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(54) **NO STRAW LIQUID POUCH**

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(60) Provisional application No. 60/597,201, filed on Nov. 16, 2005.

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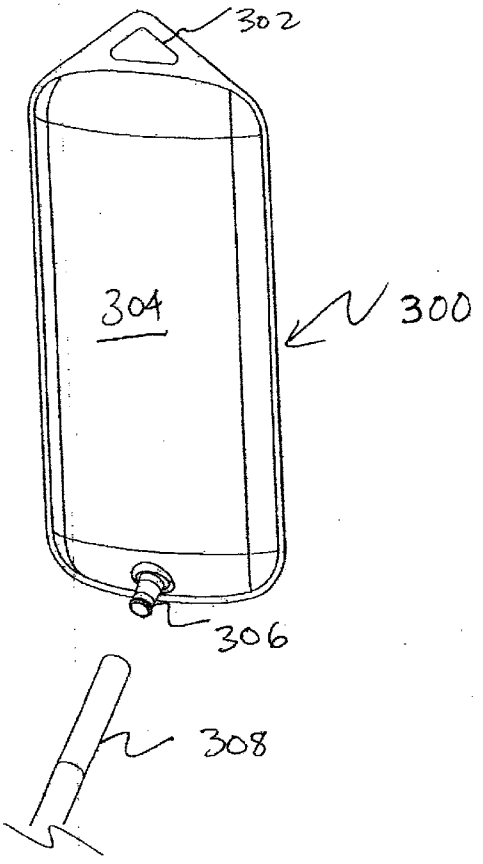
CPC ***B65D 35/46*** (2013.01)
USPC **222/92**

(57) **ABSTRACT**

A flexible tube check valve is introduced within a fluid path for leakage protection from flexible liquid containers. The flexible check valve can be a crossbill valve comprising multiple flexible members that restrict the flow of fluid in a tubular member. The flexible check valve is preferably functionally integrated with the container itself to prevent liquid from exiting a container. Preferably, the flexible check valve is a crossbill valve that is encapsulated within a flexible tube and mechanically attached to the flexible container. Alternatively, the check valve is manufactured as part of the flexible container. Liquid is designed to only flow through when an external compressive force (e.g. users fingers or lips) is applied to the valve. When force is no longer applied to the valve section, the valve returns to its normally closed position and fluid is wholly or substantially prevented from exiting. An alternative medical embodiment uses a flexible tube extension between the flexible liquid container and the flexible tube valve. A coupling connector may be added between the flexible tube extension and flexible tube valve.



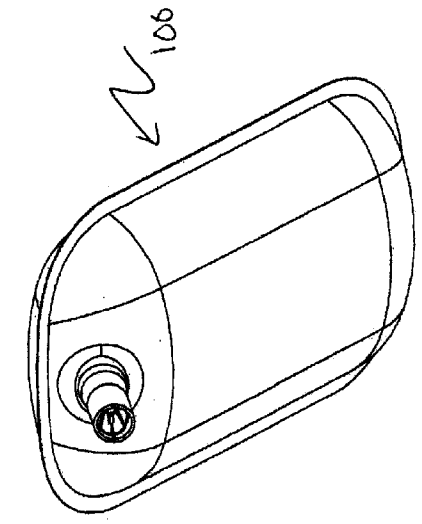


FIG. 1d

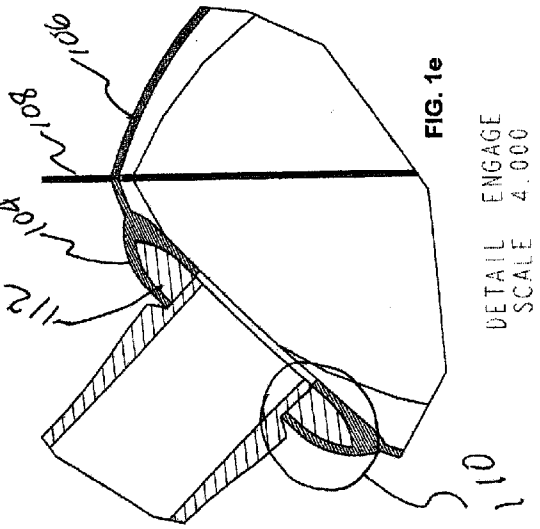


FIG. 1e

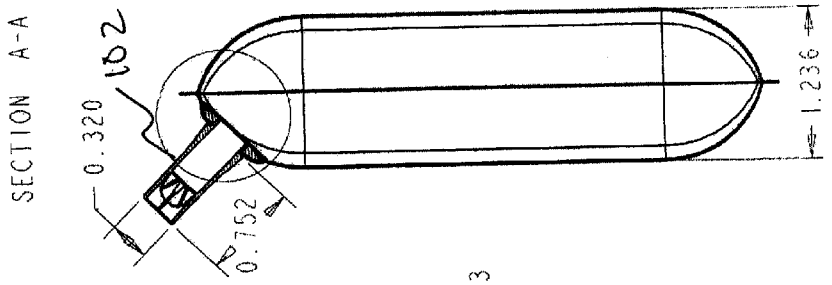


FIG. 1c

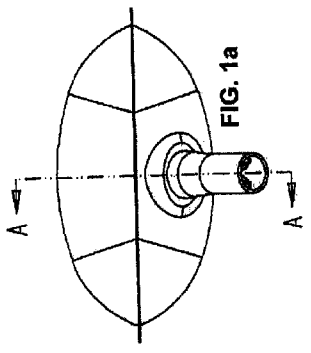


FIG. 1a

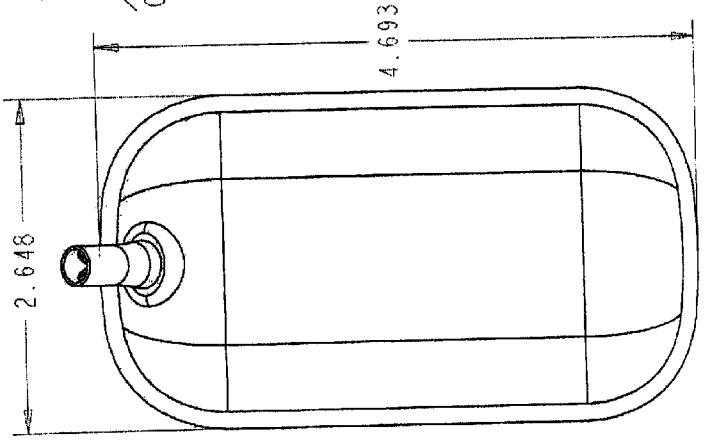


FIG. 1b

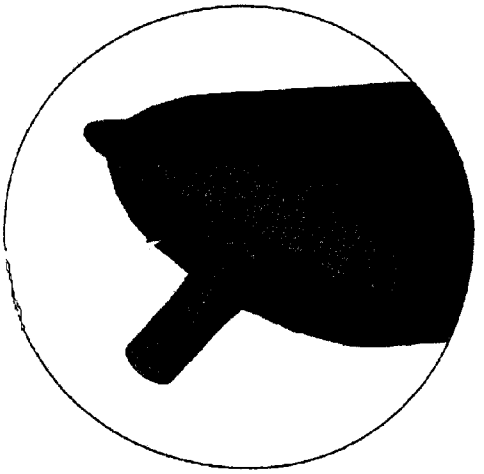


FIG. 2b

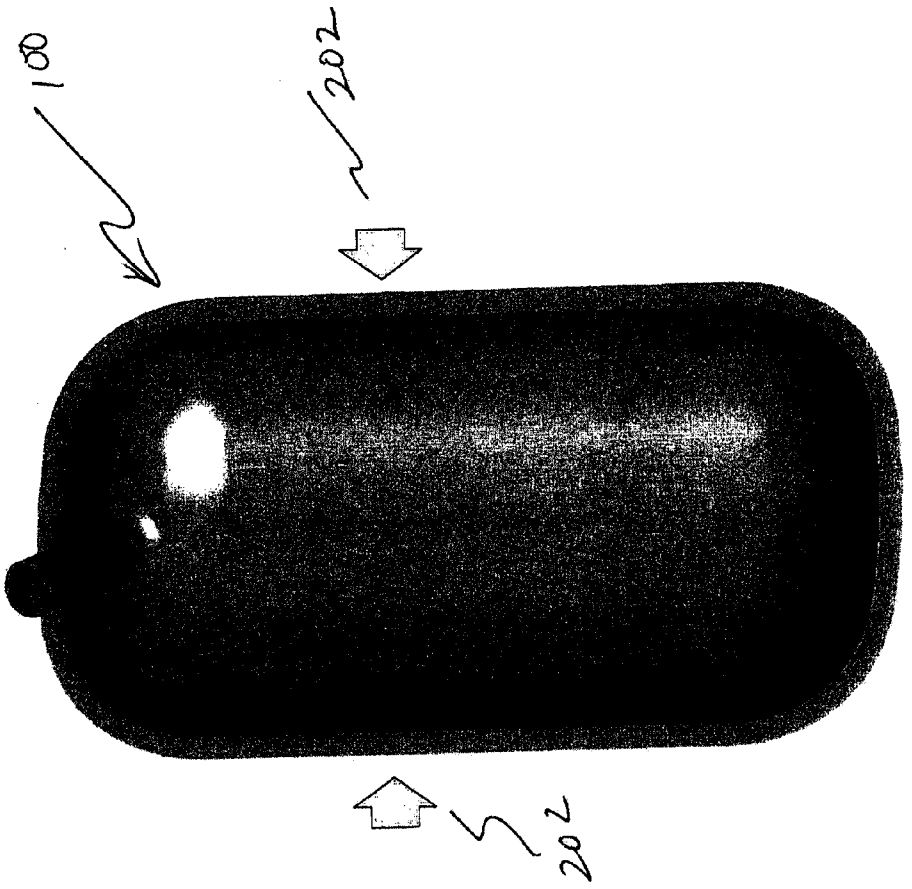


FIG. 2a

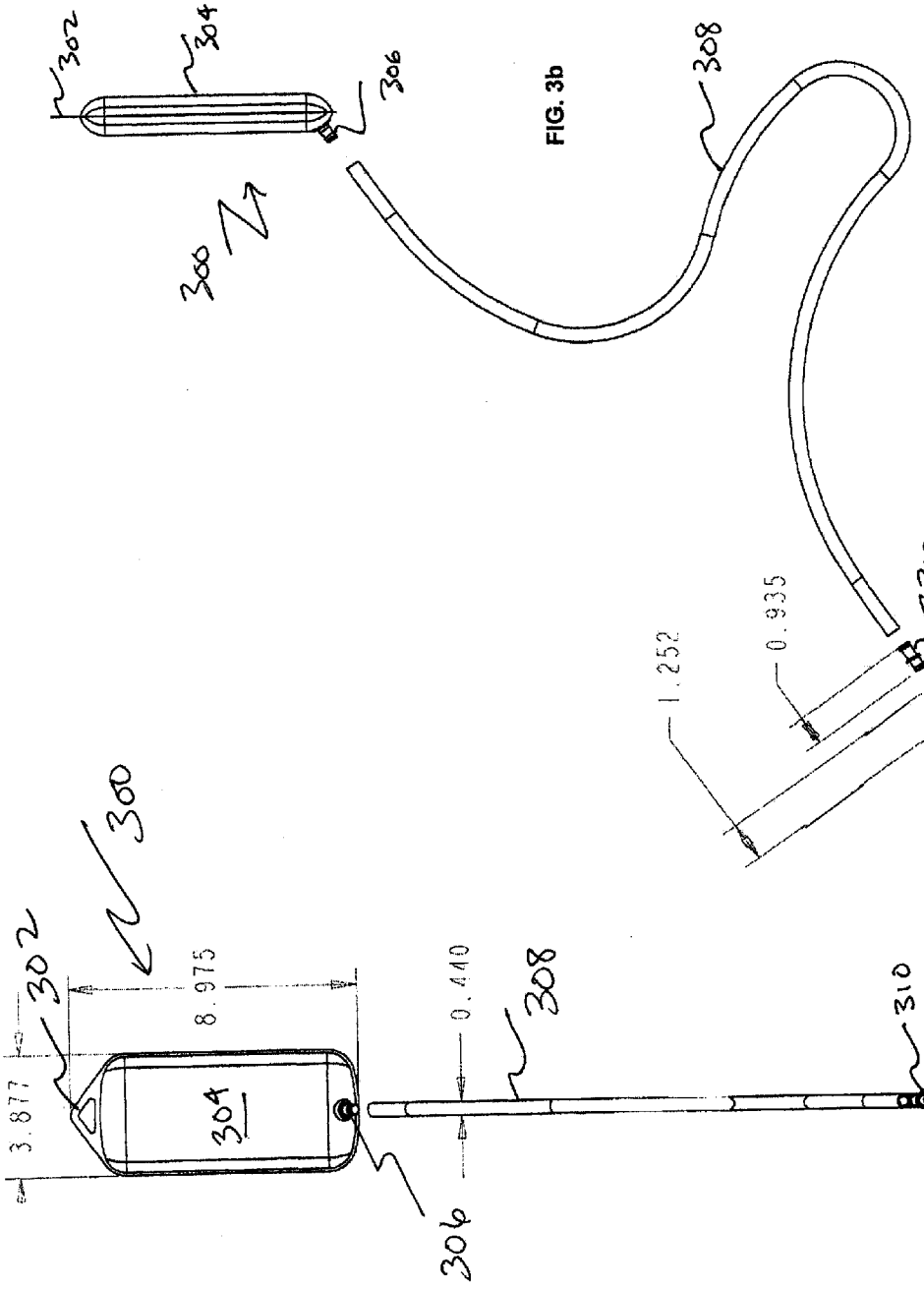


FIG. 3a

FIG. 3b

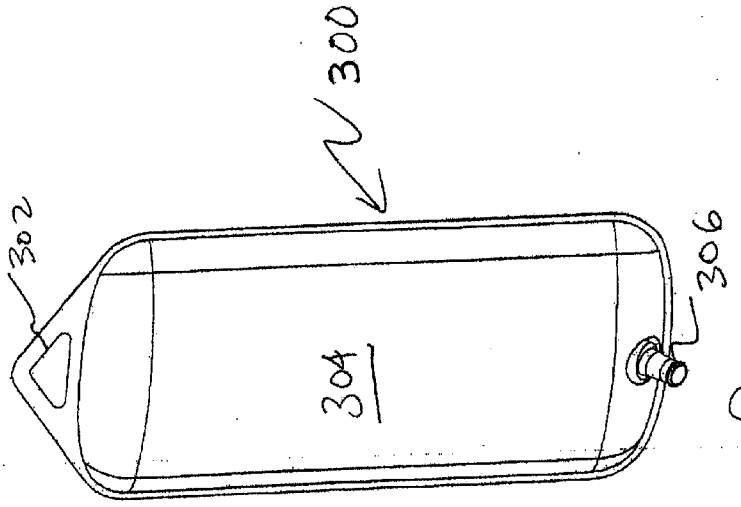


FIG. 4b

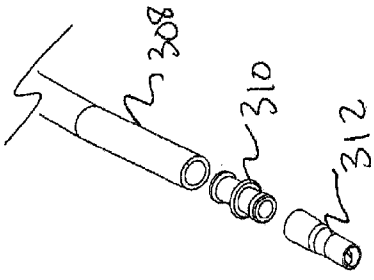


FIG. 4a

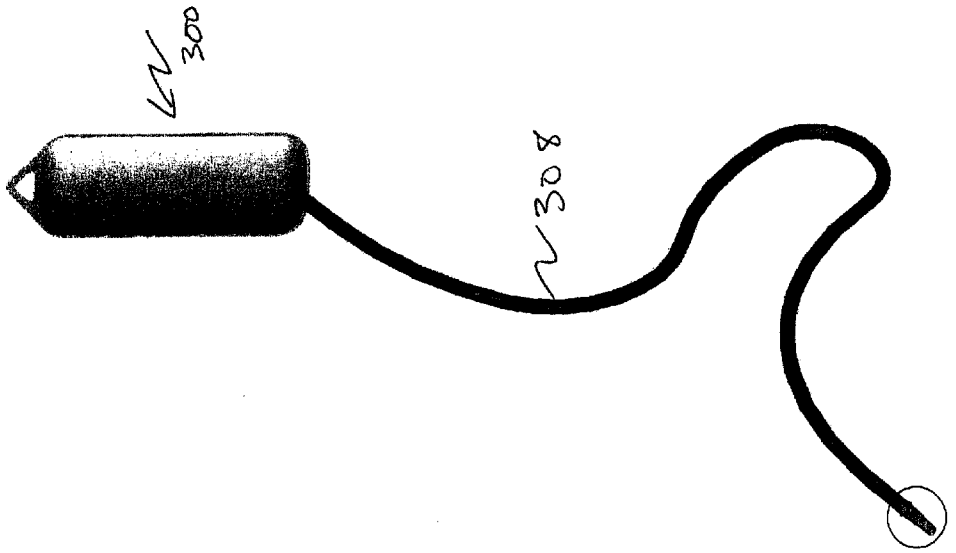


FIG. 5b

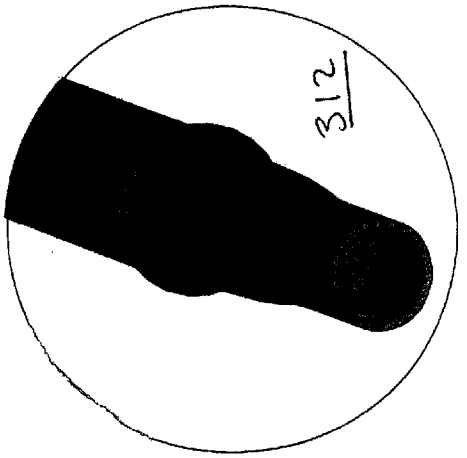


FIG. 5a

NO STRAW LIQUID POUCH

RELATED APPLICATIONS

[0001] This application is a continuation of U.S. Non-Provisional Application Ser. No. 11/560,794, entitled "NO STRAW LIQUID POUCH", filed Nov. 16, 2006, which is incorporated herein by reference in its entirety. The present application claims priority to U.S. provisional application 60/597,201 filed Nov. 16, 2005. Applicants' co-pending application Ser. No. 10/095,550, filed on Jan. 10, 2005, published as U.S. 2002-0159454 A1, is also incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

[0002] 1. Field of Invention

[0003] The present invention is related to fluid flow control and more specifically, leakage protection in a closed flexible container application with tubular egress.

[0004] 2. Discussion of Prior Art

[0005] Juice boxes and pouches are well known sealed drinking containers. Typically, these containers have attached a plastic sealed straw, which is removed and used to puncture and drain the liquid within. These containers are predominantly used by children, who through various means enable liquid to escape the straw during non-drinking situations. One problem associated with the straws is the forced evacuation of liquid through squeezing of the container or by vacuum related capillary action. Tipping of the container may also cause liquid spills. A second problem associated with such applications is the loss or damage to the straw making the use of the product difficult or impossible. The present invention reduces or eliminates the unwanted draining of the container and eliminates the detachable straw.

[0006] Whatever the precise merits, features, and advantages of the prior art, it does not achieve or fulfill the purposes of the present invention.

SUMMARY OF THE INVENTION

[0007] The present invention uses a valve within a fluid path for leakage protection. The valve is preferably a flexible check valve such as a duckbill or crossbill. The valve comprises two or more flexible members that restrict the flow of liquid from a container during non-drinking situations. The flexible members of the valve limit pressurized flow and substantially prevent liquid from exiting while remaining normally closed. To open a valve section, external compressive force is applied (e.g., by a user's fingers or lips) which separates the flexible members allowing liquid to flow through. When external compressive force is no longer applied to the valve section, the valve returns to its normally closed position and fluid is prevented from exiting. Pressurized forces, such as liquid trying to escape when a user squeezes the drinking container, only serve to press the flexible members together with greater force.

[0008] The flexible check valve is preferably used within a tubular section having a fluid path and functionally integrated into the exit of the container. An alternative embodiment includes the flexible check valve integrated as part of the drinking container itself. The attachment/integration and flexible members of the valve may comprise several embodiments.

[0009] One embodiment comprises a flexible drinking liquid container with silicon valve functionally integrated.

[0010] An alternative embodiment comprises a flexible medical liquid delivery system container with silicon valve functionally connected thereto by connected extended tubular conduit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. **1***a* illustrates an end view of a present invention liquid pouch with integrated flexible valve tube.

[0012] FIG. **1***b* illustrates a top view of a present invention liquid pouch with integrated flexible valve tube.

[0013] FIG. **1***c* illustrates a side view of a present invention liquid pouch with integrated flexible valve tube and cross-section A-A of flexible valve tube connection area.

[0014] FIG. **1***d* illustrates a perspective view of a present invention liquid pouch with integrated flexible valve tube.

[0015] FIG. **1***e* illustrates an enlargement of cross-section A-A as per FIG. **1***c*.

[0016] FIG. **2***a* illustrates a top view of a liquid pouch with integrated flexible valve tube and potential engagement forces.

[0017] FIG. **2***b* illustrates a perspective end view of a liquid pouch with integrated flexible valve tube.

[0018] FIG. **3***a* illustrates a front view of an alternative embodiment medical use fluid delivery system including liquid pouch with attachable flexible tube and attached flexible valve tube.

[0019] FIG. **3***b* illustrates a side view of the alternative embodiment medical use fluid delivery system of FIG. **3***a* including liquid pouch, attachable flexible tube, valve coupler, and flexible valve tube.

[0020] FIG. **4***a* illustrates the alternative embodiment medical use fluid delivery system attachable flexible tube, valve coupler, and flexible valve tube.

[0021] FIG. **4***b* illustrates a perspective view of the alternative embodiment medical use fluid delivery system of FIG. **3***a* including liquid pouch and attachable flexible tube.

[0022] FIG. **5***a* illustrates a close-up view of the FIG. **5***b* alternative embodiment medical use fluid delivery system flexible tube as assembled with valve coupler (not shown) and flexible valve tube.

[0023] FIG. **5***b* illustrates the alternative embodiment medical use fluid delivery system with flexible liquid pouch, flexible tube as assembled with valve coupler (not shown) and flexible tube valve.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0024] While this invention is illustrated and described in a preferred embodiment, the device may be produced in many different configurations, forms and materials. There is depicted in the drawings, and will herein be described in detail, a preferred embodiment of the invention, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and the associated functional specifications for its construction and is not intended to limit the invention to the embodiment illustrated. Those skilled in the art will envision many other possible variations within the scope of the present invention. In the description below it should be noted that the term "fluid" should include any type of liquid, gas, powder, particulate, gel, or colloid. Also, the attachment methods shown in the preferred embodiment can be used with other flexible check valves without departing from the scope of the invention.

[0025] FIGS. **1***a*-**1***e*, **2***a*, and **2***b*, collectively, illustrate the present invention liquid pouch **100** with integrated flexible valve tube **102** (e.g. injection molded silicone valve). The pouch, in a preferred embodiment, comprises a juice drink pouch commonly found in the beverage industry. The pouch is typically manufactured by heat sealing two flexible material sections **104** and **106** (e.g. foil) together to form a sealed pouch. A seam flap **108** may extend around the periphery of the pouch. Other flexible liquid container manufacturing techniques may be substituted without departing from the scope of the present invention.

[0026] In the prior art, the liquid is typically extracted by piercing a straw receiving section and drawing the liquid out through the straw. At least two problems exist, leakage and loss or damage to the straw. The present invention seeks to eliminate the detachable straw and add leakage protection.

[0027] In a first embodiment, a flexible valve tube **102** with encapsulated cross-bill valve (as fully described in Applicants' commonly-owned U.S. publication number 2002-0159454 A1) is directly attached to the drinking pouch **100** without a straw. The valve may be laminated or heat sealed between the two layers of the foil. The valve comprises operatively joined multiple flexible flaps orientated away from the fluid exit direction. The attachment method **110** shown comprises entrapping an enlarged base section **110** (circumferentially extending) within a two wall reinforced exit section of the container. Other known attachment methods are envisioned without departing from the scope of the present invention.

[0028] The user compresses the flexible tube valve **102** with their lips or teeth to open the valve and extract liquid. Compressive forces **202** on the container **100** as shown in FIG. **2***a* do not force liquid from the pouch unless the flexible tube valve has been previously opened by the user, thus leakage prevention is achieved.

[0029] An alternative medical embodiment **300** is shown in FIGS. **3***a*, **3***b*, **4***a*, **4***b*, **5***a*, and **5***b*. In this embodiment, the flexible tube check valve is moved away from the container to be closer to the user (e.g. patient). A flexible tube **308** is attached to a fitting **306**, e.g. friction fit nozzle (e.g. polypropylene, injection molded, or heat sealed), at the liquid exit point of the flexible liquid container **304** (e.g. polyethylene pouch, blow molded). A connector **310** (e.g. polypropylene, injection molded) then mechanically connects the flexible tube check valve **312** to a distal end of the flexible tube **308**. An opening **302** to hang the fluid container may be built within a seam flap of the pouch. The fluid delivery system provides a method to dispense medical hydrating liquids (saline or other) to end user without leaking. The flexible tube valve **312** requires very little pressure to operate, but still provides strong leakage protection.

CONCLUSION

[0030] A system and method has been shown in the above embodiments for the effective implementation of an integrated valve for a flexible liquid container. While various preferred embodiments have been shown and described, it will be understood that there is no intent to limit the invention by such disclosure, but rather, it is intended to cover all modifications and alternate constructions falling within the spirit and scope of the invention. For example, the present invention should not be limited by size, materials, or specific manufacturing techniques.

[0031] In addition, the flexible check valve structure, manufacturing and attachment techniques (e.g. overmolding) can be used to prevent pressurized loss/retention of any liquid, gas, powder, particulate, gel, or colloid. The completeness of leakage prevention may be based on the quality of materials, manufacturing techniques, attachment techniques, and pressures encountered. In any embodiment, the configuration should substantially prevent fluids from escaping past the flexible check valve and ideally provide a 100% check.

What is claimed is:

1. A fluid retaining flexible pouch with leakage protection, said pouch comprising:

a flexible fluid retaining section;

a fluid withdrawing section directly attached to the fluid retaining section, said fluid withdrawing section having a proximate end and distal end, said distal end used as an exit for said fluid, said fluid withdrawing section having a base section integrated at said proximate end of said fluid withdrawing section comprising a circumferentially extending section which is retained by one or more surfaces of said flexible fluid retaining section; and

a functionally integrated, circumferentially actuated flexible check valve comprising silicone encapsulated within said fluid withdrawing section, said flexible check valve comprising two or more flexible members oriented in a direction opposite said distal end that are pressed together in a normally closed configuration and prevent unwanted leakage of fluid from said distal end while the fluid retaining section receives a compressive force and the flexible members are in the closed configuration, the two or more flexible members moving from the closed position to an open position upon the fluid withdrawing section receiving a circumferentially applied force at the position of the flexible check valve encapsulated therein

2. A fluid retaining flexible pouch as per claim **1**, wherein said flexible check valve is a duckbill.

3. A fluid retaining flexible pouch as per claim **1**, wherein said flexible check valve is a silicone material.

4. A fluid retaining flexible pouch as per claim **1**, wherein said fluid retaining flexible pouch comprises a juice pouch.

5. A fluid retaining flexible pouch as per claim **1**, wherein said flexible fluid retaining section is formed by two heat sealed layers.

6. A fluid retaining flexible pouch as per claim **5**, wherein said one or more surfaces comprises a multiple layer reinforced section for retaining said base within one of said heat sealed layers.

7. A fluid retaining flexible pouch as per claim **5**, wherein said a base section is manufactured directly as part of one of said heat sealed layers.

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