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(12) **United States Patent**
Zheng

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(54) **COLLAPSIBLE SUPPORT FRAMES**

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(73) Assignee: **Patent Category Corp.**, Walnut, CA (US)

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(52) **U.S. Cl.** **160/354**; 160/351; 160/377; 52/646; 135/143
(58) **Field of Search** 135/123, 125, 135/126, 128, 143; 160/351, 353, 354, 377; 446/478; 52/108, 646

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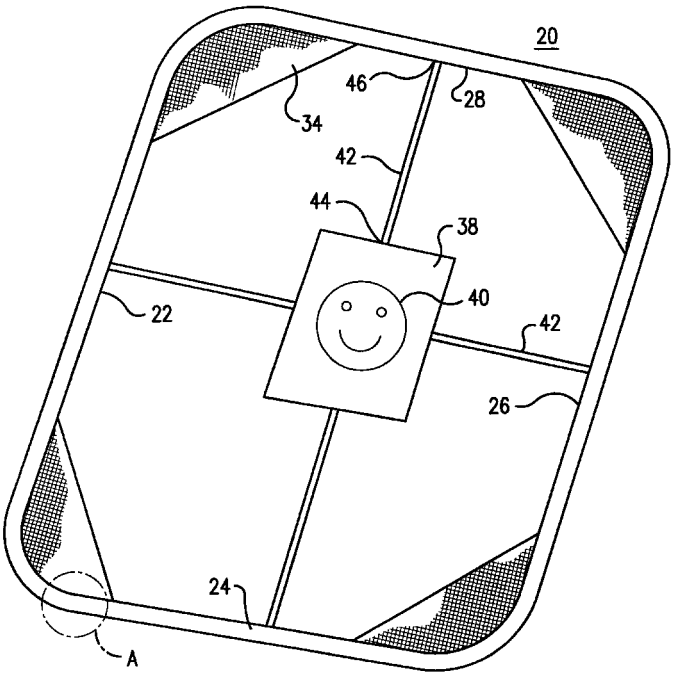
(74) *Attorney, Agent, or Firm*—Raymond Sun

(57) **ABSTRACT**

Collapsible structures are provided that have one or more support frames, each having a foldable frame member that has a folded and an unfolded orientation, with the frame member defining a periphery for the support frame. Where more than one support frame is provided, the support frames can be hingedly coupled to each other. The frame member(s) can be used, for example, to support panel pieces, objects and coverings, among others. In some embodiments, one or more objects can be coupled to and supported by the support frame(s). In other embodiments, a covering may be placed over the support frame(s).

17 Claims, 15 Drawing Sheets



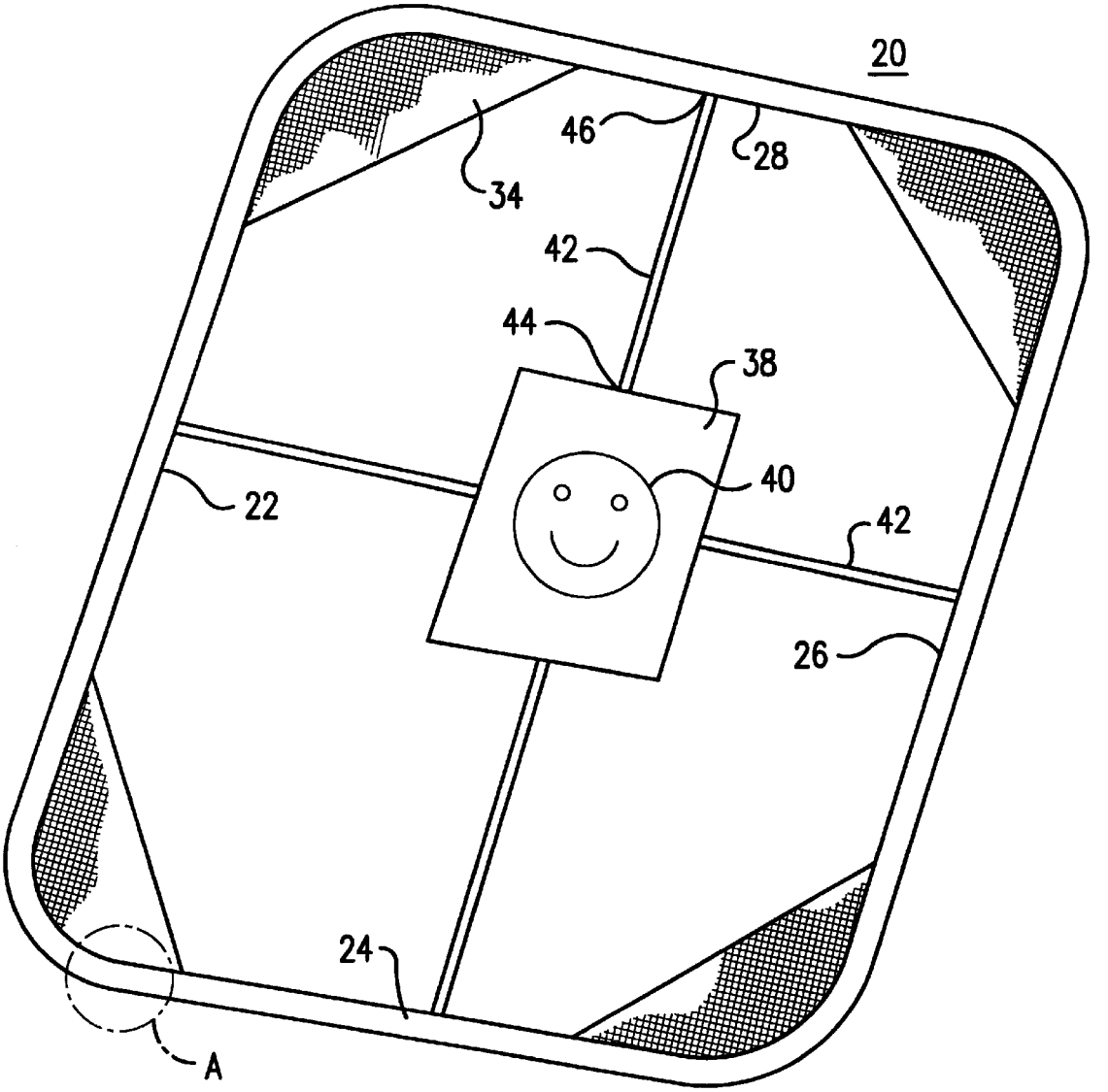


FIG. 1A

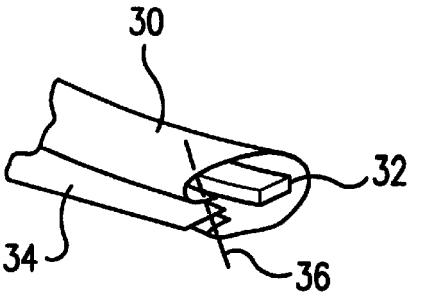


FIG. 1B

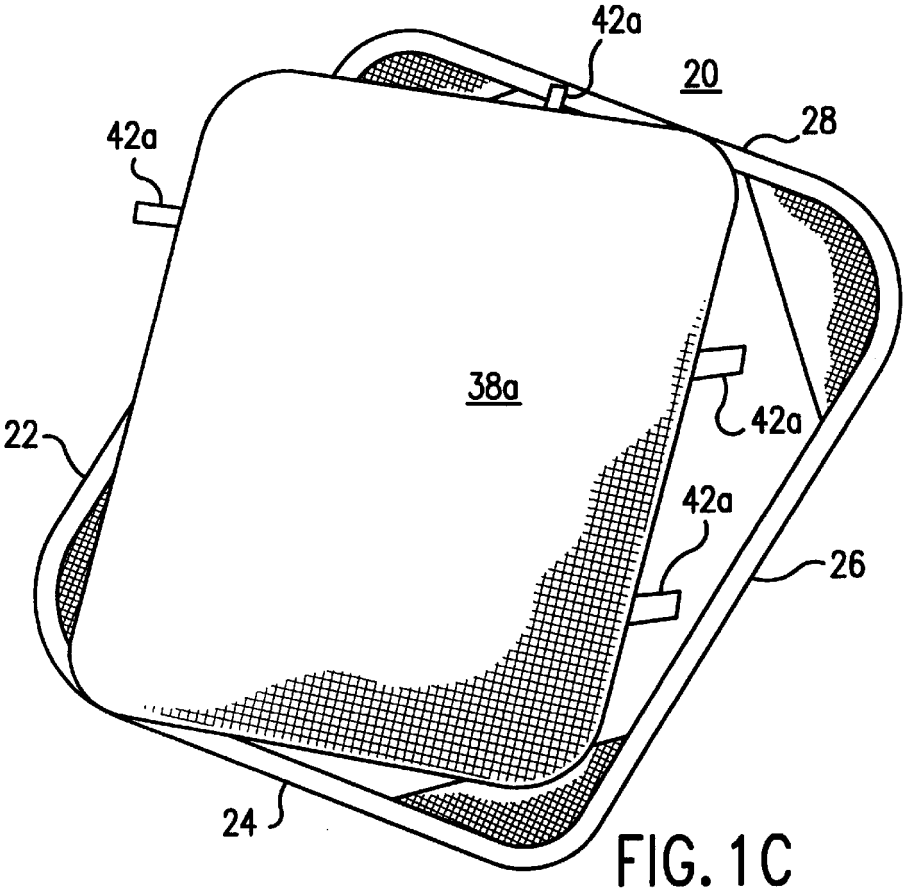


FIG. 1C

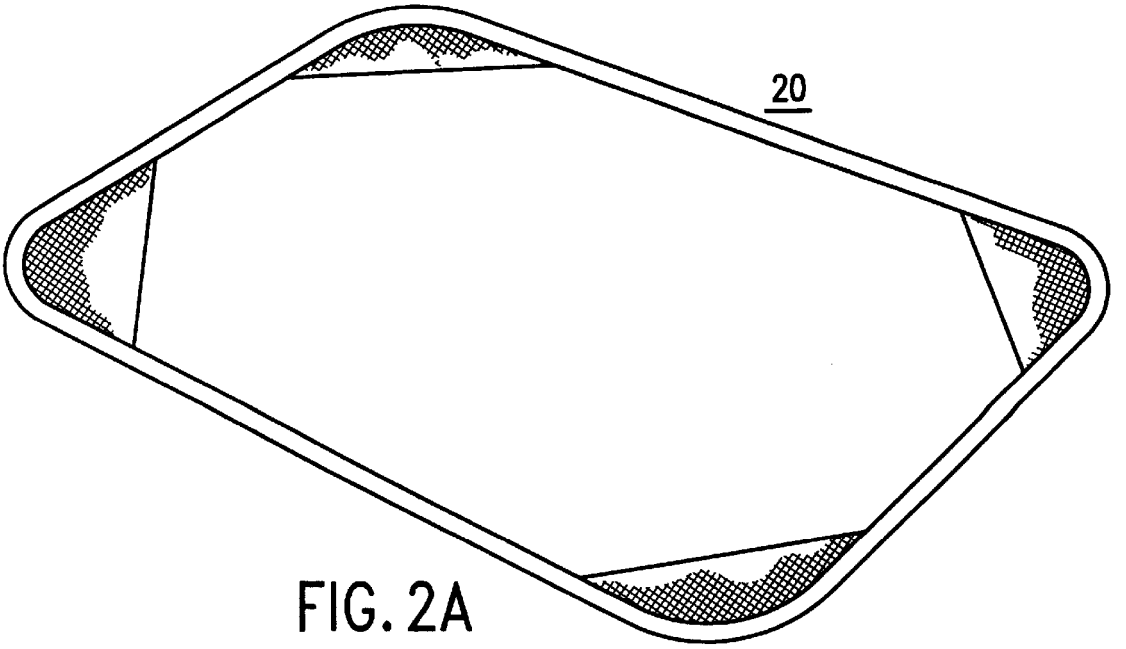


FIG. 2A

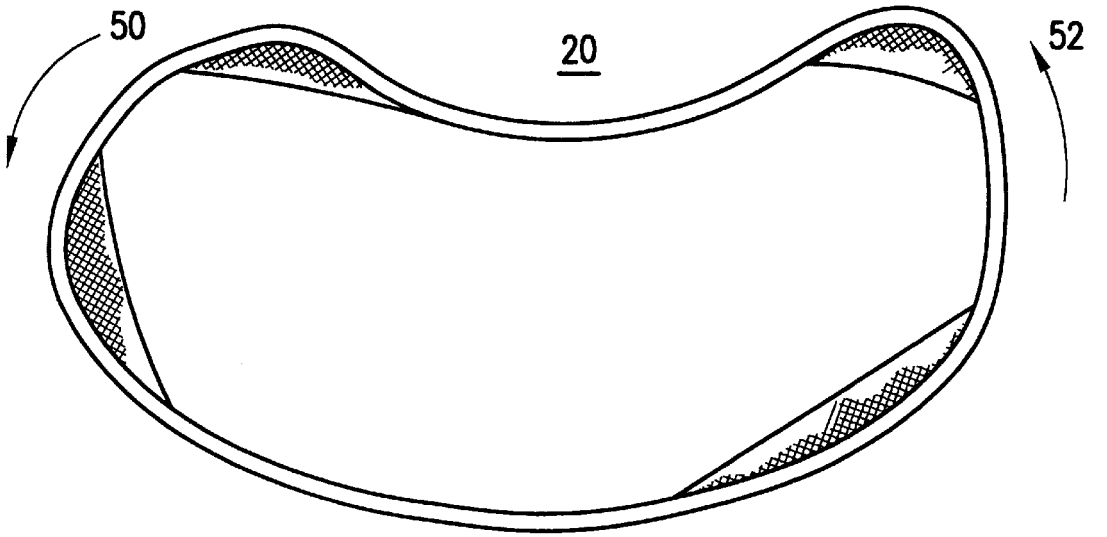


FIG. 2B

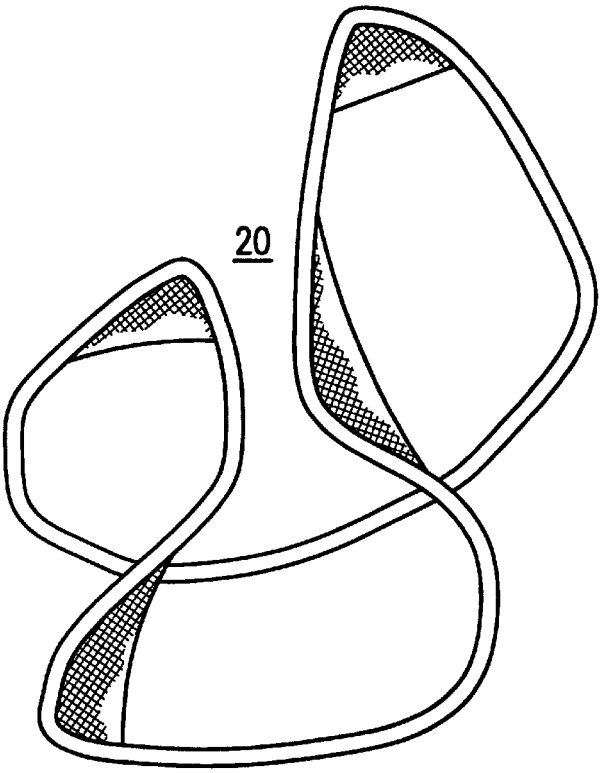


FIG. 2C

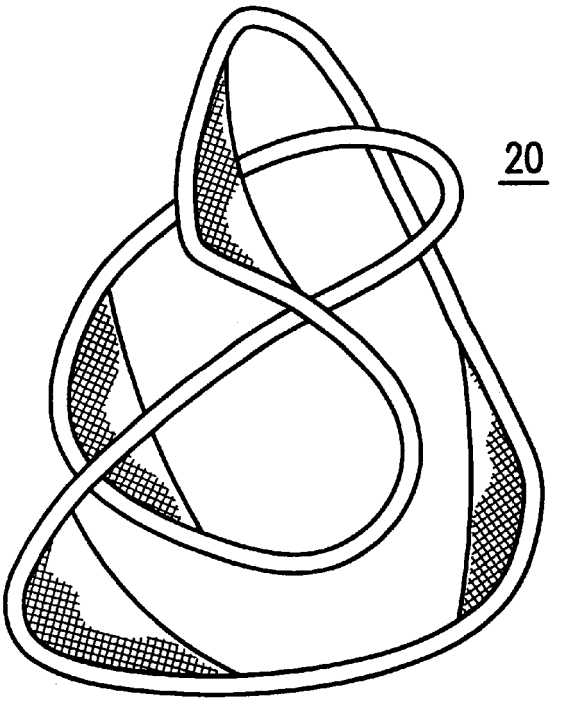


FIG. 2D

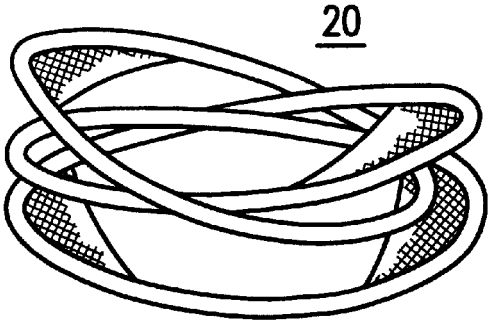


FIG. 2E

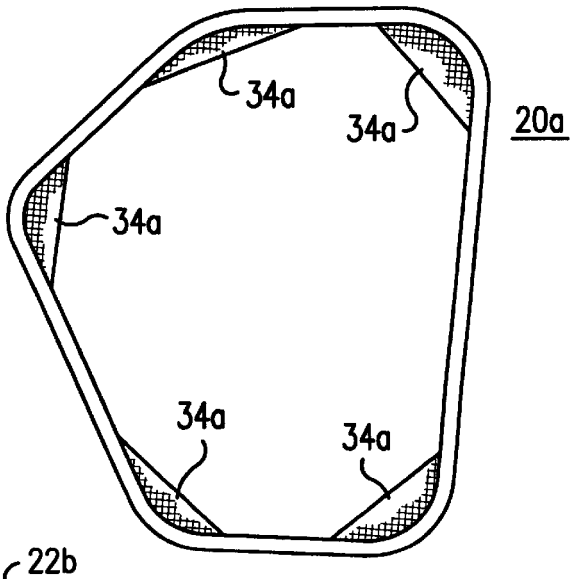


FIG.3

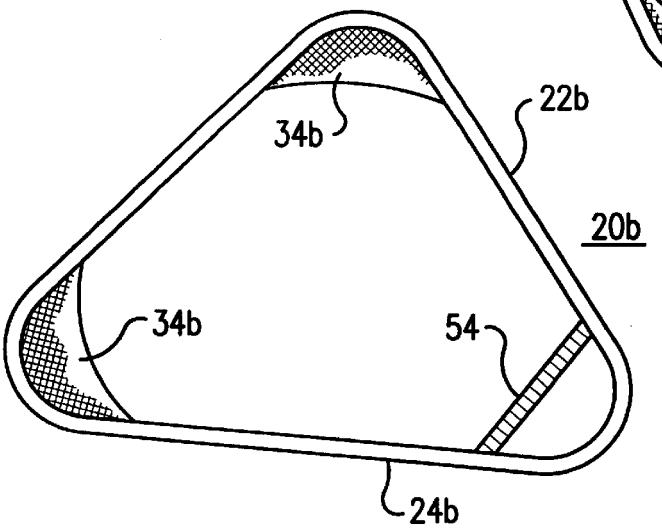


FIG.4

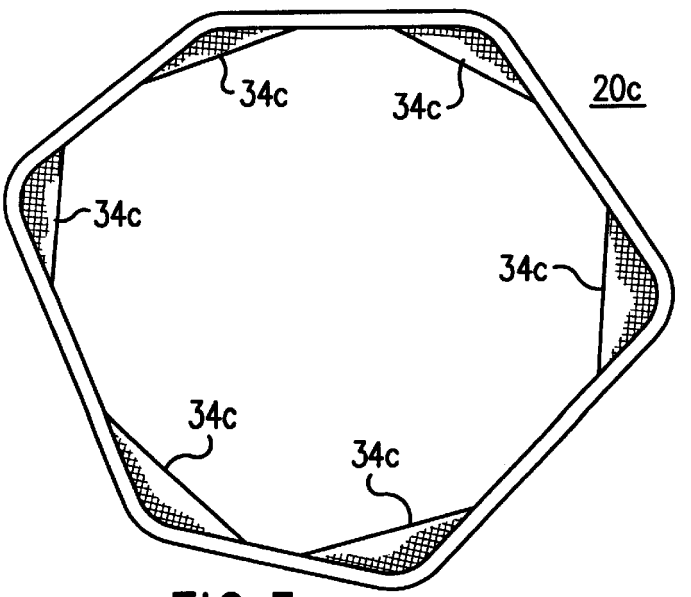


FIG.5

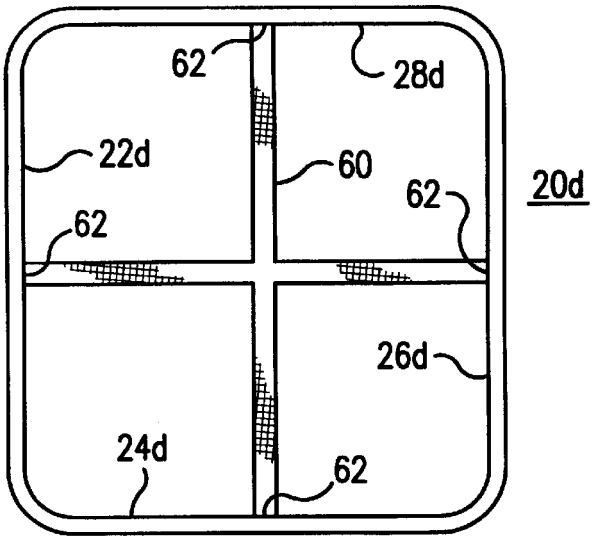

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FIG. 6A

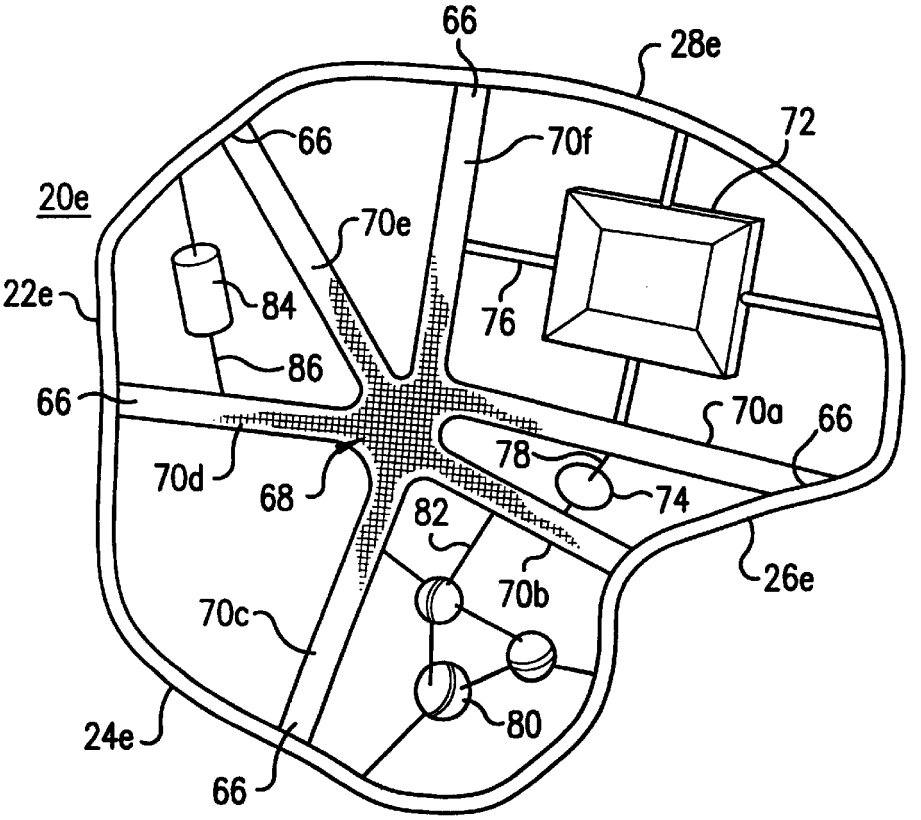
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FIG. 7

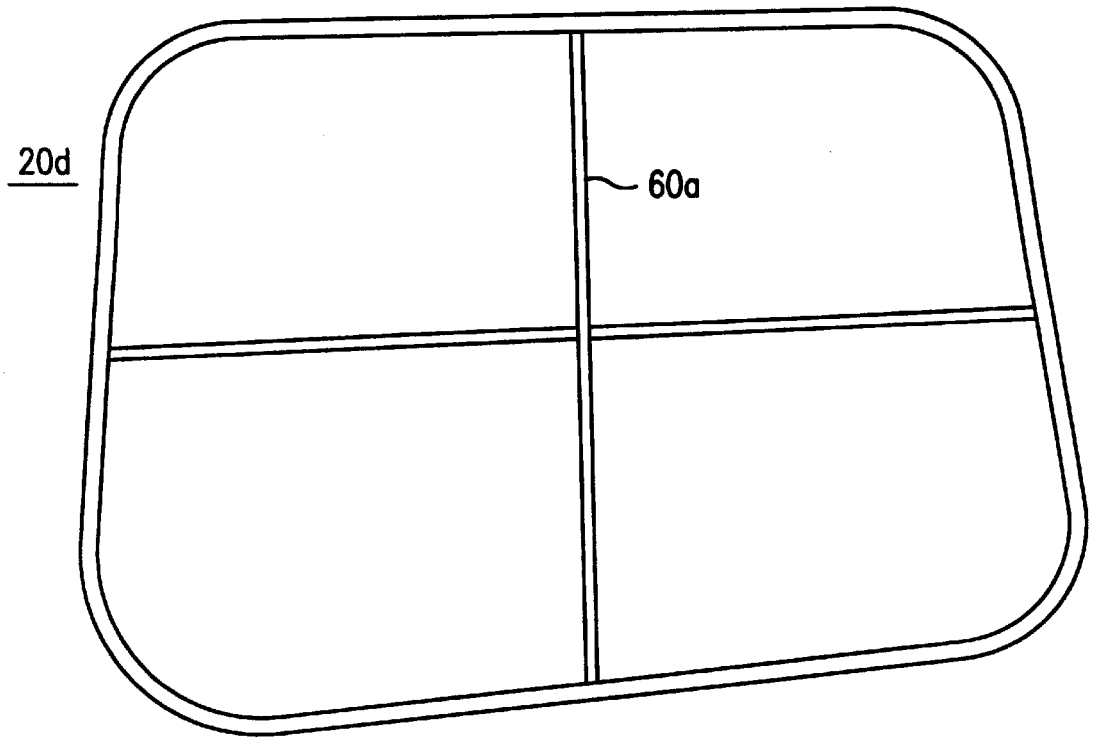

FIG. 6B

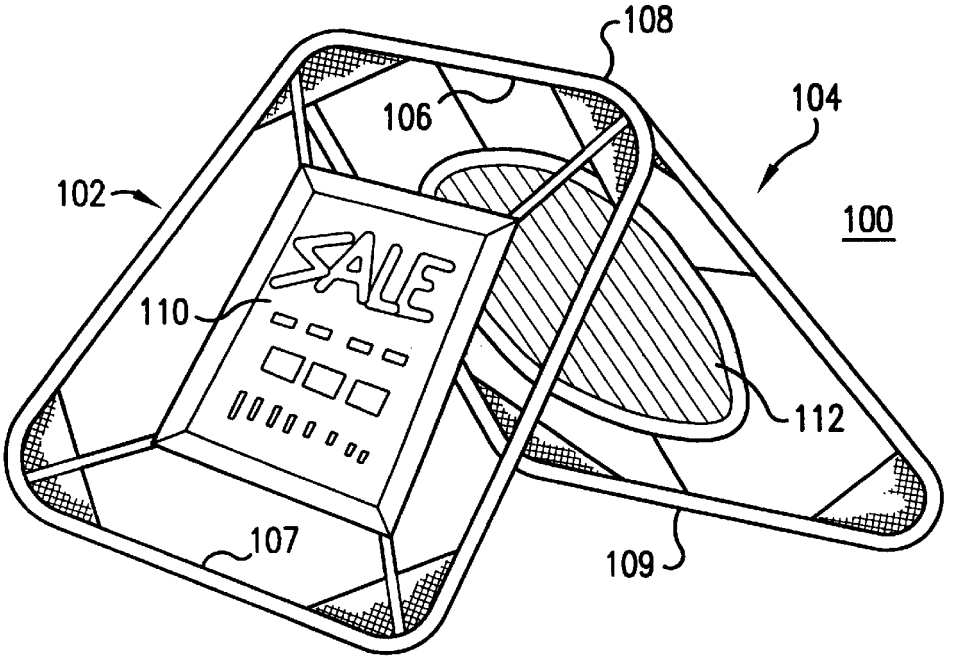

FIG. 8A

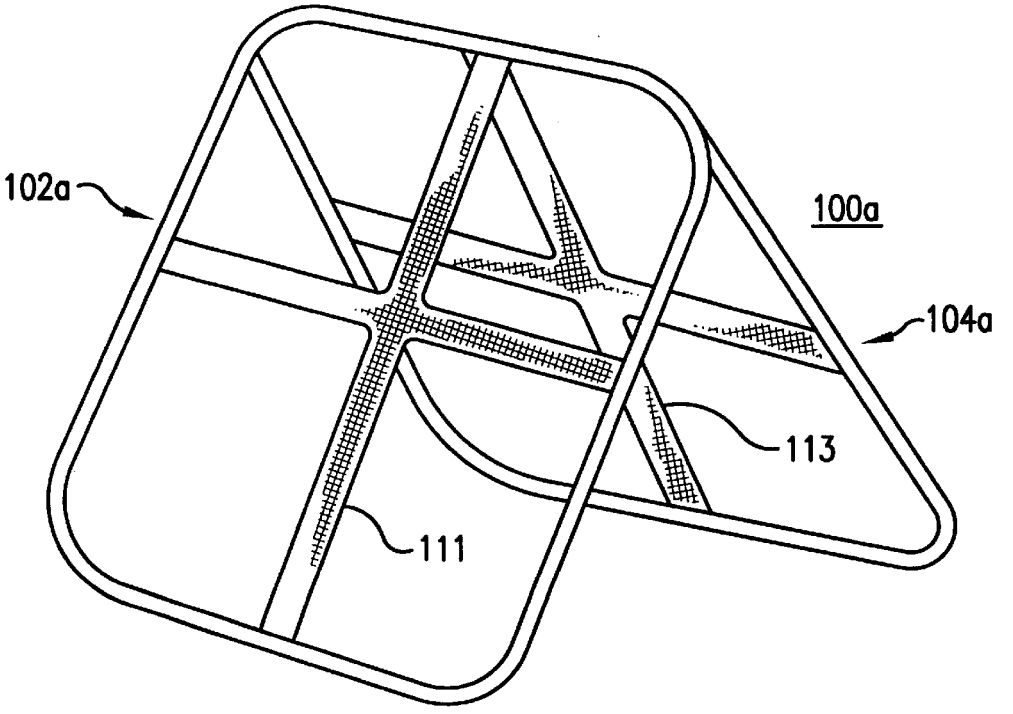

FIG. 8B

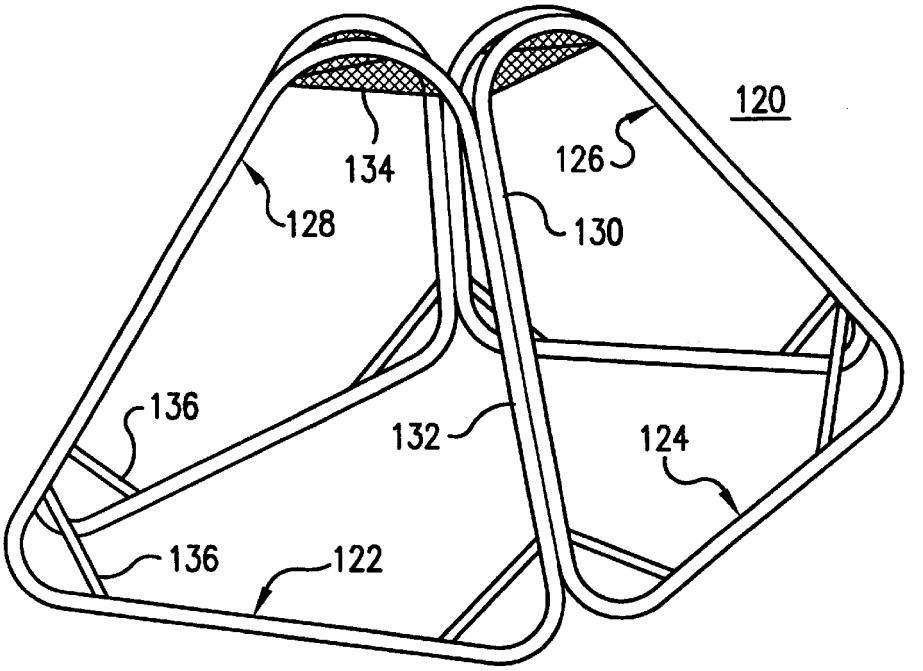
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FIG.9

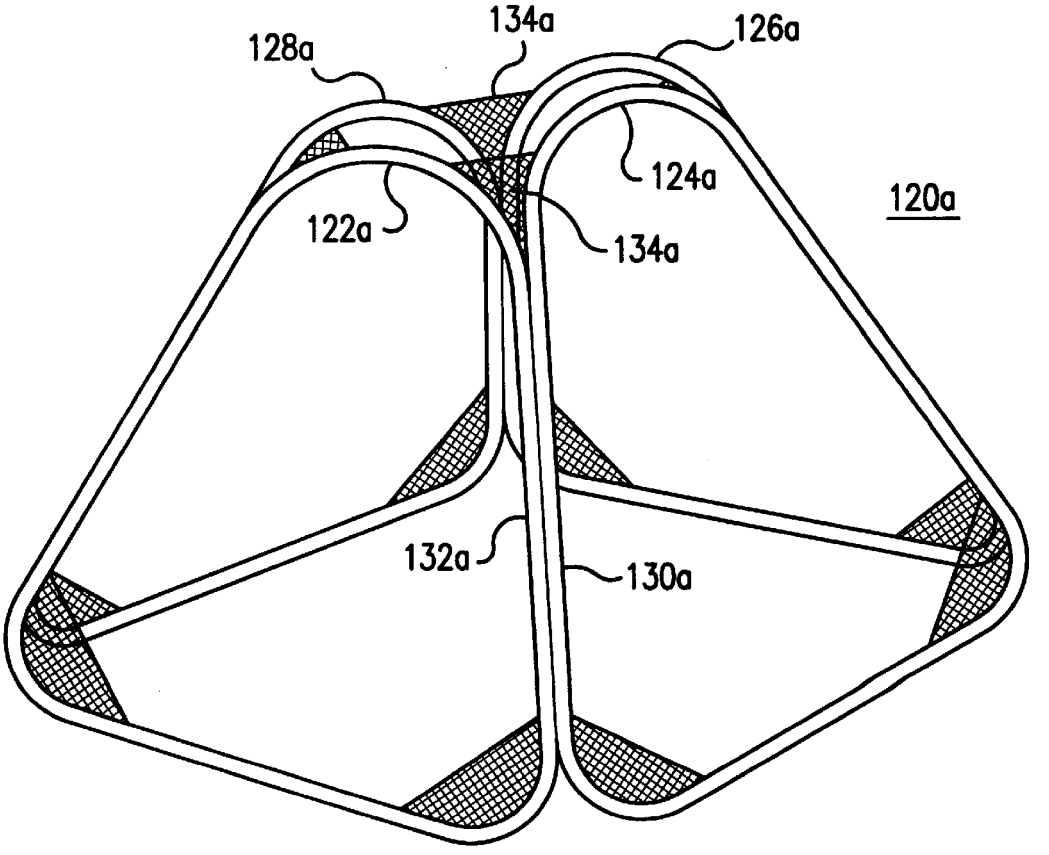
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FIG.10

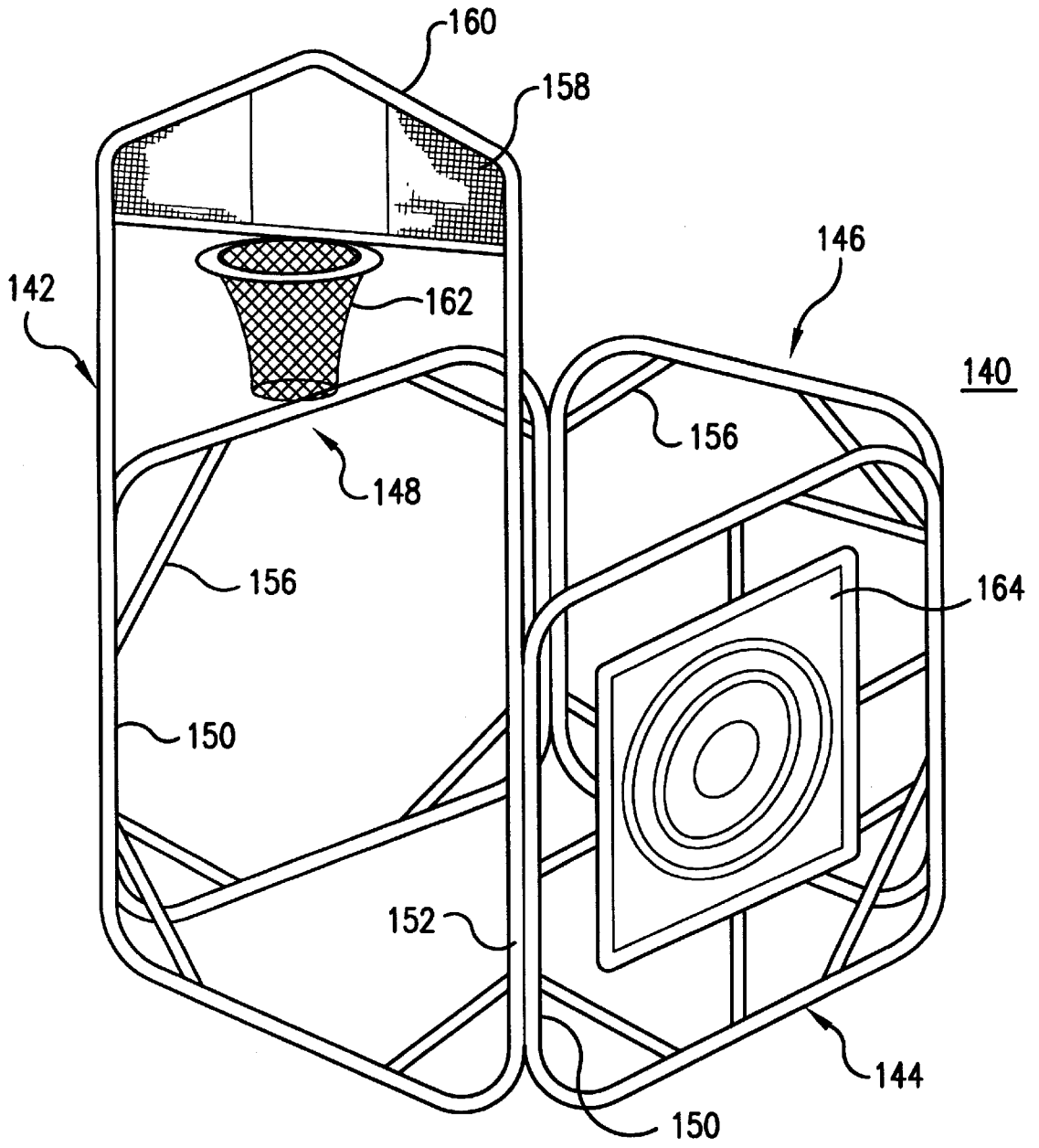

FIG. 11

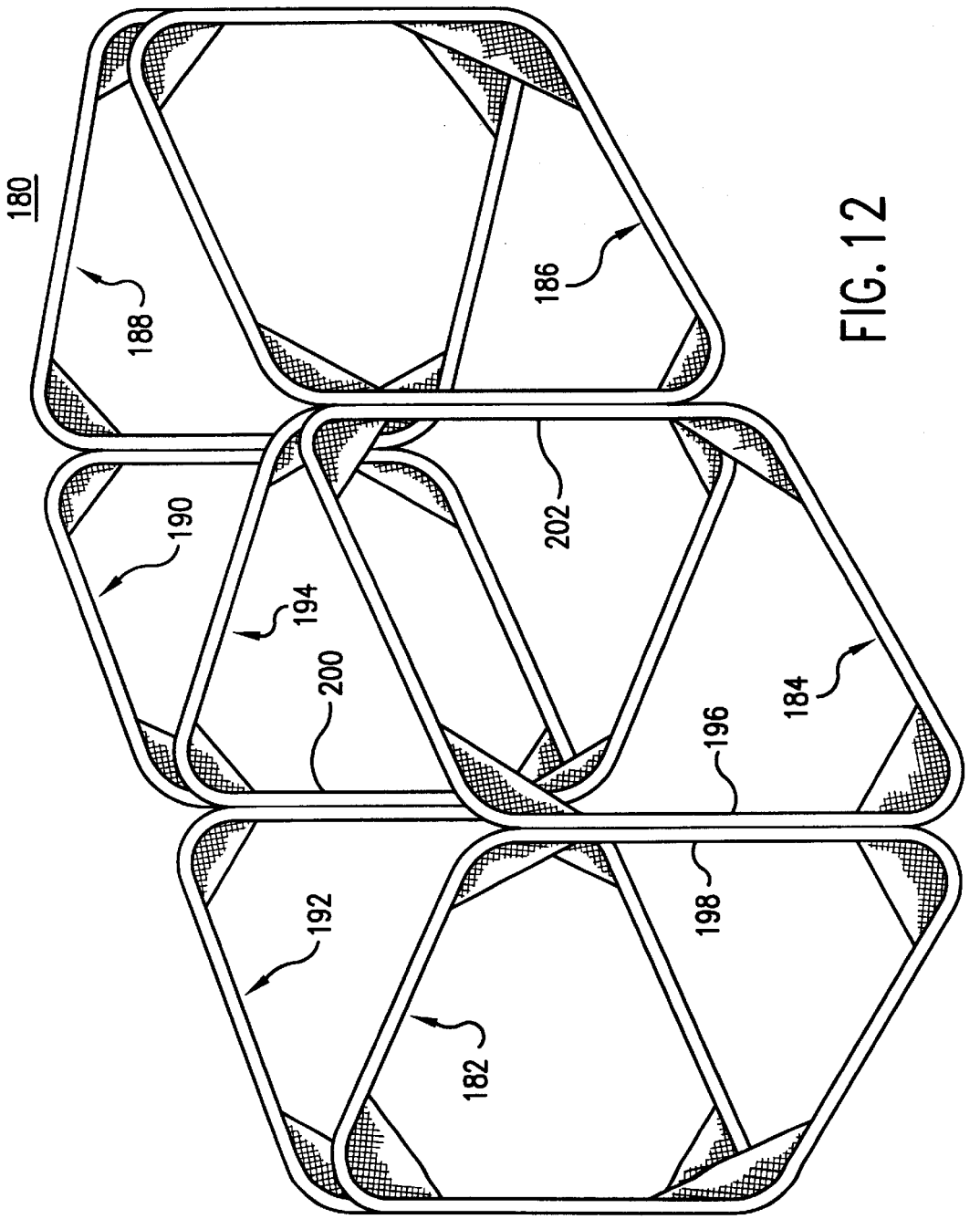

FIG. 12

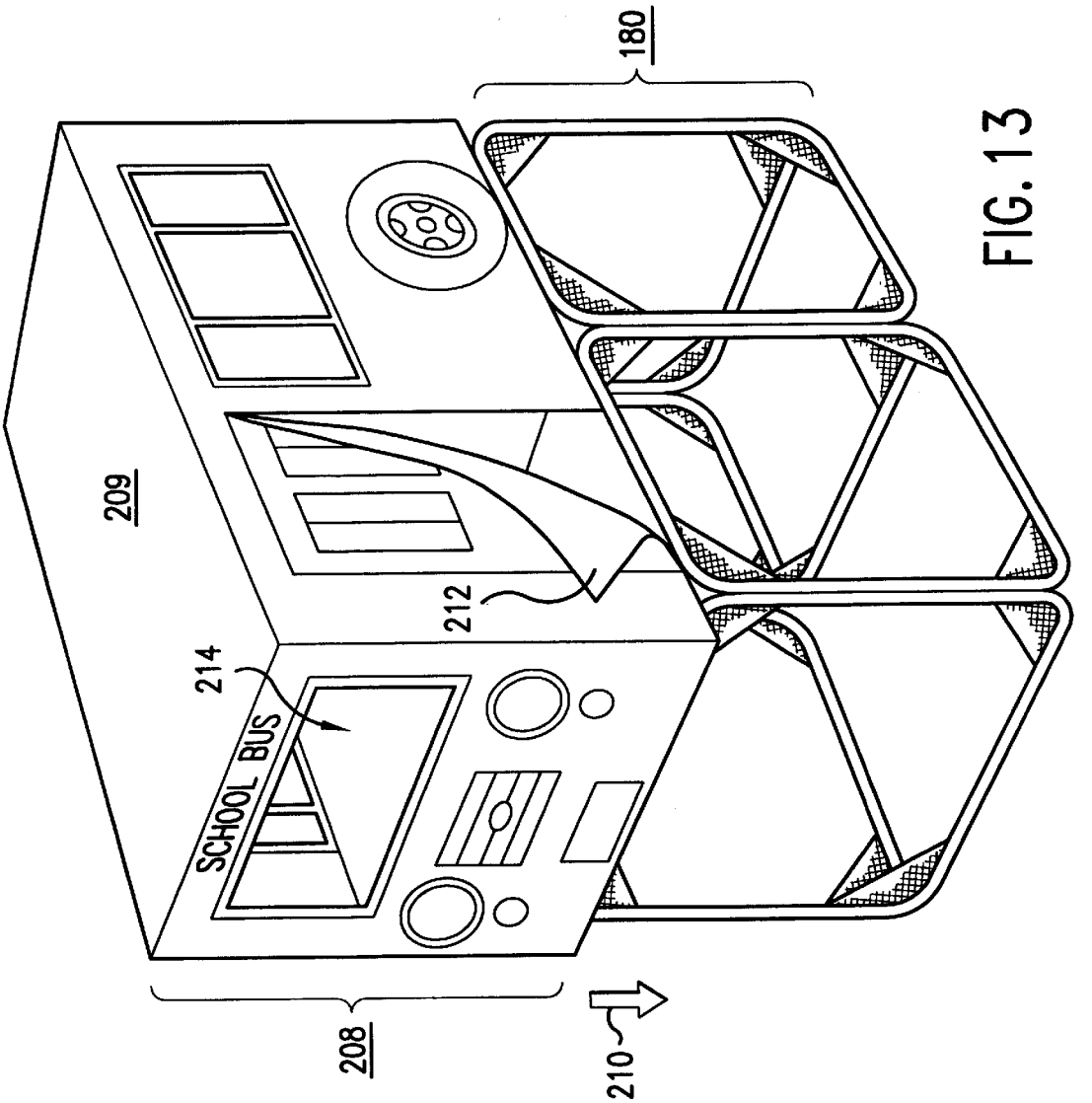

FIG. 13

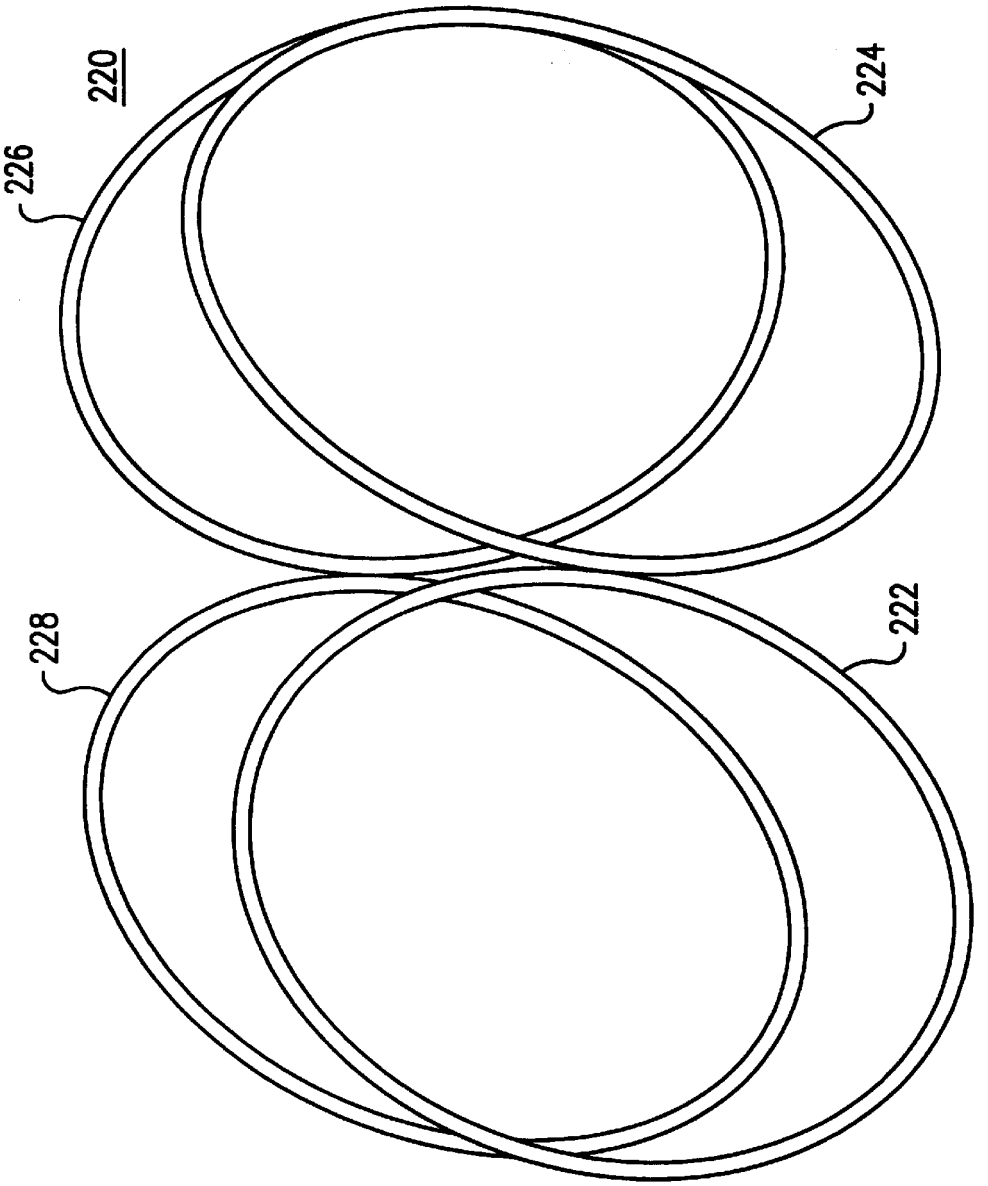

FIG. 14

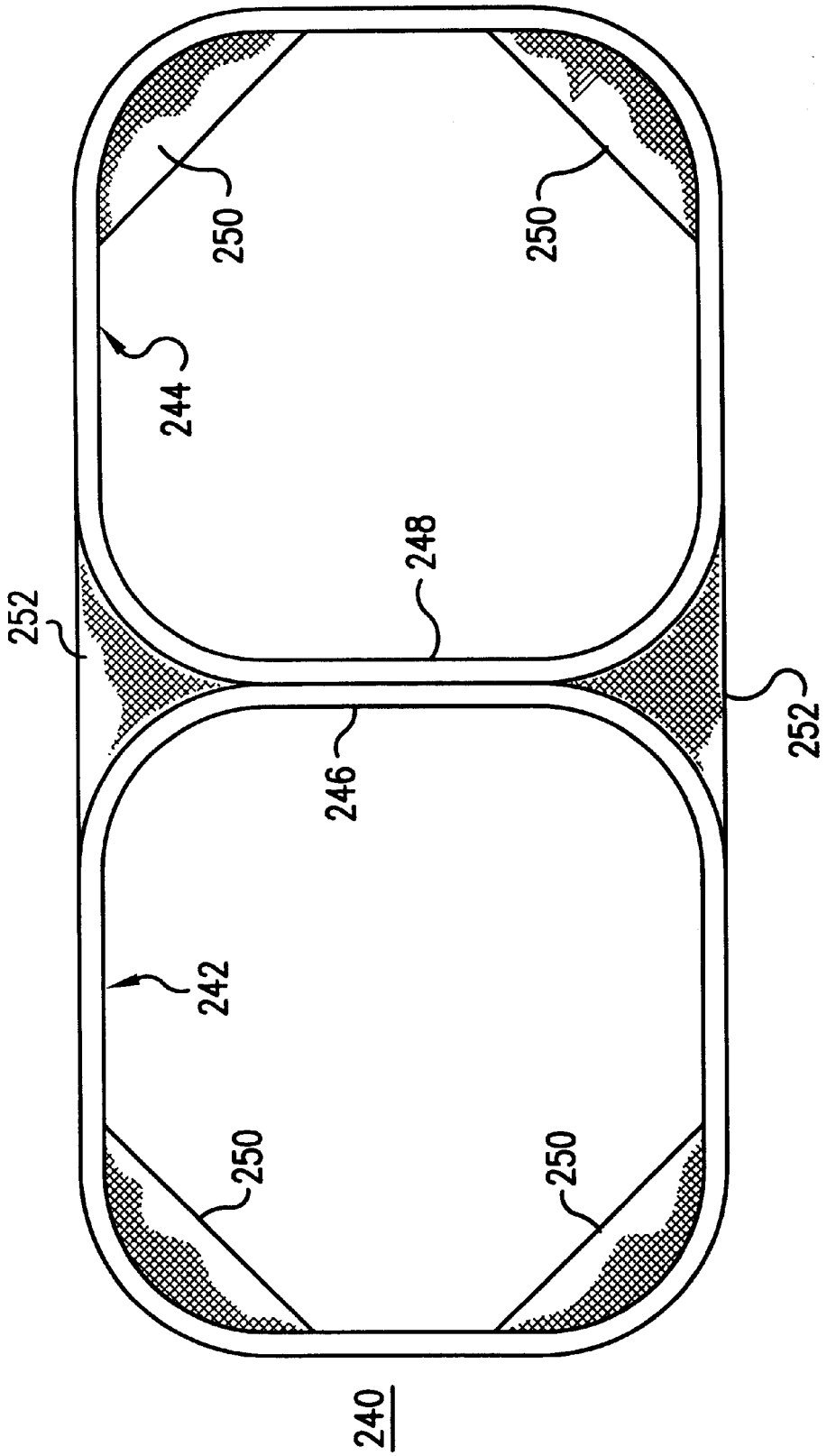

FIG. 15

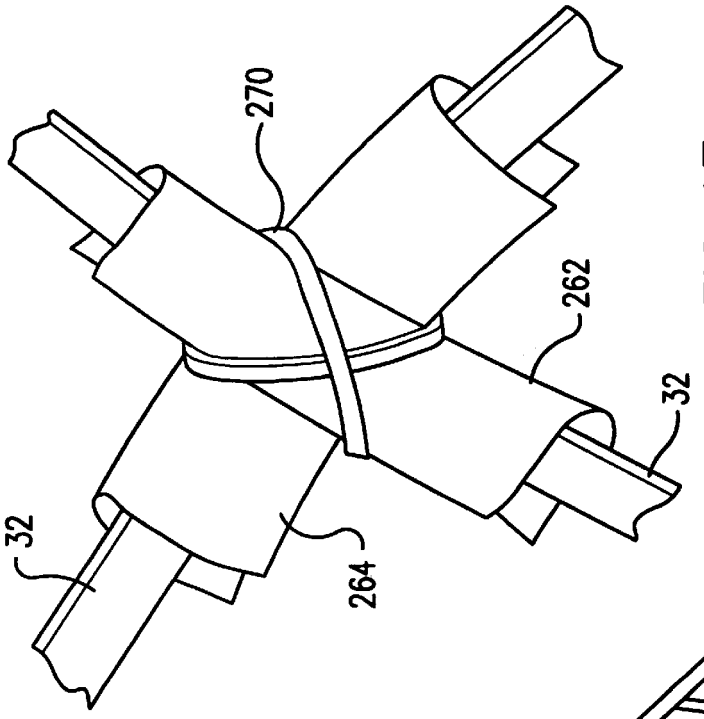

FIG. 17

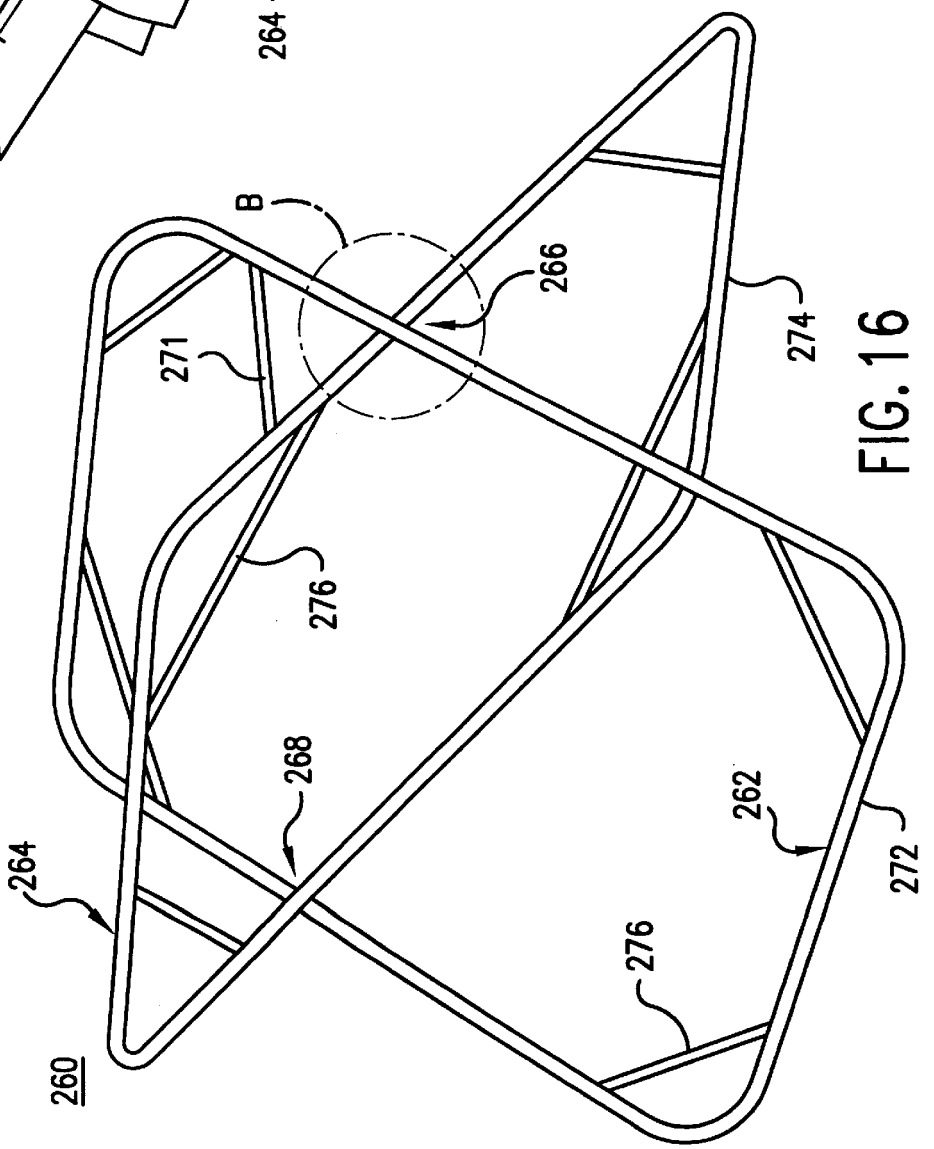

FIG. 16

COLLAPSIBLE SUPPORT FRAMES

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to collapsible structures, and in particular, to collapsible support frames that can be used to support various items, and that can be folded and collapsed to reduce the size of the frames.

2. Description of the Prior Art

Collapsible objects have recently become popular with both adults and children. Many of these collapsible objects have a plurality of panels which may be twisted and folded to reduce the overall size of the object to facilitate convenient storage and use. Each panel is comprised of a fabric or material that is supported by a resilient frame member, with the fabric or material spanning a portion of, or entirely across, the area supported by the frame member. The frame member supports the periphery of each panel, and is capable of being twisted and folded to reduce the size of each panel.

Examples of such collapsible objects are shown and described in U.S. Pat. No. 5,467,794 (Zheng), U.S. Pat. No. 5,560,385 (Zheng) and U.S. Pat. No. 5,778,915 (Zheng) in the form of collapsible structures. These structures are currently being enjoyed by many people in many different applications. For example, these structures have been provided in many different shapes and sizes for children's play indoors and outdoors. Smaller versions of these structures have been used as infant nurseries. Even smaller versions of these structures have been used as dollhouses and action figure play houses by toddlers and children. As another example, these structures have been made into tents or outdoor structures that can be used by adults and children for camping or other outdoor purposes. These structures have also been used as beach cabanas. Even animals can enjoy these structures. Some of these structures have been made into shelters that can be used by pets, both indoors and outdoors.

The wide-ranging uses for these collapsible structures can be attributed to the performance, convenience and variety that these structures provide. When fully expanded, these structures are stable and can be used as a true shelter without the fear of collapse. These structures are easily twisted and folded into a compact configuration to allow the user to conveniently store the structures. The light-weight nature of the materials used to make these structures makes it convenient for them to be moved from one location to another. These structures also provide much variety in use and enjoyment. For example, a child can use a structure both indoors and outdoors for different play purposes, and can use the same structure for camping.

Another example of collapsible objects include collapsible game and play structures, such as those illustrated in U.S. Pat. No. 5,722,446 (Zheng) and U.S. Pat. No. 5,816,954 (Zheng). These structures provide a multitude of game structures that can be enjoyed by children and adults indoors and outdoors.

Yet another example of a collapsible object includes collapsible sunshields, such as illustrated in U.S. Pat. No. 4,815,784 (Zheng). These sunshields have two interconnecting panels that span the width of the windscreen.

In all of the above-mentioned collapsible structures, the fabric or material is permanently attached (e.g., by stitching) to the resilient frame members so that each panel is provided with a fabric or material that cannot be changed unless the existing fabric or material is cut or torn, which essentially destroys the panel. As a result, these structures suffer from the drawback that they lack variety in play and use, since they can only be used for their originally intended applications.

However, there is a great benefit in providing users with variety of play and use to increase amusement value, and the number of applications to which a product can be used. Thus, there still remains a need to provide collapsible objects and structures that provide the user with increased variety of play, and which increase the number of useful applications for these objects and structures.

SUMMARY OF THE DISCLOSURE

In order to accomplish the objects of the present invention, the collapsible structures according to the present invention have one or more support frames, each having a foldable frame member that has a folded and an unfolded orientation, with the frame member defining a periphery for the support frame. Where more than one support frame is provided, the support frames can be hingedly coupled to each other. The frame member(s) can be used, for example, to support panel pieces, objects and coverings, among others. In some embodiments, one or more objects can be coupled to and supported by the support frame(s). In other embodiments, a covering may be placed over the support frame(s).

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1A** is a perspective view of a singular support frame according to one embodiment of the present invention shown in use in its expanded configuration;

FIG. **1B** is a partial cut-away view of the section A of the support frame of FIG. **1A** illustrating a frame member retained within a sleeve;

FIG. **1C** illustrates a modification to the embodiment of FIG. **1A**;

FIGS. **2A–2E** illustrate how the support frame of FIG. **1A** is folded and collapsed;

FIGS. **3–5** illustrate singular support frames similar to the support frame of FIG. **1A**, but having different shapes;

FIGS. **6A**, **6B** and **7** illustrate singular support frames according to other embodiments of the present invention shown in use in their expanded configuration;

FIGS. **8–11** illustrate collapsible support frame structures having a plurality of singular support frames according to other embodiments of the present invention shown in use in their expanded configuration;

FIG. **12** illustrates a collapsible support frame structure having a plurality of singular support frames according to yet another embodiment of the present invention shown in use in its expanded configuration;

FIG. **13** illustrates how a covering fabric can be supported by the support frame structure of FIG. **12**;

FIGS. **14** and **15** illustrate collapsible support frame structures having a plurality of singular support frames according to further embodiments of the present invention shown in use in their expanded configuration;

FIG. **16** illustrates a collapsible support frame structure having a plurality of crossing singular support frames according to yet a further embodiment of the present invention shown in use in its expanded configuration; and

FIG. **17** is a partial cut-away view of the section B of the support frame structure of FIG. **16**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

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.

The present invention provides collapsible objects and structures that have an underlying support frame structure. The support frame structure has at least one resilient frame member that can be folded and collapsed to reduce the size of the support frame structure. The frame member(s) can be used, for example, to support one or more removable panel pieces or objects, or to support a removable covering. The principles of the present invention can be used to provide collapsible support frame structures for sunshields, dividers, partitions, play structures, game structures, shelters, tents, cabanas, displays, cabinets, or the like.

FIGS. **1**A and **1**B illustrate a collapsible support frame structure **20** that embodies the underlying principles of the present invention. Referring to FIG. **1**A, the support frame structure **20** is actually a singular support frame **20**. The support frame **20** can assume any configuration, such as polygonal (see FIGS. **3** and **5**), triangular (see FIG. **4**), circular, oval, rectangular, square (as shown in FIG. **1**A), trapezoidal, or irregular. The support frame **20** has four side edges, a left side edge **22**, a bottom side edge **24**, a right side edge **26**, and a top side edge **28**. Referring also to FIG. **1**B, the support frame **20** has a continuous frame retaining sleeve **30** provided along and traversing the four edges of its four sides. A continuous frame member **32** is retained or held within the frame retaining sleeve **30** to support the support frame **20**.

The continuous frame member **32** may be provided as one continuous loop, or may be a strip of material connected at both ends to form a continuous loop. The frame member **32** is preferably formed of flexible coilable steel, although other materials such as plastics may also be used. The frame member **32** should be made of a material which is relatively strong and yet is flexible to a sufficient degree to allow it to be coiled. Thus, the frame member **32** is capable of assuming two positions, an open or expanded position such as shown in FIG. **1**A, or a folded position in which the frame member **32** is collapsed into a size which is much smaller than its open position (see FIG. **2**E).

The frame member **32** may be merely retained within the frame retaining sleeve **30** without being connected thereto. Alternatively, the frame retaining sleeve **30** may be mechanically fastened, stitched, fused, or glued to the frame member **32** to retain the frame member **32** in position.

Optional fabric corner pieces **34** can be attached to and held taut at the corners of the support frame **20**. The term fabric is to be given its broadest meaning and should be made from strong, lightweight materials and may include woven fabrics, cloth, sheet fabrics, straps, nylon, string, rope or even films. These corner pieces **34** function to provide the support frame **20** with a pre-defined configuration, especially if the support frame **20** is large in size. For example, if corner pieces **34** were omitted from the support frame **20** and the support frame **20** was large, the resilient nature of the frame member **32** may cause the support frame **20** to coil into an undefined shape. Therefore, providing four corner pieces **34** as shown in FIG. **1**A would define a generally square or rectangular support frame **20**, providing three corner pieces **34** would define a generally three-sided support frame (see FIG. **4**), and so on, as will be illustrated in greater detail in connection with FIGS. **3**–**5** below.

As best illustrated in FIG. **1**B, the frame retaining sleeve **30** may be attached to each fabric corner piece **34** by applying a stitching **36** that extends along a portion of the side edges **22**, **24**, **26**, **28**. The stitching **36** is also applied to enclose the frame retaining sleeve **30** at the other portions of the side edges **22**, **24**, **26**, **28** where no corner pieces **34** or other fabric are attached thereto.

A removable panel piece **38** may be supported from the support frame **20**. The panel piece **38** can be of any size (i.e., it can even be large enough to cover the entire support frame **20**, as shown by panel piece **38***a* in FIG. **1**C) and can take the form of a fabric piece having a message, sign, indicia, illustration, amusement feature (e.g., netting or basket or bulls-eye target, etc.), game feature, or anything else provided thereon. For example, the panel piece **38** is illustrated in its simplest form in FIG. **1**A as having an indicia or illustration **40** provided or printed on one or both surfaces. The panel piece **38** can have any shape or size, and is provided with a plurality of attachment mechanisms **42** (such as straps, strings, ropes, ties, hooks, opposing Velcro™ pads, etc.) that couple the panel piece **38** to the sides **22**, **24**, **26**, **28** of the support frame **20**, yet allows the panel piece **38** to be detached therefrom when desired. For example, FIG. **1**A shows the use of strings **42** that have one end **44** permanently attached (e.g., by stitching) to the panel piece **38** and an opposing free end **46** that can be tied to the support frame **20**. As another example, Velcro™ pads or straps **42***a* can be permanently attached (e.g., by stitching) to the panel piece **38***a* in FIG. **1**C for coupling to the support frame **20**. Although certain attachment mechanisms **42** are illustrated herein, it is possible to use any known and conventional attachment mechanism that is adapted for use with the specific size, shape and other requirements of the panel piece **38**.

Thus, the user can conveniently replace the panel piece **38** shown in FIG. **1**A with a different panel piece that has a different display, or game, or feature, by simply untying or detaching the attachment mechanisms **42** from the support frame **20**, removing the panel piece **38**, and securing a different panel piece to the support frame **20**. This allows the same support frame **20** to be used for supporting different panel pieces **38**. In addition, even though only one panel piece **38** is illustrated in FIG. **1**A, it is possible for the support frame **20** to support a plurality of panel pieces **38**, as illustrated in the other embodiments below.

The support frame **20** can also be folded and collapsed into a compact configuration for storage, as illustrated in FIGS. **2**A–**2**E. FIG. **2**A shows the support frame **20** without the panel piece **38**, ready to be folded. First, as shown in FIG. **2**B, two opposite sides of the support frame **20** are folded in opposite directions (see arrows **50** and **52**) cause the support frame **20** to be coiled and collapsed (see FIG. **2**C). As shown in FIG. **2**D, the collapsing is continued so that the initial size of the support frame **20** is reduced. Finally, the support frame **20** is collapsed on itself to provide for a small essentially compact configuration having a plurality of concentric frame members **32** so that the collapsed support frame **20** has a size which is a fraction of the size of the initial support frame **20**, as shown in FIG. **2**E. Thus, the support frame **20** can be folded and stored very quickly using the steps illustrated in FIGS. **2**A–**2**E.

To re-open the support frame **20** to its expanded configuration, the collapsed support frame **20** is unfolded. The memory (i.e., spring-load) of the frame member **32** will cause the frame member **32** to uncoil on its own and quickly expand the support frame **20** to the expanded configuration shown in FIG. **1**A. The above-described methods and principles for folding and collapsing a support frame **20**, and for re-opening the support frame **20** to deploy it for use, can be applied to all the embodiments illustrated hereinbelow.

FIG. **3** illustrates a singular support frame **20***a* that is the same as support frame **20** of FIG. **1**A, except that support frame **20***a* has five sides defined by the five corner pieces **34***a*. Similarly, FIG. **4** illustrates a singular support frame **20***b* that is the same as support frame **20** of FIG. **1**A, except that support frame **20***b* has three sides defined by the three corner pieces **34***b*. Note that one of the corner pieces **54** is provided in the form of a strap that is held taut between the two adjacent sides **22***b* and **24***b*. Similarly, FIG. **5** illustrates a singular support frame **20***c* that is the same as support frame **20** of FIG. **1**A, except that support frame **20***c* has six sides defined by the six corner pieces **34***c*. Panel pieces **38** are not shown in FIGS. **3–5**, **9**, **10**, **12** and **14–16** to simplify those illustrations, but it is intended that any of the support frames in these FIGS. can be used to support one or more panel pieces **38**.

In the support frames **20**, **20***a*, **20***b* and **20***c* described above, the panel piece **38** can be supported from the sides of the support frame itself. However, to increase the number of panel pieces **38** that can be supported by a support frame, and to allow for variations in how these panel pieces **38** can be arranged in a support frame, it is possible to provide one or more support pieces, such as **60** in FIG. **6**A. Referring to FIG. **6**A, a singular support frame **20***d* is provided that is the same as support frame **20** of FIG. **1**A, except that the corner pieces **34** have been omitted, and instead, a cross-shaped support piece **60** having four legs is provided. Each leg of the support piece **60** has an end **62** that is attached (e.g., in a permanent manner by stitching, or in a detachable manner by Velcro™ pads, straps, ties, hooks or similar mechanisms) to a separate side **22***d*, **24***d*, **26***d* and **28***d* of the support frame **20***d*. The support piece **60** and its legs also help to define the shape of the support frame **20***d*, since the four separate ends **62** each define one side of the support frame **20***d*. The support piece **60** can be made of a durable fabric, wire, strap, rubber, or soft plastic material. For example, the support piece **60***a* in FIG. **6**B can be either a wire, strap, rubber piece or soft plastic piece. The support piece **60** or **60***a* can be used alone, or together with the support frame **20***d*, to support one or more panel pieces or items.

This is illustrated in greater detail in FIG. **7**, where the singular support frame **20***e* has an irregular shape that is defined by the various ends **66** of the support piece **68**. The support frame **20***e* is essentially the same as support frame **20***d* of FIG. **6**, except that the support piece **68** has an irregular shape having six separate legs **70**, each having different lengths to cause the support frame **20***e* to assume the irregular configuration shown in FIG. **7**. For example, leg **70***a* is longer than leg **70***b*, which causes the same "side" **26***e* to be curved in several locations. A large variety of items can be supported by the support frame **20***e* and the support piece **68**. For example, a picture frame **72** can be supported by attaching straps, strings or ties **76** to the picture frame **72** and the sides **26***e* and **28***e* of support frame **20***e*, and legs **70***a* and **70***f* of support piece **68**. A rotating ball **74** can be supported by a shaft **78** that has opposing ends attached to legs **70***a* and **70***b*. An arrangement of rotating balls **80** can be supported by shafts, strings or ties **82** that have opposing ends attached to sides **24***e* and **26***e* and to legs **70***b* and **70***c*. A rotatable tin can **84** or other object can be supported by a shaft or string **86** that has opposing ends attached to leg **70***d* and side **22***e*. Thus, as shown in FIG. **7**, some items (such as picture frame **72**, the arrangement of balls **80**, and tin can **84**) are supported by both a side of the support frame **20***e* and a leg of the support piece **68**, while other items (such as ball **74**) is supported by two or more adjacent legs **70** of the support piece **68** without support from the support frame **20***e*.

The support frame structures of the present invention can have two or more support frames. Referring to FIG. **8**A, the support frame structure **100** has two support frames **102** and **104**, each of which can have the same construction as support frame **20** of FIG. **1**A. Each support frame **102**, **104** has four sides, and are hingedly coupled together along their top sides **106** and **108**, respectively. This hinged coupling can be accomplished in a permanent manner by stitching the frame retaining sleeves of the support frames **102**, **104** along the top sides **106**, **108**, or in a detachable manner by using a detachable attachment mechanism such as Velcro™ pads, ties, straps, hooks and similar mechanisms. When coupled in the manner shown in FIG. **8**, the support frames **102**, **104** together form an inverted V-shape structure with each support frame **102**, **104** angled with respect to the ground and each other, and with a bottom side **107**, **109** of each support frame **102**, **104**, respectively, adapted to rest on the ground or surface. Each support frame **102**, **104** can support one or more panel pieces **110**, **112**, respectively, that can be coupled to the support frames **102**, **104** according to the techniques described above. In this embodiment, the panel piece **110** can display a "sale" sign, and the other panel piece **112** can display another message.

The support frame structure **100** of FIG. **8**A can be folded and collapsed by first folding one support frame **102** or **104** on to the other support frame **104** or **102** about the hinged coupling of the top sides **106**, **108** to create a stack of two support frames **102**, **104**. This stack of two support frames **102**, **104** can then be twisted and folded according to the method of FIGS. **2**A–**2**E.

FIG. **8**B illustrates a modification that can be made to the structure **100** of FIG. **8**A. In FIG. **8**B, the structure **100***a* is essentially the same as structure **100**, except that each support frame **102***a*, **104***a* is provided with a cross-shaped support piece **111** and **113**, respectively, similar to support piece **60** in FIG. **6**A. Objects and panel pieces can be supported from these support pieces **111**, **113** and the support frames **102***a*, **104***a*.

FIG. **9** illustrates a four-sided support frame structure **120** having four support frames **122**, **124**, **126** and **128**, each of which can have the same construction as support frame **20** of FIG. **1**A but having a different shape. Each support frame **122**, **124**, **126**, **128** has three sides, and the left side **130** of each support frame **122**, **124**, **126**, **128** is hingedly coupled to a right side **132** of an adjacent support frame to form an enclosed space inside the four support frames **122**, **124**, **126**, **128**. These hinged couplings can also be accomplished in a permanent manner or in a detachable manner by using the mechanisms described above. Three corner pieces (which can be fabric pieces **134** or straps **136**) are provided at the three corners of each support frame **122**, **124**, **126**, **128**. Each support frame **122**, **124**, **126**, **128** can support one or more panel pieces (not shown) that can be coupled to the support frames **122**, **124**, **126**, **128** according to the techniques described above. For example, a user can provide a panel piece that completely covers a frame to act as a side wall. In this manner, if each support frame **122**, **124**, **126**, **128** is provided with a panel piece that covers the frame, then the user can essentially provide a collapsible shelter having four different panel pieces. These panel pieces can be removed and replaced by other panel pieces having different designs or patterns or amusement features to vary the appearance of the collapsible shelter.

The support frame structure **120** of FIG. **9** can be folded and collapsed by first pushing support frames **122** and **124** against support frames **128** and **126**, respectively, about the hinged coupling of the left and right sides **130**, **132**. The

combined support frames **122**, **128** can then be folded on to the combined support frames **124**, **126** about the hinged couplings to create a stack of four support frames **122**, **128**, **126**, **124**, in this order. This stack of four support frames can then be twisted and folded according to the method of FIGS. **2**A–**2**E.

FIG. **10** illustrates a support frame structure **120***a* that is essentially the same as support frame **120** of FIG. **9**, except that the top corner pieces **134***a* are attached in a taut manner between adjacent support frames **122***a*, **124***a*, **126***a*, **128***a* (also known as "external corner pieces"). Specifically, the top corner pieces that are normally provided within the confines of a corner of a specific support frame **122***a*, **124***a*, **126***l* **128***a* (also known as "internal corner pieces") are now omitted, and replaced by external corner pieces **134***a* that are attached to two adjacent support frames **122***a*, **124***a*, **126***a*, **128***a* in the space between these adjacent support frames. The external corner pieces **134***a* provide the benefit of keeping the interior of the support frames **122***a*, **124***a*, **126***a*, **128***a* open and clear for use in supporting objects or other items, since the internal corner pieces will invariably intrude into the space defined by the interior of the support frames **122***a*, **124***a*, **126***a*, **128***a*. Both the interior corner pieces and the external corner pieces perform the same function of defining the shape of the support frames **122***a*, **124***a*, **126***a*, **128***a*.

FIG. **11** illustrates a four-sided support frame structure **140** having four support frames **142**, **144**, **146** and **148**, each of which can have the same construction as support frame **20** of FIG. **1**A. Each support frame **142**, **144**, **146**, **148** has four sides, and the left side **150** of each support frame **142**, **144**, **146**, **148** is hingedly coupled to a right side **152** of an adjacent support frame to form an enclosed space inside the four support frames **142**, **144**, **146**, **148**. These hinged couplings can also be accomplished in a permanent manner or in a detachable manner by using the mechanisms described above. Four corner pieces (e.g., straps **156**) are provided at the four corners of each support frame **142**, **144**, **146**, **148**. One support frame **142** has longer left and right sides **150**, **152**, so that a fabric piece **158** can be attached (e.g., by stitching) to the top side **160** of support frame **142**. A basket or netting **162** can be attached to fabric piece **158** so that support frame **142** can be used to support a backboard. The support frame **142** can support one or more other panel pieces that can be coupled to the support frame **142** according to the techniques described above. Another support frame **144** can support a panel piece **164** that includes a "bulls-eye" target. Although not shown, the other support frames **146** and **148** can support one or more panel pieces that can be coupled to the support frames **146**, **148** according to the techniques described above. Thus, the structure **140** allows the user to change panel pieces for each support frame **142**, **144**, **146**, **148** to increase the variety of play.

The support frame structures of the present invention can also be used to support different coverings. Referring to FIGS. **12** and **13**, a support frame structure **180** is provided having seven support frames **182**, **184**, **186**, **188**, **190**, **192** and **194**, each of which can be the same as support frame **20** of FIG. **1**A. Each of the six outer support frames **182**, **184**, **186**, **188**, **190**, **192** has four sides, and the left side **196** of each of these support frames **182**, **184**, **186**, **188**, **190**, **192** is hingedly coupled to a right side **198** of an adjacent support frame to form an enclosed space inside the six outer support frames **182**, **184**, **186**, **188**, **190**, **192**. The inner support frame **194** is provided inside the enclosed space, with one side **200** of the inner support frame **194** hingedly coupled to the hinged coupling between support frames **190** and **192**, and another side **202** of the inner support frame **194** hingedly coupled to the hinged coupling between support frames **184** and **186**. These hinged couplings can also be accomplished in a permanent manner or in a detachable manner by using the mechanisms described above. Support frame **194** is positioned to provide additional stability to the structure **180**.

The structure **180** can be folded and collapsed by first pushing support frames **182** and **184** against support frames **192** and **194**, respectively, and by pushing support frames **186** and **188** against support frames **194** and **190**, respectively, about the hinged couplings of the left and right sides **196**, **198** of the respective support frames. The combined support frames **182**, **192** can then be folded on to the combined support frames **184**, **194**, and the combined support frames **188**, **190** can then be folded on to the combined support frames **186**, **194**, about the hinged couplings, to create a stack of seven support frames **192**, **182**, **184**, **194**, **186**, **188**, **190**, in this order. This stack of seven support frames can then be twisted and folded according to the method of FIGS. **2**A–**2**E.

Referring now to FIG. **13**, a covering **208** can be draped or otherwise placed over the support frame structure **180**. The covering **208** can be sized and shaped to correspond to the size and shape of the support frame structure **180**, and can be made from a fabric, cardboard, meshed, or other material. In this regard, the covering **208** also has four sides to create a rectangular shape, and can include a top or roof cover **209**. The bottom of the covering **208** can be open so that the covering **208** can be draped over the support frame structure **180** in the direction of arrow **210** as shown in FIG. **13**. Each covering **208** can be provided with different designs, patterns, indicia, games or amusement. For example, the covering **208** shown in FIG. **13** can be decorated to look like a school bus, including an opening **212** cut from a side of the covering **208** to allow ingress and egress to and from the interior of the structure **180**, and an opening **214** cut from the front side to form a front windshield. Thus, the user can replace this covering **208** with another covering bearing a different theme, pattern, design, game or amusement, so that the support frame structure **180** can be used to support a wide variety of coverings, thereby increasing the utility of the support frame structure **180**.

FIG. **14** illustrates a four-sided support frame structure **220** having four support frames **222**, **224**, **226** and **228**, each of which can have the same construction as support frame **20** of FIG. **1**A, except that each support frame **222**, **224**, **226**, **228** is generally circular in configuration, with each support frame **222**, **224**, **226**, **228** hingedly coupled to an adjacent support frame at their circumferences to form an enclosed space inside the four support frames. These hinged couplings can also be accomplished in a permanent manner or in a detachable manner by using the mechanisms described above. Since the shape of each support frame **222**, **224**, **226**, **228** is generally circular, no corner pieces (such as **34**) are needed. The structure **220** can be folded and collapsed using the same technique for the support frame structures **120**, **120***a* and **140** in FIGS. **9**–**11**.

FIG. **15** illustrates a support frame structure **240** having two support frames **242** and **244**, each of which can have the same construction as support frame **20** of FIG. **1**A, except that each support frame **242**, **244** has a different shape. The support frames **242** and **244** are hingedly coupled along the right side **246** of support frame **242** and the left side **248** of support frame **244**. This hinged coupling can also be accomplished in a permanent manner or in a detachable manner by using the mechanisms described above. The shapes of the

support frames **242**, **244** are defined by the various corner pieces. For example, each support frame **242**, **244** has two internal corner pieces **250** attached within the respective support frame **242** or **244**. In addition, two external corner pieces **252** are attached to the outside of the other corners of the support frames **242**, **244**, such that these external corner pieces **252** actually attach and couple between the two support frames **242**, **244** in a manner similar to external corner pieces **134***a* in FIG. **10**. The structure **240** can be folded and collapsed using the same technique for the support frame structure **100** in FIG. **8**.

FIGS. **16** and **17** illustrate another embodiment of a support frame structure **260** according to the present invention. The support frame structure **260** has two support frames **262** and **264**, each of which can be the same as support frame **20** of FIG. **1**A. The support frames **262**, **264** cross or intersect at an angle, and can be provided in this intersecting configuration by providing one support frame (e.g., **264**) with a slightly smaller width so that it can be fitted inside the confines of the other support frame **262**, and then coupling the two support frames **262**, **264** at their two crossing or intersection points **266** and **268**. One intersection point **266** is shown in greater detail in FIG. **17** (the other intersection **268** being the same), where a string or tie **270** can be used to tie the support frames **262**, **264** together in a manner that allows them to pivot with respect to each other at these intersection points **266**, **268**. Thus, to deploy the structure **260**, the support frames **262**, **264** can be pivoted about the intersection points **266**, **268** so that the bottom side **272** and **274** of each support frame **262** and **264**, respectively, can be rested on a floor or surface (see FIG. **16**). When in this configuration, the structure **260** is essentially self-supporting. As an alternative, a tie or strap **271** can have opposing ends secured (either permanently or detachably) to the support frames **262**, **264** above an intersection point **266** or **268** to limit the extent to which the support frames **262**, **264** can pivot. Corner pieces or straps **276** can be provided for each support frame **262**, **264**. To fold and collapse the structure **260**, the support frames **262**, **264** can be pivoted so that they are generally parallel to each other to form a stack of two support frames **262**, **264**. This stack of two support frames can then be twisted and folded according to the method of FIGS. **2**A–**2**E.

Although not expressly shown in FIGS. **8**–**16**, the structures shown in FIGS. **8**–**16** can also have support pieces like the support pieces **60** and **68** shown in FIGS. **6** and **7**.

Thus, the present invention provides collapsible support frame structures that allow a variety of games, designs, indicia, messages, etc., to be supported thereon, and to be removed and replaced by others. This increases the utility and use of these collapsible support frame structures since they can be used to support many different games, designs, indicia, messages, etc., and also provides the user with increased variety in play and amusement.

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. For example, although the panel pieces **38**, objects and other items have been described as being removable, it is also possible to attach panel pieces **38**, objects and other items to the support frames in a permanent, non-removable manner.

What is claimed is:

1. An object, comprising:

a support frame having a foldable frame member that has a folded and an unfolded orientation, the frame member defining a periphery for the support frame, the periphery defining an opening inside the support frame;

an item;

a connector extending into the opening and having a first end connected to only a discrete portion the support frame, and an opposing second end connected to the item; and

a frame retaining sleeve for retaining the frame member, with the connector coupled to the frame retaining sleeve and the item.

2. An object, comprising:

a support frame having a foldable frame member that has a folded and an unfolded orientation, the frame member defining a periphery for the support frame, the periphery defining an opening inside the support frame;

an item;

a connector extending into the opening and having a first end connected to only a discrete portion the support frame, and an opposing second end connected to the item; and

at least one corner piece coupled to the frame member to define the shape of the support frame.

3. The object of claim **2**, wherein the corner piece is a piece of fabric that is attached to the frame member.

4. The object of claim **2**, wherein the corner piece is a strap having opposing ends attached to the frame member.

5. An object, comprising:

a support frame having a foldable frame member in the form of continuous loop that has a folded and an unfolded orientation, the frame member defining a periphery for the support frame; and

at least one corner piece coupled to the frame member, each corner piece connected to two distinct and adjacent peripheral edges of the frame member along the frame member;

wherein the frame member is collapsible to the folded orientation by twisting and folding to form a plurality of concentric rings to substantially reduce the size of the support frame in the folded orientation.

6. An object, comprising:

a support frame having a foldable frame member that has a folded and an unfolded orientation, the frame member defining a periphery for the support frame, the periphery defining an opening inside the support frame;

an item;

a connector extending into the opening and having a first end connected to only a discrete portion the support frame, and an opposing second end connected to the item; and

wherein the frame member is collapsible to the folded position by twisting and folding to form a plurality of concentric rings to substantially reduce the size of the support frame in the folded position.

7. The object of claim **6**, wherein the support frame is a first support frame, the object further including:

a second support frame, a third support frame, and a fourth support frame, each having a left side, a right side, and a foldable frame member that has a folded and an unfolded orientation, the frame member defining a periphery for the respective support frame; and

wherein the left side of each support frame is hingedly coupled to the right of an adjacent support frame.

8. The object of claim **6**, further including a support piece coupled to the support frame, with the item further connected to the support piece.

9. The object of claim 8, wherein the support piece has at least one leg with an end that is attached to the support frame.

10. The object of claim 8, wherein the item is connected by the support piece and the connector to the support frame.

11. The object of claim 6, wherein the support frame is a first support frame, the object further including a second support frame having a foldable frame member that has a folded and an unfolded orientation, the frame member defining a periphery for the second support frame, and wherein the first and second support frames are hingedly coupled to each other.

12. The object of claim 11, further including at least one corner piece coupled to each frame member to define the shape of the support frame.

13. The object of claim 11, further including a corner piece coupled to the first and second support frames to partially define the shapes of the first and second support frames.

14. An object, comprising:

a support frame having a foldable frame member that has a folded and an unfolded orientation, the frame member defining a periphery for the support frame;

a panel piece removably coupled to and supported by the support frame; and

a frame retaining sleeve for retaining the frame member;

wherein the frame member is collapsible to the folded orientation by twisting and folding to form a plurality of concentric rings to substantially reduce the size of the support frame in the folded orientation, and wherein the panel piece extends across the entire periphery of the support frame.

15. An object, comprising:

a support frame having a foldable frame member in the form of a continuous loop that has a folded and an unfolded orientation, the frame member defining a periphery for the support frame;

at least two corner pieces, each corner piece being separate from the other corner pieces, and each corner piece coupled to the frame member at spaced-apart locations along the frame member to define the shape of the support frame; and

a frame retaining sleeve for retaining the frame member.

16. An object, comprising:

a support frame having a foldable frame member in the form of a continuous loop that has a folded and an unfolded orientation, the frame member defining a periphery for the support frame;

at least one corner piece coupled to the frame member, each corner piece connected to two distinct and adjacent peripheral edges of the frame member along the frame member; and

a frame retaining sleeve for retaining the frame member.

17. An object, comprising:

a support frame having a foldable frame member in the form of a continuous loop that has a folded and an unfolded orientation, the frame member defining a periphery for the support frame; and

at least two corner pieces, each corner piece being separate from the other corner pieces, and each corner piece coupled to the frame member at spaced-apart locations along the frame member to define the shape of the support frame;

wherein the frame member is collapsible to the folded orientation by twisting and folding to form a plurality of concentric rings to substantially reduce the size of the support frame in the folded orientation.

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