VENTED NO-SPILL DRINKING BOTTLE, BOTTLE CAP AND ASSOCIATED BOTTLE AND POUCH SYSTEM

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ABSTRACT

A vented bottle or bottle cap that typically includes two one-way valves. The first one-way valve vents the bottle while fluid exits the bottle, and the second one-way valve prevents spillage. The vented bottle or bottle cap may be configured for use with a conventional sports bottle, a conventional soft drink or water bottle, or a specially designed bottle with a vent tube near the bottom of the bottle. The vented bottle cap may also be used in conjunction with a pouch system that allows a user to fill a pouch with fluid while the pouch is securely supported within the bottle. In this manner, a user can carry pouches, such as foil or plastic pouches, with desired ingredients, such as a water purifying chemical, a flavor ingredient, electrolytes, medicines and so forth. A pump may be used to deliver water from a water supply into the pouch while the pouch is supported within the bottle.
FIG. 8
VENTED NO-SPILL DRINKING BOTTLE, BOTTLE CAP AND ASSOCIATED BOTTLE AND POUCH SYSTEM

PRIORITY CLAIM TO RELATED APPLICATION


TECHNICAL FIELD

[0002] The present invention relates to the field of drinking bottles and, more particularly, to a vented, no-spill drinking bottle and bottle cap that solve the problems of spillage and vacuum formation when drinking from the bottle. The invention also relates to a refillable bottle and pouch system using a vented, no-spill drinking bottle.

BACKGROUND OF THE INVENTION

[0003] Having a vacuum form in a drinking bottle, as occurs with presently available sports bottles, makes drinking from the bottle somewhat difficult. This problem is exacerbated in rigid bottles, such as glass bottles. Spillage is also a problem with many conventional drinking vessels.

[0004] Existing products configured prevent spillage and vacuum formation, such as the “sippy cup” familiar to moms and dads, use a two-port removable diaphragm to balance pressure within the container and prevent spillage through the diaphragm. This approach is somewhat complex to manufacture, and also presents problems with cleaning and often losing the removable diaphragm. In addition, this technology is not well suited for use with a standard sports bottle. As a result, a need exists for a no-spill, vented drinking bottle suitable for use as a sports bottle. There is a further need for a device of retrofitting a standard drinking bottle as a no-spill, vented drinking bottle. In addition, drinking bottles with regulated and adjustable flow rates are not presently available.

SUMMARY OF THE INVENTION

[0005] The present invention solves the problems described through a vented bottles and bottle caps that typically includes two one-way valves. The first one-way valve vents the bottle while fluid exits the bottle, and the second one-way valve prevents spillage. A first embodiment of the vented bottle cap is configured for use with a conventional sports bottle, a second embodiment is configured for use with a conventional soft drink or water bottle, and a third embodiment includes a drinking bottle with a vent near the bottom of the bottle. The vented bottle cap may also be used in conjunction with a pouch system that allows a user to fill a pouch with fluid while the pouch is securely supported within the bottle. In this manner, a user can carry pouches, such as foil or plastic pouches, with desired ingredients, such as a water purifying chemical, a flavor ingredient, electrolytes, medicines and so forth. A pump may be used to deliver water from a water supply into the pouch while the pouch is supported within the bottle.

[0006] More generally described, the invention may be implemented as a drinking bottle or a bottle cap for a drinking bottle. The bottle cap includes a cap body that is configured for attachment to the bottle portion of the drinking bottle. The bottle cap also includes a drinking conduit through the cap body, and a first one-way vent located in the cap body for allowing air to enter the drinking bottle while fluid exits the bottle. The bottle cap may also include a second one-way valve located in the drinking conduit to prevent spillage of the fluid through the drinking conduit. For example, the bottle cap may be configured as a pull-up type bottle cap or as a flip-top bottle cap.

[0007] The invention may also be practiced as a drinking bottle including a bottle portion, a lid configured for attachment to the bottle portion, and a drinking conduit through the lid. The drinking bottle also includes a first one-way valve located in the lid or bottle portion for allowing air to enter the drinking bottle while fluid exits the drinking conduit under the force of gravity at a desired fluid flow rate. In addition, the first one-way valve may be adjustable to produce the desired fluid flow rate. The drinking bottle may also include a second one-way valve located in the drinking conduit to prevent spillage of fluid inside the drinking bottle through the drinking conduit. In a particular embodiment, the lid is configured as a funnel.

[0008] The invention may also be practiced as a drinking bottle and pouch system. The system includes a drinking bottle and a bottle cap that includes a drinking conduit. The bottle cap may be attached to the bottle portion of the drinking bottle and includes a straw that is configured to be placed in communication with the drinking conduit and extending from the underside of the bottle cap. The system also includes a pouch that has a pouch enclosure; one or more elongated wings, and a straw receptacle. The pouch is configured to be supported within the drinking bottle with the wings supported between the bottle portion of the drinking bottle and the bottle cap with the straw extending through the straw receptacle into the pouch.

[0009] In addition, the bottle cap typically includes a bottle attachment member that is removably attachable to the drinking bottle and a drinking member that is removably attachable to the bottle attachment member. The bottle attachment member is configured, when the drinking member is removed from the bottle attachment member, to receive a supply tube for delivering a fluid into the pouch while the pouch is supported within the drinking bottle. And the drinking member is configured to be attached to the bottle attachment member after the pouch has been filled with fluid. The bottle cap also typically includes a first one-way valve located in the cap body for allowing air to enter the drinking bottle while fluid exits the bottle, and a second one-way valve located in the drinking conduit to prevent spillage of the fluid through the drinking conduit. The system may also include a pump for delivering a fluid from a fluid supply into the pouch by way of the supply tube.

[0010] The specific techniques and structures for implementing particular embodiments of the vented bottle cap and associated pouch system, and thereby accomplishing the advantages described above, will become apparent from the following detailed description of the embodiments and the appended drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is a side view of a drinking bottle with a pull-up type vented, no-spill bottle cap in a closed position.
FIG. 2 is a side view of the drinking bottle of FIG. 1 with the bottle cap in an open position.

FIG. 3 is a top view of the drinking bottle of FIG. 1.

FIG. 4 is a side view of a drinking bottle with a flip-top type vented, no-spill bottle cap in a closed position.

FIG. 5 is a side view of the drinking bottle of FIG. 4 with the bottle cap in an open position.

FIG. 6 is a top view of the drinking bottle of FIG. 4.

FIG. 7 illustrates a drinking bottle and pouch system.

FIG. 8 further illustrates the drinking bottle and pouch system of FIG. 7.

FIG. 9 shows a vented drinking vessel with a vent located near the bottom.

FIG. 10 shows a first type of one-way valve.

FIG. 11 shows a first type of one-way valve.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Turning now to the figures, in which like numerals refer to like elements throughout the several figures, FIG. 1 is a side view of a drinking bottle 10 with a bottle cap 12 in a closed position. FIG. 2 shows this drinking bottle with the bottle cap in an open position, and FIG. 3 is a top view of the drinking bottle. The drinking bottle 10 includes a pull-up type vented, no-spill bottle cap 12 which, as noted above, is shown in the closed position in FIG. 1 and in the open position in FIG. 2. The drinking bottle 10 also includes a bottle portion 14 to which the cap may be attached, typically through a screw-on or snap-on attachment. The bottle cap 12 includes a drinking member 16 engaged with a bottle attachment member 18. The drinking member 16 slides up with respect to the bottle attachment member 18 to open a drinking conduit through the bottle cap 12, and slides down with respect to the bottle attachment member to close the drinking conduit. That is, the drinking bottle 10 is a conventional sports bottle as described thus far.

To implement the vented feature of the drinking bottle 10, the bottle attachment member 18 includes a first one-way valve 20 that allows air to enter the drinking bottle as fluid exits the bottle. This prevents a vacuum from forming inside the bottle while a user drinks from the bottle. In addition, to implement the no-spill feature of the drinking bottle, the drinking member 16 may also include a second one-way valve 22 in the drinking conduit to prevent spillage of fluid through the drinking conduit.

FIG. 4 is a side view of a conventional soft drink or water drinking bottle 30 with a flip-top type vented, no-spill cap 34 in a closed position. FIG. 5 is a top view of a conventional drinking bottle. The bottle 30 includes a bottle portion 32 and a bottle cap 34. As shown in FIG. 5, the drinking cap 34 includes a bottle cap in an open position, and FIG. 6 is a top view of the drinking bottle. The bottle 30 includes a bottle portion 32 and a bottle cap 34. As shown in FIG. 5, the drinking cap 34 includes a bottle cap in an open position, and FIG. 6 is a top view of the drinking bottle. The bottle 30 includes a bottle portion 32 and a bottle cap 34. As shown in FIG. 5, the drinking cap 34 includes a first one-way valve 38 for venting the bottle. The cap 34 may also be covered with a removable layer of plastic to prevent air leakage during storage and shipping prior to opening of the bottle for consumption. Alternatively, or additionally, foil or other suitable removables may be placed over the vent openings to further prevent air leakage. For this embodiment, the threaded neck portion of the bottle 30 requires venting to the inside of the bottle, which can be implemented in any effective manner including, for example, a hole through the side of the neck or channels through the threads and over the top of the neck.

FIGS. 7 and 8 illustrates a drinking bottle and pouch system 50. The system includes a sports bottle such as that described with reference to FIGS. 1 through 3. In this embodiment, the drinking member 52 separates from the bottle attachment member 53 to expose a supply tube receptacle on the top of the bottle attachment member. The bottle attachment member also includes a short straw that is in communication with the drinking conduit through the bottle cap, and which is also configured to extend into the bottle for entry into a pouch 60 when the pouch is supported within the bottle portion 58.

The pouch 60 may be a foil, plastic or any other suitable type of pouch. In addition, any suitable type of mechanism may be used to support the pouch with in the drinking bottle. The pouch may carry any type of desired ingredient, such as a water purifying chemical, a flavor ingredient, electrolytes, medicines and so forth. In a preferred embodiment, for example, the pouch 60 includes a pouch body 64, two wings 66a and 66b that extend from the pouch body, and a rigid support for a straw opening 70. The bottle attachment member 53 includes a short straw 57 that is in communication with the drinking conduit, and which extends downward. The pouch is inserted into the bottle portion 58 with the wings extending out the top of the bottle portion and held taught while the bottle attachment member 53 is screwed or snapped onto the bottle portion 58. This holds the pouch 60 firmly in place with the straw 74 extending through the pouch straw opening 70.

The bottle attachment member 53 also includes a supply tube receptacle 56 which allows the user to connect a supply tube 54a to the bottle attachment member for filling the pouch 60 with a fluid, typically water. As shown in FIG. 8, the user typically fills the pouch with a pump 80 that is connected on one side to the supply tube 54a and on the other side to the supply tube 54b. The supply tube 540 is extended into a fluid supply 82, such as a container or running stream. The pump includes first one-way valve to direct the fluid from the supply tube 540 into the pump on an upstroke of the plunger, and a second one-way valve to direct fluid held within the pump into the supply tube 54a. With the supply tube 540 extending into the fluid supply 82, the user raises and then lowers the pump plunger to fill the foil pouch. The pump 80 may also include screens and filters to clean the fluid passing through the pump.

FIG. 9 shows a vented drinking vessel 110 with a vent located near the bottom of the bottle. As shown in FIG. 9, the vented drinking vessel is preferably formed of two major components, the container 112 with attached vent tube 120, and the funnel shaped cap 116 with attached curved straw 118. However, those skilled in the art will recognize that other configurations are possible, such as a configura-
tion in which the curved straw 118 separates from the funnel shaped cap 116. Similarly, the vent tube 120 may detach from the container 112 if desired. In addition, it may be desirable for the curved straw 118 to flex into different positions or rotate with respect to the funnel shaped cap 116, or to be fixed in an orientation curving away from the vent tube 120, to facilitate drinking from the vessel when the vent tube 120 is not regulated by a valve.

[0029] To prevent spillage, the vented drinking vessel may also include a check valve 126 associated with the curved straw 118 and/or a one-way valve 128 associated with the vent tube 120. FIG. 10 is a perspective view of one embodiment of the check valve 126. In this example, the check valve 126 may be a silicon or other suitable type of valve with a curved diaphragm having a slit which remains closed except when a pressure is applied by sucking on the curved straw 118 or squeezing the container 112. The check valve 126 is typically located along the curved straw 118, for example at the end as shown in FIG. 9 or at the base of the straw adjacent to the funnel shaped cap 116. It should be noted that the check valve 126 will prevent a large spill if the vessel is knocked over, but a small amount of fluid may escape from the vent tube 120 when the vessel is knocked over if a one-way valve is not is placed in the vent tube. Moreover, the check valve 126 will not prevent a person from spilling fluid through the vent tube 120 by blowing into the curved straw 118.

[0030] Alternatively or additionally, the vessel 110 may include a one-way valve 128, such as a silicon or other suitable type of duck-bill valve, in communication with the interior of the vessel. FIG. 11 is a perspective view of one embodiment of the one-way valve 128. The one-way valve 128 prevents fluid inside the container from escaping through the vent tube 120 but does not inhibit the flow of fluid through the curved straw 118. The one-way valve 128 will prevent substantially all spillage through the vent tube 120, and will also prevent a person from spilling fluid through the vent tube by blowing into the curved straw 118. This may be desirable, for example, with small children. The one-way valve 128 may be located anywhere along the vent tube 120, for example at the end of the vent tube or in the vent opening 114 as shown in FIG. 9.

[0031] If the one-way valve 128 is located in the vent opening 114, the vent tube 120 may be replaced by a solid handle including a port adjacent to and in communication with the vent opening 114. Further, for the embodiment with a one-way valve 128 in the vent opening 114, the vent opening and one-way valve need not be associated with the handle, and could be located anywhere in communication with the interior of the container 112. For example, the vent opening 114 and one-way valve 128 could be located in the bottom of the container 112, side of the container, or in the funnel shaped cap 116.

[0032] It should also be appreciated that selecting an inlet valve 128 with a desired flow rate or providing an adjustable inlet valve will regulate the air flow rate through the valve and thus control the rate of fluid flow through the bottle under the force of gravity. This will allow the vent system to be customized for various applications. In particular, the inlet valve may be selected or set to regulate the fluid flow rate through the bottle at a level that cannot be harmful to a person drinking from the bottle. The inlet valve may also be adjustable with settings appropriate for children and adults. An engineer skilled in the art of bottle design will be readily able to select the proper type of valve and air flow rate for a desired application.

[0033] In addition, the vented and no-spill drinking bottle may be implemented as a bottle cap that can be used with existing conventional sports bottles and other bottles. In addition, the drinking bottle and associated pouch system provides many advantages for joggers, bikers, hikers, campers, hunters and everyday drinkers of fluids. The pouch system also provides an innovative way for drink suppliers to offer products through pouches containing dry ingredients, or a small amount of concentrated liquid ingredients, without incurring the cost of shipping the fluid. Hikers, campers and hunters will certainly appreciate not having to pack the bulk of the fluid for their drinks. It should also be appreciated that the vented drinking bottle and pouch system provides a convenient way to administer medicine to a sick child or an injured individual, sugar to a diabetic “gone low.” The vented drinking bottle can also be used to expel a stream of fluid by squeezing the bottle, for example to irrigate and sterilize a wound, clean a contact lens, provide a drink to a dog, and so forth. Many other uses of the bottle and pouch system will become apparent as the technology is used in the community.

[0034] With respect to the one-way valves used in the bottle caps for the sports bottles described above, it has been found that a silicon duck-bill valve with a flange and indentation for holding the valve in place works well in these applications. For the soda bottle cap embodiment, flat slitted diaphragm valves are presently considered to be the best alternative. However, other types of suitable one-way valves may be used. It should also be appreciated that locating the one-way valve for the air vent in the bottle portion of the container is functionally equivalent to locating it within the bottle cap. Other variations of the basic designs shown in the preferred embodiments will become apparent to those skilled in the art of bottle design.

[0035] In view of the foregoing, it will be appreciated that the present invention provides significant improvements in drinking bottles and, more particularly, in a vented, no-spill cap for a sports bottle and an associated pouch system. It should be understood that the foregoing relates only to the exemplary embodiments of the present invention, and that numerous changes may be made to these examples without departing from the spirit and scope of the invention as defined by the following claims.

The invention claimed is:

1. A bottle cap suitable for use with a conventional drinking bottle, comprising:
   a. a cap body configured for attachment to the drinking bottle;
   b. a drinking conduit through the cap body; and
   c. a first one-way vent located in the cap body for allowing air to enter the drinking bottle while fluid exits the bottle.

2. The bottle cap of claim 1, further comprising a second one-way valve located in the drinking conduit to prevent spillage of the fluid through the drinking conduit.

3. The bottle cap of claim 1, configured as a pull-up type bottle cap.
4. The bottle cap of claim 1, further comprising a flip-top appendage hinged to the bottle cap and movable between an open position and a closed position, the flip-top appendage configured to cover the first one-way valve when the appendage is in the closed position and to uncover the first one-way valve when the appendage is in the open position.

5. The bottle cap of claim 2, further comprising a flip-top appendage hinged to the bottle cap and movable between an open position and a closed position, the flip-top appendage configured to cover the first and second one-way valves when the appendage is in the closed position and to uncover the first and second one-way valves when the appendage is in the open position.

6. A drinking bottle comprising:

   a bottle portion;

   a lid configured for attachment to the bottle portion;

   a first one-way valve located in the lid or bottle portion for allowing air to enter the drinking bottle while fluid exits the drinking conduit under the force of gravity at a desired fluid flow rate.

7. The drinking bottle of claim 6, wherein the first one-way valve is adjustable to produce the desired fluid flow rate.

8. The drinking bottle of claim 6, further comprising a second one-way valve located in the drinking conduit to prevent spillage of fluid inside the drinking bottle through the drinking conduit.

9. The drinking bottle of claim 6, wherein the lid is configured as a funnel.

10. The drinking bottle of claim 6, wherein the lid further comprises a flip-top appendage hinged to the bottle cap and movable between an open position and a closed position, the flip-top appendage configured to cover the first one-way valve when the appendage is in the closed position and to uncover the first one-way valve when the appendage is in the open position.

11. The drinking bottle of claim 6, wherein the lid further comprises a flip-top appendage hinged to the bottle cap and movable between an open position and a closed position, the flip-top appendage configured to cover the first and second one-way valves when the appendage is in the closed position and to uncover the first and second one-way valves when the appendage is in the open position.

12. A drinking bottle and pouch system, comprising:

   a drinking bottle;

   a bottle cap comprising a drinking conduit, the bottle cap being attachable to the drinking bottle and having a straw in communication with the drinking conduit extending from an underside of the bottle cap;

   a pouch comprising a pouch enclosure; one or more elongated wings, and a straw receptacle;

   the pouch configured to be supported within the drinking bottle with the wings supported between the drinking bottle and the bottle cap and the straw extending through the straw receptacle into the pouch.

13. The drinking bottle and pouch system of claim 12, wherein:

   the bottle cap comprises a bottle attachment member that is removably attachable to the drinking bottle and a drinking member that is removably attachable to the bottle attachment member, and

   the bottle attachment member is configured, when the drinking member is removed from the bottle attachment member, to receive a supply tube for delivering a fluid into the pouch while the pouch is supported within the drinking bottle; and

   the drinking member is configured to be attached to the bottle attachment member after the pouch has been filled with fluid.

14. The drinking bottle and pouch system of claim 12, wherein the bottle cap further comprises a first one-way vent located in the cap body for allowing air to enter the drinking bottle while fluid exits the bottle.

15. The drinking bottle and pouch system of claim 14, wherein the bottle cap further comprises second one-way valve located in the drinking conduit to prevent spillage of the fluid through the drinking conduit.

16. The drinking bottle and pouch system of claim 13, further comprising a pump for delivering a fluid from a fluid supply into the pouch by way of the supply tube.