PERSONAL HYDRATION SYSTEM

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ABSTRACT

A personal hydration system has a contoured panel (300) attached to a surface (506) of a mounting panel (500). The contoured panel (300) resists bending and is shaped to conform to a human spine. The perimeter (504) of the mounting panel (500) is attached to a seam (104) between the upper panel (101) and lower panel (102) of a hydration reservoir (100), forcing the hydration reservoir (100) to conform to a human back.
PERSONAL HYDRATION SYSTEM

TECHNICAL FIELD

[0001] The present disclosure relates to personal hydration reservoirs.

BACKGROUND ART

[0002] Adequate hydration is critical in maintaining the body’s homeostasis. Maintenance of adequate hydration becomes both more important and more difficult as the duration of a strenuous physical activity increases. Various techniques have been employed to maintain hydration during activity. The most common are pre-hydration, in which an athlete consumes large quantities of fluids before starting an activity, and carrying additional fluids in some external container.

[0003] Though simple and convenient, pre-hydration is of limited utility. Since consumption of excessive quantities of fluid may cause bloating, nausea, and hyponatremia, an athlete often cannot pre-hydrate sufficiently to avoid dehydration during extended strenuous activity. Unless a reliable source of hydration is readily available, dehydration and loss of performance will occur.

[0004] An athlete may carry a much greater volume of fluids in external containers than may be comfortably consumed in a short period of time, allowing the athlete to rehydrate more or less continuously for the duration of an activity. The quantity of fluids available for hydration is limited only by what the athlete is willing to carry.

[0005] However, the need to carry large volumes of fluids creates its own set of problems. Fluids are relatively heavy and change shape and shift position easily in response to motion and pressure. Since most athletes find it awkward and tiring to carry more than a very small fluid container by hand while active, a preferred method for carrying fluids relies on a backpack that holds one or more water tight containers.

[0006] A variety of personal hydration systems have evolved to fill this need. A popular personal hydration system takes the form of a small, frameless backpack. The backpack contains hydration system components and usually additional space for personal items such as clothing, food, and first aid items. Typical hydration system components are a flexible plastic reservoir with a one to three liter capacity; a hose, one end communicating with the reservoir and the other end closed by a bite valve; and a fill cap or roll top as a means for fluid to enter and fill the reservoir.

[0007] The hydration system components are integrated into the small backpack to ease their removal for cleaning and re-filling. Typically, the hydration reservoir is located in a dedicated sleeve behind the surface of the backpack that contacts the user’s back. This sleeve keeps the backpack’s contents separate from the reservoir and keeps the pack contents dry. The reservoir sleeve also holds the weight of the fluid-filled reservoir closer to the individual’s center-of-mass, thus enhancing balance and stability.

[0008] In the current art, when the reservoir is filled with fluid it assumes a columnar or semi-cylindrical shape in response to internal fluid pressure. Since most personal hydration systems are designed to accept a semi-cylindrical reservoir, this shape fits most hydration systems. However, this design tends to force a backpack to assume the reservoir’s columnar or cylindrical shape. The resulting non-anatomical structure forces the weight of the backpack’s contents away from user’s back and thus away from his or her center-of-mass. The inability of this structure to conform to the user’s back concentrates pressure on the user’s spine, causing discomfort. It also concentrates more load on small portions of the user’s shoulders and lower back.

[0009] Furthermore, without extensive load control features, the motions involved in walking or running tend to roll the backpack’s barrel-like form side-to-side across the individual’s back. To arrest this motion, additional weight and expense in the form of straps, connectors and fabric are needed.

DISCLOSURE OF INVENTION

[0010] In accordance with the present invention, I provide a hydration reservoir contoured by a structural element integrated with or in parallel to the reservoir. By forcing the contour of the reservoir to follow the shape of the user’s back, the carrying efficiency, balance, stability and user comfort of the pack and its load increase.

[0011] In a first embodiment a flexible upper panel may be welded or otherwise joined to a contoured panel to form a watertight hydration reservoir. The contoured panel forces the reservoir to conform to a human spine.

[0012] In a second embodiment flexible upper and lower panels may be joined at their perimeters to form a watertight hydration reservoir. A contoured panel may be attached to the lower panel. The contoured panel forces the reservoir to conform to a human spine.

[0013] In a third embodiment flexible upper and lower panels may be joined at their perimeters to form a watertight hydration reservoir. A contoured panel may be attached to the mounting panel. The perimeter of the mounting panel may be attached to the perimeters of the upper and lower panels. The contoured panel forces the reservoir to conform to a human spine.

[0014] All of these features and advantages of the present invention, and more, are illustrated below in the drawings and detailed description that follows.

BRIEF DESCRIPTION OF DRAWINGS

[0015] FIG. 1 shows a side elevation view of a hydration reservoir.

[0016] FIG. 2 shows a perspective view of a person wearing a pack containing a semi-cylindrical hydration reservoir.

[0017] FIG. 3 shows a rear elevation view of a contoured panel.

[0018] FIG. 4 shows a side elevation view of a contoured panel.

[0019] FIG. 5 shows an exploded view of a hydration reservoir, a contoured panel, and a mounting panel.

[0020] FIG. 6 shows a side elevation view of a hydration reservoir with an attached mounting panel and contour panel.

[0021] FIG. 7 shows a perspective view of the hydration reservoir of FIG. 6.

[0022] FIG. 8 shows a side elevation view of a person wearing a pack containing the hydration reservoir of FIG. 6.

[0023] FIG. 9 shows a top plan view of a person wearing a pack containing a semi-cylindrical hydration reservoir.
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[0024] FIG. 10 shows a top plan view of a person wearing a pack containing the hydration reservoir of FIG. 6.

MODES FOR CARRYING OUT THE INVENTION

[0025] FIG. 1 shows a side elevation view of a hydration reservoir 100 as is known in the art. The reservoir 100 is formed by welding the perimeter of an upper panel 101 to the perimeter of a lower panel 102 along a seam 104. The panels are commonly made of flexible plastic, although other known materials may be used. The resulting watertight reservoir may be filled through an orifice closed by a cap 106 retained by a retaining loop 108. Water may then be withdrawn from the reservoir 100 through a tube 110.

[0026] Since both the upper 101 and lower 102 panels are semi-rectangular and approximately equal in size, shape, and flexibility, outward pressure of fluid within the reservoir tends to force the filled reservoir 100 into a semi-cylindrical shape. When the reservoir 100 is inserted into a pack 200 as shown in FIG. 2, the rounded bulge of the lower panel 102 (not shown in FIG. 2) causes the back panel 202 of the pack 200 to bulge toward the user's back, placing pressure on the user's spine and forcing the pack 200 to stand away from the user's back. A gap 204 may open between the pack 200 and the user, causing the shoulder straps 206 of the pack to hang uncomfortably while the rounded back panel 202 rolls from side to side on the user's back, throwing the user off balance.

[0027] This uncomfortable and unbalanced configuration may be greatly improved by insertion of a stiffened, contoured panel between the user's back and the reservoir 100. FIG. 3 shows a rear elevation view of an effective contoured panel 300. The perimeter 304 of the contoured panel 300 fits within the perimeter of a flattened reservoir 100. In some embodiments, moldable ribs 302 of thicker material cause the contoured panel 300 to be more resistant to bending across its short dimension than across its long dimension, allowing the contoured panel 300 to curve around the user's spine while preventing the reservoir 100 from bulging against the user's back. FIG. 4 shows a side elevation view of an embodiment of a contoured panel 400 that is formed in a gentle S-curve that conforms well to a user's back.

[0028] The contoured panel 300 may be manufactured from a variety of known materials. Desirable physical and manufacturing material characteristics include high strength, low weight and cost, environmental compatibility, and ease in forming complex shapes. Molded thermoplastics embody many of these characteristics. The contoured panel can be injection-molded to include features that would facilitate attachment directly to an hydration reservoir or to a fabric sleeve or other attachment means. The mold can also integrate biodegradable features and flex into the shape required to contour the reservoir to the shape of the user's back.

[0029] The contoured panel 300 may be affixed directly to the reservoir 100 or attached to or inserted into a secondary structure that is attached to the reservoir. FIG. 5 shows an exploded view of an embodiment in which a contoured panel 300 is stitched, glued, or otherwise attached to an upper surface 506 of a mounting panel 500 that is the same size and shape as the flattened reservoir 100. The mounting panel 500 may be made of nylon or polyester fabric and may be marked 502 to facilitate accurate positioning of the contoured panel 300.

[0030] The perimeter 504 of the mounting panel 500 is then aligned with the perimeter of the reservoir 100 and the mounting panel 500 and reservoir 100 are stitched, glued, or otherwise attached along the reservoir seam 104. When the reservoir 100 and mounting panel 500 are attached together, bias 510 may be stitched or glued around the perimeter of the jointed edges to cover the exposed seam and panel edges.

[0031] With the contoured panel 300 thus positioned tightly against the lower panel 102 of the reservoir 100, the lower panel 102 is forced to conform to the contoured panel 300. FIG. 6 shows a side elevation view of a hydration reservoir with an attached mounting panel 500 and contour panel (not visible in FIG. 6). FIG. 7 shows a perspective view of the embodiment of FIG. 6. As is apparent in FIG. 6, the lower surface 602 of this combination conforms to the shape of the contour panel and therefore to the shape of a pack user's back.

[0032] In an alternate embodiment an injection-molded contoured panel may be welded directly to the lower panel. In still another alternate embodiment, the contoured panel and lower panel may be blow-molded as an integrated unit, with an upper panel welded around its perimeter to the integrated contoured panel and lower panel to create a hydration reservoir.

[0033] FIG. 8 shows a side elevation view of a person wearing a pack 800 into which the embodiment of FIG. 6 has been inserted with the long dimension of the hydration reservoir oriented parallel to the long dimension of the pack 800. In an embodiment with the contoured panel affixed to the hydration reservoir, the personal hydration system is further oriented so that the contoured panel is between the reservoir and the user's back. In an embodiment where the contoured panel is separate from the hydration reservoir and inserted in a dedicated sleeve or compartment within the pack, the hydration reservoir could be oriented with the cap facing toward or away from the user's back.

[0034] Unlike the pack 200 shown in FIG. 2, the pack 800 shown in FIG. 8 conforms closely to the user's back, allowing the shoulder straps 806 to distribute pack weight evenly over the user's shoulders and preventing the pack 800 from rolling from side to side in response to the shifting mass of fluid within the hydration reservoir without the additional weight and cost of load stabilization straps and other systems.

[0035] FIG. 9 shows a top plan view of a pack 900 containing a semi-cylindrical hydration reservoir. FIG. 10 shows a top plan view of a pack 1000 containing a hydration reservoir with an attached mounting panel and contour panel. While the embodiment of FIG. 9 tends to roll easily from side to side, the embodiment of FIG. 10 is markedly more stable.

[0036] The principles, embodiments, and modes of operation of the present invention have been set forth in the foregoing specification. The embodiments disclosed herein should be interpreted as illustrating the present invention and not as restricting it. The foregoing disclosure is not intended to limit the range of equivalent structure available to a person of ordinary skill in the art in any way, but rather to expand the range of equivalent structures in ways not previously contemplated. Numerous variations and changes can be made to the foregoing illustrative embodiments without departing from the scope and spirit of the present invention.

INDUSTRIAL APPLICABILITY

[0037] From the foregoing it can be seen that the teachings of this disclosure have applicability in the manufacture and use of portable hydration reservoirs, particularly those carried in backpacks. A reservoir manufactured according to the
teachings of this disclosure may increase the stability and comfort of a pack containing the reservoir.

1 claim:

1. A hydration reservoir comprising a flexible upper panel and a contoured panel, the upper panel having a first outer perimeter, the first outer perimeter affixed to a surface of the contoured panel to form a watertight seal.

2. A hydration reservoir as claimed in claim 1, wherein the contoured panel conforms to a human spine.

3. A personal hydration system, comprising:
   a hydration reservoir comprising a flexible upper panel and a lower panel; and
   a contoured panel, the contoured panel affixed to the lower panel.

4. A personal hydration system as claimed in claim 3, wherein the contoured panel conforms to a human spine.

5. A personal hydration system, comprising:
   a flexible hydration reservoir comprising an upper panel having a first perimeter and a lower panel having a second perimeter, the first perimeter joined to the second perimeter along a seam;
   a contoured panel having a third perimeter, the third perimeter having a length not greater than the length of the second perimeter; and
   a mounting panel, the mounting panel having an upper surface and a fourth perimeter, the fourth perimeter equal in length to the second perimeter, the contoured panel attached to the upper surface of the mounting panel, the fourth perimeter attached to the seam.

6. A personal hydration system as claimed in claim 5, wherein the contoured panel conforms to a human spine.

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