(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 March 2022 (24.03.2022)

WIPO | PCT

(10) International Publication Number
WO 2022/060751 A1

(51) International Patent Classification:
B65D 51/28 (2006.01) *B65D 43/02* (2006.01)
B65D 81/32 (2006.01)

(21) International Application Number:
PCT/US2021/050344

(22) International Filing Date:
14 September 2021 (14.09.2021)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
17/021,483 15 September 2020 (15.09.2020) US

(71) Applicant: **ELC MANAGEMENT LLC** [US/US]; 155 Pinelawn Road, Suite 345 South, Melville, New York 11747 (US).

(72) Inventor: **TARRANT, Philip Andrew**; 127 Hamilton Avenue, Glen Rock, New Jersey Glen Rock (US).

(74) Agent: **GIANCANA, Peter** et al.; 155 Pinelawn Road, Suite 345 South, Melville, New York 11747 (US).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, IT, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report (Art. 21(3))*

(54) Title: CONTAINER-CLOSURE SYSTEM

(57) Abstract: A container-closure system comprises a threaded-neck container that houses a first flowable product in a first reservoir. A threaded closure assembly for the container initially houses a second flowable product in a second reservoir, and comprises an inner cap and an overcap. Movement of the overcap with respect to the inner cap effects the mixing of the two flowable products in the first reservoir.

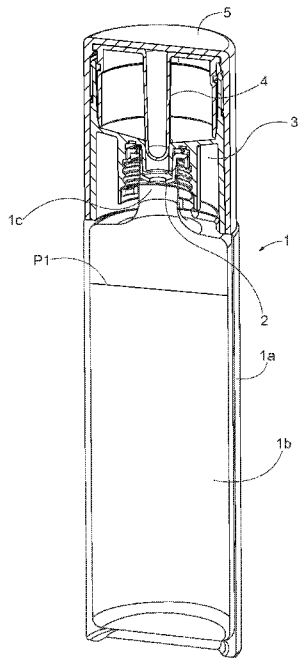


FIG. 1

WO 2022/060751 A1

Container-Closure System

Field of the Invention

The invention is in the field of packaging for consumer products, such as found in the cosmetic and personal care industry. More specifically, the invention pertains to packaging that is able to keep multiple ingredients and/or compositions separated until they are mixed at the time of use.

Background

One of the problems that formulators sometimes face is the use of ingredients whose efficacy or potency decreases with time. Thus, the time from filling a container until the first use by the consumer, represents a loss of efficacy or potency. To compensate for this, a formulator may include more of the ingredient than is really needed by the consumer. For example, a particular enzyme may slowly breakdown in the composition. To ensure that there is an efficacious amount of the enzyme by the time the consumer uses the product, extra enzyme may be put into the composition. This is an obvious disadvantage, as the enzyme may be expensive or the degraded enzyme may further disturb the chemical composition. Thus, it would be advantageous if the enzyme could be protected from degradation until the time of first use by the consumer. Furthermore, a formulator may wish to include in the composition, one or more ingredients that are reactive with the composition for some beneficial purpose. However, in some situations, it may be advantageous to delay that reaction until the time of first use by a consumer. That is not possible with a conventional, single compartment container.

In the cosmetic and personal care industry, packaging that is able to keep multiple ingredients and/or compositions separated are known. For example, US 8,087,842 discloses a multi-compartment, wiper-applicator package that comprises a container holding a first formulation, a wiper that is initially sealed at both ends, and a barbed tool. Within the sealed wiper is a quantity of secondary ingredients that is to be mixed with the first formulation in the container. The barbed tool is able to pierce the top seal, and then dislocate the bottom seal to allow the secondary ingredients to fall into the first formulation for mixing therewith.

WO2018/118845 discloses a fresh composition delivery system includes a package with two compartments separated by a foil seal for separating a cosmetically acceptable carrier from an unstable active ingredient. At the bottom of the container, an elastomeric bulb with a

dart can be actuated by the user to pierce the foil seal so that the carrier and the active can be mixed in the package to form a composition shortly before use.

US 10,661,968 discloses a container system for mixing and dispensing that comprises two containers, each container holding one or more ingredients. A first container is sealed with a frangible seal. A second container is sealed with a reusable cap and closure. At the time of use, the containers are able to be joined in a way that creates a passageway from one container to the other, which allows the ingredients in each container to mix. When the containers are separated, the first container is empty, and the second container holds the mixed ingredients. The second container can be fitted with the reusable cap closure to seal off the mixed ingredients from the ambient environment.

Object of the Invention

To provide a single container and single closure system that is able to prevent multiple ingredients and/or compositions from mixing until the time of first use, while being very easy to use.

Summary

A container-closure system according to the present invention comprises an ordinary threaded-neck container that houses a first flowable product. A threaded closure assembly for the container initially houses a second flowable product. The closure assembly comprises an inner cap and an overcap, and may be ordinary in external appearance. However, movement of the overcap with respect to the inner cap effects the mixing of the two flowable products in the container.

Description of the Figures

Figure 1 is a cross section of a container-closure system according to the invention.

Figure 2 is an exploded view of a closure assembly according to the invention.

Figure 3 is an elevation view of a container useful in the present invention.

Figure 4 is a cross sectional view of a closure assembly according to the invention.

Figure 5 is a cross sectional view of an inner cap.

Figure 6 is a perspective view of an inner cap.

Figure 7 is an elevation view of a plug.

Figure 8 is a cross sectional view of the plug of figure 7.

Figure 9 shows the plug in relation to the inner cap.

Figure 10 is a cross sectional view of an overcap.

Figure 11 is a perspective view of an orifice reducer.

Figure 12 is a cross sectional view of the orifice reducer of figure 11.

Figure 13 shows the orifice reducer in relation to the inner cap.

Figure 14 shows the inner cap and orifice reducer in relation to the container.

Detailed Description

The term "comprises" and its variants means that a list of elements is not necessarily limited to those explicitly recited.

The present invention maintains two products separately until the time of first use. The term "product" may refer to a composition comprising a multiplicity of ingredients, or it may refer to a single ingredient. For example, it may be desirable to maintain an active ingredient separate from the main composition until just prior to first use, in order to preserve the activity of the ingredient. Various types of personal care products may find use with the present invention. However, before mixing, at least one of the products should be flowable, and after mixing, the combined products should also be flowable. For example, either product may be a readily flowable liquid or flowable granulated solid (such as a powder). It is not a requirement that the products possess any degree of mutual solubility, however, it is preferable if one product is at least partially soluble in the other, and more preferable if the two products can achieve complete miscibility with simple shaking. Referring to figures 1 and 2, a container-closure system according to the present invention comprises a container (1), an orifice reducer (2), an inner cap (3), a plug (4), and an overcap (5).

A container useful in the present invention may be an ordinary threaded-neck container of the type typically used in consumer goods packaging, such as that shown in figures 1 and 3. For example, the container (1) comprises a wall (1a) that defines a first reservoir (1b) that is able to house a first flowable product (P1). The first flowable product flows into and out of the first reservoir through a neck (1c) of the container. The outer surface of the neck comprises screw threads (1d) for attaching the inner cap (3). While one thread is sufficient for the operation of the invention, figure 3 shows optional dual threads, which enable the inner cap to be fully seated in fewer turns. Optionally, a hard stop (1e) may be located at the end of each thread. When the inner cap is fully torqued down, the hard stop provides an audible click, and a more prestigious feel. Below the threads, the container is formed with a shoulder

(1g). Above the threads, the top surface (1f) of the neck may be formed with a groove (1h). Typically, the container may be glass or plastic.

The closure assembly (10) of the present invention may be ordinary in external appearance. However, as shown in figures 2 and 4, the closure assembly (10) that we describe comprises an orifice reducer (2), an inner cap (3), a plug (4) and an overcap (5), wherein the overcap and plug are able to move as one with respect to the inner cap. Referring to figures 5 and 6, the inner cap (3) comprises a vertical wall (3a) that defines an interior space. A transverse partition (3f) divides the interior space into an upper section (3b) and a lower section (3e). The upper section (3b) functions as a second reservoir that is able to house a second flowable product (P2). Depending from the transverse partition (3f), down into the lower section, is a collar (3c). The collar comprises threads (3d) that cooperate with the one or more threads (1d, 1d') of the container (1). Also depending from the transverse partition (3f) is a hollow stem (3g) that is opened at both ends. The stem is located inside the collar, and is concentric with the collar.

The plug (4) is depicted in figures 7 and 8. The plug comprises a cylindrical side wall (4a), a closed top (4b) and an opened bottom (4c). Depending downward from the center of the closed top is a pintel (4d). Referring to figure 9, the cylindrical side wall (4a) of the plug is designed to fit snugly into the vertical wall (3a) of the inner cap (3), so as to allow the plug to slide up and down therein. Initially, when the plug is fully inserted into the inner cap, the pintel (4d) extends into the hollow stem (3g), and is sized to effect a liquid-tight seal that prevents the flow of products between the first and second reservoirs (1b, 3b). Likewise, a portion of the cylindrical side wall (4a) of the plug makes a liquid tight seal against the interior surface of the vertical wall (3a) of the inner cap. Optionally, a groove (4f) in the cylindrical side wall (4a) of the plug (4) may hold a gasket O-ring (not shown) that forms a liquid tight seal against the interior surface of the vertical wall (3a) of the inner cap. In this way, the second flowable product (P2) is trapped in the second reservoir of the inner cap, and not allowed to fall into the first reservoir (1b) of the container (1).

The overcap (5) houses the plug (4) and inner cap (3). Referring to figures 4 and 10, the overcap (5) comprises a cylindrical wall (5a), a closed top (5b) and an opened bottom (5c). When the plug is fully inserted into the overcap through the opened bottom (5c), then the overcap and plug are rigidly connected, so that they move as one. For example, the plug may be provided with a lip (4e) that extends outwardly from the closed top (4b) of the plug, and the inner surface of the cylindrical wall of the overcap may be provided with one or more upper

ledges (5e) located near the top of the overcap. In this way, when the plug is fully inserted into the overcap (see figure 4), then the lip (4e) of the plug is forced over the upper ledges of the overcap, thus securing the plug in the overcap so that they will move as one.

In contrast, the overcap (5) is able to translate up and down relative to the inner cap (3). The vertical movement of the overcap occurs between a lower position and an upper position. Preferably, the overcap is prevented from being completely separated from the inner cap. For example, figure 6 shows that the inner cap may be provided with at least one enclosed vertical depression (3i) that extends down the exterior surface of the vertical wall (3a) of the inner cap, and that does not open up onto the top (3t) of the inner cap. Preferably, the inner cap has at least two enclosed vertical depressions of this type symmetrically arranged around the inner cap. In cooperation with this, the inner surface of the cylindrical wall of the overcap (5) may be provided with one or more lower ledges (5i) that are located further down the wall from the upper ledges (5e) (see figure 10). When the inner cap is assembled into the overcap (as shown in figure 4), then a lower ledge (5i) of the overcap is confined within each enclosed vertical depression (3i). The top and bottom of the enclosed vertical depressions define the limits of vertical movement of the overcap with respect to the inner cap.

Preferably, the closure assembly (10) is provided with one or more venting features. For example, figure 6 shows that the inner cap may be provided with at least one open vertical depression (3j) that extends down the exterior surface of the vertical wall (3a) of the inner cap, and that opens up onto the top (3t) of the inner cap. In operation, when the overcap is raised relative to the inner cap, the open vertical depressions will allow air into the expanding space to prevent a vacuum from forming, which would hinder function.

In order to prevent leakage during distribution, it may be preferable to prevent accidental movement of the overcap (5) and plug with respect to the inner cap (3). To this end, the exterior surface of the vertical wall (3a) of the inner cap may be provided with one or more bumps (3k) which are intended to engage one or more of the lower ledges (5i) of the overcap, as follows. When the inner cap and overcap are fully assembled, one or more lower ledges (5i) of the overcap are forced into position just below one or more bumps (3k) of the inner cap. This obstruction can be intentionally overcome by apply sufficient force by hand, but accidental movement during distribution will be prevented.

Referring to figures 6 and 10, the inner cap (3) and over cap (5) may be provided with features that prevent relative rotation between the two. For example, the inner cap (3) may comprise at least one vertical track (3h) that extends longitudinally down the exterior surface

of the vertical wall (3a) of the inner cap. Furthermore, the overcap may comprise at least one vertical shaft (5h) that extends longitudinally down the inner surface of the vertical wall (5a) of the over cap. When the inner cap is assembled into the overcap, then each vertical shaft (5h) of the overcap slides within a vertical track (3h) of the inner cap, and the overcap is prevented from rotating relative to the inner cap. Optionally, the vertical track (3h) may open up onto the top (3t) of the inner cap. This would make assembly of inner cap into overcap easier.

Figures 11 and 12 depict one embodiment of an orifice reducer (2). In general, the orifice reducer comprises a hollow cylindrical body (2a) that has a top a bottom. A flange (2b) surrounds the top of the body, extending radially outward, and a skirt (2c) depends downwardly from the flange. One or more vents (2d) pass through the flange. The bottom of the skirt may be formed as an enlarged portion (2h) for gripping the neck (1c) of the container (1). A base (2f) extends radially inward from the bottom of the body, and defines an orifice (2g).

Referring to figure 13, the orifice reducer (2) is initially associated with the inner cap (3). The orifice reducer is secured in the inner cap, being friction fitted between the collar (3c) and the stem (3g). Optionally, an O-ring liner (6) may be positioned between the transverse partition (3f) of the inner cap and the flange (2b) of the orifice reducer. Optionally, a sealing bead (2e) may rise from the flange of the orifice reducer, to make a more effective seal with the O-ring liner.

The first time that the inner cap (3) with orifice reducer (2) is fully seated on the container (1), the skirt (2c) of the orifice reducer will be stretched over the neck (1c) of the container (as shown in figure 14). Displaced air from within the neck of the container will escape through the one or more vents (2d) of the flange (2b). Thereafter, the orifice reducer will remain attached to the neck of the container, even when the inner cap is unscrewed from the container. The attachment of the orifice reducer to the container may be facilitated by the enlarged portion (2h) of the skirt engaging the groove (1h) on the neck of the container. In the process, a liquid tight connection is formed between the orifice reducer and the neck of the container. In order to ensure a liquid tight connection between the orifice reducer and the neck of the container, the vertical wall (3a) of the inner cap and the vertical wall (5a) of the overcap (5) must not bottom out on the shoulder (1g) of the container before the orifice reducer is fully seated onto the neck.

As shown in figure 14, when the inner cap (3) with orifice reducer (2) is fully seated on the container (1), then the hollow stem (3g) of the inner cap and the cylindrical body (2a) of the orifice reducer are positioned in the neck (1c) of the container. The hollow stem and orifice reducer form a passageway between the first reservoir (1b) and second reservoir (3b), through which the first and second flowable products (P1, P2) can sometimes pass. However, when the overcap (5) and plug (4) are at their lowest position with respect to the inner cap, then the pintel (4d) of the plug extends into the hollow stem (3g) of the inner cap (see figure 4). The pintel and hollow stem are sized to effect a liquid-tight seal that closes the passageway between the first and second reservoirs (1b, 3b).

Assembly and Filling

The plug (4) is first assembled into the overcap (5), such that the lip (4e) of the plug is forced over the upper ledges (5e) of the overcap, thus making a rigid connection between the plug and the overcap, so that they will move as one. With the plug and overcap upside down, a second flowable product (P2) is filled to the plug.

Next, the orifice reducer (2) and O-ring liner (6) are assembled into the inner cap, as explained above. The inner cap (3) then assembled into the overcap, so that some of the lower ledges (5i) of the overcap are confined within one or more vertical depressions (3i) of the inner cap, and some other lower ledges (5i) of the overcap are forced into position just below one or more bumps (3k) of the inner cap. Also, each vertical shaft (5h) of the overcap slides within a vertical track (3h) of the inner cap, which prevents to overcap from rotating relative to the inner cap.

At this point, the pintel (4d) of the plug extends into the hollow stem (3g) of the inner cap, and forms a liquid tight seal. Likewise, a portion of the cylindrical side wall (4a) of the plug makes a liquid tight seal against the interior surface of the vertical wall (3a) of the inner cap. In this way, the second flowable product (P2) is trapped in the second reservoir (3b) of the inner cap. The overcap, plug and inner cap with orifice reducer form a complete closure assembly (10) that is filled with the second flowable product (P2). Also, accidental movement of the overcap (5) and plug (4) with respect to the inner cap (3) is not possible. Therefore, the closure assembly may now be turned upright without fear of leakage.

The first reservoir (1b) of the container (1) is filled with a first flowable product (P1). This is done through the neck (1c) of the container, before the orifice reducer is attached to the

neck. It is critical to leave enough headspace in the first reservoir for at least a portion of the second flowable product (P2).

Next, the closure assembly (10) is applied to the container (1) by screwing the inner cap (3) onto the container until tight. In the process, the skirt (2c) of the orifice reducer will be stretched over the neck (1c) of the container, and thereafter, the orifice reducer will remain attached to the neck of the container. At this point, the first flowable product is in the first reservoir (1b), and the second flowable product is in the second reservoir (3b). The container-closure system, which appears to be an ordinary bottle of product, is ready for distribution.

Consumer Use

When consumer wants to use a fully assembled container-closure system of the present invention, the overcap (5) is raised to its upper position by pulling the overcap and container (1) in opposite directions. Initially, sufficient force must be applied by hand to urge one or more lower ledges (5i) of the overcap over one or more bumps (3k) of the inner cap, but after that, sliding the overcap relative to the inner cap is easy. When this is done, the plug (4) slides upward relative to the inner cap (3), the seal between the pintel (4d) and the hollow stem (3g) is broken, the passageway between the first reservoir and second reservoir is opened, and the second flowable product (P2) will pass through the passageway, into the first reservoir (1b), thus mixing the first and second flowable products. The user waits a short time for the second flowable product to pass into the first reservoir. Once all of the second flowable product has drained into the first reservoir, the overcap may be returned to its lower position with respect to the inner cap. After the first time, raising and lowering the overcap and plug will have no effect.

Optionally, the consumer may shake the container-closure system to thoroughly mix the two products.

Thereafter, a twisting force applied to the overcap (5) will unscrew the inner cap off of the container (1), leaving the orifice reducer (2) attached to the container.

The consumer dispenses the mixed products by pouring through the orifice reducer.

When finished, the closure assembly (10) is again screwed onto the container (1).

What is claimed is:

1. A container-closure system that comprises:

a threaded-neck container that defines a first reservoir;

a closure assembly that comprises an inner cap, a plug, an overcap, and an orifice reducer, wherein:

the inner cap comprises:

a vertical wall that defines an interior space, the interior space is divided into an upper section and a lower section by a transverse partition, wherein the upper section functions as a second reservoir;

a collar that depends from the transverse partition, down into the lower section, and comprises threads that cooperate with the threaded neck of the container; and

a hollow stem that depends from the transverse partition of the inner cap, and is concentric with the collar and located inside the collar;

the plug comprises:

a cylindrical side wall that fits snugly into the vertical wall of the inner cap, so as to allow the plug to slide up and down therein, while also forming a liquid tight seal between the cylindrical side wall and the vertical wall of the inner cap;

a closed top;

an opened bottom, and

a pintel that depends downward from the center of the closed top;

the overcap comprises:

a cylindrical wall, a closed top, and an opened bottom; wherein

the plug and inner cap are received into the opened bottom of the overcap;

the overcap is able to translate up and down relative to the inner cap between a lower position and an upper position; and

the plug is rigidly connected to the overcap and moves with the overcap;

the orifice reducer is secured between the collar and the stem of the inner cap, and comprises:

a cylindrical body;

a flange the extends radially outward,

one or more vents that pass through the flange. and

a skirt that depends downward from the flange;

such that, when the inner cap is fully seated on the container, then:

the skirt of the orifice reducer is stretched over the neck of the container to form a liquid tight connection between the orifice reducer and the neck of the container; and

the hollow stem of the inner cap and the cylindrical body orifice reducer form a passageway between the first and second reservoirs;

such that, when the overcap is in the lower position relative to the inner cap, then the pintel extends into the hollow stem of the inner cap, and forms a liquid-tight seal to close off the passageway between the first and second reservoirs; and

such that, when the overcap is in the upper position relative to the inner cap, then the seal between the pintel and the hollow stem is broken, and the passageway between the first and second reservoirs is opened.

2. The container-closure system of claim 1, wherein the overcap is in the lower position relative to the inner cap, and a first flowable product is housed in the first reservoir, and a second flowable product is housed in the second reservoir.

3. The container-closure system of claim 1, wherein the top surface of the neck of the container comprises a groove, and the skirt of the orifice reducer comprises enlarged portion that engages the groove of the neck.

4. The container-closure system of claim 1, wherein the rigid connection of the plug and overcap is effected by a lip that extends outwardly from the closed top of the plug, and one or more upper ledges that are located on an inner surface of the overcap.

5. The container-closure system of claim 1, wherein:

the vertical wall of the inner cap has a top and an exterior surface, and is provided with at least one enclosed vertical depression that extends down the exterior surface, and that does not open up onto the top of the vertical wall; and

the cylindrical wall of the overcap has an inner surface that is provided with one or more lower ledges that are confined within each enclosed vertical depression.

6. The container-closure system of claim 1 further comprising at least one venting feature, wherein:

the vertical wall of the inner cap has a top and an exterior surface, and is provided with at least one open vertical depression that extends down the exterior surface of the vertical wall, and that opens up onto the top of the inner cap.

7. The container-closure system of claim 1, wherein:

the vertical wall of the inner cap has an exterior surface, and is provided with at least one bump

the cylindrical wall of the overcap has an inner surface that is provided with one or more lower ledges that are positioned just below the one or more bumps of the inner cap, to prevent accidental movement of the overcap and plug with respect to the inner cap.

8. The container-closure system of claim 1, wherein:

the vertical wall of the inner cap has an exterior surface, and is provided with at least one open vertical track that extends longitudinally down the exterior surface of the vertical wall of the inner cap; and

the cylindrical wall of the overcap has an inner surface that is provided with at least one vertical shaft that extends longitudinally down the inner surface of the vertical wall of the over cap; such that

each vertical shaft of the overcap slides within a vertical track of the inner cap, to prevent the overcap from rotating relative to the inner cap.

9. The container-closure system of claim 1, wherein:

An O-ring liner is positioned between the transverse partition of the inner cap and the flange of the orifice reducer; and

the orifice reducer comprises a sealing bead that rises from the flange to make an effective seal with the O-ring liner.

10. A container-closure system comprising a container and closure assembly, wherein:
the container comprises a first reservoir that houses a first flowable product;
the closure assembly comprises:
a second reservoir that houses a second flowable product;
an inner cap; and
an overcap;

wherein, raising the overcap relative to the inner cap opens a passageway between the first and second reservoirs, such that the second flowable product will flow into the first reservoir.

11. A method of filling the container-closure system of claim 1, comprising the steps of:
a. assembling the plug into the overcap by a rigid connection, so that the plug and overcap will move as one;
b. with the plug and overcap upside down, filling the plug with a second flowable product;
c. assembling the orifice reducer into the inner cap;
d. completing the closure assembly by assembling the inner cap into the overcap so that the pintel of the plug extends into the hollow stem of the inner cap, and forms a liquid tight seal;
e. turning the closure assembly upright;
f. filling the first reservoir of the container with a first flowable product through the neck of the container, leaving enough headspace in the first reservoir for at least a portion of the second flowable product; and
g. applying the closure assembly to the container by screwing the inner cap onto the container until tight;

12. A method of using the container-closure system of claim 1, comprising the steps of:
a. raising the overcap to its upper position by pulling the overcap and container in opposite directions;

b. waiting for the second flowable product to pass through the opened passageway, into the first reservoir;

c. optionally, returning the overcap to its lower position.

d. optionally, shaking the container and closure system to thoroughly mix the two products;

e. unscrewing the closure assembly off of the container;

f. dispensing the mixed products by pouring through the orifice reducer; and

g. screwing the closure assembly onto the container.

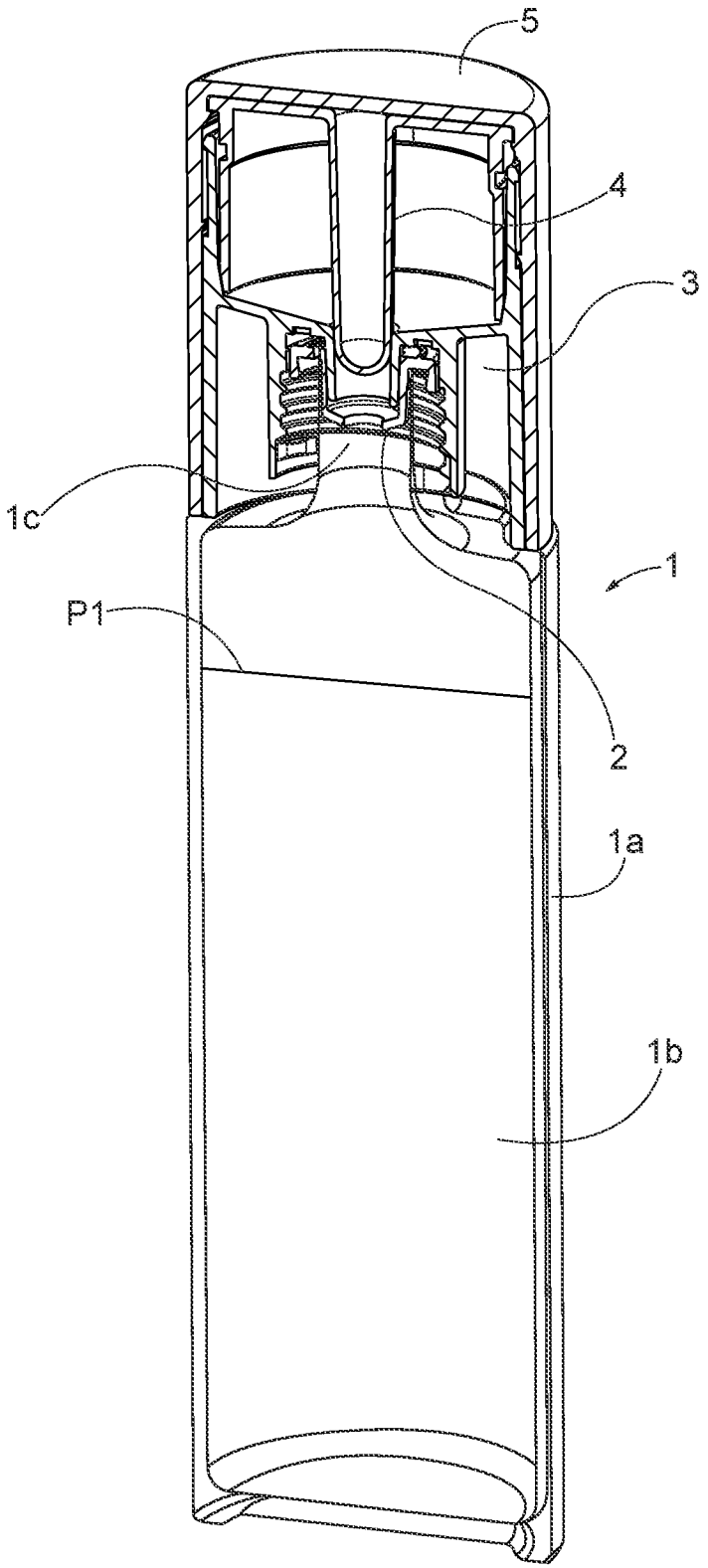


FIG. 1

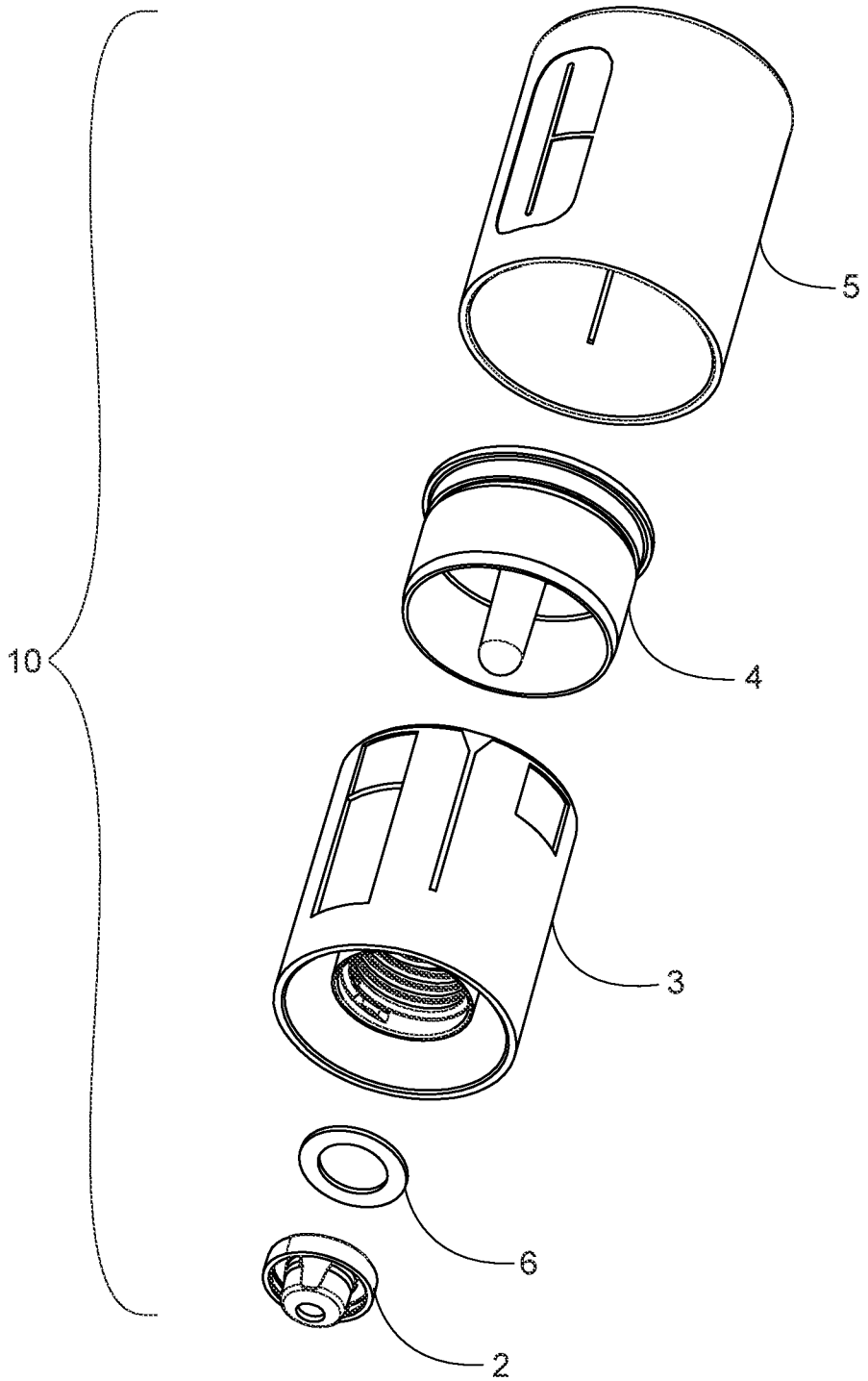


FIG. 2

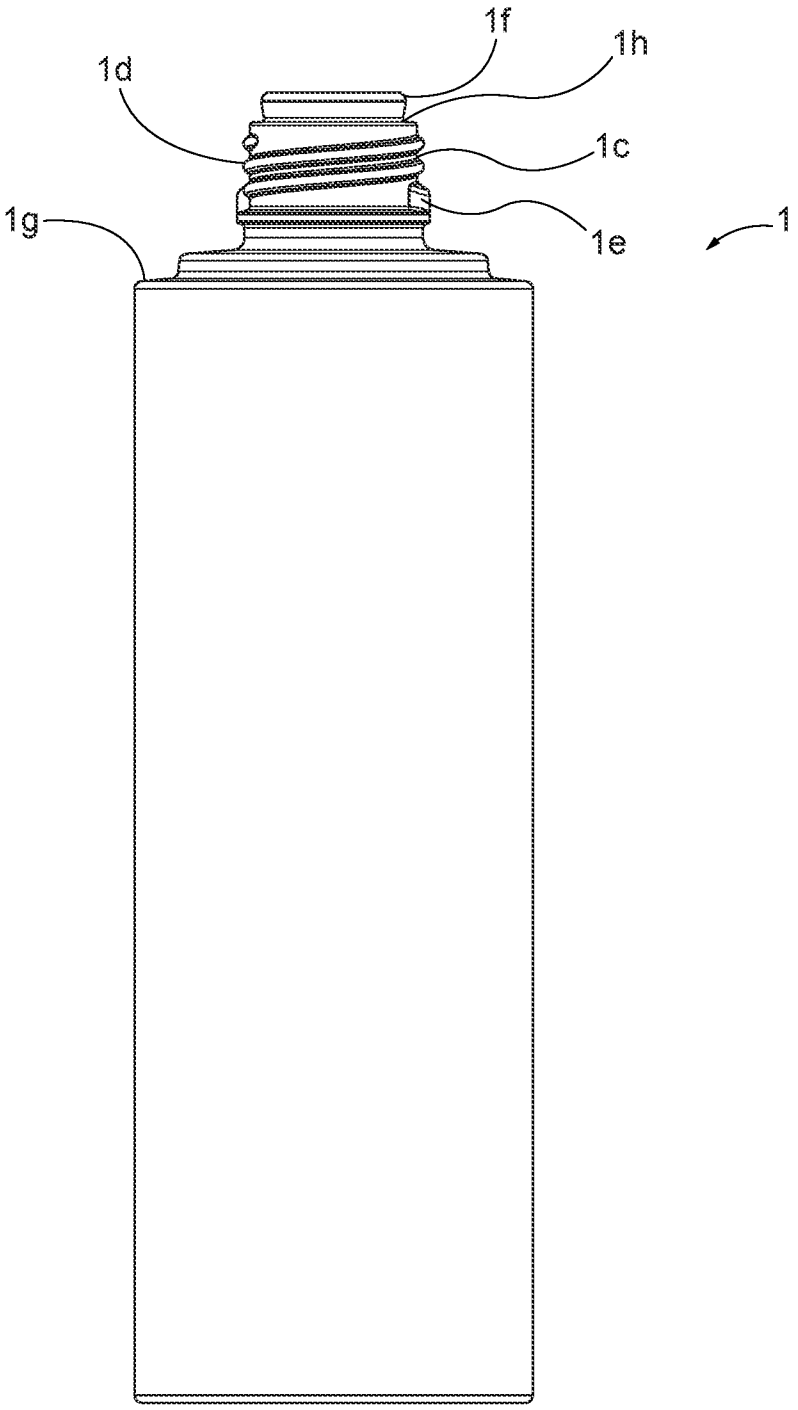


FIG. 3

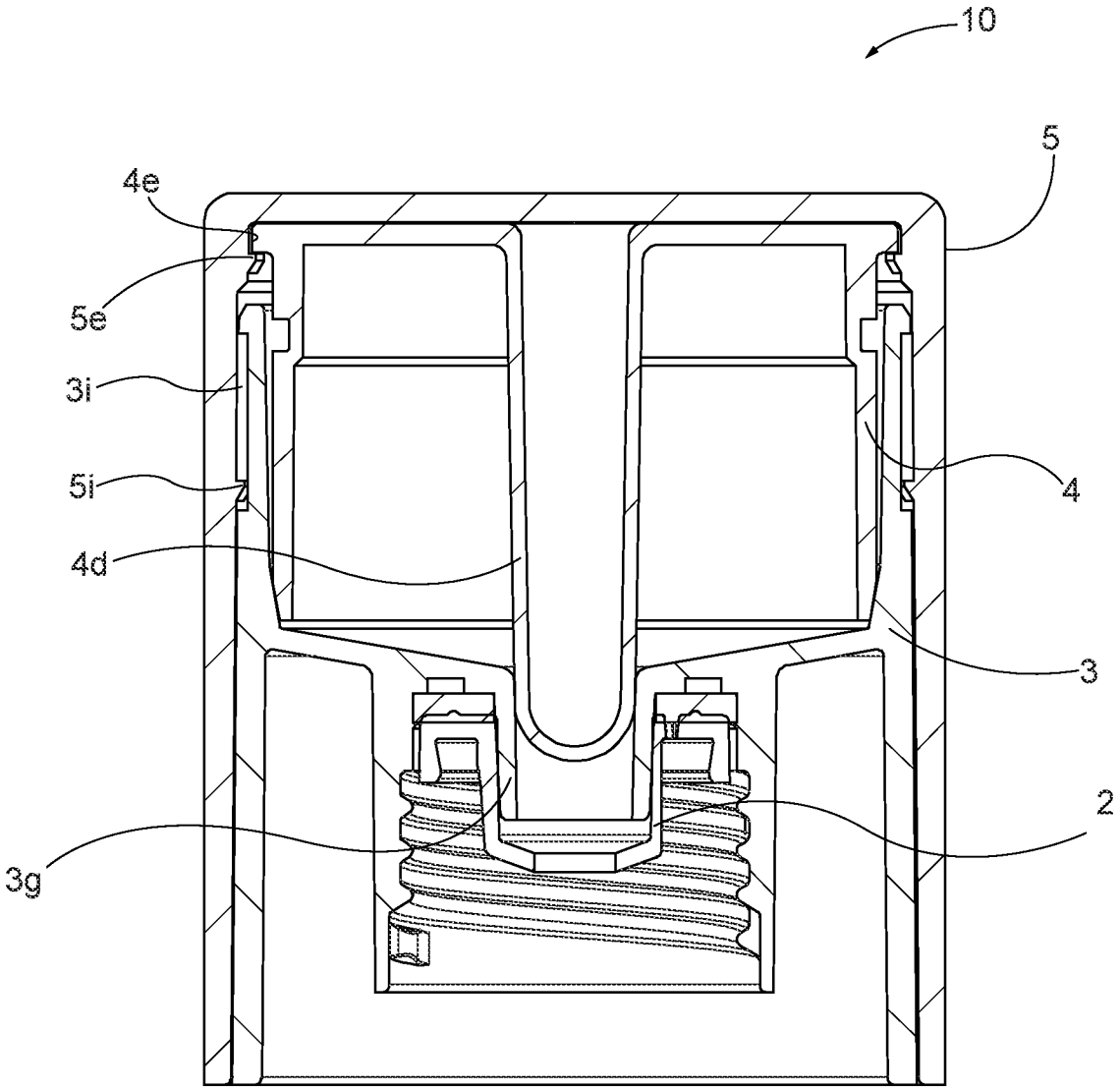


FIG. 4

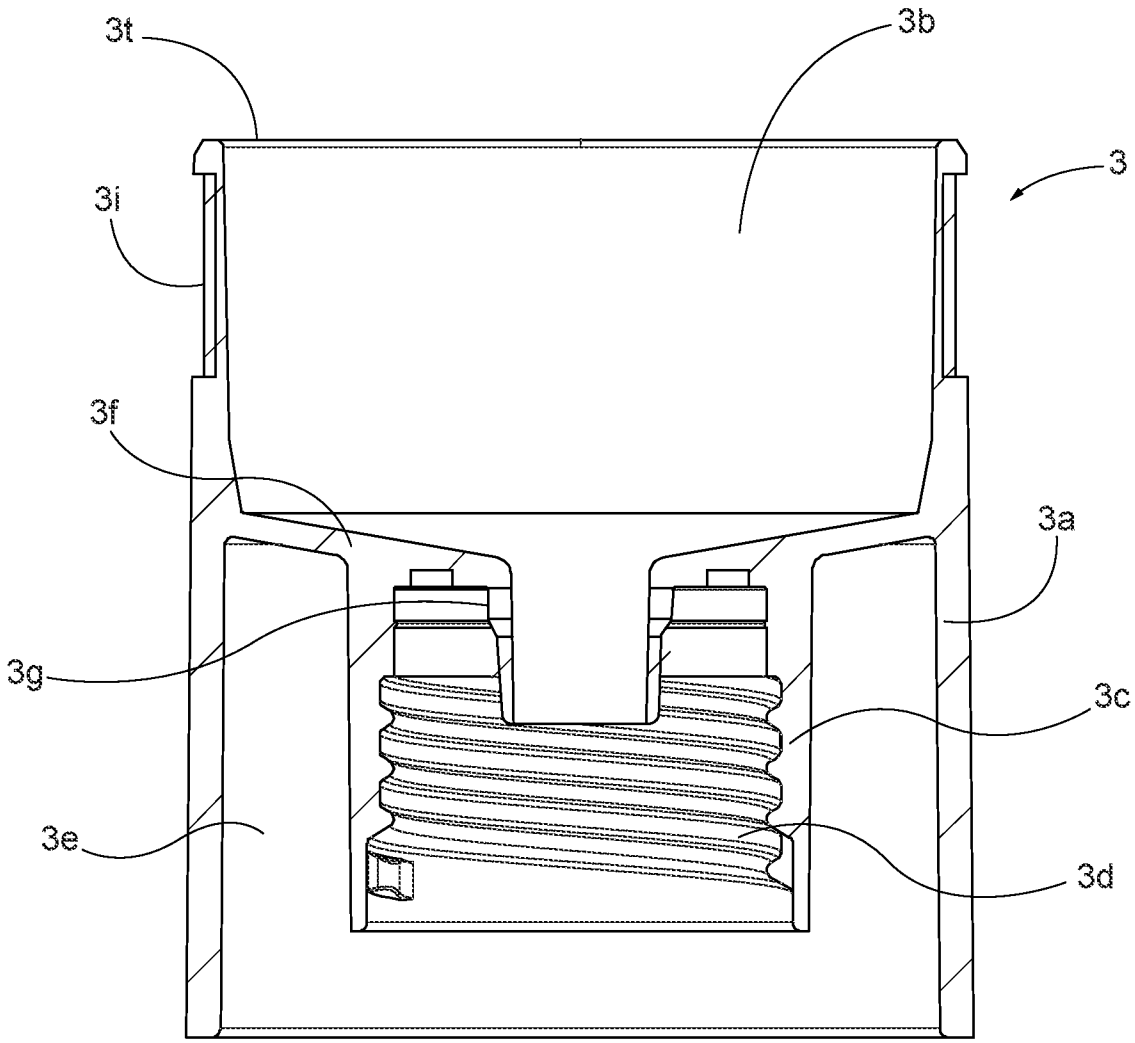


FIG. 5

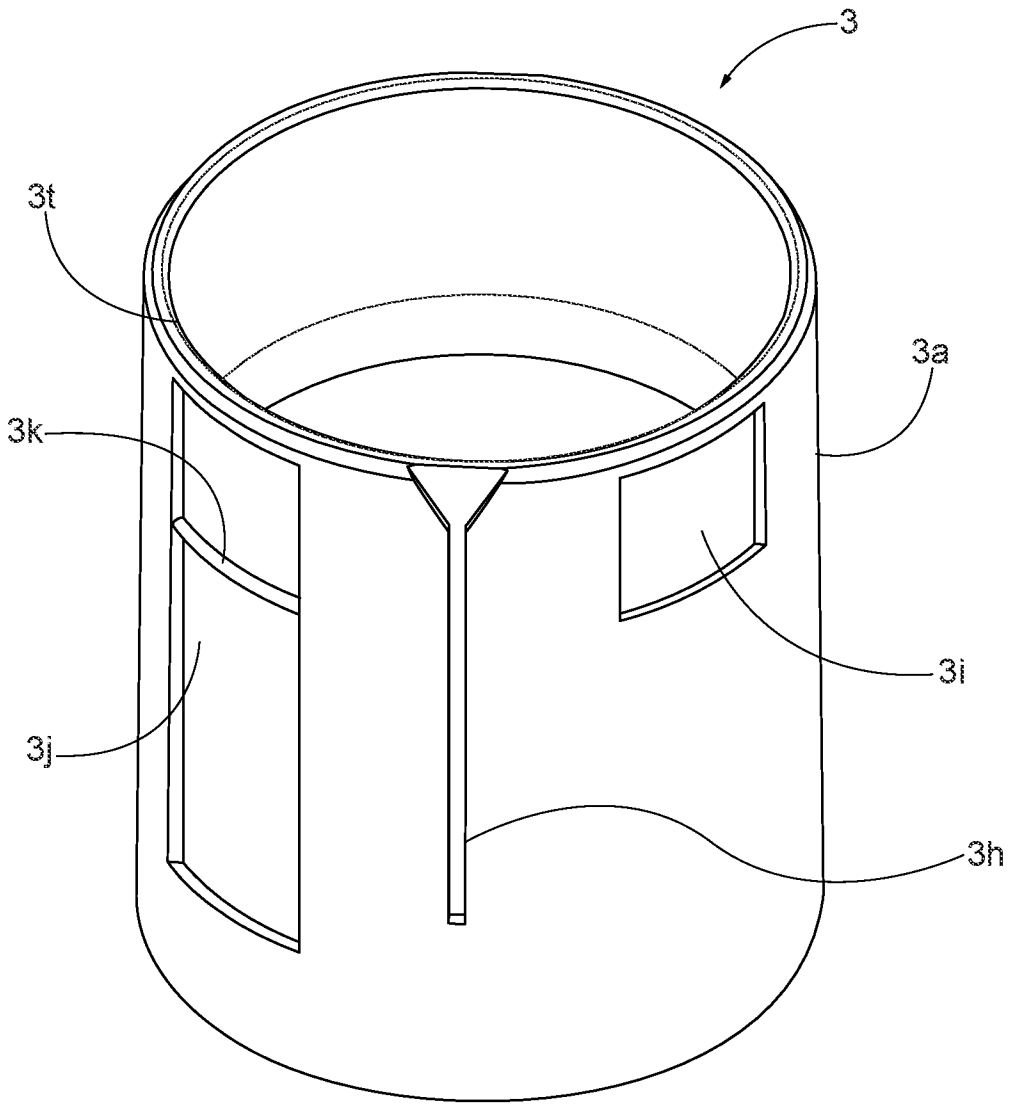


FIG. 6

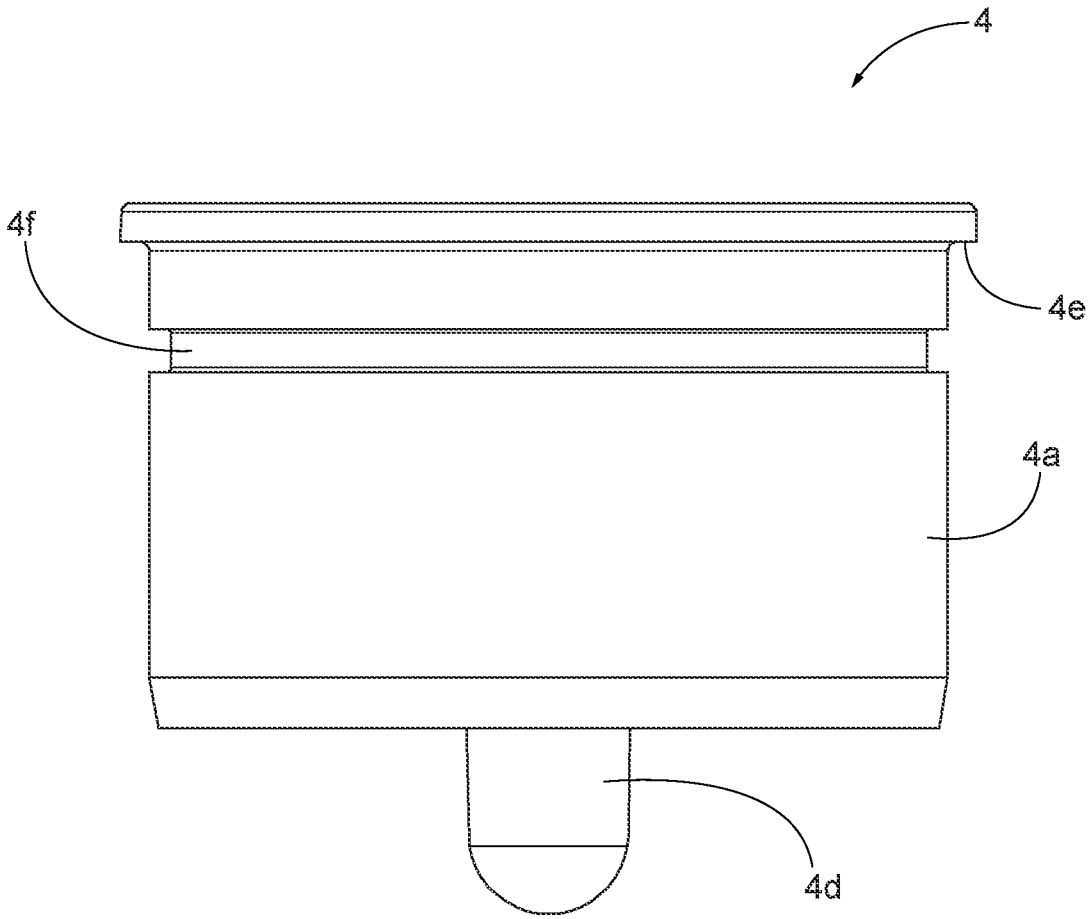


FIG. 7

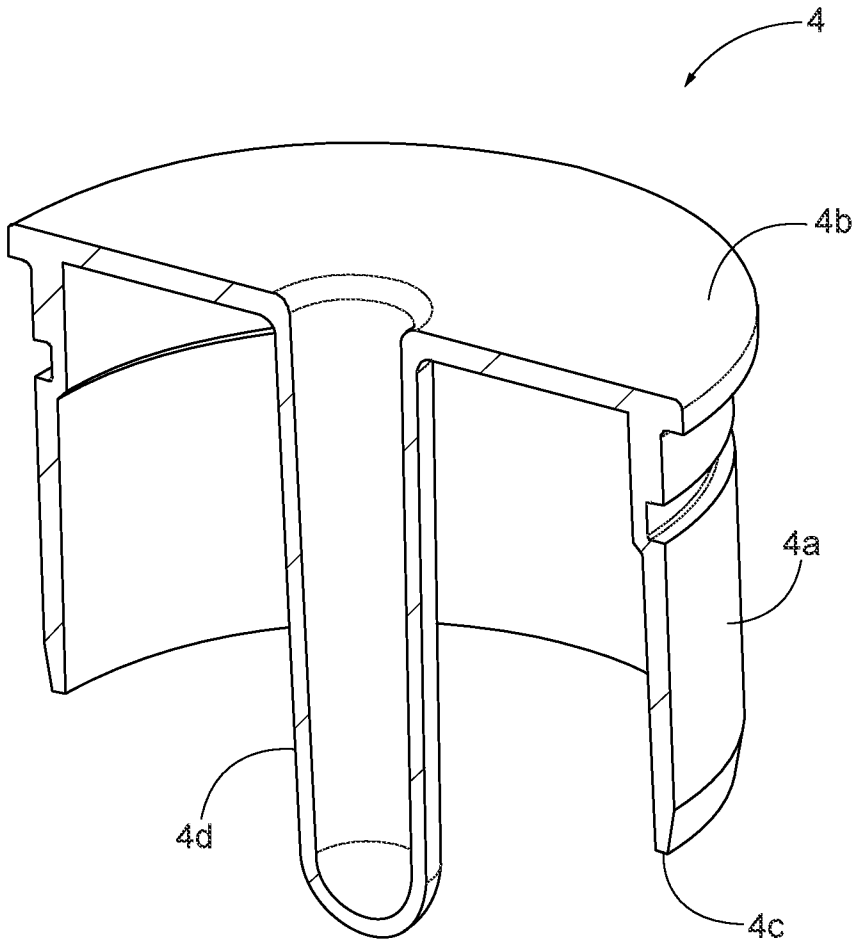


FIG. 8

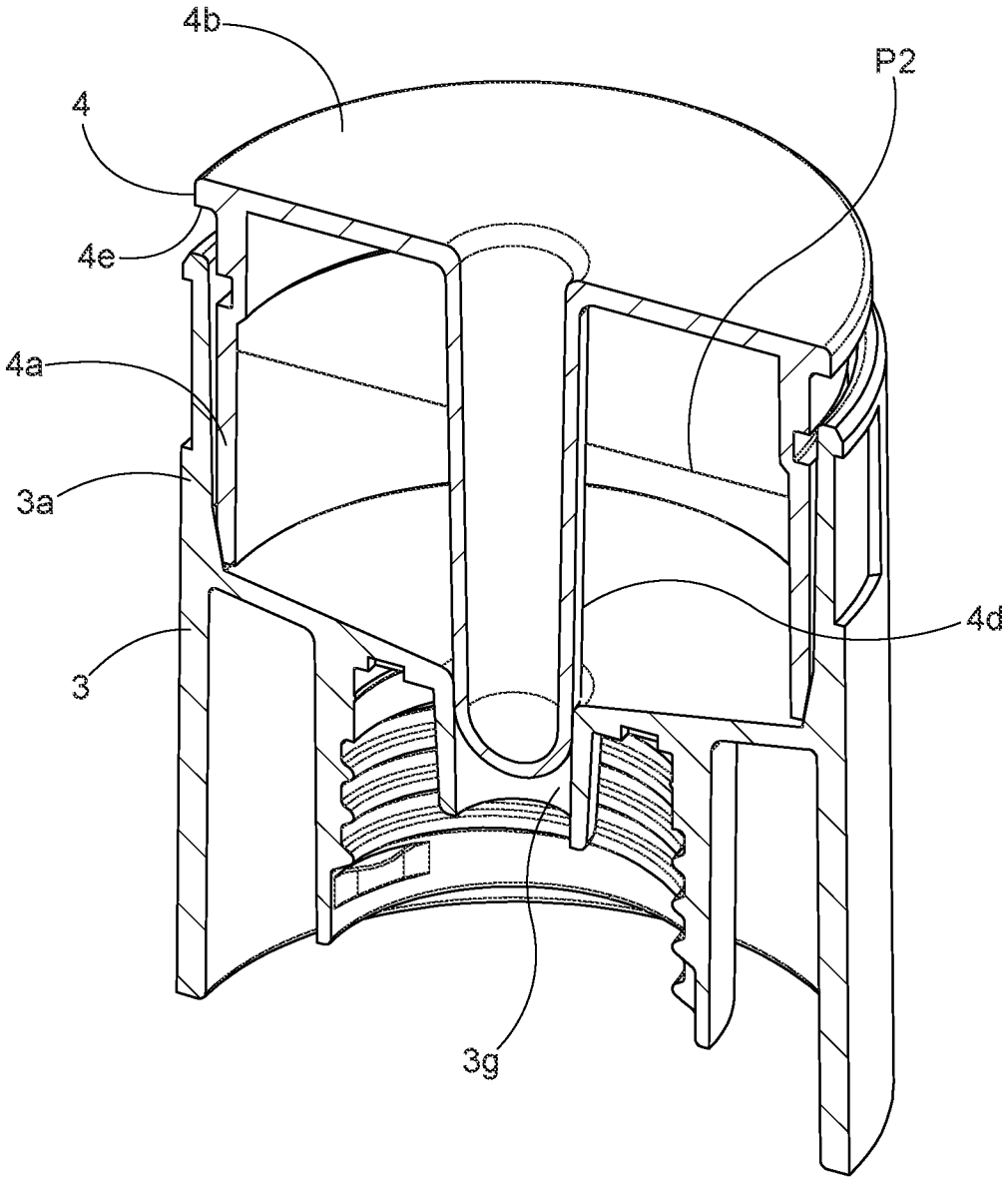


FIG. 9

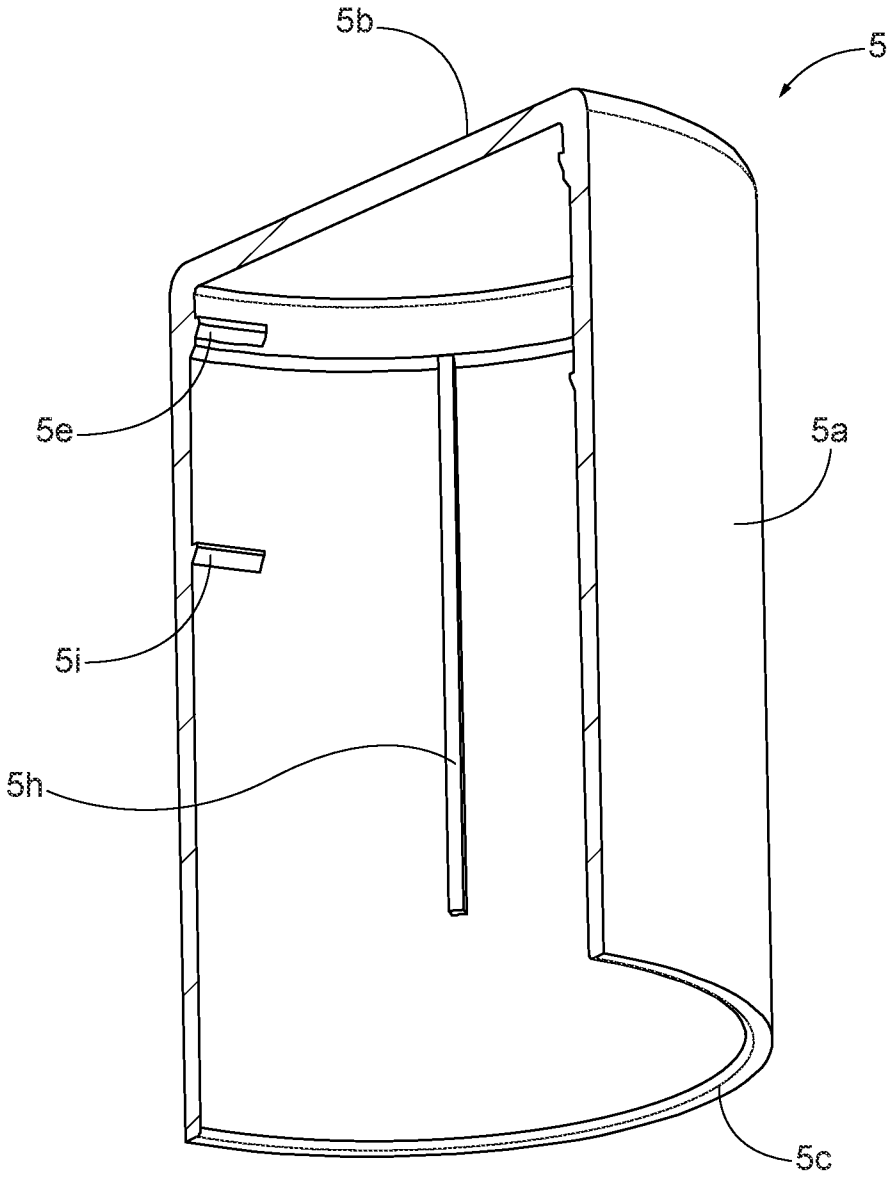


FIG. 10

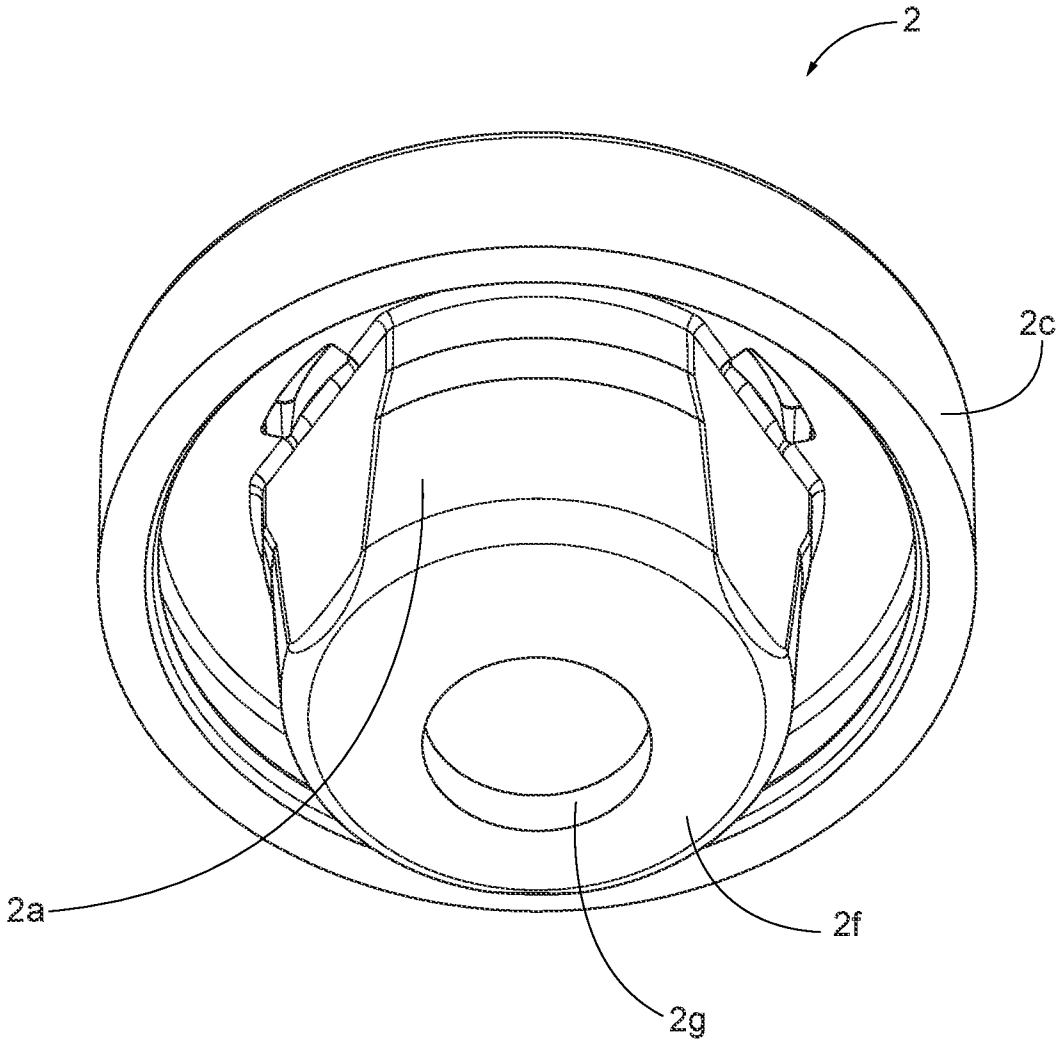


FIG. 11

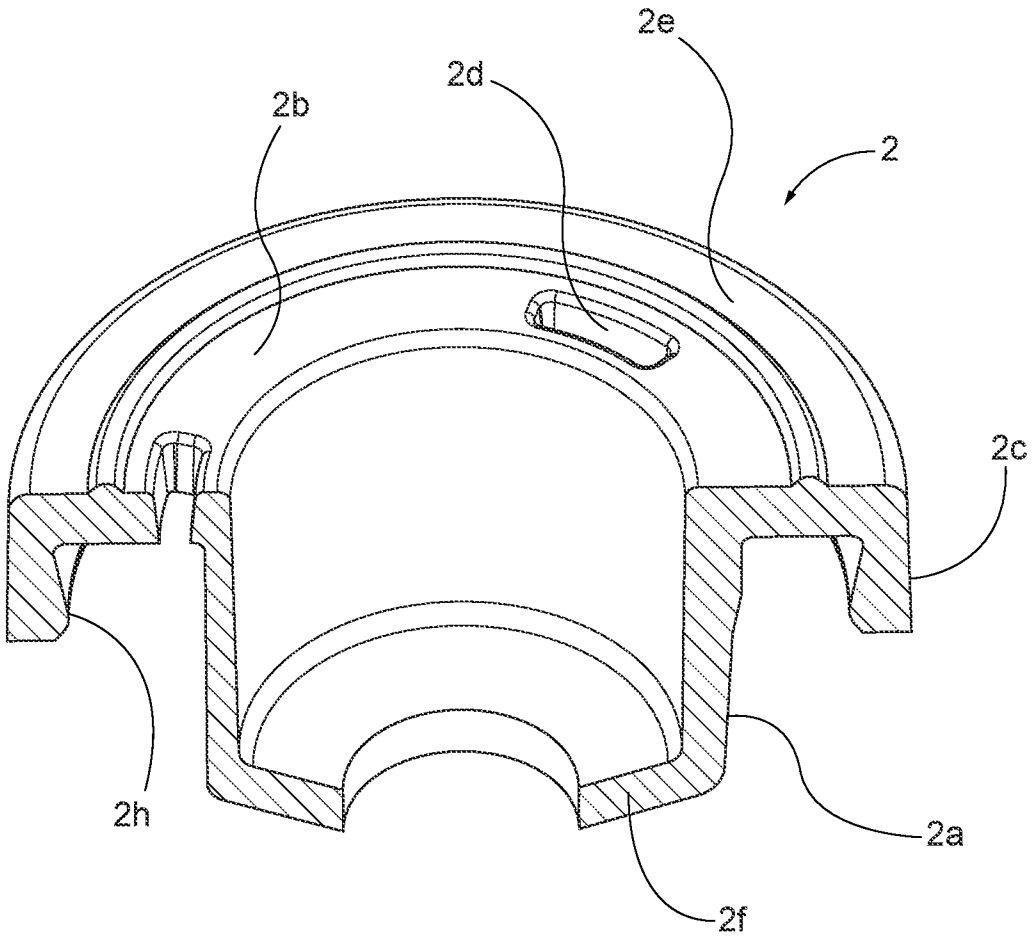


FIG. 12

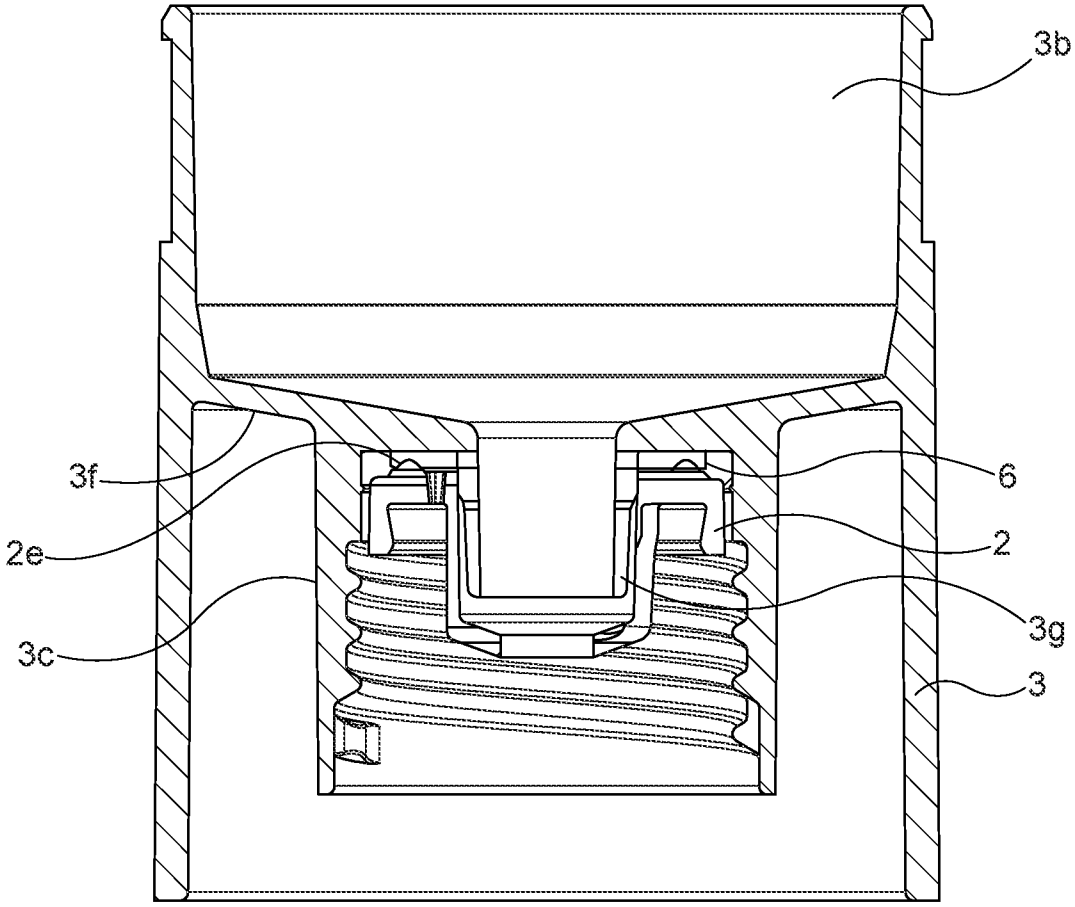


FIG. 13

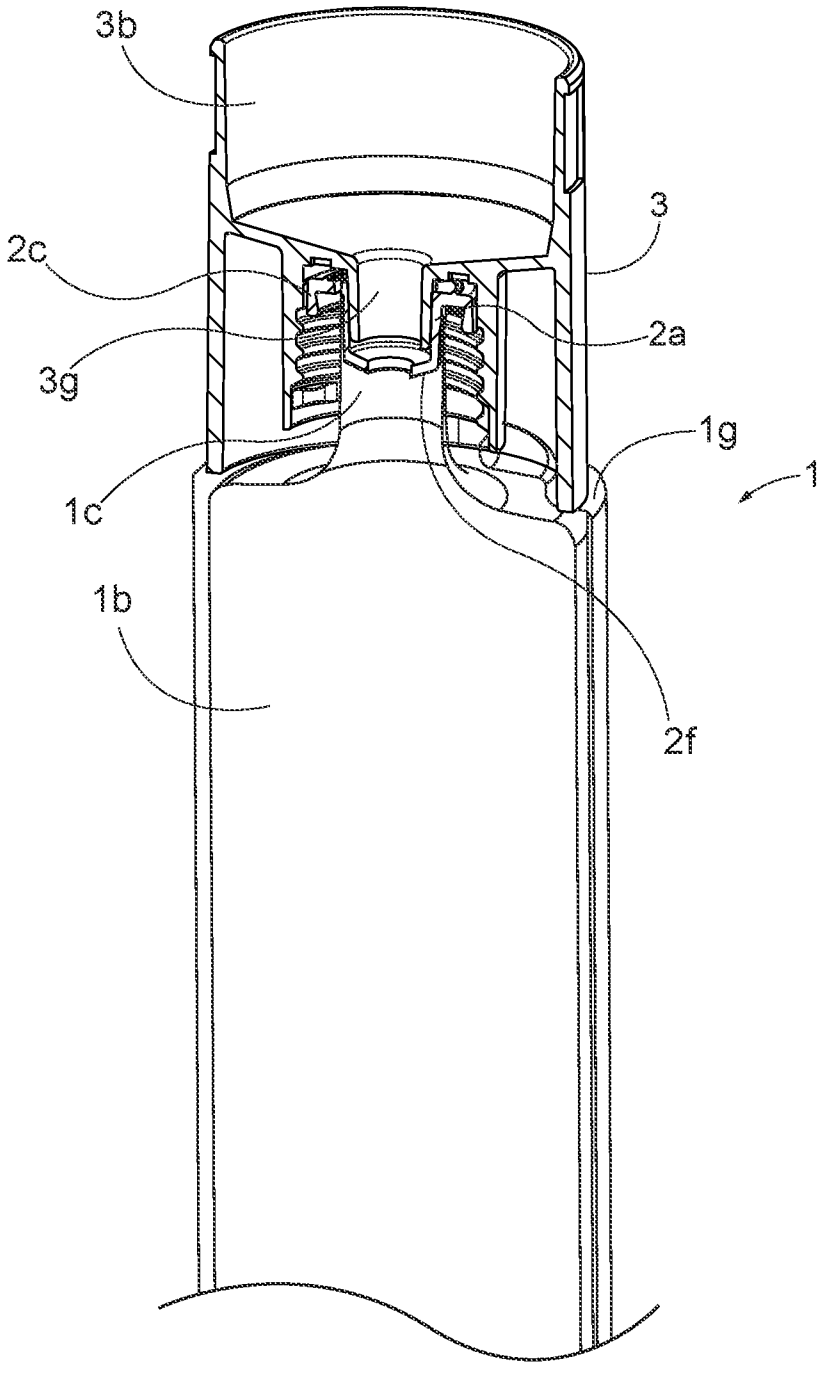


FIG. 14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2021/050344

A. CLASSIFICATION OF SUBJECT MATTER

B65D 51/28(2006.01)i; **B65D 81/32**(2006.01)i; **B65D 43/02**(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B65D 51/28(2006.01); B65D 25/08(2006.01); B65D 41/20(2006.01); B65D 51/16(2006.01); B65D 81/32(2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: threaded-neck, container, closure assembly, inner cap, plug, overcap, orifice reducer, raise, mix

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2009-0065378 A1 (MAAS, BARTHOLOMEUS HENRICUS ANTONIUS) 12 March 2009 (2009-03-12) paragraphs [0041]-[0044], [0052]-[0065] and figures 1-3	10
A		1-9,11-12
X	EP 2238043 B1 (BELCAP SWITZERLAND AG) 30 November 2011 (2011-11-30) claims 1-5 and figures 1-6	10
X	WO 2005-084135 A2 (M.L.I.S. PROJECTS LIMITED) 15 September 2005 (2005-09-15) claims 1-2 and figures 1-7	10
X	US 2020-0122908 A1 (GIZMO PACKAGING LIMITED) 23 April 2020 (2020-04-23) paragraphs [0067]-[0079] and figures 1-2	10
A	US 2017-0253412 A1 (MüHLEMANN IP GMBH) 07 September 2017 (2017-09-07) paragraphs [0026], [0028] and figures 2(a), 3	1-12

☐ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 December 2021	**29 December 2021**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office **189 Cheongsa-ro, Seo-gu, Daejeon** **35208, Republic of Korea**	**BAHNG, SEUNG HOON**
Facsimile No. **+82-42-481-8578**	Telephone No. **+82-42-481-5560**

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/US2021/050344

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
US 2009-0065378 A1	12 March 2009	AT 451312 T	15 December 2009
		DK 1931574 T3	01 March 2010
		EP 1931574 A2	18 June 2008
		EP 1931574 B1	09 December 2009
		NL 1030129 C2	10 April 2007
		US 9085397 B2	21 July 2015
		WO 2007-040396 A2	12 April 2007
		WO 2007-040396 A3	18 May 2007
EP 2238043 B1	30 November 2011	AT 535465 T	15 December 2011
		BR PI0905657 A2	07 July 2015
		BR PI0905657 B1	28 May 2019
		CN 101925521 A	22 December 2010
		CN 101925521 B	06 June 2012
		EP 2238043 A1	13 October 2010
		ES 2381624 T3	30 May 2012
		JP 2011-509221 A	24 March 2011
		JP 5356407 B2	04 December 2013
		MX 2010007528 A	04 March 2011
		PL 2238043 T3	31 August 2012
		RU 2010133733 A	20 February 2012
		RU 2502657 C2	27 December 2013
		UA 98830 C2	25 June 2012
		US 2010-0288766 A1	18 November 2010
		US 8464883 B2	18 June 2013
		WO 2009-086652 A1	16 July 2009
WO 2005-084135 A2	15 September 2005	AU 2005-220095 A1	15 September 2005
		CA 2558473 A1	15 September 2005
		CA 2558473 C	11 August 2009
		CN 1964895 A	16 May 2007
		EP 1737754 A2	03 January 2007
		EP 1737754 A4	15 July 2009
		IL 160784 A	28 February 2011
		JP 2007-527829 A	04 October 2007
		KR 10-2007-0032632 A	22 March 2007
		US 2007-0199839 A1	30 August 2007
		US 7861854 B2	04 January 2011
		WO 2005-084135 A3	15 September 2005
		WO 2005-084135 A8	22 February 2007
US 2020-0122908 A1	23 April 2020	EP 3630639 A1	08 April 2020
		US 1001425 B2	11 May 2021
		WO 2018-146459 A1	16 August 2018
US 2017-0253412 A1	07 September 2017	AU 2015-309249 A1	23 March 2017
		CH 710030 A2	29 February 2016
		CN 106794932 A	31 May 2017
		CN 106794932 B	03 May 2019
		EP 3186163 A1	05 July 2017
		JP 2017-525630 A	07 September 2017
		KR 10-2017-0048392 A	08 May 2017
		US 10315830 B2	11 June 2019

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/US2021/050344

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
		WO 2016-030073 A1	03 March 2016