Exemplary embodiments of top loading and unloading dispensers are disclosed herein. One embodiment includes a housing having a guide plate located in the housing. The guide plate includes two or more guide members, the two or more guide members have a first portion and a second portion. The first portions of the two or more guide members are closer together then the second portions of the two or more guide members. The dispenser also includes an actuator carriage and a pair of engagement blades carried by the actuator carriage. Each engagement blade has a first end that engages with one of the two or more guide members. The engagement members having opposing recesses for engaging the nozzle of a pump of a refill unit. When the pair of engagement blades move along the second portion of the two or more guide members, the size of the recess expands.
DISPENSER HAVING TOP LOADING AND UNLOADING REFILL UNITS

RELATED APPLICATIONS

This non-provisional utility patent application claims priority to and the benefits of U.S. Provisional Patent Application Ser. No. 61/860,254 filed on Aug. 23, 2013 and entitled DISPENSER HAVING TOP LOADING AND UNLOADING REFILL UNITS. This application is incorporated herein by reference in its entirety.

TECHNICAL FIELD

The present invention relates generally to liquid dispenser systems and more particularly to top loading and unloading dispensers.

BACKGROUND OF THE INVENTION

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 refill unit that is loaded and unloaded from the top by simply lowering the refill unit downward with a vertical motion and lifting the refill unit vertically to remove. Prior art dispensers allow a user to insert a refill unit using a vertical motion, but require the refill unit to be moved laterally to remove the refill unit.

SUMMARY

Exemplary embodiments of top loading and unloading dispensers are disclosed herein. One embodiment, includes a housing having a guide plate located in the housing. The guide plate includes two or more guide members, the two or more guide members have a first portion and a second portion. The first portions of the two or more guide members are closer together then the second portions of the two or more guide members. The dispenser also includes an actuator carriage and a pair of engagement blades carried by the actuator carriage. Each engagement blade has a first end that engages with one of the two or more guide members. The engagement members having opposing recesses for engaging the nozzle of a pump unit. When the pair of engagement blades move along the first portion of the two or more guide members the size of the recess remains constant, and when the pair of engagement blades move along the second portion of the two or more guide members, the size of the recess expands.

Another exemplary top loading and unloading dispenser includes housing having a guide plate located in the housing. The guide plate has two or more guide members. At least one guide member that extends vertically and has retaining portion and a release portion. The release portion is above the retaining portion. The dispenser also includes an actuator carriage and an engagement member carried by the actuator carriage. The engagement member is linked to the at least one guide member. The engagement member engages with the nozzle of a pump unit when the refill unit is installed in the dispenser. When the engagement member moves along the retaining portion of the at least one guide member the nozzle of the pump remains engaged with the engagement member. When the engagement member moves along the release portion of the at least one guide member, the engagement member disengages with the nozzle.

Another exemplary top loading and unloading dispenser includes a housing and a guide plate located in the housing. The guide plate has a pair of guide slots. A first portion of the slots extend vertically and a second portion of the slots diverge away from one another. The dispenser includes an actuator carriage and a pair of engagement blades carried by the actuator carriage. Each engagement blade has a projection that engages with one of the guide slots. The engagement members having opposing recesses for engaging the nozzle of a pump unit. When the pair of engagement blades move along the first portion of guide slot the size of the recess remains a substantially constant size, and when the pair of engagement blades move along the second portion of the two or more guide members, the size of the recess expands to release the nozzle of a pump.

BRIEF DESCRIPTION OF DRAWINGS

For a complete understanding of the aspects, structures and techniques of the invention, reference should be made to the following detailed description and accompanying drawings wherein:

FIGS. 1 and 2 are front elevational views of an exemplary embodiment of a dispenser system.

FIG. 3 is an exploded perspective view of a nozzle of a pump of the refill unit;

FIG. 3A is an enlarged cross-sectional view of a nozzle of a pump of the refill unit;

FIG. 4 is a prospective partial cross-sectional view of the dispenser system;

FIG. 5 is an exploded perspective view of another exemplary embodiment of a dispenser; and

FIG. 6 is a prospective partial cross-sectional view of the dispenser of FIG. 5.

DETAILED DESCRIPTION

FIGS. 1 and 2 are front elevational views of an exemplary embodiment of a dispenser system 100. The exemplary dispenser system 100 includes a refill unit 200 and a dispenser 120. Refill unit 110 includes a container 112, a locking ring 202 and a pump 204. Pump 204 includes an annular recess 206, a piston 208 and an outlet nozzle 214. Dispenser 120 includes a front housing 104A, a container release member 122, and an actuator 106.

Container 112 is preferably a non-collapsible container made of a thin plastic material. In some embodiments container 112 may be a collapsible container. Container 112 may contain a fluid, such as a sanitizer, a foamy sanitizer, a lotion, liquid soap, a foamy liquid soap, cosmetics or the like.

Pump 204 is a springless pump. Piston 208 requires an actuator to physically moved up to dispense a dose of fluid and to physically moved down to reprim the pump 204. Pump 204 may be any type of pump, such as, for example, a piston pump. An exemplary springless piston pump is disclosed in U.S. Pat. No. 7,815,076 entitled Vacuum Released Valve, which is incorporated herein by reference. Pump 204 may be made entirely of a recyclable material, such as, for example, plastic, because pump 204 does not require a spring.

As described in more detail below, dispenser 120 is top loadable and top unloadable by moving the refill unit 110 vertically. To install refill unit 110 in a dispenser, refill unit 110 is simply moved above dispenser 120 and lowered
straight downward. Lock ring 202 engages a container locking mechanism 320 (FIG. 4) and is retained in dispenser 120. To remove refill unit 110, container release member 122 is pushed, which releases container locking mechanism 320 and refill unit 110 is lifted straight upward.

[0019] FIG. 3 is an exploded view of the exemplary dispenser system 100. Refill unit 112 includes pump 204, which includes a first portion 204A and a second portion 204B. First portion 204A includes a collar 309 that connects to container 112 by a snap-fit connector; however, the two components may be joined together by any means, such as, for example, a threaded connection, a welded connection, an adhesive connection, or the like. Collar 309 connects to lock ring 202. The connection may be a snap-fit connection, a friction-fit connection, an adhesive connection, a welded connection, or the like.

[0020] Lock ring 202 includes a locking tab 329 and an alignment tab 328. Second pump portion 204B includes a piston 205 having an annular recess 206. In addition, piston 205 includes a angled surface 399, a bottom surface 397 and an outlet 114.

[0021] Dispenser 100 includes a rear housing 330. Rear housing 330 includes a first side wall 332 and a second sidewall 334. First sidewall 332 includes a pair of grooves 336A and 337A. Second sidewall 334 includes a pair of identical grooves (not shown). Grooves 336A, 336B (not shown) are located toward the front of the first and second sidewalls 332, 334.

[0022] First sidewall 332 also includes an aperture 333A. Aperture 333A is partially surrounded by projecting member 333B. Projecting member 333B retains container release member 122 as it moves inward and outward. In addition, projecting member 333B includes an aperture 335A for connecting to member 392A of front housing 104. Second sidewall 334 includes a groove 340. Groove 340 is sized to freely accept lock bar 326 of container locking member 320, which moves in and out of groove 340. The upper projecting member that forms groove 340 includes an aperture 335B that connects to member 392B of front housing 104. Rear housing 104B includes a base 339 and an aperture 340 which, in some embodiments, is larger than outlet 114 of refill unit 110.

[0023] Container locking member 320 includes container release member 122, tee bar 322, spring bar 324 and locking tab 326. Tee bar 322 is received within tee groove 350 of guide plate 346. Container release member 122 is received in projecting member 333B and is accessible through aperture 333A. Locking tab 326 is sized to fit at least partially within groove 340. Guide plate 346 is connected to rear housing 104B. Accordingly, when guide plate 346 is secured to rear wall 104B, locking member 320 is retained to guide plate 346 by tee bar 322 and tee groove 350, which allows locking member 320 to move horizontally. Spring bar 324 engages second sidewall 334 and biases locking member away from second sidewall 334. Thus, absent inward pressure on container release member 122, locking tab 326 protrudes outward from groove 340 to engage locking tab 329 when the refill unit is installed.

[0024] Guide plate 346 includes a tee groove 356 in its center. Tee groove 356 retains actuator tee bar 384 and allows actuator 380 to move vertically up and down with respect to guide plate 346. Guide plate 346 includes a pair of slots 352A and 352B. The upper portion of slots 352A, 352B curve outward away from one another. A similar set of slots 391A and 391B are located on front housing 104.

[0025] A pair of pump engagement blades 370 are included in the dispenser 120. First pump engagement blade 372A includes a first projecting member 374A that engages with slot 352A and a second projection member 375A that engages with slot 391A. In addition, first pump engagement blade 372A includes a recess 377A and a sloped surface 376A.

[0026] Similarly, second pump engagement blade 372B includes a first projecting member 374B that engages with slot 352B and a second projection member 375B that engages with slot 391B. Second pump engagement blade 372B also includes a recess 377B and a sloped surface 376B.

[0027] As first and second engagement blades 372A, 372B move upward along a first portion slots 352A, 352B, 391A and 391B are substantially parallel and the opening between first and second engagement blades 372A, 372B remains substantially the same size, which means the engagement blades 372A and 372B continue to engage annular groove 206 in piston 205.


[0029] A backer plate 360 is also included in dispenser 120. Backer plate 360 includes four projections 364A, 364B, 365A and 365B which are located near the outside corners of the backer plate 360. Projection 364A fits within slot 336A of sidewall 332 and projection 365A fits within slot 337A of sidewall 332. Similarly, projection 364B fits within slot 336B of sidewall 334 and projection 365B fits within slot 337B of sidewall 334. Backer plate 360 includes an aperture 362 that is larger than piston 205 which fits through the aperture 362. When the refill unit 110 is installed in dispenser 120, lock ring 202 rests on backer plate 360.

[0030] Dispenser 120 includes an actuating carriage 380. Actuating carriage 380 includes projections 382A, 382B, 383A and 383B. Projection 382A fits within slot 336A of first sidewall 332 and projection 383A fits within slot 337A. Similarly, projections 382B and 383B fit within similar slots (not shown) in sidewall 334. In addition, tee bar 384 fits within tee groove 356 of guide plate 346. Accordingly, actuator carriage 380 is retained within rear housing 104A but is free to travel up and down in a vertical motion.


[0032] One or more biasing members (not shown), such as, for example, springs, are located between actuating carriage 380 and backer plate 360 to bias actuating carriage 380 downward. Actuating carriage 380 includes an aperture 389 that is sized larger than outlet 114 of piston 205. In addition, actuating carriage 380 includes projections 386 (one on each side) that contact projections 396 on actuator 106 to move the actuating carriage 380 upward.
Actuator 106 includes connecting members 394A and 394B that pivotally connect to front housing member 104. Thus, a force on actuator 106 causes the bottom of actuator carriage 106 to rotate inward and upward. Projections 396 push upward on actuating carriage 380 which moves the actuating carriage 380 and pump engagement blades 372A and 372B upwards. If a refill unit 110 is installed in the dispenser 120, engagement blades 372A, 372B engage slot 206 to retain the piston 205. The bottom surface 387 of piston 205 engages a surface of the actuating carriage 380 for upward movement. The biasing members (not shown) push actuating carriage 380 downward, which in turn moves pump engagement blades 372A and 372B downward which also moves piston 205 downward to reprise pump 205.

Refill unit 110 is installed in dispenser 120 by locating refill unit 110 above dispenser 120 and aligning alignment tab 328 with an alignment groove (not shown). In some embodiments locking tab 329 extends the entire way around locking ring 202 and alignment tab 328 is not needed. In some embodiments, refill unit 110 is moved downward and container release mechanism 122 is pressed in until locking tab 329 of locking ring 202 passes locking tab 326 of locking member 320. Locking member 122 is released and spring bar 324 causes locking tab 326 to move over locking tab 329 to retain refill unit 110 in dispenser 120. In some embodiments, one or more of the locking tabs 326, 329 have sloped surfaces and simply lowering the refill unit 110 downward causes the locking member 320 to move horizontally and allow the tabs 326, 329 to pass one another and the spring bar 324 moves the locking member 320 back to a locking position.

In some embodiments, lowering refill unit downward causes sloped surface 399 (FIG. 3A) of piston 205 to engage sloped surface 376A of first engagement blade 372A to engage sloped surface 376B of second engagement blade 372B, which pushes first and second engagement members outward, and/or causes surface 399 of piston 205 to deflect and pass through the opening between recess 377A and 377B. Once the surface 399 passes by engagement blades 372A and 372B, the engagement blades 372A and 372B fit at least partially within annular groove 206 to retain piston 205. In some embodiments, the first actuation of actuator 106 drives engagement blades 372A and 372B upward and forces surface 399 past engagement blades 372A and 372B where engagement blades 372A and 372B fit at least partially in annular groove 206.

To remove refill unit 110 from dispenser 120, a user pushes in container release mechanism 122 and lifts upward. Because engagement blades 372A and 372B are locked in annular groove 206, engagement blades 372A and 372B and actuating carriage 380 move upward. Upward movement of engagement blades 372A and 372B causes engagement blades 372A and 372B to move apart when guide slots 352A, 352B, 391A and 391B diverge away from one another. Once the opening between recess 377A and 377B is large enough, the engagement blades 372A and 372B disengage or release from the annular groove 206 of piston 205 and the refill unit 110 is free to be removed.

FIG. 4 illustrates the pump portion 204 (without the container 11 for purposes of clarity) installed in dispenser 120. In addition, for purposes of clarity some components of pump 204 are not included in FIG. 4. Nonetheless, it will be appreciated that pump 204 is a piston pump that includes a liquid inlet, an inlet valve, an outlet valve, a pump chamber and an outlet (through outlet nozzle 114).

Pump 204 is retained in dispenser 120 by locking tab 326 being positioned over corresponding locking tab 329. In addition, at least a portion of engagement blade 372B is located in annular groove 206 to move piston 205. As discussed above, in some embodiments engagement blades 372A, 372B are used to move the piston 205 downward and the actuating carriage 380 contacts surface 397 of piston 205 to move the piston 205 upward to dispense fluid.

FIG. 5 is an exploded view of another embodiment of a dispenser 500 which is similar to the embodiment shown and described with respect to FIGS. 1-4. Many of the components are similar and function in a substantially similar manner. Accordingly, similar components and their functions may not be described in detail with respect to FIGS. 5 and 6.

Dispenser 500 includes a rear housing 530. Rear housing 530 includes a first side wall 532 and a second side wall 534. First sidewall 532 includes a pair of grooves 536A and 537A. Second sidewall 534 includes a pair of identical grooves (not shown). A plurality of brackets 533 are included to retain support 510. Support 510 connects to rear housing 530 by brackets 533 and collar 511 and to front housing 504A by brackets 533.

Support 510 retains locking member 520. Locking member 520 includes a locking tab 526 and biasing member 524. Locking member 520 rotates with respect to housing 530. Biasing member 524 biases locking member 520 toward a locked position in which locking tab 526 engages a locking member (not shown) on a locking ring (not shown) on a refill unit (not shown). To disengage locking member 520 from a refill unit (not shown), locking member 520 is rotated. Locking member 520 may include a tab that a user rotates, locking member 520 may be rotated by twisting the refill unit (not shown), or any other like means. To install a refill unit, the refill unit (not shown) is lowered down and the locking member 520 is rotated until a tab the refill unit (not shown) passes by locking tab 526 and locking tab 526 rotates to capture the tab (not shown) on a refill unit (not shown). Rear housing 530 includes a base 539 and an aperture 540.

Guide plate 546 is similar to guide plate 346 and connected to rear housing 504B. Guide plate 546 includes a tee groove 556 down its center. Tee groove 556 retains an actuator tee bar (not shown) and allows actuator 580 to move up and down with respect to guide plate 546. Guide plate 546 includes a pair of slots 552A and 552B. The upper portion of slots 552A, 552B curve outward away from another. A similar set of slots 591A and 591B are located on support 510. Optionally, slots 591A and 591B may be on front housing 504 as shown and described with respect to dispenser 120.

A pair of pump engagement blades 570 are included in the dispenser 500. First pump engagement blade 572A and second engagement blade 572B are substantially similar to engagement blades 372A and 372B and are connected to dispenser 500 and operate as described above.

In addition, a backer plate 560 and actuator carriage 580 are also included in dispenser 500. Backer plate 560 is substantially similar to backer plate 360 described above and actuating carriage 580 is substantially similar to actuator carriage 380 described above.

Actuator 506 pivotally connects to front housing member 504 and includes projections 596 that engage actuating carriage 580 to move pump engagement blades 572A and 572B upwards. Accordingly, when actuator 580 is pressed inward, the actuating carriage 580 moves upward to dispense fluid and when actuator 580 is released, actuating
carriage 580 moves downward due to a biasing member (not shown) located between carriage 580 and backer plate 560.

[0046] The exemplary embodiments of dispensers 120, 520 may be mounted on a wall, a stand, may include a base and be free standing, may be mountable on a bed rail or other point of care location in a patients room or the like.

[0047] 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.

1. A top loading and unloading dispenser comprising:
a housing;
a guide plate located in the housing;
the guide plate having two or more guide members;
the two or more guide members have a first portion and a second portion;
wherein the first portions of the two or more guide members are closer together then the second portions of the two or more guide members;
an actuator carriage;
a pair of engagement blades carried by the actuator carriage;
each engagement blade having a first end that engages with one of the two or more guide members;
the engagement members having opposing recesses for engaging the nozzle of a pump of a refill unit;
wherein when the pair of engagement blades move along the first portion of the two or more guide members the size of the recess remains constant, and when the pair of engagement blades move along the second portion of the two or more guide members, the size of the recess expands.

2. The dispenser of claim 1 wherein the guide members are slots.

3. The dispenser of claim 2 wherein the first end of each engagement blade has a projection that engages with the guide members.

4. The dispenser of claim 1 wherein the first portions of the two or more guide members extend in a substantially vertical direction and are substantially parallel.

5. The dispenser of claim 1 wherein the second portion of the two or more guide members extend vertically and outwardly.

6. The dispenser of claim 1 further comprising a refill locking mechanism that secures a refill unit to the dispenser.

7. The dispenser of claim 1 further comprising a manual actuator that moves the actuating carriage in an upward direction.

8. The dispenser of claim 1 further comprising one or more biasing members for biasing the actuator carriage in a downward direction.

9. A top loading and unloading dispenser comprising:
a housing;
a guide plate located in the housing;
the guide plate having two or more guide members;
at least one guide member that extends vertically and has retaining portion and a release portion;
wherein the release portion is above the retaining portion;
an actuator carriage;
an engagement member carried by the actuator carriage;
the engagement member linked to the at least one guide member;
the engagement member engages with the nozzle of a pump of a refill unit when the refill unit is installed in the dispenser;
wherein when the engagement member moves along the retaining portion of the at least one guide member the nozzle of the pump is remains engaged with the engagement member, and when the engagement member moves along the release portion of the at least one guide member, the engagement member disengages with the nozzle.

10. The dispenser of claim 9 wherein the at least one guide member is a slot.

11. The dispenser of claim 9 wherein the engagement member comprises a pair of engagement blades.

12. The dispenser of claim 9 wherein the retaining portion of the at least one guide member extends in a substantially vertical direction.

13. The dispenser of claim 9 wherein the release portion of the at least one guide member extends vertically and outwardly.

14. The dispenser of claim 9 further comprising a refill locking mechanism that secures a refill unit to the dispenser.

15. The dispenser of claim 9 further comprising a manual actuator that moves the actuating carriage in an upward direction.

16. The dispenser of claim 9 further comprising one or more biasing members for biasing the actuator carriage in a downward direction.

17. A top loading and unloading dispenser comprising:
a housing;
a guide plate located in the housing;
the guide plate having a pair of guide slots;
wherein a first portion of the slots extend vertically and a second portion of the slots diverge away from one another;
an actuator carriage;
a pair of engagement blades carried by the actuator carriage;
each engagement blade having a projection that engages with one of the guide slots;
the engagement members having opposing recesses for engaging the nozzle of a pump of a refill unit;
wherein when the pair of engagement blades move along the first portion of guide slot the size of the recess remains a substantially constant size, and when the pair of engagement blades move along the second portion of the two or more guide members, the size of the recess expands to release the nozzle of a pump.

18. The dispenser of claim 17 further comprising a refill locking mechanism that secures a refill unit to the dispenser.

19. The dispenser of claim 17 further comprising a manual actuator that moves the actuating carriage in an upward direction.

20. The dispenser of claim 7 further comprising one or more biasing members for biasing the actuator carriage in a downward direction.

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