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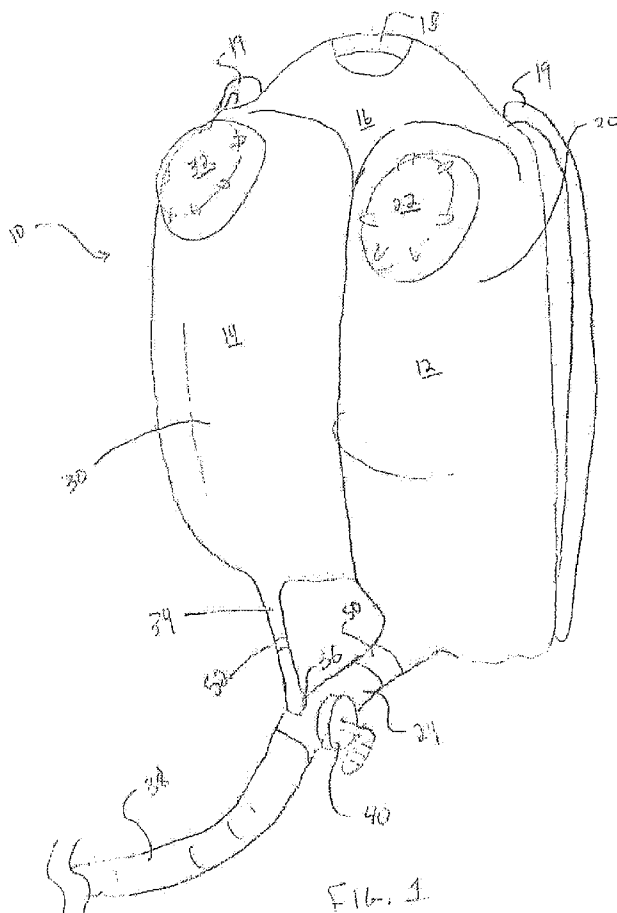
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(54) Title: MULTIPLE CHAMBER HYDRATION PACK



(57) Abstract: A multiple chamber hydration pack (10). The hydration pack includes a first bladder (12) and a second bladder (14) connected together. A first tube (24) leads from the first bladder and a second tube (34) leads from the second bladder. The first tube and second tube meet at a junction that fluidly connects the first and second tube to a drinking tube. The first or second tube may contain a valve (40) for adjusting the rate of flow through the tube in order to adjust the ratio of fluids from the first bladder and second bladder mixing together in the drinking tube.

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MULTIPLE CHAMBER HYDRATION PACK**REFERENCE TO RELATED APPLICATIONS**

(0001) The present application claims priority to U.S. Provisional patent application serial Number 60/956,191, filed August 16, 2007, and incorporated herein by reference.

BACKGROUND OF THE INVENTION

(0002) Hydration is important for a variety of outdoor activities involving physical exercise such as biking, hiking, camping, running or other activities. While engaged in these activities, however, hydrating fluids are usually not easily accessible in the outdoors. Moreover, fluids are heavy and, as a result, it is uncomfortable to carry them while engaged in outdoor activities. As a solution, hydration packs have developed, which are hydration systems that a user wears on his or her body, usually in the form of a backpack or a waist pack. The backpack or waist pack contains one or more bladders which contain fluids. Often a hose leads from each bladder allowing a user to drink fluids from the bladder without having to remove the backpack or waist pack.

(0003) When engaged in particularly stressful outdoor activities, special fluids are often consumed in order to help one's body perform at its best and avoid

sickness and injury. For instance, people often use their hydration packs in order to carry fluids rich in electrolytes to replace electrolytes lost through perspiration. In addition, hydration packs may be filled with fluids having sugars or other caloric substances in order to provide a quick source of energy.

SUMMARY OF THE INVENTION

(0004) The following presents a simplified summary of some embodiments of the invention in order to provide a basic understanding of the invention. This summary is not an extensive overview of the invention. It is not intended to identify key/critical elements of the invention or to delineate the scope of the invention. Its sole purpose is to present some embodiments of the invention in a simplified form as a prelude to the more detailed description of some embodiments that are presented later.

(0005) In accordance with an embodiment, a multiple chamber hydration pack is provided. The hydration pack includes a first bladder and a second bladder. A first tube leads from the first bladder and a second tube leads from the second bladder. The first tube and second tube meet at a junction that fluidly connects the first and second tube to a drinking tube. The first or second tube may contain a valve for adjusting the rate of flow through the tube in order to adjust the ratio of fluids from the first bladder and second bladder mixing together in the drinking tube.

(0006) Other features of the invention will become apparent from the following detailed description when taken in conjunction with the drawings, in which:

BRIEF DESCRIPTION OF THE DRAWINGS

(0007) FIGURE 1 is a side perspective view of a hydration pack in accordance with an embodiment; and

(0008) FIG. 2 is a side perspective view of another embodiment of a hydration pack.

DETAILED DESCRIPTION

(0009) In the following description, various embodiments of the present invention will be described. For purposes of explanation, specific configurations and details are set forth in order to provide a thorough understanding of the embodiments. However, it will also be apparent to one skilled in the art that the present invention may be practiced without the specific details. Furthermore, well-known features may be omitted or simplified in order not to obscure the embodiment being described. In addition, to the extent that orientations of the embodiments are described, such as "top," "bottom," "front," "rear," "right," and the like, the orientations are to aid the reader in understanding the embodiment being described, and are not meant to be limiting.

(0010) Referring now to the drawings, in which like reference numerals represent like parts throughout the several views, FIG. 1 shows a hydration pack 10 in accordance with an embodiment. The hydration pack 10 includes a first bladder 12 and a second bladder 14. The first bladder 12 and second bladder 14 may be separated, or may be connected together along a common side by a support surface 16, which may be a piece of material such as fabric configured to hold and support the first bladder 12 and second bladder 14. In an embodiment, the first bladder 12

and second bladder 14 are permanently sewn onto the support surface 16, but they may also be removably attached to the support surface 16 in pockets or other structures. In addition, the first bladder 12, second bladder 14, and support surface 16 may comprise a single piece of material. The first and second bladders 12, 14 may also be connected directly to one another, connected by another mechanism, or may be separated. The hydration pack 10 may also include other features such as a handle 18 and straps 19 configured so that the hydration pack 10 may be worn in a manner similar to a conventional backpack.

(0011) As shown in FIG. 1, the first bladder 12 is a reservoir having an interior forming a first fluid chamber 20. The first bladder 12 may be formed from rubber, vinyl, or other watertight materials. The first bladder 12 includes a cap 22 which may be removed to provide access to the interior of the first fluid chamber 20. The cap 22 may be positioned at or near the top of the first bladder 12, although it can generally be in any position. The cap 22 and first bladder 12 may be threaded in a manner that the cap 22 may be attached to and removed from the first bladder 12 by rotating the cap 22 clockwise and counterclockwise, respectively. Of course, non-threaded caps may also be used.

(0012) The first bladder 12 includes a first outlet

tube 24 extending from the bottom of the first bladder 12. In general, the first outlet tube 24 may be formed from the same or different material as the first bladder 12, and extends from any portion of the first bladder 12. The first outlet tube 24 is fluidly connected to the fluid chamber 20.

(0013) The second bladder 14 and its components may be configured similarly to the first bladder 12. In particular, the second bladder 14 is a reservoir, the interior of which forms a fluid chamber 30. Similar to the cap 22, the second bladder 14 includes a cap 32. In addition, the second bladder 14 includes a second outlet tube 34 extending from the bottom of the second bladder 14.

(0014) The first outlet tube 24 and the second outlet tube 34 meet together at a junction 36 in a manner such that the first outlet tube 24 and the second outlet tube 34 are fluidly connected and lead to a drinking tube 38. The junction 36 may comprise a venturi siphon, which is not shown, but known in the art. An example of a venturi siphon (also known as a siphon injector) can be found at http://www.spray.com/applications/application_reference/Injector_Training_Guide.pdf, a copy of which can be found attached as Exhibit A. In general, venturi siphons are fittings having an internal reduction in diameter with a tap occurring at or immediately after the reduction in diameter.

Fluid flowing past the reduction in diameter changes pressure in a manner that a vacuum is created at or immediately after the reduction in diameter. The vacuum causes fluids to enter the fitting from tubes or pipes fluidly connected to the tap and mix with the fluids that have passed the reduction in diameter. In an embodiment, the second outlet tube 34 is connected to the tap while the first outlet tube 24 is connected to the venturi siphon before the reduction in diameter and the drinking tube 38 connected to the venturi siphon after the reduction in diameter. A flow rate adjustment valve 40 may be included in the venturi siphon and be configured to reduce the diameter of the second outlet tube 34 relative to the diameter of the first outlet tube 24.

(0015) A venturi siphon, however, need not be included. For instance, the junction 36 may comprise simple fluid connection of the first outlet tube 24, the second outlet tube 34, and the drinking tube 38, perhaps utilizing a fitting known as a "T." Such a juncture may still utilize a venturi effect, via an aspirator configuration, if the pressure drop across the T is sufficient. Any general flow rate valve may be alternatively or additionally located at any position in the first outlet tube 24 or second outlet tube 34, or both, between the junction 36 and the first bladder 12 or second bladder 14.

(0016) The end of the drinking tube 38 opposite the junction 36 may include a bite valve or other type of valve (not shown). Bite valves are known in the art of hydration packs and, generally, are valves which open when users bite down on them.

(0017) To use the hydration pack 10, the first bladder 12 is filled with a liquid. This is accomplished by removing the cap 22, pouring liquid into the first fluid chamber 20 and replacing the cap 22. If desired, the second bladder 14 may also be filled with a liquid in a manner similar to the first bladder 12. For example, a user may fill the first bladder 12 with a liquid such as water and the second bladder 14 with a liquid such as a fluid high in electrolytes. The user may then place his or her arms through the straps 19 and wear the hydration pack 10 like a conventional backpack. With the hydration pack 10 on the user's back the drinking tube 38 can be brought over the user's shoulders. In this manner, the drinking tube 38 is above the top of the first bladder 12 and second bladder 14 so that gravity does not cause the fluids either the first bladder 12 or the second bladder 14 to escape and flow freely from one bag to another. A one way check valve or other mechanism, such as the check valves 50, 52 may also be used to achieve this purpose. An item such as a clip or other device (not shown) may be used to secure the drinking

tube 38 in position.

(0018) To use the hydration pack 10 for drinking, the user simply inserts the end of the drinking tube 38 opposite the junction 36 into his or her mouth and applies suction. The suction causes fluids to move from the first bladder 12 to the first outlet tube 24 and from the second bladder 14 to the second outlet tube 34 where they mix together in the drinking tube 38 after passing the junction 36. If a venturi siphon is utilized, the mixing of fluids past the junction 36 may be due, at least partially, to the venturi effect whereby fluid passing in the first outlet tube 24 past a reduction in diameter creates a vacuum which draws fluids from the second outlet tube 34 which is fluidly connected to the tap of the venturi siphon. If a venturi siphon or other venturi configuration is not utilized, fluids from each bladder 12, 14 mix after the junction 36 due to a difference a low pressure in the drinking tube 38 relative to the pressure in the bladders 12, 14 caused by the suction.

(0019) To control the ratio of fluids running through the drinking tube 38, a user may manipulate the flow rate adjustment valve 40 so as to cause the diameter of the passage through the valve to change. In particular, turning the flow rate adjustment valve 40 causes a gradual reduction in the size of the passage through the valve 40 and thereby

causes fluid to pass through the valve more slowly than when the valve 40 is fully open. Thus, in an embodiment, partially closing the flow rate adjustment valve 40 effectively causes the diameter of the second outlet tube 34 to reduce relative to the diameter of the first outlet tube 24, thereby reducing the amount of fluid from the second bladder 14 mixing in the drinking tube 38 with fluid from the first bladder. A similar result may be achieved with one or more valves placed in other places in the first outlet tube 24 or second outlet tube 34, or both, and manipulating a valve to cause more friction at the valve and, therefore, the amount of fluid passing through the valve and eventually into the drinking tube 38.

(0020) As an example of how the hydration pack 10 may be used, the first bladder 12 may be filled with water while the second bladder 14 may be filled with a fluid having a high concentration of electrolytes. A user may then manipulate the valve 40 so as to cause only a small amount of electrolytes to enter the drinking tube 38 relative to the amount of water entering the drinking tube 38 when the user sucks fluid through the drinking tube 38. Thus, a user may keep a supply of electrolytes, which are difficult to obtain except in specialty stores, in the second bladder 14 while he or she can refill the first bladder 12 as necessary with water, which may be easier to

obtain, perhaps from a spring or from a tap.

(0021) Although only two bladders 12, 14 are shown in FIG. 1, the concepts described herein may be used to provide a hydration system with 3 or more liquids being mixed and provided to a user.

(0022) FIG. 2 shows a hydration pack 110 in accordance with another embodiment. The hydration pack 110 includes a first bladder 112 and a second bladder 114. The first bladder 112 and second bladder 114 may be connected together on a support surface 116 which may be similar to the support surface 16. In an embodiment, the first bladder 112 and second bladder 114 are in a stacked configuration with the second bladder 114 above the first bladder 112. As with the hydration pack 10, the hydration pack 110 may include features such as a handle 118 and straps 119.

(0023) Similar to the first bladder 12 of the first hydration pack 10, the first bladder 112 of the hydration pack 110 includes a first fluid chamber 120, a cap 122, and a first outlet tube 124. The first outlet tube 124 may be situated on the bottom of the interior of the first fluid chamber 120 and have one end opened to the interior of the first fluid chamber 120. The second bladder 114 includes a second fluid chamber 130, a cap 132, and a second outlet tube 134. The second outlet tube 134 may extend from a

lower portion of the interior of the second fluid chamber 130 to an upper portion of the second fluid chamber 130 back down to the lower portion of the interior of the second fluid chamber 130 where it may exit the second bladder 114 and enter the first bladder 112 where it meets the first outlet tube 124 at a junction 136. A strap or other structure (not shown) may secure the second outlet tube 134 to the upper portion of the second fluid chamber 130. Configuring the second outlet tube 134 in this manner causes a portion of the second outlet tube 134 to be at a high point of the second fluid chamber 130 so as to prevent gravity from drawing a significant amount of fluids from the second fluid chamber 130 down into the first fluid chamber 120. A flow rate adjustment valve 140 similar to the valve 40 may be located in the second outlet tube 134 after the second outlet tube 134 exits the second bladder 114 and before it enters the first bladder 112.

(0024) As with the junction 36, the junction 136 fluidly connects the first outlet tube 124, the second outlet tube 134, and a drinking tube 138. The drinking tube 138 leads from the junction 136 and exits the first bladder 112. The junction 136 may or may not incorporate a venturi siphon and, if a venturi siphon is used, a valve (not shown) may be configured to vary the diameter of the second outlet tube 124 relative to the first outlet tube 134

at the tap of the venturi siphon. The system may be configured to otherwise take advantage of the venturi effect, for example by arranging the first outlet tube 124, the second outlet tube 134, and the drinking tube 138 as an aspirator.

(0025) Use of the hydration pack 110 is similar to the use of the hydration pack 10. In particular, a user wears the hydration pack 110 like a backpack, drapes the drinking tube 138 over his or her shoulder or in another comfortable position and sucks fluids through the drinking tube 138 and controls the ratio of fluid from the first bladder 112 to the fluid from the second bladder 134 by manipulating the valve 140.

(0026) Alternatives may also be practiced with the first hydration pack 10 or the second hydration pack 110. For example, in place of or in addition to a valve, such as the valve 40 or the valve 140, the ratio of fluids may be controlled by varying the diameters of the tubes relative one to another. For example, in the hydration pack 10, the second outlet tube 34 may be given a smaller inside diameter relative to the inside diameter of the first outlet tube 24. In this manner, fluids will be drawn from the first fluid chamber 20 quicker than they are drawn from the second fluid chamber 30. A suitable size for the tubes relative one to another may be determined experimentally by placing various

fluids in the first bladder 12 and second bladder 14, sucking the fluids out and measuring the ratio of fluids exiting the drinking tube 38. Likewise, in place of or in addition to a valve 140, the ratio of fluids may be controlled in the second hydration pack 110 by varying the diameters of the tubes.

(0027) Other configurations are also possible, for example, the hydration packs may be configured to be worn as waist packs or, to be configured into backpacks having a storage chamber for storing personal effects. Also, in the drawings, the first bladders 12, 112 are shown to be approximately the same size as the second bladders 14, 114, respectively. However, the first bladders 12, 112 may be larger or smaller than the second bladders 14, 114, respectively. Insulating material may also be incorporated into any of the hydration packs 10, 110 in order to maintain fluids at a suitable temperature. In addition, while the embodiments described show each hydration pack 10, 110 having two bladders, more than two bladders may be incorporated in a manner similar to above. When more than two bladders are used, some bladders may be fluidly connected, similar to the above, and others may be fluidly disconnected in order to give a user the choice of which bladders to use, the bladders which may contain different fluids.

(0028) Other variations are within the spirit of the present invention. Thus, while the invention is susceptible to various modifications and alternative constructions, a certain illustrated embodiment thereof is shown in the drawings and has been described above in detail. It should be understood, however, that there is no intention to limit the invention to the specific form or forms disclosed, but on the contrary, the intention is to cover all modifications, alternative constructions, and equivalents falling within the spirit and scope of the invention, as defined in the appended claims.

(0029) All references, including publications, patent applications, and patents, cited herein are hereby incorporated by reference to the same extent as if each reference were individually and specifically indicated to be incorporated by reference and were set forth in its entirety herein.

(0030) The use of the terms "a" and "an" and "the" and similar referents in the context of describing the invention (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms "comprising," "having," "including," and "containing" are to be construed as open-ended terms (i.e., meaning "including, but not limited to,")

unless otherwise noted. The term "connected" is to be construed as partly or wholly contained within, attached to, or joined together, even if there is something intervening. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., "such as") provided herein, is intended merely to better illuminate embodiments of the invention and does not pose a limitation on the scope of the invention unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the invention.

(0031) Preferred embodiments of this invention are described herein, including the best mode known to the inventors for carrying out the invention. Variations of those preferred embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors

intend for the invention to be practiced otherwise than as specifically described herein. Accordingly, this invention includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the invention unless otherwise indicated herein or otherwise clearly contradicted by context.

WHAT IS CLAIMED IS:

1. A hydration pack comprising:

a first bladder;

a second bladder; and

a drinking tube;

wherein the first bladder and second bladder are fluidly connected to the drinking tube.

2. The hydration pack of claim 1, wherein said first bladder and said second bladder each define an interior cavity, the hydration pack further comprising a first outlet tube having an internal diameter, said first outlet tube fluidly connected to the interior cavity of the first bladder and a second outlet tube having an internal diameter, said second outlet tube fluidly connected to the interior cavity of the second bladder.

3. The hydration pack of claim 2, wherein said first outlet tube and said second outlet tube are fluidly connected to said drinking tube.

4. The hydration pack of claim 3, wherein the flow rate of fluid through said first outlet tube and said second outlet tube may be controlled.

5. The hydration pack of claim 4, wherein the internal diameter of said first outlet tube is

different from the internal diameter of said second outlet tube.

6. The hydration pack of claim 4, further comprising at least one valve for controlling the flow rate of fluid.

7. The hydration pack of claim 1, wherein said first bladder and said second bladder are of different sizes.

8. The hydration pack of claim 1, further comprising straps for securing said hydration pack onto a wearer.

9. The hydration pack of claim 8, wherein said hydration pack is secured over the back of said wearer.

10. The hydration pack of claim 8, wherein said hydration pack is secured around the waist of said wearer.

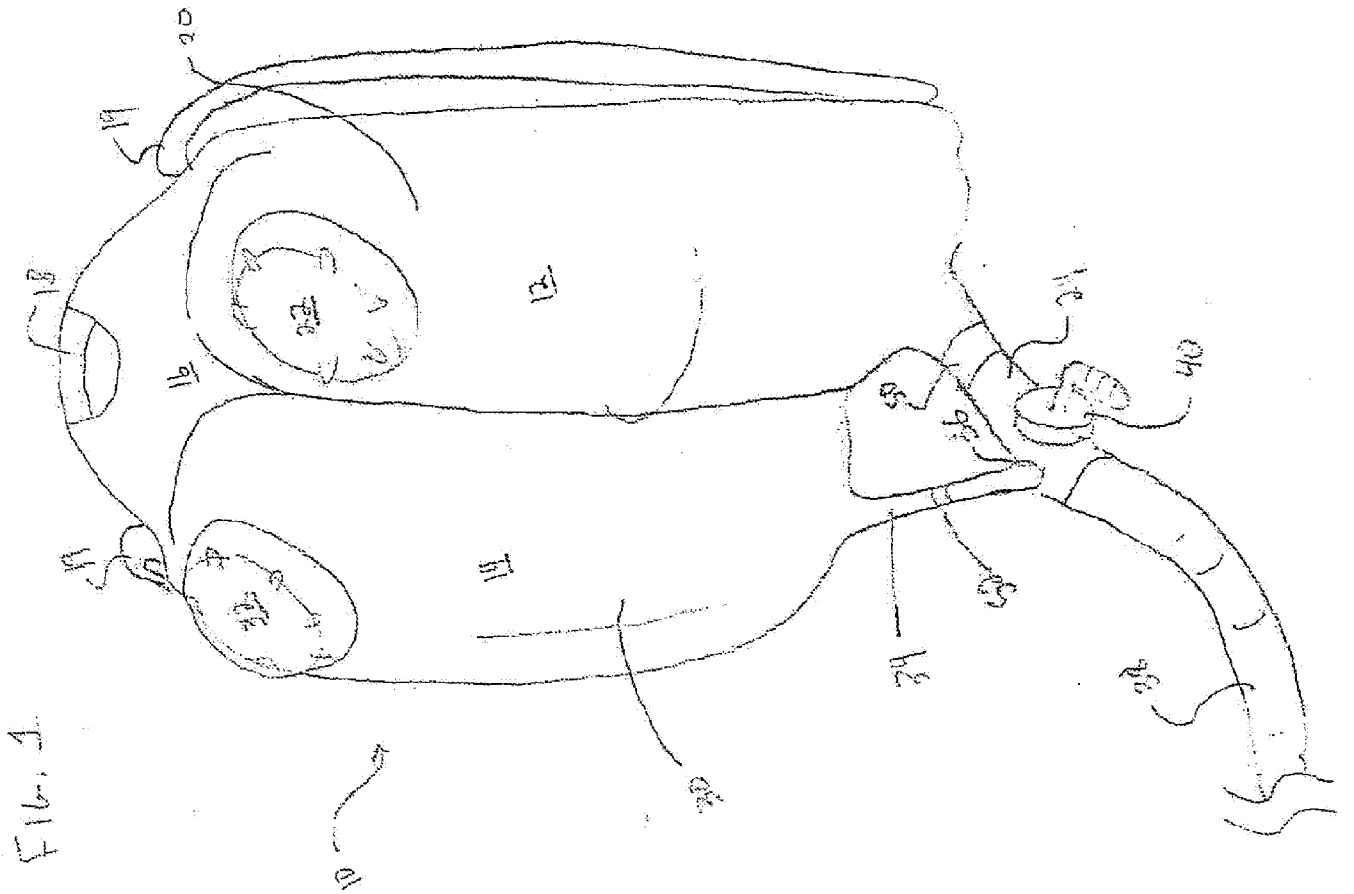
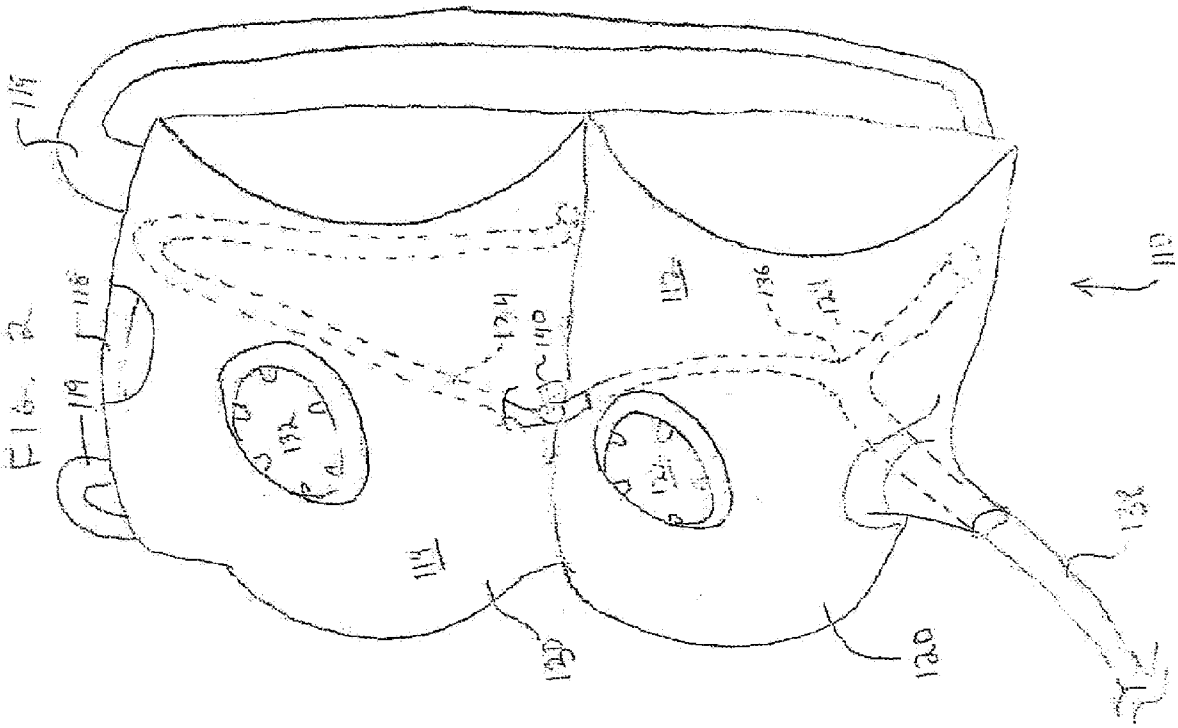
11. A hydration system comprising:

at least two separate bladders each of said at least two bladders defining an interior cavity;

a drinking tube; and

at least two outlet tubes, each of said at least two outlet tubes being attachably fluidly connected to said at least two bladders and said drinking tube.

12. The hydration system of claim 11, further comprising means for controlling the flow rate of fluids through said at least two outlet tubes.



INTERNATIONAL SEARCH REPORT

International application No
PCT/US2008/073362

A. CLASSIFICATION OF SUBJECT MATTER
INV. A45F3/20 B65D81/32

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)
A45F B65D

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.
X	US 2004/262331 A1 (WOOLFSON STEVEN [US] ET AL) 30 December 2004 (2004-12-30)	1-7, 11, 12
Y	paragraphs [0019] - [0030]	5, 7-10
X	US 2007/090135 A1 (BENHAM CHRISTOPHER J [US]) 26 April 2007 (2007-04-26)	1-4, 6, 8-12
Y	paragraphs [0054] - [0102]	5, 7-10
X	US 2004/118942 A1 (COURTNEY WILLIAM L [US]) 24 June 2004 (2004-06-24)	1-9, 11, 12
Y	paragraphs [0052] - [0069]	10
Y	US 2004/089301 A1 (CHOI ROBERT [US] ET AL) 13 May 2004 (2004-05-13)	8-10
	paragraph [0074]	

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
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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

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2008/073362

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