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(54) **COLLAPSIBLE STRUCTURES**

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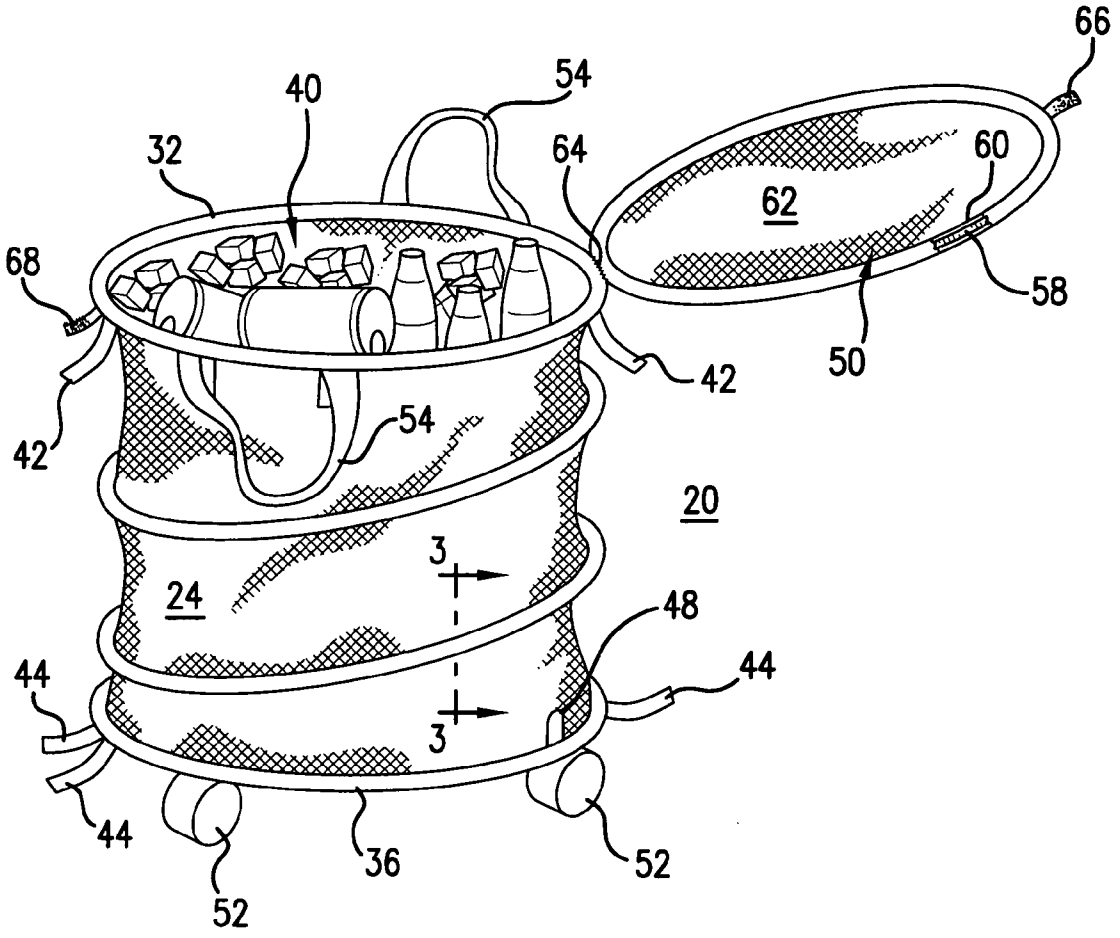
(57) **ABSTRACT**

A collapsible structure has a coiled wire supporting a covering which is attached to the wire to define an internal space, the coiled wire and its covering having a first end and a second end, and the first end having a first edge that defines an opening. The structure can have a lid that is coupled to the first end to completely cover the opening, or an amusement item that is positioned in the opening and coupled to the first end.



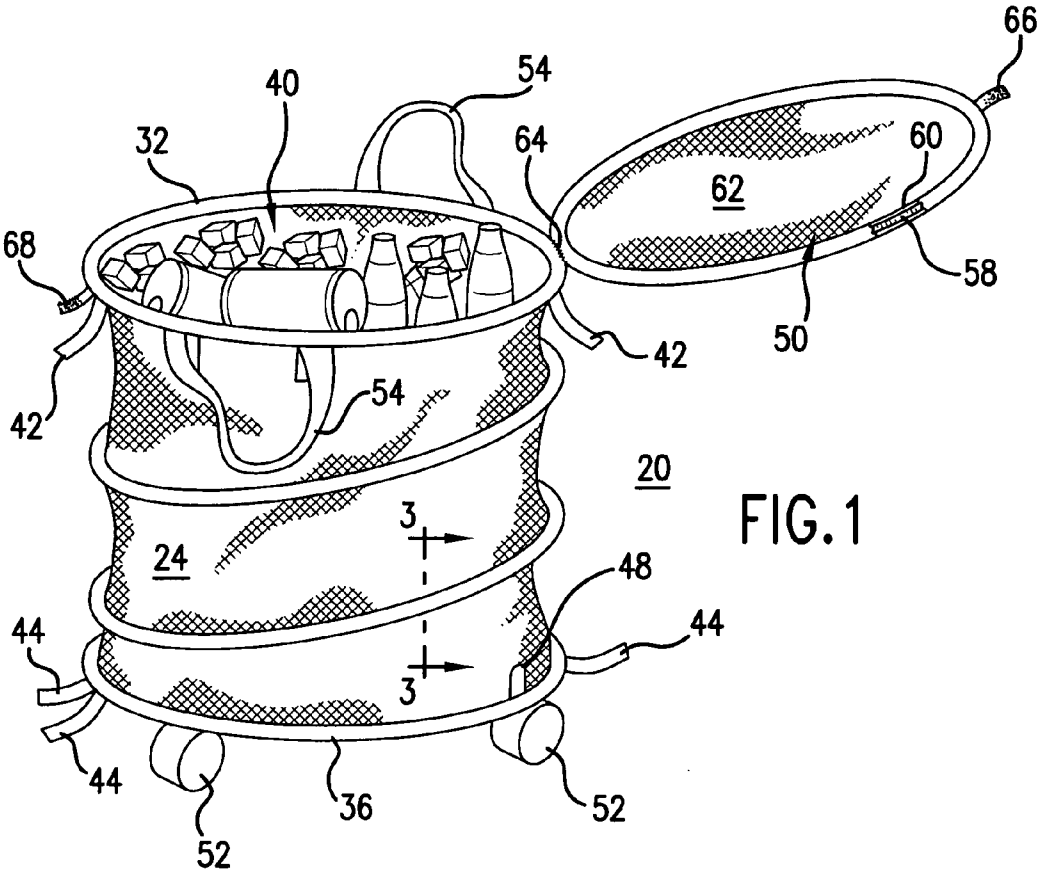


FIG.1

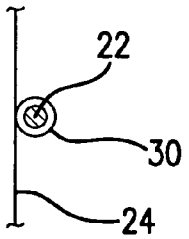


FIG.3

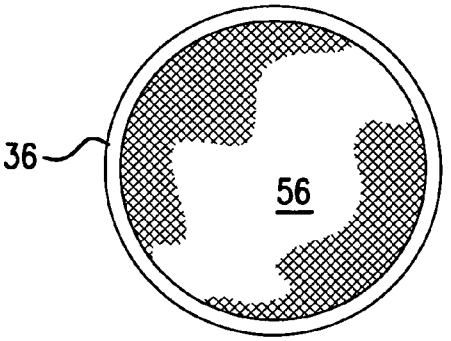


FIG.4

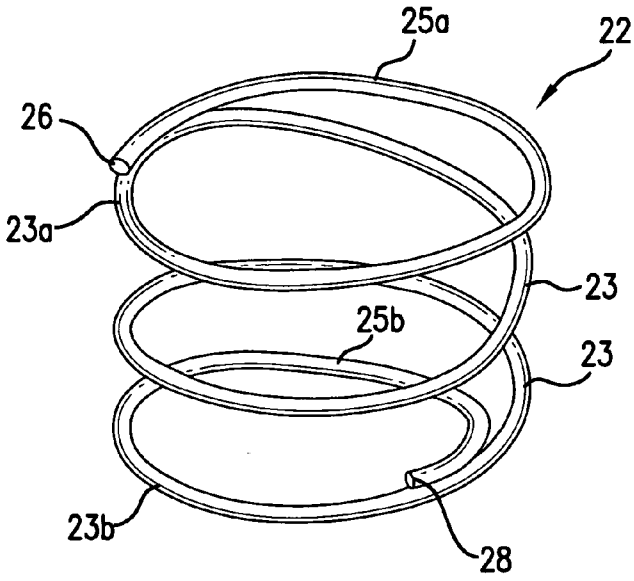

25a
22
26
23a
23
25b
23
23b
28

FIG.2

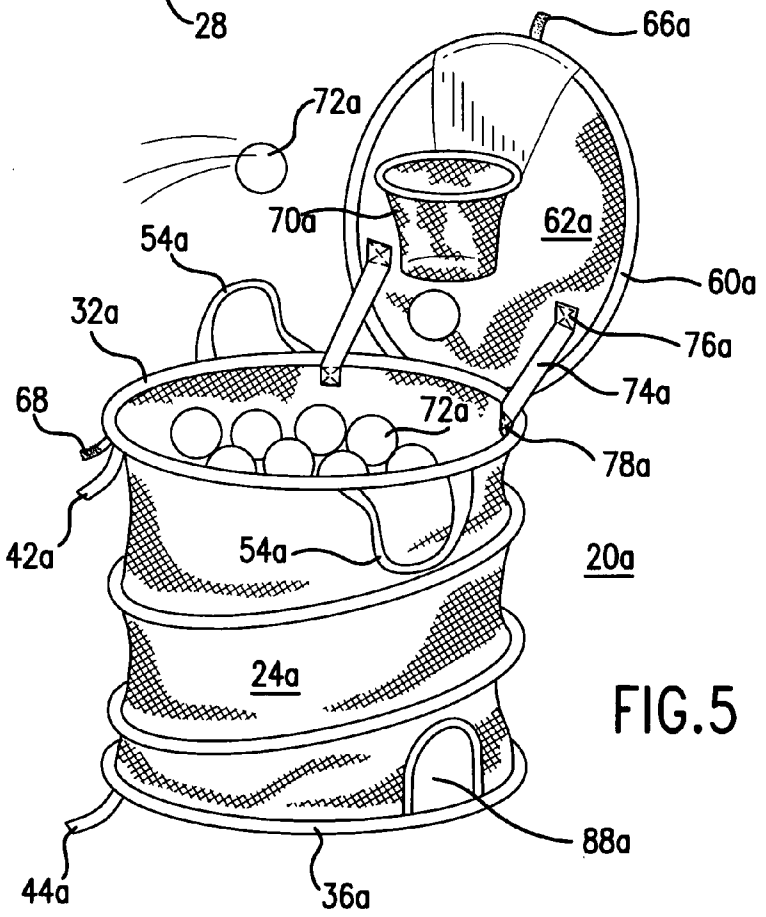

66a
72a
70a
62a
54a
60a
32a
76a
74a
68
72a
78a
42a
54a
20a
24a
88a
44a
36a

FIG.5

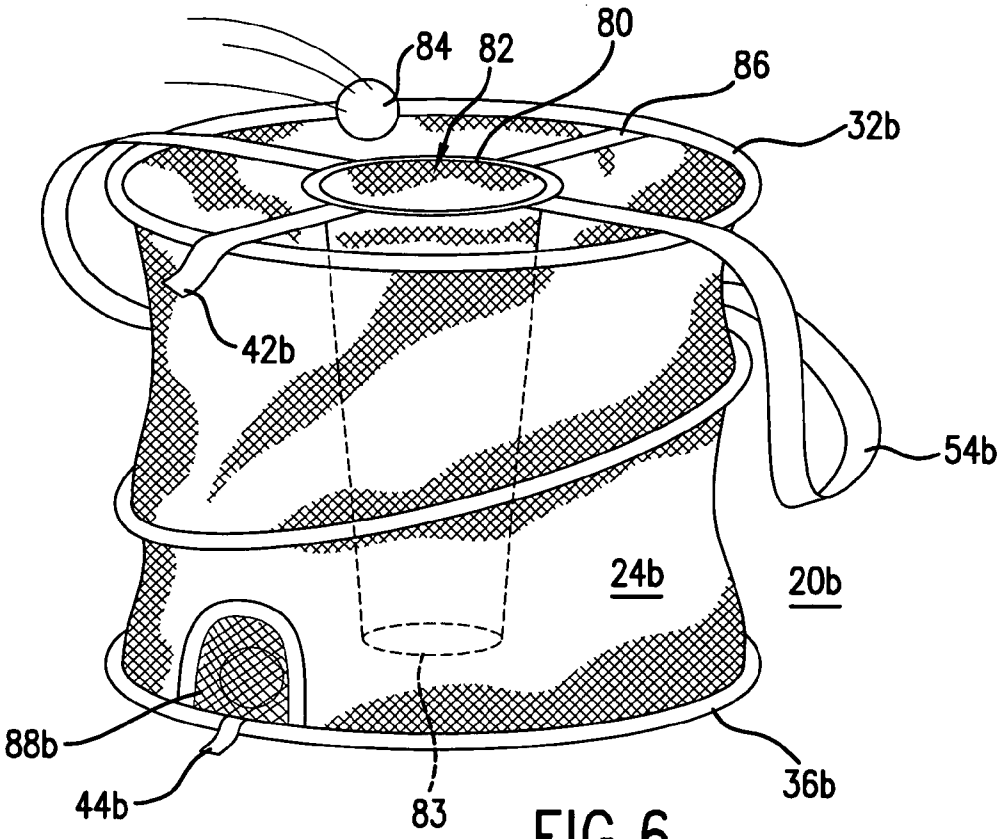

84
82
80
86
32b
42b
54b
24b
20b
88b
44b
83
36b

FIG.6

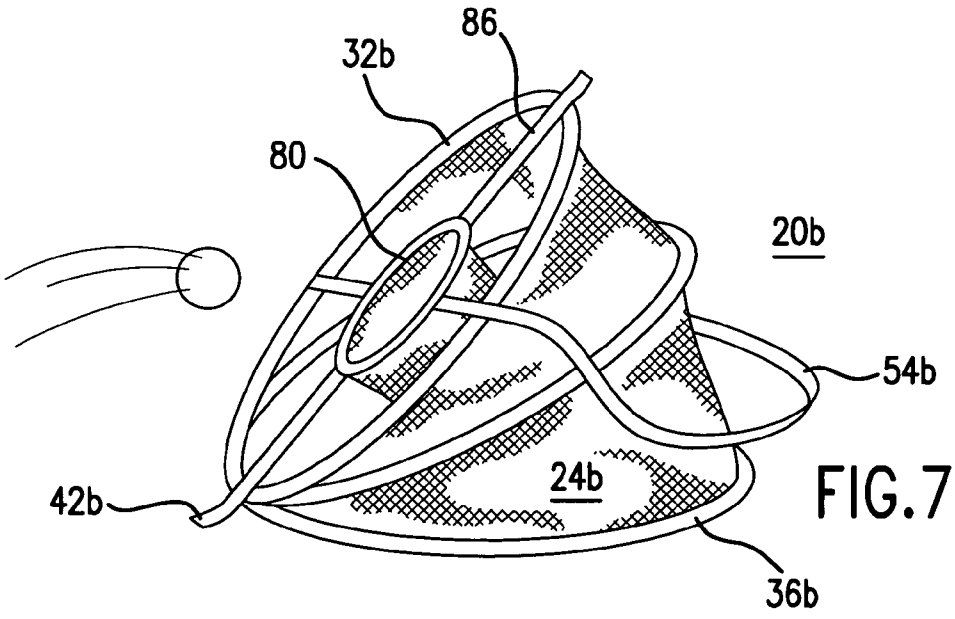

86
32b
80
20b
54b
42b
24b
36b

FIG.7

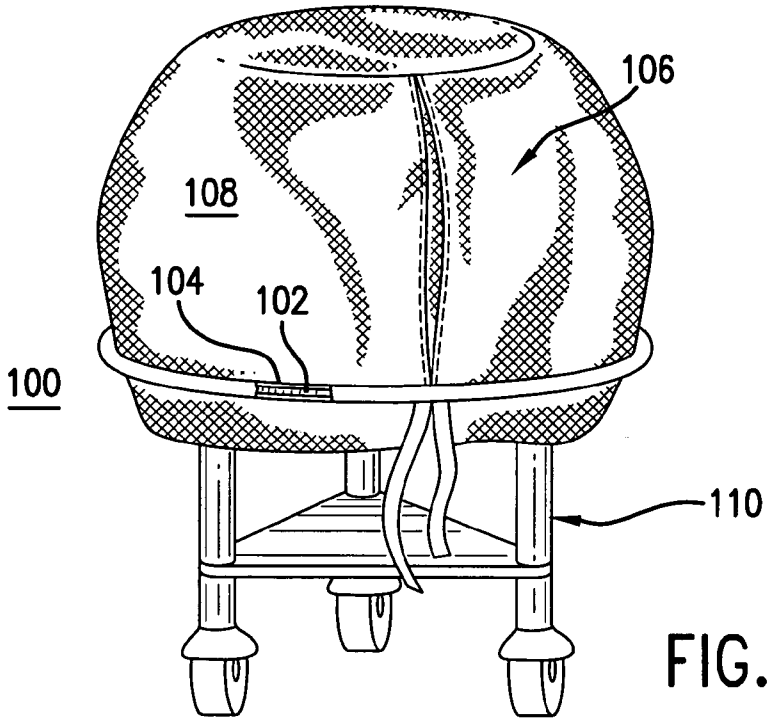


FIG.8

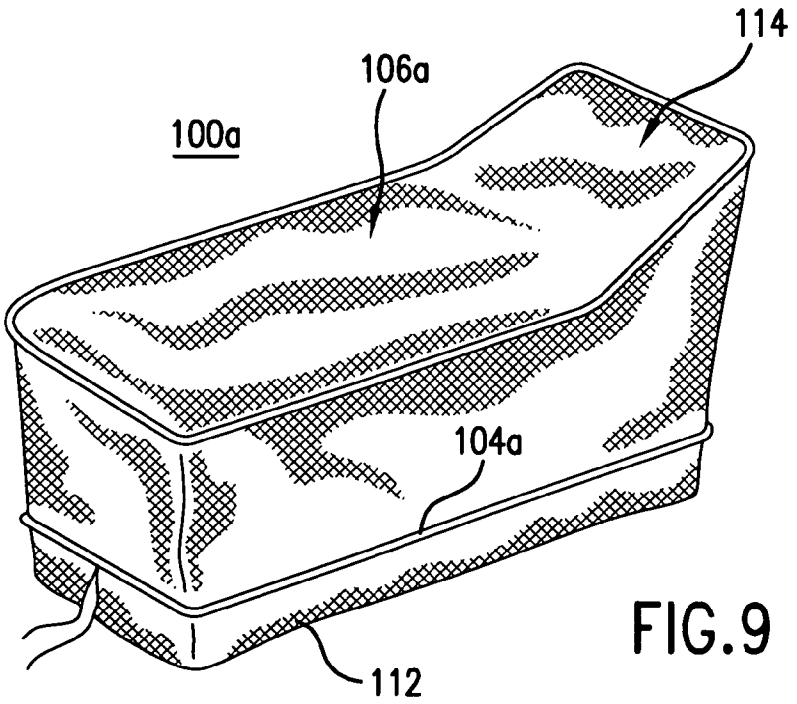


FIG.9

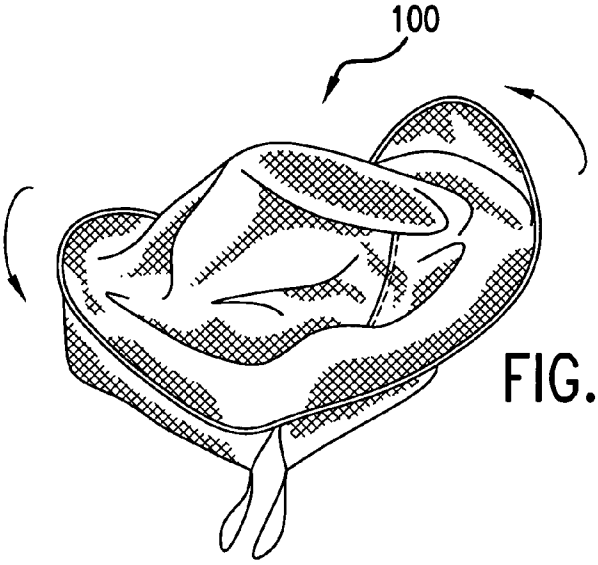


FIG.10A

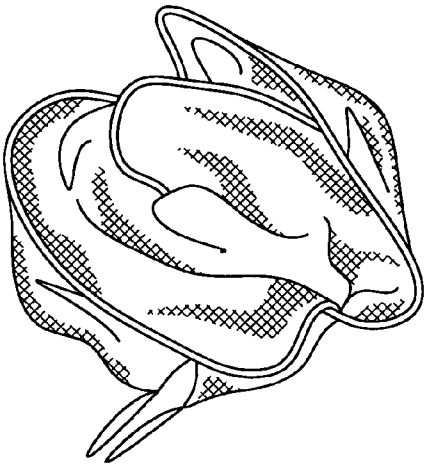


FIG.10B

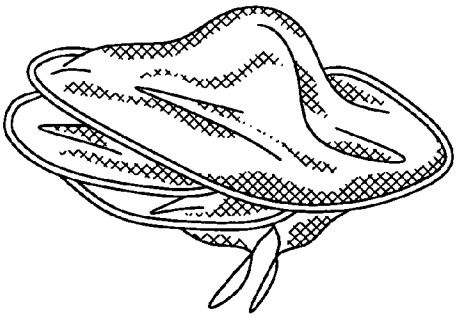


FIG.10C

COLLAPSIBLE STRUCTURES

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to structures that can assume two positions, a first expanded position where the structure can be deployed for use, and a second collapsed position where the structure can be stored or transported.

[0003] 2. Description of the Prior Art

[0004] Size and weight are two factors that are important to virtually every product because large and heavy products are usually difficult to store, transport and use. For example, metal and plastic containers can be heavy and take up much space when they are empty. As another example, certain game or play structures can be very large and bulky, making them difficult to move around.

[0005] Thus, there remains a need for products that are useful and effective for their intended applications, yet can be collapsed or reduced in size to facilitate convenient storage and transportation.

SUMMARY OF THE DISCLOSURE

[0006] In order to accomplish the objects of the present invention, there is provided, in one embodiment, a collapsible structure having a coiled wire supporting a covering which is attached to the wire to define an internal space, the coiled wire and its covering having a first end and a second end, and the first end having a first edge that defines an opening. The structure also has a lid that is coupled to the first end to completely cover the opening.

[0007] In another embodiment, the present invention provides a collapsible structure having a coiled wire supporting a covering which is attached to the wire to define an internal space, the coiled wire and its covering having a first end and a second end, and the first end having a first edge that defines an opening. An amusement item is positioned in the opening and coupled to the first end.

[0008] In yet another embodiment, the present invention provides a collapsible structure having a loop member that defines an opening, and a container portion having an enclosing wall that is made from a soft and foldable material. The enclosing wall defines an interior space and is attached to the loop member in a manner such that the interior space is accessed by the opening.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] FIG. **1** is a perspective view of a collapsible structure according to one embodiment of the present invention.

[0010] FIG. **2** is a perspective view of an internal wire that is used to define and support the structure of FIG. **1**.

[0011] FIG. **3** is a cross-sectional view of the structure of FIG. **1** taken along lines **3-3** thereof.

[0012] FIG. **4** is a bottom plan view of the structure of FIG. **1**.

[0013] FIGS. **5** and **6** are perspective views of collapsible structures according to other embodiments of the present invention.

[0014] FIG. **7** illustrates the structure of FIG. **6** deployed for use in a different position.

[0015] FIGS. **8** and **9** are perspective views of collapsible structures according to other embodiments of the present invention.

[0016] FIGS. **10A-10C** illustrate how the structure in FIG. **8** can be twisted and folded to reduce the size of the structure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0017] The following detailed description is of the best presently contemplated modes of carrying out the invention. This description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating general principles of embodiments of the invention. The scope of the invention is best defined by the appended claims.

[0018] FIG. **1** illustrates a collapsible structure **20** according to one embodiment of the present invention. The structure **20** has an internal support wire **22** supporting a covering **24** which is attached to the wire **22** to define an internal space or passageway. FIG. **2** illustrates one possible non-limiting embodiment of the wire **22**.

[0019] The wire **22** has a plurality of coils **23** that form a helical coil, and includes a first outer coil **23***a* and an opposing second outer coil **23***b*. Two adjacent coils **23** are normally biased in spaced apart relation in the manner shown in FIG. **2**. The wire **22** defines a first end **26** and a second end **28**. At the first end **26**, the wire **22** extends past the outer coil **23***a* so that a segment **25***a* at the first end **26** of the wire **22** overlaps with the outer coil **23***a*. Similarly, at the second end **28**, the wire **22** extends past the outer coil **23***b* so that a segment **25***b* at the second end **28** of the wire **22** overlaps with the outer coil **23***b*.

[0020] The covering **24** is attached to the wire **22** by gluing, stitching, fusing, mechanically fastening or other conventional attachment methods. Alternatively, as shown in FIG. **3**, a sleeve **30** may be stitched or otherwise provided along the covering **24** with the wire **22** housed or attached therein. Referring to FIGS. **1-3**, the first end **26** of the wire **22** terminates at a first generally circular edge **32** of the covering **24**. The outer coil **23***a* of the first end **26** forms a generally circular end wire portion to provide support to the first edge **32** of the covering **24**. Similarly, the second end **28** of the wire **22** terminates at a second generally circular edge **36** of the covering **24**. The outer coil **23***b* of the second end **28** forms another generally circular end wire portion to provide support to the second edge **36**. Each of the circular end wire portions and their respective circular edges **32** and **36** defines an opening, such as **40**. In addition, the overlapping segment **25***a* may be attached to the outer coil **23***a* along the length of the segment **25***a*, or the outer coil **23***a* and the overlapping segment **25***a* at the first end **26** of the wire **22** may retained in the same sleeve **30**. Similarly, the overlapping segment **25***b* may be attached to the outer coil **23***b* along the length of the segment **25***b*, or the outer coil **23***b* and the overlapping segment **25***b* at the second end **28** of the wire **22** may retained in the same sleeve **30**.

[0021] A first set of tie members **42** are provided in a spaced-apart manner along the first edge **32**, and a second set of tie members **44** are provided in a spaced-apart manner along the second edge **36**. As an example, each set of tie members **42**, **44** can include two strings or thin pieces of fabric which can be tied together to create a knot. Each set of tie members **42**, **44** can have any number of tie members, but preferably has at least two tie members. In addition, each edge **32** and **36** preferably comprises two sets of tie members, although any number of sets of tie members can be utilized at each edge **32** and **36** without departing from the spirit and scope of the present invention.

[0022] As a non-limiting alternative, the tie members **42**, **44** can be replaced by VELCRO™ straps that also function to couple or connect two corresponding VELCRO™ straps.

[0023] The wire **22** is preferably made from a strong yet springy metal, such as steel or iron, but also can be made from other strong and coilable materials, such as fiberglass or plastic. Such materials are preferably capable of allowing the wire **22** to maintain its coiled shape.

[0024] The covering **24** is preferably made from a strong durable fabric, such as cotton, canvas, mesh or net, but can also be made from other strong durable materials such as polyethylene (PE), PVC or plastic. The term fabric is to be given its broadest meaning and should be made from strong, lightweight materials and may include woven fabrics, sheet fabrics or even films. The covering **24** should be water-resistant and durable to withstand the wear and tear associated with rough treatment by children.

[0025] The structure **20** can be easily collapsed for storage. To collapse the structure **20**, the user grips the first edge **32** with one hand, grips the second edge **36** with the other hand, and pushes or compresses the first and second edges **32** and **36** against each other like an accordian. This compresses the plurality of coils **23** of the wire **22** against each other. This compression is made possible by the springy nature of the wire **22**, and its helically coiled configuration. With the wire **22** compressed, one tie member **42** along the first edge **32** is tied or connected to one corresponding tie member **44** along the second edge **36** to maintain the plurality of coils **23** of the wire **22** compressed against each other. Since each set of tie members **42** and **44** are spaced apart about the circumference of the edges **32**, **36**, two or more tie members **42** can be coupled to two or more corresponding tie members **44** to safely secure the structure **20** in the compressed position. To deploy the structure **20** for use, all the tie members **42** and **44** are disengaged and the natural springiness or bias of the wire **22** will expand the structure **20** back to the configuration shown in FIG. **1**.

[0026] The above-described elements constitute the basic configuration of the structure **20**. This structure **20** can be used in a large number of different applications. For example, in FIG. **1**, the structure **20** is embodied in the form of a container, and for this application also includes a lid **50**, a plurality of conventional casters **52** that are secured in spaced apart manner about or adjacent to the second edge **36**, one or more loops **54** (acting as handles) that are secured (e.g., by stitching) in spaced apart manner about the first edge **32**, and a wall covering **56** at the bottom of the structure **20** (see FIG. **4**).

[0027] First, the wall covering **56** can be stitched to the second edge **36** to completely cover the bottom opening defined by the second edge **36**. The covering **56** can be made from any strong material, which can be the same material as the covering **24**, and functions to define the bottom of the container.

[0028] Second, the plurality of casters **52** can be secured to the second edge **36** by providing, for each caster **52**, a pocket **48** that is sewn into the covering **24** adjacent a desired location along the second edge **36**. The shaft (not shown) of the conventional caster **52** can be inserted into the pocket **48** and secured therein by welding or stitching.

[0029] Third, the lid **50** can comprise a loop member **58** that can be made from the same material as the support wire **22**, and retained inside a peripheral sleeve **60** that extends around the circumference of the lid **50**. The peripheral sleeve **60** is preferably sized and configured to have the same size and configuration as the first edge **32**. A lid covering **62** can be attached to the sleeve **60** to form the lid **50**, and the covering **62** can be made from the same material as the covering **24**. A portion **64** of the peripheral sleeve **60** can be hingedly coupled to a portion of the first edge **32**, such as by stitching or by using detachable VELCRO™ straps. Thus, the lid **50** can be pivotably hinged about the portion **64** to cover the interior of the structure **20**, or to expose the opening **40**. A locking mechanism **66** can be provided (e.g., stitched) along the sleeve **60** and is adapted to be releasably secured to a corresponding locking mechanism **68** that can be provided (e.g., stitched) along a corresponding location along the first edge **32**. As a non-limiting example, the locking mechanisms **66** and **68** can be detachable VELCRO™ straps that can be engaged to lock the lid **50** over the opening **40**, or can be disengaged to expose the opening **40** and the interior of the structure **20** for storing or removing objects.

[0030] The dimensions of the structure **20** are not critical, but must be large enough for its intended application (e.g., storage of objects, depending on the types of objects to be stored). These configurations can be varied without departing from the spirit and scope of the present invention.

[0031] Other modifications can also be made without departing from the spirit and scope of the present invention. For example, the structure **20** does not necessarily need to be substantially straight, as shown in FIG. **1**, but can assume other configurations such as an L-shaped, S-shaped, U-shaped, or other configurations. This can be accomplished by providing the internal support wire **22** in the desired configuration and then attaching the covering **24** to it to form the structure **20**. Further, the length of the structure **20** can be varied. As a further example, the structure **20** and its edges **32** and **36** do not necessarily need to be substantially circular, but can assume a square, rectangular, triangular, polygonal or other shape. This can accomplished by coiling the internal support wire **22** to the desired shape and then attaching the covering **24** to the wire **22** to secure the wire **22** in the desired shape. Moreover, any combination of modifications described hereinabove may be utilized without departing from the spirit and scope of the present invention.

[0032] FIG. **5** illustrates another embodiment of the present invention, where the structure **20** in FIG. **1** has been modified for use in a different application. The structure **20***a* in FIG. **5** has the same construction as the structure **20** in FIG. **1**, except that the casters **52** can be omitted, and the lid **50***a* has an amusement article **70***a* provided on the bottom side of its covering **62***a*. As a result, the same numeral designations are used in FIG. **5** for the same elements as the designations used in FIG. **1**, except that an "a" has been added to the same elements in FIG. **5**. The structure **20***a* in FIG. **5** can be used as a container, but in addition, can also be used as a ball toss game. The amusement article **70***a* can be a hoop or basket so that a user can toss a ball **72***a* at the hoop **70***a*. All balls **72***a* that are tossed at the hoop **70***a* can be collected inside the structure **20***a*. A pair of support straps **74***a* can be provided to support the lid **50***a* at a generally vertical orientation (i.e., at about ninety degrees with respect to the ground) so that the hoop **70***a* can be deployed in an upright position as shown in FIG. **5**. Each strap **74***a* can have a first end **76***a* attached (e.g., stitched) to the covering **62***a* or the sleeve **60***a*, and a second end **78***a* attached (e.g., stitched) to the covering **24***a* or the first edge **32***a*.

[0033] In addition, an opening or door **88***a* can be cut out from any location on the covering **24***a* adjacent the second edge **36***a* so that the balls **72***a* collected in the interior of the structure **20***a* can be removed therefrom.

[0034] FIG. **6** illustrates yet another embodiment of the present invention, where the structure **20** in FIG. **1** has also been modified for use in a different application. The structure **20***b* in FIG. **6** has the same construction as the structure **20** in FIG. **1**, except that the lid **50** and casters **52** can be omitted, and a pocket **80** is coupled to the first edge **32***b*. As a result, the same numeral designations are used in FIG. **6** for the same elements as the designations used in FIG. **1**, except that a "b" has been added to the same elements in FIG. **6**. The pocket **80** can be provided in the form of a fabric or meshed tube having a first opening **82** through which a ball **84** can be tossed, and a second opening **83** through which a ball **84** can exit from the pocket **80**. Connectors **86** can be provided to secure the pocket **80** at the first edge **32***b*. In particular, one end of each of the connectors **86** can be connected (e.g., by stitching) to spaced-apart locations along the first edge **32***b*, with the other end of each of the connectors **86** connected (e.g., by stitching) to the pocket **80**. The connectors **86** can be made of plastic, fabric or any other flexible material. In addition, a zippered door **88***b* can be cut out from any location on the covering **24***b* adjacent the second edge **36***b* so that the balls **84** collected in the interior of the structure **20***b* can be removed.

[0035] FIG. **7** illustrates another way of deploying the structure **20***b* for use. One set of tie members **42***b* and **44***b* can be attached to couple the first and second edges **32***b* and **36***b*, respectively, at the location of the tie members **42***b*, **44***b*. This causes the structure **20***b*, and in particular, the first edge **32***b* and the opening **82** of the pocket **80**, to be angled. Thus, the structure **20***b* can be used as a target for tossing balls **84**, with the actual target (i.e., the pocket **80**) capable of being positioned generally horizontally (as in FIG. **6**) or at an angle (as in FIG. **7**) to provide enhanced play variety.

[0036] FIG. **8** illustrates a structure **100** according to yet another embodiment of the present invention. The structure **100** is comprised of a loop member **102** that can be made from the same material as the support wire **22**, and retained inside a peripheral sleeve **104**. The loop member **102** and its sleeve **104** can be configured to be almost any desired shape, including circular, square, oval, rectangular, octagonal, hexagonal, etc., and provided in any desired size depending on the desired application. A containing portion **106** is stitched or otherwise attached to the sleeve **104**. The containing portion **106** can be made from any of the materials described above for the covering **24**, and is provided with enough sag (i.e., is not taut) that it defines an interior space. The containing portion **106** defines an enclosing wall **108** which surrounds the interior space so that the interior space can be used to contain or hold one or more objects.

[0037] In one non-limiting example as shown in FIG. **8**, the container portion **106** is used to cover a barbeque pit **110**. The loop member **102** can be sized and configured so that it will snugly fit over the widest diameter of the barbeque pit **110**. In one embodiment as shown in FIG. **8**, the loop member **102** is designed to provide a snug friction fit with the outer wall of the barbeque pit **110**. In another embodiment, the loop member **102** and the containing portion **106** can be designed so that the loop member **102** extends past the widest diameter of the barbeque pit **110** to the ground, such that the entire barbeque pit **110** (including the legs of the barbeque pit **110**) is covered by the container portion **106**.

[0038] FIG. **9** illustrates yet another embodiment of the present invention, where the structure **100** in FIG. **8** has been modified for use in a different application as a furniture cover. The structure **100***a* in FIG. **9** has the same general construction as the structure **100** in FIG. **8**, except that the loop member is generally rectangular and is sized and configured to cover a piece furniture **112** (e.g., a couch), and that the container portion **106***a* has one larger end **114** to accommodate the raised portion of the furniture **112**. As a result, the same numeral designations are used in FIG. **9** for the same elements as the designations used in FIG. **8**, except that an "a" has been added to the same elements in FIG. **9**. In one embodiment as shown in FIG. **9**, the loop member is designed to provide a snug friction fit with the outer wall of the furniture **112**. In another embodiment, the loop member can be designed to extend past the widest diameter of the furniture **112**, so that the entire furniture **112** is covered by the container portion **106***a*.

[0039] The loop member **102** and its accompanying container portion **106** can be twisted and folded to reduce the size of the structure **100**. The container portion **106** is compressed to make it flat against the loop member **102**, and then the loop member **102** is twisted and folded to collapse the loop member **102** into a smaller shape. In particular, opposite locations of the loop member **102** are twisted in opposite directions as shown in FIG. **10**A to collapse the loop member **102** with the container portion **106**. As shown in FIG. **10**B, the next step is to continue the collapsing so that the initial size of the loop member **102** is reduced. FIG. **10**C shows the loop member **102** and its container portion **106** collapsed into a small essentially compact configuration having a plurality of concentric frame members so that the collapsed structure **100** has a size which is a fraction of the size of the initial structure **100**.

[0040] To re-deploy the structure **100** for use, the user merely opens the loop member **102**. The natural bias of the loop member **102** will cause the loop member **102** to uncoil and return to the configuration shown in FIG. **8**. The structure **100***a* can be collapsed and re-deployed using the same techniques illustrated in FIGS. **10**A-**10**C.

[0041] It is also noted that the loop member **58** in the lids **50** and **50***a* can also be twisted and folded using the same technique illustrated above in FIGS. **10**A-**10**C.

[0042] Although FIGS. **8** and **9** illustrate the use of the structures **100**, **100***a* as covers for barbecues and furniture, the same structures **100**, **100***a* can be used as covers for almost any desired object, and can even used for applications other than as a cover.

[0043] While the description above refers to particular embodiments of the present invention, it will be understood that many modifications may be made without departing from the spirit thereof. The accompanying claims are intended to cover such modifications as would fall within the true scope and spirit of the present invention.

1-12. (canceled)

13. A collapsible structure comprising:

a coiled wire supporting a covering which is attached to the wire to define an internal space, the coiled wire and its covering having a first end and a second end, the first end having a first edge that defines an opening; and

an amusement item positioned in the opening and coupled to the first end.

14. The structure of claim **13**, further including at least one connector for coupling the amusement item to the first end.

15. The structure of claim **13**, further including a door provided in the covering adjacent the second end.

16. A collapsible structure, comprising:

a loop member that defines an opening; and

a container portion having an enclosing wall that is made from a soft and foldable material, the enclosing wall defining an interior space and attached to the loop member in a manner such that the interior space is accessed by the opening.

17. The structure of claim **16**, further including a peripheral sleeve that retains the loop member, the peripheral sleeve attached to the enclosing wall.

18. The structure of claim **16**, wherein the opening is circular.

19. The structure of claim **16**, wherein the opening is rectangular.

* * * * *