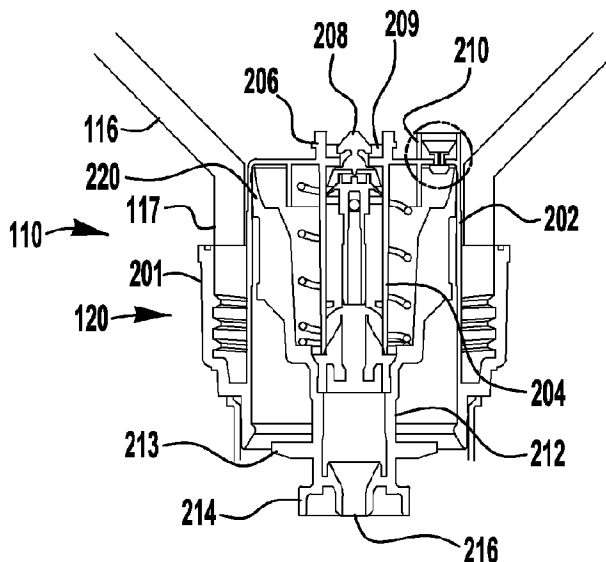




(86) Date de dépôt PCT/PCT Filing Date: 2014/11/24
(87) Date publication PCT/PCT Publication Date: 2015/06/25
(45) Date de délivrance/Issue Date: 2021/11/09
(85) Entrée phase nationale/National Entry: 2016/06/14
(86) N° demande PCT/PCT Application No.: US 2014/067030
(87) N° publication PCT/PCT Publication No.: 2015/094592
(30) Priorité/Priority: 2013/12/19 (US61/918,504)

(51) Cl.Int./Int.Cl. *A47K 5/14* (2006.01),
B05B 11/00 (2006.01), *B05B 7/00* (2006.01)
(72) Inventeurs/Inventors:
HARRIS, DONALD R., US;
MARSHALL, AARON D., US;
MCNULTY, JOHN J., US
(73) Propriétaire/Owner:
GOJO INDUSTRIES, INC., US
(74) Agent: MARKS & CLERK

(54) Titre : UNITE DE RECHARGE COMPORTANT UN RECEPTACLE NON COMPRESSIBLE ET UNE POMPE A MOUSSE COMPORTANT UN DISPOSITIF D'EVACUATION D'AIR PERMETTANT D'EVACUER L'AIR DUDIT RECEPTACLE
(54) Title: A REFILL UNIT HAVING A NON-COLLAPSING CONTAINER AND A FOAM-PUMP WITH A VENT TO VENT SAID CONTAINER



(57) Abrégé/Abstract:

Exemplary embodiments of refill units having foam pumps and non-collapsing containers are disclosed herein. In some exemplary embodiments, the refill unit includes a non-collapsing container and a foam pump. The foam pump includes a compressible air chamber. The foam pump includes a passage between the interior of the compressible air chamber and the interior of the container. A regulating valve regulates flow of air from the interior of the compressible air chamber to the interior of the container.

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

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
25 June 2015 (25.06.2015)



(10) International Publication Number
WO 2015/094592 A1

- (51) International Patent Classification:
A47K 5/14 (2006.01) *B05B 11/00* (2006.01)
B05B 7/00 (2006.01)
- (21) International Application Number:
PCT/US2014/067030
- (22) International Filing Date:
24 November 2014 (24.11.2014)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/918,504 19 December 2013 (19.12.2013) US
- (71) Applicant: **GOJO INDUSTRIES, INC.** [US/US]; One Gojo Place, Suite 500, P.O. Box 991, Akron, OH 44309 (US).
- (72) Inventors: **HARRIS, Donald, R.**; 68 Old Forge Road, Tallmadge, OH 44278 (US). **MARSHALL, Aaron, D.**; 4356 Aylesford Road, Uniontown, OH 44685 (US). **MCNULTY, John, J.**; 8712 Breckenridge Oval, Broadview Heights, OH 44147 (US).
- (74) Agent: **BONNER, Chet, J.**; Calfee, Halter & Griswold LLP, The Calfe Building, 1405 East Sixth St., Cleveland, OH 44114 (US).
- (81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, 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,

[Continued on next page]

(54) Title: A REFILL UNIT HAVING A NON-COLLAPSING CONTAINER AND A FOAM-PUMP WITH A VENT TO VENT SAID CONTAINER

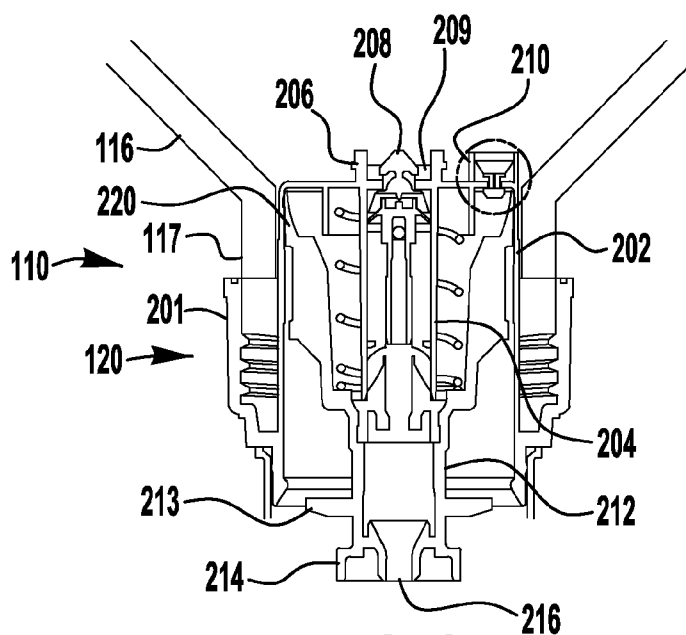


FIG. 2

(57) Abstract: Exemplary embodiments of refill units having foam pumps and non-collapsing containers are disclosed herein. In some exemplary embodiments, the refill unit includes a non-collapsing container and a foam pump. The foam pump includes a compressible air chamber. The foam pump includes a passage between the interior of the compressible air chamber and the interior of the container. A regulating valve regulates flow of air from the interior of the compressible air chamber to the interior of the container.

WO 2015/094592 A1



SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, **Published:**
GW, KM, ML, MR, NE, SN, TD, TG).

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

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

A REFILL UNIT HAVING A NON-COLLAPSING CONTAINER AND A FOAM-PUMP WITH A VENT TO VENT SAID CONTAINER

TECHNICAL FIELD

[0001/2] The present invention relates generally to liquid dispenser systems and more particularly to air-vented liquid dispensers, as well as refill units for use with such dispensers.

BACKGROUND OF THE INVENTION

[0003] Liquid dispenser systems, such as liquid soap and sanitizer dispensers, provide a user with an amount of liquid upon actuation of the dispenser. It is desirable to provide such a dispenser having a rigid container that is vented with air so that the pump may re-prime itself after a dispensing action. It is also desirable to provide such a dispenser that is easily recharged once the container runs out of liquid to dispense, and that is inexpensive to produce.

SUMMARY

[0004] Exemplary embodiments of refill units having foam pumps and non-collapsing containers are disclosed herein. In some exemplary embodiments, the refill unit includes a non-collapsing container and a foam pump. The foam pump includes a compressible air chamber.

The foam pump includes a passage between the interior of the compressible air chamber and the interior of the container. A regulating valve regulates flow of air from the interior of the compressible air chamber to the interior of the container.

[0005] Another exemplary embodiment of a refill unit includes a non-collapsing container and a foam pump. The foam pump includes a compressible air chamber and an air passage between the interior of the compressible air chamber and an interior of the container. A moveable valve secured to the passage. The movable valve has a first position that prevents pressurized air from flowing from the air chamber into the interior of the container and a second position that allows vacuum pressure in the interior of the container to draw air from the interior of the compressible air chamber to the interior of the container.

[0006] Another exemplary refill unit includes a non-collapsing container and a foam pump. The foam pump has a compressible air chamber and a passage between the interior of the compressible air chamber and an interior of the container. The foam pump includes a valve secured to the passage. The valve has a wiper seal located within the interior of the container and a second seal located at least partially within the compressible air chamber.

[0007] In this way, a simple and economical refill unit with a container vent located between the air pump chamber and the container are provided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] These and other features and advantages of the present invention will become better understood with regard to the following description and accompanying drawings in which:

[0009] Figure 1 is a cross-section of an exemplary liquid dispenser having a refill unit with a pull pump;

[0010] Figures 2 and 3 are partial cross-sections of the exemplary refill unit.

[0011] Figures 2A and 3A are enlarged cross sections of an exemplary venting valve of the exemplary embodiment of the refill unit.

DETAILED DESCRIPTION

[0001] Figure 1 illustrates an exemplary embodiment of a dispenser 100. The cross-section of Figure 1 is taken through the housing 102 to show the pump 120 and container 116. Dispenser 100 includes a disposable refill unit 110. The disposable refill unit 110 includes a container 116 connected to pump 120. The dispenser 100 may be a wall-mounted system, a counter-mounted system, an un-mounted portable system movable from place to place or any other kind of liquid dispenser system. Dispenser 100 is a foam dispenser.

[0002] The container 116 forms a liquid reservoir that contains a supply of foamable liquid within the disposable refill unit 110. In various embodiments, the contained liquid could be, for example, a soap, a sanitizer, a cleanser, a disinfectant. In the exemplary disposable refill unit 110, the container 116 is a non-collapsible container and can be made of thin plastic or like material. The container 116 may advantageously be refillable, replaceable or both refillable and replaceable.

[0003] In the event the liquid stored in the container 116 of the installed disposable refill unit 110 runs out, or the installed refill unit 110 otherwise has a failure, the installed refill unit 110 may be removed from the foam dispenser 100. The empty or failed disposable refill unit 110 may then be replaced with a new disposable refill unit 110.

[0004] The housing 102 of the dispenser 100 contains one or more actuating members 104 to activate the pump 120. As used herein, actuator or actuating members or mechanisms include one or more parts that cause the dispenser 100 to move liquid, air or foam. Actuator 104 is generically illustrated because there are many different kinds of pump actuators which may be employed in the foam dispenser 100. The actuator 104 of the foam dispenser 100 may be any type of actuator such as, for example, a manual lever, a manual pull bar, a manual push bar, a manual rotatable crank, an electrically activated actuator or other means for actuating the pump 120. Electronic actuators may additionally include a sensor 132 for detecting the presence of an object and to provide for a hands-free dispenser system with touchless operation. Various intermediate linkages, such as for example linkage 105, connect the actuator member 104 to the pump 120 within the system housing 102. An aperture 115 is located in bottom plate 103 of

housing 102 and allows liquid dispensed from the nozzle 125 of pump 120 to be dispensed to a user.

[0005] Figures 2 and 3 are partial cross-sections of an exemplary embodiment of refill unit 110. Foam pump 120 includes a collar 201 that connects to the neck 117 of container 116. Collar 201 may connect to neck 117 of container 116 in any manner such as for example a threaded connection.

[0006] Foam pump 120 includes a housing 202 that fits at least partially within neck 117. Foam pump 120 includes an inner cylindrical housing 204. In addition, housing 202 includes an first annular projection 208 and an aperture 209. Aperture 209 extends from inside the container 116 into liquid pump chamber 306. A liquid inlet valve 208 is located within aperture 209. Liquid inlet valve 208 is a one-way valve that allows liquid to flow from the container 116 into liquid pump chamber 306. Liquid inlet valve 208 may be any type of one-way valve, such as for example, a wiper valve, ball and spring valve, an umbrella valve, a flapper valve or the like.

[0007] Cylindrical pump housing 202 includes a second annular projection 210. Located within annular projection 210 is an aperture 211. Aperture 211 extends between the inside of the container 116 and air pump chamber 320 of foam pump 120. A venting valve 240 or regulating valve is located at least partially within aperture 211. As can be more clearly seen in Figure 2A and Figure 3A, venting valve 240 includes an elongated body 241 with a head 242 on a first side. Head 242 includes a sealing surface 244. On the second side of elongated body 211 is a wiper seal 246. Wiper seal 246 engages the inner wall of annular projection 210. Venting valve 240 moves freely up and down in aperture 241 and there is a gap between elongated member 241 and the walls of aperture 211 to allow air to flow past elongated body 211.

[0008] Foam pump 120 includes a piston 212. Piston 212 has a first engagement member 213 and a second engagement member 214. First engagement member 213 and second engagement member 214 engages an actuator 105 (Figure 1) to move piston 212 upward and downward. Piston 212 includes an air piston seal 220 and a liquid piston seal 310. Piston 212 also includes a sealing member 312. In addition, piston 212 includes an aperture that is located between liquid piston seal 310 in seal 312 and extends to the interior of piston 212. Piston 212 has a hollow

interior 316 from aperture 314 to outlet to 216. In addition foam pump 120 includes a biasing member 327 to bias piston 212 in the downward direction.

[0009] During operation, as piston 212 moves downward from the position shown in Figure 2 to the position shown in Figure 3, liquid flows from the container 116 past one-way liquid inlet valve 208 into liquid pump chamber 306. As air pump chamber 320 expands, air is drawn in through outlet 216 into air pump chamber 320. In addition, venting valve 240 moves from the position shown in Figure 2A to the position shown in Figure 3A. When venting valve 240 moves downward, sealing surface 244 moves away from housing 245 and opens a path from air pump chamber 322 to area 250 located below wiper seal 246. As liquid is pumped out of container 116 a vacuum pressure is created in container 116. Once the vacuum pressure in container 116 rises above the cracking pressure of venting valve 240, air from area 250 flows into container 116 to vent the container.

[0010] When foam pump 120 moves from the position shown in Figure 3 upward to the position shown in Figure 2, liquid in pump chamber 306 flows past liquid outlet seal 310 through aperture 314 and down outlet passage 316. Simultaneously, air flows from air pump chamber 320 through passage 321 and into passage 316 where it mixes with the liquid. The liquid and air mixture in passage 316 is forced through screens 317. The turbulence caused by the screens creates a rich foam that is forced out of outlet 216. The pressure in air pump chamber 320 pushes venting valve 240 upward causing sealing surface 244 to engage housing portion 245 and seals the air pump chamber 320 from the interior of container 116 to prevent air from flowing from the air pump chamber 320 into container 316.

[0011] While the present invention has been illustrated by the description of embodiments thereof and while the embodiments have been described in considerable detail, it is not the intention of the applicant to restrict or in any way limit the scope of the appended claims to such detail. Additional advantages and modifications will readily appear to those skilled in the art. Therefore, the invention, in its broader aspects, is not limited to the specific details, the representative apparatus and illustrative examples shown and described. Accordingly, departures may be made from such details without departing from the spirit or scope of the applicant's general inventive concept.

CLAIMS

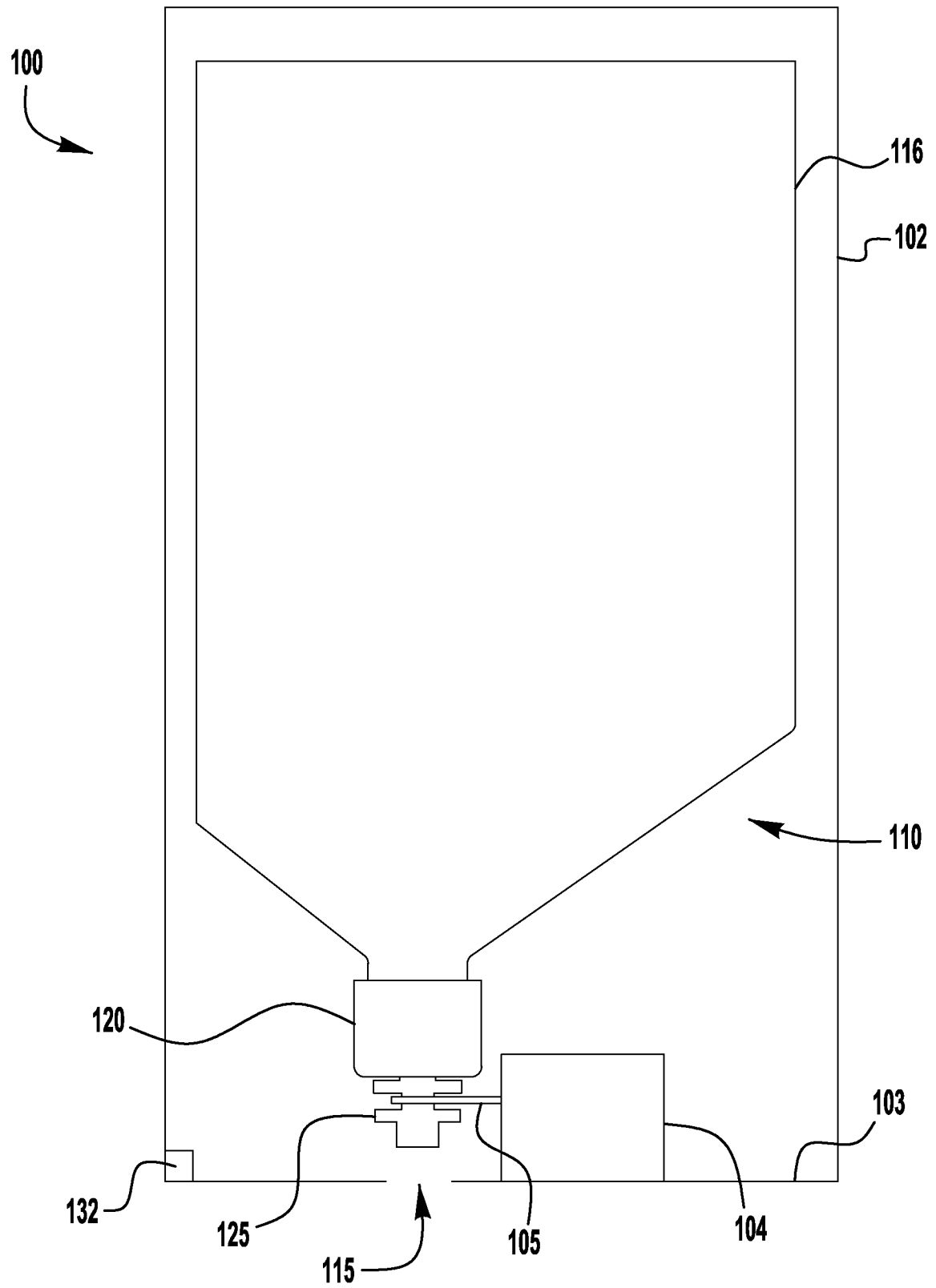
We claim:

1. A refill unit comprising:
 - a non-collapsing container;
 - a foam pump;
 - the foam pump having a compressible air chamber;
 - a passage between the interior of the compressible air chamber and the interior of the container; and
 - a regulating valve regulating flow from the interior of the compressible air chamber to the interior of the container.
2. The refill unit of claim 1 wherein the regulating valve includes a wiper seal in fluid communication with the interior of the container.
3. The refill unit of claim 2 wherein vacuum pressure in the container causes regulating valve to allow air to pass from the interior of the compressible air chamber to the interior of the container.
4. The refill unit of claim 2 wherein pressure in the compressible air chamber causes regulating valve to prevent air from passing from the interior of the compressible pump chamber to the interior of the container.
5. The refill unit of claim 1 wherein the regulating valve includes a seal member in fluid communication with the interior of the pump chamber, wherein when the pump chamber is compressed, the seal member seals against a wall of the compressible air chamber and prevents air from passing through the passage.
6. The refill unit of claim 1 wherein the regulating valve moves upward to seal off the interior of the air chamber from the interior of the container when the air chamber is pressurized
7. The refill unit of claim 1 wherein the regulating valve moves downward when the air chamber is not pressurized.

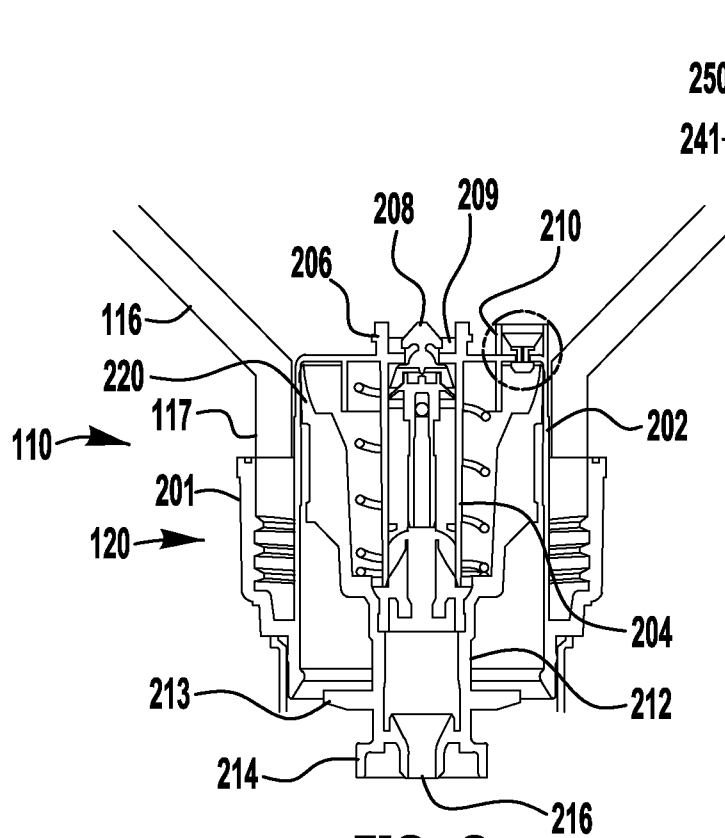
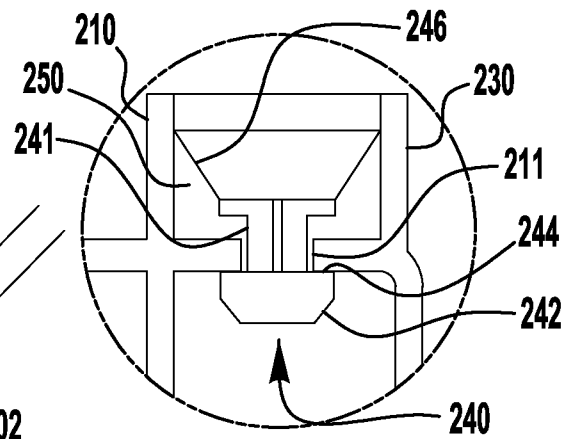
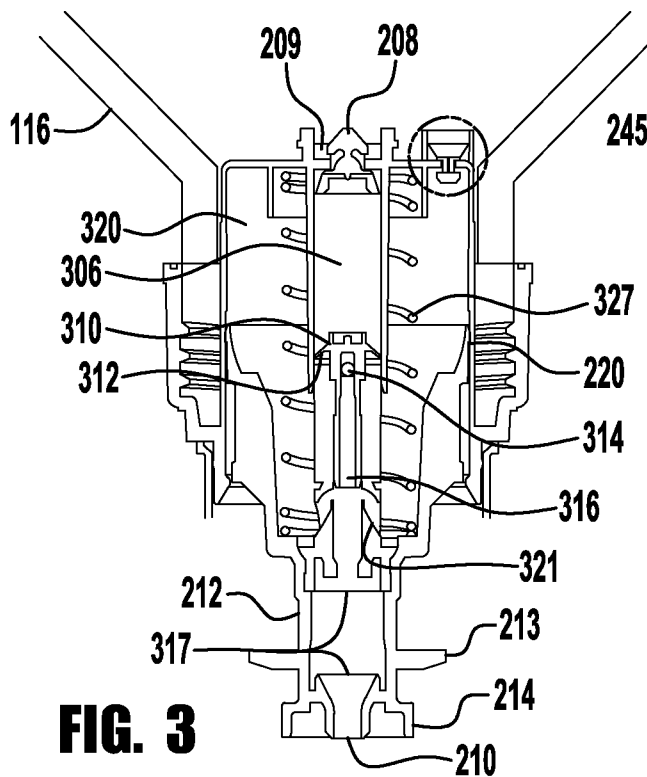
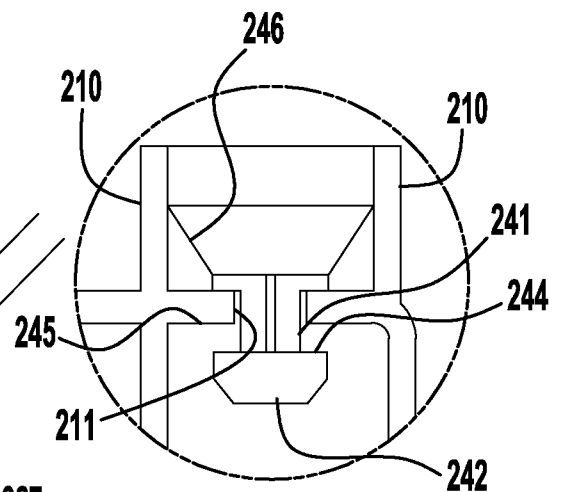
8. The refill unit of claim 1 wherein the regulating valve includes a first seal for sealing against a wall in the interior of the container and a second seal for sealing against a wall in the interior of the air chamber.
9. The refill unit of claim 1 wherein the regulating valve moves downward due to the weight of a fluid in the container.
10. The refill unit of claim 1 wherein the regulating valve is a unitary part.
11. A refill unit comprising:
 - a non-collapsing container;
 - a foam pump;
 - the foam pump having a compressible air chamber;
 - a passage between the interior of the compressible air chamber and an interior of the container; and
 - a movable valve secured to the passage, the movable valve having a first position that prevents pressurized air from flowing from the air chamber into the interior of the container and a second position that allows vacuum pressure in the interior of the container to draw air from the interior of the compressible air chamber to the interior of the container.
12. The refill unit of claim 11 wherein weight of fluid in the container urges the movable valve downward.
13. The refill unit of claim 11 wherein pressure in the compressible air chamber urges the movable valve upward.
14. The refill unit of claim 11 wherein vacuum pressure in the interior of the container causes air to flow from the compressible air chamber to the interior of the container when the movable valve is in a downward position.
15. The refill unit of claim 11 wherein vacuum pressure in the interior of the container does not cause air to flow from the compressible air chamber to the interior of the container when the movable valve is in an upward position.
16. The refill unit of claim 11 wherein the movable valve includes a wiper seal on a first side of the passage and a second seal on a second side of the passage.

17. The refill unit of claim 11 wherein the movable seal is a unitary piece.
18. A refill unit comprising:
 - a non-collapsing container;
 - a foam pump;
 - the foam pump having a compressible air chamber;
 - a passage between the interior of the compressible air chamber and an interior of the container; and
 - a valve secured to the passage, the valve having a wiper seal located within the interior of the container and a second seal located at least partially within the compressible air chamber.
19. The refill unit of claim 18 wherein the valve moves between a first position that prevents pressurized air from flowing from the interior of the compressible air chamber to the interior of the container and a second position that allows vacuum pressure in the interior of the container to draw air from the compressible air chamber when the compressible air chamber is not pressurized.
20. The refill unit of claim 18 wherein fluid in the container biases the valve in a downward direction.

1/2

**FIG. 1**

2/2

**FIG. 2****FIG. 2A****FIG. 3****FIG. 3A**

