In an example, a spherical drinking vessel is providing. The spherical drinking vessel may include a curved sidewall having a first hemisphere-shaped section and a second remaining section. The second remaining section of the curved sidewall may define an opening for receiving a liquid. A first thickness of the curved sidewall at a point corresponding to a nadir of the first hemisphere-shaped section of the curved sidewall may be different than a different point on the first hemisphere-shaped section of the curved sidewall. In an example, the second thickness is greater than the first thickness.
SPHERICAL DRINKING VESSEL

PRIORITY

[0001] This application claims benefit of U.S. Provisional Application No. 61/951,086 filed on Mar. 11, 2014, entitled: SPHERICAL MULTIUSE BEVERAGE CONTAINER, which is herein incorporated by reference in its entirety.

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BACKGROUND OF THE INVENTION

[0003] Beverage containers can come in a variety of shapes and offer a range of utility. Current closed or open top drink containers are cylindrical in shape. These containers can only be placed upright on flat surfaces; in water they tip over. Systems have been developed to provide for a cylindrical container that can float and remain upright in water. These systems require complex manufacturing processes.

[0004] Because a curved sidewall provides additional utility to the straight sidewalls of cylindrical containers, non-cylindrical containers have been developed to float in water. Some examples of these containers may appear at first glance to be spheres, but in fact have a flattened area on the bottom of the outside surface of the container.

SUMMARY OF THE INVENTION

[0005] The following is a summary of the invention in order to provide a basic understanding of some aspects of the invention. This summary 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 concepts of the invention in a simplified form as a prelude to the more detailed description that is presented later.

[0006] The present disclosure relates to beverage containers used to hold, carry, transport and drink fluid; more particularly the disclosure relates to beverage containers, for example, multiuse reusable beverage containers and amphibious beverage containers.

[0007] Spherical drink containers and floating drink containers offer exciting and unique experiences while imbibing. Reusable beverage containers are typically sold without fluid or drink contents in a retail setting or with fluid or drink contents at the point of sales in entertainment settings such as resorts or cruise lines. Reusable beverage containers commonly satisfy key goals such as to hold a specific volume of fluid, to allow for ease of portability, to allow a pathway to consume drink contents and/or to allow a pathway for new or supplementary drink contents to be easily added.

[0008] To date, spherical and/or floating beverage containers are difficult to come by in a commercial setting. The lack of commercially available spherical and/or floating beverage containers is due in part to high manufacturing costs. The high production cost of these container are due in part to complex manufacturing processes that employ multiple molds and materials that are required of the current state of the art. A single-walled floating, spherical vessel would simplify the manufacturing process while offering the recreational advantages of a weighted, balanced and buoyant spherical beverage container.

[0009] A spherical multiuse beverage container may include a single-walled beverage container which in combination with the weighting system provides users with the ability to rest this beverage container on a flat surface or in a body of water. On flat surfaces and in water the beverage container will remain upright. In water, the beverage container will also float. The weighting system provides increased mass to the lower hemisphere of the spherical beverage container, which when empty affords sufficient torque to keep the container upright. When beverage is poured into the container, the weighting system also funnels beverage into the bottom of the container thereby increasing the effective mass of the lower hemisphere of the beverage container; this increases the rotational inertia of the beverage container beverage system making it more difficult to tip over than when empty. All of these functions are provided within a single-walled vessel, which simplifies manufacture of this multiuse spherical beverage container compared to other multi-component spherical and multi-walled vessels.

[0010] In an example, a spherical beverage container is provided. The spherical beverage container may consist essentially of a northern hemisphere and a southern hemisphere, the northern hemisphere comprising a cap from which the contents of the beverage container are expelled, the southern hemisphere comprising a weight and ballast system wherein the weight and ballast system operate to keep the northern hemisphere upright and at a 90 degree angle to a surface when the spherical beverage container is placed on the surface. In an example, the spherical beverage container includes a single wall defining an outer and an inner surface of the spherical beverage container. In an example, the cap is removable from the spherical beverage container via a threaded connection.

[0011] The cap, when removed, may include a convex end and a concave end. In an example, the convex end of the cap when screwed to the top of the northern hemisphere of the spherical beverage container sitting flush with the outer wall and acting to continue the spherical shape of the beverage container.

[0012] Additional aspects and advantages of this invention will be apparent from the following detailed description of preferred embodiments, which proceeds with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] FIG. 1 is an exploded view of an example beverage container for liquid or icy drink contents.

[0014] FIG. 2 is a perspective view of the container of FIG. 1.

[0015] FIG. 3 is a perspective view with the first top straw actuated.

[0016] FIG. 4 is a sectional side view of the container shell of FIGS. 1, 2, and 3.

[0017] FIG. 5 is a perspective view that shows the second straw engaging with bottom of the dome cap.

[0018] FIG. 6 is a sectional side view of the engagement of the first top straw corresponding to 1) the closed position of FIGS. 2 and 2) the open position of FIG. 3.
FIGS. 7A-B show the engagement of the first top straw of FIG. 1 with the second straw S to provide a fluid communication pathway.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

FIG. 1 is an exploded view of an example beverage container for liquid or icy drink contents. An example beverage container10 embodying principles described herein may include a container shell 11. A dome cap 21 may attach to a second straw S at the bottom of the dome cape 21. In an example, the second straw S may be a standard shaped straw. Dome cap finger grips 22 may allow for dome cap 21 to tighten to, or loosen from, container shell 11 via connector 14, e.g., a thread. The first activating top-straw 31 may rest in the straw recess 23. Top straw long shaft 34 may fit, e.g., snap-fit, into dome cap deep recess 24. FIG. 2 shows actuating top-straw 31 in the closed position. FIG. 3 shows actuating top-straw 31 in the open position.

FIG. 4 is a sectional side view of the container shell of FIGS. 1, 2, and 3.

A thick internal wall ring 12 around the lower hemisphere of the container shell 11 may provide functional weighting to the container, e.g., to the container empty, with fluid, or icy drink. In an example, thin walls at the nadir 13 of the container shell 11 may provide a reservoir for drink contents such that fluid and functional weighting may maintain the uprightness of the drink container on a planar surface, e.g., a table, counter, etc. and/or in water, e.g., floating in a pool. Uprightness may be defined as the dome cap and top straw assembly oriented such that it may be located on the northern hemisphere of the container. Northern hemisphere may be defined as the top half of a sphere that has been bisected by an imaginary plane parallel to a planar surface on which the sphere rests. The southern hemisphere may be the bottom half, e.g., below the imaginary plane. Due north may be in exact opposition to gravitational force; due south may be in an alignment, e.g., exact alignment, with the gravitational force.

FIGS. 2 and 3 demonstrate an example where the dome cap and top straw assembly may be located due north in the northern hemisphere or in other words the most upright position. In one example, the entire container, 11, may be made of the same material, e.g., a continuous plastic material. In another example, denser than plastic materials (e.g., aluminum) may be embedded in thick internal wall ring 12. Some plastics are denser than water or an icy mixture, hence providing the tendency for torque such that the resting position would place the nadir 13 in the southern hemisphere and the dome cap and top straw assembly in the northern hemisphere. Introducing and embedding denser materials such as metals into 12 may increase the rate at which the container rights itself.

A person may use one hand or two hands to hold the beverage container (with an approximate diameter of 3.5 to 5.5 in). In an example, the beverage container may hold 40 ounces of fluid, which is a greater amount of fluid on a per surface area basis than a cylindrical beverage container. With one hand, the user may in an example place their hand underneath the container such that their palm, which is facing up, is in contact with the container surface near nadir 13. This may be difficult for children or people with small hands. To hold the container with two hands, in an example the user may place both hands palm face up underneath the container near nadir 13. This is similar to how someone may hold a bowl of soup to drink the broth. In this case, the thicker internal wall ring 12 may provide thermal insulation between the cold drink contents inside the container and contact with the environment (e.g., floating in pool, user using two hands to cradle the container).

Another example of holding or transporting the container is via the attachment of a lanyard. The lanyard may attach to a small plastic ring and/or loop formed into the dome cap 21 or of the container shell 11. This may allow user to wear it around the neck, over one shoulder, or slung over the upper torso resting on one side, near the ribs or hip, of the user. The lanyard/attachment may allow customer to clip the present beverage container 10 onto a bag, purse, belt, or clothing with loops (e.g., belt loop, jacket zipper).

FIG. 5 shows the attachment of the second straw S at the bottom of dome cap 21. The second straw S may fit into the standard straw holder with an interference fit collar 26. A connector 25 may be structured to mate with the connector 14.

FIG. 6 shows that the first top straw may be opened from the closed position in two examples. In one example, the first top straw may be opened using a finger or thumb at the top straw tip 32. Continued force applied at this tip, in the direction away from the dome cap may actuate the first top straw about dome cap deep recess 24. In another example, the first top straw may be opened using a thumb and forefinger to grasp the top straw grip 33 and may be pulled open such that the first top straw may actuate about dome cap deep recess 24.

FIGS. 7A-B show the engagement of the first top straw of FIG. 1 with the second straw S to provide a fluid communication pathway.

Referring to FIG. 7A, also shown is the nature of how the top straw may connect to the dome cap. The connection of the top straw long shaft 34 into the dome cap deep recess 24 and the dome cap snap-fit short shaft 27 into top straw short recess 36 creates an axis about which the first top straw can rotate about.

FIG. 7A shows a cross section of the top straw in the closed position in the dome cap. In the closed position, the top straw is in the down position as shown in FIG. 2. In the closed position, top straw shaft opening 35 is not in contact with the fluid pathway of the straw S and dome cap. Fluid cannot enter into the top straw long shaft in this position, prevented by the closed walls of the top straw long shaft.

FIG. 7B shows a cross section of the top straw in the open position in the dome cap. In the open position, the top straw is in the up position as shown in FIG. 3. In the open position, top straw shaft opening 35 is in contact with the fluid pathway of the straw S. In this open position, the suction that user provides to the top straw can be transported through the top straw shaft opening 35 and through the straw S. The suction can allow fluid to flow up into the straw S, through the top straw shaft opening 35, and into the top straw for the user to drink.

In an example, the spherical drinking vessel may be used as a mixer and/or a shaker. The spherical drinking vessel may be rocked to shake contents or spun to stir contents. With the cap is secured, the spherical drinking vessel may be rolled to shake and/or stir contents. In an example, a strainer with a pressure release cap on top of the strainer may be releasably coupled to the spherical drinking vessel. In one example, after mixing and/or shaking, the strainer and pressure release cap
may be removed, and the cap with the straw may be releasely coupled to the spherical drinking vessel to drink the mixed and/or stirred contents.

In an example, a spherical drinking vessel is provided. The spherical drinking vessel may include a curved sidewall having a first hemisphere-shaped section, e.g. a southern hemisphere, and a second remaining section. The second remaining section of the curved sidewall may include an opening for receiving a liquid. In an example, the spherical beverage container includes a single wall defining an outer and an inner surface of the spherical beverage container.

A connector may be attached to the top of the curved sidewall for removably attaching, e.g. sealingly removably attaching, a cap to the drinking vessel. In an example, the cap is a spherical dome shaped cap. A convex surface of the cap may include a void. A top straw may be located in the void. In an example, when folded down, the top straw fits entirely in the void. In an example, a sidewall of the straw has a curving slope corresponding to a curving slope of the concave surface of the cap.

In an example, the spherical drinking vessel may include a weight and ballast system. The weight and ballast system may operate to keep the northern hemisphere upright and at a 90 degree angle to a surface when the spherical beverage container is placed on the surface.

In an example, the weight and ballast system is integrated into a single continuous curved wall, which may provide for efficient manufacturing cost utilizing a 3D printer. In such an example, a first thickness of the curved sidewall at a point corresponding to a nadir of the first hemisphere-shaped section is different than a second thickness of the curved sidewall at different point on the first hemisphere-shaped section, e.g. midway up the first hemisphere-shaped section. In an example, the second thickness is greater than the first thickness. In an example, a shape of a cavity defined by an inside of the first hemisphere-shaped section of the curved sidewall is a spherical segment stacked on a truncated cone stacked on a spherical dome. In an example, a shape of a cavity defined by an inside of the first hemisphere-shaped section of the curved sidewall is a truncated cone stacked on a spherical dome. In an example, a shape of a cavity defined by an inside of the first hemisphere-shaped section of the curved sidewall is a three dimensional shape stacked on a spherical dome, where the three dimensional shape has a volume that is less than a volume of a spherical segment having a first base that is equal in area to a second base of the three dimensional shape and a third base that is smaller than the first base and equal in area to a fourth base of the three dimensional shape.

In another example, the weight and ballast system may include a separate component that is coupled to a curved sidewall. In an example, the separate component includes a ring of material on an inner surface of a first hemisphere-shaped section of the curved sidewall. In an example, the ring of material is oriented along a plane that is parallel to a plane along which the opening is oriented. In an example, the ring of material is affixed to the inner wall. In an example, the ring of material is attached, e.g. removably attached, to an attachment structure on the inner wall. In an example, the curved sidewall comprises a plastic, e.g. polypropylene, and a density of the ring of material may be different than a density of the plastic of the curved sidewall. In an example, the ring of material may include a non-plastic, e.g. metal or glass. In an example, the ring of material may include a non-plastic be embedded in a plastic, e.g. embedded in polypropylene. In an example, the ring of material is continuous in nature, while in other examples the ring of material is non-continuous, e.g. beads arranged in a ring but with spacing in between the beads.

In an example, the ring of material and the curved sidewall in combination are openable to, responsive to any point on an outer surface of the first hemisphere-shaped section of the curved sidewall being placed on a planar surface, to urge the apparatus to roll to, or hold, a resting position at which the planes are parallel to the planar surface.

In another example of a single-walled drinking vessel with a weight and ballast system, an outer surface of the continuous structure has a first shape of a sphere less a spherical dome having a first volume, and an inner surface of the contiguous structure defines a cavity having an upper region and a lower region. The upper region may span from a point below the equator up to the opening: the remaining cavity below that corresponding to the lower region.

The remaining lower region of the cavity may have a second shape. The second shape may be a spherical dome having a second volume. The upper region of the cavity may have a third shape. The third shape may be a spherical segment stacked on a different three dimensional shape. The different three dimensional shape may be a truncated cone, in an example.

In an example, the spherical drinking vessel has no handles with dimensions appropriate for holding with one hand or two hands similar to the way a bowl may be held, of course it is possible to include a handle formed on the outer surface.

Center of Gravity while Pouring

To provide a spherical drinking container that self-rights when placed on a planar surface (say, when empty), the weight of material in the northern hemisphere may be less than the weight of material in the southern hemisphere. The weight of the northern hemisphere may include the weight of a cap to provide self righting when empty and capped. Also, since the spherical drinking vessel may be placed on surfaces with different frictional coefficients, e.g. lacquered wooden surfaces (such as a bar) with a lower coefficient, non-lacquered wooden surfaces (such as a picnic table) with a higher coefficient, metal surfaces, plastic surfaces, etc., it may be desirable to select a ratio of weight of the southern hemisphere to a weight of the northern hemisphere that is greater than the ratio needed to self-right when empty and capped, say, in a pool or other body of water.

One possible spherical drinking vessel designed according to the principle described in the previous paragraph is a drinking vessel with a curved sidewall that is thicker at, say, a bottom of the spherical drinking vessel than in the northern hemisphere. For example, a spherical drinking vessel may have a thickness at the nadir that, going up from the nadir, begins tapering at some point to reach a different thickness at some point in the northern hemisphere. However, a spherical drinking vessel that is self-righting when empty may not necessarily hold that position as fluid is being poured into the spherical drinking vessel.

Referring again to FIG. 4, a distance between an inside surface and an outside surface at the nadir 13 is less than a distance between an inside surface and an outside surface higher up at the thick internal wall ring 12. Stated another way, starting from the nadir going up, the thickness
starts gradually increasing and then tapers back to the thickness at the nadir at the equator (or in some examples before). This feature creates a relatively predictable fluid pathway when fluid is poured into the opening, i.e. more predictable than the fluid pathway associated with the design described in the previous paragraph and/or with a design with uniformly thick sidewalls. The fluid, which is an unstable mass and could cause the center of gravity to shift in the lateral direction in a spherical drinking vessel that does not employ principles described herein, is directed, e.g. flared, towards the nadir by the thick internal wall ring 12. The fluid has a relatively stable/predictable place to rest at the bottom of the container. The result is that the center of gravity in the lateral direction is maintained during the pour, i.e. the spherical drinking vessel holds the position reached by self-righting while empty throughout the pour (e.g. may oscillate slightly during the pour, but without tipping over or spilling).

[0046] In an example, the dimensions and/or materials included in the thick internal wall ring 12 may be selected to maintain a center of gravity that is below the equator when a capped spherical drinking vessel has fluid is filled up to the point where the connector 14 meets the container shell 11. In other examples, the size and/or weight of the thick internal wall ring 12 may be selected to achieve substantial neutrality when a capped spherical drinking vessel fluid is filled up to the point where the connector 14 meets the container shell 11 (substantially neutrality being with the center of gravity more or less on the equator). In such examples, the capped (and watertight with the straw down) spherical drinking vessel may no longer self right on any or most surfaces (friction is a factor in the case of substantial neutrality) until some of the fluid is consumed, allowing a consumer to entertain themselves or others by manipulating the full and sealed spherical drinking vessel along the surface differentially depending on completely full or partially emptied.

[0047] In some examples, and empty and capped spherical drinking vessel may be substantially neutral when capped and empty. This also can allow a consumer to entertain themselves others by manipulating the empty spherical drinking vessel along the surface. In such cases, the spherical drinking vessel may still self right when the cap is removed and may still substantially hold its position during a pour (due to the directing, e.g. funneling of the fluid) up to a predefined fill amount, say, a marked fill line.

[0048] In some examples, the thick internal wall ring may taper off below the equator. In such a case, the shape of a cavity in the southern hemisphere may be a spherical segment stacked on a three dimensional shape that is stacked on a spherical dome (base side of dome up). The three dimensional shape may be a truncated cone in the example shown in FIG. 4 (truncated side down). In the case of a truncated cone (and in other cases that are not necessarily a truncated cone since the thick internal wall ring 12 is not limited to having a single flat inside surface), the three dimensional shape has a volume that is less than a volume of a spherical segment having a first base that is equal in area to a second base of the three dimensional shape and a third base that is smaller than the first base and equal in area to a fourth base of the three dimensional shape. In other examples, the thick internal wall ring may not taper off below the equator, e.g. may taper off at the equator or possibly above the equator. In such a case, the shape of a cavity in the southern hemisphere may be a three dimensional shape that is stacked on a spherical dome (base side of dome up).

[0049] In an example, a material used for 3D printing a spherical drinking container may be selected, in part, based on density of the material. For example, one material may overweight the cap due to its density, while another material having a different density may be more desirable for achieving self-righting or substantial neutrality when capped.

[0050] In an example, the thick internal wall ring 12 may be made from a different material than a material of the container shell 11. In an example, the thick internal wall ring 12 may be made of the same material as the container shell 11. In an example, the thick internal wall ring 12 may be made of more than one material, one of which may be the same material as the container shell 11. One of the materials may be partially or completely embedded in the other material (for example an embedded metal ring, or embedded beads). In an example, the thick internal wall ring 12 may be coupled, e.g. affixed or releasably coupled, to the container shell 11 instead of integrated with the container shell 11. A metal ring or other different material, whether embedded or coupled, may be used to achieve aggressive self-righting, including say self-righting when filled and capped, straw extended or not. In the case of releasably coupled ballast, a consumer may have a choice of whether to have strong self-righting (ballast installed), or not (ballast uninstalled).

[0051] In an example, a fill line may be selected to manipulate whether the capped and filled spherical drinking vessel is self-righting or substantially neutral. In an example, more than one fill line may be marked on the spherical drinking vessel to provide a consumer with a choice in this regard.

[0052] It will be obvious to those having skill in the art that many changes may be made to the details of the above described embodiments without departing from the underlying principles of the invention. The scope of the present invention should, therefore, be determined only by the following claims.

[0053] Having described and illustrated the principles of the invention in a preferred embodiment thereof, it should be apparent that the invention may be modified in arrangement and detail without departing from such principles. We claim all modifications and variations coming within the spirit and scope of the following claims.

1. An apparatus, comprising:
   a curved sidewall having a first hemisphere-shaped section and a second remaining section, the second remaining section of the curved sidewall defining an opening for receiving a liquid;
   wherein a first thickness of the curved sidewall at a point corresponding to a nadir of the first hemisphere-shaped section is different than a second thickness of the curved sidewall at different point on the first hemisphere-shaped section; and
   wherein the second thickness is greater than the first thickness.

2. The apparatus of claim 1, wherein a shape of a cavity defined by an inside of the first hemisphere-shaped section of the curved sidewall is a spherical segment stacked on a truncated cone stacked on a spherical dome.

3. The apparatus of claim 1, wherein a shape of a cavity defined by an inside of the first hemisphere-shaped section of the curved sidewall is a truncated cone stacked on a spherical dome.
4. The apparatus of claim 1, wherein a shape of a cavity defined by an inside of the first hemisphere-shaped section of the curved sidewall is a three dimensional shape stacked on a spherical dome; wherein the three dimensional shape has a volume that is less than a volume of a spherical segment having a first base that is equal in area to a second base of the three dimensional shape and a third base that is smaller than the first base and equal in area to a fourth base of the three dimensional shape.

5. The apparatus of claim 1, further comprising: a cap structured to releasably couple to the curved sidewall, the cap having a shape of spherical dome.

6. The apparatus of claim 1, wherein a convex surface of the cap defines a void, and wherein the apparatus further comprises: a fold up straw located inside the void.

7. The apparatus of claim 6, further comprising a first structure on a concave surface of the cap, the first structure arranged to mate with a second structure located on the curved sidewall.

8. The apparatus of claim 7, wherein at least one of the first structure or the second structure includes a thread.

9. The apparatus of claim 1, wherein the first thickness of the curved sidewall at said another point is equal to a third thickness of the curved sidewall at a point on the second remaining section of the curved sidewall.

10. An apparatus, comprising: a single-walled drinking vessel, the single-walled drinking vessel including: an outer surface having a first shape, wherein the first shape is a sphere less a spherical dome having a first volume; and an inner surface defining a cavity having an upper region and a lower region, wherein the lower region of the cavity has a second shape, wherein the second shape is a spherical dome having a second volume.

11. The apparatus of claim 10, wherein the upper region of the cavity has a third shape, wherein the third shape is a spherical segment stacked on a different three dimensional shape.

12. The apparatus of claim 11, wherein the different three dimensional shape is a truncated cone.

13. The apparatus of claim 10, further comprising a cap sealingly attached to the single-walled drinking vessel.

14. The apparatus of claim 10, further comprising a handle formed on the outer surface.

15. An apparatus, comprising: a curved sidewall having a first hemisphere-shaped section and a second remaining section, the second remaining section of the curved sidewall defining an opening for receiving a liquid; and a ring of material on an inner surface of the first hemisphere-shaped section of the curved sidewall, the ring of material oriented along a plane that is parallel to a plane along which the opening is oriented.

16. The apparatus of claim 15, wherein the ring of material is affixed to the inner surface of the curved sidewall.

17. The apparatus of claim 15, wherein the ring of material is attached to a structure on the inner surface of the curved sidewall.

18. The apparatus of claim 15, wherein the curved sidewall comprises a plastic, and wherein a density of the ring of material is different than a density of the plastic of the curved sidewall.

19. The apparatus of claim 15, wherein the ring of material is operable to, responsive to any point on an outer surface of the first hemisphere-shaped section of the curved sidewall being placed on a planar surface, to urge the apparatus to roll to, or hold, a resting position at which the planes are parallel to the planar surface.

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