An inverted-bottle fluid dispensing system providing efficient fluid dispensation. Various aspects of the present invention provide a stem comprising an outer surface and an inner surface defining an inner fluid flow cavity. A slot may, for example, provide a flow path between the outer surface and the inner cavity. The slot may, for example, be substantially longitudinally aligned on the stem. The stem may, for example, include a cylindrically shaped portion and a flat portion, at least a portion of which may be longitudinally coextensive with the cylindrically shaped portion. Further for example, the stem may include a plurality of faces culminating in a vertex at a tip, where at least one of the faces may comprise an aperture extending between the outer surface and the inner cavity. Also for example, the stem may comprise a base portion, where the base portion includes at least one aperture extending therethrough.
Figure 1
INVERTED BOTTLE FLUID DISPENSING SYSTEM

BACKGROUND OF THE INVENTION

[0001] Fluid dispensing systems generally dispense fluid (e.g., water) from a reservoir to a user. The reservoir may be provided with fluid in any of a variety of manners. For example, dispensable fluid may be provided in bottles or other containers. In such an exemplary scenario, the fluid container may be inverted and positioned in or on the fluid dispensing system. The fluid dispensing system may then, for example, provide a fluid flow path from the inverted fluid container to the reservoir. Also for example, dispensable fluid may be provided by various types of fluid supply lines.

[0002] A large variety of fluid dispensing system configurations currently exist. For example and without limitation, inverted-bottle fluid dispensers having pointed probes are well known in the art, as exemplified by U.S. Pat. No. 4,846,236 and numerous references cited therein. Present fluid dispensing systems (e.g., inverted bottle fluid dispensing systems) suffer from fluid flow deficiency. For example, various inverted bottle fluid dispensing system configurations allow various seals and/or vacuums to be formed, where such seals and/or vacuums interfere with the efficient flow (and therefore dispensation) of the fluid to be dispensed.

[0003] Further limitations and disadvantages of conventional and traditional approaches will become apparent to one of skill in the art, through comparison of such systems with the present invention as set forth in the remainder of the present application with reference to the drawings.

BRIEF SUMMARY OF THE INVENTION

[0004] Various aspects of the present invention provide an inverted-bottle fluid dispensing system providing efficient fluid dispensation. Various aspects of the present invention provide a stem probe portion comprising an outer surface and an inner surface defining an inner flow cavity. A slot may, for example, provide a flow path between the outer surface and the inner cavity. The slot may, for example, be disposed on the probe portion and substantially aligned along the longitudinal axis of the probe portion. In various exemplary configurations, the slot may be longitudinally positioned on the probe portion such that a properly seated fluid container will include a portion, but not all, of the slot within the volume of the fluid container.

[0005] Various other aspects of the present invention may, for example, provide a stem probe portion including a cylindrically shaped portion and a substantially flat portion. At least part of the flat portion may, for example, be longitudinally coextensive with the cylindrically shaped portion.

[0006] Various other aspects of the present invention may, for example, provide a stem probe portion including a plurality of faces (e.g., substantially flat knife faces) culminating in a vertex at a tip. At least one of the faces may, for example, include an aperture extending between, and providing a flow path between, the outer surface and inner cavity of the probe portion.

[0007] Various other aspects of the present invention may, for example, provide a stem base portion (e.g., a generally planar base portion) that is disposed at a longitudinal end of the stem probe portion opposite the probe portion tip. The base portion may, for example, include at least one aperture extending through the base portion. Also for example, the base portion may include an interference member disposed to stand off a fluid container from the primary top surface of the base portion. Additionally for example, the base portion may include various interlocking features that may be utilized to couple the stem to other fluid dispensing system components.

[0008] These and other advantages, aspects and novel features of the present invention, as well as details of illustrative aspects thereof, will be more fully understood from the following description and drawings.

BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

[0009] FIG. 1 is a drawing of a prior art fluid dispensing system stem.

[0010] FIG. 2 is a perspective drawing of an exemplary fluid dispensing system stem, in accordance with various aspects of the present invention.

[0011] FIG. 3 is a drawing including rear cutaway, side and front views of an exemplary fluid dispensing system stem, in accordance with various aspects of the present invention.

[0012] FIG. 4 is a drawing including bottom, side and top views of an exemplary fluid dispensing system stem, in accordance with various aspects of the present invention.

[0013] FIG. 5 is a drawing including top, side, perspective and side cutaway views of an exemplary fluid dispensing system basket, in accordance with various aspects of the present invention.

[0014] FIG. 6 is a drawing including various views of a combination of an exemplary fluid dispensing system stem and an exemplary fluid dispensing system basket, in accordance with various aspects of the present invention.

[0015] FIG. 7 is a drawing of an exemplary inverted-bottle fluid dispensing system, in accordance with various aspects of the present invention.

[0016] FIG. 8 is a drawing showing various non-limiting exemplary dimensions of an exemplary fluid dispensing system stem, in accordance with various aspects of the present invention.

[0017] FIG. 9 is a drawing showing various non-limiting exemplary dimensions of an exemplary fluid dispensing system basket, in accordance with various aspects of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0018] FIG. 1 is a drawing of a prior art fluid dispensing system stem 100. The prior art stem 100 includes a probe portion 110 and a base portion 150, which are molded as one uniform plastic part. The probe portion 110 is cylindrical about a longitudinal axis. The probe portion 110 includes a first circular aperture 130 and a second circular aperture (only partially shown) that is disposed circumferentially opposite of the first circular aperture 130 on the probe
portion 110. The probe portion 110 also includes a third oval-shaped aperture 131 that is displaced longitudinally and angularly from the first circular aperture 130 and the second circular aperture.

[0019] The probe portion 110 includes an inner surface 190 that defines an inner cavity 195. The first circular aperture 130 and the second circular aperture provide respective flow paths between the outer surface of the probe portion 110 and the inner cavity 195. The inner cavity 195, in turn, provides a flow path inside the probe portion 110 along the longitudinal axis. Note that the following discussion will generally utilize the phrase “flow path” to apply to fluid and/or air flow. For example, a particular flow path may provide for the flow of fluid and/or air, depending on a particular system configuration.

[0020] The probe portion 110 also includes a first flat surface 120a, second flat surface 120b and third flat surface 120c (not visible) disposed near the tip 125 of the probe portion 110. The first, second and third flat surfaces 120a, 120b, 120c are generally arranged as piercing knife faces, which culminate in a vertex at the tip 125 of the probe portion 110. The tip 125 of the probe portion 110 is thus adapted to pierce fluid containers (e.g., caps of fluid bottles) placed on the probe portion 110. Such piercing then provides a flow path from the pierced container, through the first aperture 130 and second aperture, through the inner cavity 195 and through a lower aperture (not shown) in the base portion 150. Of course, fluid will also flow to a greater or lesser extent between the probe portion 110 and a pierced fluid container (e.g., a penetrated water bottle cap), since it is not intended that a leak-proof seal be created upon penetration.

[0021] The base portion 150 is circular and planar. The base portion 150 is disposed such that the primary plane of the base portion 150 is orthogonal to the longitudinal axis of the probe portion 110. The base portion 150 includes a first bottle standoff 160 and a second bottle standoff (not shown) on the circumferentially opposite side of the base portion 150 from the first bottle standoff 160. The first bottle standoff 160 and the second bottle standoff project from the base portion 150 toward the tip 125 of the probe portion 110.

[0022] The base portion 150 also includes a lower lip 170. Extending radially outward from the lower lip 170, the base portion 150 further includes a first interlocking tab 170a, a second interlocking tab 170b, a third interlocking tab (disposed circumferentially opposite of the first interlocking tab 170a and not shown) and a fourth interlocking tab (disposed circumferentially opposite of the second interlocking tab 170b and not shown). The interlocking tabs 170a, 170b provide the capability for the prior art stem 100 to be interlocked with another part of a fluid dispensing system (e.g., an adapter, or “bucket,” formed to hold a fluid container).

[0023] FIG. 2 is a perspective drawing of an exemplary fluid dispensing system stem 200, in accordance with various aspects of the present invention. Such an exemplary fluid dispensing system stem 200 may, for example, be utilized in an inverted-bottle fluid dispensing system. It should be recognized that the exemplary stem 200 merely provides specific illustrative examples of various generally broader aspects of the present invention.

[0024] The exemplary stem 200 includes a probe portion 210 and a base portion 250. The probe portion 210 and the base portion 250 may, for example and without limitation, be molded into a single uniform plastic part. Alternatively, for example, the probe portion 210 and the base portion 250 may be molded into separate plastic parts and later coupled. Also, for example, the exemplary stem 200 may be formed from any of a number of materials. Additionally, for example, the exemplary stem 200 may be formed in accordance with any of a variety of manufacturing techniques.

[0025] The exemplary probe portion 210 may, for example, include a longitudinal axis (e.g., running generally vertically in FIG. 2). Though, as will be discussed later, the exemplary probe 210 may generally have a cylindrical shape about the longitudinal axis, such a generally cylindrical shape is by no means necessary. For example and without limitation, the exemplary probe 210 may include a triangular, square, pentagonal, hexagonal or any n-sided cross-section.

[0026] The probe portion 210 may, for example, include a first aperture 230 and a second aperture 232. The probe portion 210 may also, for example, include a third aperture (only partially shown), disposed circumferentially opposite of the first aperture 230 on the probe portion 210, and a fourth aperture (only partially shown), disposed circumferentially opposite of the second aperture 232 on the probe portion 210.

[0027] Though the exemplary apertures 230, 232 are illustrated as generally circular, the apertures 230, 232 may be formed in any of a variety of shapes and sizes. Also, though the exemplary apertures 230, 232 are illustrated as running generally orthogonal to the longitudinal axis of the probe portion 210, the apertures 230, 232 may run in any of a variety of spatial directions. Further, though the exemplary apertures 230, 232 are illustrated at particular respective vertical positions along the longitudinal axis of the probe portion 210, the apertures 230, 232 may be located in any of a variety of positions on the probe portion 210.

[0028] The exemplary probe portion 210 may, for example, include an inner surface 290. A first inner surface portion 290a is visible through the first aperture 230, and a second inner surface portion 290b is visible through the second aperture 232. The inner surface 290 generally defines an inner cavity 295. The first aperture 230 and the second aperture 232 (along with the third and fourth apertures) provide respective flow paths between the outer surface of the probe portion 210 and the inner cavity 295. The inner cavity 295, in turn, provides a flow path inside the probe portion 210 generally along the longitudinal axis of the probe portion 210.

[0029] The exemplary probe portion 210 may also include a first face 220a, a second face 220b and a third face 220c (not visible in FIG. 2) disposed near the tip 225 of the probe portion 210. The first, second and third faces 220a, 220b, 220c are generally arranged as piercing knife faces, which culminate in a vertex at the tip 225 of the probe portion 210. The tip 225 of the probe portion 210 is thus adapted to pierce fluid containers (e.g., fluid bottle caps) that are placed on the probe portion 210 and/or displace obstacles that may otherwise interfere with the efficient flow of dispensable fluid. Such piercing (and/or obstruction removal) then provides a flow path from the pierced fluid container, through at least the apertures 230, 232, through the inner cavity 295 and through a lower aperture in the base portion 250 of the exemplary stem 200.
As illustrated by a dashed line in FIG. 2, at least one of the faces 220a-c may include a face aperture 222 that extends from the outer surface of the face 220a to the inner cavity 295. Such a face aperture 222 may, for example, increase fluid flow efficiency through the probe portion 210. As with the apertures discussed previously (e.g., the first aperture 230 and the second aperture 232) the face apertures (e.g., the first face aperture 222) may include characteristics of any of a variety of shapes, sizes, locations and spatial directions.

The exemplary stem 200 illustrated in FIG. 2 is illustrated with three generally flat faces 220a-c culminating in a vertex at the tip 225 of the probe portion 210. It should be recognized that there might be any plurality of such faces. Further, it should be recognized that the faces might be flat, slightly curved or substantially curved. Additionally, it should be recognized that the faces might be flat, concave or convex. In one non-limiting example, the tip 225 may include a single continuous surface that conically converges to a point.

FIG. 3 is a drawing 300 including rear cutaway, side and front views of an exemplary fluid dispensing system stem 200, in accordance with various aspects of the present invention. The following discussion will generally refer to FIGS. 2 and 3.

The exemplary stem 200 (e.g., probe portion 210) may also include a slot 240 that is aligned substantially along the longitudinal axis of the stem 200. The slot 240 may, for example, provide a flow path between the outer surface of the probe portion 210 and the inner cavity 295 of the probe portion 210.

FIG. 3 includes a “rear cutaway” view of the exemplary stem 200 that shows the slot 240 from the inside of the stem 200 looking out at the slot 240. The rear cutaway view also shows a substantial portion of the inner surface 295 and inner cavity 295 of the stem 200. The rear cutaway view also shows an exemplary face aperture 222 extending from the outer surface of the stem 200 to the inner cavity 295.

FIG. 3 also includes a “side view” of the exemplary stem 200 that shows a profile view of the slot 240 and a direct view of the first aperture 230 and the second aperture 232. FIG. 3 further includes a “front” view of the exemplary stem 200 that shows a direct view of the slot 240, where the slot 240 exposes the inner surface 295 and a portion of the inner cavity 295 of the stem 200. The front view of the exemplary stem 200 also shows an exemplary face aperture 222.

The exemplary slot 240 may, for example, be dimensioned and longitudinally positioned on the probe portion 210 such that when a fluid container (e.g., a bottle) is properly positioned (or seated) over the stem (i.e., placed in the generally intended position of operation), a first portion of the slot 240 is disposed within a volume of the fluid container, and a second portion of the slot 240 is disposed outside a volume of the fluid container.

Such positioning may, among other advantages, provide for enhanced fluid flow efficiency. For example, such positioning may provide for free flow of fluid and/or air through the slot 240. Such positioning may be controlled in any of a variety of manners. For example and without limitation, the exemplary stem 200 or other portion of a fluid dispensing system may include one or more fluid container positioning features (e.g., interference features) that govern positioning of a fluid container relative to the stem 200. For example, an interference feature may allow a fluid container to encompass only a first portion of the slot 240. A non-limiting exemplary interference feature will be presented later in the discussion of the base portion 250.

The exemplary slot 240 is illustrated having particular dimensions. It should be recognized that the dimensions and shape of the slot 240 might vary considerably. Additionally, though the exemplary slot 240 is illustrated aligned with the longitudinal axis of the stem 200 (or probe portion 210), such alignment may vary considerably and still be considered to be “substantially aligned” with the longitudinal axis. For example and without limitation, the slot 240 may be characterized by a spiral or helix shape, while still being substantially aligned along the longitudinal axis of the stem 200.

In various non-limiting exemplary configurations, the probe portion 210 of the exemplary stem 200 may include a generally cylindrically shaped portion along the longitudinal axis of the probe portion 210. The perspective view of the exemplary probe portion 210 in FIG. 2 and the top view of the exemplary probe portion 210 in FIG. 4 provide a general illustration of such a generally cylindrically shaped portion. The probe portion 210 may also include a substantially flat portion 235 that is disposed generally along the longitudinal axis of the probe portion 210. For example and without limitation, both the substantially flat portion 235 and the cylindrically shaped portion may be generally coextensive along the longitudinal axis of the probe portion 210. Also for example, the substantially flat portion 235 and the cylindrically shaped portion may at least have overlapping components along the longitudinal axis of the probe portion 210. For example and without limitation, the cylindrically shaped portion and the substantially flat portion 235 may be molded (or otherwise formed) to a generally uniform thickness.

FIG. 4 is a drawing 400 including bottom, side and top views of an exemplary fluid dispensing system stem 200, in accordance with various aspects of the present invention. The following discussion will now generally refer to FIGS. 2 and 4.

The exemplary stem 200 may include a base portion 250 disposed proximate an end of the probe portion 210 longitudinally opposite the tip 225 of the probe portion 210. The base portion 250 may, for example and without limitation, be substantially planar, where the primary plane of the base portion 250 is generally orthogonal to the longitudinal axis of the probe portion 210. Though the base portion 250 is generally illustrated as flat and circular, such characteristics are merely exemplary.

The base portion 250 may include a central aperture 299 that opens to the inner cavity 295 of the probe portion 210. For example the central aperture 299 may be disposed on the base portion 250 inside the radius of the probe portion 210. The central aperture 299 may, for example, provide a flow path between the inner cavity 295 of the probe portion 210 and the lower side of the base portion 250 (i.e., the side of the base portion 250 generally away from the probe portion 210).
The base portion 250 may also, for example, include one or more apertures outside the radius of the probe portion 210, where such apertures generally extend through the base portion 250. For example, the exemplary base portion 250 is illustrated with a first base aperture 280a, second base aperture 280b, third base aperture 280c and fourth base aperture 280d. As with other apertures previously discussed, the shape, size, position and number of the base apertures may vary.

The base portion 250 may also include various interlocking features that are adapted to interface with corresponding interlocking features on a second dispensing system component. As will be illustrated later, such a second dispensing system component may, for example and without limitation, include an adapter, or “bucket,” formed to hold a fluid container.

Such interlocking features may, for example and without limitation, include a generally circular lower lip 270 extending from the base portion 250 in a direction generally away from the probe portion 210. The base portion 250 may then include a first interlocking tab 270a, a second interlocking tab 270b, a third interlocking tab 270c and a fourth interlocking tab 270d extending radially (i.e., generally along a radius from a central point) outward from the lower lip 270. The interlocking tabs 270a-d may, for example, provide the capability for the exemplary stem 200 to be interlocked with another part of a fluid dispensing system. For example and without limitation, the lower lip 270 and interlocking tabs 270a-d may be adapted such that a twisting motion of the stem 200 relative to a second dispensing system component interlocks the stem 200 and the second dispensing system component. It should be recognized that the illustrative interlocking features of the exemplary stem 200 are merely illustrative.

As discussed previously, the exemplary stem 200 may include various features adapted to govern positioning of a fluid container relative to the stem 200 (e.g., relative to the slot 240 or the probe portion 210). As a non-limiting example of such features, the illustrated base portion 250 includes a standoff 260 (e.g., a first standoff 260a and a second standoff 260b) protruding from the base portion 250 generally toward the tip 225 of the probe portion 210. Such a standoff 260 may, for example, prohibit a sealed fluid container from contacting or sealing with the base portion 250 (e.g., providing for efficient flow of fluid and/or air when a sealed fluid container is properly sealed). Also, for example, as mentioned previously in the discussion of the slot 240, such a standoff 260 may position a sealed fluid container (e.g., a water bottle) in a manner in which a first portion of the slot 240 is disposed within the volume of the fluid container (e.g., within the mouth or neck of a bottle), and a second portion of the slot 240 is not disposed within the volume of the fluid container. The first and second portions of the slot 240 may, for example, be large enough to provide for efficient fluid and/or air flow when a fluid container is properly seated. In general, the exemplary stem 200 (or other dispensing system component) may include any of a variety of features adapted to govern positioning of a fluid container.

As discussed previously, the exemplary fluid dispensing system stem 200 may include various interlocking features adapted to attach the stem 200 to another dispensing system component. Also as mentioned previously, such other dispensing system component may include a dispensing system adapter (or “basket”) adapted to hold a fluid container (e.g., over a fluid reservoir of a fluid dispensing system). FIG. 5 is a drawing including top, side, perspective and side cutaway views of an exemplary fluid dispensing system basket 500, in accordance with various aspects of the present invention. It should be noted that the illustrated basket 500 is merely exemplary, and characteristics thereof should not limit the scope of various aspects of the present invention, unless explicitly claimed.

The exemplary basket 500 may include a side portion 520, a bottom portion 525 and a lip portion 530. The bottom portion 525 and side portion 520 generally define an inner space 510. The inner space 510 may, for example, function as an entry portion for an inverted fluid container, at least a portion of which may be positioned in the inner space 510. The inner space 510 may, for example and without limitation, be adapted to receive at least a portion of a fluid container. In a non-limiting water dispensing system example, the inner space 510 may generally be adapted to receive a mouth, neck and partial shoulder of a water bottle. The lip portion 530 may, for example, be adapted to securely fit over an edge of a fluid holding reservoir. For example, when securely positioned over a fluid holding reservoir, the exemplary basket may securely hold a fluid container in position over the fluid holding reservoir in addition to providing efficient fluid flow between the fluid container and the fluid holding reservoir.

The bottom portion 525 may include an aperture 540 and various interlocking (or mating) features 550 adapted to receive and couple with a stem assembly. For example and without limitation, the interlocking features 550 may include slots into which the tabs 270a-d of the exemplary stem 200 may be inserted. The interlocking features 550 may also, for example, include projections or grooves adapted to receive the tabs 270a-d upon insertion of the tabs 270a-d into the slots followed by a twisting motion of the exemplary stem 200 about the longitudinal axis of the probe portion 210 relative to the basket 500.

The exemplary basket 500 may, for example, be made from any of a variety of materials and formed in any of a variety of manners. For example and without limitation, the exemplary basket 500 may be constructed from molded plastic or other material. Alternatively for example, the exemplary basket 500 may be stamped or machined.

FIG. 6 is a drawing including various views of a combination of an exemplary fluid dispensing system stem 200 (e.g., as illustrated in FIGS. 2-4) and an exemplary fluid dispensing system basket 500 (e.g., as illustrated in FIG. 5), in accordance with various aspects of the present invention. As discussed previously, various interlocking features 270 and 270a-d of the exemplary stem 200 may be mated with various corresponding interlocking features 550 of the exemplary basket 500 to form a combined assembly. Note that such a multi-piece construction may be adapted to be permanent or temporary. For example, the various interlocking features of the exemplary stem 200 and basket 500 may be adapted to provide for convenient replacement of a defective or broken stem. Further for example, the various interlocking features of the exemplary stem 200 and basket 500 may be adapted to provide for convenient interchange of
various stems and baskets (e.g., to flexibly adapt various fluid dispensing system components to different dispensing system and/or fluid container configurations).

[0052] The exemplary scenario illustrated in FIG. 6 illustrates the coupling of an independent exemplary stem 200 to an independent exemplary basket 500. It should be understood that the scope of various aspects of the present invention should not be limited by characteristics of such an assembly of separate parts. For example and without limitation, the exemplary stem 200 (or various portions thereof) and the exemplary basket 500 (or various portions thereof) may be molded (or otherwise formed) into a single part. In such a non-limiting exemplary scenario, various portions of the exemplary stem 200 and the exemplary basket 500 may be omitted. For example, at least a portion of interlocking parts adapted to couple a separate stem and basket may be omitted.

[0053] FIG. 7 is a drawing 700 showing various non-limiting exemplary illustrations of various generally broader aspects of the present invention. The fluid dispensing system basket 700 may, for example include a reservoir 710 with a basket 500 (or adapter) disposed thereon. As discussed previously, the basket 500 may include a lower opening and features adapted to mate with a stem structure. A fluid container 720 (e.g., a water bottle) includes a throat portion 722, which, when the fluid container 720 is inverted, rests in an entry portion of the basket 500.

[0054] The exemplary fluid dispensing system 700 also includes a stem 200 (or stem structure). As discussed previously, the stem 200 includes features adapted to mate with the basket 500 in the vicinity of the lower opening of the basket 500. The exemplary stem 200 also includes a longitudinal slot 240a-b. As illustrated in FIG. 7, when the bottle 720 is inverted and seated, a first portion of the slot 240a is disposed inside the volume of the bottle 720, and a second portion of the slot 240b is disposed outside the volume of the bottle 720. The exemplary stem 200 is also illustrated with a plurality of apertures (e.g., a first aperture 230) in addition to the slot 240a-b.

[0055] During use of the exemplary fluid dispensing system 700, the fluid container 720 (e.g., a throat portion thereof) may be placed into the entry portion (e.g., the inner space) of the basket 500. During such insertion, the tip of the probe portion of the stem 200 may pierce the fluid container (e.g., a cap of the fluid container). In a non-limiting exemplary water-dispensing scenario, during insertion of a water bottle (e.g., throat-side down) into the entry portion of the basket 500, the tip of the probe portion of the stem 200 may pierce the cap of the water bottle (or otherwise remove water flow obstructions). After placement of fluid container 720 into the entry portion, fluid from the fluid container 720 may freely flow through and around the probe portion of the stem 200 and through the base portion of the stem 200 into the fluid reservoir 710.

[0056] FIG. 8 is a drawing 800 showing various non-limiting exemplary dimensions of an exemplary fluid dispensing system stem, in accordance with various aspects of the present invention. The fluid dispensing system stem may, for example and without limitation, share various characteristics with the exemplary stem 200 illustrated in FIGS. 2-4 and 5 and discussed previously.

[0057] FIG. 9 is a drawing 900 showing various non-limiting exemplary dimensions of an exemplary fluid dispensing system basket, in accordance with various aspects of the present invention. The fluid dispensing system basket may, for example and without limitation, share various characteristics with the exemplary basket 500 illustrated in FIGS. 5-6 and discussed previously.

[0058] The previously discussed figures provided non-limiting exemplary illustrations of various generally broader aspects of the present invention. Accordingly, the scope of various aspects of the present invention should not be limited by characteristics of the exemplary illustrations.

[0059] In summary, various aspects of the present invention provide an inverted-bottle fluid dispensing system providing efficient fluid dispensation. While the invention has been described with reference to certain aspects and embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from its scope. Therefore, it is intended that the invention not be limited to the particular embodiment disclosed, but that the invention will include all embodiments falling within the scope of the appended claims.

What is claimed is:

1. A fluid dispensing system stem comprising a probe portion that comprises:
   - an outer surface;
   - an inner surface defining an inner cavity; and
   - a slot providing a flow path between the outer surface and the inner cavity and substantially aligned along the longitudinal axis of the probe portion.
2. The stem of claim 1, wherein the probe portion further comprises a probe tip adapted to pierce a water bottle cap.
3. The stem of claim 1, wherein the probe portion further comprises a plurality of faces culminating in a vertex at a tip of the probe portion.
4. The stem of claim 3, wherein at least one of the plurality of faces comprises an aperture extending from the outer surface to the inner cavity.
5. The stem of claim 1, wherein the probe portion comprises a cylindrically shaped portion disposed along the longitudinal axis and a substantially flat portion disposed along the longitudinal axis, where at least a portion of the substantially flat portion is longitudinally coextensive with the cylindrically shaped portion.
6. The stem of claim 5, wherein the cylindrically shaped portion and the substantially flat portion are of generally uniform thickness.
7. The stem of claim 1, wherein the probe portion further comprises an aperture extending substantially radially inward from the outer surface to the inner cavity, wherein the aperture is independent of the slot.
8. The stem of claim 1, further comprising a base portion disposed on a base end of the probe portion opposite a tip end of the probe portion, the base portion being generally planar and generally orthogonal to the longitudinal axis of the probe portion.
9. The stem of claim 8, wherein the base portion comprises:

a first aperture radially positioned inside the radius of the probe portion and open to the inner cavity of the probe portion; and

a second aperture radially positioned outside the radius of the probe portion and disposed to provide a fluid path through the base portion.

10. The stem of claim 8, wherein the base portion comprises one or more interlocking features adapted to interface with corresponding interlocking features on a second dispensing system component.

11. The stem of claim 10, wherein the interlocking features are adapted such that a twisting motion of the stem relative to the second dispensing system component interlocks the stem and the second dispensing system component.

12. The stem of claim 8, further comprising an interference feature adapted to prohibit a seated fluid container from contacting a primary surface of the base portion.

13. The stem of claim 12, wherein the interference feature comprises a standoff protruding from the base portion.

14. The stem of claim 1, wherein the slot is positioned along the longitudinal axis of the probe portion such that when a fluid container is properly positioned over the probe portion, a first portion of the slot is disposed within the volume of the fluid container and a second portion of the slot is disposed outside the volume of the fluid container.

15. The stem of claim 14, further comprising an interference feature adapted to prohibit a seated fluid container from encompassing the entire slot within the volume of the fluid container.

16. The stem of claim 15, further comprising a base portion disposed on a base end of the probe portion opposite a tip end of the probe portion, the base portion being generally planar and generally orthogonal to the longitudinal axis of the probe portion, and where the interference feature comprises a standoff protruding from the base portion.

17. A fluid dispensing system stem comprising a probe portion that comprises:

a cylindrically shaped portion disposed along a longitudinal axis of the probe portion; and

a substantially flat portion disposed along the longitudinal axis of the probe portion, wherein at least part of the cylindrically shaped portion is longitudinally coextensive with at least part of the substantially flat portion.

18. The stem of claim 17, wherein the substantially flat portion is generally longitudinally coextensive with the cylindrically shaped portion.

19. The stem of claim 17, wherein the probe portion further comprises:

an inner surface defining an inner cavity; and

an aperture extending between the inner cavity and an outer surface of the probe portion.

20. The stem of claim 19, wherein the aperture comprises a slot aligned substantially along the longitudinal axis of the probe portion.

21. The stem of claim 17, wherein the cylindrically shaped portion and the substantially flat portion are of generally uniform thickness.

22. A fluid dispensing system stem comprising a probe portion that comprises:

an outer surface; and

an inner surface defining an inner cavity; and

a plurality of faces culminating in a vertex at a tip end of the probe portion, wherein at least one of the plurality of faces comprises an aperture extending from the outer surface to the inner cavity.

23. The stem of claim 22, wherein the probe portion further comprises a slot aligned substantially along the longitudinal axis of the probe portion, where the slot extends between the outer surface and the inner cavity.

24. A fluid dispensing system stem comprising:

a probe portion having a longitudinal axis comprising:

an outer surface; and

an inner surface defining an inner cavity; and

a base portion disposed on a base end of the probe portion opposite a tip end of the probe portion, the base portion being generally planar and generally orthogonal to the longitudinal axis of the probe portion and comprising:

a first aperture radially positioned inside the radius of the probe portion and open to the inner cavity of the probe portion; and

a second aperture radially positioned outside the radius of the probe portion and disposed to provide a fluid path through the base portion.

25. The stem of claim 24, wherein the base portion comprises one or more interlocking features adapted to interface with corresponding interlocking features on a second dispensing system component.

26. The stem of claim 25, wherein the interlocking features are adapted such that a twisting motion of the stem relative to the second dispensing system component interlocks the stem and the second dispensing system component.

27. The stem of claim 24, further comprising an interference feature adapted to prohibit a seated bottle from contacting a primary surface of the base portion.

28. The stem of claim 27, wherein the interference feature comprises a standoff protruding from the base portion.

29. A dispensing system for fluids contained in a rigid container having an outlet throat portion, the system comprising:

an upwardly open reservoir open adapted to receive and hold fluid to be dispensed;

an entry portion above the reservoir for accepting the throat of the container when the container is inverted, the entry portion including a bottom with an opening defined therein;

a stem structure disposed in said entry portion and comprising:

a base portion adapted to mate with the opening of the entry portion;
a probe portion adapted to extend longitudinally upward into an inverted container, the probe portion comprising:

an outer surface;
an inner surface defining a coaxial channel within the probe portion; and
a slot providing a flow path between the outer surface and the coaxial channel and substantially aligned along the longitudinal axis of the probe portion, wherein the slot is positioned along the longitudinal axis of the probe portion such that when a fluid container is properly seated over the probe portion, a first portion of the slot is disposed within the volume of the container and a second portion of the slot is disposed outside the volume of the container.

30. The dispensing system of claim 29, wherein the probe portion comprises an upper tip end that converges to a point.

31. The dispensing system of claim 29, wherein the base portion comprises at least one aperture for fluid passage into the reservoir.

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