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(54) **METHOD OF RECONSTITUTING A CONCENTRATED PRODUCT**

VERFAHREN ZUM WIEDERHERSTELLEN EINES KONZENTRIERTEN ERZEUGNISSES

METHOD DE RECONSTITUTION D'UN PRODUIT CONCENTRE

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EP 3 414 178 B9

Description

FIELD OF THE INVENTION

[0001] The present invention relates generally to devices for holding concentrated products and methods for the reconstitution of concentrated products. Specifically, the present invention relates to flexible containers with filter elements for storing and reconstituting concentrated consumer products.

BACKGROUND OF THE INVENTION

[0002] Surfactant concentrates are well known in the art. Such concentrates are economical to ship to formulators who dilute the concentration with water or add the concentrates to cleaning compositions for use as a component of shampoos, cleansers, lotions, dishwasher or laundry detergents, etc. Food concentrates may also be dehydrated, shipped to a final destination, and then rehydrated prior to final use.

[0003] A recurring problem is that in some locations, such as developing countries or wilderness areas, water sources are often contaminated. In these cases, pretreatment or filtering of the contaminated water is required to decontaminate the water prior to reconstituting the consumer or food product.

[0004] There is therefore a desire to ship concentrated products to their final destination, and then, starting with water at the final destination, including in some cases contaminated water, reconstitute the product for consumer use.

[0005] WO 2013/057014 A1 describes a single-use feeding bottle for dispensing an aqueous nutritional composition to a human from a powdered or concentrated liquid nutritional formula base contained therein and provided with means for connecting the bottle to external liquid dispensing means adapted to supply liquid to the bottle, the bottle comprising at least one compartment forming a cavity for containing a predefined amount of powdered or concentrated liquid nutritional formula base for the preparation of the nutritional composition upon hydration with the supplied liquid, a neck portion in fluid communication with the compartment, and liquid inlet means designed to be supplied with liquid from the liquid dispensing means, the bottle furthermore comprising a filter assembly in the flow path of the liquid from the inlet means to the compartment, the filter assembly being configured to remove contaminants from liquid fed into the compartment through the inlet means.

[0006] EP 0,138,681 A2 describes an assembly for preparing and dispensing a solution and the stopper for such an assembly, said assembly comprising a first bottle containing a first liquid component, with an elongated head; a second bottle containing a second component, liquid or solid; a stopper for this second bottle presenting a recess, whose shape is homologous of the head of the first bottle. The bottom of the recess is constituted by a membrane of deformable material comprising an axial orifice which is hermetically closed, in the absence of deformation of the membrane, by the natural radial constriction of the material of the membrane. By screwing the first bottle in the stopper, the membrane is axially deformed and the orifice is radially distended, thus allowing the two bottles to be placed in communication in a reversible manner.

SUMMARY OF THE INVENTION

[0007] According to one aspect, the present invention provides methods of reconstituting a concentrated product according to claims 1-13.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008]

FIG.1 is a front view of a flexible package according to an embodiment to be used in a method of the present invention.

FIG. 2 is a side view of the flexible package embodiment of FIG. 1.

FIG. 3a is a side cross-sectional view of a first embodiment of a spout and its attachment to the flexible package embodiment of FIG. 1.

FIG. 3b is a side cross-sectional view of a second embodiment of a spout and its attachment to the flexible package embodiment of FIG. 1.

FIG. 3c is a side cross-sectional view of a third embodiment of a spout and its attachment to the flexible package embodiment of FIG. 1.

FIG. 4 is a side cross-sectional view of a first embodiment of a water filter element of the flexible package embodiment of FIG. 1.

FIG. 5 is a top cross-sectional view of a section of the water filter element of FIG. 4 taken along the 5-5 plane.

FIG. 6 is a side cross-sectional view of the water filter element as shown in FIG. 4 prior to attachment to the flexible package embodiment of FIG. 1.

FIG. 7 is a side cross-sectional view of the water filter element as shown in FIG. 4 after attachment to the flexible package embodiment of FIG. 1.

FIG. 8 is a schematic view of a flexible package according of the present invention coupled to a water source prior to being filled.

FIG. 9 is a schematic view of a flexible package according of the present invention coupled to a water source after being filled.

FIG. 10 is a side cross-sectional view of an embodiment of a removable water filter element prior to attachment to the flexible package embodiment of FIG. 1.

FIG. 11 is a side cross-sectional view of an embodiment of a removable water filter element after attachment to the flexible package embodiment of FIG.

1.

FIG. 12 is a schematic view of the removable water filter element of FIG. 10 coupled to a water source after being removed from a flexible package embodiment of the present invention.

FIG. 13 is a front view of a flexible package according to a second embodiment of the present invention.

FIG. 14 is a side view of the flexible package embodiment of FIG. 13.

FIG. 15 is a schematic view of the second embodiment of the flexible package to be used in a method according of the present invention coupled to a water source prior to being filled.

FIG. 16 is a schematic view of the second embodiment of the flexible package coupled to a water source after being filled.

DETAILED DESCRIPTION OF THE INVENTION

[0009] The term "concentrate" as used herein means the concentrated form of substance to which water or other diluting agent may be added to reconstitute the concentrate to the substance desired. Examples of certain concentrates, according to certain embodiments of the present invention, include concentrated forms of fluid consumer product formulations that may be reconstituted via the addition of water to consumer products intended for use by a consumer.

[0010] The term "consumer product" as used herein means merchandise or other items of common or daily use, ordinarily bought by individuals or households for private consumption. A representative, non-limiting list of product categories includes personal care products including products for: baby care including lotions, soaps, shampoos, and conditioners; skin care, including body washes, facial cleansers, hand lotions, moisturizers, conditioners, astringents, exfoliation products, microdermabrasion and peel products, skin rejuvenation products, anti-aging products, masks, and UV protection products; beauty care, such as, cosmetics and colognes; feminine care; hair care (human or animal), including bleaches, colors and dyes, shampoos, conditioners (including rinse-off and leave-in forms), and styling aids; oral care, including toothpaste, dentifrice, tooth gel, tooth rinse, mouth rinse, gum care, denture adhesive, and tooth whitening; personal cleansing, including hand soaps and shower gels. Other product categories include household products including products for: dish care, including hand dishwashing agents or light duty dishwashing agents, and machine dishwashing agents; fabric care, including fabric treatment and conditioning (including softening); laundry care, including detergents, bleach, conditioners, softeners, anti-static products, and liquid refreshers; floor and surface cleaning and/or treatment products, wood floor cleaners, antibacterial floor and surface cleaners, air refreshers and vehicle washing products; as well as healthcare products including over-the-counter products such as respiratory and cough/cold products, pain relievers, oral and topical analgesics, gastro-intestinal treatment products, RX pharmaceuticals, and pet health and nutrition. Food, beverage, and snack products are also included.

[0011] The present invention is directed to containers for concentrates, and methods of their use, that can be advantageously used to reconstitute such concentrates from a variety of water sources, including sources of contaminated water. According to certain embodiments, the present invention is directed to a flexible container for a concentrate comprising a flexible body holding the concentrate, a spout, a filter element disposed in the spout, the filter element comprising a filter and an attachment element configured to attach to a water source.

[0012] The container of the present invention may be in any form suitable to hold a concentrate and to allow fluid to be added thereto to reconstitute the concentrate within the flexible body. Examples of suitable containers with a flexible body include sachets, pouches, bottles, and the like.

[0013] As will be readily understood by one of skill in the art, pouches for use in the present invention may be any suitable spouted pouch. In general, pouches are multi-layered laminates of with printable outer layers and inner layers with barrier properties. Examples of suitable types of spouted pouches include shaped pouches, stand-up pouches, retort pouches, box pouches, slider pouches, zipper pouches, and the like. Pouches may be obtained from manufacturers such as Glenroy, Inc. (Menomonee Falls, WI) or ProAmpac (Cincinnati, OH).

[0014] In certain preferred embodiments, the container of the present invention is a single- or multi-use pouch which in the art is also referred to as a sachet. Sachets may also be in the form of shaped, stand-up, retort, box, slider, and zipper sachets, and the like.

[0015] The flexible body of the container may be made with any of a variety of suitable materials. In certain embodiments, the flexible body will be formed out of polymers or plastics used in the packaging of consumer products. These include, but are not limited to, polycarbonate (PC), polyethylene terephthalate (PET), high density polyethylene (HDPE), low density polyethylene (LDPE), polypropylene (PP), and polyvinyl chloride (PVC) and combinations thereof. In the case of retort pouches or sachets, the inner layer may be formed of thin metal foils. In some embodiments, the flexible body will be formed by coextruding inner and outer layers.

[0016] In some embodiments, the polymers or plastics used to form the flexible body can be made of biodegradable or dissolvable polymers. Biodegradable polymers are a specific type of polymer that breaks down after its intended purpose to result in natural byproducts such as gases (CO_2, N_2), water, biomass, and inorganic salts. Biodegradable polymers are found both naturally and synthetically made, and largely consist of ester, amide, and ether functional groups. Biodegradable polymers that can be used include, but are not limited to: polyhydroxyalkanoates (PHAs) like the poly-3-hydroxybutyrate

(PHB), polyhydroxyvalerate (PHV) and polyhydroxyhexanoate (PHH); polylactic acid (PLA); polybutylene succinate (PBS), polycaprolactone (PCL), and polyanhydrides (PAH). Dissolvable polymers that can be used include, but are not limited to: polyvinyl alcohol (PVOH); most of the starch derivatives; cellulose esters like cellulose acetate and nitrocellulose and their derivatives (celluloid).

[0017] The containers of the present invention may comprise any suitable spout through which fluid, material, or product may be introduced into, or removed from, the inside of the container. The spout may be connected to the flexible body of the container by a number of known means, several of which will be described later. The spout suitable for use in the present invention may be made of any suitable material. Examples of such materials include the polymers or plastics used in the packaging of consumer products. These include, but are not limited to, high density polyethylene (HDPE), low density polyethylene (LDPE), polypropylene (PP), polycarbonate (PC), polyethylene terephthalate (PET), and polyvinyl chloride (PVC). In some embodiments, the spout may be formed of metal, or the biodegradable or dissolvable polymers discussed above.

[0018] For any given embodiment, at least one spout of the present invention is sized to have a water filter element of the present invention disposed therein and attached thereto. In some embodiments, the water filter element will be permanently attached to the spout. Methods such as ultrasonic welding, thermal fusing, or permanent adhesives may be used to permanently attached the water filter element to the spout. In other embodiments, the water filter element will be removably attached to the spout. Any suitable connection elements for removably connecting the water filter element to the port may be used. For example, the port and water filter element may comprise connection elements such as screw threads, snap-fit connection elements, resistant fit elements, and the like.

[0019] The water filter element of the present invention may comprise any suitable filter. Suitable filters for use in the present invention comprise filters capable of filtering out a variety of health-related contaminants such as organic contaminants or infectious microorganisms found in the water supplies. Infectious microorganisms found in the water supplies include bacteria, such as Shigella, Escherichia coli, Vibrio, and Salmonella, and protozoans, such as Entamoeba, Giardia, and Cryptosporidium.

[0020] Applicants have identified a variety of filtering materials which may be used. Reverse osmosis (RO) or nano-filtration (NF) membranes may be used, though these require high upstream pressure to drive water through them. In certain embodiments where there is a desire for using a filter that does not require significant pressure to drive water through the filter, a filter comprising nano-filter media (NFM) such as Boehmite (aluminum oxide hydroxide) fiber nano-particles may be used. In other embodiments, nano-fibers on micro-glass fiber carries may be used as a filter media. Filters comprising carbon nano-tubes may also be used in still other embodiments.

[0021] In certain particularly preferred embodiments, it is preferred that the filter would allow the user to fill the containers of the present invention in a reasonable amount of time using only gravity flow or hand squeezing of a squeezable water source (e.g. a water bottle). In some embodiments, container fill time is about ten minutes or less, or about five minutes or less, or about three minutes or less or about one minute or less.

[0022] The applicants have found that using Boehmite filters from Ahlstrom Corporation (Helsinki, Finland) and a 15 cm head of water pressure (about 150 Pa) in a two-liter water PET bottle, a flow rate of 0.75 ml/(min*cm^2) can be obtained. They have also found that by squeezing the two-liter bottle, a flow rate of about 20 ml/(min*cm^2) can be obtained. At this flow rate, and with a spout area of about 5 cm^2, a 100 ml container can be filled in about a minute. According to certain embodiments, the filter of the present invention has a flow rate of about 5 ml/(min*cm^2) or greater, including, about 10 ml/(min*cm^2) or greater, about 15 ml/(min*cm^2) or greater, or about 20 ml/(min*cm^2) or greater when water is squeezed from a two-liter water PET bottle through the filter using a grip strength of about 30 kilograms. According to certain embodiments, the filter of the present invention has a flow rate of about 5 ml/(min*cm^2) or greater, including, about 10 ml/(min*cm^2) or greater, about 15 ml/(min*cm^2) or greater, or about 20 ml/(min*cm^2) or greater when water is squeezed from a two-liter water PET bottle through the filter using a grip strength of about 40 kilograms. According to certain embodiments, the filter of the present invention has a flow rate of about 5 ml/(min*cm^2) or greater, including, about 10 ml/(min*cm^2) or greater, about 15 ml/(min*cm^2) or greater, or about 20 ml/(min*cm^2) or greater when water is squeezed from a two-liter water PET bottle through the filter using a grip strength of about 50 kilograms. According to certain embodiments, the filter of the present invention has a flow rate of about 5 ml/(min*cm^2) or greater, including, about 10 ml/(min*cm^2) or greater, about 15 ml/(min*cm^2) or greater, or about 20 ml/(min*cm^2) or greater when water is squeezed from a two-liter water PET bottle through the filter using a grip strength of about 60 kilograms.

[0023] The water filter element of the present invention may comprise any suitable attachment element for connecting to a water source. Suitable attachment elements may comprise screw threads, snap-fit connection elements, resistant fit elements, and the like. In certain preferred embodiments, the attachment element comprises screw threads sized to fit and engage with the screw threads of a water hose and/or a water bottle to connect thereto. In certain preferred embodiments, the attachment element of the removable water filter comprises a female attachment element and the connecting element on the water source is a corresponding male connection

element. For example, in the embodiments of the invention wherein the water source is a hand held bottle containing water, the screw threads commonly found around the neck of the hand held bottle may be screwed into a female attachment element of the water filter element to engage the screw threads therein and connect the bottle to the water filter element.

[0024] Those of skill in the art will recognize that the term "hand held bottle" refers to any of a variety of commercially available bottles that can be held in the hand and may be used in general as a source of drinking water (or other fluid). Hand held bottles may be of any suitable size including, for example, bottles sized to hold from about two liters or less, including from about one liter or less, from about 500 milliliter or less, from about 250 milliliter or less. Preferably, the hand held bottle is made from a flexible material, and may be squeezed by hand to help expel the fluid contained therein. Examples of certain hand held bottles include commercially available plastic twelve ounce, twenty ounce, one liter, two liter (or other commercially available sizes around the world) bottles of water, soda, or other fluids intended for drinking, or other similar sized bottles for other products that have been emptied and may then be filled with water for use in the present invention.

[0025] In certain embodiments, the concentrate in the container of the present invention may be substantially free of preservatives. Examples of preservatives include, but are not limited to, parabens, quaternary ammonium species, phenoxyethanol, benzoates, DMDM hydantoin, and the like. As used herein "substantially free of preservatives" means less than 0.5% by weight of a product of preservatives, including, for example, less than 0. 1%, less than 0.05%, less than 0.01% by weight of the product of preservatives, or in certain embodiments the product is free of preservatives.

[0026] Accordingly, in certain embodiments, the present invention provides for methods of reconstituting a concentrated product comprising providing a flexible container containing a concentrate, attaching a water source to the attachment element of the flexible container, and forcing water through the filter element of the container and into the container to reconstitute a concentrate therein.

[0027] Any of the suitable elements as described above may be used in the methods of the present invention. According to the invention, the water source is a bottle capable of being held and squeezed in the hand, and the step of forcing water through the filter element comprises squeezing the water source by hand to force water through the filter element.

[0028] In certain embodiments, the method comprises forcing a predetermined and/or desired amount of water into the container to reconstitute the concentrate. Such predetermined/desired amount may be sufficient water to fill the flexible container, or may be an amount indicated by a visible indicator (e.g. a fill line or the like) or other indicator in or on the container. Those of skill in the art will readily understand the use of a visible fill indicator (such as a fill line or other indicator) to indicate to a user when sufficient water has been added to the flexible container to reconstitute the concentrate. In certain embodiments, the reconstituted concentrate made in accord with the present invention may be stored prior to use and/or when designed for multiple uses, the product may be stored in between uses.

[0029] In certain embodiments of the present invention, the product resulting from reconstituting the concentrate may be used by dispensing the product back through the spout used to introduce water to the concentrate. Such dispensing may be done with the filter in place or removed. In certain embodiments the filter is removed. In these embodiments, the product may be dispensed by removing the filter element from the spout and dispensing the reconstituted product. In embodiments wherein the flexible container contains more than one spout, the resulting product may be dispensed back out through the spout used to introduce water, or may instead be dispensed through a second spout configured to allow reconstituted product to be dispensed therethrough.

[0030] In certain embodiments, after reconstituting the product, the removable filter may be removed from the spout while the removable filter remains attached to the water source. In this way, water from the water source may be forced through the removed filter element to provide filtered and/or potable water outside of the flexible container for drinking or other purposes. In other embodiments, after reconstituting the product, the removable filter element may be removed from the spout and the water source, optionally cleaned, and then attached to either the same or a different water source. In this way, water from the water source may be forced through the removed filter element to provide filtered and/or potable water outside of the flexible container for drinking or other purposes.

[0031] Further illustration of certain embodiments of the device and method of the present invention are now described in a non-limiting manner with reference to the drawings. FIGs. 1 and 2 show a flexible package according to an embodiment of the present invention. FIGs. 1 is a front view of package **10** comprising flexible container or pouch **20** with proximal **22** and distal **24** ends. Spout **30** is located on proximal end **22** of flexible container **20.** Water filter element **60** is disposed in spout **30.** Flexible container **20** is partially filled with concentrated consumer product **40.** Consumer product **40** may be in the form of a concentrated liquid, a loose or compressed powder, tablets, or a combination of forms. FIG. 2 is a side view of flexible package **10**, showing a narrow section in flexible container **20** between proximal **22** and distal **24** ends.

[0032] The packages of the present invention may comprise any suitable spout through which fluid, material, or consumer product may be introduced into, or removed from, the inside of the container. FIG. 3a is a side cross-sectional view of a first embodiment of a spout **30a** and its attachment to flexible container **20**. The figure shows

spout **30a** with spout opening **32a**, and inner and outer spout walls, **34a** and **36a**, respectively. The figure also shows flexible container **20** with container opening **25**, and outer and inner container walls, **26** and **28**, respectively. Spout **30a** is attached to outer wall **26** of flexible container **20**, and inner wall **34a** surrounds container opening **25** such that fluid or other material may flow through the spout opening **32a** into and out of container **20** through container opening **25**. In a second embodiment, shown in FIG. 3b, spout **30b** may be attached to inner wall **28** of flexible container **20**, and extend through and out of container **20** through container opening **25**. In this embodiment, inner wall **34b** of spout **30b** defines spout opening **32b** through which material may flow into and out of flexible container **20**. In a third embodiment, shown in FIG. 3c, spout **30c** may comprise a first spout portion **37c** attached to inner wall **28** of the flexible container **20**. A locking ring **38c** is attached to the outer wall **26** of spout **30c** to hold spout **30c** in place. Here, inner wall **34c** of spout **30c** defines spout opening **32c** through which material may flow into and out of flexible container **20**.

[0033] FIGs. 4 and 5 show a first embodiment of water filter element **60**. FIG. 4 is a side cross-sectional view of filter element **60**, which includes outer surface **62** and inner surface **66**. Inner surface **66** has attachment means **68**, shown as screw threads. Filter element **60** has filter opening **72**. The walls of water filter element **60** define open volume **74** in which is disposed filter **80**. Contaminated water will enter water filter element **60** through open volume **74**, pass through filter **80**, and leave water filter element **60** through filter port **76** as clean water.

[0034] In the embodiment shown in FIGs. 4 and 5, filter **80** is held in place by filter supports **82**. Other embodiments of support for filter **80** include spacers or "O"-rings, and the like.

[0035] FIG. 5 is a top cross-sectional view of a section of the removable water filter element of FIG. 4 taken along the 5-5 plane. The figure shows filter supports **82** and filter port **76**. In the embodiment shown, a single filter port **76** is shown with a circular cross-section. In other embodiments, there may be multiple filter ports **76**, and they may have a number of other cross-sectional shapes such as oval, square, rectangular, etc. In the embodiment shown in FIG 5, numerous filter supports **82** with rectangular cross-sectional shapes are shown. In other embodiments, filter supports **82** may have a number of other cross-sectional shapes such as circular, oval, square, etc.

[0036] Though not shown, a closure device for filter element **60** may be employed prior to use of package **10**. In some embodiments, a cap may engage with filter element **60** by means of screws threads, a snap-fit or a resistant fit. In other embodiments, a plug that fits into the inner surface **66** of filter element **60** and is connected to filter element **60** via attachment means **68**, may be used. In yet other embodiments, a foil or plastic membrane may be used to seal filter element **60** prior to use of package **10**.

[0037] Water filter element **60** is disposed in, and attached to, spout **30**. FIGs. 6 and 7 show one embodiment of the steps used to attach water filter element **60** to spout **30a.** FIG. 6 is a side cross-sectional view of water filter element **60** and spout **30a** prior to their attachment. The figure shows water filter element **60** sized to fit into spout **30a** such that outer surface **62** of water filter element **60** contacts inner spout walls **34a**. FIG. 7 is a side cross-sectional view of the water filter element **60** and spout **30a** after their attachment. In one embodiment, a resistance fit can keep water filter element **60** from separating from spout **30a**. In other embodiments, adhesive can be applied to either or both outer surface **62** of water filter element **60** and inner spout walls **34a** to keep the parts from separating. In some embodiments, water filter element **60** will be permanently attached to spout **30a**. Methods such as ultrasonic welding, thermal fusing, or permanent adhesives may be used to permanently attached water filter element **60** to spout **30a**. In other embodiments, water filter element **60** may be removably attached to spout **30a**. Snap-fit and screw thread attachment means may allow water filter element **60** to be removably attached to spout **30a**.

[0038] FIGs. 8 and 9 show one embodiment of a method of use of flexible package **10** according to an embodiment of the present invention. FIG. 8 is a schematic view of package **10** coupled to a removable water source **90** prior to being filled. In this embodiment, water source is a bottle **90** with proximal **92** and distal **94** ends containing contaminated water **95**. Neck **96** is located on distal **94** end of bottle **90** and has screw threads **98** as a means to attach to flexible package **10**. In this embodiment, screw threads **98** of bottle **90** and screw threads **68** located on inner surface **66** of filter element **60** are sized so that screw threads **98** of bottle **90** engage with screw threads **68** of filter element **60**. Plastic water bottles have standard screw thread profiles, and screw threads **68** of filter element **60** can be designed to fit the standard screw thread profiles.

[0039] In other embodiments, neck **96** of bottle **90** may engage with filter element **60** by means of a snap-fit or resistant fit.

[0040] In yet other embodiments, water source **90** could be in the form of a conduit such as a pipe or hose through which contaminated water **95** is pumped. Pipe or hose could have screw threads sized to be able to engage with screw threads **68** located on inner surface **66** of filter element **60**. In still other embodiments, pipe or hose may engage with filter element **60** by means of a snap-fit or resistant fit.

[0041] In FIG. 8, flexible container **20** with concentrated consumer product **40** is shown in flattened configuration. FIG. 9 is a schematic view of package **10** coupled to a water source **90** after being filled. Flexible container **20** with reconstituted consumer product **42** is shown in distended configuration.

[0042] In one embodiment method of using flexible

package **10** according of the present invention, flexible package **10** containing concentrated consumer product **40** is first coupled to contaminated water source. Contaminated water source is then pressurized to force contaminated water through filter element **60** and into flexible container **20**. In the embodiment shown in FIGs. 8 and 9, where water source **90** is a bottle **90**, pressure may be applied to bottle **90** by squeezing bottle **90**. In embodiments using pipes or hoses, upstream pressure could be applied in the pipe or hose to force contaminated water through filter element **60** and into flexible container **20**.

[0043] The amount of contaminated water passed through filter element **60** and into flexible container **20** will depend on the amount of water needed to dilute concentrated consumer product **40** to properly reconstituted consumer product **42**. There are many ways to determine the amount of water needed to dilute concentrated consumer product **40** to properly reconstituted consumer product **42**. For example, the use of indicia marked on flexible container **20** is one method. As shown in FIG. 9, distended configuration flexible container **20** is another indicator that sufficient water has been added to flexible container **20** to convert concentrated consumer product **40** to properly reconstituted consumer product **42**.

[0044] Once sufficient water is passed through filter element **60** and into flexible container **20**, flexible package **10** is uncoupled from contaminated water source. Properly reconstituted consumer product **42** is now ready for use. To use consumer product **42**, user removes water filter element **60** from spout **30** and disperses consumer product **42** through spout **30.** Water filter element **60** may be removed from spout **30** by a number of means. In one embodiment, the user can punch through water filter element **60** using punching tool. If water filter element **60** is removably attached to spout **30**, the user may easily remove filter element **60** from spout **30** and disperse consumer product **42** through spout **30**.

[0045] Once consumer product **42** is fully dispersed from package **10**, package **10** can be discarded. If the elements of package **10** are made of biodegradable or dissolvable polymers, disposal of package **10** will not contribute to the problems of trash accumulation in many parts of the world.

[0046] In embodiments using a removable water filter element, the filter element may have the ability to be reusable. In these embodiments, the water filter element may be removed from a first flexible container/spout package and disposed in a second package. In these embodiments, kits can be sold which contain a single, reusable water filter element and multiple packages comprising flexible containers/spouts. In these embodiments, a single filter can be used with up to two, or four, or six, or twelve, or twenty four or more packages comprising flexible containers/spout configurations. In some embodiments, the individual flexible containers/spout configurations can each be single-use sachets.

[0047] In some embodiments, removable water filter elements can find a second important use in locations, such as developing countries or wilderness area, where water sources are often contaminated. The removable water filter element can be attached to a hand held bottle, filled with contaminated water and used to filter out said contaminations to make the water potable. FIG. 10 is a side cross-sectional view of an embodiment of a removable water filter element **160** prior to assembly with spout **130** of a flexible package embodiment of the present invention.

[0048] The figure shows removable water filter element **160**, which includes outer surface **162** and inner surface **166**. Outer surface **162** has first attachment means **164**, here shown as screw threads, as well as second attachment means **165**, also shown as screw threads. Inner surface **166** has third attachment means **168**, also shown as screw threads. The walls of removable water filter element **160** define open volume **174** in which is disposed filter **180**. Filter **180** is held in place, in this embodiment, by filter supports **182**. Contaminated water will enter water filter element **160** through open volume **174**, pass through filter **180**, and leave water filter element **160** has through filter port **176** as clean water.

[0049] In this embodiment, cap **150** is designed to act as a closure device for filter element **160**. Cap **150** has means of attachment **154**, in this embodiment shown as screws threads **154**, located on inner surface **152** of cap **150**. In this embodiment, screw threads **164** located on outer surface **162** of filter element **160** and screws threads **154** on cap **150** are sized so that screws threads **154** on cap **150** engage with screw threads **164** of filter element **160**. FIG. 11 shows cap **150** attached to removable water filter element **160**. In other embodiments, cap **150** may engage with water filter element **160** by means of a snap-fit or resistant fit.

[0050] FIG. 10 also shows another spout embodiment. The figure shows spout **130** with spout opening **132**, and inner and outer spout walls, **134** and **136**, respectively. Inner spout walls **134** have attachment means in the form of screw threads **137**. The figure also shows flexible container **20** with container opening **25**, and outer and inner container walls, **26** and **28**, respectively. Spout **130** is attached to outer wall **26** of flexible container **20**, and inner wall **134** surrounds container opening **25** such that fluid or other material may flow through the spout opening **132** into and out of container **20** through container opening **25**.

[0051] FIG. 11 shows removable water filter element **160** disposed in spout **130** of flexible container **120**, and screws threads **137** on spout **130** engage with screw threads **165** of water filter element **160**. Removable water filter element **160** is now removably attached to spout **130**. In other embodiments, snap-fit or resistant fit may be used to couple water filter element **160** to spout **130** of flexible container **20**.

[0052] As described earlier, flexible container may now be filled with contaminated water to dilute concentrated consumer product. As described in FIGs. 8 and 9, water source is a bottle **90** with proximal **92** and distal **94** ends

containing contaminated water **95**. Neck **96** is located on distal **94** end of bottle **90** and has screw threads **98** as a means to attach to flexible package **10**. In this embodiment, screw threads **98** of bottle **90** and screw threads **168** located on inner surface **166** of filter element **160** are sized so that screw threads **198** of bottle **190** engage with screw threads **168** of filter element **160**. In other embodiments, neck **96** of bottle **90** may engage with filter element **160** by means of a snap-fit or resistant fit.

[0053] In this embodiment method of using flexible package **10** according of the present invention, flexible package **10** containing concentrated consumer product **40** is first coupled to contaminated water source. Contaminated water source is then pressurized to force contaminated water through filter element **160** and into flexible container **20**. As in the embodiment shown in FIGs. 5 and 6, pressure may be applied to bottle **90** by squeezing bottle **90**, passing contaminated water **95** through filter element **160** and into flexible container **20**.

[0054] In this embodiment, once sufficient water is passed through removable filter element **160** and into flexible container **20**, flexible package **10** is uncoupled from contaminated water source while filter element **160** remains coupled to contaminated water source. This is accomplished when screw threads **165** are disengaged from matching screw threads located inside port **30** of flexible package **10**. Now, filter element **160** remains coupled to bottle **90** via the engagement of screw threads **98** of bottle **90** and screw threads **168** of filter element **160**.

[0055] FIG. 12 is a schematic view of water filter element **160** of FIG. 10 coupled to a water bottle **90** after being removed from flexible package **10**. At this point, the user now is able to obtain clean water for drinking, washing, or other uses by using removable water filter element **160** to filter contaminated water **95** in bottle **90**.

[0056] Though not shown, a cap with matching screw threads can engage with screw threads **165** on removable water filter element **160** to seal water bottle **90** between uses.

[0057] FIGs. 13 and 14 show a flexible package according to a second embodiment of the present invention. FIG. 13 is a front view of package **200** comprising flexible container or pouch **220** with proximal **222** and distal **224** ends, as well as first face **226** and second face **228**. First spout **230** is located on first face **226** of flexible container **220**. Second spout **330** is located on proximal end **222** of flexible container **220**. Although first spout **230** is located on first face **226** of flexible container **220**, it may be located on second face **228** of flexible container **220**. Also, it is to be understood that although this embodiment shows two spouts, there may be more than two spouts located on any of proximal **222** and distal **224** ends, as well as first face **226** and second face **228** of flexible container **220**.

[0058] Water filter element **60** is disposed in first spout **230**, and cap **350** is shown disposed on second spout **330**. It is to be understood that in some embodiments, water filter element **60** may be disposed in second spout **330**, while cap **350** may be disposed on first spout **230**. Also, in some embodiments, there may be no cap, or multiple caps.

[0059] Flexible container **220** is partially filled with concentrated consumer product **240**. As mentioned earlier, consumer product **240** may be in the form of a concentrated liquid, a loose or compressed powder, tablets, or a combination of forms. FIG. 14 is a side view of flexible package **200**, showing a narrow section in flexible container **220** between proximal **222** and distal **224** ends. Though shown as relatively flat in FIGs. 13 and 14, flexible container **220** may be in a folded configuration to save space in storage.

[0060] FIGs. 14 and 15 show one embodiment of a method of use of flexible package **200** according to an embodiment of the present invention. FIG. 14 is a schematic view of package **200** coupled to a removable water source **90** prior to being filled. Water source is a bottle **90** with proximal **92** and distal **94** ends containing contaminated water **95**. Neck **96** is located on distal **94** end of bottle **90** and has screw threads **98** as a means to attach to flexible package **10**. In this embodiment, screw threads **98** of bottle **90** and screw threads **68** located on inner surface **66** of filter element **60** (see FIGs. 6 and 7) are sized so that screw threads **98** of bottle **90** engage with screw threads **68** of filter element **60**. Plastic water bottles have standard screw thread profiles, and screw threads **68** of filter element **60** can be designed to fit the standard screw thread profiles.

[0061] In other embodiments, neck **96** of bottle **90** may engage with filter element **60** by means of a snap-fit or resistant fit.

[0062] In yet other embodiments, water source **90** could be in the form of a conduit such as a pipe or hose through which contaminated water **95** is pumped. Pipe or hose could have screw threads sized to be able to engage with screw threads **68** located on inner surface **66** of filter element **60**. In still other embodiments, pipe or hose may engage with filter element **60** by means of a snap-fit or resistant fit.

[0063] In FIG. 14, flexible container **220** with concentrated consumer product **240** is shown in flattened configuration. FIG. 15 is a schematic view of package **200** coupled to a water source **90** after being filled. Flexible container **220** with reconstituted consumer product **242** is shown in distended configuration.

[0064] In one embodiment method of using flexible package **200** according of the present invention, flexible package **200** containing concentrated consumer product **240** is first coupled to contaminated water source. Contaminated water source is then pressurized to force contaminated water through filter element **60** and into flexible container **220**. In the embodiment shown in FIGs. 14 and 15, where water source **90** is a bottle **90**, pressure may be applied to bottle **90** by squeezing bottle **90**. In embodiments using pipes or hoses, upstream pressure could be applied in the pipe or hose to force contaminated water

through filter element **60** and into flexible container **220**.

[0065] The amount of contaminated water passed through filter element **60** and into flexible container **220** will depend on the amount of water needed to dilute concentrated consumer product **240** to properly reconstituted consumer product **242**. There are many ways to determine the amount of water needed to dilute concentrated consumer product **240** to properly reconstituted consumer product **242**. For example, the use of indicia marked on flexible container **220** is one method. As shown in FIG. 15, distended configuration flexible container **220** is another indicator that sufficient water has been added to flexible container **220** to convert concentrated consumer product **240** to properly reconstituted consumer product **242**.

[0066] Once sufficient water is passed through filter element **60** and into flexible container **220**, flexible package **200** is uncoupled from contaminated water source by disengaging neck **96** of bottle **90** from first spout **230**. Properly reconstituted consumer product **242** is now ready for use.

[0067] In general, second spout **330** is configured to allow reconstituted consumer product **242** to be dispensed therethrough. In some embodiments, second spout **330** is designed so that water source **90** cannot connect with second spout **330**. This is done to prevent user from connecting contaminated water to package **200** without water passing through water filter element **260** of first spout **230**. In some embodiments, this may be done by designing second spout **330** with a non-round cross-section. Non-round cross-sections include, but are not limited to, as oval, square, diamond, or hexagonal. Second spout **330** may also be in a tapered configuration, such as frustoconical, to prevent the user from connecting contaminated water to package **200**.

[0068] To use reconstituted consumer product **242**, user removes cap **350** from second spout **330** and disperses reconstituted consumer product **242** through second spout **330**. In embodiment not using a cap, the user can punch through second spout **330** using punching tool.

[0069] Once reconstituted consumer product **242** is fully dispersed from package **200**, package **200** can be discarded. If the elements of package **200** are made of biodegradable or dissolvable polymers, disposal of package **200** will not contribute to the problems of trash accumulation in many parts of the world.

Claims

1. A method of reconstituting a concentrated product comprising:

providing a flexible container (20, 220) holding a concentrate (40, 240), said container comprising: a flexible body holding said concentrate, a spout (30, 230), a filter element (60, 260) disposed in said spout, said filter element comprising a filter (80) and an attachment element (68) configured to attach to a water source;

attaching a water source (90) to the attachment element of the flexible container; and

forcing water through the filter element of the container and into the container to form a reconstituted concentrate;

wherein said flexible container is in the form of a pouch; and

wherein said water source is a hand held water bottle and said forcing step comprises squeezing said water bottle by hand to push water through the filter element and into said flexible container to reconstitute the concentrate.

2. The method of claim 1 wherein said flexible container is filled within a period of about five minutes or less.

3. The method of claim 2 wherein said container comprises a visible fill indicator and said forcing step comprises forcing sufficient water through the filter element such that the visible fill indicator indicates that the container is full.

4. The method of claim 1 further comprising the step of removing the filter element from said spout to dispense the reconstituted concentrate though said spout.

5. The method of claim 4 wherein said filter element remains attached to said water source when said filter element is removed from said spout.

6. The method of claim 1 wherein said flexible container comprises a second spout (330) and said method further comprises the step of dispensing the reconstituted concentrate through said second spout.

7. The method of claim 1 wherein said concentrate is a concentrate of a consumer product selected from the group consisting of lotions, soaps, shampoos, conditioners, body washes, facial cleansers, moisturizers, astringents, exfoliation products, microdermabrasion and peel products, skin rejuvenation products, anti-aging products, and UV protection products.

8. The method of claim 7 wherein said concentrate is substantially free of preservatives.

9. The method of claim 1 wherein said forcing step comprises forcing water through said filter at a flow rate of about 10 ml/(min*cm^2) or greater.

10. The method of claim 9 wherein said forcing step comprises forcing water through said filter at a flow rate of about 20 ml/(min*cm^2) or greater.

11. The method of claim 5 further comprising the step of forcing water from the water source through the filter element removed from the spout to produce filtered water outside of said flexible container.

12. The method of claim 4 wherein said removed filter element is removed from the spout and the water source, optionally cleaned, and then attached to the same or a different water source.

13. The method of claim 11 wherein after said removed filter element is attached to the same or a different water source, water is forced therethrough to produce filtered water.

Patentansprüche

1. Verfahren zum Wiederherstellen eines konzentrierten Erzeugnisses, das Folgendes umfasst:

Bereitstellen eines biegsamen Behälters (20, 220), der ein Konzentrat (40, 240) enthält, wobei der Behälter Folgendes umfasst: einen biegsamen Körper, der das Konzentrat enthält, eine Tülle (30, 230), ein Filterelement (60, 260), das in der Tülle angeordnet ist, wobei das Filterelement ein Filter (80) und ein Anbringungselement (68) umfasst, das konfiguriert ist, um an einer Wasserquelle angebracht zu werden;
Anbringen einer Wasserquelle (90) an dem Anbringungselement des biegsamen Behälters; und
Forcieren von Wasser durch das Filterelement des Behälters und in den Behälter, um ein wiederhergestelltes Konzentrat zu bilden;
wobei der biegsame Behälter die Form eines Beutels aufweist; und
wobei die Wasserquelle eine handgehaltene Wasserflasche ist und der Forcierungsschritt das Quetschen der Wasserflasche mit der Hand umfasst, um Wasser durch das Filterelement und in den biegsamen Behälter zu drücken, um das Konzentrat wiederherzustellen.

2. Verfahren nach Anspruch 1, wobei der biegsame Behälter innerhalb einer Zeitspanne von etwa fünf Minuten oder weniger gefüllt wird.

3. Verfahren nach Anspruch 2, wobei der Behälter einen sichtbaren Füllungsanzeiger umfasst, und der Forcierungsschritt das Forcieren von ausreichend Wasser durch das Filterelement derart umfasst, dass der sichtbare Füllungsanzeiger angibt, dass der Behälter voll ist.

4. Verfahren nach Anspruch 1, das ferner den Schritt des Entfernens des Filterelements von der Tülle umfasst, um das wiederhergestellte Konzentrat durch die Tülle abzugeben.

5. Verfahren nach Anspruch 4, wobei das Filterelement an der Wasserquelle angebracht bleibt, wenn das Filterelement von der Tülle entfernt wird.

6. Verfahren nach Anspruch 1, wobei der biegsame Behälter eine zweite Tülle (330) umfasst, und das Verfahren ferner den Schritt des Abgebens des wiederhergestellten Konzentrats durch die zweite Tülle umfasst.

7. Verfahren nach Anspruch 1, wobei das Konzentrat ein Konzentrat aus einem Verbraucherprodukt ist, das aus der Gruppe ausgewählt wird, die aus Lotionen, Seifen, Shampoos, Conditionern, Körperreinigungsmitteln, Gesichtsreinigungsmitteln, Feuchtigkeit spendenden Mitteln, adstringierenden Mitteln, Exfoliationsprodukten, Microdermabrasions- und Peelingprodukten, Hautverjüngungsprodukten, Anti-Alterungsprodukten und UV-Schutzprodukten besteht.

8. Verfahren nach Anspruch 7, wobei das Konzentrat im Wesentlichen frei von Konservierungsmitteln ist.

9. Verfahren nach Anspruch 1, wobei der Forcierungsschritt das Forcieren von Wasser durch das Filter mit einer Flussrate von etwa 10 ml/(min*cm^2) oder größer umfasst.

10. Verfahren nach Anspruch 9, wobei der Forcierungsschritt das Forcieren von Wasser durch das Filter mit einer Flussrate von etwa 20 ml/(min*cm^2) oder größer umfasst.

11. Verfahren nach Anspruch 5, das ferner den Schritt des Forcieren von Wasser von der Wasserquelle durch das Filterelement, das von der Tülle entfernt ist, umfasst, um gefiltertes Wasser außerhalb des biegsamen Behälters zu erzeugen.

12. Verfahren nach Anspruch 4, wobei das entfernte Filterelement von der Tülle und Wasserquelle entfernt, optional gereinigt und dann an derselben oder einer unterschiedlichen Wasserquelle angebracht wird.

13. Verfahren nach Anspruch 11, wobei nachdem das Filterelement an derselben oder einer unterschiedlichen Wasserquelle angebracht wurde, Wasser hindurch forciert wird, um gefiltertes Wasser zu erzeugen.

Revendications

1. Procédé de reconstitution d'un produit concentré

comprenant :

l'obtention d'un récipient souple (20, 220) contenant un concentré (40, 240), ledit récipient comprenant : un corps souple contenant ledit concentré, un bec (30, 230), un élément filtrant (60, 260) disposé dans ledit bec, ledit élément filtrant comprenant un filtre (80) et un élément de fixation (68) configuré pour se fixer à une source d'eau ;
la fixation d'une source d'eau (90) à l'élément de fixation du récipient souple ; et
l'entraînement d'eau à travers l'élément filtrant du récipient et à l'intérieur du récipient pour former un concentré reconstitué ;
dans lequel ledit récipient souple se présente sous la forme d'une poche ; et
dans lequel ladite source d'eau est une bouteille d'eau tenue à la main et ladite étape d'entraînement comprend la compression de ladite bouteille d'eau à la main pour pousser de l'eau à travers l'élément filtrant et à l'intérieur dudit récipient souple pour reconstituer le concentré.

2. Procédé de la revendication 1 dans lequel ledit récipient souple est rempli en un laps de temps d'environ cinq minutes ou moins.

3. Procédé de la revendication 2 dans lequel ledit récipient comprend un indicateur de remplissage visible et ladite étape d'entraînement comprend l'entraînement d'une quantité suffisante d'eau à travers l'élément filtrant pour que l'indicateur de remplissage visible indique que le récipient est plein.

4. Procédé de la revendication 1 comprenant en outre l'étape de retrait de l'élément filtrant dudit bec pour distribuer le concentré reconstitué par ledit bec.

5. Procédé de la revendication 4 dans lequel ledit élément filtrant reste fixé à ladite source d'eau quand ledit élément filtrant est retiré dudit bec.

6. Procédé de la revendication 1, ledit récipient souple comprenant un deuxième bec (330) et ledit procédé comprenant en outre l'étape de distribution du concentré reconstitué par ledit deuxième bec.

7. Procédé de la revendication 1 dans lequel ledit concentré est un concentré d'un produit de consommation choisie dans le groupe constitué par les lotions, les savons, les shampooings, les revitalisants, les savons liquides pour le corps, les produits nettoyants pour le visage, les produits hydratants, les astringents, les produits d'exfoliation, les produits de microdermabrasion et de décollement, les produits de rajeunissement de la peau, les produits anti-âge, et les produits anti-UV.

8. Procédé de la revendication 7 dans lequel ledit concentré est sensiblement dépourvu de conservateurs.

9. Procédé de la revendication 1 dans lequel ladite étape d'entraînement comprend l'entraînement d'eau à travers ledit filtre à un débit d'environ 10 ml/(min*cm^2) ou plus.

10. Procédé de la revendication 9 dans lequel ladite étape d'entraînement comprend l'entraînement d'eau à travers ledit filtre à un débit d'environ 20 ml/(min*cm^2) ou plus.

11. Procédé de la revendication 5 comprenant en outre l'étape d'entraînement d'eau depuis la source d'eau à travers l'élément filtrant retiré du bec pour produire de l'eau filtrée à l'extérieur dudit récipient souple.

12. Procédé de la revendication 4 dans lequel ledit élément filtrant retiré est retiré du bec et de la source d'eau, éventuellement nettoyé, et fixé ensuite à cette dernière ou à une source d'eau différente.

13. Procédé de le la revendication 11 dans lequel, après que ledit élément filtrant retiré a été fixé à la même source d'eau ou une source d'eau différente, de l'eau est entraînée à travers pour produire de l'eau filtrée.

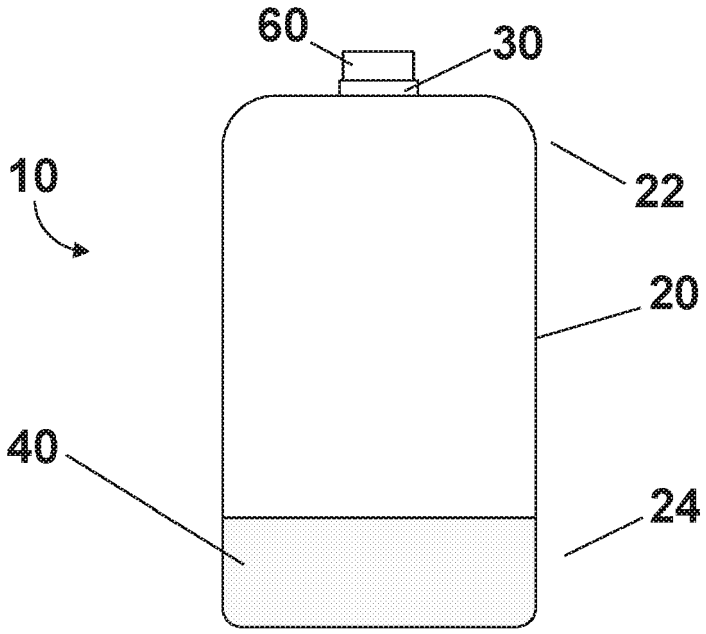


FIG. 1

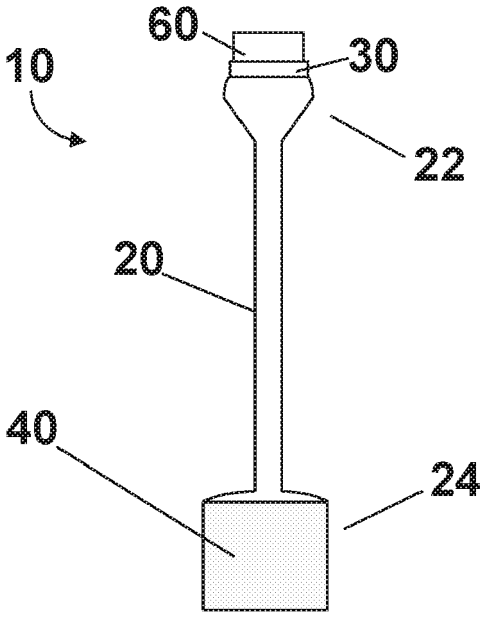


FIG. 2

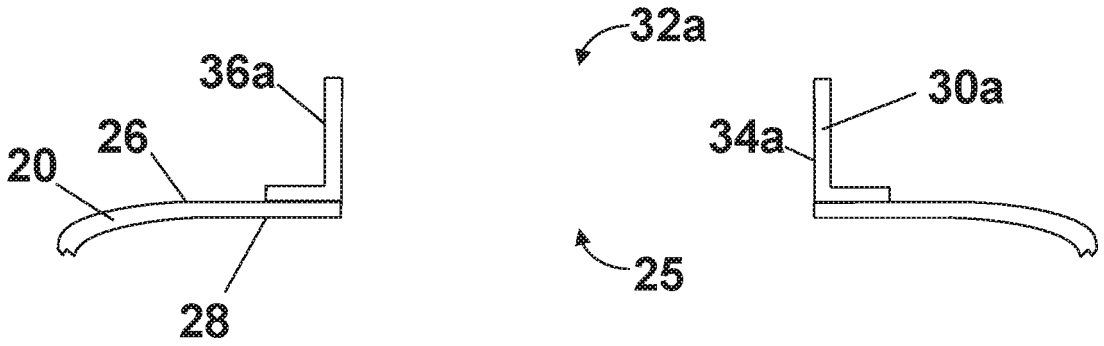


FIG. 3a

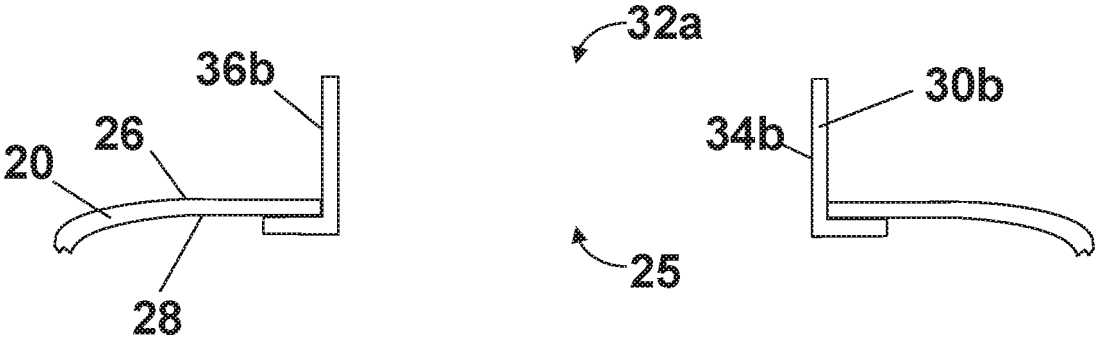


FIG. 3b

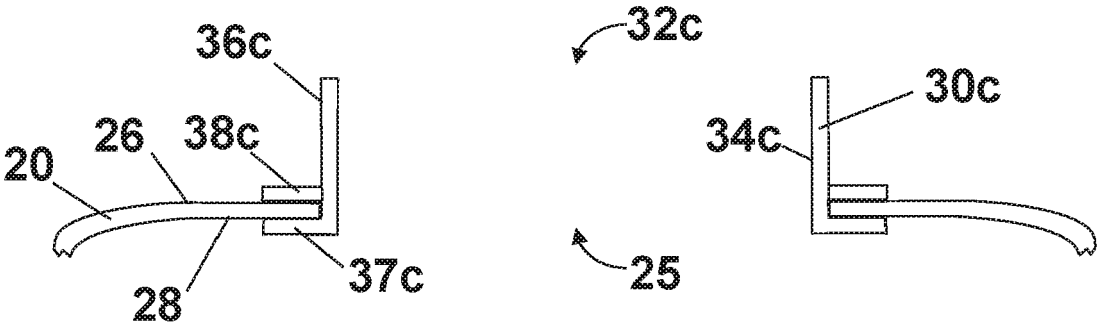


FIG. 3c

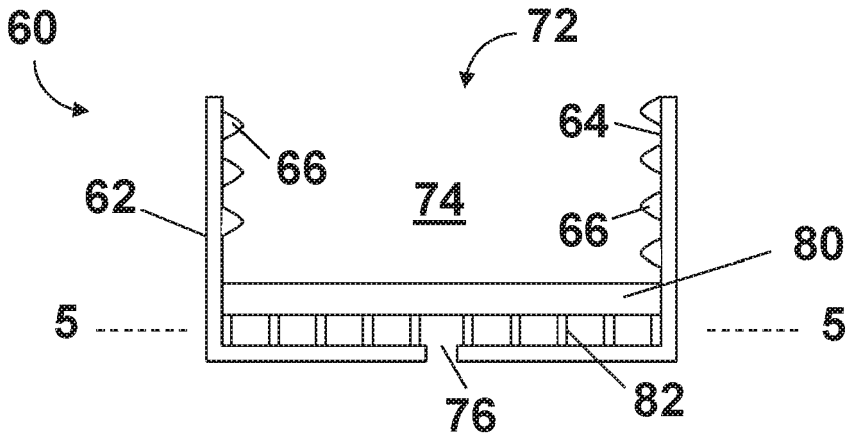


FIG. 4

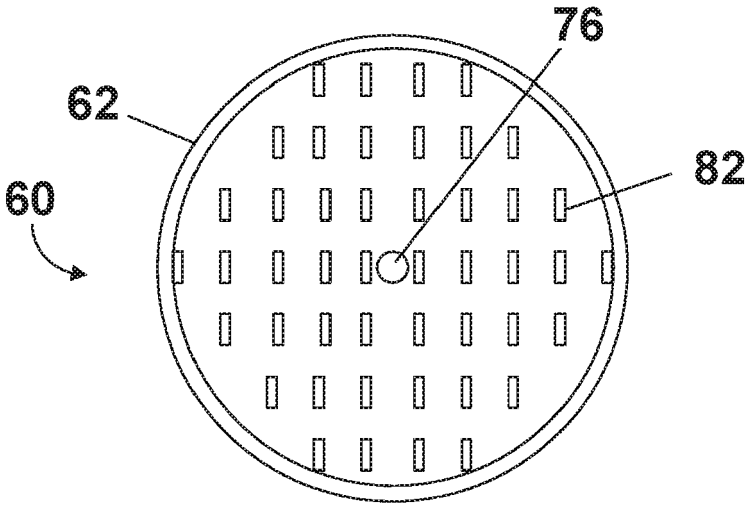


FIG. 5

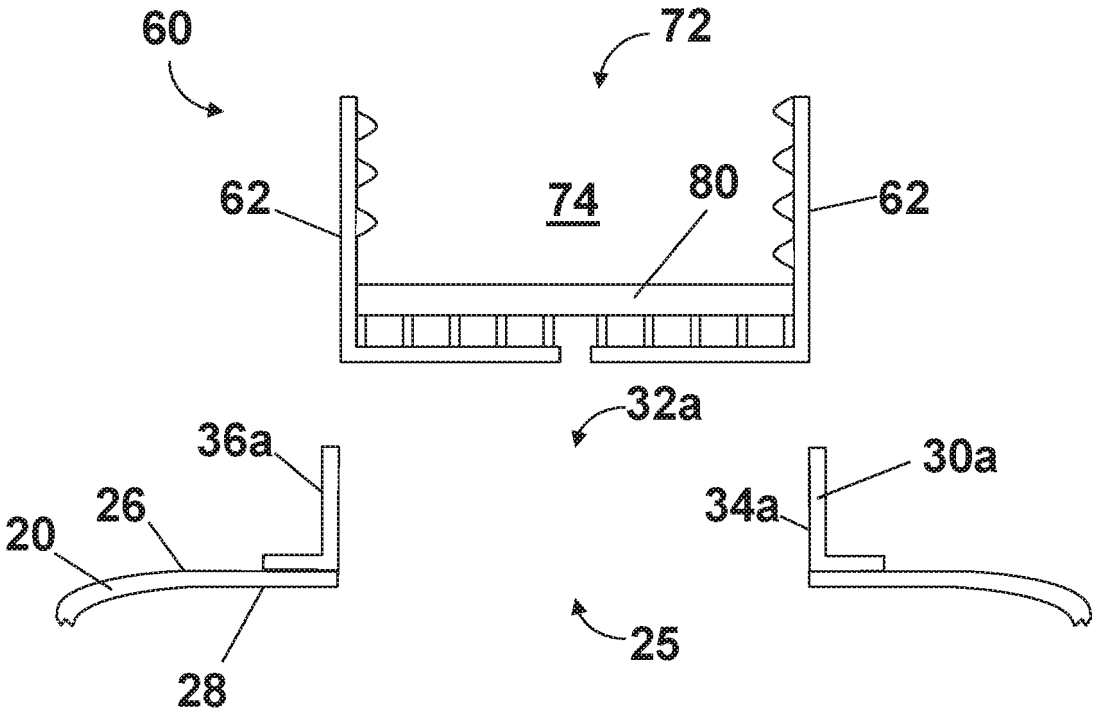
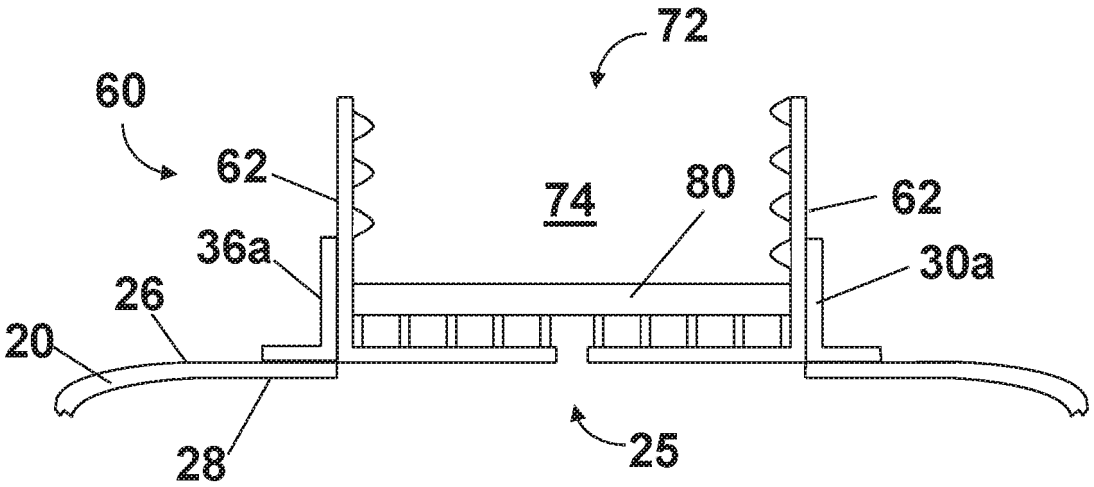

60
72
62
74
80
62
32a
36a
30a
26
34a
20
25
28

FIG. 6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74
80
62
36a
30a
26
20
25
28

FIG. 7

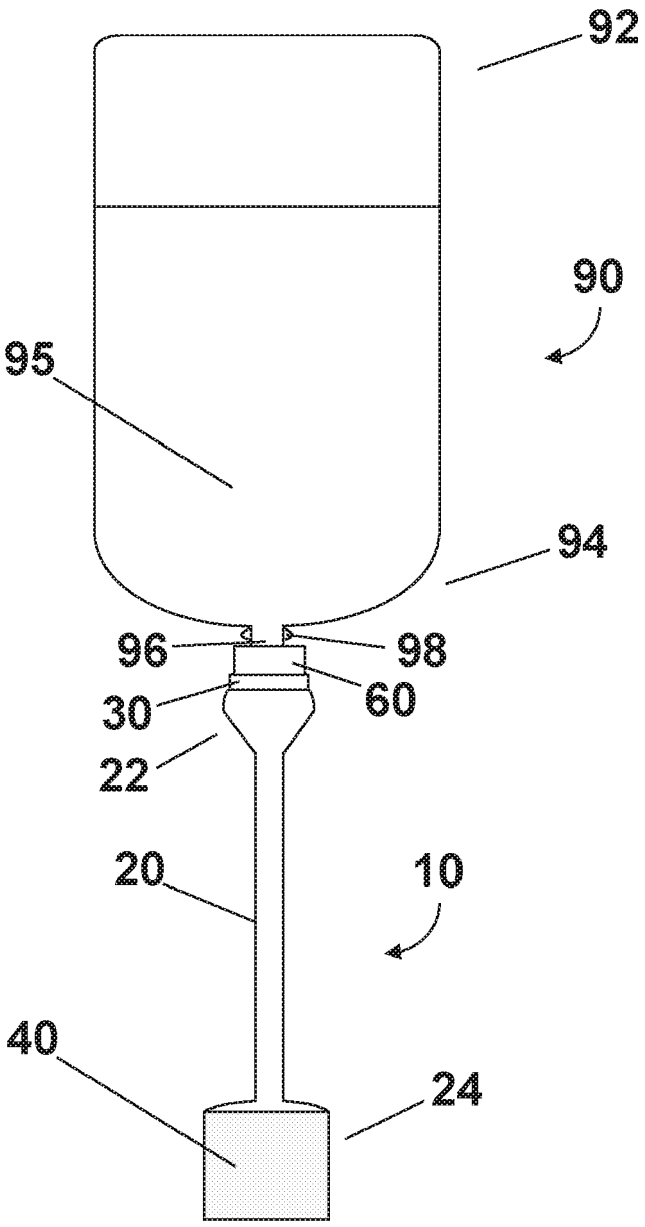

FIG. 8

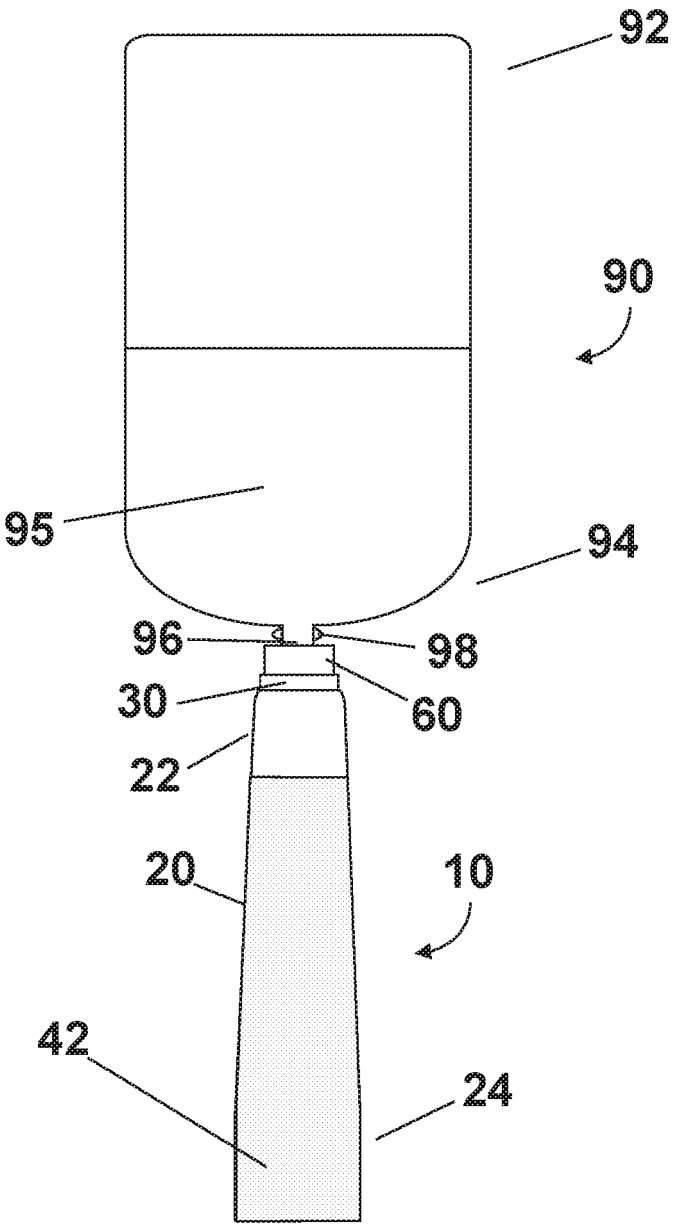

FIG. 9

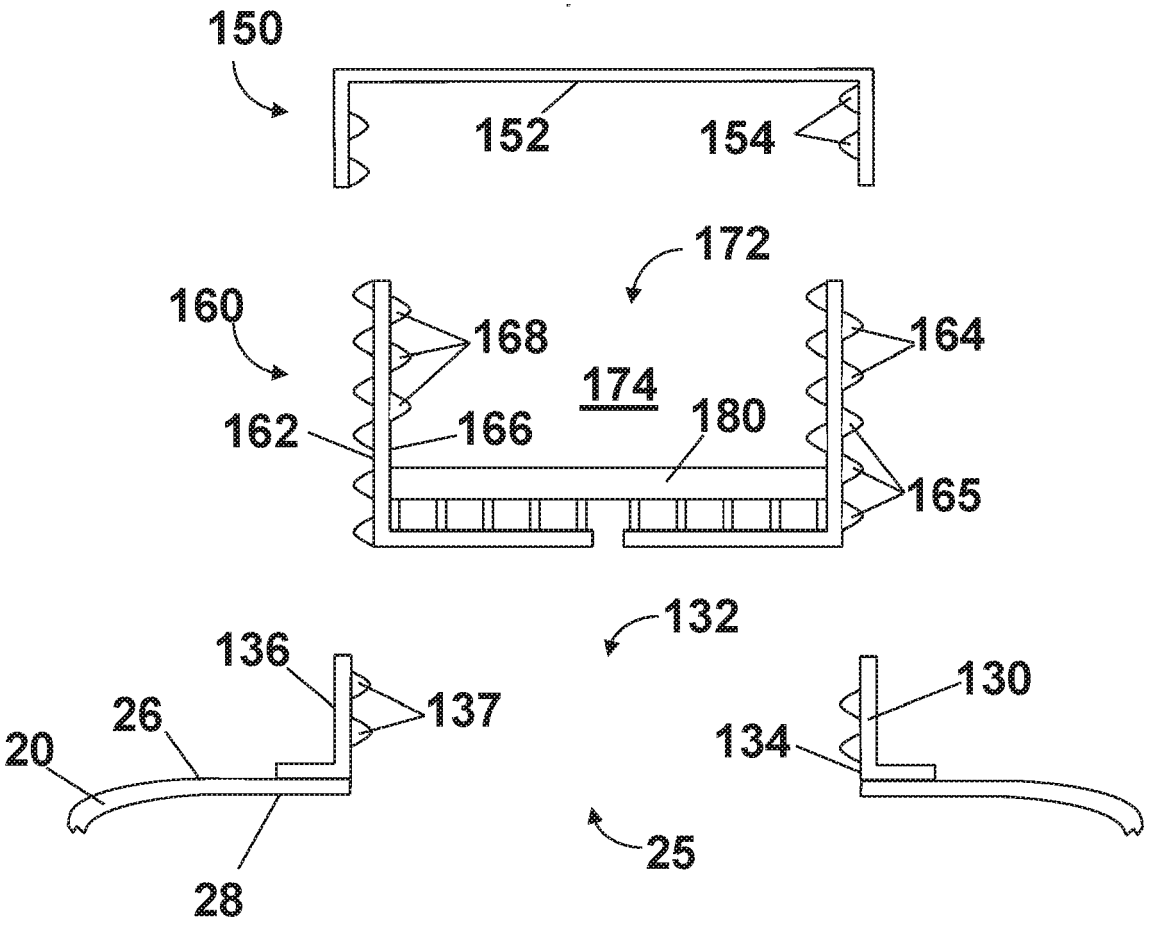
150
152
154
172
160
168
164
174
162
166
180
165
132
136
137
130
26
20
134
25
28

FIG. 10

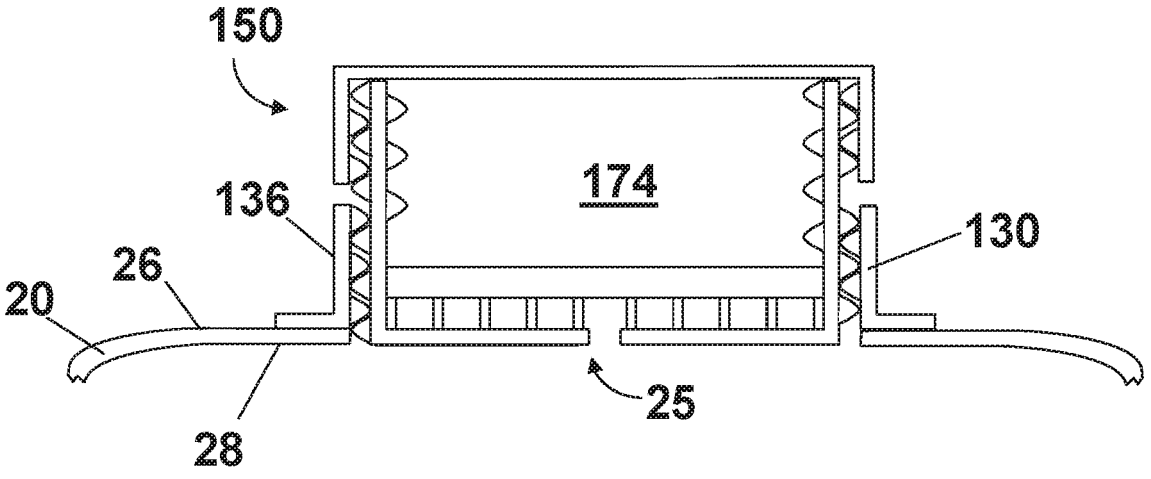
150
174
136
130
26
20
25
28

FIG. 11

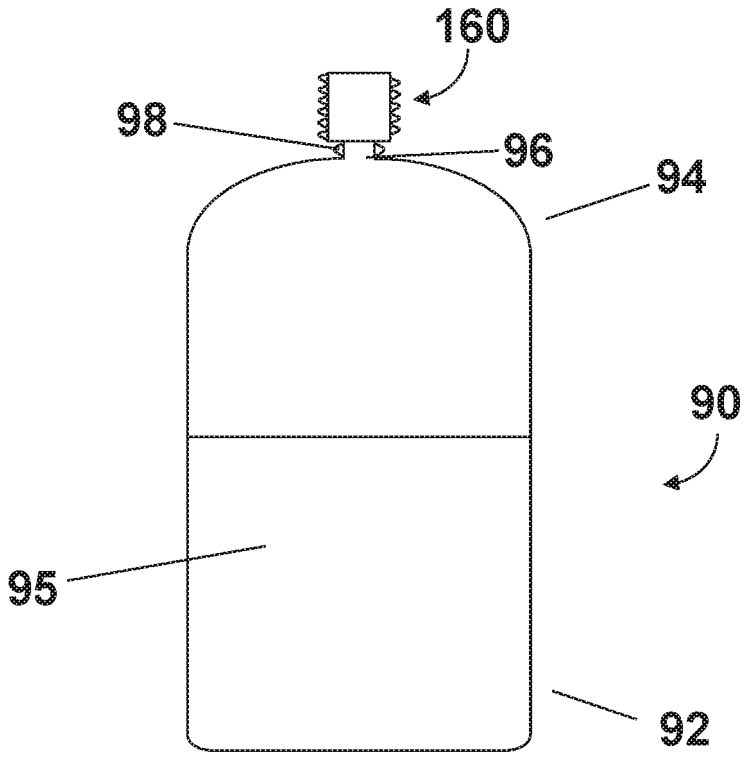

FIG. 12

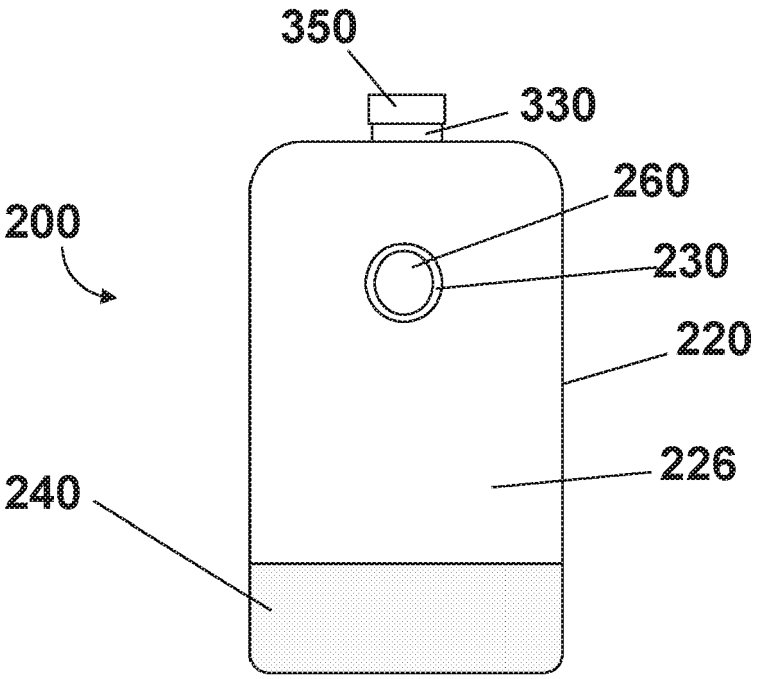
350
330
260
200
230
220
226
240

FIG. 13

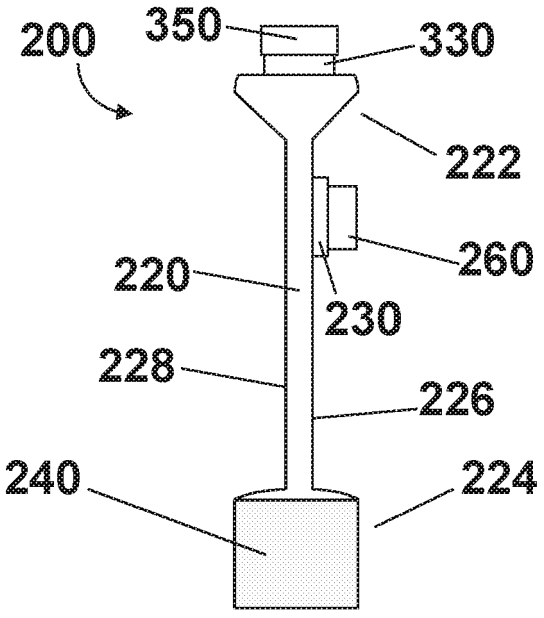
200
350
330
222
260
220
230
228
226
240
224

FIG. 14

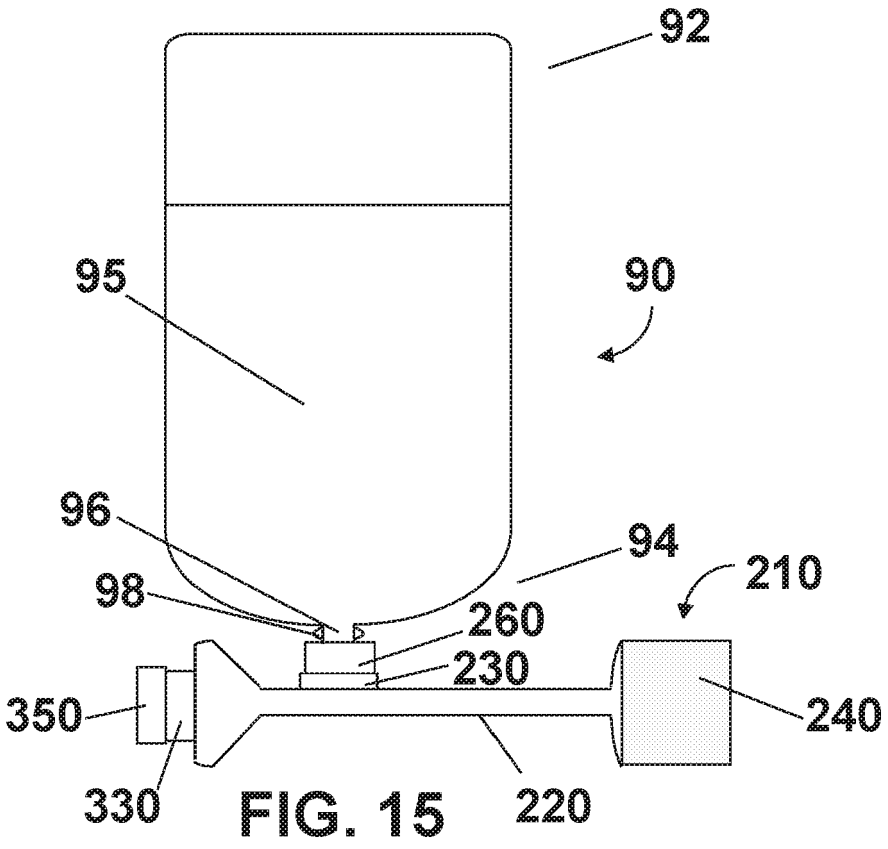

FIG. 15

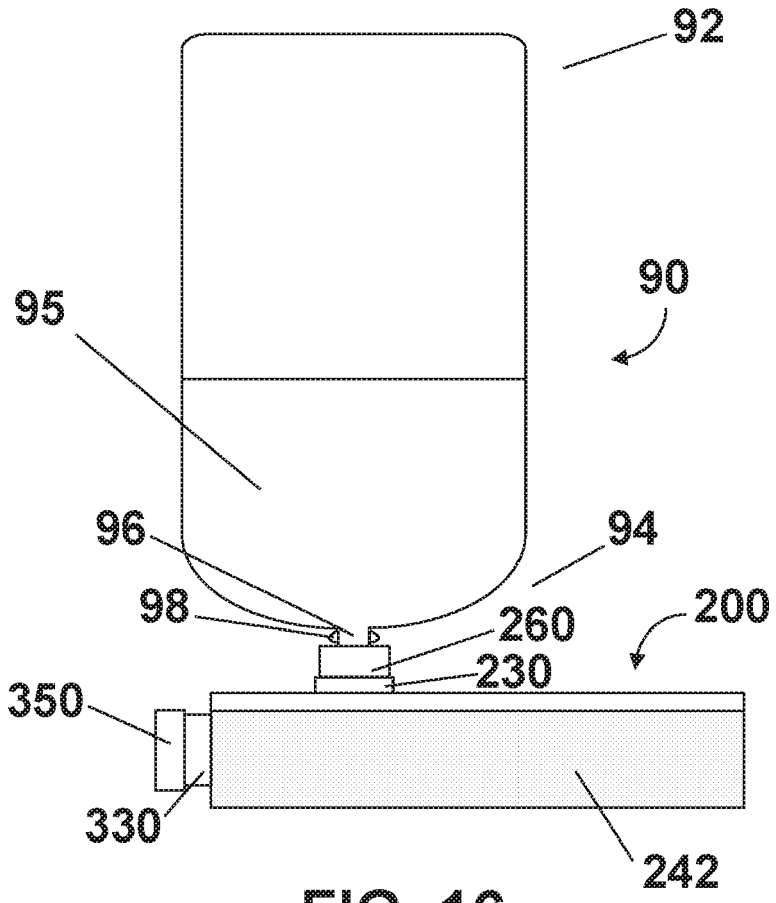

FIG. 16

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2013057014 A1 **[0005]**
- EP 0138681 A2 **[0006]**