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(54) Double rib overcap for a container with a removable membrane

(57) There is provided a double rib overcap (12) for a container (14) with a removable membrane (16). The skirt (32) of the overcap (12) includes a first inwardly projecting rib (52) and a second inwardly projecting rib (54) that are axially separated and includes inside surfaces of the skirt (32) that are axially above each rib. The container (14) has an opening (18) that is encircled by a rim (20) and the membrane (16) covers the opening (18) such that the membrane (16) extends radially onto an outer surface of the rim (20). A first inside surface above the first rib (52) of the overcap (12) is dimensionally sized to create an interference- fit with the membrane (16) and the rim when the overcap (12) is connected to the container (14). Likewise, a second inside surface above the second rib (54) of the overcap (12) is dimensionally sized to create an interference-fit with the rim of the container (14) when the overcap (12) is connected to the container (14) after the membrane (16) has been removed.

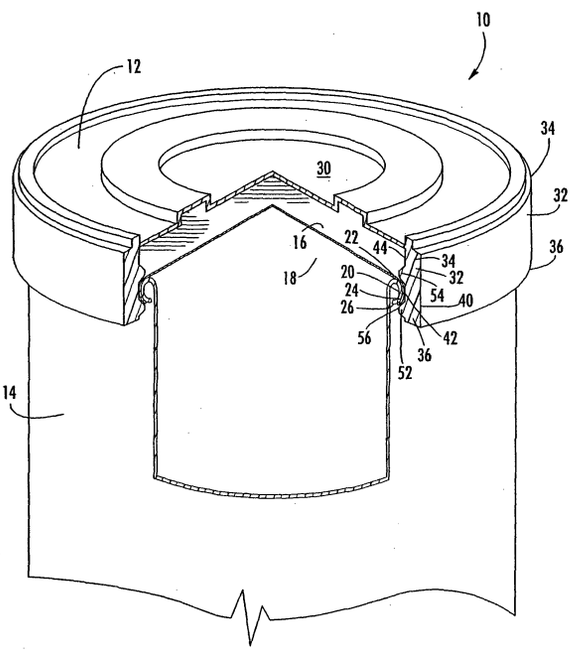

FIG. 1

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Description

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. The overcap has a skirt configured to engage a rim of the container with an interference-fit to seal the container.

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 reclosing 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. An insufficient 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 to a distal end. The skirt defines a first inside surface that is axially spaced from the top panel and is proximate the distal end of the skirt. The skirt also defines a second inside surface axially positioned between the first inside surface and the top panel. The first inside surface is diametrically dimensioned to produce an interference-fit with the membrane and rim when the overcap is connected to the container with the attached membrane. The second inside surface is diametrically dimensioned to produce an interference-fit with the rim alone when the overcap is connected to the container without the membrane.

[0007] The skirt of the overcap includes a first rib projecting inwardly from the skirt and axially located between the first inside surface of the skirt and the distal end of the skirt. The skirt also includes a second rib projecting inwardly from the skirt and axially located between the second inside surface and the first inside surface. When the overcap is connected to the container with the attached membrane such that the membrane and rim create an interference-fit with the first inside surface, the first rib engages beneath the rim of the container to resist detachment of the overcap. When the overcap is connected to the container without the attached membrane such that second inside surface creates an interference-fit with the rim and the second rib engages beneath the rim of the container to resist detachment of the overcap.

[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 with two inside surfaces and two ribs, as described above. One embodiment of the invention includes a membrane that extends radially outward onto the outer surface of the rim, and another embodiment includes a membrane that covers the container opening without extending radially outward onto the outer surface of the rim.

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:

FIG. 1 is a perspective view of an overcap, partially in section, in accordance with an embodiment of the present invention;

FIG. 2 is a schematic, cross-sectional view of the overcap of **FIG. 1** showing the first inside surface of the overcap engaging the membrane and the rim of the container to create an interference-fit; and

FIG. 3 is a schematic, cross-sectional view of the overcap of **FIG. 1** showing the second inside surface of the overcap engaging the rim of the contain-

er to create an interference-fit.

DETAILED DESCRIPTION OF THE INVENTION

[0010] 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.

[0011] With reference to **FIGS. 1-3,** 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 because the membrane **16** provides a barrier to seal the container **14.**

[0012] The membrane **16** is removably attached to the container **14** during the packaging of the stored product, subsequent to the placement of the product within the container. 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.

[0013] The container **14** as illustrated in **FIG. 1** is a cylindrical tube. Further embodiments of the invention may include containers, and corresponding overcaps **12,** 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. 1** 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 **14** of the present invention may include a rim **20** 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. 1** has a generally consistent cross-section throughout the entire circumference of the container; however, other containers **14** 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 **12** or membrane **16.**

[0014] The membrane **16** of **FIGS. 1-3** is attached to both the top surface **22** and the outer surface **24** of the rim **20.** Other embodiments of the storage device **10** may include a membrane **16** that is attached only to the top surface **22** 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 arrange to accommodate the membrane **16** attached to the various surfaces to improve the fit between the overcap and the membrane and rim **20.**

[0015] The overcap **12** of **FIG. 1** includes a top panel **30** and a skirt **32.** The top panel **30** is generally disk-shaped and may include additional features on the top surface and the bottom surface of the top panel. The top panel **30** also 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.** The overcap **12** of further embodiments of the storage device **10** may include features that are at a radial distance beyond the periphery **34** or above the top panel **30.** Such features may include surfaces to facilitate the disconnecting or connecting of the overcap **12** and container **14.** The skirt **32** of illustrated overcap **12** extends generally perpendicular from the top panel **30** to a distal end **36.** Other embodiments of the overcap **12** may include a skirt **32** that extends from the top panel **30** at a non-perpendicular angle.

[0016] The skirt **32** of **FIG. 2** and **FIG. 3** has an outside surface **40** and an inside surface facing the interior of the overcap. The inside surface of the skirt **32** includes a first inside surface **42** and a second inside surface **44.** The first inside surface **42** is axially spaced apart from the top panel **30** and is proximate the distal end **36** of the skirt **32.** The second inside surface **44** is axially positioned between the first inside surface **42** and the top panel **30.** Furthermore, the skirt **32** includes a first rib **52** that projects inwardly from the inside surface of the skirt and is axially located between the first inside surface **42** and the distal end **36.** The skirt **32** also includes a second rib **54** that projects inwardly from the inside surface of the skirt and is axially located between the second inside surface **44** and the first inside surface **42.**

[0017] **FIG. 2** illustrates the overcap **12** connected to the container **14,** when the membrane **16** is attached to the container, and **FIG. 3** illustrates the overcap connected to the container when the membrane has been removed. As shown in **FIG. 2,** the first inside surface **42** is diametrically dimensioned to produce an interference-fit with the membrane **16** and the rim **20.** The inside diameter of the first inside surface **42** of the undeformed overcap **12** is generally less than the diameter of the outer surface **24** of the rim **20** added to twice the thickness of the membrane. This difference in diameter creates an interference-fit when the overcap **12** is pushed onto the top of the container. A slight growth in diameter of the overcap **12** and/or a slight reduction in diameter of the rim **20** and membrane **16** occurs through material deformation. Since the materials have resilience, they exert a restoring force, which tends to keep the overcap **12** attached. Other embodiments of the interference-fit

overcap **12** may create the interference-fit by having a friction-fit or an interference-fit between the membrane **16** and/or a surface of the rim **20** and the first inside surface **42** of the skirt **32,** between the membrane and/or a surface of the rim and the first rib **52,** between the membrane and/or a surface of the rim and the second rib **54,** or between any combination of the rim features and the skirt features.

[0018] As shown in **FIG. 3,** the second inside surface **44** is diametrically dimensioned to produce an interference-fit with the rim **20** alone. The inside diameter of the second inside surface **44** of the interference-fit overcap **12** is generally less than the diameter of the outer surface **24** of the rim **20.** This difference in diameter creates the interference-fit. Other embodiments of the interference-fit overcap **12** may create the interference-fit by having a friction-fit or an interference-fit between a surface of the rim **20** and the second inside surface **44** of the skirt **32,** between a surface of the rim and the second rib **54,** between a surface of the rim and the top panel **30,** or between any combination of the rim features and the skirt features.

[0019] The first inside surface **42** of the skirt **32** defines an inside diameter that is approximately equivalent to a combined distance of the inside diameter of the second inside surface **44** and twice the thickness of the membrane **16,** as illustrated in **FIGS. 2** and **3.** Further embodiments of the overcap **12** may include a first inside surface **42** and second inside surface **44** that have various relative inside diameters.

[0020] The ribs **52** and **54** of the overcap engage the rim **20** of the container **14** to resist detachment of the overcap from the container when the rim of the container is located axially above the respective rib. When the membrane **16** is attached and the membrane and rim **20** engage the first inside surface **42,** the first rib **52** may contact the rim on the bottom surface **26,** the outer surface **24,** or some combination of both surfaces to resist detachment of the overcap **12** from the container **14.** Likewise, when the membrane **16** is removed and the rim **20** engages the second inside surface **44,** the second rib **54** may contact the rim on the bottom surface **26,** the outer surface **24,** or some combination of both surfaces to resist detachment of the overcap **12** from the container **14.**

[0021] The overcap **12** of **FIGS. 2** and **3** has a first rib **52** and a second rib **54** that each define a rounded portion **56** at the innermost surface of the rib. The rounded portion **56** of the rib **52** and of the rib **54** is the surface of the respective rib opposite the outside surface **40** of the skirt **32.** The rounded portion **56** of each rib facilitates the connecting and disconnecting of the overcap **12,** while minimizing or preventing damage to the membrane **16** or the rim **20.** The rounded portion **56** of the first rib **52** defines a diametrical distance relatively smaller than the inside diameter of the first inside surface **42.** Therefore, when the overcap **12** is connected to the container **14,** the skirt **32** of the overcap must flex outward and/or the rim **20** flex inward to allow passage of the membrane **16** and the rim past the first rib **52** and into the first inside surface, as shown in **FIG. 2.** Likewise, the rounded portion **56** of the second rib **54** has an inside diameter smaller than the inside diameter of the second inside surface **44.** Therefore, when the overcap **12** is connected to the container **14,** the skirt **32** of the overcap must flex outward and/or the rim **20** flex inward to allow passage of the rim past the first rib **52** and second rib **54** and into the first inside surface, as shown in **FIG. 3.**

[0022] The overcap **12** of **FIG. 1** 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 overcap **12** of the illustrated embodiment is made of a material that is sufficiently flexible and resilient to allow passage of the rim **20** of the container **14** through the first rib **52** and the second rib **54** of the overcap. An overcap **12** of a more rigid material may include a thin-wall portion in the top panel **30** or skirt **32** such that the rigid material is allowed to flex enough to allow passage of the rim **20** of the container **14** through the first rib **52** and the second rib **54** of the overcap.

[0023] Each of the ribs **52** and **54** of the overcap **12** of **FIGS. 1-3** defines an uninterrupted circumferential rib to provide uniform retention of the overcap when the overcap is attached or connected to the container **14.** Other embodiments of the overcap **12** may include a first rib **52** and/or a second rib **54** that defines a plurality of circumferentially spaced portions. These spaced portions may be of equal circumferential width and spacing or may be of random width and spacing. Each of the portions of the plurality of circumferentially spaced portions defining a single rib are all located at an equivalent axial distance from the top panel **30,** so that when the overcap **12** is attached to the container, the top panel is generally parallel to the opening **18.**

[0024] The membrane **16** can be manufactured from any suitable material or combinations or 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 tube. 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.

[0025] 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.

Claims

1. An interference-fit overcap, for engaging a radially outwardly protruding rim encircling a container opening having a removably attached membrane, comprising:

a top panel having a periphery;
a skirt extending from the periphery of the top panel to a distal end such that the skirt defines a first inside surface axially spaced from the top panel proximate the distal end of the skirt and defines a second inside surface axially positioned between the first inside surface and the top panel, wherein the first inside surface is diametrically dimensioned to produce an interference-fit with the membrane and rim and the second inside surface is diametrically dimensioned to produce an interference-fit with the rim alone;
a first rib projecting inwardly from the skirt and axially located between the first inside surface of the skirt and the distal end of the skirt; and
a second rib projecting inwardly from the skirt and axially located between the second inside surface and the first inside surface;

wherein the first rib engages beneath the rim of the container to resist detachment of the overcap when the membrane is attached and the second rib engages beneath the rim of the container to resist detachment of the overcap when the membrane is not attached.

2. An interference-fit overcap according to claim 1, wherein the radially outwardly protruding rim encircling the container defines an outer surface and the membrane extends radially outward onto the outer surface of the rim.

3. An interference-fit overcap according to claim 1, wherein the radially outwardly protruding rim encircling the container defines an outer surface and the membrane covers the container opening without extending radially outward onto the outer surface of the rim.

4. An interference-fit overcap according to claim 1, wherein the first rib and the second rib each defines an uninterrupted circumferential rib.

5. An interference-fit overcap according to claim 1, wherein the first rib and the second rib each defines a plurality of circumferentially spaced portions.

6. An interference-fit overcap according to claim 1, wherein the skirt extends substantially perpendicular to the top panel of the overcap.

7. An interference-fit overcap according to claim 1, wherein the first rib and the second rib of the overcap each define a rounded edge portion at a radially inward surface opposite the first inside surface and the second inside surface of the skirt.

8. An interference-fit overcap according to claim 7, wherein the rounded edge portion of the first rib defines an inside diameter relatively larger than an inside diameter of the rounded edge portion of the second rib.

9. An interference-fit overcap according to claim 1, wherein the overcap is a thermoplastic material.

10. A container, comprising:

a container body formed by a wall, wherein the 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 from the periphery of the top panel to a distal end such that the skirt defines a first inside surface axially spaced

from the top panel proximate the distal end of the skirt and defines a second inside surface axially positioned between the first inside surface and the top panel, wherein the first inside surface is diametrically dimensioned to produce an interference-fit with the membrane and rim and the second inside surface is diametrically dimensioned to produce an interference-fit with the rim alone;

a first rib projecting inwardly from the skirt and axially located between the first inside surface of the skirt and the distal end of the skirt; and

a second rib projecting inwardly from the skirt and axially located between the second inside surface and the first inside surface;

wherein the first rib engages beneath the rim of the container to resist detachment of the overcap when the membrane is attached and the second rib engages beneath the rim of the container to resist detachment of the overcap when the membrane is not attached.

11. A container according to claim 10, wherein the radially outwardly protruding rim encircling the container defines an outer surface and the membrane extends radially outward onto the outer surface of the rim.

12. A container according to claim 10, wherein the radially outwardly protruding rim encircling the container defines an outer surface and the membrane covers the container opening without extending radially outward onto the outer surface of the rim.

13. A container according to claim 10, wherein the outwardly protruding rim is an outwardly rolled bead.

14. A container according to claim 10, wherein the first rib and the second rib each defines an uninterrupted circumferential rib.

15. A container according to claim 10, wherein the first rib and the second rib each defines a plurality of circumferentially spaced portions.

16. A container according to claim 10, wherein the skirt extends substantially perpendicular to the top panel of the overcap.

17. A container according to claim 10, wherein the first rib and the second rib of the overcap each define a rounded edge portion at a radially inward surface opposite the first inside surface and second inside surface of the skirt.

18. A container according to claim 17, wherein the rounded edge portion of the first rib defines an inside diameter relatively larger than an inside diameter of the rounded edge portion of the second rib.

19. A container according to claim 10, wherein the membrane defines a thickness and the inside diameter of the first inside surface is approximately equivalent to a combined distance of the inside diameter of the second inside surface and twice the thickness of the membrane.

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

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

22. A sealable storage device, comprising:

a container, comprising:

a body formed by a wall,

an opening defined by the wall, and

an outwardly rolled bead encircling the opening of the container,

wherein the bead protrudes generally outward from the wall and defines an outer surface;

a membrane removably attached to the bead such that the membrane substantially covers the opening and extends radially outward onto the outer surface of the bead while the membrane is attached; and

an interference-fit overcap, comprising:

a top panel having a periphery;

a skirt extending from the periphery of the top panel to a distal end such that the skirt defines a first inside surface axially spaced from the top panel proximate the distal end of the skirt and defines a second inside surface axially positioned between the first inside surface and the top panel, wherein the first inside surface is diametrically dimensioned to produce an interference-fit with the membrane and bead and the second inside surface is diametrically dimensioned to produce an interference-fit with the bead alone;

a first rib projecting inwardly from the skirt and axially located between the first inside surface of the skirt and the distal end of the skirt; and

a second rib projecting inwardly from the skirt and axially located between the second inside surface and the first inside sur-

face;

wherein the first rib engages beneath the bead of the container to resist detachment of the overcap when the membrane is attached and the second rib engages beneath the bead of the container to resist detachment of the overcap when the membrane is not attached.

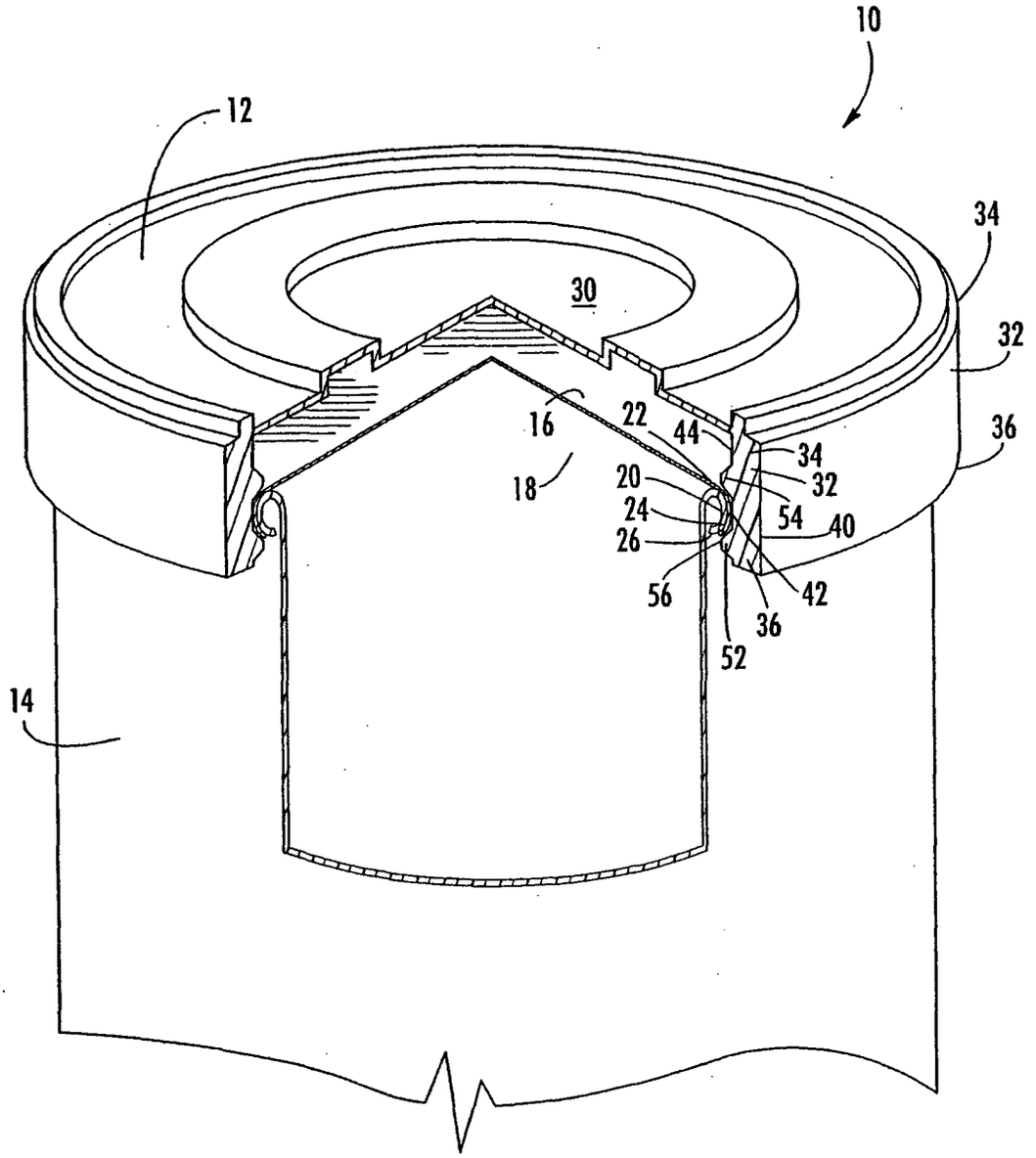

FIG. 1

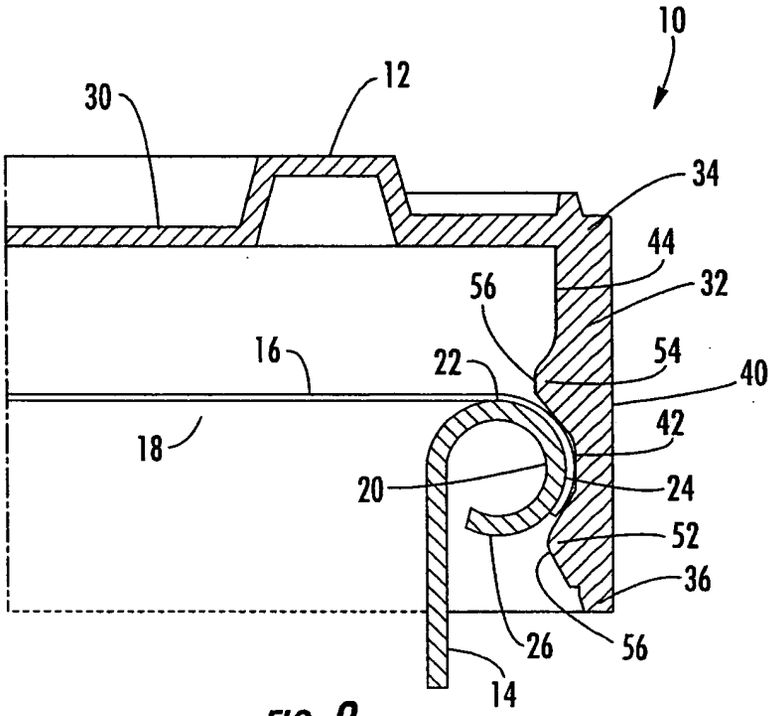
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FIG. 2

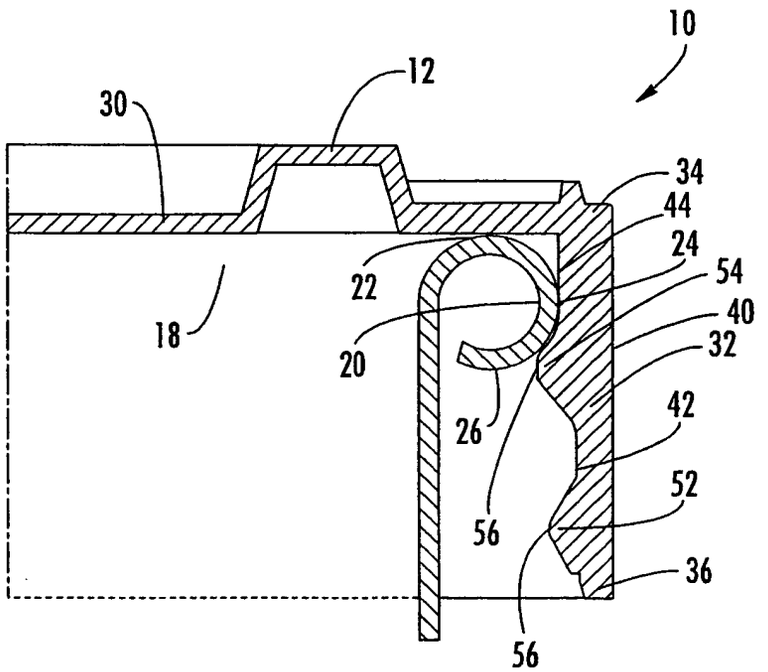
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FIG. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 25 0526

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	27 May 2005	SERRANO GALARRAGA, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 25 0526

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27-05-2005

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82