or contaminants to enter the container or may cause the overcap to come off unintentionally.

[0005] Therefore, a need exists for an overcap for containers with membranes that provides an interference-fit when the membrane is attached and when the membrane is removed.

BRIEF SUMMARY OF THE INVENTION

[0006] The invention addresses the above needs and achieves other advantages by providing an interference-fit or snap-fit overcap for engaging a radially outwardly protruding rim of a container that includes a removably attached membrane. The overcap includes a top panel with a periphery and a skirt that extends from the periphery of the top panel. The skirt provides an interference-fit with the rim when the membrane is removably attached to the container. The overcap also includes a circumferential ring that extends in a direction opposite the skirt, and the circumferential ring defines an outside surface that is diametrically dimensioned to produce an interference-fit with an inner wall of the container after the membrane has been removed from the container. Thus, the present invention provides an overcap that in one orientation can be secured to the container when the membrane is attached, and that in an opposite orientation can seal the container closed after the membrane has been removed.

[0007] The circumferential ring of the overcap of some embodiments of the present invention defines an outside surface that is generally angled relative to the axis of the opening of the container to thereby provide an interference-fit with the inner wall of the container. Furthermore, the circumferential ring of additional embodiments defines an innermost portion that is diametrically dimensioned to receive a bottom portion of a second container to thereby allow stacking of containers prior to removal of the membrane.

[0008] The present invention also provides a container with a membrane and an overcap. The container includes a container body formed by a wall, where the wall defines an opening encircled by a radially outwardly protruding rim. The membrane is removably attached to the container to substantially cover the opening while the membrane is attached. The overcap includes a skirt and an opposed circumferential ring, as described above. Thus containers of the present invention may be sealed by interference-fits with the overcap when the membrane is attached and when the membrane is removed.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0009] Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

[0010] FIG. 1 is a perspective view of two containers that are each in accordance with one embodiment of the present invention, illustrating the containers stacked one upon the other;

[0011] FIG. 2 is a partial schematic, cross-sectional view of one overcap of FIG. 1 showing the skirt providing an interference-fit with the rim when the membrane is removably attached to the container;

[0012] FIG. 3 is a perspective view of one container in accordance with one embodiment of the present invention, illustrating the overcap in the inverted position after the membrane has been removed from the container;

[0013] FIG. 4 is a partial schematic, cross-sectional view of the overcap of FIG. 3 showing the circumferential ring providing an interference-fit with the inner wall of the container when the membrane has been removed from the container.

DETAILED DESCRIPTION OF THE INVENTION

[0014] The present invention now will be described more fully hereinafter with reference to the accompanying drawings in which some but not all embodiments of the invention are shown. Indeed, the invention may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout.

[0015] With reference to FIGS. 1-4, a sealable storage device in accordance with one embodiment of the invention is illustrated. The storage device 10 includes an overcap 12,

a container 14, and a membrane 16. The container 14 is structured to store products within the container and to provide access to the stored products through an opening 18. A variety of products can be stored in the storage device 10; however, the storage device is preferably used to store perishable products, and the membrane 16 provides a barrier to seal the container 14.

[0016] Referring now to FIG. 2, the membrane 16 is removably attached to the container 14 during the packaging of the stored product. The membrane 16 substantially covers the entire opening 18 of the container 14 and minimizes or prevents the passage of oxygen, moisture, and/or other contaminants into the container. The membrane 16 must be removed, either completely or partially, to provide access to the product, during normal use of the storage device 10. After the membrane 16 has been removed, it generally cannot be reattached to seal the container 14, and is usually discarded.

[0017] The container 14 as illustrated in FIG. 1 is a generally cylindrical tube that tapers radially outward as the container extends in an axial direction toward the opening. Further embodiments of the invention may include containers, and corresponding overcaps, that are of any geometric shape. Thus, although terms such as diameter, circumferential, radial, and the like, are used herein, they are not intended to limit the invention to any particular configuration, but are merely used as descriptive terms. The container 14 of FIG. 2 includes the opening 18, which is encircled by a radially outwardly protruding rim 20. The rim 20 of the illustrated container 14 is an outwardly rolled bead. Other containers of the present invention may include a rim of any configuration. The rim 20 includes a top surface 22, an outer surface 24, and a bottom surface 26. The rim 20 of FIG. 2 has a generally consistent cross-section throughout the entire circumference of the container; however, other containers of the present invention may include a rim that includes one or more features of varying cross-section. Such features may be included to facilitate removal of the overcap or membrane.

[0018] The membrane 16 of FIG. 2 is attached to only the top surface 22 of the rim 20. Other embodiments of the storage device 10 may include a membrane 16 that is attached to both the top surface 22 and the outer surface 24 of the rim 20 or that is attached to the top surface, the outer surface 24, and the bottom surface 26. The overcaps 12 of such embodiments are structured and arranged to accommodate the membrane 16 attached to the various rim surfaces to improve the fit between the overcap and the membrane and rim 20.

[0019] The overcap 12 of FIG. 2 includes a top panel 30 and a skirt 32. The top panel 30 is generally disk-shaped and defines a periphery 34 proximate the outer circumference of the top panel. The skirt 32 extends downward from the periphery 34 of the top panel 30 in a first direction. For the illustrated embodiment of the present invention, the first direction in which the skirt 32 extends is generally in the same direction as the axis of the opening 18 and container 14; however, further embodiments of the present invention include skirts that extend in alternative directions relative to the opening and/or container. The overcap 12 also includes a circumferential ring 36, as discussed in more detail below, and further embodiments of the storage device may include additional features, including features that are at a radial

distance beyond the periphery or axially above the circumferential ring. Such features may include surfaces to facilitate the disconnecting or connecting of the overcap and container. Referring again to FIG. 2, the skirt 32 of illustrated overcap 12 extends generally perpendicular from the top panel 30 to a distal end 38. Other embodiments of the overcap may include a skirt that extends from the top panel at a non-perpendicular angle.

[0020] The skirt 32 of FIG. 2 has an outside surface 40 and an inside surface 42 facing the interior of the overcap. The inside surface 42 is axially positioned between the top panel 30 and the distal end 38 of the skirt 32. Furthermore, the skirt 32 includes a rib 44 that extends radially-inwardly from the inside surface of the skirt and is axially located proximate the distal end 38. FIGS. 1 and 2 illustrate the overcap 12 connected to the container 14 when the membrane 16 is attached to the container, and FIGS. 3 and 4 illustrate the overcap connected to the container when the membrane has been removed. As shown in FIG. 2, the skirt 32 is sized to produce an interference-fit with the rim 20 when the membrane 16 is removably attached to the container 14. The inside diameter of the inside surface 42 of the undeformed overcap 12 is generally less than the diameter of the outer surface 24 of the rim 20, and the axial distance between the bottom surface of the top panel 30 and the top of the rib 44 is generally less than the axial thickness of the membrane 16 and the rim 20. This difference in diameter and axial thickness creates an interference-fit when the overcap 12 is pushed onto the top of the container when the membrane 16 is attached. However, further embodiments of the present invention define the interference-fit in either the diametrical or axial directions in alternative fashions suitable to keep the overcap securely retained to the container when the membrane is removably attached. When the overcap 12 is attached, a slight growth in diameter of the skirt 32 or axial distance between the top panel 30 and the rib 44 and/or a slight reduction in diameter of the rim 20 or slight reduction in axial thickness of the membrane 16 and rim occurs through material deformation. Since the materials have resilience, they exert a restoring force, which tends to keep the overcap 12 attached. Further embodiments of the storage device that include a membrane that is attached to the top surface of the rim and/or the top surface and outer surface of the rim include an overcap with skirt and/or rib that are sized to accommodate the additional thickness of the membrane while still providing an interference fit.

[0021] Referring again to FIG. 2, the overcap 12 includes a circumferential ring 36 that extends from the top panel 30 in a second direction that is generally opposite the first direction in which the skirt 32 extends. The circumferential ring 36 of the illustrated embodiments defines a ring of continuous cross-section; however, further embodiments of the present invention include circumferential rings with alternative cross-sections and/or cross-sections that change as the ring extends circumferentially, to describe two non-limiting ways in which the circumferential ring may vary from the illustrated embodiment. The circumferential ring 36 of FIG. 2 defines an outside surface 50 on a radially outermost portion of the circumferential ring. The outside surface 50 is diametrically dimensioned to define a diameter that is greater than the diameter of an inner wall 52 of the container 14 that the outside surface of the circumferential ring 36 engages when the overcap is inverted and inserted into the opening 18 of the container. Because the outside

surface **50** defines a greater diameter than the inner wall **52**, the circumferential ring **36** produces an interference-fit with the inner wall of the container after the membrane **16** has been removed from the container.

[0022] The outside surface **50** of the circumferential ring **36** of the illustrated embodiments of the present invention defines a surface that is generally angled relative to the axis (or axial direction) of the container **14**. The angled outside surface **50** is structured to generally coincide with the angle of an inner wall **52** of the container **14** such that when the overcap is inverted, as illustrated in FIGS. **3** and **4**, the circumferential ring **36** produces the interference-fit with the inner wall of the container. Further embodiments of the present invention define outside surfaces and inner walls at alternative angles, that define curved surfaces, or that are axially aligned with the axis of the container or opening. Still further embodiments of the present invention include surface texturing or additional components on the outside surface and/or inner wall to enhance the interference-fit and the resulting seal.

[0023] The overcap **12** of FIGS. **1-4** can be made of various materials that have sufficient flexibility and resilience to allow the necessary deformation of the overcap as it is pushed onto the container rim. Suitable materials include but are not limited to polyester, polyolefins (including homopolymers, co-polymers, etc.) such as polyethylene or polypropylene, polystyrene, elastomers (including thermoplastic rubber, thermoplastic elastomer, etc.), and mixtures or combinations thereof. The membrane **16** can be manufactured from any suitable material or combinations of two or more different materials, and can be removably attached by any suitable adhesive or process. The membrane **16** of the illustrated storage device **10** is a metal foil that is joined with adhesive to a container **14** that is a paperboard container. Where moisture and/or gas barrier performance is required of the membrane, the membrane can comprise various barrier materials, including but not limited to metal foil, polyethylene terephthalate, metallized polyethylene terephthalate, polyethylene naphthalate, metallized polypropylene, metal oxide and silicate coated polyester, metal oxide and silicate coated polypropylene, ethylene vinyl alcohol copolymer, and mixtures thereof. Instead of or in addition to a barrier layer of such materials, the membrane can include one or more layers of other materials such as polyester, polyolefin, and others. The membrane **16** can be adhered to the container by various materials, including but not limited to glues or adhesives such as hot melt glues, ethylene vinyl acetate, ethyl methyl acrylate, metallocenes, and the like, heat seal materials such as ionomers (e.g., SURLYN®, TRANCEND®, or the like), polypropylene (with or without mineral filler), high-density polyethylene, low-density polyethylene, and others. The container itself can be formed of various materials and by various processes including but not limited to spiral winding of composite materials, convolute winding of composite materials, injection molding, blow molding, or thermoforming a suitable polymer material, and others.

[0024] Many modifications and other embodiments of the invention set forth herein will come to mind to one skilled in the art to which the invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific

embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

That which is claimed:

1. An interference-fit overcap for engaging a radially outwardly protruding rim encircling a container opening having a removably attached membrane, wherein the container defines an opening encircled by an inner wall of the container, the overcap comprising:

a top panel having a periphery;

a skirt extending in a first direction from the periphery of the top panel to a distal end, wherein the skirt provides an interference-fit with the rim when the membrane is removably attached to the container; and

a circumferential ring extending in a second direction, which is generally opposite the first direction, from the top panel and defining an outside surface on a radially outermost portion of the circumferential ring, wherein the outside surface is diametrically dimensioned to produce an interference-fit with the inner wall of the container after the membrane has been removed from the container.

2. An interference-fit overcap according to claim 1, wherein the container defines an axial direction and the outside surface of the circumferential ring defines a generally angled surface relative to the axial direction.

3. An interference-fit overcap according to claim 1, wherein the skirt defines a radially-inwardly extending bead at the distal end of the skirt.

4. An interference-fit overcap according to claim 1, wherein the circumferential ring defines an innermost portion that is diametrically dimensioned to receive a bottom portion of a second container.

5. A container, comprising:

a container body formed by a wall, wherein an inner wall defines an opening encircled by a radially outwardly protruding rim;

a removably attached membrane substantially covering the opening while the membrane is attached; and

an interference-fit overcap, comprising:

a top panel having a periphery;

a skirt extending in a first direction from the periphery of the top panel to a distal end, wherein the skirt provides an interference-fit with the rim when the membrane is removably attached to the container; and

a circumferential ring extending in a second direction, which is generally opposite the first direction, from the top panel and defining an outside surface on a radially outermost portion of the circumferential ring, wherein the outside surface is diametrically dimensioned to produce an interference-fit with the inner wall of the container after the membrane has been removed from the container.

6. A container according to claim 5, wherein the outwardly protruding rim is an outwardly rolled bead.

7. A container according to claim 5, wherein the container defines an axial direction and the outside surface of the circumferential ring defines a generally angled surface relative to the axial direction.

8. A container according to claim 5, wherein the skirt defines a radially-inwardly extending bead at the distal end of the skirt.

9. A container according to claim 10, wherein the circumferential ring defines an innermost portion that is diametrically dimensioned to receive a bottom portion of a second container.

10. A container according to claim 10, wherein the membrane is a metal foil.

11. A container according to claim 10, wherein the overcap is a thermoplastic material.

12. A sealable storage device, comprising:

a container, comprising:

a body formed by a wall,

an opening defined by an inner wall of the container, and

an outwardly rolled bead encircling the opening of the container, wherein the bead protrudes generally outward from the wall;

a removably attached membrane substantially covering the opening while the membrane is attached; and

an interference-fit overcap of thermoplastic material, comprising:

a top panel having a periphery;

a skirt extending in a first direction from the periphery of the top panel to a distal end, wherein the skirt provides an interference-fit with the rim when the membrane is removably attached to the container; and

a circumferential ring extending in a second direction, which is generally opposite the first direction, from the top panel and defining an outside surface on a radially outermost portion of the circumferential ring, wherein the outside surface is diametrically dimensioned to produce an interference-fit with the inner wall of the container after the membrane has been removed from the container.

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