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Control Number(s)	
Filing Date(s)	
First Named Inventor	Robert Choi
Title	DRINK BOTTLES
Patent Number	10,676,255
Examiner Name	
Attorney Docket No(s).	Z036-0005RE

I hereby revoke all previous requester powers of attorney given in the above-identified reexamination proceeding control number(s).

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SIGNATURE of Third Party Requester

Signature	Scott D Meyer	Date	30 November 2022
Name	Scott D. Meyer	Telephone	(509) 244-8663
Title and Company	Vice President & General Counsel, Zak Designs, Inc.		

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US010676255B2

(12) **United States Patent**
Choi et al.

(10) **Patent No.: US 10,676,255 B2**
(45) **Date of Patent: Jun. 9, 2020**

(54) **DRINK BOTTLES**

(71) Applicant: **CamelBak Products, LLC**, Petaluma, CA (US)

(72) Inventors: **Robert Choi**, Ogden, UT (US); **Barley A. Forsman**, Cotati, CA (US); **Jeremy Galten**, Petaluma, CA (US)

(73) Assignee: **CamelBak Products, LLC**, Petaluma, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **16/035,418**

(22) Filed: **Jul. 13, 2018**

(65) **Prior Publication Data**

US 2018/0327151 A1 Nov. 15, 2018

Related U.S. Application Data

(63) Continuation of application No. 15/287,915, filed on Oct. 7, 2016, now Pat. No. 10,023,365, which is a (Continued)

(51) **Int. Cl.**

B65D 47/06	(2006.01)
A47G 19/22	(2006.01)
A45F 3/20	(2006.01)

(52) **U.S. Cl.**

CPC ***B65D 47/065*** (2013.01); ***A45F 3/20*** (2013.01); ***A47G 19/2266*** (2013.01); ***B65D 47/066*** (2013.01); *A47G 19/2272* (2013.01)

(58) **Field of Classification Search**

CPC A47G 19/2266; A47G 19/2272; B65D 47/066

(Continued)

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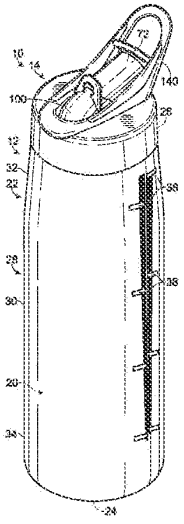
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Primary Examiner — Shawn M Braden
(74) *Attorney, Agent, or Firm* — Amardeep S. Grewal; Gerard M. Donovan; Reed Smith LLP

(57) **ABSTRACT**

Drink bottles, or drink containers with cap assemblies that include a drink spout. In some embodiments, the drink spout is pivotally coupled to a base of the cap assembly. In some embodiments, the drink spouts include mouthpieces, including self-sealing and/or bite-actuated mouthpieces. In some embodiments, the cap assembly includes a handle, which may include at least one guard for the drink spout and/or mouthpiece. In some embodiments, the drink containers include a manual on/off valve. In some embodiments, the dispensing spout includes a mount for the mouthpiece and/or cooperates with the cap to provide a manual on/off valve to selectively restrict flow of drink fluid from the drink container regardless of the drink spout's and/or mouthpiece's configuration. In some embodiments, the drink containers include a drink tube extending from external of the drink containers and/or an air return system.

19 Claims, 9 Drawing Sheets



Related U.S. Application Data

continuation of application No. 14/329,096, filed on Jul. 11, 2014, now Pat. No. 9,463,911, which is a continuation of application No. 12/133,954, filed on Jun. 5, 2008, now Pat. No. 9,777,048, which is a continuation of application No. 11/588,476, filed on Oct. 26, 2006, now Pat. No. 8,622,237, which is a continuation of application No. 11/313,488, filed on Dec. 20, 2005, now Pat. No. 7,533,783.

(60) Provisional application No. 60/706,700, filed on Aug. 8, 2005, provisional application No. 60/670,828, filed on Apr. 11, 2005.

(58) **Field of Classification Search**
USPC 215/11.4, 11.5; 220/254.3, 704, 705, 220/707, 714
See application file for complete search history.

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Fig. 1

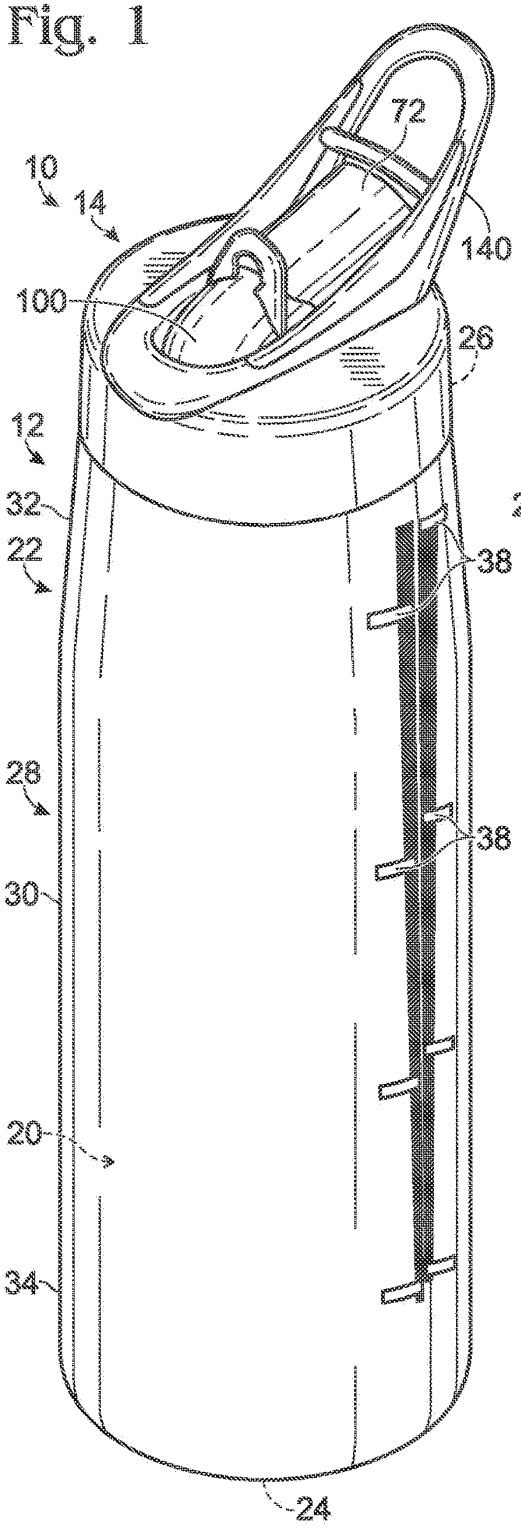

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Fig. 2

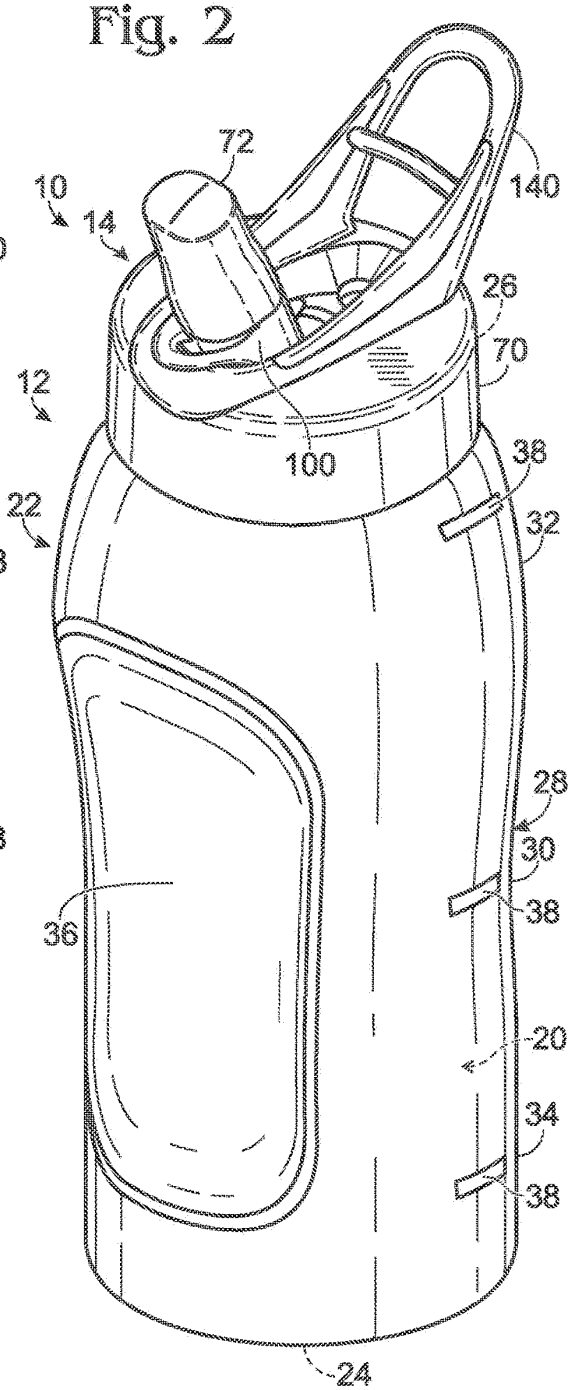

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Fig. 3

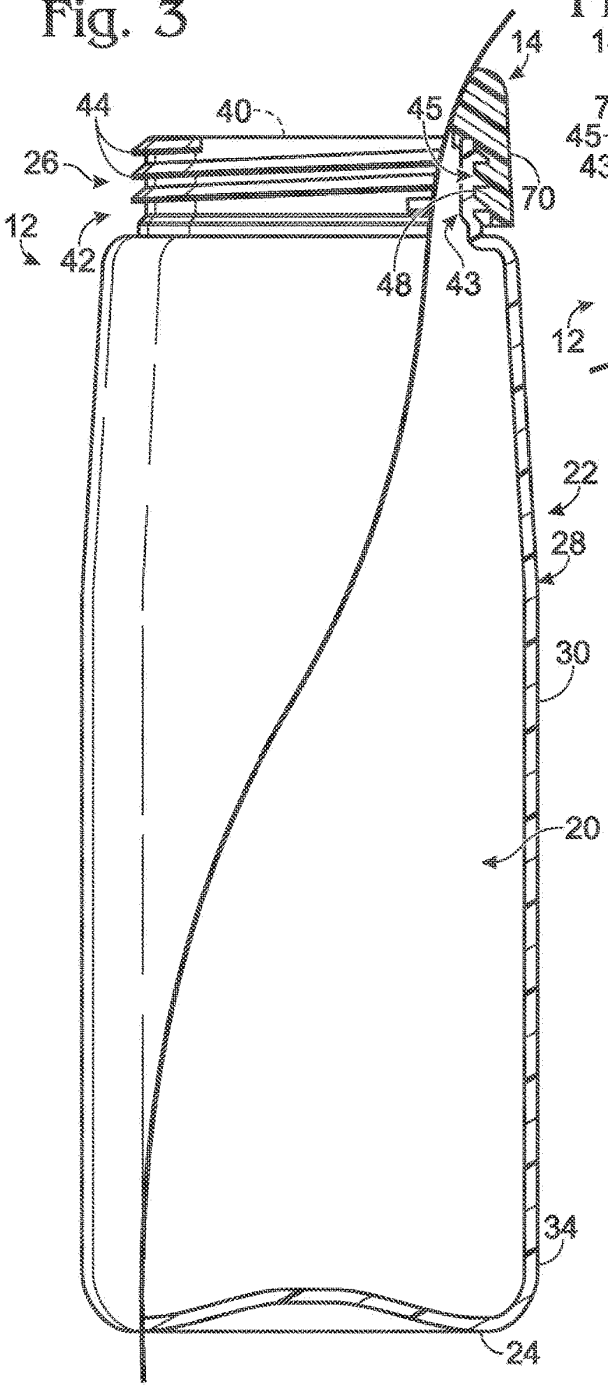
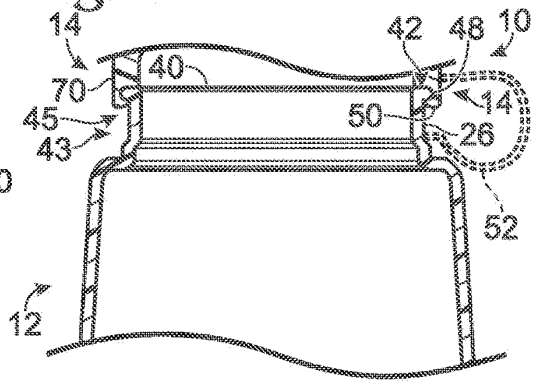


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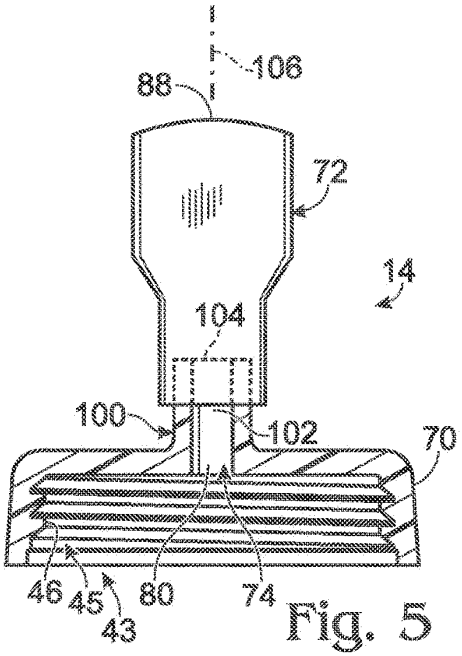


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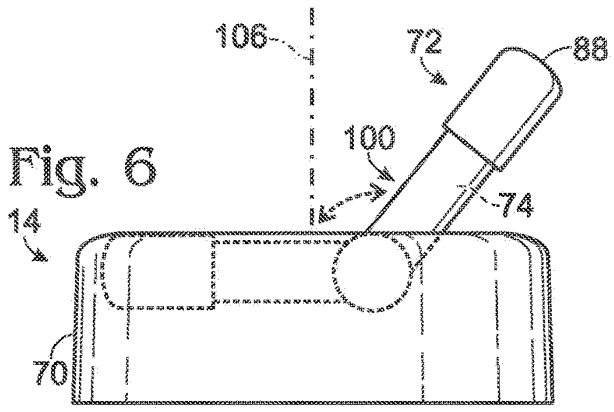


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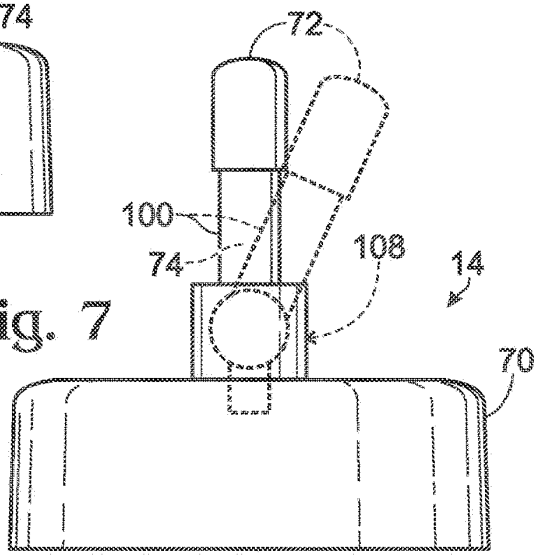


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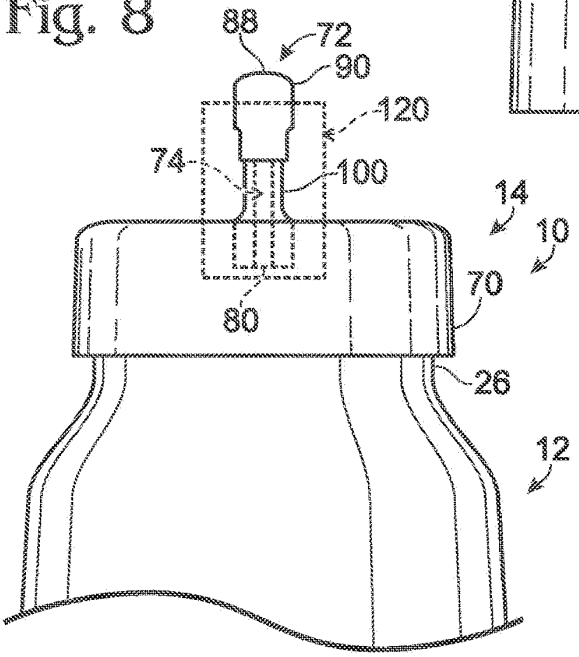


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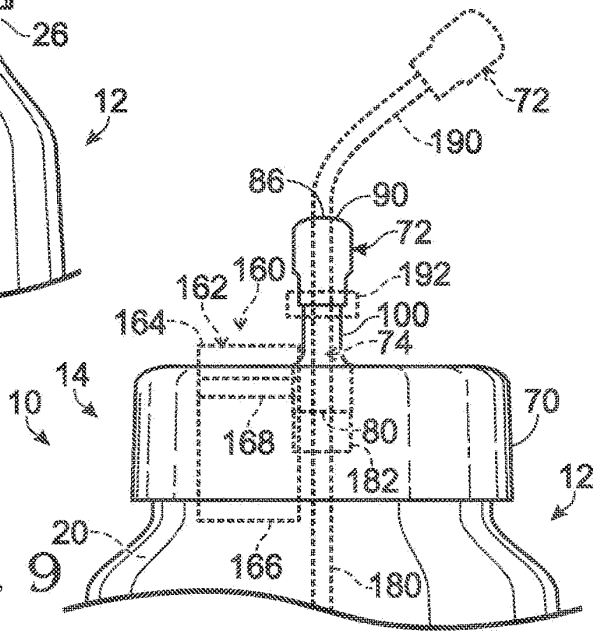


Fig. 9

Fig. 10

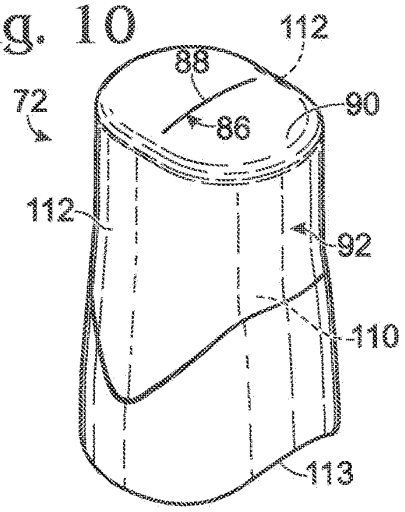


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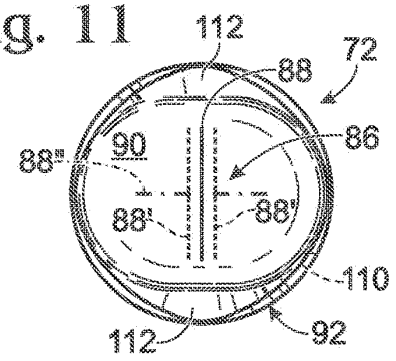


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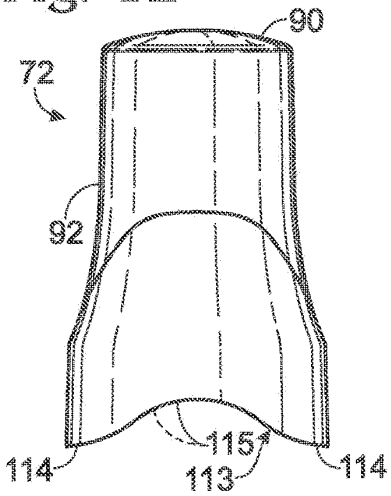


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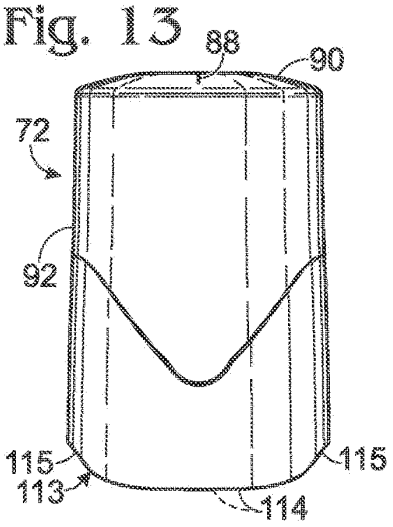


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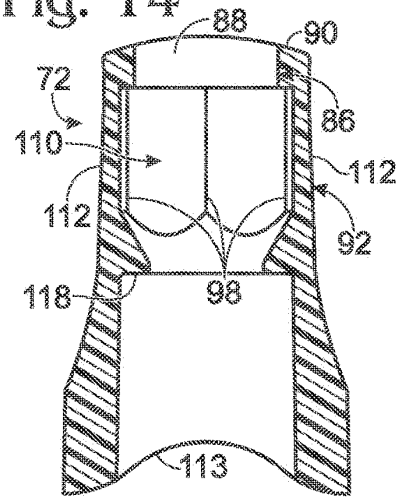


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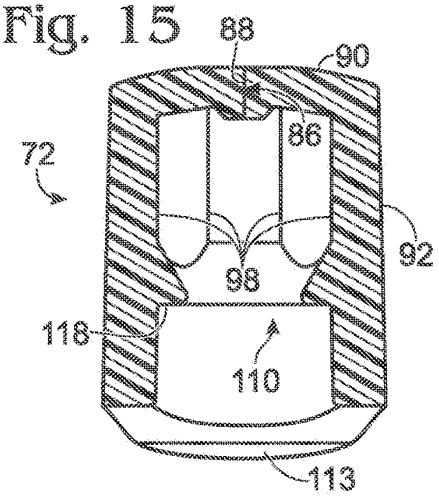


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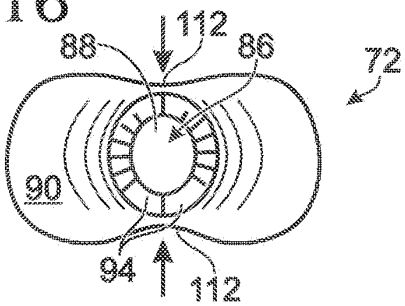


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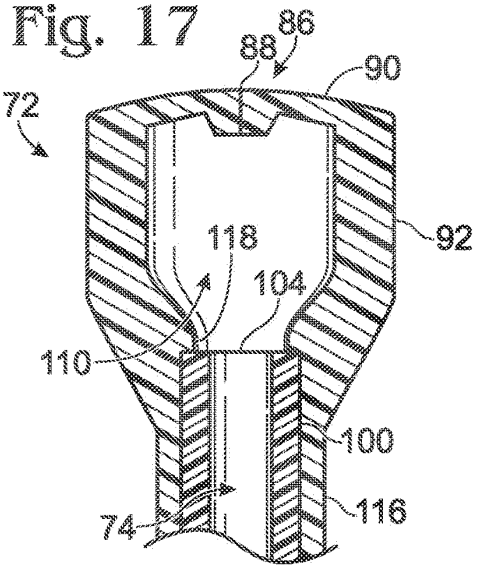


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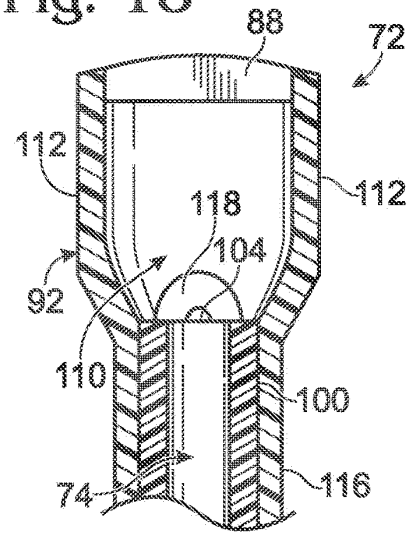


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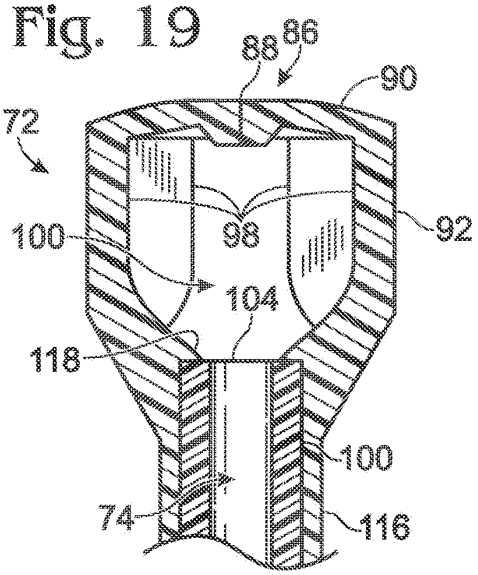


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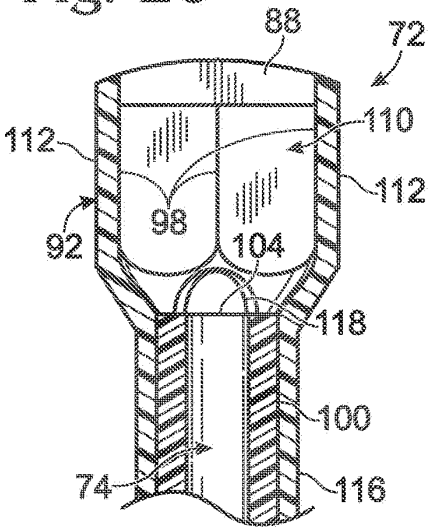


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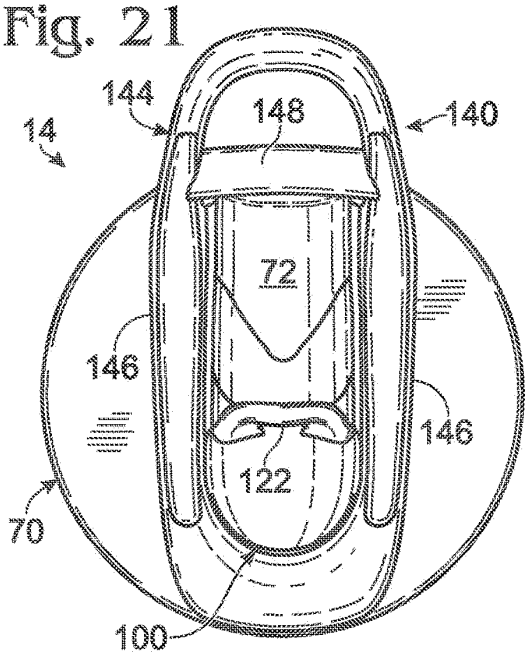


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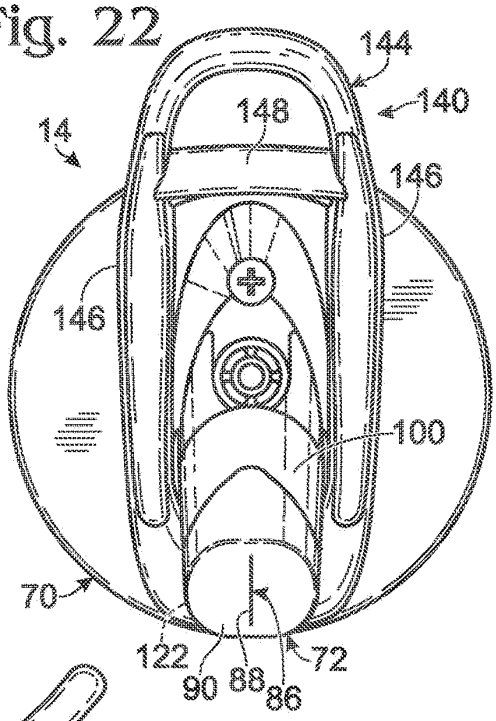
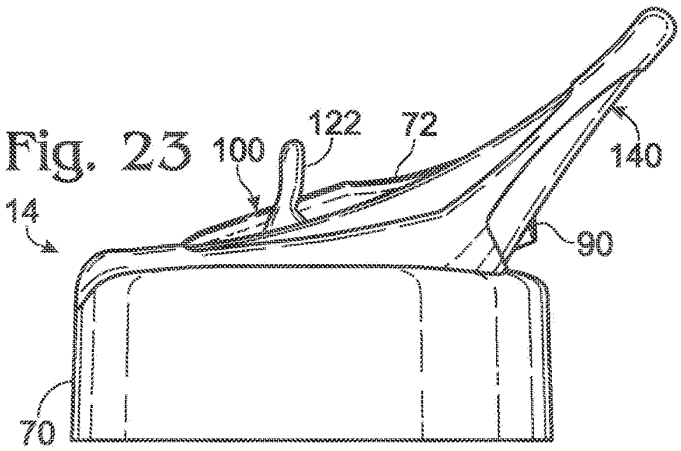


Fig. 23



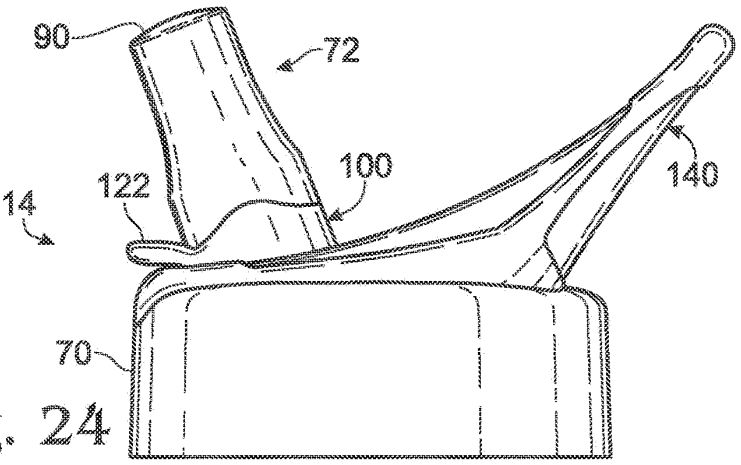
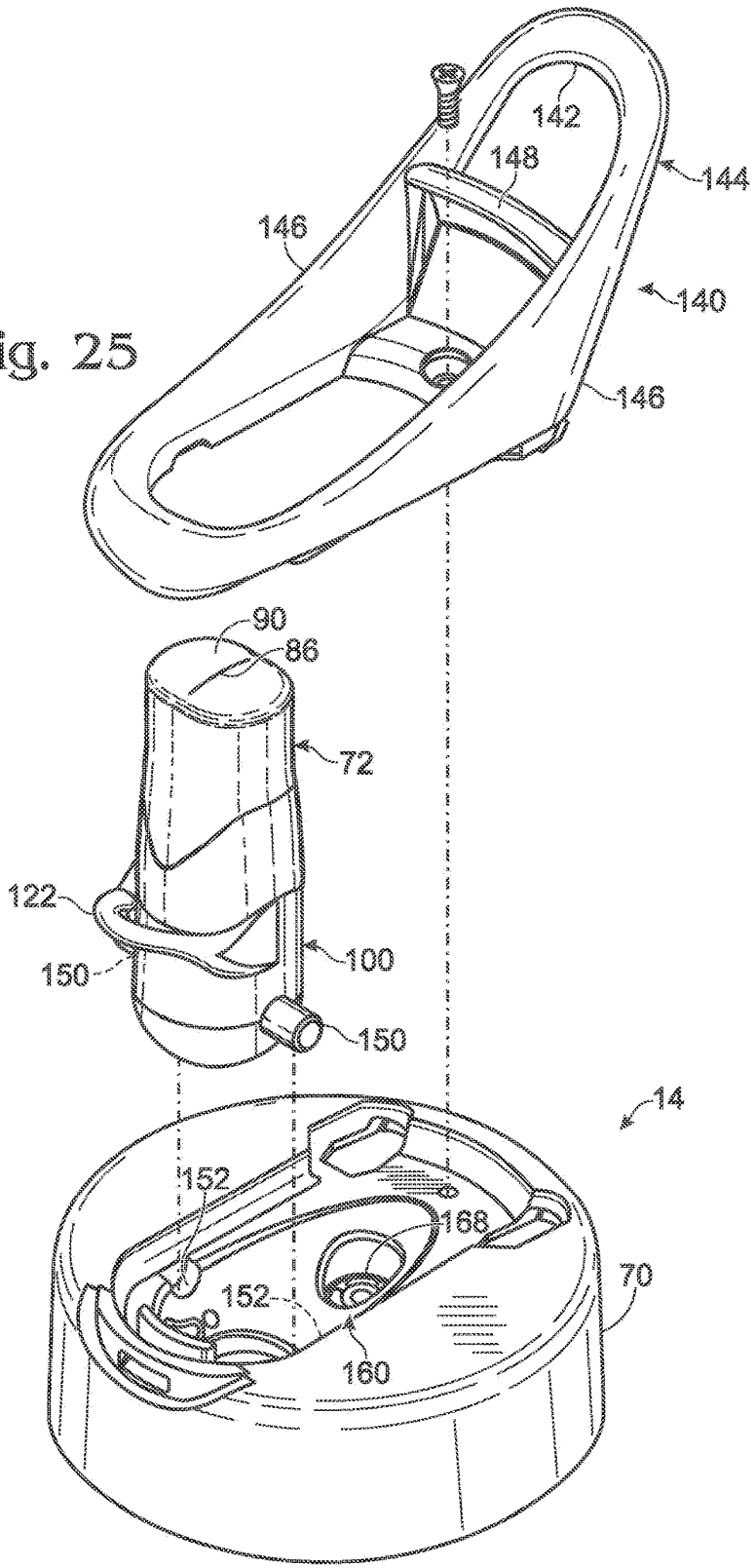


Fig. 24

Fig. 25


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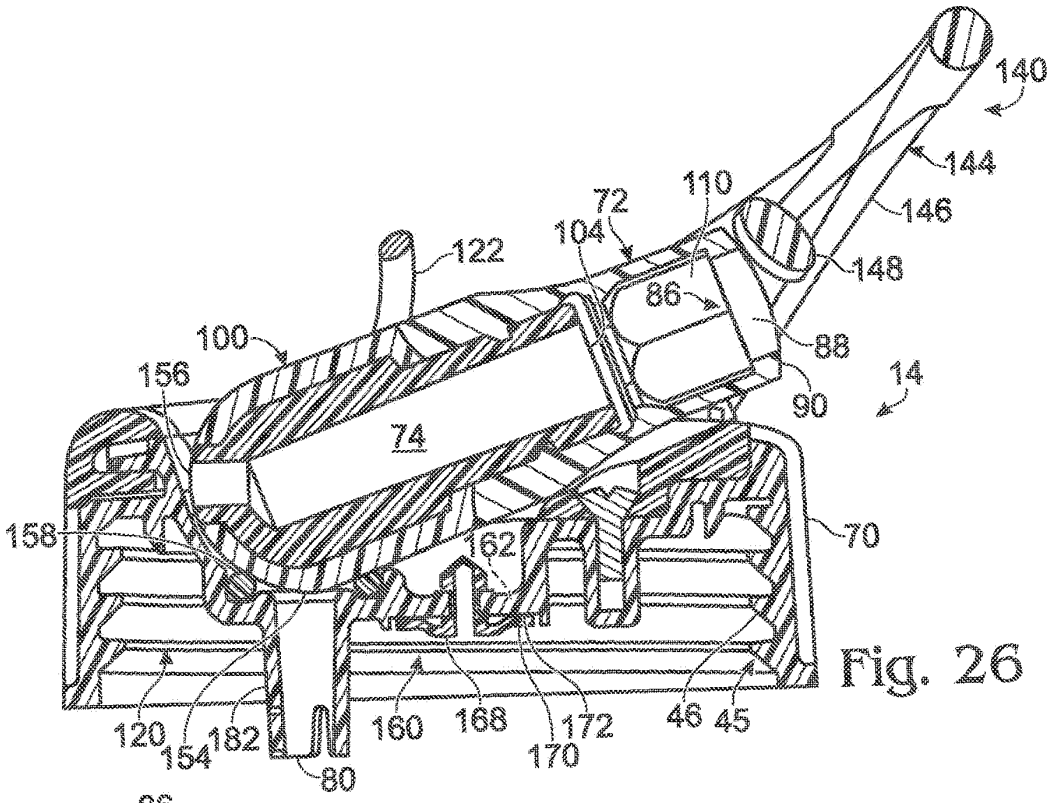

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Fig. 26

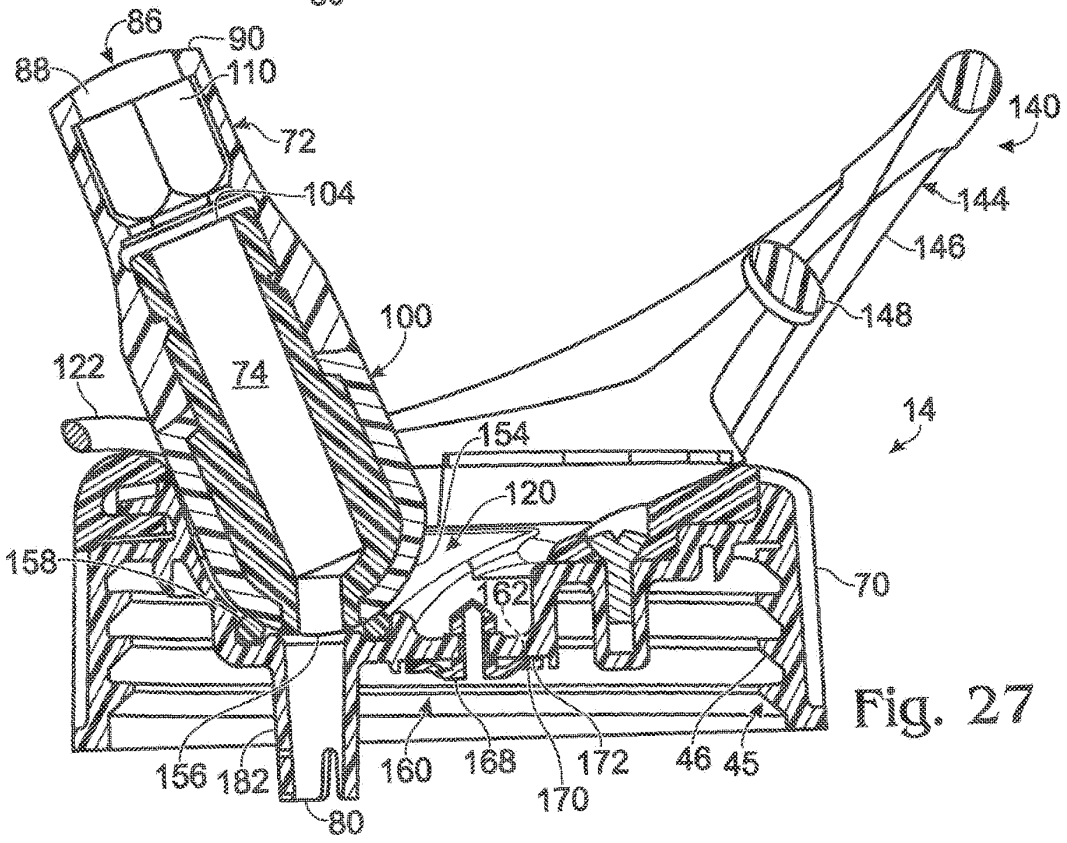

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Fig. 27

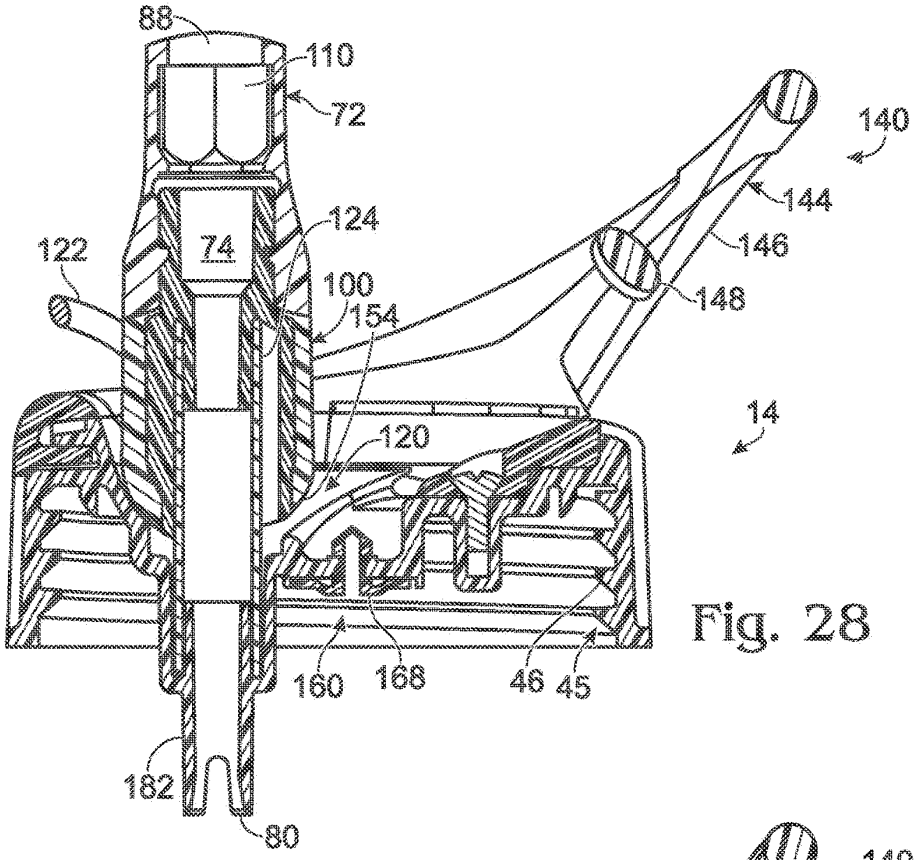

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Fig. 28

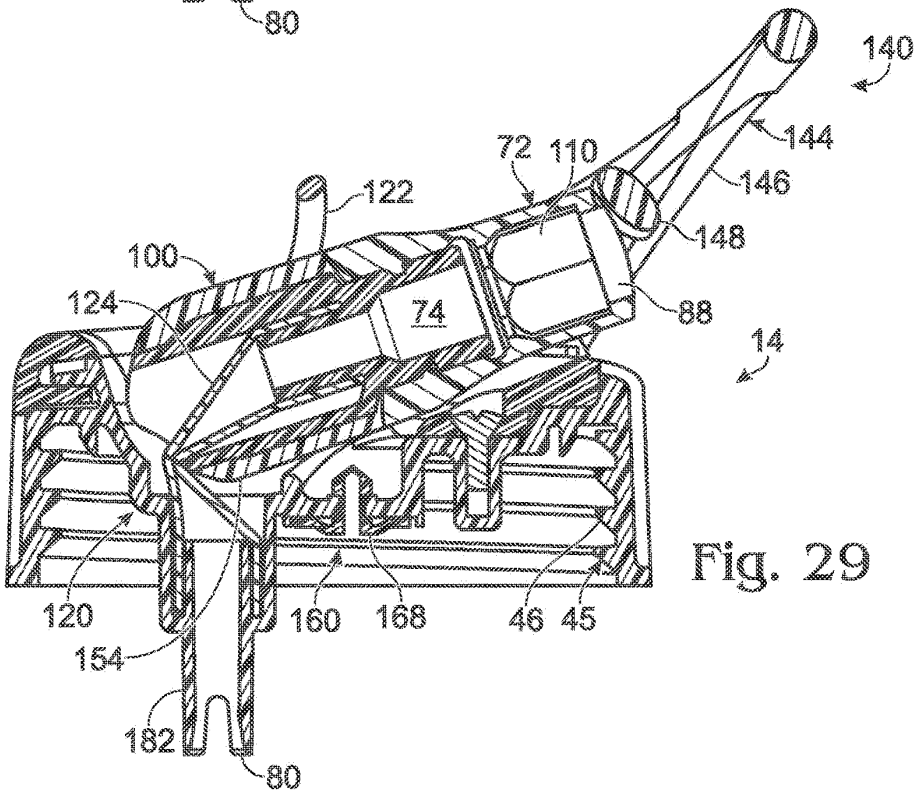

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Fig. 29

DRINK BOTTLES

RELATED APPLICATIONS

The present application is a continuation of, and claims priority under 35 U.S.C. § 120 to, U.S. patent application Ser. No. 15/287,915, which was filed on Oct. 7, 2016, issued on Jul. 17, 2018 as U.S. Pat. No. 10,023,365, and which claims priority to U.S. patent application Ser. No. 14/329,096, which was filed on Jul. 11, 2014, issued on Oct. 11, 2016 as U.S. Pat. No. 9,463,911, and which claims priority to U.S. patent application Ser. No. 12/133,954, which was filed on Jun. 5, 2008, issued on Jul. 15, 2014 as U.S. Pat. No. 8,777,048, and which claims priority to U.S. patent application Ser. No. 11/588,476, which was filed on Oct. 26, 2006, issued on Jan. 7, 2014 as U.S. Pat. No. 8,622,237, and which claims priority to U.S. patent application Ser. No. 11/313,488, which was filed on Dec. 20, 2005, and issued on May 19, 2009 as U.S. Pat. No. 7,533,783. U.S. patent application Ser. No. 11/313,488 claims priority to U.S. Provisional Patent Application Ser. Nos. 60/670,828 and 60/706,700, which were filed on Apr. 11, 2005 and Aug. 8, 2005, respectively. The complete disclosures of the above-identified patents and patent applications are hereby incorporated by reference.

FIELD OF THE DISCLOSURE

The present disclosure relates generally to drink bottles, and more particularly to drink bottles with bite-actuated mouthpieces.

BACKGROUND OF THE DISCLOSURE

For some time people have recognized the need to stay hydrated. Conventionally, many individuals carry drink bottles that contain water or other potable beverages. These bottles are formed from plastic and include a cap. Some conventional drink bottles include a threaded or other neck from which a user drinks fluid contained in the drink bottle after removal of the cap. Some conventional drink bottles include a spout, or nozzle, from which the drink fluid may be drawn from the drink bottle without removing the cap of the drink bottle. Conventional spouts include straws and rigid spouts having an outlet through which drink fluid may flow. Other conventional drink bottles require the cap to be removed to permit drink fluid to be removed from the drink bottle.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a bite-actuated drink bottle according to the present disclosure.

FIG. **2** is a perspective view of another bite-actuated drink bottle according to the present disclosure.

FIG. **3** is a fragmentary, partial cross-sectional side elevation view of a fluid container that may be used with bite-actuated drink bottles according to the present disclosure.

FIG. **4** is a fragmentary cross-sectional side elevation view of portions of another bite-actuated drink bottle according to the present disclosure.

FIG. **5** is a partial cross-sectional side elevation view of a cap assembly that may be used with bite-actuated drink bottles according to the present disclosure.

FIG. **6** is a side elevation view of another cap assembly that may be used with bite-actuated drink bottles according to the present disclosure.

FIG. **7** is a side elevation view of another cap assembly that may be used with bite-actuated drink bottles according to the present disclosure.

FIG. **8** is a fragmentary somewhat schematic side elevation view of portions of another bite-actuated drink bottle according to the present disclosure.

FIG. **9** is a fragmentary somewhat schematic side elevation view of portions of another bite-actuated drink bottle according to the present disclosure.

FIG. **10** is an isometric view of a bite-actuated mouthpiece that may be used with bite-actuated drink bottles according to the present disclosure.

FIG. **11** is a top plan view of the mouthpiece of FIG. **10**.

FIG. **12** is a side elevation view of the mouthpiece of FIG. **10**.

FIG. **13** is a side elevation view of the mouthpiece of FIG. **10**.

FIG. **14** is a cross-sectional view of the mouthpiece of FIG. **12**.

FIG. **15** is a cross-sectional view of the mouthpiece of FIG. **13**.

FIG. **16** is a somewhat schematic top plan view of a bite-actuated mouthpiece in a dispensing configuration.

FIG. **17** is a cross-sectional view of another bite-actuated mouthpiece that may be used with bite-actuated drink bottles according to the present disclosure.

FIG. **18** is transverse cross-sectional view of the mouthpiece of FIG. **17**.

FIG. **19** is a cross-sectional view of another bite actuated mouthpiece that may be used with bite-actuated drink bottles according to the present disclosure.

FIG. **20** is a transverse cross-sectional view of the mouthpiece of FIG. **19**.

FIG. **21** is a top plan view of another suitable cap assembly for use with bite-actuated drink bottles according to the present disclosure, with the cap assembly's spout in a stowed configuration.

FIG. **22** is a top plan view of the cap assembly of FIG. **21**, with the cap assembly's spout in a dispensing configuration.

FIG. **23** is a side elevation view of the cap assembly of FIG. **21**.

FIG. **24** is a side elevation view of the cap assembly of FIG. **22**.

FIG. **25** is an exploded isometric view of the cap assembly of FIG. **21**.

FIG. **26** is a cross-sectional side elevation view of the cap assembly of FIG. **21**.

FIG. **27** is a cross-sectional side elevation view of the cap assembly of FIG. **22**.

FIG. **28** is a partial cross-sectional side elevation view of another cap assembly that may be used with bite-actuated drink bottles according to the present disclosure.

FIG. **29** is a partial cross-sectional side elevation view of the cap assembly of FIG. **28**, with the spout pivoted to a stowed configuration.

DETAILED DESCRIPTION AND BEST MODE OF THE DISCLOSURE

Examples of drink bottles according to the present disclosure are shown in FIGS. **1** and **2** and indicated generally at **10**. Drink bottles **10** according to the present disclosure include a fluid container **12** and a cap, or cap assembly, **14** that includes a mouthpiece **72**. Although referred to herein

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as being "drink bottles," it is within the scope of the present disclosure that the fluid container may have any suitable shape, including shapes that do not resemble conventional bottles, and may be formed from any suitable material. Accordingly, it is within the scope of the present disclosure that drink bottles **10** may additionally or alternatively be referred to as drink containers **10** and/or as beverage containers **10**. As discussed in more detail herein, drink bottles **10** according to the present disclosure will typically include a free-standing fluid container **12**. Drink bottles **10** according to the present disclosure will typically include a cap assembly with a base **70** that is adapted to be coupled to the fluid container and a bite-actuated mouthpiece, or valve assembly, **72** upon which a user may bite to configure the mouthpiece from a closed configuration to a dispensing configuration.

In FIGS. **1** and **2**, the cap assemblies are shown including optional pivotal mounts **100** to which the mouthpieces are mounted, and optional handles **140** that extend from the cap assembly. In FIG. **2**, the cap assembly is shown with the mount in a dispensing configuration in which the mouthpiece is oriented in a suitable position from which a user may draw drink fluid from the drink bottle through mouthpiece **72** when the user bites upon the mouthpiece or otherwise urges the mouthpiece from the illustrated sealed configuration to a dispensing configuration. In FIG. **1**, the illustrative example of a cap assembly **14** is shown with the mount in a stowed configuration, in which the mouthpiece is positioned closer to the base of the cap than in the dispensing configuration, with the stowed configuration typically corresponding to an orientation in which the mouthpiece is not suitably positioned for a user to bite upon the mouthpiece to configure the mouthpiece to a dispensing configuration. The stowed configuration may also be referred to as a retracted configuration, and the dispensing configuration may also be referred to as an extended configuration in which the distal end, or outlet, of the mount is oriented to extend generally away from the base of the cap assembly. The various configurations referred to herein may also be selectively referred to as positions without departing from the scope of the present disclosure.

As indicated in FIGS. **1-2** and perhaps best seen in FIG. **3**, fluid container **12** defines an internal compartment **20** that is sized to hold, or receive, up to a predetermined volume of potable drink fluid, or liquid. Illustrative examples of drink fluids include water, sports drinks, juices, energy drinks, and the like. Typically, container **12** will be sized to hold up to approximately two liters of drink fluid, with many embodiments of container **12** being sized to hold a maximum volume of less than two liters of drink fluid. It is within the scope of the present disclosure that container **12** may have any suitable size and shape, with illustrative, non-exclusive examples being shown in FIGS. **1-3**. Illustrative, non-exclusive examples of suitable sizes (i.e., capacities of drink fluid able to be received into the fluid container at one time) for fluid container **12** include 4 oz., 6 oz., 8 oz., 10 oz., 12 oz., 16 oz., 20 oz., 24 oz., 32 oz., 36 oz., 0.5 liters, 0.7 liters, 1 liter, 1.5 liters, 6-11 oz., 12-19 oz., 19-25 oz., 12-36 oz., 25-36 oz, and 10-70 oz. (with these illustrative examples referring to fluid ounces of drink fluid that may be poured in one filling into an empty fluid container). It is within the scope of the present disclosure that containers having different sizes, including sizes that are smaller than, larger than, or within the illustrative sizes and/or ranges presented above, may be used without departing from the scope of the present disclosure.

Fluid container **12** may be formed from any suitable material or combination of materials. Non-exclusive examples of factors that may be (but are not required to be) considered when selecting material(s) for the fluid container include the durability of the material, the intended potable drink fluid, or types of drink fluids, that will be contained in the fluid container, the intended life, or period of use, of the drink bottle, whether the fluid container is intended to be refilled or otherwise reused, environmental concerns, whether the fluid container is intended to resist being collapsed during use, whether the fluid container is designed to permit a user to collapse the fluid container inwardly when dispensing fluid therefrom, or to dispense drink fluid therefrom, whether the drink container (and optionally the cap assembly) is designed to be washed in a household dishwasher, etc. Illustrative examples of materials that may be used include polycarbonate, polyethylene, polypropylene, glass, metal, and the like. In some embodiments, it may be desirable for the material(s) to be selected so that the fluid container will be transparent, or at least translucent, so that a user may see the contents of the fluid container, or at least the level of drink fluid within the fluid container, through the walls, or wall structure, of the container. In some embodiments, it may be desirable for the material(s) to be selected so that the fluid container is rigid and resists being collapsed when a user drinks from the container. In some embodiments, the material(s) may be selected so that the fluid container is designed to be collapsed (i.e., to permit opposing portions of the wall structure to be urged toward, or even into contact with, each other) during use. However, even fluid containers that are adapted to be collapsed during use, such as by a user squeezing the container, will tend to be at least semi-rigid in their construction and thereby adapted to be self-supporting. In some embodiments, the material(s) may be selected so that the fluid container is not breakable, i.e., will not shatter if dropped. Polyethylene will typically produce a collapsible fluid container that is translucent or opaque, but not transparent. Polycarbonate will typically produce a rigid, or stiff, fluid container that has a clear or glass-like appearance without the fragility of glass. Polypropylene will typically produce a fluid container that is more translucent and stiffer than polyethylene yet still able to be collapsed during use by a user squeezing the wall structure of the fluid container.

As indicated with respect to the illustrated examples of fluid containers shown in FIGS. **1-3**, container **12** includes a body **22** with a base, or bottom surface, **24** and a neck **26**, with the bottom surface and the neck being separated by wall structure **28**. As perhaps best seen in FIG. **3**, bottom surface **24** is adapted to support the drink bottle on a level surface. In other words, in the illustrative example, when the drink bottle is set upon a generally level surface, the bottom surface of the drink bottle will support the drink bottle in an upright configuration upon that surface. FIG. **3** also demonstrates that the bottom surface of the fluid container is not required to have a flat, or planar, configuration, although this configuration is within the scope of the present disclosure.

In the illustrated example shown in FIG. **2**, wall structure **28** has a contoured configuration, with the central region **30** of the wall structure being tapered, or defining a portion of the internal compartment that has a reduced cross-sectional area, relative to the corresponding upper and lower regions **32** and **34** of the wall structure. For example, the central region may be shaped to facilitate easier grasping of the drink bottle by a user. It is within the scope of the present disclosure that other configurations may be utilized. For example, the body may include a handle, or passage, that

extends into, or through, the drink compartment. As another illustrative, non-exclusive example, the body may include a handle that projects outwardly from the wall structure. As yet another example, the wall structure may have a cylindrical or other geometrically shaped configuration. As shown in FIG. **1**, the container's wall structure **28** may have a generally cylindrical configuration. In the illustrated example, the upper region **32** of the wall structure has a tapered configuration relative to the central and lower regions **30** and **34** of the wall structure, and thereby has a smaller internal perimeter.

The cross-sectional configuration of the wall structural may be symmetrical throughout the upper, central, and lower regions, or at least one of the regions may have a cross-sectional configuration that is not symmetrical with the other regions and/or with respect to itself. For example, selectively shaping the cross-sectional configuration, or perimeter, of at least the central region may permit the drink bottle to be rotationally oriented by a user for drinking from the subsequently discussed bite-actuated valve assembly without requiring the user to look at the rotational position of the valve assembly relative to the user's hand that is holding the central region of the fluid container's wall structure. For example, and with reference to FIG. **2**, shaping the wall structure to have a depression or other unsymmetrical portion **36** on the central region of the wall structure generally beneath the bite-actuated mouthpiece may permit a user to grasp and orient the bottle for drinking from the mouthpiece simply by feeling the position of the unsymmetrical portion of the wall structure. However, this is but one of many suitable configurations and is not required. In FIGS. **1** and **2**, the wall structure includes gradations **38** to indicate the volume of fluid present in the container. As shown, the gradations are spaced-apart along the height of the fluid container to indicate or otherwise demarcate volumes of drink fluid. Gradations **38** provide another example of optional structure that may or may not be implemented in a particular embodiment without departing from the scope of the present disclosure.

Neck **26** provides an opening, or portal, through which drink fluid may be poured into the internal compartment of the fluid container and/or removed therefrom. Neck **26** will typically have a reduced cross-sectional area (or smaller perimeter) than the region of the fluid container from which it extends, although this configuration is not required. Neck **26** is adapted to interconnect, typically removably, with the cap assembly via any suitable mechanical interconnection, or coupling structure. In the illustrative example shown in FIG. **3**, neck **26** includes a portal **40** with a coupling structure **42** that includes threads **44** that are configured to be threadingly engaged by corresponding threads **46** on the base **70** of the cap assembly to permit the cap to be screwed, or threaded, onto the neck, such as shown in FIG. **3**. In the illustrative example shown in FIG. **3**, the cap assembly's threads **46** provide the coupling structure **45** of the base. It is within the scope of the present disclosure that coupling assembly **43** may be used to refer collectively to the coupling structures of the base and the neck, such as threads **44** and **46**.

Another example of a suitable coupling assembly **43** for interconnecting the cap assembly and the fluid container is shown in FIG. **4**. As shown, the cap assembly is configured to engage the neck with a coupling assembly **43** in the form of a friction fit assembly, with neck **26** including a coupling structure **42** that includes an external lip, or ledge, **48** over which a corresponding coupling structure **45** in the form of a flange, or internal ledge, **50** of the base of the cap assembly extends to couple the cap assembly onto the neck. Cap assembly **14** and/or neck **26** may form a fluid-tight seal therebetween without requiring the inclusion of gaskets, o-rings or seal-enhancing structure. However, it is also within the scope of the present disclosure that one or more such structures may be utilized.

As discussed, cap assembly **14** is connected, and typically removably connected, to the neck of the fluid container. By "removably connected," it is meant that the cap assembly is designed, or adapted, to be repeatedly connected to and disconnected from the neck of the fluid container without destruction of the cap assembly or the neck. When properly connected to the neck, the cap assembly forms a seal with the neck of the fluid container and thereby selectively seals the internal compartment of the container to prevent drink fluid from being dispensed therefrom through opening **40** except as permitted by the cap assembly. One or more of the cap assembly and the neck may include a compressible gasket or other sealing structure to assist in providing a water-tight seal between the cap assembly and the neck when the cap assembly is properly secured on the neck. When removed or otherwise disconnected from the fluid container, the cap assembly may be retained proximate the fluid container by a tether that interconnects the cap assembly and the fluid container to retain a connection between these components when the base of the cap assembly is not coupled to the neck of the fluid container. An optional tether is schematically illustrated in FIG. **4** at **52**. When present, the tether may be integrally formed with one or both of the cap assembly and the fluid container, or it may be coupled to the cap assembly and/or the fluid container via any suitable mechanism. It is also within the scope of the present disclosure that the cap assembly may not be coupled to the fluid container by a tether.

As discussed, and as somewhat schematically illustrated in FIG. **5**, cap assembly **14** includes a base **70**, which is adapted to interconnect with the neck of the fluid container. Cap assembly **14** further includes a mouthpiece, such as a bite-actuated mouthpiece **72**, which is adapted to selectively permit drink fluid to flow therethrough when the valve assembly is deformed from its closed configuration to a dispensing, or open, configuration. Cap assembly **14** further includes, or defines, a fluid conduit **74** though which drink fluid may selectively flow from the fluid container to the mouthpiece.

As discussed, base **70** is preferably configured to be removably coupled to the neck of the fluid container to seal the portal defined by the neck of the fluid container. In other words, a user may drink directly from the fluid container through opening **40** when the cap assembly is not secured to the neck by a suitable coupling structure. When cap assembly **14** is secured to the neck, then drink fluid may not be withdrawn from fluid container **12** other than as permitted by the cap assembly, such as via bite-actuated mouthpiece **72**. Base **70** forms a portion of coupling assembly **43**, with the base and the neck of the fluid container cooperating to secure the base upon the neck. In FIG. **5**, base **70** is shown including coupling structure **45** in the form of threads **46** that are configured to threadingly engage corresponding threads on the neck of a fluid container. As shown in FIG. **5**, base **70** also includes, or defines, an inlet **80** to the fluid conduit **74** through which drink fluid is selectively drawn from the fluid container and dispensed through bite-actuated mouthpiece **72**.

As discussed, cap assembly **14** defines a fluid conduit **74** that extends from the fluid container to the bite-actuated mouthpiece so that drink fluid from container **12** may be

selectively dispensed through mouthpiece **72**. FIG. **5** graphically depicts that it is within the scope of the present disclosure that cap assembly **14** may include a mount **100** to which the bite-actuated mouthpiece is removably mounted, or secured, with the mount defining at least a portion of fluid conduit **74**, such as which may extend through a hollow passage **102** within the mount to a distal open end region **104** of the mount. When mount **100** includes a fluid passage through which drink fluid may at least selectively flow from the internal compartment of the fluid container to the mouthpiece, the mount may be referred to as a drink spout. In the illustrated example shown in FIG. **5**, mount **100** extends in a fixed orientation relative to base **70**, thereby defining the orientation of the mouthpiece **72** relative to the base (and fluid container) during use of the drink bottle. In FIG. **5**, the mount extends generally parallel to the central, or long, axis **106** of the cap assembly and corresponding drink bottle (i.e., straight away from the cap assembly). However, any suitable orientation may be used without departing from the scope of the present disclosure. This is graphically depicted in FIG. **6**, in which the mount is shown extending at an inclined angle relative to the long, or central, axis **106** of the cap assembly and corresponding drink bottle.

It is also within the scope of the present disclosure that mount **100** may be adjustably positionable relative to the base of the cap assembly, thereby permitting the orientation of the bite-actuated mouthpiece to be adjusted within a range of positions, or configurations, that are defined at least in part by the mount. This adjustable positioning of the mouthpiece, when provided for in a particular embodiment, may permit a user to adjust the orientation of the mouthpiece to a user-selected drinking orientation. An example of an adjustably positionable mount **100** is shown in dashed lines in FIG. **6**, in which the mount and attached mouthpiece are shown pivoted from the dispensing configuration shown in solid lines to a stowed configuration. In the stowed configuration, the mouthpiece is typically not positioned for being received into a user's mouth. As discussed in more detail herein, it is within the scope of the present disclosure that the cap assembly may include an optional valve or other fluid regulator that is adapted to prevent or otherwise restrict the flow of drink fluid to the mouthpiece when the mount is in a stowed configuration. In such an embodiment, when the mount is in the stowed configuration, drink fluid would be prevented from flowing from the fluid container through the mouthpiece regardless of the configuration of the mouthpiece.

Another illustrative example of a cap assembly **14** that includes a mount, or drink spout, **100** that is pivotal within a range of positions, or configurations, relative to the base of the cap assembly is shown in FIG. **7**. As shown, the cap assembly includes an adjustable joint **108**, which is somewhat schematically illustrated. As illustrative examples, the mouthpiece, and at least a portion of the mount, may be coupled to the base of the cap assembly by a joint (and/or valve) **108**, such as may take the form of a pivotal joint, a ball joint, or other suitable structure that provides for adjusting the angular and/or rotational orientation of the mount relative to the base of the cap assembly. When the cap assembly includes such a pivotal joint **108**, it is within the scope of the present disclosure that the joint may form a portion of the cap assembly's fluid conduit **74**, such as with the passage of the fluid conduit extending through the joint. However, this construction is not required to all embodiments. As a variation of this structure, the mount may include a hinged or other flexible region that permits selective adjustment of the orientation of the mount's distal open end region **104** relative to the inlet of the fluid conduit.

It is within the scope of the present disclosure that the mouthpiece is non-removably, or permanently, secured to the base, mount, or other portion of the cap assembly. However, in many embodiments it may be desirable for the mouthpiece to be removably connected to the cap assembly, such as to permit the mouthpiece to be repeatedly removed, such as for cleaning or replacement, and thereafter recoupled to the mount. As non-exclusive, illustrative examples, the mouthpiece may be removably mounted onto mount **100** and/or with mount **100** being designed to be removed from base **70**.

Bite-actuated mouthpiece, or valve, **72** includes at least one opening through which drink fluid may flow when the mouthpiece is in its dispensing, or open configuration. An illustrative, non-exclusive example of a suitable construction for bite-actuated mouthpiece **72** is shown in FIGS. **10-15**. In the illustrated example, and perhaps best seen in FIGS. **10** and **14-15**, the mouthpiece includes a dispensing outlet, or opening, **86** that is defined by a slit **88** that extends through the dispensing face **90** of the mouthpiece. It is within the scope of the present disclosure that other configurations may be used, including two or more slits, intersecting or spaced-apart slits, etc. This range of optional configurations is schematically indicated in FIG. **11**, in which a pair of laterally spaced slits are shown in dashed lines at **88'**, and in which a second slit that intersects with slit **88** is shown in dash-dot lines at **88"**. The mouthpiece defines an internal chamber **110** into which drink fluid flows from the outlet, or end region, of the mount and to the opening formed by slit **88** when the mouthpiece is in a dispensing configuration. The sidewalls, or wall structure, **92** of the mouthpiece may be described as including one or more bite regions **112**, which refer to opposed regions upon which a user may bite or otherwise apply compressive forces to urge the mouthpiece from its closed configuration to a dispensing configuration.

As perhaps best seen in FIG. **10**, the illustrated example of a mouthpiece **72** has a non-symmetrical cross-sectional configuration between opposed regions of the mouthpiece's sidewalls **92**. By this it is meant that the illustrated mouthpiece has different dimensions transverse to the direction of fluid flow, depending upon whether the dimensions are measured transverse or parallel to the illustrated slit. It is within the scope of the present disclosure that other non-symmetrical or symmetrical configurations may be used. For example, mouthpiece **72** may have a circular cross-sectional configuration, amongst others.

Mouthpiece **72** is resilient and biased to its closed configuration, such as is shown in FIGS. **10-15**. In use, the mouthpiece is adapted to be configured to the dispensing configuration by a user placing the mouthpiece in the user's mouth and biting upon or otherwise compressing the appropriate portions of sidewalls **92** of the mouthpiece, such as bite regions **112**, to deform the mouthpiece to a position where the slit or other opening is no longer sealed and instead defines a fluid pathway through which drink fluid may flow. This is somewhat schematically depicted in FIG. **16** with another illustrative example of a suitable bite-actuated mouthpiece. As shown, the opposed lips, or sealing surfaces, **94** that define slit **88** are spread apart from each other to define opening **86**, through which drink fluid may be dispensed from the drink bottle. Mouthpiece **72** may be referred to as a self-sealing valve, or valve assembly, because the mouthpiece is constructed to automatically return to its closed, or sealed, configuration when the

compressive forces, such as may be applied by a user's teeth or mouth, are no longer applied to maintain the mouthpiece in its dispensing configuration. Therefore, unless forces are being exerted to the mouthpiece to deform the mouthpiece to a dispensing configuration, the mouthpiece will be in its closed, or sealed, configuration.

The illustrated example also demonstrates that the region of the mouthpiece distal the dispensing face, which may be referred to as the base, or distal, portion of the mouthpiece and which is generally indicated at **113** in FIGS. **10** and **12-15** may have (but is not required to have) a contoured configuration that does not extend at a constant distance from the dispensing face. In the illustrative, non-exclusive example shown in FIGS. **12** and **13**, the base portion includes a pair of projecting regions **114** separated by a pair of concave regions **115**, although this construction is not required and other irregular base configurations may be utilized without departing from the scope of the present disclosure. Having a contoured or otherwise irregular configuration, when mounting on a dispensing spout or other mount that is complimentarily configured to receive and conform to such a configuration enables the mount to restrict relative rotation of the mouthpiece thereupon due to the engagement of the distal portion **113** of the mouthpiece with the mount, such as shown by referring back to FIGS. **1** and **2**. As discussed, the illustrated example is but a non-exclusive example of a suitable configuration, with it being within the scope of the present disclosure that the distal portion of the mouthpiece and/or the corresponding mount may have any suitable configuration for securing the mouthpiece upon the mount.

Additional illustrative, non-exclusive examples of suitable configurations for bite-actuated, self-sealing mouthpieces **72** for use with drink containers according to the present disclosure are shown in FIGS. **17-20**. In FIGS. **17-20**, the mouthpieces are shown positioned on a mount **100** that extends into a neck region **116** of the mouthpiece and terminates at an end region **104**. Also shown are optional stops, or internal projections, **118** that are adapted to engage the end region **104** of the mount to define the fully inserted position of the mount within the mouthpiece. The illustrative portions of mount **100** define portions of fluid conduit **74** which extends from the end region, or outlet, **104** of the mount and into the internal chamber **110** of the mouthpiece.

Additional illustrative examples of suitable bite-actuated mouthpieces, including external and internal constructions of which that may be selectively utilized (in whole or in part) with mouthpieces **72** according to the present disclosure are disclosed in U.S. Pat. Nos. 6,070,767 and 6,032,831, the complete disclosures of which are hereby incorporated by reference for all purposes. In the illustrated examples, mouthpiece **72** has a narrower head portion than the mouthpieces disclosed in the incorporated patents, but any of the illustrated configurations may be utilized. Similarly, the internal construction of the incorporated mouthpieces may be utilized with mouthpiece **72**, such as the internal configurations for the mouthpiece's face and/or sidewalls. For example, at least FIGS. **14** and **15** illustrate that mouthpieces **72** may, but are not required to, include internal discontinuities, such as internal corners or edges, that extend along the sidewalls away from the dispensing face and which may assist in the mouthpiece deforming to its open configuration and/or returning to a sealed configuration.

In the preceding discussion, mouthpiece **72** has been described as a bite-actuated mouthpiece. As also discussed, in some embodiments, the fluid container will be formed from a material that configures, or permits, the wall structure of the fluid container to be collapsed inwardly as a user squeezes the fluid container. This intentional reduction in the internal volume of the fluid container may urge drink fluid through the fluid conduit and expel the fluid through the bite-actuated mouthpiece. It is within the scope of the present disclosure that mouthpiece **72** may be configured to permit this additional method of dispensing drink fluid from the drink bottle.

A potential benefit of the bite-actuated mouthpiece being biased to its closed configuration is that a user may position the drink bottle (and mouthpiece) to a desired drinking orientation, and even a partially or completely inverted orientation, without drink fluid being dispensed from the mouthpiece. When the user desires to drink from the positioned drink bottle, the user may bite upon the mouthpiece (and/or optionally squeeze a fluid container that is designed to be collapsed during use) to commence the flow of drink fluid through the mouthpiece to the user.

As discussed, bite-actuated mouthpiece **72** is biased to a closed, or sealed, configuration in which the opening that is formed in the dispensing face of the mouthpiece is closed and prevents drink fluid from passing therethrough. Therefore, unless the mouthpiece is reconfigured from its closed configuration to a dispensing configuration, drink fluid is prevented from being dispensed through the cap assembly's fluid conduit. In some embodiments, it may be desirable for the cap assembly to further include a flow-restricting, or on/off, valve in addition to the bite-actuated mouthpiece. For example, because the mouthpiece is designed to be configured to its dispensing configuration when lateral external forces are imparted to the mouthpiece (such as when a user bites upon or otherwise compresses the sidewalls of the mouthpiece toward each other), it is possible that external forces may be inadvertently exerted upon the mouthpiece. Should this occur, drink fluid may be dispensed through the mouthpiece. However, the inclusion of an optional manual on/off valve, which selectively restricts whether drink fluid may flow to the mouthpiece from the fluid container, may prevent this unintentional dispensing of drink fluid regardless of the configuration of the mouthpiece. A graphical example of a drink bottle according to the present disclosure that includes an on/off, or shutoff, valve and a bite-actuated mouthpiece **72** is shown in FIG. **8**. In FIG. **8**, the on/off valve is indicated in dashed lines at **120** to graphically represent that the on/off valve, when present, may be located at any suitable position downstream (i.e., toward the internal compartment of the fluid container) of the mouthpiece's face, and typically proximate or upstream (i.e., toward the mouthpiece's dispensing face) from the inlet of the fluid conduit **74**.

The on/off valve is selectively configured between open and closed configurations independent of the configuration of the bite-actuated mouthpiece. When the on/off valve is in its closed configuration, it is adapted to obstruct at least a portion of the fluid conduit, and optionally to completely obstruct the fluid conduit, thereby preventing drink fluid from passing from the fluid container to the face of the bite-actuated mouthpiece. Therefore, when the on/off valve is in its closed configuration, drink fluid cannot be dispensed from the fluid container through the mouthpiece, regardless of the configuration of the bite-actuated mouthpiece. As such, the on/off valve may also be referred to as a shutoff valve. When the on/off valve is in its open configuration, the drink fluid is selectively dispensed from the fluid container through the mouthpiece depending upon the configuration of the bite-actuated mouthpiece.

Unlike bite-actuated mouthpiece **72**, the on/off valve will typically not be biased to return automatically to a particular configuration. Instead, the on/off valve may be configured to remain in a user-selected orientation until reconfigured to a different orientation by a user. In such an embodiment, the on/off valve may be referred to as being a static valve, in that it only restricts flow of drink fluid through the fluid conduit when positively configured to do so by a user. The on/off valve may utilize any suitable actuation mechanism to selectively configure the valve between its open and closed configurations.

As an illustrative, non-exclusive example, the joint **108** illustrated in FIG. **7** may be configured to provide an on/off valve **120** when pivoting of the mount relative to the cap assembly selectively causes the fluid conduit through the cap assembly to mouthpiece **72** to be obstructed. For example, at least a portion of the fluid conduit may be obstructed as the distal end of the mount is pivoted toward the cap assembly. In some embodiments, such as when the fluid conduit extends through the joint, the degree to which the corresponding portion of the fluid conduit is obstructed may vary depending upon the degree to which the mount is pivoted or otherwise moved toward the cap assembly. In such an embodiment, the fluid conduit may not be obstructed by the joint or other on/off valve in at least one position (and optionally a sub-range of positions) within the range of positions within which the mount may be oriented relative to the cap assembly, the portion of the fluid conduit may be partially obstructed during another sub-range of the range of positions, and the portion of the fluid conduit may be completely obstructed in at least one (and optionally a third sub-range of positions) within the range of positions. It is also within the scope of the present disclosure that a similar range and sub-ranges may be provided by other embodiments of on/off valve **120**. However, this construction is not required to all drink bottles according to the present disclosure.

An illustrative, non-exclusive example of a suitable configuration for an on/off, or shutoff, valve is shown in FIGS. **26** and **27**, in which the on/off valve is generally indicated at **120**. As shown, mount **100** is pivotally coupled to base **70** of the cap assembly to selectively restrict and permit drink fluid to flow from the fluid container to the fluid conduit. In at least FIGS. **26** and **27**, mount **100** may be described as providing a drink spout that is pivotally coupled to the base of the cap assembly. The drink spout is selectively pivoted between a stowed, or closed, configuration (such as shown in FIG. **26**) and a dispensing, or extended, configuration (such as shown in FIG. **27**), in which the drink spout is pivoted generally away from the base of the cap assembly relative to the closed configuration. In the closed configuration, the drink spout is pivoted toward or even against the base of the cap assembly relative to the dispensing configuration. In the illustrated example, the fluid conduit between the internal compartment of the drink container and the mouthpiece of the cap assembly is blocked by the drink spout when the drink spout is in its closed configuration, thereby restricting (or preventing) drink fluid from being dispensed through the drink spout regardless of the configuration of the mouthpiece when the drink spout is in the closed configuration. In the dispensing configuration, pivoting of the drink spout away from the base aligns an aperture in the drink spout to establish a continuous fluid conduit from the internal compartment to the mouthpiece.

Another example of a suitable actuation mechanism for an on/off valve **120** that may be used with drink bottles **10** according to the present disclosure is a push-pull mechanism, in which the bite-actuated mouthpiece and typically at least a portion of the mount and/or fluid conduit is urged away from a baffle or other obstruction that selectively prevents drink fluid from passing through the mount or other portion of the fluid conduit to the internal chamber of the mouthpiece. For example the push-pull mechanism may, in its closed configuration, prevent drink fluid from entering the inlet of the fluid conduit until the mouthpiece and other corresponding structure is drawn away from the obstruction. As another example, the push-pull mechanism that provides an on/off valve may selectively restrict drink fluid from passing through an intermediate portion of the fluid conduit (such as within the mount), and/or from exiting the mount into the internal compartment of the mouthpiece. In a variant of this push-pull mechanism, the obstruction is selectively pushed or otherwise urged away from the inlet or other suitable portion of the fluid conduit to permit drink fluid to flow therethrough.

Yet another illustrative example of a suitable construction for a static on/off valve **120** is a rotatable mechanism, in which a portion of the fluid conduit upstream from the internal chamber of the mouthpiece (such as the inlet, outlet, or an intermediate portion of the mount) is selectively obstructed until the mouthpiece (and typically at least a portion of the mount and/or fluid conduit) is rotated to a position in which the obstruction no longer prevents drink fluid from passing through the fluid conduit. Yet another illustrative, non-exclusive example of a suitable actuation mechanism for a static on/off valve **120** utilizes a fluid conduit having a foldable, collapsible, resiliently deformable, and/or crimpable region and suitable structure for selectively folding, flattening, resiliently deforming, and/or crimping that region of the fluid conduit to block, obstruct, or otherwise restrict the flow of drink fluid therethrough. This region may define a portion of the fluid conduit through which drink fluid may selectively flow from the inlet to the mouthpiece. An illustrative, non-exclusive example of a suitable material for such a portion of the fluid conduit is silicone or another material that does not readily take a compression set and therefore may be repeatedly folded, flattened, crimped, and the like without leaking or otherwise being permanently deformed or failing.

The schematic example of an on/off, or shutoff, valve **120** that is depicted in FIG. **8** is intended to graphically represent these and any other suitable constructions for a static on/off valve that selectively prevents drink fluid from being dispensed from the drink bottle through the opening of the mouthpiece regardless of the configuration of the mouthpiece. Additional examples are presented in the provisional patent applications that are incorporated by reference herein.

Drink bottles **10** according to the present disclosure may, but are not required to, additionally or alternatively include an air return, or pressure relief, assembly that is adapted to selectively permit air from external the drink bottle to enter the drink bottle's internal compartment other than through the dispensing opening of the mouthpiece. When present, the air return assembly is preferably positioned sufficiently away from the dispensing face of the mouthpiece that the air return valve is not obstructed when a user is drawing drink fluid from the fluid container through the opening of the mouthpiece. Especially when the fluid container has a rigid construction that is not adapted to readily collapse as drink fluid is drawn therefrom, a vacuum will tend to be drawn within the fluid container as drink fluid is withdrawn therefrom through the mouthpiece. As this vacuum, or pressure-differential, increases, it will become more difficult for a user

to draw additional drink fluid through the mouthpiece until this pressure differential is reduced.

A schematic example of a drink bottle **10** according to the present disclosure that includes an air return assembly is shown in FIG. **9**, with the air return assembly generally indicated at **160**. Air return assembly **160** is adapted to permit air from external the drink bottle to enter the internal compartment **20** of fluid container **12** without having to pass through the drink bottle's mouthpiece **72** (or least the dispensing face **90** or opening **86** of the mouthpiece). It is within the scope of the present disclosure that the air return assembly may be implemented on the cap assembly, such as on base **70** of the cap assembly. It is also within the scope of the present disclosure that the air return assembly, when present, may be implemented on the fluid container and/or that the drink bottle may be formed without an air return assembly that is separate from the bite-actuated mouthpiece. It is also within the scope of the present disclosure that an air return valve may be integrally formed with the bite-actuated mouthpiece or that it may be separately formed from the mouthpiece. When separately formed from the mouthpiece, the air return assembly may be positioned in a spaced-apart relationship to the mouthpiece on the cap assembly, on a dispensing mount (or nozzle) **100**, on the fluid container, etc.

Air return assembly **160** may define an air conduit **162** through which air may flow at least from external the drink bottle to the internal compartment of the drink container. In FIG. **9**, the conduit is schematically illustrated including an inlet **164**, through which air may enter the conduit from external the drink container, and an outlet **166**, through which air in the conduit may pass to the interior of the drink bottle, such as to the internal compartment of the drink container.

In embodiments of drink bottles **10** that include an air return assembly **160**, the air return assembly may, but is not required to, include at least one air return valve, such as is schematically illustrated in FIG. **9** at **168** and which is less schematically illustrated in the subsequently discussed FIGS. **25-29**. Air return valve **168** is adapted to selectively restrict the flow of air through the air conduit from external the drink bottle and/or to restrict the flow of drink fluid through the air conduit from internal the drink bottle. Air return valve **168** is adapted to be selectively configured between a closed, or sealed, configuration in which the flow of air into the internal compartment through the air return assembly from external the drink bottle is restricted, and an open, or actuated, configuration, in which the air return valve is at least partially displaced from its sealed configuration and in which air may flow through the air return assembly, such as from external the drink bottle into the internal compartment of the fluid container. This flow of air may be through an air conduit, such as conduit **162**, or may be simply through an opening in the drink bottle that is selectively obstructed by the air return valve. Air return valve **168** preferably has a relatively low actuation pressure for permitting air to be drawn from external the drink bottle into the drink bottle's internal compartment, while also having a relatively high resistance to drink fluid being able to pass through the valve from within the internal compartment. In other words, the air return valve is preferably constructed to resist fluid flow through the valve from internal the compartment. Similar to bite-actuated mouthpiece **72**, the air return valve is preferably a resilient valve that is biased to a closed configuration in which the valve is sealed and thereby prevents air or other fluid from passing therethrough. As discussed, the air return valve may be designed to be configured to an actuated, or open, configuration responsive to more than a predetermined pressure differential existing between the drink bottle's internal compartment and the environment external the drink bottle.

Air return valve **168** may include any suitable structure for selectively permitting air to enter the internal compartment of the drink bottle, preferably while also restricting drink fluid from exiting the internal compartment through the air return valve. As an illustrative, non-exclusive example, the air return valve may be a pressure-differential valve that is adapted to selectively permit air to flow into the drink container's internal compartment while restricting the flow of fluid through the air conduit from the internal compartment to exterior of the drink bottle. An illustrative, non-exclusive example of a suitable construction for air return valve **168** is an umbrella, or diaphragm valve, although other suitable valves may be used, including other suitable self-sealing valves. Another illustrative example of a suitable structure is a "duck bill" configuration, in which the valve assembly projects internally into the internal compartment and includes lips that are adapted to spread apart from each other to define a passage through which air may be returned into the internal compartment of the drink bottle, but which are biased together to resist drink fluid passing from the internal compartment through the passage. Further examples include valves having one or more slits, including intersecting slits. When a self-sealing valve (i.e., a valve that is biased to a sealed configuration) is utilized, the seal may be provided by abutting surfaces of the valve itself and/or by the valve sealing against a portion of the drink bottle.

It is within the scope of the present disclosure that drink containers that include an air return assembly **160** may alternatively not include any form of physical valve that restricts the flow of fluid through the air conduit. In some embodiments, the air return assembly may include an air conduit that is obstructed on at least one of its ends (internal the fluid container or external the fluid container) when the drink bottle is not being used, such as when a pivotal dispensing nozzle is pivoted to a closed configuration. Air return assembly **160** is preferably positioned so that its air conduit is not obstructed by a user's mouth when the drink bottle is used to dispense drink fluid to a user.

FIG. **9** also graphically depicts that drink bottles **10** according to the present disclosure may, but are not required to, include an optional straw **180** that extends from the cap assembly into the fluid container, such as to (or at least proximate) the lower region of the fluid container. Straw **180** enables a user to draw drink fluid from the drink container via mouthpiece **72** without having to tip the drink bottle so that drink fluid may flow into the fluid conduit **74**. For example, as the size of the fluid container increases, users may be more likely to want to draw drink fluid from the drink bottle without having to lift and tilt the drink bottle to the generally horizontal or even inverted configuration that would be used if straw **180** was not present. Straw **180** may be removably (or permanently) coupled to a corresponding mount **182** on the cap assembly, such as at or proximate the inlet **80** of fluid conduit **74**. A benefit of a removable straw structure **180** is that a user may selectively attach or remove the straw structure from the cap assembly, such as depending upon the desired use of the drink bottle at a given time. As discussed, it is also within the scope of the present disclosure that the straw may be fixedly, or permanently, attached to the cap assembly. As used herein, "removably," "removably coupled," and "removably attached" refer to structures that are designed to be repeatedly connected and disconnected

without destruction of the corresponding structures. Similarly, fixedly connected or permanently coupled structures refer to structures that are not designed to be separated without destruction of at least a portion of the structures and/or the mechanism that joins the structures.

FIG. **9** also illustrates that drink bottles **10** according to the present disclosure may, but are not required to, include (or be selectively used with) elongate, flexible drink tubes, or external straw structures, **190** that fluidly interconnect the bite-actuated mouthpiece with mount **100** or another suitable receiver on cap assembly **14**. It is within the scope of the present disclosure that any of the drink bottles disclosed, illustrated, and/or incorporated herein may be selectively utilized with an elongate drink tube **190**. A potential benefit of this optional construction is that a user may draw drink fluid from the drink bottle without having to hold the drink bottle. Although it is within the scope of the present disclosure that the drink tube may be integrated with or otherwise permanently secured to one or both of the cap assembly or the bite-actuated mouthpiece, it may be desirable for each of these components to be removably coupled to the drink tube. For example, this permits the drink bottle to be used with the mouthpiece connected directly to the cap assembly (such as to mount **100**) or to be connected to the cap assembly by drink tube **190**. In FIG. **9**, an optional mount **192** is shown interconnecting the drink tube with mount **100**, such as with the end region thereof), although it is within the scope of the present disclosure that the drink tube may be coupled directly to an end of the mount, such as by extending the corresponding end of the drink tube within or over an end of the mount. After attachment to the mount, the drink tube may optionally be described as forming an extension of the fluid conduit **74** of the drink bottle. When drink bottles according to the present disclosure include an elongate drink tube, such as tube **190**, it is also within the scope of the present disclosure that the downstream assembly defined by the drink tube and mouthpiece may optionally include one or more quick-connect assemblies and/or flow-regulating devices and accessories, such as disclosed in U.S. Pat. Nos. 6,908,015, 7,073,688, and U.S. Patent Application Publication No. 2004/0089301, the complete disclosures of which are hereby incorporated by reference herein for all purposes.

The previously discussed FIGS. **7-9** schematically illustrate a variety of components and structures that may (but are not required to be) incorporated into drink bottles according to the present disclosure. It is within the scope of the present disclosure that these components and structures, when present, may have any suitable structure meeting the functional criteria set forth herein and may be implemented individually or in combination with others of these or other components and structures.

FIGS. **21-27** show a less schematic example of a suitable cap assembly **14** that may be used with drink bottles **10** according to the present disclosure. The example shown in FIGS. **21-27** includes non-exclusive examples of various ones of the previously discussed components and structures. However, it is with the scope of the present disclosure that other components and/or structures may be utilized in place of or in addition to the illustrated components and structures. Accordingly, the depicted example is not intended to require the selected examples and combination of components and structures. Instead, it is intended to provide an illustrative, non-exclusive example of a suitable construction for cap assemblies according to the present disclosure. The other components, structures, and variants thereof that are illustrated, described and/or incorporated herein may be selectively utilized with the illustrated cap assembly without departing from the scope of the present disclosure. Similarly, the illustrated cap assembly may be used with any of the drink bottles described, illustrated, and/or incorporated herein, as may the other cap assemblies and/or mouthpieces described, illustrated and/or incorporated herein.

In the example shown in FIGS. **21-27**, the cap assembly includes a base **70** from which a mount, or drink spout, **100** extends. The mount is pivotally coupled to the base of the cap assembly and is selectively pivoted within a range of positions relative to the base of the cap assembly. In FIGS. **21**, **23**, and **26**, the mount is shown in a stowed configuration, while in FIGS. **22**, **24-25** and **27**, the mount is shown in illustrative dispensing configurations within the range of positions. The dispensing configurations of the mount may also be described as deployed and/or ready-to-drink configurations. The cap assembly includes a bite-actuated mouthpiece **72** that is mounted on mount **100** and is in fluid communication therewith. The illustrative mouthpiece includes a dispensing face **90** having a self-sealing opening **86** through which drink fluid may be selectively dispensed when the mount and mouthpiece are both in dispensing configurations.

In the illustrative example shown in FIGS. **21-27**, the mount includes an optional flange, or lever arm, **122** that projects from the mount and provides a surface that may be grasped or otherwise suitably engaged by a user, such as by a user's finger or thumb, to draw the mouthpiece and its mount from the stowed configuration toward, or to, a ready-to-drink configuration. Flange **122** may optionally be utilized with any of the other pivotal (or otherwise selectively stowable) mounts that are described, illustrated and/or incorporated herein.

The illustrative example of a cap assembly **14** shown in FIGS. **21-27** also includes a handle **140** that extends from the base of the cap assembly. Handle **140** may take any other suitable form, may have a rigid or flexible construction, and may be (but is not required to be) used with any of the other cap assemblies that are disclosed, illustrated and/or incorporated herein. When present, handle **140** may, but is not required to, define a closed perimeter, or boundary, **142** through which a lanyard, karabineer, belt, strap, user's finger, or other structure may extend to hold and/or retain the drink bottle in a selected position. It is within the scope of the present disclosure that this closed boundary is perhaps best seen in FIG. **25**. The closed boundary may be defined entirely by the handle or that it may be defined by the handle and the base of the cap assembly. Regardless, the closed boundary refers to a closed perimeter around an opening through which an object may be inserted, such as to position or coupled to the drink container. Additionally or alternatively, when the drink bottle includes a tether than interconnects the cap assembly and the fluid container, the tether may also define (when the cap assembly is properly mounted on the fluid container) a (or another) closed boundary through which a strap or other securing or positioning structure may extend.

FIG. **25** also illustrates a non-exclusive example for a suitable pivotal mounting mechanism for mount **100**, with the mount including lateral projections **150** that are received into sockets **152** defined by portions of the base **70** and handle **140** of the cap assembly. The projections are rotatable within the sockets, and thereby function as rotatable supports, or axles, upon which the mount and any attached mouthpiece may be pivotally moved relative to the base of the cap assembly, such as between stowed and dispensing configurations and/or otherwise within the previously discussed range of positions. This illustrative mounting con-

figuration is intended to provide a non-exclusive example of a suitable configuration, and it is within the scope of the present disclosure that other configurations may be utilized.

In the illustrated example, and as indicated in FIGS. **21-22** and **25**, the handle also provides guards **144** that are positioned to protect the bite-actuated mouthpiece from unintentional contact and/or exposure at least when the mouthpiece is in its stowed configuration. In the illustrated example, handle **140** provides a pair of lateral guards **146** that extend on opposing sides of the mouthpiece, as well as a dispensing face guard, or cover, **148** that is adapted to protect the dispensing face of the bite-actuated mouthpiece when the mouthpiece is in its stowed configuration. For example, guard **148** may provide a form of dust cover that protects the dispensing face, and thus the slit or other opening formed therein, from being contacted by dirt, grime, and other substances when the mouthpiece is in its stowed configuration. As handle **140** is itself optional and thereby not required to all embodiments of drink bottles according to the present disclosure, it follows that handle **140**, when present, may be formed with only one or more of the illustrated guards, with one or more additional guards, and/or without any guards.

In FIGS. **26** and **27**, the internal structure of the cap assembly shown in FIGS. **21-25** is shown in more detail. For example, the illustrated cap assembly includes a coupling structure **45** in the form of threads **46**. As discussed, any other suitable coupling structures may be utilized without departing from the scope of the present disclosure. FIGS. **26** and **27** provide a graphical illustration of a pivotal mount **100** that defines a portion of fluid conduit **74** and therefore may be referred to as a drink spout through which drink fluid may selectively flow from the drink container, through an inlet **80** of the fluid conduit defined by the cap assembly, and thereafter through an outlet **104** of the mount into the internal chamber **110** of the bite-actuated mouthpiece **72**. When the mouthpiece is urged to a dispensing configuration, such as by a user biting upon the mouthpiece, the drink fluid may be dispensed through the self-sealing opening **86** in the mouthpiece.

The illustrated example of a cap assembly **14** includes a manual on/off valve, or shutoff valve, **120** that is defined at least in part by the mount. As shown in FIG. **26**, fluid conduit **74** is obstructed by a portion of the body **154** of the mount when the mount is in a stowed configuration. As shown with consideration of FIGS. **26** and **27**, the mount's body includes an inlet **156** that is selectively aligned in fluid communication with the inlet **80** of the fluid conduit. In FIG. **26**, the mount is in a stowed configuration and the fluid inlet to the mount is not aligned in fluid communication with the inlet of the fluid conduit. As such, drink fluid is prevented from flowing from the fluid container and through the fluid conduit to the mouthpiece. Therefore, drink fluid from the fluid container will not be dispensed through the fluid conduit and mouthpiece regardless of the configuration of the mouthpiece. When the mount is pivoted to a dispensing configuration, such as shown in FIG. **27**, drink fluid may flow through the entire fluid conduit. FIGS. **26** and **27** include an optional gasket, or sealing member, **158**. As illustrated, the gasket takes the form of a compressible o-ring, but any other suitable structure may be utilized when sealing member **158** is included in cap assembly **14**.

In FIGS. **26** and **27**, the inlet **80** of the fluid conduit is defined by an optional mount **182** for an internal straw that may be selectively attached to the mount. When attached, the inlet for the fluid conduit would be defined by the distal end of the straw. When mount **182** is not present, the inlet to the fluid conduit may be defined by a portion of the cap assembly beneath the mount, or optionally, by the fluid inlet to the mount itself.

FIGS. **26** and **27** also provide a graphical example of a cap assembly **14** that includes an air return assembly **160**. In the illustrative, non-exclusive example, the air return assembly includes an air return valve **168** that has an umbrella valve configuration, in which the valve assembly includes an internally deflectable flap or perimeter region **170** that is biased to seal against a region **172** of the underside (or other suitable portion) of the cap assembly that contains an aperture or other passage or conduit **162** through which air may selectively flow when the air return valve is in a open, or deflected configuration.

FIGS. **28** and **29** generally correspond to the cap assembly shown in FIGS. **26** and **27**. FIGS. **28** and **29** provide a graphical demonstration that cap assemblies **14** that include an on/off valve **120** may implement the shutoff mechanism with structure other than the structure shown in FIGS. **26** and **27**. For example, in FIGS. **28** and **29**, the on/off valve includes a flexible tube, or conduit **124** that in FIG. **28** fluidly interconnects the inlet **80** of the fluid conduit with the internal chamber **110** of the mouthpiece. However, when the mount is pivoted to a stowed configuration, such as shown in FIG. **29**, the body **154** of the mount engages the tube and collapses or otherwise compresses or crimps the tube to obstruct the fluid conduit, thereby preventing the flow of drink fluid from the fluid container, through the fluid conduit, and out of the mouthpiece, regardless of the configuration of the mouthpiece. As the mount is pivoted from the stowed configuration shown in FIG. **29** to a dispensing configuration, such as the illustrative configuration shown in FIG. **28**, the constrictive pressure applied by the body of the mount is correspondingly reduced, and a fluid flow path through the fluid conduit is reestablished.

INDUSTRIAL APPLICABILITY

The drink bottles and drink containers of the present disclosure are applicable to the hydration fields, and are specifically applicable to portable bottles and similar containers from which users may selectively drink potable drink fluid.

It is believed that the disclosure set forth above encompasses multiple distinct inventions with independent utility. While each of these inventions has been disclosed in its preferred form, the specific embodiments thereof as disclosed and illustrated herein are not to be considered in a limiting sense as numerous variations are possible. The subject matter of the inventions includes all novel and non-obvious combinations and subcombinations of the various elements, features, functions and/or properties disclosed herein. Similarly, where the claims recite "a" or "a first" element or the equivalent thereof, such claims should be understood to include incorporation of one or more such elements, neither requiring nor excluding two or more such elements.

It is believed that the following claims particularly point out certain combinations and subcombinations that are directed to one of the disclosed inventions and are novel and non-obvious. Inventions embodied in other combinations and subcombinations of features, functions, elements and/or properties may be claimed through amendment of the present claims or presentation of new claims in this or a related application. Such amended or new claims, whether they are directed to a different invention or directed to the same invention, whether different, broader, narrower, or equal in

scope to the original claims, are also regarded as included within the subject matter of the inventions of the present disclosure.

The invention claimed is:

1. A drink container, comprising:

a fluid container having a neck with an opening and having an internal compartment sized to hold a volume of potable drink fluid;

a cap assembly removably coupled to the fluid container to cover the opening, wherein the cap assembly defines a fluid conduit for drink fluid to flow from the fluid container and through the cap assembly to a user, wherein the fluid conduit includes an inlet through which drink fluid from the fluid container may enter the fluid conduit, and a dispensing outlet through which drink fluid in the fluid conduit may be dispensed from the cap assembly to a user, and further wherein the cap assembly comprises:

a cap assembly base removably coupled to the neck of the fluid container, wherein the cap assembly base is configured to be selectively and repeatedly decoupled from and re-coupled to the neck of the fluid container;

a pivotal mount coupled to the cap assembly base for pivotal movement relative to the cap assembly base, wherein the pivotal mount includes a pair of lateral projections, wherein the cap assembly base defines a pair of sockets into which the pair of lateral projections extend;

a resilient mouthpiece coupled to the pivotal mount for pivotal movement with the pivotal mount relative to the cap assembly base, wherein the resilient mouthpiece is pivotal about an axis defined by the pair of lateral projections as the pair of lateral projections rotate within the pair of sockets;

wherein the resilient mouthpiece defines a portion of the fluid conduit, including the dispensing outlet;

wherein the resilient mouthpiece and the pivotal mount are configured to be selectively pivoted between a stowed position and a dispensing position, and further in the dispensing position, the dispensing outlet is positioned further away from the cap assembly base than when the resilient mouthpiece and the pivotal mount are in the stowed position;

wherein the resilient mouthpiece is adapted to resiliently compress responsive to compressive forces applied to the resilient mouthpiece by a user's teeth; and

a manual on/off valve having a closed configuration, in which the manual on/off valve obstructs the fluid conduit to restrict drink fluid from flowing between the inlet and the dispensing outlet, and an open configuration, in which the manual on/off valve permits drink fluid to flow through the fluid conduit from the inlet to the dispensing outlet; wherein the manual on/off valve includes a flexible tube that defines a portion of the fluid conduit;

wherein when the manual on/off valve is in the closed configuration, the tube is crimped to obstruct the flow of drink fluid through the fluid conduit; and

wherein when the manual on/off valve is in the open configuration, the tube is not crimped and does not obstruct the flow of drink fluid through the fluid conduit.

2. The drink container of claim 1, wherein the cap assembly base further comprises a handle that extends from the cap assembly base, and further wherein the handle is secured to the cap assembly base in a position that obstructs removal of the pair of lateral projections from the pair of sockets.

3. The drink container of claim 1, wherein the cap assembly includes a pair of lateral guards that extend on opposed sides of the resilient mouthpiece when the resilient mouthpiece and the pivotal mount are in the stowed position, and further wherein the cap assembly includes a dust cover extending between the pair of lateral guards and positioned to protect the dispensing outlet of the resilient mouthpiece by extending across at least a portion of the dispensing outlet of the resilient mouthpiece when the resilient mouthpiece and the pivotal mount are in the stowed position.

4. The drink container of claim 3, wherein when the resilient mouthpiece is pivoted from the stowed position to the dispensing position, the resilient mouthpiece pivots away from the dust cover.

5. The drink container of claim 3, wherein the dust cover projects above an upper surface of the cap assembly base.

6. The drink container of claim 3, wherein the cap assembly further includes a handle that extends from the cap assembly base and includes the pair of lateral guards and the dust cover.

7. The drink container of claim 1, wherein the cap assembly further comprises a handle that extends in a fixed orientation from the cap assembly base and which defines at least a portion of a closed loop with an aperture through which a user's finger may be inserted to carry the drink container.

8. The drink container of claim 1, wherein the resilient mouthpiece is permanently secured to the pivotal mount.

9. The drink container of claim 1, wherein the resilient mouthpiece includes projections that extend generally transverse to the portion of the fluid conduit that extends through the resilient mouthpiece, and further wherein the projections engage an end region of the pivotal mount.

10. The drink container of claim 9, wherein the projections are internal projections.

11. The drink container of claim 1, wherein the resilient mouthpiece is configured to be selectively removed from and recoupled to the pivotal mount.

12. The drink container of claim 11, wherein the resilient mouthpiece includes a mouthpiece base with an end distal the dispensing outlet that has a contoured configuration that does not extend at a constant distance from the dispensing outlet, wherein the end of the resilient mouthpiece base includes a projecting region and a concave region, wherein the projecting region of the end of the mouthpiece base extends a greater distance away from the dispensing outlet than the concave region of the end of the mouthpiece base, and further wherein the pivotal mount is configured to engage the projecting region and the concave region of the mouthpiece base to restrict rotation of the resilient mouthpiece relative to the pivotal mount.

13. The drink container of claim 1, wherein the resilient mouthpiece includes a dispensing face, and further wherein the dispensing outlet extends through the dispensing face of the resilient mouthpiece.

14. The drink container of claim 13, wherein the dispensing outlet is defined by a slit that extends through the dispensing face of the resilient mouthpiece.

15. The drink container of claim 1, wherein the resilient mouthpiece includes a dispensing face that defines the dispensing outlet, wherein the resilient mouthpiece includes opposed bite regions, wherein the dispensing face includes opposed lips between which the dispensing outlet is defined, and further wherein when a user applies compressive forces

to the opposed bite regions, the lips are urged away from each other to enlarge the dispensing outlet.

16. The drink container of claim **15**, wherein the opposed lips seal against each other when the opposed bite regions are not urged toward each other.

17. The drink container of claim **1**, wherein the pivotal mount further includes a projecting flange that extends away from a portion of the fluid conduit that extends through the pivotal mount, wherein the projecting flange provides a lever arm that is configured to be engaged by a user's finger to pivot the pivotal mount from the stowed position to the dispensing position.

18. The drink container of claim **1**, wherein the pivotal mount is adapted to selectively engage the flexible tube to apply crimping forces thereto and thereby configure the manual on/off valve to the closed configuration as the pivotal mount is pivoted from the dispensing position to the stowed position.

19. The drink container of claim **1**, wherein the flexible tube is secured to the pivotal mount.

* * * * *

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US006116458A

United States Patent [19]

Dark

[11] Patent Number: 6,116,458

[45] Date of Patent: Sep. 12, 2000

[54] **SPORT DRINKING CUP WITH VALVED STRAW CAP**

[76] Inventor: **Richard C. G. Dark**, 2248 Gum Tree La., Fallbrook, Calif. 92028

[21] Appl. No.: **09/257,355**

[22] Filed: **Feb. 25, 1999**

[51] **Int. Cl.**[7] **A47G 21/18**

[52] **U.S. Cl.** **220/709**; 220/708

[58] **Field of Search** 220/709, 708, 220/707, 711, 714, 715, 717, 719

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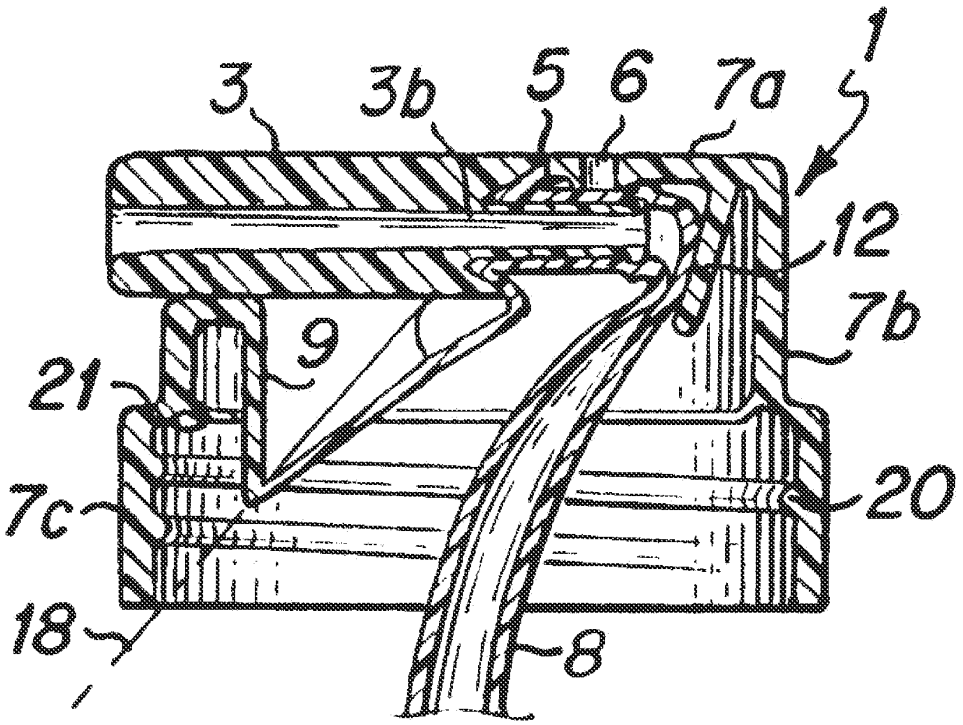
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Primary Examiner—Stephen Castellano
Attorney, Agent, or Firm—Ronald M. Goldman

[57] **ABSTRACT**

An easy-to-operate vented leak-proof drinking cup cap for a bottle is formed by a pivotable drinking spout (**3**) and diaphragm arrangement (**4**) in the cap base (**7**). The drinking spout that forms the mouthpiece on the upper side of the diaphragm through which the user sucks liquid, contains a portion (**3***b*) on the underside the diaphragm. That lower spout portion carries an elastic hose or tube (**8**) for immersion in the bottle's liquid when the drinking spout is in the open position, whereby the series of passages through the elastic tube and drinking spout serves as a straw. When the spout is pivoted to its closed position and latched, in one movement, the lower portion of the spout swings a portion of the elastic tube against the vent (**6**), closing the vent, and forces another portion of that hose into an interference surface (**12**), creating a bend or kink in the hose that prevents liquid passage.

17 Claims, 1 Drawing Sheet



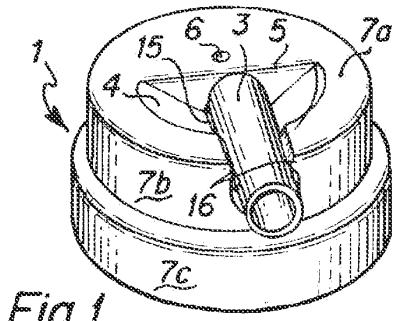


Fig.1

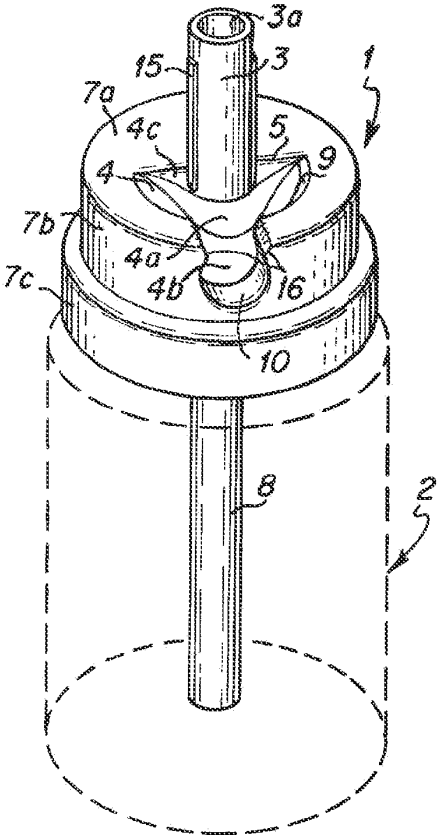


Fig.2

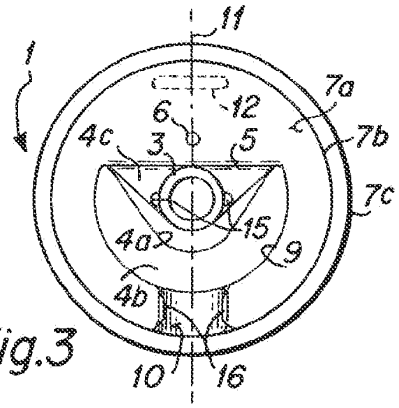


Fig.3

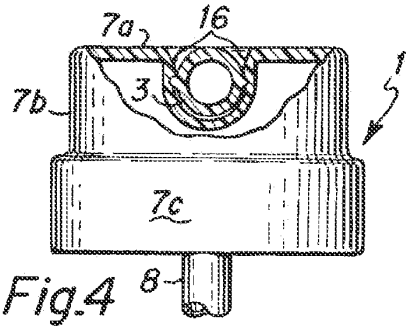


Fig.4

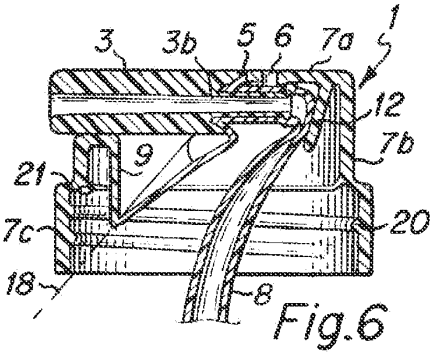


Fig.6

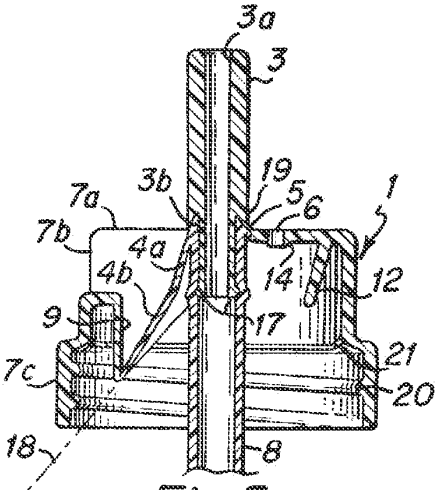


Fig.5

SPORT DRINKING CUP WITH VALVED STRAW CAP

FIELD OF THE INVENTION

This invention relates to sport drinking cups and, more particularly, to a sport drinking cup that contains a resealable straw-like member.

BACKGROUND

Sports enthusiasts, particularly bicyclists, are accustomed to carrying a container of water along which they are able to efficiently access "on the run" to quench a thirst. One common form for the container is a flexible plastic bottle with a drinking spout that is manually opened and closed. Conveniently, the drinking spout serves as a mouthpiece for the drinker. Moving the spout to the open position, the cyclist inserts the spout into the mouth and squeezes the bottle, expressing drinking water. Another form is a plastic bottle having a plastic drinking straw. Being always open, the cyclists grips the bottle and, with the straw's end in the mouth, squeezes to express the drinking water.

Further, in my patent U.S. Pat. No. 5,392,968 granted Feb. 28, 1995, entitled Dispensing Closure and Method, hereafter referred to as the "Dark '968 patent", a one-piece molded plastic closure for fluids is described that contains a pivotable spout and a compound diaphragm, the disclosure of which is incorporated herein by reference in its entirety. Among other things evident from inspection of the patent there is also described adaptations to that novel closure structure to enable the closure to serve as such a sport drinking cup cap. The structure illustrated in FIGS. 20 and 21 of that patent employs a flexible thin-walled tubular extension integrally formed on the underside of a more rigid thick walled tubular fluid dispensing spout that lies on the underside of the closure base. With the spout in its open position upstanding fluid confined within the associated container or bottle is dispensed through the spout. When the spout is pivoted down to the closed or sealed position and latched, the flexible tubular extension is pressed against a seal member, a plastic member that depends from the underside of the closure base, collapsing and flattening a portion of the tube to close the fluid passage therethrough.

An alternative embodiment described in the patent combines the one-piece closure with a separate flexible straw to form a two-piece structure. As illustrated in FIGS. 22 and 23 of that patent, a flexible plastic straw is inserted through the rigid spout and extends through the closure base and into the liquid confined in the container. When the pivotable spout is pivoted down to the closed or sealed position and latched, the pivoting spout swings the straw around and bends it, pressing a portion of the straw against a seal member, a plastic member that depends from the underside of the closure base, and, as in the preceding structure, collapses and flattens a portion of the straw to block the fluid passage. Although not specifically illustrated, the foregoing drinking cup caps may include a conventional air vent that extends through the closure base to permit liquids to be more easily sucked from the bottle. The vent allows air to enter the bottle as the liquid is sucked out.

Although novel, the foregoing drinking cup cap structures illustrated did not achieve market acceptance for reasons not herein fully described. The soft tube extending out of the mouthpiece was not acceptable and the lack of a vent in the cap made the drinking cup difficult to use.

Preferably air vents employed in the foregoing drinking cup caps are made sufficiently small in size so that the surface tension of the confined liquid alone would prevent any leakage when the cap was closed. One problem with small sized vents in rigid caps is that the liquid can only be sucked from the container as fast as the exterior air can enter, which is an annoyance to some. Further, because of the varied nature of liquids held in the bottle, such as beverages, juices and water, and to minimize the potential for clogging that vent, wherein operation would be more difficult, particularly for uninformed users who may not understand the purpose of the air vent, the approach taken is to use a much wider vent than would otherwise be necessary. As a consequence, the drinking cup cap would allow some minor leakage, and could not be characterized as leak-proof.

Good hygiene is a concern that is sometimes overlooked. To ensure that the drinking cup is sanitary it should be frequently disassembled and washed. The most widely available drinking cup cap uses a push-pull valve, which is formed of two components. That valve is not designed to be dismantled for cleaning. Therefore, even when the drinking cup and cap are washed in a normal manner, particles of juice or other liquids may remain between the two valve components inside the valve, causing contamination. Other drinking caps, such as those imported from China, are manufactured and assembled from an even larger number of components. One such drinking cup product consists of a cap, a straw, an a rubber tube joining the straw to the spout, and an over cap that, when twisted, closes the valve and encapsulates the spout. That product is not designed for cleaning and is almost impossible to sterilize.

A principal object of my invention is to provide a leak-proof drinking cup cap.

Another object of my invention is to provide a leak proof drinking cup that takes advantage of some elements of my prior designs while being more easily manufactured and used.

A further object of my invention is to provide a drinking cup cap that requires less force to unlatch and open making it easier for user's to use a drinking cup "on the run".

And a still further object of my invention is to provide a drinking cup cap that may be easily dissassembled for cleaning.

SUMMARY OF THE INVENTION

In accordance with the foregoing objects and advantages, the drinking cup cap includes a pivotally mounted drinking spout that is manually pivoted, swivelled, about a pivot hinge on the base of the cap, moving between an open position, with the spout upstanding vertically, and a closed position, with the spout oriented horizontal on the upper side of the cap base. The spout includes an extended portion, the lower spout portion, which is located on the under side of the cap base. With the drinking spout being pivoted to the closed position along the upper side surface the lower spout portion simultaneously pivots toward the underside surface of the cap base. The lower spout portion is attached to an elastic tube, a portion of which ensleeves the lower spout portion and the remainder of which extends from the lower spout portion for immersion into liquid within a bottle to which the cap is attached. With the drinking spout open, a user may suck liquid through the mouthpiece, which is aided by a vent passage also contained in the cap base.

When the spout is pivoted to the closed position, the lower spout portion swings the elastic tube about and presses one portion of the elastic tube over the vent passage, and, simultaneously, pinches closed another portion of the elastic tube, thereby sealing the cap. With a single action the cap

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openings are closed. With both cap openings closed the confined liquid cannot leak or escape from the bottle, nor can external contaminants enter.

Appropriately the drinking cup includes a diaphragm that permits the drinking spout to pivot and a releasible latch to latch the drinking spout in the closed position. In accordance with another feature to the invention, except for the elastic tube, all of the foregoing elements are suitably an integral assembly formed of one-piece of plastic material, suitably polypropylene.

As an advantage, the preferred embodiment contains only two components, the elastic tube and the cap, the latter containing the integrally formed diaphragm and spout. The components may be easily separated and washed. The cap may be washed on the top shelf of the dishwasher, and the elastic tube can be thoroughly flushed out and cleaned. Reassembly is simple and requires no special tools or training.

The foregoing and additional objects and advantages of the invention together with the structure characteristic thereof, which was only briefly summarized in the foregoing passages, becomes more apparent to those skilled in the art upon reading the detailed description of a preferred embodiment, which follows in this specification, taken together with the illustration thereof presented in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. **1** is a front perspective view of a preferred embodiment of the cap to the drinking cup, illustrated in the closed condition;

FIG. **2** is an embodiment of the drinking cup containing the drinking cup cap of FIG. **1**, illustrated in an open condition, and an associated bottle, partially illustrated;

FIG. **3** is a top view of the drinking cup cap of FIG. **2**;

FIG. **4** is a front partial section view of FIG. **1**, illustrating the integrally formed latch.

FIG. **5** is a side section view of the drinking cup cap as illustrated in FIG. **2**; and

FIG. **6** is a side section view of the drinking cup cap in the closed condition as illustrated in FIG. **1**.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Concurrent reference is made to FIG. **1** which illustrates my drinking cup cap **1** in a closed position and to FIG. **2** which illustrates the foregoing elements in an open position and, in dash lines, the associated liquid container **2**, which, with the foregoing cap, forms a drinking cup. As shown in FIG. **1**, the cap includes a pivotable drinking spout **3**, diaphragm **4**, hinge **5**, vent passage **6**, located behind the lower or base end of spout **3**, all formed on a cap base. In the illustrated embodiment the cap base is formed of a relatively planar upper surface **7***a*, located on the top of cylindrical wall **7***b*, and a cylindrical walled collar **7***c*, slightly larger in diameter than and supporting wall **7***b*. The foregoing configuration of the cap base is preferred, although as those skilled in the art recognize from study of this specification, in other embodiments alternative geometries may be employed.

As illustrated in FIG. **2**, cap **1** is attached to the top of container **2**, a bottle. Since the drinking cap is intended for use with any conventional screw top plastic or glass bottle, the details of which are not necessary to an understanding of the invention, the bottle need not be further illustrated or described. An elastic tube **8**, later herein more fully described, is partially illustrated, extending from the underside of drinking cap **1** and into the bottom region of that bottle.

In FIG. **1**, drinking spout **3** is illustrated in its closed position, extending horizontally, pivoted down into a U-shaped recess in the cap base that extends radially through the side. The spout extends slightly beyond the side wall to the cap base, allowing a protruding portion for the user to grip or push against in order to unlatch and pivot the spout up to the open position. In FIG. **2** the drinking spout **3** is illustrated in in the open position, in which the drinking spout is vertically upstanding. The drinking spout is connected to hinge **5**, as later herein discussed in greater detail. The hinge is a living hinge integrally formed in the upper surface of the cap base. That hinge defines the pivot axis on which the spout pivots, or more appropriately, swivels, between the spout's open and closed positions and vice-versa.

As in my prior patent, U.S. Pat. No. 5,392,968, pivotable movement of the drinking spout **2** is possible due to the function of diaphragm **4**, which is attached to both spout **3** and to the support surfaces of the more rigid cap base. The diaphragm's flexure permits the drinking spout to be pivoted and maintains the continuity of the cap's surfaces in the face of that spout movement.

As later herein described, spout **3**, when in the open position, together with elasteic tube **8**, forms a straw by means of which the user may suck liquid from bottle **2**. Vent passage **6** extends through the upper surface **7***a* and serves as an air vent. When sucking on the end of the drinking spout **3** to draw up liquid, the vent permits external air to pass into the confined region on the underside of the cap base and the liquid confined in bottle **2** which aids in sucking up the liquid.

Reference is made to FIG. **3** which illustrates the embodiment in a top view with the drinking spout **3** in the open condition as in FIG. **2**. The full expanse of diaphragm **4** is visible in this view. Diaphragm **4** consists of an upper or top portion **4***c*, which is relatively rigid, a top flexible portion **4***a* and a lower flexible portion **4***b*. A semi-circular region, recessed from planar top surface **7***a* in the cap base, is bordered on one side by a depending circular wall **9**, only partially visible in FIGS. **1** and **2**, to which diaphragm **4** is attached. The diaphragm essentially serves as part of the border or surface to that recess.

Circular wall **9** extends in a semi-circle about the base end of spout **3** and is symmetric therewith. The wall's length varies and is determined by the downward slope of diaphragm **4**; the wall need be only deep enough to reach and attach the outer edges or border of the diaphragm **4**. That wall's depth varies from a maximum at the center to a minimum at each end at hinge **5**. Circular wall **9** is relatively rigid and provides a firm support for the diaphragm. In turn the juncture between the diaphragm and that wall permits the diaphragm to flex in the manner described in the Dark '968 patent, during the opening and closing operation of the spout.

The upper planar surface **7***a* is interrupted also by a walled U-shaped recessed portion **10**, recessed from the top planar surface, and forms a passage or trench from the aforementioned recessed region, through both the depending circular wall **9** and the outer cylindrical wall **7***b*. The U-shaped region permits the spout to be pivoted to and held down in

a horizontal position, as shown, when closed. The U-shaped recess **10** extends radially in line with the plane of rotation of spout **2**, represented by line **11**, and is wide enough and deep enough to receive the spout. As shown that plane of rotation extends through the axis of spout **3**, vent passage **6** and, illustrated in hidden lines, an interference rib **12**, the latter located on the underside of the cap's upper surface *7a*.

The outer edges of lower flexible diaphragm portion *4b* are attached to the semi-circular wall **9**. Upper diaphragm portion *4c*, specifically two triangular shaped portions, which are integral with of the flexible foldable portion *4a* of the diaphragm, latter herein more fully described, one of which is located on each side of drinking spout **3**. The triangular shaped upper diaphragm portions, being formed with a greater thickness of material and being relatively small in size than diaphragm portions *4a* and *4b*, are relatively rigid, relative to those other diaphragm portions. Upper portion *4c* connect to the cap base along hinge **5** and also connect to spout **3**. As shown diaphragm **4** serves also as a barrier to fluid. The only passages through the cap are the fluid passage through spout **3** and vent passage **7**.

A pair of axially extending splines **15** are located on diametrically opposite positions on the outer tubular wall at the front end of drinking spout **2**. Those splines protrude radially outwardly sideways a short extent. A pair of elongated barbs **16** formed in the opposed side walls to U-shaped region **10**, together with splines **15** form a releasible latch that holds spout **3** in the closed position illustrated in FIG. **1**, until manually released by the user by pushing up on the distal end of the spout.

Returning to FIG. **2**, splines **15**, only one of which is fully visible in this view, extend axially along the length of the spout. The spline's length is sufficient to engage barbs **16**, molded within the side walls of U-shaped recess **10**, when the spout is pivoted down.

Reference is made to FIG. **4**, which is a partial front section view of FIG. **1**, and better illustrates the position of the latch member when the spout is latched. As shown, the upper surface of each barb **16** is tapered downward for a short vertical distance, forming a cam surface, and then drops off horizontally. The ends of splines **15** on the spout are spaced apart horizontally a greater distance that the distance between the sloped portions of those barbs, but is spaced about the same distance as the ends of the horizontal portion of those barbs, located at the supporting walls.

To latch spout **3** closed, the user presses down on the spout to force the spout in its closed and latched position. In being pivoted down for closing, splines **15** encounter the cam or sloped surface of barbs **16**, which initially provides an obstruction. The downward force exerted by the user must be sufficient to outwardly flex the side walls of the U-shaped cap portion **10** supporting barbs **16**, and/or, through the splines, inwardly resiliently compress the spout, in order to move the spout down past the horizontal portion of barbs **16** and latch it in place.

Once splines **15** have moved past the tapered portion of the barbs, the flexed surfaces elastically return to their original shape and the barbs overlie the splines. Splines **15** catch and are held by the horizontally oriented surface of barbs **16**, which now hold the spout down against any upward force that may be exerted by resiliency in diaphragm **3** and, as later herein described, by the elastic force in tube **8**.

Referring next to the section view of FIG. **5**, the drinking cap **1** is seen as essentially being a hollow body, formed of relatively thin walls that provides a cavity region on the underside of the upper surface *7a*, bounded by cylindrical walls *7b* and *7c*, the diaphragm and spout. An edge of vertical circular wall **9** to the recessed region is visible in this view. The height of circular wall **9** at any angular position about the axis of the spout **3** varies with the location of the position of outer edge of diaphragm portion *4b*, which extends upwardly at a steep angle relative to horizontal surface *7a*. Vent passage **6** is radially displaced in position from the axis of spout **3**, and from the pivot axis at hinge **5**. The underside of the vent passage is also preferably surrounded by a seal **14**, formed as a circular protruding portion of the underside of cap surface *7a*.

Interference rib **12** is formed integral with the underside of the closure's horizontal planar surface *7a* and is positioned a greater distance away from the axis of the spout **3** and hinge **5**, and is positioned along a radial line **11**, illustrated in FIG. **3**, that intersects both the spout's axis and vent passage **6**. Suitably Interference rib **12** extends down into the underside cavity region to provide a radially inwardly inclined surface oriented at an angle to the vertical, of between about five and ten degrees in a practical embodiment, angled toward and facing spout **3**. As later herein described the slight angle allows the interference rib to serve a second spout latching function in combination with elastic tube **8**.

Continuing with FIG. **5**, drinking spout **3** contains an integral extension or, as variously termed, lower spout portion *3b*, located on the underside of diaphragm **4** beneath upper surface *7a* to complete the fluid passage through the spout, from the upper side of the cap base to the under side. The foot end of the lower spout portion supports a retainer ring **17**, an enlarged outer diameter portion or ring that radially outwardly protrudes from the tubular wall of the spout.

In this embodiment the lower spout portion *3b* is of a restricted outer diameter relative to the upper portion. The length of the lower spout portion is great enough to span at least the radial distance to vent passage **6**, when spout **3** is pivoted about hinge **5** to the closed position, but not so great in length as to contact interference rib **12**. Elastic tube **8** fits over and ensleeves that lower spout portion, frictionally engaging the lower portion's outer cylindrical wall and is secured in place on that spout portion by the frictional force of retaining ring **17**, which elastically expands a small portion of the tube wall. The remaining portion of the elastic tube is suspended from the spout. The elastic tube, only partially illustrated in the figure, is of sufficient length to extend to the bottom region of the associated bottle and, like a straw, is intended to be immersed within any liquid confined in that bottle when the spout is in the open position.

When spout **3** is pivoted down to the closed position, as illustrated in the section view of FIG. **6** to which reference is next made, the lower end of the spout swings elastic tube **8** up against the underside of the closure's upper surface *7a*, pressing the tube's elastic material against seal **14** on the underside of that surface and covering vent passage **6**. It also presses another portion of that elastic tube against interference rib **12**, producing a bend in the tube, and collapsing the tube walls between the lower spout portion's foot end and the confronting surface of the interference rib. The collapsed or "kinked" tube walls thereby block the fluid passage through the tube.

As noted earlier, interference rib **12** is inclined at a five to ten degree angle to the vertical (or ninety to ninety five degrees to the horizontal) toward the spout. The angle creates a second latch method that helps elastic tube **8** to stay

in a sealed position when the spout is in the closed position. As spout **3** is pivoted to the sealed position, shown in FIG. **6**, the elastic tube first engages the lower end of interference rib **12**. With the user exerting downward force on the spout, a portion of that tube, located below the end of tube extension **3***b*, is squeezed past that rib, temporarily compressing the tube at that portion. As that portion is moved upward above the end of the interference rib into the laterally wider region close to the underside of top surface **7***a*, the portion resiliently expands slightly, as the other portion of the tube engages the vent seal. That expansion allows the resilient force of the tube walls to assist in holding the bottom end of the spout in the horizontal, closed position illustrated in the figure. To move the spout end out of the closed position, thus, the force must be sufficient to re-squeeze that portion of the elastic tube. By contributing to the latching function in the foregoing way, it is possible to reduce the strength of the earlier described latch at the front end of the spout.

The portion of the elastic tube **8** sealing the air vent is supported by the rigid walls of the lower spout portion, while the tube portion carried into the bend is a suspended portion. It is appreciated that the foot end of the lower spout portion is sufficiently distant from interference rib **12** so that the kink is preferably positioned slightly below the foot end when the spout is pivoted down as illustrated. That positioning minimizes the force necessary to pivot the spout down and maintain it latched in place.

Reference is again made to FIG. **5**. Diaphragm **4** is preferably a compound diaphragm described in the Dark '968 patent to which reference may be made for a more detailed description and which is incorporated herein by reference. Essentially the diaphragm is formed of two types of diaphragms that are serially connected together in between the cap base and the spout **3**, comprising an invertible diaphragm **4***a* and a flexible foldable diaphragm **4***b* the edges of which are illustrated in the figure.

In the specific embodiments illustrated in that prior patent, a bi-sector plane is illustrated oriented at an angle of forty five degrees to the plane of the planar upper surface of the cap base, such as the horizontal plane of the upper surface **7***a*, illustrated in FIG. **5**. Plane line **18** represents a bisector plane in drinking cap **1** that contains the border of the diaphragm **4** and extends through hinge **5**. In the present invention, that angle between bi-sector plane **18** and the horizontal is made more shallow, specifically forty degrees. When swiveling spout **3** from the vertically upstanding open position to the closed position, the spout pushes on flexible diaphragm **4***b*, which in turn pulls or swivels the invertible diaphragm **4***a* down through the bi-sector plane.

With the forty degree angle the invertible diaphragm **4***a* component of the compound diaphragm inverts, that is, passes through the top dead center position, the bi-sector plane **18**, but does not invert as fully, as occurs in the design shown in the Dark '968 patent in which the forty five degree angle is employed, before a fold over action of foldable diaphragm **4***b* component occurs. The description of the diaphragm's movement during closing, and opening of the spout, is adequately described in the prior Dark '968 patent, which is incorporated herein by reference, and not here repeated.

With full invertible diaphragm inversion it was found that a residual propensity for the diaphragm to pull up slightly occurs, pivoting the spout back by up to five degrees of arc, from the position in which the spout is closed, assuming the spout latch is removed or disabled. Such residual force appears to be due to the fact that the polypropylene material of which the diaphragm is preferably constructed, unlike rubber, does not completely "relax" in the inverted position, and the diaphragm material is distorted along the outer edges. That return or spring back force is small, and much much smaller than the force required to move the diaphragm back through the top dead center position of the invertible plane.

For the most part the invertible diaphragm's residual spring back force is of little or no concern, since the closure's spout latch holds the spout down tightly sealed, and, accordingly, so is the attached diaphragm. Due to the nature of a sport drinking bottle's use, however, one desires to make the drinking bottle as easy to open as possible. To achieve that ease, a latch for the spout should be designed to be less strong than in the foregoing closures of the Dark '968 patent. Since the latch **15** and **16** must handle the described residual spring back force created by the diaphragm's inversion, the problem addressed was to reduce or divert that force. The present invention accomplishes that by reducing the angle of the diaphragm from forty-five degrees to forty degrees. Such change is found to reduce that spring back force to a lower level. The invertible diaphragm portion is no longer required to fully invert when the spout is sealed closed. The spout latch may now be of a weaker design and, hence, is easier to release.

As illustrated in FIG. **5**, drinking spout **3** is attached to the diaphragm **4** by a connecting portion at a position slightly above the horizontal surface **7***a* of the cap base to enable the drinking spout to swivel about the pivot axis of hinge **5**. The smaller diameter lower spout portion **3***b* therefore extends up to a position slightly above surface **7***a*. That permits diaphragm **4** to be slightly greater in size, which facilitates pivoting of the spout between its open and closed positions.

As shown in FIGS. **5** and **6**, cylindrical wall **7***c* serves as a collar for connecting drinking cap **1** to bottle **2**. The internal side of that wall contains an appropriate screw thread **20** molded into the wall for attaching the drinking cap to screw-type container or bottle **2**, earlier illustrated in FIG. **2**, and a flexible annulus **21** that extends from an inner cylindrical wall and is integral therewith. That annulus is radially inwardly directed and is downwardly sloped and is oriented to engage the top edge of the associated drinking bottle and serves as a liquid seal. It is recognized that other conventional side wall configurations may be substituted to connect the cap to the bottle, all of which come within the scope of my invention.

As those skilled in the art appreciate from the side section view of FIG. **5**, all of the foregoing elements of the drinking cup cap, excepting the elastic tube **10**, may be molded from one piece of plastic material, suitably polypropylene, as example, in the manner described in the Dark '968 patent, and forms an integral unitary one-piece structure. Preferably elastic tube **8** is formed of rubber. Less preferred embodiments may use a tube formed of polypropylene material. However, polypropylene creeps, a disadvantage, while rubber is easier to repeatedly stretch and compress, which makes it prefereable.

The foregoing provides a leakproof drinking cup cap that is easy to open and close. It is formed of only two component pieces which are easily assembled together. It is easy to disassemble and clean. One need only remove the cap from the bottle and open the spout, pull off the elastic tube **8**, which is only frictionally held in place. The cap may be washed by hand or in the top shelf of the dishwasher, and the tube can be flushed and cleaned, leaving no trace of any

beverage. The bottle may be separately cleaned. Reassembly is equally simple. The end of elastic tube **8** is simply forced onto the lower spout portion **3***b*, elastically expanding the tube end over the ring **17**. As is apparent, no special tools or training is required.

It is believed that the foregoing description of the preferred embodiments of the invention is sufficient in detail to enable one skilled in the art to make and use the invention. However, it is expressly understood that the detail of the elements presented for the foregoing purpose is not intended to limit the scope of the invention, in as much as equivalents to those elements and other modifications thereof, all of which come within the scope of the invention, will become apparent to those skilled in the art upon reading this specification. Thus the invention is to be broadly construed within the full scope of the appended claims.

What is claimed is:

1. A leakproof vented drinking cup cap comprising a base having top and bottom surfaces, and a vent passage through said base; a pivotable spout extending through said base, said spout having first and second ends and a fluid passage therethrough, said spout being pivotable between a closed position in which said spout is oriented alongside said base and an open position in which said spout is oriented upstanding from said base; said pivotable spout and said base comprising a unitary assembly formed of one piece of plastic material; an elastic tube coupled to said second end of said spout to define with said spout a straw for passing fluid there through; said spout for carrying said elastic tube to a position covering said vent passage to prevent fluid leakage through said vent passage and for kinking said elastic tube to block fluid passage there through, when said spout is moved to said closed position.

2. A resealable drinking cup cap comprising:

a cap base;

a drinking spout and a diaphragm moved by said drinking spout mounted on said cap base;

said drinking spout being pivotally mounted to said cap base for swiveling movement between an open position and a closed position and said diaphragm being connected between said cap base and said spout, wherein said diaphragm at least in part swivels responsive to said drinking spout moving between said open position and said closed position;

said drinking spout including an upper spout portion located on an upperside of said cap base and a lower spout portion located principally on an underside surface of said cap base;

an interference surface protruding downwardly from said underside surface of said cap base, said interference surface facing and being angularly inclined toward said lower spout portion;

a vent passage through said cap base for normally venting the underside of said cap base when said drinking spout is in said open position, said vent passage being located in said cap base between and radially aligned with said upper spout portion and said interference surface; and

latch means for releasibly latching said drinking spout in the closed position; and, further comprising:

an elastic tube, said elastic tube having elastically collapsible tubular walls, said elastic tube having an upper end portion attached to and ensleeving said lower spout portion and a suspended portion suspended from said lower spout portion;

said lower spout portion for swinging said upper end portion of said elastic tube along said underside of said cap surface to cover said vent passage, responsive to said spout being moved into said closed position, and, simultaneously, swinging said suspended portion of said elastic tube into contact with said interference surface to bend and squeeze closed said suspended portion of said elastic tube between a bottom end of said lower spout portion and said seal surface, to thereby close said drinking cup cap.

3. The invention as defined in claim **2**, further comprising:

a liquid container for confining liquid, said liquid container including an open top; and wherein said drinking cup cap further includes: a collar; fastening means carried by said collar for fastening said drinking cup cap to said open top; and a seal for providing a liquid tight seal between said drinking cup cap and said open top when said drinking cup cap is fastened thereto.

4. The invention as defined in claim **3** wherein said diaphragm is a compound diaphragm and comprises:

a flexible diaphragm and an invertible diaphragm serially connected between a lower end of said upper spout portion and said cap base;

said invertible diaphragm providing an over dead center arrangement that pre-loads said drinking spout in the direction of said open position, responsive to said drinking spout being in the dispensing position, and pre-loads said drinking spout in the direction of said closed position, responsive to said drinking spout being moved from said open position toward said closed position;

said flexible diaphragm and said invertible diaphragm being angularly inclined relative to one another to define a crease there between responsive to said drinking spout being in said open position;

said flexible diaphragm including a top end connected to said lower end of said upper spout portion and defining a bend line therewith at said top end, said flexible diaphragm being bendable relative to said drinking spout at said connection with said lower end;

said lower end of said drinking spout being movable in an arcuate path to push said flexible diaphragm during the initial course of travel of said drinking spout from said open position to said closed position and, through said flexible diaphragm, to invert said invertible diaphragm and, during additional movement to said closed position, to place said flexible diaphragm in a position underlying said upper spout portion;

said flexible diaphragm being adapted to swivel about and be pushed and then be pulled by said arcuately moving lower end of said upper spout portion, whereby said flexible diaphragm is temporarily wrapped over and forms a bend therein at said lower end of said upper spout portion and is placed in a position underlying said upper spout portion responsive to said drinking spout attaining the closed latched position.

5. The invention as defined in claim **2**, wherein said lower spout portion is of a predetermined length, said length being greater than the distance between said vent passage and said upper spout portion and less than the distance between said upper spout portion and said interference surface, when said spout is in the open position.

6. The invention as defined in claim **4**, wherein said lower spout portion is of a predetermined length, said length being greater than the distance between said vent passage and said upper spout portion and less than the distance between said upper spout portion and said interference surface, when said spout is in the open position.

7. The invention as defined in claim 2, wherein said cap base, said diaphragm, said spout, said interference surface and said latch means comprise an integral assembly formed in one-piece of plastic material.

8. The invention as defined in claim 2, wherein said cap base further includes a hinge for pivotally mounting said drinking spout to said cap base, said hinge being integrally formed in said cap base and defining a pivot axis.

9. The invention as defined in claim 7, wherein said cap base further includes a hinge for pivotally mounting said drinking spout to said cap base, said hinge being integrally formed in said cap base and defining a pivot axis.

10. The invention as defined in claim 9, wherein said plastic material comprises polypropylene, and wherein a distal edge of said diaphragm, most remote from said drinking spout, and said pivot axis define a bi-sector plane, said plane being oriented at an angle of 40 degrees relative to a reference plane, said reference plane being oriented normal to the axis of said drinking spout when said drinking spout is in the open position.

11. The invention as defined in claim 5, wherein said angular incline of said interference surface is a predetermined angle in the range of from five degrees to no greater than ten degrees from the vertical, said vertical being defined by the axis of said spout when said spout is in the open position.

12. The invention as defined in claim 7, wherein said elastic tube consists of rubber.

13. The invention as defined in claims 9, wherein said angular incline of said interference surface is a predetermined angle in the range of from five degrees to no greater than ten degrees from the vertical, said vertical being defined by the axis of said spout when said spout is in the open position.

14. The invention as defined in claim 13, wherein said cap base includes a radially extending U-shaped recessed portion for receiving said spout, when said spout is in the closed position, said U-shaped recessed portion including side walls; and wherein said latch means comprises:

a pair of splines located on diametrically opposite sides of and extending in parallel to the axis of said spout; and

a pair of barbs located on respective ones of said side walls of said radially extending U-shaped recessed portion, said barbs containing a cam surface.

15. The invention as defined in claim 2, wherein said spout is of a length sufficient to extend beyond and overhang the side of the upper surface of said cap base, when said spout is latched in said closed position, for providing a gripping surface.

16. A resealable drinking cup cap comprising:

a cap base;

a drinking spout and a diaphragm moved by said spout mounted on said cap base;

said spout being pivotally mounted to said cap base for swiveling movement between an open position and a closed position and said diaphragm being connected between said cap base and said spout, wherein said diaphragm at least in part swivels responsive to said drinking spout moving between said open position and said closed position;

a living hinge connected between said cap base and said drinking spout for pivotally mounting said drinking spout to said cap base, said hinge being integrally formed in said cap base and defining a pivot axis;

said drinking spout including an upper spout portion located on an upperside of said cap base and a lower spout portion located principally on an underside surface of said cap base;

said diaphragm further comprising:

a flexible diaphragm and an invertible diaphragm serially connected between a lower end of said upper spout portion and said cap base;

said invertible diaphragm providing an over dead center arrangement that pre-loads said drinking spout in the direction of said open position, responsive to said drinking spout being in the dispensing position, and pre-loads said drinking spout in the direction of said closed position, responsive to said drinking spout being moved from said open position toward said closed position;

said flexible diaphragm and said invertible diaphragm being angularly inclined relative to one another to define a crease therebetween responsive to said drinking spout being in said open position;

said flexible diaphragm including a top end connected to said lower end of said upper spout portion and defining a bend line therewith at said top end, said flexible diaphragm being bendable relative to said drinking spout at said connection with said lower end;

said lower end of said drinking spout being movable in an arcuate path to push said flexible diaphragm during the initial course of travel of said drinking spout from said open position to said closed position and, through said flexible diaphragm, to invert said invertible diaphragm and, during additional movement to said closed position, to place said flexible diaphragm in a position underlying said upper spout portion;

said flexible diaphragm being adapted to swivel about and be pushed and then be pulled by said arcuately moving lower end of said upper spout portion, whereby said flexible diaphragm is temporarily wrapped over and forms a bend therein at said lower end of said upper spout portion and is placed in a position underlying said upper spout portion responsive to said drinking spout attaining the closed latched position;

wherein a distal edge of said diaphragm, most remote from said drinking spout, and said pivot axis define a bi-sector plane, said plane being oriented at an angle of forty degrees relative to a reference plane, said reference plane being oriented normal to the axis of said drinking spout when said drinking spout is in the open position;

an interference surface protruding downwardly from said underside surface of said cap base, said interference surface facing and being angularly inclined toward said lower spout portion;

a vent passage through said cap base for normally venting the underside of said cap base when said spout is in said open position, said vent passage being located in said cap base between and radially aligned with said upper spout portion and said interference surface, a seal for said vent passage on said underside of said cap base, said seal bordering said vent passage and protruding from said underside;

said lower spout portion being of a predetermined length, said predetermined length being greater than the distance between said vent passage and said upper spout portion and less than the distance between said upper spout portion and said interference surface when said spout is in the open position; and

latch means for releasibly latching said spout in the closed position, said latch means including a pair of splines, said splines axially extending and radially outwardly protruding from diametrically opposite sides of said upper spout portion, and a pair of latch barbs located in said cap base for engagement with said splines;

said cap base, said diaphragm, said drinking spout, said interference surface and said latch means comprising an integral assembly formed in one-piece of polypropylene plastic material and, further comprising:

an elastic tube, said elastic tube having elastically collapsible tubular walls, said elastic tube having an upper end portion attached to and ensleeving said lower spout portion and a suspended portion suspended from said lower spout portion;

said lower spout portion for swinging said upper end portion of said elastic tube into contact said vent seal along said underside of said cap surface to cover said vent passage, responsive to said drinking spout being moved into said closed position, and, simultaneously, swinging said suspended portion of said elastic tube into contact with said interference surface to bend and squeeze closed said suspended portion of said elastic tube between a bottom end of said lower spout portion and said seal surface, to thereby close said drinking cup cap.

17. The invention as defined in claim 16, wherein said elastic tube comprises rubber; and wherein said angular incline of said interference surface is a predetermined angle in the range of from five degrees to no greater than ten degrees from the vertical, said vertical being defined by the axis of said spout when said spout is in the open position.

* * * * *

US00D547607S

(12) **United States Design Patent** (10) **Patent No.: US D547,607 S**
Forsman (45) **Date of Patent: ** Jul. 31, 2007**

(54) **DRINK BOTTLE CAP**

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(**) Term: **14 Years**

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(51) **LOC (8) Cl.** **07-01**
(52) **U.S. Cl.** **D7/396.2**; D9/449
(58) **Field of Classification Search** 220/203.04, 220/203.05–203.06, 203.09, 203.13, 203.19, 220/203.21, 212.5, 253, 592.16, 592.17, 220/703; 215/387; 222/521, 566; D24/197; D28/76; D7/202, 300, 300.1, 312, 317, 319, D7/394, 396.1, 396.2, 397, 398, 608, 510–512, D7/624.3; D3/202; D9/435, 440, 448, 449, D9/523, 525, 527–529, 531, 535, 537; D23/255
See application file for complete search history.

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(57) **CLAIM**

I claim the ornamental design for a drink bottle cap, as shown and described.

DESCRIPTION

FIG. **1** is a perspective view of a drink bottle cap showing the design of the present disclosure with the cap's drink spout in a stowed configuration.

FIG. **2** is a perspective view of a drink bottle cap showing the design of the present disclosure with the cap's drink spout in a dispensing configuration.

FIG. **3** is a top plan view of the cap of FIG. **1**.

FIG. **4** is a top plan view of the cap of FIG. **2**.

FIG. **5** is a side elevation view of the cap of FIG. **1**, with the other side view being a mirror image thereof.

FIG. **6** is a side elevation view of the cap of FIG. **2**, with the other side view being a mirror image thereof.

FIG. **7** is a front elevation view of the cap of FIG. **1**.

FIG. **8** is a front elevation view of the cap of FIG. **2**.

FIG. **9** is a rear elevation view of the cap of FIG. **1**; and.

FIG. **10** is a rear elevation view of the cap of FIG. **2**.

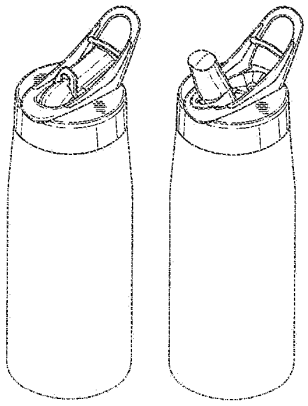
The broken line(s) shown in the drawings are for illustrative purposes only and form no part of the claimed design.

The bottom and internal construction of the cap form no part of the claimed design.

The shading lines shown in the drawings represent the three-dimensional contour of the design, and are not intended to indicate surface decoration.

Portions of the cap that are not shown in the drawings form no part of the claimed design.

1 Claim, 3 Drawing Sheets



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2005/0056652	A1	3/2005	Cezeaux	
2005/0115966	A1	6/2005	Leoncavallo et al.	

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Fig. 1

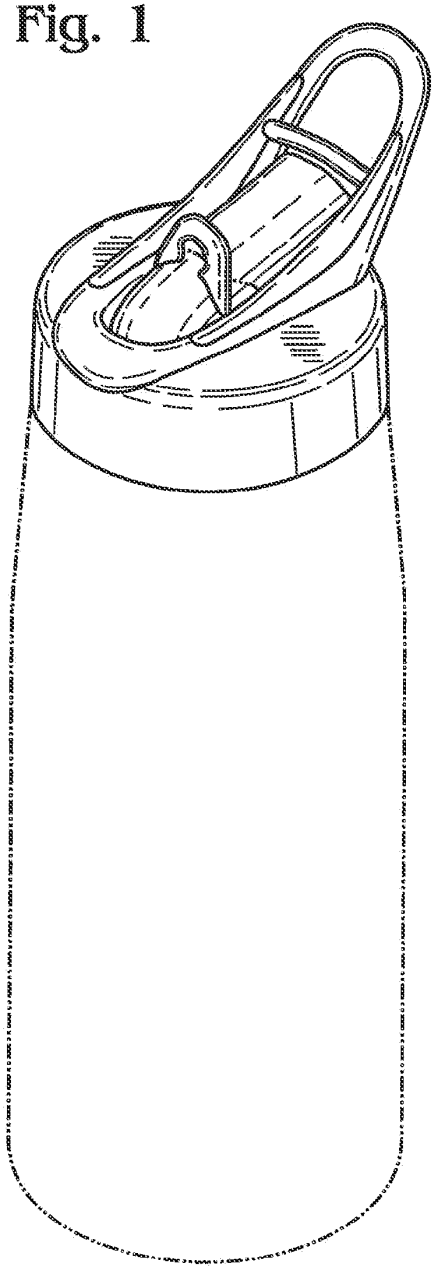


Fig. 2

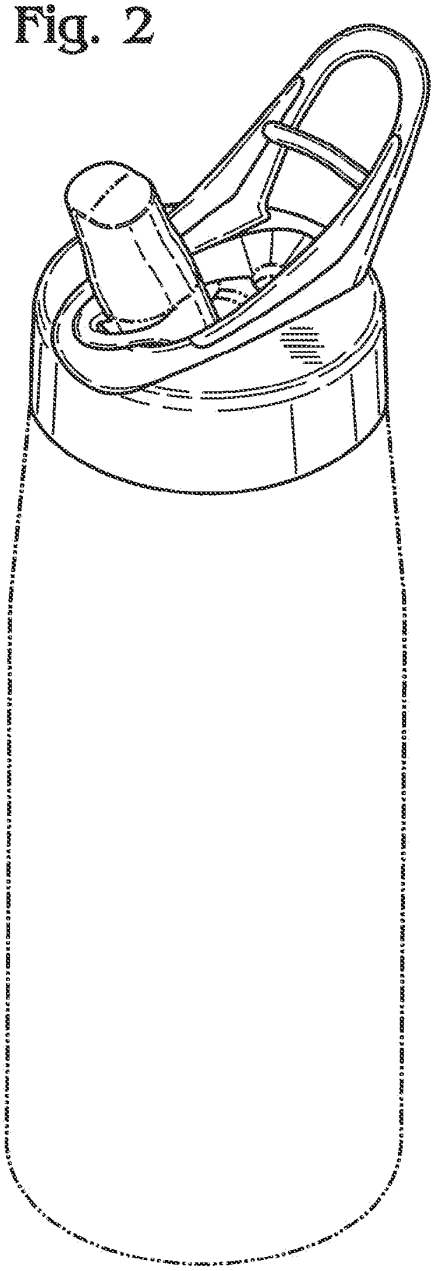


Fig. 3

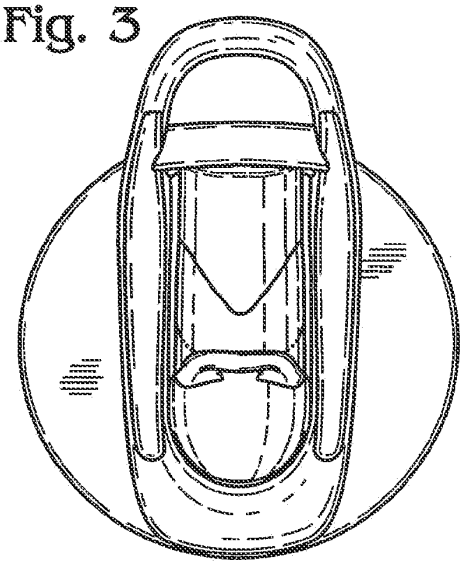


Fig. 4

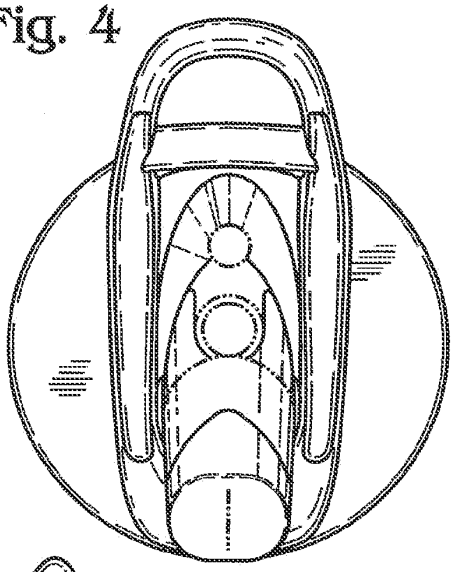


Fig. 5

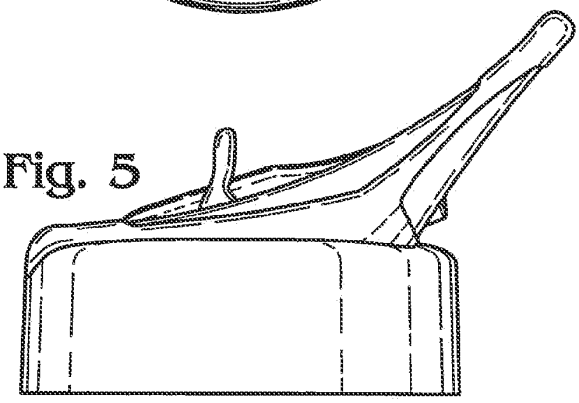
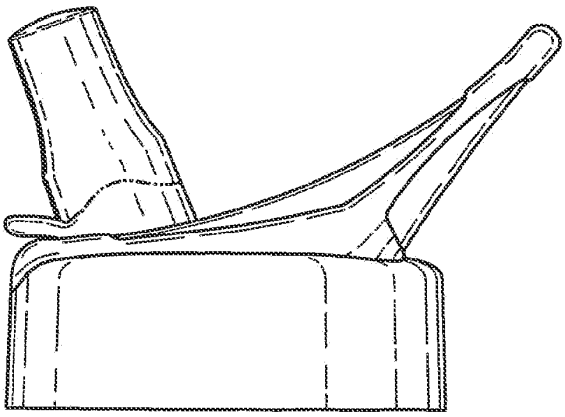


Fig. 6



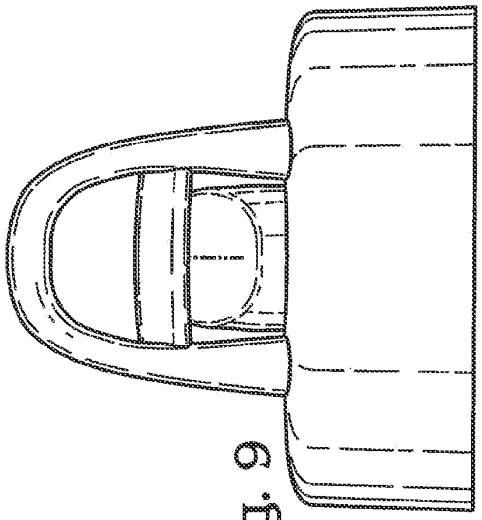


Fig. 9

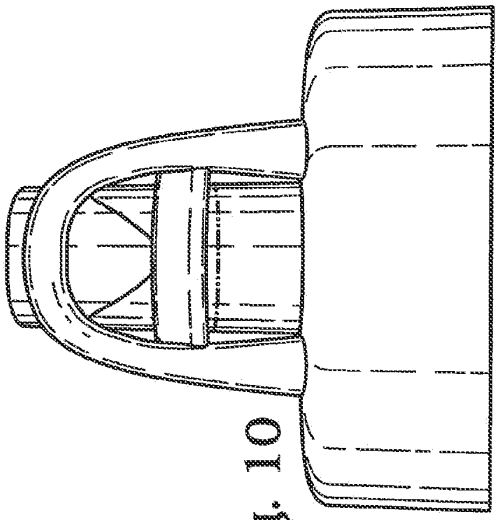


Fig. 10

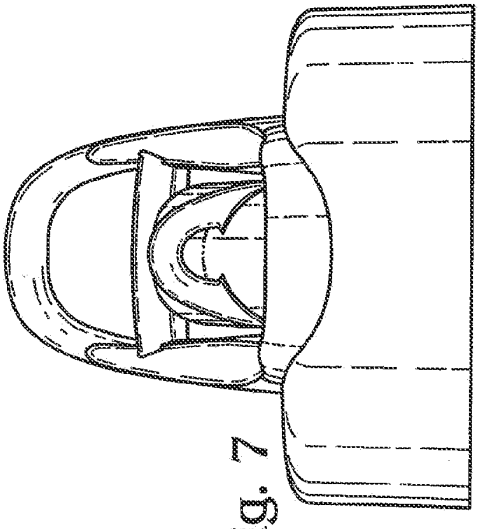


Fig. 7

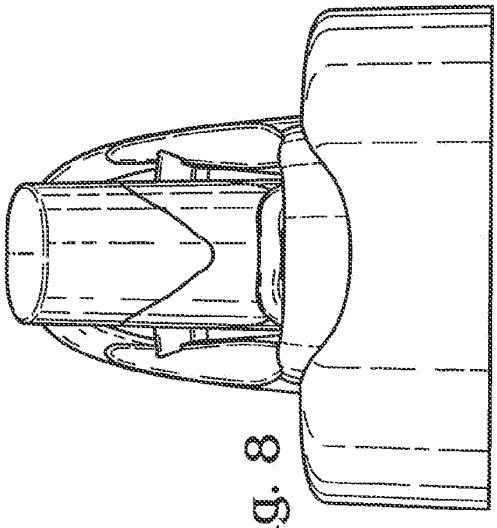


Fig. 8

US 20050029271A1

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McDonough (43) Pub. Date: Feb. 10, 2005

(54) STRAW DRINKING CUP

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(21) Appl. No.: 10/637,228

(22) Filed: Aug. 8, 2003

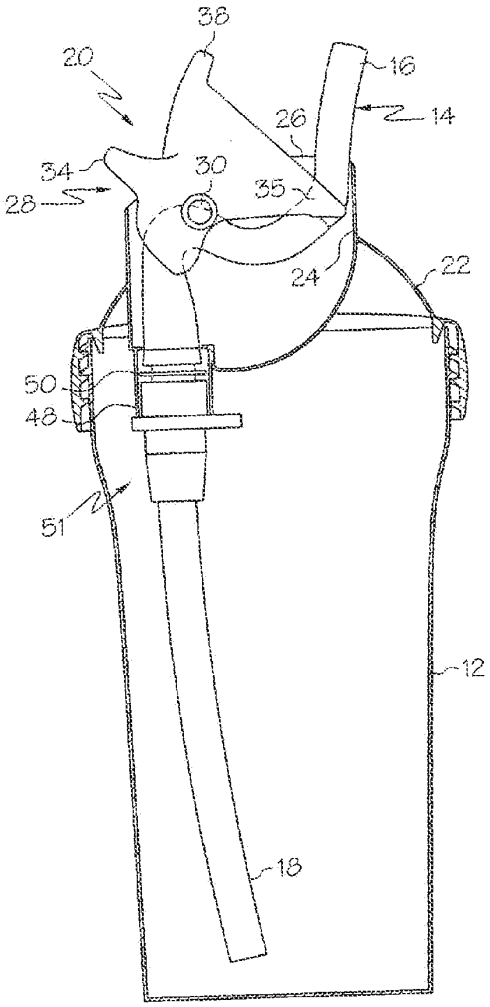
Publication Classification

(51) Int. Cl.[7] A47G 19/22

(52) U.S. Cl. 220/709; 220/705; 239/33

(57) ABSTRACT

A straw drinking cup includes a container and a flexible straw having a first, drinking, end and a second and that is disposed within the container. Advantageously, the cup includes a straw positioning mechanism that ensures that the first, drinking end of the flexible straw will remain upwardly oriented to minimize the possibility of leakage, regardless of whether the straw positioning mechanism is in the open position, the closed position, or in transit between the two positions. The straw drinking cup further includes an advantageous venting mechanism that includes a flexible membrane that permits air to flow into the container only when a sufficient pressure differential is developed across the membrane, such as will occur when a consumer is sucking on the flexible straw. The venting mechanism further operates so as to prevent leakage from the container, as sufficient pressure will not exist to draw any liquid across the flexible membrane.



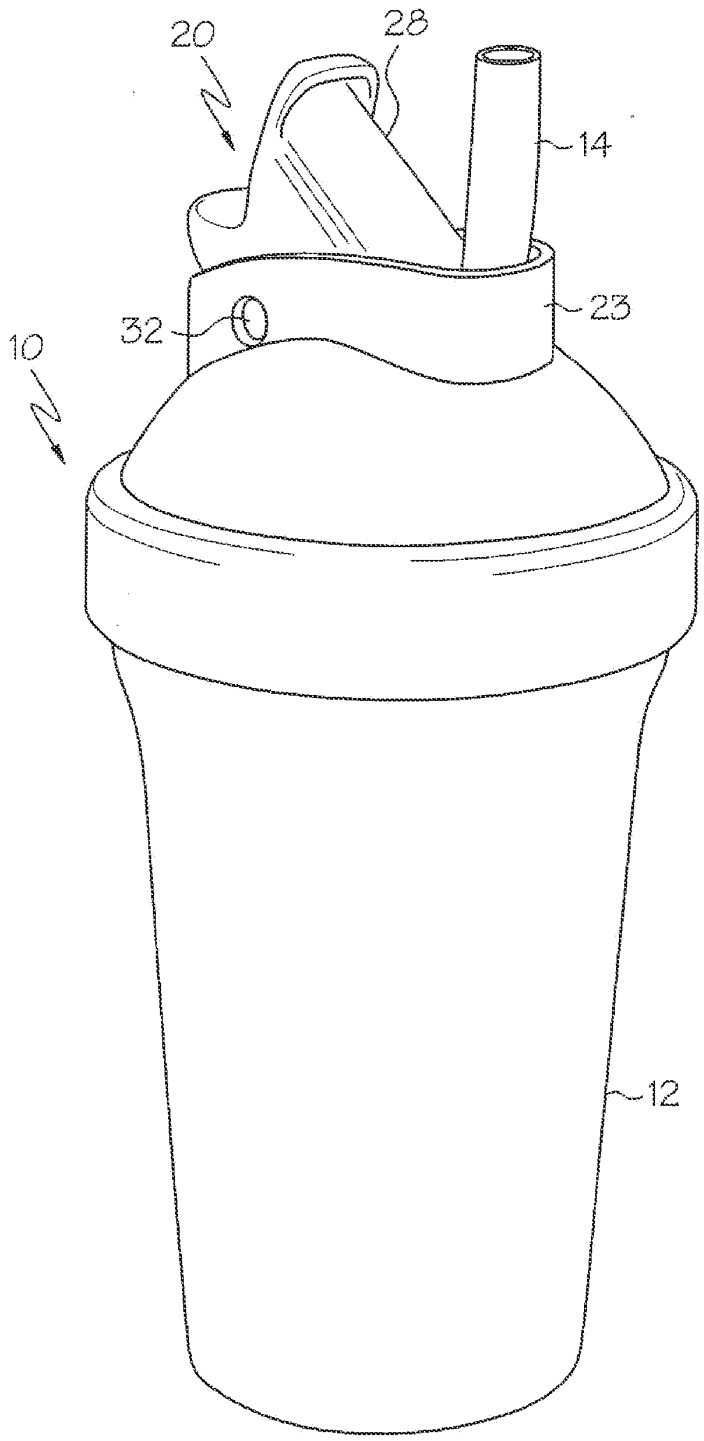


FIG. 1

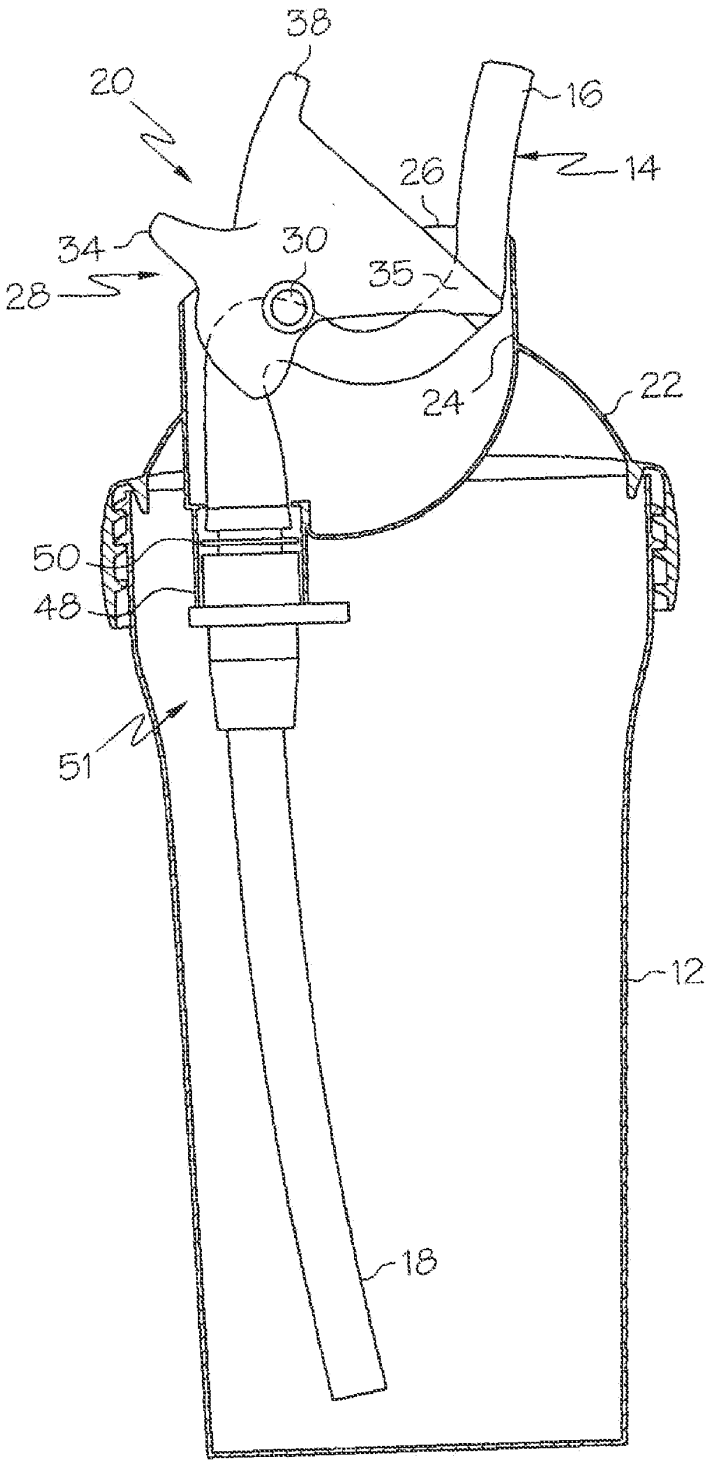


FIG. 2

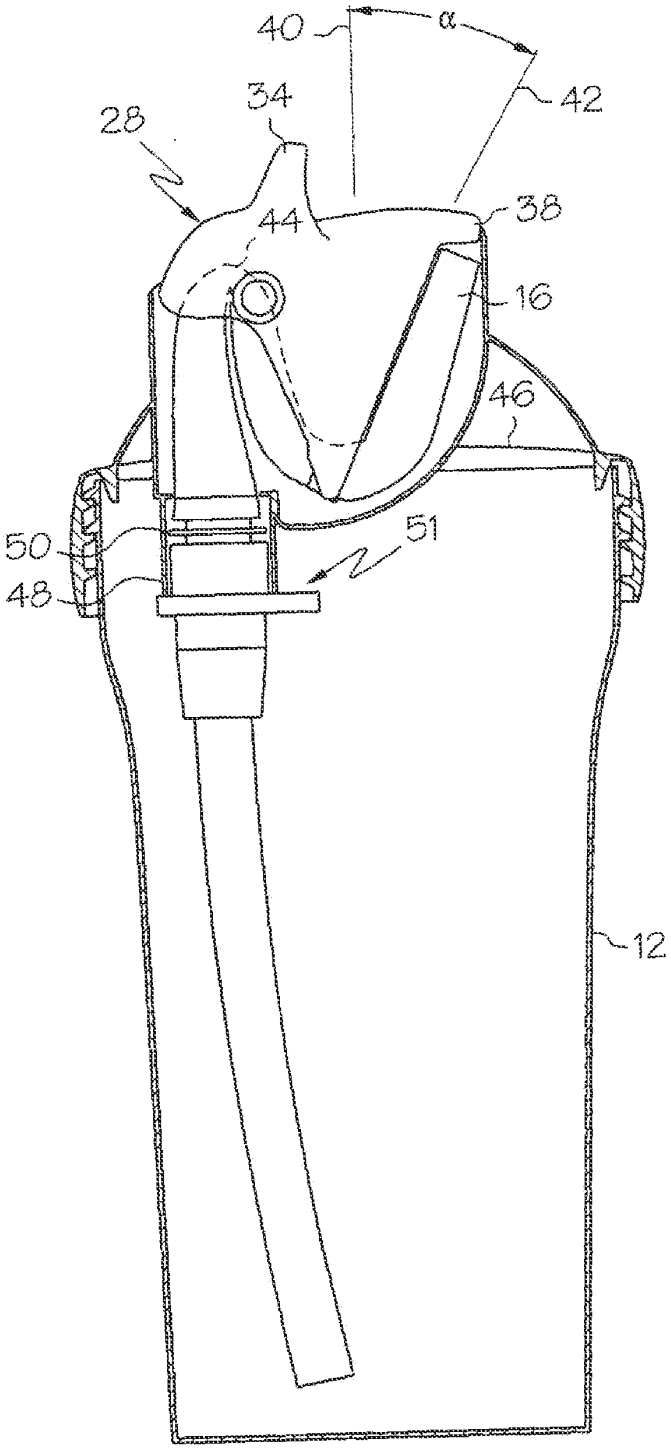


FIG. 3

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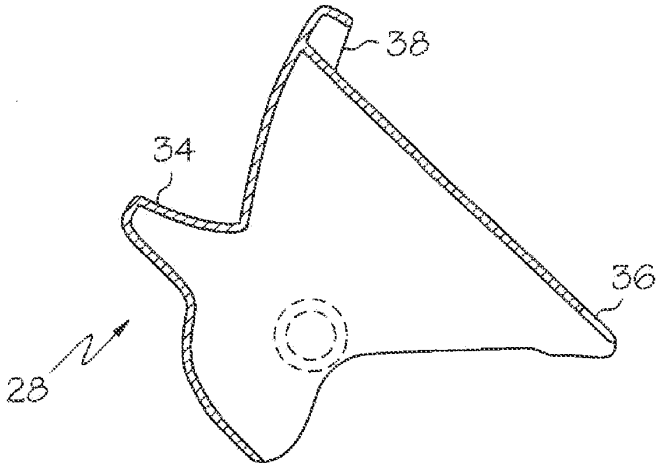


FIG. 4

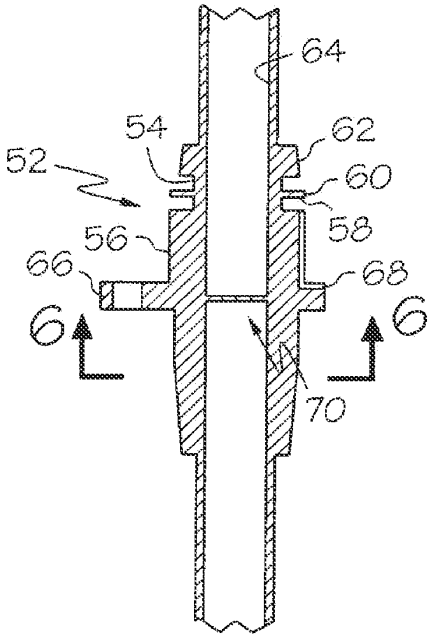


FIG. 5

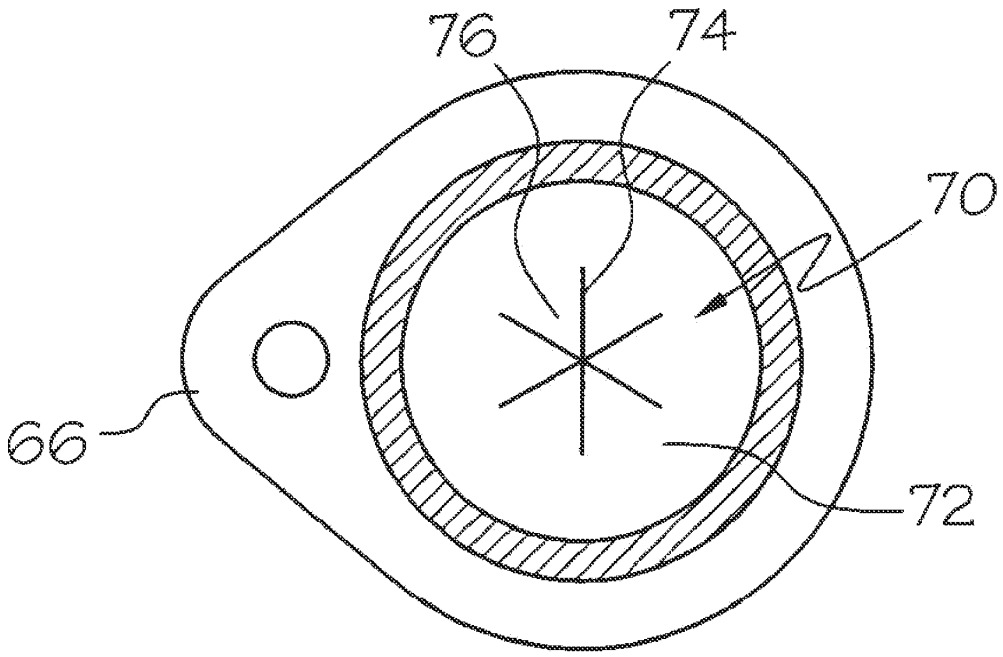


FIG. 6

STRAW DRINKING CUP

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates broadly to sealed drinking containers for serving beverages, especially to small children and individuals who are disabled. More specifically, this invention relates to an improved straw drinking cup of the type including a closed container and a flexible straw that is in communication with an interior of the container.

[0003] 2. Description of the Related Technology

[0004] A number of straw drinking cups are commercially available and described in the patent literature. For example, U.S. Pat. No. 5,273,172 to Rossbach et al. describes a straw drinking cup that includes a pivotally movable cap that will contact, deflect, bend and cover a flexible drinking straw when it is closed. In order to permit replacement air to enter the cup during drinking, a separate borehole is defined in the cap of the Rossbach et al. design. A similar design is disclosed in U.S. Pat. No. 5,897,013 to Manganiello, which includes supplemental structure for correctly orienting the rotational position of the flexible drinking straw.

[0005] One problem that tends to afflict conventional straw drinking cups is leakage of the beverage that commonly occurs from the flexible draining straw and from the container itself. Leakage from the container typically occurs through the venting holes that are provided to allow replacement air into the container during draining. Leakage from the flexible draining straw typically will occur as the straw is bent over during the closing of the cap. As the drinking end of the straw becomes inverted and points downwardly, residual liquid that is in the straw will of course tend to flow downwardly and leak onto the cap structure. Besides being messy and unsightly, such leakage may contribute to bacterial colonization in the affected area.

[0006] A need exists for an improved straw drinking cup design that is less susceptible to leakage during use.

SUMMARY OF THE INVENTION

[0007] Accordingly, it is an object of the invention to provide an improved straw drinking cup design that is less susceptible to leakage during use.

[0008] In order to achieve the above and other objects of the invention, a straw drinking cup that is constructed according to a first aspect of the invention includes a container; a flexible straw having a first end and a second end; and a straw positioning mechanism for positioning the flexible straw with respect to the container, the straw positioning mechanism being movable between a first operative position wherein the first end of said flexible straw is presented for sipping by a consumer and a second storage position, and wherein the straw positioning mechanism is constructed and arranged so that the first end of the flexible straw is upwardly oriented when in the second storage position, whereby spillage from the first end of the flexible straw is minimized.

[0009] According to a second aspect of the invention, an apparatus for serving a beverage includes a container, a first passage in communication with the container for serving a beverage from the container; a second, venting, passage that is in communication with the container; and a flexible membrane interposed in the second passage, the flexible membrane being constructed and arranged to permit air to flow through the second passage when a predetermined pressure differential is developed across the flexible membrane.

[0010] According to a third aspect of the invention, a straw drinking cup includes a container; a flexible straw having a first end and a second end, the flexible straw having an integral valve defined therein; and a straw positioning mechanism for positioning the flexible straw with respect to the container, the straw positioning mechanism being movable between a first operative position wherein the first end of the flexible straw is presented for sipping by a consumer and a second storage position.

[0011] According to a fourth aspect of the invention, a flexible straw assembly includes a flexible straw having a first end and a second end, an outer wall and an inner wall defining a lumen; and an integral valve positioned within said flexible straw for impeding fluid flow through said lumen unless a pressure differential is applied thereto.

[0012] These and various other advantages and features of novelty that characterize the invention are pointed out with particularity in the claims annexed hereto and forming a part hereof However, for a better understanding of the invention, its advantages, and the objects obtained by its use, reference should be made to the drawings which form a further part hereof, and to the accompanying descriptive matter, in which there is illustrated and described a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] **FIG. 1** is a perspective view of a straw drinking cup that is constructed according to a preferred embodiment of the invention;

[0014] **FIG. 2** is a partial cross-sectional view of the straw drinking cup shown in **FIG. 1**, shown in a first operational position;

[0015] **FIG. 3** is a partial cross-sectional view depicting a second operational position;

[0016] **FIG. 4** is a cross-sectional view through one component of the straw drinking cup;

[0017] **FIG. 5** is a fragmentary cross-sectional view through another component of the straw drinking cup; and

[0018] **FIG. 6** is a cross-sectional view taken along lines **6-6** in **FIG. 5**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

[0019] Referring now to the drawings, wherein like reference numerals designate corresponding structure throughout the views, and referring in particular to **FIG. 1**, a straw drinking cup **10** that is constructed according to a preferred embodiment of the invention includes a container **12** and a flexible elastomeric straw **14** having a first, drinking end **16** and a second end **18** that is positioned within the container **12**, as shown in **FIG. 2**. Straw drinking cup **10** further includes a straw positioning mechanism **20** for positioning the flexible straw **14** with respect to the container **12**

between a first drinking position, shown in **FIG. 2**, and a second storage position, shown in **FIG. 3**. Most advantageously, and as will be described in greater detail below, the straw positioning mechanism **20** is constructed and arranged so that the first end **16** of the flexible straw **14** is upwardly oriented in the second storage position, and furthermore remains upwardly oriented during the entire range of movement between the first drinking position and the second storage position. Accordingly, liquid within the flexible straw **14** will not at any point be induced to flow downwardly out of the drinking end **16** to become trapped at any location in the drinking cup **10**.

[0020] Referring now to **FIG. 2**, it will be seen that container **12** is constructed so as to including a lid **22** that is screwable onto the main body portion of the container **12** and that has an upstanding wall **23** defining a space for receiving the straw positioning mechanism **20**. Upstanding wall **23** has an inner surface **24** that is positioned, as may be seen in **FIG. 2**, to be frictionally engaged by the outer surface of the flexible straw **14** as the straw positioning mechanism **20** is moved between the first and second positions. This frictional engagement provides a controlled feel to the consumer during movement of the straw positioning mechanism **20**. Upstanding wall **23** defines a portion of an opening **26** that is provided in the lid **22**. Opening **26** is further defined by a downwardly extending, tube-like projection **48** having an inner surface **50** that defines a passage through which the flexible straw **14** extends, as will be described in greater detail below.

[0021] As may best be seen in **FIGS. 2 and 3**, straw positioning mechanism **20** is preferably embodied as a straw positioning member **28** that is pivotally mounted to the lid **22** and is substantially positioned within the opening **26** that is defined by the upstanding wall **23**. Straw positioning member **28** includes a pair of axle projections **30** that are journaled into a corresponding pair of holes **32** that are defined in the upstanding wall **23**, as shown in **FIG. 1**. Straw positioning member **28** preferably includes finger-gripping structure **34** for facilitating movement of the straw positioning member **28** by a consumer. In the preferred embodiment, finger-gripping structure **34** is an upstanding projection that may be contacted and pushed one way or another by a finger or a thumb of a consumer. Straw positioning member **28** preferably includes a downwardly extending arm **35** that has a recess **36** defined at its distal end for receiving the flexible straw **14**. When the straw positioning mechanism **20** is in the second, closed position shown in **FIG. 3**, the flexible straw **14** will be bent into a horizontal S-shaped configuration by the downwardly extending arm **35** so as to be crimped in a first location **44** and also in a second location **46** that is adjacent to the recess **36**. This minimizes the potential for leakage through the flexible straw **16** in the storage position, especially in conjunction with the venting mechanism **51** that will be described in greater detail below.

[0022] The inner surface **64** of the flexible straw **14** defines a first passage that is in communication with the container **12** for serving a beverage from the container **12**. In operation, a consumer will suck on the draining end **16** of the flexible straw **14**, which will induce a pressure differential between the drinking end **16** and the second end **18** of the flexible straw **14**. This, in turn, will draw the beverage upwardly through the flexible straw **14** into the mouth of the consumer. As may be seen in **FIG. 5**, which is a cross-sectional depiction of a portion of the flexible straw **14** that is part of the venting mechanism **51**, the flexible straw **14** is circumferentially enlarged for a portion of its length into a plug portion **52** that has an outer surface **56** that is shaped and sized to fit snugly against the inner surface **50** of the tube-like projection **48** that partly defines the opening **26** in the lid **22** of the container **12**. A number of longitudinal grooves **62** are defined in the plug portion **52** and together define a second, venting passage that is also in communication with the interior of the container **12**. In the preferred embodiment, three longitudinal grooves **62** are provided in the plug portion **52** and are spaced evenly about the periphery of the plug portion **52**. In the preferred embodiment, the lower end of the plug portion **52** is formed as a flange that includes a pull tab **66** for removing the flexible straw **14** from the lid **22**. One or more radial grooves **68** are preferably defined in the upper face of the flange to insure adequate communication of the longitudinal grooves **62** with the interior of the container **12**.

[0023] As may be seen in **FIG. 5**, an annular recess **54** is defined in the plug portion **52**, and a radially extending flexible membrane **58** is disposed in the annular recess **54**. Flexible membrane **58** is sized so that its outer edge **60** will contact the inner surface **50** of the tube-like projection **48**, thereby forming a seal that will, in the absence of a sufficient pressure differential to deflect the flexible membrane **58**, prevent passage of air or liquid through the second passage or the individual longitudinal grooves **62**. The flexible membrane **58** is engineered so that when a pressure differential of the magnitude that would be developed by a consumer sucking on the drinking end **16** of the flexible straw **14** is developed across the flexible membrane **58**, the flexible membrane **58** will deflect, permitting replacement air to flow through the longitudinal grooves **62** and into the container **12**. However, when the straw drinking cup **10** is not in use the flexible membrane **58** will act as a closed valve to prevent both air and liquid from escaping from the container **12**.

[0024] Referring now to **FIGS. 5 and 6**, it will be seen that an integral internal valve **70** is further positioned within the flexible straw **14** for impeding fluid flow through the flexible straw **14** until a pressure differential of the magnitude that would be developed by a consumer sucking on the drinking end **16** of the flexible straw **14** is developed across the internal valve **70**. As is best shown in **FIG. 6**, integral internal valve **70** is preferably constructed as an internal membrane **72** that is positioned across the lumen that is defined within the flexible straw **14**. Internal membrane **72** is preferably molded with the flexible straw **14** so as to be unitary therewith. A plurality of slits **74** is defined within the internal membrane **72** in order to define a corresponding plurality of flap members **76**. Flap members **76** are sized and shaped so as to deflect when a pressure differential of sufficient magnitude is applied across the internal membrane **72**, thereby permitting fluid to flow through the internal valve **70**.

[0025] The entire flexible straw **14**, including the venting mechanism structure that is depicted in **FIG. 5** and the internal valve **70**, is preferably of unitary construction, and is preferably fabricated from a resilient elastomeric material such as silicone.

[0026] By crimping the flexible straw **14** in two different positions and through the provision of the flexible mem-

brane **58** in the venting structure, straw drinking cup **10** is provided with triple redundancy against leakage when the straw positioning mechanism **20** is in the closed position. The flexible straw **14** will also tend to function as a toggle spring as the straw positioning mechanism **20** is moved between the two operative positions, as may be visualized in **FIGS. 2 and 3**. Because of the symmetrical construction of the flexible drinking straw **14**, there is further no need to orient the flexible drinking straw **14** relative to the lid **22** during assembly.

[0027] When the straw drinking cup **10** is in the opening, drinking position, the unique orientation of the flexible straw **14** creates a flowpath that never allows both ends of the flowpath to be below the water level at any cup orientation. This, therefore, minimizes the potential of static leakage through the straw **14** in the open position, even in the event of valve failure. The flexible straw **14** in conjunction with the pivotal straw positioning structure **28** further provides a positive interlocking arrangement for positioning the straw **14**, while minimizing the complexity of assembly with the other components.

[0028] It is to be understood, however, that even though numerous characteristics and advantages of the present invention have been set forth in the foregoing description, together with details of the structure and function of the invention, the disclosure is illustrative only, and changes may be made in detail, especially in matters of shape, size and arrangement of parts within the principles of the invention to the full extent indicated by the broad general meaning of the terms in which the appended claims are expressed.

1. A straw drinking cup, comprising:

a container;

a flexible straw having a first end and a second end; and

a straw positioning mechanism for positioning said flexible straw with respect to said container, said straw positioning mechanism being movable between a first operative position wherein said first end of said flexible straw is presented for sipping by a consumer and a second storage position, and wherein said straw positioning mechanism is constructed and arranged so that said first end of said flexible straw is upwardly oriented when in said second storage position, whereby spillage from said first end of said flexible straw is minimized.

2. A straw drinking cup according to claim 1, wherein said straw positioning mechanism is further constructed and arranged so that said first end of said flexible straw remains continuously upwardly oriented when said straw positioning mechanism is moved between said first and second storage positions.

3. A straw drinking cup according to claim 1, wherein said first end of said flexible straw is upwardly oriented when in said second storage position at an angle that is 60 degrees or less divergent from a longitudinal axis of said container.

4. A straw drinking cup according to claim 3, wherein said first end of said flexible straw is upwardly oriented when in said second storage position at an angle that is 45 degrees or less divergent from a longitudinal axis of said container.

5. A straw drinking cup according to claim 1, wherein said container comprises a lid having an opening defined therein, and said straw positioning mechanism comprises a straw positioning member that is pivotally mounted to said lid and is disposed in said opening.

6. A straw drinking cup according to claim 5,wherein said straw positioning member includes finger gripping structure for facilitating movement of said straw positioning member by a consumer.

7. A straw drinking cup according to claim 5,wherein said straw positioning member has a recess defined therein for receiving said flexible straw.

8. A straw drinking cup according to claim 5,wherein said straw positioning member further includes a protective shelf portion for precluding external contact with said first end of said flexible straw when said straw positioning mechanism is in the second storage position.

9. A straw drinking cup according to claim 5, wherein said lid comprises an internal sidewall that at least partially defines said opening, and wherein said straw positioning mechanism is constructed and arranged to slide a portion of said flexible straw over said internal sidewall when said straw positioning mechanism is moved between said first and second storage positions.

10. A straw drinking cup according to claim 5, wherein said straw positioning member has a recess defined therein for receiving a bent portion of said flexible straw when said straw positioning mechanism is in said second storage position.

11. A straw drinking cup according to claim 1, wherein said straw positioning mechanism is constructed and arranged so as to crimp said flexible straw in at least two places when said straw positioning mechanism is in the second, closed position.

12. A straw drinking cup according to claim 1, wherein said straw positioning mechanism is constructed and arranged so as to be biased for movement in at least one direction by elastic deformation of said flexible straw.

13. A straw drinking cup according to claim 12, further comprising a venting mechanism, said venting mechanism being constructed and arranged to permit air to flow into the container without permitting liquid to escape therethrough.

14. An apparatus for serving a beverage, comprising:

a container;

a first passage in communication with said container for serving a beverage from said container;

a second, venting, passage that is in communication with said container; and

a flexible membrane interposed in said second passage, said flexible membrane being constructed and arranged to permit air to flow through said second passage when a predetermined pressure differential is developed across said flexible membrane.

15. An apparatus for serving a beverage according to claim 14, wherein said first passage comprises a flexible straw that is inserted into the container through an opening that is defined in the container.

16. An apparatus according to claim 15, wherein said flexible membrane is integral with said flexible straw.

17. An apparatus according to claim 15, wherein said second, venting passage comprises a space that is defined between an outer surface of said flexible straw and said opening that is defined in the container.

18. An apparatus according to claim 17, wherein said flexible straw comprises a circumferentially enlarged plug portion for securely fitting within said opening that is defined in said container, and wherein said second, venting passage comprises at least one longitudinal groove that is defined in an outer surface of said plug portion.

19. An apparatus according to claim 18, further comprising an annular recess that is defined in said circumferentially enlarged plug portion, and wherein said flexible membrane is positioned as a radially extending projection within said annular recess, said flexible membrane having a radially outer edge that is sized so as to contact a sidewall defined in said opening in said container.

20. An apparatus according to claim 18, wherein said second, venting passage comprises a plurality of said longitudinal grooves.

21. A straw drinking cup, comprising:

a container;

a flexible straw having a first end and a second end, said flexible straw having an integral valve defined therein; and

a straw positioning mechanism for positioning said flexible straw with respect to said container, said straw positioning mechanism being movable between a first operative position wherein said first end of said flexible straw is presented for sipping by a consumer and a second storage position.

22. A straw drinking cup according to claim 21, wherein said flexible straw and said integral valve are fabricated from a single, unitary piece.

23. A straw drinking cup according to claim 22, wherein said single, unitary piece is fabricated from a material comprising silicone.

24. A straw drinking cup according to claim 22, wherein said integral valve comprises a membrane that is positioned within said straw so as to normally occlude fluid flow through said straw, and a plurality of slits that are defined in said membrane so as to define a plurality of flaps, said flaps being displaceable when a pressure differential is applied across said membrane in order to permit fluid flow therethrough.

25. A flexible straw assembly, comprising:

a flexible straw having a first end and a second end, an outer wall and an inner wall defining a lumen; and

an integral valve positioned within said flexible straw for impeding fluid flow through said lumen unless a pressure differential is applied thereto.

26. A straw drinking cup according to claim 25, wherein said flexible straw and said integral valve are fabricated from a single, unitary piece.

27. A straw drinking cup according to claim 26, wherein said single, unitary piece is fabricated from a material comprising silicone.

28. A straw drinking cup according to claim 26, wherein said integral valve comprises a membrane that is positioned within said straw so as to normally occlude fluid flow through said straw, and a plurality of slits that are defined in said membrane so as to define a plurality of flaps, said flaps being displaceable when a pressure differential is applied across said membrane in order to permit fluid flow therethrough.

* * * * *

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43/16		43/16		Ｚ　４Ｆ０３３
47/26		47/26		Ｔ
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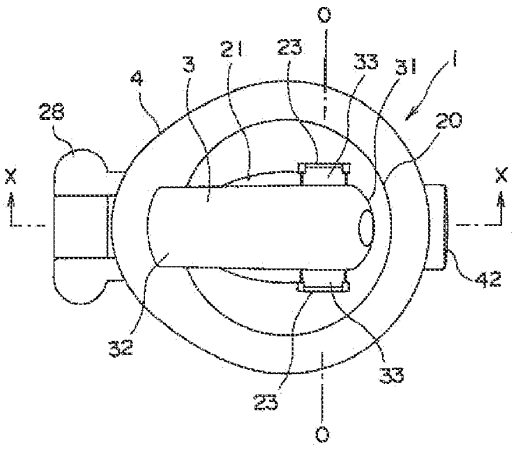
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(54)【発明の名称】　ノズル付きのボトルキャップ

(57)【要約】
【課題】　本発明は、ノズルを適度な角度に傾けて飲み易くし、簡単な構成で部品点数を少なくしてコストアップを押さえると共に、取り扱いが便利でコンパクトなノズル付きのボトルキャップをを実現する。
【解決手段】　本発明は、ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、先端に吸い口が設けられて基部の両側に回動軸を設けたノズルと、外面側にノズルを回転可能に収容する収容部と収容部を介在させた支持部を併設し、支持部の対向面に回動軸の押入可能な軸受けを形成すると共に、雌ネジを螺設した内面側に通液筒を設けた本体と、本体の通液筒に着脱自在に接続されて先端を内液に浸漬されるストローと、本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆う蓋部材とを備え、ノズルの回転に伴う起伏動作に関連して内液の流路を開閉するノズル付きのボトルキャップを構成した。



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【特許請求の範囲】
【請求項１】　ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、
先端に吸い口が設けられて基部の両側に回動軸を設けたノズルと、
外面側に前記ノズルを回転可能に収容する収容部と該収容部を介在させた支持部を併設し、該支持部の対向面に前記回動軸の押入可能な軸受けを形成すると共に、前記雌ネジを螺設した内面側に通液筒を設けた本体と、
該本体の通液筒に着脱自在に接続されて先端を内液に浸漬されるストローと、
前記本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆う蓋部材とを備え、
前記ノズルの回転に伴う起伏動作に関連して前記内液の流路を開閉することを特徴とするノズル付きのボトルキャップ。
【請求項２】　前記ノズルの起立角θを任意の鋭角内に設定し、望ましくはほぼ６０°に傾けて設定したことを特徴とする請求項１記載のノズル付きのボトルキャップ。
【請求項３】　前記収容部に開口する流路を包囲するシーリング部材を設けたことを特徴とする請求項１または２記載のノズル付きのボトルキャップ。
【請求項４】　前記ノズルの起立方向を開蓋時の蓋部材と反対方向に設定したことを特徴とする請求項１乃至３の何れかに記載のノズル付きのボトルキャップ。
【請求項５】　ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、
先端に吸い口が設けられて基部の端部に接続部を設けたノズルと、
外面側に前記ノズルを往復動可能に収容する収容部を設けると共に、前記雌ネジを螺設した内面側に収容部に通じる挿通孔を設けた本体と、
前記ノズルの基部に着脱自在に接続されて前記挿通孔を介して先端を内液に浸漬されるストローと、
前記本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆って閉蓋時に前記ノズルを押圧する蓋部材とを備え、
該蓋部材の開閉に伴うノズルの後退動作に関連して前記ストローを屈曲させて内液の流路を遮断することを特徴とするノズル付きのボトルキャップ。
【請求項６】　前記ストローに弾性を有する軟質材を用いたことを特徴とする請求項５記載のノズル付きのボトルキャップ。
【請求項７】　前記挿通孔にストローの移動を抑制する抑制手段を設けたことを特徴とする請求項５または６記載のノズル付きのボトルキャップ。
【請求項８】　ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、
先端に吸い口が設けられて基部の両側と端部にそれぞれ回動軸と接続部を設けたノズルと、
外面側に前記ノズルを回転可能に収容する収容部と該収容部を介在させた支持部を併設し、該支持部の対向面に前記回動軸の押入可能な軸受けを形成すると共に、前記雌ネジを螺設した内面側に収容部に通じる挿通孔を設けた本体と、
前記ノズルの基部に着脱自在に接続されて前記挿通孔を介して先端を内液に浸漬されるストローと、
前記本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆って閉蓋時に前記ノズルを押圧する蓋部材とを備え、
該蓋部材の開閉に伴うノズルの回転による起伏動作に関連して前記ストローをノズルの一部で押さえて内液の流路を遮断することを特徴とするノズル付きのボトルキャップ。
【請求項９】　前記ススストローに弾性を有する軟質材を用いたことを特徴とする請求項８記載のノズル付きのボトルキャップ。
【請求項１０】　前記挿通孔にストローの移動を抑制する抑制手段を設けたことを特徴とする請求項８または９記載のノズル付きのボトルキャップ。
【請求項１１】　前記ノズルの起立角θを任意の鋭角内に設定し、望ましくはほぼ６０°に傾けて設定したことを特徴とする請求項１記載のノズル付きのボトルキャップ。
【請求項１２】　前記ノズルの起立方向を開蓋時の蓋部材と反対方向に設定したことを特徴とする請求項８乃至１１の何れかに記載のノズル付きのボトルキャップ。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】近時、ペットボトル等のボトル内に詰められた自然水や清涼飲料等の中味を、ストローで飲む，所謂ゆる“ストロー飲み”を可能にするノズル付きのボトルキャップが開発されている。ノズル付きのボトルキャップを利用すればコップが不要で、しかも何回にも飲み分ける際に都度キャップの蓋を開閉することなく詰められた中身を飲むことができて極めて都合がよい。本発明は上述したようなノズル付きのボトルキャップに関するものである。
【０００２】
【従来の技術】従来のこの種の類似キャップを用いた物品として、例えば実公平３－８０９０号公報と実公平３－１８３６２号記載の容器が知られている。両容器の構成を図９と図１０に記載するが、図９の説明では公報記載の符号に数値１００を付加し、図１０には２００を付加して説明する。図９は実公平３－８０９０号公報記載の容器の構成を示す分解斜視図である。図９において、

１０１は容器本体、１０２は注入注出用口部、１０４は注入注出用口部１０２の閉塞部材、１０５は閉塞部材１０４に設けられたストロー導出用の小口部、１０６は小栓、１０６ｂはその嵌合部、１０９は保持筒である。また、１１０は螺着手段、１１１はストロー、１１２はストッパー、１１３はスプリングである。

【０００３】容器本体１０１の内部の飲料を飲むときは、閉塞部材１０４の小口部１０５に嵌着した小栓１０６の嵌合部１０６ｂを外せば、小口部１０５の筒状縁１０５ａに螺着手段１１０で固着した保持筒１０９内のスプリング１１３の弾発力によりストロー１１１がストッパー１１２と小口部１０５の下端との当接位置まで持ち上げられる。そして、ストロー上端部が小口部１０５から突出することになり、突出したストロー１１１により内部飲料を吸飲することができる。また、スプリング１１３の弾発力に抗してストロー１１１を押し込むようにして小栓１０６を小口部１０５に嵌着すれば、ストロー１１１を容器本体１０１内に保持した元の状態に戻るようになっている。

【０００４】図１０は上記した実公平３－１８３６２号公報に掲載の図面で、（ａ）は全体の縦断面図、（ｂ）はキャップ部分の分解斜視図である。図１０において、２０１は液体容器、２０２はキャップ、２０３はストロー、２０４はキャップ２０２の突出口、２０５はストロー２０３を突出させるバネ、２０６はレバー、２０７は開閉部材、２０８は内蓋、２０９は筒部、２１０はバネ２０３の下端部が嵌着された凹部である。また、２１１はストロー２０３に嵌めたパッキング、２１２は内蓋２０８と容器２０１との間のパッキング、２１３はキャップ２０２の側面に形成した凹部、２１４はレバー２０６が凹部２１０に飛び出す上下方向の孔、２１６は押しばねである。

【０００５】図１０に示した液体容器２０１の構成において、開閉部材２０７はストロー２０３の突出方向と交叉方向へスライドし、その先端部でストロー２０３の上端を抑えているので、ストロー２０３は突出口２０４から直ちに突出し、飲用後は押下げレバー２０６を押下げれば自動的に開閉部材２０７が突出口２０４を閉じる。また、ストロー２０３の上端に当接する開閉部材２０７は、漏液も防止する。また、開閉部材２０７をスライド操作すれば突出ばね２０５によりストロー２０３が突出口２０４から直ちに突出し、飲用後は押下げレバー２０６を押下れば自動的に突出口２０４が閉じられるようになっている。

【０００６】

【発明が解決しようとする課題】しかしながら、図９と図１０の従来の容器は何れもストロー１１１と２０３が、垂直上方に突出するように構成されている。したがって、ストロー１１１と２０３で内液を吸飲するときには、上体と一緒に頭部を傾けて無理な姿勢を取らなければならず極めて不便である。姿勢の傾きを怠って直立したまま吸飲すると、容器１０１や２０１側が傾いて内容液を零す恐れがある。また、樹脂と異なる金属のスプリング１１３やバネ２０５，２１６を利用しているので、部品点数と資材の手配先の業種が増えるばかりが設計に当たって腐食対策を配慮しなければならない等の問題点があった。

【０００７】本発明は、上述のような従来の問題点を解消するためになされたもので、ノズルを適度な角度に傾けて飲み易くし、簡単な構成で部品点数を少なくしてコストアップを押さえると共に、取り扱いが便利でコンパクトなノズル付きのボトルキャップを実現することを目的とするものである。

【０００８】

【課題を解決するための手段】本発明は、ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、先端に吸い口が設けられて基部の両側に回動軸を設けたノズルと、外面側にノズルを回転可能に収容する収容部と収容部を介在させた支持部を併設し、支持部の対向面に回動軸の押入可能な軸受けを形成すると共に、雌ネジを螺設した内面側に通液筒を設けた本体と、本体の通液筒に着脱自在に接続されて先端を内液に浸漬されるストローと、本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆う蓋部材とを備え、ノズルの回転に伴う起伏動作に関連して内液の流路を開閉するノズル付きのボトルキャップを構成したものである。また、上記において、ノズルの起立角θを任意の鋭角内に設定し、望ましくはほぼ６０°に傾けて設定したノズル付きのボトルキャップを構成したものである。また、上記において、収容部に開口する流路を包囲するシーリング部材を設けたノズル付きのボトルキャップを構成したものである。また、上記において、ノズルの起立方向を開蓋時の蓋部材と反対方向に設定したノズル付きのボトルキャップを構成したものである。

【０００９】また、本発明は、ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、先端に吸い口が設けられて基部の端部に接続部を設けたノズルと、外面側にノズルを往復動可能に収容する収容部を設けると共に、雌ネジを螺設した内面側に収容部に通じる挿通孔を設けた本体と、ノズルの基部に着脱自在に接続されて挿通孔を介して先端を内液に浸漬されるストローと、本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆って閉蓋時にノズルを押圧する蓋部材とを備え、蓋部材の開閉に伴うノズルによる押圧動作に関連してストローを屈曲させて内液の流路を遮断するノズル付きのボトルキャップを構成したものである。また、上記において、ストローに弾性を有する軟質材を用いたノズル付きのボトルキャップを構成したものである。また、上記において、挿通孔

にストローの移動を抑制する抑制手段を設けたノズル付きのボトルキャップを構成したものである。

【００１０】また、本発明は、ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、先端に吸い口が設けられて基部の両側と端部にそれぞれ回動軸と接続部を設けたノズルと、外面側にノズルを回転可能に収容する収容部と収容部を介在させた支持部を併設し、支持部の対向面に回動軸の押入可能な軸受けを形成すると共に、雄ネジを螺設した内面側に収容部に通じる挿通孔を設けた本体と、ノズルの基部に着脱自在に接続されて挿通孔を介して先端を内液に浸漬されるストローと、本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆って閉蓋時にノズルを押圧する蓋部材とを備え、蓋部材の開閉に伴うノズルによる押圧動作に関連してストローをノズルの一部で押さえて内液の流路を遮断するノズル付きのボトルキャップを構成したものである。また、上記において、ストローに弾性を有する軟質材を用いたノズル付きのボトルキャップを構成したものである。また、上記において、挿通孔にストローの移動を抑制する抑制手段を設けたノズル付きのボトルキャップを構成したものである。また、上記において、ノズルの起立角θを任意の鋭角内に設定し、望ましくはほぼ６０°に傾けて設定したノズル付きのボトルキャップを構成したものである。さらに、上記において、ノズルの起立方向を開蓋時の蓋部材と反対方向に設定したノズル付きのボトルキャップを構成したものである。

【００１１】

【発明の実施の形態】実施の形態１．図１は本発明実施の形態１の構成を示す上面図、図２は図１のＸ－Ｘ断面図、図３は本体の断面図、図４は実施の形態１の動作を示す断面図である。図１乃至図４において、１はボトルキャップである。ボトルキャップ１の素材にはポリプロピレン等が用いられ、破損し難いやや軟質な樹脂材で成型されている。２はボトルキャップ１の本体、３はノズル、４は蓋である。また、１１はシリコーンチューブのようなゴム状の弾性樹脂を用いたストロー、１２はペットボトル、１３はペットボトル１２に詰められた内液である。

【００１２】２ａはキャップ型の本体２の内面側、２ｂは外面側である。２ｃは内面側２ａに設けられた雌ネジ、２ｄは貫通する内液１３の流路を設けて下方に突出した垂直方向の通液筒、２ｅはリング状の平パッキンである。雌ネジ２ｃは垂直方向のキャップ軸Ｙ０－Ｙ０を中心に螺設され、通液筒２ｄはキャップ軸Ｙ０－Ｙ０からδだけずれた並行方向の中心軸Ｙ１－Ｙ１上に設けられている。通液筒２ｄにはストロー１１が取り外し自在に接続されて、その先端は内液１３に浸漬される。２０は外面側２ｂの上面の丸ドーム状の支持部、２１は支持部２０の頂部を左右方向に水平にカットした円弧状の収納溝である。収納溝２１のカットにより、支持部２０に前後方向の対向壁面が併設されている。

【００１３】２２は中心軸Ｙ１－Ｙ１上の点を球心Ｏとする半球状に穿設した収容部で、収納溝２１内に開口している。２３は収納溝２１の上端から収容部２２の側壁にかけて水平方向（図３の前後方向）に対向して形成されたほぼＵ字溝状の軸受けである。軸受け２３の下端の円弧の中心を結ぶ直線は球心Ｏを通って中心軸Ｙ１－Ｙ１に直交していて、次に説明するノズル３の回動軸の軸心Ｏ－Ｏを構成する。図３に示すように、収容部２２の最深部の中心には通液筒２ｄの流路が開口している。２４は通液筒２ｄの開口を囲む環状溝、２５は環状溝２４に介装されたＯリングである。２６は収容部２２の凹球面に形成されクリック用の小さな窪み、２７は本体２の内外面を貫通した通気孔である。２８はキャップ軸Ｙ０－Ｙ０に対して中心軸Ｙ１－Ｙ１（回動軸３３）の反対側の端部に設けられたヒンジ部、２９は他端側の係止部である。

【００１４】一方、ノズル３は、球型の基部３１と、この基部３１から接線方向に延設された吸い口３２とを具備する。基部３１は本体２の収容部２２に対応する球面で構成され、球面上には吸い口３２の延長方向と交叉する方向に一対のボス状の回動軸３３が対称的に突設されている。３４は窪み２６に対応して基部３１の表面に形成された突起である。吸い口３２を貫通して先端に開口した流路の他端は、基部３１の球面上に開口している。そして、基部３１の両側の回動軸３３が軸受け２３内に上方からやや固く押し込まれて、基部３１の凸球面が収容部２２の凹球面内に嵌入されて、相互に密着して摺動するようになっている。

【００１５】こうして、本体２の外面側２ｂに装着されたノズル３は、回動軸３３を中心に回動角の上限が後述する望ましい起立角θに対応するようにほぼ１２０°の角範囲を回動して吸い口３２が起伏される。この場合、吸い口３２は突起３４が窪み２６に嵌合したクリック位置で伏臥して収納溝２１内に収納されると共に、伏臥した吸い口３２によって通気孔２７が封鎖される。また、回動角の上限では吸い口３２の背部が収容部２２の角部に当接して起立状態が保持されると共に、ノズル３と通液筒２ｄの流路が一致して連通する。４１は蓋４を本体２のヒンジ部２８に連結するヒンジ軸、４２は他端側の係止片である。蓋４はヒンジ軸４１を支点にほぼ３／４回転して本体２の上部空間を開放し、係止片４２が係止部２９に係止されて本体２の上空が包囲される。

【００１６】次に、図４を主にして、実施の形態１の動作を説明する。図４では、本考案のボトルキャップ１をペットボトルに適用した場合が例示されている。ペットボトル１２の注ぎ口に被された専用のキャップを取り除いてから、通液筒２ｄに接続されたストロー１１を注ぎ口に差し込む。図２に示されたような閉蓋状態のボトル

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キャップ１の雌ネジ２ｃを注ぎ口の雄ネジに螺入して、注ぎ口との接触面に介装されたパッキン２ｅを締め付けて装着する。この結果、図示されていないが、ペットボトル１２の中に挿入されたストロー１１の先端が底に沈められて、内液１３内の最深部に浸漬される。

【００１７】このときの状態では、前述のように基部３１が収容部２２に球面接触で密着して収納されており通気孔２７も伏臥状態の吸い口３２の胸部に封鎖されているので、たとえ振動等が加わってもペットボトル１２の内液１３が零ぼれるようなことがない。内液１３を飲むときは、係止片４２と係止部２９との係止を解除し、蓋４をヒンジ軸４１を中心に反時計方向に回転して本体２の上方を開放する。蓋４の解放後、ノズル３を回動軸３３を中心に時計向きに回転して、吸い口３２をクリック位置に起立させる。起立した吸い口３２内の空気を吸い込めば、連通された流路が負圧になって内液１３を飲むことができる。ノズル３の起立したときの角度（起立角θ…水平面とのなす角）は、垂直または水平付近では飲み難い。よって、垂直と水平の間の任意の鋭角内で、できれば起立角θをほぼ６０°に設定することが望ましい。

【００１８】図４に示すように、開放状態の蓋４と起立して傾斜した吸い口３２が左右に分かれて互いに対向して反対方向に保持されているので内液１３の吸飲に支障を来すことがない。吸飲が終わると、上記と逆の動作で収納溝２１に収納されたノズル３の上部空間が蓋４で覆われるようになっている。収納状態でノズル３は蓋４で覆われるので、衣類等との接触や塵埃の付着がなくなり衛生状態を保つことができる。ゴミ等が付着して汚れたときはノズル３を本体２から引き抜いて、汚れ易いノズル３を分離状態で簡単且つ綿密に洗浄することができる。同様に、ストロー１１，Ｏリング２５，パッキン２ｅも本体２から分解して洗浄可能である。この様に、分解して洗浄を行うことにより、ボトルキャップ１を清潔に保つことが可能であり、新たなペットボトル１２への使用を可能とする。

【００１９】実施の形態２．図５は実施の形態２の構成を示す説明図で、（ａ）は断面図、（ｂ）は変形例の部分断面図、図６は実施の形態２の動作を示す断面図である。実施の形態２では前記の従来例と同様に吸い口３２を垂直方向に突出させる突出型が採用されているが、構造面において著しく簡素化された特徴を有する。図５（ａ）と図６の実施の形態２では収容部２２が有底円筒状に形成され、キャップ軸Ｙ０－Ｙ０上で底部を内面側２ａに露出させている。内面側２ａのキャップの内壁に雌ネジ２Ｃが螺設されている構造には、実施の形態１と変わりがない。３５ａはノズル３の基部３１の上端の外周に設けられた抜け止めを防ぐ突条、３５ｂは端部に形成された円筒溝である。円筒溝３５ｂに包囲された内筒は、ストロー１１との接続部を構成する。３６は収容部２２の底面に設けられたストロー１１の挿通孔で、内面側２ａから外面側２ｂに通じている。

【００２０】収容部２２の上端の内壁面には内側に向けた爪部３６ａが形成され、挿通孔３６の内周面には例えば折り返し部３６ｂ等のストローの移動を抑制する滑り止め機能が与えられる。ストロー１１の先端はノズル３の基部３１の接続部に接続され、途中が挿通孔３６に挿通されている。このため，挿通孔３６に挿通されたストロー１１の挿入と引き出しに僅かな難易差を生じて、引き出し時には若干の抵抗力が加えられる。一方、ノズル３の基部３１は収容部２２の内部を、往復動可能に介装される。特に、ストロー１１にはやや強いバネ性の復元力を有するシリコンチューブが用いられている。その他の一部の共通部材には、実施の形態１と同一の符号が付されている。

【００２１】そして、蓋４の閉鎖時には吸い口３２の先端が蓋４の内壁に押圧されることにより、ノズル３は収納部２２内に押し下げられるものの、ノズル３に接続されたストロー１１は挿通孔３６の内周面に設けられた例えば折り返し部３６ｂ等により移動が抑制されているために圧縮されることになる。このとき、圧縮されたストロー１１は挿通孔３６により外部に押し出されることなく、図５に示すように横方向に撓んで“つの字型”に屈曲することになり、この屈曲部により内液１３の流路が自動的に封鎖されて遮断される。また、蓋４の係止を解いて開放すれば、ストロー１１の復元力が作用して基部３１がストロー１１の上限位置又は突条３５ａが爪部３６ａに当接する位置に押し上げられて吸い口３２が突出する。ノズル３の突出状態が、図６に示されている。実施の形態２によればノズル３を突出させるためのバネが不必要で面倒な組立操作が省け、部品点数と組立工数を減少させてコストの低減に寄与することが可能になる。

【００２２】図５（ｂ）は実施の形態２の変形例の要部の部分断面図である。図５（ｂ）において、４３は蓋４の内面でキャップ軸Ｙ０－Ｙ０上に形成された凹陥部、４４は板パッキンである。板パッキン４４には弾性を持つシリコンのような素材が用いられて、直径がやや小さく穿設された凹陥部４３内に取り外し自在に圧入されている。圧入された板パッキン４４は、蓋４の内面と同一面か或いは面より若干落ち込んで嵌入されている。そして、図示のように閉蓋時にノズル３の先端の吸い口３２が板パッキン４４に圧着して、流路の開口が封鎖されて内液１３の漏洩が防止されるようになっている。この場合、必ずしもストロー１１の“つの字型”の屈曲部が流路を封鎖していなくてもよい。実施の形態２には、この他に実施の形態１に類似した構成の第２の変形例が準備されている。第２の変形例は図示を省略したが、ノズル３の中心を通る垂直方向の中心軸Ｙ１－Ｙ１がキャップ軸Ｙ０－Ｙ０からδだけ並行にずれた構成が採用されている。この第２の変形例においても、バネが不必要で面

倒な組立操作が省ける等の前述と同等の効果が得られる。

【００２３】実施の形態３．図７は実施の形態３の構成を示す断面図、図８は実施の形態３の動作を示す説明図で、（ａ）と（ｂ）は蓋の開放状態の上面図と断面図、（ｃ）は要部の変形例の説明図である。この実施の形態３においても上述のストロー１１の復元力を利用するのは同じである。但し流路の封鎖はストロー１１をノズル３の一部で押さえる事で行い、蓋４の解放時にストロー１１の復元性でノズルを自動的に起立させる自動起伏構造が採用されている。また、このノズル３が回動軸３３を中心に回動して起伏するノズル３の軸支構造は実施の形態１と同様になっている。このため、図１に示されたように本体２がほぼ楕円形で、外面側２ｂに丸ドーム状の支持部２０が併設されて共通した構造になっている。また、ノズル３の基部３１には円筒溝３５ｂが形成されて、ストロー１１が円筒溝３５ｂに囲まれた内筒にやや固く接続されている。この他に、実施の形態３ではノズル３が伏臥したときにストロー１１の流路の遮断を効果的に行わせるために、基部３１の少なくとも下側の外環部に突出部３７が形成されている。また、収容部２２は下方に向う漸縮型で、ノズル３の伏臥方向に幾分傾けた逆円錐状に形成され自動的な起伏動作を円滑に実施させるための配慮がなされている。

【００２４】いま、図８（ｂ）に示されたように、開蓋状態でノズル３が起立しているときに蓋４をヒンジ部２８を支点に矢印方向に１５０°近く回転すると蓋４の内面が吸い口３２に接触する。蓋４を更に回転すると、ノズル３が弾性を有するストロー１１を引き伸ばして蓋４に逆方向の抵抗力を加えながら回動軸３３を中心に一体に同方向に回転する。そして、ストロー１１の抵抗力を受けている蓋４の係止片４２を係止部２９に係止すると、図７に示すようにノズル３が逆円錐状の部分から抜け出して伏臥状態になって収納溝２１内に収容される。このとき、ノズル３の回動に伴う部分的な伸張差にのもとに接続部付近のストロー１１が潰され、この潰された部分の内面が密着するように突出部３７により弾性的に圧接される。この結果、内部の流路が自動的に塞がれて、内液１３の漏洩が防止される。

【００２５】逆に、ヒンジ部２８の係止を開放すると、蓋４によって押圧されていたノズル３がストロー１１の復元力によって蓋４の開放に追随して図７の状態から図８の（ｂ）に示すように自動的に起立することになる。このように、実施の形態３によれば、ノズル３を起立させる手動動作が不必要になるばかりか、バネの利用を省略することができる。このほかに、蓋４が本体２と一体に作られていて、両者を連結した肉薄の帯部材でヒンジ部２８が構成されている。これにより実施の形態１に比較して同等の機能を果たしながら、一層のコストの低廉化が図られている。もちろん、実施の形態１，２と同様に蓋４が本体２と別体に形成されてもよい。

【００２６】図８の（ｃ）に、実施の形態３の流路の遮断機構の変形例が示されている。即ち、図（ｃ）では、ストロー１１が接続されるノズル３の基部３１の内環部の筒先に傾斜面３８が形成されている。そして、閉められた蓋４によってノズル３が押圧されて伏臥したときに、前記と同様に伸張差により強く引き伸ばされたストロー１１の内面部分が傾斜面３８に弾性的に圧着されることになる。それ故、この内面部分の圧着によって傾斜面３８に開口する流路が自動的に封鎖されて、内液１３の漏洩が防止されることになる。

【００２７】なお、上述の各実施の形態では本発明を自然水等を詰めたペットボトルの雄ネジを設けた注ぎ口に適用した場合を例示して説明したが、雌ネジの代替え構造を用いれば水筒や哺乳瓶等の他のボトルにも適用することができる。また、実施の形態１では９０°を越えた１２０°程度の回動角で吸い口３２を起伏させた場合で説明したが、回転角の上限を９０°以下にしてもよく、要するに開蓋時における蓋の反対側であって前述したようなノズル３の起立角θを任意の鋭角内で、望ましくは６０°付近に傾けて設定したものであればよい。さらに、本体やノズルの形状等についても、同等の機能を果たす限りでは必ずしも実施の形態に限定するものではない。

【００２８】

【発明の効果】本発明は、ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、先端に吸い口が設けられて基部の両側に回動軸を設けたノズルと、外面側にノズルを回転可能に収容する収容部と収容部を介在させた支持部を併設し、支持部の対向面に回動軸の押入可能な軸受けを形成すると共に、雌ネジを螺設した内面側に通液筒を設けた本体と、本体の通液筒に着脱自在に接続されて先端を内液に浸漬されるストローと、本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆う蓋部材とを備え、ノズルの回転に伴う起伏動作に関連して内液の流路を開閉するノズル付きのボトルキャップを構成した。また、上記において、ノズルの起立角θを任意の鋭角内に設定し、望ましくはほぼ６０°に傾けて設定したノズル付きのボトルキャップを構成した。また、上記において、収容部に開口する流路を包囲するシーリング部材を設けたノズル付きのボトルキャップを構成した。また、上記において、ノズルの起立方向を開蓋時の蓋部材と反対方向に設定したノズル付きのボトルキャップを構成した。

【００２９】この結果、図９と図１０に示した従来の容器のようにノズル（ストロー）が垂直上方に突出することがないので、頭部や上体を無理に傾けることなく楽な姿勢で内液を吸飲することができ便利になる。また、ボトルを傾けて飲むこともなくなり、キャップの締め付け

を多少弱くした場合でも内液を漏すようなこともなくなる。また、樹脂と異なる金属のスプリングやバネを利用しないので、部品点数と資材の手配先の業種も限定されるばかりが設計に当たって腐食対策を考慮する心配がなくなる。

【００３０】また、本発明は、ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、先端に吸い口が設けられて基部の端部に接続部を設けたノズルと、外面側にノズルを往復動可能に収容する収容部を設けると共に、雌ネジを螺設した内面側に収容部に通じる挿通孔を設けた本体と、ノズルの基部に着脱自在に接続されて挿通孔を介して先端を内液に浸漬されるストローと、本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆って閉蓋時にノズルを押圧する蓋部材とを備え、蓋部材の開閉に伴うノズルの後退動作に関連してストローを屈曲させて内液の流路を遮断するノズル付きのボトルキャップを構成した。また、上記において、ストローに弾性を有する軟質材を用いたノズル付きのボトルキャップを構成した。また、上記において、挿通孔にストローの移動を抑制する抑制手段を設けたノズル付きのボトルキャップを構成した。

【００３１】また、本発明は、ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、先端に吸い口が設けられて基部の両側と端部にそれぞれ回動軸と接続部を設けたノズルと、外面側にノズルを回転可能に収容する収容部と収容部を介在させた支持部を併設し、支持部の対向面に回動軸の押入可能な軸受けを形成すると共に、雌ネジを螺設した内面側に収容部に通じる挿通孔を設けた本体と、ノズルの基部に着脱自在に接続されて挿通孔を介して先端を内液に浸漬されるストローと、本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆って閉蓋時にノズルを押圧する蓋部材とを備え、蓋部材の開閉に伴うノズルの回転による起伏動作に関連してストローをノズルの一部で押さえて内液の流路を遮断するノズル付きのボトルキャップを構成した。また、上記において、ストローに弾性を有する軟質材を用いたノズル付きのボトルキャップを構成した。また、上記において、挿通孔にストローの移動を抑制する抑制手段を設けたノズル付きのボトルキャップを構成した。また、上記において、ノズルの起立角θを任意の鋭角内に設定し、望ましくはほぼ６０°に傾けて設定したノズル付きのボトルキャップを構成した。さらに、上記において、ノズルの起立方向を開蓋時の蓋部材と反対方向に設定したノズル付きのボトルキャップを構成した。

【００３２】この結果、ノズルの往復動と起伏の動作にストローの屈伸性と弾力性の復元力を利用した実施の形態２と３によれば、従来に比較してバネ機構や回動機構が省略されて全体構成を著しく簡素化することができる。また、ストローを直接ノズルの基部に接続するので、ボトルの深さ等に応じて適宜適切なストローに交換することができ取り扱いも便利になる。さらに、バネの省略で面倒な組立操作が省け、部品点数と組立工数を減少させる等の利点もある。特に、蓋にパッキンを設けた実施形態の変形例によれば、ノズル突出用のバネを用いずに開蓋時における内液の漏洩を完全に防止できるボトルキャップを実現できる。

【００３３】よって、本発明によれば、ノズルを適度な角度に傾けて飲み易くし、簡単な構成で部品点数を少なくしてコストアップを押さえると共に、取り扱いが便利でコンパクトなノズル付きのボトルキャップを提供することができる。

【図面の簡単な説明】

【図１】実施の形態１の構成を示す上面図である。

【図２】図１のＸ－Ｘ断面図である。

【図３】本体の断面図である。

【図４】実施の形態１の動作を示す断面図である。

【図５】実施の形態２の構成を示す説明図である。

【図６】実施の形態２の動作を示す断面図である。

【図７】実施の形態３の構成を示す断面図である。

【図８】実施の形態３の動作を示す説明図である。

【図９】従来装置の構成を示す説明図である。

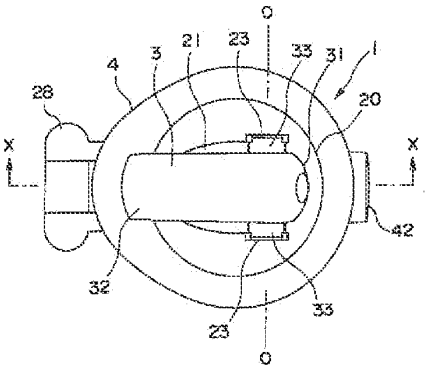
【図１０】従来装置の別の構成を示す説明図である。

【符号の説明】

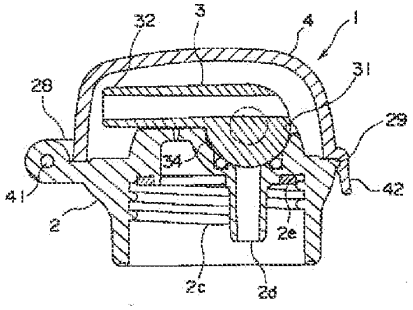
１　ボトルキャップ
２　本体
２ａ　内面側
２ｂ　外面側
２ｃ　雌ネジ
２ｄ　通液筒
２ｅ　パッキン
３　ノズル
４　蓋（蓋部材）
１１　ストロー
１２　ペットボトル
１３　内液
２０　支持部
２１　収納溝
２２　収容部
２３　軸受け
２４　環状溝
２５　Ｏリング
２６　窪み
２７　通気孔
２８　ヒンジ部
２９　係止部
３１　基部
３２　吸い口
３３　回動軸

３４　突起
３５ａ　突条
３５ｂ　円筒溝
３６　挿通孔
３６ａ　爪部
３６ｂ　折り返し部（滑り止め手段）
３７　突出部
３８　傾斜面
４１　ヒンジ軸
４２　係止片
４３　凹陥部
４４　板パッキン
Ｏ－Ｏ　軸心
Ｙ０－Ｙ０　キャップ軸
Ｙ１－Ｙ１　中心軸
δ　ズレ
θ　起立角

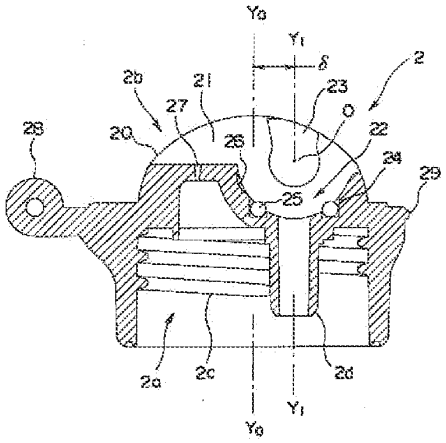
【図１】



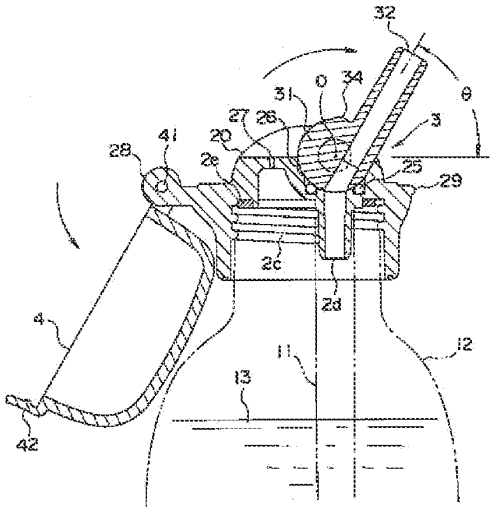
【図２】



【図３】



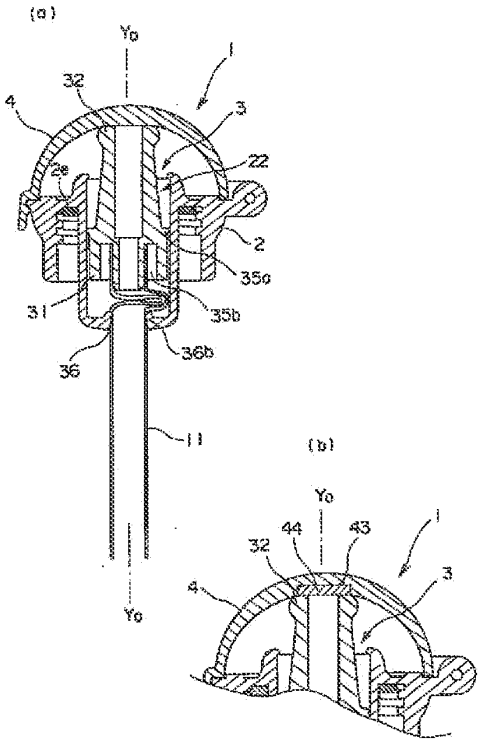
【図４】



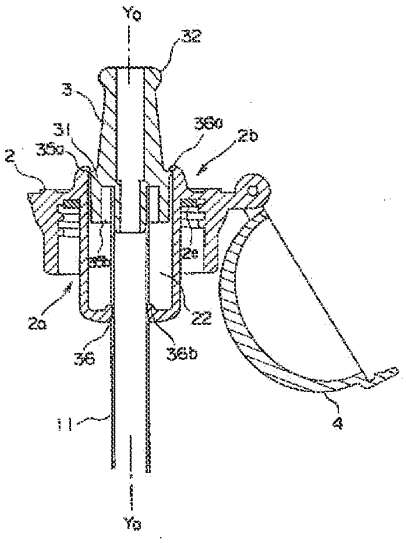
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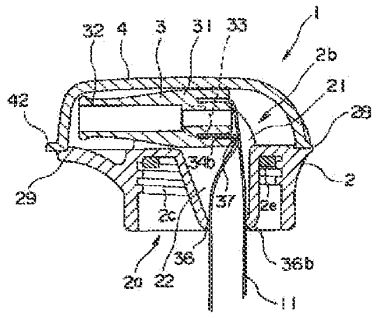
【図5】


(a)
Yo
1
32
3
4
22
2e
2
35a
31
35b
36
36b
11
Yo
(b)
Yo
44
43
1
32
3
4
Yo

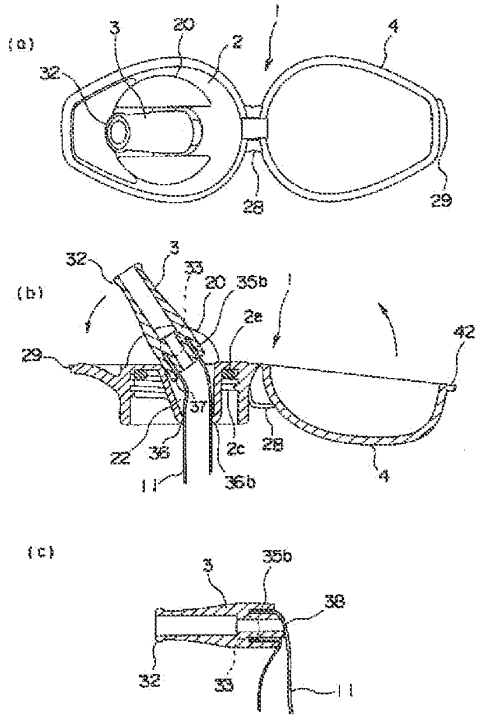
【図6】


Yo
32
3
31
35a
36a
2b
2
2e
2a
22
36
36b
11
4
Yo

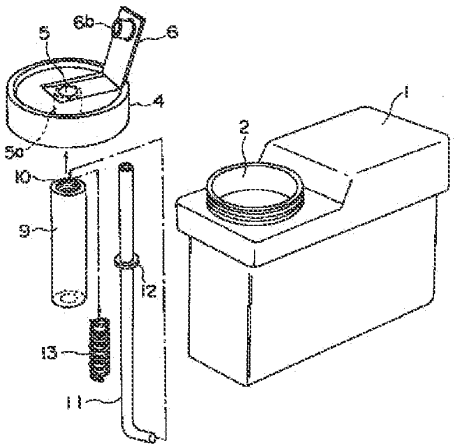
【図7】


32
4
3
31
33
1
2b
21
28
42
34b
2
29
2c
37
2e
36
36b
2a
22
11

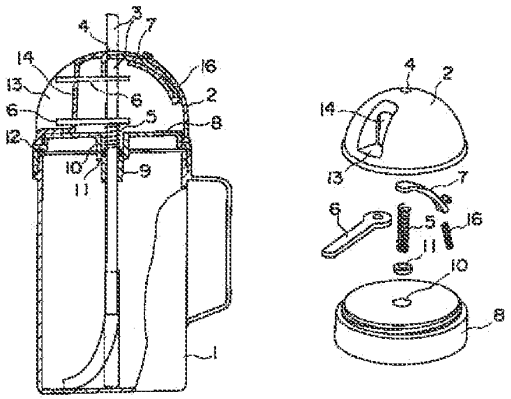
【図8】


(a)
3
20
2
1
4
32
28
29
(b)
32
3
33
20
35b
2e
1
42
29
37
22
36
2c
28
11
36b
4
(c)
3
35b
38
32
33
11

【図9】



【図10】



【手続補正書】
【提出日】平成12年6月19日（2000．6．19）
【手続補正1】
【補正対象書類名】明細書
【補正対象項目名】全文
【補正方法】変更
【補正内容】
【書類名】　明細書
【発明の名称】　ノズル付きのボトルキャップ
【特許請求の範囲】
【請求項1】　ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、
先端に吸い口が設けられて基部の両側に回動軸を設けたノズルと、
外面側に前記ノズルを回転可能に収容する収容部と該収容部を介在させた支持部を併設し、該支持部の対向面に前記回動軸の押入可能な軸受けを形成すると共に、前記雌ネジを螺設した内面側に通液筒を設けた本体と、
該本体の通液筒に着脱自在に接続されて先端を内液に浸漬されるストローと、
前記本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆う蓋部材とを備え、
前記ノズルの回転に伴う起伏動作に関連して前記内液の流路を開閉することを特徴とするノズル付きのボトルキャップ。
【請求項2】　前記ノズルの起立角θを任意の鋭角内に設定し、望ましくはほぼ60°に傾けて設定したことを特徴とする請求項1記載のノズル付きのボトルキャップ。
【請求項3】　前記収容部に開口する流路を包囲するシーリング部材を設けたことを特徴とする請求項1または2記載のノズル付きのボトルキャップ。
【請求項4】　前記ノズルの起立方向を開蓋時の蓋部材と反対方向に設定したことを特徴とする請求項1乃至3の何れかに記載のノズル付きのボトルキャップ。
【請求項5】　ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、
先端に吸い口が設けられて基部の両側と端部にそれぞれ回動軸と接続部を設けたノズルと、
外面側に前記ノズルを回転可能に収容する収容部と該収容部を介在させた支持部を併設し、該支持部の対向面に前記回動軸の押入可能な軸受けを形成すると共に、前記雌ネジを螺設した内面側に収容部に通じる挿通孔を設けた本体と、
前記ノズルの基部に着脱自在に接続されて前記挿通孔を介して先端を内液に浸漬されるストローと、
前記本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆って閉蓋時に前記ノズルを押圧する蓋部材とを備え、
該蓋部材の開閉に伴うノズルの回転による起伏動作に関連して前記ストローをノズルの一部で押さえて内液の流路を遮断することを特徴とするノズル付きのボトルキャップ。
【請求項6】　前記ススストローに弾性を有する軟質材を用いたことを特徴とする請求項5記載のノズル付きのボトルキャップ。
【請求項7】　前記挿通孔にストローの移動を抑制する抑制手段を設けたことを特徴とする請求項5または6記

載のノズル付きのボトルキャップ。
【請求項８】　前記ノズルの起立角θを任意の鋭角内に設定し、望ましくはほぼ６０°に傾けて設定したことを特徴とする請求項５乃至７の何れかに記載のノズル付きのボトルキャップ。
【請求項９】　前記ノズルの起立方向を開蓋時の蓋部材と反対方向に設定したことを特徴とする請求項５乃至８の何れかに記載のノズル付きのボトルキャップ。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】近時、ペットボトル等のボトル内に詰められた自然水や清涼飲料等の中味を、ストローで飲む，所謂ゆる“ストロー飲み”を可能にするノズル付きのボトルキャップが開発されている。ノズル付きのボトルキャップを利用すればコップが不要で、しかも何回にも飲み分ける際に、その都度キャップの蓋ネジを回して開閉することなく、詰められた中身をノズルの飲み口で飲むことができて極めて都合がよい。本発明は上述したようなノズル付きのボトルキャップに関するものである。
【０００２】
【従来の技術】従来のこの種の類似キャップを用いた物品として、例えば実公平３－８０９０号公報と実公平３－１８３６２号記載の容器が知られている。図７は実公平３－８０９０号公報記載の容器の構成を示す分解斜視図である。図７において、１０１は容器本体、１０２は注入注出用口部、１０４は注入注出用口部１０２の閉塞部材、１０５は閉塞部材１０４に設けられたストロー導出用の小口部、１０６は小栓、１０６ｂはその嵌合部、１０９は保持筒である。また、１１０は螺着手段、１１１はストロー、１１２はストッパー、１１３はスプリングである。
【０００３】容器本体１０１の内部の飲料を飲むときは、閉塞部材１０４の小口部１０５に嵌着した小栓１０６の嵌合部１０６ｂを外せば、小口部１０５の筒状縁１０５ａに螺着手段１１０で固着した保持筒１０９内のスプリング１１３の弾発力によりストロー１１１がストッパー１１２と小口部１０５の下端との当接位置まで持ち上げられる。そして、ストロー上端部が小口部１０５から突出することになり、突出したストロー１１１により内部飲料を吸飲することができる。また、スプリング１１３の弾発力に抗してストロー１１１を押し込むようにして小栓１０６を小口部１０５に嵌着すれば、ストロー１１１を容器本体１０１内に保持した元の状態に戻るようになっている。
【０００４】図８は上記した実公平３－１８３６２号公報に掲載の図面で、（ａ）は全体の縦断面図、（ｂ）はキャップ部分の分解斜視図である。図８において、２０１は液体容器、２０２はキャップ、２０３はストロー、２０４はキャップ２０２の突出口、２０５はストロー２０３を突出させるバネ、２０６はレバー、２０７は開閉部材、２０８は内蓋、２０９は筒部、２１０はバネ２０５の下端部が嵌着された凹部である。また、２１１はストロー２０３に嵌めたパッキング、２１２は内蓋２０８と容器２０１との間のパッキング、２１３はキャップ２０２の側面に形成した凹部、２１４はレバー２０６が凹部２１０に飛び出す上下方向の孔、２１６は押しばねである。
【０００５】図８に示した液体容器２０１の構成において、開閉部材２０７はストロー２０３の突出方向と交叉方向へスライドし、その先端部でストロー２０３の上端を押えているので、ストロー２０３は突出口２０４から直ちに突出し、飲用後は押下げレバー２０６を押下げれば自動的に開閉部材２０７が突出口２０４を閉じる。また、ストロー２０３の上端に当接する開閉部材２０７は、漏液も防止する。また、開閉部材２０７をスライド操作すれば突出ばね２０５によりストロー２０３が突出口２０４から直ちに突出し、飲用後は押下げレバー２０６を押下れば自動的に突出口２０４が閉じられるようになっている。
【０００６】
【発明が解決しようとする課題】しかしながら、図７と図８の従来の容器は何れもストロー１１１と２０３が、垂直上方に突出するように構成されている。したがって、ストロー１１１と２０３で内液を吸飲するときには、上体と一緒に頭部を傾けて無理な姿勢を取らなければならず極めて不便である。姿勢の傾きを怠って直立したまま吸飲すると、容器１０１や２０１側が傾いて内容液を零す恐れがある。また、樹脂と異なる金属のスプリング１１３やバネ２０５，２１６を利用しているので、部品点数と資材の手配先の業種が増えるばかりか設計に当たって腐食対策を配慮しなければならない等の問題点があった。
【０００７】本発明は，上述のような従来の問題点を解消するためになされたもので、ノズルを適度な角度に傾けて飲み易くし、簡単な構成で部品点数を少なくしてコストアップを押さえると共に、取り扱いが便利でコンパクトなノズル付きのボトルキャップを実現することを目的とするものである。
【０００８】
【課題を解決するための手段】本発明は、ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、先端に吸い口が設けられて基部の両側に回動軸を設けたノズルと、外面側にノズルを回転可能に収容する収容部と収容部を介在させた支持部を併設し、支持部の対向面に回動軸の押入可能な軸受けを形成すると共に、雌ネジを螺設した内面側に通液筒を設けた本体と、本体の通液筒に着脱自在に接続されて先端を内液に浸漬されるストローと、本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆う

蓋部材とを備え、ノズルの回転に伴う起伏動作に関連して内液の流路を開閉するノズル付きのボトルキャップを構成したものである。また、上記において、ノズルの起立角θを任意の鋭角内に設定し、望ましくはほぼ６０°に傾けて設定したノズル付きのボトルキャップを構成したものである。また、上記において、収容部に開口する流路を包囲するシーリング部材を設けたノズル付きのボトルキャップを構成したものである。また、上記において、ノズルの起立方向を開蓋時の蓋部材と反対方向に設定したノズル付きのボトルキャップを構成したものである。

【０００９】また、本発明は、ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、先端に吸い口が設けられて基部の両側と端部にそれぞれ回動軸と接続部を設けたノズルと、外面側にノズルを回転可能に収容する収容部と収容部を介在させた支持部を併設し、支持部の対向面に回動軸の押入可能な軸受けを形成すると共に、雄ネジを螺設した内面側に収容部に通じる挿通孔を設けた本体と、ノズルの基部に着脱自在に接続されて挿通孔を介して先端を内液に浸漬されるストローと、本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆って閉蓋時にノズルを押圧する蓋部材とを備え、蓋部材の開閉に伴うノズルによる押圧動作に関連してストローをノズルの一部で押さえて内液の流路を遮断するノズル付きのボトルキャップを構成したものである。また、上記において、ストローに弾性を有する軟質材を用いたノズル付きのボトルキャップを構成したものである。また、上記において、挿通孔にストローの移動を抑制する抑制手段を設けたノズル付きのボトルキャップを構成したものである。また、上記において、ノズルの起立角θを任意の鋭角内に設定し、望ましくはほぼ６０°に傾けて設定したノズル付きのボトルキャップを構成したものである。さらに、上記において、ノズルの起立方向を開蓋時の蓋部材と反対方向に設定したノズル付きのボトルキャップを構成したものである。

【００１０】

【発明の実施の形態】実施の形態１．図１は本発明実施の形態１の構成を示す上面図、図２は図１のＸ－Ｘ断面図、図３は本体の断面図、図４は実施の形態１の動作を示す断面図である。図１乃至図４において、１はボトルキャップである。ボトルキャップ１の素材にはポリプロピレン等が用いられ、破損し難いやや軟質な樹脂材で成型されている。２はボトルキャップ１の本体、３はノズル、４は蓋である。また、１１はシリコーンチューブのようなゴム状の弾性樹脂を用いたストロー、１２はペットボトル、１３はペットボトル１２に詰められた内液である。

【００１１】２ａはキャップ型の本体２の内面側、２ｂは外面側である。２ｃは内面側２ａに設けられた雌ネジ、２ｄは貫通する内液１３の流路を設けて下方に突出した垂直方向の通液筒、２ｅはリング状の平パッキンである。雌ネジ２ｃは垂直方向のキャップ軸Ｙ０－Ｙ０を中心に螺設され、通液筒２ｄはキャップ軸Ｙ０－Ｙ０からδだけずれた並行方向の中心軸Ｙ１－Ｙ１上に設けられている。通液筒２ｄにはストロー１１が取り外し自在に接続されて、その先端は内液１３に浸漬される。２０は外面側２ｂの上面の丸ドーム状の支持部、２１は支持部２０の頂部を左右方向に水平にカットした円弧状の収納溝である。収納溝２１のカットにより、支持部２０に前後方向の対向壁面が併設されている。

【００１２】２２は中心軸Ｙ１－Ｙ１上の点を球心Ｏとする半球状に穿設した収容部で、収納溝２１内に開口している。２３は収納溝２１の上端から収容部２２の側壁にかけて水平方向（図３の前後方向）に対向して形成されたほぼＵ字溝状の軸受けである。軸受け２３の下端の円弧の中心を結ぶ直線は球心Ｏを通って中心軸Ｙ１－Ｙ１に直交していて、次に説明するノズル３の回動軸の軸心Ｏ－Ｏを構成する。図３に示すように、収容部２２の最深部の中心には通液筒２ｄの流路が開口している。２４は通液筒２ｄの開口を囲む環状溝、２５は環状溝２４に介装されたＯリングである。２６は収容部２２の凹球面に形成されクリック用の小さな窪み、２７は本体２の内外面を貫通した通気孔である。２８はキャップ軸Ｙ０－Ｙ０に対して中心軸Ｙ１－Ｙ１（回動軸３３）の反対側の端部に設けられたヒンジ部、２９は他端側の係止部である。

【００１３】一方、ノズル３は、球型の基部３１と、この基部３１から接線方向に延設された吸い口３２とを具備する。基部３１は本体２の収容部２２に対応する球体で構成され、球面上には吸い口３２の延長方向と交叉する方向に一対のボス状の回動軸３３が対称的に突設されている。３４は窪み２６に対応して基部３１の表面に形成された突起である。吸い口３２を貫通して先端に開口した流路の他端は、基部３１の球面上に開口している。そして、基部３１の両側の回動軸３３が軸受け２３内に上方からやや固く押し込まれて、基部３１の凸球面が収容部２２の凹球面内に嵌入されて、相互に密着して摺動するようになっている。

【００１４】こうして、本体２の外面側２ｂに装着されたノズル３は、回動軸３３を中心に回動角の上限が後述する望ましい起立角θに対応するようにほぼ１２０°の角範囲を回動して吸い口３２が起伏される。この場合、吸い口３２は突起３４が窪み２６に嵌合したクリック位置で伏臥して収納溝２１内に収納されると共に、伏臥した吸い口３２によって通気孔２７が封鎖される。また、回動角の上限では吸い口３２の背部が収容部２２の角部に当接して起立状態が保持されると共に、ノズル３と通液筒２ｄの流路が一致して連通する。４１は蓋４を本体２のヒンジ部２８に連結するヒンジ軸、４２は他端側の

係止片である。蓋４はヒンジ軸４１を支点にほぼ３／４回転して本体２の上部空間を開放し、係止片４２が係止部２９に係止されて本体２の上空が包囲される。

【００１５】次に、図４を主にして、実施の形態１の動作を説明する。図４では、本考案のボトルキャップ１をペットボトルに適用した場合が例示されている。ペットボトル１２の注ぎ口に被された専用のキャップを取り除いてから、通液筒２ｄに接続されたストロー１１を注ぎ口に差し込む。図２に示されたような閉蓋状態のボトルキャップ１の雌ネジ２ｃを注ぎ口の雄ネジに螺入して、注ぎ口との接触面に介装されたパッキン２ｅを締め付けて装着する。この結果、図示されていないが、ペットボトル１２の中に挿入されたストロー１１の先端が底に沈められて、内液１３内の最深部に浸漬される。

【００１６】このときの状態では、前述のように基部３１が収容部２２に球面接触で密着して収納されており通気孔２７も伏臥状態の吸い口３２の胸部に封鎖されているので、たとえ振動等が加わってもペットボトル１２の内液１３が零れるようなことがない。内液１３を飲むときは、係止片４２と係止部２９との係止を解除し、蓋４をヒンジ軸４１を中心に反時計方向に回転して本体２の上方を開放する。蓋４の開放後、ノズル３を回動軸３３を中心に時計向きに回転して、吸い口３２をクリック位置に起立させる。起立した吸い口３２内の空気を吸い込めば、連通された流路が負圧になって内液１３を飲むことができる。ノズル３の起立したときの角度（起立角θ…水平面とのなす角）は、垂直または水平付近では飲み難い。よって、垂直と水平の間の任意の鋭角内で、できれば起立角θをほぼ６０°に設定することが望ましい。

【００１７】図４に示すように、開放状態の蓋４と起立して傾斜した吸い口３２が左右に分かれて互いに対向して反対方向に保持されているので内液１３の吸飲に支障を来すことがない。吸飲が終わると、上記と逆の動作で収納溝２１に収納されたノズル３の上部空間が蓋４で覆われるようになっている。収納状態でノズル３は蓋４で覆われるので、衣類等との接触や塵埃の付着がなくなり衛生状態を保つことができる。ゴミ等が付着して汚れたときはノズル３を本体２から引き抜いて、汚れ易いノズル３を分離状態で簡単且つ綿密に洗浄することができる。同様に、ストロー１１，Ｏリング２５，パッキン２ｅも本体２から分解して洗浄可能である。この様に、分解して洗浄を行うことにより、ボトルキャップ１を清潔に保つことが可能であり、新たなペットボトル１２への使用を可能とする。

【００１８】実施の形態２．図５は実施の形態２の構成を示す断面図．図６は実施の形態２の動作を示す説明図で、（ａ）と（ｂ）は蓋の開放状態の上面図と断面図、（ｃ）は要部の変形例の説明図である。実施の形態２では構造面において、実施の形態１に比較して著しく簡素化された特徴を有する。基本的には、流路の封鎖にストロー１１をノズル３の一部で押さえることで行い、蓋４の解放時にストロー１１の復元性でノズルを自動的に起立させる自動起伏構造が採用されている。また、ノズル３が回動軸３３を中心に回動して起伏するノズル３の軸支構造は実施の形態１と同様になっている。このため、図１に示されているように本体２がほぼ楕円形で、外面側２ｂに丸ドーム状の支持部２０が併設されて実施の形態１と共通した構造になっている。

【００１９】また、ノズル３の基部３１には円筒溝３６が形成されて、ストロー１１が円筒溝３６に囲まれた内筒にやや固く着脱自在に接続されている。この他に、実施の形態２ではノズル３が伏臥したときにストロー１１の流路の遮断を効果的に行わせるために、基部３１の少なくとも下側の外環部に突出部３７が形成されている。また、収容部２２は下方に向う漸縮型で、ノズル３の伏臥方向に幾分傾けた有底の逆円錐状に形成されて自動的な起伏動作を円滑に実施させるための配慮がなされている。そして、逆円錐状の収容部２２の底部を内面側２ａに露出させている。

【００２０】２２ａは収容部２２の底部に設けられたストロー１１の挿通孔で、本体２の内面側２ａから外面側２ｂに通じている。この挿通孔２２ａの内周面には例えば折り返し部２２ｃ等のストロー１１の移動を抑制する滑り止め機能が与えられる。ストロー１１の先端はノズル３の基部３１に接続され、途中が挿通孔２２ａに挿通されている。特に、ストロー１１にはやや強いバネ性の復元力を有するシリコーンチューブが用いられている。その他の一部の共通部材には、実施の形態１と同一の符号が付されている。

【００２１】いま、図６（ｂ）に示されたように、開蓋状態でノズル３が起立しているときに蓋４をヒンジ部２８を支点に矢印方向に１５０°近く回転すると蓋４の内面が吸い口３２に接触する。蓋４を更に回転すると、ノズル３が弾性を有するストロー１１を引き伸ばして蓋４に逆方向の抵抗力を加えながら回動軸３３を中心に一体に同方向に回転する。そして、ストロー１１の抵抗力を受けている蓋４の係止片４２を係止部２９に係止すると、図５に示すようにノズル３が逆円錐状の部分から抜け出して伏臥状態になって収納溝２１内に収容される。このとき、ノズル３の回動に伴う部分的な伸張差のもとに接続部付近のストロー１１が潰され、この潰された部分の内面が密着するように突出部３７により弾性的に圧接される。この結果、内部の流路が自動的に塞がれて、内液１３の漏洩が防止される。

【００２２】逆に、係止片４２の係止部２９との係止を開放すると、蓋４によって押圧されていたノズル３がストロー１１の復元力によって蓋４を開放させながら図５の状態から図６の（ｂ）に示すように自動的に起立することになる。このように、実施の形態２によれば、ノズ

ル３を起立させる手動動作が不必要になるばかりか、バネの利用を省略することができる。このほかに、蓋４が本体２と一体に作られていて、両者を連結した肉薄の帯部材でヒンジ部２８が構成されている。これにより実施の形態１に比較して同等の機能を果たしながら、一層のコストの低廉化が図られている。もちろん、実施の形態１と同様に蓋４が本体２と別体に形成されてもよい。

【００２３】図６の（ｃ）に、実施の形態２の流路の遮断機構の変形例が示されている。即ち、図（ｃ）では、ストロー１１が接続されるノズル３の基部３１の円筒溝３６に囲まれた内筒の筒先に傾斜面３８が形成されている。そして、閉められた蓋４によってノズル３が押圧されて伏臥したときに、前記と同様に伸張差により強く引き伸ばされたストロー１１の内面部分が傾斜面３８に弾性的に圧着されることになる。それ故、この内面部分の圧着によって傾斜面３８に開口する流路が自動的に封鎖されて、内液１３の漏洩が防止されることになる。

【００２４】なお、上述の両実施の形態では本発明を自然水等を詰めたペットボトルの雄ネジを設けた注ぎ口に適用した場合を例示して説明したが、雌ネジの代替え構造を用いれば水筒や哺乳瓶等の他のボトルにも適用することができる。また、実施の形態１では９０°を越えた１２０°程度の回動角で吸い口３２を起伏させた場合で説明したが、回転角の上限を９０°以下にしてもよく、要するに開蓋時における蓋の反対側であって前述したようなノズル３の起立角θを任意の鋭角内で、望ましくは６０°付近に傾けて設定したものであればよい。さらに、本体やノズルの形状等についても、同等の機能を果たす限りでは必ずしも実施の形態に限定するものではない。

【００２５】

【発明の効果】本発明は、ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、先端に吸い口が設けられて基部の両側に回動軸を設けたノズルと、外面側にノズルを回転可能に収容する収容部と収容部を介在させた支持部を併設し、支持部の対向面に回動軸の押入可能な軸受けを形成すると共に、雌ネジを螺設した内面側に通液筒を設けた本体と、本体の通液筒に着脱自在に接続されて先端を内液に浸漬されるストローと、本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆う蓋部材とを備え、ノズルの回転に伴う起伏動作に関連して内液の流路を開閉するノズル付きのボトルキャップを構成した。また、上記において、ノズルの起立角θを任意の鋭角内に設定し、望ましくはほぼ６０°に傾けて設定したノズル付きのボトルキャップを構成した。また、上記において、収容部に開口する流路を包囲するシーリング部材を設けたノズル付きのボトルキャップを構成した。また、上記において、ノズルの起立方向を開蓋時の蓋部材と反対方向に設定したノズル付きのボトルキャップを構成した。

【００２６】この結果、図９と図１０に示した従来の容器のようにノズル（ストロー）が垂直上方に突出することがないので、頭部や上体を無理に傾けることなく楽な姿勢で内液を吸飲することができ便利になる。また、ボトルを傾けて飲むこともなくなり、キャップの締め付けを多少弱くした場合でも内液を漏すようなこともなくなる。また、樹脂と異なる金属のスプリングやバネを利用しないので、部品点数と資材の手配先の業種も限定されるばかりか設計に当たって腐食対策を考慮する心配がなくなる。

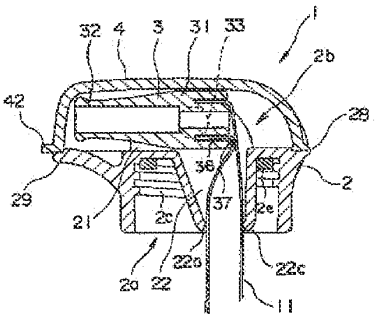
【００２７】また、本発明は、ボトルの内液の注ぎ口に雌ネジを螺合して着脱自在に装着されるノズル付きのボトルキャップにおいて、先端に吸い口が設けられて基部の両側と端部にそれぞれ回動軸と接続部を設けたノズルと、外面側にノズルを回転可能に収容する収容部と収容部を介在させた支持部を併設し、支持部の対向面に回動軸の押入可能な軸受けを形成すると共に、雌ネジを螺設した内面側に収容部に通じる挿通孔を設けた本体と、ノズルの基部に着脱自在に接続されて挿通孔を介して先端を内液に浸漬されるストローと、本体にヒンジを介して開閉可能に取り付けられて本体の上面を覆って閉蓋時にノズルを押圧する蓋部材とを備え、蓋部材の開閉に伴うノズルの回転による起伏動作に関連してストローをノズルの一部で押さえて内液の流路を遮断するノズル付きのボトルキャップを構成した。また、上記において、ストローに弾性を有する軟質材を用いたノズル付きのボトルキャップを構成した。また、上記において、挿通孔にストローの移動を抑制する抑制手段を設けたノズル付きのボトルキャップを構成した。また、上記において、ノズルの起立角θを任意の鋭角内に設定し、望ましくはほぼ６０°に傾けて設定したノズル付きのボトルキャップを構成した。さらに、上記において、ノズルの起立方向を開蓋時の蓋部材と反対方向に設定したノズル付きのボトルキャップを構成した。

【００２８】この結果、ノズルの起伏の動作にストローの屈伸性と弾力性の復元力を利用した実施の形態２によれば、従来に比較してバネ機構や回動機構が省略されて全体構成を著しく簡素化することができる。また、ストローを直接ノズルの基部に接続するので、ボトルの深さ等に応じて適宜適切な長さのストローに交換することができ取り扱いも便利になる。さらに、バネの省略で錆対策と面倒な組立操作が省け、部品点数と組立工数を減少させる等の利点もある。

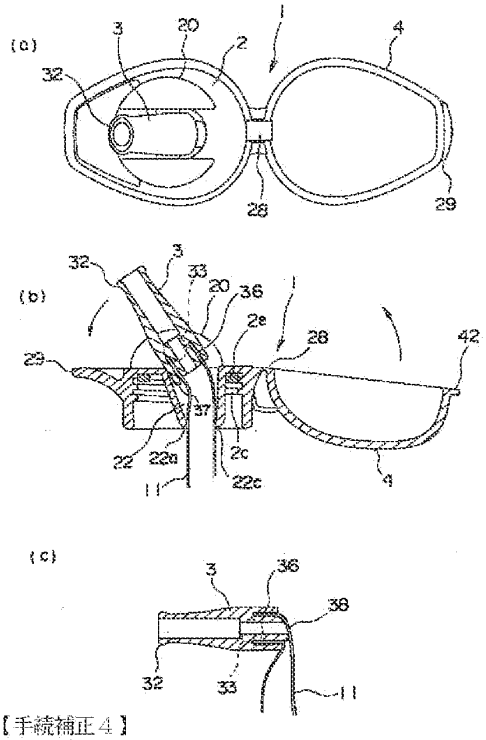
【００２９】よって、本発明によれば、ノズルを適度な角度に傾けて飲み易くし、簡単な構成で部品点数を少なくしてコストアップを押さえると共に、取り扱いが便利でコンパクトなノズル付きのボトルキャップを提供することができる。

【図面の簡単な説明】

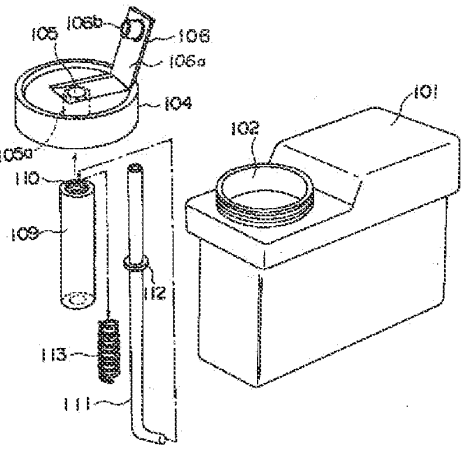
【図１】実施の形態１の構成を示す上面図である。
【図２】図１のＸ－Ｘ断面図である。
【図３】本体の断面図である。
【図４】実施の形態１の動作を示す断面図である。
【図５】実施の形態２の構成を示す断面図である。
【図６】実施の形態２の動作を示す説明図である。
【図７】従来装置の構成を示す説明図である。
【図８】従来装置の別の構成を示す説明図である。
【符号の説明】
１　ボトルキャップ
２　本体
２ａ　内面側
２ｂ　外面側
２ｃ　雌ネジ
２ｄ　通液筒
２ｅ　平パッキン
３　ノズル
４　蓋（蓋部材）
１１　ストロー
１２　ペットボトル
１３　内液
２０　支持部
２１　収納溝
２２　収容部
２２ａ　挿通孔
２２ｃ　折り返し部
２３　軸受け
２４　環状溝
２５　Ｏリング
２６　窪み
２７　通気孔
２８　ヒンジ部
２９　係止部
３１　基部
３２　吸い口
３３　回動軸
３４　突起
３６　円筒溝
３７　突出部
３８　傾斜面
４１　ヒンジ軸
４２　係止片
Ｏ－Ｏ　軸心
Ｙ０－Ｙ０　キャップ軸
Ｙ１－Ｙ１　中心軸
δ　ズレ
θ　起立角
【手続補正２】
【補正対象書類名】図面
【補正対象項目名】図５
【補正方法】変更
【補正内容】
【図５】



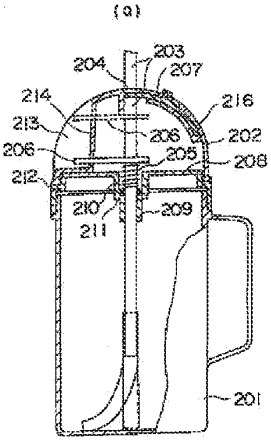
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【補正対象書類名】図面
【補正対象項目名】図６
【補正方法】変更
【補正内容】
【図６】

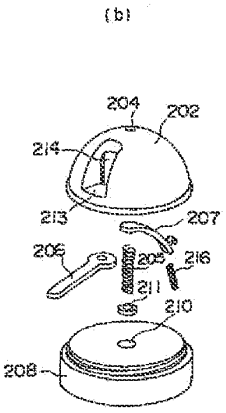


【手続補正４】
【補正対象書類名】図面
【補正対象項目名】図７
【補正方法】変更
【補正内容】
【図７】



【手続補正５】
【補正対象書類名】図面
【補正対象項目名】図８
【補正方法】変更
【補正内容】
【図８】





【手続補正６】
【補正対象書類名】図面
【補正対象項目名】図９
【補正方法】削除

【手続補正７】
【補正対象書類名】図面
【補正対象項目名】図１０
【補正方法】削除

フロントページの続き

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CC03 FB01 GA04
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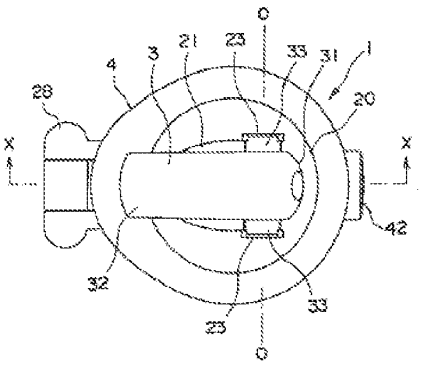
(Continued on the last page)

(54) [Title of the Invention] BOTTLE CAP WITH NOZZLE

(57) Abstract

[Problems] The present invention realizes a bottle cap with a nozzle that enables the nozzle to be tilted at an appropriate angle to facilitate drinking and the cost to be reduced by lowering the number of parts with a simple configuration and is convenient to handle and compact.

[Solution] The present invention is constituted of a bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising: a nozzle provided with a suction port at its tip and rotation shafts on both sides of the base portion; a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed; a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid; and a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body, wherein the flow path of the internal liquid is opened or closed in connection with the up and down motion associated with the rotation of the nozzle.



[What is claimed is]

[Claim 1] A bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising:

a nozzle provided with a suction port at its tip and rotation shafts on both sides of the base portion;

a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed;

a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid; and

a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body,

wherein the flow path of the internal liquid is opened or closed in connection with the up and down motion associated with the rotation of the nozzle.

[Claim 2] The bottle cap with a nozzle according to Claim 1, wherein the rising angle θ of the nozzle is set to an arbitrary acute angle and the bottle cap with a nozzle is desirably set to be tilted at about 60 degrees.

[Claim 3] The bottle cap with a nozzle according to Claim 1 or 2, wherein a sealing member surrounding the flow path opened to the storage portion is provided.

[Claim 4] The bottle cap with a nozzle according to any one of Claims 1-3, wherein the rising direction of the nozzle is set to the direction opposite to the direction of the lid member when it is opened.

[Claim 5] A bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising:

a nozzle provided with a suction port at its tip and a connecting portion at the tip portion of the base portion;

a main body provided with a storage portion for storing the nozzle in a reciprocatable manner on the outer surface side and an insertion hole communicating with the storage portion on the inner surface side where the female screw is screwed;

a straw detachably connected with the base portion of the nozzle, wherein the tip of the straw is to be immersed in the internal liquid via the insertion hole; and

a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body and thereby press the nozzle down when the lid is closed,

wherein the flow path of the internal liquid is blocked by bending the straw in connection with the backward motion of the nozzle associated with the opening and closing of the lid member.

[Claim 6] The bottle cap with a nozzle according to Claim 5, wherein an elastic soft material is used for the straw.

[Claim 7] The bottle cap with a nozzle according to Claim 5 or 6, wherein restraining means are provided for the insertion hole for restraining the movement of the straw.

[Claim 8] A bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising:

a nozzle provided with a suction port at its tip as well as rotation shafts and a connecting portion on both sides and tip portion of the base portion, respectively;

a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed;

a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid, and

a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body,

wherein the flow path of the internal liquid is blocked by pressing the straw with part of the nozzle in connection with the up and down motion caused by the rotation of the nozzle associated with the opening and closing of the lid member.

[Claim 9] The bottle cap with a nozzle according to Claim 8, wherein an elastic soft material is used for the straw.

[Claim 10] The bottle cap with a nozzle according to Claim 8 or 9, wherein restraining means are provided for the insertion hole for restraining the movement of the straw.

[Claim 11] The bottle cap with a nozzle according to Claim 1, wherein the rising angle θ of the nozzle is set to an arbitrary acute angle and the bottle cap with a nozzle is desirably set to be tilted at about 60 degrees.

[Claim 12] The bottle cap with a nozzle according to any one of Claims 8-11, wherein the rising direction of the nozzle is set to the direction opposite to the direction of the lid member when it is opened.

[detailed Explanation of the Invention]

[0001]

[Technological Field to which the Invention Belong] Recently, there is a bottle cap with a nozzle developed for enabling the so-called "straw drinking" to drink the contents of natural water or soft drinks filled in bottles such as PET bottles with a straw. If you use a bottle cap with a nozzle, you don't need a cup, and you can drink the packed contents without opening and closing the lid of the cap every time you want to drink them different times, which is extremely convenient. The present invention relates to a bottle cap with a nozzle as described above.

[0002]

[Prior Art] As conventional articles using a similar cap of this type, for example, containers disclosed in Japanese Utility Model Publication No. H03-8090 and Japanese Utility Model Publication No. H03-18362 are known. The configurations of both containers are described in FIGS. 9 and 10, but in the description of FIG. 9, the numerical value 100 is added to the reference numerals described in the gazette and 200 is added to FIG. 10. FIG. 9 is an exploded perspective view showing the configuration of the container described in Japanese Utility Model Publication No. H03-8090. In FIG. 9, 101 is a container main body, 102 is an injection/pouring opening, 104 is a closing member for the injection/pouring opening 102, 105 is a small opening portion for discharging a straw provided on the closing member 104, 106 is a small plug, 106b is a fitting portion thereof, and 109 is a holding cylinder. Furthermore, 110 is a screwing member, 111 is a straw, 112 is a stopper, and 113 is a spring.

[0003] When drinking a beverage inside the container main body 101, by removing the fitting portion 106b of the small plug 106 fitted in the small opening portion 105 of the closing member, the straw 111 is lifted up to the contact position between the stopper 112 and the lower end of the small opening portion 105 by the elastic force of the spring 113 in the holding cylinder 109, which is fixed to the cylindrical edge 105a of the small opening portion 105 by a screwing means. Then, the upper end portion of the straw projects from the small opening portion 105, and you can drink the internal beverage using the protruding straw 111. In addition, if the straw 111 is pushed against the elastic force of the spring 113 to make the small plug 106 fit into the small opening portion 105, the straw 111 can be returned to the original state held in the container main body 101.

[0004] FIG. 10 is a drawing disclosed in the abovementioned Japanese Utility Model Publication No. H03-18362, in which (a) is an overall longitudinal sectional view and (b) is an exploded perspective view of a cap portion. In FIG. 10, 201 is a liquid container, 202 is a cap, 203 is a straw, 204 is a projecting opening of the cap 202, 205 is a spring for projecting the straw 203, 206 is a lever, 207 is an opening/closing member, 208 is an inner lid, 209 is a cylindrical portion, and 210 is a recessed portion into which the lower end of the spring 203 is fitted. Furthermore, 211 is a packing fitted in the straw 203, 212 is a packing between the inner lid 208 and the container 201, 213 is a recessed portion formed on the side surface of the cap 202, 214 is a vertical hole through which the level 206 jumps to the recessed portion 210, and 216 is a push spring.

[0005] In the configuration of the liquid container 201 shown in FIG. 10, the opening/closing member 207 slides in the direction intersecting with the projecting direction of the straw 203 to hold down the top end of the straw 203 by means of the tip portion thereof, so that the straw 203 immediately projects from the projecting opening 204, and after drinking, if the push-down lever 206 is pressed down, the opening/closing member 207 automatically closes the projecting opening 204. Also, the opening/closing member 207 abutting the upper end of the straw 203 prevents liquid leakage. Furthermore, when the opening/closing member 207 is slid, the straw 203 is immediately projected from the projecting opening 204 by means of the projecting spring 205, and after drinking, the projecting opening 204 is automatically closed by pressing the push-down lever 206 down.

[0006]

[Problems that the Invention is to Solve] However, in both the conventional containers shown in FIGS. 9 and 10, the straws 111 and 203 are configured to project vertically upward. Therefore, when drinking the internal liquid by sucking with the straws 111 and 203, the head needs to be tilted together with the upper body so that an unreasonable posture must be taken, which is extremely inconvenient. If you drink the beverage by sucking while standing upright without tilting the posture, container 101 or 201 side tilts so that the content liquid might leak out. Moreover, since the spring 113 and the springs 205 and 216 made of metal are used rather than resin, the number of parts and the number of industries from which materials are procured increase, and there is an additional problem that corrosion-preventive measures must be taken into consideration at the time of designing.

[0007] The present invention has been made in order to solve the abovementioned problems, the object of the present invention is to realize a bottle cap with a nozzle that enables the nozzle to be tilted at an appropriate angle to facilitate drinking and the cost to be reduced by lowering the number of parts with a simple configuration and is convenient to handle and compact.

[0008]

[Means for Solving the Problems] The present invention is constituted of a bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising: a nozzle provided with a suction port at its tip and rotation shafts on both sides of the base portion; a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed; a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid; and a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body, wherein the flow path of the internal liquid is opened or closed in connection with the up and down motion associated with the rotation of the nozzle. Furthermore, in the abovementioned bottle cap with a nozzle, the rising angle θ of the nozzle is set to an arbitrary acute angle and the bottle cap with a nozzle is desirably set to be tilted at about 60 degrees. Furthermore, in the abovementioned bottle cap with a nozzle, a sealing member surrounding the flow path opened to the storage portion is provided. Furthermore, in the abovementioned bottle cap with a nozzle, the rising direction of the nozzle is set to the direction opposite to the direction of the lid member when it is opened.

[0009] The present invention is constituted of a bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising: a nozzle provided with a suction port at its tip and a connecting portion at the tip portion of the base portion; a main body provided with a storage portion for storing the nozzle in a reciprocatable manner on the outer surface side and an insertion hole communicating with the storage portion on the inner surface side where the female screw is screwed; a straw detachably connected with the base portion of the nozzle, wherein the tip of the straw is to be immersed in the internal liquid via the insertion hole; and a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body and thereby press the nozzle down when the lid is closed, wherein the flow path of the internal liquid is blocked by bending the straw in connection with the pressing motion of the nozzle associated with the opening and closing of the lid member.

[0010] The present invention is constituted of a bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising: a nozzle provided with a suction port at its tip as well as rotation shafts and a connecting portion on both sides and tip portion of the base portion, respectively; a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed; a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid; and a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body, wherein the flow path of the internal liquid is blocked by pressing the straw with part of the nozzle in connection with the pressing motion by the nozzle associated with the opening and closing of the lid member. Furthermore, in the abovementioned bottle cap with a nozzle, an elastic soft material is used for the straw. Furthermore, in the abovementioned bottle cap with a nozzle, restraining means are provided for the insertion hole for restraining the movement of the straw. Furthermore, in the abovementioned bottle cap with a nozzle, the rising angle θ of the nozzle is set to an arbitrary acute angle and the bottle cap with a nozzle is desirably set to be tilted at about 60 degrees. Furthermore, in the abovementioned bottle cap with a nozzle, the rising direction of the nozzle is set to the direction opposite to the direction of the lid member when it is opened.

[0011]

[Mode for Implementing the Invention] Embodiment 1. FIG. 1 is a top view showing the configuration of the first embodiment of the present invention. FIG. 2 is a sectional view taken along the line X-X of FIG. 1, FIG. 3 is a sectional view of a main body, and FIG. 4 is a sectional view showing the operation of the first embodiment. In FIGS. 1 through 4, 1 denotes a bottle cap. Polypropylene or the like is used as the material of the bottle cap 1 and is molded with a slightly soft resin material that is hard to break. The reference numeral 2 is the main body of the bottle cap 1, 3 is a nozzle, and 4 is a lid. Furthermore, 11 is a straw using a rubber-like elastic resin such as a silicone tube. The reference numeral 12 is a PET bottle, and 13 is an internal liquid filled in the PET bottle 12.

[0012] Reference numeral 2a is the inner surface side of the cap-type main body 2, and 2b is the outer surface side. Reference numeral 2c is a female screw provided on the inner surface side 2a, 2d is a vertical liquid passing cylinder protruding downward and provided with a passage for the internal liquid 13 penetrating therethrough, and 2e is a ring-shaped flat packing. The female screw 2c is screwed around a vertical cap shaft Y0-Y0, and the liquid passing cylinder 2d is provided on a parallel central shaft Y1-Y1, which is offset from the cap shaft Y0-Y0 by δ. The straw 11 is detachably connected to the liquid passing cylinder 2d, and the tip thereof is immersed in the internal liquid 13, and 21 is an arcuate storage groove formed by horizontally cutting the top portion of the support portion 20 in the left-right direction. Due to the cutting of the storage groove 21, opposing wall surfaces in the front-rear direction are provided on the support portion 20.

[0013] Reference numeral 22 denotes a semi-spherically projecting storage portion having a spherical center at a point on the central shaft Y1-Y1 and opens to the storage groove 21. Reference numeral 23 is a substantially U-shaped groove-like bearing formed to face the horizontal direction (the front-back direction in FIG. 3) and is orthogonal to the central shaft Y1-Y1 and constitutes the shaft center O-O of the rotation shaft of the nozzle 3 described below. As shown in FIG. 3, the flow path of the liquid passing cylinder 2d is opened at the center of the deepest portion of the storage portion 22. Reference numeral 24 is an annular groove surrounding the opening of the liquid passing cylinder 2d, and 25 is an O-ring interposed in the annular groove 24. Reference numeral 26 is a small cavity formed on the concave spherical surface of the storage portion 22, and 27 is a vent penetrating the inner and outer surfaces of the main body 2. Reference numeral 28 is a hinge portion provided at an end portion on the opposite side of the central shaft Y1-Y1 (rotation shaft 33) with respect to the cap shaft Y0-Y0, and 29 is a latching portion on the other end side.

[0014] On the other hand, the nozzle 3 is provided with a spherical base portion 31 and a suction port 32 extending tangentially from the base portion 31. The base portion 31 is formed of a spherical surface corresponding to storage portion 22 of the main body 2, and on the spherical surface, a pair of boss-shaped rotation shafts 33 are symmetrically projected in the direction intersecting with the extending direction of the suction port 32. Reference numeral 34 is a projection formed on the surface of the base portion 31 corresponding to the cavity 26. The other end of the flow path, which penetrates through the suction port 32 and opens at the tip, are slightly tightly pushed into the bearing 23 from above, and the convex spherical surface of the base portion 31 is fitted into the concave spherical surface of the storage portion 22 and slides in close contact with each other.

[0015] In this way, the nozzle 3 mounted on the outer surface side 2b of the main body 2 rotates about the rotation shaft 33 in an angular range of about 120 degrees so that the upper limit of the rotation angle corresponds to a desired rising angle θ described below and makes the suction port 32 up and down. In this case, the suction port 32 is stored in the storage groove 21 while lying down at the click position where the projection 34 fits into the cavity 26, and the vent 27 is closed by the lying-down suction port 32. Furthermore, at the upper limit of the rotation angle, the back portion of the suction port comes into contact with the corner portion of the storage portion 22 to maintain the rising state, and the flow paths of the nozzle 3 and the liquid passing cylinder 2d coincide and communicate with each other. Reference numeral 41 is a hinge shaft that connects the lid 4 to the hinge portion 28 of the main body 2, and 42 is a latching piece on the other end side. The lid 4 rotates about 3/4 around the hinge shaft 41 as a fulcrum to open the upper surface of the main body 2, and the latching piece 42 is latched onto the latching portion 29 to close the upper space of the main body 2.

[0016] Next, the operation of the first embodiment is described below mainly with reference to FIG. 4. FIG. 4 illustrates the case where the bottle cap 1 of the present device is applied to a PET bottle. After removing the dedicated cap covering the pouring portion of the PET bottle 12, the straw 11 connected to the liquid passing cylinder 2d is inserted into the pouring portion. The female screw 2c of the bottle cap 1 in the closed state as shown in FIG. 2 is screwed into the male screw of the pouring portion, and the packing 2e interposed on the surface in contact with the pouring portion is attached by tightening. As a result, the tip of the straw 11 inserted into the PET bottle 12 is sunk to the bottom and immersed in the deepest part of the internal liquid 13 (not shown here).

[0017] In this state, as described above, the base portion 31 is stored in close spherical contact with the storage portion 22, and the vent 27 is also blocked by the chest portion of the suction port 32 in the prone state, so that if a vibration or the like occurs, the internal liquid 13 of the PET bottle 12 does not spill. When drinking the internal liquid 13, the latching between the latching piece 42 and the latching portion 29 is released, and the lid 4 is rotated counterclockwise around the hinge shaft 41 to open the upper part of the main body 2. After the lid 4 is released, the nozzle 3 is rotated clockwise around the rotation shaft 33 to raise the suction port 32 to the click position. If the air in the standing suction port 32 is sucked in, the pressure of the communicating flow path becomes negative, so that the internal liquid 13 can be drunk. If the angle is near vertical or horizontal when the nozzle 3 is in the rising state (the rising angle θ, i.e., the angle formed with respect to the horizontal plane), it is difficult to drink the internal liquid. Therefore, it is desirable to set the rising angle within an arbitrary acute angle between vertical and horizontal positions (it is desirable to set it to approximately 60 degrees if possible).

[0018] As shown in FIG. 4, since the lid 4 in the open state and the suction port 32 in a rising and inclined state face each other right and left and are held in opposite directions, nothing can interfere to drink the internal liquid 13 by sucking. After the drinking is finished, the upper space of the nozzle 3 stored in the storage groove 21 is covered with the lid 4 by the operation reversed to the above. Since the nozzle 3 is covered with the lid 4 in the stored state, no contact with clothes or the like occurs and dust is not attached, so that the hygienic state can be maintained. When dust or the like adheres the nozzle 3 to make it dirty, it can be pulled out from the main body 2; the nozzle 3 that tends to be easily polluted can be washed in a separate state with ease and thoroughly. Similarly, the straw 11, the O-ring 25, and the packing 2e can also be disassembled from the main body 2 to be washed. In this way, i.e., by disassembling and washing, the bottle cap 1 can be kept clean and can also be used for a new PET bottle 12.

[0019] Embodiment 2. FIG. 5 is an explanatory view showing the configuration of the second embodiment, where (a) is a sectional view and (b) is a partial sectional view of a modified example, and FIG. 6 is a sectional view showing the operation of the second embodiment. In the second embodiment, as in the abovementioned conventional examples, the protruding type is used in which the suction port 32 is vertically projected, but it is characterized by a remarkably simplified structure. In the second embodiment shown in FIGS. 5 (a) and 6, the storage portion 22 is formed in a cylindrical shape having a bottom, and the bottom portion is exposed to the inner surface side 2a on the cap shaft Y0-Y0. The structure in which the female screw 2C is screwed on the inner wall of the cap on the inner surface side 2a is the same as that of the first embodiment. Reference numeral 35a denotes a ridge provided on the outer periphery of the upper end of the base portion 31 of the nozzle 3 for preventing from falling out, and 35b denotes a cylindrical groove formed at the end portion. The cylinder surrounded by the cylindrical groove 35b constitutes a connecting portion with the straw 11. Reference numeral 36 denotes an insertion hole for the straw 11 provided on the bottom surface of the storage portion 22, which communicates from the inner surface side 2a to the outer surface side 2b.

[0020] A claw portion 36a directed inwardly is formed on the inner wall surface of the upper end of the storage portion 22, and the inner peripheral surface of the insertion hole 36 is provided with a slip preventing function such as a folded portion 36b for suppressing movement of the straw. The tip of the straw 11 is connected to the connecting portion of the base portion 31 of the nozzle 3, and the middle section thereof is inserted into the insertion hole 36. For this reason, there is a slight difference in difficulty for the insertion and withdrawal of the straw 11 inserted through the insertion hole 36, and a slight resistance force is applied during withdrawal. On the other hand, the base portion 31 of the nozzle 3 is placed in such a way that the storage portion 22 can be reciprocated inside. In particular, the straw 11 is made of a silicon tube having a slightly strong spring-like restoring force. Some other common members are designated by the same reference numerals as those in the first embodiment.

[0021] When the lid 4 is closed, the tip of the suction port 32 is pressed against the inner wall of the lid 4, so that the nozzle 3 is pushed down into the storage portion 22; however, the straw 11 connected to the nozzle 3 is compressed, because the movement of the straw 11 is restrained by the folded portion 36b or the like provided on the inner peripheral surface of the insertion hole 36. At this time, the compressed straw 11 is not pushed to the outside by the insertion hole 36 but is bent in the lateral direction into a "U shape" as shown in FIG. 5 and the flow path of the internal liquid 13 is automatically blocked by this bent portion. When the lid 4 is unlocked and released, the restoring force of the straw 11 acts and the base portion 31 is pushed up to the upper limit position of the straw 11 or the position where the ridge 35a abuts the claw portion 36a, resulting in the protrusion of the suction opening 32. The protruding state of the nozzle 3 is shown in FIG. 6. According to the second embodiment, a spring for projecting the nozzle 3 is unnecessary, so that a troublesome assembling operation can be omitted, and the number of parts and the number of assembling steps can be reduced, which can contribute to the cost reduction.

[0022] FIG. 5 (b) is a partial cross-sectional view of the essential parts of a modified example of the second embodiment. In FIG. 5 (b), 43 is a cavity portion formed on the cap shaft Y0-Y0 on the inner surface of the lid 4, and 44 is a plate packing. The plate packing 44 uses a material such as silicon having elasticity and removably press-fitted into the protruded cavity portion 43 having a slightly smaller diameter. The press-fitted plate packing 44 is fitted on the same surface as the inner surface of the lid 4 or slightly down from the surface. Then, as shown in the drawing, when the lid is closed, the suction port 32 at the tip of the nozzle is pressed against the plate packing 44 to block the opening of the flow path and prevent the internal liquid 13 from leaking. In this case, it is not absolutely necessary for the "U-shaped" bent portion of the straw 11 to close the flow path. In addition to this, the second embodiment prepares a second modified example having a configuration similar to that of the first embodiment. Although no illustration is shown in the second modified example, a configuration is adopted in which the central axis Y1-Y1 in the vertical direction passing through the center of the nozzle 3 is deviated from the cap shaft Y0-Y0 in parallel by δ. In this second modified example, effects similar to those described above, i.e., no spring or troublesome assembly operation can also be achieved.

[0023] Embodiment 3. FIG. 7 is a cross-sectional view showing the configuration of the third embodiment. FIG. 8 is an explanatory view showing the operation of the third embodiment, wherein (a) and (b) are respectively top and cross-sectional views of the lid in an open state, and (c) is an explanatory view of a modified example of the main portion. In the third embodiment, the restoring force of the straw 11 is also used in the same manner. However, the flow path is closed by pressing the straw 11 with part of the nozzle 3, and when the lid is released, and an automatic undulating structure is employed in which the nozzle is automatically raised by the resilience of the straw 11. In addition, the shaft support structure of the nozzle 3 in which the nozzle 3 rotates around the rotation shaft 33 up and down is similar to that of the first embodiment. Therefore, as shown in FIG.1, the main body 2 has a substantially elliptical shape, and the support portion 20 having a circular dome shape is provided side by side on the outer surface side 2b to have a common structure. A cylindrical groove 35b is formed in the base portion 31 of the nozzle 3, and the straw 11 is slightly rigidly connected to the inner cylinder surrounded by the cylindrical groove 35b. In addition to this, in the third embodiment, in order to effectively block the flow path of the straw 11 when the nozzle 3 is prone, a projecting portion 37 is formed at least on the lower outer ring portion of the base portion 31. Furthermore, the storage portion 22 is of a gradual downward reduction type and is formed in an inverted conical shape that is slightly inclined in the prone direction of the nozzle 3 so as to ensure a smooth automatic up and down motion.

[0024] Now, as shown in FIG. 8 (b), when the lid 4 is rotated about 150 degrees in the direction of an arrow around the hinge 28 as the fulcrum when the nozzle 3 is standing in the open state, the inner surface of the lid 4 comes into contact with the suction port 32. When the lid 4 is further rotated, the nozzle 3 stretches the straw 11 having elasticity to apply resistance force to the lid 4 in the opposite direction and integrally rotates in the same direction around the rotating shaft 33. Then, when the latching piece 42 of the lid 4 under the resistance force of the straw 11 is latched onto the latching portion 29, the nozzle 3 comes out of the inverted conical portion and becomes a prone state as shown in FIG. 7 to be stored in the storage groove 21. At this time, the straw 11 near the connection portion is crushed based on the partial expansion difference due to the rotation of the nozzle 3, and the ridge 37 elastically presses the inner surface of the crushed portion to make it attached firmly. As a result, the internal flow path is automatically closed and thereby the internal liquid 13 is prevented from leaking.

[0025] Conversely, when the latching of the hinge portion 28 is released, the nozzle 3 pressed by the lid 4 follows the opening of the lid 4 by the restoring force of the straw 11 and is automatically raised as shown in FIG. 8 (b) from the state shown in FIG. 7. Thus, according to the third embodiment, not only is the manual operation for raising the nozzle 3 becomes unnecessary, but the use of the spring can be eliminated as well. In addition to this, the lid 4 is formed integrally with the main body 2, and the hinge portion 28 is configured by a thin band member that connects both. As a result, the cost is further reduced while achieving the same function as that of the first embodiment. Of course, the lid 4 may be formed separately from the main body 2 as in the first and second embodiments.

[0026] FIG. 8 (c) shows a modified example of the flow path blocking mechanism according to the third embodiment. In other words, in FIG. 8 (c), an inclined surface 38 is formed at the cylinder tip of the inner ring portion of the base portion 31 of the nozzle 3 to which the straw 11 is connected. When the nozzle 3 is pressed by the closed lid 4 to lie down, the inner surface portion of the straw 11 which is strongly stretched due to the expansion difference in a manner similar to that described above is elastically pressed against the inclined surface 38. Therefore, by the pressure bonding of the inner surface portion, the flow path that is open to the inclined surface 38 is automatically closed, and the leakage of the inner liquid 13 is prevented.

[0027] Each of the abovementioned embodiments describes the case where the present invention is applied to a pouring opening provided with a male screw of a PET bottle filled with natural water or the like as an example; however, if an alternative structure of a female screw is used, it can also be applied to other bottles such as water bottles and baby bottles. Furthermore, the first embodiment describes the case where the suction opening 32 is moved up and down at a rotation angle of about 120 degrees (i.e., exceeding 90 degrees), but the upper limit of the rotation angle may be set to 90 degrees or less; in other words, it is good enough as long as the suction port can be set on the opposite side of the lid and the rising angle θ of the nozzle 3 as described above may be set within an arbitrary acute angle, preferably at an angle of about 90 degrees. Furthermore, the shapes of the main body and the nozzles are not necessarily limited to the embodiments as long as they have the equivalent functions.

[0028]

[Effect of the Invention] The present invention is constituted of a bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising: a nozzle provided with a suction port at its tip and rotation shafts on both sides of the base portion; a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed; a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid; and a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body, wherein the flow path of the internal liquid is opened or closed in connection with the up and down motion associated with the rotation of the nozzle. Furthermore, in the abovementioned bottle cap with a nozzle, the rising angle θ of the nozzle is set to an arbitrary acute angle and the bottle cap with a nozzle is desirably set to be tilted at about 60 degrees. Furthermore, in the abovementioned bottle cap with a nozzle, a sealing member surrounding the flow path opened to the storage portion is provided. Furthermore, in the abovementioned bottle cap with a nozzle, the rising direction of the nozzle is set to the direction opposite to the direction of the lid member when it is opened.

[0029] As a result, since the nozzle (straw) does not project vertically upward unlike the conventional containers shown in FIGS. 9 and 10, the internal liquid can conveniently be drunk in a comfortable posture without unreasonably tilting the head or upper body. Also, since the bottle is not tilted for drinking, the internal liquid will not be spilled when the cap is tightened a little loosely. Furthermore, since no spring made of a metal is used (i.e., resin is used), not only are the number of parts and the number of industries from which materials are procured can be limited, but there is also no need to worry about any corrosion measures at the time of designing.

[0030] Furthermore, the present invention is constituted of a bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising: a nozzle provided with a suction port at its tip and a connecting portion at the tip portion of the base portion; a main body provided with a storage portion for storing the nozzle in a reciprocatable manner on the outer surface side and an insertion hole communicating with the storage portion on the inner surface side where the female screw is screwed; a straw detachably connected with the base portion of the nozzle, wherein the tip of the straw is to be immersed in the internal liquid via the insertion hole, and a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body and thereby press the nozzle down when the lid is closed, wherein the flow path of the internal liquid is blocked by bending the straw in connection with the backward motion of the nozzle associated with the opening and closing of the lid member. Furthermore, in the abovementioned bottle cap with a nozzle, an elastic soft material is used for the straw. Furthermore, in the abovementioned bottle cap with a nozzle, restraining means are provided for the insertion hole for restraining the movement of the straw.

[0031] The present invention is constituted of a bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising: a nozzle provided with a suction port at its tip as well as rotation shafts and a connecting portion on both sides and tip portion of the base portion, respectively; a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed; a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid; and a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body, wherein the flow path of the internal liquid is blocked by pressing the straw with part of the nozzle in connection with the up and down motion caused by the rotation of the nozzle associated with the opening and closing of the lid member. Furthermore, in the abovementioned bottle cap with a nozzle, an elastic soft material is used for the straw. Furthermore, in the abovementioned bottle cap with a nozzle, restraining means are provided for the insertion hole for restraining the movement of the straw. Furthermore, in the abovementioned bottle cap with a nozzle, the rising angle θ of the nozzle is set to an arbitrary acute angle and the bottle cap with a nozzle is desirably set to be tilted at about 60 degrees. Furthermore, in the abovementioned bottle cap with a nozzle, the rising direction of the nozzle is set to the direction opposite to the direction of the lid member when it is opened.

[0032] As a result, according to the second and third embodiments in which the bending and stretching properties of the straw and its elastic restoring force are used for the reciprocating motion and up and down motion of the nozzle, the spring mechanism and the rotating mechanism are omitted as compared with the conventional one, so that the overall configuration can be remarkably simplified. Furthermore, since the straw is directly connected to the base portion of the nozzle, it can be replaced with a suitable straw appropriately according to the depth of the bottle and the like, so that the handling also becomes convenient. Furthermore, since the spring is omitted, there is an advantage that the troublesome assembling operation can be omitted and the number of parts and the assembling man-hour can be reduced. Particularly, according to the modified example of the embodiment in which the lid is provided with the packing, it is possible to realize the bottle cap that can completely prevent the leakage of the internal liquid when the lid is closed without using the spring for projecting the nozzle.

[0033] Accordingly, the present invention can provide a bottle cap with a nozzle that enables the nozzle to be tilted at an appropriate angle to facilitate drinking and the cost to be reduced by lowering the number of parts with a simple configuration and is convenient to handle and compact.

[Brief Description of Drawings]

[FIG. 1] A top view showing the configuration of Embodiment 1.

[FIG. 2] An X-X sectional view of FIG. 1

[FIG. 3] A sectional view of a main body.

[FIG. 4] A sectional view showing the operation of Embodiment 1.

[FIG. 5] A sectional view showing the configuration of Embodiment 2.

[FIG. 6] A sectional view showing the operation of Embodiment 2.

[FIG. 7] A sectional view showing the configuration of Embodiment 3.

[FIG. 8] A sectional view showing the operation of Embodiment 3.

[FIG. 9] An explanatory view showing the configuration of a conventional device.

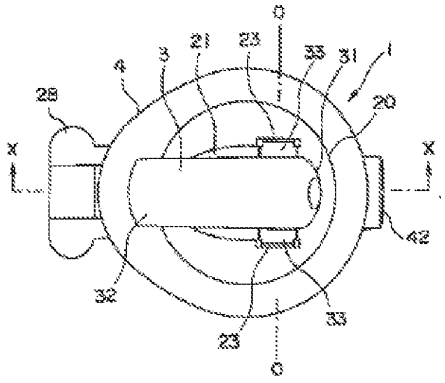
[FIG. 10] An explanatory view showing the configuration of another conventional device.

[Explanation of Reference Numerals]

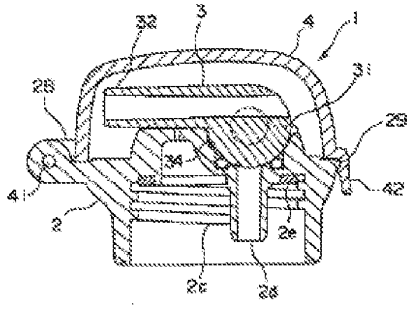
1: Bottle cap
2: Main body
2a: Inner surface side
2b: Outer surface side
2c: Female screw
2d: Liquid passing cylinder
2e: Packing
3: Nozzle
4: Lid (lid member)
11: Straw
12: PET bottle
13: Internal liquid
21: Support portion
22: Storage groove
23: Bearing
24: Ring-shaped groove
25: O-ring
26: Cavity
27: Vent
28: Hinge portion
29: Latching portion
31: Base portion
32: Suction port
33: Rotation shaft

34: Projection
35a: Ridge
35b: Cylindrical groove
36: Insertion hole
36a: Claw portion
36b: Folded portion (anti-slip portion)
37: Projecting portion
38: Inclined plane
41: Hinge shaft
42: Latching piece
43: Recessed portion
44: Plate packing
O-O: Shaft center
Y0-Y0: Cap shaft
Y1-Y1: Central shaft
δ: Difference
θ: Rising angle

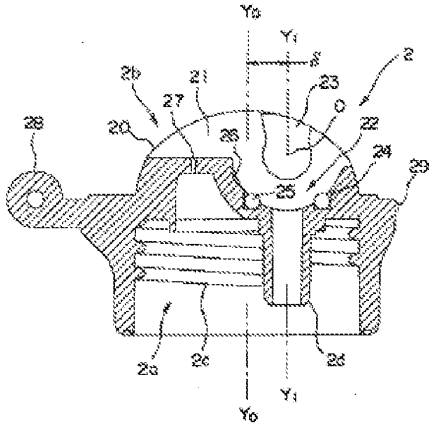
[FIG. 1]



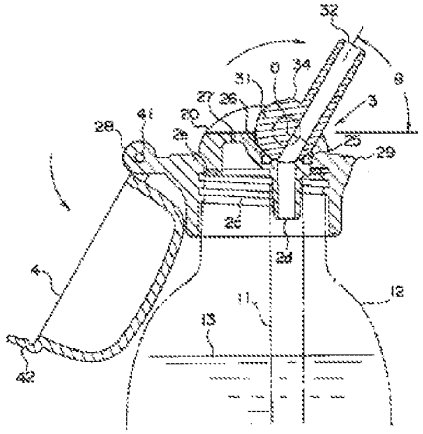
[FIG. 2]



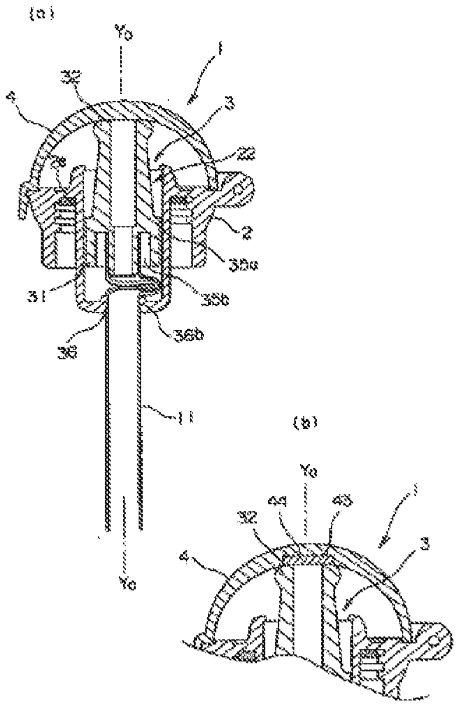
[FIG. 3]



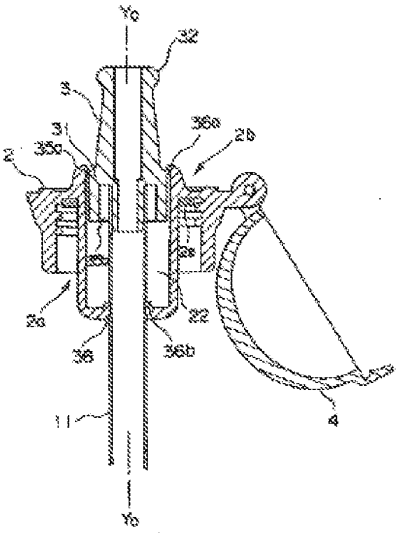
[FIG. 4]



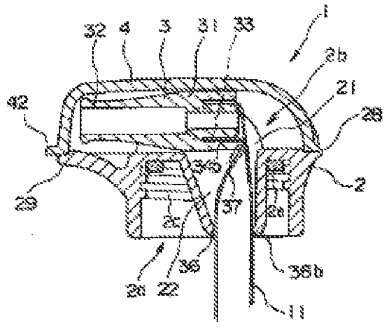
[FIG. 5]



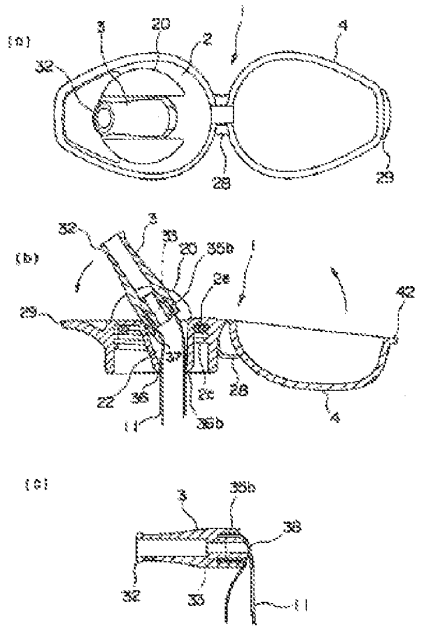
[FIG. 6]



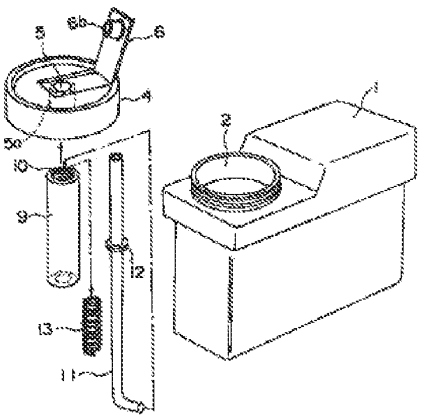
[FIG. 7]



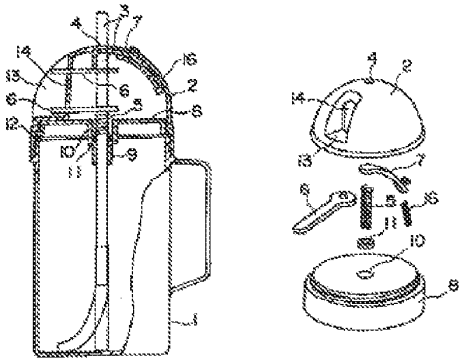
[FIG. 8]



[FIG. 9]



[FIG. 10]



[Amendment]
[Filing Date] June 19, 2000 (2000.6.19)
[Amendment 1]
[Document Title for Parts Amended] Specification
[Item Name for Parts Amended] Full text
[Method for the Amendment] Modification
[Content of the Amendment]
[Title of the Invention]
[Document Title] Specification
[What is claimed is] BOTTLE CAP WITH A NOZZLE

[Claim 1] A bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising:

a nozzle provided with a suction port at its tip and rotation shafts on both sides of the base portion;

a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed;

a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid; and

a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body,

wherein the flow path of the internal liquid is opened or closed in connection with the up and down motion associated with the rotation of the nozzle.

[Claim 2] The bottle cap with a nozzle according to Claim 1, wherein the rising angle θ of the nozzle is set to an arbitrary acute angle and the bottle cap with a nozzle is desirably set to be tilted at about 60 degrees.

[Claim 3] The bottle cap with a nozzle according to Claim 1 or 2, wherein a sealing member surrounding the flow path opened to the storage portion is provided.

[Claim 4] The bottle cap with a nozzle according to any one of Claims 1-3, wherein the rising direction of the nozzle is set to the direction opposite to the direction of the lid member when it is opened.

[Claim 5] A bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising:

a nozzle provided with a suction port at its tip as well as rotation shafts and a connecting portion on both sides and tip portion of the base portion, respectively;

a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed;

a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid; and

a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body,

wherein the flow path of the internal liquid is blocked by pressing the straw with part of the nozzle in connection with the up and down motion caused by the rotation of the nozzle associated with the opening and closing of the lid member.

[Claim 6] The bottle cap with a nozzle according to Claim 5, wherein an elastic soft material is used for the straw.

[Claim 7] The bottle cap with a nozzle according to Claim 5 or 6, wherein restraining means are provided for the insertion hole for restraining the movement of the straw.

[Claim 8] The bottle cap with a nozzle according to any one of Claims 5-7, wherein the rising angle θ of the nozzle is set to an arbitrary acute angle and the bottle cap with a nozzle is desirably set to be tilted at about 60 degrees.

[Claim 9] The bottle cap with a nozzle according to any one of Claims 5-8, wherein the rising direction of the nozzle is set to the direction opposite to the direction of the lid member when it is opened.

[Detailed explanation of the Invention]

[0001]

[Technical Field to which the Invention belongs] Recently, there is a bottle cap with a nozzle developed for enabling the so-called "straw drinking" to drink the contents of natural water or soft drinks filled in bottles such as PET bottles with a straw. If you use a bottle cap with a nozzle, you don't need a cup, and you can drink the packed contents without rotating to open and close the lid screw of the cap every time you want to drink them different times, which is extremely convenient. The present invention relates to a bottle cap with a nozzle as described above.

[0002]

[Prior Art] As conventional articles using a similar cap of this type, for example, containers disclosed in Japanese Utility Model Publication No. H03-8090 and Japanese Utility Model Publication No. H03-18362 are known. FIG. 7 is an exploded perspective view showing the configuration of the container described in Japanese Utility Model Publication No. H03-8090. In FIG. 7, 101 is a container main body, 102 is an injection/pouring opening, 104 is a closing member for the injection/pouring opening 102, 105 is a small opening portion for discharging a straw provided on the closing member 104, 106 is a small plug, 106b is a fitting portion thereof, and 109 is a holding cylinder. Furthermore, 110 is a screwing member, 111 is a straw, 112 is a stopper, and 113 is a spring.

[0003] When drinking a beverage inside the container main body 101, by removing the fitting portion 106b of the small plug 106 fitted in the small opening portion 105 of the closing member, the straw 111 is lifted up to the contact position between the stopper 112 and the lower end of the small opening portion 105 by the elastic force of the spring 113 in the holding cylinder 109, which is fixed to the cylindrical edge 105a of the small opening portion 105 by a screwing means. Then, the upper end portion of the straw projects from the small opening portion 105, and you can drink the internal beverage using the protruding straw 111. In addition, if the straw 111 is pushed against the elastic force of the spring 113 to make the small plug 106 fit into the small opening portion 105, the straw 111 can be returned to the original state held in the container main body 101.

[0004] FIG. 8 is a drawing disclosed in the abovementioned Japanese Utility Model Publication No. H03-18362, in which (a) is an overall longitudinal sectional view and (b) is an exploded perspective view of a cap portion. In FIG. 8, 201 is a liquid container, 202 is a cap, 203 is a straw, 204 is a projecting opening of the cap 202, 205 is a spring for projecting the straw 203, 206 is a lever, 207 is an opening/closing member, 208 is an inner lid, 209 is a cylindrical portion, and 210 is a recessed portion into which the lower end of the spring 205 is fitted. Furthermore, 211 is a packing fitted in the straw 203, 212 is a packing between the inner lid 208 and the container 201, 213 is a recessed portion formed on the side surface of the cap 202, 214 is a vertical hole through which the level 206 jumps to the recessed portion 210, and 216 is a push spring.

[0005] In the configuration of the liquid container 201 shown in FIG. 8, the opening/closing member 207 slides in the direction intersecting with the projecting direction of the straw 203 to hold down the top end of the straw 203 by means of the tip portion thereof, so that the straw 203 immediately projects from the projecting opening 204, and after drinking, if the push-down lever 206 is pressed down, the opening/closing member 207 automatically closes the projecting opening 204. Also, the opening/closing member 207 abutting the upper end of the straw 203 prevents liquid leakage. Furthermore, when the opening/closing member 207 is slid, the straw 203 is immediately projected from the projecting opening 204 by means of the projecting spring 205, and after drinking, the projecting opening 204 is automatically closed by pressing the push-down lever 206 down.

[0006]

[Problems that the Invention is to Solve] However, in both the conventional containers shown in FIGS. 7 and 8, the straws 111 and 203 are configured to project vertically upward. Therefore, when drinking the internal liquid by sucking with the straws 111 and 203, the head needs to be tilted together with the upper body so that an unreasonable posture must be taken, which is extremely inconvenient. If you drink the beverage by sucking while standing upright without tilting the posture, container 101 or 201 side tilts so that the content liquid might leak out. Moreover, since the spring 113 and the springs 205 and 216 made of metal are used rather than resin, the number of parts and the number of industries from which materials are procured increase, and there is an additional problem that corrosion-preventive measures must be taken into consideration at the time of designing.

[0007] The present invention has been made in order to solve the abovementioned problems, the object of the present invention is to realize a bottle cap with a nozzle that enables the nozzle to be tilted at an appropriate angle to facilitate drinking and the cost to be reduced by lowering the number of parts with a simple configuration and is convenient to handle and compact.

[0008]

[Means for Solving the Problems] The present invention is constituted of a bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising: a nozzle provided with a suction port at its tip and rotation shafts on both sides of the base portion; a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed; a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid; and a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body, wherein the flow path of the internal liquid is opened or closed in connection with the up and down motion associated with the rotation of the nozzle.

Furthermore, in the abovementioned bottle cap with a nozzle, the rising angle θ of the nozzle is set to an arbitrary acute angle and the bottle cap with a nozzle is desirably set to be tilted at about 60 degrees. Furthermore, in the abovementioned bottle cap with a nozzle, a sealing member surrounding the flow path opened to the storage portion is provided. Furthermore, in the abovementioned bottle cap with a nozzle, the rising direction of the nozzle is set to the direction opposite to the direction of the lid member when it is opened.

[0009] The present invention is constituted of a bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising: a nozzle provided with a suction port at its tip as well as rotation shafts and a connecting portion on both sides and tip portion of the base portion, respectively; a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed; a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid; and a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body, wherein the flow path of the internal liquid is blocked by pressing the straw with part of the nozzle in connection with the up and down motion caused by the rotation of the nozzle associated with the opening and closing of the lid member. Furthermore, in the abovementioned bottle cap with a nozzle, an elastic soft material is used for the straw. Furthermore, in the abovementioned bottle cap with a nozzle, restraining means are provided for the insertion hole for restraining the movement of the straw. Furthermore, in the abovementioned bottle cap with a nozzle, the rising angle θ of the nozzle is set to an arbitrary acute angle and the bottle cap with a nozzle is desirably set to be tilted at about 60 degrees. Furthermore, in the abovementioned bottle cap with a nozzle, the rising direction of the nozzle is set to the direction opposite to the direction of the lid member when it is opened.

[0010]

[Mode for Implementing the Invention] Embodiment 1. FIG. 1 is a top view showing the configuration of the first embodiment of the present invention. FIG. 2 is a sectional view taken along the line X-X of FIG. 1, FIG. 3 is a sectional view of a main body, and FIG. 4 is a sectional view showing the operation of the first embodiment. In FIGS. 1 through 4, 1 denotes a bottle cap. Polypropylene or the like is used as the material of the bottle cap 1 and is molded with a slightly soft resin material that is hard to break. The reference numeral 2 is the main body of the bottle cap 1, 3 is a nozzle, and 4 is a lid. Furthermore, 11 is a straw using a rubber-like elastic resin such as a silicone tube. The reference numeral 12 is a PET bottle, and 13 is an internal liquid filled in the PET bottle 12.

[0011] Reference numeral 2a is the inner surface side of the cap-type main body 2, and 2b is the outer surface side. Reference numeral 2c is a female screw provided on the inner surface side 2a, 2d is a vertical liquid passing cylinder protruding downward and provided with a passage for the internal liquid 13 penetrating therethrough, and 2e is a ring-shaped flat packing. The female screw 2c is screwed around a vertical cap shaft Y0-Y0, and the liquid passing cylinder 2d is provided on a parallel central shaft Y1-Y1, which is offset from the cap shaft Y0-Y0 by δ. The straw 11 is detachably connected to the liquid passing cylinder 2d, and the tip thereof is immersed in the internal liquid 13, and 21 is an arcuate storage groove formed by horizontally cutting the top portion of the support portion 20 in the left-right direction. Due to the cutting of the storage groove 21, opposing wall surfaces in the front-rear direction are provided on the support portion 20.

[0012] Reference numeral 22 denotes a semi-spherically projecting storage portion having a spherical center at a point on the central shaft Y1-Y1 and opens to the storage groove 21. Reference numeral 23 is a substantially U-shaped groove-like bearing formed to face the horizontal direction (the front-back direction in FIG. 3) and is orthogonal to the central shaft Y1-Y1 and constitutes the shaft center O-O of the rotation shaft of the nozzle 3 described below. As shown in FIG. 3, the flow path of the liquid passing cylinder 2d is opened at the center of the deepest portion of the storage portion 22. Reference numeral 24 is an annular groove surrounding the opening of the liquid passing cylinder 2d, and 25 is an O-ring interposed in the annular groove 24. Reference numeral 26 is a small cavity formed on the concave spherical surface of the storage portion 22, and 27 is a vent penetrating the inner and outer surfaces of the main body 2. Reference numeral 28 is a hinge portion provided at an end portion on the opposite side of the central shaft Y1-Y1 (rotation shaft 33) with respect to the cap shaft Y0-Y0, and 29 is a latching portion on the other end side.

[0013] On the other hand, the nozzle 3 is provided with a spherical base portion 31 and a suction port 32 extending tangentially from the base portion 31. The base portion 31 is formed of a spherical surface corresponding to storage portion 22 of the main body 2, and on the spherical surface, a pair of boss-shaped rotation shafts 33 are symmetrically projected in the direction intersecting with the extending direction of the suction port 32. Reference numeral 34 is a projection formed on the surface of the base 31 corresponding to the cavity 26. The other end of the flow path, which penetrates through the suction port 32 and opens at the tip, are slightly tightly pushed into the bearing 23 from above, and the convex spherical surface of the base portion 31 is fitted into the concave spherical surface of the storage portion 22 and slides in close contact with each other.

[0014] In this way, the nozzle 3 mounted on the outer surface side 2b of the main body 2 rotates about the rotation shaft 33 in an angular range of about 120 degrees so that the upper limit of the rotation angle corresponds to a desired rising angle θ described below and makes the suction port 32 up and down. In this case, the suction port 32 is stored in the storage groove 21 while lying down at the click position where the projection 34 fits into the cavity 26, and the vent 27 is closed by the lying-down suction port 32. Furthermore, at the upper limit of the rotation angle, the back portion of the suction port comes into contact with the corner portion of the storage portion 22 to maintain the rising state, and the flow paths of the nozzle 3 and the liquid passing cylinder 2d coincide and communicate with each other. Reference numeral 41 is a hinge shaft that connects the lid 4 to the hinge portion 28 of the main body 2, and 42 is a latching piece on the other end side. The lid 4 rotates about 3/4 around the hinge shaft 41 as a fulcrum to open the upper surface of the main body 2, and the latching piece 42 is latched onto the latching portion 29 to close the upper space of the main body 2.

[0015] Next, the operation of the first embodiment is described below mainly with reference to FIG. 4. FIG. 4 illustrates the case where the bottle cap 1 of the present device is applied to a PET bottle. After removing the dedicated cap covering the pouring portion of the PET bottle 12, the straw 11 connected to the liquid passing cylinder 2d is inserted into the pouring portion. The female screw 2c of the bottle cap 1 in the closed state as shown in FIG. 2 is screwed into the male screw of the pouring portion, and the packing 2e interposed on the surface in contact with the pouring portion is attached by tightening. As a result, the tip of the straw 11 inserted into the PET bottle 12 is sunk to the bottom and immersed in the deepest part of the internal liquid 13 (not shown here).

[0016] In this state, as described above, the base portion 31 is stored in close spherical contact with the storage portion 22, and the vent 27 is also blocked by the chest portion of the suction port 32 in the prone state, so that if a vibration or the like occurs, the internal liquid 13 of the PET bottle 12 does not spill. When drinking the internal liquid 13, the latching between the latching piece 42 and the latching portion 29 is released, and the lid 4 is rotated counterclockwise around the hinge shaft 41 to open the upper part of the main body 2. After the lid 4 is released, the nozzle 3 is rotated clockwise around the rotation shaft 33 to raise the suction port 32 to the click position. If the air in the standing suction port 32 is sucked in, the pressure of the communicating flow path becomes negative, so that the internal liquid 13 can be drunk. If the angle is near vertical or horizontal when the nozzle 3 is in the rising state (the rising angle θ, i.e., the angle formed with respect to the horizontal plane), it is difficult to drink the internal liquid. Therefore, it is desirable to set the rising angle within an arbitrary acute angle between vertical and horizontal positions (it is desirable to set it to approximately 60 degrees if possible).

[0017] As shown in FIG. 4, since the lid 4 in the open state and the suction port 32 in a rising and inclined state face each other right and left and are held in opposite directions, nothing can interfere to drink the internal liquid 13 by sucking. After the drinking is finished, the upper space of the nozzle 3 stored in the storage groove 21 is covered with the lid 4 by the operation reversed to the above. Since the nozzle 3 is covered with the lid 4 in the stored state, no contact with clothes or the like occurs and dust is not attached, so that the hygienic state can be maintained. When dust or the like adheres the nozzle 3 to make it dirty, it can be pulled out from the main body 2; the nozzle 3 that tends to be easily polluted can be washed in a separate state with ease and thoroughly. Similarly, the straw 11, the O-ring 25, and the packing 2e can also be disassembled from the main body 2 to be washed. In this way, i.e., by disassembling and washing, the bottle cap 1 can be kept clean and can also be used for a new PET bottle 12.

[0018] Embodiment 2. FIG. 5 is a cross-sectional view showing the configuration of Embodiment 2, and FIG. 6 is an explanatory view showing the operation of the second embodiment, wherein (a) and (b) are respectively top and cross-sectional views of the lid in an open state, and (c) is an explanatory view of a modified example of the main portion. The second embodiment has significantly simplified features as compared with the first embodiment. Basically, an automatic undulating structure is employed in which the straw 11 is pressed with part of the nozzle 3 so as to block the flow path and the nozzle is automatically raised by the resistivity of the straw 11 when the lid 4 is released. In addition, the shaft support structure of the nozzle 3 in which the nozzle 3 rotates around the rotation shaft 33 up and down is similar to that of the first embodiment. Therefore, as shown in FIG.1, the main body 2 has a substantially elliptical shape, and the support portion 20 having a circular dome shape is provided side by side on the outer surface side 2b to have a common structure.

[0019] A cylindrical groove 36 is formed in the base portion 31 of the nozzle 3, and the straw 11 is slightly rigidly connected removably to the inner cylinder surrounded by the cylindrical groove 36. In addition to this, in the second embodiment, in order to effectively block the flow path of the straw 11 when the nozzle 3 is in a prone position, a projecting portion 37 is formed at least on the lower outer ring portion of the base 31. Furthermore, the storage portion 22 is of a gradual downward reduction type and is formed in an inverted conical shape that is slightly inclined in the prone direction of the nozzle 3 so as to ensure a smooth automatic up and down motion. The bottom portion of the inverted conical shaped storage portion 22 is exposed to the inner surface side 2a.

[0020] The reference numeral 22a is an insertion hole provided on the bottom portion of the storage portion 22 for the straw 11 and communicates from the inner surface side 2a of the main body 2 to its outer surface side 2b. The inner peripheral surface of the insertion hole 22a is provided with a slip preventing function such as a folded portion 22c for suppressing movement of the straw 11. In particular, the straw 11 is made of a silicone tube having a slightly strong spring-like restoring force. Some other common members are designated by the same reference numerals as those in the first embodiment.

[0021] Now, as shown in FIG. 6 (b), when the lid 4 is rotated about 150 degrees in the direction of an arrow around the hinge 28 as the fulcrum when the nozzle 3 is standing in the open state, the inner surface of the lid 4 comes into contact with the suction port 32. When the lid 4 is further rotated, the nozzle 3 stretches the straw 11 having elasticity to apply resistance force to the lid 4 in the opposite direction and integrally rotates in the same direction around the rotating shaft 33. Then, when the latching piece 42 of the lid 4 under the resistance force of the straw 11 is latched onto the latching portion 29, the nozzle 3 comes out of the inverted conical portion and becomes a prone state as shown in FIG. 5 to be stored in the storage groove 21. At this time, the straw 11 near the connection portion is crushed based on the partial expansion difference due to the rotation of the nozzle 3, and the ridge 37 elastically presses the inner surface of the crushed portion to make it attached firmly. As a result, the internal flow path is automatically closed and thereby the internal liquid 13 is prevented from leaking.

[0022] Conversely, when the latching of the latching piece 42 with the latching portion 29 is released, the nozzle 3 pressed by the lid 4 follows the opening of the lid 4 by the restoring force of the straw 11 and is automatically raised as shown in FIG. 6 (b) from the state shown in FIG. 5. Thus, according to the second embodiment, not only is the manual operation for raising the nozzle 3 becomes unnecessary, but the use of the spring can be eliminated as well. In addition to this, the lid 4 is formed integrally with the main body 2, and the hinge portion 28 is configured by a thin band member that connects both. As a result, the cost is further reduced while achieving the same function as that of the first embodiment. Of course, the lid 4 may be formed separately from the main body 2 as in the first embodiments.

[0023] FIG. 6 (c) shows a modified example of the flow path blocking mechanism according to the second embodiment. In other words, in FIG. 6 (c), an inclined surface 38 is formed at the cylinder tip of an inner cylinder surrounded by the cylindrical groove 36 of the base portion 31 of the nozzle 3 to which the straw 11 is connected. When the nozzle 3 is pressed by the closed lid 4 to lie down, the inner surface portion of the straw 11 which is strongly stretched due to the expansion difference in a manner similar to that described above is elastically pressed against the inclined surface 38. Therefore, by the pressure bonding of the inner surface portion, the flow path that is open to the inclined surface 38 is automatically closed, and the leakage of the inner liquid 13 is prevented.

[0024] Each of the abovementioned embodiments describes the case where the present invention is applied to a pouring opening provided with a male screw of a PET bottle filled with natural water or the like as an example; however, if an alternative structure of a female screw is used, it can also be applied to other bottles such as water bottles and baby bottles. Furthermore, the first embodiment describes the case where the suction opening 32 is moved up and down at a rotation angle of about 120 degrees (i.e., exceeding 90 degrees), but the upper limit of the rotation angle may be set to 90 degrees or less; in other words, it is good enough as long as the suction port can be set on the opposite side of the lid and the rising angle θ of the nozzle 3 as described above may be set within an arbitrary acute angle, preferably at an angle of about 90 degrees. Furthermore, the shapes of the main body and the nozzles are not necessarily limited to the embodiments as long as they have the equivalent functions.

[0025]

[Effect of the Invention] The present invention is constituted of a bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising: a nozzle provided with a suction port at its tip and rotation shafts on both sides of the base portion; a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed; a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid; and a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body, wherein the flow path of the internal liquid is opened or closed in connection with the up and down motion associated with the rotation of the nozzle. Furthermore, in the abovementioned bottle cap with a nozzle, the rising angle θ of the nozzle is set to an arbitrary acute angle and the bottle cap with a nozzle is desirably set to be tilted at about 60 degrees. Furthermore, in the abovementioned bottle cap with a nozzle, a sealing member surrounding the flow path opened to the storage portion is provided. Furthermore, in the abovementioned bottle cap with a nozzle, the rising direction of the nozzle is set to the direction opposite to the direction of the lid member when it is opened.

[0026] As a result, since the nozzle (straw) does not project vertically upward unlike the conventional containers shown in FIGS. 9 and 10, the internal liquid can conveniently be drunk in a comfortable posture without unreasonably tilting the head or upper body. Also, since the bottle is not tilted for drinking, the internal liquid will not be spilled when the cap is tightened a little loosely. Furthermore, since no spring made of a metal is used (i.e., resin is used), not only are the number of parts and the number of industries from which materials are procured can be limited, but there is also no need to worry about any corrosion measures at the time of designing.

[0027] The present invention is constituted of a bottle cap with a nozzle, which is detachably installed by screwing a female screw into the pouring opening of the internal liquid of a bottle, the bottle cap with a nozzle comprising: a nozzle provided with a suction port at its tip as well as rotation shafts and a connecting portion on both sides and tip portion of the base portion, respectively; a main body provided with a storage portion for rotatably storing the nozzle and a support portion with the storage portion interposed therebetween on the outer surface side, a bearing formed on the opposing side of the support portion, through which the rotation shaft can be inserted, and a liquid passing cylinder on the inner surface side where the female screw is screwed; a straw detachably connected with the liquid passing cylinder of the main body, wherein the tip of the straw is to be immersed in the internal liquid; and a lid member mounted on the main body via a hinge in an openable and closable manner to cover the upper surface of the main body, wherein the flow path of the internal liquid is blocked by pressing the straw with part of the nozzle in connection with the up and down motion caused by the rotation of the nozzle associated with the opening and closing of the lid member. Furthermore, in the abovementioned bottle cap with a nozzle, an elastic soft material is used for the straw. Furthermore, in the abovementioned bottle cap with a nozzle, restraining means are provided for the insertion hole for restraining the movement of the straw. Furthermore, in the abovementioned bottle cap with a nozzle, the rising angle θ of the nozzle is set to an arbitrary acute angle and the bottle cap with a nozzle is desirably set to be tilted at about 60 degrees. Furthermore, in the abovementioned bottle cap with a nozzle, the rising direction of the nozzle is set to the direction opposite to the direction of the lid member when it is opened.

[0028] As a result, according to the second embodiment in which the bending and stretching properties of the straw and its elastic restoring force are used for the up and down motion of the nozzle, the spring mechanism and the rotating mechanism are omitted as compared with the conventional one, so that the overall configuration can be remarkably simplified. Furthermore, since the straw is directly connected to the base portion of the nozzle, it can be replaced with a suitable straw appropriately according to the depth of the bottle and the like, so that the handling also becomes convenient. Furthermore, since the spring is omitted, there is an advantage that the rust-preventive measures and the troublesome assembling operation can be omitted and the number of parts and the assembling man-hour can be reduced.

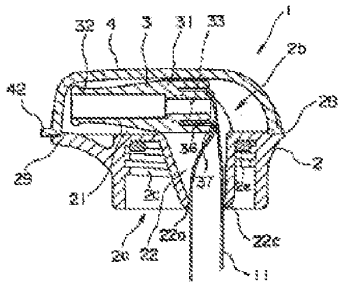
[0029] Accordingly, the present invention can provide a bottle cap with a nozzle that enables the nozzle to be tilted at an appropriate angle to facilitate drinking and the cost to be reduced by lowering the number of parts with a simple configuration and is convenient to handle and compact.

[Brief Description of Drawings]

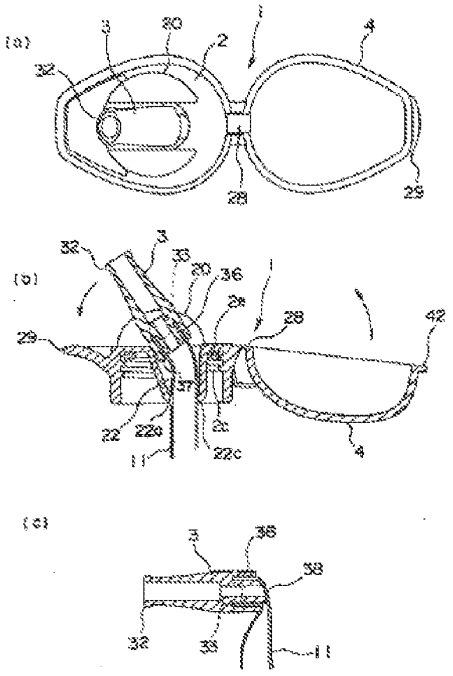
Zak Designs, Inc. Exhibit 1008
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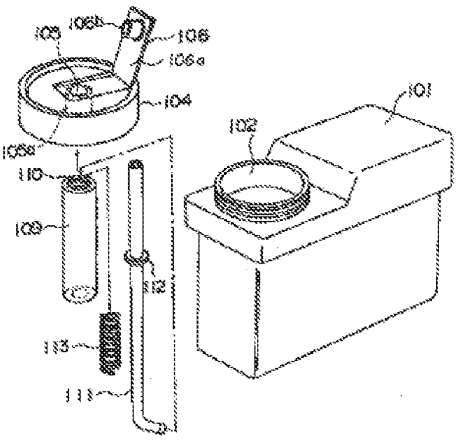
[FIG. 1] A top view showing the configuration of Embodiment 1.
[FIG. 2] An X-X sectional view of FIG. 1
[FIG. 3] A sectional view of a main body.
[FIG. 4] A sectional view showing the operation of Embodiment 1.
[FIG. 5] A sectional view showing the configuration of Embodiment 2.
[FIG. 6] A sectional view showing the operation of Embodiment 2.
[FIG. 7] An explanatory view showing the configuration of a conventional device.
[FIG. 8] An explanatory view showing the configuration of another conventional device.
[Explanation of Reference Numerals]
1: Bottle cap
2: Main body
2a: Inner surface side
2b: Outer surface side
2c: Female screw
2d: Liquid passing cylinder
2e: Packing
3: Nozzle
4: Lid (lid member)
11: Straw
12: PET bottle
13: Internal liquid
21: Support portion
22: Storage groove
22a: Insertion hole
22c: Folded portion
23: Bearing
24: Ring-shaped groove
25: O-ring
26: Cavity
27: Vent
28: Hinge portion
29: Latching portion
31: Base portion
32: Suction port
33: Rotation shaft
34: Projection
36: Cylindrical groove
37: Projecting portion
38: Inclined plane
41: Hinge shaft
O-O: Shaft center
Y0-Y0: Cap shaft
Y1-Y1: Central shaft
δ: Difference
θ: Rising angle
[Amendment 2]
[Document Title for Parts Amended] Drawing
[Item Name for Parts Amended] FIG. 5
[Method for the Amendment] Modification
[Content of the Amendment]
[FIG. 5]



[Amendment 3]
[Document Title for Parts Amended] Drawing
[Item Name for Parts Amended] FIG. 6
[Method for the Amendment] Modification
[Content of the Amendment]
[FIG. 6]

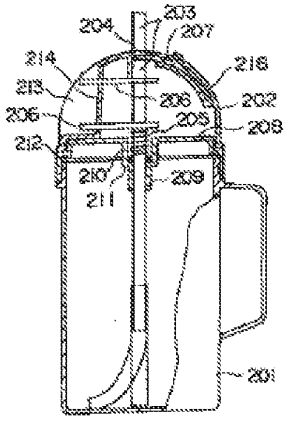


[Amendment 4]
[Document Title for Parts Amended] Drawing
[Item Name for Parts Amended] FIG. 7
[Method for the Amendment] Modification
[Content of the Amendment]
[FIG. 7]

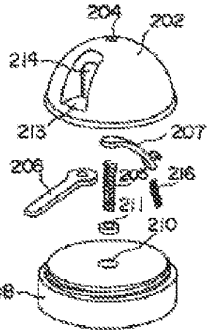


[Amendment 5]
[Document Title for Parts Amended] Drawing
[Item Name for Parts Amended] FIG. 8
[Method for the Amendment] Modification
[Content of the Amendment]
[FIG. 8]

(a)



(b)



[Amendment 6]
[Document Title for Parts Amended] Drawing
[Item Name for Parts Amended] FIG. 9
[Method for the Amendment] Deletion

[Amendment 7]
[Document Title for Parts Amended] Drawing
[Item Name for Parts Amended] FIG. 10
[Method for the Amendment] Deletion

(Continued from the front page)

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4F033 BA04 CA04 DA01 EA01 NA01

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

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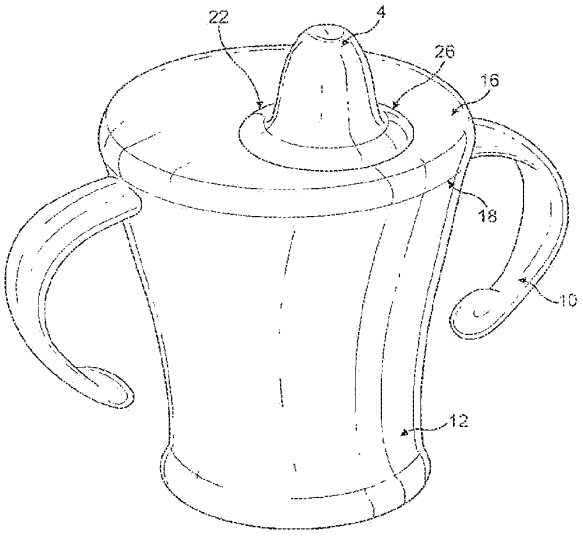
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[Continued on next page]

(54) Title: A DRINKING VESSEL



(57) Abstract: The present invention relates to a drinking vessel comprising a vessel body (12) and a cover (16), wherein the cover includes a flexible mouthpiece (24) defining a flow passage from the vessel body, the mouthpiece having a top with a duck bill valve and sides, arranged such that on application of a force to the sides of the mouthpiece, the mouthpiece deforms inwardly and the duck bill valve opens.

WO 03/101261 A1

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

A Drinking Vessel

The invention relates to a drinking vessel, for example a vessel such as a children's drinking vessel and preferably an infant drinking vessel.

A range of infant cups are known, for example of the type generally termed trainer cups, including a cup-like body often including handles for ease of use by an infant, a cover and a drinking spout provided on the cover. The cup is easier to handle and allows the infant to drink from the cup with less risk of spillage.

Various improvements to infant cups are known which typically use a variety of types of suction actuated non-spill valves, either at the tip of a rigid spout or mounted in the lid itself, which allows liquid to flow when the infant sucks but closes otherwise. As a result the cup is largely spill-proof under normal conditions.

It will be appreciated that biting or prolonged sucking on a spout can lead to tooth damage for the infant during the important teething stage, especially for infants up to 9 months of age. As the known systems allow liquid to flow only under pure suction, "grazing" is encouraged whereby the infant sucks continually, as can be the case with more standard feeding bottles. This can lead to the infant's teeth being bathed for long periods in the liquid in the cup, which will often be a sweet drink, and again can give rise to tooth damage. Also it is recognised that dental health and ear, nose and throat problems could be caused by the extra suction required (over and above the level of suction needed to drink from a straw or a free flow training spout) to open a

conventional non-spill valve. Furthermore this extra suction can be tiring and off putting for the child.

According to the invention there is provided a drinking vessel comprising a vessel body and a cover, wherein the cover includes a flexible mouthpiece defining a flow passage from the vessel body, the mouthpiece having a top with a duck bill valve and sides, arranged such that on the application of a force to the sides of the mouthpiece, the mouthpiece deforms inwardly and the duck bill valve opens. The sideways force is applied substantially in the same direction as the duck bill valve. For the purposes of this invention, the mouthpiece can be a spout.

As a result the vessel promotes a healthy drinking action, especially for infants. The duck bill valve is biased towards the closing direction and will not open when suction alone is applied. Instead it is necessary to apply a force to the sides of the mouthpiece which then opens the duck bill valve. As a result the duck bill valve opens under a pursing, biting or stripping action rather than sucking which is believed to be preferable to a sucking action. The flexibility of the mouthpiece also reduces the risk of damage to the infant's teeth.

The mouthpiece is preferably formed of flexible resilient material and hence does not damage the user's teeth.

Embodiments of the invention will now be described, by way of example, with reference to the drawings, of which:

Fig. 1a shows the assembled drinking vessel according to the present invention
Fig. 1b shows a sectional of the cover with a removable/replaceable spout

Fig. 1c shows a sectional view of the cover with an integrally moulded spout

Fig. 1d shows a sectional view of the cover with an integrally moulded spout and duck bill valve

Fig. 2a shows a perspective view of the spout forming part of the present invention

Fig. 2b shows a sectional view of the spout with the duck bill valve in its closed position

Fig. 2c shows a sectional view of the spout with the duck bill valve in its open position

Fig. 2d shows a view of the spout from above with the duck bill valve in its closed position

Fig. 2e shows a view of the spout from above with the duck bill valve in its open position

Fig. 3a shows a sectional view of the spout integrally moulded onto a screw ring, for attachment to a bottle or disposable container with a clip on hygenic cover

Fig 3b shows a sectional view of the spout integrally moulded onto a screw ring and internal hygenic cover connected via a live hinge.

Fig 3c shows a sectional view of the spout integrally moulded onto a cover with a hygenic cover clipped to the cover and an integral duck bill valve mould into the cover.

Referring to Fig. 1a to 1c, the basic components of an infant cup according to one embodiment of the present invention are shown. It will be noted that the invention is not limited to the specific construction shown. The infant cup is designated generally a cup body 12 of generally circular cross section. The cup

may alternatively have 10 one or two handles allowing the infant to grip the cup firmly.

The cup further includes a cover 16 having a skirt 18 wherein the cover 16 is a press fit over the cup. The cup body 12 and cover 16 are preferably made of polypropylene although any other suitable materials can be used. The threaded locking ring may have an integrally moulded or clip on hinged hygienic cover (90) which will cover the spout when not in use and rotate away from the spout for usage.

The cover 16 further provides a mouthpiece (24), which is integrally moulded into place via a second shot process allowing the cover 16 and spout 24 to be one complete unit

The cover 16 includes a general circular threaded orifice 22 arranged to receive a threaded locking ring 26 from above which the spout is integrally moulded onto via a second shot process.

The outer shape of the mouthpiece 24 is generally oval in cross-section in a horizontal plane and can follow the conventional shape of infant cup spouts. However, as discussed in more detail below, the mouthpiece is formed of a flexible, resilient flexible elastomer material such as PU rubber.

The cover 16 includes a tab (25) to provide purchase for the user to remove the cover 16 more easily. The positioning of any such formations must of course be selected so as not to impede the use of the cup by the infant in any way.

As can be seen in Figures 2a to 2e, the mouthpiece includes an upper mouthpiece portion 40 having a duck bill valve 44. Referring to figure 2D, the upper mouthpiece portion can be viewed as being substantially oval in cross-section having two "long sidewalls" 50 visible in front cross-section and two "short sidewalls" 52 visible in side cross-section terminating in a concave top. The duck bill valve 44 is located perpendicular to the long sidewalls 50.

In a preferred embodiment of the present invention as illustrated in Figures 2a-c, the mouthpiece comprises a concave dome area (80) above the duck bill valve (44). This dome area (80) protects the duck bill valve from damage caused by biting on the mouthpiece. The duck bill valve is thus domed downwards at the base of the dome area (80) as illustrated in Figure 2b.

When suction is applied to the mouthpiece (40), the duck bill valve (44) is pulled more tightly closed thereby preventing the flow of liquid from the drinking vessel. The duck bill valve opens only under a biting or stripping action.

To aid orientation of the mouthpiece in the mouth, the mouthpiece (40) may comprise a lipped rim (82) and one or more dimples (84). The mouth of the user is guided between the rim (82) and the dimples (84) so that the biting or stripping action occurs such that a sideways force is applied in the same direction on the duck bill valve to ensure opening of the duck bill valve and resulting flow of liquid.

In use, the action of pursing, biting or stripping the mouthpiece in the direction of the duck bill valve causes the opening of the duck bill valve and allows fluid

flow. As a sideways force is applied to the long sidewalls 50, the duck bill valve is forced open allowing the flow of fluid. It is further possible to vent the drinking vessel by manually applying a sideways force to the long sidewalls 50 of the mouthpiece (for example by squeezing the sidewalls 50 between the thumb and forefinger). Alternatively, the vessel may comprise a second duck bill valve, preferably on the cover 16 which will automatically release or equalise pressure within the drinking vessel when the vessel is in use.

The second duck bill valve allows airflow into the vessel when the spout is actively in use thus preventing a vacuum from building up, said vacuum preventing the free flow of liquid. It will be appreciated that in the illustrated embodiment the duck bill valve is aligned to open when the mouthpiece is fitted into the mouth in its most comfortable position.

A particular advantage of the configuration according to the present invention is that it allows a natural drinking action especially in younger infants. In order to open the duck bill valve, lateral pressure on the mouthpiece by the infant's teeth, lips or gums is required. While this pressure can result from normal biting or squeezing, the 'stripping' action used by an infant when breastfeeding will also open the duck bill valve. It is well established that this stripping action is beneficial to the infant's dental development and that the transition to a pure sucking action too early can be detrimental. In addition, this stripping action which is peristaltic in nature provides a discontinuous flow of liquid which can reduce caries. In addition, because the mouthpiece is of flexible material and, in the preferred embodiment, the duck bill valve is also made in no more than semi-rigid material, physical damage to the infant's teeth is reduced or avoided. The sensitivity of the mouthpiece coupled with activation by direct pressure or

by a stripping action gives rise to a range of advantages over known suction activated values.

Because the degree to which the duck bill valve is opened is dependent on the force applied to the mouthpiece, the user can control the flow rates by varying the force exerted on the mouthpiece. In addition the responsiveness can be varied by altering the materials, their softness/hardness flexibility or their thickness. The mouthpiece can be provided with a portion of the mouthpiece for example the top portion being flexible. Alternatively, the whole of the mouthpiece may be flexible. As a result a fully responsive system is provided which can be adapted to change with the infant's changing needs.

As illustrated in Figure 3, the mouthpiece and locking ring (26) of the drinking vessel may comprise a cover (90) clipped onto or integrally moulded to the mouthpiece/locking ring unit. The cover (90) protects the mouthpiece when the drinking vessel is in transit or not in use. Preferably, the cover is recessed into the cover (16) of the drinking vessel when the drinking vessel is in use.

As illustrated in Figure 3c, the cover (16) may further comprise a second duck bill valve (92). This valve (92) equalises or releases the pressure within the container when in use.

It will be appreciated that the specific configuration described with reference to Figs. 1, 2 and 3 comprises only one embodiment of the invention; various other ways of forming the invention are encompassed by the present invention. For example, the cover 16 may have a threaded skirt 18 (not shown) allowing the cover to be screwed into a co-operating screw thread (not shown) on the thread.

It will be appreciated that the mouthpiece may contain more than one duck bill valve, for example a two or multi-valve mouthpiece.

The various components are easily separated for cleaning, provide no dirt traps and are indeed easily cleaned. The components are of a size and shape that remove any choking hazard and again makes cleaning more easy – for example the mouthpiece comprises a single integral piece. It will be appreciated that of the various materials discussed above, different components can be changed or altered as long as the relevant functional requirements are met but preferably the selected materials ensure that operation of the mouthpiece is not affected by the range of temperatures to which the cup may be subjected or to sudden changes in temperature experienced in cleaning, use and/or storage of the cup.

Although the system is discussed specifically in relation to infant drinking vessels, it may be used equally in other appropriate drinking vessels where a non-spill action is required, for example adult or sports drinking bottles. The vessels may be of the multi-use kind or single use, disposable vessels. The vessel body may be a beaker, bottle or disposable container such as a carton or bag which may have no handles.

Claims

1. A drinking vessel comprising a vessel body and a cover, wherein the cover includes a flexible mouthpiece defining a flow passage from the vessel body, the mouthpiece having a top including a duck bill valve and sides arranged such that on the application of a sideways force to the sides of the mouthpiece, the mouthpiece deforms inwardly and the duck bill valve opens.

2. A drinking vessel as claimed in claim 1 wherein the sideways force is applied to the mouthpiece in substantially the same direction as the duck bill valve.

3. A drinking vessel as claimed in claims 1 or 2 wherein the sideways force is provided by a pursing, biting or striping action.

4. A drinking vessel as claimed in anyone of claims 1 to 3 wherein the mouthpiece is substantially oval in cross-section with two long sidewalls and two short sidewalls, and where the duck bill valve is perpendicular to the long sidewalls.

5. A drinking vessel as claimed in anyone of claims 1 to 4 wherein the mouthpiece is composed of flexible, resilient material.

6. A drinking vessel as claimed in any one of claims 1 to 5 wherein a portion of the mouthpiece is flexible.

7. A drinking vessel as claimed in any one of claims 1 to 5 wherein all of the mouthpiece is flexible.

8. A drinking vessel as claimed in any one of claims 1 to 7 further comprising a second pressure equalising valve.

9. A drinking vessel as claimed in claim 8 wherein the second pressure equalising valve is a duck bill valve.

10. A drinking vessel as claimed in any one of claims 1 to 9 further comprising an integral hygienic cover

11. A mouthpiece having a top including a duck bill valve and sides, arranged such that on application of a sideways force to the sides of the mouthpiece, the duck bill valve opens.

12. A drinking vessel substantially as described herein with reference to one or more of the drawings.

13. A mouthpiece substantially as described herein with reference to one or more of the drawings.

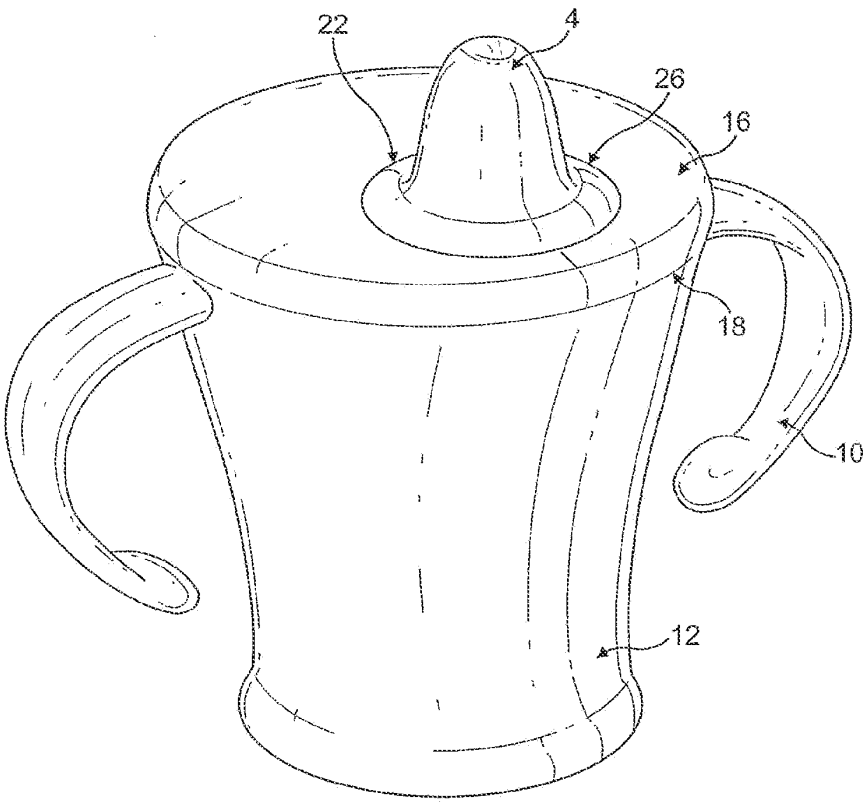


FIG. 1A

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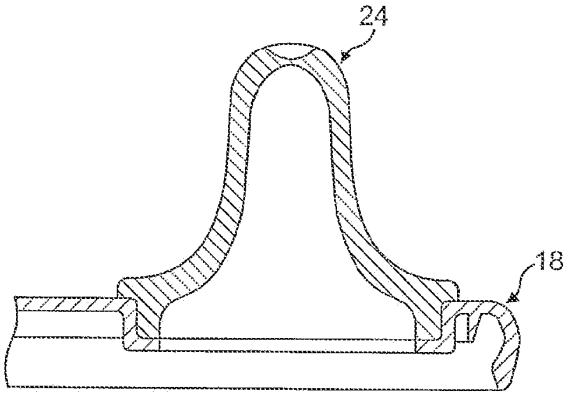


FIG. 1B

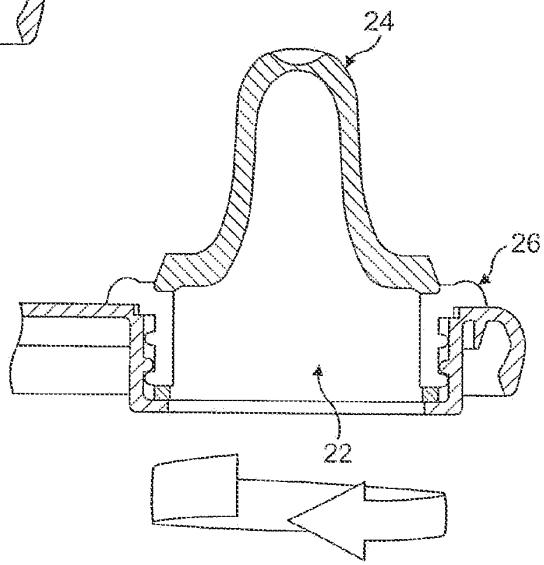


FIG. 1C

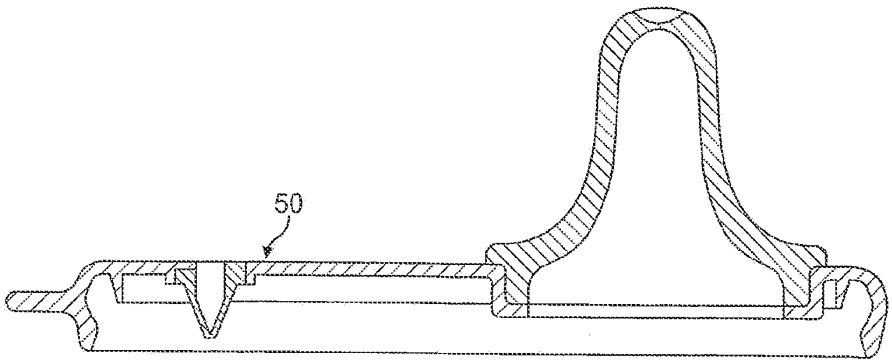


FIG. 1D

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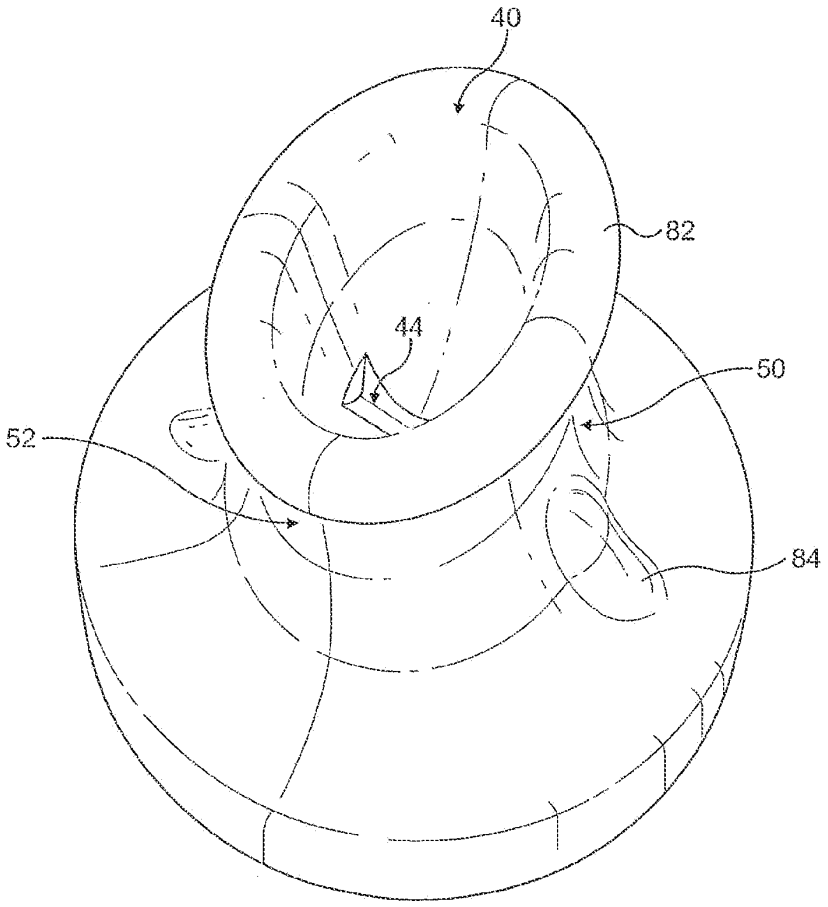


FIG. 2A

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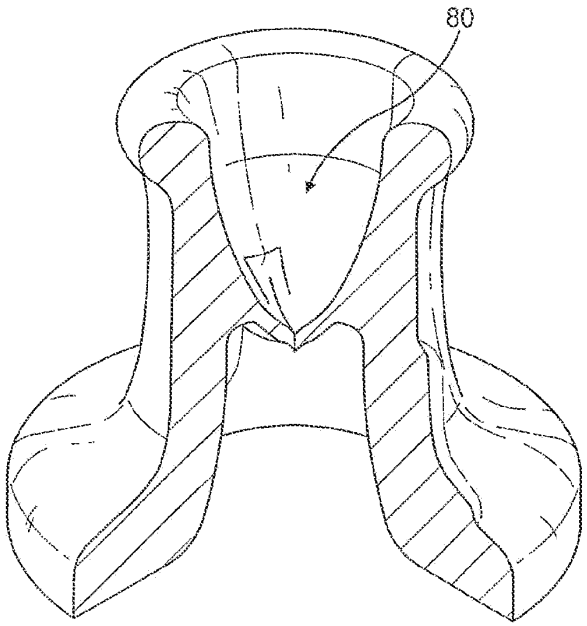


FIG. 2b

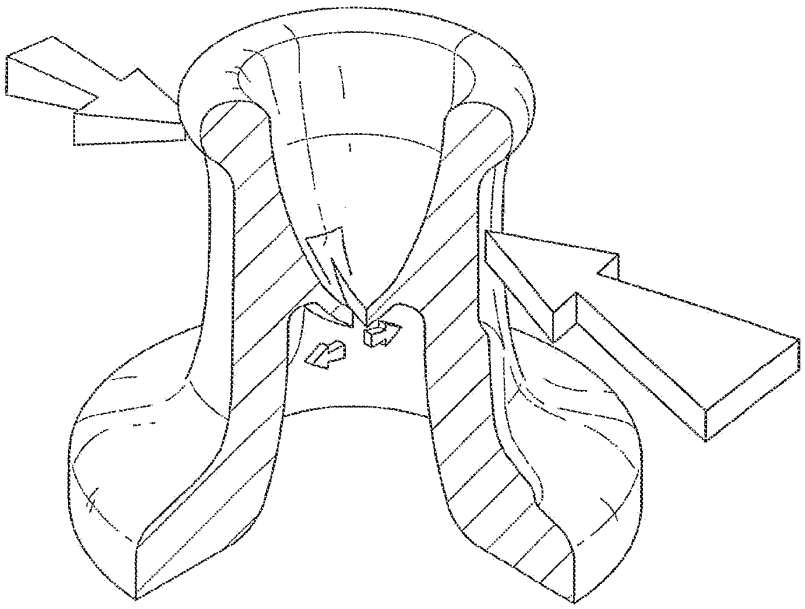


FIG. 2C

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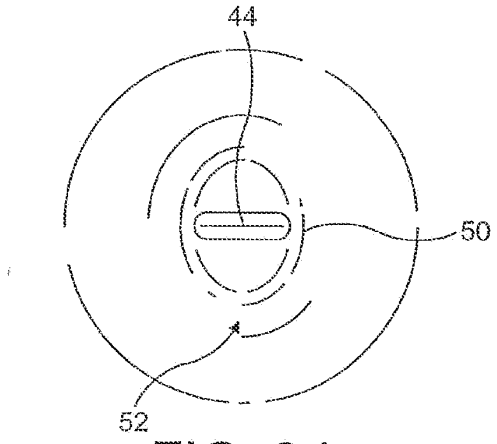


FIG. 2d

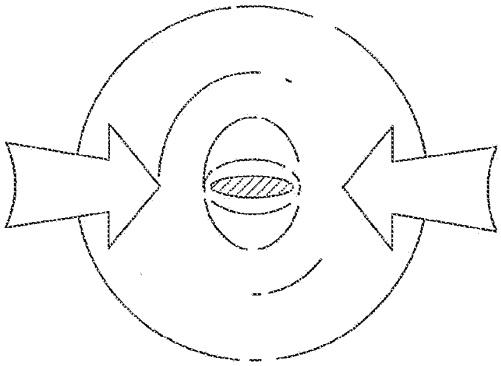


FIG. 2e

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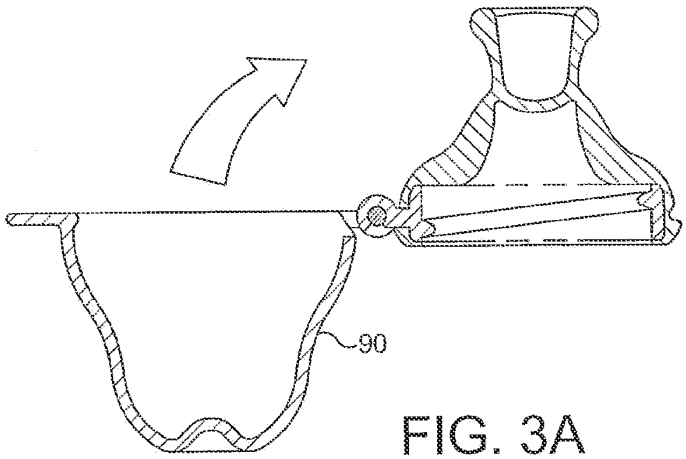


FIG. 3A

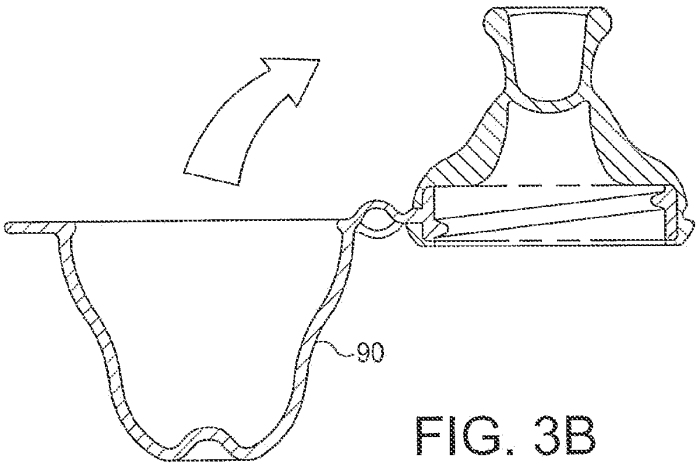


FIG. 3B

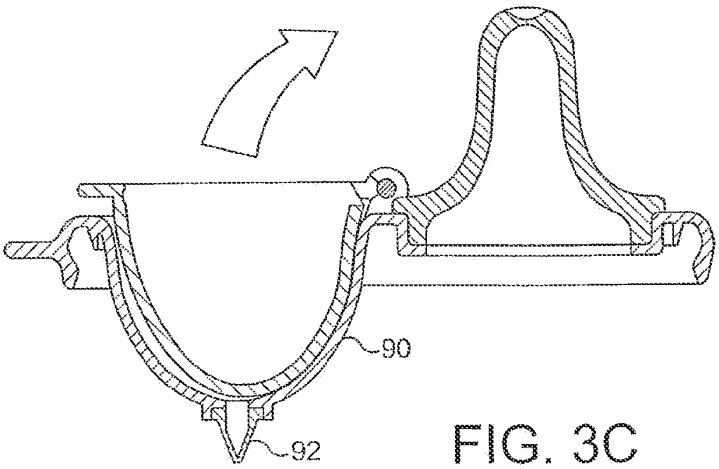


FIG. 3C

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 03/02357

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A47G19/22 A61J11/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A47G A61J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	US 5 035 340 A (TIMMONS SARAH J) 30 July 1991 (1991-07-30) figures 3,5	1-3,5,7, 11-13
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X	US 5 601 207 A (PACZONAY JOSEPH R) 11 February 1997 (1997-02-11) column 3, line 3 -column 4, line 57	1-6, 11-13
	-/--	

[X] Further documents are listed in the continuation of box C. [X] Patent family members are listed in annex.

° Special categories of cited documents :

'A' document defining the general state of the art which is not considered to be of particular relevance

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'O' document referring to an oral disclosure, use, exhibition or other means

'P' document published prior to the international filing date but later than the priority date claimed

'T' later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

'X' document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

'Y' document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

'&' document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
4 September 2003	22/09/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Reichhardt, O

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INTERNATIONAL SEARCH REPORT

International Application No
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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A	WO 02 22073 A (JACKEL INTERNAT LTD) 21 March 2002 (2002-03-21) figure 13A	10

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United States Patent [19]

Phlaphongphanich

[11] **Patent Number: 4,676,386**

[45] **Date of Patent: Jun. 30, 1987**

[54] **NIPPLE**

[75] Inventor: **Vichai Phlaphongphanich**, Bangkok, Thailand

[73] Assignee: **Royal American Industries, Inc.**, Westboro, Mass.

[21] Appl. No.: **815,450**

[22] Filed: **Dec. 31, 1985**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 673,665, Nov. 21, 1984, abandoned.

[51] **Int. Cl.**[4] **A61J 11/00**; A61J 11/04

[52] **U.S. Cl.** ..... **215/11 R**; 128/360

[58] **Field of Search** ..... 215/11 R, 11 A–11 E; 128/359, 360

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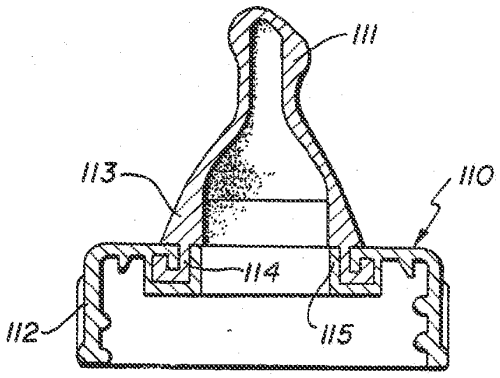
457009	3/1928	Fed. Rep. of Germany	215/11 R
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Primary Examiner—William Price
Assistant Examiner—Sue A. Weaver
Attorney, Agent, or Firm—Norman S. Blodgett; Gerry A. Blodgett

[57] **ABSTRACT**

Baby bottle nipple or pacifier having a mouth portion made of elastomer and a base portion made of semi-rigid thermoplastic polymer. The mouth portion is formed in a hot first mold and the mouth portion is transferred to relatively cold second mold in which the base portion is molded around it.

5 Claims, 17 Drawing Figures



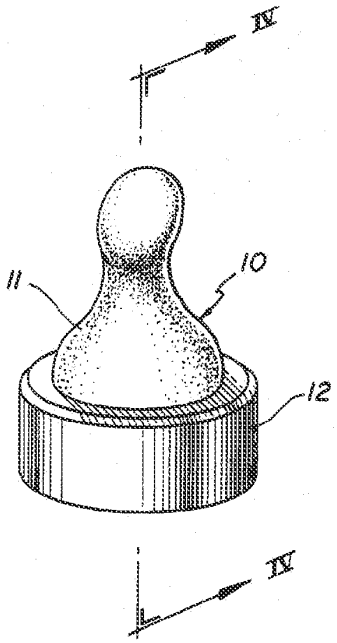


FIG. 1

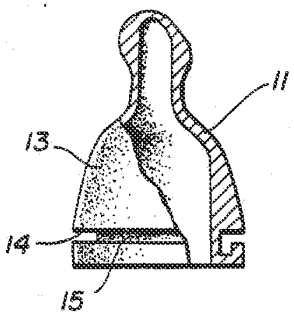


FIG. 2

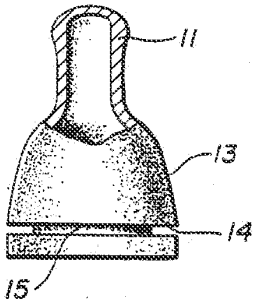


FIG. 3

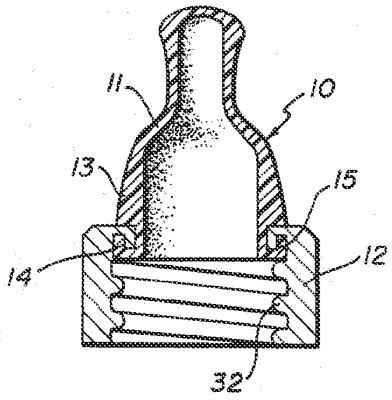


FIG. 4

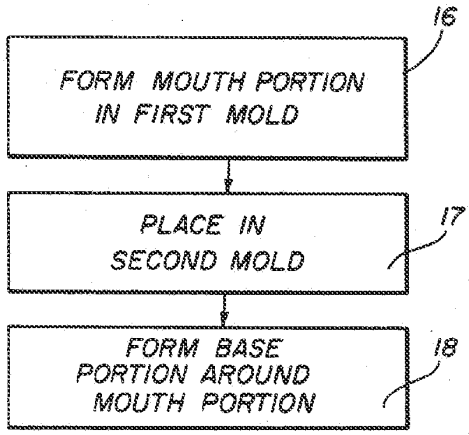
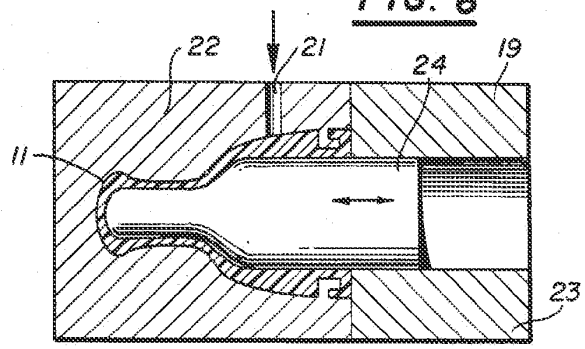


FIG. 5

FIG. 6



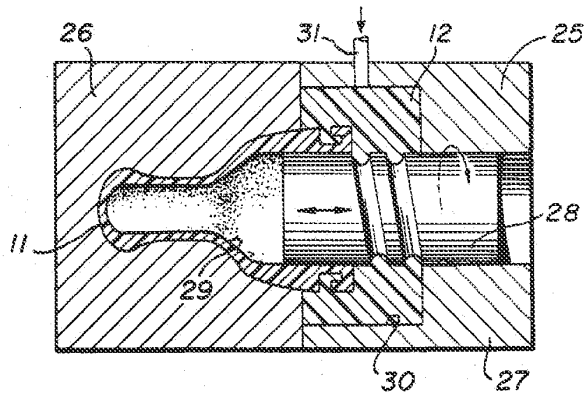


FIG. 7

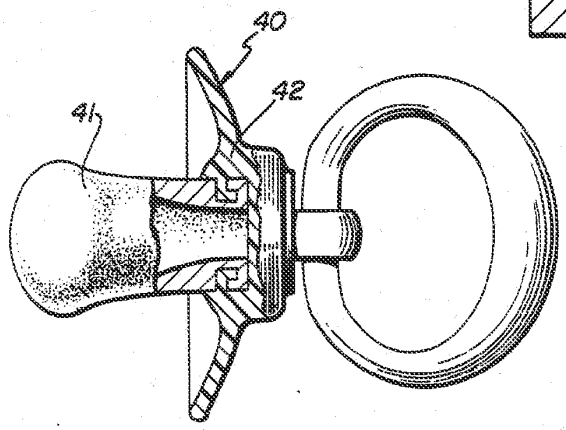


FIG. 8

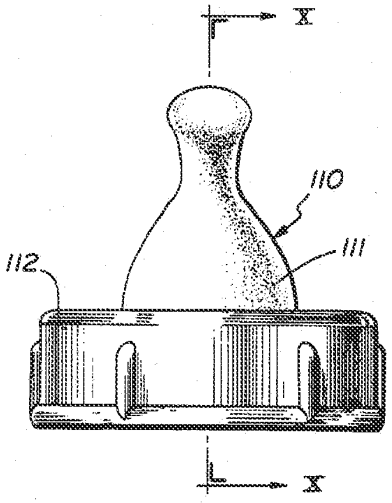


FIG. 9

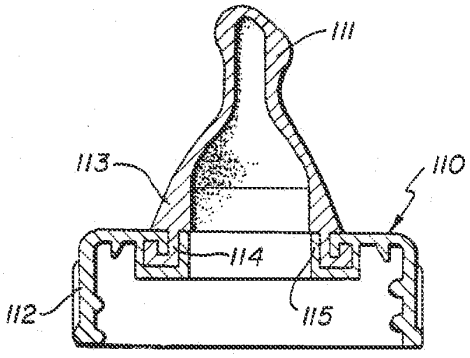


FIG. 10

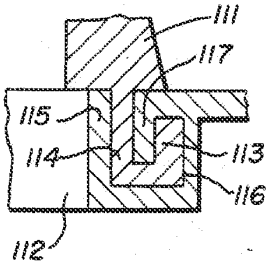


FIG. 11

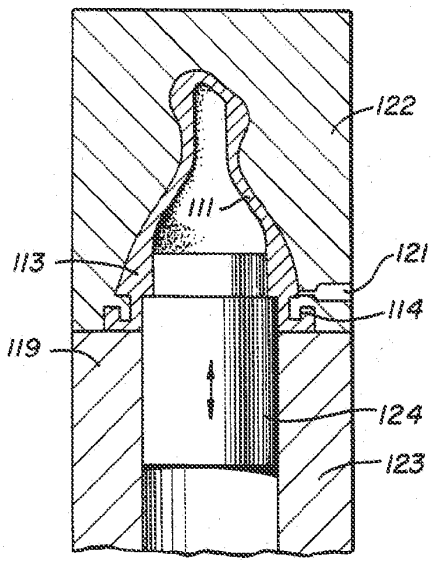


FIG. 12

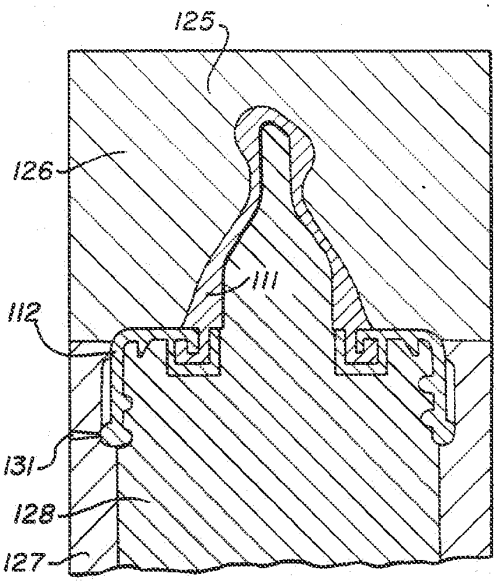


FIG. 13

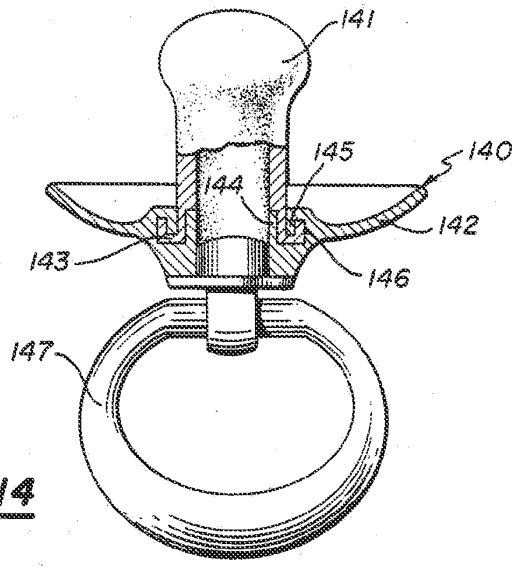


FIG. 14

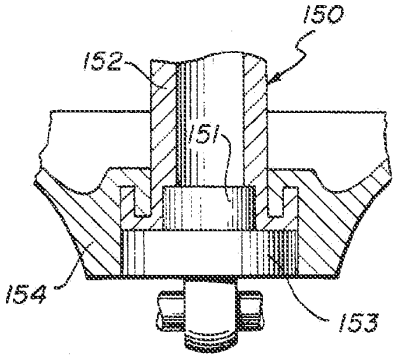


FIG. 15

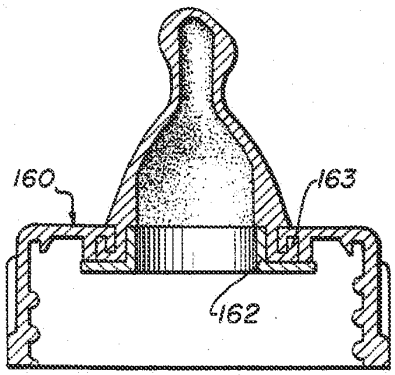


FIG. 16

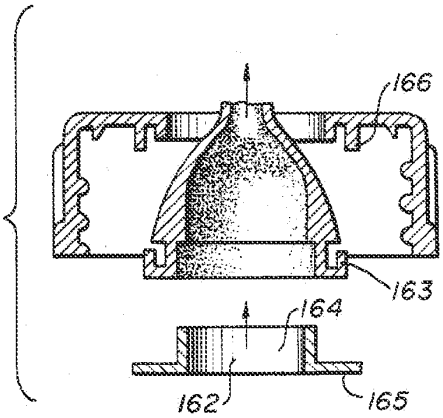


FIG. 17

NIPPLE

This is a continuation-in-part of copending application Ser. No. 673,655 filed on Nov. 21, 1984, abandoned.

BACKGROUND OF THE INVENTION

The traditional construction of baby feeders has involved the provision of a bottle having a wide mouth to which an elastic nipple is attached by means of a threaded cap. When the entire nipple and cap combination is formed from the best materials, such as liquid silicone rubber, it becomes quite expensive. At the same time, the use of an elastic nipple that is separate from a semi-rigid bottle cap leads to a situation in which the baby sometimes pulls the nipple out of the cap. These and other difficulties experienced with the prior art devices have been obviated in a novel manner by the present invention.

It is, therefore, an outstanding object of the invention to provide a nipple or the like formed of a combination of expensive and inexpensive materials.

Another object of this invention is the provision of a nipple which can be attached to a baby bottle in such a way that it cannot be pulled free by the baby.

A further object of the present invention is the provision of a method of manufacturing a hybrid baby bottle nipple with an orthodontic mouth portion.

Another object of the invention is the provision of a nipple or the like in which only a small portion is made of an expensive elastic material.

It is another object of the instant invention to provide a method of making a nipple which is an integral combination of an elastomer mouth portion and a semi-rigid cap portion.

With these and other objects in view, as will be apprarent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

SUMMARY OF THE INVENTION

In general, the invention consists of a nipple or the like having a mouth portion formed of an elastomer having a high melting temperature, and a cap portion formed around the mouth portion, the cap portion being formed of a polymer having a relatively low melting temperature.

More specifically, the invention consists of a method of forming the nipple consisting of forming in a first mold the mouth portion of an elastomer having a high melting temperature, placing the mouth portion in a second mold, and forming a cap portion around the mouth portion of a thermoplastic polymer having a relatively low melting temperature.

BRIEF DESCRIPTION OF THE DRAWINGS

The character of the invention, however, may be best understood by reference its structural forms, as illustrated by the accompanying drawings, in which:

FIG. 1 is a perspective view of a nipple incorporating the principles of the present invention,

FIG. 2 is a front elevational view of the nipple with portions broken away,

FIG. 3 is a side elevational view of the nipple with portions broken away,

FIG. 4 is a vertical sectional view of the nipple taken on the line IV—IV of FIG. 1,

FIG. 5 is a flow chart of the steps used in a process for manufacturing the nipple,

FIG. 6 is a vertical sectional view of a first mold used in the process,

FIG. 7 is a vertical sectional view of a second mold used in the process,

FIG. 8 is an elevational view with portions broken away of a pacifier making use of the principles of the present invention,

FIG. 9 is a front elevation view of a modified form of the nipple,

FIG. 10 is a vertical sectional view of the nipple taken on the line X—X of FIG. 9,

FIG. 11 is an enlarged sectional view of a portion of the nipple,

FIG. 12 is a vertical sectional view of a mold for forming the mouth portion of the nipple,

FIG. 13 is a vertical sectional view of a mold for forming the cap portion of the nipple,

FIG. 14 is an elevational view with portions broken away of a modified form of pacifier,

FIG. 15 is a vertical sectional view of a portion of a still further modification of the pacifier,

FIG. 16 is a vertical sectional view of a further modification of the nipple, and

FIG. 17 is an exploded view of the nipple of FIG. 16, showing the manner of assembly of the parts.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIGS. 1–5, which best show the general features of the invention, it can be seen that the nipple, indicated generally by the reference numeral 10, consists of a mouth portion 11 and a base or cap portion 12.

The mouth portion 11 is formed of an elastomer having a high melting temperature. The cap portion 12 is formed around the mouth portion, and is formed of a polymer having a relatively low melting temperature. In the preferred embodiment, the elastomer is liquid silicone rubber.

As is evident in FIGS. 2 and 3, the mouth portion 11 has a lower skirt 13 formed with an external groove 14 into which the cap portion is locked. The groove extends entirely around the skirt, has an L-shaped cross-section, and has a textured surface 15.

FIGS. 5, 6, and 7 illustrate the method used in manufacturing the nipple. The process consists of a first step 16 that consists of injection-forming the mouth portion 11 in a first mold 19 of an elastomer having a high melting temperature and then a second step 17 of placing the mouth portion 11 in a second mold 25.

The third step 18 consists of injection-forming the cap portion 12 around the mouth portion of a thermoplastic polymer having a relatively low melting temperature.

Since the nipple is orthodontic, the mouth portion 11 is formed in a non-drawable, thin-walled shape and the elastomer is liquid silicone rubber having a melting temperature in the order of 400° to 500° F. The first mold 19 is operated at a high temperature and the second mold 25 is operated at a relatively low temperature, in the order of 250° F. The elastomer is expensive and the polymer is inexpensive.

In FIG. 6, it can be seen that the first mold 19 consists of a first part 22 having the cavity with an injection port 21 for forming the mouth portion 11, a second part 23, and a third part 24 which defines the interior of the

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mouth portion. The first part **22** and the second part **23** are moved apart to permit removal of the workpiece or product; the third part may have independant movement to facilitate removal of the mouth portion, which is non-drawable because of the orthodontic shape. This shape makes it necessary to collapse it elastically to permit removal from the mold. This is made necessary also by the configuration of the groove **14**.

FIG. **7** illustrates the manner in which the second mold **25** has a first part **26** having a cavity in which the preformed mouth portion **11** is inserted. A second part **27** is provided with a cavity **30** in which the cap portion **12** is formed by injection of molten plastic through an injection port **31**. A third part **28** is in the form of a plug that lies in the cavity **30** to define the inner surface of the cavity to support the preform and to form a thread **32** (see FIG. **4**) on the inside of the base portion, which the thread serves to lock the assemblage onto the top of a baby bottle. The third part **28** must, of course, be removable by turning in the well-known manner, because of the thread on the product.

The operation and advantages of the invention will now be readily understood in view of the above description. The nipple **11** serves the dual functions of the traditional nipple and baby bottle cap. The unit is threaded onto the baby bottle after the liquid formula has been placed in the bottle. Because of the unitary construction, the baby cannot separate the mouth portion from the base portion, so that the nipple of the invention is very safe to use. The mouth portion **11** can be made of a very satisfactory (but expensive) elastomer, such as liquid silicone rubber, while the base portion **12** can be made of an inexpensive, semi-rigid polymer, such as polypropyiene. The resulting combination then becomes inexpensive enough to be commercially acceptable, i.e., affordable by a wide range of consumers.

FIG. **8** shows a pacifier **40** constructed in the manner described above. A mouth portion **41** made of the liquid silicone rubber is formed in a first mold. The material has a high melting temperature, i.e., in the order of 500° F. The mouth portion is then placed in a second mold and a base portion **42** is molded around it, using an injection temperature that is relatively low, such as 250° F.

FIG. **9** shows a nipple **110** which is a modification of the nipple **10**. The nipple **110** is provided with an elastomer mouth portion **111** that is attached to a cap or base portion **112** formed of a semi-rigid polymer.

FIG. **10** illustrates the manner in which the mouth portion and the base portion are connected. The mouth portion is of orthodontic shape and has a skirt **113** with an annular appendage **114** of U-shaped cross-section. The base portion **112** is formed around the skirt to interlock with the appendage. The base portion is provided with a tubular portion **115** that lies inside the skirt and presses outwardly against the appendage **114**. The outer leg of the appendage is larger that the other parts to promote adequate locking.

FIG. **11** shows in detail the details of the interlocking between the mouth portion and the base portion. The base portion **112** has a second tubular portion **116** that lies outside the appendage **114** and presses inwardly against it. The base portion also has a third tubular portion **117** that lies in the appendage **114** and engages the facing surfaces of the U-shaped cross-section.

FIG. **12** illustrates the mold **119** that is used to form the mouth portion **111**. The mold consists of a first part **122** that contacts a second part **123**. An injection port **121** leads into the cavity in which the mouth portion is formed. A third part **124** is slidably carried in a bore in the second part **123**. The third part forms and supports the skirt **113** and the appendage **114** during formation.

In a similar way, FIG. **13** shows the mold **125** for forming the cap portion **112**. An injection port **131** leads into the cavity. The upper part of the mouth portion is inserted in a first part **126** of the mold with the appendage extending downwardly into a portion of the cavity formed in a third part **128**. The cap cavity is formed in the first part **126**, the second part **127**, and the third part **128**.

The pacifier **140** shown in FIG. **114** uses a means for locking together an elastomer mouth portion **141** to a semi-rigid polymer base portion **142** that is similar to the system shown in the nipple of FIG. **10**. The mouth portion has a lower appendage **143** that has a U-shaped cross-section about which the base portion is molded. A tubular portion **144** supports the inner surface of the appendage, a tubular portion **145** extends into the groove in the appendage, and a wall **146** supports the outside of the appendage. The usual pacifier ring **147** is pivotally mounted on the base portion.

In FIG. **15**, a pacifier **150** is shown in which a plug **151** supports the inner surface of the appendage of the mouth portion **152**. A larger plug **153** supports the bottom wall of the appendage. The plug **153** is mounted in a bore formed in the base portion **154**.

The nipple **160** illustrated in FIG. **16** is similar to that shown in FIG. **10**, but is provided with a base portion that has a separate plug **162** to support the inner wall of the appendage **163**. The details are best shown in FIG. **17**. The plug **162** has a tubular portion **164** that fits inside the the appendage. It also has a radial portion **165** that fits against the bottom of the appendage and is cemented or fused to a second tubular portion **166** forming part of the base portion.

An examination of FIGS. **10**, **11**, **14** and **16** shows that, in each case, the base portion can be described as having a cavity of annular form extending downwardly from an upper surface. The cavity is concentric with the skirt of the mouth portion. The cavity has a U-shaped cross-section defined by a first tubular leg that opens at the upper end on the said surface and a second tubular leg which is concentric with the first leg and joined to it by a radial passage. The skirt of the mouth portion enters the cavity through the said opening; it passes down the first leg, through the radial passage, and up the second leg. In this way, the mouth portion is securely locked to the base portion.

More specifically, the radial dimension (thickness) of the second leg is substantially greater than (a) the first leg, and (2) the vertical dimension of the radial passage. This construction serves to inhibit the pulling of the skirt from the cavity.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, however, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

The invention having been thus described, what is claimed as new and desired to secure by Letters Patent is:

1. Nipple, comprising:

(a) a mouth portion of orthodontic shape formed of an elastomer and having a skirt with an annular appendage of U-shaped cross-section, and

(b) a base portion made of a semi-rigid polymer and formed around the skirt of the mouth portion to interlock with the appendage, the base portion having a tubular portion that lies inside the skirt and presses outwardly against the appendage.

2. Nipple as recited in claim 1, wherein the base portion has a second tubular portion that lies outside the appendage and presses inwardly against it.

3. Nipple as recited in claim 2, wherein the base portion has a third tubular portion that lies in the appendage and engages the facing surfaces of the U-shaped cross-section.

4. Nipple, comprising:

(a) a mouth portion of orthodontic form made of an elastomer and having a generally tubular skirt,

(b) a base portion made of semi-rigid polymer, the base portion having a cavity of annular form, which cavity is concentric with the skirt of the mouth portion, wherein the cavity, has a U-shaped cross-section defined by a first tubular leg having an opening onto an outer surface of the base portion and a second tubular leg concentric with the first leg and joined to it by a radial passage, the skirt of the mouth portion entering the cavity through the opening into the first leg, filling the first leg, the radial passage, and the second leg to lock the mouth portion securely to the base portion.

5. Nipple as recited in claim 4, wherein the radial dimension of the second leg is substantially greater than that of the first leg and the vertical dimension of the said radial passage in order to resist the pulling of the skirt from the cavity.

* * * * *

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SIPPER SEAL FOR FLUID-FILLED VESSELS

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Fig. 1

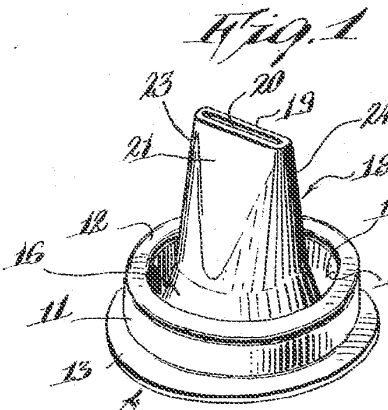


Fig. 2

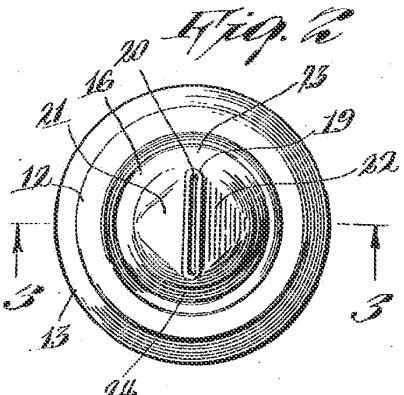


Fig. 4

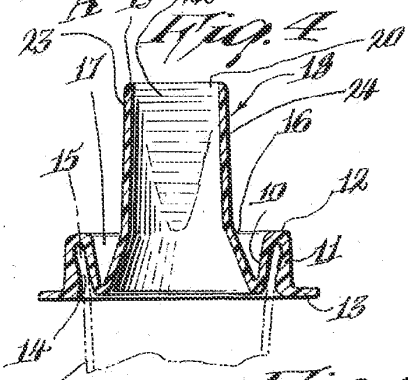


Fig. 3

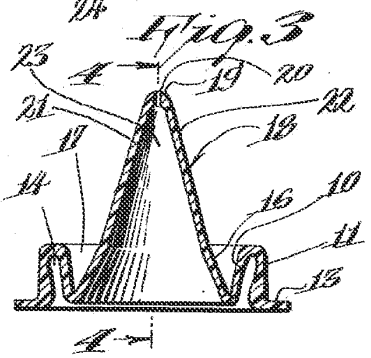
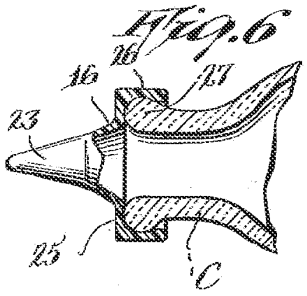


Fig. 5



Fig. 6



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SIPPER SEAL FOR FLUID-FILLED VESSELS

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Fig. 7

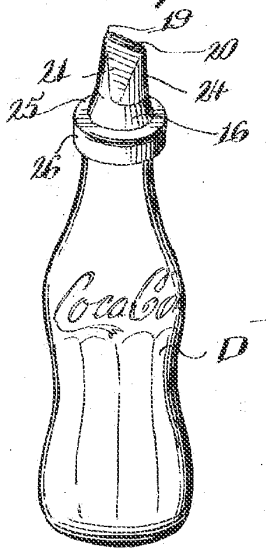


Fig. 8

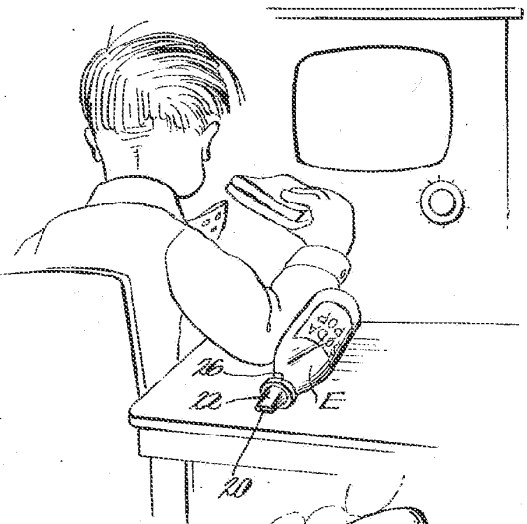
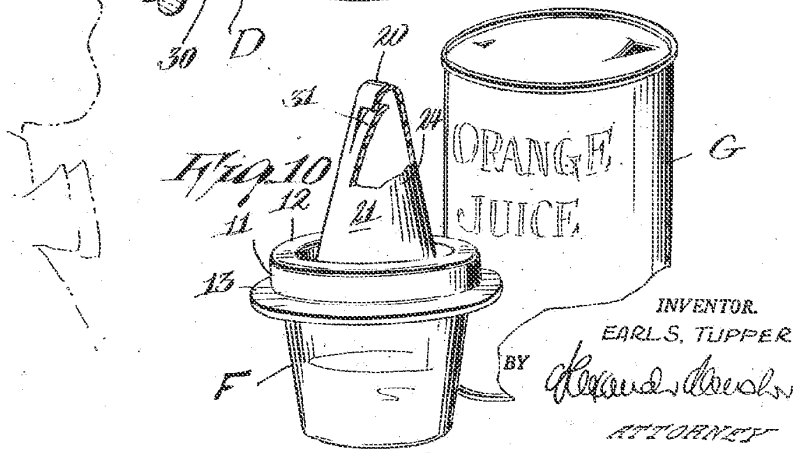


Fig. 9



Fig. 10



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United States Patent Office 2,816,548 Patented Dec. 17, 1957

2,816,548

SIPPER SEAL FOR FLUID-FILLED VESSELS

Earl S. Tupper, Smithfield, R. I.

Application September 16, 1955, Serial No. 534,846

7 Claims. (Cl. 128—252)

This invention relates generally to a removable sipper-type of seal for consuming fluid contents from vessels or containers, but more specifically to a combined seal and sipper for use during fluid consumption whereby flow of fluid contents is prevented when the vessel accidentally assumes horizontal or inverted position during the period of consumption.

A main feature of the invention resides in the provision of a removable sipper-type of seal formed of a sterile, odorless, durable and locally deformable plastic material adapted to serve multiple functions during fluid consumption periods. The device serves to sealably engage the vessel neck at the neck of the bottle or the container inner peripheral portion thereof, to act simultaneously as a sipper for withdrawal of fluid contents, and to act as a check for fluid flow when the vessel accidentally assumes horizontal or inverted position.

A further feature of the invention resides in the structure of a sipper-type of seal provided with central and projecting tubular structure terminating on top in a narrow longitudinal slot communicating with the interior of the vessel and adapted to be filled to check gravity flow when and if there is sufficient of the fluid contents of the vessel to spill over under the action of gravity by reason of accidental horizontal or inverted position of the vessel.

Another feature of the invention resides in the provision of a seal of this type wherein the sipping or drawing operation is capable of functioning by tilting the vessel upwardly with the narrow longitudinal slot within the mouth as when drawing a fluid from the neck of a bottle or by alternate lip or teeth compression of the tubular structure to force fluid contents therethrough based on the principle of nipple feeding.

A further feature of of the invention resides in the provision of a sipping seal of the above type which is sanitary, reusable, capable of serving as a souvenir and which is spill-proof.

A further feature of the invention resides in the provision of a sipper-type of seal which is capable of being used by and is especially attractive to children for withdrawal of liquid contents from vessels in the home, in the den and on common carriers and tending to serve the double function of a sipping seal and check to spillage during the consumption period.

These objects and other incidental ends and advantages of the invention will hereinafter appear in the progress of the disclosure and as pointed out in the appended claims.

Accompanying this specification are drawings showing preferred forms of the invention wherein:

Figure 1 is a view in perspective showing one form of sipper seal per se.

Figure 2 is a top plan view of Figure 1.

Figure 3 is a sectional view of Figure 2 across the plane 3—3 thereof.

Figure 4 is a sectional view of Figure 3 across the plane 4—4 thereof showing the neck of a container in phantom.

Figure 5 is a view in perspective showing a child withdrawing fluid from a baby bottle equipped with a modified form of seal.

Figure 6 is an enlarged sectional view of Figure 5 across the plane 6—6 thereof.

Figure 7 shows the seal of Figures 5 and 6 as applied to a soda bottle.

Figure 8 shows the seal device of Figure 7 applied to a vessel in horizontal position while a child is viewing a television program and eating simultaneously, the bottle having been accidently thrown down.

Figure 9 is a view in perspective partly in section showing another modified form of seal in the form of an insert and being engaged for sipping or fluid withdrawal purposes.

Figure 10 is another modified view of a sipper seal as applied to a vessel containing orange juice.

In accordance with the invention and the preferred forms shown, letter A indicates generally a sipper-type of seal having an engaging groove for the neck of a container or vessel generally indicated by letter B, said engaging groove being of the inverted type and having an inner wall 10, an outer wall 11, a top connecting wall 12, and an outer wall offset shown as outwardly extending flange 13. Said groove walls form a groove 14 for engagement of the neck portion 15 of a vessel shown in phantom lines in Figure 4. Inner groove wall 10 extends inwardly to form a frusto-conical and hollow section 16, the outer face thereof forming with the outer face of groove inner wall 10 a trough 17 of V-shape in cross section.

Formed with and extending upwardly and vertically from the frusto-conical hollow section 16 is an inwardly tapering and tubular section generally indicated by numeral 18. A pair of opposite walls of tubular section 18 are flattened from the top of said tubular section 18 to form a narrow and elongated rim 19 for a slot 20, front and rear walls 21 and 22 being substantially in the form of inverted isosceles triangles, and tapering end walls 23 and 24.

The engaging groove 14 represented by walls 10—12 is capable of being applied to rim 15 of vessel B by spreading the groove at any position over the rim 15 by means of offset or flange 13 and then applying sliding thumb pressure on top wall 12 for complete hermetical engagement. It is preferable that the inner lateral dimension of wall 11 be less than the outer lateral dimension of rim 15 for this purpose so that there will be live engagement at least between the inner face of wall 11 and the vessel neck.

In Figures 5, 6, 7 and 8 are shown a modification of a vessel-engaging structure for the neck of the vessel differing over the groove engaging structure of Figures 1–4 in that the frusto-conical hollow section 16 at the base has a concentric horizontal extension 25 terminating in a downwardly extending peripheral engaging flange 26 for removable and sealing engagement with the outer periphery of the neck 27 of a feeding vessel C (Figure 5), with the outer periphery of the neck of a beverage bottle D (Figure 7), and with the outer periphery of the neck of a pop bottle E (Figure 8). It is to be observed that in Figure 8 the pop bottle E is shown in accidentally displaced horizontal position by a child who is casually eating and following a television program.

In Figure 9 is a modified form of sipper-type of seal and is of the stopper type wherein the frusto-conical section 16 is substituted by a downwardly extending substantially cylindrical section 28 of thicker gauge than the rest of the seal, the said cylindrical section being adapted

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to frictionally engage the inner surface 29 of neck 30 of bottle D in the form of a stopper.

In Figure 10 is shown a sipper-type of seal, similar to that shown in Figures 1–4, engageable with a tumbler F for purposes of sipping a fluid such as fruit juice. A can of orange juice indicated by letter G is shown in Figure 10 for purposes of replenishing tumbler F. The sipper seal of Figure 10 is modified over that shown in Figures 1–4 in having provided therewith a slitted portion 31 for ingress of atmospheric pressure so that the fluid may be drawn out of slot 20 in a continuous operation.

The sipper-type of seal described is capable of formation by known procedures, such as compression, vacuum, injection, and blow molding or otherwise. Moreover, the material from which the seal is formed should be inert, odorless, washable, capable of sterilization, and further should be yieldable and not subject to breakage or comminution by the teeth or mouth of the user as is the case with glass. A plastic of the locally deformable type such as polyethylene or vinyl is preferable for use since said material is compatible with mouth introduction.

The sipper seal and spill-proof features thereof as described is suitable for infants after they have been weaned from a nipple; for children at parties and even for grown-ups. The draw of fluid contents from the longitudinal and narrow opening 20 is smoother and more controlled compared to drawn flow from a bottle neck, and as mentioned there is no danger of introducing shatterable and dangerous glass into the mouth. Moreover, when the elongated slot 20 of the sipper seal is held in any non-drinking position capable of creating a gravity flow toward slot 20, the fluid tends to completely fill the entire area of the slot to check spillage by reason of fluid capillarity and surface tension.

I wish it understood that minor changes and variations in the material, gauge, shape, formation and location of parts may all be resorted to without departing from the spirit of the invention and the scope of the appended claims. It is further understood that the sipper seal described may be formed of various sizes, and the dispensing end is capable of being squeezed or deformed by the mouth or teeth of the user whereby slot 20 is capable of being increased in width to vary drawing capacity.

I claim:

1. A removable sipper seal of resilient plastic material for the pouring rim of a fluid-containing vessel, comprising a hollow body member removably and sealably engageable with said rim, a hollow frusto-conical section communicating with and projecting upwardly from said body member, a hollow dispensing member formed and communicating with the top edge of said frusto-conical section and terminating at the top in an elongated narrow rim enclosing a slot whereby fluid contents of the vessel may be expeditiously withdrawn into the mouth of the user and whereby said slot acts as a check valve against flow when the vessel is accidentally thrown off its base.

2. A removable sipper seal as set forth in claim 1 and wherein the said seal is formed of a substance from the group consisting of polyethylene and the vinyl plastic compounds.

3. A removable sipper seal as set forth in claim 1 wherein said seal is formed of a locally deformable plastic material.

4. A removable sipper seal of resilient plastic material for sealing the pouring rim of a fluid-containing vessel, comprising a body member having a peripheral rim-engaging groove formed of inner, top and outer walls, the said inner wall having formed therewith a frusto-conical section projecting upwardly from the bottom thereof, a hollow dispensing member formed and communicating with the top edge of said frusto-conical section and terminating at the top in an elongated and narrow rim enclosing a slot, said slot serving either as a withdrawing outlet for fluid contents or to check the flow of said fluid contents when the vessel lies in horizontal or other leaking position.

5. A removable sipper seal as set forth in claim 4 wherein said outer wall is provided with an offset portion for application and removal of said engaging groove with respect to the pouring rim.

6. A removable sipper seal of resilient plastic material for sealing the pouring rim of a fluid-containing vessel, comprising a hollow body member having a top wall portion and peripheral downwardly extending skirt for telescopic engagement with said rim, a hollow frusto-conical section communicating with and projecting upwardly from said body member, a hollow dispensing member formed and communicating with the top edge of said frusto-conical section and terminating at the top in an elongated narrow rim enclosing a slot, said slot serving either as a withdrawing outlet for the flow of fluid contents or to check the flow of said fluid contents when the vessel lies in horizontal or other leaking position.

7. A removable sipper seal of resilient plastic material for sealing the pouring rim of a fluid-containing vessel, comprising a hollow body member sealably engageable with and internally of said rim, a hollow frusto-conical section communicating with and projecting upwardly from said body member, a hollow dispensing member formed and communicating with the top edge of said frusto-conical section and terminating at the top in an elongated narrow rim enclosing a slot, the said slot serving either as a withdrawing outlet for the flow of fluid contents or to check the flow of said fluid contents when the vessel lies in horizontal or other leaking position.

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May 21, 1935. A. C. HEISE ET AL. 2,001,842

TEETHING AND FEEDING NIPPLE

Filed May 21, 1934

Fig. 1

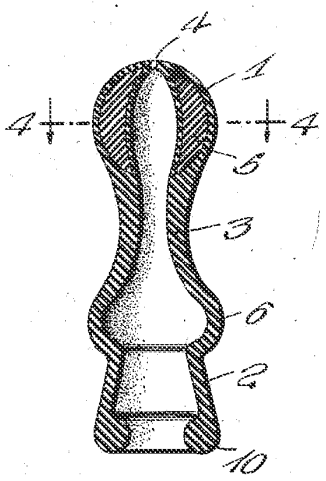
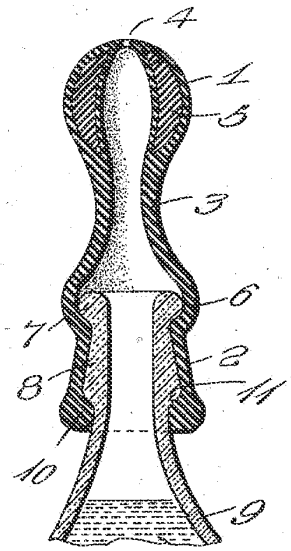


Fig. 2



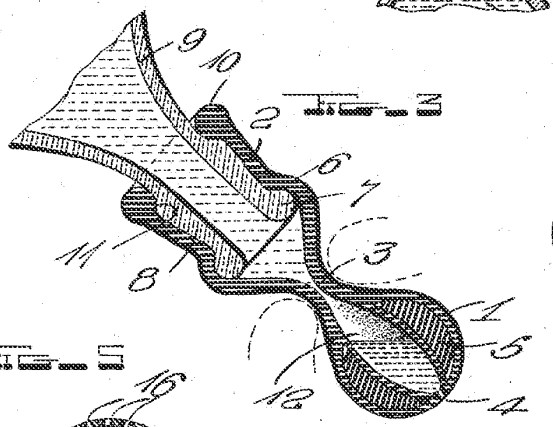


Fig. 3

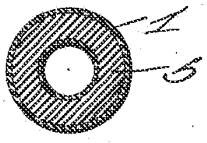
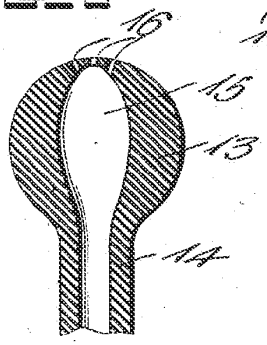


Fig. 4

Fig. 5



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Patented May 21, 1935 2,001,842

UNITED STATES PATENT OFFICE

2,001,842

TEETHING AND FEEDING NIPPLE

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Application May 21, 1934, Serial No. 726,838

2 Claims. (Cl. 128—252)

This invention relates to nipples and one object of the invention is to provide a device of this character of such construction that it may serve both as a feeding nipple and as a teething device.

Another object of the invention is to provide the nipple with a reinforced outer end portion of such construction that it serves very effectively as a teething device and also as a reservoir for a measured quantity of milk when a baby is feeding from a bottle.

A still further object of the invention is to provide a nipple of such construction that during feeding, pressure of the lips will cause the nipple to be constricted inwardly of its reinforced outer end portion as suction is applied, thereby restricting flow of additional milk into the chamber formed by the reinforced outer end portion of the nipple and preventing more than a certain quantity of milk being sucked into the baby's mouth at one time. This prevents too rapid feeding and also prevents danger of colic due to a large quantity of milk being consumed in a short length of time.

Another object of the invention is to so construct the nipple that when it is in use, it cannot collapse due to the formation of a partial vacuum in the bottle and prevent flow of milk through the nipple.

A still further object of the invention is to provide a nipple having its inner end portion of such construction that it will firmly grip the neck of a bottle and not be liable to work loose or be pulled off by a baby.

Still another object of the invention resides in providing a nipple which is simple and durable in construction, inexpensive to manufacture and one which will be very efficient in application to use.

With these and numerous other objects in view, our invention consists in the novel features of construction, combination and arrangement of parts as will be hereinafter referred to and more particularly pointed out in the specification and claims.

In the accompanying drawing forming a part of this application;

Figure 1 is a sectional view taken longitudinally through the nipple;

Figure 2 is a longitudinal sectional view showing the nipple applied to a bottle;

Figure 3 is a view similar to Figure 2 showing the bottle tilted as in use and the nipple constricted during a sucking operation;

Figure 4 is a section taken transversely through the nipple along the line 4—4 of Figure 1; and

Figure 5 is a longitudinal sectional view illustrating a modified construction.

This improved nipple is formed of rubber and has a body consisting of an outer end portion 1, an inner end portion 2 and a throat or intermediate portion 3 uniting the inner and outer end portions. The body is of soft rubber of sufficient thickness to normally retain the shape disclosed in Figure 1 and its outer end 1 which is formed with an outlet opening 4 at its center, is substantially spherical in shape and molded about a reinforcement 5 formed of tough resilient rubber. The solid reinforcement is entirely embedded in walls of the outer end portion or head of the nipple and it should be noted that its walls are crescent shaped in longitudinal section as shown in Figures 1, 2 and 3. By this arrangement, the head will have a soft outer surface so that it will not hurt a baby's tender gums but at the same time the head will have sufficient resiliency and toughness to permit it to be used as a teething device.

The walls of the body gradually lessen in thickness from the head 1 towards the inner end of the neck 3 which is flared and then constricted to form a channel 6 to engage about the bead 7 of the neck 8 of a bottle 9 and the neck 2 or inner end portion of the nipple increases in diameter towards its rear end and terminates in an inwardly projecting circumferential bead 10 which fits tightly about the bottle neck under the shoulder 11. It will thus be seen that the inner end portion of the neck 2 of the nipple will have tight fitting engagement about the neck of a bottle and since the bead 10 engages under the shoulder 11 and the bead 7 of the bottle is received in the channel 6, there will be no danger of the nipple working off of the bottle and also a baby will not be able to pull the nipple from the bottle.

Referring to Figures 1 and 2, it will be seen that when this nipple is in its normal condition and applied to a bottle, milk can flow freely from the bottle through the neck 3 into the head or front end 1 and fill the interior of the nipple. When the bottle is in use it is tilted in an inverted position as shown in Figure 3 and the head of the nipple placed in the baby's mouth with the neck disposed between the lips indicated by dotted lines in this view. In drinking from the bottle, the baby sucks upon the nipple and pressure of the lips will cause the neck 3 to be constricted, thereby entirely or almost entirely closing the nipple intermediate the

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length of the neck and effectively preventing flow of milk from the bottle into the chamber 12, thus formed in the interior of the head. The pressure and suction causes milk in this chamber to pass out through the discharge opening 4 and since flow of additional milk into the chamber is prevented as long as the neck is constricted, only a predetermined quantity of milk corresponding to the capacity of the chamber 12 can be consumed during one sucking operation. When pressure upon the neck is relieved during intervals between sucking, milk will again flow into the chamber to fill the same and during each sucking operation, the chamber will be emptied. It will thus be seen that too rapid feeding will be prevented and as the baby cannot gulp its milk, likelihood of colic will be eliminated.

The reinforcement 5 serves to quickly distend the nipple to its normal dimensions between sucking operations and it also serves to prevent collapsing of the nipple by action of a partial vacuum forming in the bottle when the milk is partially consumed. A bottle having one of the improved nipples applied thereto can be given to a baby during the night and will last such a length of time that only one night feeding will be necessary. When a baby is cutting teeth the nipple can be used as a teething device as the reinforcement is sufficiently tough and resilient to permit the head to be chewed upon without losing its spherical shape. It should be further noted that when the nipple is to be washed, the head can be readily grasped in one hand and the throat and neck or rear end portion turned forwardly over the head to such a position that the inner and outer surfaces of the nipple can be thoroughly cleansed.

In Figure 5, there has been disclosed a modified embodiment of the invention. Referring to this figure, it will be seen that the head 13 is formed entirely of soft rubber instead of having a tough resilient core embedded therein. The dimensions and shape are substantially the same as shown in Figures 1, 2 and 3 so that the neck 14 and inner end portion of the head may be constricted to confine milk in the chamber 15 and force a measured quantity of milk to be ejected during each sucking operation. It should also be noted that in this form of the invention a plurality of outlet openings 16 are provided instead of a single outlet. This nipple serves very effectively as a feeding nipple and to a certain extent as a teething device as the walls of the head are thick enough to normally retain the head in spherical shape and a baby can chew upon the head without unduly collapsing the head.

From the foregoing description of the construction of our improved nipple, the application of the same to use will be readily understood. It will be seen that we have provided a simple, inexpensive and efficient means for carrying out the objects of the invention and while we have particularly described the elements best adapted to perform the functions set forth, it is obvious that various changes in form, proportion and in the minor details of construction may be resorted to, without departing from the spirit or sacrificing any of the principles of the invention.

Having thus described the invention, what is claimed is:

1. A nipple comprising a body of soft rubber having its rear portion adapted for application to a bottle and having its forward portion enlarged to form a substantially spherical head merging into a reduced intermediate portion, an outlet opening being formed centrally of the outer end of the nipple, and a reinforcement of tough resilient rubber embedded in walls of the head, said reinforcement being substantially spherical in shape and extending the entire circumference of the head and longitudinally thereof for substantially the entire depth of the head but terminating in radial spaced relation to the outlet opening and in spaced relation to the reduced neck whereby the neck portion of the nipple may be constricted.

2. A nipple comprising a body of soft rubber open at its rear and formed with a bottle engaging rear portion, a substantially spherical forward portion constituting a head and a reduced intermediate portion between the head and rear portion, walls of the intermediate portion gradually increasing in thickness towards the head and merging into the head and the head being formed with a centrally located discharge opening at its outer end and having forward portions of its walls gradually decreased in thickness towards the discharge opening, and a reinforcement of tough resilient rubber substantially spherical in shape, said reinforcement being entirely embedded in walls of the head for the entire circumference thereof and extending longitudinally of the head for substantially the entire length thereof, walls of the reinforcement being substantially crescent-shaped in longitudinal section and gradually decreased in thickness towards inner and outer ends of the head with their outer ends terminating in radial spaced relation to the discharge opening.

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April 19, 1949. W. G. CANHAM ET AL 2,467,463

NURSING UNIT

Filed Dec. 7, 1945

FIG. 1

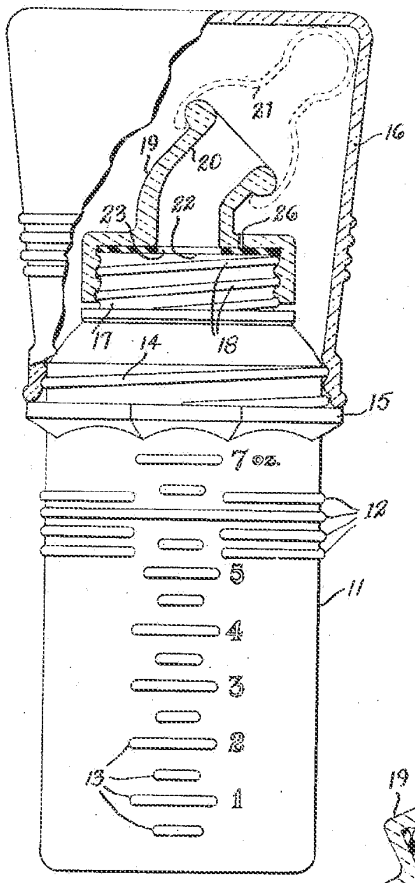


FIG. 2.

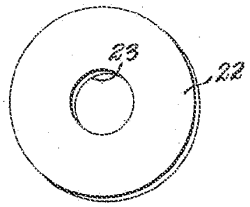


FIG. 3.

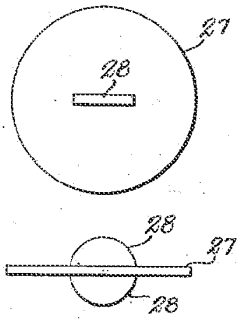


FIG. 4.

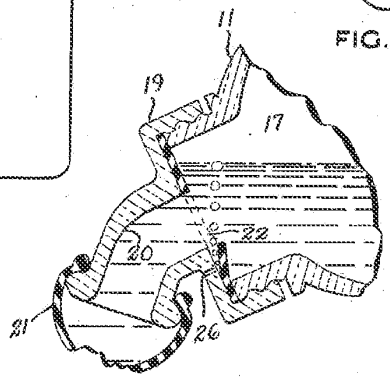


FIG. 5

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Patented Apr. 19, 1949 2,467,463

UNITED STATES PATENT OFFICE

2,467,463

NURSING UNIT

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Application December 7, 1945, Serial No. 633,488

3 Claims. (Cl. 215—11)

1

This invention relates to a baby's nursing devices, and more particularly to a combination nursing unit and tumbler.

A main object of the invention is to provide a novel and improved baby's nursing unit of simple construction which is provided with automatic pressure equalizing means for providing a substantial continuous flow of fluid to the infant while nursing and wherein the infant may be fed with its head in a comfortable position.

A further object of the invention is to provide an improved nursing unit for an infant wherein the infant may obtain fluid from the unit without sucking in colic-producing air, and wherein protective means is provided for keeping the nipple portion of the unit sterile when the unit is not in use.

Further objects and advantages of the invention will appear from the following description and claims, and from the accompanying drawings, wherein:

Figure 1 is a side elevational view, partly in cross-section, of a nursing unit constructed in accordance with the present invention.

Figure 2 is a perspective view of a gasket member employed with the nursing unit of Figure 1.

Figure 3 is a plan view of a sealing disc adapted to be employed with the nursing unit of Figure 1.

Figure 4 is a side elevational view of the sealing disc of Figure 3.

Figure 5 is a detail cross-sectional view of the neck portion of the nursing unit of Figure 1 shown in inverted nursing position.

Referring to the drawings, 11 designates a container for baby's milk or other fluid, said container being preferably molded of transparent heat-resistant plastic material.

Container 11 is formed with a plurality of integral strengthening ribs 12 and with a series of integrally molded graduation ribs 13 appropriately marked in terms of fluid volumetric units.

The upper portion of container 11 is formed with threads 14 and an abutment rib 15 for the reception of a sealing closure 16, preferably of molded transparent plastic, which is also adapted to be employed as a tumbler.

The top end of container 11 is formed with a reduced neck portion 17 provided with threads 18 upon which is adapted to be threadedly engaged a nipple adapter member 19, preferably of molded plastic, which is formed with an outlet passage 20 inclined at about 45° to the axis of the container. The top end of adapter member 19 is formed to receive a conventional nipple 21.

Positioned between adapter member 19 and the rim of the container is a resilient gasket member 22 of rubber or the like, which is formed with an opening 23 adapted to register with passage 20.

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Adapter member 19 is formed with a restricted orifice 25 normally sealed by gasket 22, but which is adapted to be opened to the atmosphere when the pressure inside of the container drops below atmospheric pressure, to thereby admit air to equalize the pressure within the container with respect to atmospheric pressure. Gasket 22 is sufficiently flexible to bend slightly inward, as shown in Figure 5, to permit the entry of the required amount of air when the pressure inside the container is reduced by the withdrawal of fluid by the infant. Gasket 22 thus functions as a pressure-responsive check valve.

When the unit is not in use, passage 20 may be sealed off by a rigid disc member 27 positioned between adapter member 19 and gasket 22. Disc member 27 is formed with lug elements 28 on each face thereof, the lower lugs element being adapted to be received in opening 23 of the gasket member.

The inclined relation of passage 20 of adapter 19 to the axis of the container makes it possible to feed the infant in many different positions comfortably. When the baby is in a reclining position the nipple can be turned downwardly and the container supported on the baby's chest. The baby can then drink the fluid without bending the nipple, thus insuring an uninterrupted flow of fluid. The angle top makes it easy to handle the container regardless of which way the baby turns.

Tumbler 16 may be used to hold baby food to be given along with the milk or other fluid in the container.

While a specific embodiment of a baby nursing unit has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore, it is intended that no limitations be placed on the invention other than as defined by the scope of the appended claims.

What is claimed is:

1. A baby nursing unit comprising a container having a threaded rim, an adapted member threadedly secured to the rim of the container and formed to receive a nipple, said adapter member having its outer end inclined with respect to the axis of the container and having its inner end aligned with said axis, an opening formed in said adapter member laterally spaced from the rim of the container, and a resilient gasket interposed between said adapter member and the rim of the container and normally covering said opening, said gasket having a central opening registering with the inner end of the adapter member and being adapted to be bent inwardly at times by air pressure to uncover the adapter member opening.

2. A baby nursing unit comprising a container

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having a rim, an adapter member secured to the rim of the container and formed to receive a nipple, said adapter member having a portion inclined with respect to the axis of the container, and valve means for admitting air to the container responsive to the decrease of pressure within the container to below atmospheric, said valve means comprising an opening formed in said adapter member inwardly spaced from the rim of the container and an annular resilient gasket interposed between said adapter member and the rim of the container and normally covering said opening.

3. A baby nursing unit comprising a container having a rim, an adapter member secured to the rim of the container and formed to receive a nipple, said adapter member having a portion inclined with respect to the axis of the container, a resilient gasket interposed between said adapter member and the rim of the container, said gasket having a central opening registering with the inner end of the adapter, and a sealing member interposed between said adapter member and

said gasket, said sealing member being provided with a lug element projecting from a face thereof, the lug element being positioned within said opening.

WALTER G. CANHAM.
ALVIN H. OSTRIN.
LEON BORSTEIN.

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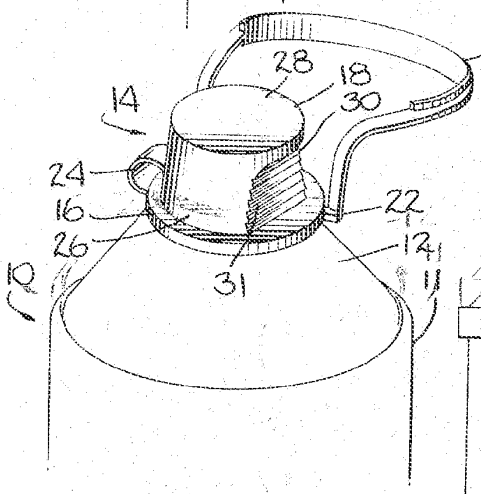
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March 7, 1967 J. J. ANDERSON 3,307,752

CAPTIVE PLASTIC CLOSURE FOR CONTAINER WITH INTEGRAL CONTAINER HANDLE

Filed March 15, 1965 2 Sheets-Sheet 1

Fig. 1.



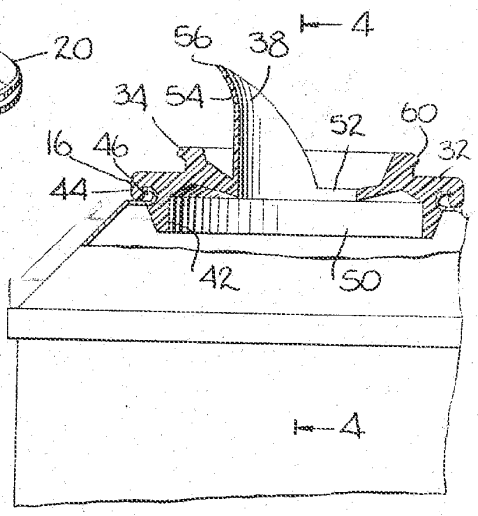


Fig. 3.

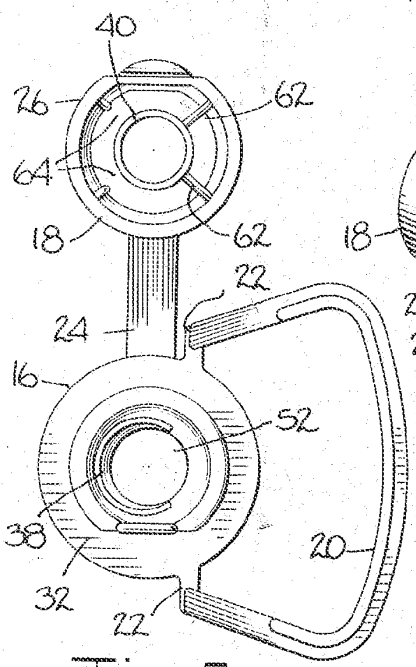


Fig. 6.

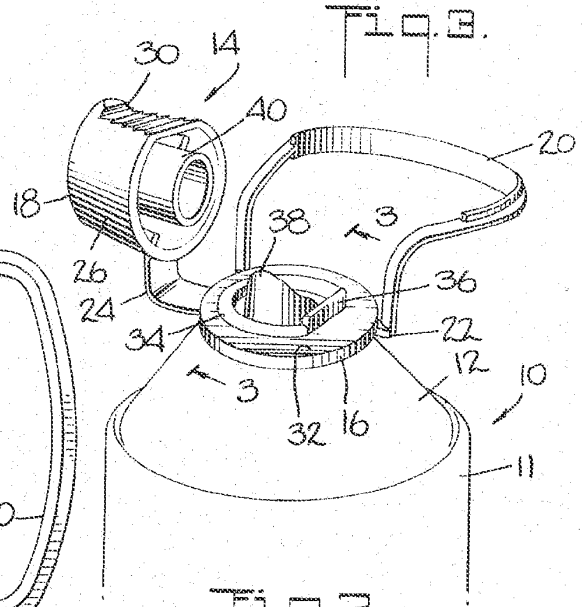


Fig. 2.

March 7, 1967 J. J. ANDERSON 3,307,752

CAPTIVE PLASTIC CLOSURE FOR CONTAINER WITH INTEGRAL CONTAINER HANDLE

Filed March 15, 1965 2 Sheets-Sheet 2

Fig. 4.

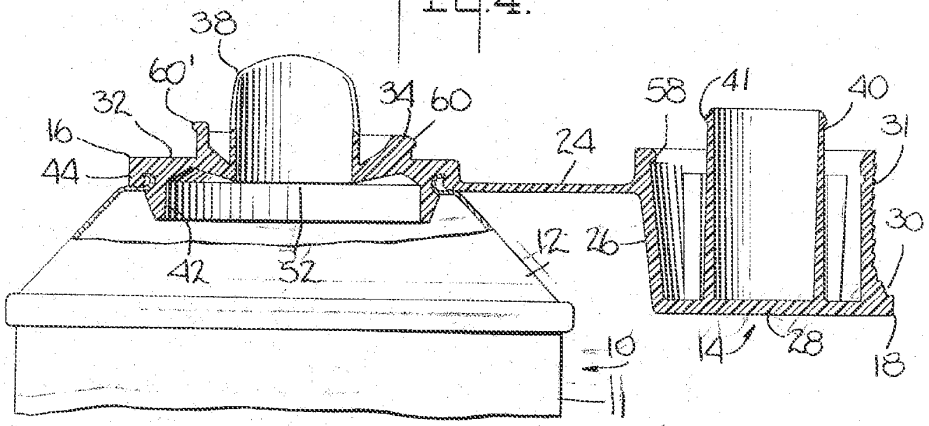


Fig. 7.

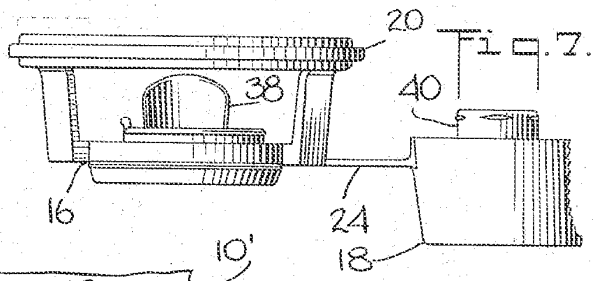


Fig. 5.

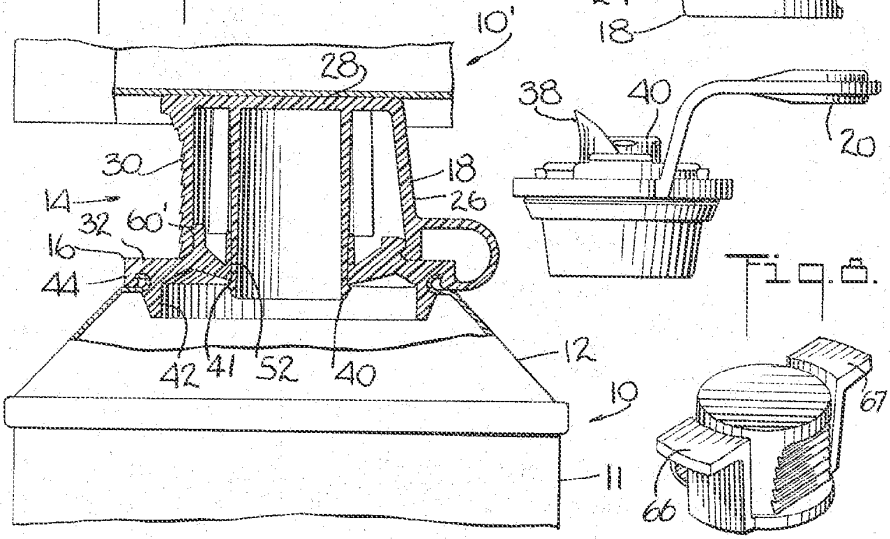


Fig. 8.

Fig. 9.

United States Patent Office

3,307,752
Patented Mar. 7, 1967

3,307,752

CAPTIVE PLASTIC CLOSURE FOR CONTAINER WITH INTEGRAL CONTAINER HANDLE

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Filed Mar. 15, 1965, Ser. No. 439,777
4 Claims. (Cl. 222—465)

This invention relates to container closures and more particularly it concerns an improved overcap closure arrangement for use with spouted containers.

Certain liquids, such as those of low viscosity and low cohesiveness, exhibit a strong tendency to spill or drip during pouring. For this reason, it is desirable to provide some sort of a pouring spout on the containers in which these liquids are kept.

Unfortunately, the provision of pouring spouts on liquid containers has introduced collateral difficulties of such a nature that the spouts in many cases had to be dispensed with. One such difficulty was due to the fact that the spout, being located along the inner edge of the container opening, made it difficult to design a really effective and easily openable closure for the container. Another difficulty was that the upwardly protruding spout, being of comparatively fragile construction, was easily damaged or distorted when these containers were handled or stacked upon each other as for storage or shipment prior to sale.

In some cases, spouted containers have been provided with closure means such as a removable plug which was wedged into the container opening at the base of the spout. This, however, left the spout exposed and susceptible to contamination. Furthermore, the exposed upwardly protruding spout was left in a position to be crushed by the weight of any containers stacked thereon. Also, the weight of stacked containers very often would wedge the plug into the container opening to such an extent as to cause distortion and loss of the liquid seal.

In certain other cases, container closures of the cap type have been provided. These closures, which resembled an inverted cup, would cover the entire container opening. However, they were unsatisfactory for use with spouted containers for they would allow liquid to flow up and around the spout area and inside the hollow cap, so that when the cap was removed, the problem of dripping and spilling was even greater than before.

I have made possible, through my invention, the provision of a container closure for use in connection with spouted containers without the aforementioned difficulties of the prior art. As a result of my invention, it is possible to provide at very low cost, conveniently useable container closures which neatly seal and protect a spouted container opening without undue distortion due to the heavy loading effects of stacked containers.

In essence, my invention resides in the provision of a specially shaped double walled cap structure which cooperates in a novel manner with the spouted opening of a container. The cap structure includes an outer wall portion which surrounds and encloses the spout, and an inner plug portion which depends within the outer wall portion and which is shaped such that when the cap is in position on the container, the plug enters into and seals the container opening. The plug has essentially the same peripheral dimensions along its length as the container opening so that the sealing effect of the plug is substantially independent of any distortion which the outer portion of the cap may undergo.

According to one feature of my invention, I provide a circumferential ridge surrounding the spout and opening, and a pressure receiving surface immediately surrounding the ridge. This allows the bottom peripheral edge of the wall portion of the cap to be pressed down against the container without distorting the shape of the container opening. Also, where the cap is of a resilient plastic material, the ridge may be beaded for a snap type fit with the cap thus providing a positive closure without the complexity and expense of screw threads.

According to another feature of my invention, I have provided as an integral unit, a captive cap and spouted base arrangement which can readily be snapped onto metal or glass containers formed with a simple central container opening. This integral unit may be molded of polyethylene material quite economically and it greatly increases the versatility of conventional metal and glass containers.

In one of its aspects, my invention includes the provision of a specially shaped handle preferably molded as an integral part of the base and captive cap. This handle serves a dual function; first, that of providing a carrying means thus eliminating the need for a waist shaped or small necked container; and secondly, that of providing a front end holding means when the container is tipped for pouring out through the spout.

There has thus been outlined rather broadly the more important features of the invention in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception upon which this disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of the invention. It is important, therefore, that the claims be regarded as including such equivalent constructions as do not depart from the spirit and scope of the invention.

A specific embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawings, forming a part of the specification wherein:

FIG. 1 is a perspective view illustrating the top portion of a container outfitted with a closure cap arrangement according to the present invention;

FIG. 2 is a view similar to FIG. 1 but illustrating the closure cap arrangement in opened condition;

FIG. 3 is an elevational view, partially in section, taken along lines 3—3 of FIG. 2;

FIG. 4 is an elevational view, partially in section, taken along lines 4—4 of FIG. 3;

FIG. 5 is a side elevational view similar to FIG. 4 but showing the cap in closed condition and illustrating the relationship of stacked containers outfitted with this cap;

FIG. 6 is a bottom plan view of a closure cap arrangement representing one embodiment of the invention;

FIG. 7 is a rear elevation of the embodiment shown in FIG. 6;

FIG. 8 is a side elevation of the embodiment shown in FIG. 6;

FIG. 9 is a perspective view illustrating a T-bar handle arrangement.

In FIG. 1 there is shown a container 10, having a cylindrically shaped side wall 11, and an upwardly slanted top wall 12. The container 10 is typical of many glass or metal containers used in connection with the retail merchandising of various liquids such as floor wax or liquid cleansers. On the top of the container 10, I provide a novel cap arrangement, indicated generally at 14. This novel cap arrangement is formed of a plastic material such as polyethylene and includes a circular base 16, fitted onto the top wall 12, a cup-shaped overcap 18. In a preferred embodiment handle 20 is generally U-shaped. In this embodiment handle 20 is affixed to and may be integrally molded with the base portion 16 at outwardly protruding lugs 22 located at its periphery.

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In still another embodiment (not shown) handle 20 is affixed to base portion 16 by means of a single outwardly protruding lug. Also, the overcap 18 is permanently connected to the base portion 16 via a strap hinge 24 which likewise may be integral with the base 16.

The cup-shaped overcap 18 includes a generally cylindrical and slightly tapered outer wall 26 which terminates at a flat top wall 28. These walls serve to support the weight of other containers which may be stacked upon the container 10.

The overcap 18 is undercut as at 30 and has its undercut surface formed with serrations or ribs as at 31. This provides an effective thumb grip for lifting up and opening the overcap from the base 16.

In the preferred embodiment handle 20, as can be seen in FIG. 2, extends upwardly from the lugs 22 for a short distance and then outwardly away from the overcap 18 so that its maximum height does not exceed that of the overcap. This permits stacking of these containers without undue interference from or to their respective handles. Also, this handle configuration enables the containers to to be grasped quite readily both for pouring and for carrying.

FIG. 2 shows the container 10 with its overcap 18 in opened position, so as to expose the internal elements of the circular base 16. On the upper side of the base there is provided a horizontal annular pressure receiving surface 32 and a locking and reinforcing rib 34 which extends upwardly from the inner edge of the pressure bearing surface 32. The rib 34 is dimensioned to fit closely within the outer wall 26 of the overcap portion 18. Thus, it is provided with a flattened region 36 which accommodates the undercut thumb grip portion 30 of the overcap. Immediately within the reinforcing rib 34 there extends an upwardly protruding spout 38 designed to provide proper control of liquid flow out of the container. The precise shape of the spout will, of course, depend upon the nature of the liquid in the container. However, in all cases its most important feature will be that it protrudes up and out from the top of the container so as to keep the liquid being poured from dripping down over the walls of the container.

My overcap 18, as can be seen, is hollow and open at its bottom; and it is provided with a centrally depending tubular shaped plug element 40. This plug element, as will be seen more fully hereinafter, fits down inside of the spout 38 to seal the container when the overcap 18 is in closed position as in FIG. 1. At the same time, the spout 38 extends up into the cap between the plug element 40 and the outer wall 26.

As shown in FIGS. 3 and 4, the circular base 16 is of integral construction and is provided with annular downwardly depending inner and outer skirts 42 and 44 which are shaped to define a locking groove 46. The top wall 12 of the container is bent back as at 48 around a central opening 50 to form a semi-circular channel which cooperates with the locking groove 46 to secure the base 16 to the container 10.

The base 16 itself has a central opening 52 located within its locking and reinforcing rib 34. The spout 38 rises upwardly from the edge of this base opening and out over the rib 34. In order to ensure freedom from dripping, etc. I make the spout 38 at least semi-circular at the opening 52 and provide a slightly accentuated curve 54 and a tapered lip 56 toward its upper edge.

The spout obviously is incapable of supporting any appreciable loads and would be crushed or severly distorted should one attempt to stack other containers on it. Because of my novel arrangement, however, such crushing is avoided even though very heavy loading forces are imposed on the container.

The annular pressure bearing surface 32 of the base 16 is located outside the rib 34, while the spout 38 and central opening 52 are located inside the rib. It will be noted also, that the pressure bearing surface 32 is located nearly directly above the inner and outer skirts 42 and 44 so that loading forces imposed on the overcap 18 are transmitted directly through the outer regions of the base 16 to the upper wall 12 of the container 10 thus bypassing the region of the central opening 52 and the spout 38. This arrangement, in cooperation with the reinforcing rib 34 prevents these loading forces from distorting the central opening and spout even though these loading forces may cause buckling of the container 10 or the overcap 18.

As can be seen in FIG. 4, the plug element 40 of my overcap 18 extends somewhat beyond the open edge of the outer wall 26 of the overcap 18. Also the circumferential configuration all along the length of the plug element conforms closely to the configuration of the central opening 52 in the base 16. The end of the plug 40 is provided with a bead 41 which locks under the wall forming the central opening 52. Thus, when the plug element it fitted into this opening, it provides a positive liquid seal; and this seal is essentially unaffected by any vertical movements which the plug element might undergo as a result of exceptionally heavy loads on the overcap 18.

The intercooperation of the various elements which form the base 16 and overcap 18 can be seen in the partial section view of FIG. 5. Here the overcap 18 is shown in closed position on the base 16 and while at the same time being subjected to the loading effects of another stacked container 10' placed on top of the container 10. As shown, the upper container 10' rests on the top wall 28 of the overcap 18. The weight of this upper container is resisted solely by the outer wall 26 of the overcap 18 and not by the plug element 40. This is because the plug element, being at most of a very slight taper, is free to move with respect to the base opening 52 whereas the outer wall 26 is restrained by the pressure bearing surface 32 which in turn is supported by the top wall 12 of the container 10. Since the downwardly loading forces are thus bypassed around the plug 40 and central opening 52, they will undergo no distortion and the seal between them will remain intact even under relatively heavy loads. Further, even if the loading forces increase to a point where the outer wall 26 begins to buckle, the seal between the plug element 40 and the central opening 52 remains unaffected, for the plug element merely becomes pushed slightly further into the opening.

It will, of course, be appreciated that at this same time, the spout 38 is itself isolated from these loading forces by virtue of this novel arrangement of element, since the spout extends up between the plug 40 and the outer wall 26 of the overcap without contacting any part of the overcap.

In order to maintain a positive snap fit connection between the overcap 18 and the base 16, I provide a slight protrusion 58 around the inner periphery of the lower edge of the overcap outer wall 26 and a corresponding mating protrusion 60 about the reinforcing and locking rib 34. I have found that the effectiveness of the snap fit connection is improved without appreciably increasing the difficulty of removing the cap by making the flattened region 36 of the reinforcing and locking rib 34 somewhat higher than the remainder of the rib, and by positioning its locking protrusion 60' near its upper edge.

FIGS. 6, 7 and 8 serve to illustrate the overall configuration of the cap arrangement 14.

As shown in FIG. 6, the overcap 18 is provided with a plurality of reinforcing ribs 62 which extend radially between the plug element 40 and the outer wall 26. Certain of these ribs have portions thereof cut away as at 64 so as to provide room for the spout 38 when the overcap is in closed position.

The handle 20 is arranged to extend back in a direction away from the spout 38. This enables it to be used both for carrying the container 10 and for supporting the

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upper end of the container when pouring liquid out through the spout.

FIG. 9 illustrates another handle arrangement wherein the wing protrusions 66 and 67 respectively are located adjacent to the overcap 18 to provide a T-shaped handle arrangement. This handle arrangement is particularly suited for carrying container 10.

It will be seen that the cap lends itself to integral construction and that it may easily be molded of a plastic material such as polyethylene; thus providing a considerable improvement to the characteristics of metal and/or glass containers without appreciably increasing their cost.

Although a particular embodiment of the invention is herein disclosed for purposes of explanation, further modifications thereof, after study of this specification, will be apparent to those skilled in the art to which the invention pertains. Reference should accordingly be had to the appended claims in determining the scope of the invention.

What is claimed and desired to be secured by Letters Patent is:

1. A cap arrangement comprising, a base made of a plastic material said base including means for securing it to a container opening, said base further being formed with a central opening leading into such container, a plastic spout integral with said base and rising upwardly from the edge of said central opening, said base being formed with a horizontal annular pressure bearing surface surrounding said spout and central opening, a locking rib protruding upwardly from said base along one edge of said pressure bearing surface, a hollow cup shaped plastic overcap having a generally tubular upstanding outer wall and a horizontal top wall, the lower peripheral edge of said outer wall being shaped to rest upon said pressure bearing surface and to frictionally engage said locking rib in a snap fit to secure said overcap on said base, and a plastic handle of generally U-shaped configuration and attached at its ends to points along the edge of said base, said handle rising upwardly from said base to the height of said overcap, and then horizontally away from said cap to provide full finger access without interference with movements of said overcap.

2. A cap arrangement comprising, a base made of a plastic material said base including means for securing it to a container opening, said base further being formed with a central opening leading into such container, a plastic spout integral with said base and rising upwardly from the edge of said central opening, said base being formed with a horizontal annular pressure bearing surface surrounding said spout and central opening, a locking rib protruding upwardly from said base along one edge of said pressure bearing surface, a hollow cup shaped plastic overcap having a generally tubular upstanding outer wall and a horizontal top wall, the lower peripheral edge of said outer wall being shaped to rest upon said pressure bearing surface and to frictionally engage said locking rib in a snap fit to secure said overcap on said base, and a pair of oppositely disposed handle members, said members being attached at their ends to the edge of said base at oppositely disposed points respectively, each of said handle members rising upwardly and flaring outwardly to provide finger access without interference with movement of said overcap.

3. In combination, a base having a central opening therethrough and adapted to form the top opening of a container, a spout formed about at least a portion of the periphery of said central opening and extending upwardly therefrom, said base being formed with an annular pressure bearing surface encircling said central opening and said spout in a plane below the outer edge of said spout, a cup shaped overcap having a lower peripheral edge shaped in accordance with said pressure receiving surface, said overcap having an internal height greater than the height of said spout above said pressure bearing surface, and a plug element depending centrally from the inside top of said overcap, said plug element being of a length and outer contour such that it enters into said central opening when the peripheral edge of said overcap is located on said pressure bearing surface, means for positively securing and sealing said overcap with respect to said base.

4. In combination, a base having a central opening therethrough and adapted to form the top opening of a container, a spout formed about at least a portion of the periphery of said central opening and extending upwardly therefrom, said base being formed with an annular pressure bearing surface encircling said central opening and said spout in a plane below the outer edge of said spout, a locking rib protruding upwardly from said base along one edge of said pressure bearing surface, a cup shaped overcap having a lower edge shaped in accordance with said pressure receiving surface, a protrusion on the inner periphery of the lower edge of said overcap and a mating protrusion on said locking rib, said overcap having an internal height greater than the height of said spout above said pressure bearing surface, and a plug element depending centrally from the inside top of said overcap, said plug element being of a length and outer contour such that it enters into said central opening, and a sealing and locking bead disposed towards the end of said plug for locking under the periphery of said central opening when the lower edge of said overcap is located on said pressure bearing surface.

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RAPHAEL M. LUPO, *Primary Examiner.*

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(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2004/0217139 A1

Roth et al. (43) Pub. Date: Nov. 4, 2004

(54) CLOSURE FOR A BOTTLE

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(21) Appl. No.: 10/702,409

(22) Filed: Nov. 5, 2003

Related U.S. Application Data

(63) Continuation-in-part of application No. 29/180,775, filed on Apr. 30, 2003, now Pat. No. D,485,757.

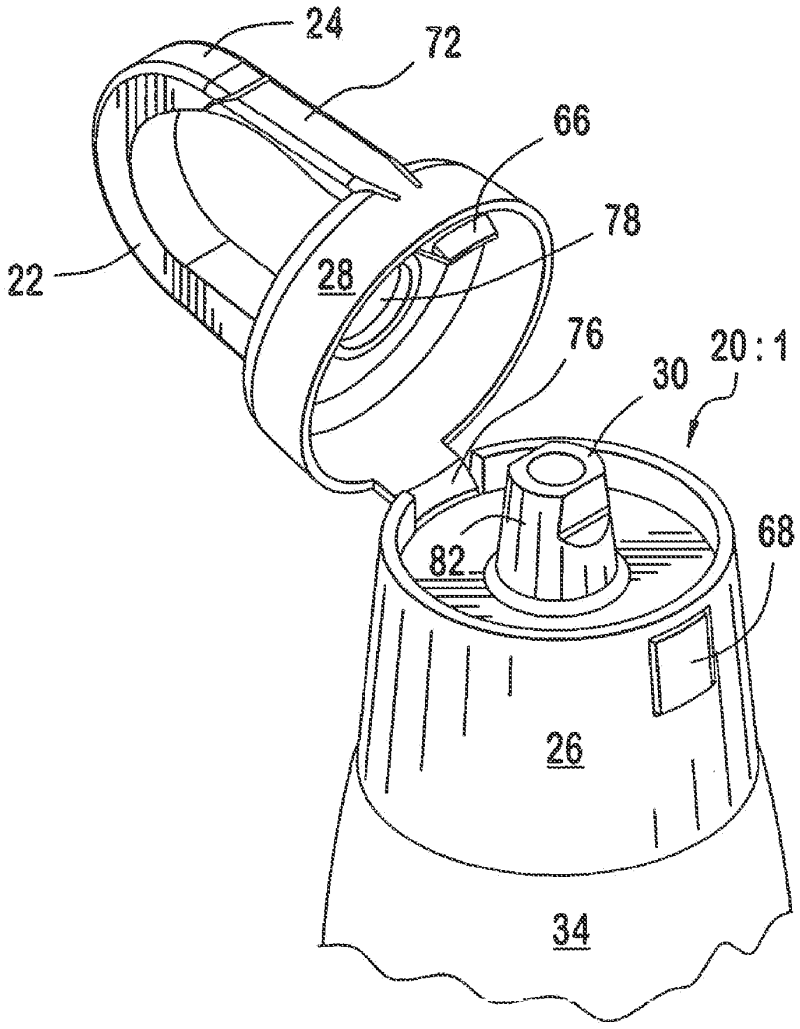
Publication Classification

(51) Int. Cl.[7] B65D 51/00; B65D 23/12; A45F 3/00

(52) U.S. Cl. 224/148.7; 215/228; 215/237; 215/387; 215/399; 224/269

(57) ABSTRACT

A closure for a bottle that defines a cavity opening to a mouth. The closure includes a closure body having a base portion configured to engage the bottle with the closure body positioned over the mouth. A liquid passageway is defined by the base portion and extends at least partially therethrough. A connector is disposed on the closure body and is adapted to allow the closure body to be detachably connected to an object.



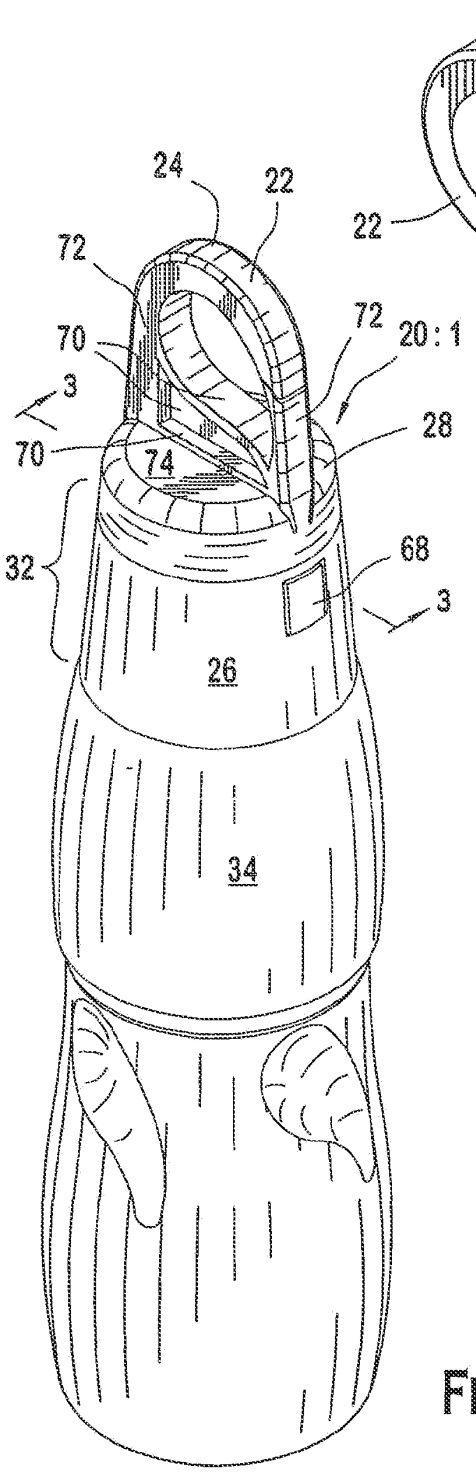

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FIG. 1

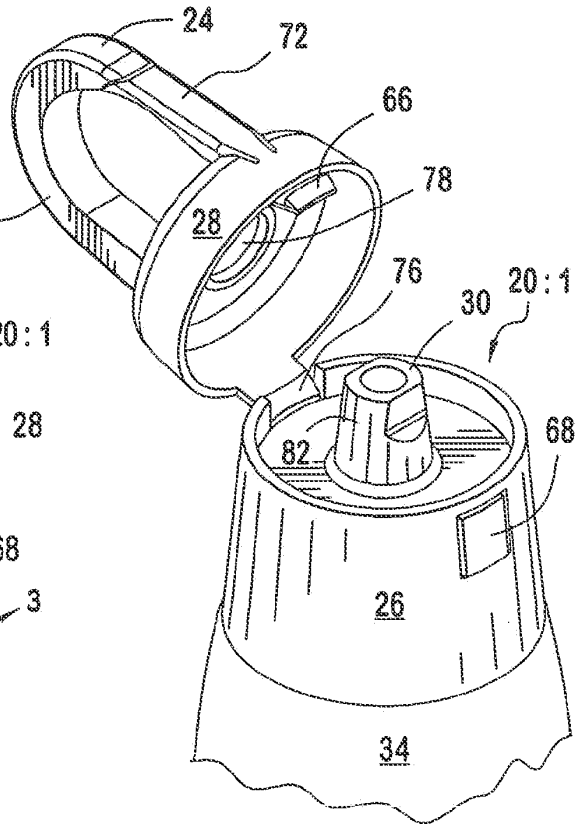

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FIG. 2

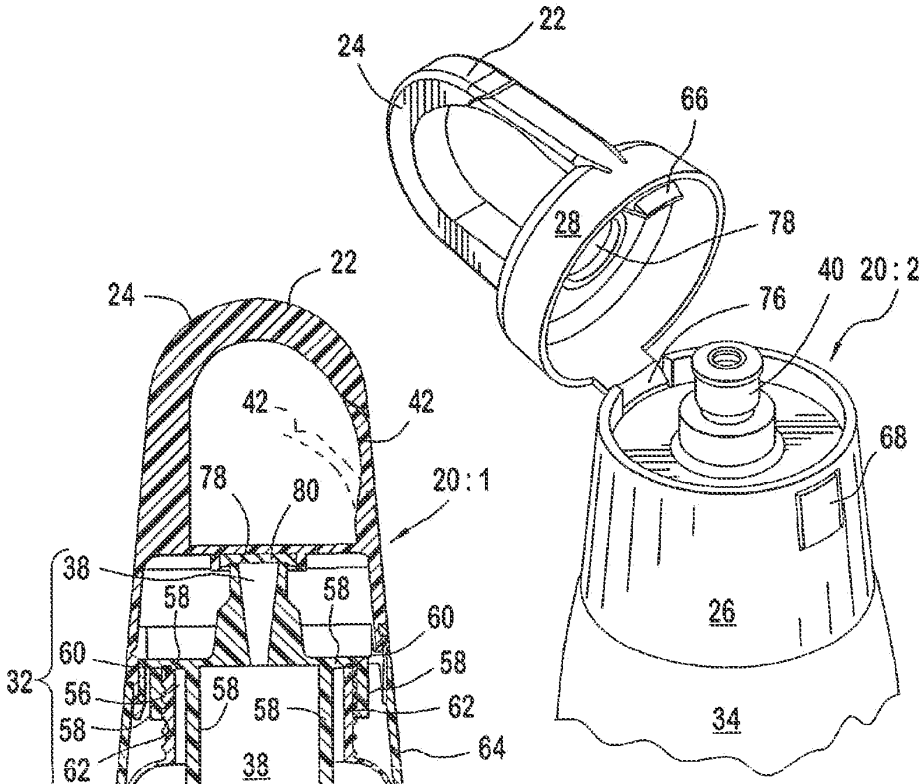

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FIG. 4

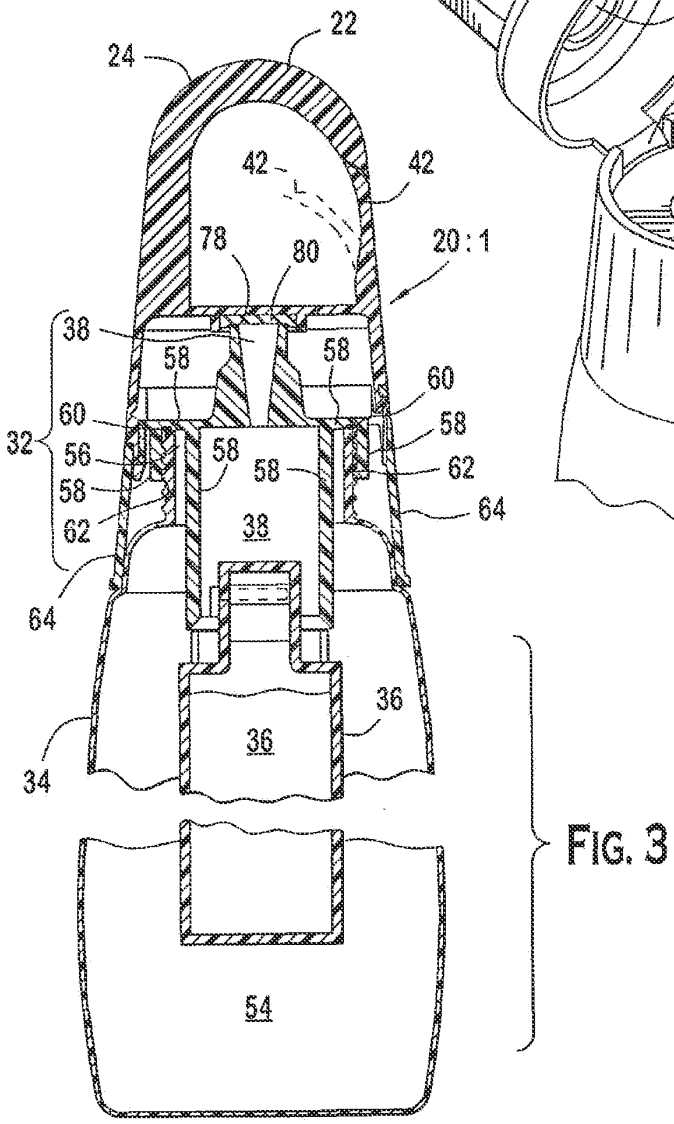

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FIG. 3

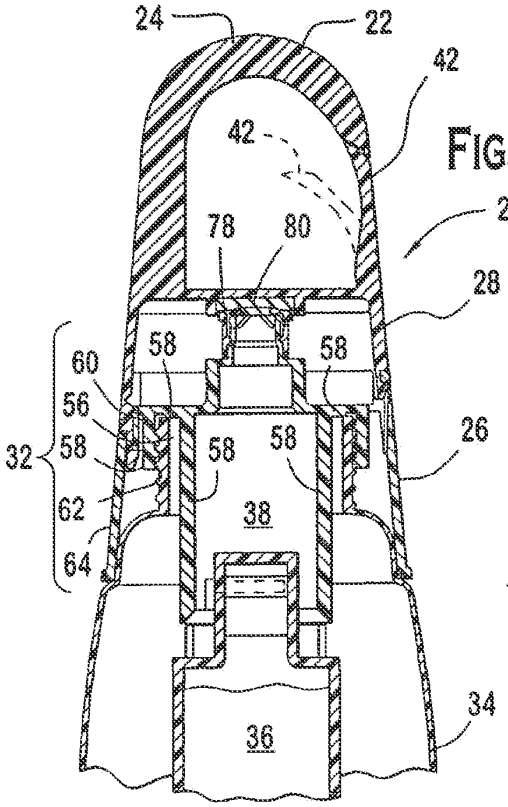


FIG. 5

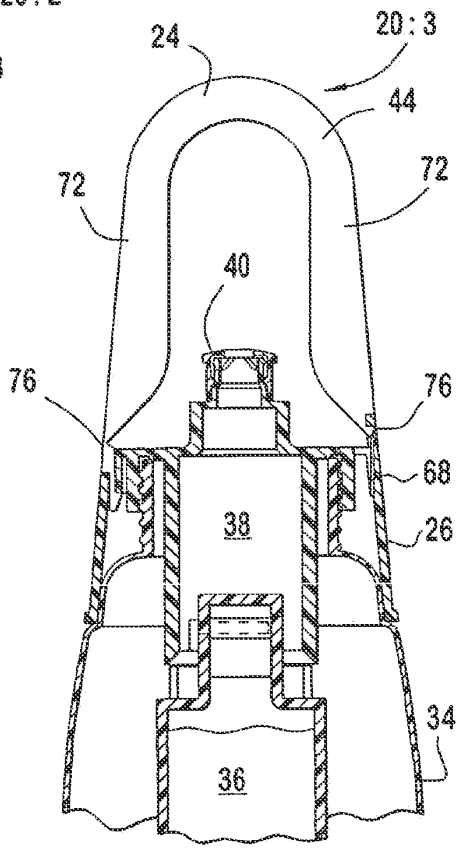


FIG. 6

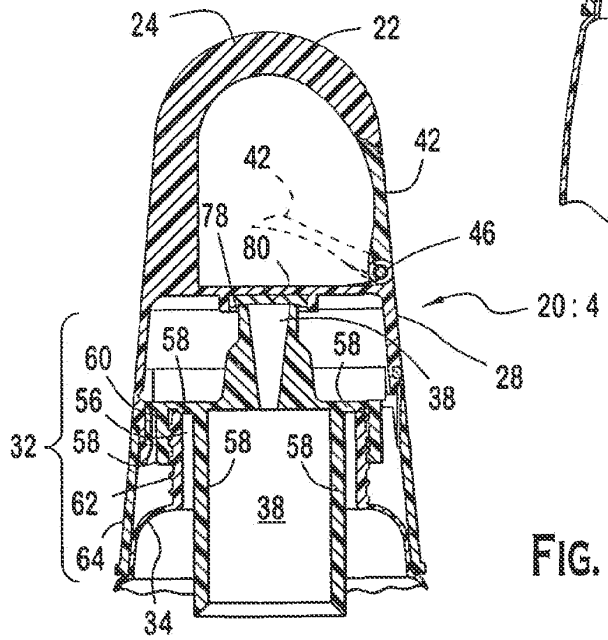


FIG. 7

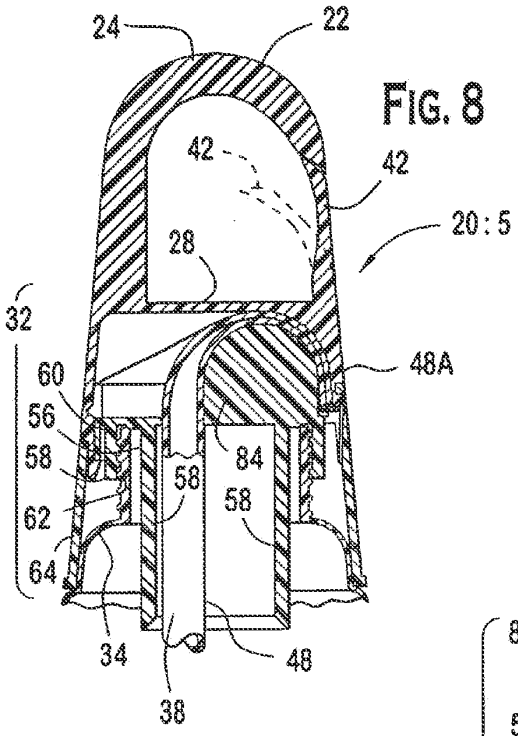


FIG. 8

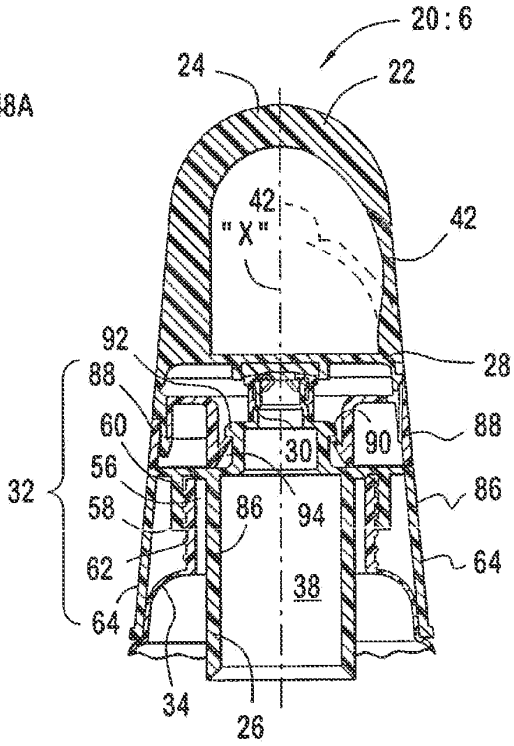


FIG. 9

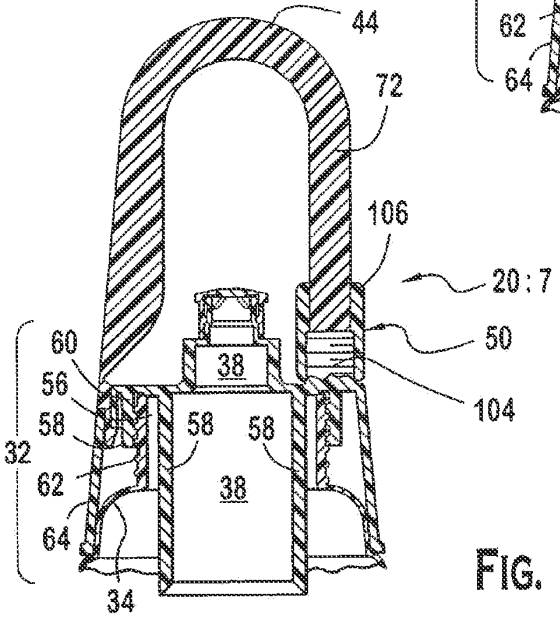


FIG. 10

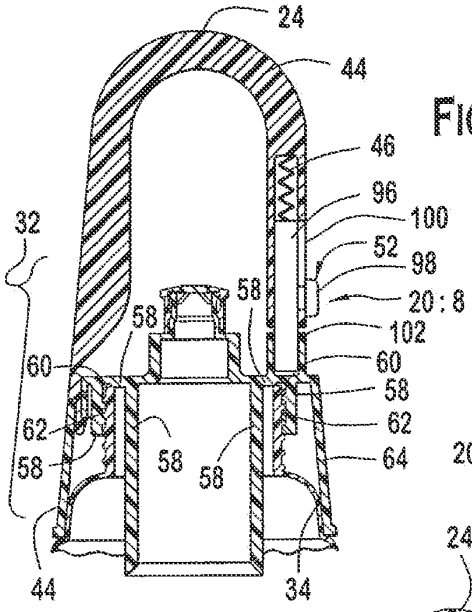
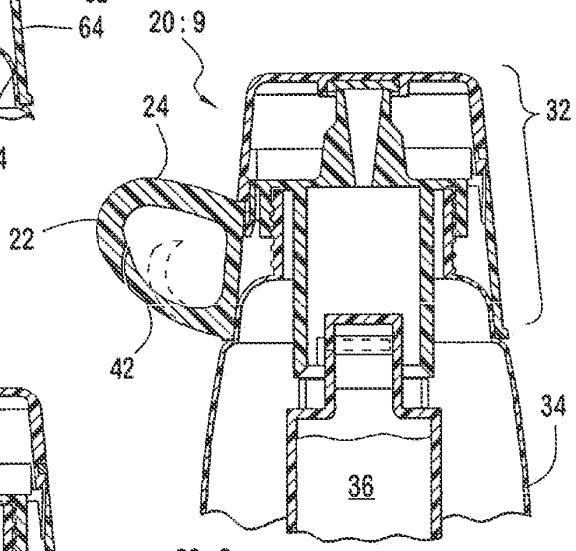


FIG. 11

FIG. 11A



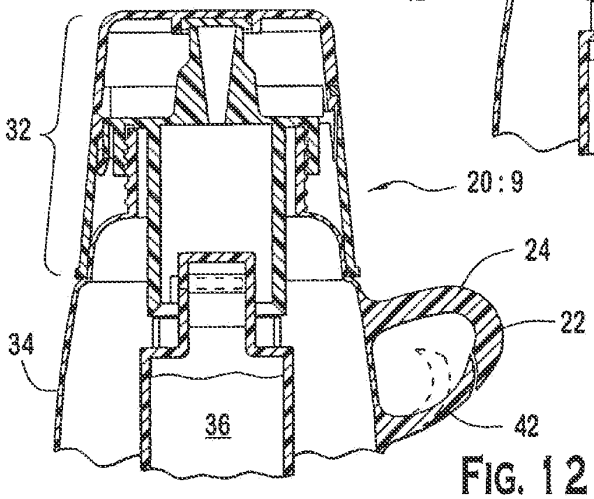
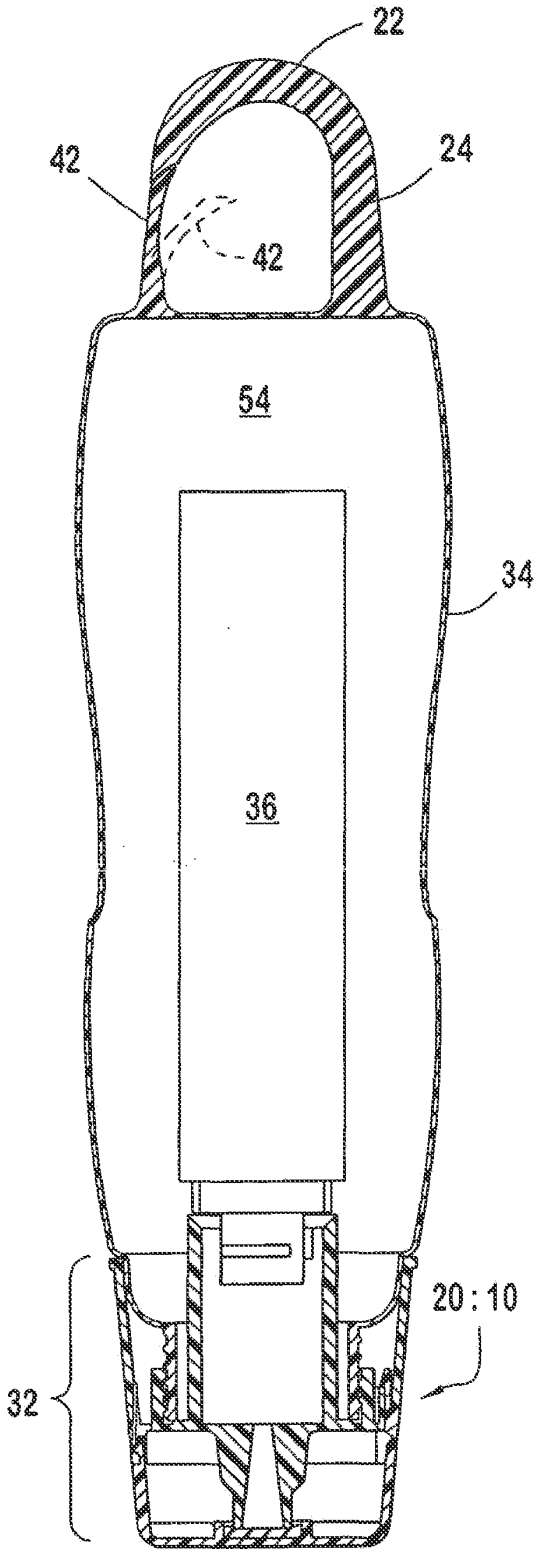


FIG. 12

FIG. 13



CLOSURE FOR A BOTTLE

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application is a continuation-in-part and claims priority under 35 U.S.C. § 120 from U.S. Design patent application Ser. No. 29/180,775, filed Apr. 30, 2003, and entitled "Lid for a Bottle", which is hereby incorporated by reference herein in its entirety as if fully set forth.

BACKGROUND

[0002] The present invention is directed to closures for bottles and, more specifically, to closures that allow bottles to be detachably connected to objects.

[0003] Drinking bottles are typically carried by hand when their owners are traveling and wish to bring along a beverage. In some cases, drinking bottles are stored in backpacks or purses to simplify carrying. However, while storing drinking bottles in backpacks or the like may simplify carrying, it also increases the amount of time necessary to drink from the bottle. Specifically, it is necessary to open the backpack, locate the bottle, remove the bottle from the backpack, and then open the bottle to begin to drink.

[0004] It would be advantageous to provide a bottle that could be attached to objects, for example, a belt loop or a purse strap, to simplify the removal and reattachment of the bottle to facilitate drinking therefrom.

SUMMARY

[0005] One embodiment of the present invention is directed to a closure for a bottle that defines a cavity opening to a mouth. The closure includes a closure body having a base portion configured to engage the bottle with the closure body positioned over the mouth. A liquid passageway is defined by the base portion and extends at least partially therethrough. A connector is disposed on the closure body and is adapted to allow the closure body to be detachably connected to an object.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The foregoing summary as well as the following detailed description of the preferred embodiments of the present invention will be better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there are shown in the drawings embodiments which are presently preferred. It is understood, however, that the present invention is not limited to the precise arrangements and instrumentalities shown. In the drawings:

[0007] **FIG. 1** is a perspective view a first preferred embodiment of a closure according to the present invention; the closure includes a closure body formed by a lid and a base portion with a connector located on the lid; the connector is formed by a snap hook; the lid is shown in a first position;

[0008] **FIG. 2** is an enlarged perspective view of **FIG. 1** with the lid pivoted away from the base of the closure body to allow access to a drinking spout; the lid is in a second position in which the lid is at least partially disengaged from the base portion;

[0009] **FIG. 3** is a cross-sectional view of the closure of **FIG. 1** as taken along the line **3-3** of **FIG. 1** and illustrates a preferred engagement of the closure of **FIG. 1** with a bottle; a thermal energy storing member can also be attached to the closure; the lid is in the first position, in which the lid engages the base portion and prevents access to the drinking spout;

[0010] **FIG. 4** is a perspective view of a second preferred embodiment of the closure of the present invention and illustrates the liquid passageway through the base portion being part of a pull top drinking spout;

[0011] **FIG. 5** is a cross-sectional view of the closure of **FIG. 4** similar to that of **FIG. 3** and illustrates a snap lever in a closed position (shown in solid lines) and in an open position (shown in dashed lines) to allow the snap hook to be engaged or disengaged from an object;

[0012] **FIG. 6** is a cross-sectional view similar to that of **FIG. 3** illustrating a third preferred closure according to the present invention; this closure has an enlarged U-shaped member that can have one end detached from the base portion to allow the closure to be attached to an object; the pull top drinking spout preferably remains exposed regardless of whether the enlarged U-shaped member is fully engaged with or partially disengaged from the base portion;

[0013] **FIG. 7** is a cross-sectional view similar to that of **FIG. 3** illustrating a fourth preferred embodiment of the closure of the present invention in which the snap lever is spring biased;

[0014] **FIG. 8** is a cross-sectional view similar to **FIG. 3** illustrating a fifth preferred embodiment of the closure of the present invention in which the liquid passageway **38** is formed by a straw **48**;

[0015] **FIG. 9** is a cross-sectional view of a sixth preferred embodiment of the closure of the present invention in which the lid and connector are configured to swivel about a longitudinal axis of the bottle to simplify the engagement and disengagement of the closure with an object;

[0016] **FIG. 10** is a cross-sectional view similar to **FIG. 3** illustrating a seventh preferred embodiment of a closure member according to the present invention in which an enlarged U-shaped snap member incorporates a fastener type connection;

[0017] **FIG. 11** is a cross-sectional view similar to that of **FIG. 3** illustrating an eighth preferred embodiment of a closure according to the present invention in which the enlarged U-shaped member incorporates a bolt clip;

[0018] **FIG. 11A** is cross-section a view similar to that of **FIG. 3** illustrating an alternative embodiment of a closure according to the present invention in which the snap hook is disposed on a side of the closure;

[0019] **FIG. 12** is a cross-sectional view similar to that of **FIG. 3** illustrating a ninth preferred embodiment of a closure according to the present invention in which the connector is disposed on the bottle; and

[0020] **FIG. 13** is a cross-sectional view similar to **FIG. 3** illustrating a tenth preferred embodiment of a closure according to the present invention in which the connector is located on an end of the bottle opposite from the closure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] Certain terminology is used in the following description for convenience only and is not limiting. The words "right,""left,""top," and "bottom" designate directions in the drawings to which reference is made. The words "inwardly" and "outwardly" refer to directions toward and away from, respectively, the geometric center of the closure and designated parts thereof. The words "a" and "one" are defined as including one or more of the referenced item unless specifically stated otherwise. This terminology includes the words above specifically mentioned, derivatives thereof, and words of similar import.

[0022] Referring to **FIGS. 1-13**, wherein like numerals indicate like elements throughout, ten preferred embodiments of a closure according to the present invention are shown and generally designated **20:1-20:10** respectively. Briefly stated, the present invention is directed to a closure **20:1-20:10** for a bottle **34** that increases the ease and enjoyment with which a user can carry and drink from the bottle **34**.

[0023] Many of the features of the closure **20:1-20:10** of the present invention are similar and operate in a generally similar fashion. For simplicity, the first preferred closure **20:1** will be described and, thereafter, generally only the differences between the first preferred closure **20:1** and the remaining preferred closure assemblies **20:2-20:10** will be discussed. Accordingly, it is understood that those features discussed in connection with any one the embodiments of the closure **20:1-20:10** will operate generally the same in the remaining embodiments unless otherwise described.

[0024] It is preferred that the closure **20:1-20:10** be formed of a durable, non-corrosive, compatible with food material, such as a suitable polymer. However, those of ordinary skill in the art will appreciate from this disclosure that the closures **20:1-20:10** of the present invention may be formed of any suitable material, such as stainless steel or the like without departing from the scope of the present invention.

[0025] Referring to **FIGS. 1-3**, the first preferred closure **20:1** of the present invention is adapted for use with a bottle **34** that defines a cavity **54** which opens to a mouth **56**. The closure **20:1** includes a closure body **32** having a base portion **26** that is configured to engage the bottle **34** with the closure body **32** positioned over the mouth **56**.

[0026] As best shown in **FIG. 3**, the closure **32** preferably includes an annular envelope **58** adapted to receive a portion of the bottle **34** which defines the mouth **56** therein. While the annular envelope **58** is shown being as generally rectilinear in cross-section, those of ordinary skill in the art will appreciate from this disclosure that the annular envelope **58** may be parabolic or otherwise non-rectilinear in cross-section without departing from the scope of the present invention.

[0027] It is preferred that the closure **20:1** include a seal **60** that is positioned within the upper portion of the annular envelope **58** to create a generally liquid tight seal between the top of the bottle mouth **56** and the closure **32** when the bottle **34** is fully inserted into the annular envelope **58**. The seal **60** generally reduces any liquid transfer between the closure body **32** and the bottle **34**.

[0028] It is preferred that the annular envelope **58** include at least one thread **62** for engaging the bottle **34**. It is also preferred that the closure **32** include an annular shroud **64** that is adapted to cover any interface between the annular envelope **58** and the bottle **34**. It is preferred the annular shroud **64** flare outwardly as one moves along the outer surface of the annular shroud **64** downwardly toward the bottle and away from a drinking spout **30** (further described below).

[0029] Referring to **FIG. 2**, it is preferred that the closure body **32** include a latch **66** for detachably securing the lid **28** in a first position (shown in **FIGS. 1 and 3** and further described below). It is preferred that the annular shroud **64** include a depressible section **68** that releases the latch **66** to allow the lid **28** to be moved from the first position.

[0030] Referring again to **FIG. 3**, a liquid passageway **38** is defined by the base portion **26** and extends at least partially therethrough. Referring to FIGS. **5, 7-10**, and **12**, the liquid passageway **38** can have various shapes without departing from the scope of the present invention.

[0031] Referring to **FIGS. 1-3**, a connector **24** is disposed on the closure body **32** and is adapted to allow the closure body **32** to be detachably connected to an object, such as a belt loop, a carry strap, a purse strap, a cord, a loop, or the like. It is preferred that the connector **24** is located on the closure body **32** to extend generally outwardly away from the bottle **34**. As shown in **FIG. 1** the connector **24** preferably extends generally upwardly from the lid **28**. However, those of ordinary skill in the art will appreciate from this disclosure that the connector **24** can extend from a lateral side of the closure body **32** or from a lateral side of the annular shroud **64** without departing from the scope of the present invention. It is preferable that the connector **24** is generally symmetrically aligned about a longitudinal axis (the axis is shown in **FIG. 9** and identified by reference numeral "X") of the bottle **34**.

[0032] Referring to **FIGS. 1-5, 8, 9, 12**, and **13**, it is preferable that the connector **24** is a snap hook **22**. It is preferred that the snap hook **22** include a portion **42**, also referred to as snap lever, having a sufficiently thin cross section to allow the snap hook portion **42** to be deflected (as shown in dashed lines). It is preferred that the snap hook **22** is integrally formed with the closure body **32**. It is also preferred that the closure body **32** and the snap hook **22** are formed by a suitable polymer. As best shown in **FIG. 1**, it is also preferred that the snap hook **22** include a lateral support member **70** that is connected to opposing lateral sides **72** of the snap hook **22** and to a surface **74** of the closure body **32** that supports the snap hook **22**.

[0033] Referring to **FIGS. 2 and 3**, it is preferred that a drinking spout **30** is disposed on the base portion **26** of the closure body **32** and forms at least part of the liquid passageway **38**. The closure body **32** preferably includes a lid **28** that is moveably connected to the base portion **26** due to a hinge connection **76**. While the hinge connection **76** is shown as a living hinge formed by a portion of the closure body **32** those of ordinary skill in the art will appreciate that any hinge, torsion hinge, or suitable pivotable connector can be used to moveably secure the lid **28** to the base portion **26** without departing from the scope of the present invention.

[0034] The lid **28** is moveable between a first position (shown in **FIG. 3**), in which the lid **28** engages the base

portion **26** and prevents access to the drinking spout **30**, and a second position (shown in **FIG. 2**), in which the lid **28** is at least partially disengaged from the base portion **26** to allow access to the drinking spout **30**. It is preferred that a surface **78** of the lid **28**, which faces the base portion **26** when the lid **28** is in the first position, seals the drinking spout **30** while in the first position (shown in **FIG. 3**). It is also preferred that the surface **78** include a seal **80** which substantially prevents fluid flow from the bottle **34** past the lid **28** when the lid **28** is in the first position. Any known suitable seal material may be used in conjunction with the lid surface **78**.

[0035] Referring to **FIG. 2**, the drinking spout **30** may be a tube **82** or the like. Referring to **FIGS. 4 and 5**, the drinking spout **30** may be a pull top **40** as well. Alternatively, the drinking spout may be formed by part of a straw **48** as shown in **FIG. 8**. A drinking end **48A** of the straw is preferably bendable about an abutment **84** when the lid **28** is in the first position. Those of ordinary skill in the art will appreciate from this disclosure that the drinking spout may be any known mechanism, such as a rotatable tube or the like, without departing from the scope of the present invention.

[0036] Referring to **FIG. 9**, a sixth preferred embodiment of the closure **20**:6 has a lid **28** and connector **24** that are rotatable about a central axis "X" regardless of whether the lid **28** in the first or second position. It is preferred that the base portion **26** include a first part **86** that is adapted to engage the bottle and a second part **88** that is rotatably connected to the first part **86**. It is preferred that the second part **88** of the base portion **26** is rotatably connected to the first part **86** via the drinking spout **30**.

[0037] It is preferred that the second part **88** have an inner ridge **90** that extends generally upwardly and inwardly in an annular fashion about the drinking spout **30**. It is also preferred that the drinking spout **30** include a circumferential lip **92** that abuts the inner ridge **90** of the second part **88** of the base portion **26** to prevent the second part **88** from being disconnected from the first part **86** of the base portion **26**. An inwardly facing surface of the inner ridge **90** forms a beveled surface **94** that faces generally diagonally downwardly and inwardly toward the bottom center of the closure body **32**.

[0038] During assembly, the beveled surface **94** in combination with the circumferential ridge **92** allows the second part **88** of the closure body **32** to be downwardly depressed over the drinking spout **30** to snap into place for ease of manufacturing. Once the second part **88** has been pressed downwardly so that beveled surface **94** is past the circumferential lip **92**, the top edge of the inner ridge **90** abuts the circumferential lip **92** and prevents removal of the second part **88** from the drinking spout **30** that is preferably integrally formed with the first part **86** of the closure body **32**.

[0039] Referring to **FIG. 6**, a third embodiment of the closure body **32** includes a connector formed by an enlarged U-shaped member **44**. The right side of the enlarged U-shaped **44** member detachably engages the base portion **26** to secure the connector **24** in the closed position. To engage the closure **20**:3 with an object, the right side of the enlarged U-shaped member **44** is disengaged from the base portion **26** so that the object can be inserted between the lateral sides **72** of the enlarged U-shaped member **44**. Then, the right side of the enlarged U-shaped member **44** is reengaged with the base portion **26** so that the latch **66** of the U-shaped member **44** is secured thereto.

[0040] Referring to **FIG. 7**, as an alternative to the snap lever **42** being an integral part of the connector **24** and the lid **28**, the snap lever **42** may be a separate piece that is rotatably secured to the lid **28** and biased into the closed position by an elastic member, such as spring **46**. Referring to **FIG. 11**, the connector **24** may be a bolt clip or may be an enlarged U-shaped member **44** which incorporates a bolt clip **52** therein. The bolt clip **52** may be incorporated into the right leg of the U-shaped member **44** so that a bolt **96** is sidably positioned therein. It is preferable that the bolt **96** be biased downwardly by an elastic member **46** or the like. A button **98** preferably protrudes through a slot **100** to allow a user to manually move the bolt **96** upwardly to disengage the bolt **96** from a bolt receptacle **102** disposed on either a lid or the base portion **26**.

[0041] Referring to **FIG. 10**, the enlarged U-shaped member **44** may use a fastener type connection **50** to secure the unhinged side to the lid **28** or the base portion **26**. For example, a threaded projection **104** may be located on the base portion **26** to threadably engage a sleeve to secure the right lateral side **72** of the U-shaped member **44** in the closed position.

[0042] Referring to **FIGS. 12 and 13**, the closures **20**:9-**20**:10 of the present invention may include connectors **24** that are located on the bottle **34**. The placement of connectors **24** on the bottle **34** is within the scope of the present invention.

[0043] Referring to **FIGS. 3, 5, 6**, and **13**, a thermal energy storing member **36** may be attached to the inside of the inner wall which preferably forms a part of the annular envelope **58**. Details of the engagement of the thermal energy storing member **36** with the closure **20**:1-**20**:10 of the present invention are provided in U.S. Pat. No. 6,584,800, issued to Donna Roth and Hank Roth on Jul. 1, 2003, which is hereby incorporated by reference herein in its entirety as if fully set forth.

[0044] Referring to **FIGS. 1-3**, one embodiment of the present invention operates as follows. A user attaches the bottle closure **20**:1 to an object, such as a backpack strap, by depressing the snap lever **42** to allow the back pack strap or the like to be placed within the snap connector **22**. Once the closure **20**:1 and any accompanying bottle is secured, a user may carry the closure **20**:1 with ease. When a drink is desired, the snap lever **42** is depressed to allow the closure **20**:1 to be disengaged from the back pack strap or the like. Then, the user presses the depressible section **68** to disengage the latch **66** from the base portion **26**. Then, the lid **28** is rotated from the first position (shown in **FIG. 3**) into the second position (shown in **FIG. 2**) to allow the user to access the drinking spout **30**. Once the user is finished drinking from the drinking spout **30**, the lid **28** is moved into the first position such that the latch **66** is engaged with the base portion **26**. Then, the closure **20**:1 and accompanying bottle can be secured for transport by depressing the snap lever **42** to engage the snap hook **22** with a portion of an object. As detailed above, a few examples of the sort of objects to which the closures can be attached are: backpacks, clothes lines, purses, belts, belt loops, luggage straps, drawstrings, loops, and the like.

[0045] While various shapes, connectors, drinking spouts, liquid passageways, and types of base portions have been described above and shown in the drawings for the various embodiments of the closure **20**:**1**-**20**:**10** of the present invention, those of ordinary skill in the art will appreciate from this disclosure that any combination of the above features, connectors, base portions or the like can be used, in any combination, without departing from the scope of the present invention. Accordingly, it is recognized by those skilled in the art from this disclosure that changes may be made to the above described embodiments of the invention without departing from the inventive concept thereof It is understood, therefore, that this invention is not limited to the particular embodiments disclosed, but is intended to cover all modifications which are within the spirit and scope of the present invention as defined by the appended claims and/or as shown in the attached drawings.

What is claimed is:

1. A closure for a bottle defining a cavity opening to a mouth, the closure comprising:

a closure body having a base portion configured to engage the bottle with the closure body positioned over the mouth;

a liquid passageway defined by the base portion and extending at least partially therethrough; and

a connector disposed on the closure body and adapted to allow the closure body to be detachably connected to an object.

2. The closure of claim 1, wherein the connector is located on the closure body to extend generally outwardly away from the bottle.

3. The closure of claim 2, wherein the connector is generally symmetrically aligned about a longitudinal axis of the bottle.

4. The closure of claim 1, wherein the connector is a snap hook.

5. The closure of claim 1, wherein the snap hook is integrally formed with the closure body.

6. The closure of claim 4, wherein the closure body and the snap hook are formed by a polymer, a portion of the snap hook having a sufficiently thin cross-section to allow the portion to be deflected.

7. The closure of claim 4, wherein the snap hook includes a lateral support member that is connected to opposing lateral sides of the snap hook and to a surface of the closure body that supports the snap hook.

8. The closure of claim 1, wherein the connector is a U-shaped member having first and second legs, the first leg being pivotably connected to the closure body and the second leg being detachably engageable with the closure body.

9. The closure of claim 8, wherein the connector incorporates a bolt clip that is configured to detachably engage the closure body.

10. The closure of claim 1, further comprising:

a drinking spout disposed on the base portion of the closure body and forming at least part of the liquid passageway;

the closure body including a lid that is moveably connected to the base portion for motion between a first position, in which the lid engages the base portion and prevents access to the drinking spout, and a second position, in which the lid is at least partially disengaged from the base portion to allow access to the drinking spout.

11. The closure of claim 10, wherein the drinking spout is a tube.

12. The closure of claim 10, wherein the drinking spout is a pull top drinking spout.

13. The closure of claim 10, wherein the drinking spout is formed by part of a straw.

14. The closure of claim 10, wherein the drinking spout is a rotatable tube.

15. The closure of claim 10, wherein a surface of the lid, which faces the base portion when the lid is in the first position, seals the drinking spout while in the first position.

16. The closure of claim 15, wherein the surface includes a seal which substantially prevents fluid flow from the bottle past the lid when the lid is in the first position.

17. The closure of claim 10, wherein the closure further comprises an annular envelope adapted to receive a portion of the bottle defining the mouth therein.

18. The closure of claim 17, wherein the closure further comprises a seal located within the envelope to generally reduce any liquid transfer between the closure body and the bottle.

19. The closure of claim 17, wherein the annular envelope includes at least one thread for engaging the bottle.

20. The closure of claim 17, further including an annular shroud adapted to cover any interface between the annular envelope and the bottle.

21. The closure of claim 20, wherein the closure body further comprises a latch for detachably securing the lid in the first position.

22. The closure of claim 21, wherein the annular shroud further comprises a depressible section that releases the latch to allow the lid to be moved from the first position.

23. The closure of claim 1, further comprising a thermal energy storage member detachably connected to the base portion of the closure body, wherein the base portion is configured to support the thermal energy storage member within the cavity of the bottle when the base portion is engaged with the bottle.

24. The closure of claim 10, wherein the lid and connector are rotatable about a central closure axis regardless of whether the lid is in the first or second position.

25. The closure of claim 24, wherein the base portion includes a first part that is adapted to engage the bottle and a second part that is rotationally connected to the first part.

26. The closure of claim 25, wherein the second part of the base portion is rotationally connected to the first part via the drinking spout.

27. The closure of claim 8, wherein the connector incorporates a fastener on the second leg that is configured to detachably engage the closure body.

* * * * *

United States Patent [19]

Hurst

[11] **4,020,964**

[45] **May 3, 1977**

[54] **INFANTS FEEDING BOTTLE**

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[73] Assignee: **Lewis Woolf Griptight Limited**, Birmingham, England

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[21] Appl. No.: **612,042**

[52] **U.S. Cl.** ..... **215/11 C**

[51] **Int. Cl.²** **A61J 9/00**

[58] **Field of Search** ..... 215/11 C, 11 R; 248/102; 128/252

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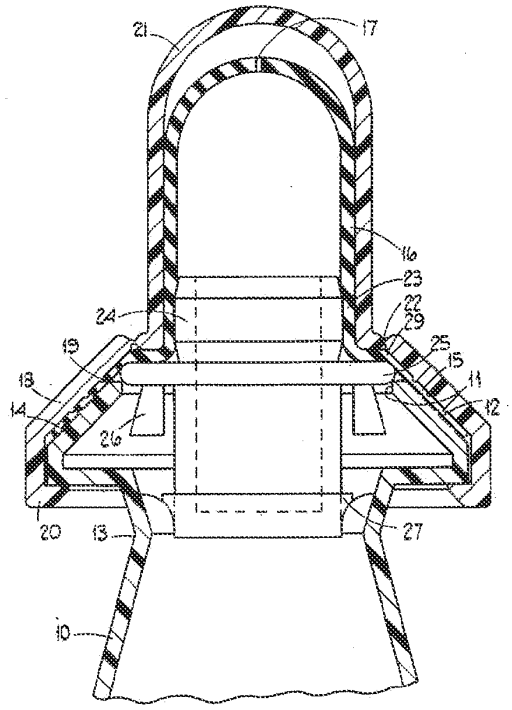
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Primary Examiner—Ro E. Hart

[57] **ABSTRACT**

An infants feeding bottle comprising a container for liquid, a teat securable onto the container, a detachable teat cap enclosing the teat before use and a closure member frictionally engageable within the teat and arranged to be dislodged by manipulation of the teat cap without the necessity for removal thereof from a position in which it covers the teat, the teat container, teat cap and closure member being substantially of oval section the longer dimensions of the oval sections being mutually in alignment and the teat having an outlet slit at its end the length of which is in the direction of the longer dimensions of the oval sections.

2 Claims, 2 Drawing Figures



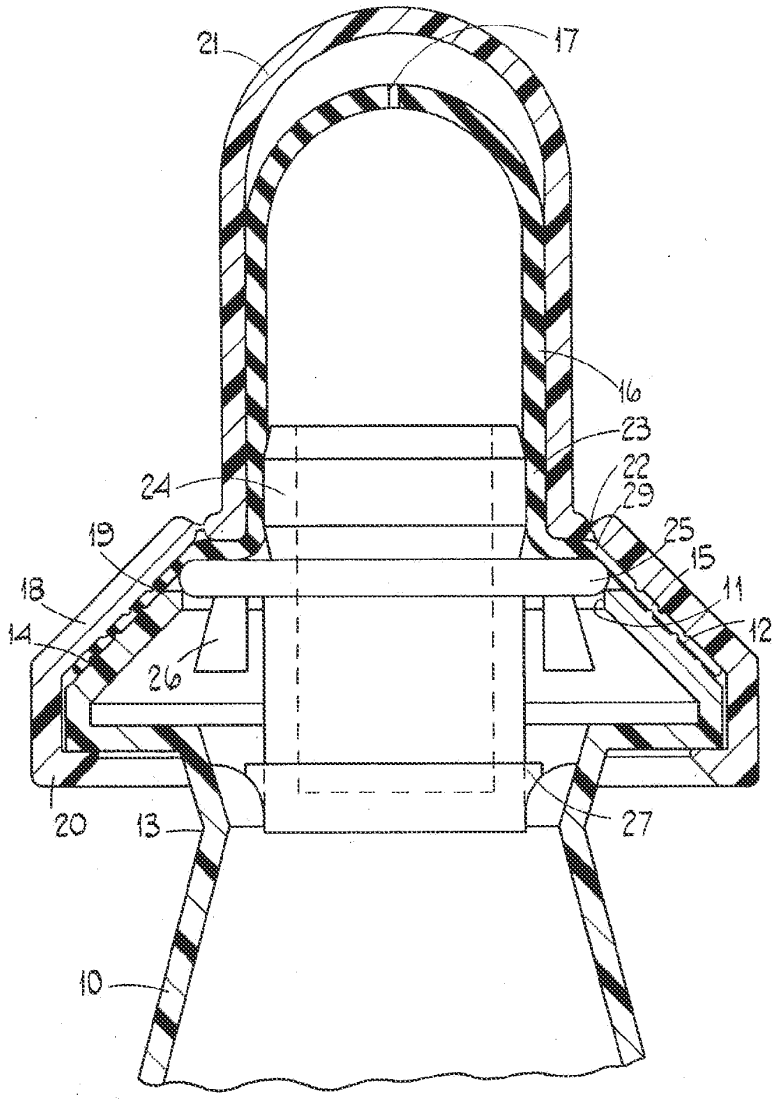
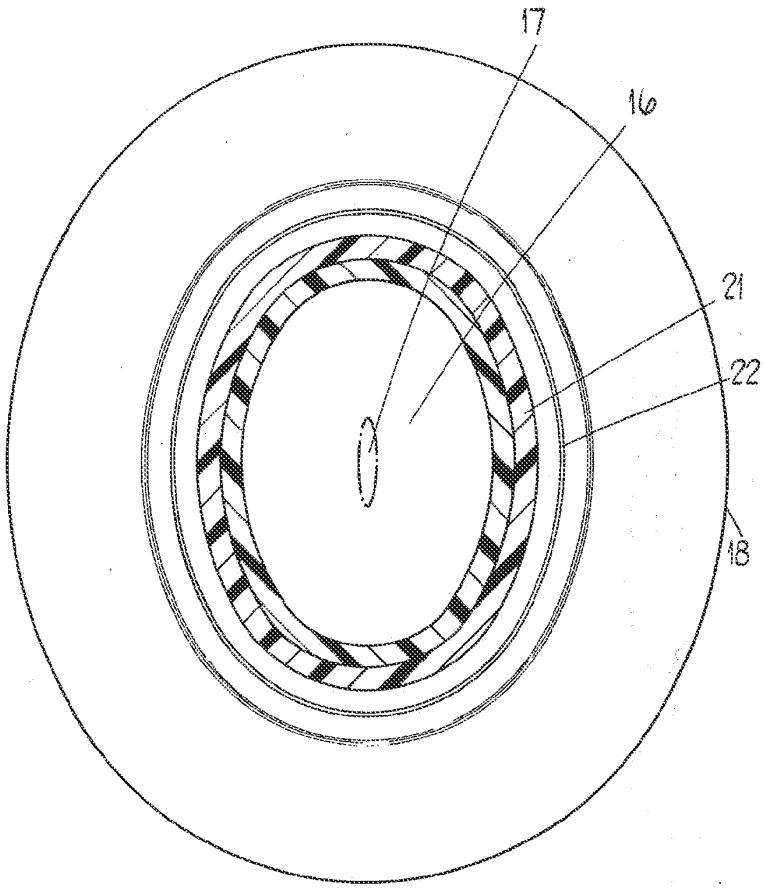


FIG. 1

FIG. 2.



INFANTS FEEDING BOTTLE

This invention relates to infants feeding bottles of the kind comprising a container for liquid, a teat securable onto the container, a detachable teat cup enclosing the teat before use and means whereby before use the interior of the container is isolated from the interior of the teat.

It is the object of this invention to provide an infants feeding bottle which is not only particularly convenient to use in that its correct orientation is easily determined, but also it can be inexpensively produced thus rendering disposal after use economically realistic.

According to the invention an infants feeding bottle comprises a container for liquid, a teat securable onto the container, a detachable teat cap enclosing the teat before use, and a closure member frictionally engageable within the teat before use, and arranged to be dislodged by manipulation of the teat cap into the interior of the container, with the cap covering the teat, the container, teat, teat cap and closure member being of substantially oval sections respectively, the longer dimensions of the oval sections being aligned, and the teat having an outlet slit at its end, the length of the slit being in the direction of the longer dimensions of the oval sections.

The invention will now be described by way of example with reference to the accompanying drawing, in which FIG. 1 is a side elevation cross-sectional view of an infants feeding bottle, constructed in accordance with the invention and shown in the sealed condition,

FIG. 2 is a cross-sectional view through the teat.

The feeding bottle illustrated comprises a container 10 having an opening 11 surrounded by a frusto conical seating 12. The seating is formed on the external surface of an enlarged mouth portion of the container which is defined by a narrow neck portion indicated generally at 13. The surface of the seating 12 is formed with ribs 14. Engaging on the seating surface 12 is a flange 15 of a teat 16. In the condition shown the teat is somewhat deformed in shape as will be described. The flange 15 is formed by a flare portion at one end and the other end is domed and provided with a single outlet 17. This outlet 17 is in the form of a slit in the center of the end of the teat 16.

To retain the teat flange 15 in sealing engagement with the seat 12 of the container 10 there is an attachment part 18. The attachment part has an internal surface matching that of the seating 12 and having integral ribs 19 similar to those of the seating 12. The ribs 14 and 19 tend to deform the teat flange 15 so as to retain it firmly in place in tight sealing engagement with the seating 12. The attachment part has an undercut flange 20 arranged to engage under the portion of the container on which the seating 12 is formed. To allow the attachment part 18 to be fitted to the container the edge of the undercut flange is chamfered as shown. Both the container and the attachment part are formed from resilient materials to allow snap engagement to be accomplished as will be described.

Formed integrally with the attachment part 18 is a teat cap 21. These parts are connected together by an integral continuous thin severable portion 22. This portion 22 provides a connecting zone which when it is intact prevents ingress of dirt to that portion of the teat 16 which is immediately within it. The attachment part 18 and cap 21 with the connecting portions 22 are

preferably formed by a moulding process from a plastics material, and the severable portion 22 has sufficient strength to withstand normal handling during transport or storage of the feeding bottle, but when required it can be broken away.

Breaking away of the severable portion 22 is accomplished by driving it inwards by the application of pressure to the top of the cap

The cap 21 is tightly engaged against the exterior surface of the teat 16 in the zone indicated at 23. Such tight engagement is produced by a closure member 24 which in the sealed condition has a plug portion of generally cylindrical external configuration. The edges of such a plug portion are however shallowly chamfered as indicated but the diameter of the cylindrical zone thereof is sufficiently large to place the zone 23 of the teat in compression.

The closure member 24 is of unitary construction and is preferably moulded from a plastics material. It has an integral flange 25 from which depend a number of support lugs 26. The flange is adjacent the plug portion of the closure member, but the other end is formed with four projections 27. The edges of these are curved and they define between them four zones through which liquid stored in the interior of the container 10 can flow into the upper part of the container and ultimately into the interior of the teat when the feeding bottle has been made ready for use.

Support lugs 26, and the projections 27 provide means for supporting the closure member 24 in the position within the narrow neck portion 13 of the container. The flange 25 is however slightly larger in external dimensions and the opening 11 of the container 10. The edge of the flange 25 is rounded and it is possible to force the flange through the opening 11. Once it has passed through the opening the flange will not however return therethrough.

The rim of the cap 21 is disposed in the sealing condition shown in the drawing over th flange 25 and the teat 16 is compressed in the zone indicated at 29 between such rim of the cap 21 and the flange 25 of the closure member 24.

This provides means whereby the closure member 24 can be positively forced downwards by manipulation of the cap 21 between the sealing position shown and a ready position.

The container 10, the teat 16, the teat cap 21, the attachment part 18 and the closure member 24 are all of oval section. The longer dimensions of the oval sections are moreover aligned so that the whole assembly is narrower in one direction than it is in the other.

The slit 17 forming the outlet from the teat 16 extends in the direction of the longer dimensions of the oval sections of the respectively components.

Operations for making the feeding bottle ready for use comprise the following. In the sealing condition the severable portion 22 is complete. Severing of this is accomplished by application of pressure to the top of the cap 21. This has the effect also of driving the closure member to a position where its flange 25 passes through the opening 11 in the top of the container, and the support lugs 26 and the projections 27 engage on either side of the narrow neck portion 13 of the container. This operation is carried out with the teat cap 21 covering the teat 16 at all times.

Subsequently the teat cap 21 can be removed from over the teat 16. In practice the first operation of dislodging the closure member into the interior of the

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container may be carried out at a position remote from the position of use, but the cap **21** remains in place until the feeding bottle is actually to be put to use. Only immediately before such use commences is the cap **21** removed.

Removal of the cap allows the teat **16** to become undeformed. Not only is it impossible for the closure member **24** to pass the opening **11** in the container **10** but were it to do so it would be impossible for the closure member **24** to re-engage in the interior of the teat since a degree of compression of the teat takes place during such insertion and the closure member **24** has insufficient weight to allow such compressive force to be exerted. Thus a completely reliable operation of the feeding bottle is accomplished both during the process of making it ready for use and during actual use.

The method of assembling the components comprises the following. First the teat **16** is inserted into the cap **21** which has formed integrally with it the attachment part **18**. Next the closure member **24** is inserted into the interior of the teat some pressure being necessary to accomplish this. Finally the whole of this assembly is secured onto the top of the container by the snap action afforded by the undercut flange **20** of the attachment part **18**.

To replace the snap action afforded by the undercut flange **20** of the attachment part **18** other means for securing the attachment part to the container may be employed. Welding or the use of adhesives constitute some such methods of attachment.

The provision of an oval cross-sectional assembly together with a slit as an outlet from the teat **16** has certain advantages. The slit provides means for regulating the rate at which feeding takes place, and the oval section of the feeding bottle allows the orientation of the slit to be readily recognised.

The provision of an oval teat moreover has the advantage that it is possible by the hot latex dip process to manufacture larger numbers of teats simultaneously than is possible with teats of circular cross-section. The teats are manufactured by this process in lines carried on support bars. With oval section teats a larger number of such teats can be mounted on a bar than is possible with those of circular section.

I claim:

1. An infants feeding bottle comprising a container for liquid, a teat securable onto the container, a detachable teat cap enclosing the teat before use, and a closure member frictionally engageable within the teat before use, and arranged to be dislodged by manipulation of the teat cap into the interior of the container, with the cap covering the teat, the container, teat, teat cap and closure member being of substantially oval sections respectively, the longer dimensions of the oval sections being aligned, and the teat having an outlet slit at its end, the length of the slit being in the direction of the longer dimensions of the oval sections.

2. An infants feeding bottle as claimed in claim **1** in which the teat cap and the attachment part are connected by a severable portion.

* * * * *

IN THE UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF ARKANSAS
FAYETTEVILLE DIVISION

CAMELBAK PRODUCTS, LLC **PLAINTIFF**

V. **CASE NO. 5:21-CV-05109**

ZAK DESIGNS, INC. **DEFENDANT**

MEMORANDUM OPINION AND ORDER

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I. INTRODUCTION

As Plaintiff CamelBak Products, LLC's patents explain, "For some time people have recognized the need to stay hydrated." (Doc. 64-1, p. 14). This need has created a market for well-designed, reusable water bottles. CamelBak and Defendant Zak Designs, Inc. are competitors in this market. CamelBak brought this case alleging Zak is infringing on its patents for water bottles and water bottle lids.

The parties now ask the Court to construe certain terms that appear in the claims—the recitations at the end of a patent that define the scope of the invention—of CamelBak's patents. The Court conducted a claim construction hearing on December 2, 2022. In advance of the hearing, the parties submitted a Joint Claim Construction and Prehearing Statement (Doc. 63) which identified 23 claim terms in dispute. Pursuant to Northern District of California Patent Local Rule 4.3(c),[1] the parties also identified the 10 most significant terms for the Court to construe during the claim construction stage of this case. The parties then briefed their proposed constructions of those 10 terms. *See* Docs. 64, 65, 69. The parties' briefing included declarations and deposition testimony from CamelBak's expert witness, Jim Goldman, and Zak's expert, John Hamilton. There is no dispute that both Mr. Goldman and Mr. Hamilton, as experienced mechanical engineers, qualify as persons of ordinary skill in the art. At the hearing, the Court entertained oral argument and presentations on the disputed terms identified as most significant by the parties. After the hearing, the Court instructed the parties to submit supplemental briefing on their proposed constructions of an additional disputed term, variations of the word "bias." *See* Docs. 71, 73, 74.

Having fully examined the patents, briefing, exhibits, expert opinions, and the parties' oral arguments and presentations, the Court construes the disputed claim terms as stated below.

[1] The parties consented to the Court's adoption of the Northern District of California Patent Local Rules in this case.

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II. BACKGROUND

CamelBak's Amended Complaint (Doc. 61) alleges Zak is infringing on six of its patents which fall into two patent families (collectively, "the Asserted Patents"). Within the six Asserted Patents, CamelBak alleges Zak has infringed 75 claims. The Asserted Patents are as follows:

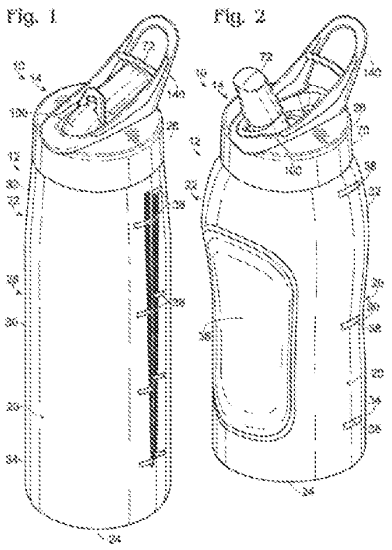
Family	Patent Number	Priority Date
Drink Bottles Leak-proof flip-top water bottles	9,463,911 ("the '911 patent")	Apr. 11, 2005
	10,676,255 ("the '255 patent")	
Drink Containers Push-button flip-top water bottles	9,782,028 ("the '028 patent")	Jan. 21, 2009
	9,820,595 ("the '595 patent")	
	10,165,879 ("the '879 patent")	
	10,542,833 ("the '833 patent")	

The '255 patent is a continuation of the '911 patent, and their specifications—the figures and text in a patent that precede the claims—are nearly identical. Similarly, the '595, '879, and '833 patents are continuations of the '028 patent with near-identical specifications for each patent. Therefore, this Opinion cites only to the '911 and '028 specifications. However, certain of the disputed claim terms appear only in the continuation patents.

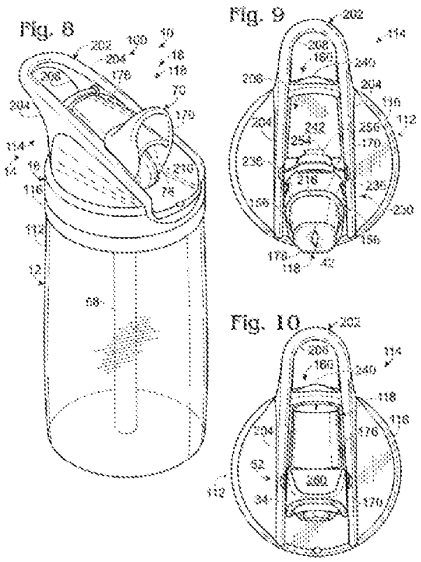
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The '911 patent (Doc. 64-1) describes, in part, a drink container with a removable cap and a fluid conduit (tube). The cap has a manually operated drink spout and valve that allow for a closed configuration, wherein the spout is stowed and the valve prevents liquid from flowing through the fluid conduit, and an open configuration, wherein the spout is in a dispensing position and the valve allows liquid to flow through the fluid conduit. The drink spout has a flexible mouthpiece that opens when the user bites down on it, allowing the user to drink liquid. The cap also has an air return assembly that allows air to flow into the drink container when the drink spout is in the dispensing position but does not allow air to flow when the spout is stowed.



The '028 patent (Doc. 64-3) describes a drink container that is similar to the drink container described in the '911 patent. The container includes, in part, the following features: a cap assembly; a mouthpiece that alternates between a stowed configuration and a dispensing configuration; a tube that may be crimped to restrict the flow of liquid when the mouthpiece is stowed; a mouthpiece that is biased toward being in the dispensing configuration and moves automatically to that configuration upon user activation; a mouthpiece that is opened through an action of the user, such as



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biting down; two catch structures that secure the mouthpiece in the stowed position until activated; and a user release mechanism that allows the user to activate and release the mouthpiece from its stowed configuration so the mouthpiece can move automatically to the dispensing configuration.

III. LEGAL STANDARD

"Victory in an infringement suit requires a finding that the patent claim 'covers the alleged infringer's product or process,' which in turn necessitates a determination of 'what the words in the claim mean.'" *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372 (1996) (quoting H. Schwartz, Patent Law and Practice 1, 80 (2d ed.1995)). This determination of the meaning of claim terms, known as claim construction, "is exclusively within the province of the court." *Id.* at 372.

Claim terms are given "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc) (quotation and citations omitted). "In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." *Id.* at 1314 (citing *Brown v. 3M*, 265 F.3d 1349, 1352 (Fed. Cir. 2001)). In other words, some claim terms do not require any construction at all.

Nevertheless, "[w]hen the parties present a fundamental dispute regarding the scope of a claim term, it is the court's duty to resolve it." *O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008). "Thus, a determination that a claim term needs no construction or has the plain and ordinary meaning may be

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inadequate when a term has more than one 'ordinary' meaning or when reliance on a term's 'ordinary' meaning does not resolve the parties' dispute." *Eon Corp. IP Holdings v. Silver Spring Networks*, 815 F.3d 1314, 1318 (Fed. Cir. 2016) (cleaned up).

Claims must be construed in light of the intrinsic evidence—the claim language itself, the specification, and the patent's prosecution history. The claim language can "provide substantial guidance as to the meaning of particular claim terms," both through the context in which the claim terms are used and through comparison with other claims in the patent. *Phillips*, 415 F.3d at 1314. "[T]he specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). The prosecution history, while often lacking the "clarity" of the specification, also constitutes intrinsic evidence that provides "evidence of how the PTO and the inventor understood the patent." *Phillips*, 415 F.3d at 1317.

Courts may also consider extrinsic evidence—such as dictionaries and expert testimony—though such evidence is given less weight than intrinsic evidence. *Id.* Dictionaries may reveal what the ordinary and customary meaning of a term would have been to a person of ordinary skill in the art at the time of the invention. *See Frans Nooren Afdichtingssystemen B.V. v. Stopaq Amcorr Inc.*, 744 F.3d 715, 722 (Fed. Cir. 2014). Expert testimony can also help "to ensure that the court's understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field." *Phillips*, 415 F.3d at 1318.

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IV. DISCUSSION

A. Agreed Constructions		
Claim Term	**Patents**	**Construction**
"constructed as a unitary assembly"	'028, '595, '879, and '833 Patents	"constructed as a single piece that includes a group of parts or distinct portions"
"friction-fit arrangement"	'028, '595, '879, and '833 Patents	"arrangement in which one part is fitted inside another part such that relative movement between them is resisted by friction"
"fluid conduit"	'911 and '255 Patents	"fluid-carrying structure, such as a channel, pipe, or tube"
"mouthpiece assembly"	'028, '595, '879, and '833 Patents	"the group of parts or distinct sections that, taken together, allow the user to drink liquid"
"air return assembly"	'911 Patent	"a group of parts that, taken together, form a unit that is adapted to return air"

In the Joint Claim Construction and Prehearing Statement, the parties agreed to the constructions of two claim terms, "constructed as a unitary assembly" and "friction-fit arrangement." In their claim construction briefing, the parties informed the Court they had also reached an agreement on the construction of one of the ten most significant terms, "fluid conduit." On the record at the claim construction hearing, the parties agreed to the constructions of two additional disputed terms, "mouthpiece assembly" and "air return assembly." Having reviewed these agreed constructions in the context of the Asserted Patents, the Court agrees with the parties' constructions and adopts them as stated above.

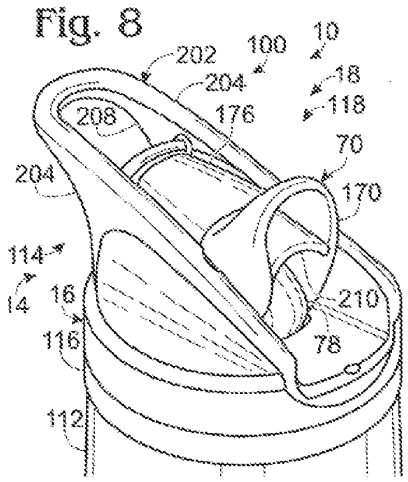
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The Court now turns to the remaining disputed terms, taking them up in the order presented by the parties at the claim construction hearing.

B. "rigid"		
'028, '595, '879, and '833 Patents		
CamelBak's Proposed Construction	**Zak's Proposed Construction**	**Court's Construction**
plain and ordinary meaning	indefinite	plain and ordinary meaning

The term "rigid" is used extensively in the Asserted Patents' specifications and claims. For example, claim 10 of the '028 patent recites that "the mouthpiece assembly further includes a rigid collar member that is pivotally coupled to the base and which includes a crimping portion," and "wherein the rigid collar member engages and crimps the crimping region to restrict the flow of drink liquid through the liquid passage when the mouthpiece assembly is in the stowed configuration." (Doc. 64-3, pp. 18–19). This "rigid collar member" 170 is seen in figure 8 of the '028 patent:



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Id. at p. 6. The '028 specification further states that "[i]n some embodiments, the collar member may be rigid or at least semi-rigid." *Id.* at 11. However, only "rigid" appears in the claim language; "semi-rigid" is used only in the specification.

Zak argues the term "rigid" is indefinite. Indefiniteness occurs when the "claims, read in light of the specification . . . and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instr., Inc.*, 572 U.S. 898, 901 (2014). A finding of indefiniteness renders the claim invalid. Because patents are presumptively valid, 35 U.S.C. § 282(a), the party asserting indefiniteness bears the burden of proof and must demonstrate invalidity by clear and convincing evidence, *Young v. Lumenis, Inc.*, 492 F.3d 1336, 1345 (Fed. Cir. 2007) (citing *AK Steel Corp. v. Sollac & Ugine*, 344 F.3d 1234, 1238–39 (Fed. Cir. 2003)).

Zak's expert, Mr. Hamilton, attests that "that the scope of the claim term 'rigid' was not reasonably certain to a person of ordinary skill in the art in January 2009 or at any time since," (Doc. 65-1, ¶ 22), because the specification describes the collar member as either "rigid" or "semi-rigid" and "there are no functional standards in the specifications or prosecution histories to use to determine when the collar member is rigid, semi-rigid, or other than rigid or semi-rigid," *id.* at ¶ 26. In short, Zak contends that rigidity exists on a spectrum, and the intrinsic evidence provides no guidance as to what level of rigidity the claims are referencing when they use the term.

CamelBak admits that rigidity exists on a spectrum but counters that the scope of "rigid" is not indefinite because the specification extensively discusses the term and even includes examples of the materials that would be "rigid" in this context. CamelBak further argues that "rigid" is a well-known term to mechanical engineers and the admissions of

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Zak's expert are fatal to Zak's indefiniteness argument. At his deposition, Mr. Hamilton admitted that

- the examples of rigid materials in the specification helped clarify what "rigid" means in the context of the patents;
- the collar member must be rigid enough to collapse the silicone crimping region; and
- while rigidity is context specific and difficult to define, "engineers know it when they see it."

(Doc. 64-9, pp. 11, 18, 20). CamelBak's expert, Mr. Goldman, attests that the meaning of "rigid" in this context would be clear to a person of ordinary skill in the art. *See* Doc. 64-7, ¶ 32.

The Court finds that Zak has not met its burden to show "rigid" is indefinite by clear and convincing evidence. The contentions of Zak's expert as to the indefiniteness of "rigid" are undercut by his later admissions that a person of ordinary skill in the art could determine what "rigid" means when presented with the intrinsic evidence here. While rigidity is a relative measurement, the specification and claims adequately define the level of rigidity required by the inventions. For example, the claim language makes clear that the collar member must be sufficiently rigid to crimp the tube when the mouthpiece is in the stowed configuration and thereby prevent liquid from passing through the tube. This context, along with the figures and "rigid" material examples, provides sufficient objective standards with which a person of ordinary skill in the art could determine the level of rigidity required by the inventions. The specification's singular use of the term "semi-rigid"

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to describe a possible embodiment of the collar member does not render "rigid"—the term actually used in the claims—indefinite.

Having found "rigid" not indefinite, the Court turns to the proper construction of the term and finds that "rigid" is an easily understood term that requires no construction in the context of these patents. The Court agrees with CamelBak that the meaning of "rigid" in this context would be clear not only to a person of ordinary skill in the art but also to lay judges and juries. Aside from asserting that "rigid" is indefinite, Zak has not offered a contrary construction.

C. "the resilient mouthpiece is more resilient than the drink spout"		
'911 Patent		
CamelBak's Proposed Construction	**Zak's Proposed Construction**	**Court's Construction**
plain and ordinary meaning	indefinite	plain and ordinary meaning

This term appears in claims 1 and 25 of the '911 patent. Claim 1 states that the invention includes

> a resilient mouthpiece removably mounted on the drink spout and having a dispensing face, which includes the dispensing outlet, and a mouthpiece base that is shaped to restrict rotation of the resilient mouthpiece on the drink spout; wherein when the drink spout is in the dispensing position, the dispensing outlet is positioned further away from the cap assembly base than when the drink spout is in the Stowed position, *wherein the resilient mouthpiece is more resilient than the drink spout* and is adapted to resiliently compress responsive to compressive forces applied to the resilient mouthpiece by a user's teeth . . . .

(Doc. 64-1, p. 23) (emphasis added). The specification provides silicone as an example of a "resiliently deformable" material and polycarbonate as a "rigid, or stiff," material. (Doc. 64-1, pp. 15, 19).

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Zak contends this term is indefinite because the '911 patent provides no objective standard to measure resilience and therefore the scope of "more resilient" would not be reasonably certain to a person of ordinary skill in the art. Mr. Hamilton attests that the phrase "the resilient mouthpiece is more resilient than the drink spout" could mean one of four things:

> (1) the mouthpiece springs back or returns to its previous position or shape after being compressed *faster* than the drink spout;
>
> (2) the mouthpiece springs back or returns to its previous position or shape without damage after being *compressed to a greater extent* than the drink spout;
>
> (3) the mouthpiece can be *compressed for a longer period of time* and still spring back or return to its previous position or shape compared to the drink spout; or
>
> (4) the mouthpiece can be *compressed and decompressed more times* than the drink spout and still spring back or return to its previous position or shape without damage.

(Doc. 65-1, ¶ 60). Based on Mr. Hamilton's opinion that all four of these meanings are plausible, Zak argues the scope of the term is not reasonably certain.

CamelBak counters that it is clear in context that this term means that the "mouthpiece" must be sufficiently resilient to compress in response to a user's teeth, whereas the "drink spout" must be "sufficiently non-resilient, or rigid, so as to be able to apply a crimping force that restricts the flow of fluid through the fluid conduit." (Doc. 64, p. 15). CamelBak points to Mr. Hamilton's admissions at his deposition that resilience has a well-known technical meaning and that a person of ordinary skill in the art would be able to compare the relative resilience of any two materials. *See* Doc. 64-9, pp. 25–26.

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CamelBak argues that Mr. Hamilton ignored this technical meaning in favor of a Webster's Dictionary definition of "resilient," from which he derived the four plausible meanings above.

The Court finds that Zak has not met its burden to show "the resilient mouthpiece is more resilient than the drink spout" is indefinite by clear and convincing evidence. The surrounding claim language and context from the specification sufficiently define the scope of the term—the mouthpiece must be made of a material that is more resilient, such as silicone, than the material the drink spout is made from. Mr. Hamilton agreed during his deposition that an engineer would understand resilience of a material to be "the elastic energy stored up in a cubic inch of material at the elastic limit" and that resilience is measurable. (Doc. 64-9, p. 25). Consistent with this testimony, Zak conceded at the hearing that a person of ordinary skill in the art would know what "resilient" means.

Zak maintains, however, that the dispute is whether adding the word "more" before "resilient" makes the term indefinite because the Webster's Dictionary definition gives four possible meanings of "resilient." But Mr. Hamilton also conceded at his deposition that a person of ordinary skill in the art could compare the resilience of two materials in the context of the '911 patent—in other words, a person of ordinary skill in the art could determine whether material A is more resilient than material B. That is all the claim term requires. A lay dictionary definition of "resilient" that allows for four possible types of resilience cannot make the term's scope indefinite when there is an agreed technical meaning. Given these findings, the Court cannot say that the term "fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instr., Inc.*, 572 U.S. 898, 901 (2014).

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Lacking any counter-construction from Zak, the Court finds that "the resilient mouthpiece is more resilient than the drink spout" should be given its plain and ordinary meaning. Given that the parties' experts agree that the resilience of a material is measurable and comparable, the Court finds that the ordinary meaning of the claim term to a person of ordinary skill in the art will not be meaningfully in dispute at trial.

D. "release the mouthpiece assembly to move via its bias from the stowed configuration to the dispensing configuration"		
'028, '595, '879, and '833 Patents		
CamelBak's Proposed Construction	**Zak's Proposed Construction**	**Court's Construction**
plain and ordinary meaning	indefinite	plain and ordinary meaning

Zak argues this phrase is indefinite because "its bias" lacks an antecedent basis. "The requirement of antecedent basis is a rule of patent drafting, administered during patent examination." *Energizer Holdings, Inc. v. Int'l Trade Comm'n*, 435 F.3d 1366, 1370 (Fed. Cir. 2006). The rule requires that the first time a term is used it be prefaced with an indefinite article—"a" or "an"—and then any subsequent use of the same term should be prefaced by a definite article—"said" or "the"—so the reader is clear that the latter term refers back to the former. "[F]ailure to provide explicit antecedent basis for terms does not always render a claim indefinite" because "an antecedent basis can be present by implication." *Id.* Accordingly, whether a term is given an explicit antecedent basis or not, the inquiry remains whether the term "fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc. v. Biosig Instr., Inc.*, 572 U.S. 898, 901 (2014).

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Zak contends that "its bias" lacks an antecedent basis because the claim language does not include a recitation of "a bias." Zak points out that the patents' other uses of "bias" were as a verb or adjective—"biased" or "biases." Zak argues that the use of bias as a noun—"its bias"—is ambiguous. Zak points to the following section of the '028 patent's specification:

> Mouthpiece assemblies 18 according to the present disclosure are biased toward the dispensing configuration and therefore may be described as having a biasing mechanism 50. The bias of a mouthpiece assembly according to the present disclosure may be provided by the internal bias created by the material from which at least a portion of the mouthpiece assembly is constructed. For example, at least a portion of a mouthpiece assembly, such as crimping region 44, may be constructed of a resiliently deformable material. An illustrative, non-exclusive example of a suitable resiliently deformable material includes (but is not limited to) silicone. Additionally or alternatively, a biasing mechanism 50 may include at least one spring. Other configurations are also within the scope of the present disclosure.

(Doc. 64-3, p. 10). Mr. Hamilton attests that that this section describes three different ways the mouthpiece could be biased: "(1) an internal bias created by the material from which the mouthpiece assembly is constructed; (2) an external bias that includes at least one spring; or (3) an internal bias and an external bias." (Doc. 65-1, ¶ 36) (emphasis in original). Because it is not clear which of these three is being referred to by "its bias," Zak argues a person of ordinary skill in the art could not determine the scope of the claim with reasonable certainty.

The Court disagrees with Zak's reading of the claims and specification. What Zak and Mr. Hamilton refer to as three ways the mouthpiece assembly can be biased are actually three different ways the mouthpiece assembly's bias *can be accomplished*. The mouthpiece assembly's bias is the same—it returns to the dispensing configuration—whether that bias is created using a resiliently deformable material, a spring, or both. In

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the disputed phrase "release the mouthpiece assembly to move via its bias from the stowed configuration to the dispensing configuration," "its bias" explains *why* the mouthpiece assembly would move from the stowed configuration to the dispensing configuration when released by the user. The specification provides examples of *how* that bias is created. Therefore, the specification language cited by Zak fails to create the ambiguity Zak describes.

Even assuming Zak's reading of the specification is correct, the Court disagrees that the specification describing three possible embodiments of the mouthpiece assembly's bias renders the claim indefinite. Under Zak's reading, "its bias" would refer to whatever bias the mouthpiece assembly has in a given embodiment—be it internal, external, or both. But the term would not be indefinite simply because the specification provides the universe of possible biases the mouthpiece assembly can have and, in any event, the term "bias" has its own construction, as discussed below, that adds clarity to the disputed phrase.

The term "its bias" may lack an explicit antecedent basis, but it is clear in context that "its" refers to "mouthpiece assembly"—a point Zak conceded at the hearing—and "bias"—as used here—refers to the mouthpiece assembly's predisposition to the dispensing configuration. Zak has not shown by clear and convincing evidence that a person of ordinary skill in the art would fail to understand the scope of this term.

CamelBak argues that this term should be given its plain and ordinary meaning, and the Court agrees. In context, and with the aid of the other terms separately construed herein, the phrase "release the mouthpiece assembly to move via its bias from the stowed

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configuration to the dispensing configuration" is easily understood by lay judges and juries.

E. "a user release mechanism adapted to automatically disengage the first and second catch structures upon actuation of the user release mechanism and thereby release the mouthpiece assembly to move via its bias from the stowed configuration to the dispensing configuration"		
'028, '595, and '879 Patents		
CamelBak's Proposed Construction	**Zak's Proposed Construction**	**Court's Construction**
plain and ordinary meaning	means-plus-function limitation	plain and ordinary meaning

Zak argues this claim must be limited to a means-plus-function construction under 35 U.S.C. § 112(f), which states:

> An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

Section 112(f) permits patent drafters to claim an element as "means" or "steps" for performing a function without identifying any particular structure. However, the "price to be paid" for drafting under § 112(f) is the limitation of the claim to only those structures disclosed in the specification and their equivalents. *O.I. Corp. v. Tekmar Co., Inc.*, 115 F.3d 1576, 1583 (Fed. Cir. 1997). In other words, § 112(f) allows a patent drafter to draft a claim more generically than otherwise allowed but limits the scope of that claim to only the example-embodiments described in the specification.

Normally, the clue that a claim has been drafted under § 112(f) is the use of the word "means" in the claim language. *See Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015). There is a rebuttable presumption that claim terms without the

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word "means" are not governed by § 112(f), but the presumption is not a strong one. *Id.* at 1349. "[T]he essential inquiry is not merely the presence or absence of the word 'means' but whether the words of the claim are understood by persons of ordinary skill in the art to have a sufficiently definite meaning as the name for structure." *Id.* at 1348.

When the word "means" is not present, the drafter's use of "[g]eneric terms such as 'mechanism,' 'element,' 'device,' and other nonce words that reflect nothing more than verbal constructs may be . . . tantamount to using the word 'mean' because they 'typically do not connote sufficiently definite structure.'" *Id.* at 1350 (quoting *Mass. Inst. of Tech. & Elecs. for Imaging, Inc. v. Abacus Software*, 462 F.3d 1344, 1354 (Fed. Cir. 2006)).

Zak argues that "user release mechanism" is a nonce phrase that is tantamount to using the word "means." Zak further argues that "the remaining language—'adapted to automatically disengage the first and second catch structures upon actuation of the user release mechanism . . .'—is merely functional because it gives no sense of what structure or form the claimed user release mechanism takes and only describes what the user release mechanism does." (Doc. 65, p. 20).

Zak points to *Williamson*, where the Federal Circuit examined a patent for virtual learning software and held that § 112(f) applied to the term "distributed learning control module," despite the term's lack of the word "means." 792 F.3d at 1351. The court found that "module" was a nonce word equivalent to using the word "means." *Id.* at 1350. The court looked without success to the specification for insight as to how a "distributed learning control module" would interact with the patent's other components "in a way that might inform the structural character of the limitation-in-question or otherwise impart structure." *Id.* at 1351. While recognizing "that the presence of modifiers can change the

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meaning of" a nonce word, the use of the prefix "distributed learning control" could not save the term because those "words do not describe a sufficiently definite structure." *Id.*

CamelBak argues that "user release mechanism" is not a nonce phrase because—while "mechanism" may be a nonce word on its own—"user release" modifies "mechanism" and connotes sufficient structure to a person of ordinary skill in the art for § 112(f) to not apply. CamelBak points to the structures described in the disputed claim language:

> [A] *user release mechanism* adapted to automatically disengage *the first and second catch structures* upon actuation of the *user release mechanism* and thereby *release the mouthpiece assembly* to move via its bias from the *stowed configuration to the dispensing configuration*.

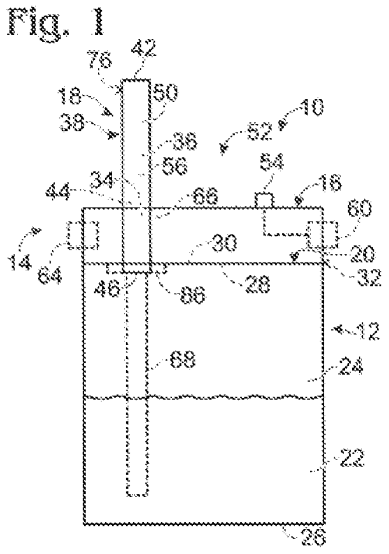
(Doc. 64-3, p. 18) (emphasis added). CamelBak argues that the word "user" implies a physical structure with which a user may interact. Moreover, the word "release" describes how the "mechanism" interacts with the other pieces of the physical structure: the "user release mechanism" must be a structure than can release the first and second catch structures to allow the mouthpiece to move to the dispensing configuration. CamelBak also argues that the figures and descriptions in the specification further elucidate the physical structure of the "user release mechanism."

CamelBak relies on *Alex Is the Best, LLC v. BLU Products, Inc.*, where the district court found § 112(f) did not apply to the terms "optical module" and "image capturing module." 2017 WL 5031638, at *7–8 (D. Del. Nov. 3, 2017). The court acknowledged that "module" is a nonce word that did not connote structure on its own but found that, in the context of digital photography equipment, the modifiers "optical" and "image capturing" made the terms' structures sufficiently clear to a person of ordinary skill in the art. *Id.* The court adopted the plain and ordinary meaning of the terms. *Id.*

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The Court finds that § 112(f) does not apply to "user release mechanism" and its accompanying claim language. This mechanism is not a generic placeholder in the context of the patents. Rather, it plays the structural role of allowing the user to release the mouthpiece from the catch structures, causing the mouthpiece to move to the dispensing position. And unlike the disputed term in *Williamson*, here the specification "inform[s] the structural character" of "user release mechanism." 792 F.3d at 1351. For example, the figures in the '028 patent demonstrate how the "user release mechanism" 60 interacts with the catch structures 54 and 56 and the mouthpiece assembly 18:



(Doc. 64-3, pp. 4, 10).

Accordingly, the Court finds that, to a person of ordinary skill in the art, "user release mechanism" has "a sufficiently definite meaning as the name for structure," *Williamson*, 792 F.3d at 1348, and Zak has failed to overcome the presumption against the application of § 112(f). The Court further finds that the meaning of the full phrase

> a user release mechanism adapted to automatically disengage the first and second catch structures upon actuation of the user release mechanism and

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> thereby release the mouthpiece assembly to move via its bias from the stowed configuration to the dispensing configuration

is clear in context. Apart from the terms in this phrase that are separately construed herein, the Court gives the phrase its plain and ordinary meaning.

F. "is biased" / "biases"		
'028, '595, '879 and '833 Patents		
CamelBak's Proposed Construction	**Zak's Proposed Construction**	**Court's Construction**
"tends to return . . . absent an external force"	"is pushed, or force is exerted on, in a particular direction"	"returns . . . absent an external force"

Variations of the term "bias" appear in the patents in at least three contexts. First, the claims recite a mouthpiece assembly that "is biased to the dispensing configuration" and a crimping region that "at least partially biases the mouthpiece assembly to the dispensing configuration." (Doc. 64-3, p. 18). CamelBak asserts that the mouthpiece assembly's bias can be either internal—created by the material the mouthpiece assembly is made from—or external—created by a mechanism external to the mouthpiece assembly, such as a spring. The '028 specification explains:

> The bias of a mouthpiece assembly according to the present disclosure may be provided by the internal bias created by the material from which at least a portion of the mouthpiece assembly is constructed. For example, at least a portion of a mouthpiece assembly, such as crimping region 44, may be constructed of a resiliently deformable material. An illustrative, non-exclusive example of a suitable resiliently deformable material includes (but is not limited to) silicone. Additionally or alternatively, a biasing mechanism 50 may include at least one spring.

Id. at p. 10.

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Second, the claims recite a bite-actuated mouthpiece that "is biased to the closed configuration." *Id.* CamelBak asserts this bias is internal only. In other words, the mouthpiece is made from a material—such as silicone—that remains closed until the user bites down on it, at which point the slit in the mouthpiece opens and allows liquid to flow into the user's mouth.

Third, the claims recite a sliding member that "is biased away from a position in which the sliding member releases the mouthpiece assembly to move from the stowed configuration to the dispensing configuration." (Doc. 64-6, p. 18). CamelBak asserts this bias is external only.

CamelBak proposes the "bias" terms be construed to mean "tends to return . . . absent an external force." For example, if this construction is inserted into the claim language, the claims would recite a mouthpiece assembly that "~~is biased~~ tends to return to the dispensing configuration absent an external force." In this example, the first and second catch structures are the "external force" that restrain the mouthpiece assembly and prevent it from returning to the dispensing configuration. CamelBak contends that this construction gives the "bias" terms a consistent meaning throughout the patents and is applicable to both internal and external biases.

Zak proposes "is biased" should be construed to mean "is pushed, or force is exerted on, in a particular direction" and "biases" should be construed to mean "pushes or exerts force in a particular direction." Zak contends that "the patents describe the biasing mechanism or biasing member as the part of the drink container that pushes or exerts force on another part to move it in a particular direction from one position or another position." (Doc. 73, p. 3).

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Zak argues CamelBak's proposed construction is wrong because it "focus[es] on the part of the drink container that is biased while ignoring how its catch-all construction applies to the part that biases" and the inclusion of an ellipsis makes CamelBak's "proposed construction impossible for the jury to understand." *Id.* at 4–5. CamelBak contends Zak's proposed construction is inappropriately limited to only external biases because it requires a "push" or "force" against the structure and that the construction is nonsensical when inserted into the claim language.

Both parties cite to district court cases construing variations of the term "bias" to support their proposed constructions. Zak relies on *Perfectvision Manufacturing, Inc. v. PPC Broadband, Inc.*, 2014 WL 4285786, at *4 (E.D. Ark. Aug. 29, 2014), where the district court construed "to bias" to mean "to exert force in a particular direction against an object." Zak also points to *Invisible Fence, Inc. v. Perimeter Technologies, Inc.*, 2006 WL 1443399, at *5 (N.D. Ind. May 25, 2006), where the district court construed the term "biasing"—a term found in the claim language, "a contactor having a spring located inside the battery holder between the base of the battery holder and the battery for biasing the battery toward the opening of the battery holder"—to mean "exerting force in a particular direction toward the open end of the battery holder."

CamelBak argues that the claim language in *Perfectvision* and *Invisible Fence* referenced external biases only and are thus inapplicable here. Instead, CamelBak relies on *Acantha LLC v. DePuy Synthes Sales, Inc.*, 2017 WL 972106, at *6 (E.D. Wis. Mar. 13, 2017), where the district court construed "biased" to mean "the tendency of a structure or component to return to a certain position or shape absent external force."

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The Court finds Zak's "is pushed, or force is exerted on" language fails to capture the full meaning of the "bias" terms. Zak's language is a poor fit when used to refer to the mouthpiece assembly's internal bias to the dispensing configuration, where nothing is pushing the mouthpiece assembly and the only force being exerted is the force generated by the material itself. Similarly, while Zak's "in a particular direction" language has been used by other courts to construe variations of the term "bias," the language is inartful in the context of these patents. The core of the "bias" terms is the predisposition of a part to a particular orientation, not necessarily the direction the part is moving in. CamelBak's proposed construction—"tends to return . . . absent an external force"—better captures this meaning. Mr. Goldman confirms that this is how a person of ordinary skill in the art would have understood the claim language, attesting that, in his opinion, the "bias" terms mean, "tends to return to its default state, absent an external force." (Doc. 64-7, ¶ 28). The Court finds the inclusion of an ellipsis in CamelBak's construction, as a placeholder for a part's specified default state, is appropriate and will be understandable by a jury.

However, Zak takes issue with CamelBak's inclusion of the word "tends" in the phrase "tends to return," and the Court agrees that CamelBak has not justified the word's inclusion. While one dictionary definition of the word "bias" is "tendency," *Bias*, The Merriam-Webster Dictionary (2022), the claim language and specification suggest that the parts are designed to *always* move to their default configuration absent an external force, *see, e.g.*, Doc. 65-3, p. 11 ("Bite-actuated valves . . . are typically biased to a closed configuration, and thus automatically return from an open configuration to a closed configuration upon release of the compression forces being applied thereto . . . ."). So, rather than having a tendency to return, the parts simply return.

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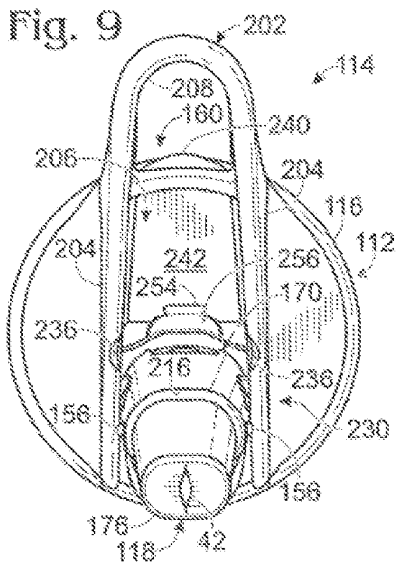
Accordingly, the Court construes the terms "is biased" and "biases" to mean "returns . . . absent an external force."

G. "stowing region"		
'028, '595, and '879 Patents		
CamelBak's Proposed Construction	**Zak's Proposed Construction**	**Court's Construction**
plain and ordinary meaning	"the space on the cap assembly that is sized for storing at least a portion of the mouthpiece assembly"	plain and ordinary meaning

The term "stowing region" appears in the '028, '595, and '879 patents. For example, claim 1 of the '879 patent recites that "the cap assembly defines a stowing region sized to receive at least a portion of the mouthpiece assembly when the mouthpiece assembly is in the stowed configuration." (Doc. 64-5, p. 18). Claim 6 of the '028 patent recites that "the cap assembly further includes a handle that projects away from the base of the cap assembly and a pair of lateral guards that at least partially define a stowing region that receives at least a portion of the mouthpiece assembly." (Doc. 64-3, p. 18). A possible embodiment of the "stowing region" 206 and "mouthpiece assembly" 118 is shown in figure 9 of the '028 patent:

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Id. at p. 6.

Zak argues "stowing region" should be defined as "the space on the cap assembly that is sized for storing at least a portion of the mouthpiece assembly." In other words, Zak contends the "stowing region" is limited to *only* the area on the cap assembly where the mouthpiece assembly is stored and does not extend outside the space needed for that purpose. Zak points to the figures in the specification to support this construction.

CamelBak argues "stowing region" is a self-explanatory term that requires no construction. CamelBak further argues that Zak's construction improperly replaces "region" with "space" and "stowing" with "storing" and adds redundant language already present in the claims.

The Court finds that "stowing region" should be given its plain and ordinary meaning. First, CamelBak is correct that Zak's construction would substitute the claim language for similar words and would include redundant language. Second, Zak's construction would limit the claims based on the *possible* embodiments shown in the specification, but the Federal Circuit "has cautioned against limiting the claimed invention

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to preferred embodiments or specific examples in the specification." *Vulcan Eng'g Co. v. Fata Aluminium, Inc.*, 278 F.3d 1366, 1376 (Fed. Cir. 2002) (quoting *Texas Instruments, Inc. v. U.S. Int'l Trade Comm'n*, 805 F.2d 1558, 1563 (Fed. Cir. 1986)). The claim language limits the scope of the "stowing region" to an area defined by the cap assembly and a pair of lateral guards that is large enough to stow a portion of the mouthpiece assembly when in the stowed configuration, but the language does not say the region must be *no larger* than the mouthpiece assembly. Zak's contentions as to the scope of the "stowing region" are resolved by the claim language, and the term requires no construction by the Court.

H. "automatically"		
'028, '595, and '879 Patents		
CamelBak's Proposed Construction	**Zak's Proposed Construction**	**Court's Construction**
"without additional human intervention"	"without additional action by the user after actuation of the user release mechanism"	"without additional human intervention"

The term "automatically" appears in conjunction with the user release mechanism's ability, when pressed by the user, to release the mouthpiece assembly from the stowed configuration. For example, claim 1 of the '028 patent recites "a user release mechanism adapted to automatically disengage the first and second catch structures upon actuation of the user release mechanism and thereby release the mouthpiece assembly to move via its bias from the stowed configuration to the dispensing configuration." (Doc. 65-3, p. 18). The '028 specification states that "[i]n some examples, the mouthpiece assembly is

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biased toward the dispensing configuration and thus moves automatically under its bias upon release by the user-release mechanism." *Id.* at p. 8.

CamelBak argues "automatically" means "without additional human intervention" because the claim language and specification show that the user release mechanism "automatically" releases the mouthpiece assembly only after the user actuates it.

Zak initially proposed to construe "automatically" as "without action by the user," arguing the word "additional" is not necessary because other claim language recites the action required by the user. Nevertheless, Zak now offers a compromise construction of "without additional action by the user after actuation of the user release mechanism." So, Zak's compromise resolves the parties' primary dispute, which was over the word "additional." However, Zak maintains that if "additional" is included, then "after actuation of the user release mechanism" must also be included; CamelBak objects, pointing out that the latter phrase would be redundant of the surrounding claim language.

The Court agrees with CamelBak. In this context, "automatically" means that the user release mechanism performs the described function without requiring any further manual manipulation by the user beyond what is already described in the claim language. CamelBak's straightforward construction—"without additional human intervention"—captures this meaning. Zak has agreed to the inclusion of the word "additional," and the intrinsic evidence supports Zak's concession. "Automatically" cannot mean without *any* human intervention because the claim language requires that the user first actuate the user release mechanism. *See CollegeNet, Inc. v. ApplyYourself, Inc.*, 418 F.3d 1225, 1235 (Fed. Cir. 2005) (affirming the district court's construction of "automatically" as "once initiated, the function is performed by a machine, without the need for manually

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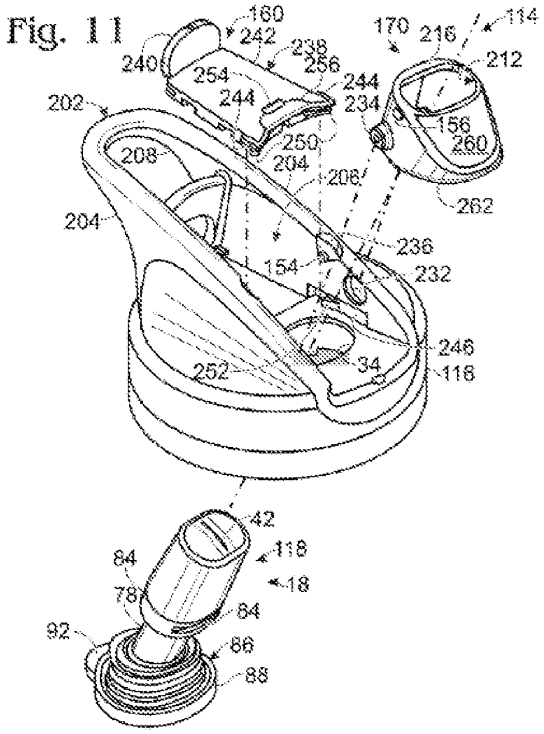
performing the function"). But full adoption of Zak's compromise construction would create an unnecessary and confusing redundancy in the definition of "automatically" by inserting a limitation—"after actuation of the user release mechanism"—that already exists in the claim language. Accordingly, the Court construes "automatically" to mean "without additional human intervention."

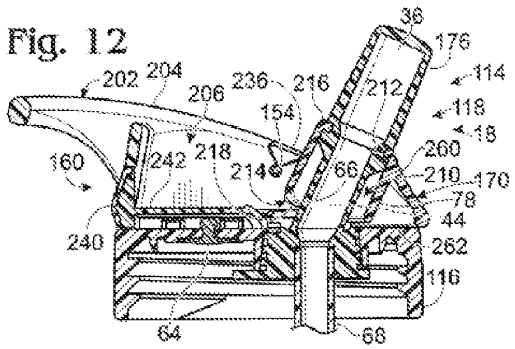
I. "user engagement pad . . . which extends through the sidewall of the base of the cap assembly" / "user engagement pad that extends through a wall of the cap assembly" / "user engagement pad extends through a wall of the cap assembly"		
'028, '595, and '833 Patents		
CamelBak's Proposed Construction	**Zak's Proposed Construction**	**Court's Construction**
plain and ordinary meaning	"user engagement pad . . . which extends from one side to the other side of an opening that is surrounded by the sidewall of the base of the cap assembly"	plain and ordinary meaning

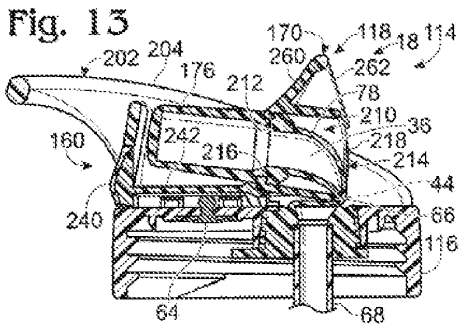
These terms involve the scope of the "user engagement pad," which is the area of the user release mechanism that the user presses (or otherwise interacts with) to release the mouthpiece from the stowed configuration. Claim 3 of the '028 patent recites that "the user release mechanism further includes a user engagement pad that is coupled to the sliding member and which extends through the sidewall of the base of the cap assembly for selective engagement by the user." The same or similar claim language is present elsewhere in the '028 patent and the '595 and '833 patents. The "user engagement pad" 240, the "user release mechanism" 160, the "sliding member" 238, and the "base of the cap assembly" 116 are exemplified in figures 11, 12, and 13 of the '028 patent:

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(Doc. 64-3, p. 7).

Zak argues that because the "user engagement pad" phrases are not discussed in the specification, the Court must turn to the figures to understand their meaning. According to Zak, the figures show that the "user engagement pad" must extend from one side to the other side of an opening that is surrounded by the sidewall of the base of the cap assembly. Zak contends that giving these phrases their plain and ordinary meaning, as CamelBak proposes, would improperly allow CamelBak to claim an invention that is broader than what CamelBak actually invented with the patents. CamelBak argues that Zak's construction injects limitations not present in the claim language by substituting "from one side to the other side" for "through" and requiring the sidewall "surround" the opening.

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The Court finds the "user engagement pad" phrases should be given their plain and ordinary meaning and require no construction by the Court. The Court declines to construe these phrases using Zak's description of the specification figures. Such a construction would improperly limit the claim language by using only the embodiment in the specification figures. *See Vulcan Eng'g*, 278 F.3d at 1376. Certainly, one embodiment of CamelBak's patents might include a user engagement pad that "extends from one side to the other side of an opening that is surrounded by the sidewall of the base of the cap assembly," but the claim language itself is not limited to that embodiment. Rather, the "user engagement pad" must extend through the wall of the base of the cap assembly so that the user can interact with the "user release mechanism." This *may* be accomplished by having the "user release mechanism" protrude through an enclosed opening that is the same size as the "user release mechanism," but this is not the only embodiment contemplated by the claim language. Accordingly, there remains no genuine dispute as to the scope of the plain language of these terms, and they require no construction by the Court.

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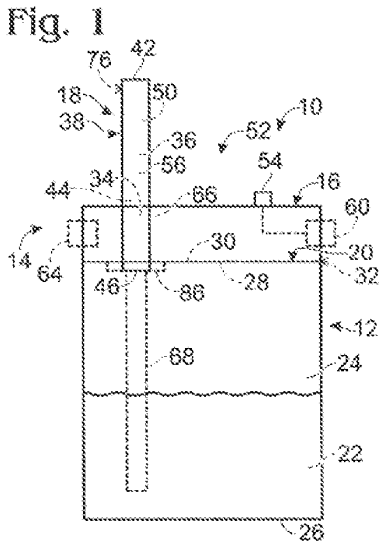
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J. "the anchor portion is sized to restrict passage of the anchor portion through the through passage"		
'028, '595, and '879 Patents		
CamelBak's Proposed Construction	**Zak's Proposed Construction**	**Court's Construction**
plain and ordinary meaning	"the anchor portion is sized such that at least a part of the anchor portion is too large to fit into the through-passage and no part of the anchor portion may pass into one end of the through-passage and out of the opposite end of the through-passage"	plain and ordinary meaning

A representation of this claim phrase appears in claim 1 of the '028 patent, which recites "an anchor portion extending from the tube distal the mouthpiece portion, wherein the anchor portion is sized to restrict passage of the anchor portion through the through passage of the base of the cap assembly." (Doc. 64-3, p. 18). The '028 patent's specification further provides that "the mouthpiece assembly may include an anchor, or anchor portion, 86 that is adapted to prevent, or at least restrict, passing of the anchor portion through the through-passage of the base of the cap assembly." *Id.* at p. 12. The "anchor portion" 86 and "through passage" 34 are exemplified in figure 1 of the '028 patent:

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Id. at p. 4.

Zak argues this claim phrase must be construed to mean that the "anchor portion" must be sized so that part of it is too big to fit into the through passage and none of it can fit *all the way* through the through passage. Zak insists this construction comes directly from the successful arguments CamelBak made to the Patent Trial and Appeal Board ("PTAB") and that CamelBak must be held to those arguments.

CamelBak argues it has not abandoned its arguments to the PTAB and that, contrary to Zak's proposed construction, the patents explicitly distinguish between *restricting* passage through the through passage and *preventing* passage through the through passage. CamelBak writes that "Zak's proposed construction fails because it limits the scope of the claim to the unclaimed preventing embodiment and excludes the claimed restricting embodiment." (Doc. 65, p. 28).

Zak directs the Court to the relevant prosecution history. The patent examiner initially rejected certain claims of the '028 patent due to prior art. Specifically, the examiner found that a prior drink container patent disclosed a mouthpiece portion with an anchor

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portion. *Ex Parte Jeff Davies & Derek Gavin Sullivan*, 2017 WL 1032223, at *2 (P.T.A.B. Mar. 15, 2017). The examiner found CamelBak's limitation in claims 1 and 21 that the anchor portion be "sized to restrict passage of the anchor portion through the through passage" failed to distinguish CamelBak's invention from the prior art because "as long as the anchor portion has a size, it is capable of restricting passage." *Id.* CamelBak appealed the examiner's decision to the PTAB, which reversed the examiner's decision. *Id.* at *3. The PTAB found that CamelBak's "sized to restrict" language "positively limits the structure of the claims to a structure in which an anchor portion has a size that functionally acts to restrict, or limit, passage of the anchor portion through the claimed through-passage," and this limitation was not present in the prior art the examiner relied on. *Id.* Adopting CamelBak's argument, the PTAB explained that the examiner's findings were "unreasonable" because "[e]very structure has *a size*, but not all structures are capable of performing the claimed functional requirement of restricting passage of the anchor portion through the through-passage of the base of the cap assembly." *Id.* (emphasis in original). The PTAB further explained that "as [CamelBak] correctly note[s], for example, an anchor portion that is *smaller* than the through-passage will not function to restrict passage therethrough." *Id.* (emphasis in original).

The PTAB also reversed the examiner's rejection of claim 18 of the '028 patent, which does not recite the disputed claim phrase but instead recites an anchor portion having "a plurality of flanges that are sized and shaped to provide a friction-fit arrangement with the through-passage and to restrict passage of the anchor portion through the through-passage." *Id.* at *4. The examiner found that a prior patent, Choi, disclosed an anchor portion and another patent, Lin, disclosed flanges. The examiner

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found that "that it would have been obvious to incorporate Lin's flanges into Choi's anchor portion to prevent leakage." *Id.* The PTAB reversed this finding, explaining:

> We agree with Appellants. As discussed above, Choi does not disclose an anchor portion as claimed. Lin does not remedy this defect because, although Lin teaches a plurality of flanges, Lin does not teach flanges that restrict passage of an anchor portion through a through-passage. Indeed, Lin's lower flange is expressly configured *to permit* passage through the through-passage. Further, the Examiner's purported reasoning for incorporating Lin's flanges into Choi's structure lacks rational underpinning, as Choi does not articulate a "leakage" problem, and Lin does not associate the prevention of leakage with the inclusion of flanges.

Id. (emphasis in original) (citations omitted).

Zak contends its proposed construction is appropriate because "[t]he PTAB accepted CamelBak's arguments that the relative size of the anchor portion and the through-passage is essential to the meaning of this claim phrase" and "that no part of the anchor portion (such as the lower flange in Lin) may pass into one end of the through-passage and out of the opposite end of the through-passage in order to meet the 'restrict passage of the anchor portion through the through-passage' limitation." (Doc. 65, pp. 10–12). Zak also points to the specification figures to support its proposed construction.

The Court finds Zak's proposed construction misconstrues the prosecution history and would inappropriately limit the claim phrase to embodiments not dictated by the claim language. While Zak purports to be pulling its construction from CamelBak's successful arguments to the PTAB, CamelBak did not argue that its claimed "anchor portion" must be sized so that part of it is too big to fit into the through passage and none of it can fit all the way through the through passage. Instead, CamelBak argued, and the PTAB agreed, that its "sized to restrict passage" claims were patentable because the claims required the anchor portion be at least as big as the through passage; otherwise, the passage of

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the anchor portion through the through passage would not be restricted. This does not require the anchor portion to be *larger* than the through passage so that the anchor portion's passage through the through passage is *prevented*. Support for this interpretation is found in the specification, which states that the anchor portion "is adapted to prevent, or at least restrict, passing of the anchor portion through the through-passage of the base of the cap assembly," differentiating between "prevent" and "restrict." (Doc. 64-3, p. 12). As for claim 18 of the '028 patent, none of CamelBak's arguments nor the PTAB's reasoning—which was simply that the prior art did not include CamelBak's "plurality of flanges" that would restrict passage through the through passage—require an anchor portion sized to prevent passage through the through passage.

The meaning of the disputed claim phrase is simply its plain and ordinary meaning—that the anchor portion is of such a size that its passage through the through passage is restricted. Mr. Goldman persuasively attests that a person of ordinary skill in the art would understand this plain meaning. (Doc. 64-7, pp. 15–16). Accordingly, the Court finds that the claim phrase "the anchor portion is sized to restrict passage of the anchor portion through the through passage" requires no construction and is given its plain and ordinary meaning.

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V. CONCLUSION

The Court **HEREBY ADOPTS** the above constructions for the claim terms identified by the parties.

IT IS SO ORDERED on this 9th day of January, 2023.

TIMOTHY L. BROOKS
UNITED STATES DISTRICT JUDGE

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