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Bemis(10) **Pub. No.: US 2009/0242587 A1**(43) **Pub. Date: Oct. 1, 2009**(54) **PERSONAL HYDRATION SYSTEM**(52) **U.S. Cl. 222/92**(76) **Inventor: Steve L. Bemis, Pinehurst, TX (US)**

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(21) **Appl. No.: 12/141,009**(22) **Filed: Jun. 17, 2008****Related U.S. Application Data**(63) **Continuation of application No. 11/432,236, filed on May 11, 2006.****Publication Classification**(51) **Int. Cl.**
B65D 37/00 (2006.01)(57) **ABSTRACT**

A personal hydration system for use by military personnel in environments containing nuclear, biological and chemical agents. This system includes a bladder, a neck, a cap having an outlet port and a hose with a connector. The bladder has no sharp or small radius internal corners and may be turned inside out through an oversized fill port to ensure complete cleaning. The cap is sealed by a primary seal, wherein a thicker portion of the bladder is trapped between the cap and the neck, and a secondary seal, wherein seals are squeezed between the neck and the bladder's interior. The cap includes an outlet port, thereby decreasing the possible exposure sites. The connector is adapted so that it may attach itself to various other equipment, such as gas masks or mouthpieces. A user wearing thick gloves will be capable of operating the entire system, including the cap and the connectors.

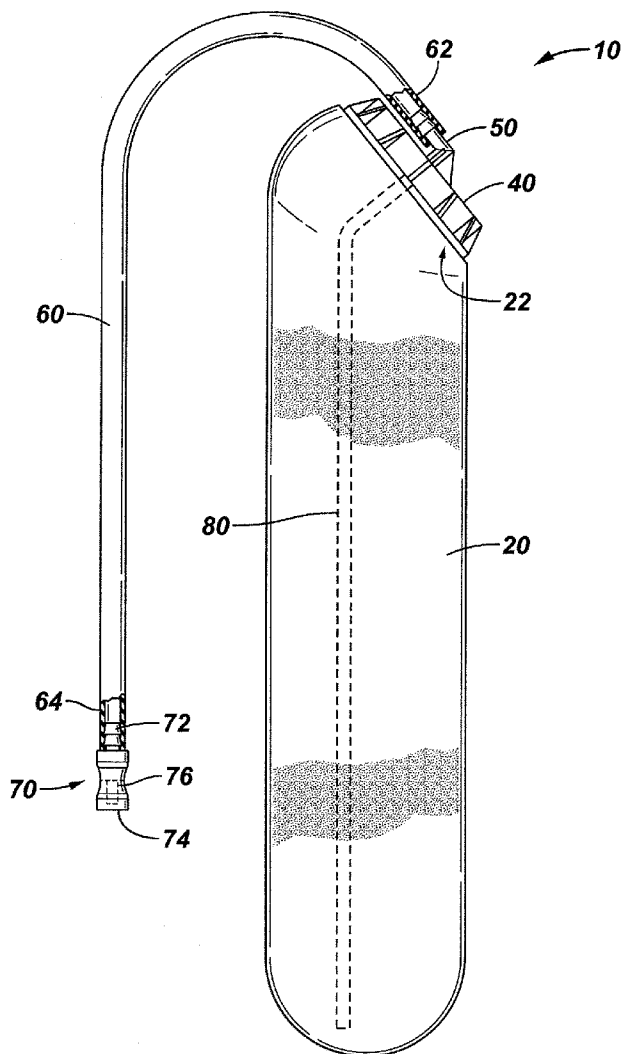


FIG. 1

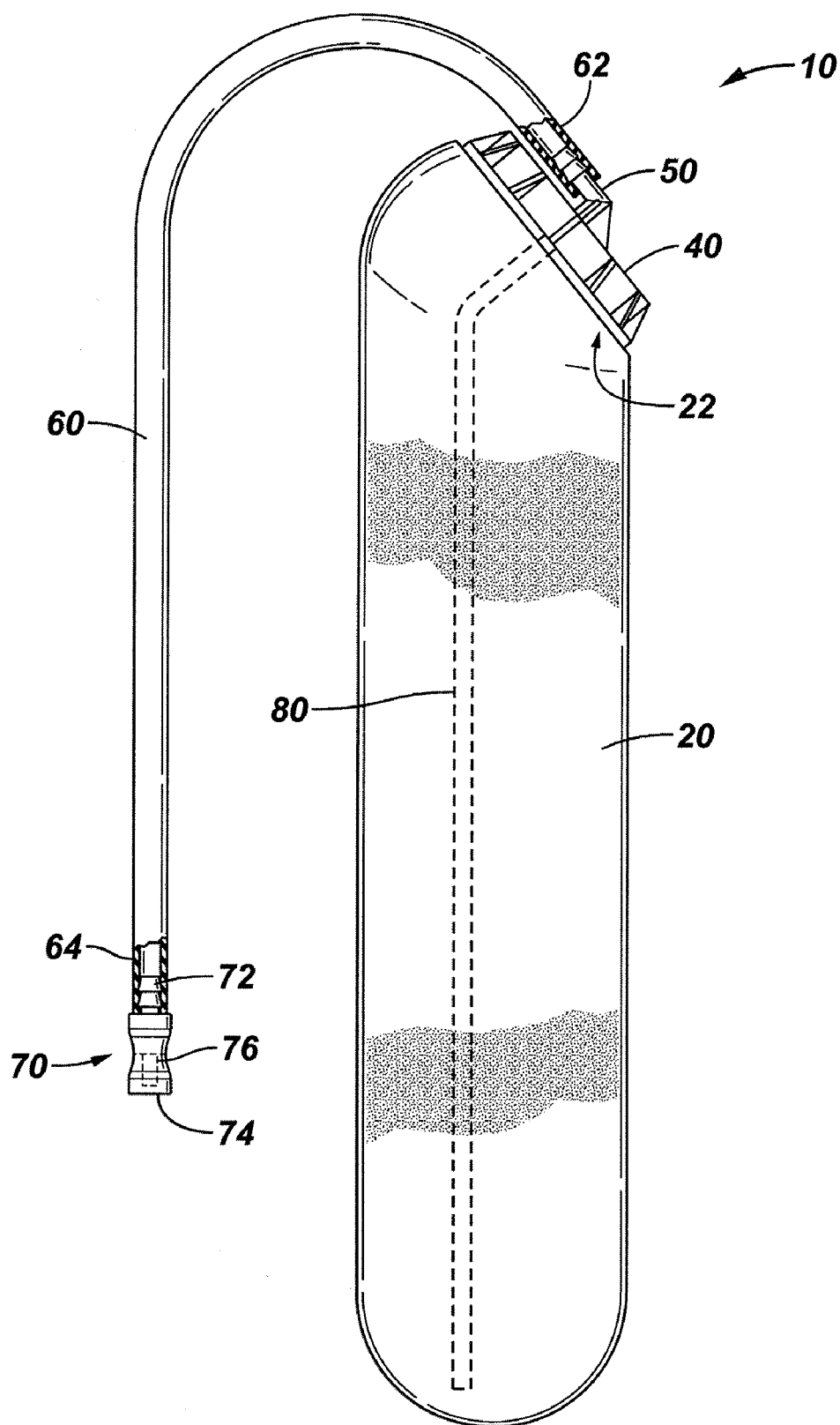


FIG. 1A

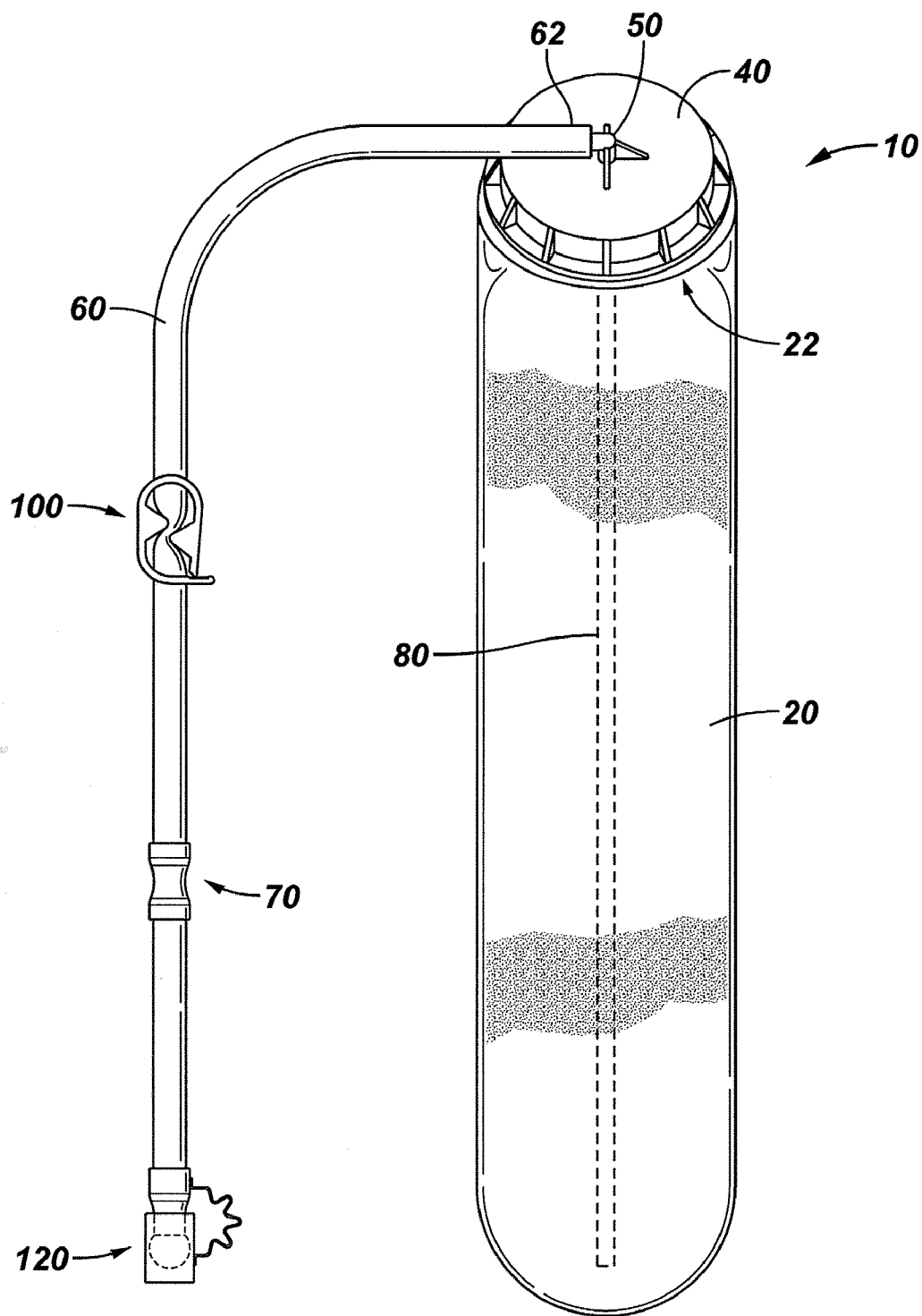


FIG. 1B

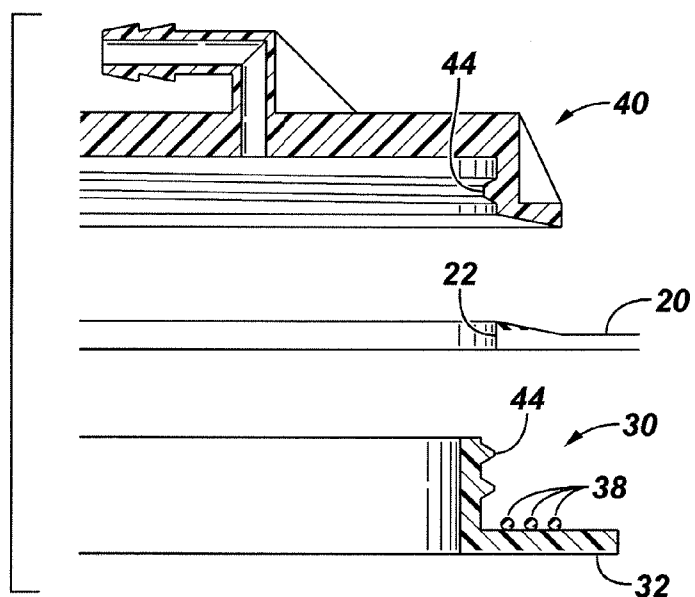


FIG. 2

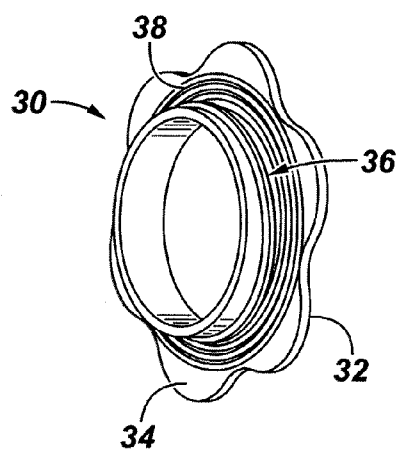


FIG. 3

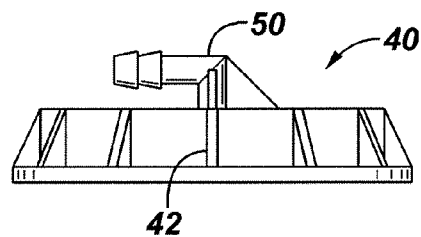


FIG. 4

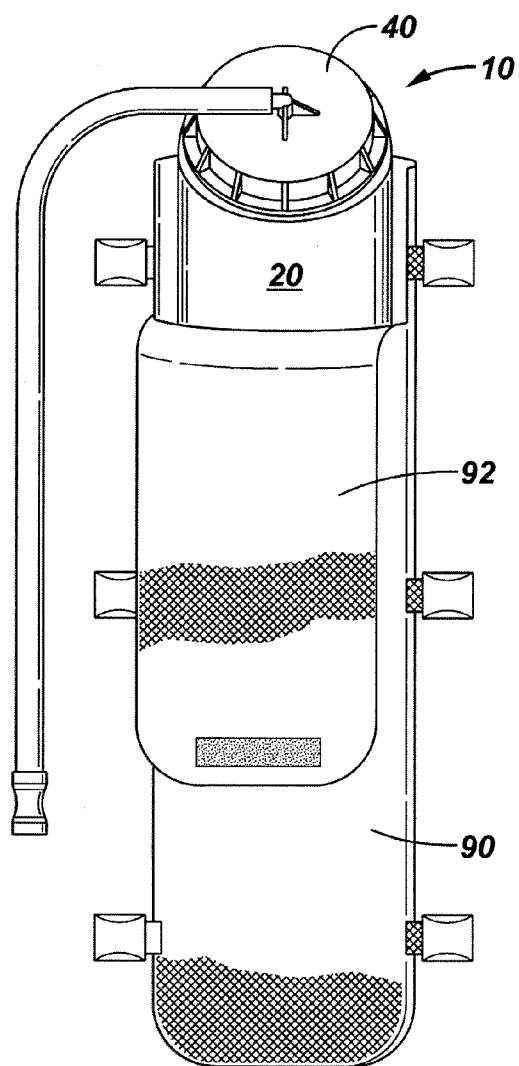


FIG. 5

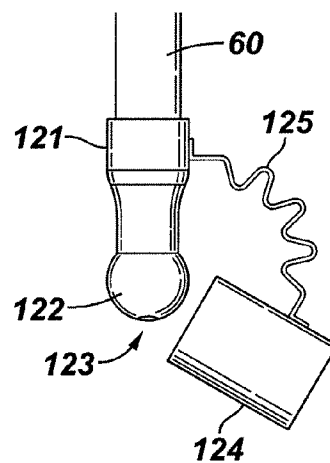
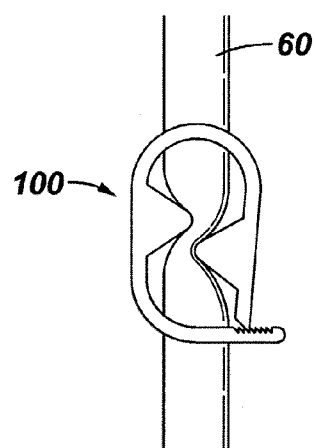


FIG. 6



PERSONAL HYDRATION SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation in part of U.S. application Ser. No. 11/432,236, filed May 11, 2006, the contents of which are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates generally to systems for providing drinking fluid to a user and more particularly to a personal hydration system capable of being used by military personnel, police, security or members of the public who may find themselves in hazardous environmental conditions, an environment which may include nuclear, biological and chemical agents.

BACKGROUND

[0003] Canteens and water bottles of various configurations have long been utilized to create a portable source of drinking water and other hydrating fluids. While functional, they require a significant amount of manual manipulation and distraction from the activities at hand.

[0004] More recently, a number of improvements in hydration systems have been devised. These improvements are based on a flexible bladder connected to a tube and a shut-off device that allows the user to drink at will with no or minimal distraction and use of the hands. These bladders are often strapped in carriers worn on the back, creating a small pressure that enables the drinking fluid to be dispensed with little or no sucking. The result of these hydration systems is that they facilitate hydration without requiring the user to pause in activities such as bicycling, hiking, skiing, etc.

[0005] These same features have also proved to be useful to military personnel who often face the need to remain hydrated while being engaged in physical activities. Hydration systems designed for the recreational market have been utilized by military personnel and a certain amount of customization has been done to facilitate that usage.

[0006] While improvements have been made to the personal hydration system, there are still numerous drawbacks for use of these personal hydration systems in a military setting. One drawback of the prior art personal hydration systems is that they are difficult to clean and do not allow the user to visually inspect the cleanliness of the systems. Another drawback of the prior art personal hydration systems is that the systems are difficult to operate when the user is wearing thick gloves. A third drawback of the prior art personal hydration systems is that there are too many lineal sealing points which may provide access to nuclear, biological and chemical agents into the hydration systems. Yet, another drawback of the prior art systems is that the bladders have corners which form stress joints and may allow for nuclear, biological and chemical agents to enter into the hydration systems. Another drawback of the prior art personal hydrating systems is that the users will find it difficult to determine whether the cap is properly sealed before operating the hydration systems in unsafe environmental conditions. These are just a few of the numerous drawbacks of the prior art personal hydration systems.

[0007] It is a desire of the present invention to provide an improved personal hydration system that is easier to clean, allows the user to visually determine that the system is clean,

operable with thick gloves, has fewer lineal sealing points, has fewer stress joints and has improved sealing of the cap so as to enable the user to determine that the cap is sealed properly. The present invention uses a connector that eliminates the lock-ring, thus allowing the user to connect the improved personal hydration system to other equipment by simply pulling and pushing the connector to the equipment.

BRIEF SUMMARY OF THE INVENTION

[0008] An embodiment of the improved personal hydration system, which may be used by military personnel, includes an elastomeric bladder that may be translucent, a neck, a cap having an outlet port, an internal drinking tube, and a hose with a connector at one end. The improved personal hydration system is capable of being used in environments containing nuclear, biological and chemical agents. The bladder is flexible and has a shape that has no sharp or small radius internal corners. In an embodiment, the bladder has a fill port located at an angle in the bladder's top portion which is oversized so that the bladder may be turned inside out for cleaning purposes. In another embodiment, the fill port is not angled.

[0009] The neck has deformable seals positioned concentrically along its base which attaches to the internal side of the bladder's fill port. A thicker portion of the bladder, the portion which is slightly thicker at the rim of the fill port, is exposed along the top side of the neck's base adjacent to the lower end of the neck's threaded section so that it may act as a primary seal when the cap is attached to the neck. The rim of the cap is tapered at its bottom side so that it can properly form a seal with the thicker portion of the bladder trapped between the cap and the neck. The cap also has external ribs to facilitate a user operating the cap while wearing gloves. The cap has an outlet port attached to the top side of the cap, thereby decreasing the number of parts and the possible exposure sites to the environment. As the cap is turned for closing, the cap is sealed by two methods. The primary seal is where the bladder is trapped between the cap and the neck and is tightened as the cap is closed. The secondary seal is where the deformable seals are squeezed between the neck and the bladder's inner surface.

[0010] The internal drinking tube attaches to the outlet port on the cap's inner side and extends the bladder's length along its interior side. The hose is connected to the outlet port on the cap's exterior side and has a connector attached to the hose's other end. The connector is adapted so that it may receive a connection from various other equipment, which includes, but is not limited to, a mouthpiece or a gas mask.

[0011] The foregoing has outlined the features and technical advantages of the present invention in order that the detailed description of the invention that follows may be better understood. Additional features and advantages of the invention will be described hereinafter which form the subject of the claims of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The foregoing and other features and aspects of the present invention will be best understood with reference to the following description of a specific embodiment of the invention, when read in conjunction with the accompanying drawings, wherein:

[0013] FIG. 1 illustrates an improved personal hydration system in accordance with one embodiment of the present invention;

[0014] FIG. 1A illustrates an improved personal hydration system connected to a mouth-piece in accordance with another embodiment of the present invention;

[0015] FIG. 1B depicts an exploded cross-sectional view of the primary seal, which is created by a thicker portion of the bladder, the cap and the neck, as shown in FIG. 1 in accordance with one embodiment of the present invention;

[0016] FIG. 2 depicts a side angular view of a neck of the improved personal hydration system in accordance with one embodiment of the present invention;

[0017] FIG. 3 illustrates a side view of a cap of the improved personal hydration system in accordance with one embodiment of the present invention;

[0018] FIG. 4 illustrates a frontal view of an insulated cover holding the improved personal hydration system in accordance with one embodiment of the present invention;

[0019] FIG. 5 illustrates a view of a mouthpiece attached to the personal hydration system in accordance with one embodiment of the present invention; and

[0020] FIG. 6 illustrates a view of a shut-off valve in accordance with one embodiment of the present invention.

DETAILED DESCRIPTION

[0021] The following discussion is presented to enable a person skilled in the art to make and use the invention. The general principles described herein may be applied to embodiments and applications other than those detailed below without departing from the spirit and scope of the present invention as defined by the appended claims. The present invention is not intended to be limited to the embodiments shown, but is to be accorded the widest scope consistent with the principles and features disclosed herein.

[0022] As such, 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, methods, and devices for carrying out the several purposes of the present invention. It is important, therefore, that the claims be regarded as including such equivalent constructions insofar as they do not depart from the spirit and scope of the present invention.

[0023] As shown in FIG. 1, the present invention disclosed hereinbelow describes an improved personal hydration system 10 specifically designed for operation by military personnel in hazardous environmental conditions, which may include nuclear, biological and chemical agents. The improved personal hydration system 10 has been designed with several improvements so that it may be used by anyone, including non-military personnel, who wishes to take advantage of its improvements, without departing from the scope and spirit of the present invention. The improved personal hydration system 10 includes a bladder 20 for storing potable drinking fluid and has a fill port 22 located at the top portion of the bladder 20, a neck 30 (FIG. 2) installed at the fill port 22, a cap 40 having an outlet port 50, wherein the cap 40 is removably attached to the neck 30 (FIG. 2), an internal drinking tube 80 connected to the cap's 40 inner side and extending therefrom within the bladder 20 to the bladder's bottom, a hose 60 having an adjacent end 62 and a distal end 64, wherein the adjacent end 62 is removably connected to the outlet port 50, a shut-off valve 100 slideable along the length of the hose, and a connector 70 attached to the hose 60 at the distal end 64. In an embodiment the connector 70 is used to attach a mouthpiece 120 via the hose 60 attached to the distal end 64.

[0024] In an embodiment, the bladder 20 has a fill port 22 located at an angle along its top portion. The bladder 20 is a molded elastomeric bladder, preferably made of silicone and coated with parylene. The wall thickness of bladder 20 is uniform throughout, with the exception that the wall thickness at the fill port 22 is slightly greater. Silicone is an inherently translucent elastomer which naturally inhibits biological growth. There are several other benefits for using silicone as the construction material. Another benefit is that silicone is easy to make suitable for potable water. A third benefit is that silicone has a history of application in products which must be resistant to atmospheric contaminants, which include nuclear, biological and chemical agents. Another benefit is that it is easily formulated with excellent strength and very high ultimate elongation, which allows it to resist shock and deformation extremely well. Although silicone with a parylene liner has been shown as the construction material in this embodiment, other materials that are waterproof and resistant to nuclear, biological and chemical agents, such as chlorobutyl and other butyl materials may be used without departing from the scope and spirit of the present invention.

[0025] Other illustrative non-exclusive examples of chemically resistant materials for constructing components of bladder 20 include thermoset epoxies such as vulcanized butyl rubber and chloro-isobutene-isoprene rubber (chloro-butyl), thermoplastic elastomers such as Sentoprene rubber, nylon, ABS, polyurethane, polypropylene, polyethylene. The choice of materials for a particular component include considerations of the expected forces to be applied to the component, structural requirements, and flexibility requirements, and accordingly may vary from component to component and system to system. For the inside of the bladder 20, colored material, of the same elastomer formulation as the outside, is contemplated. A multilayer design is contemplated such that surface degradation would not affect the performance of the system. Since the inside and outside layers are merely versions of the same basic elastomer formulation and are applied as part of the same manufacturing step, the resulting multilayered construction remains essentially homogeneous. Thus, the outer layer would also be potable water compatible and formulated for low taste as the inner layer and the inner layer would also incorporate nuclear, biological and chemical agent (NBC) impermeability as the outerlayer. Further, nanofillers such as nano-clays are also contemplated to be incorporated in the bladder 20 to enhance the impermeability of the elastomers used.

[0026] A multi-layered dip molding process is used for manufacturing the hydration system 10 of the present invention. This process allows for the use of different versions of the same basic material for manufacturing the different layers of the bladder 20. The exterior of the bladder 20 may be made of carbon black. The inner colored layer of the bladder 20 may be of a lighter color. Additionally, the multi-layered dip molding process results in the hydration system of the present invention being significantly lighter in weight as compared to other commercially available products. Hence, the thinner and lighter product of the present invention provides greater conformity to the user, minimizing space for a given water volume.

[0027] The bladder 20 is molded as an elliptical shape, with a cylindrical body and spherical ends, having no sharp or small radius internal corners. Small radius internal corners are internal corners having a radius of about 1.5 mm or less. In this embodiment, the bladder 20 has internal corners with a

radius of about 2.5 mm. This shape removes potential stress points and areas capable of trapping debris. The bladder 20 may vary in shape and size depending upon the volume of drinking fluid to be carried by the user and the intended use of the improved personal hydration system 10, while still remaining within the scope of the present invention. The bladder 20 may come in other shapes, such as round, oval, cubical, rectangular, triangular, etc., so long as there are no sharp or small radius internal corners, without departing from the scope and spirit of the present invention. Also, although this embodiment shows the radius for the internal corner being about 2.5 mm, the radius may be larger without departing from the scope and spirit of the present invention.

[0028] In this embodiment, the bladder 20 needs to meet certain testing and physical requirements because of its potential use in a military setting. First, the bladder 20 must be able to hold at least 70 ounces of drinking fluid at a temperature in the range from about -60° F. to about 160° F. The present invention, however, is not limited to such a size, as different sizes can be provided to hold more or less fluid in the bladder 20 as needed. The bladder 20 will be designed to normally store drinking fluid at a temperature in the range from about 0° F. to about 125° F. The bladder 20 should also be able to support a 500 lb distributed load and be able to withstand a 30-foot drop while filled with chilled water at a temperature range from about 32° F. to about 40° F. Also, there should be no air leakage through the bladder 20 when it is exposed to about a 5 psi pressure. Finally, the bladder 20 should provide 24 hour protection from exposure to nuclear, biological and chemical agents based on a 15 liter/day consumption rate and 70 ounces bladder 20 capacity. These requirements may be higher or lower without departing from the scope and spirit of the present invention.

[0029] The materials and construction of the improved personal hydration system 10 will enable a user to use it for multiple purposes, including in environments containing nuclear, biological and chemical agents (NBC), conventional warfare, training use and daily use. With the present invention, there is no need to use different products for different types of activities.

[0030] The fill port 22 in this embodiment, which is circular in shape, is located at the top portion of the bladder 20 at an angle so as to reduce the profile of bladder 20 while the cap 40 is engaged to the neck 30 (FIG. 2). The location of the fill port 22 may be at other locations on the bladder 20 without departing from the scope and spirit of the present invention. In an embodiment, the fill port may be located more to the end of the bladder in a centered position to avoid issues like directional-specific hose connections that can cause hose kinking problems and a reduction in the overall effective length of the hose. The shape of fill port 22 may also vary without departing from the scope and spirit of the present invention. The wall thickness of fill port 22 is slightly greater than the rest of the bladder 20 because it acts as an anti-extrusion device and also provides an adequate sealing area when it is trapped between the cap 40 and the neck 30. The fill port 22 is also oversized, thus facilitating the cleaning and drying of the bladder 20 by allowing the bladder 20 to be drawn inside out through the fill port 22. This oversized fill port 22 also enables the user to more easily fill the bladder 20 with drinking fluid or ice. Finally, since the fill port 22 is oversized, the cap 40 will also be larger, thereby allowing the user to operate the cap 40 while wearing thick gloves.

[0031] As shown in FIG. 2, the neck 30 has a base 32 having a plurality of arcs 34 along its perimeter and a circular threaded section 36 protruding outward therefrom. A plurality of deformable seals 38 are placed concentrically around the top side of the base 32 of the neck 30, such that it traverses along each of the plurality of arcs 34. These deformable seals 38 create a seal between the base 32 of the neck 30 and the interior of the bladder 20 (FIG. 1) at the fill port 22 (FIG. 1), once the neck 30 has been installed properly to the bladder 20 (FIG. 1). Once installed properly and the seal is created, the neck 30 is no longer removable from the bladder 20 (FIG. 1). As the cap 40 (FIG. 1) is tightened upon the neck 30, the result is a tighter seal. The plurality of arcs 34 provides an increased surface area of the base 30 which is located on the interior side of bladder 20 (FIG. 1), thereby preventing the neck area from being pulled out away from the sealing area as well as creating a tighter seal between the neck 30 and the bladder 20 (FIG. 1) when force is applied, i.e. pulling or tightening of the cap 40. The overall seal of cap 40 (FIG. 1) and neck 30 to bladder 20 (FIG. 1) consists of a single point with approximately 8.5 lineal inches of seal. There are a total of four sealing points which have about 10.4 lineal inches of seal, thus minimizing the risk of ingress of nuclear, biological and chemical agents. The four sealing points are the seals created between the fill port 22 of the bladder 20 (FIG. 1) fill port 22 and the cap 40 (FIG. 1), between the outlet port 50 (FIG. 1) and the hose 60 (FIG. 1), between the hose 60 (FIG. 1) and the connector 70 (FIG. 1) and between the connector 70 (FIG. 1) and the equipment connector (not shown). The design of connector 70 may also incorporate an additional sealing point, which would add about 2 lineal inches of seal, thus totaling 12.4 lineal inches of seal for the improved personal hydration system 10 (FIG. 1).

[0032] In this embodiment, the neck 30 needs to meet certain testing and physical requirements because of its potential use in a military setting. The neck 30 must be able to support three times the weight of the bladder 40 (FIG. 1) filled with drinking fluid. This requirement may be higher or lower without departing from the scope and spirit of the present invention.

[0033] As seen in FIG. 1A, the neck 30 has deformable seals 38 positioned concentrically along its base 32 which attaches to the internal side of the fill port 22 of bladder 20. A thicker portion of the bladder 20, the portion which is slightly thicker at the rim of the fill port 22, is exposed along the top side of the base 32 of the neck 30, adjacent to the lower end of the threaded section 36 of neck 30 so that it may act as a primary seal when the cap 40 is attached to the neck 30. The rim of the cap 40 is shown to be tapered at its bottom side so that it can properly form a seal with the thicker portion of the bladder 20 trapped between the cap 40 and the neck 30. Thus, as the cap 40 is turned for closing, the cap 40 is sealed by two methods. The primary seal is where the thicker portion of the bladder 20 is trapped between the cap 40 and the neck 30 and is tightened as the cap 40 is closed, thereby eliminating the need for separate o-rings or other sealing devices. The secondary seal is where the deformable seals 38 are squeezed between the neck 30 and the inner surface of bladder 20. These sealing techniques serve to lower cost, minimize the number of components and eliminate the possibility of the seals becoming dislodged and lost. The threaded section 36 has a large pitch with a small profile so that the cap 40 may fully seal with a short rotation.

[0034] As shown in FIG. 3, the cap 40 is tapered at its bottom side and has external ribs 42 located along its side, an outlet port 50 located on its top side and threads (not shown) located along the interior sides of the cap 40. The cap 40, when engaged to the neck 30 (FIG. 2), is designed to minimize its profile above the surface of bladder 20 (FIG. 1) so as to minimize the possibility of snagging and facilitate the roll over of the user. The cap 40 is also attached to the bladder 20 (FIG. 1) so that it does not get lost or misplaced. Although this embodiment depicts the cap 40 being attached to the bladder 20 (FIG. 1), the cap 40 may be completely removable from the bladder 20 (FIG. 1) without departing from the scope and spirit of the present invention.

[0035] The external ribs 42 are substantially vertical along the external side of cap 40 and serve a dual purpose. First, the external ribs 42 facilitate the user to turn the cap 40, even while wearing thick gloves. Secondly, the external ribs 42 strengthen the integrity of the cap 40. Although this embodiment shows the external ribs 42 being substantially vertical, they may also be angled without departing from the scope and spirit of the present invention.

[0036] The outlet port 50, preferably a hose barb, is integrally molded onto the center of the exterior top side of the cap 40. Although this embodiment shows that the outlet port 50 is integral to the cap 40, the outlet port 50 may be removably attached to the cap 40 without departing from the scope and spirit of the present invention. Also, although this embodiment locates the outlet port 50 onto the center of the cap 40, the outlet port 50 may be located elsewhere on the cap 40, including its sides, without departing from the scope and spirit of the present invention. Some of the advantages of having the outlet port 50 molded onto the cap 40 are (1) the number of components are reduced thereby limiting the cost and the number of leak points, (2) the length of the hose 60 (FIG. 1) is reduced by the length of the bladder 20 (FIG. 1) thereby reducing the surface area exposed to nuclear, biological and chemical agents, (3) the exterior is easier to clean, and (4) it eliminates tubes and attachment outcroppings at the bottom of the bladder 20 (FIG. 1) which allows for easier insertion into an insulated cover 90 (FIG. 4).

[0037] Threads 44 (FIG. 1A) having a large pitch are located along the interior sides of the cap 40. The large pitch enables a user to seal the cap 40 with a short rotation. The threads 44 (FIG. 1A) are designed to be self locking to prevent accidental loosening. As the cap 40 is turned for sealing, the cap 40 eventually hits a dead stop on the rim of the threaded section 36 (FIG. 2) of neck 30 (FIG. 2) to create a positive hard stop of rotation to enable the user to determine that the cap 40 is fully closed and sealed.

[0038] Referring back to FIG. 1, the internal drinking tube 80 attaches to the outlet port 50 on the inner side of cap 40 and extends the length of bladder 20 along its interior. The internal drinking tube 80 may be constructed from any suitable material for dispensing potable water, which includes, but is not limited to, polypropylene and polyethylene. These materials may be light and inexpensive compared to silicone with parylene coating used for the bladder 20 since the internal drinking tube 80 is already protected by the bladder 20 from nuclear, biological and chemical agents that may be present in the atmosphere.

[0039] The hose 60 has an adjacent end 62 and a distal end 64, wherein the adjacent end 62 is removably connected to the outlet port 50 on the exterior side of cap 40. In this embodiment, the hose 60 is constructed of the same or similar mate-

rial as the material of bladder 20. This material ensures that nuclear, biological, and chemical agents do not penetrate into the improved personal hydration system 10 via the hose 60. Although this embodiment shows that the material of hose 60 is the same or similar material as the material of bladder 20, the material of hose 60 may be completely dissimilar depending upon its application without departing from the scope and spirit of the present invention.

[0040] Also shown in FIG. 1, the connector 70 has a male end 72 and a female end 74 having a guiding rod 76. The male end 72 is removably attached to the distal end 64 of hose 60. Once attached, the user may remove the connector 70 from the hose 60 by pulling, and possibly twisting, hard. The female end 74 has a guiding rod 76 which attaches to an equipment connector (not shown). As the equipment connector approaches the guiding rod 76, it snaps into the guiding rod 76 via a pushing force. The user may disconnect the equipment connector from the connector 70 by pulling the two apart and can easily reconnect it to another equipment connector (not shown). The connector is adapted so that it may attach itself to various equipment, such as gas masks or mouthpieces. One of the advantages of using this connector 70 is that the user may operate it while wearing thick gloves, i.e., when the user is performing military duty and wearing thick gloves is a requirement.

[0041] In an embodiment, the distal end of the hose is connected via the connector 70 to a mouthpiece 120 such that the hose 60 is in fluid communication with mouthpiece 120. Mouthpiece 120 is sized to be received within the user's mouth to deliver fluid to the user. Mouthpiece 120 is shown in more detail in FIG. 5. Mouthpiece 120 includes a neck 121 which is connected to and in fluid communication with end 64 of hose 60 via the connector 70. As shown in FIG. 5, neck 121 is fit over the distal end 64 of hose 60 and forms a watertight seal. It should be noted that the mouthpiece can be slipped on and off the hose 60 for cleaning or maintenance. Mouthpiece 120 further includes a head 122, which typically is of larger cross-section than neck 121 and which includes a dispensing face 123 through which fluid is selectively dispensed from the mouthpiece. Mouthpiece 120 also includes a detachable cap 124 attached to the neck 121 via an attaching means 125.

[0042] An example of the mouthpiece 120 is a bite-actuated, or mouth-actuated, mouthpiece 120 that it is selectively deformed from a sealed (or closed) position, in which fluid is prevented from being dispensed from the mouthpiece, to a dispensing (or open) position, in which the user may draw fluid from the reservoir through the tube and mouthpiece when the user compresses the mouthpiece with the user's teeth or lips. Bite-actuated mouthpieces are often biased or otherwise configured to automatically return to the closed position when a user is not exerting force upon the mouthpiece to configure the mouthpiece to its closed position. Another example of the mouthpiece 120 is the pop-up style valve. Pop up valves are usually provided on a cap with thread attachments so that they can connect to the threaded spout of the bottle. The valve is popped open to provide a flow path. The valve has to be pushed down to close the flow path. This requires action by a user to close the valve. If left open, the contents of a container could leak if tipped over.

[0043] FIG. 6 shows a detailed view of the shut-off valve 100. The shut-off valve 100 is placed along the length of the hose between the outlet port and the connector and is slideable along this length. The hose 60 is threaded slidably through the shut-off valve 100 in a direction normal to the

valve and extending within the shut-off valve **100** across its width and is characterized by a pair of outwardly extending opposite longitudinal formations between the ends over at least the length of the portion of the hose **60**. The shut-off valve **100** controls the flow of fluid through the hose **60**. Such valves control or terminate fluid flow by constricting or pinching the line, thus maintaining fluid under pressure within the line and upstream of the valve.

[0044] Although the improved personal hydration system **10** could be used separately, FIG. **4** illustrates the insulated cover **90** with the improved personal hydration system **10** secured within it. The insulated cover **90** would have a flap **92** going from the front, an open position, to the back, a closed position. The flap **92** can be opened to provide access to the cap **40** for filling with drinking fluid without removal of the bladder **20** from the insulated cover **90**. There are numerous other benefits that are provided when using the insulated cover **90**. First, in its closed position, the insulated cover **90** can protect the surface of bladder **20** and cap **40** by further limiting exposure to nuclear, biological and chemical agents and facilitating clean-up from exposure to the same. This same feature would also provide an additional layer of physical protection for the bladder **20** and keep it cleaner than if the insulated cover **90** was not used. Finally, the use of the insulated cover **90** in conjunction with the low profile of cap **40** allows for less snagging potential and reduces the impediment for a user to roll over on his back.

[0045] Although the invention has been described with reference to specific embodiments, these descriptions are not meant to be construed in a limiting sense. Various modifications of the disclosed embodiments, as well as alternative embodiments of the invention, will become apparent to persons skilled in the art upon reference to the description of the invention. It should be appreciated by those skilled in the art that the conception and the specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the invention as set forth in the appended claims. It is therefore, contemplated that the claims will cover any such modifications or embodiments that fall within the true scope of the invention.

What is claimed is:

1. An improved personal hydration system comprising:
 - an elastomeric bladder, for containing a drinking fluid, having an oversized fill port, wherein the bladder can be turned inside out through the fill port for cleaning and inspection purposes;
 - a neck having a base and a threaded portion extending from the base, wherein the base is attached to the interior side of the bladder at the fill port;
 - a cap that is removably attached to the threaded portion of the neck;
 - an outlet port located at a position on the improved personal hydration system such that the outlet port has access to the drinking fluid within the bladder;
 - a hose having an adjacent end and a distal end, wherein the adjacent end is attached to the outlet port and the distal end is attached to a connector; and
 - a shut-off device moveably positioned on the hose between the outlet port and the connector.
2. The system of claim 1, wherein the bladder is constructed of silicone and has a parylene coating.

3. The system of claim 1, wherein the bladder is constructed of butyl rubber.

4. The system of claim 3, wherein said butyl rubber incorporates nano-fillers for improving impermeability.

5. The system of claim 4, wherein said nano-filler is a nano-clay.

6. The system of claim 1, wherein the outlet port is located on the exterior side of the cap.

7. The system of claim 1, wherein the threaded portion of the neck has a large pitch.

8. The system of claim 1, wherein the rim of the cap is tapered.

9. The system of claim 1, wherein the cap comprises external ribs located around the side of the cap.

10. The system of claim 1, wherein at least one deformable seal is placed between the top side of the base of the neck and the interior side of the bladder at the fill port.

11. The system of claim 1, wherein the base comprises a plurality of arcs to provide a greater surface area for sealing and preventing the neck from being dislodged from the bladder while a user pulls on the neck.

12. The system of claim 1, wherein a thicker portion of the bladder is trapped between the cap and the neck, thereby creating a seal for the cap.

13. The system of claim 1, wherein the bladder has no sharp or small radius internal corners.

14. The system of claim 1, wherein the fill port is located at an angle on the top portion of the bladder, thereby creating a low profile.

15. The system of claim 1, wherein the cap has a hard stop upon closure, thereby allowing a user to determine proper sealing of the cap.

16. The system of claim 1, further comprising an internal drinking tube attached to the interior side of the outlet port and extending toward the bottom of the bladder.

17. The system of claim 1, further comprising an insulated cover having a flap, wherein the insulated cover holds the bladder, and wherein the cap is accessible for filling with drinking fluid when the flap is in an open position.

18. The system of claim 1, wherein the connector is adapted to attach to a gas mask.

19. The system of claim 1, wherein the connector is adapted to attach to a mouthpiece.

20. An improved personal hydration system capable of being used in environments containing nuclear, biological and chemical agents, the system comprising:

- an elastomeric bladder, for containing a drinking fluid, having an oversized fill port located on the top portion of the bladder, wherein the bladder can be turned inside out through the fill port for cleaning and inspection purposes, wherein the bladder has no sharp or small radius internal corners, and wherein the bladder is constructed of butyl rubber;

- a neck having a base with at least one deformable seal located on its top side and a threaded portion extending from the base, wherein the base is attached to the interior side of the bladder at the fill port;

- a cap having an outlet port, wherein the cap is removably attached to the threaded portion of the neck, wherein a

thicker portion of the bladder is trapped between the cap and the neck thereby creating a seal for the cap, and wherein the cap has a hard stop upon closure thereby allowing a user to determine proper sealing of the cap;
a hose having an adjacent end and a distal end, wherein the adjacent end is attached to the outlet port; and the distal end is attached to a connector;
a shut-off device moveably positioned on the hose between the outlet port and the connector;

an internal drinking tube attached to the interior side of the outlet port and extending toward the bottom of the bladder; and
an insulated cover having a flap, wherein the insulated cover holds the bladder, and wherein the cap is accessible for filling with drinking fluid when the flap is in an open position.

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