A collapsible container that can be used as a swimming pool is provided that can change from a collapsed to an expanded configuration. The swimming pool is constructed of a foldable, durable material, and is shaped by way of tension provided by a base spring, which is a coilable spring constructed from a wire having an oblong cross-section. The wire maintains tension when fully extended, but can be coiled or folded upon itself, allowing the base of the swimming pool, along with the rest of the pool material, to be folded and stored in a compact form. Various support spring configurations are provided to automatically expand the pool to full size upon unfolding it from its collapsed configuration. A flotation device may be provided at the top of the side wall of the pool, which floats on the water used to fill the pool, thereby raising the side wall of the pool as the water level rises.
COLLAPSIBLE SWIMMING POOL

FIELD OF THE INVENTION

[0001] The invention relates to collapsible containers. More specifically, the invention is directed to collapsible swimming pools.

BACKGROUND

[0002] Portable swimming pools, or "kiddie" pools are commonly known. Generally, these articles come in two types. The most common type of pool is the type that is formed from molded plastic, which permanently takes on the shape of a small, portable swimming pool. These pools exist in a variety of shapes and sizes and consumers are able to pick and choose the specific portable pool that suits their particular needs.

[0003] One problem commonly associated with these types of portable pools is that they are generally cumbersome. Because of their awkward size and shape, they are difficult to transport, usually being larger than many commonly used vehicles. Thus, to transport one of these items, a consumer must typically strap it to the roof of a normal-sized vehicle, or must make arrangements for oversized vehicle transport. Moreover, they are difficult and awkward to handle or carry even for short distances.

[0004] In addition to the problem with transporting them, these cumbersome portable pools, they are generally so large that they are difficult to store. In fact, among certain consumers, they have become disposable due to the difficulties of storage. Some consumers, for example, may purchase one of these portable pools at the beginning of the summer swimming season, and simply discard it during the colder months when it would otherwise need to be stored. However, this practice is viewed by many as wasteful, and desirable to avoid.

[0005] Another problem commonly associated with traditional molded plastic portable pools is that they are easily breakable. Because of this problem, the difficulty in storing such items as they cannot easily be bent or manipulated without the risk of breaking the item. Additionally, because of the manner in which children play in and around such portable pools, the fact that they are easily breakable is highly undesirable since it could potentially cause or contribute to injuries.

[0006] As an attempt to address the cumbersome nature of such portable swimming pools, inflatable pools were developed, which are easier to store. However, even these pools present some storage difficulties as they are slippery, cumbersome, and frequently do not easily fit in their original packaging. Other difficulties associated with these pools often become obstacles for a consumer wishing to use the pool immediately. For example, inflatable pools often require a consumer to expend a significant amount of time and energy inflating them. Additionally, such inflatable pools are also relatively easily damaged, as they can be punctured, torn, or ripped during the course of normal use by children, or when being stored.

[0007] Accordingly, it would be desirable to develop a portable pool that exhibits the portability of an inflatable pool, but which does not require the same time and energy expenditure or present the same storage difficulties as an inflatable pool, and which possesses the ability to be used immediately, such as a molded pool. Moreover, it would be desirable that such a portable, storable pool be relatively robust, and not be easily broken, or otherwise damaged.

SUMMARY

[0008] The foregoing objectives are achieved by way of collapsible container, that is both portable and robust, and which exhibits an ease of use that renders it useful almost immediately. Specifically, the invention provides various collapsible swimming pools, which may also be used as other containers, that exhibit the portability and ease of storage of an inflatable or portable pool without the need for a great expenditure of time and energy prior to use, such as the difficulties that might generally be associated with an inflatable pool. Additionally, the various swimming pools of the invention are configured to be used immediately, without any need for appreciable set-up time or significant energy. Moreover, the swimming pools of the invention are relatively robust, and are not easily broken, punctured, torn, or otherwise damaged, as was the case with known pools.

[0009] In accordance with an embodiment of the invention, a floatation device (which may be inflatable) may be positioned at the top of the collapsible pool, and a coilable spring wire may be positioned near the bottom of the pool. Although the spring wire is positioned near the bottom of the pool, it can be positioned such that when the pool is in use it either rests on the ground or remains some distance above the ground. The floatation device may provide padding for those entering and exiting the pool, and may also provide a manner by which the pool changes from a collapsed to an expanded configuration. For example, the floatation device may rise as the water level rises due to its buoyant properties, extending the material connecting the top of the pool and the spring at the bottom of the pool, thereby erecting the side wall of the pool. The spring wire positioned at the bottom of the pool may provide a means by which the pool maintains a circular shape, or other desired shape, at its base. The spring wire may be configured in such a manner that it is able to be "folded" upon itself, but is also able to maintain a semi-rigid shape when in an expanded configuration. When in an expanded configuration, the spring wire is almost completely rigid in the plane of the spring. Once the spring is bent, moving it from that plane, it loses much of its tension such that it can be "coiled" or folded. The springs are connected by a soft material, such as a textile, or synthetic material that is strong but wear- and damage-resistant. The soft material is a water-tight material, such as PVC, vinyl, or the like.

[0010] In accordance with another embodiment of the invention, a collapsible pool is provided, which makes use of spring wires positioned at the top and bottom of the pool to allow the pool to maintain its shape when in an expanded configuration. Additionally, these springs allow for manipulation and folding of the pool, much in the same manner as the single spring configuration, such that the pool can be stored or transported at a size significantly smaller than its expanded, full size. The springs are connected by a soft material, such as a textile, or synthetic material that is strong but wear- and damage-resistant. The soft material is a water-tight material, such as PVC, vinyl, or the like.

[0011] In accordance with another embodiment of the invention, the springs at the top and bottom of the pool may
be connected to one another by way of a helical spring, or may form part of a helical spring, extending from the top to the bottom of the pool along its sides. This helical spring configuration may help provide rigid side wall, as it would extend over the entire height of the pool, and be present within or adjacent to the material side wall. Additionally, the helical spring may be coiled, or folded, in the same manner and together with the base spring. Upon unfolding, the helical spring provides an upward tension that causes the pool to "pop-up" automatically, erecting the side wall and changing the container from a collapsed configuration to an expanded configuration.

In accordance with yet another embodiment of the invention, other types of support springs may be used in connection with the springs at the top and bottom of the pool to cause the pool to pop-up or to expand from a collapsed to an expanded configuration automatically. These springs, which are in operable engagement with the springs near the base of the pool, and the top of the pool, if present, may be arranged within or adjacent to the material forming the side wall of the pool to provide tension to the side wall’s material while erecting the pool to its expanded configuration. They may be connected to the springs near the top and bottom of the pool in a variety of manners such as a hinged contact, a sliding contact, or any other suitable contact, which provides the desirable pop-up and/or tensioning effect. Such connecting springs may be configured in a variety of shapes and sizes depending upon the desired function and operation thereof.

In accordance with yet another embodiment of the invention, supports such as vertical rib supports, can be coupled proximate to the side wall of the pool. For example, the supports can be inserted within the material making up the side wall. These support members can comprise at least a portion of a flotation device or a support member, and can have at least a portion coupled to the top of the side wall and vertically along the side wall to provide buoyancy and/or rigidity to the side wall. These support members may comprise, for example, one or more inflatable bladders, collapsible foam, removable support members, or the like.

Further features of the invention, and the advantages offered thereby, are explained in greater detail hereinafter with reference to specific embodiments illustrated in the accompanying drawings, wherein like elements are indicated by like reference designators.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1A is a perspective view of a pool having a flotation device, in accordance with an embodiment of the invention.

FIG. 1B is a top view of the pool shown in FIG. 1A.

FIG. 1C is a side view of the pool shown in FIG. 1A.

FIG. 1D is a schematic perspective view of the pool shown in FIG. 1A.

FIG. 2 is a perspective view of an alternate embodiment of the pool shown in FIG. 1A.

FIG. 3 is a perspective view of a collapsible pool in accordance with an embodiment of the invention.

FIGS. 4A-4D are perspective views of a collapsible, pop-up pool in accordance with an embodiment of the invention.

FIG. 4E is a diagram of a cross-section of a pop-up pool, in accordance with an embodiment of the invention.

FIG. 4F is a diagram of a cross-section of a base spring of an embodiment of the invention.

FIG. 4G is a perspective view of a collapsible, pop-up pool in accordance with an embodiment of the invention.

FIGS. 5A-5C are perspective views of a collapsible, pop-up pool using a helical spring, in accordance with an embodiment of the invention.

FIG. 5D is a diagram of a cross-section of the support spring of an embodiment of the invention.

FIG. 5E is a diagram of a cross-section of a helical spring of an embodiment of the invention.

FIG. 5F is a perspective view of the collapsible, pop-up pool of FIGS. 5A-5C.

FIG. 6 is a diagram illustrating a collapsible, pop-up pool, using a support member in accordance with an embodiment of the invention.

FIG. 7A is a diagram illustrating a collapsible, pop-up pool using an alternate support member configuration, in accordance with an embodiment of the invention.

FIG. 7B is a diagram illustrating the collapsible, pop-up pool of FIG. 7A in a collapsed configuration.

DETAILED DESCRIPTION

To facilitate an understanding of the principles and features of the invention, it is explained hereinafter with reference to its implementation in an illustrative embodiment. In particular, the invention is described in the context of a collapsible swimming pool. In one embodiment, this collapsible swimming pool includes at least one spring located at the bottom of the pool. In other embodiments, the collapsible pool includes a variety of support spring configurations. Because of its collapsible nature, the invention can be easily stored, and is readily portable.

The invention, however, is not limited to its use as a portable, collapsible, and/or pop-up swimming pool. Rather, the invention can be used wherever a collapsible and/or pop-up container that provides for convenient storage is needed or desired. Thus, the container described hereinafter as a portable swimming pool may also find utility as a container for a variety of liquids or other substances that require or could make use of such a collapsible container. Additionally, the material described hereinafter as making up the various elements of the container of the invention are intended to be illustrative and not restrictive. Any suitable materials that would perform the same or a similar function as the materials described herein are intended to be embraced within the scope of the invention. Such other materials not described herein may include, but are not limited to, materials that are developed after the time of the development of the invention, for example.

The invention provides several embodiments of collapsible containers that can be used as swimming pools.
These collapsible containers are generally formed by joining a base, along its perimeter, to a side wall at or near one edge of the side wall. A colatable spring is affixed to the container in proximity to the area where the base and side wall are joined. This colatable spring, which serves as a base spring, provides tension to the base when expanded, and can be collapsed and folded on itself for storage. Generally, the base spring has a rounded shape (e.g., circular, elliptical, etc.), but can take on a number of different shapes if desired.

Along the edge of the side wall not joined to the base, either an upward force providing member or a shape retaining member, or a combination of the two may be affixed. The upward force providing member or shape-retaining member generally has at least a portion coupled proximate to the end of the side wall not joined to the base. The upward force providing member may comprise a variety of different elements capable of aiding the transformation of the collapsible container from a collapsed configuration to an expanded configuration by erecting the side wall. For example, the upward force providing member might be a floating device that floats on liquid deposited in the container, causing the side wall to rise as more liquid is deposited in the container. Alternatively, the upward force providing member could be a spring, a tensioning member, or some combination of both.

The shape retaining member could be any device that will assist in forming the edge of the side wall to which it is connected (i.e., the edge opposite the edge that is attached to the base) into a desired shape. For example, a shaped, colatable spring could be used to form the desired shape. Also, the shape retaining member could take a variety of other forms, such as a solid piece, an inflatable ring, or the like. The shape retaining member could also be a device that serves as both a shape retaining member and an upward force providing member, or could be used in connection with an upward force providing member.

A support member and/or shape-retaining member may be formed from one or more support members having at least a portion coupled proximate to the side wall of the pool. For example, vertical rib supports could be used as an upward force providing member, a shape-retaining member, or both. Such vertical ribs could be formed from individual inflatable portions, or could be a foam insert, or the like. According to some embodiments, such vertical ribs could be collapsible, being formed from collapsible inflatable portions, collapsible foam portions, or other suitable compositions.

A container, or portable swimming pool, constructed in accordance with an embodiment of the invention, can be seen in the perspective view illustrated in FIG. 1A. The pool illustrated in FIG. 1A is only one embodiment of the invention, and is described first for convenience in referencing features common among several of the various embodiments of the invention.

As shown in FIG. 1A, a swimming pool 100 has a base 102, which is made from a physical material and is formed in the shape of a circle. The shape of the base 102 is maintained by tension provided by a base spring 104 contained within the material of the base 102. The side wall 106 of the swimming pool, or adjacent thereto. In accordance with the embodiment shown in FIG. 1A, the base spring 104 may be contained within a sleeve of material, which is attached to the pool 100 at or near the intersection of the base 102 and the side wall 106 of the pool. When the base spring 104 is contained within such a sleeve, the sleeve may be formed from a material that is more durable than the base 102 or side wall 106 of the pool, because it is likely to be subjected to the most wear.

For example, the base 102 of the swimming pool 100 may be formed from a textile (e.g., burlap, etc.) or synthetic material (e.g., plastics, polyurethane, PVC, nylon, etc.). Obviously to use many materials (especially water-permeable textiles, etc.) to construct a pool, they would need to be treated somehow to retain water. For example, such materials could be adhered to, laminated with, coated with, or bonded to a material impermeable to water. In accordance with the embodiment shown in FIG. 1A, the base 102 may be formed from a nylon shell, which may be laminated or otherwise treated to hold water. For example, the nylon shell might be bonded to another material, such as a polyurethane, PVC, or other suitable impermeable lining to provide the desirable waterproof qualities, and to provide a more pleasing tactile quality to the interior of the pool. Similarly, the wall 106 of the pool 100 may be constructed from these materials, or other materials having similar suitable qualities. When a sleeve is used to house the base spring 104, it may be formed from the same material, or from more durable material, such as a webbed nylon material, or the like. Many of the materials that are used may be selected for their durability.

The pool 100 illustrated in FIG. 1A has a flotation device 108, which is formed in the shape of a circle, attached to the top of the side wall 106. Although this flotation device 108 may comprise a variety of materials and configurations, according to the embodiment shown in FIG. 1A, the flotation device 108 may be, for example, an inflatable ring. This inflatable ring, when inflated, may provide some stiffness at the top of the side wall 106, and may help maintain the overall circular shape of the pool 100. Additionally, as the flotation device is buoyant, it can be made to rise with the level of water within the pool 100, such that as water is deposited in the pool 100 and the flotation device 108 rises with the level of that water, the side wall 106 is automatically erected as the pool is filled.

The pool 100 is collapsed for transport by deflating the inflatable ring 108 and folding the base spring 104 onto itself along with the base 102 and side wall 106 material in a manner that is well known. One example of the folding technique used for folding colatable springs that can be used to fold the pool of the invention is illustrated in U.S. Pat. No. 6,710,100, to LeGree et al., which is incorporated herein in its entirety.

The base 102 and side wall 106 of the pool 106 may be made from any material suitable for constructing a swimming pool. Naturally, for the pool 100 to hold water or another liquid, the material forming the base 102 and side wall 106 might be water-impermeable, or otherwise capable of holding water. For example, the base 102 and side wall 106 may be formed from a textile material, treated such that it is water impermeable. In addition to textile materials, other suitable materials could be used to construct the base 102 and side wall 106 of the swimming pool. For example, the swimming pool 100 could be made from rubber, or could be made of man-made materials such as polyurethane, PVC,
plastics, nylon, or other man-made materials, which are suitable for holding water. Additionally, as mentioned above, the pool 100 could be formed from a combination of a number of suitable materials. For example, the base 102 could be formed from materials that are more durable than the side wall 106, as this section of the pool would likely be subjected to more wear than that experienced by the side wall 106. Additionally, as mentioned above, the base spring 104 may be contained within a sleeve made from a material that is more durable than the base 102 and/or the side wall 106. Also, as mentioned above, the base 102 and side wall 106 may be formed from a combination of materials, which may be adhered or bonded together. The materials used for the various portions of the pool 100 can be joined by way of a number of commonly known suitable techniques, such as sewing, adhesives, bonding, lamination, RF welding, or any other suitable joining technique.

More specifically, FIG. 1B is a top view, in which the flotation device 108 and the interior of the base 102 can be seen. FIG. 1C is a side view, in which the base 102 and base spring 104 are more easily discernible. Additionally, the side view shown in FIG. 1C illustrates the flotation device 108 and the side wall 106. FIG. 1D is a schematic perspective view of the pool shown in FIG. 1A, from approximately the same viewing angle represented in FIG. 1A. The depiction shown in FIG. 1D more clearly illustrates the base spring 104, and also illustrates the side wall 106 and the flotation device 108.

The pool 100 illustrated in FIGS. 1A-1D can be made in a variety of sizes, depending upon the desired use. Additionally, although the pool 100 is shown as having a circular base, it can be made in a variety of shapes, including, but not limited to, rectangular, square, oblong, oval-shaped, elliptical, rectangular with rounded corners, and the like.

In accordance with an embodiment of the invention, the diameter of the base 102 can be, for example, between about 36 and 60 inches, and according to a specific embodiment is approximately 48 inches. The height of the side wall 106 can be, for example, between about 10 to 15 inches, and according to a specific embodiment is approximately 12 inches. In accordance with an embodiment of the invention, the outer diameter of the flotation device 108 can be, for example, larger than the diameter of the base 102 by approximately 2 to 4 inches. The width of the flotation device 108 at any given point can be, for example, approximately 4 inches, when inflated, according to a specific embodiment. The sizes provided herein are intended to be examples only, and may be varied depending upon any particular design requirements or constraints for the construction of the pool 100.

FIG. 2 is a perspective view of a pool according to an alternate embodiment of the invention. In FIG. 2, a pool 100a, similar to the pool 100 shown in FIG. 1A, is shown. The pool 100a shown in FIG. 2 includes base 102, base spring 104, side wall 106, and flotation device 108, similar to the pool 100 shown in FIG. 1A.

However, the pool 100a has the added feature of a top spring 110 located at the top of the side wall 106, which is attached to the side wall 106 and the flotation device 108. Thus, the embodiment shown in FIG. 2 uses two springs: a base spring 104 and a top spring 110. As in the case with the base spring 104, the top spring may be attached to the side wall 106, and the flotation device 108, in a variety of manners. For example, the top spring 110 may be attached to the side wall 106 by way of an additional sleeve connected thereto. Alternatively, the top spring could be contained within the material forming the side wall 106 or the flotation device 108. The top spring 110 can be connected to the side wall 106 and the flotation device 108 in a variety of manners, depending upon the desired use of the pool 100a.

One additional advantage provided by way of the pool 100a shown in FIG. 2 is that the top spring 110 provides additional tension to the side wall 106, such that a more rigid circular shape can be maintained at the top of the side wall 106. Both the base spring 104 and the top spring 110 are collapsible, or collapsible, as they can be effectively folded upon themselves. In accordance with an embodiment of the invention, the base spring 104 may be constructed of heavier weight materials, such that it maintains a more rigid shape and provides greater tension than the top spring 110. Additionally, as the side wall 106 is erected by the buoyancy of the flotation device 108, the weight of the top spring 110 can be a consideration. For example, the weight of the top spring 110 should not overcome the buoyant force on the flotation device 108, which allows it to rise. The size and weight of the top spring 110 may vary, as may the size and buoyancy of the flotation device 108, according to specific design requirements.

FIG. 3 illustrates a perspective view of a collapsible pool 100b in accordance with an embodiment of the invention. The pool 100b illustrated in FIG. 3 could be either of the previous embodiments shown in FIGS. 1-2, and includes base 102, base spring 104, side wall 106 and flotation device 108. Additionally, the pool 100b shown in FIG. 3 could include a top spring 110 such as the one shown in FIG. 2. As discussed above, the side wall 106 may be constructed of a variety of materials that are foldable and have varying stiffnesses. Thus, the pool 100b shown in FIG. 3 illustrates the natural bowing of the side wall 106 that may occur when softer materials are used to construct the side wall 106 and when the side wall is has no additional support. This bowing of the side wall 106 is not detrimental, and the pool 100b is perfectly suitable for a variety of activities even with its bowed wall. As will be appreciated, however, some activities and uses for the pool of the invention may require stiffer construction of the side wall 106. This may be accomplished by way of a variety of supports within or adjacent to the side wall 106. Some of these alternate embodiments are described below in greater detail. FIG. 3 is merely intended to illustrate that the side wall 106 may not always be entirely straight or rigid, as illustrated in FIGS. 1-2.

It will be appreciated by those skilled in the art that the flotation device 108 may be of a nature other than an inflatable ring. For example, this flotation device 108 may be made of a material that floats, and is bendable, such that it may be folded or bent with the springs of the swimming pool.

The flotation device 108, shown in FIGS. 1-3, could be made from a variety of materials. For example, the ring could be a standard inflatable polyurethane casing, or other casing that is suitable for retaining air or other gas in an inflated state. The flotation device 108 could be inflated
by conventional means, for example by a valve configured for oral inflation or for inflation by a device such as a pump, or the like. Additionally, the flotation device 108 could make use of a variety of chemical or other reactions that would automatically inflate it.

[0052] The flotation device 108 could also be made from material that does not require inflation, but provides adequate buoyancy and floats on the water contained within the pool (or other liquid when the pool is used as a general container). For example, special foams, polystyrene, or other materials could be used to create a flotation device 108, which would float with the water line contained in the pool, and cause the walls 106 to be erected as the pool fills. In this manner, the pool could automatically change from a collapsed to an expanded configuration. As the pool is a collapsible pool, and intended to be folded, the flotation device 108 can be made of a material that could be subjected to folding, without becoming damaged. Additionally, the flotation device 108 can be removable the pool as the pool is folded into its collapsed state. Those skilled in the art will appreciate that, although some potential materials from which the flotation device 108 could be formed have been mentioned above, other materials including, but not limited to, newly developed materials could be incorporated within the design of the invention, and used to form the flotation device 108 without departing from the invention.

[0053] FIGS. 4A-4D are perspective views of a collapsible pool constructed in accordance with an embodiment of the invention. With reference to FIGS. 4A-4D, a collapsible pool 100c is shown from various viewing angles. FIG. 4A is a top view, FIG. 4B is a view from an angle elevated with respect to the pool, FIG. 4C is a side view, and FIG. 4D is another side view of the viewing plane perpendicular to the viewing plane shown in FIG. 4C. In FIGS. 4A-4D, a pool 100c is shown having features similar to those shown in connection with the pools illustrated in FIGS. 1-3. The pool 100c has similar features to the pools described above, including a base 102, a base spring 104, and a side wall 106. Uniquely, the pool 100c illustrated in FIG. 4A has a pop-up spring wire 112, which is used to provide tension in the side wall 106, and which may be folded along with the base spring 104 when the pool is collapsed for storage or transport.

[0054] The pop-up spring 112 may be attached to the side wall 106 either by enclosing it within the material that forms the side wall 106, or by otherwise attaching it to the side wall 106. As is the case with the base spring 104, the pop-up spring 112 may be enclosed within a separate sleeve, which is attached to the side wall 106 by some suitable means.

[0055] With reference to FIGS. 4B and 4C, it will be noted that the side wall 106 is formed in such a manner as to have a lower portion at the ends of the minor access of the ellipse formed by the base spring 104. The highest portion of the side wall 106 is located at either end of the ellipse’s minor axis. Thus, there appears to be a “dip” 114 (shown in FIGS. 4B and 4C) along portions of the side wall 106, which would allow for easy entrance and exit access to and from the pool 100c.

[0056] Because of the shape and position of the pop-up spring 112, it provides tension on the side wall 106. However, when the pool is to be collapsed, and folded for storage or transport, the tension in the pop-up spring 112 is released, as the base spring 104 is folded upward to meet the pop-up spring 112. To fold the pool 100c to its collapsible form, the base spring 104 and the pop-up spring 112 are folded upon themselves for storage in a manner described above, in connection with U.S. Pat. No. 6,170,100, incorporated by reference above.

[0057] The ability of the base spring 104 and the pop-up spring 112 to be folded, and to remain rigid in certain configurations is a function of the cross-section of the wire that makes up each of the springs. FIG. 4E is a diagram of a cross-section of the pop-up spring 112, and FIG. 4F is a diagram of the cross-section of the base spring 104. As these figures show, the general shape of the cross-section of the wires that make up each of these springs is an oblong shape, similar to a rounded rectangle, or an oval. This shape, as will be appreciated by those skilled in the art, allows each of the springs described in connection with the various embodiments of the invention to provide a stiff tension when fully extended, and lying flat, as is the case with the base spring 104 in FIGS. 4A-4D. However, this shape, when provided as a wire of at least a certain length, can be “folded” onto itself in a manner described above.

[0058] In accordance with an embodiment of the invention, the vertical width of the pop-up spring shown in FIG. 4E (i.e., the narrower of the widths of the cross-section) is between about 0.5 to 3 millimeters, and according to a specific embodiment of the invention is approximately 1.36 millimeters. The horizontal width of the pop-up spring (i.e., the larger width) is approximately 2 to 5 millimeters, and according to a specific embodiment of the invention is about 3.36 millimeters. A cross-section of the wire from which base spring 104 is formed is shown in FIG. 4F. The base spring 104 wire is thicker in both respective dimensions than the wire from which the pop-up spring 112 is formed. The vertical width of this cross-section is between about 1 to 4 millimeters, while the horizontal width is about 5 to 8 millimeters. In accordance with a specific embodiment of the invention, however, the vertical width of the cross-section of the base spring is approximately 2.71 millimeters, and the horizontal width of that cross-section is approximately 6.71 millimeters.

[0059] Although the general shape of the cross-section of these springs is oblong, they may be placed, for example, within an optional protective sheath of more uniform diameter prior to being attached to the pool, whether in a sleeve or otherwise. The wire from which the springs are formed can be any suitably rigid material that allows for the proper folding and exhibits the necessary flexible characteristics. For example, many metals could be used to form the springs. However, it is anticipated that other materials, such as plastic that is resilient and flexible, or similarly suitable materials could be used in place of metals to form the various springs.

[0060] FIG. 4G is a perspective view of the collapsible, pop-up pool 100c illustrated in FIGS. 4A-4D. This figure illustrates the three-dimensional view of the pool 100c. In accordance with an embodiment of the invention, the length of the major axis of the ellipse formed by the base spring 104 is between about 0.5 to 2 meters, and according to a specific embodiment of the invention is approximately 1.2 meters. The length of the minor axis of the ellipse formed by the base spring 104 is between about 0.5 to 2 meters, and
according to a specific embodiment of the invention is about 0.9 meters. The height of the side wall 106 at its lowest point, which is at the ends of the minor axis of the ellipse formed by the base spring 104 (i.e., at the location of the dip 114 illustrated in FIGS. 4B and 4C) is between about 0.05 to 0.7 meters, and according to a specific embodiment of the invention is approximately 0.2 meters. The height of the side wall 106 at its highest point, which is at either end of the major axis of the ellipse formed by the base spring 104, is between about 0.1 to 1 meter, and according to a specific embodiment of the invention is approximately 0.4 meters.

[0061] The pool 100c illustrated in FIGS. 4A-4D and 4G can be made from a variety of materials, such as the materials discussed above. According to a specific embodiment of the invention, however, the interior of the pool 100c is constructed from a PVC liner that is adhered or bonded to a nylon outer skirt, which forms the outer portion of the side wall 106. Additionally, this material may form the inner and outer sides of the base 102.

[0062] An alternate embodiment of the invention is shown and described in connection with FIGS. 5A-5F. FIGS. 5A, 5B, and 5C show a top view, an elevated angle perspective view, and a side view, respectively, of a collapsible, pop-up pool 100d, according to an embodiment of the invention. This pool 100d shares similar features to the pools described above. Namely, it includes base 102, base spring 104, and side wall 106 similar to those described above. Additionally, the pool 100d illustrated in these figures includes a top spring 110, which is similar to the top spring 110 described in connection with FIG. 2 above. In addition to these common features, the pool 100d illustrated in FIGS. 5A-5C also includes a support spring 116, which is shaped in the form of a helix. This helical spring 116 extends from the pool’s base 102 to the top of the side wall 106, and creates support in the side wall 106, such that it may be maintained more rigid. Because of the helical spring 116, the side wall 106 is much less likely to bow (e.g., as shown in FIG. 3) than the pool designs described above. In addition to providing more rigidity in the side wall 106, the helical spring 116 provides a spring-loaded pop-up action when unfolded, causing the pool to automatically extend from its collapsed configuration to its expanded configuration. The pool 100d may also utilize one or more additional support springs 118, for added rigidity of the side wall 106.

[0063] Although the pool 100d is described as having a bottom spring 104, a top spring 110, and a helical spring 116, these springs could be integrally formed as one piece. For example, the bottom and top springs could be attached to the helical spring 116, or it could form a part thereof. According to various embodiments of the invention, the bottom and top springs may be formed from thicker pieces of wire than the helical spring 116. However, in an embodiment where the top and bottom springs form parts of the helical spring 116, the width of the cross section of wire forming the helical spring 116 could simply be increased to suitable widths near the top and the bottom of the side wall 106.

[0064] FIG. 5D is an illustration of a cross-section of the base spring 104, the top spring 110, or the support spring 118. FIG. 5E is an illustration of the cross-section of the helical spring 116, and is generally not as thick as the base spring 104, top spring 110, or support spring 118, in either of its respective dimensions. However, this need not be the case, as all of the springs could be constructed to have approximately the same cross section size. In accordance with embodiments of the invention, the vertical width of the cross-section of the base spring 104 illustrated in FIG. 5D is between about 1 to 4 millimeters, and according to a specific embodiment of the invention is approximately 2.7 millimeters. The horizontal width of the cross-section illustrated in FIG. 5D, according to various embodiments of the invention is between about 5 to 8 millimeters, and according to a specific embodiment of the invention is about 6.7 millimeters.

[0065] The width of the helical spring 116 is usually less than the width of the cross-section of the base spring 104 in both respective dimensions, as illustrated in FIG. 5E. The vertical width of the helical spring 116 is between about 1 to 3 millimeters, and is approximately 2.0 millimeters according to a specific embodiment of the invention. The horizontal width of the helical spring 116 is between about 4 to 6 millimeters, and is about 5.0 millimeters according to a specific embodiment of the invention.

[0066] FIG. 5F is a perspective view of the pop-up pool 100d illustrated in FIGS. 5A-5C. This pop-up pool 100d may make use of materials described above, such as a PVC material for the inner liner, and a nylon covering for the outer portion of the side wall 106. The overall height of the side wall 106 may vary. However, in accordance with embodiments of the invention, the side wall 106 may have a height of between about 0.2 to 0.7 meters. According to a specific embodiment of the invention, the height of the side wall is approximately 0.45 meters. The support spring 118, if included, would be positioned at approximately the midpoint of the height of the side wall 106. If multiple support springs are used, they can be placed at suitable locations along the height of the side wall 106.

[0067] According to embodiments of the invention, the diameter of the base 102 may be between about 1 to 3 meters, and according to a specific embodiment of the invention is approximately 1.2 meters. According to another specific embodiment of the invention, the diameter of the base 102, and the pool 100d generally, is approximately 48 inches, and the pool is approximately 18 inches deep. Those skilled in the art will recognize, however, that the size of the pool 100d can be varied over a wide range of sizes, depending on its desired use, without departing from the spirit or essential characteristics of the invention.

[0068] FIGS. 6-7 illustrate a collapsible pop-up pool having various support members to cause the side wall 106 to pop up to its expanded configuration from its collapsed configuration. These support members also provide support to stiffen the side wall 106. The pool 100e illustrated in FIG. 6 is similar to the pools described above, with the addition of the support spring 120. This support spring 120 can be formed in essentially a sinusoidal shape, approximating one full period of a sinusoidal wave, or can be formed in any other shape that provides the adequate support and tension, such as the shape of an inverted parabola. The pool 100e can be made either with or without a top spring 110. When a top spring 110 is included, the support spring 120 can be connected thereto, as well as connected to the base spring 104. As illustrated in FIG. 6, the support spring 120 is connected to the base spring 104 by way of sliding mechanisms. The mechanisms engage the base spring 104 and
allow the support spring 120 to slide along the length of the base spring 104, when the pool 100c is collapsed and folded. The support spring 120 may be included within the side wall 106 or may be otherwise attached to the side wall. According to a specific embodiment of the invention, the support spring 120 may be fitted between two layers of a double-wall construction of the side wall 106.

[0069] The support spring 120 may also have a tensioning member 124 attached thereto, which may be an elastic material (e.g., bungee, rubber, etc.), a spring, or other suitable tensioning member. When the pool 100c is unfolded or expanded from its folded, collapsed configuration, the tensioning member 124 pulls the sides of the support spring 120 where it is attached closer together, causing the sliding members 122 to slide toward each other on the base spring 104, and causing the top spring 110, or the top of the side wall 106, to be raised, such that the side wall 106 becomes erect. Although not shown in the figure, the construction of the support spring 120 can be similar to the construction of the support springs and base springs described above, in that it has, for example, an oblong, oval-like, or rounded rectangle cross-section, allowing it to be folded along with the base spring 104 and the top spring 110, if a top spring is included. The dimensions of the pool 100c and the materials used to construct it, can be similar to those described above in connection with the other embodiments of the invention.

[0070] The swimming pool 100f shown in FIG. 7A is similar to the pool 100e shown in FIG. 6. This pool 100f is shown in its expanded configuration in FIG. 7A, and in its collapsed configuration (prior to folding) in FIG. 7B. The principal difference between the pool 100f shown in FIG. 7A and the pool 100e shown in FIG. 6 is the construction of the support springs 126, which is formed by two crossing members being hingedly connected to each other and slidably engaged with the bottom spring 104 and a top spring 110. The connection of the two crossing members may also be a connection other than a standard hinged connection. These crossing members of the support springs 126 are connected by tensioning members 124, which provide tension that pulls the two crossing members together when the pool is expanded from its collapsed configuration. When this occurs, the crossing members being pulled together by the tensioning members 124 causes the top spring 110 to be raised, erecting the pool and forming a rigid side wall.

[0071] The support springs 126 may be contained within the side wall 106 of the pool 100f in the same manner as the support spring 120 of the pool 100e described in connection with FIG. 6. Similar to that support spring 120, the support springs 126 of the pool 100f shown in FIG. 7A may be constructed in a manner similar to the springs described above, in that it may have a cross-section that is oblong, oval-like, or a rounded rectangle. Similarly to the pools described above, the pool 100f of FIG. 7A may be constructed using materials similar to those described above.

[0072] From the foregoing, it can be seen that the invention provides a number of different collapsible containers which may be used as swimming pools. The various embodiments of the invention described above provide collapsible swimming pools that are foldable, which allows for easy storage and increased portability when compared with prior approaches. Additionally, according to various embodiments of the invention, the collapsible swimming pools of the invention may be provided with a pop-up mechanism that automatically erects the pool to its full-sized, expanded configuration. Thus, unlike prior approaches, the swimming pools of the invention combine portability and storability with ready access for immediate use. Additionally, the swimming pools of the invention are constructed from durable, lightweight, foldable materials which are not easily damaged, and therefore contribute to their long life.

[0073] It will be appreciated by those skilled in the art, however, that the invention can be embodied in other specific forms without departing from the spirit or essential characteristics thereof. For example, while the invention has been described in the context of swimming pools, generally for use with children, the concepts described herein need not be limited to these illustrative embodiments. For example, swimming pools of larger sizes could be constructed using the same methods, and would enjoy the same benefits as the kiddie pools described above. Additionally, other types of containers, which could be used to contain liquids or other substances could be constructed using the principles of the invention and enjoy similar advantages as those described above.

[0074] Additionally, the specific configurations, choice of materials, and the size and shape of various elements could be varied according to particular design specifications or constraints requiring a container constructed according to the principles of the invention. For example, in addition to creating containers of various sizes, configurations of support springs in the pop-up container configuration could be widely varied to achieve the same or similar advantages described above. Such changes are intended to be embraced within the scope of the invention.

[0075] The presently disclosed embodiments are, therefore, considered in all respects to be illustrative and not restrictive. The scope of the invention is indicated by the appended claims, rather than the foregoing description, and all changes that come within the meaning and range of equivalents thereof are intended to be embraced therein.

What is claimed is:

1. A collapsible container, comprising:
   a base having a perimeter;
   a side wall having a first edge and a second edge, the first edge of the side wall coupled proximate to the perimeter of the base;
   a coilable spring coupled proximate to at least one of the perimeter of the base and the first edge of the side wall, the coilable spring being configured to outwardly bias the base; and
   a floatation device having at least a portion coupled proximate the second edge of the side wall.

2. The collapsible container of claim 1, further comprising:
   a shape retaining member coupled proximate to the second edge of the side wall, the shape retaining member configured to upwardly bias the side wall.

3. The collapsible container of claim 2, wherein the shape retaining member includes a top spring.

4. The collapsible container of claim 1, wherein the base and the side wall are water-impermeable materials.
5. The collapsible container of claim 1, wherein the floating device includes an inflatable member.

6. The collapsible container of claim 1, further comprising:
   at least one support spring disposed along the side wall, the at least one support spring being configured to provide tension along the side wall.

7. The collapsible container of claim 6, wherein the support spring includes a spring located approximately midway between the first and second edge of the side wall.

8. The collapsible container of claim 6, wherein the support spring includes a spring in the form of a helix.

9. The collapsible container of claim 8, wherein the container is configured to automatically erect the side wall in response to spring force from the support spring.

10. The collapsible container of claim 6, wherein the support spring includes a spring in the form of a sinusoid.

11. The collapsible container of claim 6, wherein:
   the support spring includes a spring in the form of a sinusoid; and
   the support spring in the form of a sinusoid is slidably attached to the coilable spring.

12. The collapsible container of claim 6, wherein:
   the support spring includes a spring in the form of a sinusoid;
   the support spring in the form of a sinusoid is slidably attached to the coilable spring; and
   the support spring includes a first portion, a second portion, and a tension member coupled to the first portion of the support spring and the second portion of the support spring.

13. The collapsible container of claim 6, wherein:
   the support spring includes a spring in the form of a sinusoid;
   the support spring in the form of a sinusoid is slidably attached to the coilable spring;
   the support spring includes a first portion, a second portion, and a tension member coupled to the first portion of the support spring and the second portion of the support spring; and
   the container is configured to automatically erect the side wall in response to force from the tension member and spring force from the support spring so that the container is in an expanded configuration.

14. The collapsible container of claim 6, further comprising:
   a shape retaining member having at least a portion coupled proximate to the second edge of the side wall, the shape retaining member configured to upwardly bias the side wall, the shape retaining member including a top spring, a support spring, and an edge spring, the support spring including an edge spring assembly having a first cross member and a second cross member each with a first end and a second end, the first cross member being hingedly attached to the second cross member, the first end of the first cross member and the first end of the second cross member being slidably attached to the edge spring, the second end of the first cross member and the second end of the second cross member being slidably attached to the top spring.

15. The collapsible container of claim 14, wherein the first and second cross members of the support spring are coupled to at least one tensioning member.

16. The collapsible container of claim 15, wherein the container is configured to automatically erect the side wall into an expanded configuration in response to force from the at least one tensioning device.

17. A collapsible container, comprising:
   a base having a perimeter;
   a side wall having a first edge and a second edge, the first edge of the side wall coupled proximate to the perimeter of the base;
   a coilable spring coupled proximate to at least one of the perimeter of the base and the first edge of the side wall, the coilable spring being configured to outwardly bias the base; and
   a support member having at least a portion coupled proximate to the second edge of the side wall, the support member being configured to bias the side wall away from the base.

18. The collapsible container of claim 17, further comprising:
   a shape retaining member coupled proximate to the second edge of the side wall, the shape retaining member maintaining a desired shape to be formed by the side wall.

19. The collapsible container of claim 18, wherein the shape retaining member includes a top spring.

20. The collapsible container of claim 17, wherein the support member includes a floatation device.

21. The collapsible container of claim 17, wherein the support member includes a spring in the form of a helix.

22. The collapsible container of claim 17, wherein the support member includes a spring in the form of a sinusoid that is slidably attached to the coilable spring.

23. The collapsible container of claim 17, wherein the support member includes a shape retaining having at least a portion member coupled proximate to the second edge of the side wall, the shape retaining member configured to upwardly bias the side wall, the shape retaining member including a top spring, a support spring, and an edge spring, the support spring including an edge spring assembly having a first cross member and a second cross member each with a first end and a second end, the first cross member being hingedly attached to the second cross member, the first end of the first cross member and the first end of the second cross member being slidably attached to the edge spring, the second end of the first cross member and the second end of the second cross member being slidably attached to the top spring.

24. A collapsible container, comprising:
   a base having a perimeter;
   a side wall having a first edge and a second edge, the first edge of the side wall coupled proximate to the perimeter of the base;
   a coilable spring coupled proximate to at least one of the perimeter of the base and the first edge of the side wall, the coilable spring being configured to outwardly bias the base; and
a shape retaining member having at least a portion coupled proximate the second edge of the side wall.

25. The collapsible container of claim 24, wherein the shape retaining member includes a top spring.

26. The collapsible container of claim 24, wherein the shape retaining member includes a flotation device.

27. The collapsible container of claim 24, further comprising:

a support member coupled proximate to the second edge of the side wall, the side wall being configured to bias the side wall away from the base.

28. The collapsible container of claim 25, wherein the support member includes a spring in the form of a helix.

29. The collapsible container of claim 25, wherein the support member includes a spring in the form of a sinusoid that is slidably attached to the base spring.

30. The collapsible container of claim 24, wherein the shape retaining member includes a support member having at least a portion coupled proximate to the second edge of the side wall, the support member configured to upwardly bias the side wall, the support member including a top spring, a support spring, and an edge spring, the support spring including an edge spring assembly having a first cross member and a second cross member, each having a first end and a second end, the first cross member being hingedly attached to the second cross member, the first end of the first cross member and the first end of the second cross member of being slidably attached to the edge spring, the second end of the first cross member and the second end of the second cross member being slidably attached to the top spring.

31. An apparatus, comprising:

a non-planar membrane having a first portion and a second portion, the non-planar membrane having a collapsed configuration and an expanded configuration;

a coilable spring coupled to the first portion of the non-planar membrane, the coilable spring being configured to lie substantially in a single plane, the coilable spring having an unfolded position associated with the expanded configuration of the non-planar membrane and a folded position associated with the collapsed configuration of the non-planar membrane; and

a support member having at least a portion coupled to the second portion of the non-planar membrane, the support member configured to bias the second portion of the non-planar membrane away from the first portion of the non-planar membrane.

32. The apparatus of claim 31, wherein the first portion of the non-planar membrane is substantially planar.

* * * * *