US 20090152286A1

(19) United States

(12) Patent Application Publication

(10) Pub. No.: US 2009/0152286 A1

(43) Pub. Date: Jun. 18, 2009

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(54) **DRAINABLE CAP FOR INVERTIBLE CONTAINERS**

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(21) Appl. No.: **11/955,392**

(22) Filed: **Dec. 13, 2007**

Publication Classification

(51) **Int. Cl.**
B65D 51/04 (2006.01)

(52) **U.S. Cl.** **220/810**; 215/235

(57) **ABSTRACT**

A system is described for storing liquids. The system comprises a cap configured to couple to a container. The cap comprises a base surface configured to provide a base for a coupled container; a flip-open lid positioned to enable access to an interior of a coupled container; a first cavity having a floor defined by a portion of the cap and a sidewall defined by a portion of the cap; and a drainage port sized to enable water to drain from the first cavity. By providing one or more drainage ports for the hollow portions of invertible container caps, the tendency of water to pool and stagnate within the caps can be reduced. This can reduces the growth of harmful mold in showers.

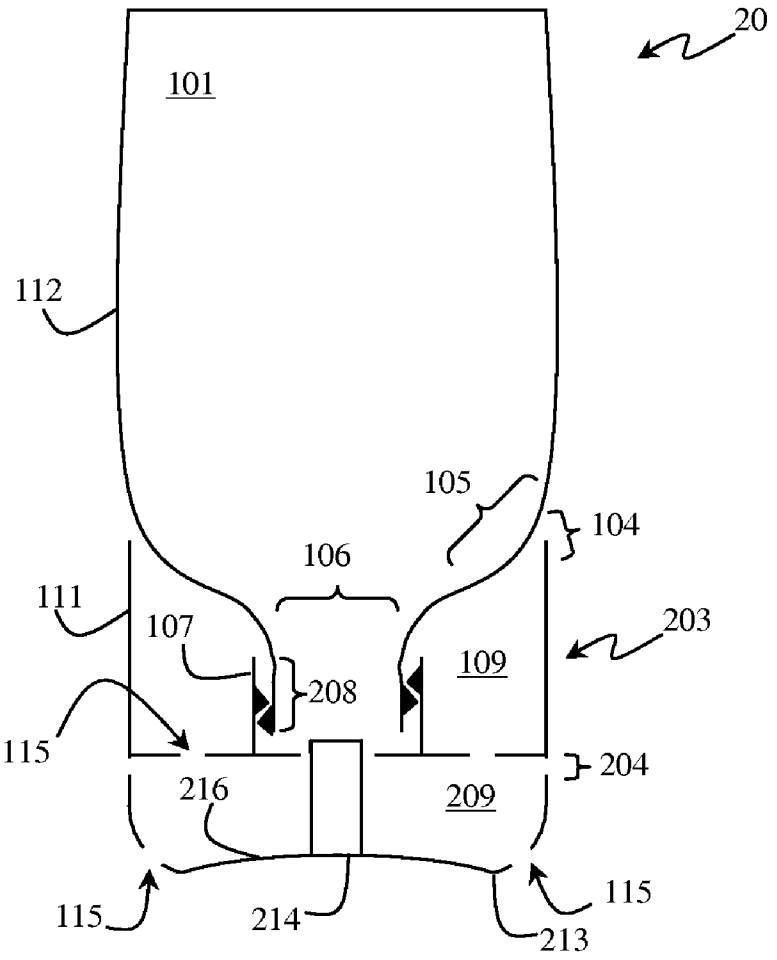


FIG. 1

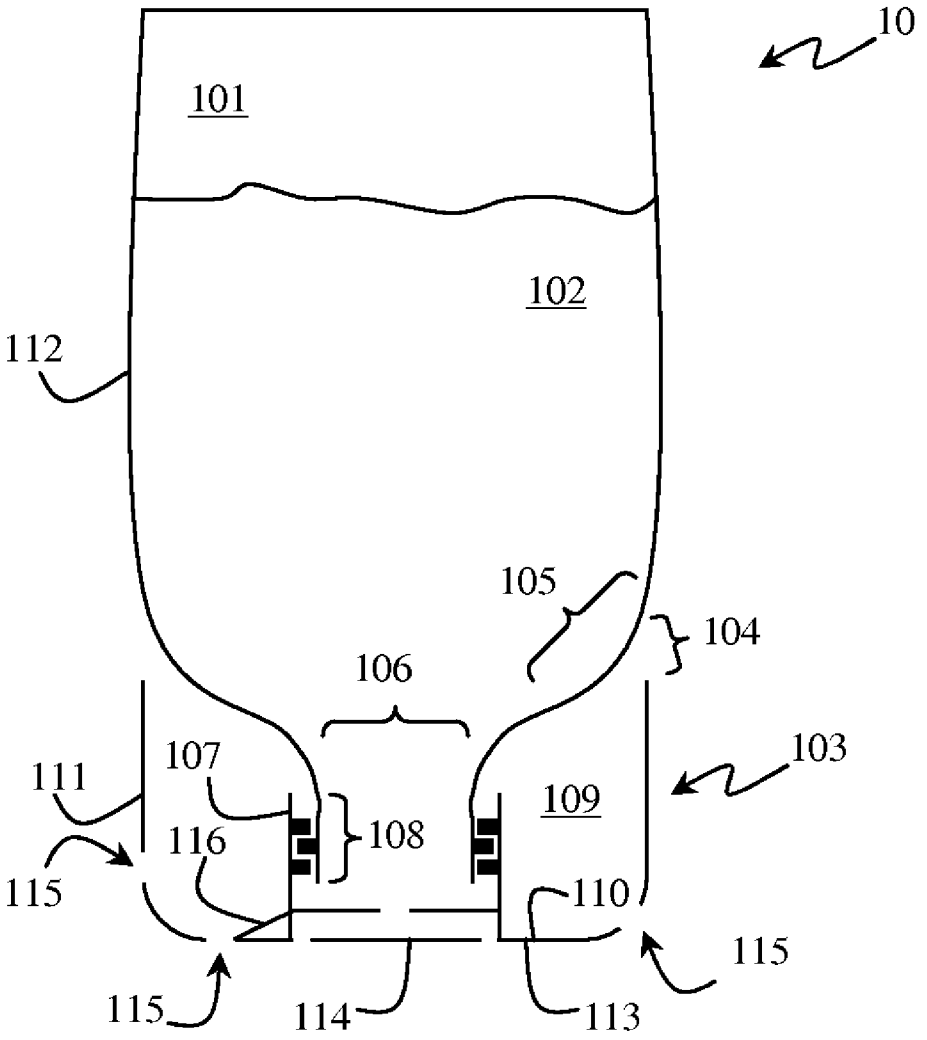

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114
113

FIG. 2

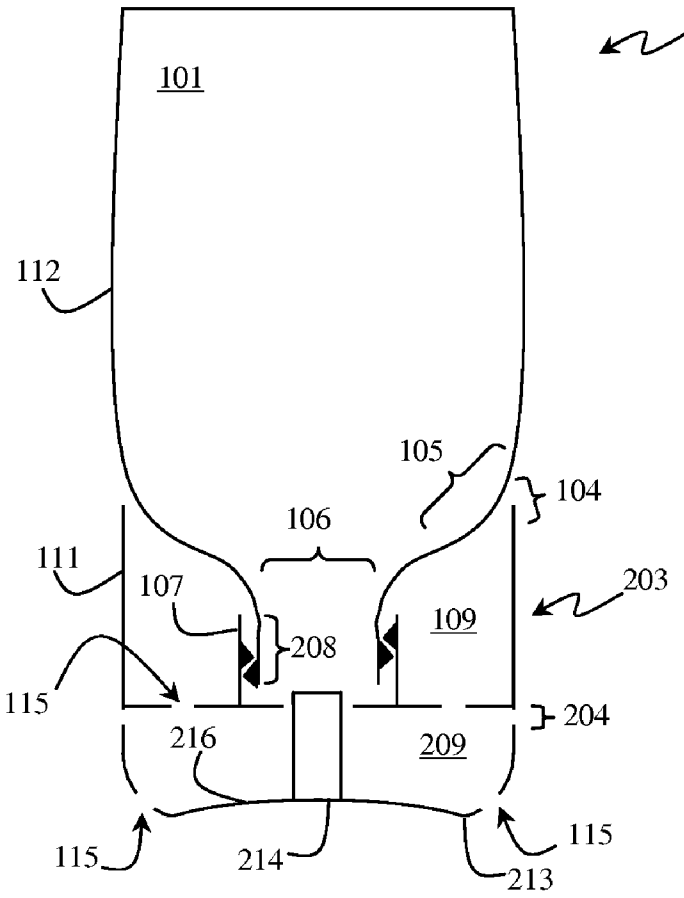
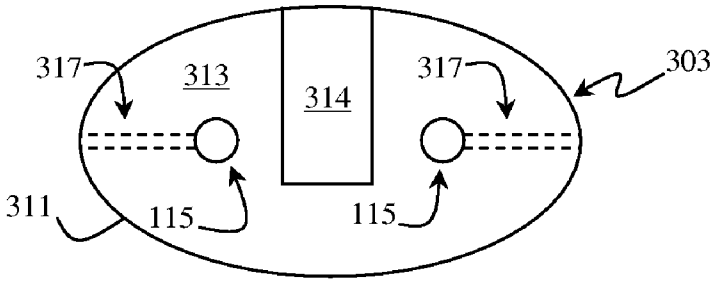

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111
107
203
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208
115
204
216
209
115
214
115
213

FIG. 3


317
313
314
317
303
311
115
115

DRAINABLE CAP FOR INVERTIBLE CONTAINERS

BACKGROUND

[0001] Many toiletries product containers are stored in shower stalls between episodes of use. For example, plastic bottles for shampoo, conditioner, skin treatment, and other personal hygiene liquids are often left in the shower until used up. Often, these liquids are thick and move slowly, so to reduce the amount of time that it requires a consumer to obtain the liquid from the containers, the caps are coupled to the containers that enable the containers stand in an inverted position, i.e. opening-side or cap-side down. This design enables gravity to pull the liquids toward the container opening between uses, so that the liquids are readily-available at the opening when a portion of the cap, such as a flip-open lid, is opened.

[0002] Typically, caps designed to permit inverted storage, have common features. These include a flat, or inwardly arced, base surface suitable to balance the container under normal storage conditions, such as on a relatively flat shelf-top surface, and a flip-open lid that enables access to the contents in the interior of the container. For some of these caps, the majority of the base surface covers a portion of the exterior of the container in addition to the covering the opening, and further, the caps often have vertical sides for added strength, but are hollow for weight and material savings. This results in a relatively closed cavity between a portion of the exterior of the container and a portion of the interior of the cap.

[0003] Unfortunately, due to manufacturing constraints, there is often a water-permeable gap between the sides of a typical cap and the shoulders of the container, i.e. the portions of the container that narrow toward the opening, where the cap is attached. Further, the sides of the container are typically more flexible than the cap, so that liquids may be squeezed out, while the cap remains strong enough to prevent the container from tipping over. This provision for container deformation often necessitates the gap between the shoulders of the container and the sides of the cap.

[0004] Other caps, for example, caps for certain flexible tubes, are designed such that the entire base surface is part of the flip-open lid, but yet only a relatively small portion of the cap allows access to the interior of the flexible tube. These caps may additionally have interior cavities within the flip-open lid, in addition to any possible cavities between the cap and the tube. Water can sometimes enter the inside of a cavity in a flip-open lid through gaps on the sides of the cap. Caps may connect to a tube by a threaded coupling spanning nearly the full width of the tube, or else spanning just the width of an opening that is appreciably smaller than the full width of the tube.

[0005] Unfortunately, it is well known that standing water in high-moisture environments can contribute to the growth of mold. A sad reality is that water splashing against the exterior of an inverted container may run down the side of the container, through a gap, and pool inside the cap. This can contribute to the growth of mold or other fungus, which can be hazardous. Since mold is typically not a cash crop, anyone wishing to avoid becoming an inadvertent mold farmer may need to turn invertible containers cap-side up, to drain collected water from the caps, prior to departing a recently-used shower stall.

[0006] Since it is so well known that continual moisture in shower stalls fosters mold growth, an assertion that a reasonably cost-efficient and effective system for draining the interior of invertible container caps is obvious, or was already known to the toiletries industry, is effectively an assertion that the toiletries industry has deliberately chosen to sell products that contribute to mold-growth problems and thus risk harming consumers, instead of using reasonable care to reduce the danger.

BRIEF SUMMARY OF THE INVENTION

[0007] By providing one or more drainage ports for the hollow portions of invertible container caps, the tendency of water to pool and stagnate within the caps can be reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] For a more complete understanding of the present invention, reference is now made to the following descriptions taken in conjunction with the accompanying drawings, in which:

[0009] FIG. **1** illustrates an embodiment of a drainable system for storing liquids;

[0010] FIG. **2** illustrates another embodiment of a drainable system for storing liquids; and

[0011] FIG. **3** illustrates an embodiment of a drainable cap for an invertible container.

DETAILED DESCRIPTION OF THE INVENTION

[0012] FIG. **1** illustrates an embodiment of a drainable system **10** for storing liquids. In system **10**, container **101**, holding a liquid **102**, such as shampoo, is coupled to cap **103**. Container **101** may comprise a bottle or tube, and be made of plastic or another material. Further, container **101** may hold another liquid, or an amount of a solid or even gaseous material. A gap **104** exists between cap **103** and a shoulder **105** of container **101**. In the embodiment illustrated, gap **104** is water-permeable, which allows water splashed against container **101** to run into cap **103**, where it can pool and stagnate.

[0013] An opening **106** of container **101** is shown facing downward, indicating that container **101** is illustrated as inverted. Cap coupling section **107** couples to container **101** by snap-fit **108**, although another coupling method may be used, such as threads, adhesives, or melting. Cap **103** may be removable from container **101**, or else permanently attached.

[0014] A cavity **109** is shown inside cap **103**, which provides a place for water to pool, stagnate, and foster mold growth. Cavity **109** is defined by portions of cap **103** and container **101**. Cavity floor **110** is within cap **103** and, in the illustrated embodiment, cavity sidewall **111** is the sidewall of cap **103**. The top side of cavity **109** is defined by a portion of container **101**, including the portion between shoulder **105** and opening **106**. In some applications, sidewall **111** is more rigid than sidewall **112** of container **101**, to allow container **101** to be squeezed, while cap **103** retains structural strength to bear the weight of container **101** and liquid **102**.

[0015] Cap **103** further comprises base surface **113**, which is sized, shaped, and constructed in a manner that enables system **10** to balance on an approximately flat and level surface, with the center of gravity above cap **103**. Base surface **113**, therefore, provides a base for container **101** to stand inverted. A flip-open lid **114** is positioned approximately aligned with opening **106** to enable access to liquid **102** in the

interior of container **101**. Flip-open lid **114** is illustrated as comprising part, but less than the entirety of base surface **113**.

[0016] The illustrated embodiment shows three drainage ports **115** in cap **103**. Drainage ports are sized large enough that the surface tension of the water within cavity **109** will typically not prevent the water from passing through. One drainage port **115** is shown disposed on base surface **113**. Another drainage port **115** is shown disposed on sidewall **111**, and yet another drainage port is shown disposed near the intersection of sidewall **111** and base surface **113**. A ramp **116**, within cap **103**, is oriented to direct water toward at least one of the plurality of drainage ports **115**.

[0017] FIG. **2** illustrates an embodiment of a drainable system **20** for storing liquids. In system **20**, container **101** is coupled to cap **203** by threads **208**. For cap **203**, flip-open lid **214** spans nearly the entire width of cap **203**, such that it comprises the entirety of base surface **213**. Since flip-open lid **214** is arced inward, base surface **213** forms an oval ridge in cap **203**, that is wide enough such that container **101** can stand inverted.

[0018] Cap **203** has a second cavity **209**, below cavity **109**. Cavity **209** is has a floor and sidewalls defined by portions of flip-open lid **214**, and a top side defined by another portion of cap **203**. Water can enter cavity **209**, either by a gap **204** and/or a drainage port **115** that drains water from cavity **109** above. In some embodiments, cavity **109** may not have any drainage ports, or may have a drainage port in sidewall **111**. Further, in some embodiments, only cavity **209** is present, and cavity **109** does not exist. For example, some invertible caps are only wide enough to cover opening **106**, so that cap coupling section **107** and sidewall **111** are the same piece. In such an arrangement, opening **106** spans approximately the width of container **101**, in order to provide a suitably wide base surface **213**. Cavity **209** in flip-open lid **214** is illustrated as having two drainage ports **115** disposed near base surface **115**. The interior arced shape of flip-open lid forms a ramp **116**, which directs water toward drainage ports **115**.

[0019] FIG. **3** illustrates an embodiment of a drainable cap **303** for an invertible container. Cap **303** comprises drainage ports **115** on base surface **313**, on opposite sides of flip-open lid **314**. Water channels **317**, which form recesses in base surface **313**, enable water to pass from each drainage port **115** to the edge nearby sidewall **311** of cap **303**, when cap **303** sits on an approximately flat surface, such as a shelf ledge inside a shower. Water channels **317** thus prevent a shelf ledge from trapping water inside cap **303**, by blocking drainage ports **115**.

[0020] Although the present invention and its advantages have been described above, it should be understood that various changes, substitutions and alterations can be made herein without departing from the spirit and scope of the invention as defined by the appended claims. Moreover, the scope of the present application is not intended to be limited to the particular embodiments described in the specification.

What is claimed is:

1. A system for storing liquids, the system comprising:
a cap configured to couple to a container, the cap comprising:
a base surface configured to provide a base for a coupled container;
a flip-open lid positioned to enable access to an interior of a coupled container;
a first cavity having a floor defined by a portion of the cap and a sidewall defined by a portion of the cap; and
a drainage port sized to enable water to drain from the first cavity.

2. The system of claim **1** wherein the first cavity comprises:
a ramp configured to direct water toward the drainage port.

3. The system of claim **1** wherein the drainage port is disposed on the base surface.

4. The system of claim **1** wherein the base surface comprises:
a water channel configured to allow water to pass from the drainage port to an edge of the base surface when the base surface abuts an approximately flat surface.

5. The system of claim **1** wherein the drainage port is disposed on the flip-open lid.

6. The system of claim **1** wherein the flip-open lid comprises:
the entirety of the base surface.

7. The system of claim **1** wherein the flip-open lid comprises:
a portion, less than the entirety, of the base surface.

8. The system of claim **1** wherein the first cavity has a top side defined by a portion of a coupled container.

9. The system of claim **1** wherein the cap further comprises:
a second cavity having a floor defined by a portion of the cap and a top side defined by a portion of the cap.

10. The system of claim **1** wherein the first cavity has a top side defined by a portion of the cap.

11. The system of claim **1** further comprising:
a container coupled to the cap.

12. The system of claim **11** wherein the container comprises at least one selected from the list consisting of:
a flexible-sided bottle and a flexible-sided tube.

13. The system of claim **11** further comprising:
a liquid within the container.

14. The system of claim **1** wherein the drainage port is disposed on the sidewall of the cavity.

15. The system of claim **1** wherein the drainage port is disposed near an intersection of a sidewall of the cap and the base surface.

16. The system of claim **1** wherein the cap further comprises:
a plurality of drainage ports.

17. A system for storing liquids, the system comprising:
a flexible-sided container;
a cap coupled to the container, the cap comprising:
a base surface configured to provide a base for the container;
a flip-open lid positioned to enable access to an interior of the container;
a first cavity having a floor defined by a portion of the cap and a sidewall; and
a plurality of drainage ports sized to enable water to drain from the cavity.

18. The system of claim **17** wherein the cavity is further defined on a top side by a portion of the container, wherein the flip-open lid comprises a portion, less than the entirety, of the base surface, wherein the cavity sidewall is defined by a sidewall of the cap, and wherein at least one of the plurality of drainage ports is disposed on the base surface.

19. The system of claim **17** wherein the cavity is further defined on a top side by a portion of the cap, wherein the flip-open lid comprises the entirety of the base surface, wherein the cavity sidewall is defined by a portion of the flip-open lid, and wherein at least one of the plurality of drainage ports is disposed near an intersection of the sidewall of the cavity and the base surface.

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