



(51) International Patent Classification:

B05B 11/00 (2006.01)

B08B 3/08 (2006.01)

B05B 15/30 (2018.01)

(21) International Application Number:

PCT/US2019/048766

(22) International Filing Date:

29 August 2019 (29.08.2019)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

16/423,526

28 May 2019 (28.05.2019)

US

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

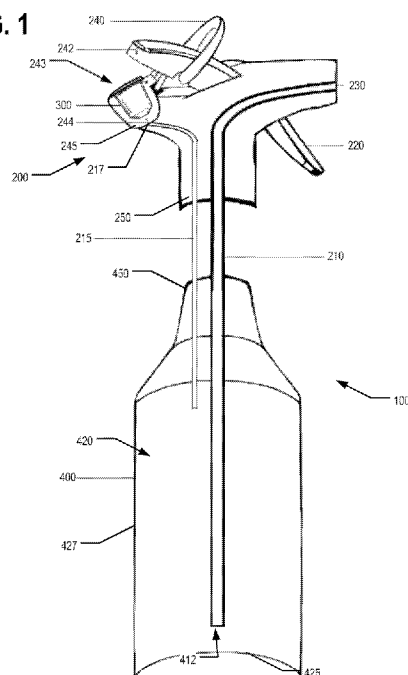
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU,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

Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

(54) Title: CONCENTRATED CLEANING CAPSULE AND DISPENSER FOR DISPENSING CLEANING SOLUTION THEREFROM

FIG. 1



(57) Abstract: In an example embodiment, a dispenser for dispensing cleaning solution from a capsule is provided. The dispenser comprises a handle, a base, and a dispensing pipette extending from the nozzle into the base. The handle comprises a nozzle, a trigger, a lever, the dispensing pipette, and a capsule chamber. The base comprises a reservoir portion configured for receiving cleaning solution from the capsule. The handle is configured to be secured to the base. When the capsule is positioned within the capsule chamber and the lever is moved from an open position to a closed position, the cleaning solution is provided to the reservoir portion. When the capsule is positioned within the capsule chamber, the handle is secured to the base, and the trigger is activated, the cleaning solution is dispensed from the reservoir portion through the dispensing pipette and out of the nozzle.

Published:

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

CONCENTRATED CLEANING CAPSULE AND DISPENSER FOR DISPENSING CLEANING SOLUTION THEREFROM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. Application No. 16/423,526, filed May 28, 2019, the content of which is hereby incorporated by reference in its entirety.

BACKGROUND

[0002] In general, a user may wish to have various cleaning solutions for cleaning different surfaces. For example, a user may wish to have a glass cleaning solution, a bath cleaning solution, a general purpose kitchen cleaning solution, a metal cleaning solution, and/or the like. However, traditional cleaning arrangements require users to maintain store separate reservoirs of cleaning solution corresponding to each desired use cleaning solution. The user may not want or be able to dedicate enough storage space to a plurality of reservoirs of cleaning solution to accommodate a plurality of different reservoirs of cleaning solutions.

[0003] Moreover, traditional cleaning arrangements require that a user purchase a dispenser each time the user wishes to refill a cleaning product. This increases the financial and carbon footprint costs of cleaning products.

BRIEF SUMMARY

[0004] Example embodiments of the present invention provide concentrated cleaning capsules configured to store concentrated cleaning solution and a dispenser for dispensing the concentrated cleaning solution therefrom. Example embodiments of the present invention allow a user to have multiple types of cleaning solution, without requiring the user to have multiple dispensers. In various embodiments, the dispenser may be an atomizer (e.g., spray bottle), a pump dispenser (e.g., hand pump), and/or the like. In various embodiments, the concentrated cleaning solution may be a concentrated glass cleaning solution, bath cleaning solution, general purpose kitchen cleaning solution, metal cleaning solution, hand soap, dish soap, laundry stain remover, scent neutralizing solution, air freshener, and/or the like. Some example embodiments of the present invention provide a user with a single use amount of cleaning solution.

[0005] According to one aspect of the present invention, a dispenser for dispensing a cleaning solution from a capsule is provided. In an example embodiment, the dispenser comprises a handle and a base. The handle comprises a nozzle, a trigger, a lever, a reservoir pipette, a dispensing pipette, and a capsule chamber. The base comprises a reservoir portion configured for receiving cleaning solution from the capsule. The handle is configured to be secured to the base. When the capsule is positioned within the capsule chamber and the handle is secured to the base and the lever is closed, the cleaning solution is provided to the reservoir portion through the reservoir pipette. When the capsule is positioned within the capsule chamber, the handle is secured to the base, the lever is closed, and the trigger is activated, the cleaning solution is dispensed from the reservoir portion through the dispensing pipette and out of the nozzle.

[0006] In an example embodiment, the dispensing pipette extends from the handle into the base. When the handle is secured to the base and the dispensing pipette is inserted into the body of the base (e.g., the reservoir portion), cleaning solution can be transferred and/or dispensed (e.g., in a stream, mist, pump, and/or the like) by activation (e.g., pulling, pushing, squeezing, pressing, and/or the like) of the trigger on the handle from the dispensing pipette to the nozzle.

[0007] In an example embodiment, the base comprises a reservoir portion configured to receive a dilution chemical configured to dilute the cleaning solution. The dilution chemical is dispensed from the reservoir portion of the base through the dispensing pipette and out of the nozzle with the cleaning solution. In an example embodiment, the dilution chemical comprises water (e.g., distilled water, ionized water, filtered water, and/or tap water).

[0008] In an example embodiment, the lever comprises and/or is coupled to a first puncture pin configured to puncture a first surface (e.g., the lid portion) of the capsule. In an example embodiment, the capsule is configured to be inserted into the capsule chamber and securing the capsule into the capsule chamber by closing and/or actuating the lever causes the first puncture pin to puncture a first surface (e.g., the lid portion) of the capsule disposed within the capsule chamber. In an example embodiment, the capsule chamber comprises a second puncture pin configured to puncture a second surface (e.g., the cup portion) of the capsule. In an example embodiment, the capsule chamber is configured to hold the capsule and cause the second puncture pin to puncture the cup portion of the capsule when the lever is closed and/or actuated. Closing and/or actuating of the lever causes at least one of (a) the first puncture pin to create a

first puncture hole in a first surface (e.g., the lid) of the capsule or (b) the second puncture pin to create a second puncture hole in a second surface (e.g., the cup portion) of the capsule. In an example embodiment, closing the lever causes the cleaning solution to be infused into the reservoir pipette and secures the capsule within the handle. For example, the second puncture pin may be a hollow puncture pin that is coupled to the reservoir pipette such that cleaning solution may flow through the second puncture pin and into the reservoir pipette. The cleaning solution may then flow through the reservoir pipette into the reservoir portion.

[0009] In an example embodiment, the capsule is configured to contain 0.5 to 2 ounces of the cleaning solution. In an example embodiment, the capsule is configured to contain 0.25 to 1.25 ounces of cleaning solution (e.g., 0.5 to 1 ounce). In an example embodiment, the capsule is configured to contain 1.5 to 3 ounces of the cleaning solution. In an example embodiment, the capsule is configured to contain 1-2 ounces of the cleaning solution. In an example embodiment, the reservoir portion has a convex end surface configured to direct the cleaning solution toward a mouth of the dispensing pipette. In an example embodiment, the mouth of the dispensing pipette extends from the center of the handle into the center of the base. In an example embodiment, the base comprises a metal or other resilient material such as glass, wood, plastic, rubber, and/or the like. In an example embodiment, the reservoir portion has a capacity of 10-30 ounces. In an example embodiment, the reservoir portion has a capacity of 5 to 15 ounces. In an example embodiment, the reservoir portion has a capacity of 20 to 40 ounces.

[0010] According to another aspect of the present invention, a capsule is provided. In an example embodiment, a capsule comprises a cup portion; a ridge portion; and a lid portion. The lid portion is configured to seal cleaning solution within the cup portion. The ridge portion is configured for securing the capsule within a capsule chamber.

[0011] In example embodiments, the capsule is configured to contain 1-2 ounces of the cleaning solution. In an example embodiment, the capsule is configured to contain 0.5 to 2 ounces of the cleaning solution. In an example embodiment, the capsule is configured to contain 1.5 to 3 ounces of the cleaning solution. In an example embodiment, at least a portion of the capsule comprises metal. In various embodiments, the capsule may be comprised of a natural post recycled material, rubber, aluminum, plastic, cardboard, paper, etc. The shape of the capsule may be round/spherical, cubic, ovoid, polyhedron (e.g., a tetrahedron, pyramid, cuboid, rectangular cuboid, etc.), and/or the like, as appropriate for the application.

[0012] According to yet another aspect of the present invention, a method of dispensing a cleaning solution from a capsule is provided. In an example embodiment, the method comprises providing a dispenser. The dispenser comprises a handle comprising a capsule chamber configured to receive a capsule containing cleaning solution therein, a base, and a dispensing pipette extending from the nozzle into a reservoir portion of the base. The handle comprises the nozzle, a trigger, a lever, a reservoir pipette, a dispensing pipette, and the capsule chamber. The base comprises a reservoir portion configured for receiving cleaning solution from the capsule, for example, via the reservoir pipette. The method further comprises inserting the capsule into the capsule chamber; securing the handle to the base; and closing and/or actuating the lever to cause the cleaning capsule to be punctured to enable the cleaning solution to flow into the reservoir portion through the reservoir pipette. The method further comprises diluting the cleaning solution with a dilution chemical in the reservoir portion to form a diluted and/or deconcentrated cleaning solution and activating the trigger. Activating the trigger causes diluted and/or deconcentrated cleaning solution (e.g., a mixture of concentrated cleaning solution and dilution chemical) to be dispensed from the reservoir portion, through the dispensing pipette, and out of the nozzle.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

[0013] Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

[0014] Figure 1 is a partially exploded cross-section view of an atomizer dispenser with a cleaning capsule therein, in accordance with an example embodiment;

[0015] Figure 2 provides perspective views of four cleaning capsules, in accordance with example embodiments;

[0016] Figure 3 is a perspective view of an atomizer dispenser, in accordance with an example embodiment;

[0017] Figure 4 is a perspective view of a hand pump dispenser, in accordance with an example embodiment;

[0018] Figure 5 is a partially exploded cross-section view of a hand pump dispenser with a cleaning capsule therein, in accordance with an example embodiment; and

[0019] Figure 6 provides a flowchart illustrating various processes for using a dispenser and cleaning capsule, in accordance with example embodiments.

DETAILED DESCRIPTION EXAMPLE EMBODIMENTS

[0020] The present invention now will be described more fully hereinafter with reference to the accompanying drawings, in which some, but not all embodiments of the invention are shown. Indeed, this invention may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout.

[0021] Example embodiments of the present invention provide cleaning capsules for storing and providing concentrated cleaning solution and a dispenser for diluting and/or deconcentrating the concentrated cleaning solution (e.g., to form a diluted and/or deconcentrated cleaning solution) and dispensing the diluted and/or deconcentrated cleaning solution. Figures 1, 2, and 3 show an example dispenser that is an atomizer 100 and example cleaning capsules 300. Figures 4 and 5 show an example dispenser that is a hand pump 600. In general, a user may place a cleaning capsule 300 within a dispenser (e.g., atomizer 100, hand pump 600, and/or the like) to provide cleaning solution to the dispenser. The user may then use the cleaning solution. In an example embodiment, a cleaning capsule 300 may be configured to contain approximately one cleaning session worth of cleaning solution such that when the user is finished cleaning, the user need not store unused cleaning solution. The dispenser (e.g., atomizer 100, hand pump 600, and/or the like) may generally comprise a handle 200, 800 and a base 400, 700. In example embodiments, the handle 200, 800 may be configured to receive a cleaning capsule 300 therein (e.g., within a capsule chamber 245, 845) and provide a trigger 220, 820 and a nozzle 230, 830 such that when the trigger 220, 820 is activated, the cleaning solution is dispensed through the nozzle 230, 830. As should be understood, the atomizer 100 and the hand pump 600 are some example dispensers that may be utilized in various embodiments. In some other embodiments, the dispenser may be a dispenser other than a hand pump or atomizer (e.g., a direct application dispenser via which diluted and/or deconcentrated cleaning solution is dispensed directly to a cleaning surface via a sponge and/or the like secured to a base, etc.). Various aspects of cleaning

capsules 300 and some example dispensers (e.g., atomizer 100, hand pump 600) will now be described in more detail below.

Exemplary Cleaning Capsule

[0022] In an example embodiment, a cleaning capsule 300 is configured to hold cleaning solution therein. In an example embodiment, the cleaning capsule 300 comprises a first surface and a second surface. For example, in an example embodiment, the first surface is at least a part of a lid portion 310 of the cleaning capsule 300 and the second surface is at least a portion of a cup portion 330 of the cleaning capsule 300. The cup portion 330 is configured to hold cleaning solution therein. The lid portion 310 is configured to seal the cleaning solution within the cup portion 330. The cleaning capsule 300 may further comprise a ridge portion 320. The ridge portion 320 may be where the lid portion 310 is secured to the cup portion 330. The ridge portion 320 may further be configured to assist in securing the cleaning capsule 300 into the capsule chamber 245, 845 of the dispenser (e.g., atomizer 100, hand pump 600, and/or the like). For example, the ridge portion 320 may be configured to aid in the alignment of the cleaning capsule within the capsule chamber 245, 845 of the dispenser or be secured within the capsule chamber 245, 845 or other portion of the dispenser.

[0023] In various embodiments, the cup portion 330 is configured to hold one to two ounces of cleaning solution. In an example embodiment, the capsule is configured to contain 0.5 to 2 ounces of the cleaning solution. In an example embodiment, the capsule is configured to contain 1.5 to 3 ounces of the cleaning solution. In other embodiments, smaller or larger volumes of cleaning solution may be accommodated by the cup portion 310. In an example embodiment, the cup portion 330 is configured to hold a single cleaning session worth of cleaning solution. For example, the cup portion 330 may be configured to hold enough cleaning solution to clean the windows of one house or apartment, to clean one bathroom, and/or the like. In various embodiments, the cup portion 330 may be configured to hold between about 10-100 doses (each dose corresponding to a single actuation of the atomizer to dispense a dose of cleaning solution through the nozzle). In example embodiments, the cleaning solution may be a concentrated cleaning solution. In some embodiments, the concentrated cleaning solution may be of a cleaning solution strength that is ready to use. In some embodiments, the cleaning solution may be intended to be diluted (e.g., by putting water or another dilution chemical into the reservoir

portion 420 before the cleaning solution to the reservoir portion). In various embodiments, the concentrated cleaning solution may be a concentrated glass cleaning solution, bath cleaning solution, general purpose kitchen cleaning solution, metal cleaning solution, hand soap, dish soap, laundry stain remover, scent neutralizing solution, air freshener, and/or the like. In example embodiments, the cup portion 330 may be color-coded based on the cleaning solution type contained therein. In example embodiments, the cup portion 330 may be made of aluminum, another metal, plastic, cardboard, paperboard, a natural post-consumer recycled material, or another appropriate material and/or combination thereof.

[0024] In example embodiments, the lid portion 310 may be configured to seal the cleaning solution within the cup portion 330. For example, the cup portion 330 may comprise an opening and the lid portion 310 may seal the opening. In example embodiments, the lid portion 310 comprises aluminum (e.g., a rigid sheet of aluminum and/or aluminum foil), another metal, plastic, cardboard, paperboard, or another appropriate material and/or combination thereof. In an example embodiment, the lid portion 310 may be a foil lid. The lid portion 310 may have information/data printed thereon. For example, the printed information/data may comprise a cleaning solution type indicator, branding, and/or other printed information and/or indicia. The printed information/indicia may be on an exterior surface of the lid portion 310 opposite the side of the lid portion 310 that directly faces the opening of the cup portion 330.

[0025] In example embodiments, the lid portion 310 may be sealed to the cup portion 330 to a ridge portion 320 surrounding the opening of the cup portion 330. The ridge portion 320 may be configured to assist in securing the cleaning capsule 300 into the capsule chamber 245, 845. For example, when the cleaning capsule 300 is properly inserted into the capsule chamber 245, 845, the ridge portion 320 may be configured to abut a seat 241, 841 within the capsule chamber 245, 845 of the handle 200, 800. When the lever 240, 840 is in a closed position, the ridge portion 320 may be engaged by both a lip of the lever arm 246, 846 and a seat 241, 841 within the capsule chamber 245, 845, thereby holding the cleaning capsule 300 in place with respect to components of the handle 200, 800.

Exemplary Atomizer Dispenser

[0026] In various embodiments, the dispenser may be an atomizer 100 configured for spraying and/or otherwise dispensing diluted and/or deconcentrated cleaning solution. In various embodiments, the atomizer 100 comprises a handle 200 and a reservoir portion 400.

Exemplary Atomizer Dispenser Handle

[0027] In example embodiments, the handle 200 comprises a reservoir pipette 215, a dispensing pipette 210, a trigger 220, a nozzle 230, attachment portion 250, a capsule chamber 245, and a lever 240. In an example embodiment, the lever 240 comprises and/or is coupled to a lever arm 246 and lever arm support(s) 248. The dispensing pipette 210 is configured to, when the trigger 220 is activated, receive cleaning solution via a mouth 412 of the dispensing pipette 210 that is disposed within a reservoir portion 420 of the base 400 and provide the cleaning solution to the nozzle 230. In an example embodiment, the nozzle 230 is an atomizer nozzle. In an example embodiment, the cleaning solution enters the mouth 412 of the dispensing pipette 410 from the reservoir portion 420 of the base such that the cleaning solution may be dispensed (e.g., as a mist, stream, and/or the like) via the nozzle 230. The attachment portion 250 is configured to secure the handle 200 to the base 400 (e.g., via threadings and/or another mating mechanism). In example embodiments, various portions of the handle 200 may comprise aluminum, another metal, and/or other appropriate resilient material.

[0028] In example embodiments, the dispensing pipette 210 is attached to the handle 200 and extends out from the bottom of the handle 200 where the attachment portion 250 connects the handle 200 to the base 400. The dispensing pipette 210 is configured to receive cleaning solution into the mouth 412 of the dispensing pipette 210 when the trigger 220 is pulled and/or activated. The dispensing pipette 210 may then provide the cleaning solution to the nozzle 230 for dispensing. The nozzle 230 may be adjustable such that a user may select how directed the stream and/or mist of cleaning solution is that is dispensed through the nozzle 230. In an example embodiment, the nozzle 230 and the general direction in which the nozzle 230 dispenses the cleaning solution defines a nozzle axis. The dispensing pipette 210 defines a pipette axis. The nozzle axis and pipette axis intersect and define a plane. In example embodiments, the angle between the nozzle axis and the pipette axis in the plane is between 60 and 120 degrees. In an example embodiment, the angle between the nozzle axis and the pipette axis in the plane is between 80 and 100 degrees or approximately 90 degrees.

[0029] When the handle 200 is secured to the base 400, the cleaning solution may be forced into the dispensing pipette 210, in response to the trigger 220 being activated. For example, a user may squeeze, press, pull, push, or otherwise activate the trigger 220 to cause cleaning solution to be dispensed from the nozzle 230. For example, when the trigger 220 is activated, the cleaning solution is pumped from the reservoir portion 420 through the dispensing pipette 210 and dispensed out of the nozzle 230. For example, the trigger 220 may be actuated to create a pressure differential along the length of the dispensing pipette 210, causing the cleaning solution to be dispensed from the reservoir portion 420 through dispensing pipette 210, and out of the nozzle 230.

[0030] The attachment portion 250 of the handle 200 is configured to secure the handle 200 to the base 400. The attachment portion 250 may comprise threads or another mating mechanism for securing the handle 200 to the base 400. For example, the attachment portion 450 of the base may comprise corresponding threads such that the base 400 may be screwed onto the handle 200.

[0031] In various embodiments, the handle further comprises a capsule chamber 245. In an example embodiment, the nozzle 230 is disposed on first end 260 of the handle 200 and the capsule chamber 245 is disposed at, adjacent, and/or proximate to a second end 265 of the handle 200. The first end 260 of the handle 200 and the second end 265 of the handle 200 are located on opposite sides of the handle 200 with respect to the nozzle axis. The capsule chamber 245 portion of the handle 200 is configured to receive the cleaning capsule 300 and comprises one or more elements configured to puncture the cleaning capsule 300 to release the cleaning solution contained within the cleaning capsule 300. In example embodiments, the capsule chamber 245 may comprise a seat 241 configured to have the ridge portion 320 of the cleaning capsule 300 engage therewith. The capsule chamber 245 may further comprise a cup receiving portion 243 configured to receive the cup portion 330 of a cleaning capsule 300 therein. The capsule chamber 245 may further comprise a mechanism for at least partially opening the cleaning capsule 300. For example, the capsule chamber 245 may comprise a first puncture pin 242 configured to at least partially open (e.g., puncture) a first surface of the cleaning capsule 300 (e.g., the lid portion 310 of the cleaning capsule 300) when the lever 240 is moved from an open position to a closed position on the handle 200. A second puncture pin 244 is configured to partially open (e.g., puncture) a second surface of the cleaning capsule 300 (e.g., the capsule cup 330) simultaneous to the first puncture of the first surface (e.g., lid portion 310) of the cleaning

capsule 300. This is achieved upon moving of the lever 240 from an open position to a closed position when the cleaning capsule 300 is disposed within the cup receiving portion 243 and the ridge portion 320 of the cleaning capsule 300 is engaged with the seat 241. For example, when the lever 240 is in the open position, a lever arm 246 may be in a position such that the cup receiving portion 243 of the capsule chamber 245 is accessible (e.g., a cleaning capsule 300 may be inserted into and/or removed from the cup receiving portion 243). The lever arm 246 may be supported at least in part in the open position by one or more lever arm supports 248. When the lever 240 is in the closed position, the lever arm 246 is in a position such that the lever arm at least partially covers the cup receiving portion 243 such that cup receiving portion 243 is not accessible (e.g., a cleaning capsule 300 may not be inserted into and/or removed from the cup receiving portion 243). For example, the lever arm 246 may be coupled to the lever 240 (e.g., possibly via the lever arm support(s) 248) such that moving of the lever 240 from the open position to the closed position causes the lever arm 246 into a position where the lever arm 246 encloses and/or at least partially seals the cup receiving portion 243 of the capsule chamber 245. In various embodiments, the lever arm 246 is coupled to the lever 240 (e.g., possibly via the lever arm support(s) 248) such that moving the lever 240 from the closed position to the open position causes the lever arm 246 to move into a position where the cup receiving portion 243 is accessible (e.g., not closed or sealed such that a cleaning capsule may be inserted into and/or removed from the cup receiving portion 243).

[0032] In various embodiments, moving the lever 240 from the open position to the closed position causes the lever arm 246 to move to enclose and/or at least partially seal the capsule 300 within the capsule chamber 245. In an example embodiment, moving the lever 240 from the open position to the closed position may cause the capsule chamber 245 to move (e.g., on a hinge mechanism provided via the one or more lever arm supports 248 and/or the like) such that the opening of the cup receiving portion 243 moves toward the lever arm 246. For example, the capsule chamber 245 may move such that a ridge portion 320 of the cleaning capsule 300 disposed within the capsule chamber 245 (e.g., such that the ridge portion 320 is proximate and/or engages seat 241) engages a lip of the lever arm 246.

[0033] In various embodiments, the first puncture pin 242 is disposed on and/or coupled to the lever arm 246 such that moving the lever 240 from the open position to the closed position causes the first puncture pin 242 to engage and puncture a first surface (e.g., the capsule lid 310)

of a cleaning capsule 300 disposed within the cup receiving portion 243. The second puncture pin 244 may be disposed in the cup receiving portion 243. In an example embodiment, the moving of the lever 240 from the open position to the closed position causes a lip of the lever arm 246 to engage the ridge portion 320 of the cleaning capsule disposed within the cup receiving portion 243, causing the cup 330 to be pressed against the second puncture pin 244 within the cup receiving portion 243 such that the second puncture pin 244 punctures the cup 330. In an example embodiment, the second puncture pin is coupled to the reservoir pipette 215 such that cleaning solution may vacate the cleaning capsule 300 via the puncture in the cup 330 cause by engagement of the second puncture pin 244 with the cup 330 and enter the reservoir pipette 215. For example, the second puncture pin 244 may be a hollow puncture pin affixed to a mouth 217 of the reservoir pipette 215. The reservoir pipette 215 facilitates the flow of concentrated cleaning solution from the cleaning capsule 300 to the reservoir portion 420 of the base 400 for dilution and mixture.

Exemplary Atomizer Base

[0034] In example embodiments, the atomizer 100 comprises a base 400. The base 400 may comprise a reservoir portion 420, and an attachment portion 450. In example embodiments, the attachment portion 450 is configured to secure the base 400 to the handle 200. The reservoir portion 420 is configured to receive cleaning solution therein and provide the cleaning solution to the mouth 412 of the dispensing pipette 210 such that the cleaning solution may be dispensed via the nozzle 230. In example embodiments, the base 400 may comprise aluminum, another metal, or other appropriate material such as glass, plastic, wood, rubber, and/or the like.

[0035] In example embodiments, the reservoir portion 420 may comprise a hollow portion within the base 400 configured for receiving cleaning solution therein from the cleaning capsule 300 (e.g., via the reservoir pipette 215). For example, the cleaning capsule 300 may provide cleaning solution to the reservoir portion 420. The reservoir portion 420 may contain the cleaning solution therein. In example embodiments, the reservoir portion 420 may be configured to receive and/or contain a dilution chemical (e.g., water) therein for mixing with concentrated cleaning solution provided by the cleaning capsule 300. In example embodiments, the reservoir portion 420 may be configured to have a dilution chemical (e.g., water) and concentrated cleaning solution mixed therein to provide a diluted concentrated cleaning solution.

[0036] The reservoir portion 420 may further comprise an end surface 425. The end surface 425 may define one end of the hollow portion of the reservoir portion 420. Wall 427 may join the end surface 425 to the attachment portion 450. The interior of the wall 427 and the end surface 425 may define the hollow portion of the reservoir portion 420. In various embodiments, the end surface 425 is planar, convex, concave, and/or a combination thereof. In example embodiments, the mouth 412 of the dispensing pipette 210 may be located directly below the attachment portion 450 proximate the center of the bottom surface 425, as shown in Figure 1.

[0037] In example embodiments, the attachment portion 450 of the base 400 comprises a mechanism for securing the base 400 to the handle 200. For example, the attachment portion 450 of the base 400 may comprise threads that correspond to threads on the attachment portion 250 of the handle 200 and/or another mating mechanism that corresponds to (e.g., is configured to mate with) the mating mechanism of the attachment portion 250 of the handle 200.

Exemplary Hand Pump Dispenser

[0038] In various embodiments, the dispenser may be a hand pump 600 configured for dispensing diluted and/or deconcentrated cleaning solution (e.g., hand soap, dish soap, gel and/or gel-like diluted and/or deconcentrated cleaning solution, and/or the like). In various embodiments, the hand pump 600 comprises a handle 800 and a reservoir portion 700.

Exemplary Hand Pump Dispenser Handle

[0039] In example embodiments, the handle 800 comprises a reservoir pipette 815, a dispensing pipette 810, a trigger 820, a nozzle 830, attachment portion 850, a capsule chamber 845, and a lever 840. In an example embodiment, the lever 840 comprises and/or is coupled to a lever arm 846 and lever arm support(s) 848. The dispensing pipette 810 is configured to, when the trigger 820 is activated, receive cleaning solution via a mouth 712 of the dispensing pipette 810 that is disposed within a reservoir portion 720 of the base 700 and provide the diluted and/or deconcentrated cleaning solution to the nozzle 830. In an example embodiment, the diluted and/or deconcentrated cleaning solution enters the mouth 712 of the dispensing pipette 810 from the reservoir portion 720 of the base such that the diluted and/or deconcentrated cleaning solution may be dispensed (e.g., as a stream, gel, and/or the like) via the nozzle 830. The attachment portion 850 is configured to secure the handle 800 to the base 700 (e.g., via

threadings and/or another mating mechanism). In example embodiments, various portions of the handle 800 may comprise aluminum, another metal, and/or other appropriate resilient material.

[0040] In example embodiments, the dispensing pipette 810 is attached to the handle 800 and extends out from the bottom of the handle 800 where the attachment portion 850 connects the handle 800 to the base 700. The dispensing pipette 810 is configured to receive diluted and/or deconcentrated cleaning solution into the mouth 712 of the dispensing pipette 810 when the trigger 820 is pushed, pressed, lowered, and/or activated. The dispensing pipette 810 may then provide the diluted and/or deconcentrated cleaning solution to the nozzle 830 for dispensing therethrough. The nozzle 830 may be adjustable such that a user may select how much diluted and/or deconcentrated cleaning solution is dispensed via the nozzle 830 with each activation of the trigger 820. In an example embodiment, the nozzle 830 and the general direction in which the nozzle 830 dispenses the cleaning solution defines a nozzle axis. The dispensing pipette 810 defines a pipette axis. The nozzle axis and pipette axis intersect and define a plane. In example embodiments, the angle between the nozzle axis and the pipette axis in the plane is between 60 and 120 degrees. In an example embodiment, the angle between the nozzle axis and the pipette axis in the plane is between 80 and 100 degrees or approximately 90 degrees.

[0041] When the handle 800 is secured to the base 700, the diluted and/or deconcentrated cleaning solution may be forced into the dispensing pipette 810, in response to the trigger 820 being activated. For example, a user may push or otherwise activate the trigger 820 to cause cleaning solution to be dispensed from the nozzle 830. In an example embodiment, the trigger 820 of the hand pump 600 is a surface on top of the handle 800 and a user activates the trigger by pressing, pushing, and/or the like on the trigger 820 surface, causing the handle 800 to move from a decompressed state to a compressed state and causing (diluted and/or deconcentrated) cleaning solution to be dispensed from the hand pump 600 via the nozzle 830. For example, when the trigger 820 is activated, the cleaning solution is pumped from the reservoir portion 720 through the dispensing pipette 810 and dispensed out of the nozzle 830. For example, the trigger 820 may be actuated to create a pressure differential along the length of the dispensing pipette 810, causing the diluted and/or deconcentrated cleaning solution to be dispensed from the reservoir portion 720 through dispensing pipette 810, and out of the nozzle 830.

[0042] The attachment portion 850 of the handle 800 is configured to secure the handle 800 to the base 700. The attachment portion 850 may comprise threads or another mating mechanism

for securing the handle 800 to the base 700. For example, the attachment portion 750 of the base may comprise corresponding threads such that the base 700 may be screwed onto the handle 800. In an example embodiment, the attachment portion 850 may include a spring 835 and/or the like configured to cause the handle 800 to return to a decompressed state after the trigger 820 has been activated and the released. For example, activation of the trigger 820 (e.g., a user pressing and/or pushing down on the trigger 820) may cause the handle to enter a compressed state where the spring 835 is compressed. In an example embodiment, the diluted and/or deconcentrated cleaning solution is dispensed as the handle 800 moves from the decompressed state to the compressed state through the action of the trigger 820 being activated. When the user releases the pressure on the trigger 820, the spring 835 may cause the handle 800 to return to a decompressed state.

[0043] In various embodiments, the handle further comprises a capsule chamber 845. In an example embodiment, the nozzle 830 is disposed on first end 860 of the handle 800 and the capsule chamber 845 is disposed at, adjacent, and/or proximate to a second end 865 of the handle 800. The first end 860 of the handle 800 and the second end 865 of the handle 800 are located on opposite sides of the handle 800 with respect to the nozzle axis. The capsule chamber 845 portion of the handle 800 is configured to receive the cleaning capsule 300 and comprises one or more elements configured to puncture the cleaning capsule 300 to release the cleaning solution contained within the cleaning capsule 300. In example embodiments, the capsule chamber 845 may comprise a seat 841 configured to have the ridge portion 320 of the cleaning capsule 300 engage therewith. The capsule chamber 845 may further comprise a cup receiving portion 843 configured to receive the cup portion 330 of a cleaning capsule 300 therein. The capsule chamber 845 may further comprise a mechanism for at least partially opening the cleaning capsule 300. For example, the capsule chamber 845 may comprise a first puncture pin 842 configured to at least partially open (e.g., puncture) a first surface of the cleaning capsule 300 (e.g., the lid portion 310 of the cleaning capsule 300) when the lever 840 is moved from an open position to a closed position on the handle 800. A second puncture pin 844 is configured to partially open (e.g., puncture) a second surface of the cleaning capsule 300 (e.g., the capsule cup 330) simultaneous to the first puncture of the first surface (e.g., lid portion 310) of the cleaning capsule 300. This is achieved upon moving of the lever 840 from an open position to a closed position when the cleaning capsule 300 is disposed within the cup receiving portion 843 and the

ridge portion 320 of the cleaning capsule 300 is engaged with the seat 841. For example, when the lever 840 is in the open position, a lever arm 846 may be in a position such that the cup receiving portion 843 of the capsule chamber 845 is accessible (e.g., a cleaning capsule 300 may be inserted into and/or removed from the cup receiving portion 843). The lever arm 846 may be supported at least in part in the open position by one or more lever arm supports 848. When the lever 840 is in the closed position, the lever arm 846 is in a position such that the lever arm at least partially covers the cup receiving portion 843 such that cup receiving portion 843 is not accessible (e.g., a cleaning capsule 300 may not be inserted into and/or removed from the cup receiving portion 843). For example, the lever arm 846 may be coupled to the lever 840 (e.g., possibly via the lever arm support(s) 848) such that moving of the lever 840 from the open position to the closed position causes the lever arm 846 into a position where the lever arm 846 encloses and/or at least partially seals the cup receiving portion 843 of the capsule chamber 845. In various embodiments, the lever arm 846 is coupled to the lever 840 (e.g., possibly via the lever arm support(s) 848) such that moving the lever 840 from the closed position to the open position causes the lever arm 846 to move into a position where the cup receiving portion 843 is accessible (e.g., not closed or sealed such that a cleaning capsule may be inserted into and/or removed from the cup receiving portion 843).

[0044] In various embodiments, moving the lever 840 from the open position to the closed position causes the lever arm 846 to move to enclose and/or at least partially seal the capsule 300 within the capsule chamber 845. In an example embodiment, moving the lever 840 from the open position to the closed position may cause the capsule chamber 845 to move (e.g., on a hinge mechanism provided via the one or more lever arm supports 848 and/or the like) such that the opening of the cup receiving portion 843 moves toward the lever arm 846. For example, the capsule chamber 845 may move such that a ridge portion 320 of the cleaning capsule 300 disposed within the capsule chamber 845 (e.g., such that the ridge portion 320 is proximate and/or engages seat 841) engages a lip of the lever arm 846.

[0045] In various embodiments, the first puncture pin 842 is disposed on and/or coupled to the lever arm 846 such that moving the lever 840 from the open position to the closed position causes the first puncture pin 842 to engage and puncture a first surface (e.g., the capsule lid 310) of a cleaning capsule 300 disposed within the cup receiving portion 843. The second puncture pin 844 may be disposed in the cup receiving portion 843. In an example embodiment, the

moving of the lever 840 from the open position to the closed position causes a lip of the lever arm 846 to engage the ridge portion 320 of the cleaning capsule disposed within the cup receiving portion 843, causing the cup 330 to be pressed against the second puncture pin 844 within the cup receiving portion 843 such that the second puncture pin 844 punctures the cup 330. In an example embodiment, the second puncture pin is coupled to the reservoir pipette 815 such that cleaning solution may vacate the cleaning capsule 300 via the puncture in the cup 330 cause by engagement of the second puncture pin 844 with the cup 330 and enter the reservoir pipette 815. For example, the second puncture pin 844 may be a hollow puncture pin affixed to a mouth 817 of the reservoir pipette 815. The reservoir pipette 815 facilitates the flow of concentrated cleaning solution from the cleaning capsule 300 to the reservoir portion 720 of the base 700 for dilution and mixture.

Exemplary Hand Pump Base

[0046] In example embodiments, the hand pump 600 comprises a base 700. The base 700 may comprise a reservoir portion 720, and an attachment portion 750. In example embodiments, the attachment portion 750 is configured to secure the base 700 to the handle 800. The reservoir portion 720 is configured to receive cleaning solution therein and provide the cleaning solution to the mouth 712 of the dispensing pipette 810 such that the cleaning solution may be dispensed via the nozzle 830. In example embodiments, the base 700 may comprise aluminum, another metal, or other appropriate material.

[0047] In example embodiments, the reservoir portion 720 may comprise a hollow portion within the base 700 configured for receiving cleaning solution therein from the cleaning capsule 300 (e.g., via the reservoir pipette 815). For example, the cleaning capsule 300 may provide cleaning solution (e.g., concentrated cleaning solution) to the reservoir portion 720. The reservoir portion 720 may contain the cleaning solution therein. In example embodiments, the reservoir portion 720 may be configured to receive and/or contain a dilution chemical (e.g., water) therein for mixing with concentrated cleaning solution provided by the cleaning capsule 300. In example embodiments, the reservoir portion 720 may be configured to have a dilution chemical (e.g., water) and concentrated cleaning solution mixed therein to form a diluted and/or deconcentrated cleaning solution.

[0048] The reservoir portion 720 may further comprise an end surface 725. The end surface 725 may define one end of the hollow reservoir portion 720. Wall 727 may join the end surface 725 to the attachment portion 750. The interior of the wall 727 and the end surface 725 may define the hollow portion of the reservoir portion 720. In various embodiments, the end surface 725 is planar, convex, concave, and/or a combination thereof. In example embodiments, the mouth 712 of the dispensing pipette 810 may be located directly below the attachment portion 750 proximate the center of the bottom surface 725, as shown in Figure 5.

[0049] In example embodiments, the attachment portion 750 of the base 700 comprises a mechanism for securing the base 700 to the handle 800. For example, the attachment portion 750 of the base 700 may comprise threads that correspond to threads on the attachment portion 850 of the handle 800 and/or another mating mechanism that corresponds to (e.g., is configured to mate with) the mating mechanism of the attachment portion 850 of the handle 800. In an example embodiment, the attachment portion 750 comprises a ledge or lip configured to engage the spring 835. For example, the spring 835 may engage the ledge or lip of the attachment portion 750 when the trigger 820 is activated, as the handle 800 approaches the compressed state, when the handle 800 is in the compressed state, and as the handle 800 moves from the compressed state to the decompressed state.

Exemplary Method of Use

[0050] Figure 6 provides a flowchart that illustrates various processes that may be completed to dispense a cleaning solution from a dispenser (e.g., an atomizer 100, hand pump 600, and/or the like). Starting at block 502, the base 400, 700 is secured to the handle 200, 800. For example, a user may mate the mating mechanism(s), threads, and/or the like of the attachment portion 450, 750 of the base 400, 700 with the corresponding mating mechanism(s), threads, and/or the like of the attachment portion 250, 850 of the handle 200, 800. In an example embodiment, a user may add a dilution chemical (e.g., water) to the reservoir portion 420, 720 of the base 400, 700 prior to securing the base 400, 700 to the handle 200, 800. For example, the reservoir portion 420, 720 and/or base 400, 700 may include a fill line and the user may add the dilution chemical to the reservoir portion 420, 720 until the dilution chemical reaches the fill line. Various other mechanisms may be used to guide a user in adding an appropriate amount of the dilution

chemical (e.g., water) to the reservoir portion 420, 720 of the base 400, 700 in various embodiments.

[0051] At block 504, with the lever 240, 840 in the open position, a cleaning capsule 300 is inserted into a capsule chamber 245, 845 of the handle. For example, a user may insert a cleaning capsule 300 into the capsule chamber 245, 845 of the handle 200, 800 such that the cup portion 330 of the cleaning capsule is within the cup receiving portion 243, 843 and the ridge portion 320 rests against and/or proximate a seat 241, 841 of the capsule chamber 245, 845. For example, the cup portion 330 may be pressed against and/or proximate a second puncture pin 244, 844 of the capsule chamber 245, 845. In some embodiments, the user may press the cleaning capsule 300 into the capsule chamber 245, 845 until the second puncture pin 244, 844 punctures the cup portion 330 to create a puncture hole. In other embodiments, the cleaning capsule 300 may rest against and/or be positioned in the vicinity of the second puncture pin 244, 844 but not actually engaged with the second puncture pin 244, 844 at this point.

[0052] At block 506, the lever 240, 840 is moved from an open position to a closed position. In example embodiments, moving the lever 240, 840 from the open position to the closed position causes the lever arm 246, 846 coupled to the lever 240, 840 to enclose and/or at least partially seal the cup receiving portion 243, 843 of the capsule chamber 245, 845. For example, moving the lever 240, 840 from the open position to the closed position causes the lever arm 246, 846 to secure the cleaning capsule 300 within the capsule chamber 245, 845. For example, a lip of the lever arm 246, 846 may engage the lid 310 side of ridge portion 320 of the cleaning capsule 300 to press the opposite side of the ridge portion 320 (e.g., the cup portion 330 side) against and/or into engagement with the seat 241, 841 of the capsule chamber 245, 845. Moving of the lever 240, 840 from the open position to the closed position may further cause the first puncture pin 242, 842 to open (e.g., puncture) the lid portion 310. Thus, a puncture hole may be created in the lid portion 310. If the second puncture pin 244, 844 has not yet punctured the cup portion 330, closing of the lever 240, 840 may cause the second puncture pin 244, 844 to puncture the cup portion 330. Thus, the cleaning solution may be infused, released, provided, and/or the like into the reservoir pipette 215, 815. In some embodiments, the cleaning solution is not infused, released, provided and/or the like into the reservoir pipette 215, 815 until both the first puncture pin 242, 842 and the second puncture pin 244, 844 have punctured the cleaning capsule 300. In various embodiments, the cleaning solution flows through the mouth 217, 817 of

the reservoir pipette 215, 815, through the reservoir pipette 215, 815, and into the reservoir portion 420, 720 of the base 400, 700.

[0053] In an example embodiment, as noted above, before securing the handle 200, 800 to the base 400, 700, the reservoir portion 420, 720 may be at least partially filled with a dilution chemical (e.g., water). Thus, when the concentrated cleaning solution is provided to the reservoir portion 420, 720 (as a result of the lever 240, 840 being moved from the open position to the closed position), the resulting diluted and/or deconcentrated cleaning solution in the reservoir portion 420, 720 may be a regular or normal strength cleaning solution. For example, the concentrated cleaning solution provided by the cleaning capsule 300 to the reservoir portion 420, 720 through the reservoir pipette 215, 815 may be diluted to a less concentrated cleaning solution.

[0054] At block 508, the dispenser (e.g., atomizer 100, hand pump 600) may be shaken, stirred, swirled, turned, twirled, and/or the like. For example, the user may shake, stir, swirl, turn, twirl, and/or the like the dispenser. In example embodiments, shaking, stirring, swirling, turning, twirling, and/or the like the dispenser may cause at least a portion of any cleaning solution still residing the cleaning capsule 300 to be infused, released, and/or provided to the reservoir portion 420, 720 through the reservoir pipette 215, 815. In another example, shaking the dispenser may cause the concentrated cleaning solution to mix generally uniformly with any dilution chemical (e.g., water) within the reservoir portion 420, 720 such that the resulting solution is a relatively uniform diluted and/or deconcentrated cleaning solution.

[0055] At block 510, the trigger 220, 820 may be activated to cause the cleaning solution to be dispensed. For example, the user may activate the trigger 220, 820 by pulling, pushing, pressing, pumping, squeezing, or otherwise activating the trigger 220, 820. When the trigger 220, 820 is activated, a pressure differential along the length of the dispensing pipette 210, 810 may cause cleaning solution to enter the mouth 412, 812 of the dispensing pipette 210, 810, and be provided to the nozzle 230, 830, from which the cleaning solution is dispensed. Thus, activating the trigger 220, 820 causes cleaning solution to be dispensed from the reservoir portion 420, 720, through dispensing pipette 210, 810, and out of the nozzle 230, 830. In various embodiments, a user activates the trigger 220, 820 (e.g., pushing, pressing, squeezing, and/or the like the trigger 220, 820) to cause the trigger 220, 820 to enter a compressed state. When the user stops activating the trigger 220, 820 (e.g., releases the trigger 220, 820), a spring 835 and/or the like

may cause the trigger 220, 820 to return to a decompressed state from the compressed state such that the trigger 220, 820 is ready to be activated again.

Conclusion

[0056] Many modifications and other embodiments of the invention set forth herein will come to mind to one skilled in the art to which this invention pertains having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the invention is not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

THAT WHICH IS CLAIMED:

1. A dispenser for dispensing a cleaning solution from a capsule, the dispenser comprising:

a handle, the handle comprising:

a nozzle,

a trigger,

a lever configured to be moved between an open position and a closed position,

a dispensing pipette, and

a capsule chamber;

a base, the base comprising:

a reservoir portion configured for receiving cleaning solution from the capsule;

wherein (a) the handle is configured to be secured to the base, (b) when the capsule is positioned within the capsule chamber and the lever is moved from the open position to the closed position, the cleaning solution is provided to the reservoir portion, and (c) when the trigger is activated, the cleaning solution is dispensed from the reservoir portion through the dispensing pipette and out of the nozzle.

2. The dispenser of Claim 1, wherein the reservoir portion is configured to receive a dilution chemical configured to dilute the cleaning solution, and wherein the dilution chemical is dispensed from the reservoir portion through the pipette and out of the nozzle with the cleaning solution.

3. The dispenser of Claim 2, wherein the dilution chemical comprises water.

4. The dispenser of Claim 1, wherein the cleaning solution is one of glass cleaning solution, bath cleaning solution, general purpose kitchen cleaning solution, metal cleaning solution, hand soap, dish soap, laundry stain remover, scent neutralizing solution, or air freshener solution.

5. The dispenser of Claim 1, wherein the dispenser is one of an atomizer or a hand pump dispenser.

6. The dispenser of Claim 1, wherein the handle further comprises a reservoir pipette and when the lever is moved from the open position to the closed position, the cleaning solution is provided to the reservoir portion via the reservoir pipette.

7. The dispenser of Claim 1, wherein the lever is coupled to a first puncture pin configured to puncture a first surface of the capsule positioned within the capsule chamber when the lever is moved from the open position to the closed position.

8. The dispenser of Claim 1, wherein the capsule chamber comprises a second puncture pin configured to puncture a second surface of the capsule positioned within the capsule chamber.

9. The dispenser of Claim 8, wherein the puncturing of the second surface by the second puncture pin is caused by the lever being moved from the open position to the closed position.

10. The dispenser of Claim 8, wherein the second puncture pin is coupled to a reservoir pipette such that cleaning solution exiting the capsule via a puncture generated by the second puncture pin enters a mouth of the reservoir pipette, wherein the reservoir pipette is configured to provide the cleaning solution to the reservoir portion of the base.

11. The dispenser of Claim 8, wherein the second puncture pin is hollow.

12. The dispenser of Claim 1, wherein the capsule chamber comprises a second puncture pin configured to puncture a cup portion of the capsule.

13. A method of dispensing a cleaning solution from a capsule, the method comprising:

providing a dispenser, the dispenser comprising:

a handle configured to (a) receive a capsule containing cleaning solution therein and (b) be secured to a base, the handle comprising:

a nozzle,
a trigger,
a lever configured to move between an open position and a closed position,
a dispensing pipette, and
a capsule chamber configured for receiving the capsule therein; and
the base, the base comprising:
a reservoir portion configured for receiving cleaning solution from the capsule;

inserting the capsule into the capsule chamber;

moving the lever from the open position to the closed position, wherein the moving of the lever from the open position to the closed position causes the cleaning capsule to be opened to enable the cleaning solution to flow into the reservoir portion;

diluting the cleaning solution with a dilution chemical in the reservoir portion; and

activating the trigger, thereby causing cleaning solution and dilution chemical to be dispensed from the reservoir portion, through the dispensing pipette, and out of the nozzle.

14. The method of Claim 13, wherein the cleaning solution is one of glass cleaning solution, bath cleaning solution, general purpose kitchen cleaning solution, metal cleaning solution, hand soap, dish soap, laundry stain remover, scent neutralizing solution, or air freshener solution.

15. The method of Claim 13, wherein the dispenser is one of an atomizer or a hand pump dispenser.

16. The method of Claim 13, further comprising adding the dilution chemical to the reservoir portion of the base.

17. The method of Claim 16, further comprising, after adding the dilution chemical to the reservoir portion of the base, securing the base to the handle.

18. The method of Claim 13, wherein the handle further comprises a reservoir pipette and the cleaning solution flows through the reservoir pipette from the capsule into the reservoir portion.

19. The method of Claim 13, wherein the handle further comprises a first puncture pin and a second puncture pin and moving the lever from the open position to the closed position causes the first puncture pin to puncture a first surface of the capsule.

20. The method of Claim 19, wherein moving the lever from the open position to the closed position causes the second puncture pin to puncture a second surface of the capsule.

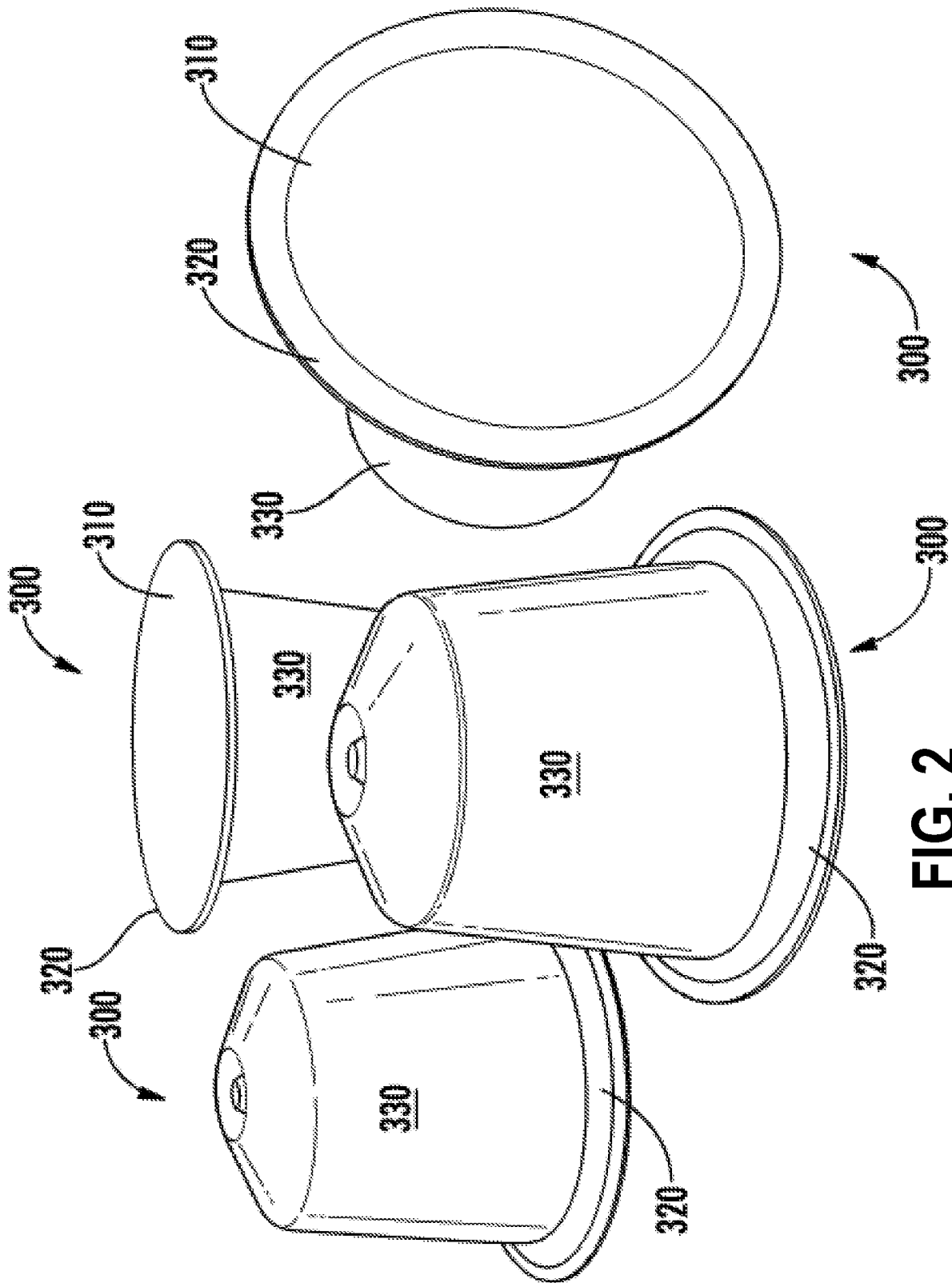


FIG. 2

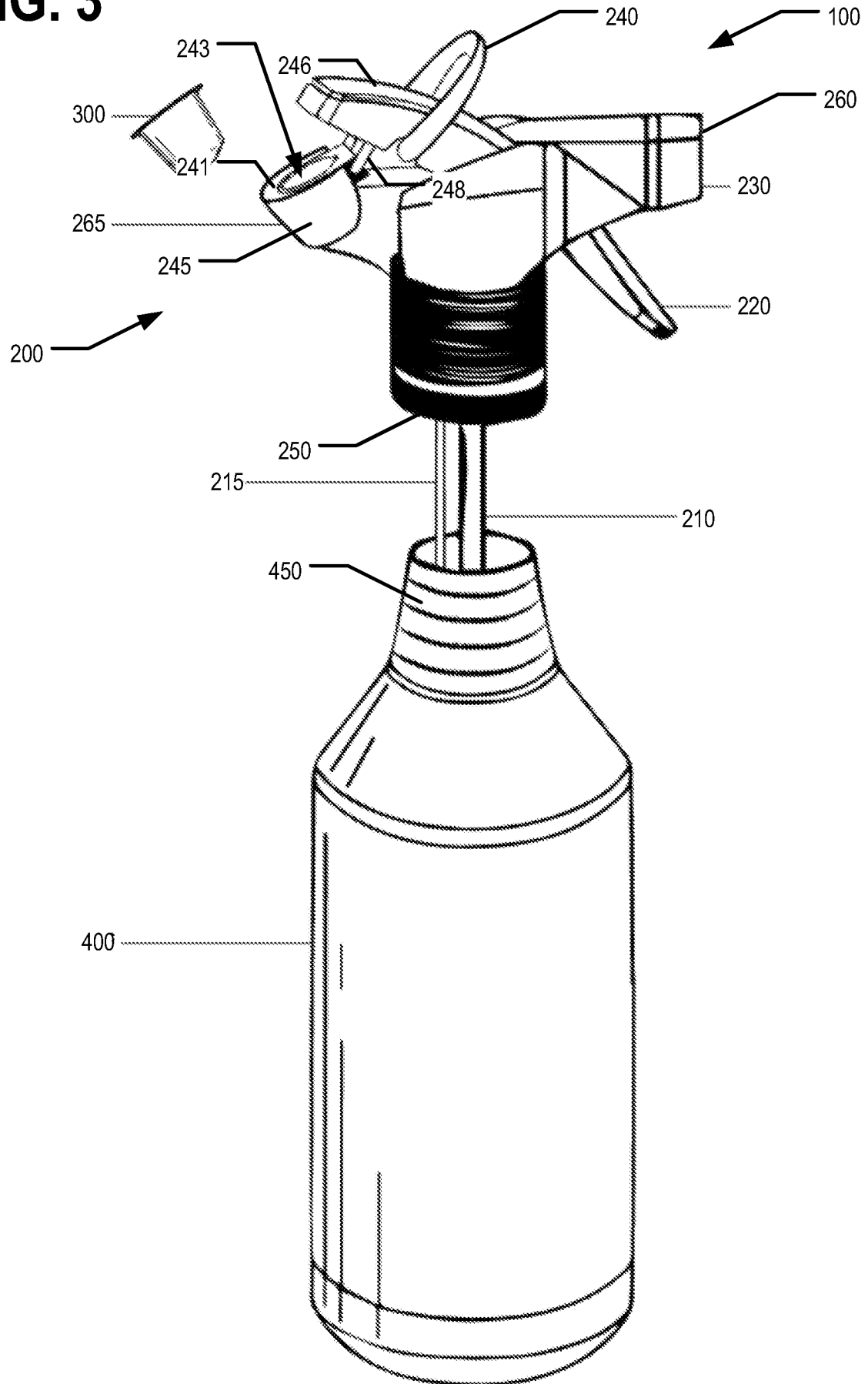
FIG. 3

FIG. 4

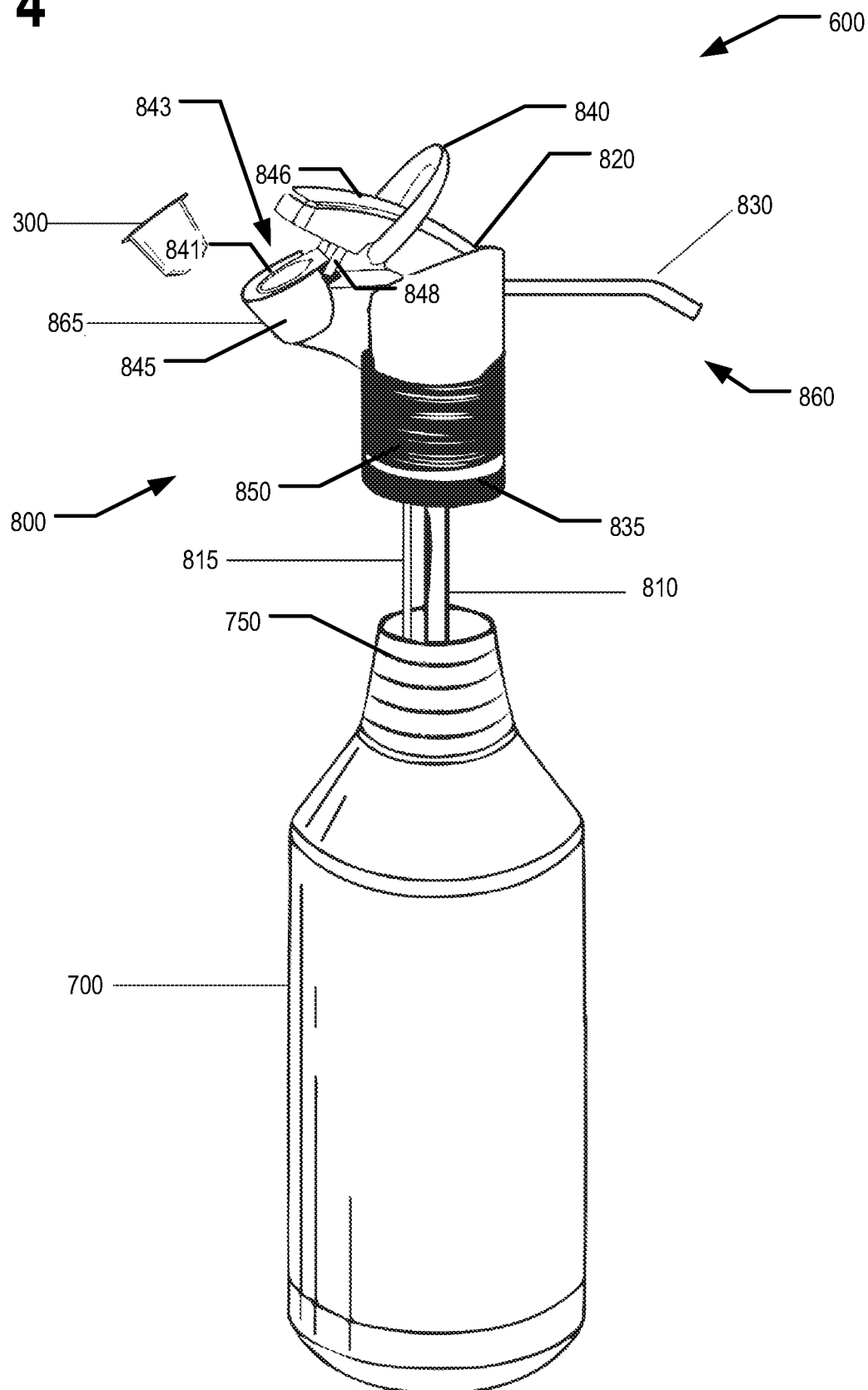


FIG. 5

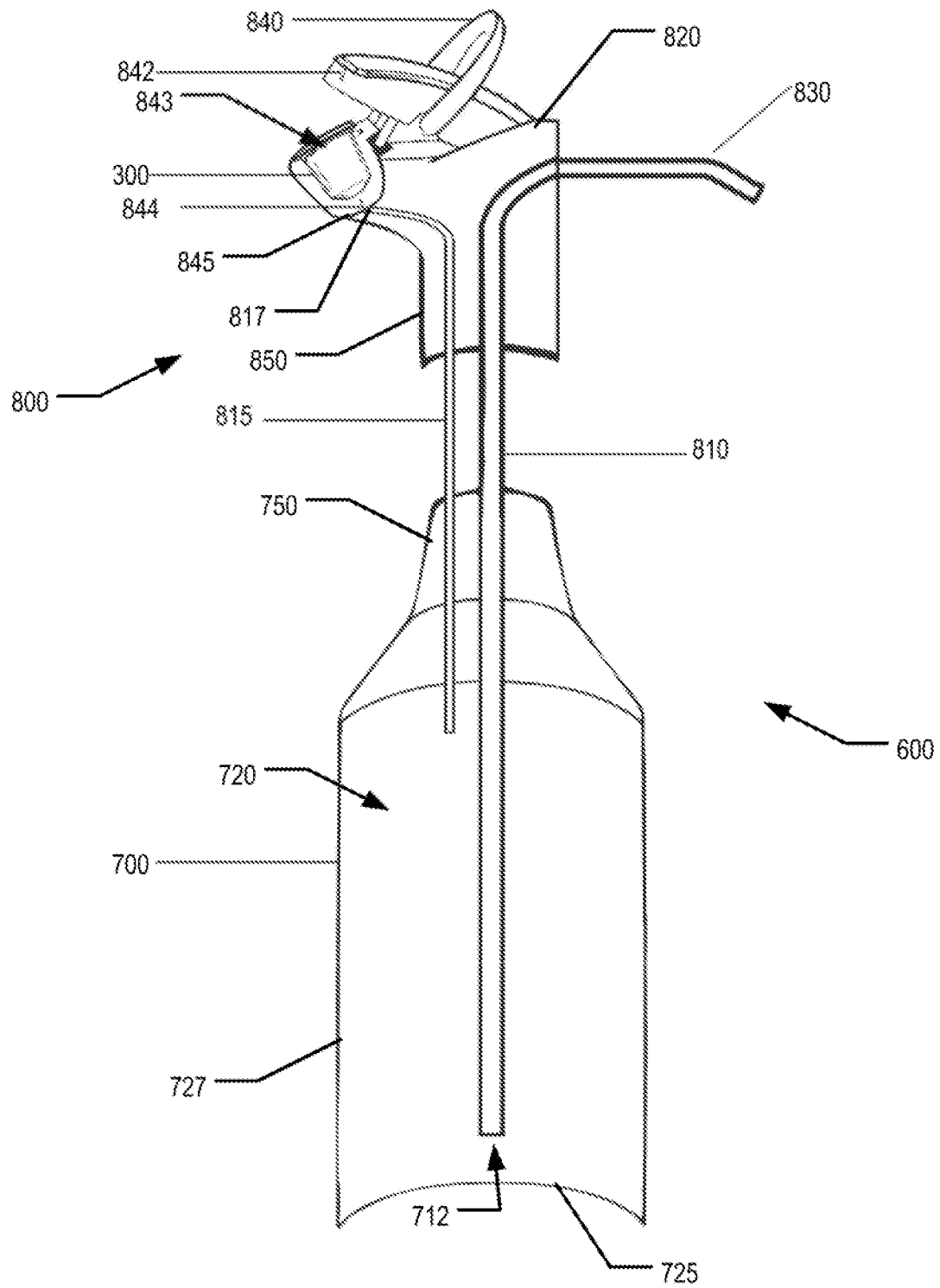
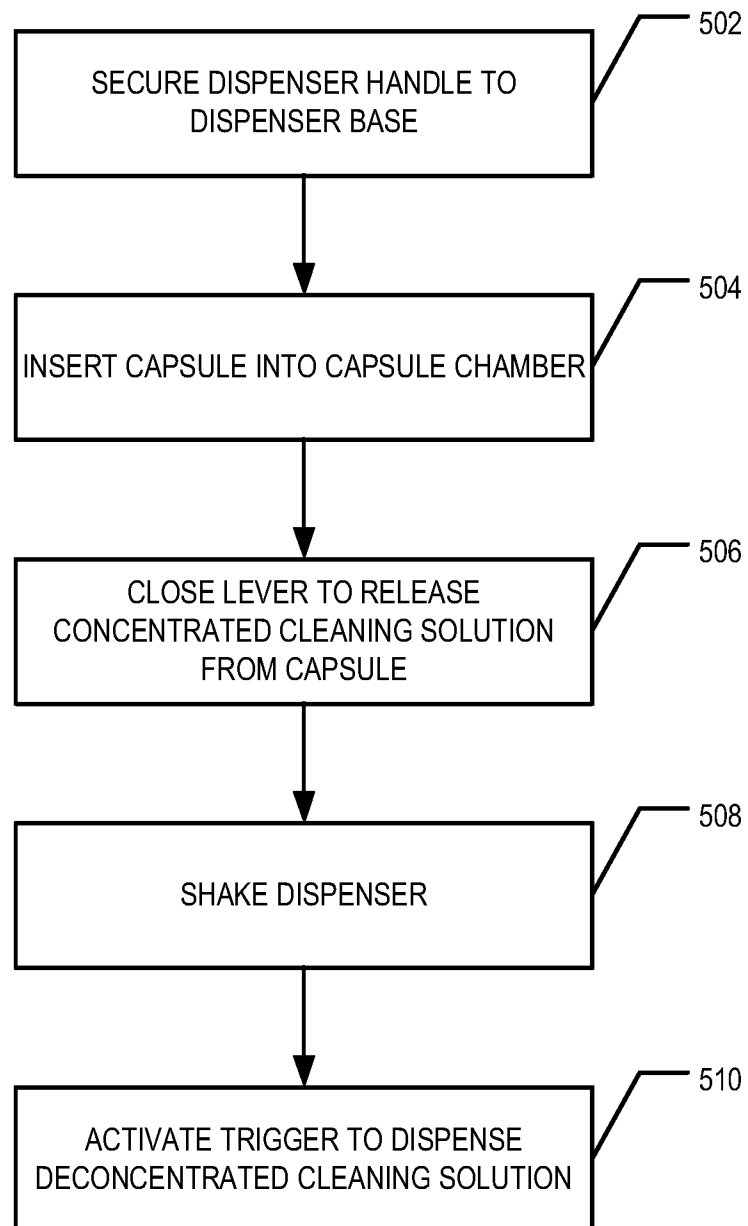


FIG. 6

A. CLASSIFICATION OF SUBJECT MATTER**B05B 11/00(2006.01)i, B05B 15/30(2018.01)i, B08B 3/08(2006.01)i**

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B05B 11/00; B05B 7/24; B05B 7/26; B67D 005/00; B67D 5/06; B67D 5/42; B67D 5/52; B05B 15/30; B08B 3/08

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: sprayer, capsule, cartridge, lever and mix

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2010-0206903 A1 (BANCO et al.) 19 August 2010 paragraphs [0034], [0038]-[0039], [0041], [0064], [0067] and figures 3, 11.	1-20
Y	US 5964377 A (DEMAREST et al.) 12 October 1999 column 11, lines 5-10 and figure 7.	1-20
A	US 2005-0224515 A1 (MON et al.) 13 October 2005 paragraphs [0005]-[0008] and figure 1.	1-20
A	US 2009-0277928 A1 (BRUCKNER, ERIK) 12 November 2009 abstract and figures 1-2.	1-20
A	KR 20-2014-0004697 U (LG HOUSEHOLD & HEALTH CARE LTD.) 18 August 2014 claim 1 and figure 6.	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"D" document cited by the applicant in the international application

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

27 February 2020 (27.02.2020)

Date of mailing of the international search report

27 February 2020 (27.02.2020)

Name and mailing address of the ISA/KR

International Application Division

Korean Intellectual Property Office

189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea



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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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