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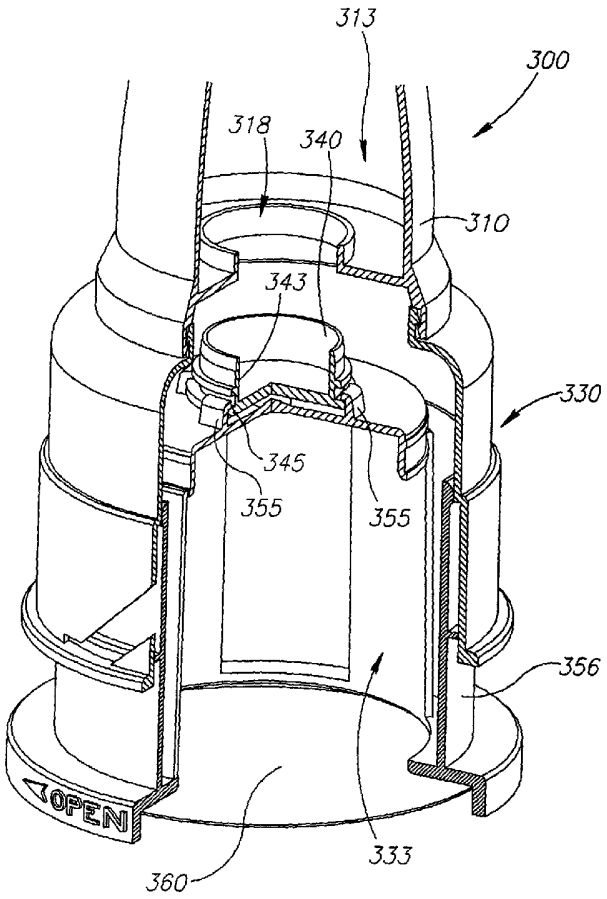
(54) Title: MULTI COMPARTMENT CONTAINER ASSEMBLY SYSTEM



(57) Abstract: A container assembly system for storing multiple components of a formulation in separate individually sealed assembly units or containers that can be assembled into a single multi-compartment container. The components of a formulation may be stored in each of the individually sealed assembly units while the assembly units remain sealed and then assembled into a multi-compartment container. The seals sealing each of the assembly units can then be unsealed so that the components can be mixed into a formulation.

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MULTI-COMPARTMENT CONTAINER ASSEMBLY SYSTEM

FIELD OF THE INVENTION

This invention relates to a multi-compartment container system and assembly for separately storing two or more components in individual containers until ready for combining and mixing prior to use. This invention further relates to a multi-compartment container that may be used to dispense a predetermined amount of the content of the multi-compartment container.

BACKGROUND OF THE INVENTION

A multi-compartment container assemblies are known in the art where two or more individually sealable assembly units may be joined together to assemble a multi-compartment container. One concern with such multi-compartment container assemblies is that at least one of the assembly units must be unsealed before other sealed assembly units can be attached to it to form a multi-compartment container. Removing the seals during the assembly process introduce a potential risk of contaminating or spilling the contents of the assembly units.

SUMMARY OF THE INVENTION

The present invention provides a multi-compartment container system and assembly in which two or more individually sealable container assembly units can be assembled into a multi-compartment container while each of the assembly units remain sealed and later unsealed without disassembling the multi-compartment container system. One advantage of the multi-compartment assembly is that the sealed assembly units, can be assembled into a multi-compartment assembly while each of the assembly units remain sealed. Because the multi-compartment assembly can be assembled without unsealing the assembly units, any risk of contaminating the contents of each of the assembly units is minimized. The seals between the assembly units can subsequently be unsealed while in their assembled state so that the contents of the assembly units can be mixed into a formulation and then dispensed from the assembly.

In a preferred embodiment of the invention, two assembly units are assembled together to form a two-compartment container, each of the assembly units forming a sealed compartment. Each of the assembly units have at least one sealed opening that engage one another to assemble the units into a two-compartment container. In this assembled state, sealing mechanisms sealing the at least one sealed opening of the assembly

units may be adapted and configured to couple with one another. The coupling may be effectuated during the assembly of the container or subsequently at a later desired time. This coupling configuration allow the sealing mechanisms of the two assembly units to unseal simultaneously when either one of the sealing mechanisms is axially displaced into an unsealed position. This establishes a flow-communication between the two assembly units allowing the contents of the two assembly units to be mixed.

In another embodiment of the invention, the multi-compartment container system may be configured and adapted so that one of the compartments at the terminal ends of the assembly is measured to hold a predetermined amount of substance to be dispensed.

The way in which the sealing mechanisms of each of the two assembly units couple will now be illustrated in some specific embodiments but it will be appreciated by one of ordinary skill in the art that the same principle is also applicable to form containers with additional separate compartments. For example, in applications where more than two assembly units are assembled together to form a multi-compartment container having more than two compartments, the sealing mechanisms involved between any two assembly units may couple so that they may be unsealed simultaneously.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a two-compartment container assembly according to an embodiment of the invention;

Fig. 2 is a perspective view of the two-compartment container assembly of **Fig. 1** with the dispensing unit and the cartridge unit separated;

Fig. 3 is an exploded partial cutaway view of the dispensing unit of **Fig. 1**;

Fig. 4 is an exploded partial cutaway view of a cartridge unit of **Fig. 1**;

Fig. 5 is a detailed partial cutaway view of the two-compartment container assembly of **Fig. 1** with the displaceable member in its sealed position;

Fig. 6 is a detailed partial cutaway view of the two-compartment container assembly of **Fig. 1** with the displaceable member in its unsealed position;

Fig. 6A is a perspective view of another embodiment of the two-compartment container assembly of **Fig. 1**;

Fig. 7 is a detailed partial cutaway view of another embodiment of the coupling mechanism for the sealing member of the dispensing unit and the top seal wall of the cartridge unit;

Fig. 8 is a perspective view of a dispensing unit and a cartridge unit illustrating another embodiment of the coupling mechanism for the sealing member of the dispensing unit and the top seal wall of the cartridge unit;

Fig. 9 is a detailed cutaway view of a two-compartment container assembled with the assembly units of **Fig. 8** where the displaceable unit is in its sealed position; and

Fig. 10 is a detailed cutaway view of a two-compartment container assembled with the assembly units of **Fig. 8** where the displaceable unit is in its unsealed position.

The drawings are only schematic and are not necessarily to scale.

DETAILED DESCRIPTION OF THE INVENTION

Some examples of the multi-compartment containers are provided to illustrate various specific configurations and examples of the invention. The invention should not be regarded as being limited to these embodiments. The containers may also be used for different uses, *e.g.*, two or more compartment containers for medicinal formulations, dietary powders to be reconstituted with a liquid, alcoholic beverages to form cocktails with other ingredients or various non-alcoholic beverages that are prepared from powders wherein one compartment contains one component and the other compartment contains another component to be mixed to form a formulation. The multi-compartment containers may also be used to store a quantity of a substance to be dispensed in a predetermined desired quantities. For example, in a two-compartment container embodiment, one compartment may hold a supply of medication and the second compartment may be configured and sized for a predetermined single dosage of that medication. To minister the dosage, the seals partitioning the two compartments are unsealed establishing a communication passage between the compartments and allow the medication to fill the second compartment. Once the second compartment is filled, the compartments may be partitioned again by closing the seals and the measured contents of the second compartment may be dispensed.

Fig. 1 illustrates a preferred embodiment of a two-compartment container assembly **100**. The two-compartment container **100** is assembled from two assembly units: a dispensing unit **10** and a cartridge unit **30.** Each of these assembly units are individually sealable containers that may be filled with a component that may be sealed and stored in them. The

Fig. 2 illustrates the dispensing unit **10** and the cartridge unit **30** detached from one another as discrete assembly units. Both of these assembly units **10, 30** may be containers having sealable openings at top and bottom ends. A flange **12** provided at the bottom end of the dispensing unit **10** engages a rim **32** provided at the top end of the cartridge unit **30** when the dispensing unit **10** and the cartridge unit **30** are assembled into a two-compartment container **100.** The diameters of the flange **12** and the rim **32** are such that they preferably engage to form a seal. The quality of the seal should be sufficiently tight for a given application for the container **100.** In a preferred embodiment, however, the seal should be of such quality to keep the contents of the container from leaking and keep any undesirable substances from entering the assembled container and possibly contaminating or compromising the quality of the contents of the container **100.**

In this illustrated example, the flange **12** has a larger diameter than the rim **32** and it fits over the rim **32.** But, the dispensing unit **10** and the cartridge unit **30** may be configured with many other variety of structures to sealingly engage one another to form a seal. The mating surfaces of the flange **12** and the rim **32** may be provided with raised sealing ridges that produce friction-fitted seal at the mating interface. Alternatively, at least one of the mating surfaces may be provided with elastomeric seals to form compression seal at the mating interface.

The bottom end of the dispensing unit **10** is sealed with a sealing member **40** and the top end of the cartridge unit **30** is sealed with a top sealing wall **50.** According to one embodiment of the present invention, the sealing member **40** and the top sealing wall **50** are configured and adapted to couple with one another when the top sealing wall **50** is axially displaced downwardly. So, as the top opening of the cartridge unit **30** is unsealed, the sealing member **40** is also pulled downwardly along with the top sealing wall **50,** thereby unsealing the bottom end opening of the dispensing unit **10.** The specific manners by which the two sealing mechanisms (the sealing member **40** and the top sealing wall **50**) couple may be achieved in a number of different ways within the scope of the present invention.

For example, in the embodiment illustrated in **Fig. 2,** the sealing member **40** is provided with two or more coupling arms **45** on its bottom surface, i.e., the surface facing the cartridge unit **30** when the dispensing unit **10** and the cartridge unit **30** are being assembled together. The top sealing wall **50** of the cartridge unit **30** is provided with its own set of two or more coupling arms **55** that correspond to the coupling arms **45.** The coupling arms **45, 55** are arranged radially with spaces **45A, 55A** between the coupling arms **45** and **55,** respectively. When the dispensing unit **10** and the cartridge unit **30** are brought

together and assembled, the coupling arms **45, 55** align with the spaces **55A, 45A,** respectively so that the coupling arms **45, 55** do not interfere with one another.

Fig. 3 illustrates a detailed partial cutaway view of the dispensing unit **10** and the coupling arms **45** can be seen in more detail. The coupling arms **45** have a J-shaped profile and protrude from the sealing member **40** with the top of the J-shaped coupling arms **45** being attached to the sealing member **40** with the bottom of the J-shaped coupling arms **45** forming locking ridges **47.** The dispensing unit **10** has two openings: a top opening **16** and a bottom opening **18.** The top opening **16** may be sealed with a top sealing member **20.** The bottom opening **18** is defined by a flange **12.** The flange **12** may comprise an upper flange portion **12A** and a lower flange portion **12B.** A bottom sealing member **40** engages the upper flange portion **12A** to seal the bottom opening **18** of the dispensing unit **10.** Preferably, the bottom sealing member **40** and the upper flange portion **12A** are configured to engage and form a seal. The bottom sealing member **40** may be a friction-fitting plug, a snap-fitting plug, or other sealing methods and mechanisms that will provide a seal with the necessary sealing quality. Of course the quality of the seal formed by the bottom sealing member **40** or any of the other seals in the container system will depend upon the particular application, but in a preferred embodiment of the present invention, the seals should at minimum keep the contents of the assembly units from leaking and keep any undesired substances from entering the assembly units and possibly contaminating or compromising the quality of the contents of the assembly units.

The seal formed at the top opening **16** by the top sealing member **20** is preferably of such quality that the dispensing unit may be filled with either liquid or solid substances and also protect the contents of the dispensing unit from contamination during storage. The top sealing member **20** may be a screw cap, a friction-fitting plug, a snap-fitting plug, a heat-sealed membrane, or sealing methods or mechanisms.

Fig. 4 illustrates an exploded partial cutaway view of the cartridge unit **30** which may be engaged with the dispensing unit **10** to form a two-compartment container. A multi-compartment container system and assembly utilizing a cartridge unit such as the cartridge unit **30** is disclosed in detail in pending United States Patent Application No. 10/214,374, filed August 6, 2002, and the disclosure of which is incorporated herein by reference.

Cartridge unit **30** comprises a cartridge housing **31** with a top opening **36** defined by a rim **32** and a displaceable member **56** provided within the cartridge housing **31.** The displaceable member **56** is axially displaceable within the cartridge unit's housing **31** between a sealed position and an unsealed position. In its sealed position, the displaceable

member's top sealing wall **50** engages the rim **32** and seals the top opening **36.** In its unsealed position, the displaceable member **56** is axially displaced away from the rim **32** leaving the top opening **36** open. The bottom opening **38** of the cartridge unit **30** is defined by the bottom end of the displaceable unit **56** and it provides access to the internal space of the cartridge unit **30** so that the cartridge unit **30** may be filled with its contents. The bottom opening **38** may be sealed with any appropriate closure member **60.** The closure member **60** may be a screw cap, a friction fitting plug, a snap-fitting plug, a heat-sealed membrane, or other sealing methods and mechanisms.

When the cartridge unit **30** and the dispensing unit **10** are assembled, a rim **32** is inserted into a flange portion **12** of the dispensing unit **10.** The rim **32** and the flange portion **12** are configured and adapted to form a seal that is of appropriate quality for a given application. The mating surfaces of the rim **32** and the flange portion **12** may be provided with sealing ridges or other similar type of structures to produce a friction-fitting seal at the mating interface. For example, the mating surfaces may be configured with an elastomeric material to form the seal. Alternatively, the rim **32** and the flange portion **12** may be provided with screw threads so that the dispensing unit **10** and the cartridge unit **30** may be screwed together for assembly.

The displaceable member **56** has a user manipulable portion **52** for axially displacing the displaceable member **56** between the sealed position and the unsealed position. To guide the axial motion of the displaceable member **56**, the displaceable member **56** may be provided with one or more guide pins **54** and the cartridge housing **31** is provided with a corresponding number of guide slots **34** within which the guide pins are situated. The number of guide slots **34** and the guide pins **54** need not be equal. For example, more guide slots **34** than guide pins **54** may be provided. As illustrated in **Figs. 1-4**, the guide slots **34** are S-shaped with the terminal ends forming horizontal sections. By twisting the manipulable portion **52** about the longitudinal axis of the cartridge unit **30** in the direction indicated by arrow **A** on the manipulable portion **52** in **Figs. 1** and **2**, the guide pins **54** will follow the path of the guide slots **34** and the displaceable member **56** will move accordingly. Thus, the displaceable member **56** will first just rotate about its longitudinal axis without any axial translation, then the displaceable member **56** will move in at least an axial direction (i.e., along the longitudinal axis of the cartridge unit **30**).

During the initial movement of the displaceable member **56** without any axial translation, the coupling arms **45, 55** are brought into interlocking positions. Then during the axial movement of the displaceable member **56**, the top sealing wall **50** and the coupled sealing member **40** will both simultaneously unseal. The displaceable member **56**

is connected to the sealing wall **50** via one or more connecting member **58.** And, in between the connecting members **58** are spaces **59** that allow the internal space of the cartridge unit **30** (defined by the displaceable unit **56**) to communicate with the external environment through the top opening **36** when the displaceable unit **56** is in the unsealed position.

In **Fig. 4**, the coupling arms **55** provided on the top sealing wall **50** of a displaceable member **56** can be seen in more detail. Similar to the coupling arms **45**, the coupling arms **55** also have a J-shaped profile and they protrude from the top surface of the top sealing wall **50.** The top of the J-shaped coupling arms **55** are attached to the sealing wall **50** with the bottom of the J-shaped coupling arms **55** forming locking ridges **57.** After the dispensing unit **10** and the cartridge unit **30** are assembled together as illustrated in **Fig. 1**, as the displaceable member **56** is rotated by turning the manipulable portion **52** in the direction of arrow **A**, the coupling arms **45** and **55** align with one another so that the locking ridges **47** and **57** interlock. As can be seen in **Figs. 3 and 4**, the coupling arms **45** are oriented with their locking ridges **47** facing radially outward while the coupling arms **55** are oriented with their locking ridges **57** facing radially inward so that they interfere and interlock with one another. Of course, the orientation of both locking ridges **47, 57** may be reversed.

Fig. 5 illustrates a detailed cutaway view of a fully assembled two-compartment container **100** whose assembly units are in sealed state. The lower flange portion **12B** of the dispensing unit **10** and the rim **32** of the cartridge **30** are sealingly engaged. The bottom sealing member **40** is sealingly engaged to the upper flange portion **12A** of the dispensing unit **10**, sealing the bottom opening of the dispensing unit **10.** The displaceable member **56** is in its sealed position so that the top sealing wall **50** has sealingly engaged the top opening of the cartridge unit **30** and the coupling arms **45** and **55** are in an unlocked position. The bottom opening of the cartridge unit **30** is sealed with the closure member **60.**

Fig. 6 illustrates a detailed cutaway view of a fully assembled two-compartment container **100** whose assembly units have been unsealed so that the two compartments are in communication with each other. The displaceable member **56** has been axially displaced to its unsealed position and hence the guide pin **54** is in its lower-most position in the guide slot **34.** The bottom sealing member **40** remains coupled to the top sealing wall **50** of the cartridge unit **30** by the interlocked coupling arms **45** and **55.** The bottom sealing member **40** has been pulled down by the downward axial displacement of the displaceable member **56** disengaging from the upper flange portion **12A.**

Once the two-compartment container **100** is properly assembled and the coupling arms **45** and **55** are interlocked, and a user turns the manipulable portion **52** of the cartridge unit **30** and moves the displaceable member **56** to the unsealed position, both the top sealing wall **50** of the cartridge unit **30** and the bottom sealing member **40** of the dispensing unit **10** will be unsealed and the internal spaces of the dispensing unit **10** and the cartridge unit **30** will be in flow-communication. Of course the strength of the coupling provided by interlocking of the coupling arms **45** and **55** should be sufficiently strong to be able to pull and unseal the bottom sealing member **40**.

The interlocking of the top sealing wall **50** and the bottom sealing member **40** of the assembly units **30** and **10**, respectfully, allows the user to store each component of a formulation in sealed assembly units and assemble them into a container while keeping the assembly units intact as sealed units in order to prepare the formulation. Because the assembly units can remain intact as sealed units while assembling them into a container, the risk of contaminating the stored contents of the assembly units is minimized.

In another embodiment of the container assembly **100**, once the assembly units **10** and **30** are brought together, the dispensing unit **10** and the cartridge unit **30** may be twisted or rotated about their longitudinal axis in opposite directions so that the coupling arms **45** and **55** align with each other and interlock their locking ridges **47** and **57.**

In another embodiment of the container assembly **100**, each of the sealing mechanisms (sealing member **40** and top sealing wall **50**) may be provided with a single coupling arm on each of the sealing mechanisms. For example, each sealing mechanisms may be provided with a coupling arm that extends in a half circle.

Fig. 6A illustrates yet another embodiment of the container assembly **100A**. In this embodiment, a displaceable member **56A** may be configured and adapted to prevent that member from being returned to its sealed position once it has been axially displaced to its unsealed position. For example, in addition to guide pins **54A**, the displaceable member **56A** may be provided with a second set of pins **51A** that is positioned closer to the bottom end of the displaceable member **56A** so that when the displaceable member **56A** is axially displaced to its unsealed position, the pins **51A** protrudes out below the cartridge housing **31A.** The pins **51A** are sufficiently tall to interfere with the cartridge housing **31A** to prevent the displaceable member **56A** from returning to its sealed position. In this embodiment, the cartridge housing **31A** and the displaceable member **56A** are made from materials sufficiently elastic to accommodate the displaceable member **56A**, with the pins **51A** protruding from its outer surface, within the cartridge housing **31A.** When the

cartridge unit **30A** of this embodiment is initially assembled, the pins **51A** are Such feature would prevent an undesired reuse of the container after its content has been dispensed.

It would be obvious to one of ordinary skill in the art that the closure member **60** that seals the bottom opening **38** of the cartridge unit **30** may be configured and adapted to take on a form similar to the bottom sealing member **40** of the dispensing unit **10.** For example, the closure member **60** may also be configured to have structures similar to the coupling arms **45** so that a second cartridge unit (not shown) may be engaged to the bottom end of the cartridge unit **30** adding a third compartment to the container assembly **100.**

Similarly, any number of cartridge units may be assembled serially in this manner to form a multi-compartment container assembly having any desired number of compartments. Furthermore, a multi-compartment container assembly may be assembled by connecting two or more cartridge units in series without any dispensing unit. Once the contents of the cartridges are mixed, whether they be liquids, powders, or combinations, the contents may be directly dispensed through the end opening of one of the two terminally located cartridges. In other words, the mixed content may be dispensed through the top opening of the top cartridge or the bottom opening of the bottom cartridge. If a separate dispensing device were required by a particular application, an appropriate dispensing device may be attached to the opening of the dispensing unit.

It would be appreciated by one of ordinary skill in the art that another configuration of a multi-compartment container assembly may include one or more of the cartridge units as described herein attached to both open ends of a dispensing unit. In another embodiment, the dispensing unit may be a bottle like container having only one opening. Again, one or more cartridge units may be attached in series to such a dispensing unit to assemble a multi-compartment container assembly.

Furthermore, according to one embodiment of the present invention, two or more cartridge units may be assembled serially to assemble a multi-compartment container. Each of the cartridge units in the assembly constitutes a sealed compartment holding a component of a formulation to be mixed. Once the contents of the container assembly have been mixed and are ready to be dispensed, the displaceable member of the upper-most cartridge unit in this assembly is moved to its unsealed position so that the mixed formulation can be dispensed through the top opening of the upper-most cartridge unit. If necessary, an appropriate dispensing device, such as a baby feeding nipple, can be attached to the top opening of the upper-most cartridge unit.

Fig. 7 illustrates a two-compartment container assembly **200** according to another embodiment of the present invention where the container is assembled with a , dispensing unit **210** and a cartridge unit **230.** The bottom opening **218** of the dispensing unit **210** has a smaller diameter than in the previously described embodiments. The smaller diameter of the bottom opening **218** may be more suitable for an application requiring filling the dispensing unit **210** with a pressurized component. By reducing the size of the bottom opening, the sealing member **240** is accordingly smaller and thus the pressure exerted on the sealing member **240** by the internal pressure can be reduced. This minimizes the chance that the sealing member **240** might be pushed out of its sealed position before being assembled with a cartridge unit. The smaller diameter sealing member **240** has a plurality of J-shaped coupling arms **245** on the side facing the cartridge unit **230.** The displaceable unit **256** is provided with top sealing wall **250** that sealingly engages with rim **232** when the displaceable member **256** is in its sealed position. A plurality of J-shaped coupling arms **255** is provide on the top surface of the top sealing wall **250** for coupling with the sealing member **240** by interlocking with the coupling arms **245.** In this embodiment, the coupling arms **245** and **255** are provided as a plurality of arms, similar to the coupling arms **45** and **55** in the container **100,** but the coupling arms **245** and **255** are arranged in a circular formation with minimal spaces between each of the plurality of coupling arms. The actual number of arms provided for each group **245** and **255** may vary depending upon the particular application and would be a matter of design choice. These coupling arms **245** interlock with the coupling arms **255** by snap-fitting with when the dispensing unit **210** and the cartridge unit **230** are brought together for assembly. The coupling arms **245** and **255** are both arranged in a circular configuration with coupling arms **245** in a smaller diameter configuration. And the coupling arms **245** and **255** are oriented so that the hook-end of the J-shaped profile of the coupling arms **245** are facing the hook-end of the J-shaped profile of the coupling arms **255.** When the dispensing unit **210** and the cartridge unit **230** are brought together, the coupling arms **245** and **255** elastically bend to allow the coupling arms **245** to slide inside the circle formed by the coupling arms **255** until they interlock. In this embodiment, the rotational movement of the displaceable member **256** is not required to interlock the coupling arms **245** and **255.**

It would be obvious to one of ordinary skill in the art to provide the coupling arms **245** and **255** in other appropriate configurations. For example, the coupling arms **245** and **255** each may be solid circular structures.

Figs. 8 illustrates another embodiment of a two-compartment container assembly **300** where the coupling mechanism between the dispensing unit's bottom sealing

member and the top sealing wall of the cartridge unit is provided in a different configuration. In this embodiment, the bottom sealing member **340** of the dispensing unit **310** has an extension **343** that protrudes downwardly and has an elliptically shaped bottom end having two ends **345** that extend beyond the extension **343.** The top sealing wall **350** of the cartridge unit **330** has two coupling arms **355** that have a J-shaped profile. The coupling arms **355** are located equidistant from the center of the top sealing wall **350** with the hook-end of the J-shaped coupling arms **355** facing each other. The top opening of the dispensing unit **310** is sealed with a screw cap **320.**

Fig. 9 is a partial cutaway illustration of the fully assembled container assembly **300** and the configuration described above can be seen in more detail. The bottom opening of the dispensing unit **310** is sealed with a sealing member **340.** In this view, the dispensing unit **310** and the cartridge unit **330** have been assembled together but the sealing member **340** and the top sealing wall **350** have not yet been coupled together. As illustrated, the dispensing unit **310** and the cartridge unit **330** are oriented so that the extending ends **345** of the elliptical bottom end of the sealing member **340** lie between the two coupling arms **355.** To couple the sealing member **340** and the top sealing wall **350,** the user would twist the dispensing unit **310** and the cartridge unit **330** in opposite directions about the longitudinal axis of the assembly, thereby causing the extending ends **345** of the elliptical bottom end of the sealing member **340** to slide under the hook end of the J-shaped coupling arms **355.**

Fig. 10 illustrates the two-compartment container assembly **300** after the displaceable member **356** has been axially displaced to its unsealed position unsealing the coupled sealing member **340** and the top sealing wall **350.** The top compartment **313** (defined by the internal space of the dispensing unit **310**) and the bottom compartment **333** (defined by the internal space of the displaceable member **356**) of the container assembly **300** are now in flow communication through the bottom opening **318** of the dispensing unit **310.** has been pulled out of is sealing position leaving the bottom opening **318** of the dispensing unit **310** open. The bottom opening of the cartridge unit **330** is illustrated as being sealed with a closure member **360.** As discussed previously in conjunction with the container assembly **100,** in another embodiment of the invention, the bottom end of the displaceable member **356** of the cartridge unit **330** may be configured and adapted to have a structure similar to that of the bottom end of the dispensing unit **310.** Thus, a second cartridge unit may be engaged to the bottom end of the cartridge unit **330** to form a third compartment of the container assembly **300.**

It will be appreciated that the above descriptions are intended only to serve as examples, and that many other embodiments are possible and encompassed within the spirit and the scope of the present invention. The assembly units, cartridge units and the dispensing units, described herein and illustrated in the figures are examples only. Assembly units embodying other variations of the structures described here are within the scope of the present invention. For example, a multi-compartment container system according to the present invention may be configured so that the dispensing unit is configured and adapted to hold a predetermined amount of substance. Such container may be used to store a bulk volume of a substance in the other compartments and use the dispensing unit to measure a predetermined single dose of the substance for dispensing. The bottom sealing member of the dispensing unit may be opened by axially displacing the displaceable member of the cartridge unit that is attached to the dispensing unit and let the contents of the cartridge unit fill the dispensing unit. Next, the sealing member of the dispensing unit is resealed by axially displacing the displaceable member to its sealed position. The dispensing unit now is filled with a predetermined amount of the substance that may be dispensed through a separate dispensing opening on the top end of the dispensing unit.

We claim:

1. A multi-compartment container system comprising:

at least two assembly units;

at least one of the assembly units being a cartridge unit, the cartridge unit comprising:

a cartridge housing having an opening at each of its top and bottom ends;

at least one of the two openings adapted and configured to engage and seal another assembly unit;

a displaceable member having a sealing wall at one end, a manipulable portion at the other end adapted and configured to be controlled by a user to move the displaceable member, and at least one connecting member extending between the sealing wall and the manipulable portion;

a closure member sealing the other of the two openings;

wherein the displaceable member is moveable between a sealed position, where the sealing wall engages the cartridge housing sealing the top end opening of the cartridge housing, and an unsealed position, where the sealing wall is disengaged from the cartridge housing and the top end opening is open; and

the other of the at least two assembly units having at least one opening sealed with a sealing member, said at least one opening adapted and configured to engage the top end opening of the cartridge housing, said sealing wall and said sealing member each provided with at least one coupling arm that interlock with one another when the two assembly units are assembled, wherein when the displaceable member is moved to its unsealed position disengaging the sealing wall from the cartridge housing, the sealing member is also disengaged from the at least one opening of the other of the at least two assembly units.

2. A multi-compartment container system according to claim 1, wherein the coupling arms provided on the sealing wall and the sealing member are protrusions having locking ridges.

3. A multi-compartment container system according to claim 1, wherein the coupling arms provided on the sealing wall and the sealing member are protrusions having a J-shaped profile.

4. A multi-compartment container system according to claim 1, wherein the coupling arms provided on the sealing wall and the sealing member are a plurality of radially positioned protrusions having locking ridges.

5. A multi-compartment container system according to claim 1, wherein the coupling arms provided on the sealing wall and the sealing member are a plurality of radially positioned protrusions having a J-shaped profile.

6. A multi-compartment container system according to claim 1, wherein the at least one of the top and bottom openings of the cartridge housing is provided with screw threads for sealingly engaging another assembly unit.

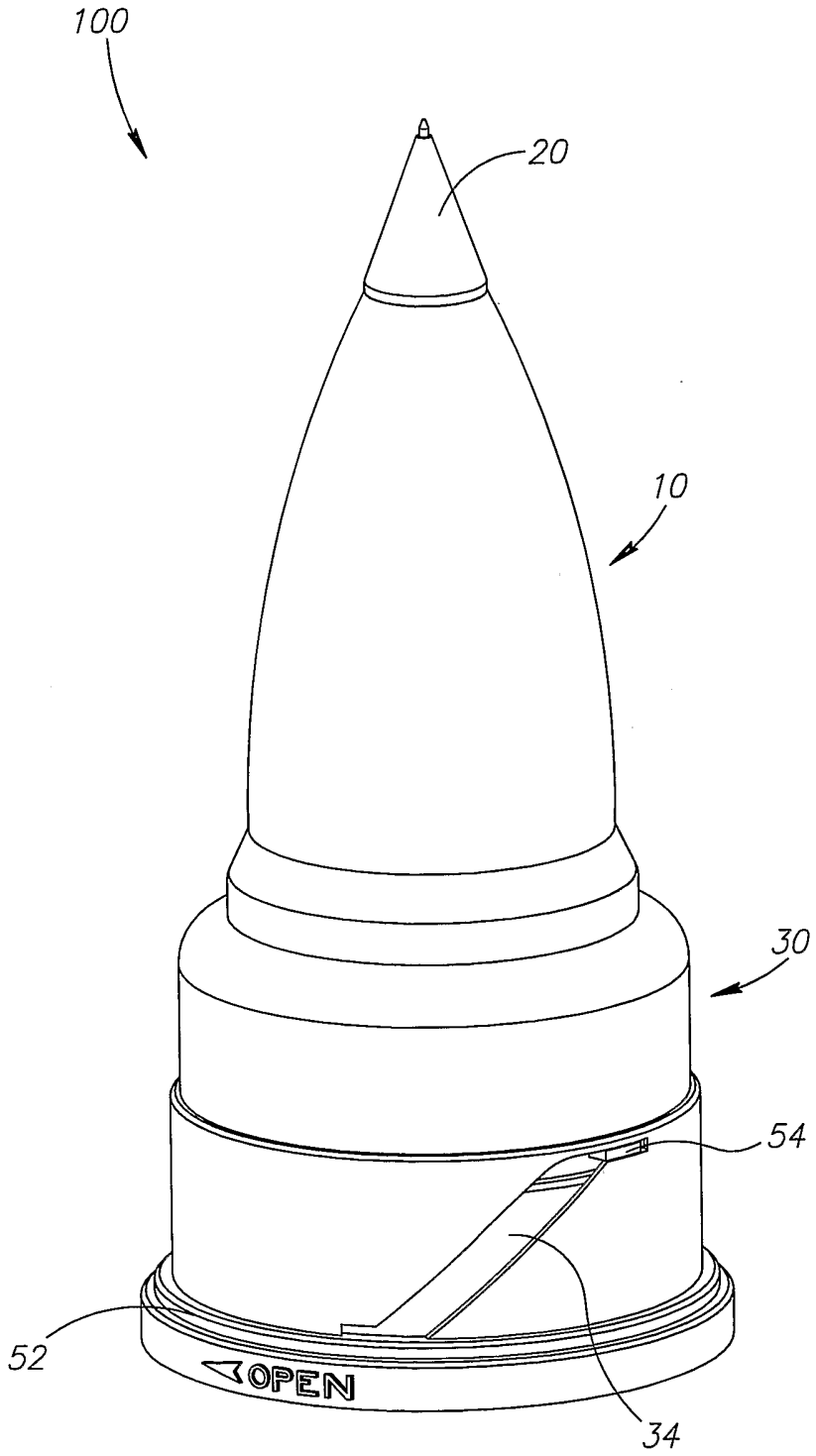

FIG.1

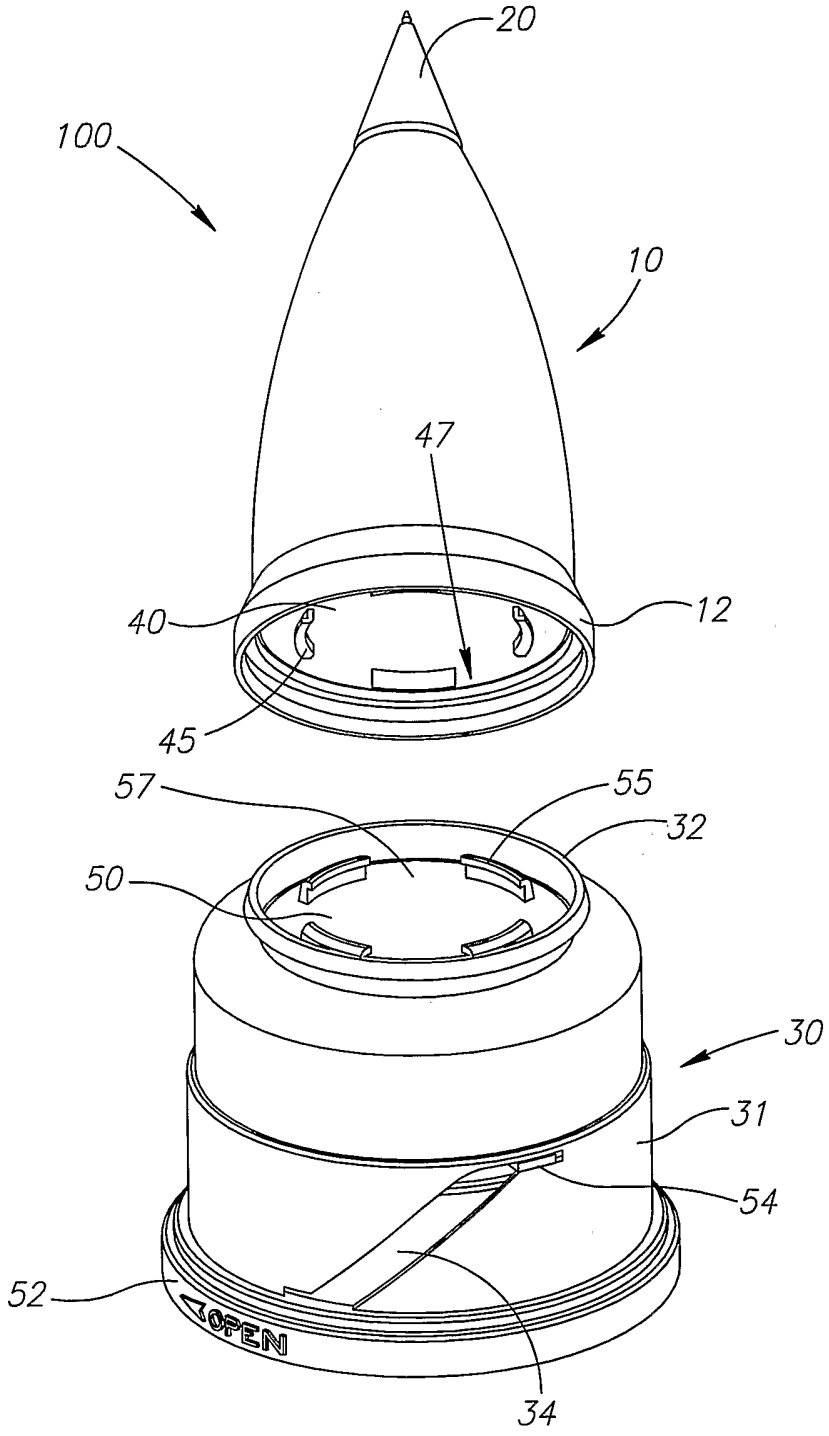

FIG.2

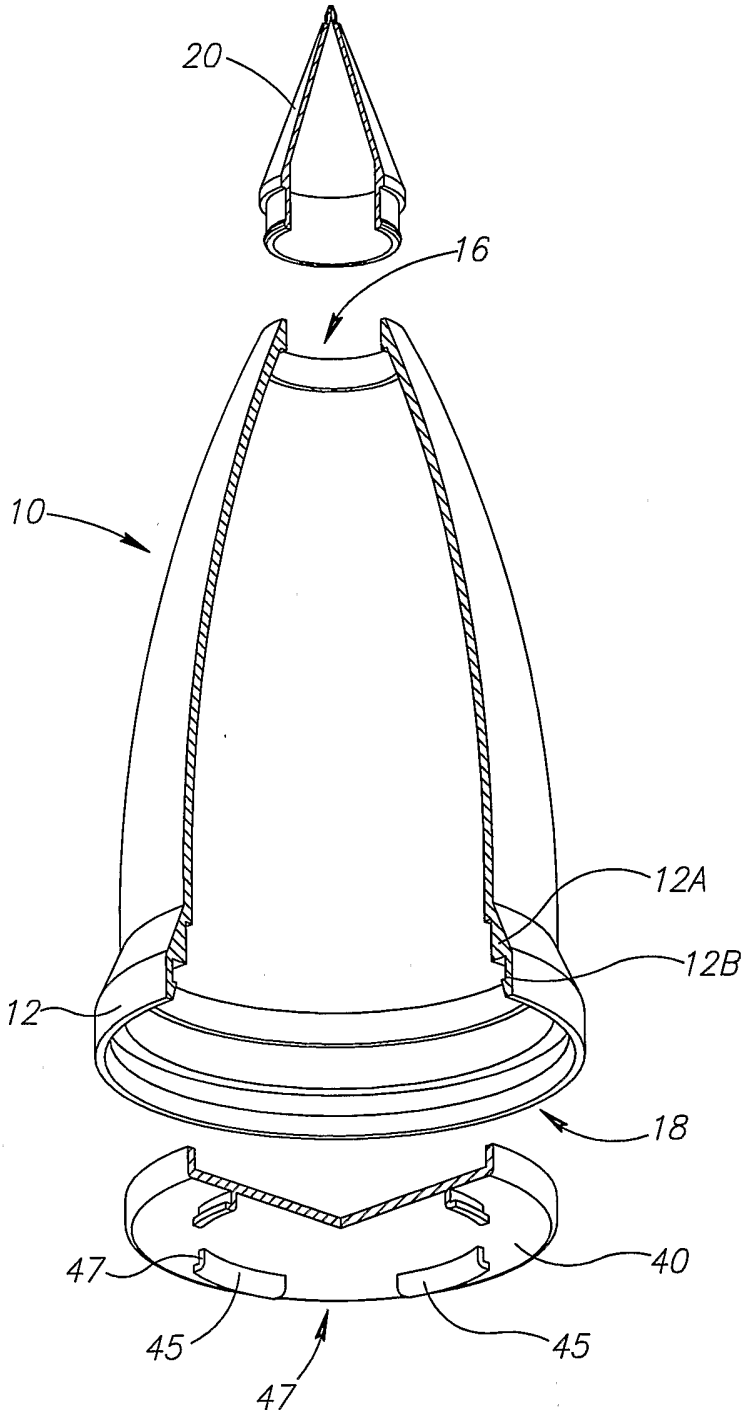

FIG.3

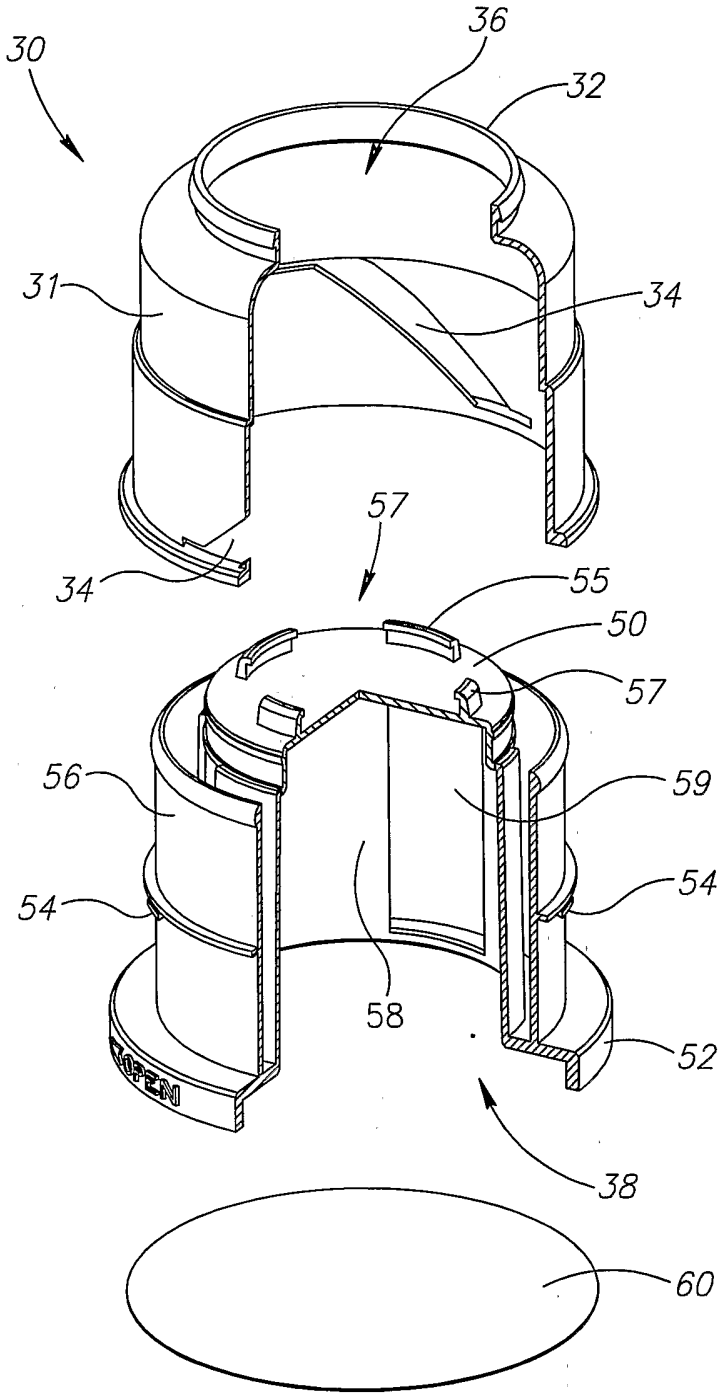

FIG.4

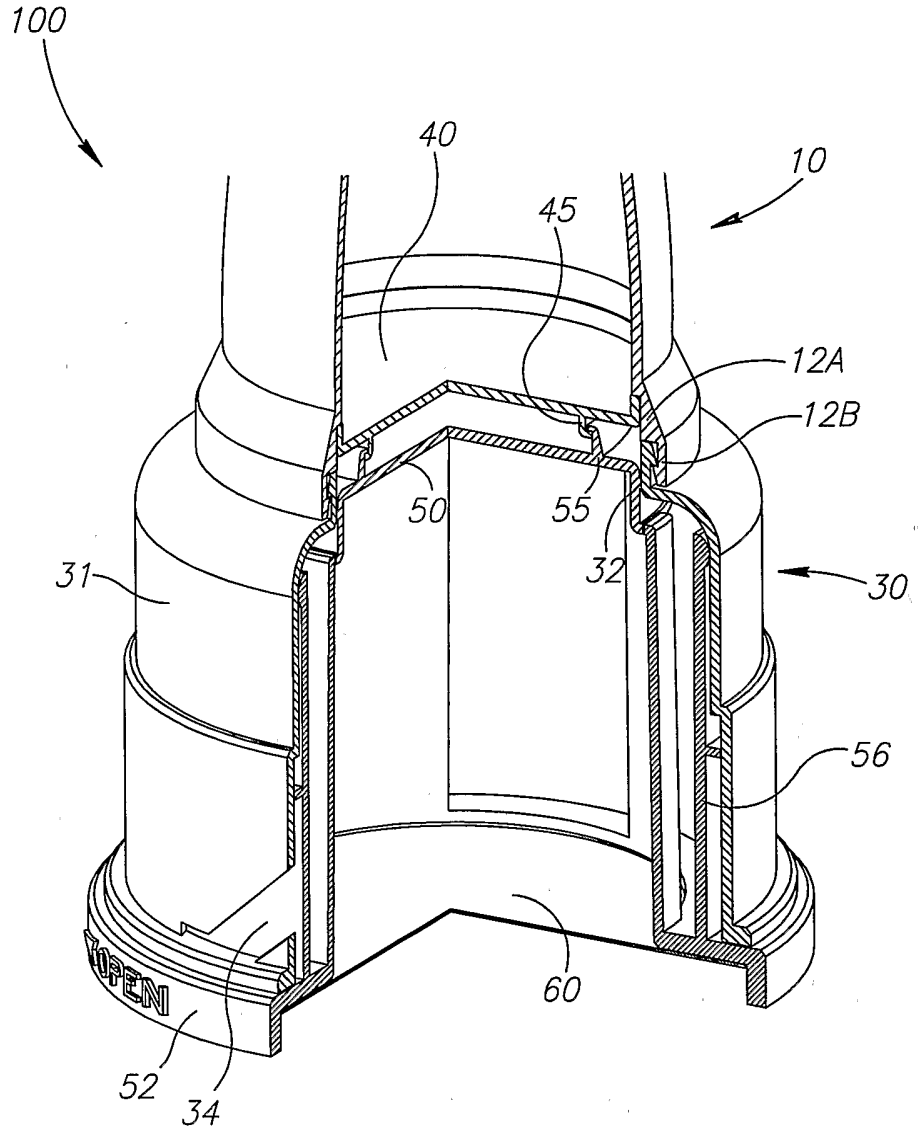

FIG.5

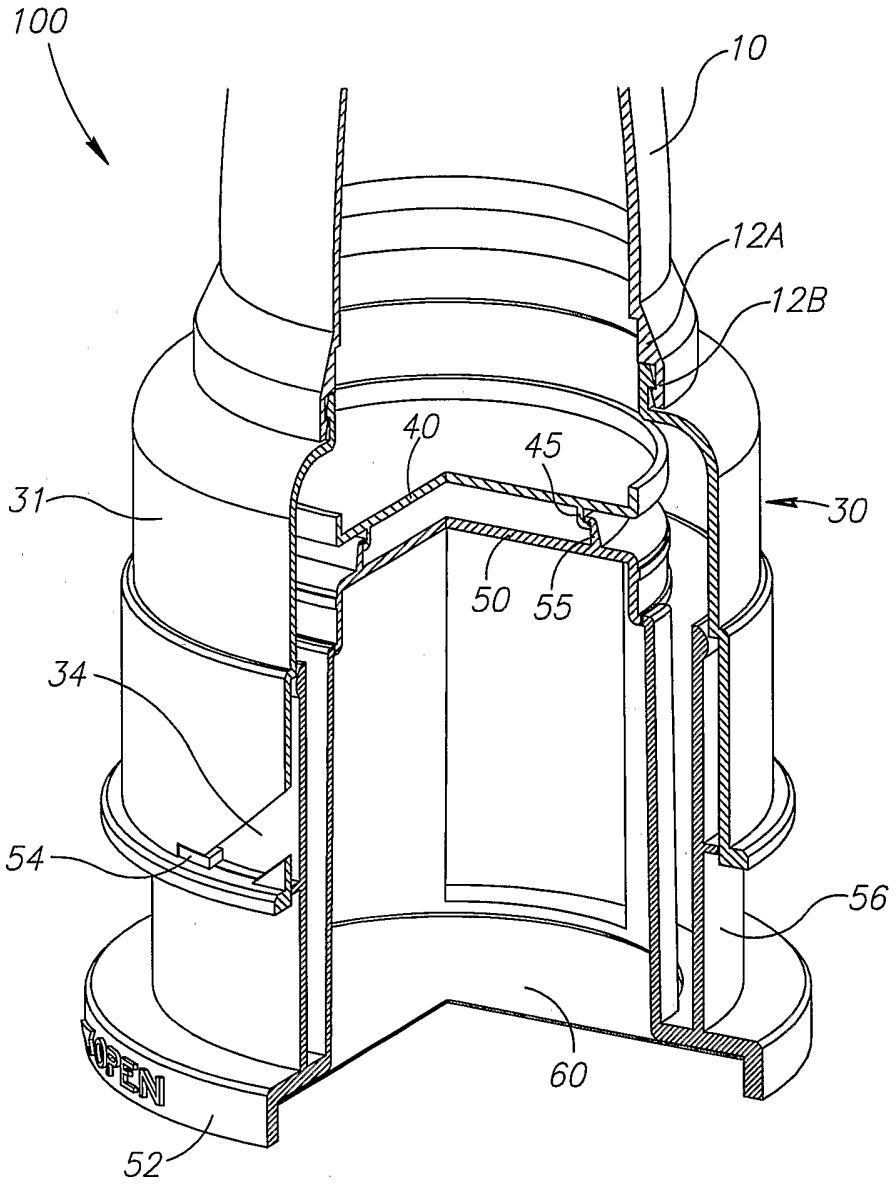

FIG.6

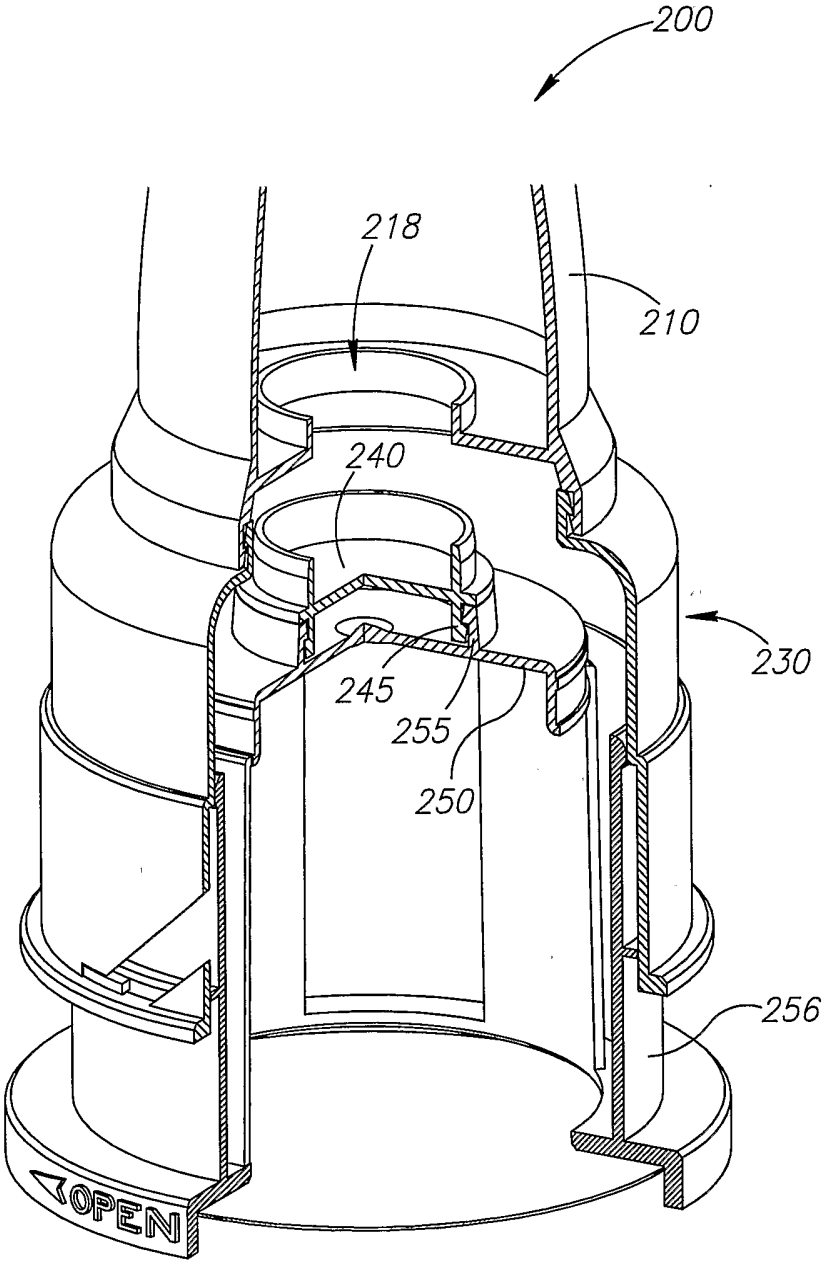

FIG.7

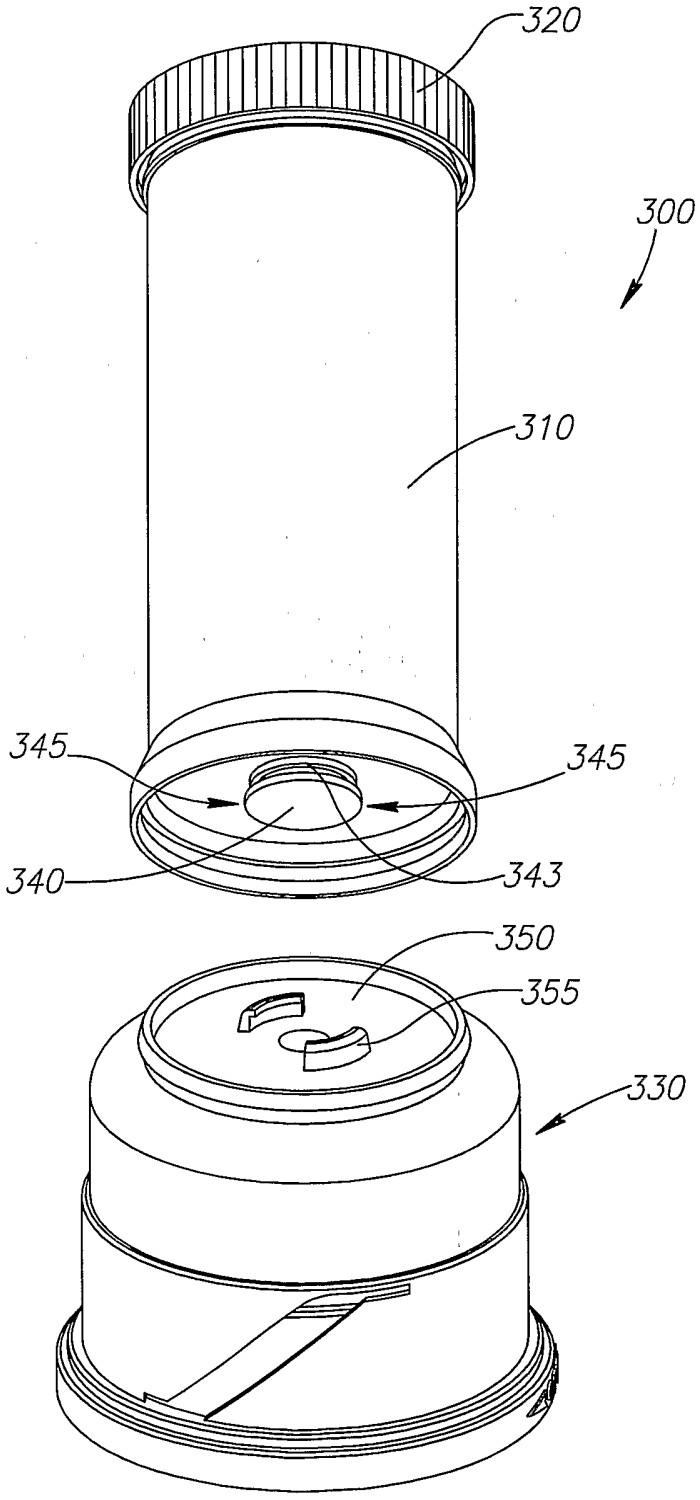

FIG.8

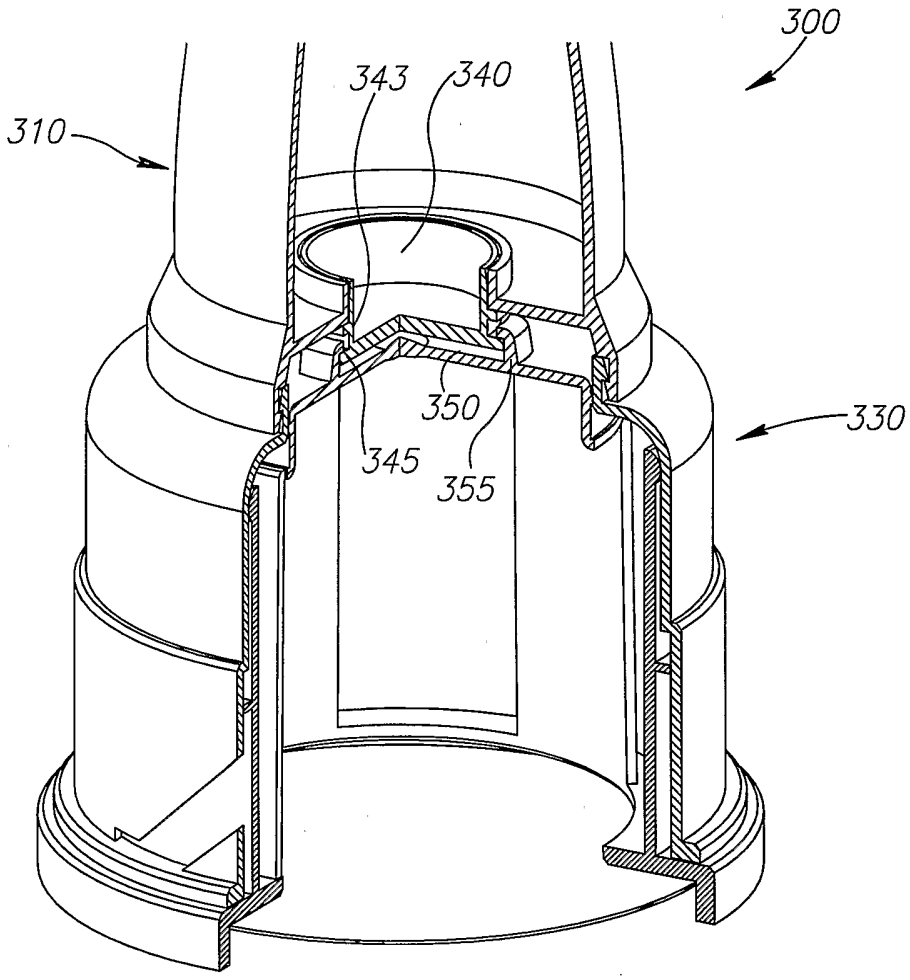

FIG.9

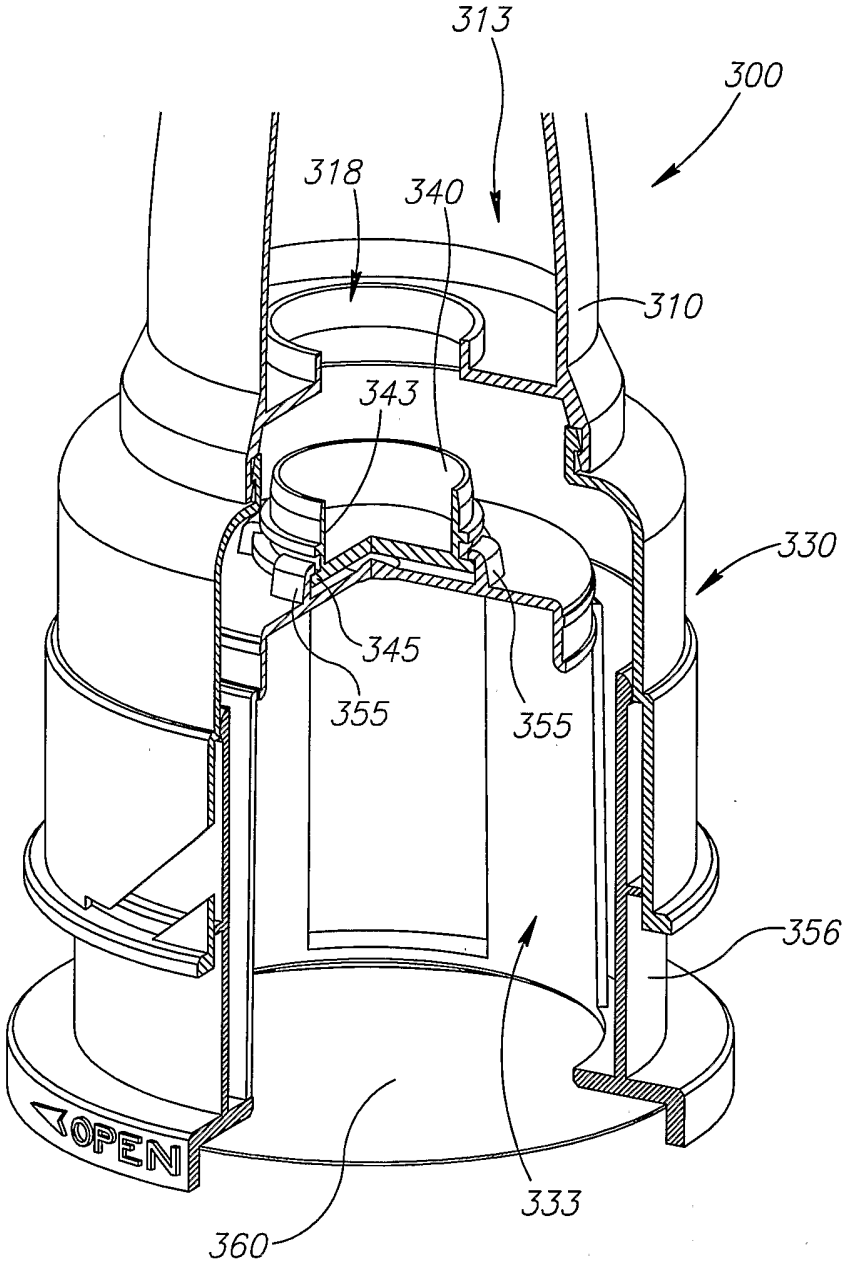

FIG.10