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(19) **United States**(12) **Patent Application Publication**  
**MARINA et al.**(10) **Pub. No.: US 2017/0183146 A1**(43) **Pub. Date: Jun. 29, 2017**(54) **POST-MIX BEVERAGE SYSTEM****Publication Classification**(71) Applicant: **PepsiCo, Inc.**, Purchase, NY (US)(72) Inventors: **Carlos Hernan MARINA**, Deerfield Beach, FL (US); **Ricardo ARIAS**, Deerfield Beach, FL (US); **Miriam CLOQUELL GONZALES**, Chicago, IL (US); **Marc LITE FRANCISCO**, Barcelona (ES); **Anton PINYOL ESCARDO**, Barcelona (ES)(51) **Int. Cl.****B65D 85/804** (2006.01)**B65D 25/20** (2006.01)**B65D 81/32** (2006.01)**B65D 25/08** (2006.01)**B65D 41/50** (2006.01)(52) **U.S. Cl.**CPC ..... **B65D 85/8043** (2013.01); **B65D 25/08** (2013.01); **B65D 41/50** (2013.01); **B65D 81/32** (2013.01); **B65D 25/205** (2013.01)(21) Appl. No.: **15/436,175**(22) Filed: **Feb. 17, 2017****Related U.S. Application Data**

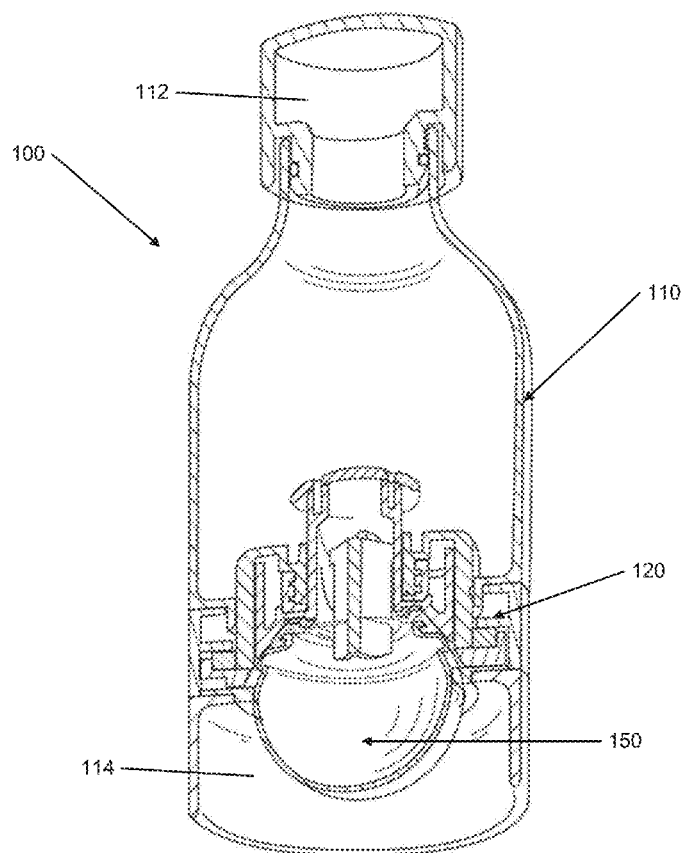
(63) Continuation of application No. 14/874,048, filed on Oct. 2, 2015, which is a continuation of application No. 12/982,374, filed on Dec. 30, 2010, now Pat. No. 9,272,827, which is a continuation-in-part of application No. 12/550,101, filed on Aug. 28, 2009, now Pat. No. 8,740,020.

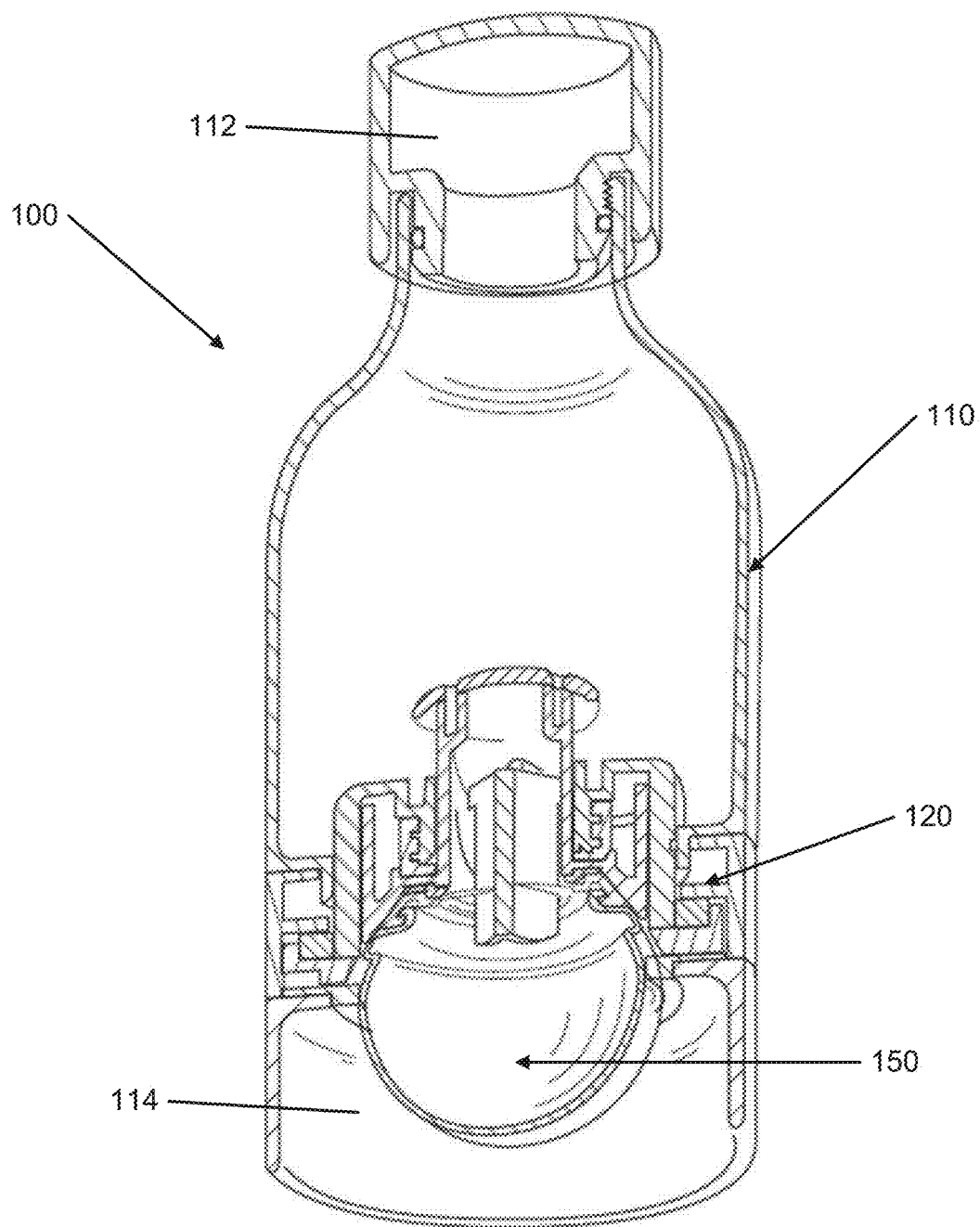
(60) Provisional application No. 61/146,156, filed on Jan. 21, 2009, provisional application No. 61/093,090, filed on Aug. 29, 2008.

(57)

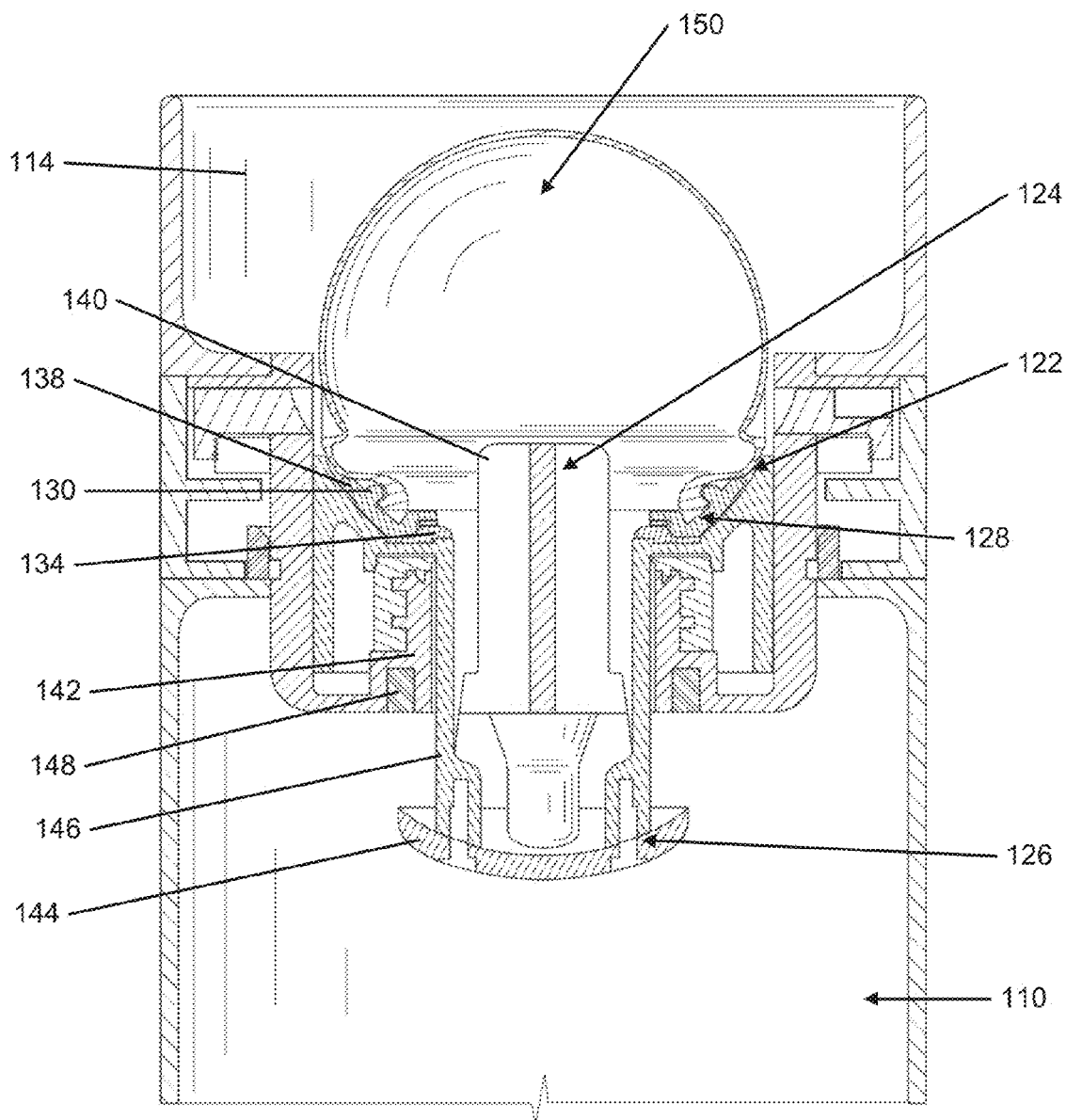
**ABSTRACT**

A beverage dispensing system comprises a container, an attachment mechanism, and a cartridge. The container may hold a mixing solution or liquid, such as water, to be mixed with the contents of the cartridge. The attachment mechanism is generally located within the container. The cartridge generally engages with the attachment mechanism to open the cartridge to be dispensed into the container, thereby combining the contents of the cartridge with the liquid within the container to create a drinkable beverage. The cartridge may include a unique identifier to track a set of beverage characteristics associated with the contents of the cartridge and the beverage. The container may capture the unique identifier of the cartridge associated with the set of beverage characteristics and transfer the set of beverage characteristics over a wireless network to a computing device or network.

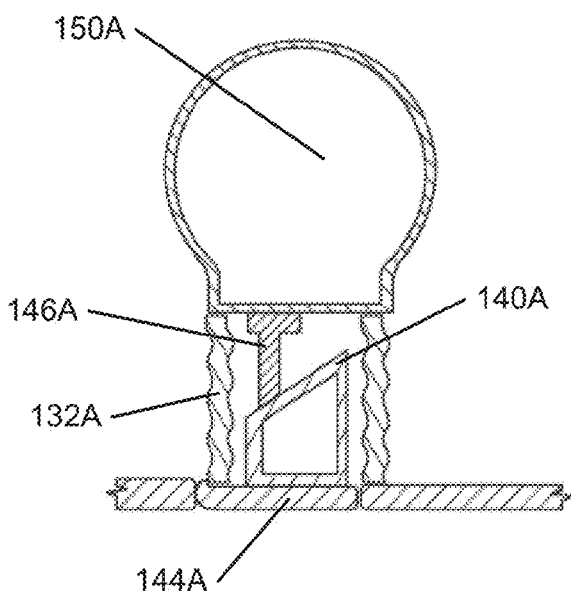




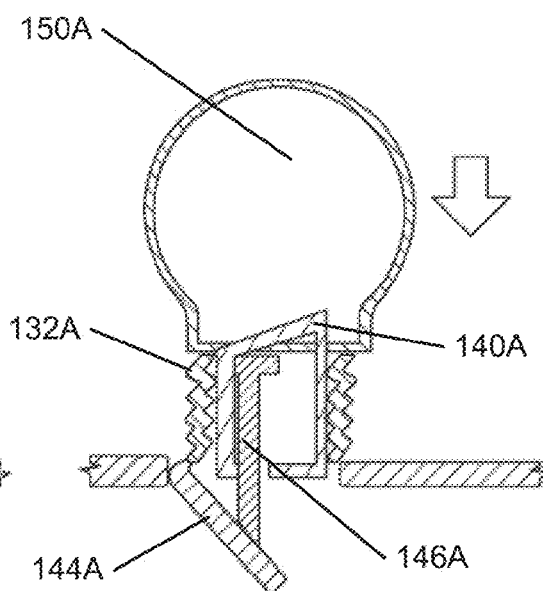
**FIG. 1**



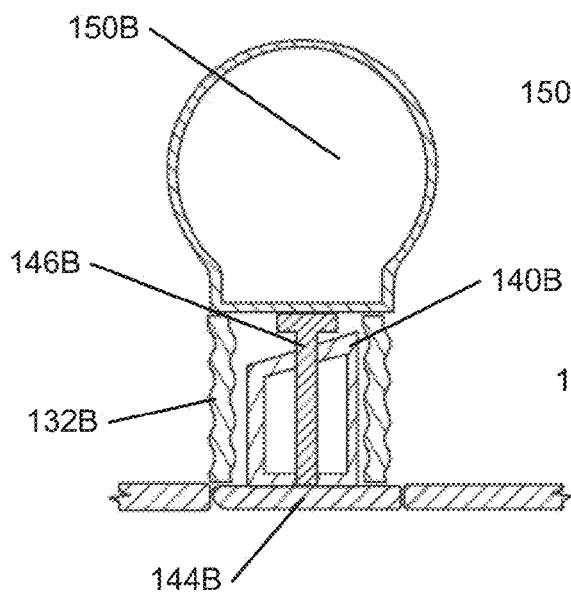
**FIG. 1A**



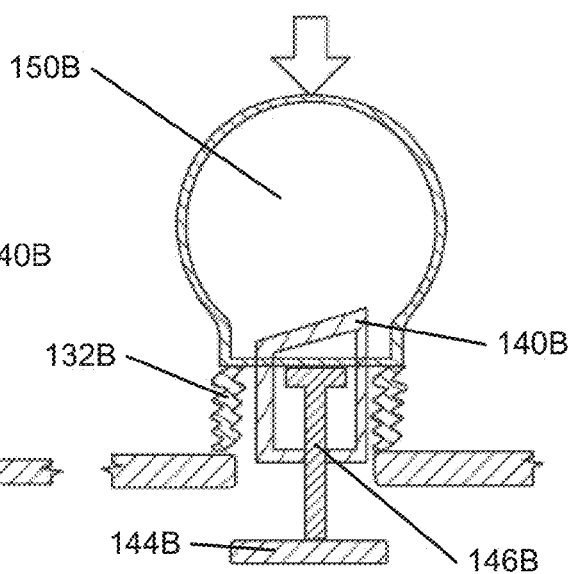
**FIG. 2A1**



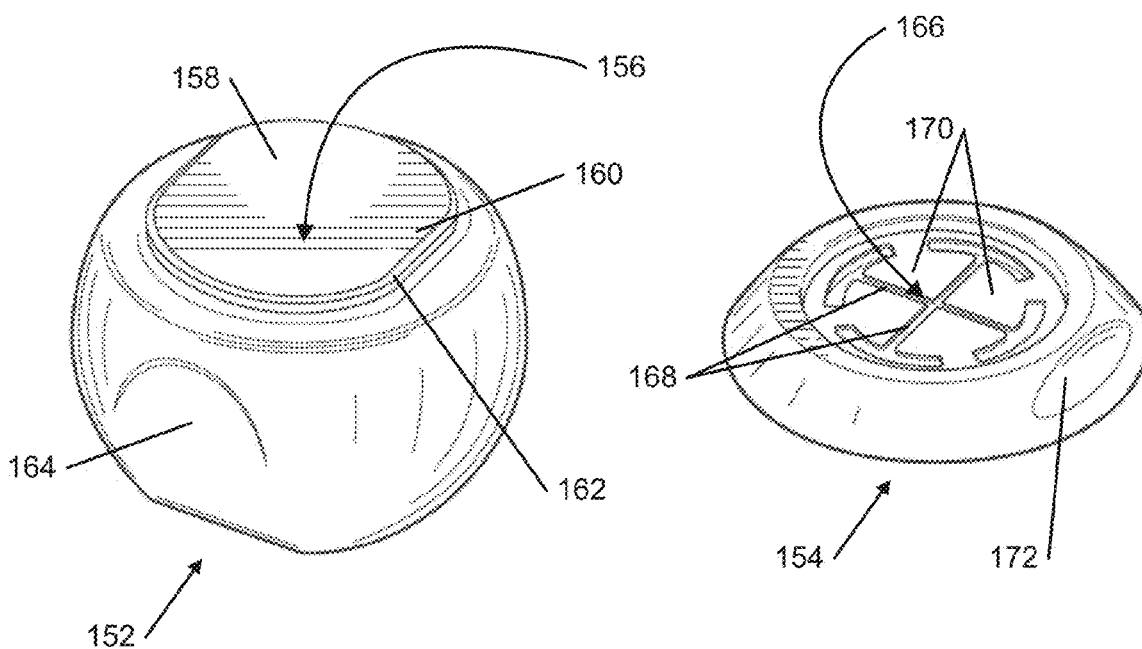
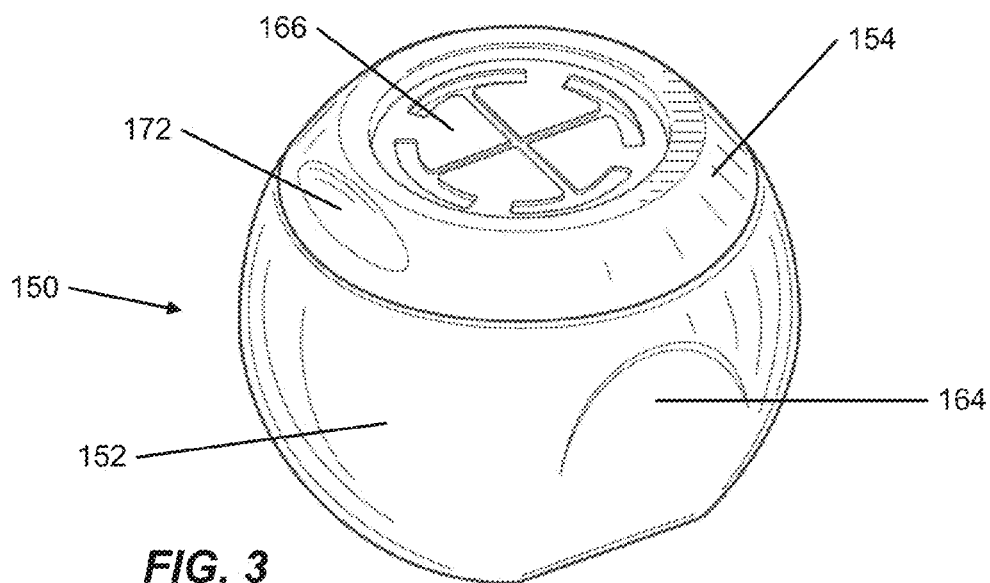
**FIG. 2A2**

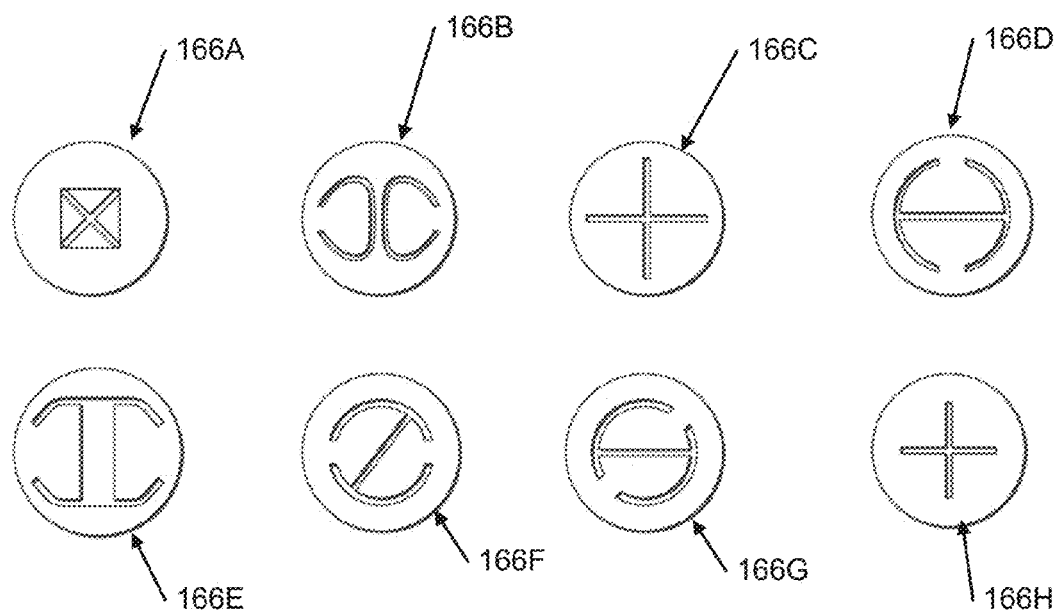


**FIG. 2B1**

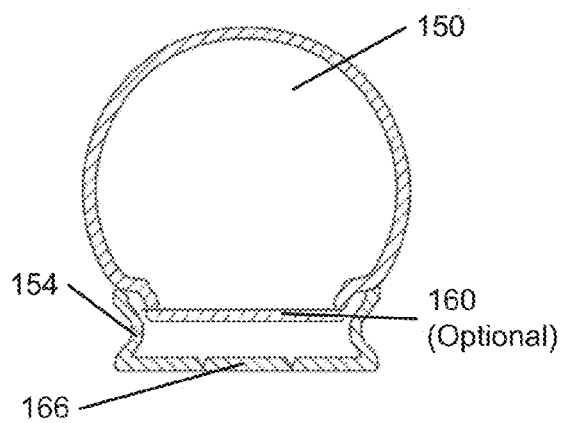


**FIG. 2B2**

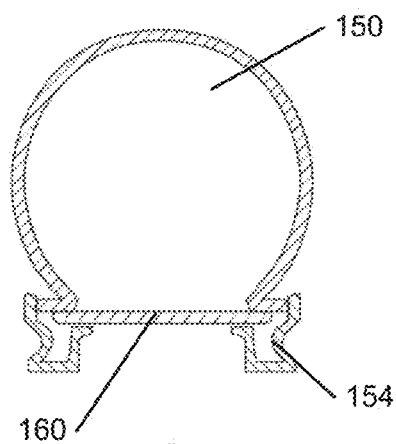




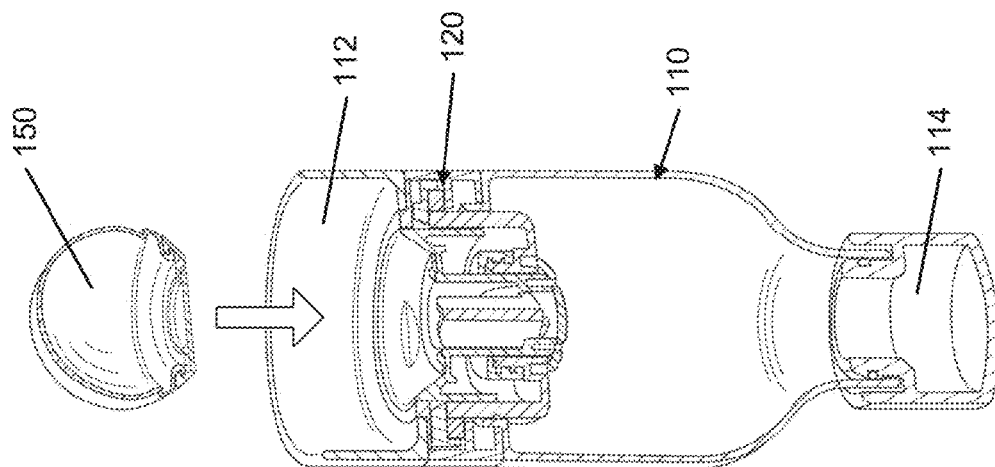
**FIG. 3B**



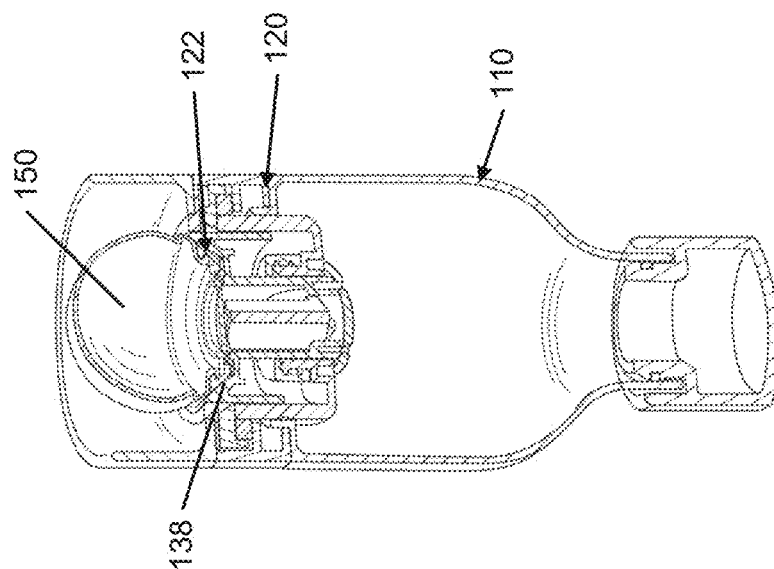
**FIG. 3C**



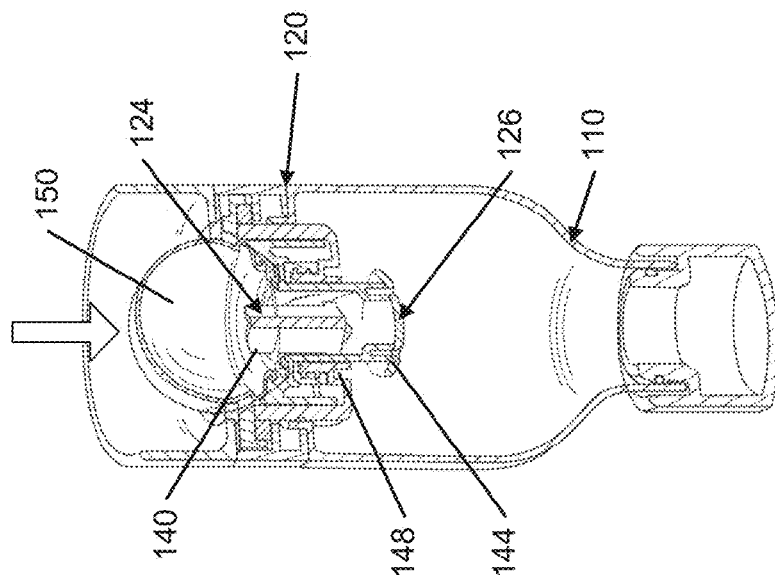
**FIG. 3D**



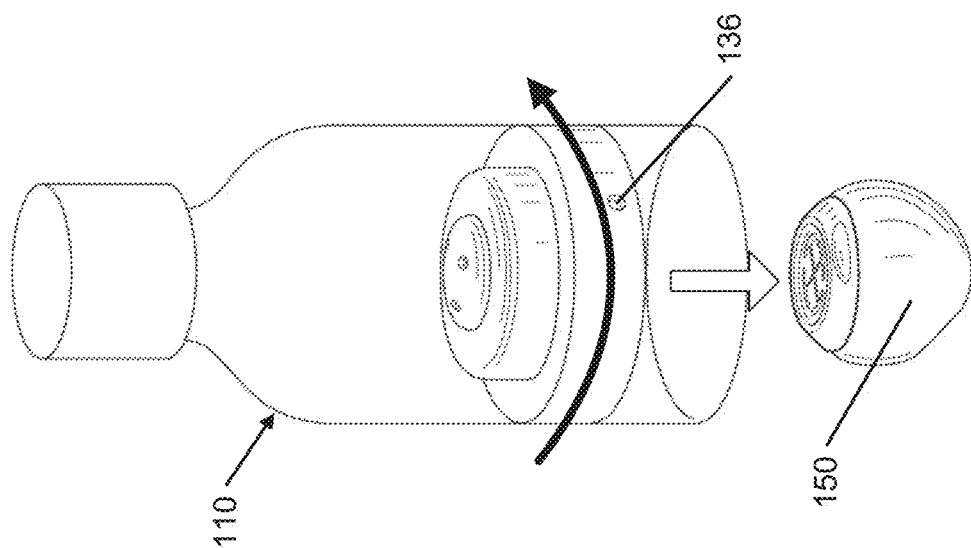
**FIG. 4A**



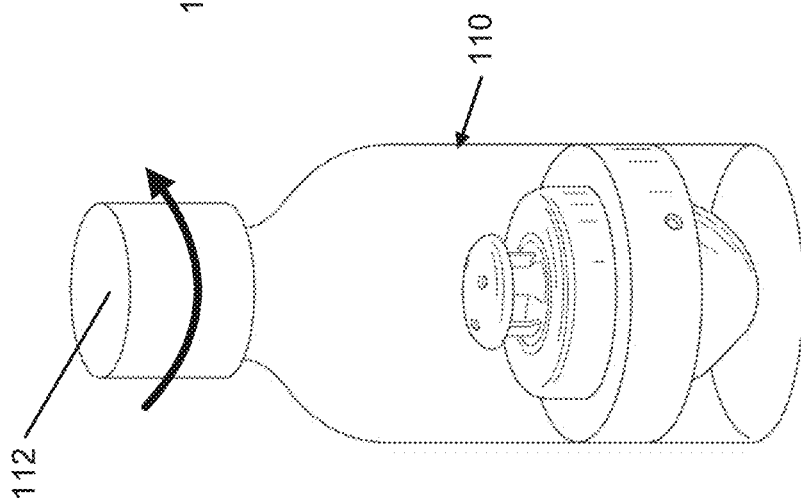
**FIG. 4B**



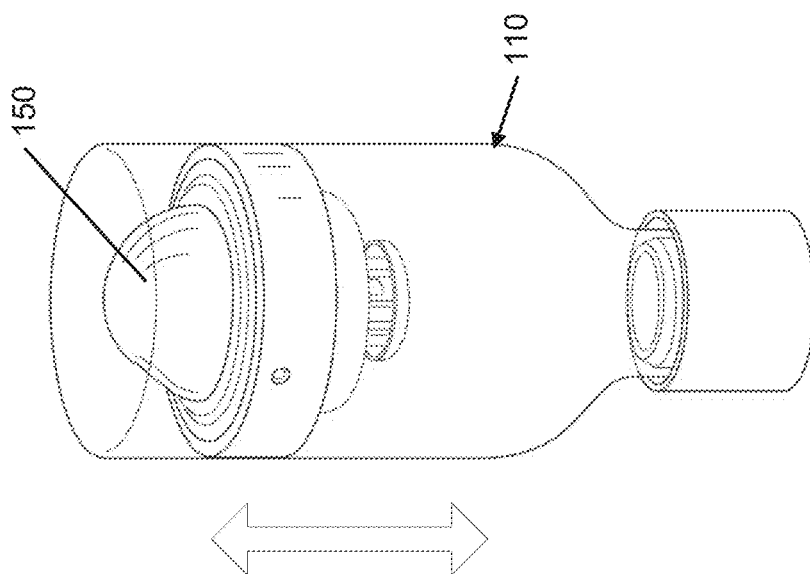
**FIG. 4C**



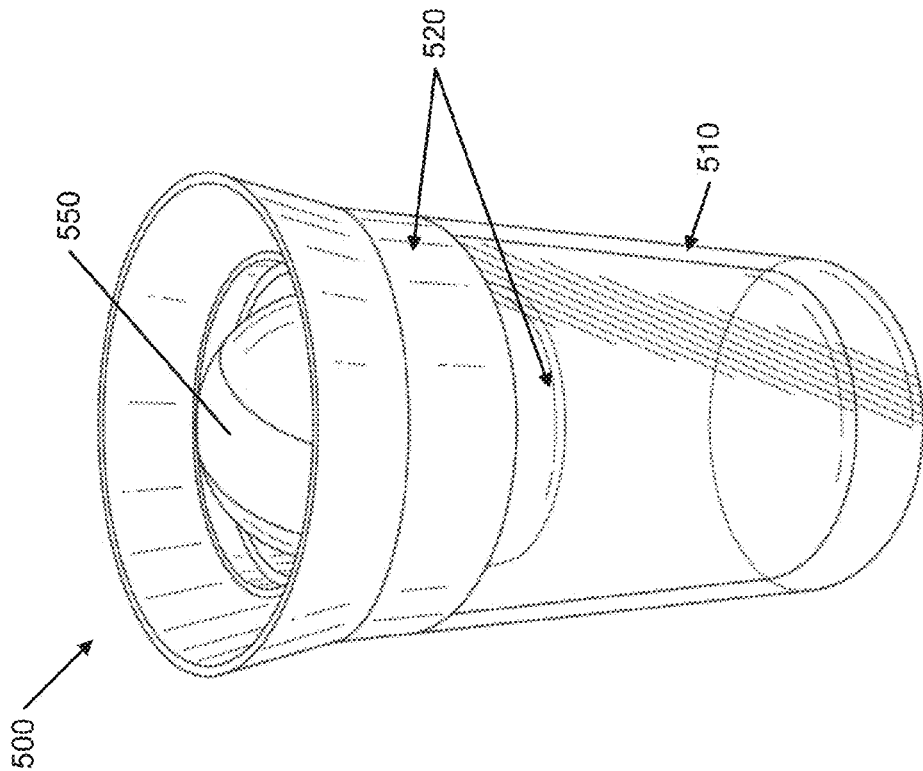
**FIG. 4F**



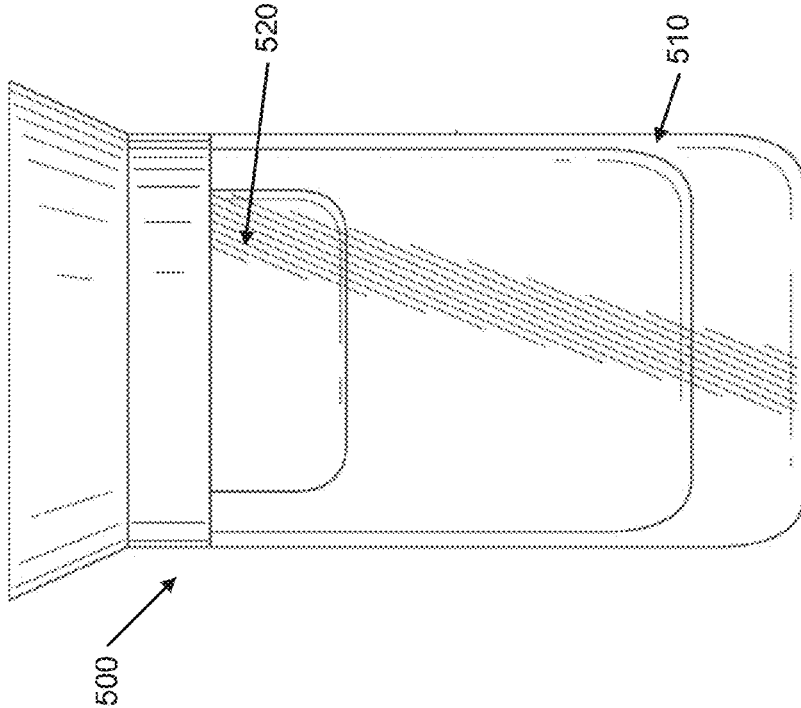
**FIG. 4E**



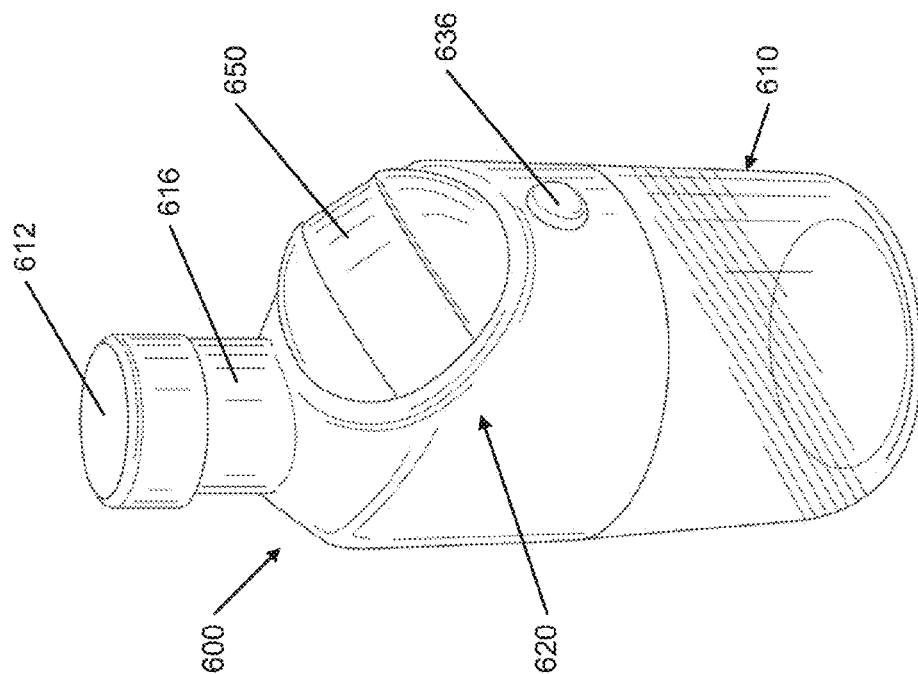
**FIG. 4D**



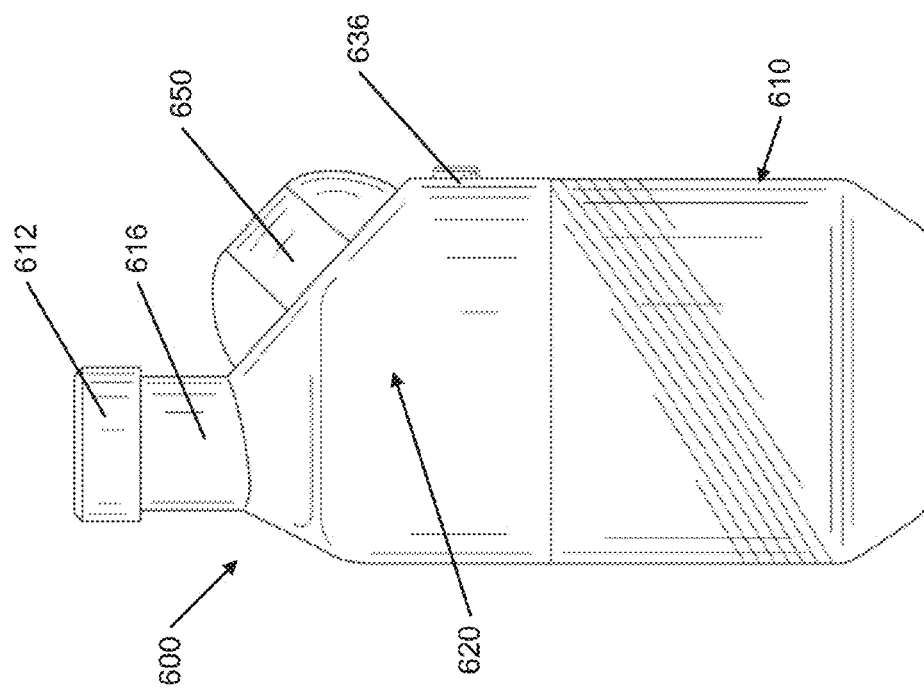
**FIG. 5A**



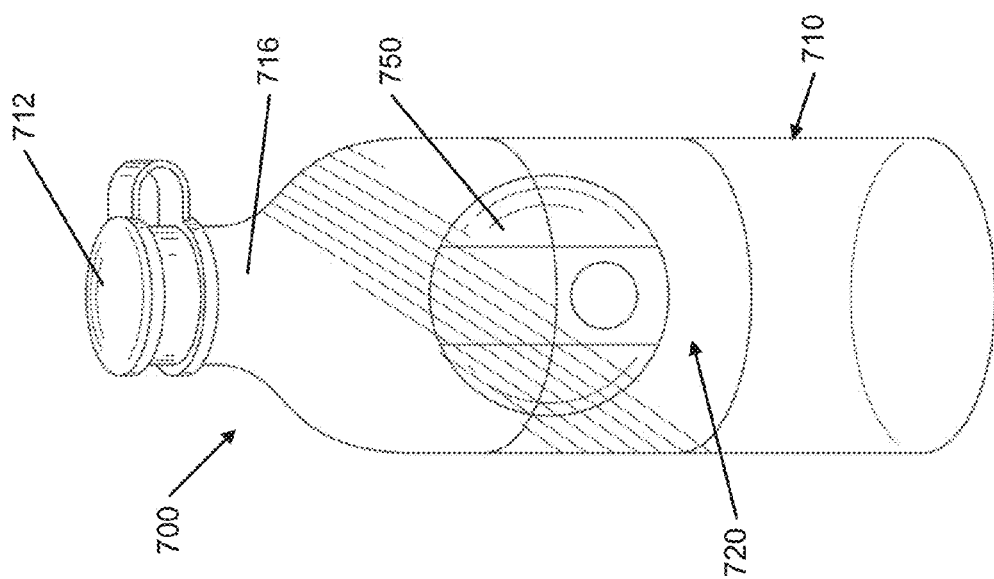
**FIG. 5B**



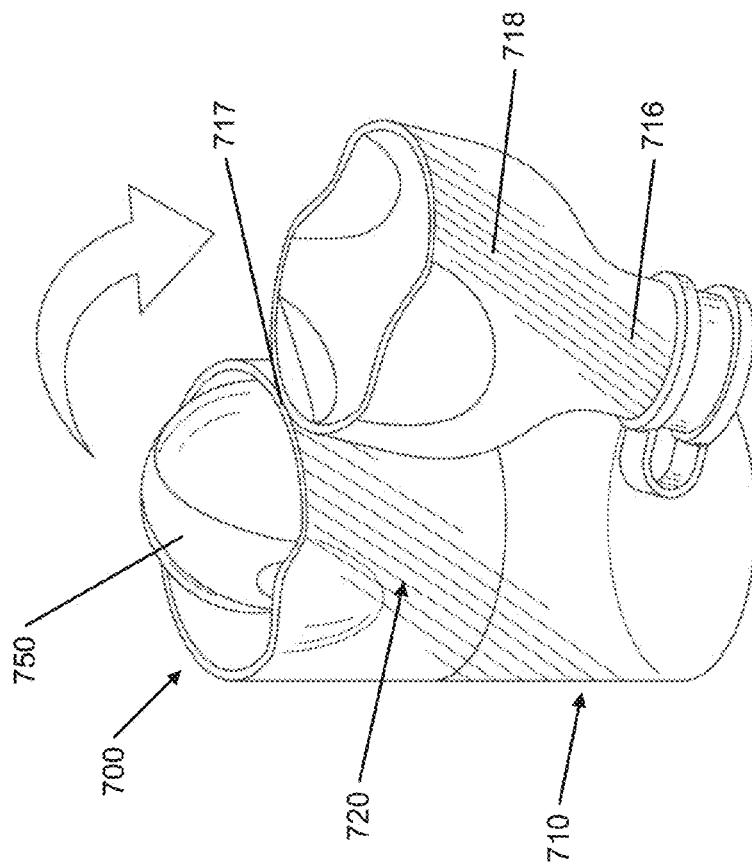
**FIG. 6B**



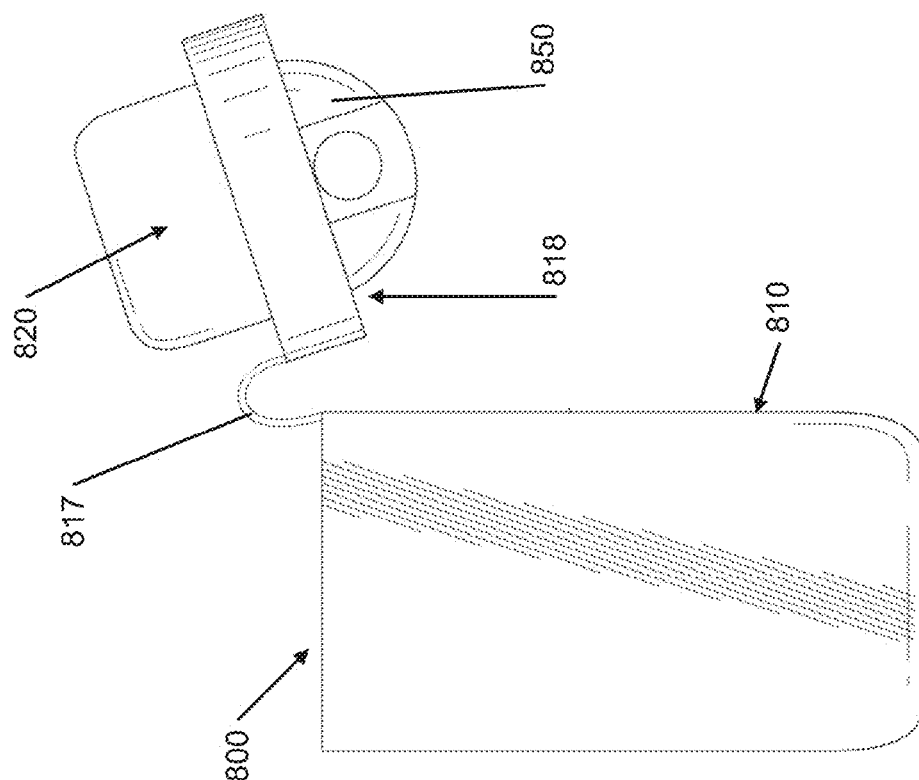
**FIG. 6A**



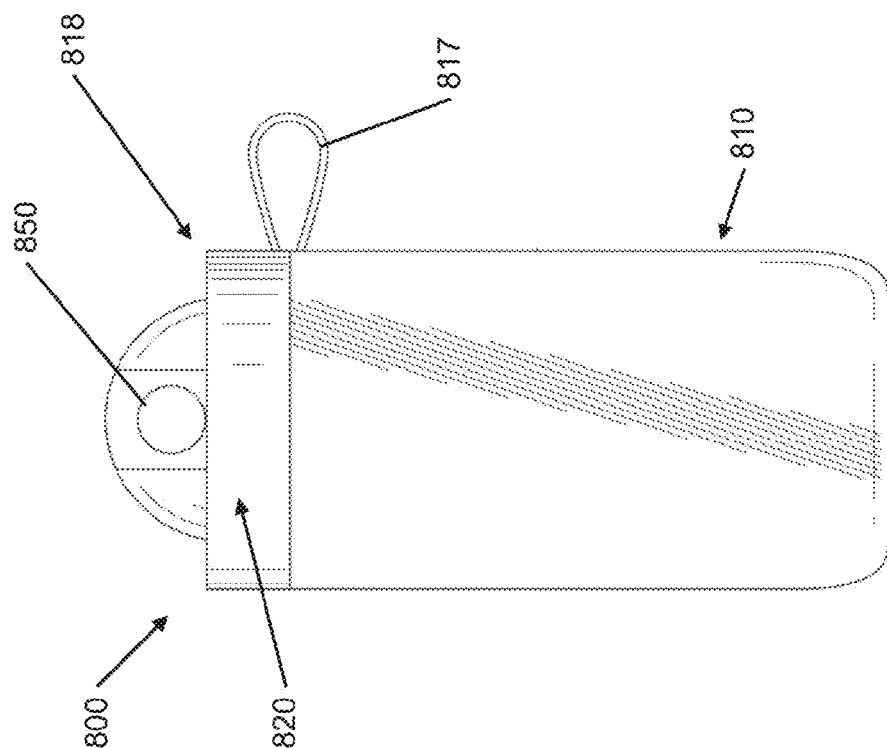
**FIG. 7A**



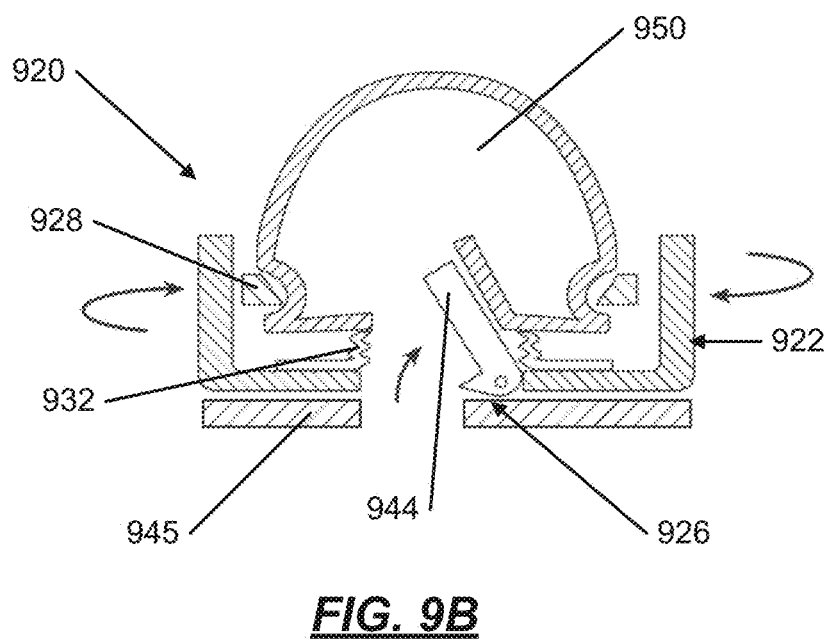
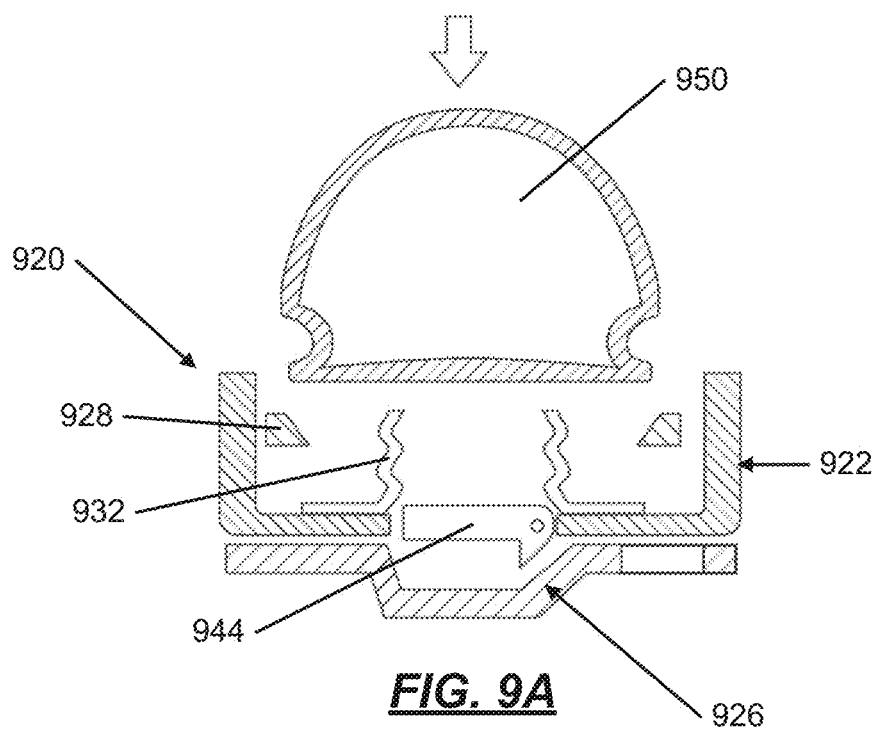
**FIG. 7B**

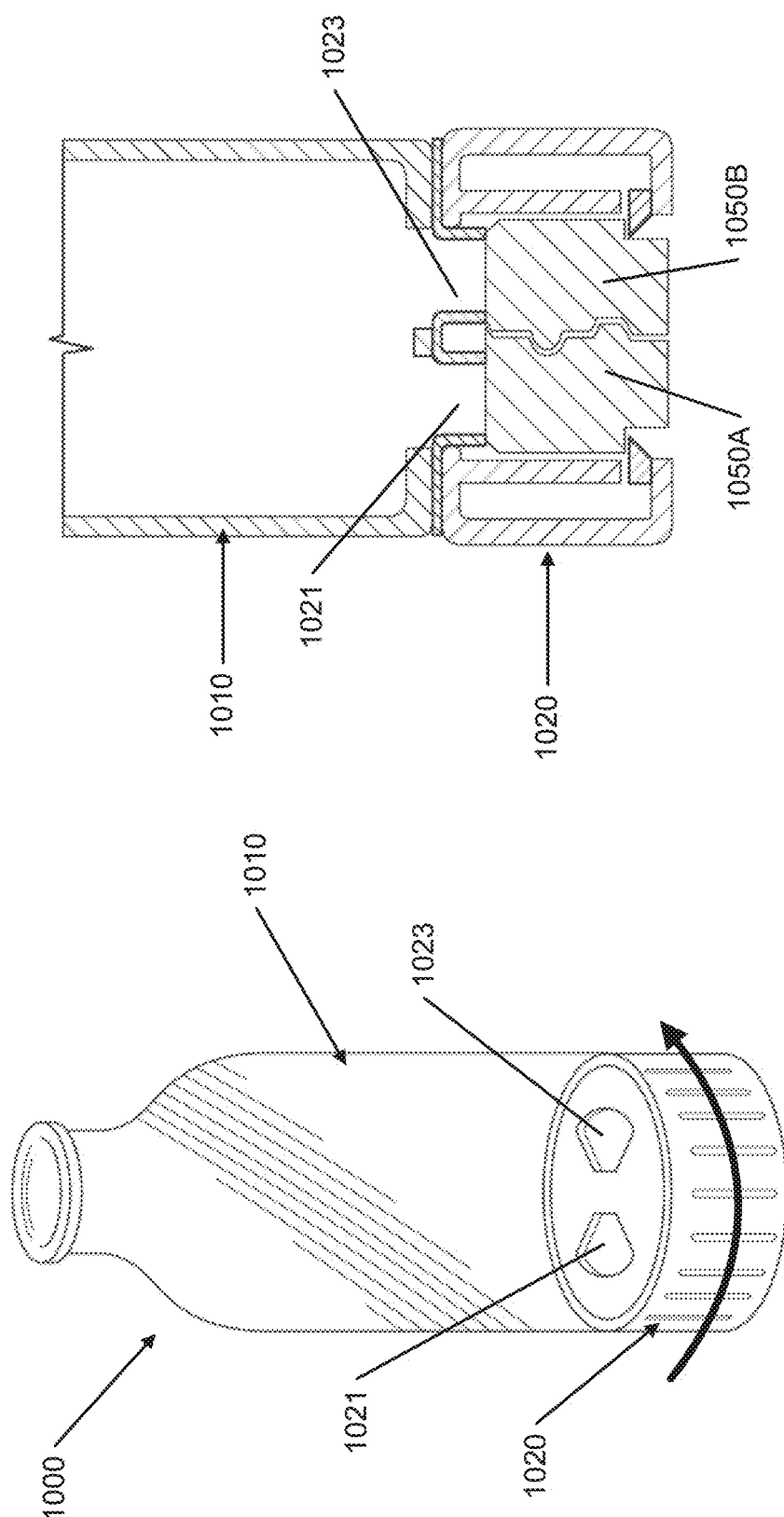


**FIG. 8B**



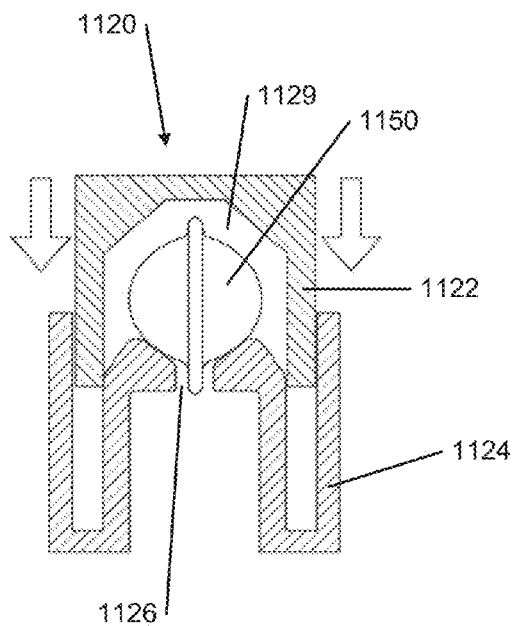
**FIG. 8A**



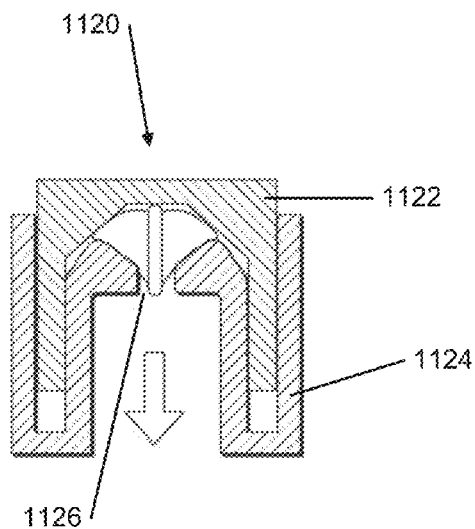


**FIG. 10B**

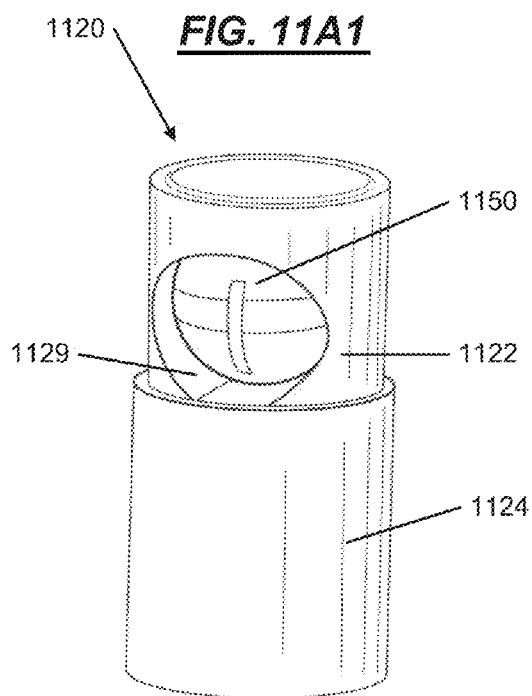
**FIG. 10A**



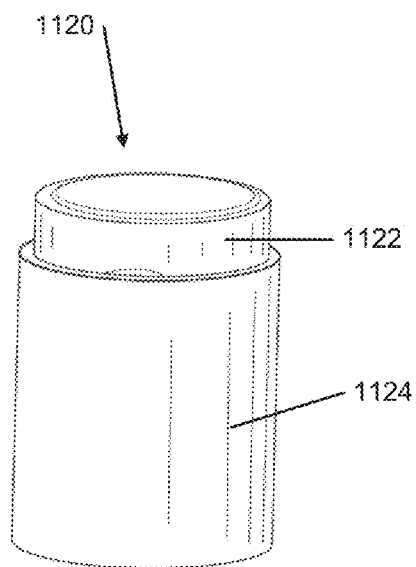
**FIG. 11A1**



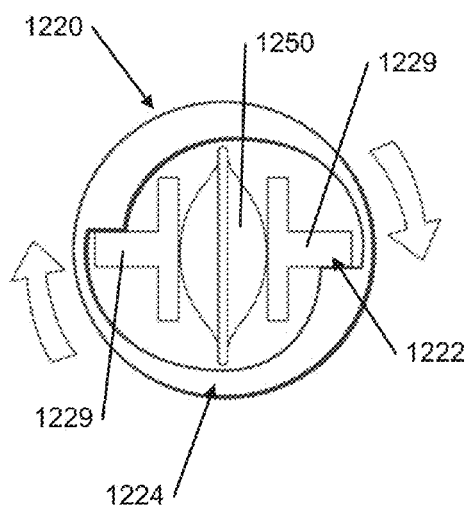
**FIG. 11A2**



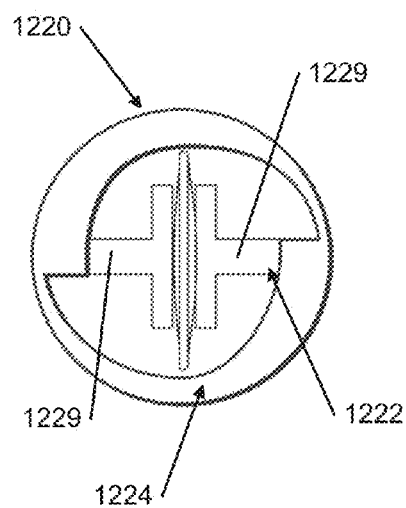
**FIG. 11B1**



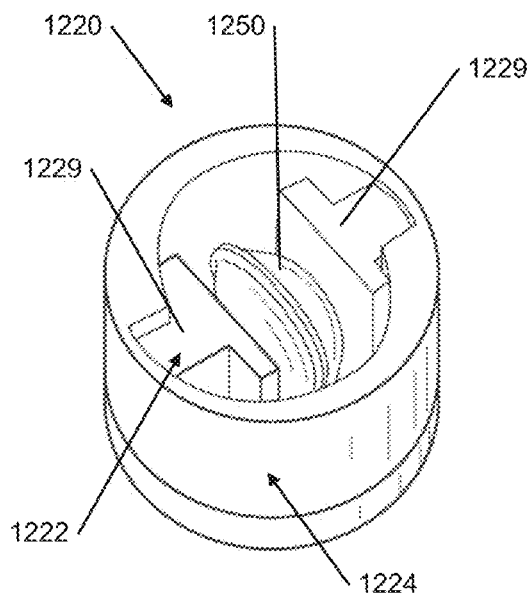
**FIG. 11B2**



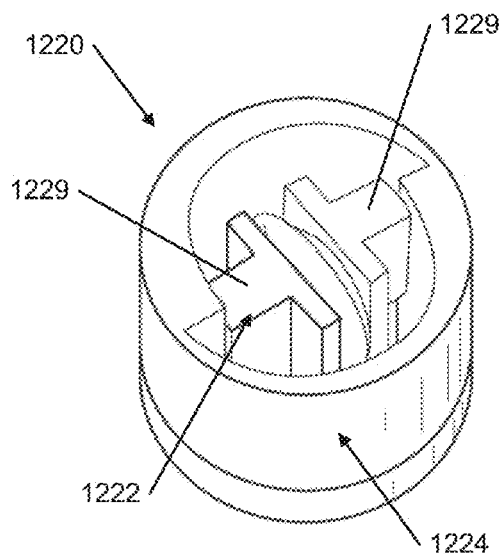
**FIG. 12A1**



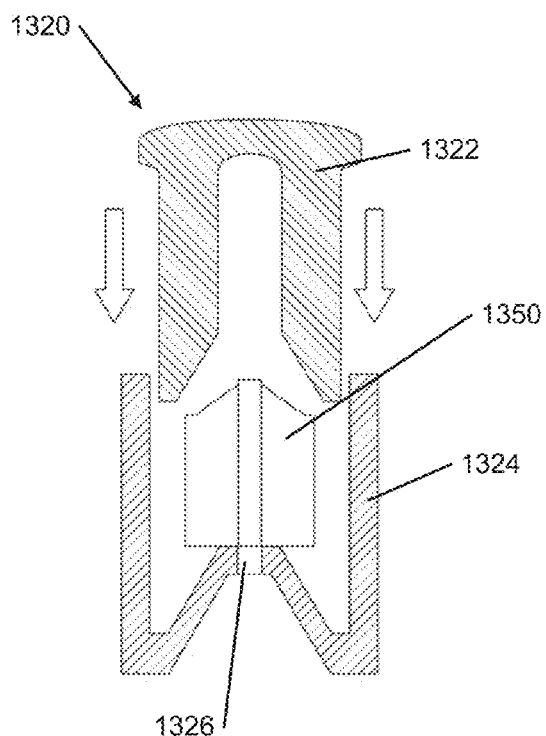
**FIG. 12A2**



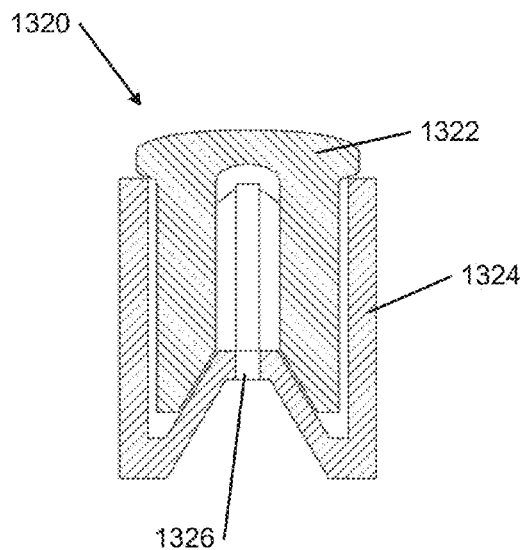
**FIG. 12B1**



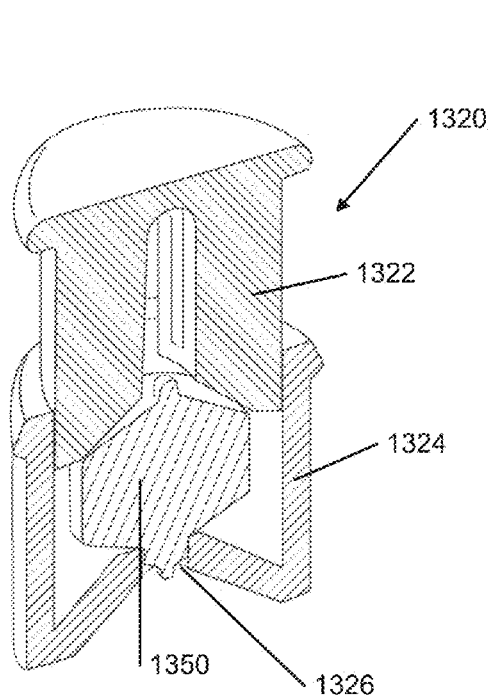
**FIG. 12B2**



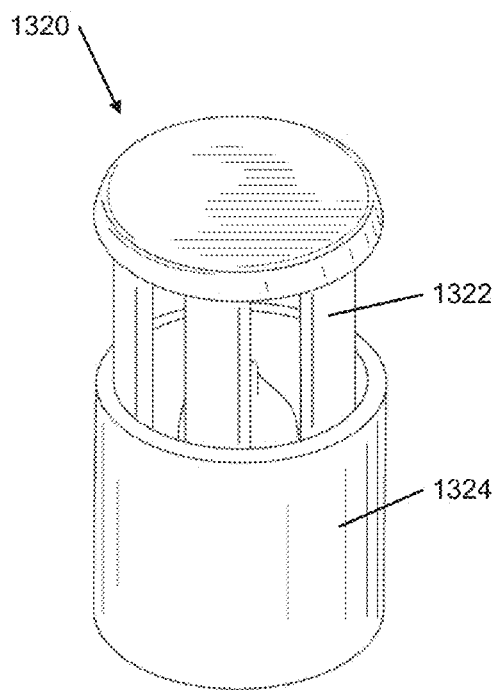
**FIG. 13A1**



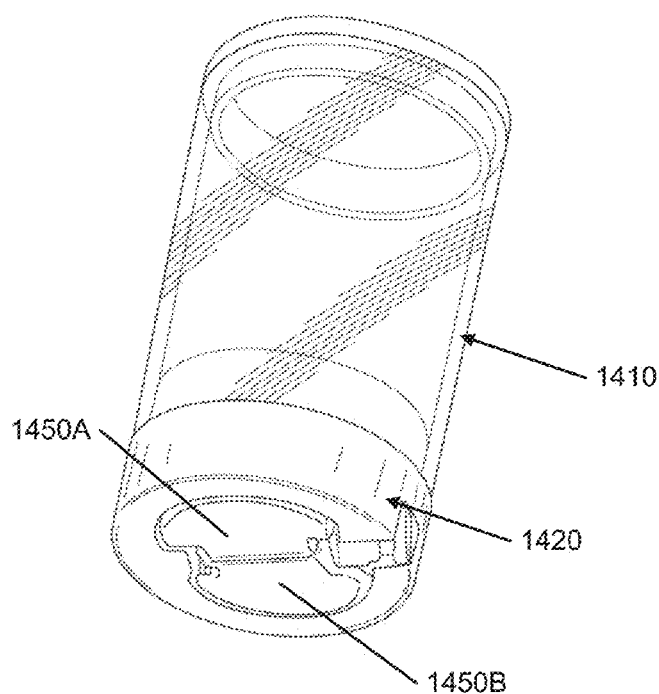
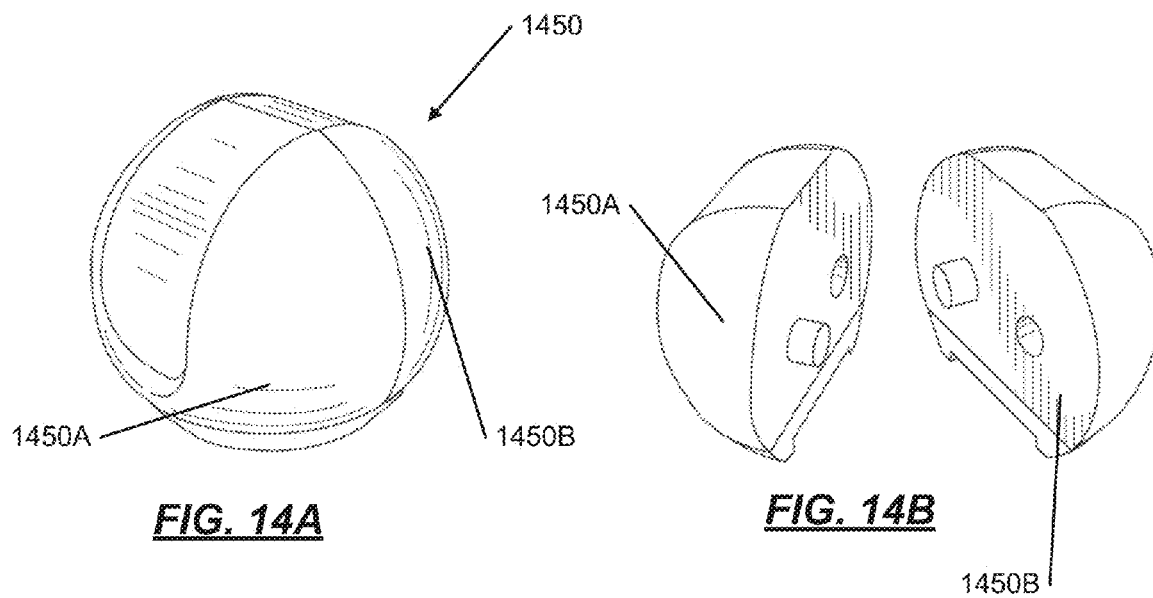
**FIG. 13A2**

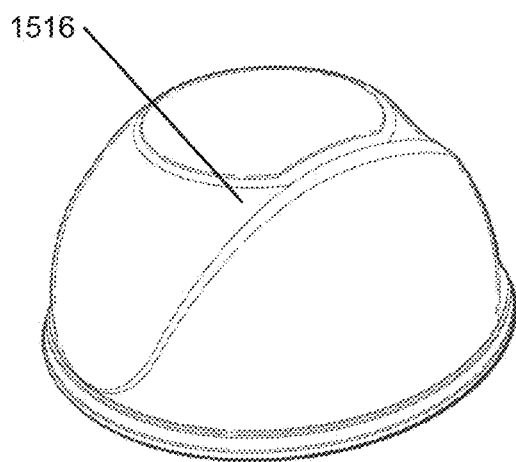
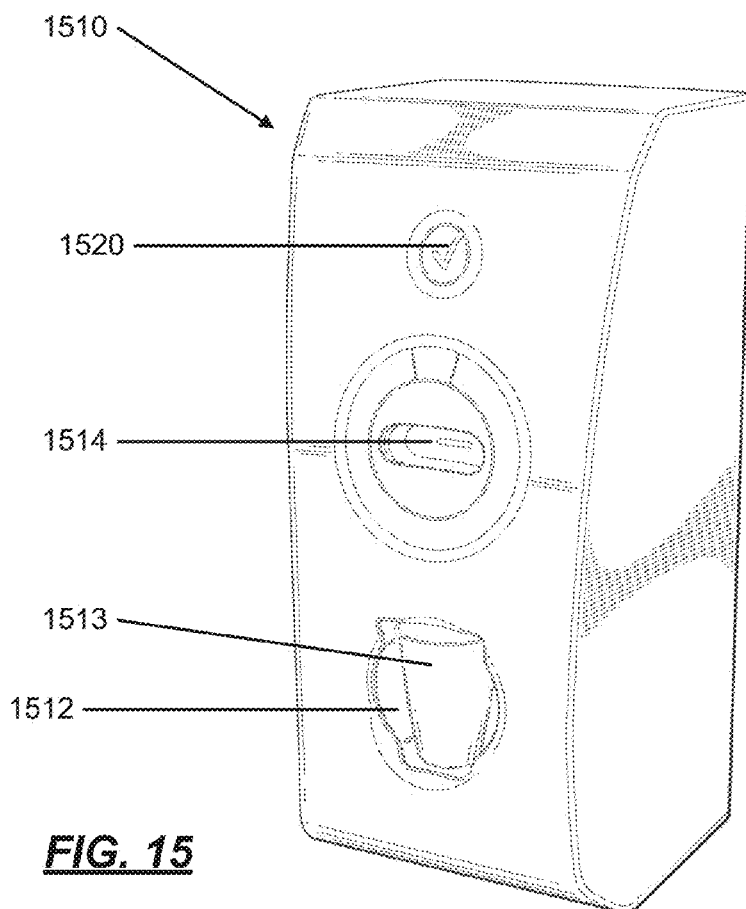


**FIG. 13B1**

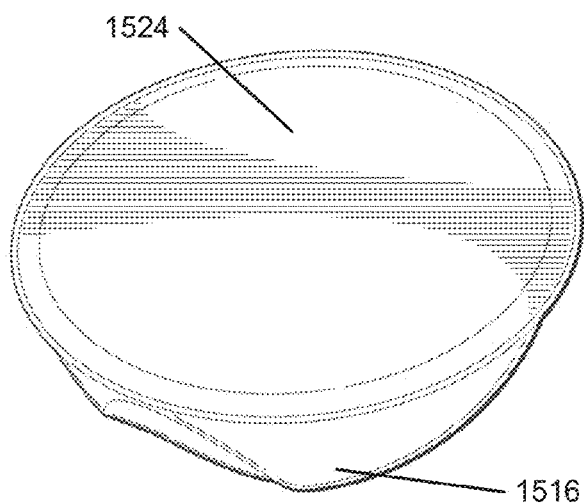


**FIG. 13B2**

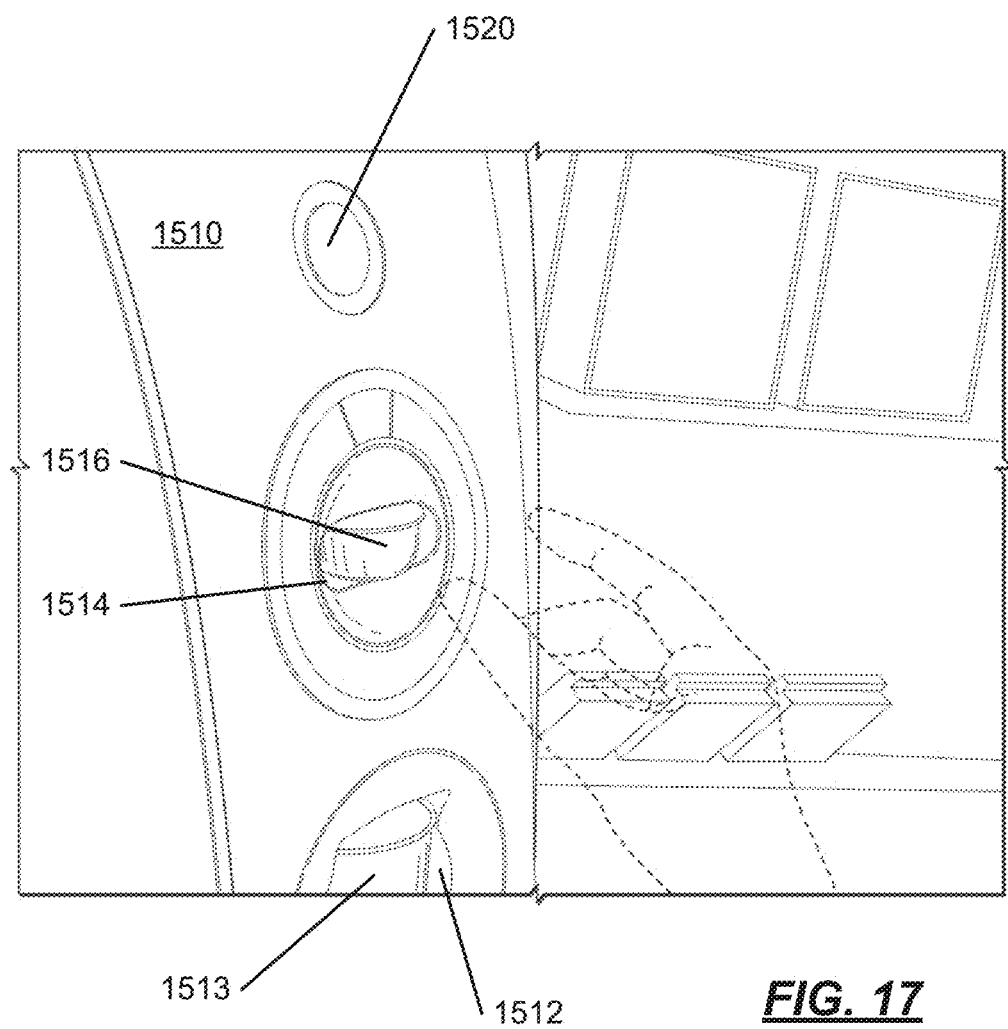


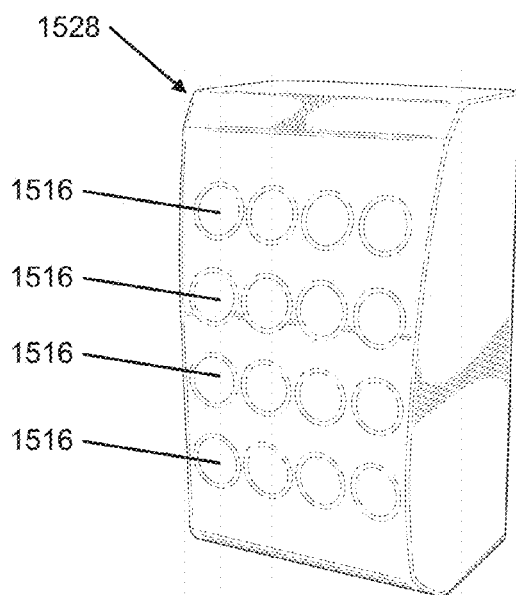


**FIG. 16A**

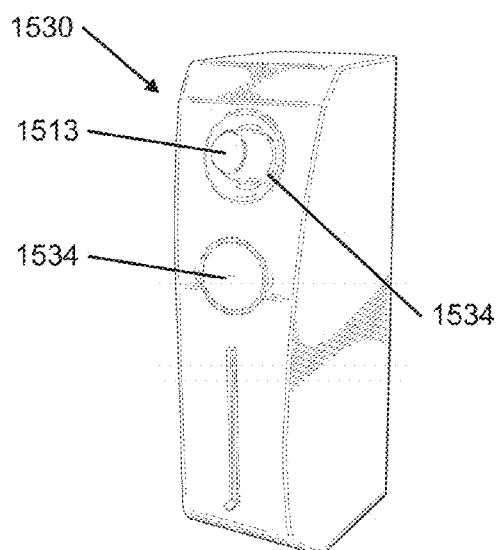


**FIG. 16B**

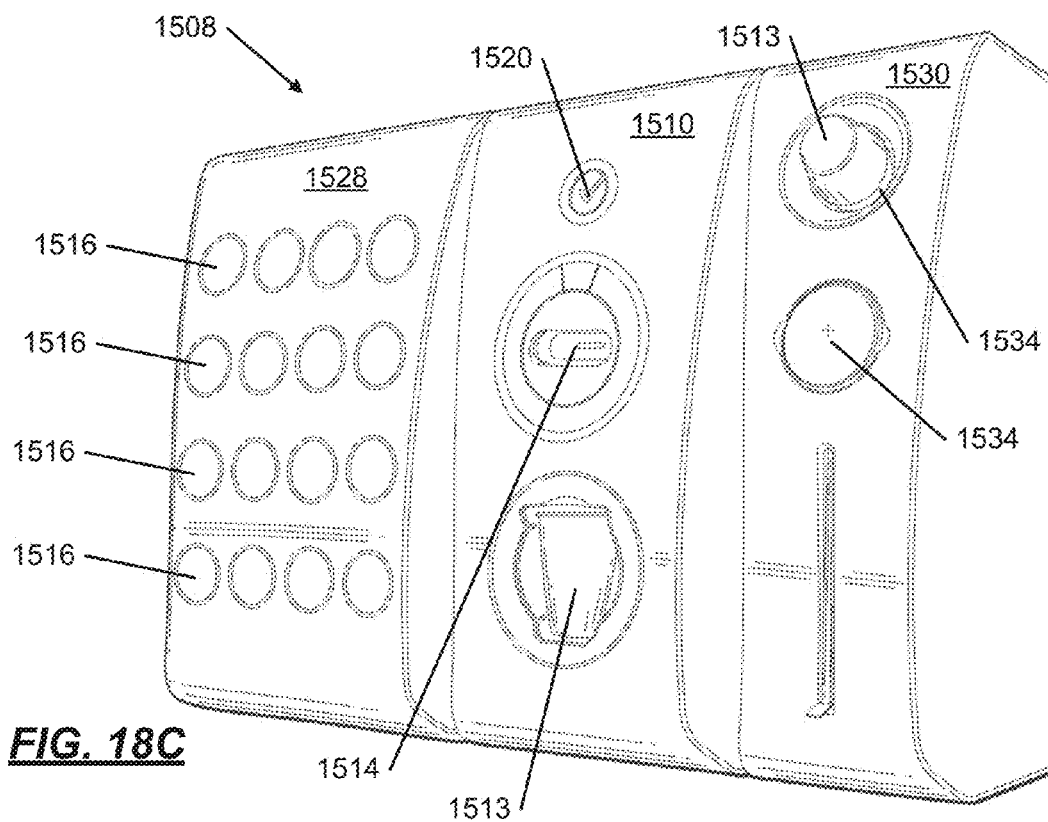




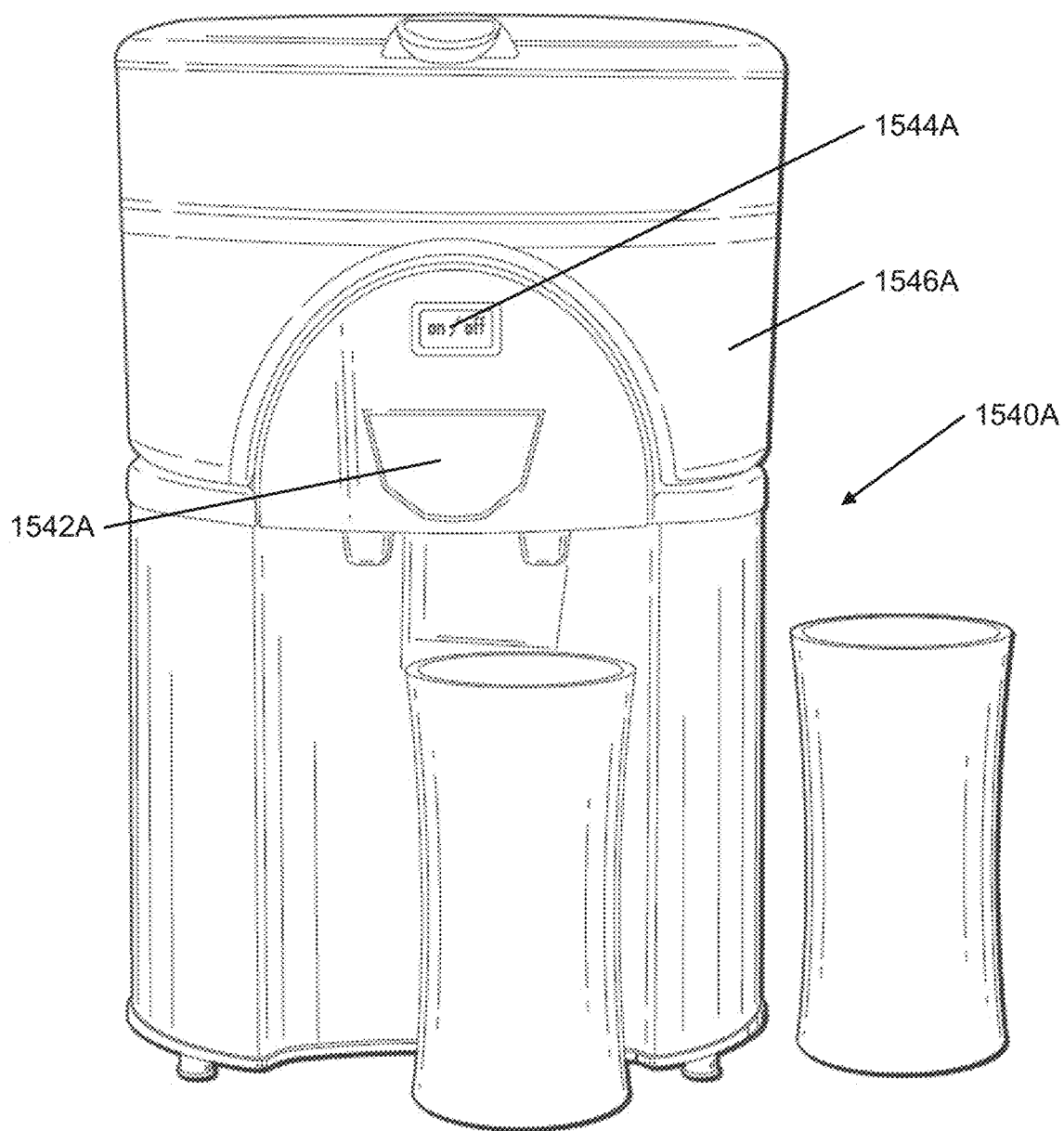
**FIG. 18A**



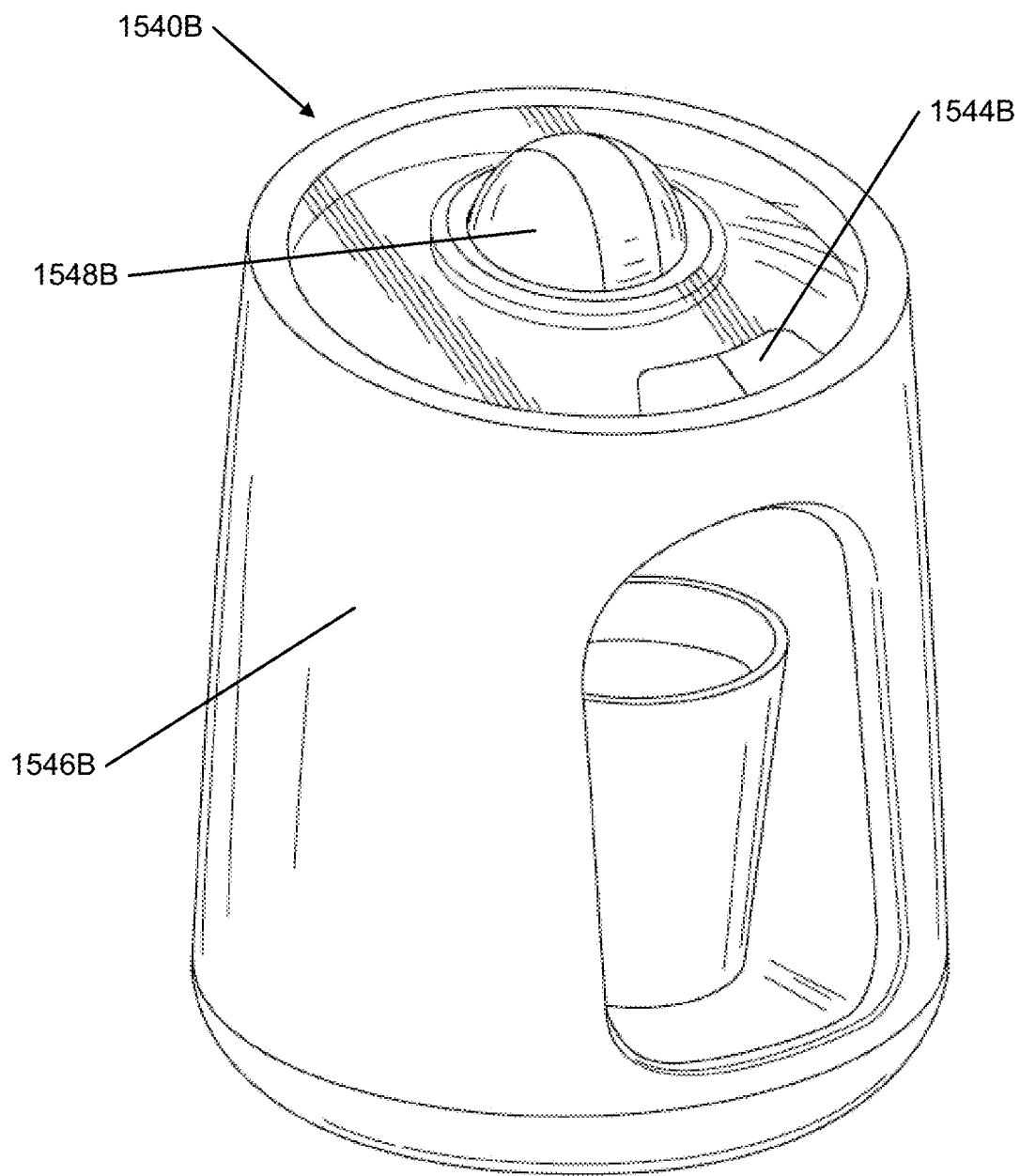
**FIG. 18B**

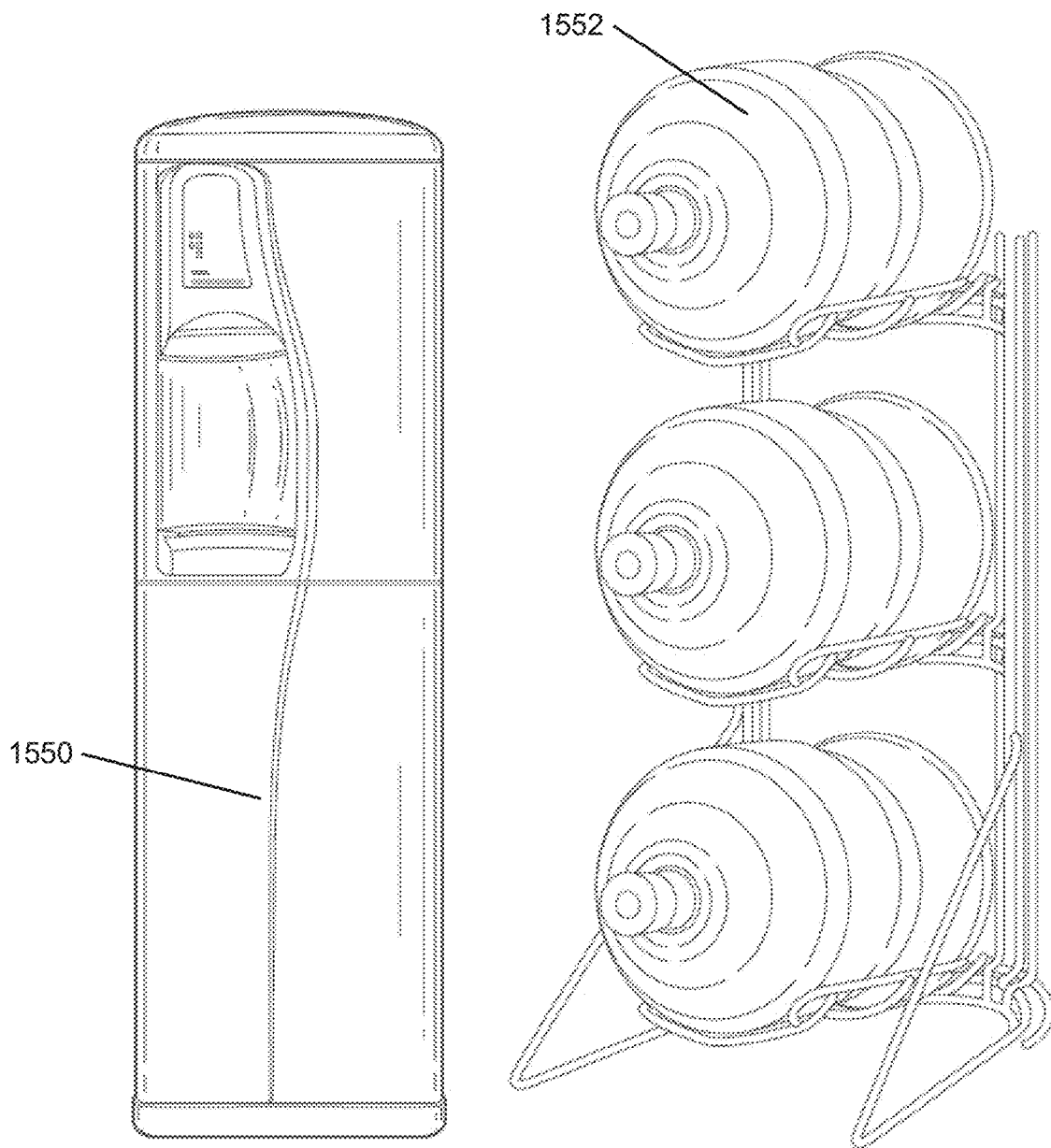


**FIG. 18C**

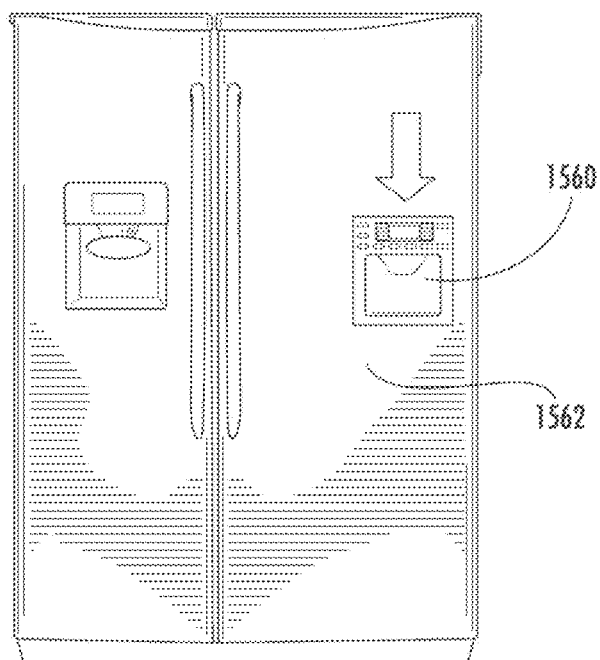


**FIG. 19A**

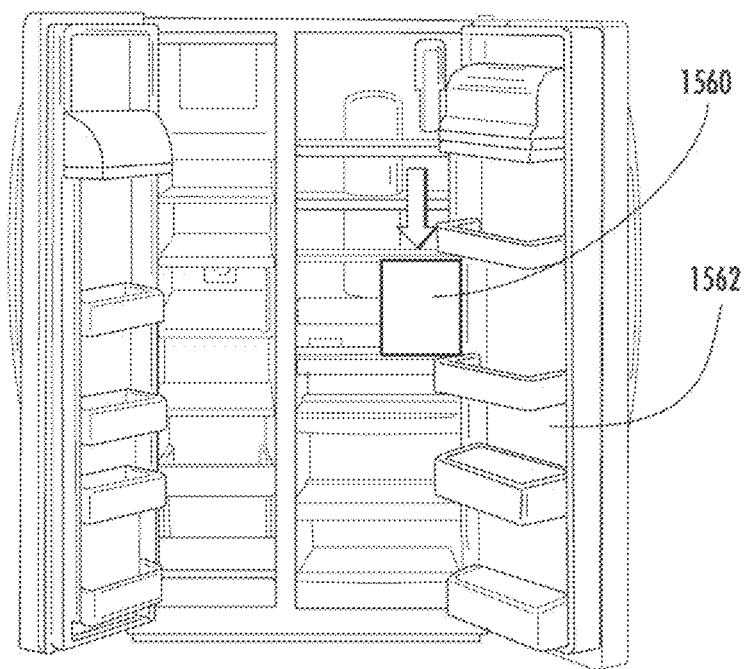
**FIG. 19B**



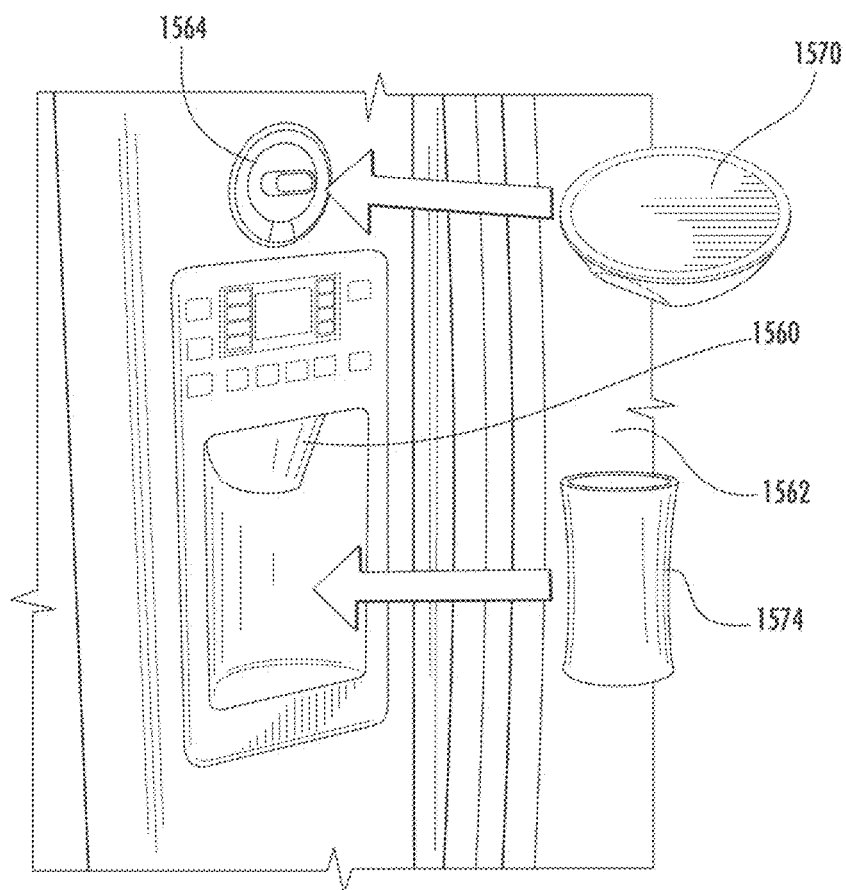
**FIG. 20**



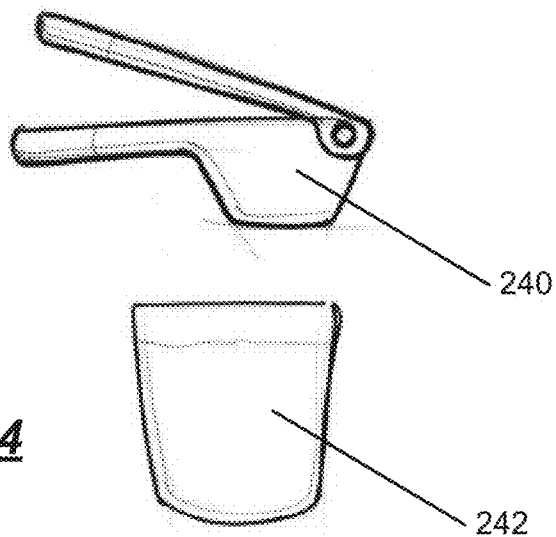
**FIG. 21**



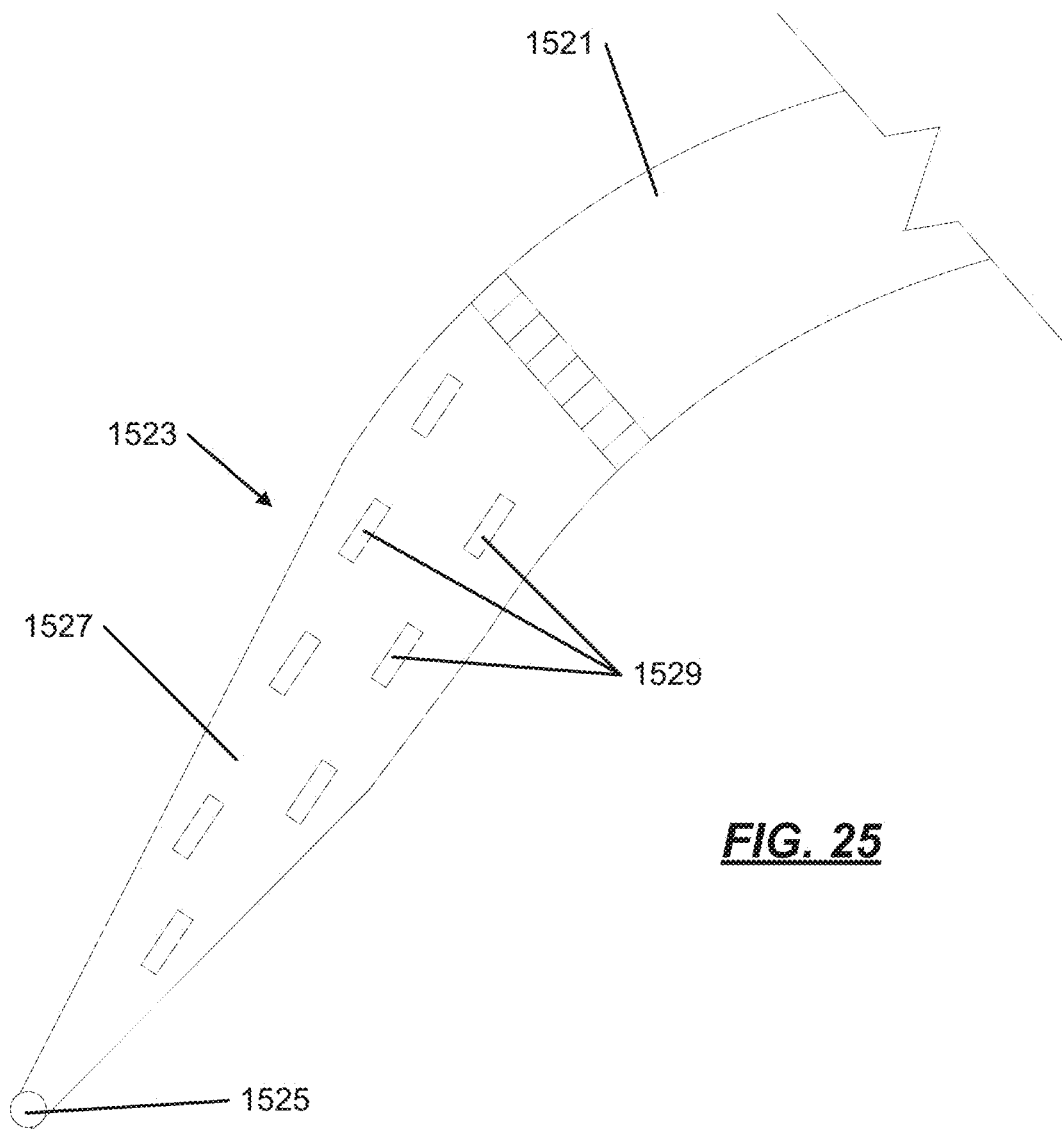
**FIG. 22**

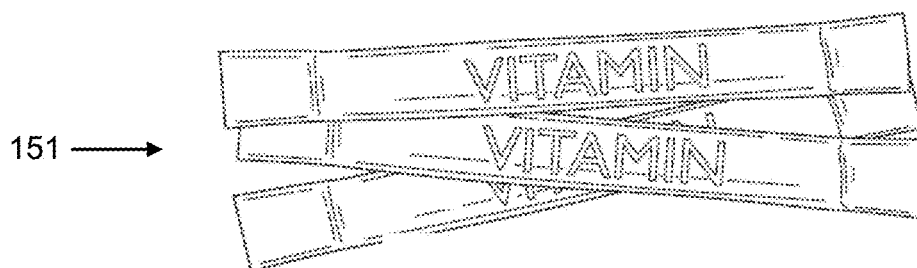


**FIG. 23**

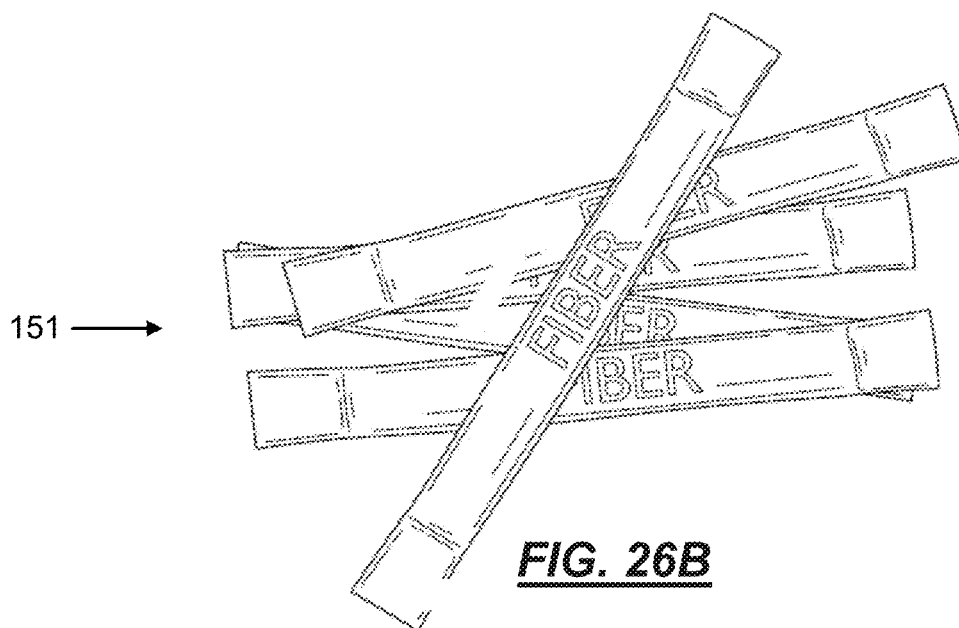


**FIG. 24**

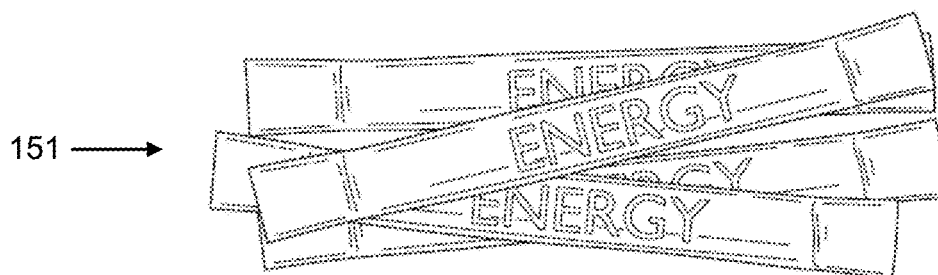




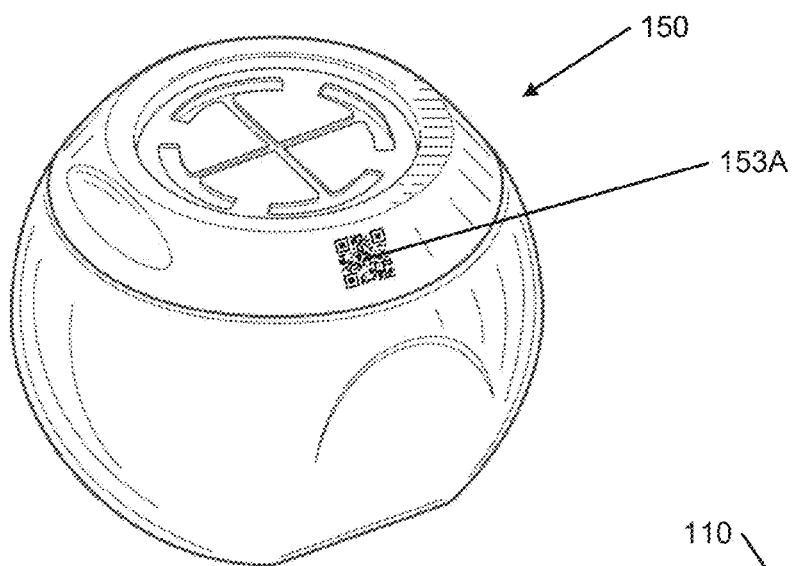
**FIG. 26A**



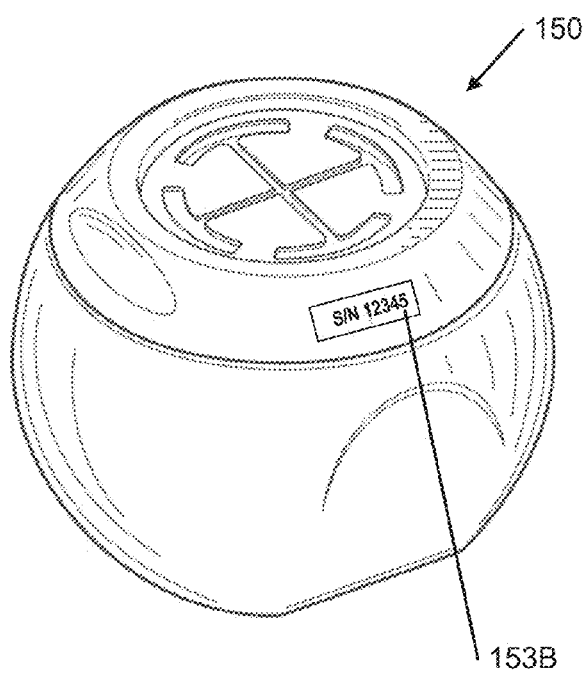
**FIG. 26B**



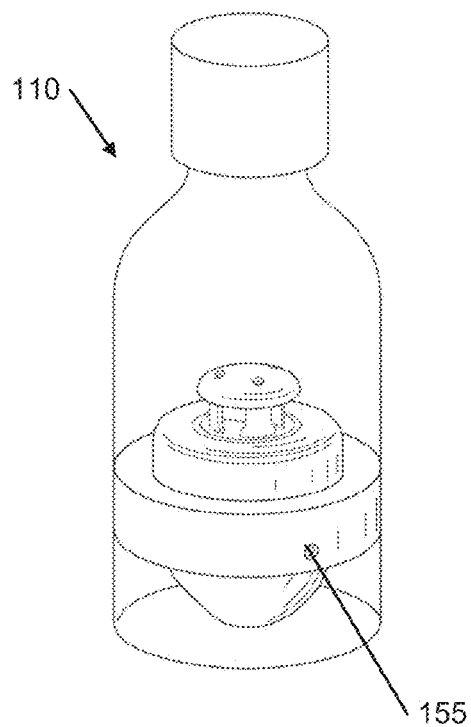
**FIG. 26C**



**FIG. 27A**



**FIG. 27B**



**FIG. 27C**

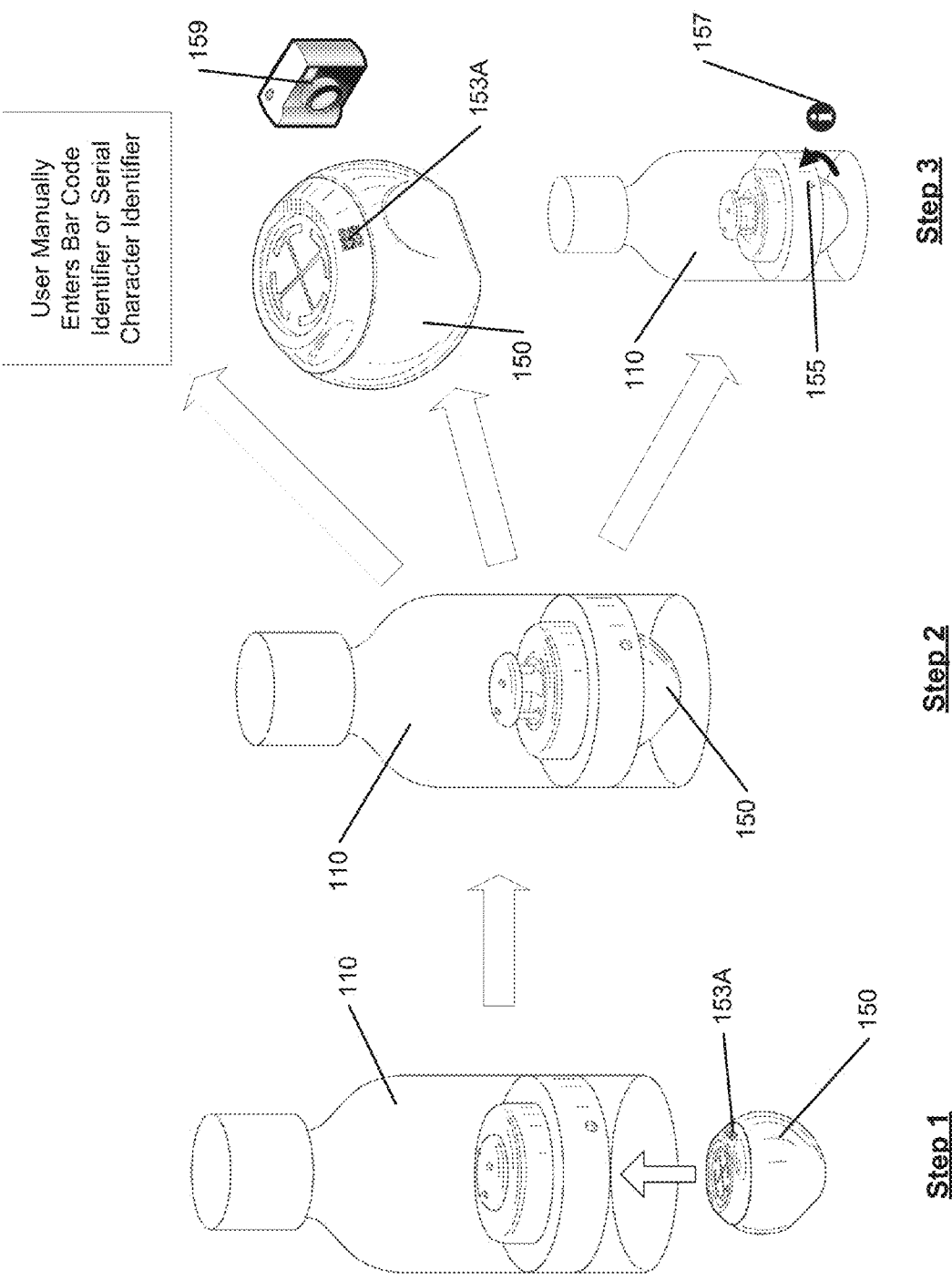
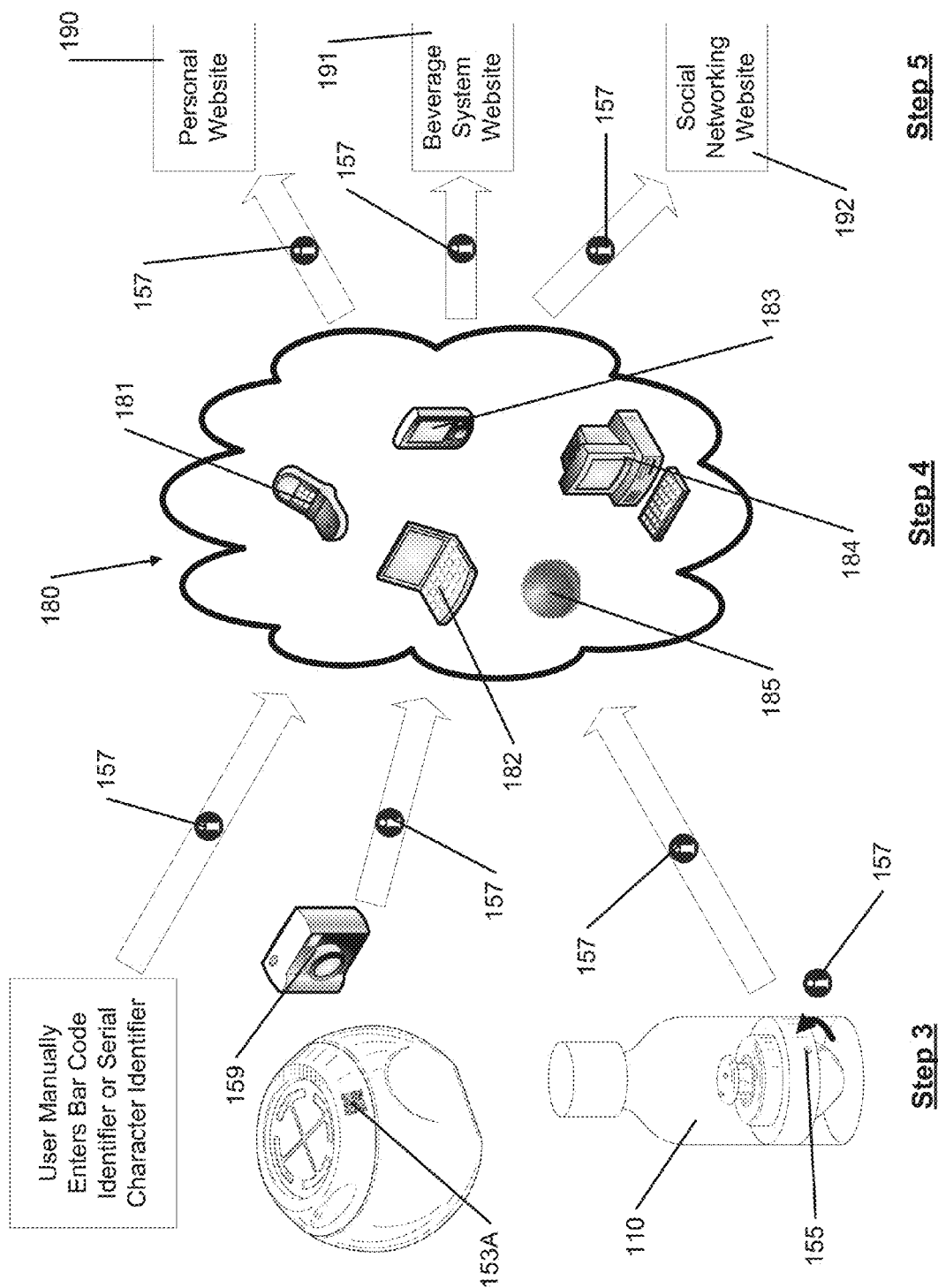
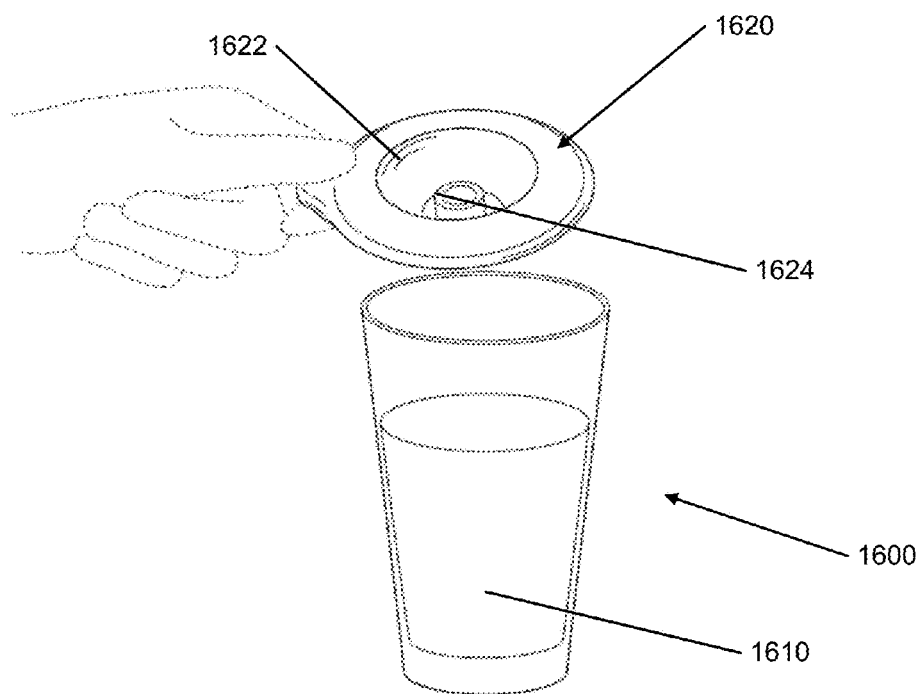


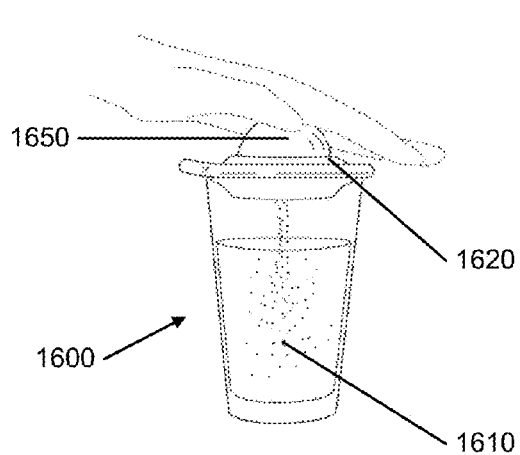
FIG. 28A



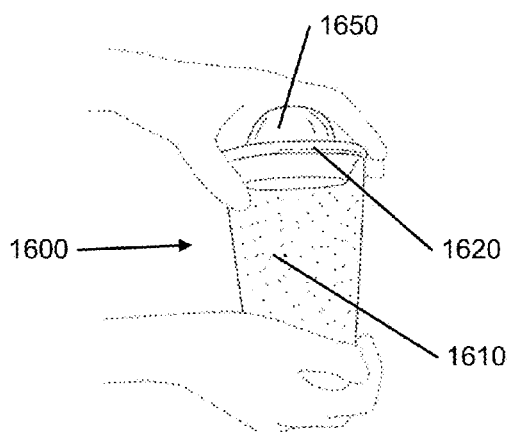
**FIG. 28B**



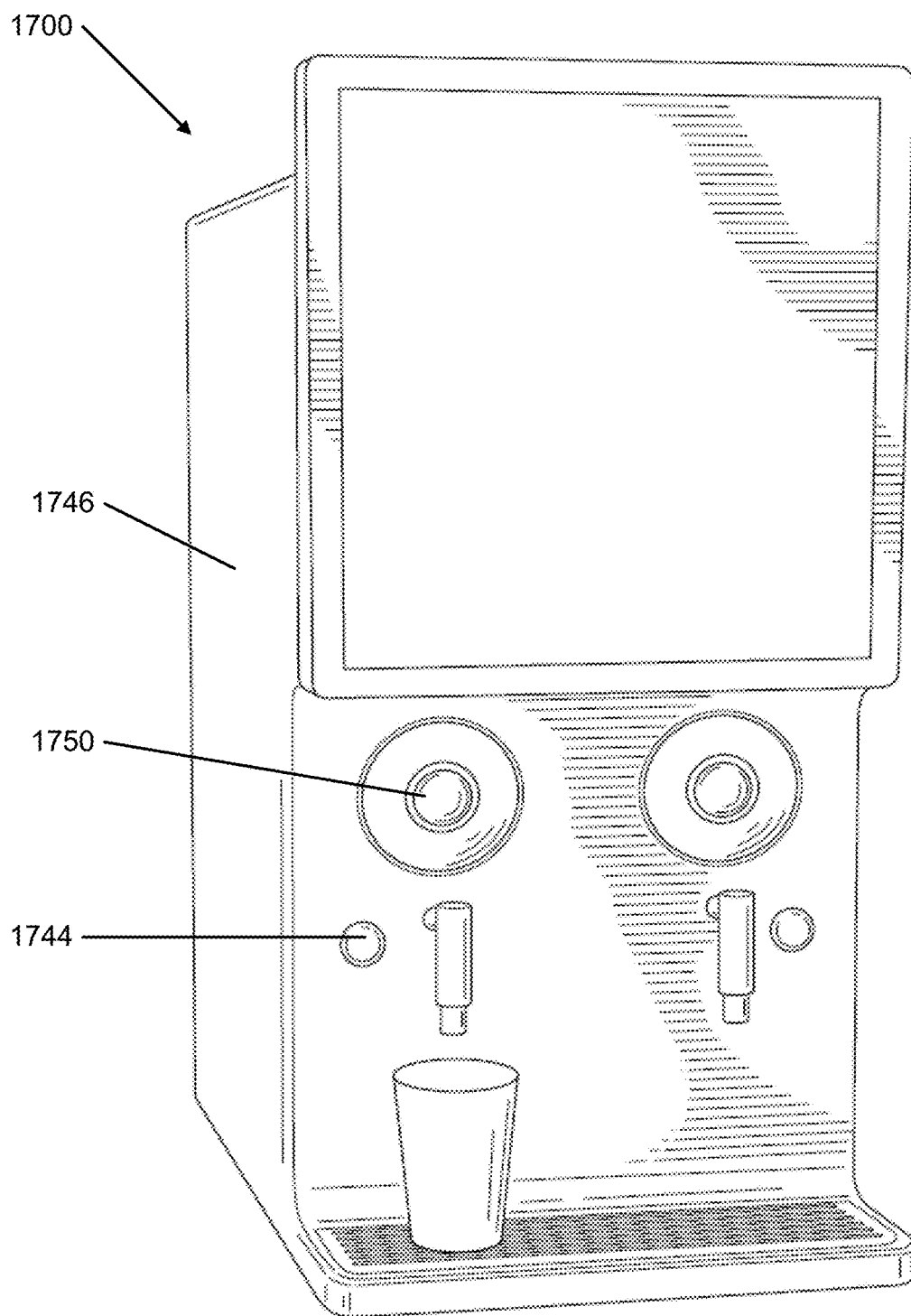
**FIG. 29A**

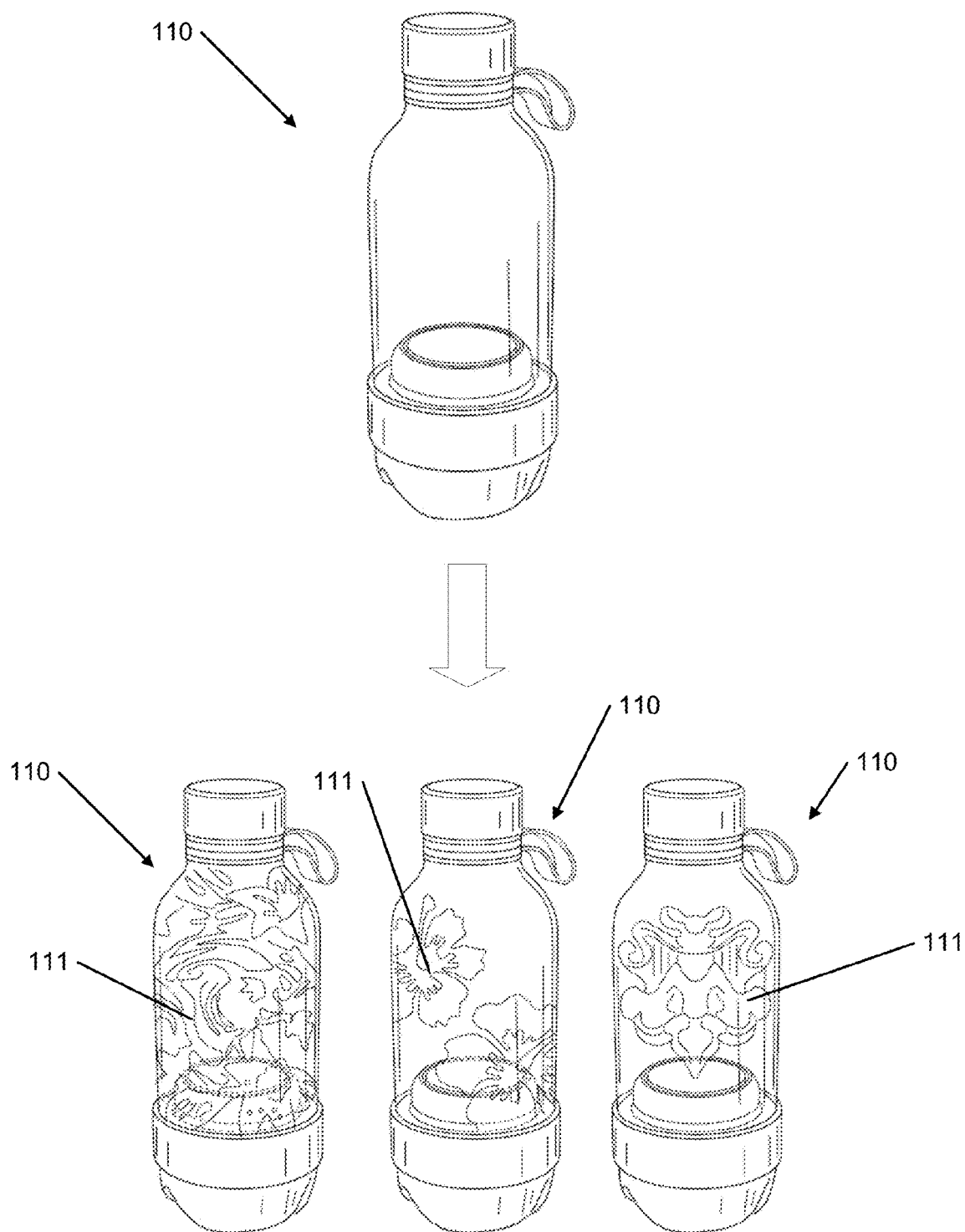


**FIG. 29B**



**FIG. 29C**

**FIG. 30**



**FIG. 31**

## POST-MIX BEVERAGE SYSTEM

[0001] This application is a continuation of U.S. application Ser. No. 14/874,048, filed Oct. 2, 2015, which is a continuation of U.S. application Ser. No. 12/982,374, filed Dec. 30, 2010, which is a continuation-in-part of U.S. application Ser. No. 12/550,101, filed Aug. 28, 2009, which claims priority to U.S. Provisional Application No. 61/093,090, filed Aug. 29, 2008 and U.S. Provisional Application No. 61/146,156, filed Jan. 21, 2009. Each of these applications is incorporated herein by reference in its entirety.

## FIELD

[0002] The present invention relates generally to beverage dispensers and more particularly to post-mix beverage systems.

## BACKGROUND

[0003] It is known that beverages are marketed, delivered and sold in a variety of different types of containers. The type of container utilized may depend on several factors, including, for example, the consumer for which the beverage is being marketed towards, the distribution channel(s), and/or the quantity of beverage being sold. In this regard, beverages marketed towards consumers are often distributed in plastic bottles. Unfortunately, however, a large portion of the plastic bottles are disposed of as waste. While recycling efforts have increased, the bottles are purchased and consumed in areas where recycling is not available or feasible. Furthermore, plastic lids used for sealing the bottles are generally not recyclable and end up as waste, or worse yet, as litter throughout the environment. Additionally, these wasteful plastic bottles are also marketed and sold as “multi-packs” in which further packaging, such as shrink-wrap and/or cardboard must be utilized to contain individual bottles together as a multi-pack. Thus, such prior art delivery mechanisms generate a vast quantity of unwanted and unneeded waste.

[0004] In addition to having an adverse environmental impact, most prior art containers use valuable space, both in the retail environment and at the end-users’ location, such as their homes. Past systems, known as “post-mix” systems, attempted to alleviate some of these drawbacks by selling concentrated beverage syrups designed to be diluted with a liquid, such as water. While known post-mix systems reduce waste associated with other delivery mechanisms, such as plastic bottles, these systems require large, expensive systems that are too complicated and cumbersome for use by consumers other than retail establishments that sell large quantities of beverages. Even for such establishments, the knowledge and costs required to maintain these conventional post-mix systems is inconvenient. Furthermore, past systems are known to require calibration on a regular basis to ensure that the correct amount of syrup is properly combined with the liquid. In this regard, any miscalibration or failure of the machine is often only discovered after several customers complain about the taste of the beverage and further time is required to check and fix the ratio of syrup to liquid.

## SUMMARY

[0005] The following presents a general summary of aspects of the invention in order to provide a basic under-

standing of at least some of its aspects. This summary is not intended as an extensive overview of the invention. It is not intended to identify key or critical elements of the invention or to delineate the scope of the invention. The following summary merely presents some concepts of the invention in a general form as a prelude to the more detailed description below.

[0006] Aspects of this invention relate to beverage dispensing system that comprises a container, an attachment mechanism coupled to the container, and a cartridge adapted to engage the attachment mechanism. The cartridge may hold one or more beverage ingredients. The cartridge may include a unique identifier to track a set of beverage characteristics associated with the one or more beverage ingredients of the cartridge. Additionally, wherein when the cartridge is engaged with the attachment mechanism, the attachment mechanism opens the cartridge to the container. The set of beverage characteristics may include one or more of the following: flavor of the beverage ingredients, nutritional content of the beverage ingredients, functional ingredients of the beverage ingredients, and location or time of day consumed. Additionally, the nutritional content of the beverage ingredients may include one or more of the following: calories, carbohydrates, water intake, sugar content, and sodium.

[0007] In another embodiment of the beverage dispensing system the container may capture the unique identifier and the set of beverage characteristics. The container may also store the set of beverage characteristics and/or transfer the set of beverage characteristics over a wireless network to a computing device or a network. Additionally, the set of beverage characteristics may be used with a software application on a computing device or a network. The computing device may include one of the following: a cellular phone, a laptop computer, a desktop computer, the internet, a smart phone, a personal data assistant (PDA), and a tablet computer. Additionally, the software application may perform at least one of the following functions: tracking water consumed throughout the day, tracking nutrients, tracking the amount of PET equivalent saved with using the beverage system instead of other drinking methods, tracking of medicine consumption that is shared with a doctor, updating a loyalty program with points or reward prizes, providing the information sharing with friends or similar people through social network websites, tracking time of day, or tracking geolocation of consumption.

[0008] Additional aspects of this invention relate to a method for managing information associated with a beverage dispensing system. The method comprises the steps of: (a) inserting a cartridge holding one or more beverage ingredients into an attachment mechanism coupled to a container holding a mixing solution; (b) engaging the cartridge with the attachment mechanism, thereby releasing the one or more beverage ingredients into the container and the mixing solution; (c) capturing the unique identifier of the cartridge; and (d) transferring the set of beverage characteristics associated with the unique identifier to a computing device. Additionally, the cartridge includes a unique identifier associated with a set of beverage characteristics associated with the one or more beverage ingredients of the cartridge. The method may further comprise the step of consolidating the beverage characteristics associated with the unique identifier with beverage characteristics from previously consumed beverages on a website. Additionally,

the method may further comprise the step of storing the beverage characteristics associated with the unique identifier on a website. Furthermore, the method may further comprise the step of providing information associated with the beverage characteristics for sharing with friends or similar people through social network websites.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0009] A more complete understanding of the present invention and certain advantages thereof may be acquired by referring to the following description in consideration with the accompanying drawings, in which like reference numbers indicate like features, and wherein:

[0010] FIG. 1 illustrates a perspective view of a beverage dispensing system in accordance with the present invention;

[0011] FIG. 1A illustrates a cross-sectional view of the beverage dispensing system from

[0012] FIG. 1 in accordance with the present invention;

[0013] FIGS. 2A1 and 2A2 illustrate a close-up view a portion of the beverage dispensing system from FIG. 1 in accordance with the present invention;

[0014] FIGS. 2B1 and 2B2 illustrate another close-up view a portion of the beverage dispensing system from FIG. 1 in accordance with the present invention;

[0015] FIGS. 3 through 3D illustrate an exemplary cartridge for the beverage dispensing system from FIG. 1 in accordance with the present invention;

[0016] FIGS. 4A through 4F illustrate perspective views the operation of the beverage dispensing system from FIG. 1 in accordance with the present invention;

[0017] FIGS. 5A and 5B illustrate an example of a container for a beverage dispensing system in accordance with the present invention;

[0018] FIGS. 6A and 6B illustrate an example of a container for a beverage dispensing system in accordance with the present invention;

[0019] FIGS. 7A and 7B illustrate an example of a container for a beverage dispensing system in accordance with the present invention;

[0020] FIGS. 8A and 8B illustrate an example of a container for a beverage dispensing system in accordance with the present invention;

[0021] FIGS. 9A and 9B illustrate an example of an attachment mechanism for a beverage dispensing system in accordance with the present invention;

[0022] FIGS. 10A and 10B illustrate an example of an attachment mechanism for a beverage dispensing system in accordance with the present invention;

[0023] FIGS. 11A1 and 11A2 illustrate an attachment mechanism for a beverage dispensing system in accordance with the present invention;

[0024] FIGS. 11B1 and 11B2 illustrate an attachment mechanism for a beverage dispensing system in accordance with the present invention;

[0025] FIGS. 12A1 and 12A2 illustrate an attachment mechanism for a beverage dispensing system in accordance with the present invention;

[0026] FIGS. 12B1 and 12B2 illustrate an attachment mechanism for a beverage dispensing system in accordance with the present invention;

[0027] FIGS. 13A1 and 13A2 illustrate an attachment mechanism for a beverage dispensing system in accordance with the present invention;

[0028] FIGS. 13B1 and 13B2 illustrate an attachment mechanism for a beverage dispensing system in accordance with the present invention;

[0029] FIGS. 14A through 14C illustrate an example half-pod cartridge in accordance with the present invention;

[0030] FIG. 15 illustrates an example of a beverage system in accordance with the present invention;

[0031] FIG. 16A and 16B illustrate an example of a cartridge to be used with any of the beverage systems in accordance with the present invention;

[0032] FIG. 17 illustrates a detail view of the beverage system in FIG. 15 in accordance with the present invention;

[0033] FIGS. 18A through 18C illustrate an example of a beverage system in accordance with the present invention;

[0034] FIGS. 19A and 19B illustrate an example of a beverage system in accordance with the present invention;

[0035] FIG. 20 illustrates an example of a beverage system in accordance with the present invention;

[0036] FIG. 21 illustrates an example of a beverage system mounted in a refrigerator in accordance with the present invention;

[0037] FIG. 22 illustrates an example of a beverage system mounted in a refrigerator in accordance with the present invention;

[0038] FIG. 23 illustrates a detail view of the beverage system mounted in a refrigerator in

[0039] FIG. 21 in accordance with the present invention

[0040] FIG. 24 illustrates an alternative example of a beverage system in accordance with the present invention;

[0041] FIG. 25 illustrates an example needle to be used with the beverage system in FIGS. 15 through 17 in accordance with the present invention;

[0042] FIGS. 26A through 26C illustrate examples of powder boosters to be used with any of the beverage systems in accordance with the present invention;

[0043] FIGS. 27A-27C illustrate an example cartridge and container to be used with any of the beverage systems in accordance with the present invention;

[0044] FIGS. 28A and 28B illustrate an example digital communication system for the beverage system in accordance with the present invention;

[0045] FIGS. 29A through 29C illustrate an example of a beverage system configured to be used with a container in accordance with the present invention;

[0046] FIG. 30 illustrates an example of a beverage system in accordance with the present invention; and

[0047] FIG. 31 illustrates examples of a container for a beverage dispensing system in accordance with the present invention.

[0048] The reader is advised that the attached drawings are not necessarily drawn to scale.

#### DETAILED DESCRIPTION

[0049] In the following description of various examples of the invention, reference is made to the accompanying drawings, which form a part hereof, and in which are shown by way of illustration various example structures, systems, and steps in which aspects of the invention may be practiced. It is to be understood that other specific arrangements of parts, structures, example devices, systems, and steps may be utilized and structural and functional modifications may be made without departing from the scope of the present invention. Also, while the terms “top,” “bottom,” “front,” “back,” “side,” and the like may be used in this specification

to describe various example features and elements of the invention, these terms are used herein as a matter of convenience, e.g., based on the example orientations shown in the figures. Nothing in this specification should be construed as requiring a specific three dimensional orientation of structures in order to fall within the scope of this invention.

[0050] FIG. 1 illustrates an example of a beverage dispensing system 100 in accordance with the present invention. The beverage dispensing system 100 includes a container 110, an attachment mechanism 120 and a cartridge 150. The container 110 may hold a mixing solution or liquid, such as water, to be mixed with the contents of the cartridge 150. Other mixing solutions or liquids may include milk, juices, or tea. The mixing solution or liquid may be cold, warm, or hot in temperature. Additionally, the mixing solution may contain ice, slush, or be and ice/water mixture. The attachment mechanism 120 is generally located within the container 110. The cartridge 150 generally engages with the attachment mechanism 120 to open the cartridge 150 to be dispensed into the container 110, thereby combining the contents of the cartridge 150 with the liquid within the container 110 to create a drinkable beverage.

[0051] The container 110, as illustrated in FIG. 1, may be generally in the shape of a bottle.

[0052] The container 110 may be a variety of other shapes, without departing from this invention. The container 110 may include a cap 112. The cap 112 may seal an opening at the top of the container 110 where a user can drink from the container 110. Additionally, the container 110 may include a base or bezel 114. The cartridge 150 may be inserted through the base or bezel 114 to engage the cartridge 150 with the attachment mechanism 120. As illustrated in FIG. 1, this base or bezel 114 is located at the bottom of the container 110. The base or bezel 114 may be located at different areas of the container 110 as discussed below without departing from this invention. Additionally, the cartridge 150 may be inserted through the cap 112 of the container 110 to engage the cartridge 150 with the attachment mechanism 120. Furthermore, without departing from the invention, the cap 112 may comprise the cartridge 150, such that when the cap 112 is screwed onto the container 110, the cartridge 150 engages the attachment mechanism 120 and releases the contents of the cartridge 150 as described further below.

[0053] Additionally, as shown in FIG. 31, the container 110 may not only be a variety of other shapes, but the container 110 may also be a variety of other colors and color configurations. Additionally, the container 110 may include a variety of different skin 111 coverings around the container 110. The skins 111 for the containers 110 may vary in design, color, texture, thickness, material, size, and shape without departing from the invention. By using different skins 111 for the containers 110, the containers can be personally customizable. Other examples for skins 111 may include brand names, college names or mascots, professional sport teams, favorite sayings, personal pictures, etc. Additionally, the color and style of the top or cap of the container may differ without departing from the invention.

[0054] The attachment mechanism 120, as illustrated in FIGS. 1 and 1A, comprises an engagement assembly 122, a piercing portion 124, and a valve assembly 126. The engagement assembly 122 may generally receive the cartridge 150 within the attachment mechanism 120. The piercing portion 124 may generally pierce the cartridge 150, thereby releasing the contents of the cartridge 150 into the container 110.

The valve assembly 126 may generally open upon engagement of the cartridge 150 with the attachment mechanism 120 thereby allowing the mixing of the contents of the container 110 with the contents of the cartridge 150.

[0055] The engagement assembly 122 may include a locking mechanism 128 to engage and hold the cartridge 150 in the container 110. The locking mechanism 128 may include a rib 130 which matches with and engages the cartridge 150. The locking mechanism 128 may also include a spring (not shown in FIG. 1A), such that when the cartridge 150 is inserted into the engagement assembly 122, the spring provides a biasing force to the cartridge 150 to more easily engage the rib 130. Additionally, the locking mechanism 128 may include a cam or a lever 134 such that when the cartridge 150 is snapped into a locked position, the piercing portion 124 and valve assembly 126 are engaged as will be explained below. The spring may also bias against the cartridge 150 as the cartridge 150 is snapped into the locked position.

[0056] Additionally, the engagement assembly 122 may include a releasing mechanism 136 wherein the releasing mechanism 136 releases the locking mechanism 128 to release the cartridge 150. The releasing mechanism 136 may be in the form of a rotating bezel, wherein the user can release the cartridge 150 by rotating the bezel (as shown in FIG. 4F). The rotation of the bezel may eject the cartridge 150 and return the attachment mechanism 120 to the starting position. Additionally, the releasing mechanism 136 may be in the form of a release button or a release lever, wherein the user may press the release button or slide the release lever to release the cartridge 150. Other means to release the cartridge 150 may be used with the engagement assembly 122 without departing from this invention.

[0057] The engagement assembly 122 may also include a cartridge sealing portion 138. The cartridge sealing portion 138 seals the area around the top of the cartridge 150 to the engagement assembly 122 when the cartridge 150 is snapped into a locked position. The cartridge sealing portion 138 ensures that the liquid or solution is contained within the cartridge 150 during the mixing process. The cartridge sealing portion 138 may include a gasket, o-ring, or grommet or other sealing structures in accordance with this invention. The cartridge sealing portion 138 may be made of rubber, plastic, or metal or other materials in accordance with this invention.

[0058] As illustrated in FIG. 1, the piercing portion 124 of the attachment mechanism 120 may include an opening structure 140. The piercing portion 124 may be cooperatively engaged to the cam or lever 134 such that when the cartridge 150 is pressed into the engagement assembly 122, the cartridge 150 is pressed against the piercing portion 124, and the piercing portion 124 slides into the opening 158 of the pod 152. The opening structure 140 may be sharp enough to pierce the cover 160 of the cartridge 150, thereby breaking the cover 160 on the pod 152, and allowing the contents of the cartridge 150 to mix with the contents of the container 110.

[0059] In another example in accordance with this invention, in cooperation with a foil retainer 166 as explained below, the opening structure 140 may be shaped such that it corresponds specifically with the flaps or retaining portions 170 on the foil retainer 166. In this example, when the cartridge 150 is pressed against the piercing portion 124, the opening structure 140 puts pressure against the foil retainer

166, specifically the flaps or retaining portions 170 on the foil retainer 166. The pressure from the opening structure 140 causes the flaps 170 to break open, and fold into the cover 160 (if present), thereby piercing the cover 160 on the pod 152, and allowing the contents of the cartridge 150 to mix with the contents of the container 110. It is important to note that the specific arrangement and configuration of the opening structure 140 must match the flaps 170 on the foil retainer 166 for the opening structure 140 to adequately pressure and break the foil retainer 166. If the opening structure 140 and flaps 170 on the foil retainer 166 do not match, it is possible that the cover 160 will not be broken when the cartridge 150 is pressed into the locked position. In other embodiments without departing from the invention, the flaps 170 on the foil retainer 166 do not need to match the opening structure 140. For example, there may be opening structures 140 which do not match the flaps 170, however the cover 160 is still broken when the cartridge 150 is pressed into the locked position.

[0060] The piercing portion 124 may also include an internal sealing portion 142. The internal sealing portion 142 seals the area around opening structure 140 when the cartridge 150 is snapped into a locked position. The internal sealing portion 142 ensures that the liquid or solution is contained within the cartridge 150 during the mixing process.

[0061] The valve assembly 126, as illustrated in FIG. 1A, may generally open upon engagement of the cartridge 150 with the attachment mechanism 120 thereby allowing the mixing of the contents of the container 110 with the contents of the cartridge 150. The valve assembly 126 may include a valve 144 and an elevator 146. The valve 144 may be cooperatively engaged with the elevator 146 and with the cam or lever 134 of the engagement assembly 122, such that when the cartridge 150 is snapped into the locked position and engages the cam or lever 134 of the engagement assembly 122, the valve 144 is moved from a closed position to an open position. Generally, as pressure is applied to the cartridge 150 and the cartridge 150 is snapped into the locked position, the elevator 146 moves and thereby engages the valve 144 and moves the valve 144 to the open position.

[0062] In one example in accordance with this invention, as illustrated in FIG. 2A, the valve assembly 126 may be in the form of a door-type valve 144A. The valve 144A, as illustrated in FIG. 2A may be hinged at one side, such that as pressure is applied to the cartridge 150A and thereby to the elevator 146A and the spring 132A, the valve 144A swings to the open position and into the container 110. Additionally, as the cartridge 150A is pushed, the opening structure 140A moves into the cartridge 150A. As the valve 144A swings to the open position into the container 110, the contents of the cartridge 150A and the contents of the container 110 can then mix.

[0063] In another example in accordance with this invention, as illustrated in FIG. 2B, the valve assembly 126 may be in the form of a plunger-type valve 144B. The valve 144B, as illustrated in FIG. 2B, may slide into the container 110 as one piece as pressure is applied to the cartridge 150B and thereby to the elevator 146B and to the spring 132B. When the elevator 146B is pushed against the valve 144B, the valve 144B moves from the closed position to the open position and into the container 110. Additionally, as the cartridge 150B is pushed, the opening structure 140B moves into the cartridge 150B. As the valve 144B slides to the open

position, the contents of the cartridge 150B and the contents of the container 110 can then mix.

[0064] The valve assembly 126 may also include a valve sealing portion 148. The valve sealing portion 148 seals the area between the valve 144 and the container 110 when the cartridge 150 is not snapped into the locked position. Prior to the engagement of the cartridge 150 in the engagement assembly 122, the container 110 may contain a liquid and the valve sealing portion 148 ensures that the liquid or solution is contained within the container 110 when there is no cartridge 150 and the valve 144 is in the closed position. The valve sealing portion 148 may include a gasket, o-ring, or grommet or other sealing structures in accordance with this invention. The valve sealing portion 148 may be made of rubber, plastic, or metal or other materials in accordance with this invention.

[0065] The cartridge 150, as illustrated in FIGS. 3 and 3A, may comprise a pod 152 and a cap 154. The cartridge 150 is adapted to engage the attachment mechanism 120 at the engagement assembly 122. The cartridge 150 may hold one or more beverage ingredients, wherein the beverage ingredients may be selected from the list comprising: syrup, paste, powder, granules, or other compositions. Additionally, the cartridge 150 may hold other ingredients or flavors, such as nutrients or vitamins, in accordance with this invention.

[0066] In another embodiment in accordance with this invention, the cartridge 150 may include different liquid flavors/ingredients. The liquid flavors/ingredients may be created by condensed liquids that pack the essence of a beverage with the full power of healthy ingredients and nutrients. The liquid flavors/ingredients may include a fruit and/or flavor base such as: plum, blueberry, mango, cherry, grape, kiwi, strawberry, lemon, lime, passion fruit, apple, melon, tangerine, raspberry, orange, pomegranate, pineapple, coconut, grapefruit, acai, watermelon, peach, or any combination thereof. Additionally, the liquid flavors/ingredients may include a functional ingredient that includes herbs and spices or vegetables such as: mint, black tea, green tea, red tea, white tea, celery, chamomile, hibiscus, lavender, carrot, cucumber, yerba mate, coca extract, ginger, chlorophyll, aloe, cinnamon, ginseng, or any combination thereof. Additionally, the liquid flavors/ingredients may include a functional ingredient that includes minerals, vitamins, and other functional ingredients such as: calcium, sodium, potassium, bicarbonate, magnesium, caffeine, fiber, protein, taurine, ribose, omega 3, or any combination thereof. Additionally, without departing from the invention, the liquid flavors/ingredients may include any combination of fruit or flavor base, functional ingredients with herbs and spices or vegetables, or functional ingredients with minerals and/or vitamins.

[0067] The pod 152 is generally a vessel capable of holding a syrup, paste, powder, granules or other compositions. The pod 152 as shown in FIGS. 3 and 3A is a circular-shaped structure that includes a chamber 156, an opening 158, and a cover 160. The cover 160 may be located over the opening 158 of the pod 152. An engaging portion 162 may be located near the opening 158, wherein the engaging portion 162 may be a snap structure that engages the cap 154. Additionally, the engaging portion 162 on the pod 152 may include threads that may engage threaded structures on the cap 154.

[0068] As illustrated in FIGS. 3C and 3D, the cover 160 may be a foil seal located over the opening 158 of the pod 152. The cover 160 may be attached to the edges of the opening 158 of the pod 152. The cover 160 may be made of a variety of different materials in accordance with this invention, such as: aluminum and sealing coatings or laminated with sealing polymers like polyethylene, metalized bioriented polypropylene and sealing coatings or laminated with sealing polymers like polyethylene, or metalized polyester and sealing coatings or laminated with sealing polymers like polyethylene.

[0069] In an additional example in accordance with this invention, the pod 152 may include a locking portion 164. The locking portion 164 may be engaged with the engagement assembly 122 of the attachment mechanism 120 to snap the cartridge 150 into the attachment mechanism 120.

[0070] As illustrated in FIG. 3C, the cap 154 may be attached to the top of the chamber 156.

[0071] The cap 154 may be a snap-on type cap, wherein the cap 154 may snap onto the top of the chamber 156. The cap 154 may also attach to the top of the chamber 156 by screwing onto the top of the chamber 156. The cap 154 may be made of a variety of different materials without departing from this invention, such as: polyethylene, polypropylene, or polyethylene or polypropylene closures with internal liners containing oxygen scavengers like: components of Hyguard™, Celox™, etc.

[0072] In an additional example in accordance with this invention, the cap 154 may include a foil retainer 166. The foil retainer 166 may be in the shape of a disc located in the center of the cap 154. The foil retainer 166 may include cut-out portions 168, thereby creating flaps or retaining portions 170 on the foil retainer 166 that may break-away with pressure. These flaps 170 are designed to cooperate specifically with the opening structure 140 as described above. When the opening structure 140 is pressed against the flaps 170 and the flaps 170 are pressed open, the flaps 170 may pierce the cover 160 and fold into the pod 152, thereby holding the pierced and cut portions of the cover 160 open so that the contents of the cartridge 150 can mix freely with the contents of the container 110. As illustrated in FIG. 3A, the cut-out portion 168 may be in the shape of a cross, thereby creating four triangular flaps 170. In other examples in accordance with this invention, the foil retainers 166A-166H may include cut-out portions 168 and flaps 170 in the shapes as illustrated in FIG. 3B. Additional shapes may be used for the cut-out portions 168 and flaps 170 without departing from this invention. When the foil retainer 166 is used with the cap 154, the cover 160 may be used or it may not be used. The foil retainer 166 may be made of a variety of different materials without departing from this invention, such as: polyethylene, polypropylene, or polyethylene or polypropylene closures with internal liners containing oxygen scavengers like: components of Hyguard™, Celox™, or any other material which is flexible enough to break when pressure is applied from the opening structure 140, and hard enough to cut or pierce the cover 160 and remain in place, thereby keeping the cover 160 open. As shown in FIGS. 3C and 3D, the cartridge 150 may include no cover 160 with a cap 154 or the cartridge 150 may include a cover 160 with no cap 154.

[0073] In an additional example in accordance with this invention, the cap 154 may include a locating portion 172. The locating portion 172, as illustrated on FIG. 3A, engages

with the engagement assembly 122 to properly position the cartridge 150 within the attachment mechanism 120.

[0074] The pod 152 may be made of various materials without departing from this invention.

[0075] For example, the pod 152 may be made of polyethylene terephthalate (PET). Additionally, the pod 152 may be made of PET in combination (by mixing and/or by using multi-layer structures) with passive barrier materials and/or oxygen scavengers like: plasma-applied coatings of SiOx or amorphous carbon, polyamides, polyglycolic acid, Amosorb™, DiamondClear™, or components of Hyguard™. Additionally, the pod 152 may be made of polyethylene or polypropylene in combination (by mixing and/or by using multilayer structures) with passive barrier materials and/or oxygen scavengers like: polyamides, ethylene vinyl alcohol. Additionally, the pod 152 may be made of aluminum. Other materials may be used for the pod 152 in accordance with this invention, such that the material alone or in combination with a barrier system protects some beverages or other products that are oxygen sensitive and to avoid excessive loss of water.

[0076] FIGS. 4A through 4F illustrate the operation of the beverage dispensing system according to examples of this invention. The preparation of the beverage dispensing system 100 as described above is shown in FIGS. 4A-4F. As shown in FIG. 4A, the cartridge 150 is inserted into the attachment mechanism 120 as located in the base of the container 110. The cartridge 150 may be inserted with the cap towards the attachment mechanism 120.

[0077] As shown in FIG. 4B, the cartridge 150 may be rotated to make sure the cartridge 150 is located in the proper location. The locating portion 172 located on the cap, engages with the engagement assembly 122 to properly position the cartridge 150 within the attachment mechanism 120. Additionally, the cartridge sealing portion 138 seals the area around the top of the cartridge 150 to the engagement assembly 122 when the cartridge 150 is inserted into the attachment mechanism 120. The cartridge sealing portion 138 ensures that the liquid or solution is contained within the cartridge 150 during the mixing process.

[0078] As shown in FIG. 4C, the cartridge 150 may be pressed into the attachment mechanism 120, thereby engaging the engagement assembly 122 and pressing the cartridge 150 into the locked position. As the cartridge 150 is engaged with the engagement assembly 122, the opening structure 140 of the piercing portion 124 pierces the opening and the cover 160 on the pod 152, thereby releasing the contents of the cartridge 150 into the container 110. Additionally, as the cartridge 150 is engaged with the engagement assembly 122, the valve assembly 126 is engaged and the valve sealing portion 148 is released from the container 110. The valve 144 opens into the container 110. As the opening 158 and cover 160 are pierced and the valve 144 opens, the contents of the container 110 and the contents of the cartridge 150 are now able to be mixed together.

[0079] As shown in FIG. 4D, the container 110 may be rotated or shaken to mix the contents of the container 110 and the contents of the cartridge 150. This shaking movement causes the contents to mix together, thereby creating a desired beverage. As shown in FIG. 4E, the beverage is now ready to be consumed.

[0080] Once the beverage is consumed by the user, the cartridge 150 can be released from the attachment mechanism 120 by using the releasing mechanism 136. As shown

in FIG. 4F, the releasing mechanism 136 is a rotating bezel, which ejects the cartridge 150 and returns the attachment mechanism 120 to the starting position. The releasing mechanism 136 may also be in the form of a release button or a release lever as explained above. Additionally, without departing from the invention, the cartridge 150 may be released from the attachment mechanism 120 prior the beverage being consumed by the user.

[0081] Prior to mixing the contents of the container and the contents of the cartridge, the user may pour a powder booster or additional ingredients via a packet 151. Examples of the packet 151 are illustrated in FIG. 26. The packet may include any of the following powder boosts or ingredients: electrolytes, energy, calm, protein, fiber, vitamins, antioxidants, sweeteners, or any combination thereof. Additional configurations of the packet 151 or other containers to hold the powder boosts may be utilized without departing from the invention.

[0082] In accordance with this invention, a beverage apparatus or machine may perform the same operation as the container 110 as described above (apparatus not shown). The beverage apparatus may include an attachment mechanism 120 similar to as described above, wherein the cartridge 150 may be inserted into the attachment mechanism 120. Additionally, a glass or cup may be placed under or within the beverage apparatus to hold the desired beverage.

[0083] After the cartridge 150 is inserted into the attachment mechanism 120 of the beverage apparatus, the cartridge 150 may then be pressed into the attachment mechanism 120, thereby pressing the cartridge 150 into the locked position. As the cartridge 150 engages the attachment mechanism, the opening structure 140 pierces the cover 160 on the cartridge 150, thereby releasing the contents of the cartridge 150 into the container 110. As the cover 160 is pierced, a metered amount of water or other liquid from a first source may flush through the cartridge 150. Additionally, a metered amount of water or other liquid from a second source may be flushed directly into the glass. These first and second flushes help to ensure the contents of the cartridge 150 are completely emptied into the glass and that the contents of the cartridge 150 and the water or other liquid are completely mixed as required.

[0084] Additionally, the beverage apparatus may have a mechanical means to rotate or shake the glass to assist with mixing the contents of the container 110 and the contents of the cartridge 150. This shaking movement may cause the contents to mix together, thereby creating the desired beverage. Once the beverage is consumed by the user, the cartridge 150 can be removed from the beverage apparatus.

[0085] FIGS. 5A-8B illustrate additional container configuration according to examples of this invention.

[0086] FIGS. 5A and 5B illustrate a beverage dispensing system 500 with a cartridge 550 located at the top of the container 510. FIGS. 5A and 5B illustrate an example according to this invention similar to that described above in conjunction with FIGS. 1 through 4F (the same or similar reference numbers are used in FIGS. 5A and 5B as those used in FIGS. 1 through 4F to denote the same or similar parts). In another example in accordance with this invention, as shown in FIG. 5A, the beverage dispensing system 500 is generally comprised of a container 510, an attachment mechanism 520, and a cartridge 550. The container 510 may hold a mixing solution or liquid, such as water, to be mixed with the contents of the cartridge 550. The cartridge 550

generally engages with the attachment mechanism 520 to open the cartridge 550 to be dispensed into the container 510, thereby combining the contents of the cartridge 550 with the liquid within the container 510 to create a drinkable beverage.

[0087] In this example configuration, the attachment mechanism 520 is located at the top of the container 510, such that the cartridge 550 is inserted into the attachment mechanism 520 at the top of the container 510. Additionally, the container 510 may include an area located around the cartridge 550, such that when the cartridge 550 is attached to the container 510, the user can drink from the container 510. The container 510 may include an open area around the cartridge 550 for drinking. Additionally, a release mechanism may be located on a side of the container 510. The release mechanism may be in the form of a release button or a release lever, wherein the user may press the release button or slide the release lever to release the cartridge. The attachment mechanism 520 and the cartridge 550 may be any of the configurations as described in this application without departing from the invention.

[0088] FIGS. 6A and 6B illustrate a beverage dispensing system 600 with a cartridge 650 located at the top of the container 610 at an angle. FIGS. 6A and 6B illustrate an example according to this invention similar to that described above in conjunction with FIGS. 1 through 4F (the same or similar reference numbers are used in FIGS. 6A and 6B as those used in FIGS. 1 through 4F to denote the same or similar parts). In another example in accordance with this invention, as shown in FIGS. 6A and 6B, the beverage dispensing system 600 is generally comprised of a container 610, an attachment mechanism 620, and a cartridge 650. The container 610 may hold a mixing solution or liquid, such as water, to be mixed with the contents of the cartridge 650. The cartridge 650 generally engages with the attachment mechanism 620 to open the cartridge 650 to be dispensed into the container 610, thereby combining the contents of the cartridge 650 with the liquid within the container 610 to create a drinkable beverage.

[0089] In this example configuration, the attachment mechanism 620 is located at the top of the container 610 at an angle, such that the cartridge 650 is inserted into the attachment mechanism 620 at the top angle of the container 610. Additionally, the container 610 may include a drinking spout 616 located adjacent to the cartridge 650, such that when the cartridge 650 is attached to the container 610, the user can drink from the container 610 out of the drinking spout 616. Additionally, a release mechanism 636 may be located on a side of the container 610. The release mechanism 636 may be in the form of a release button or a release lever, wherein the user may press the release button or slide the release lever to release the cartridge 650. The attachment mechanism 620 and the cartridge 650 may be any of the configurations as described in this application without departing from the invention.

[0090] FIGS. 7A and 7B illustrate a beverage dispensing system 700 with a container 710 with a hinge 717 and a cartridge 750 located in middle of the container 710. FIGS. 7A and 7B illustrate an example according to this invention similar to that described above in conjunction with FIGS. 1 through 4F (the same or similar reference numbers are used in FIGS. 7A and 7B as those used in FIGS. 1 through 4F to denote the same or similar parts). In another example in accordance with this invention, as shown in FIGS. 7A and

7B, the beverage dispensing system 700 is generally comprised of a container 710, an attachment mechanism 720, and a cartridge 750. The container 710 may hold a mixing solution or liquid, such as water, to be mixed with the contents of the cartridge. The cartridge generally engages with the attachment mechanism to open the cartridge 750 to be dispensed into the container 710, thereby combining the contents of the cartridge 750 with the liquid within the container 710 to create a drinkable beverage.

[0091] In this example configuration, the container 710 may have a hinged portion 717, such as a top portion 718 of the container 710, wherein the top portion 718 swings to an open position, as illustrated in FIG. 7B. When the top portion 718 is in the open position, the cartridge 750 can be inserted into the attachment mechanism 720. The attachment mechanism 720 may be located in the middle area of the container 710, such that the cartridge 750 is inserted into the attachment mechanism 720 when the top portion 718 is in the open position. After the cartridge 750 is inserted, the top portion 718 may swing back to a closed position, as illustrated in FIG. 7A. When the top portion 718 is in the closed position, the beverage may be mixed and the user may drink from the container 710. Additionally, the container 710 may include a drinking spout 716 located at the top of the container 710. Additionally, a release mechanism may be located on a side of the container 710. The release mechanism may be in the form of a release button or a release lever, wherein the user may press the release button or slide the release lever to release the cartridge 750. The attachment mechanism 720 and the cartridge 750 may be any of the configurations as described in this application without departing from the invention.

[0092] FIGS. 8A and 8B illustrate a beverage dispensing system 800 with a container 810 with a hinge 817 and a cartridge 850 located in the hinged portion 818 of the container 810. FIGS. 8A and 8B illustrate an example according to this invention similar to that described above in conjunction with FIGS. 1 through 4F (the same or similar reference numbers are used in FIGS. 8A and 8B as those used in FIGS. 1 through 4F to denote the same or similar parts). In another example in accordance with this invention, as shown in FIGS. 8A and 8B, the beverage dispensing system 800 is generally comprised of a container 810, an attachment mechanism 820, and a cartridge 850. The container 810 may hold a mixing solution or liquid, such as water, to be mixed with the contents of the cartridge 850. The cartridge 850 generally engages with the attachment mechanism 820 to open the cartridge 850 to be dispensed into the container 810, thereby combining the contents of the cartridge 850 with the liquid within the container 810 to create a drinkable beverage.

[0093] In this example configuration, the container 810 may have a hinged portion 817, such as a lid 818 on the container 810, wherein the lid 818 swings to an open position, as illustrated in FIG. 8B. The lid 818 may include the attachment mechanism 820 located at the top of the container 810. The cartridge 850 may be inserted into the attachment mechanism 820 when the lid 818 is in the open position. After the cartridge 850 is inserted, the lid 818 may swing back to a closed position, as illustrated in FIG. 8A. When the lid 818 is in the closed position, the beverage may be mixed and the user may drink from the container 810. Additionally, the container 810 may include a drinking area located at the top of the container 810 around the cartridge

850. Additionally, a user may drink from the container 810 when the lid 818 is in the open position. A release mechanism may be located on a top side of the container 810. The release mechanism may be in the form of a release button or a release lever, wherein the user may press the release button or slide the release lever to release the cartridge 850. The attachment mechanism 820 and the cartridge 850 may be any of the configurations as described in this application without departing from the invention.

[0094] Additional container configurations may be utilized without departing from this invention. Containers such as: multi-serve containers which may hold multiple cartridges or bigger cartridges; containers to hold liquid food, such as soup; containers which can be used as a glass by removing the upper portion which contains the attachment mechanism; containers for use in a car or in a sports environment which may have a sports closure, such as a push/pull drinking spout; containers for use in airline flights such that the cartridges and water are used to supply drinks to the passengers; containers which may contain medicated drinks such as an aspirin or prescription drugs; containers which may fit within a refrigerator that has a tap dispenser and a top that contains the attachment mechanism; containers that may be hand-held; and containers which are much larger that may be located on a counter or shelf, either in a store environment or in a home, to name a few. Again, the teachings and principles of the invention may be applied to any container configuration without departing from the invention.

[0095] FIGS. 9A through 13B illustrate additional attachment mechanism configurations according to examples of this invention.

[0096] FIGS. 9A and 9B illustrate an attachment mechanism 920 with a paddle-type valve assembly 926. FIGS. 9A and 9B illustrate an example according to this invention similar to that described above in conjunction with FIGS. 1 through 4F (the same or similar reference numbers are used in FIGS. 9A and 9B as those used in FIGS. 1 through 4F to denote the same or similar parts). In another example in accordance with this invention, as shown in FIGS. 9A and 9B, the attachment mechanism 920 is generally comprised of an engagement assembly 922, a piercing portion 924, and a valve assembly 926. The engagement assembly 922 may generally receive the cartridge 950 within the attachment mechanism 920. The piercing portion 924 may generally pierce the cartridge 950, thereby releasing the contents of the cartridge 950 into the container 910. The valve assembly 926 may generally open upon engagement of the cartridge 950 with the attachment mechanism 920 thereby allowing the mixing of the contents of the container 910 with the contents of the cartridge 950.

[0097] In this example configuration, the attachment mechanism 920 requires a two-part action to attach the cartridge 950 and open the cartridge 950. First, as shown in FIG. 9A, the cartridge 950 is attached to the engagement assembly 922, wherein the engagement assembly 922 includes a latching structure 928 and a spring 932 to hold the cartridge 950 in a locked position. Once the cartridge 950 is in a locked position, as shown in FIG. 9B, the engagement assembly 922 may be twisted. As the engagement assembly 922 is twisted, the twisting action causes a cam 945 within the valve assembly 926 to rotate a valve 944 in the valve assembly 926 upward into the opening of the cartridge 950, thereby piercing the cover 960. With the valve 944 rotating

upward, the valve 944 may also, simultaneously, open the container 910 to the cartridge 950 so that the contents of the container 910 and the contents of the cartridge 950 can mix. The container 910 and cartridges 950 may be any of the configurations as described in this application without departing from the invention.

[0098] As illustrated in FIGS. 10A and 10B, in a similar configuration to the paddle-type valve assembly 1026 as described above, the attachment mechanism 1020 may be rotated to uncover a hole or a plurality of holes 1021, 1023 if more than one cartridge is used. As shown in FIGS. 10A and 10B, two cartridges 1050A, 1050B are attached to the attachment mechanism 1020 with two holes 1021, 1023 located in the attachment mechanism 1020. The rotation of the attachment mechanism 1020 may enable the mixing of the contents of the container 1010 with the contents of the pod or pods 1050A, 1050B. The attachment mechanism 1020, the container 1010, and the cartridges 1050A, 1050B may be any of the configurations as described in this application without departing from the invention.

[0099] FIGS. 11A and 11B illustrate an attachment mechanism with a piston-type attachment mechanism 1120. FIGS. 11A and 11B illustrate an example according to this invention similar to that described above in conjunction with FIGS. 1 through 4F (the same or similar reference numbers are used in FIGS. 11A and 11B as those used in FIGS. 1 through 4F to denote the same or similar parts). In another example in accordance with this invention, as shown in FIGS. 11A and 11B, the attachment mechanism 1120 is generally comprised of an engagement assembly, a crushing portion, and a valve assembly. The engagement assembly may generally receive the cartridge 1150 within the attachment mechanism. The crushing portion may generally open the cartridge 1150, thereby releasing the contents of the cartridge 1150 into the container. The valve assembly may generally open upon engagement of the cartridge 1150 with the attachment mechanism 1120 thereby allowing the mixing of the contents of the container with the contents of the cartridge 1150.

[0100] In this example configuration, the engagement assembly may include a piston 1122. The attachment mechanism may also include a base 1124 wherein the crushing portion and the valve assembly may be contained. A cartridge 1150 is placed within an opening 1129 in the piston 1122, wherein the opening 1129 is located on the side of the piston 1122. The piston 1122 may then be pushed such that the cartridge 1150 is crushed or squeezed against the base 1124. As the piston 1122 is moved against the base 1124, a valve 1126 opens to the container, thereby allowing the contents of the container and the contents of the cartridge to mix. Additionally, as the piston 1122 is moved against the base 1124, the cartridge 1150 is crushed or squeezed, thereby causing the cover 1160 to open and discharge the contents of the cartridge 1150 into the container. The container and the cartridge 1150 may be any of the configurations as described in this application without departing from the invention.

[0101] FIGS. 12A and 12B illustrate an attachment mechanism with a rotating cam type attachment mechanism 1220. FIGS. 12A and 12B illustrate an example according to this invention similar to that described above in conjunction with FIGS. 1 through 4F (the same or similar reference numbers are used in FIGS. 12A and 12B as those used in FIGS. 1 through 4F to denote the same or similar parts). In

another example in accordance with this invention, as shown in FIGS. 12A and 12B, the attachment mechanism 1220 is generally comprised of an engagement assembly, a crushing portion, and a valve assembly. The engagement assembly may generally receive the cartridge 1250 within the attachment mechanism. The crushing portion may generally open the cartridge, thereby releasing the contents of the cartridge 1250 into the container. The valve assembly may generally open upon engagement of the cartridge 1250 with the attachment mechanism 1220 thereby allowing the mixing of the contents of the container with the contents of the cartridge 1250.

[0102] In this example configuration, the engagement assembly may include a cam assembly 1222 and a base 1224. The cam assembly 1222 may also include two cams 1229. The cartridge 1250 may be inserted in between the two cams 1229 through the top of the attachment mechanism 1220. The two cams 1229 may be attached to the cam assembly 1222, such that as the base 1224 and cam assembly 1222 is rotated, the cams 1229 press inward. As the cams 1229 press inward the cams 1229 crush or squeeze the cartridge 1250 within the cams 1229, thereby causing the cover of the cartridge 1250 to open and discharge the contents of the cartridge 1250 into the container. The container and the cartridge 1250 may be any of the configurations as described in this application without departing from the invention.

[0103] FIGS. 13A and 13B illustrate an attachment mechanism with a plunger-type attachment mechanism 1320. FIGS. 13A and 13B illustrate an example according to this invention similar to that described above in conjunction with FIGS. 1 through 4F (the same or similar reference numbers are used in FIGS. 13A and 13B as those used in FIGS. 1 through 4F to denote the same or similar parts). In another example in accordance with this invention, as shown in FIGS. 13A and 13B, the attachment mechanism 1320 is generally comprised of an engagement assembly, a crushing portion, and a valve assembly. The engagement assembly may generally receive the cartridge 1350 within the attachment mechanism. The crushing portion may generally open the cartridge 1350, thereby releasing the contents of the cartridge 1350 into the container. The valve assembly may generally open upon engagement of the cartridge 1350 with the attachment mechanism thereby allowing the mixing of the contents of the container with the contents of the cartridge 1350.

[0104] In this example configuration, the engagement assembly may include a plunger 1322. The attachment mechanism 1320 may also include a base 1324 wherein the crushing portion and the valve assembly may be contained. A cartridge 1350 is placed in the top of the base 1324. The plunger 1322 may then be pushed such that the cartridge 1350 is crushed or squeezed between the plunger 1322 and the base 1324 of the attachment mechanism 1320. As the plunger 1322 is moved against the base 1324 of the attachment mechanism 1320, a valve 1326 may open to the container, thereby allowing the contents of the container and the contents of the cartridge 1350 to mix. As the plunger 1322 is moved against the base 1324 of the attachment mechanism 1320, the cartridge 1350 is crushed or squeezed, thereby causing the cover to open and discharge the contents of the cartridge 1350 into the container. Additionally, the plunger 1322 may contain a piercing needle (not shown) wherein the piercing needle pierces the cartridge 1350 as the

plunger **1322** is pushed into the base **1324** of the attachment mechanism **1320**. The container and the cartridge **1350** may be any of the configurations as described in this application without departing from the invention.

**[0105]** Additional attachment mechanisms may be utilized without departing from this invention. Attachment mechanism such as: threaded connections between the container and the attachment mechanism instead of the snap feature as described above; quarter-turn connections between the container and the attachment mechanism instead of the snap feature as described above; a hand-tool **240** similar to a nut-cracker which holds a cartridge and can pierce and open the cartridge by use of the hand-tool **240** and thus pouring the contents of the cartridge into a glass **242** (as shown in FIG. **24**).

**[0106]** FIGS. **14A** through **14C** illustrate additional cartridge configurations according to examples of this invention. As illustrated in FIGS. **14A** through **14C**, in another example cartridge configuration, the cartridge **1450** may be comprised of multiple pods. As illustrated in FIGS. **14A** and **14B**, the cartridge may comprise two half pods **1450A**, **1450B**, wherein each of the half pods **1450A**, **1450B** can be combined to make one singular pod **1450**. The contents of each pod **1450A**, **1450B** may then be mixed with water or other liquid to form the desired beverage. Each half pod **1450A**, **1450B** may contain syrup, paste, powder, granules or other compositions that when mixed with water or other liquids will result in a beverage. In an alternative aspect of the invention, the half pod **1450A**, **1450B** may contain an energy boost, nutrients, or vitamin supplement that can be added to the beverage. The two half pods **1450A**, **1450B** may be inserted into an attachment mechanism **1420** located at the bottom of a container **1410** as shown in FIG. **14C**. Alternatively, the cartridge **1450** may include three or more pods.

**[0107]** In another example cartridge configuration, the beverage dispensing system may include multiple attachment mechanisms, piercing portions, and valve assemblies, such that multiple cartridges may be inserted for a single container or beverage dispensing system. The contents of each cartridge may then be mixed with water or other liquids to form the desired beverage. Each cartridge may contain syrup, paste, powder, granules or other compositions that when mixed with water or other liquids will result in a beverage. In an alternative aspect of the invention, one or more of the cartridges may contain an energy boost or vitamin supplement that can be added to the beverage. Additionally, one or more of the cartridges may be a different size, such as smaller or larger, than the other cartridges.

**[0108]** In another example cartridge configuration, the cartridge may be comprised of multiple chambers each containing the same or different beverage-making component. Multiple chambers may be beneficial when there are unstable ingredients that must remain separate as part of the beverage. The contents of each chamber may then be mixed with water or other liquids to form the desired beverage. Each chamber may contain syrup, paste, powder, granules or other compositions that when mixed with water or other liquids will result in a beverage. In an alternative aspect of the invention, one of the chambers may contain an energy boost or vitamin supplement that can be added to the beverage.

**[0109]** In another example in accordance with this invention, a beverage dispensing system is directed at a single-serve beverage dispensing system. The beverage dispensing system is directed to overcome the drawbacks and problems with existing beverage dispensing or delivery systems. A single-serve beverage dispensing system is disclosed in FIGS. **15-18C**. As illustrated by FIGS. **15-18C**, the single-serve beverage dispensing system dispenses a metered amount of water or other liquid through a syrup-containing cartridge having the proper amount of syrup to create a single-serve beverage, for example, a soft drink. As illustrated by FIGS. **15-17**, the beverage dispensing system of the invention permits a consumer in a retail environment or at home to create a single-serve beverage by selecting a cartridge containing the desired beverage ingredients and placing the cartridge into the beverage dispensing system. The consumer then presses a button which activates the beverage mixing operation of the system. Once activated, a needle operatively connected to a water or other liquid supply will drop down and puncture the cartridge through the top and bottom of the cartridge. For a predetermined period of time, the needle will remain in and partially extending through the cartridge. While the needle is positioned in the cartridge, water or other liquids are directed to the needle and allowed to pass through an opening in the end of the needle and through a plurality of apertures positioned around the periphery of the needle. The water or other liquids passing through the plurality of apertures will enter the cartridge and mix with the syrup contained in the cartridge. Once mixed, the beverage will pass through the punctured opening created in the bottom of the cartridge and drop into a cup positioned beneath the cartridge. Water or other liquids will additionally flow out through the opening in the end of the needle to further create the proper consistency and flavor of the beverage. After the beverage has been dispensed into the cup, the consumer may remove the cup and enjoy the beverage. The used cartridge may then be discarded.

**[0110]** More specifically, and referring to FIGS. **15-17**, in an exemplary embodiment, the beverage system **1508** includes a dispenser housing **1510** that includes openings **1512** and **1514** formed in the housing. Opening **1512** is sized and shaped to receive a beverage cup **1513** for receiving and containing the created beverage dispensed from the beverage system. Opening **1514** is sized and shaped to receive a cartridge **1516** that contains syrup, which is mixed with water or other liquids to make the beverage. The opening **1514** and cartridge **1516** define a mating configuration in that the cartridge **1516** is shaped to match the shape of the opening **1514**, and vice versa. With this configuration, only cartridges having a shape that matches the shape of the opening **1514** can be inserted into the opening **1514**, thereby preventing undesirable or non-matching cartridges or containers from being used with the beverage system. The beverage system further includes a button or switch **1520** that a consumer presses to activate the beverage system.

**[0111]** Positioned within the housing **1510** is a water (or other liquid) supply system that includes a water supply line **1521** operatively connected at one end to a water source, and at an opposing end to a needle **1523**. The water (or other liquid) source may be either carbonated or non-carbonated water, or may be any other suitable liquid that can be mixed with the syrup contained within the cartridge. As illustrated in FIG. **25**, the needle **1523** defines a pointed or sharp open

end 1525 that as explained above is used to puncture the cartridge 1516. The needle 1523 further defines an elongated tube-like body 1527 that further defines a plurality of apertures 1529 positioned around the periphery of the tube body 1527 of the needle 1523. Once positioned within the cartridge 1516, the apertures 1529 permit water or other liquids traveling through the tube body 1527 to pass into the cartridge 1516 to mix with syrup contained within the cartridge 1516. As should be understood, the needle 1523 may define numerous other configurations that permit the puncturing of the cartridge 1516 and passing of water or other liquids into the cartridge 1516.

[0112] The cartridge 1516 may define a single chamber, or may define multiple chambers each containing the same or different beverage-making component. The contents of each chamber may then be mixed with water or other liquid to form the desired beverage. Each chamber may contain syrup, paste, powder, granules or other compositions that when mixed with water or other liquids will result in a beverage. In an alternative aspect of the invention, the cartridge may contain an energy boost or vitamin supplement that can be added to the beverage.

[0113] As illustrated in FIG. 16, the cartridge may define a dome-shaped configuration made of a plastic material. The dome shape creates the one or more chambers within the cartridge. Aluminum foil 1524 or a similar sealing material may be positioned across the cartridge to seal the contents within the cartridge. The aluminum foil may include product information or other indicia printed thereon, or may contain instructions as to how to use the cartridge and/or beverage system. The use of aluminum foil and plastic with the cartridge permits the needle to easily penetrate and puncture the foil and plastic. It should be understood that numerous other shapes and configurations of the cartridge are possible and that the depicted dome shape is merely exemplary of the numerous alternative configurations.

[0114] Referring to FIGS. 18A through 18C, the beverage system 1508 may also include a housing 1528 containing numerous cartridges each containing a different beverage flavor or ingredient giving the consumer numerous choices for a beverage, unlike the limited options with existing beverage systems. In one embodiment, the cartridges may be positioned in an array with the product information relating to the cartridge readily visible to the consumer, the array creating an aesthetically pleasing consumer impression. The housing may contain various eye-catching colors and advertisements to attract the attention of the consumers. The beverage system 1508 may also include a cup-holding housing 1530 that contains numerous stacked cups 1513 that are also readily accessible to a consumer. The housing 1530 may include one or more cup-holding openings 1534 to accommodate multiple sized cups. The beverage housings 1510, 1528 and 1530 are all modular to provide flexibility in placing the beverage system within a retail store environment to enhance the visibility of the system, and are sufficiently lightweight and compact to permit each to sit on top of a counter within the store, or at any other desired location within the store.

[0115] Referring to FIGS. 19A-23, the beverage system may be packaged in numerous configurations. FIG. 19A depicts a beverage system 1540A that may be used at home where a cartridge may be placed within the opening 1542A and upon pressing the dispensing button 1544A, water or other liquids stored within water housing 1546A mixes with

the contents of the cartridge, similar to the manner described above, to make the desired beverage. FIG. 19B illustrates a similar beverage system 1540B that may be used at home, a small bar, and/or a restaurant where a cartridge or pod 1548B may be placed on the top of the system 1540B. Upon pressing a dispensing button 1544B, water or other liquids stored within or connected to the housing 1546B mixes with the contents of the cartridge 1550 or pod, similar to the manner described above to make the desired beverage. FIG. 20 depicts yet another beverage system 1550 that operates in the same manner as described herein but utilizes large water containers 1552, similar to those used in drinking coolers. Still other packaging options are possible with the invention.

[0116] Referring to FIGS. 21-23, the beverage system 1560 may be configured with a refrigerator 1562. The beverage system 1560 may be mounted in or to the refrigerator, or attached as a stand-alone unit to the refrigerator. If the beverage system 1560 is mounted in or to the refrigerator, the system 1560 may be accessible from the exterior of the refrigerator (FIGS. 21 and 23) or may be accessible from the interior of the refrigerator (FIG. 22). As illustrated in FIG. 22, the beverage system may be mounted within a compartment located within the refrigerator. As illustrated in FIG. 23, the beverage systems may be incorporated with the ice/water dispensing system of the refrigerator. With each of these alternative embodiments, the beverage system 1560 may be attached to the drinking water supply of the refrigerator. If the beverage system 1560 is attached to the refrigerator as a stand-alone unit, it may be connected to the drinking water supply of the refrigerator. As with the other embodiments described herein, the cartridge 1570 may be placed within an opening 1564 and upon pressing the dispensing button, water from refrigerator 1562 mixes with the contents of the cartridge, similar to the manner described above, to make the desired beverage, which will then be dispensed into a cup 1574.

[0117] Referring to FIGS. 27A-27C, in accordance with this invention, the cartridges or pods 150 as described above may contain a unique identifier. The unique identifier may consist of a bar code 153A, serial characters 153B, RFID tag, near-field communication device, or a device or system similar wherein a user could enter, scan, or read to track the beverage characteristics of the cartridge 150 they just consumed. The beverage characteristics may then be tracked and captured for the user. The beverage characteristics that may be tracked could include: flavor, nutritional content (such as calories, carbohydrates, water intake, sodium), functional ingredients, favorite beverages, plastic bottles "saved", location or time of day consumed, carbon footprint account, or other information such as the delivery of specific medicines. Additionally, instead of the user entering the unique identifier, the user could capture the unique identifier via a camera 159. An example bar code identifier 153A on a cartridge 150 is illustrated in FIG. 27A. An example serial character identifier 153B on the cartridge 150 is illustrated in FIG. 27B. The information linked to the bar code 153A and/or serial character 153B could then be uploaded to a personal website 190 linked to the beverage system and the user.

[0118] Additionally, in accordance with this invention, as illustrated in FIG. 27C, a container 110 may capture the information linked to the unique identifier 153 on the cartridge 150 described above. The container 110 may include a capture device 155 that reads the unique identifier

**153.** Specifically, the capture device **155** may consist of a memory chip to store the information from the bar code **153A** or serial characters **153B** on the individual cartridges **150**. Alternatively, the capture device **155** may include a scanning device to scan the bar code **153A** or serial characters **153B** on the individual cartridges **150**. The capture device **155** may also include an RFID tag reader or a near-field communication device. The memory chip or scanning device may then store the information for future upload. The upload from the container or memory chip may be done through a wireless means, such as a wireless network. This information could then be uploaded to a personal website **190** linked to the beverage system and the user. The capture device **155** may be included within the container **110**, the cap **112**, the attachment mechanism **120**, the engagement assembly **122**, or any other portion of the container **110** without departing from this invention.

**[0119]** For example, a user may select a given flavor or beverage cartridge **150** and connect the cartridge **150** to the container **110** as described above in any of the various embodiments of the cartridge and container. When the cartridge **150** is locked into the container **110**, the capture device **155** on the container **110** may scan or read the bar code **153A** or the serial character **153B** on the cartridge **150**. Additionally, without departing from this invention, the cartridge **150** may be positioned within the container **110** such that the bar code **153A**, the serial character **153B**, or RFID tag is located in the correct location for scanning and reading by the capture device **155** on the container **110**. After the capture device **155** scans or reads the bar code **153A** or serial character **153B**, the unique information **157** linked to the selected flavor or cartridge **150** may be maintained within the container memory chip. When the user wants to download the information **157**, the user may “connect” the container **110** to a computing device **180**. The user may connect the container **110** via a wired connection or a wireless connection, such as wireless network, cellular network, Bluetooth, or any other similar wireless-type connection. The container **110** may connect to any computing device **180** that may include, but is not limited to, a cell phone **181**, a laptop computer **182**, a desktop computer **184**, a smart phone **183**, etc. Once the container **110** is connected to the computing device **180**, the user may then download that unique information **157** (such as flavor, nutritional content, or functional ingredients, etc.) that was stored from the selected beverage cartridge **150**. The user may also download any other sets of unique information **157** saved in the memory chip of the container **110** from previous uses and previously used beverage cartridges **150**. This information **157** may then be uploaded to a personal website **190** linked to the beverage system and the user.

**[0120]** Furthermore, in accordance with this invention, the information **157** uploaded from the unique identifiers **153** on the individual beverage cartridges **150** may be used with online applications. These online application may be included on such devices or locations such as on smart phones, cell phones, personal websites, company websites, beverage system websites, gaming or social networks, etc. The use of such information **157** may be used with an online application for such functions such as tracking water consumed throughout the day, tracking nutrients and/or nutraceuticals consumed, tracking the amount of PET equivalent saved with using the beverage system instead of other drinking methods, tracking of medicine consumption that

could be shared with a third party (such as a doctor), updating loyalty programs with points or reward prizes, providing the information sharing with friends or similar people through gaming or social networks, tracking time of day, or tracking geolocation of consumption. Furthermore, additional types of uses that the information could have on an online environment may include games and virtual pets for kids as rewards are granted for drinking healthy beverage options, or applications for carbon footprint tracking, or nutrient consumption for seniors, etc.

**[0121]** FIGS. **28A** and **28B** illustrate a beverage system in operation that communicates and transfers the information **157** as described above. FIG. **28A** illustrates steps **1** through **3**, while FIG. **28B** illustrates steps **3** through **5**, with step **3** being repeated for illustrative purposes only. As illustrated in FIG. **28A**, in step **1**, a cartridge **150** includes a unique identifier in the form of a bar code **153A**. The cartridge **150** is configured to fit or be connected to a container **110**. In step **2**, the user inserts the cartridge **150** into the container **110** and the user may then mix and consume the beverage. Following step **2**, the user may then track the information from the beverage and the user may do this in one of at least three different ways as illustrated in step **3** in FIG. **28A**. First, the user may manually enter the bar code identifier **153A** (or serial character identifier **153B**, or RFID tag) into a system as was described above. Second, the user may capture the bar code identifier **153A** (or serial character identifier **153B** or RFID tag) with a camera **159** as was described above. Third, a capture device **155** with the container **110** may scan the bar code identifier **153A** or read the bar code identifier **153A**. The capture device **155** may read the information **157** from the bar code identifier **153A** and/or the cartridge **150**.

**[0122]** As illustrated in FIG. **28B**, following step **3**, in step **4**, the information **157** from the bar code identifier **153A** and/or the cartridge **150** is then transmitted or transferred to a computing device **180** or network device. The information **157** may be transmitted over a wired connection. Additionally, as was discussed above, this information **157** may be transmitted wirelessly via any means known and used in the art to transfer information, such as a wireless network, cellular network, Wi-Fi, Bluetooth, or any other similar wireless-type connection. The computing device **180** may include, but is not limited to, a cell phone **181**, a laptop computer **182**, a personal data assistant (PDA)/smart phone **183**, a desktop computer **184**, or the interne **185**, etc. In step **5**, the computing device **180** may consolidate or store this information **157** to be uploaded to a personal website **190** linked to the beverage system and the user, a beverage system website **191** linked to the user with user preferences, or a social network site **192** linked to the beverage system and the user. Online applications may be available on the computing device **180**, the personal website **190**, the beverage system website **191**, and/or the social networking website **192**. As discussed above, the online applications may include such functions as tracking water consumed throughout the day, tracking nutrients and/or nutraceuticals consumed, tracking the amount of PET equivalent saved with using the beverage system instead of other drinking methods, tracking of medicine consumption that could be shared with a third party (such as a doctor), updating loyalty programs with points or reward prizes, providing the information sharing with friends or similar people, tracking time of day, or tracking geolocation of consumption. Further-

more, additional types of uses that the information could have on an online environment may include games and virtual pets for kids as rewards are granted for drinking healthy beverage options, or applications for carbon footprint tracking, or nutrient consumption for seniors, etc. Additionally, the online applications may include tracking favorite beverages, consumption competitions, collecting or providing information for consumer and/or marketing research, or users recommending other beverages or flavors that other users might like.

**[0123]** FIGS. 29A-30 illustrate various additional examples of beverage systems in accordance with the present invention. Referring to FIGS. 29A-29C, a beverage system 1600 may be configured to be used with a container, such as a tumbler style glass 1610. FIGS. 29A-29C illustrate an example according to this invention similar to that described above in conjunction with FIGS. 1 through 4F (the same or similar reference numbers are used in FIGS. 29A-29C as those used in FIGS. 1 through 4F to denote the same or similar parts). The beverage system 1600 illustrated in FIGS. 29A-29C includes an attachment mechanism 1620. The attachment mechanism 1620 may comprise an engagement assembly 1622 and a piercing portion 1624. The engagement assembly 1622 may generally receive the cartridge 1650 within the attachment mechanism 1620. The piercing portion 1624 may generally pierce the cartridge 1650, thereby releasing the contents of the cartridge 1650 into the glass 1610 and allowing the mixing of the contents of the glass 1610 with the contents of the cartridge 1650. The glass 1610 and the cartridge 1650 may be any of the configurations as described in this application without departing from the invention.

**[0124]** As illustrated in FIG. 29A, a user may place the attachment mechanism 1620 on top of the glass 1610. The attachment mechanism 1620 may be sized to fit on top of multiple sized glasses 1610 or containers. As further illustrated in FIG. 29B, the user may then place the cartridge 1650 onto the attachment mechanism 1620, wherein the cartridge 1650 is engaged by the engagement assembly 1622 of the attachment mechanism 1620. The user may then press or place a force against the cartridge 1650, thereby pressing the cartridge 1650 against the piercing portion 1624. The piercing portion 1624 pierces the cartridge 1650, thereby releasing the contents of the cartridge 1650 into the glass 1650. As finally illustrated in FIG. 29C, the user may then shake the glass 1610 to mix the contents of the glass 1610 and the contents of the cartridge 1650.

**[0125]** FIG. 30 depicts a beverage system 1700 that may be configured to dispense and make smoothies and/or frozen beverages. Similar to the description above for FIGS. 18-23, a cartridge 1750 may be placed into the beverage system 1740. While the cartridge 1750 is placed into the front of the beverage system 1700 illustrated in FIG. 30, the cartridge 1750 may be placed at any location within the beverage system 1700 without departing from this invention. Upon pressing a dispensing button 1744 on the front of the beverage system 1700, a frozen mixer may be dispensed. The frozen mixer may take the form of ice, slush, or ice/water mixture, etc. The frozen mixer, which may be stored and/or formed within the housing 1746, may mix with the contents of the cartridge 1750, similar to the manner described above, to make the desired smoothie or frozen drink.

**[0126]** Described below is a detailed description of additional aspects of this invention, specifically a method of producing a beverage using a beverage dispensing system. Additional aspects of this disclosure relate to methods of producing a beverage using a beverage dispensing system in accordance with examples of this disclosure. Such methods may include, for example, one or more of the following steps in any desired order and/or combinations: (a) inserting a cartridge into a container; (b) rotating or positioning the cartridge into location within an attachment mechanism; (c) pressing on the cartridge thereby engaging the cartridge with the engagement assembly, releasing the valve assembly, and piercing the foil seal with the piercing portion; (d) mixing the contents of the container; (e) drinking the beverage from the container; and (f) releasing the cartridge from the container.

**[0127]** One of the benefits of this invention is the improvement and impact on the environment through reusing, recycling, and reducing. For example, this beverage system may reduce dramatically the water usage index from 2.4 L/L to 1.3 L/L. Additionally, for the environmental impact on land and packaging: the beverage system packaging may be approximately 5 grams, which is approximately 75% less than packaging for other comparable-use beverage system; all of the beverage system packaging may be 100% recyclable; and the container of the beverage system may be reusable eliminating post-consumer bottles. Additionally, for the environmental impact on climate change: the transportation for the beverage system components, etc. is approximately 17% of the carbon footprint of a comparable-use product, thereby reducing the carbon footprint by approximately 90%; and the containers are approximately 40% of the carbon footprint of comparable-use product containers, thereby reducing the carbon footprint by approximately 75%. Finally, for the environmental impact on the community: recycling facilities and device stations may be provided for the beverage system of the present invention; social online platform to track contributions such as water, energy and/or carbon footprint savings.

**[0128]** It is to be understood that the invention is not limited in its application to the details of construction and the arrangement of the components set forth herein. The invention is capable of other embodiments and of being practiced or being carried out in various ways. Variations and modifications of the foregoing are within the scope of the present invention. It should be understood that the invention disclosed and defined herein extends to all alternative combinations of two or more of the individual features mentioned or evident from the text and/or drawings. All of these different combinations constitute various alternative aspects of the present invention. The embodiments described herein explain the best modes known for practicing the invention and will enable others skilled in the art to utilize the invention.

What is claimed is:

1. A beverage system comprising:

a cup; and

a piercing apparatus detachably attachable to a top of the cup, the piercing apparatus having a piercer composed of a rigid material, wherein the piercer protrudes upwardly from a bottom of the piercing apparatus,

wherein the piercing apparatus defines an outer support that engages with a top surface of the cup to attach the piercing apparatus to the cup.

2. The beverage system of claim 1, further comprising a cartridge that is openable through engagement with the piercer,

wherein the cartridge comprises a chamber, an opening, and a cover located over the opening, and wherein the cartridge contains one or more beverage ingredients.

3. The beverage system of claim 1, wherein the piercing apparatus defines an engagement assembly configured to receive a cartridge containing a mixing solution.

4. The beverage system of claim 3, wherein a rib disposed in the engagement assembly engages and secures the cartridge to the piercing apparatus.

5. The beverage system of claim 3, wherein the engagement assembly seals the cartridge to the piercing apparatus.

6. The beverage system of claim 3, wherein a top edge of the engagement portion is configured to engage a side of the cartridge.

7. The beverage system of claim 1, wherein the outer support is composed of a flexible material, and wherein when a cartridge is pushed against the piercer, the outer support creates a seal against the top of the cup.

8. The beverage system of claim 2, wherein when the cover of the cartridge is pushed against the piercer, the piercer breaks the cover allowing the one or more beverage ingredients to mix with the contents of the cup.

9. The beverage system of claim 2, wherein when the cartridge is pushed against the piercer, agitation of the beverage system enables mixing between the contents of the cup and the one or more beverage ingredients of the cartridge, and the contents of the cup are configured to enter into the cartridge during agitation.

10. An attachment apparatus configured to detachably attach to a drinking glass, the attachment apparatus comprising:

an engagement assembly that slopes downward from a top of the attachment apparatus and is configured to receive a cartridge containing a mixing solution;

a piercer that is concentric with the attachment apparatus and defines an opening, wherein the piercer is config-

ured to pierce the cartridge and release the mixing solution from the cartridge through the opening and into the drinking glass; and

a rib disposed in the engagement assembly that engages the cartridge and secures the cartridge to the attachment apparatus when the cartridge is received in the engagement assembly,

wherein the attachment apparatus is configured to seal the cartridge around the opening when the cartridge is received in the engagement assembly.

11. The attachment apparatus of claim 10, wherein the attachment apparatus further comprises a grip that projects outward from the attachment apparatus.

12. The attachment apparatus of claim 10, wherein the rib circumferentially projects from an inner surface of the engagement assembly.

13. The attachment apparatus of claim 10, wherein the rib is composed of a flexible material.

14. The attachment apparatus of claim 10, wherein the opening of the piercer is circular.

15. The attachment apparatus of claim 10, wherein the shape of the piercer corresponds to flaps on the cartridge to enable the piercer to pierce the flaps of the cartridge to release the mixing solution in the cartridge through the opening into the drinking glass.

16. The attachment apparatus of claim 10, wherein the piercer projects upward from a bottom of the attachment apparatus.

17. The attachment apparatus of claim 10, further comprising an outer support that engages with a top surface of the drinking glass to attach the attachment apparatus to the drinking glass.

18. The attachment apparatus of claim 17, wherein the outer support is composed of a flexible material.

19. The attachment apparatus of claim 10, wherein a top edge of the engagement portion is configured to engage a side of the cartridge.

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