(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 921 232 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
07.10.2020 Bulletin 2020/41

(51) Int Cl.:
B01L 3/00 *(2006.01)* ***B65D 41/04*** *(2006.01)*
B65D 41/06 *(2006.01)* ***B65B 7/28*** *(2006.01)*

(21) Application number: **15159958.6**

(22) Date of filing: **19.03.2015**

(54) CONTAINER AND CONTAINER ENGAGING MEMBER SUITABLE FOR VACUUM ASSISTED FILTRATION

BEHÄLTER UND BEHÄLTEREINRASTELEMENT FÜR VAKUUMUNTERSTÜTZTE FILTRATION

RÉCIPIENT ET ÉLÉMENT DE CONTACT D'UN TEL RÉCIPIENT APPROPRIÉ POUR FILTRATION ASSISTÉE PAR DÉPRESSION

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **21.03.2014 US 201461968532 P**
09.03.2015 US 201514641843

(43) Date of publication of application:
23.09.2015 Bulletin 2015/39

(60) Divisional application:
20190545.2

(73) Proprietor: **EMD Millipore Corporation**
Burlington, MA 01803 (US)

(72) Inventors:
- **Scott, Chris**
  Billerica, Massachusetts 01821 (US)
- **Greenizen, Kurt**
  Billerica, Massachusetts 01821 (US)
- **Sydlowski, Paul**
  Billerica, Massachusetts 01821 (US)
- **Doyle, Jay**
  Billerica, Massachusetts 01821 (US)

(74) Representative: **Uexküll & Stolberg**
Partnerschaft von
Patent- und Rechtsanwälten mbB
Beselerstraße 4
22607 Hamburg (DE)

(56) References cited:
GB-A- 2 267 484
US-A- 5 145 080
US-A- 5 271 512
US-A- 5 533 633
US-A- 5 853 093
US-A1- 2002 195 412
US-A1- 2005 242 055
US-A1- 2013 334 164
US-B1- 6 227 391

EP 2 921 232 B1

Description

BACKGROUND

[0001] The embodiments disclosed herein generally relate a container and a container engaging member, and in certain embodiments, relate to vacuum filter devices and particularly to such devices for filtering liquids from one container through a membrane and depositing the filtrate directly into another container.

[0002] Numerous laboratory devices have been developed to carry out filtration, in order to concentrate, separate and/or purify laboratory samples. Researchers routinely need to concentrate their sample prior to other investigative research. Devices for filtering biological solutions generally involve three primary components, i.e. a membrane filter interposed between two vessels, a feed container located upstream of the membrane for holding the sample solution to be filtered and a filtrate container located downstream of the membrane filter for collecting the filtered sample solution. Typically a vacuum is drawn downstream of the membrane to increase the rate of filtration by creating a pressure differential across the filter.

[0003] Several device designs have been made for filtering a feed liquid into a filtrate container. These are typically used to clarify and sterilize biological solutions, such as fetal calf serum, tissue culture media and the like. In certain conventional devices, the user transfers the feed liquid from a storage vessel to the filter device. Vacuum filtration systems such as the STERICUP® system commercially available from EMD Millipore is ideally suited for sterile filtration of cell culture media, buffers and reagents. This device can handle a maximum unfiltered volume of 1 liter based on the size of the feeding funnel. Large volumes can be processed continuously, as determined by the volume of the feed and filtrate storage vessels.

[0004] The arrangement of the components for vacuum filtration can take various forms; however, especially in laboratory settings, ease of use, reduced storage requirements and minimal disposable hardware are important concerns as is avoiding spillage of the biological solution. In certain other applications, preserving the sterility of the solution being filtered is also important.

[0005] Various single use, disposable, sterile filtration devices including a funnel and lid attached to a filtration collar, with an attached container, are commercially available. Most of these devices can process volumes ranging from 150 ml to 1000 ml, and offer a filtration top that includes a funnel and lid attached to a filtration collar assembly that one can assemble onto a pre-existing bottle or container. The assembly comes bagged with packaged bottle caps, and are sterilized such as by gamma sterilization. Conventional devices require 1-2 turns to disengage the bottle or container from the filter after filtration is complete. Since the bottle or container is filled with media, this manipulation can lead to possible dripping, spilling, etc., as well as contamination of the sample. This is especially true when operating in a laminar flow cell culture hood, where the sash is open 10-18" and manipulation is especially difficult.

[0006] US 2002/0195412 A1 discloses a combination of a container and a reversible child-resistant cap. The container includes a double entry thread in its upper end region and, below thereof, a locking mechanism having a sloped snap protrusion, a notch, and a raised stop member. The faces of the snap protrusion and the raised stop member joining the notch run perpendicularly with respect to the base line of the notch. The cap comprises a seal, at one end a thread matching the thread of the container, and at the other end a tab or locking lug fitting to the notch. The cap can be connected to the container in two ways: either by using the thread, or (when the cap is reversed in position) in a child-resistant manner. In the latter, a locking lug fits into the notch and locks the cap so that it cannot be rotated because of the perpendicularly running end faces of the notch. To overcome this lock, the cap has to be axially pressed (in order to release the lug from the notch) and to be rotated (so that the lug gets out of the area of the sloped snap protrusion).

[0007] US 2005/0242055 A1 discloses a child-resistant container and cap, in which part of a connecting thread comprises a barb. The barb can be moved out of a blocking action by an axial pressure onto the cap, which causes a flexure of part of the thread.

SUMMARY

[0008] The present invention relates to a container and a container engaging member and to a method of engaging a container and a container engaging member and is defined in claims 1 and 10, respectively. Advantageous versions of the invention follow from the dependent claims.

[0009] The problems of the prior art have been overcome by the embodiments disclosed herein, which provide a device particularly useful for large volume filtration of sample, although the applications are not limited to filtration. In certain embodiments, the device provides rapid high-quality separations or purifications of samples in a convenient and reliable manner, which simplifies the engagement and disengagement of the various device components. Assurance is provided that the device is closed, and feedback is provided to the user that the container engaging member is completely engaged. The device includes a container and a container engaging member. In certain embodiments, the container engaging member includes a collar, and may include a sample holder or reservoir or funnel and a filtration element such as a membrane. In the assembled condition, the sample holder or reservoir is upstream of the filtration element, the container is downstream of the filtration element, and the sample holder or reservoir is attached to the container. In certain embodiments, the container is a filtrate bottle. Upon subjecting the sample in the sample holder to

a driving force such as vacuum, the sample flows from the reservoir, through the filtration element, and into the container. In certain embodiments, the container engaging member includes a container cap. In certain embodiments, the container engagement member is engageable and disengageable from the bottle or container in a quick attach, quick release manner, such as with only a 90 degree, ¼ turn. Since only a 90 degree ¼ turn is required to engage or disengage the components, the user's hands/fingers do not have to leave the device to engage or disengage the components. A tactile indication that the engagement is complete is provided. In certain embodiments, an audible indication that the engagement is complete is provided. In certain embodiments, the container engagement member is a container cap that is similarly engageable and disengageable from the container, with similar audible and tactile indications.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

FIG. 1 is a perspective view of a container in accordance with certain embodiments;

FIG. 2 is an enlarged perspective view of the neck portion of the container of FIG. 1 in accordance with certain embodiments;

FIG. 3A is a perspective bottom view of a container engaging member in accordance with certain embodiments;

FIG. 3B is a perspective view of a neck portion of a container in accordance with certain embodiments;

FIG. 3C is a cross-sectional view of tabs on the outer surface of the neck of a container in accordance with certain embodiments;

FIG. 4 is a perspective bottom view of a container engaging member with a portion shown in detail, in accordance with certain embodiments;

FIG. 5 is a perspective view of a container with a portion shown in detail, in accordance with certain embodiments;

FIG. 5A is a partial enlarged perspective view of a container engaged with a container engaging member in accordance with certain embodiments;

FIG. 5B is a perspective view of an engaging member shown engaged with and sealed to a container in accordance with certain embodiments;

FIG. 6 is a perspective bottom view of a container engaging member in accordance with certain embodiments;

FIG. 7 is an enlarged perspective bottom view of a container engaging member in accordance with certain embodiments;

FIG. 7A is a perspective view of another engaging member engaged with and sealed to a container in accordance with certain embodiments;

FIG. 8 is a partial enlarged perspective bottom view of a container engaging member not in accordance with the presently claimed subject matter;

FIG. 9 is a partial enlarged perspective view of a container engaged with a container engaging member not in accordance with the presently claimed subject matter; and

FIGS. 10A, 10B and 10C are views illustrating a snap lock feature which is not in accordance with the presently claimed subject matter.

DETAILED DESCRIPTION

[0011] Turning first to FIG. 1, in accordance with certain embodiments there is shown a container or housing 10 having an open top 11 as shown. In the embodiment shown, the container 10 is a generally cylindrical one-piece housing that can hold relatively large volumes of sample, such as about 500 milliliters, although the volume capacity is not particularly limited. In certain embodiments, the container 10 is made of a plastic such as polystyrene, polycarbonate, a member of the PET family (e.g., PETG, PETE), and a polyolefin, particularly polypropylene, but may also be made from any other suitable material not deleterious to the operation (keeping in mind cost and vacuum strength).

[0012] FIG. 2 shows the details of certain embodiments of the neck 13 of the container 10. In certain embodiments, the neck 13 is generally cylindrical and extends from the body 12 of the container 10. The neck 13 is open at 11, allowing access to the interior of the container 10. The outer surface of the neck 13 includes a plurality of spaced tabs 14, individually labeled as tabs 14a, 14b, 14c, 14d (four shown) that extend radially outwardly from the outer surface of the neck 13. In certain embodiments, there are six spaced tabs, positioned in three stacked pairs, each stacked pair being spaced from another stacked pair. In certain embodiments, the spacing between stacked pairs of tabs is determined to achieve a balance between moldability and function (stability and avoidance of cross-threading). Each stacked pair includes an upper tab (e.g., 14a) and a lower tab (e.g., 14b), the lower tab parallel to, aligned with, and positioned just below the upper tab. In certain embodiments, each of the tabs extends radially outwardly from the neck 13 to the same extent, and are similarly shaped. In certain embodiments, the opposite ends of each tap taper inwardly towards each other. In certain embodiments, the tabs in two stacked pairs of tabs are shorter in length than the tabs in the third stacked pair, to ensure orientation is in one direction and that the container and engaging member line up. In certain embodiments, the tabs of the two stacked pairs that are shorter in length than the tabs of the third are of equal length. As seen in FIG. 3C, in certain embodiments each tab includes a downwardly sloping ramp portion 24 that transitions to a vertical portion 25, and has a flat bottom portion 26. The tabs are discontinuous with respect to each other. In certain embodiments, each stacked pair is positioned a different distance below the open end of the neck 13. In other

words, were each of the lower tabs connected, the resulting hypothetical annular ring would be angled with respect to the open end of the neck 13. Similarly, were each of the upper tabs connected, the resulting hypothetical annular ring would be angled with respect to the open end of the neck 13. In certain embodiments, the angle of the two hypothetical rings with respect to the open end of the neck 13 would be the same.

[0013] The pitch of the tabs 14 is configured so that the tabs are capable of engaging and disengaging with a suitable engaging member with a 90 degree ¼ turn, and are also capable of engaging with a conventional engaging member (e.g., a standard buttress thread with a pitch of 4.23 mm (0.1667 inches)) with a full 360 degree or more turn. Pitch is defined as the z-axis (depth) of movement corresponding to a full, 360° turn. The thread start (starting with the depth of the first thread) and thread lead (angle where the first thread starts) are configured to ensure that the stop is engaged after the click is engaged and after the engaging member seal 48 is fully engaged. More specifically, in certain embodiments as shown in FIG. 5B, a seal 48 such as a foam gasket is positioned to be compressed by the collar 40 as it is rotated relative to the body 12 onto the container, contacting the flat surface of the free end of the neck 13. Similarly, as shown in FIG. 7A, in certain embodiments cap 60 includes a seal 48' is comprised of a protruding ring feature that engages with the inside wall of the bottle neck 13 to form a seal when compressed.

[0014] The neck 13 also includes a circumferential flange 30 extending radially outwardly. The flange extends radially outwardly a distance further than the tabs 14. In certain embodiments, the flange 30 is spaced from the bottom of the neck 13; that is, it is positioned just above the region where the neck 13 transitions to the body 12 of the container 10. In certain embodiments, the flange 30 includes two spaced tabs 31a, 31b, preferably spaced 180° from each other. Each tab includes a radially extending top portion 32 that extends upwardly from the flange 30 and radially outwardly from the neck 13 coextensively with the flange 30 extends. Each tab also includes a radially extending bottom portion 33 that extends radially outwardly from the edge of the flange 30 and terminates in a free end 34. In cooperation with certain elements on the collar 40 as discussed below, the tabs 31a, 31b serve to create a snap fit engagement between the collar 40 and the container 10, or a cap 60 and the container 10.

[0015] Turning now to FIGS. 3A and 4, collar 40 is shown. In certain embodiments, collar 40 is configured to engage the neck 13 of container 10. In certain embodiments, the collar 40 is generally cylindrical, and includes a top portion 39 (FIG. 5A) that has a plurality of spaced radial ribs 44 or the like that support a filter element such as glass fibers or a membrane (not shown) (e.g., DURAPORE® 0.45μm membrane). In certain embodiments, the collar 40 also supports a sample reservoir (not shown) that is in fluid communication with the container 10 via the membrane through a plurality of apertures in the collar 40. The collar can be placed in communication with a driving force such as vacuum via inlet pipe 38.

[0016] Within collar 40 there is an inner cylindrical member 41 extending axially from the underside of the top portion of the collar 40. In certain embodiments, the cylindrical member 41 is centrally located in the collar 40 and is a neck engaging member. In certain embodiments, the inner wall 42 of the cylindrical member 41 includes a plurality of spaced threads or helical sweeps 45, extending radially inwardly from the inner wall 42 and configured to receive respective tabs 14 on the neck 13 of the container 10. In certain embodiments, the threads 45 are discontinuous with respect to each other. In certain embodiments, there are nine spaced threads 45, positioned in three axially stacked groups, each stacked group being equally spaced from another stacked group. Each stacked group includes a first thread (e.g., thread 45a), a second intermediate thread (e.g., thread 45b), and a third thread (e.g., thread 45c), the second and third threads being parallel to, aligned with, and positioned just below (when the collar 40 is in the upright position) the first thread 45a. In certain embodiments, the cylindrical member 41 also includes one full thread 45' that spans the entire inner circumference of the cylindrical member 41 near the bottom thereof. In certain embodiments, each of the threads 45 extends radially outwardly from the wall 42 to the same extent, and the threads are similarly shaped. In certain embodiments, two stacked groups of threads are shorter in length than the threads of the third stacked group, to ensure orientation is in one direction and that the container and engaging member line up. In certain embodiments, the threads of the two stacked groups that are shorter in length than the threads of the third are of equal length. In certain embodiments, the opposite ends of each thread taper inwardly towards each other. In certain embodiments, each thread 45 includes an upwardly sloping ramp portion 46 that transitions to a vertical portion 47. The upwardly sloping ramp portion of a thread contacts the downwardly sloping ramp portion 24 of a corresponding tab 14 when the collar 40 is engaged on the neck 13.

[0017] The enlarged detail of FIG. 4 illustrates the snap engagement feature 50 in accordance with the claimed subject matter. The snap engagement feature 50 cooperates with the tabs 31a, 31b to create a snap fit engagement between the collar 40 and the container 10. The illustrated snap engagement feature 50 is formed on the free end 49 of the cylindrical member 41, and includes a raised snap bead 51, a notch 52, and a raised stop member 53. In certain embodiments, there are two such snap engagement features 50, spaced apart 180°, each capable of cooperating with a respective one of the tabs 31a, 31b of the container 10. As the collar 40 is rotated with respect to the container 10, the tab 31a travels along the free end 49 of the collar 40 until it is raised axially by raised snap bead 51. Further relative rotation in the same

direction causes the tab 31a to ride over the snap bead 51 (creating feedback to the user) and drop into notch 52. Still further relative rotation causes the tab 31a to abut against side wall 54 of raised stop member 53, creating a backstop. The abutment of the tab 31a against the side wall 54 causes an audible "click" sound feedback to the user, warning the user to cease the rotation, thereby preventing over-torquing. The tab will remain in the notch 52 until sufficient force is exerted so that the tab 31a can overcome the height of the snap bead 51. In certain embodiments, such sufficient force is defined as force that can easily and comfortably overcome the height of the snap bead by the 5th percentile adult female to the 95th percentile adult male as verified through usability studies. The tab 31a thus sits in the region of notch 52 when the collar 40 is in the closed position on the container 10, and the raised snap bead 51 is raised a sufficient amount to hinder premature or unwanted loosening of the tab 31a from the region of the notch 52. Tab 31b cooperates with the other snap engagement feature in a similar way.

[0018] In certain embodiments, the cylindrical member 41 includes one or more (two shown) rotational limiting members such as tabs 55a, 55b that extend axially from the cylindrical member 41 as shown in FIGS. 3A and 4. The rotational limiting members 55a, 55b are positioned in the thread relief region 57 of the cylindrical member 41. The rotational limiting members 55a, 55b interact with the bottom portion 33 of tabs 31a, 31b on the container 10 and stop the relative rotation of the collar 40 and container 10 when disengaging the collar 40 from the container 10. This provides feedback to the user when the tabs 14a, 14b, 14c and 14d on the neck 13 are located in the thread relief region 57 of the cylindrical member 41, are no longer engaged with the threads 45a, 45b and 45c, and thus the collar 40 can be raised axially away from the container 10 and removed therefrom. Were this feature absent, the threads 45 could re-engage with the tabs 14 if the relative rotation of the collar 40 and container 10 exceeds 90°. In certain embodiments, the rotational limiting member(s) 55 also serve to assist in the proper positioning of the container engaging member with respect to the container to engage the components. For example, as these components are brought together, the rotational limiting member(s) can be positioned in a region between the spaced, discontinuous tabs 14 of said neck (such a region being called out by marking 9 (FIG. 5) formed on the container body). The container is then moved axially with respect to the container engaging member, followed by rotating the container with respect to the neck engaging member 90° to engage the tabs of the container with the threads of the neck engaging member.

[0019] In certain embodiments, there are three spaced thread relief regions 57 and three spaced groups of threads 45. This allows the container 10 to drop in up to the single full thread 45' on the bottom of the collar 40. Relative rotation of the container 10 and collar 40 will further engage all of the threads.

[0020] In certain embodiments, it is advantageous to have a cap for the container 10. Users often store media in the container 10 for weeks at a time, and access the container 10 regularly to feed cells. Accordingly, the cap/container interface is often the primary interface of the device, and should be ergonomically designed. Turning now to FIG. 6, a cap 60 is shown. In certain embodiments, the cap 60 includes a generally cylindrical body 62 and annular bell shaped bottom region 63 that angles out radially from the body 62. In certain embodiments, the cap 60 includes a plurality of spaced fins 61 that extend radially outwardly from the body 62 and associated radiuses that in conjunction with annular ring 64, allow ergonometric gripping of the cap for assembling and disassembling of the cap 60 on the neck 13 of the container 10 with one hand, e.g., a single thumb, especially while wearing gloves. For example, the user's fingers conveniently fit in the regions between the fins 61, facilitating the relative rotation of the cap 60 with respect to the container 10. The fins 61 also allow the cap 60 to rest on its side to reduce the chance of contamination.

[0021] In certain embodiments, the interior of the body 62 of cap 60 includes a single continuous helical thread 66. The thread 66 allows for free-spin operation; applying a slight rotation force to the cap 60 relative to the container 10 is sufficient to rotate the cap 60 relative to the container 10 enough to disengage the cap 60 from the container 10.

[0022] In certain embodiments, the cap 60 includes a snap engagement feature 50'. The snap engagement feature 50' cooperates with the tabs 31a, 31b of the container 10 to create a snap fit engagement between the cap 60 and the container 10. In certain embodiments, the snap engagement feature 50' is formed on the surface of the cylindrical body 62 where it transitions to the bell shaped bottom region 63, and includes a raised snap bead 51', a notch 52', and a raised stop member 53'. In certain embodiments, there are two such snap engagement features 50', spaced apart 180°, each capable of cooperating with a respective one of the tabs 31a, 31b of the container 10. As the cap 60 is rotated with respect to the container 10, the tab 31a approaches the snap fit engagement feature 50' until it is raised axially by raised snap bead 51'. Further relative rotation in the same direction causes the tab 31a to drop into notch 52'. Still further relative rotation causes the tab 31a to about against side wall 54' of raised stop member 53', creating a backstop. The abutment of the tab 31a against the side wall 54' causes an audible "click" sound as well as tactile feedback to the user, warning the user to cease the rotation, thereby preventing over-torquing. The tab 31a sits in the region of notch 52' when the cap 60 is in the closed position on the container 10, and the raised snap bead 51' is raised a sufficient amount to hinder premature or unwanted loosening of the tab 31a from the region of the notch 52'. Tab 31b cooperates with the other snap engagement feature in a similar way.

[0023] FIGS. 8-10 illustrate a design of the cap engagement with a container 10 which is not covered by the present claims. In accordance with this design, a snap lock feature is provided that flexes radially outwardly when it engages the lock features in the container 10. As shown in FIG. 8, a cantilever snap lock member 51" is positioned radially outwardly from raised stop member 53", and offset therefrom circumferentially (e.g., offset by the thickness of the tab 31a). The cantilever snap lock member 51" is formed in a recess 510 in the bell shaped bottom region 63 of the cap 60, and protrudes axially therefrom. The edges of the snap lock member 51" are chamfered as can be seen in FIG. 8, and the snap lock member 51" is capable of flexing radially outwardly when its radially inward surface engages the radially outward surface of tab 31a on the container 10, as shown in FIG. 9. In certain designs, there are two such snap lock members, spaced apart 180°, each capable of cooperating with a respective one of the tabs 31a, 31b of the container 10.

[0024] As the cap 60 is rotated relative to the container 10, the tab 31a (and more specifically, the radially extending bottom portion 33 of the tab 31a) rides over the chamfered edge forcing the snap lock member 51" radially outward. As shown in FIG. 10A, initial contact between the tab 31a and the snap lock member 51" is made (e.g., at about 11°). FIG. 10B shows that continued relative rotation of the cap 60 and container 10 causes the snap lock member 51" to deflect radially outward. FIG. 10C shows that upon further relative rotation, the tab 31a no longer contacts the snap lock member 51", and the latter returns to its original position. In the position shown in FIG. 10C, the tab 31a (and more specifically, the radially extending top portion 32 of tab 31a) abuts against side wall 54" of raised stop member 53", creating a backstop. This abutment of the tab 31a and raised stop member 53" causes an audible "click" sound as well as tactile feedback to the user, warning the user to cease the rotation, thereby preventing over-torquing.

Claims

1. A container and a container engaging member,

said container (10) having a container body (12) and an open neck (13), said open neck (13) comprising a plurality of spaced, discontinuous tabs (14, 14a, 14b, 14c, 14d) extending radially from said neck (13),
said container engaging member (40, 60) comprising a seal member (48, 48') and a body (62) having a neck engaging member (41, 62), said neck engaging member (41, 62) comprising a plurality of spaced, discontinuous threads (45, 45a, 45b, 45c) configured to engage with said spaced, discontinuous tabs (14, 14a, 14b, 14c, 14d) upon relative rotation of said neck (13) and said neck engaging member (41, 62),
wherein said seal member (48, 48') is positioned to engage said neck (13) and compress upon relative rotation of said neck (13) and said neck engaging member (41, 62),
characterized
in that said container (10) further comprises a circumferential flange (30) extending radially outwardly from said neck (13), said flange (30) comprising a plurality of spaced tabs (31a, 31b), and
in that said neck engaging member (41, 62) comprises a raised snap bead (51, 51'), a notch (52, 52'), and a raised stop member (53, 53') that cooperate with said tabs (31a, 31b) of said flange (30) to create a snap fit engagement between said neck (13) and said neck engaging member (41, 62) upon further relative rotation in the same direction which causes the tab (31a) to ride over the snap bead (51) and drop into notch (52).

2. The container and container engaging member of claim 1, wherein said spaced, discontinuous tabs (14, 14a, 14b, 14c, 14d) of said neck (13) are positioned in a plurality of stacked pairs, each stacked pair being equally spaced from another stacked pair.

3. The container and container engaging member of claim 2, wherein each said stacked pair comprises an upper tab (14a) and a lower tab (14b), said lower tab (14b) being parallel to, aligned with, and positioned just below said upper tab (14a).

4. The container and container engaging member of claim 2, wherein each tab (14, 14a, 14b, 14c, 14d) of the plurality of spaced, discontinuous tabs (14, 14a, 14b, 14c, 14d) of said neck (13) comprises a downwardly sloping ramp portion (24) that transitions to a vertical portion (25).

5. The container and container engaging member of claim 1, wherein said container engaging member comprises a cap (60) for closing said container (10).

6. The container and container engaging member of claim 1, wherein each of said tabs (31a, 31b) of said flange (30) comprises a radially extending top portion (32) that extends upwardly from said flange (30) and radially outwardly from said neck (13), and a radially extending bottom portion (33) that extends radially outwardly from said flange (30) and terminates in a free end (34).

7. The container and container engaging member of claim 1, wherein said neck engaging member (41, 62) comprises at least one rotational limiting member (55, 55a, 55b) that extends axially from said neck

engaging member (41, 62) and abuts against said tabs (31a, 31b) on said flange (30) to prevent relative rotation in one direction of said neck engaging member (41, 62) and container (10).

8. The assembly of claim 1, wherein said seal member (48, 48') is a foam gasket (48).

9. The assembly of claim 1, wherein said seal member (48') is comprised of a protruding ring feature that engages with the inside wall of the bottle neck (13).

10. A method of engaging the container (10) and the container engaging member (40, 60) of claim 1, wherein said neck engaging member (41, 62) further comprises at least one rotational limiting member (55, 55a, 55b) extending axially from said neck engaging member (41, 62), the method comprising:

positioning said container engaging member (40, 60) over said container (10) such that said at least one rotational limiting member (55, 55a, 55b) is positioned in a region (57) between said spaced, discontinuous tabs (14, 14a, 14b, 14c, 14d) of said neck (13);
rotating said container (10) with respect to said neck engaging member (41, 62) 90° to engage said spaced, discontinous tabs (14, 14a, 14b, 14c, 14d) of said neck (13) with said threads (45, 45a, 45b, 45c) of said neck engaging member (41, 62).

Patentansprüche

1. Behälter und Behältereingriffsteil,

wobei der Behälter (10) einen Behälterkörper (12) und einen offenen Hals (13) hat, wobei der offene Hals (13) eine Mehrzahl von auf Abstand zueinander befindlichen, nicht kontinuierlichen Vorsprüngen (14, 14a, 14b, 14c, 14d) aufweist, die radial von dem Hals (13) vorstehen,
wobei das Behältereingriffsteil (40, 60) ein Dichtungselement (48, 48') und einen Körper (62) mit einem Halseingriffsteil (41, 62) aufweist, wobei das Halseingriffsteil (41, 62) eine Mehrzahl von auf Abstand zueinander befindlichen, nicht kontinuierlichen Gewindegängen (45, 45a, 45b, 45c) aufweist, die dazu ausgestaltet sind, in Reaktion auf relative Drehung von Hals (13) und Halseingriffselement (41, 62) zueinander mit den auf Abstand zueinander befindlichen, nicht kontinuierlichen Vorsprüngen (14, 14a, 14b, 14c, 14d) einzugreifen,
wobei das Dichtungselement (48, 48') so angeordnet ist, um in Reaktion auf relative Drehung von Hals (13) und Halseingriffsteil (41, 62) zueinander in Andruck an den Hals (13) zu kommen und komprimiert zu werden,
dadurch gekennzeichnet,
dass der Behälter (10) weiter einen umlaufenden Flansch (30) aufweist, der von dem Hals (13) radial vorsteht, wobei der Flansch (30) eine Mehrzahl von auf Abstand zueinander befindlichen Vorsprüngen (31a, 31b) aufweist, und
dass das Halseingriffsteil (41, 62) eine erhöhte Rastnase (51, 51'), eine Kerbe (52, 52') und ein erhöhtes Stoppteil (53, 53') aufweist, die mit den Vorsprüngen (31a, 31b) des Flanschs (30) zusammenwirken, um bei weiterer in derselben Richtung gerichteter relativer Drehung, die bewirkt, dass der Vorsprung (31a) über die Rastnase (51) gleitet und in die Kerbe (52) absinkt, eine Einschnappverbindung zwischen dem Hals (13) und dem Halseingriffsteil (41, 62) zu erzeugen.

2. Behälter und Behältereingriffsteil nach Anspruch 1, wobei die auf Abstand zueinander befindlichen, nicht kontinuierlichen Vorsprünge (14, 14a, 14b, 14c, 14d) des Halses (13) in einer Mehrzahl von übereinander angeordneten Paaren positioniert sind, wobei jedes übereinander angeordnete Paar im gleichen Abstand zu einem anderen übereinander angeordneten Paar liegt.

3. Behälter und Behältereingriffsteil nach Anspruch 2, wobei jedes übereinander angeordnete Paar einen oberen Vorsprung (14a) und einen unteren Vorsprung (14b) aufweist, wobei der untere Vorsprung (14b) parallel zu und ausgerichtet mit und positioniert genau unterhalb des oberen Vorsprungs (14a) verläuft.

4. Behälter und Behältereingriffsteil nach Anspruch 2, wobei jeder Vorsprung (14, 14a, 14b, 14c, 14d) der Mehrzahl von auf Abstand zueinander befindlichen, nicht kontinuierlichen Vorsprünge (14, 14a, 14b, 14c, 14d) des Halses (13) einen nach unten abfallenden Rampenbereich (24) aufweist, der in einen vertikalen Bereich (25) übergeht.

5. Behälter und Behältereingriffsteil nach Anspruch 1, wobei das Behältereingriffsteil eine Kappe (60) zum Schließen des Behälters (10) aufweist.

6. Behälter und Behältereingriffsteil nach Anspruch 1, wobei jeder der Vorsprünge (31a, 31b) des Flansches (30) einen radial verlaufenden oberen Bereich (32), der von dem Flansch (30) nach oben und von dem Hals (13) radial nach außen verläuft, und einen radial verlaufenden unteren Bereich (33) aufweist, der von dem Flansch (30) radial nach außen verläuft und in einem freien Ende (34) endet.

7. Behälter und Behältereingriffsteil nach Anspruch 1, wobei das Behältereingriffsteil (41, 62) wenigstens ein Drehbegrenzungsteil (55, 55a, 55b) aufweist, das von dem Halseingriffsteil (41, 62) axial vorsteht und in Anlage an die Vorsprünge (31a, 31b) an dem Flansch (30) kommt, um relative Drehung des Halseingriffsteils (41, 62) und des Behälters (10) in eine Richtung zu verhindern.

8. Anordnung nach Anspruch 1, wobei das Dichtungselement (48, 48') eine Schaumstoffdichtung (48) ist.

9. Anordnung nach Anspruch 1, wobei das Dichtungselement (48') durch ein vorstehendes Ringmerkmal gebildet ist, das an der Innenwand des Behälterhalses (13) anliegt.

10. Verfahren zum Ineingriffbringen des Behälters (10) und des Behältereingriffsteils (40, 60) nach Anspruch 1, wobei das Halseingriffsteil (41, 62) weiter wenigstens ein Drehbegrenzungsteil (55, 55a, 55b) aufweist, das von dem Halseingriffsteil (41, 62) axial vorsteht, wobei bei dem Verfahren:

das Behältereingriffsteil (40, 60) über den Behälter (10) platziert wird, so dass das wenigstens eine Drehbegrenzungsteil (55, 55a, 55b) in einer Region (57) zwischen den auf Abstand zueinander befindlichen, nicht kontinuierlichen Vorsprüngen (14, 14a, 14b, 14c, 14d) des Halses (13) positioniert ist,
der Behälter (10) in Bezug auf das Halseingriffsteil (41, 62) 90° gedreht wird, um die auf Abstand zueinander befindlichen, nicht kontinuierlichen Vorsprünge (14, 14a, 14b, 14c, 14d) des Halses (13) mit den Gewindegängen (45, 45a, 45b, 45c) des Halseingriffsteils (41, 62) in Eingriff miteinander zu bringen.

Revendications

1. Récipient et élément de mise en prise de récipient, ledit récipient (10) ayant un corps de récipient (12) et un col ouvert (13), ledit col ouvert (13) comprenant une pluralité de languettes espacées, discontinues (14, 14a, 14b, 14c, 14d) s'étendant de façon radiale à partir dudit col (13),
ledit élément de mise en prise de récipient (40, 60) comprenant un élément formant joint (48, 48') et un corps (62) ayant un élément de mise en prise de col (41, 62), ledit élément de mise en prise de col (41, 62) comprenant une pluralité de filetages espacés, discontinus (45, 45a, 45b, 45c) configurés pour mettre en prise lesdites languettes espacées, discontinues (14, 14a, 14b, 14c, 14d) lors de la rotation relative dudit col (13) et dudit élément de mise en prise de col (41, 62),
dans lequel ledit élément formant joint (48, 48') est positionné pour mettre en prise ledit col (13) et se comprimer lors de la rotation relative dudit col (13) et dudit élément de mise en prise de col (41, 62),
caractérisé
en ce que ledit récipient (10) comprend en outre une bride circonférentielle (30) s'étendant de façon radiale à l'extérieur à partir dudit col (13), ladite bride (30) comprenant une pluralité de languettes espacées (31a, 31b), et
en ce que ledit élément de mise en prise de col (41, 62) comprend un talon d'encliquetage élevé (51, 51'), une encoche (52, 52') et un élément de butée élevé (53, 53') qui coopère avec lesdites languettes (31a, 31b) de ladite bride (30) pour créer une mise en prise par emboîtement-pression entre ledit col (13) et ledit élément de mise en prise de col (41, 62) lors d'une rotation relative supplémentaire dans le même sens qui amène la languette (31a) à aller sur le talon d'encliquetage (51) et à tomber dans l'encoche (52).

2. Récipient et élément de mise en prise de récipient selon la revendication 1, dans lesquels lesdites languettes espacées, discontinues (14, 14a, 14b, 14c, 14d) dudit col (13) sont positionnées en une pluralité de couples empilés, chaque couple empilé étant régulièrement espacé d'un autre couple empilé.

3. Récipient et élément de mise en prise de récipient selon la revendication 2, dans lesquels chacun dudit couple empilé comprend une languette supérieure (14a) et une languette inférieure (14b), ladite languette inférieure (14b) étant parallèle à, alignée sur, et positionnée juste au-dessous de ladite languette supérieure (14a).

4. Récipient et élément de mise en prise de récipient selon la revendication 2, dans lesquels chaque languette (14, 14a, 14b, 14c, 14d) de la pluralité de languettes espacées, discontinues (14, 14a, 14b, 14c, 14d) dudit col (13) comprend une portion formant rampe s'inclinant vers le bas (24) qui effectue une transition jusqu'à une portion verticale (25).

5. Récipient et élément de mise en prise de récipient selon la revendication 1, dans lesquels ledit élément de mise en prise de récipient comprend un capuchon (60) pour fermer ledit récipient (10).

6. Récipient et élément de mise en prise de récipient selon la revendication 1,
dans lesquels chacune desdites languettes (31a, 31b) de ladite bride (30) comprend une portion supérieure s'étendant de façon radiale (32) qui s'étend vers le haut à partir de ladite bride (30) et de façon radiale vers l'extérieur à partir dudit col (13), et une portion inférieure s'étendant de façon radiale (33)

qui s'étend de façon radiale vers l'extérieur à partir de ladite bride (30) et se termine en une extrémité libre (34).

7. Récipient et élément de mise en prise de récipient selon la revendication 1,
dans lesquels ledit élément de mise en prise de col (41, 62) comprend au moins un élément de limitation en rotation (55, 55a, 55b) qui s'étend de façon axiale à partir dudit élément de mise en prise de col (41, 62) et bute contre lesdites languettes (31a, 31b) sur ladite bride (30) pour empêcher une rotation relative dans un sens particulier dudit élément de mise en prise de col (41, 62) et de récipient (10).

8. Ensemble selon la revendication 1, dans lequel ledit élément formant joint (48, 48') est une garniture d'étanchéité en mousse (48).

9. Ensemble selon la revendication 1, dans lequel ledit élément formant joint (48') est composé d'une particularité annulaire saillante qui met en prise la paroi intérieure du col de bouteille (13).

10. Procédé de mise en prise du récipient (10) et de l'élément de mise en prise de récipient (40, 60) selon la revendication 1, dans lequel ledit élément de mise en prise de col (41, 62) comprend en outre au moins un élément de limitation en rotation (55, 55a, 55b) s'étendant de façon axiale à partir dudit élément de mise en prise de col (41, 62), le procédé comprenant :

le positionnement dudit élément de mise en prise de récipient (40, 60) sur ledit récipient (10) de sorte que ledit au moins un élément de limitation en rotation (55, 55a, 55b) est positionné dans une région (57) entre lesdites languettes espacées, discontinues (14, 14a, 14b, 14c, 14d) dudit col (13) ;
la rotation dudit récipient (10) par rapport audit élément de mise en prise de col (41, 62) de 90° pour mettre en prise lesdites languettes espacées, discontinues (14, 14a, 14b, 14c, 14d) dudit col (13) avec lesdits filetages (45, 45a, 45b, 45c) dudit élément de mise en prise de col (41, 62).

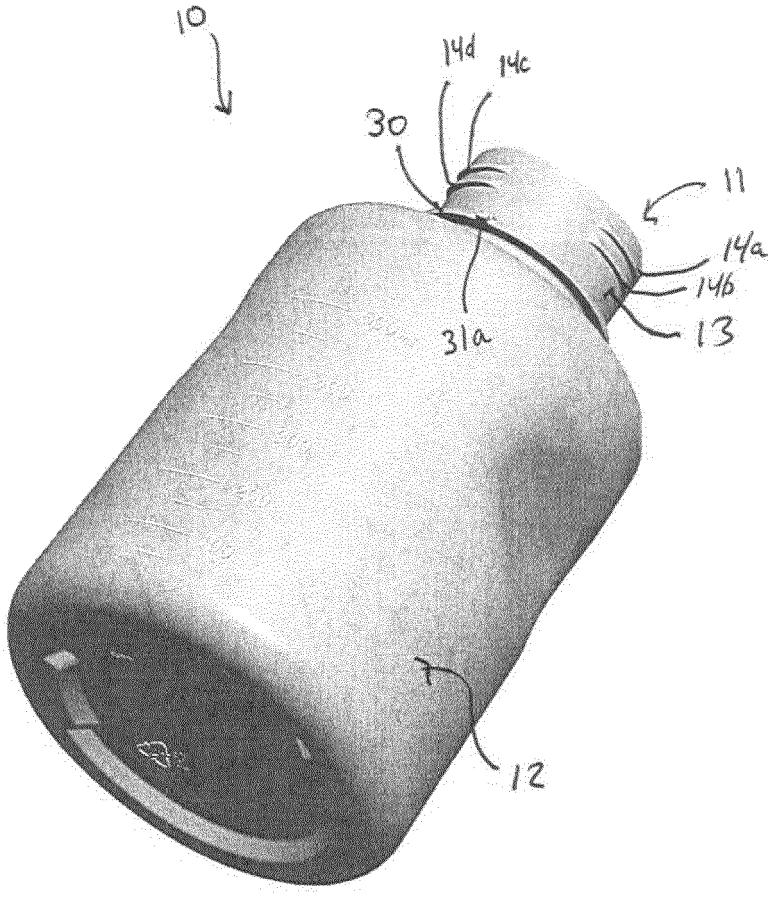


FIG. 1

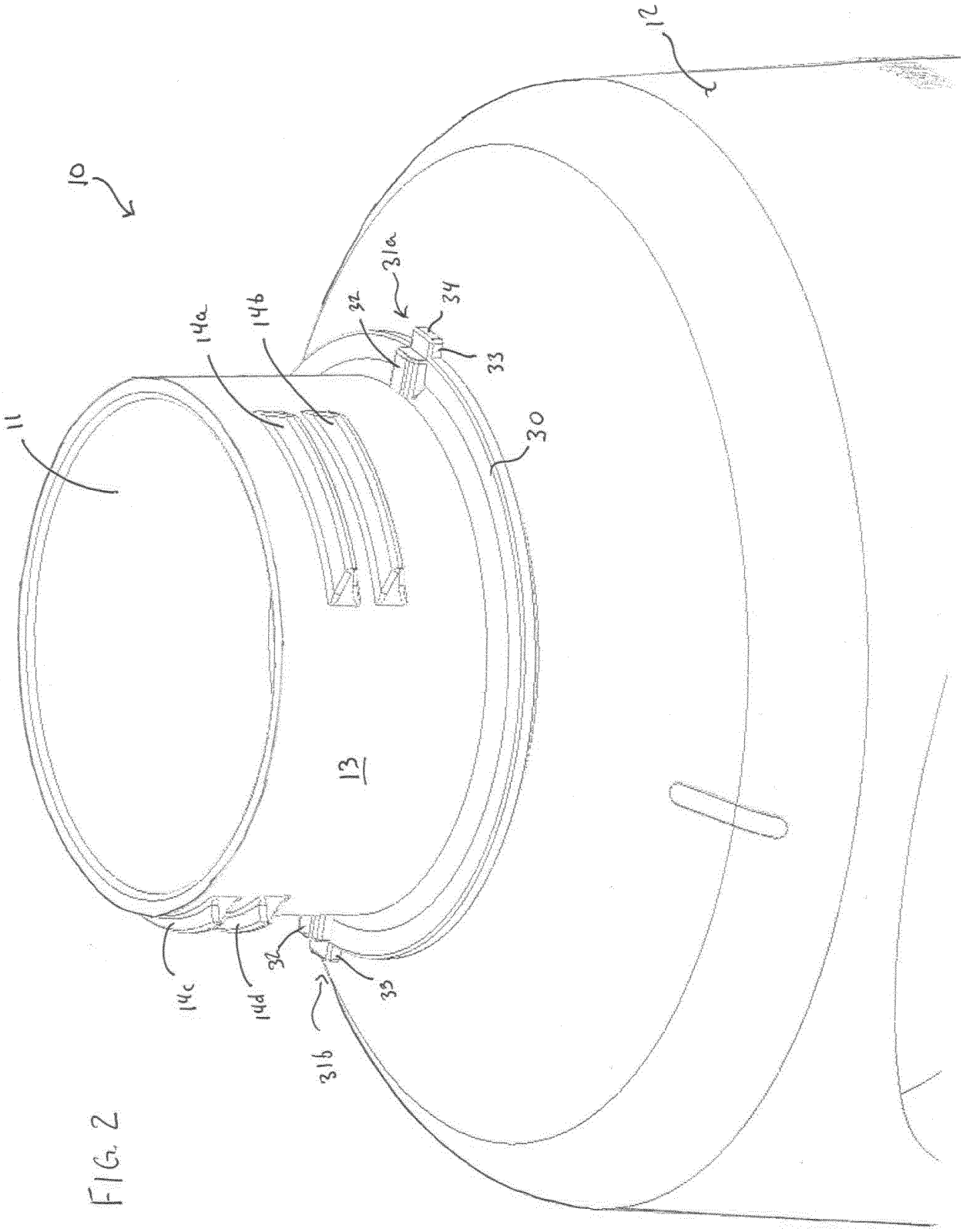


FIG. 2

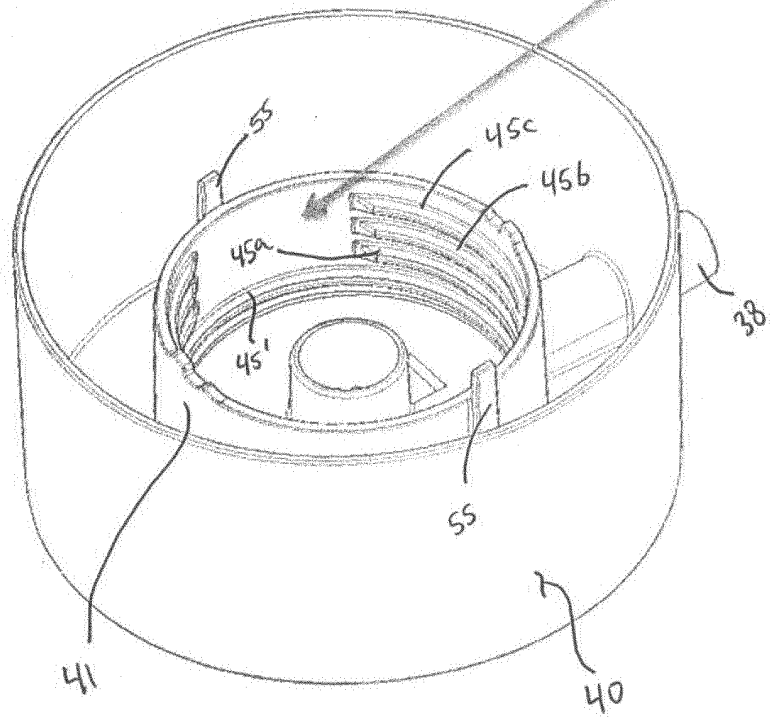
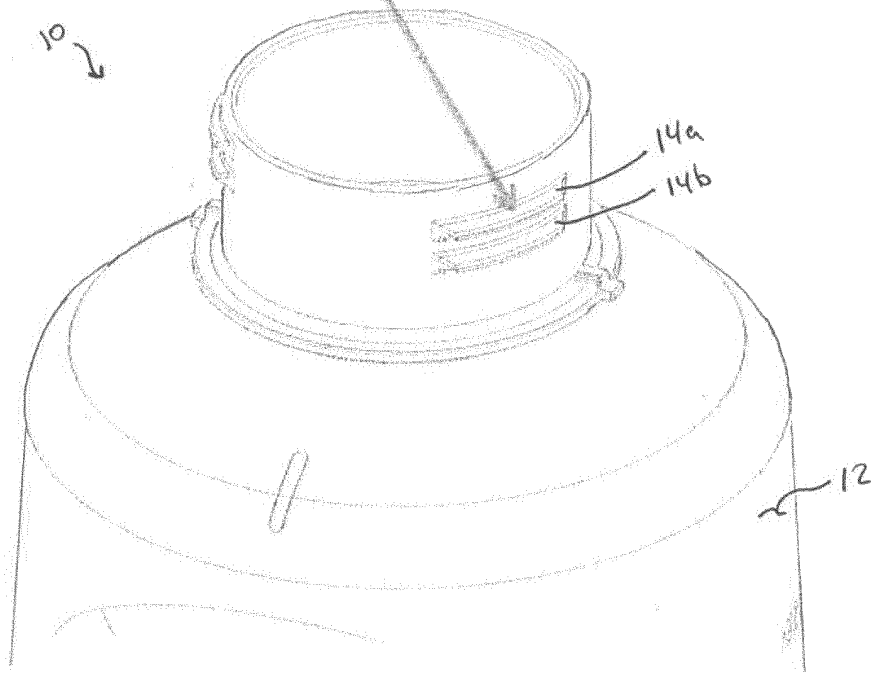


FIG. 3A

Bottle tabs drop into the Collar slots and engage the threads when rotated



Aside from ease of use, the purpose of the ¼ turn is to reduce (or eliminate) the flaking that is seen during automated assembly of the bottles.

FIG. 3B

FIG. 3C

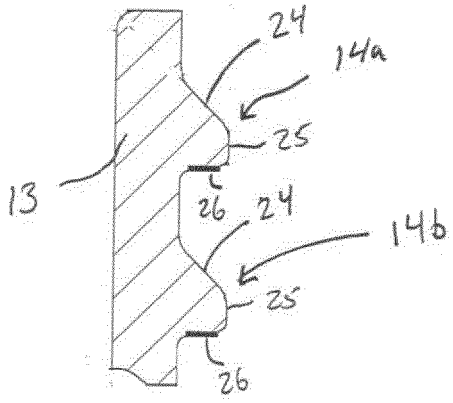
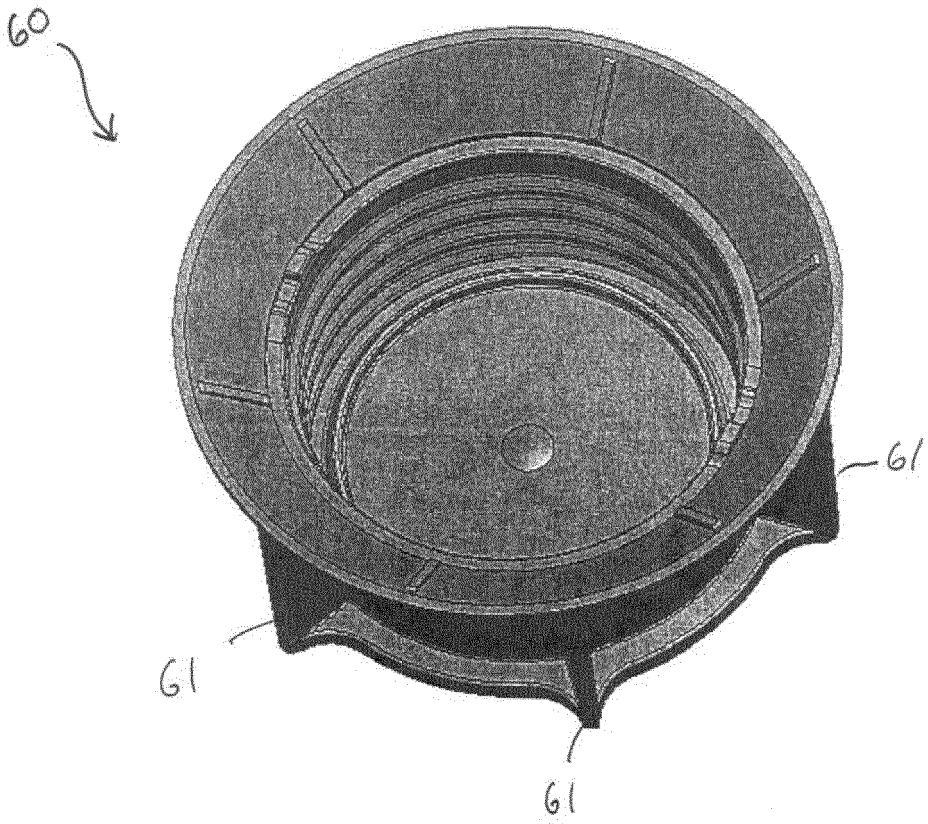


FIG. 6



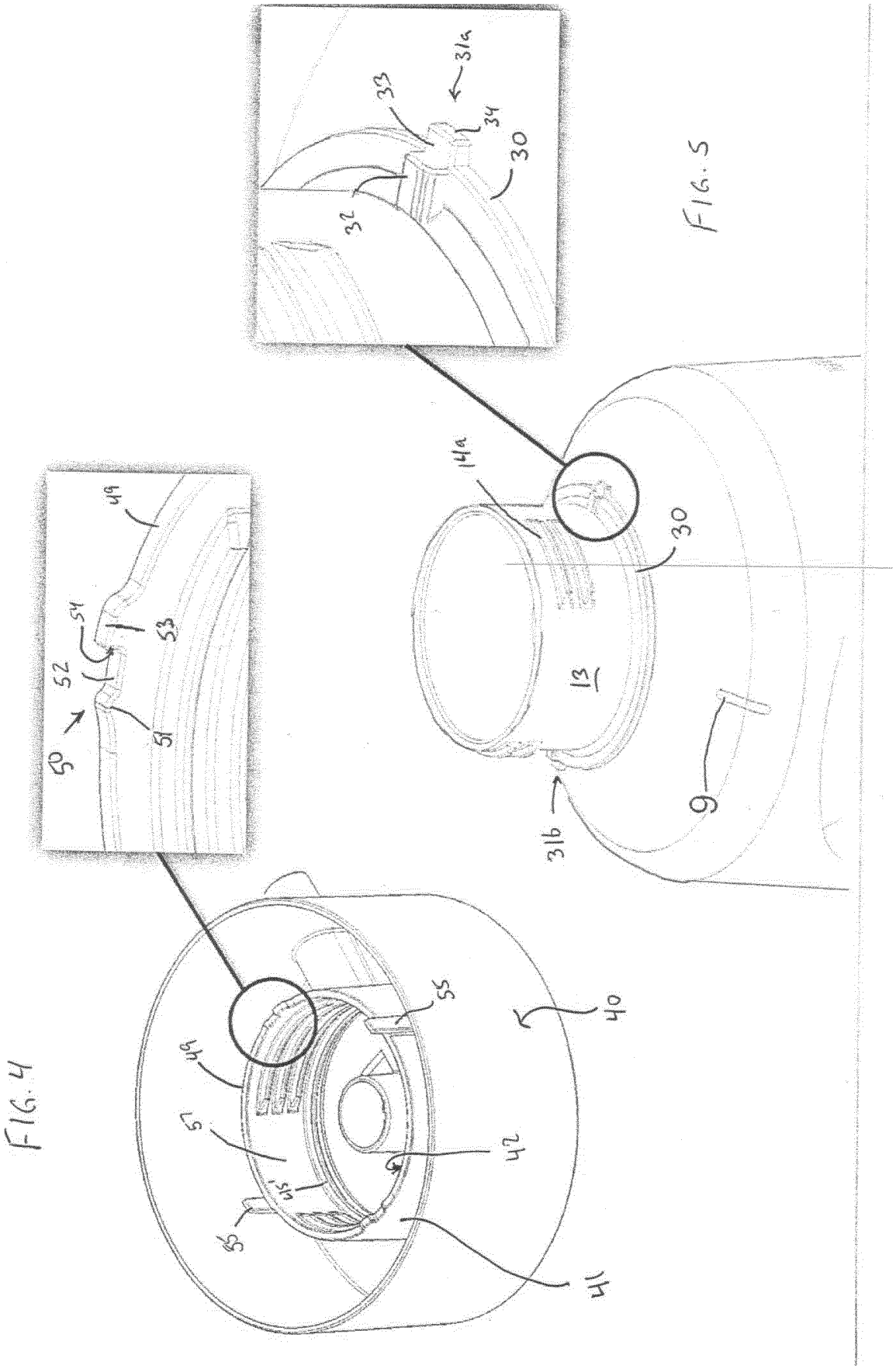


FIG. 4

FIG. 5

Features provides a snap fit lock, an audible "click", and tactile feedback of closure.

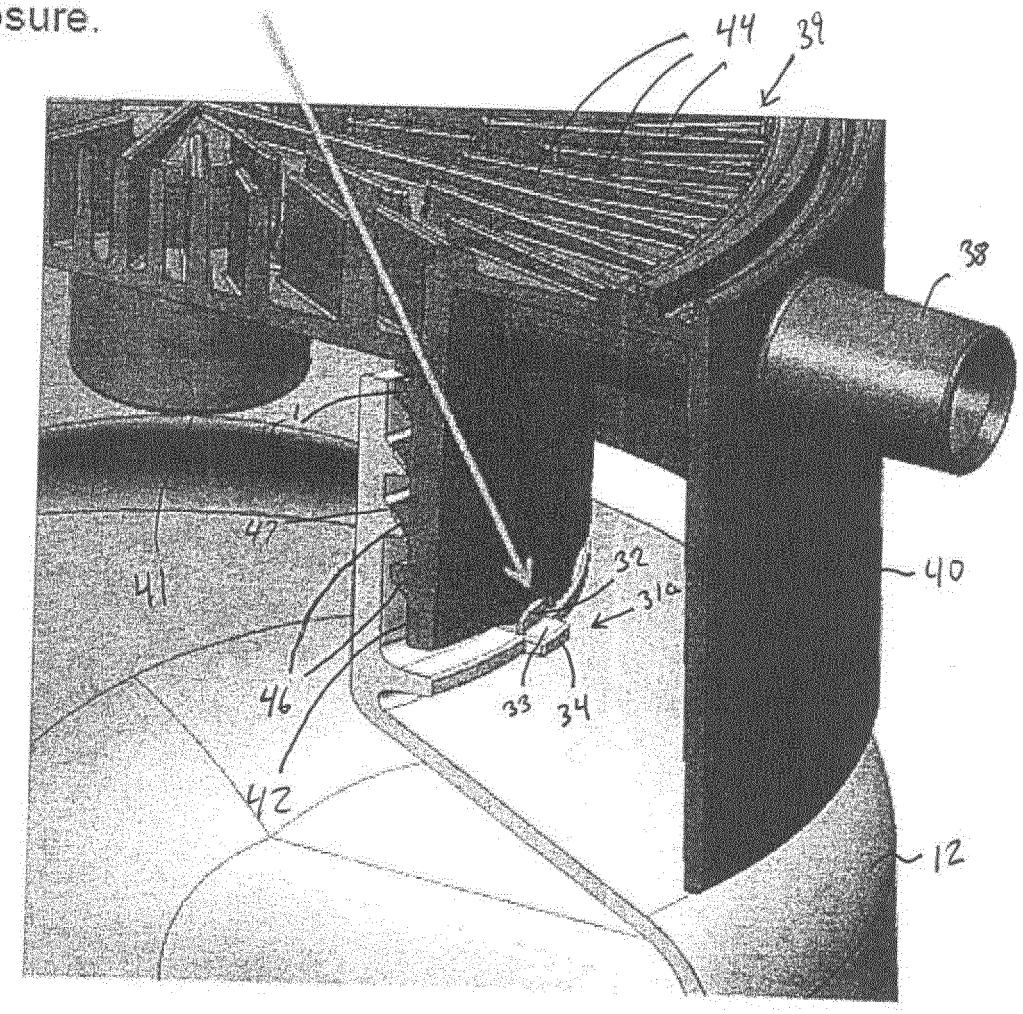


FIG. 5A

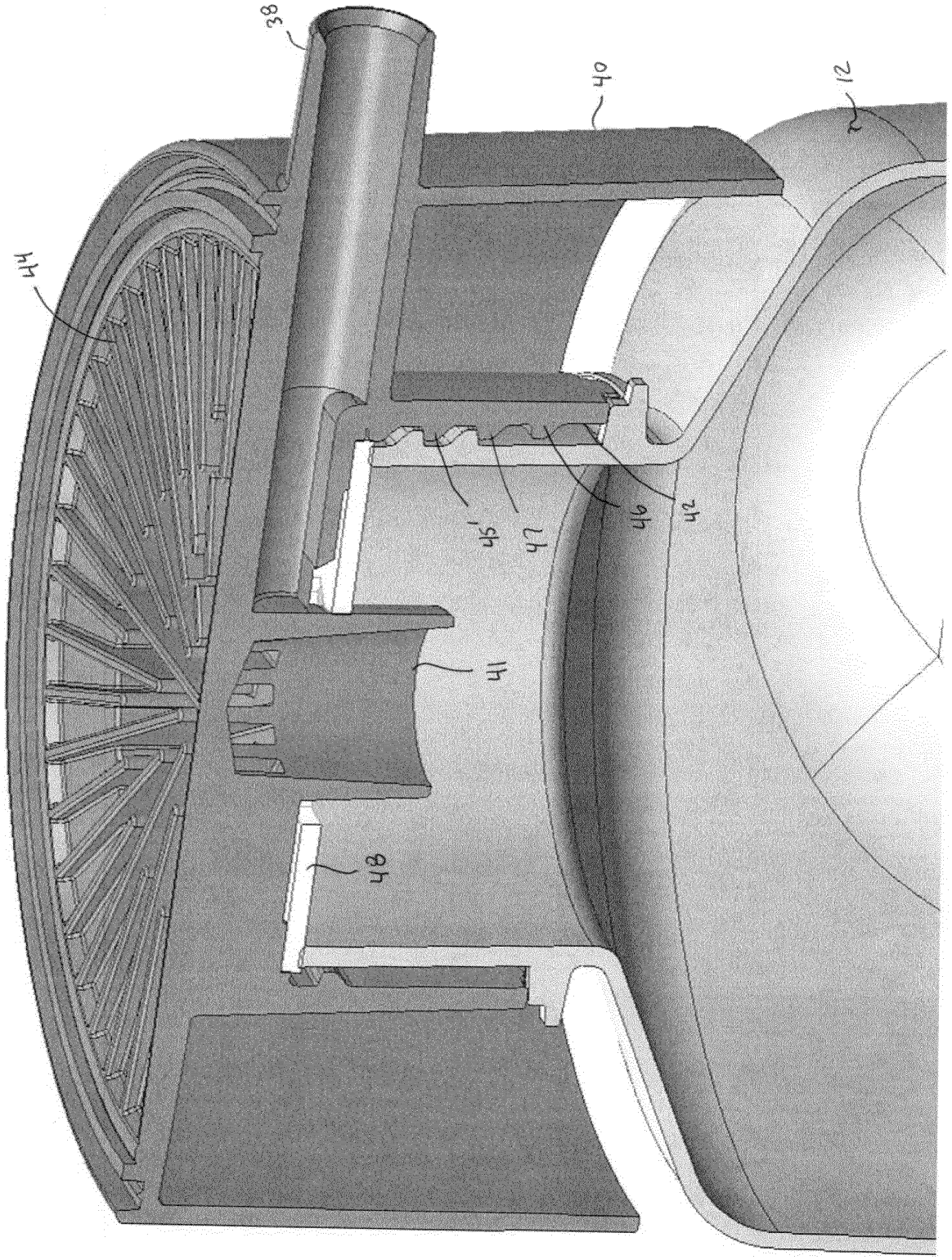


FIG. 5B

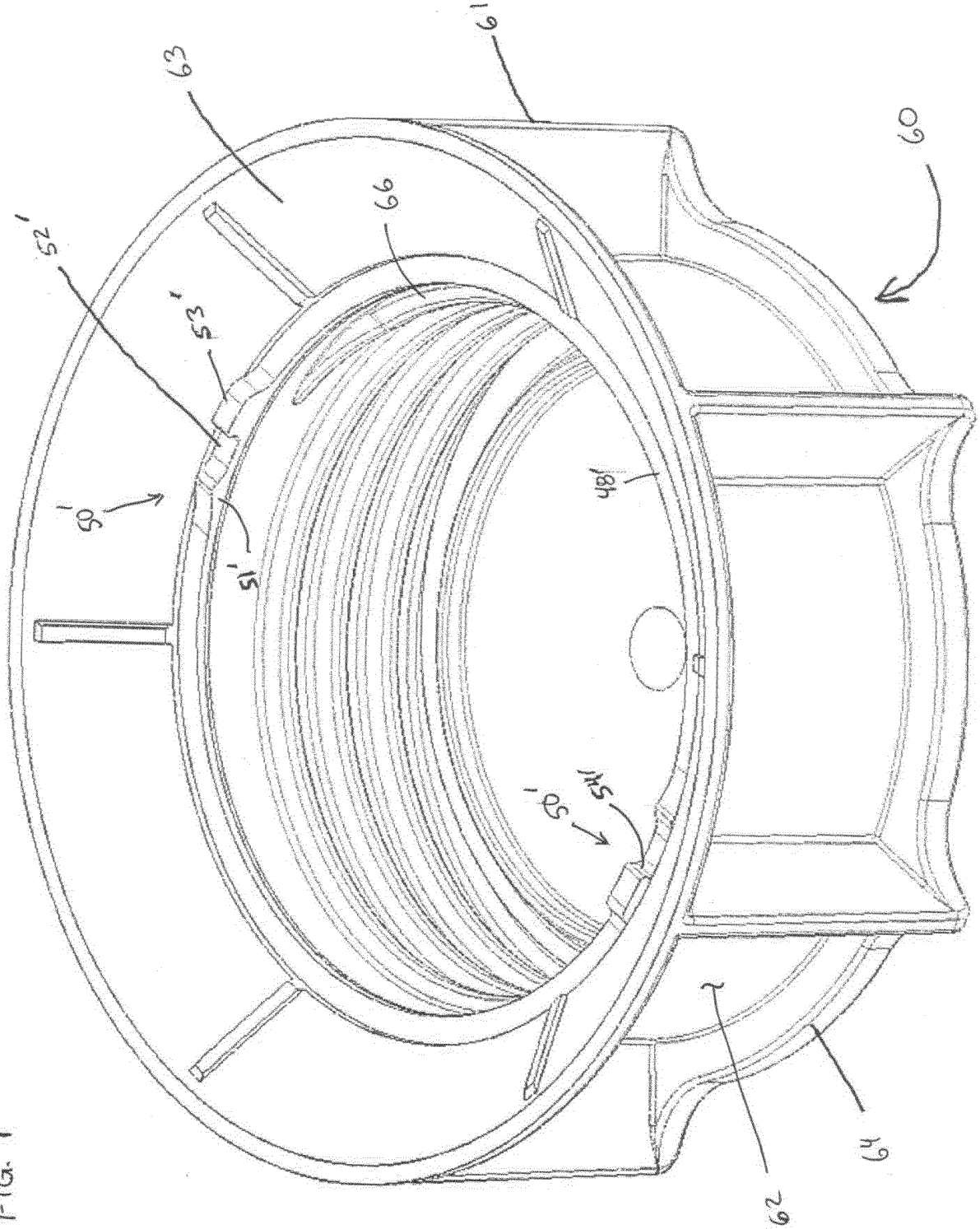


FIG. 7

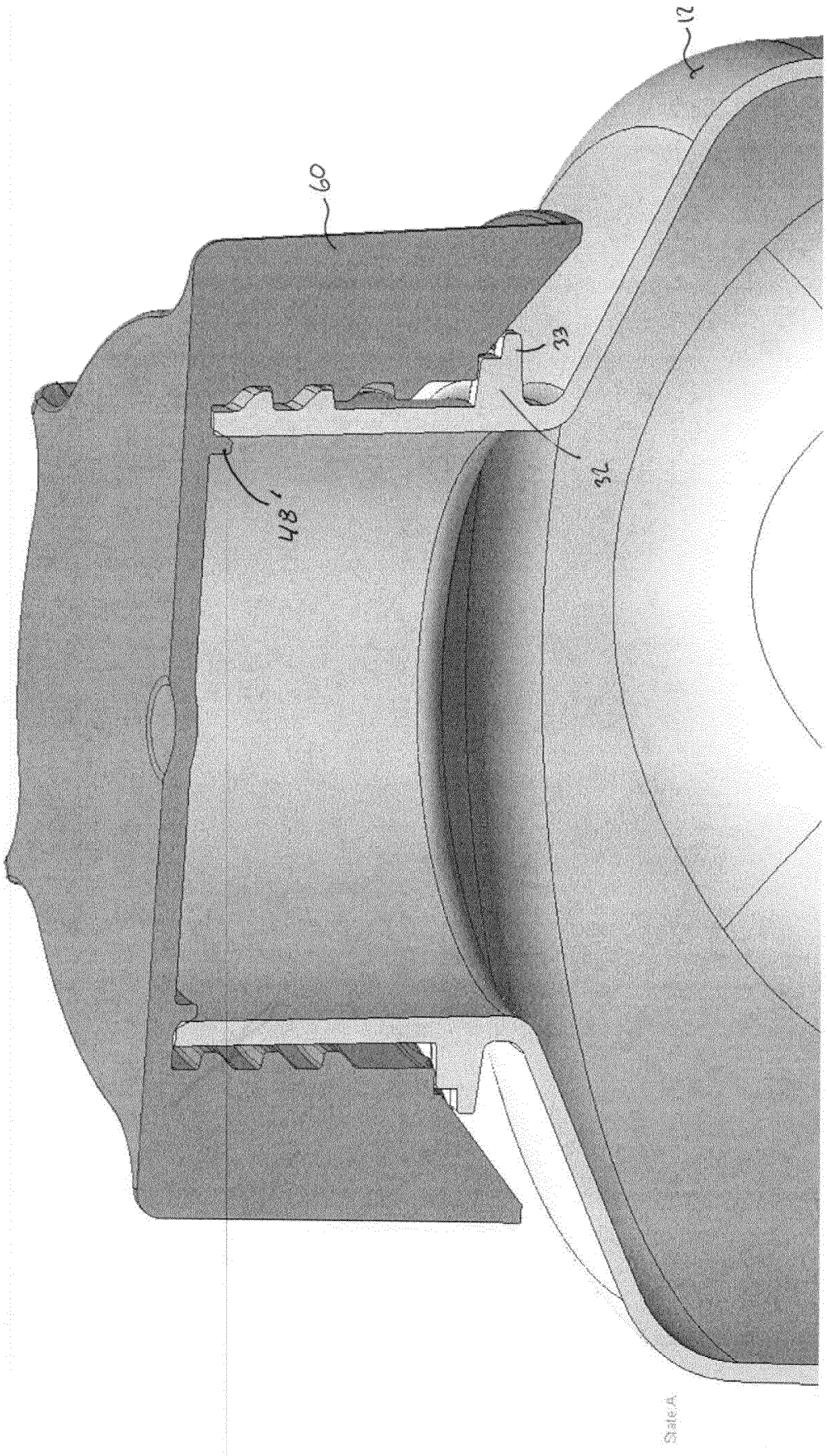


FIG. 7A

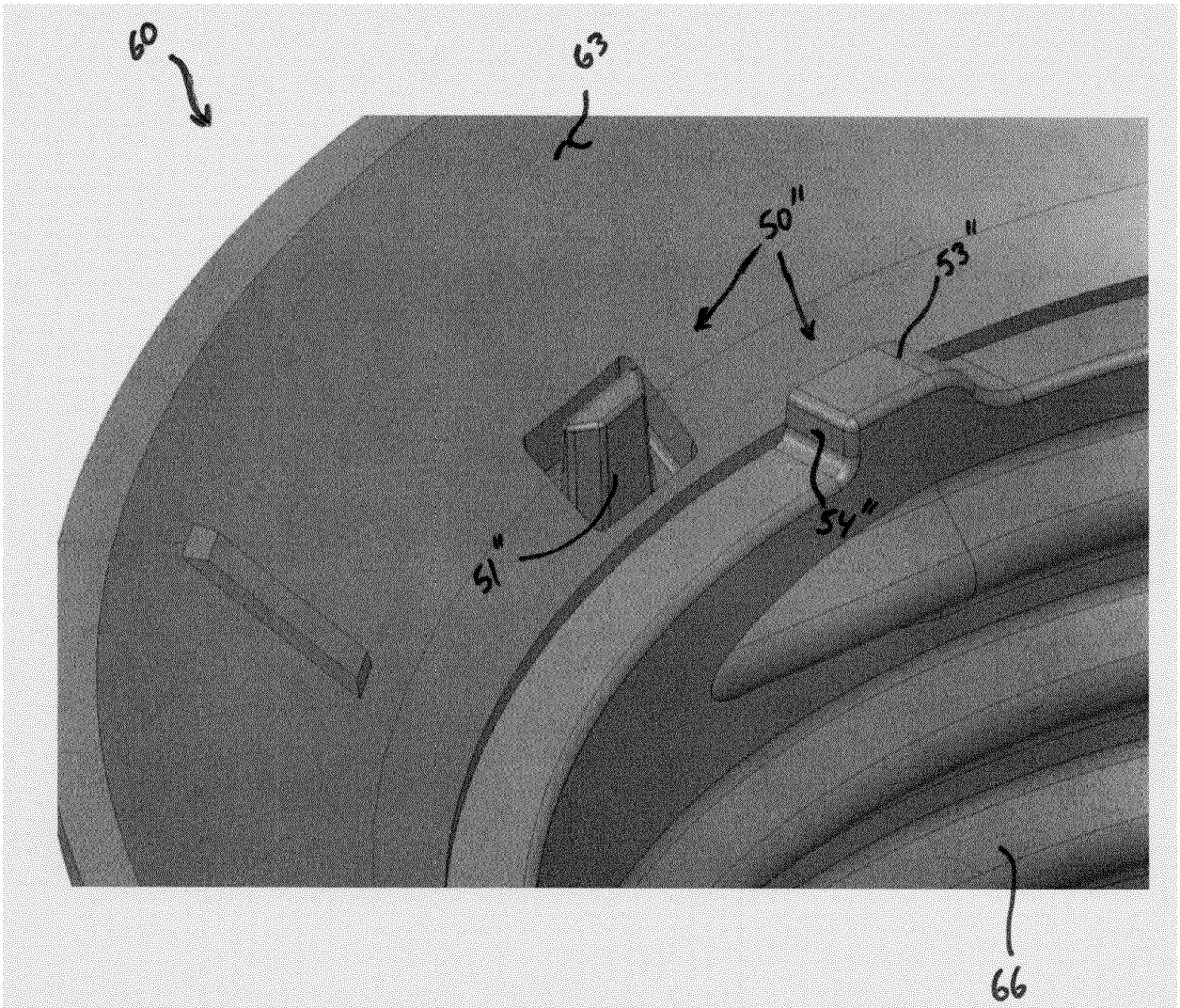


FIG. 8

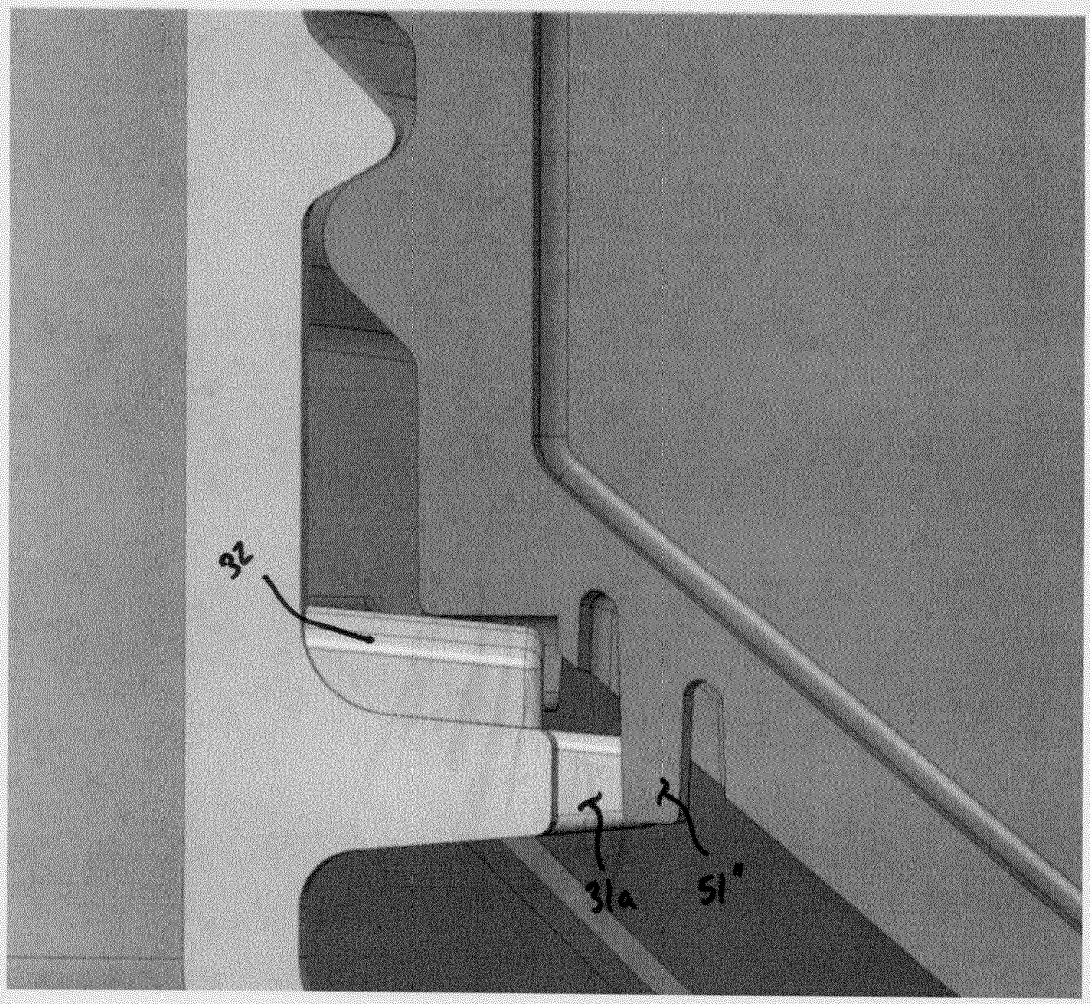


FIG. 9

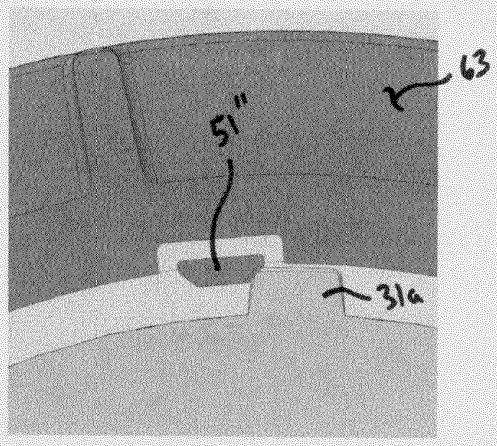


FIG. 10A

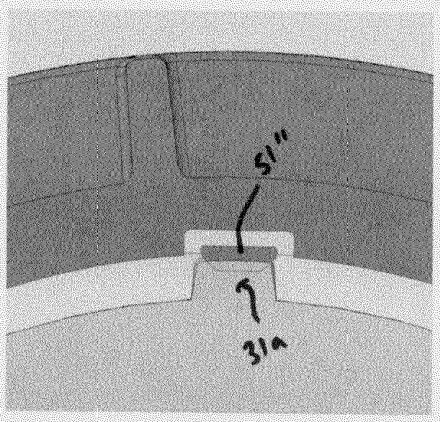


FIG. 10B

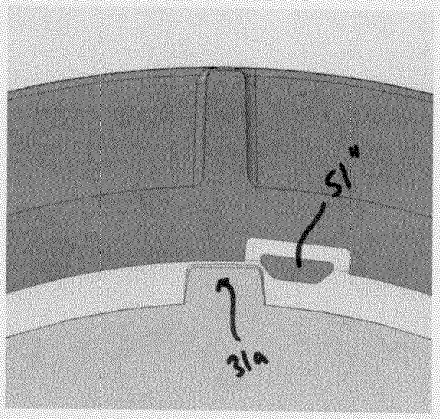


FIG. 10C

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 20020195412 A1 **[0006]**
- US 20050242055 A1 **[0007]**