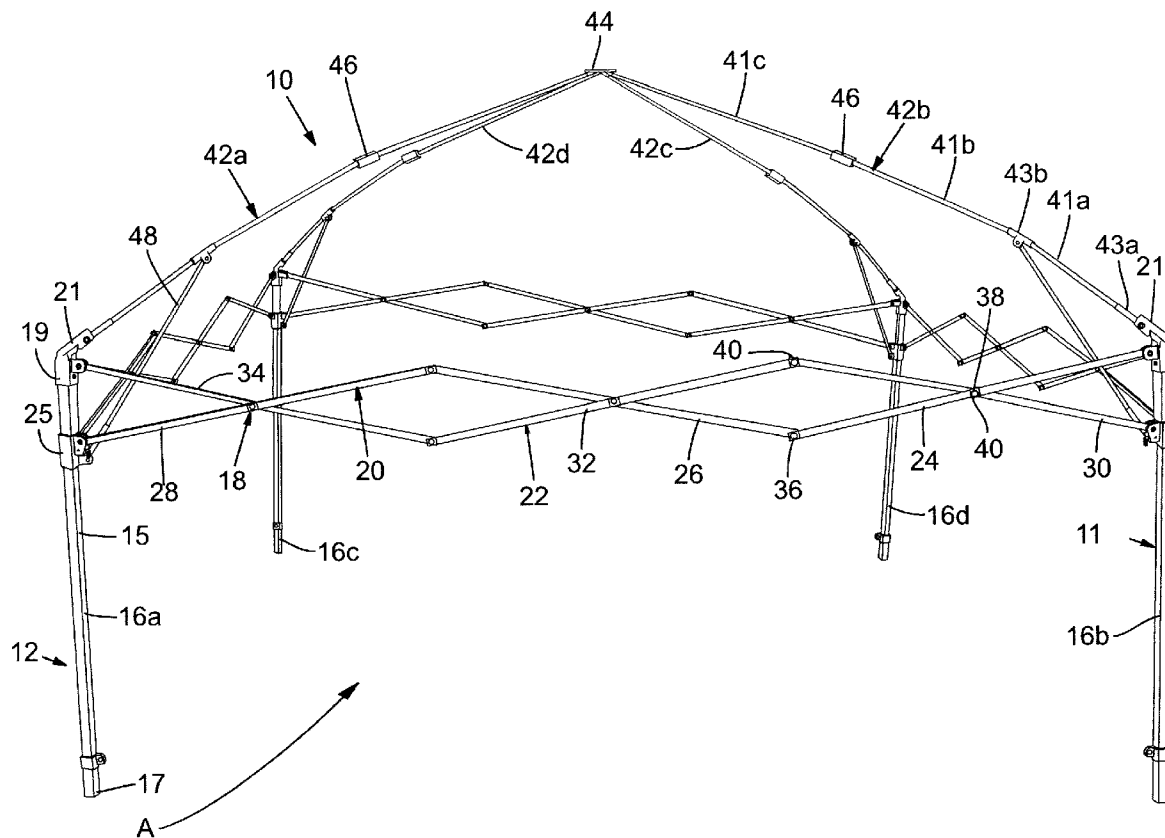


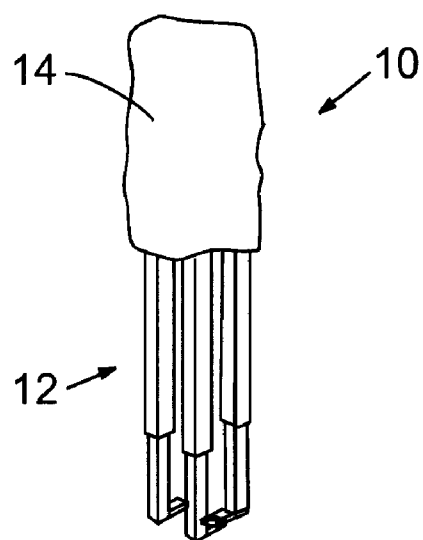
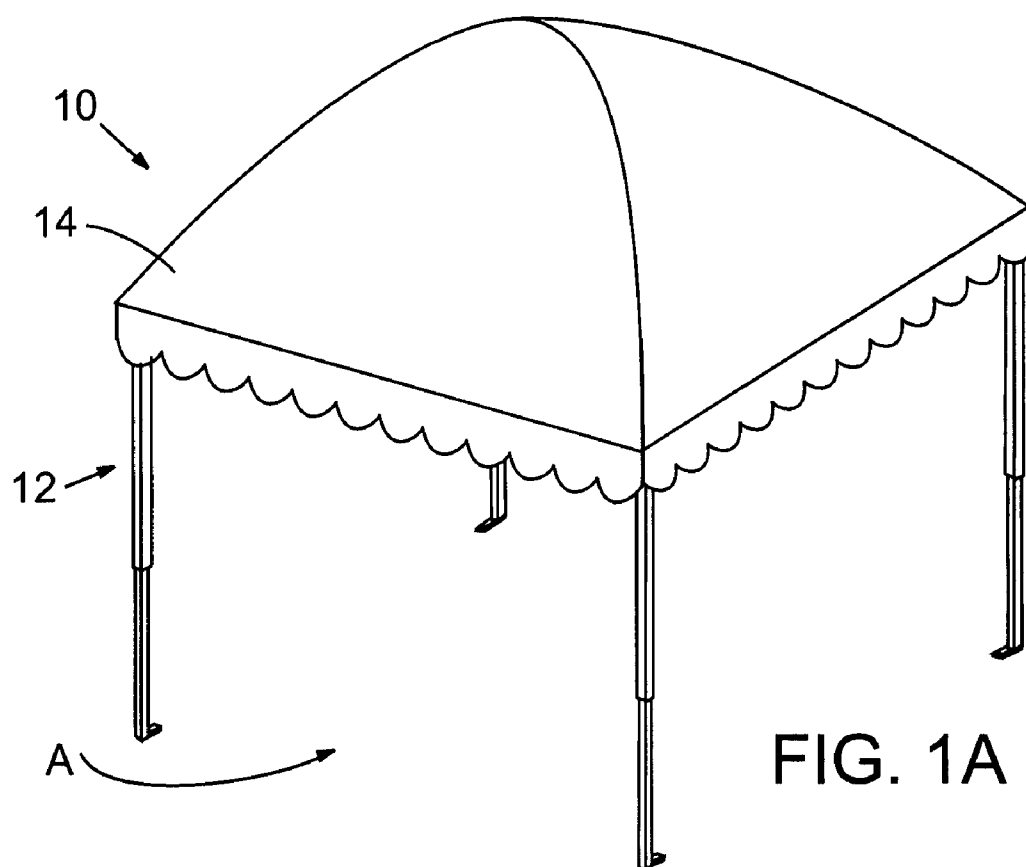


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(19) **United States**(12) **Patent Application Publication**
Lin(10) **Pub. No.: US 2011/0061702 A1**(43) **Pub. Date: Mar. 17, 2011**(54) **PORTABLE SHELTER HAVING FRAME
WITH MOVEABLY COUPLED CANOPY
SUPPORT MEMBERS****Publication Classification**(51) **Int. Cl.**
E04H 15/50 (2006.01)
E04H 15/48 (2006.01)
(52) **U.S. Cl.** **135/145; 135/151; 135/153**
(57) **ABSTRACT**(75) **Inventor:** **Tseng Hsiang Lin**, Kuala Lumpur
(MY)(73) **Assignee:** **YJIP, INC.**, Addison, TX (US)(21) **Appl. No.:** **12/720,932**(22) **Filed:** **Mar. 10, 2010****Related U.S. Application Data**(60) Provisional application No. 61/158,921, filed on Mar.
10, 2009.

A portable shelter includes a canopy and a frame assembly that supports the canopy. The frame assembly includes a lower portion that defines an area and a resiliently flexible canopy support member extending over the area and supporting the canopy over the area. The frame assembly further includes a collapsible coupling with a first end operably coupled to the lower portion and a second end operably coupled to the canopy support member. A distance between the first end and the second end is variable.





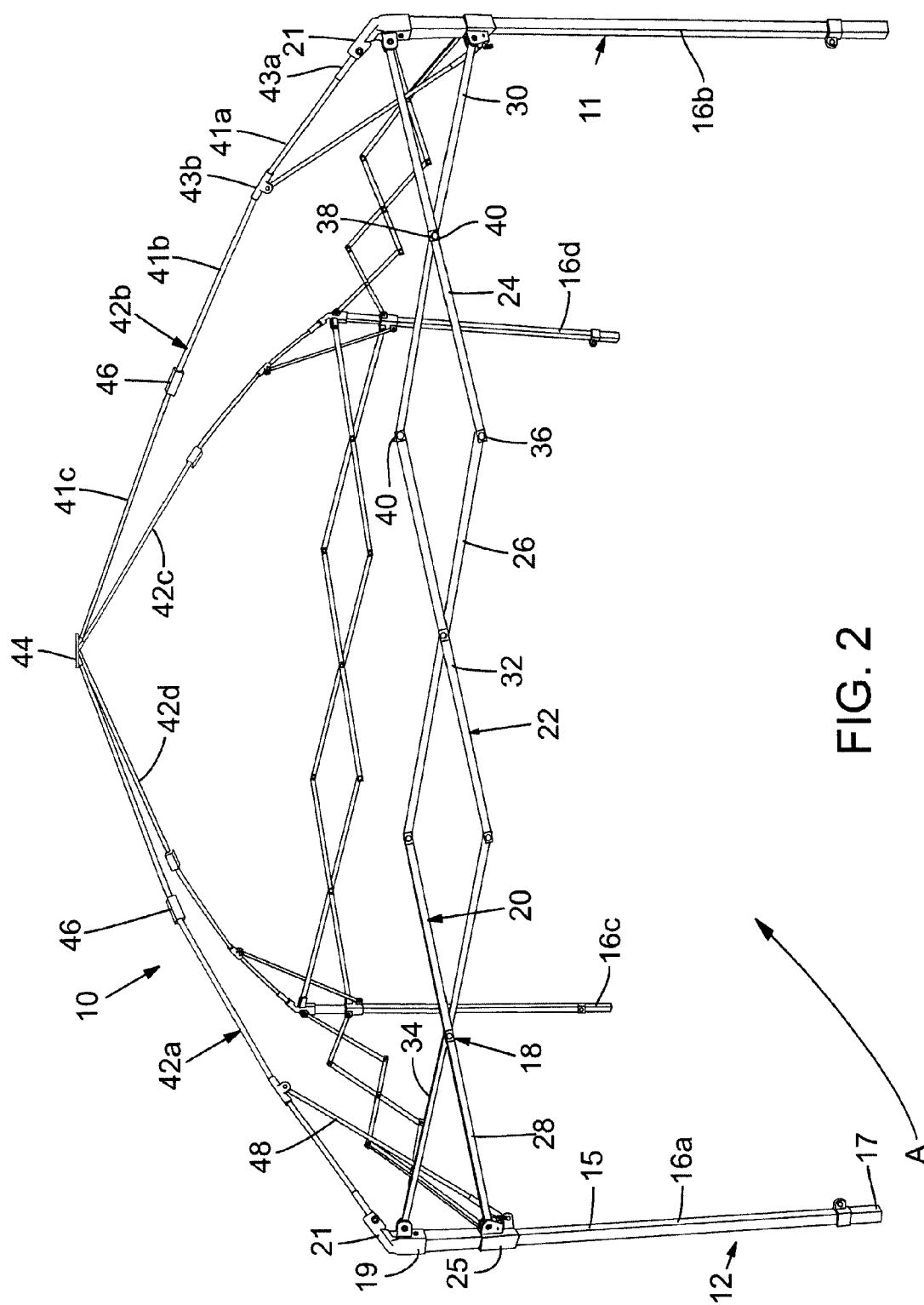
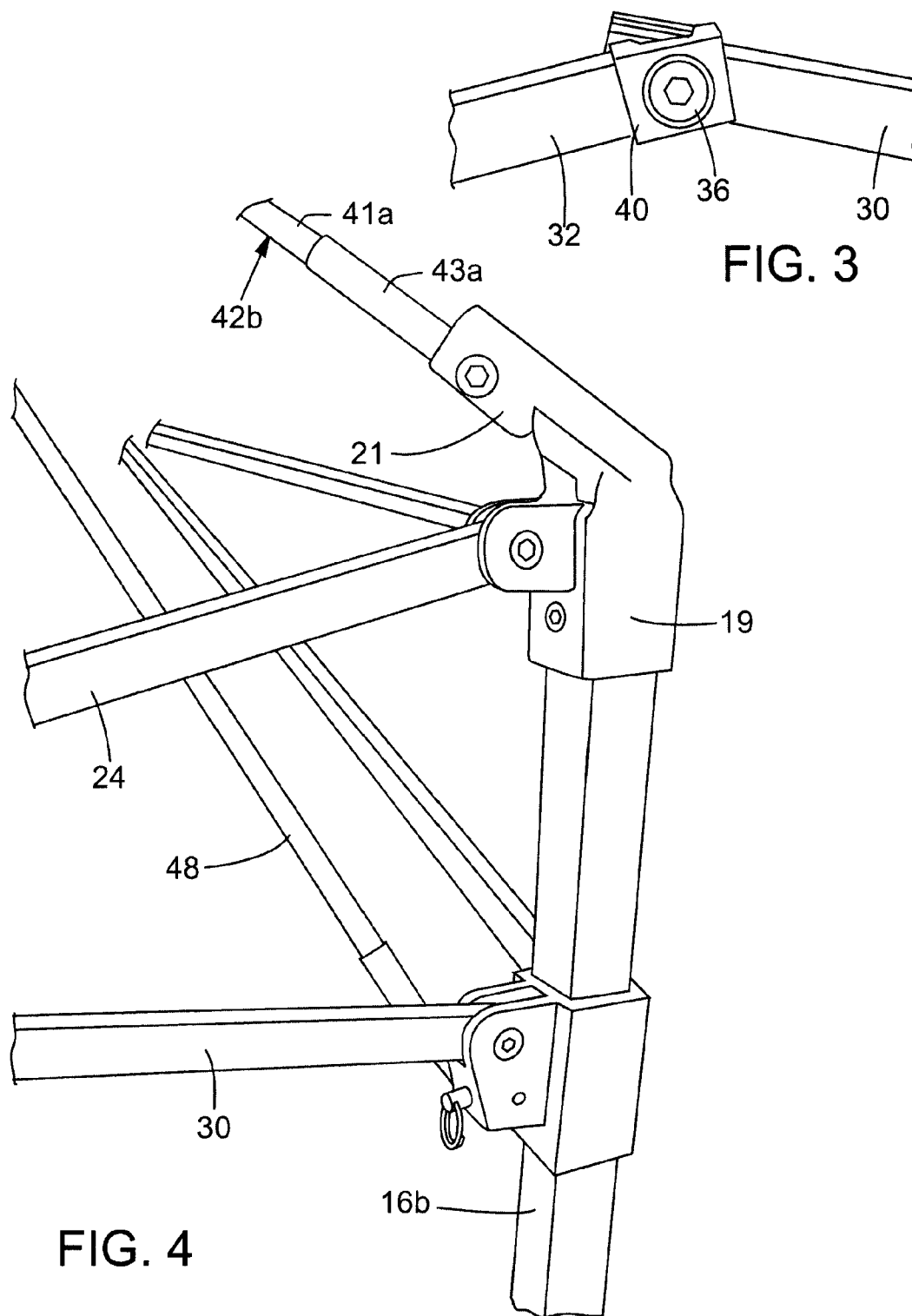
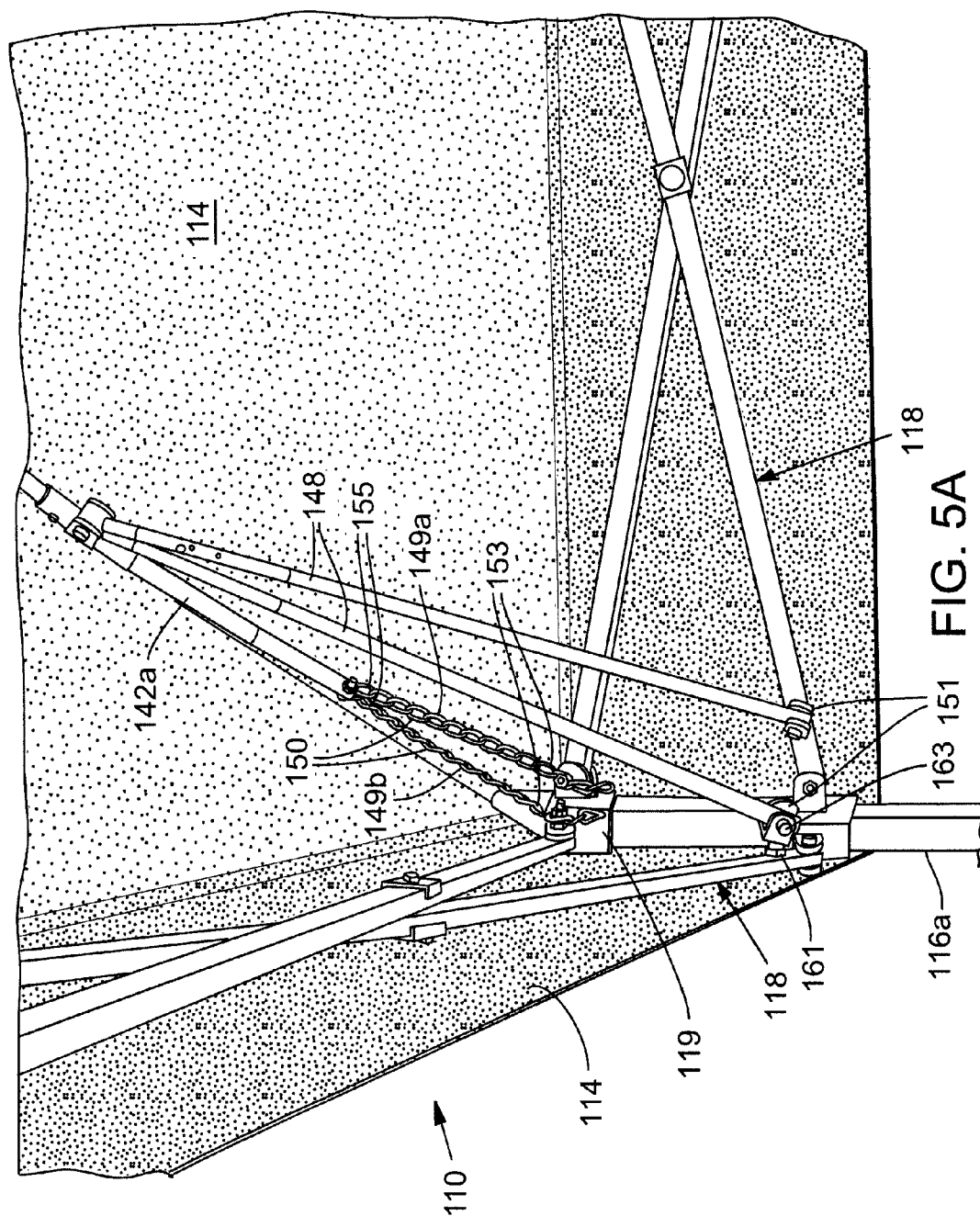
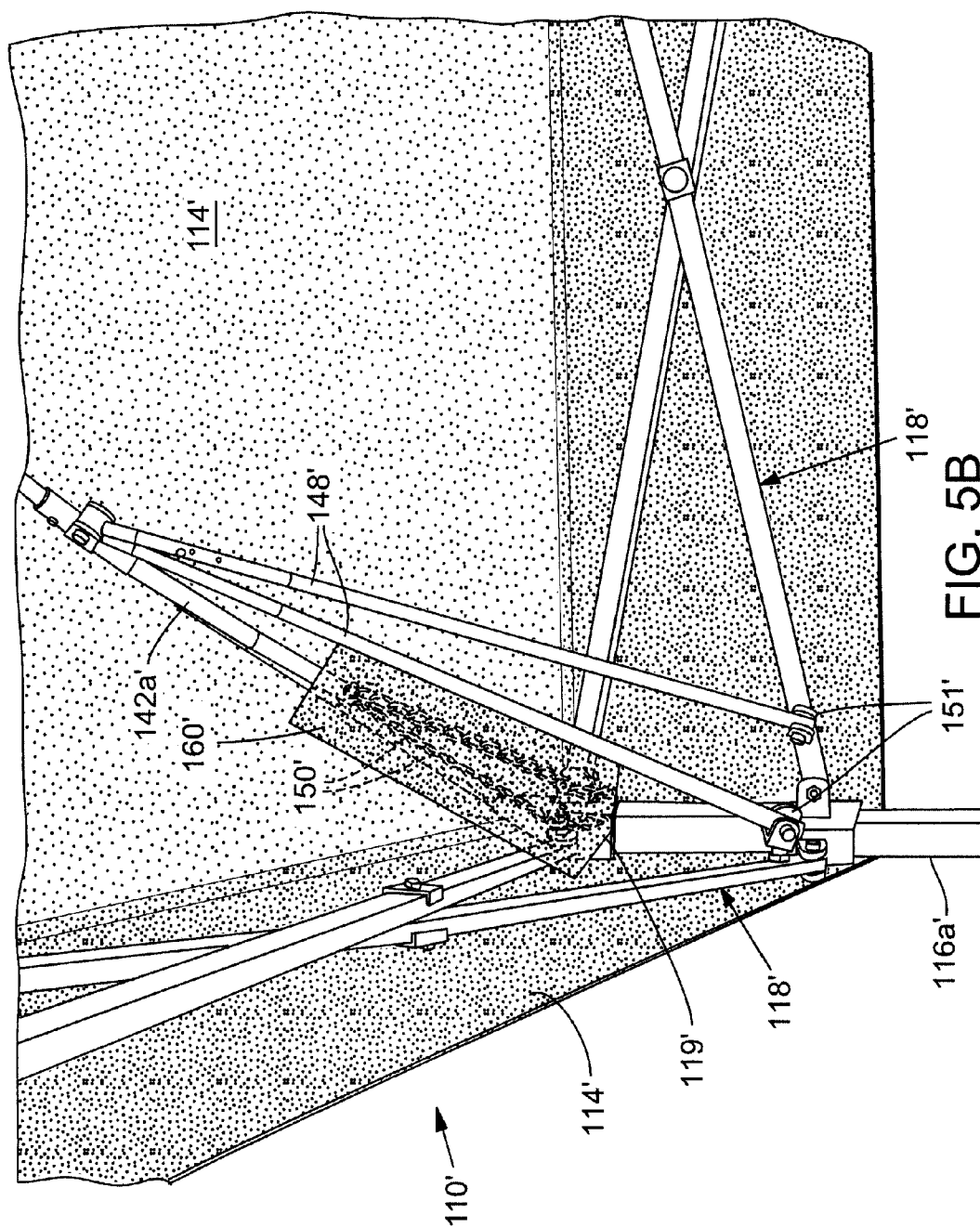
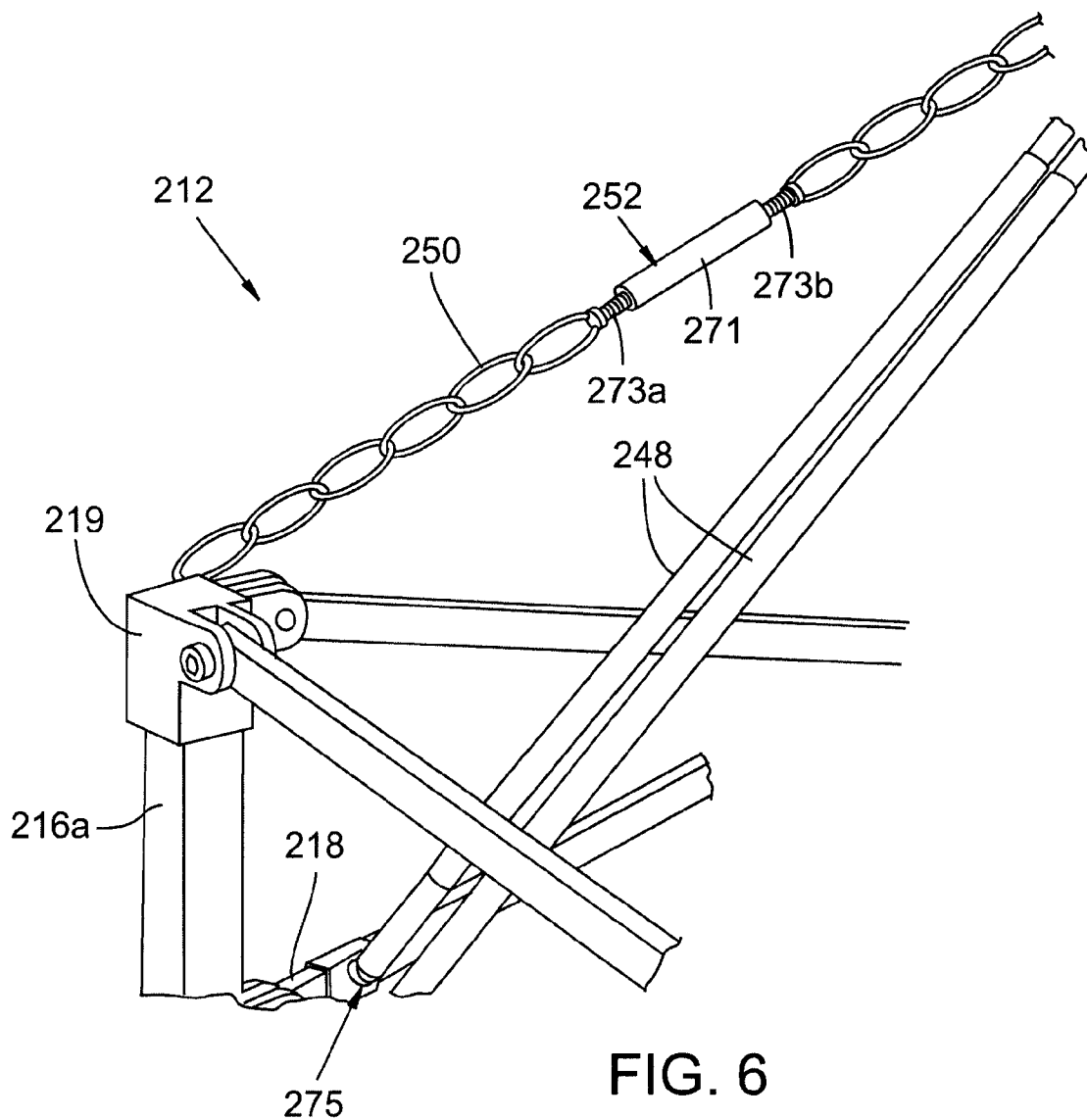


FIG. 2









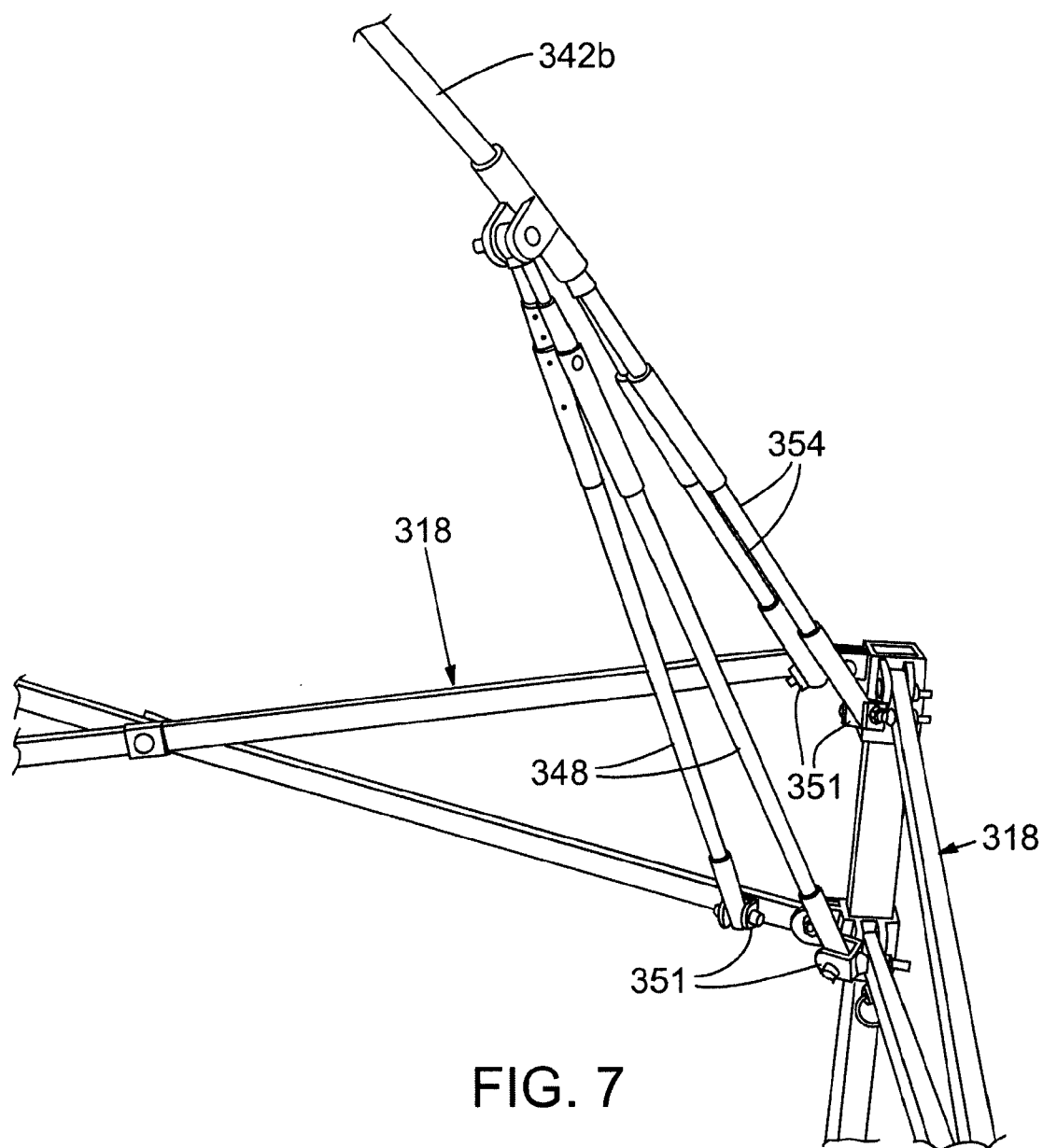


FIG. 7

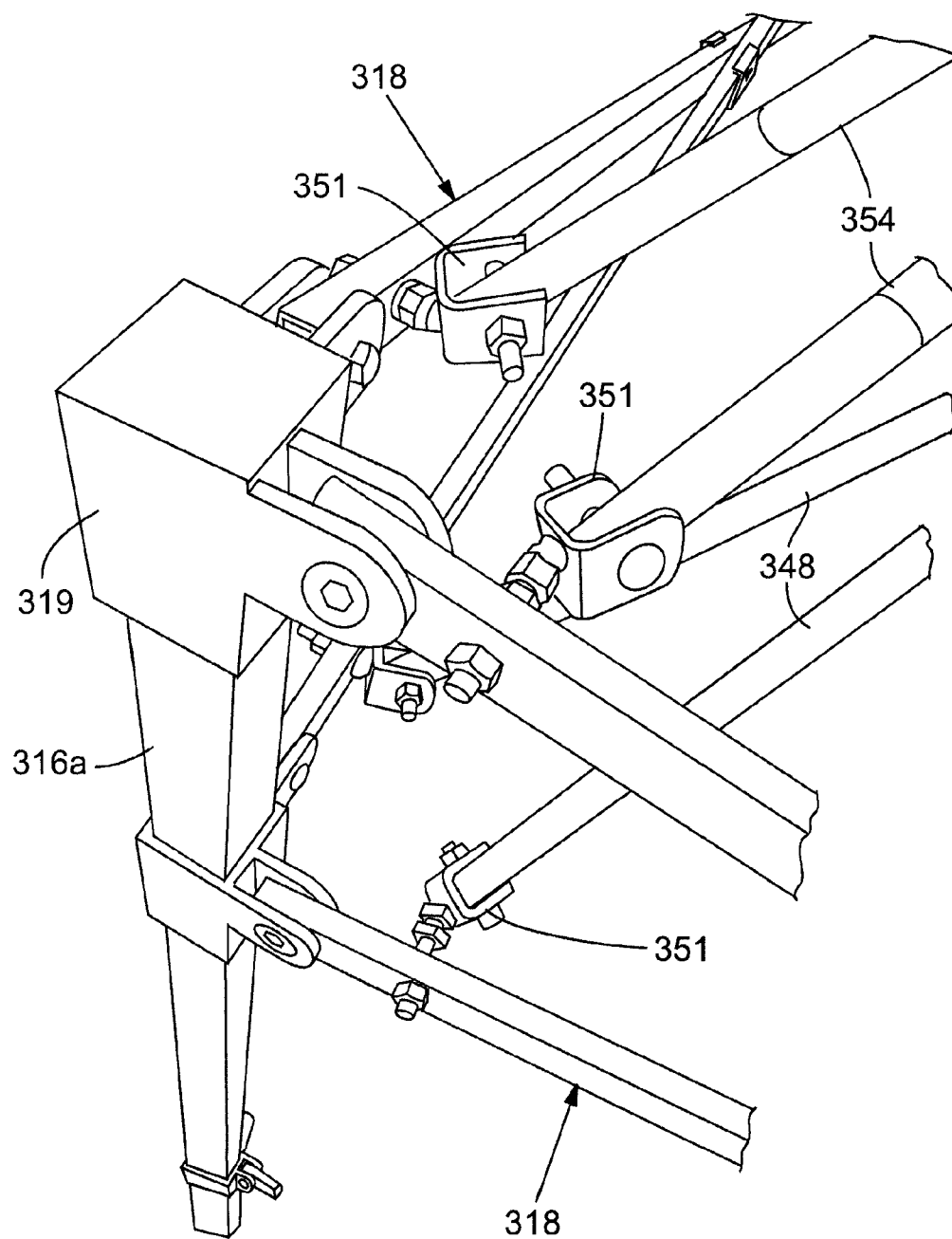


FIG. 8

PORTABLE SHELTER HAVING FRAME WITH MOVEABLY COUPLED CANOPY SUPPORT MEMBERS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/158,921, filed on Mar. 10, 2009. The entire disclosure of the above application is incorporated herein by reference.

FIELD

[0002] The present disclosure relates to a portable shelter and, more particularly, relates to a portable shelter having a frame with moveably coupled canopy support members.

BACKGROUND

[0003] Portable shelters have been proposed for conveniently providing shade from the sun, for providing shelter from inclement weather, and the like. These shelters can be used as canopies for outdoor gatherings, as temporary awnings that extend from a recreational vehicle, and for other similar uses.

[0004] These shelters can include a self-supporting frame and a tarp, canvas, or other foldable roof or canopy that is coupled to and supported by the frame. The frame can be moved between an extended and retracted position. When the frame is in the extended position, the canopy can be unfurled, unfolded, and expanded above the ground surface such that the canopy provides shelter. When the frame is in the retracted position, the canopy can be folded or otherwise retracted to make the shelter more compact and portable.

[0005] Although conventional portable shelters have been adequate for their intended purposes, they do suffer from certain disadvantages. For instance, when the frame is in the extended position, the canopy may not be adequately supported by the frame, and as a result the canopy might sag, bunch, bulge, etc. Furthermore, high winds, precipitation, or other loads on the canopy can transfer to the frame of the structure and cause the frame to inadvertently move. Still further, the frame can include many interconnected parts, and the construction of the frame can be complex. As such, assembling the portable shelter, disassembling the shelter, and/or moving the frame between the extended and retracted positions can be difficult and burdensome.

[0006] Accordingly, there remains a need for a portable shelter with a frame that can better support the canopy cover. Moreover, there remains a need for a portable shelter that is more stable. Additionally, there remains a need for a portable shelter that can be more easily assembled, disassembled, and moved between its extended and retracted positions.

SUMMARY

[0007] A portable shelter is disclosed that includes a canopy and a frame assembly that supports the canopy. The frame assembly includes a lower portion that defines an area and a resiliently flexible canopy support member extending over the area and supporting the canopy over the area. The frame assembly further includes a collapsible coupling with a first end operably coupled to the lower portion and a second end operably coupled to the canopy support member. A distance between the first end and the second end is variable.

[0008] In addition, a portable shelter is disclosed that includes a canopy and a frame assembly that supports the canopy. The frame assembly is moveable between an extended position in which the canopy is unfurled and a retracted position in which the canopy is furled. The frame assembly includes a lower portion that defines an area, and the frame assembly further includes a resiliently flexible canopy support member extending over the area and supporting the canopy over the area. Also, the frame assembly includes a chain with a plurality of interlocking links. The chain has a first end operably coupled to the lower portion and a second end operably coupled to the canopy support member.

[0009] Still further, a portable shelter is disclosed that includes a foldable canopy and a frame assembly that supports the canopy. The frame assembly is moveable between an extended position in which the canopy is unfurled and a retracted position in which the canopy is furled. The frame assembly includes a plurality of upright, rigid legs that define an area between the plurality of legs. Also, the frame assembly includes a plurality of scissoring, pivotally attached, rigid leg supports that extend between and interconnect respective ones of the plurality of legs. Furthermore, the frame assembly includes a plurality of resiliently flexible canopy support members extending over the area and supporting the canopy over the area. The frame assembly additionally includes a plurality of resiliently flexible struts operably coupled to respective ones of the legs and operably coupled to respective ones of the canopy support members. The frame assembly also includes a plurality of chains, each with a plurality of interlocking links. The chains each have a first end operably coupled to respective ones of the legs, and a second end operably coupled to the canopy support member. The chains allow the canopy support members to resiliently flex relative to the legs when the frame assembly is in the extended position.

[0010] This section provides a general summary of the disclosure, and is not a comprehensive disclosure of its full scope or all of its features. Further areas of applicability will become apparent from the description provided herein. The description and specific examples in this summary are intended for purposes of illustration only and are not intended to limit the scope of the present disclosure.

DRAWINGS

[0011] The drawings described herein are for illustrative purposes only of selected embodiments and not all possible implementations, and are not intended to limit the scope of the present disclosure.

[0012] FIG. 1A is an isometric view of a portable structure according to an exemplary embodiment of the present disclosure, wherein the portable structure is shown in an extended position;

[0013] FIG. 1B is an isometric view of the portable structure of FIG. 1A shown in a retracted position;

[0014] FIG. 2 is an isometric view a frame assembly of the portable structure of FIG. 1A;

[0015] FIG. 3 is an isometric view of a portion of the frame assembly of FIG. 1B;

[0016] FIG. 4 is an isometric view of a portion of the frame assembly of FIG. 1B;

[0017] FIG. 5A is an isometric view of a portion of the frame assembly of FIG. 2 according to another exemplary embodiment;

[0018] FIG. 5B is an isometric view of the portion of the frame assembly of FIG. 5A according to another exemplary embodiment;

[0019] FIG. 6 is an isometric view of a portion of the frame assembly of FIG. 2 according to another exemplary embodiment;

[0020] FIG. 7 is an isometric view of a portion of the frame assembly of FIG. 2 according to another exemplary embodiment; and

[0021] FIG. 8 is an isometric view of a portion of the frame assembly of FIG. 7.

[0022] Corresponding reference numerals indicate corresponding parts throughout the several views of the drawings.

DETAILED DESCRIPTION

[0023] Example embodiments will now be described more fully with reference to the accompanying drawings.

[0024] Referring to FIGS. 1A and 1B, a portable shelter or structure 10 is illustrated according to various exemplary embodiments of the present disclosure. The portable structure 10 generally includes a frame assembly 12. The frame assembly 12 can support a canopy 14. The canopy 14 can be made out of any suitable material, such as canvas, plastic sheeting, and the like. The canopy 14 can extend about an exterior, upper portion of the frame assembly 12, and the frame assembly 12 can support the canopy 14 above the ground. Accordingly, the canopy 14 can provide shade, shelter from the elements, and the like.

[0025] Also, as will be described, the portable structure 10 can be positioned in an extended configuration, as shown in FIG. 1A, wherein the canopy 14 is extended, deployed, unfurled, etc., and the canopy 14 is supported above the ground to provide shelter. Furthermore, the frame assembly 12 can be positioned in a retracted configuration, as shown in FIG. 1B, wherein the canopy 14 is retracted, folded, furled, etc., and the frame assembly 12 occupies less space, thereby making the structure 10 more compact and portable. However, it will be appreciated that the structure 10 can be stationary without moving between an extended and a retracted position without departing from the scope of the present disclosure.

[0026] FIG. 2 shows an exemplary embodiment in which the frame assembly 12 is shown in greater detail. As shown, the frame assembly 12 can generally include a lower portion 11 and a plurality of canopy support members 42a-42d. The lower portion 11 can define an interior area A, and the canopy support members 42a-42d can extend over the area A. The canopy support members 42a-42d can be operably coupled to the lower portion 11 as will be discussed, and the canopy support members 42a-42d can support the canopy 14 to cover the area A. Accordingly, users can be sheltered within the area A.

[0027] As shown in FIG. 2, the lower portion 11 can include a plurality of upstanding legs 16a, 16b, 16c, 16d that are supported upright above a ground surface. In the embodiment shown, there are four legs 16a-16d that define the outer corners of the structure 10; however, it will be appreciated that the structure 10 can include any number of legs 16a-16d and the legs 16a-16d can be disposed at any suitable position.

[0028] The legs 16a-16d can be generally elongate, hollow, tubular, and rigid. The legs 16a-16d can also be made out of any suitable material, such as metal. In some embodiments, the legs 16a-16d are made out of aluminum, steel, or the like. The legs 16a-16d can each include a top portion 15 and a

bottom portion 17. When the frame assembly 12 is in the extended configuration, as shown in FIG. 2, the bottom portion 17 can be supported on the ground, and the respective legs 16a-16d can be positioned generally upright such that the top portion 15 is disposed above the ground. Furthermore, the legs 16a-16d can each include a telescoping portion (not shown) which telescopingly extends from the bottom portion 17 of the respective leg 16a-16d to increase the height of the respective leg 16a-16d.

[0029] The frame assembly 12 can also include a plurality of caps 19 that are each disposed on the top portion 15 of a respective leg 16a-16d. The caps 19 can be hollow so as to receive and couple to the top portion 15 of the respective leg 16a-16d. Each cap 19 can also include a projection member 21, as shown in FIGS. 2 and 4. The cap 19 and the projection member 21 can be fixedly and integrally coupled so as to be monolithic. Furthermore, the cap 19 and the projection member 21 can be made out of a polymeric material or any other suitable material.

[0030] The frame assembly 12 can further include a plurality of sliders 25. The sliders 25 can be hollow and tubular and can be slidably received on respective ones of the legs 16a-16d. The sliders 25 can be made out of any suitable material, such as a polymeric material.

[0031] Moreover, the frame assembly 12 can include a plurality of leg support members, generally indicated at 18. The leg support members 18 generally extend between, interconnect, and support respective ones of the legs 16a-16d. Thus, the structure 10 can be stable and free standing.

[0032] For purposes of discussion, the leg support member 18 extending between legs 16a, 16b will be discussed, and it will be appreciated that the other leg support members 18 can be similarly constructed. The leg support members 18 can be of a scissoring type as will be discussed in greater detail below. However, it will be appreciated that the leg support members 18 can be of any suitable (e.g., fixed) type without departing from the scope of the present disclosure.

[0033] Specifically, each leg support member 18 can include a first member 20 and a second member 22. The first and second members 22 can be rigid and elongate and can be made out of any suitable material, such as steel, aluminum, or another metal. The first member 20 of the leg support member 18 can include a first portion 24, a second portion 26, and a third portion 28. The first portion 24 can be pivotally or hingeably coupled to a cap 19 at one end, and can be hingeably coupled to the second portion 26 at the opposite end. Furthermore, the second portion 26 can be hingeably coupled to the third portion at the opposite end thereof. Still further, the third portion 28 can be hingeably attached to a slider 25 on the opposite end thereof. The first member 20 can also include a plurality (e.g., two) hinge joints 36 with a pin or other suitable member that hingeably couples the first portion 24 to the second portion 26 and the second portion 26 to the third portion 28. Accordingly, the first portion 24 and the third portion 28 are operatively coupled to different legs 16a, 16b, and the first, second, and third portions 24, 26, 28 can hingeably pivot relatively to each other to allow the legs 16a, 16b to move toward each other when the frame assembly 12 moves from the extended configuration to the retracted configuration.

[0034] Moreover, the second member 22 of the leg support member 18 can include a first portion 30, a second portion 32, and a third portion 34, which are similar to the portions 24, 26, 28 of the first member 20 of the leg support member 18.

Furthermore, the first and second members 20, 22 can include a plurality (e.g., two) of pivot pins 38 that rotatably couple the first and second members 20, 22. As such, the leg support members 18 each fold in a scissoring action to allow the legs 16a, 16b, 16c, 16d to move toward and away from each other when moving the frame assembly 12 between the extended and retracted positions as will be discussed in greater detail below.

[0035] Moreover, the frame assembly 12 can include a plurality of reinforcement members 40. Reinforcement members 40 can be made out of any suitable material, such as a polymeric material. As shown in FIGS. 2 and 3, the reinforcement members 40 can be disposed on inner and outer surfaces of the leg support members 18 adjacent the hinge joints 36 and/or the pivot pins 38. The reinforcement members 40 provide a smooth surface for pivoting of the respective hinge joint 36 and/or respective pivot pin 38 for facilitating movement and reinforcement of the associated hardware.

[0036] Additionally, as mentioned above and as shown in FIG. 1B, the frame assembly 12 can further include a plurality of canopy support members 42a, 42b, 42c, 42d. The canopy support members 42a-42d can be elongate and resiliently flexible. However, in other embodiments, the canopy support members 42a-42d can be rigid. The canopy support members 42a-42d can be made out of any suitable material, such as metallic and/or polymeric material. In some embodiments, the canopy support members 42a-42d can include any one of the various features disclosed in U.S. Pat. No. 6,450,187, entitled REINFORCED SUPPORT MEMBER AND METHOD, issued Sep. 17, 2002, which is hereby incorporated by reference in its entirety. Thus, the canopy support members 42a-42d can each include a core (not specifically shown) made out of fiberglass or other suitable material, and the core can be jacketed in a resiliently elastic material, such as polyethylene, polyvinyl chloride, vinyl, polypropylene, polyurethane, rubber and/or latex, to decrease the likelihood of splintering of the core.

[0037] For purposes of brevity, only the canopy support member 42b as shown in FIG. 2 will be discussed in greater detail; however, it will be appreciated that each of the canopy support members 42a, 42c, 42d can have similar features. As shown, the canopy support members 42b can include a plurality of resilient sections 41a, 41b, 41c. The section 41a can be received in a rigid, hollow tube 43a (e.g., a metallic ferrule), and the tube 43a can be pivotally attached (e.g., via a pin or other suitable fastener) to the respective projecting member 21. Furthermore, the sections 41a, 41b can each be received within another rigid hollow tube 43b (e.g., a metallic ferrule) such that the tube 43b joins the sections 41a, 41b. In addition, the sections 41b, 41c can each be pivotally attached and joined by a kick joint 46. The kick joint 46 can allow the sections 41b, 41c to rotate about the kick joint 46 relative to each other in one direction and limit rotation in the opposite direction.

[0038] Furthermore, in some embodiments, a resilient cord (not specifically shown) can extend through a hollow passage defined longitudinally through the sections 41a-41c, the tubes 43a, 43b, and the kick joint 46. The cord can bias these components toward each other and provide additional support.

[0039] Also, each canopy support member 42a-42d can be hingeably coupled to a central member 44, as shown in FIG. 2. Thus, it will be appreciated that the canopy support members 42a-42d each extend upward at an obtuse angle relative

to respective the leg 16a-16d, and the canopy support members 42a-42d can collectively reach an apex at the central member 44.

[0040] The canopy support members 42a-42d can be disposed on an inner surface of the canopy 14 and can thereby provide support for the canopy 14. Also, the canopy support members 42a-42d can resiliently bias the canopy 14 upwards and outwards away from the lower portion 11 of the frame assembly 12. Thus, the canopy support members 42a-42d can inhibit the canopy 14 from sagging inward due to wind, rain, and the like. Also, the canopy support members 42a-42d can resiliently flex relative to the legs 16a-16d, for instance, under wind or other loads, and once the load is reduced, the support members 42a-42d can return the canopy 14 to its fully deployed state. Thus, the structure 10 is more stable and is more likely to remain upright with the canopy 14 deployed. In addition, the support members 42a-42d can be lightweight, and resiliently flexible, and can easily collapse to allow the structure 10 to more easily move between the extended and the retracted position.

[0041] In addition, the frame assembly 12 can include a plurality of struts 48, as shown in FIGS. 2 and 4. Each strut 48 can be an elongate member made out of rigid metal, polymeric material, or any other suitable material. In other embodiments, the strut 48 can be resiliently flexible, and can be similar in construction to the canopy support members 42a-42d. The strut 48 can each be pivotally (e.g., hingeably) coupled to a respective slider 25 to be coupled to the respective leg 16. The opposite end of the strut 48 can be pivotally (e.g., hingeably) coupled to the tube 43b (FIG. 2) of the respective canopy support member 42a-42d. The strut 48 can provide additional support to the respective canopy support member 42a-42d to maintain the canopy 14 in its deployed position.

[0042] In order to move the frame assembly 12 from the extended configuration (FIGS. 1A and 2) to the retracted configuration (FIG. 1B), the legs 16a-16d are moved generally toward each other while remaining generally parallel to each other. In order to move the legs 16a-16d together, the first and second members 20, 22 of the leg support members 18 hingeably pivot about the respective hinge joints 36 and pivot pins 38 in a scissoring motion, thereby causing the sliders 25 to slide toward the bottom portion 17 of the respective legs 16a-16d. In addition, the canopy support members 42a-42d each fold at the respective kick joint 46 such that the kick joints 46 move generally toward the ground. Moreover, the struts 48 pivot relative to both the respective slider 25 and the respective canopy support member 42a-42d. Also, the canopy support members 42a-42d hingeably pivot relative to the respective projection member 21 toward the ground. As a result, the canopy 14 folds and becomes furled as represented in FIG. 1B.

[0043] Furthermore, to move the frame assembly 12 from the retracted configuration (FIG. 1B) to the extended configuration (FIGS. 1A and 2), the legs 16a-16d are moved away from each other while remaining generally parallel to each other. In so doing, the first and second members 20, 22 of the leg support members 18 pivot about the respective hinge joints 36 and pivot pins 38, thereby causing the sliders 25 to slide away from the bottom portion 17 toward the top portion 15 of the respective leg 16a-16d. Also, the canopy support members 42a-42d move from an area between the legs 16a-16d, pivoting relative to the respective projection members 21 and unfolding about the respective kick joints 46 to be sup-

ported generally above the legs **16a-16d**, as shown in FIG. 1B. Additionally, the struts **48** pivot about both the respective legs **16a-16d** and the respective canopy support members **42a-42d**.

[0044] Now referring to FIG. 5A, the structure **110** is shown according to another exemplary embodiment. Components that are similar to the embodiment of FIGS. 1A-4 are indicated by corresponding reference numerals increased by **100**.

[0045] As shown, the structure **110** can additionally include one or more collapsible couplings **149a, 149b**. In some embodiments, the collapsible couplings **149a, 149b** can include a chain **150** with a plurality of interlocking links. However, it will be appreciated that the collapsible couplings **149a, 149b** can be of any suitable type. The chain **150** can be made out of any suitable material, such as metal, polymer, etc.

[0046] The collapsible couplings **149a, 149b** can each include a first end **153**, which is operably coupled to the lower portion **111** of the frame assembly **112**, and a second end **155**, which is operably coupled to a respective one of the canopy support members **142a-142d**. The chain **150** is collapsible, meaning that the chain **150** is not self-supporting or self-standing. As such, the distance between the first and second ends **153, 155** can vary fairly easily. Thus, the chain **150** can allow the canopy **114** and the canopy support members **142a-142d** to resiliently move to better absorb heavy loading dues to wind or the like.

[0047] Specifically, as shown in FIG. 5A, the first ends **153** of the chains **150** can be operably coupled to different surfaces of the cap **119**. A fastener (e.g., a bolt) can extend through the respective first end **153** of the chain **150**, through the cap **119** and through the respective leg support member **118** to moveably couple these members. In some embodiments, the first ends **153** are coupled to the same fastener that hingeably couples the respective leg support member **118** to the cap **119**. Also, a fastener (e.g., a bolt) can extend through the second end **155** of both chains **150** and through the canopy support member **142a** to moveably couple these members. Thus, the chains **150** can branch away from the canopy support member **142a** and can be movably coupled to the respective leg support member **118** and/or cap **119**.

[0048] In addition, as shown in FIG. 5A, the frame assembly **112** can include a plurality of struts **148** that each support the same canopy support member **142a-142d**. One end of each strut **148** can be pivotally coupled to the same canopy support member **142a**. The struts **148** can also branch away from each other and can be movably (e.g., pivotally) coupled to a respective leg support member **118**.

[0049] In some embodiments, the frame assembly **112** can include pivot joint members **151** that each pivotally couple a respective strut **148** to a respective leg support member **118**. For instance, the pivot joint members **151** can be generally U-shaped with a first fastener **161** (e.g., a pin) extending through the pivot joint member **151** and the respective leg support member **118**. A second fastener **163** (e.g., a pin) can extend through the pivot joint member **151** and the respective strut **148** as well. Accordingly, the strut **148** can pivot relative to the leg support member **118** about the axis of the first fastener **161** as well as the axis of the second fastener **163**. In other embodiments, the pivot joint member **151** can be a ball and socket joint, which allows the strut **148** to pivot relative to the leg support member **118** about a plurality of axes. The added mobility provided by the pivot joint member **151** can

allow the structure **110** to be more stable as well as allow the structure **110** to move more easily between its extended and retracted positions.

[0050] As shown in FIG. 5B, the structure **110'** can include a sleeve **160'** through which the chains **150'** extend. The sleeve **160'** can be made out of any suitable material, such as fabric, polymeric material, or other suitable material. The sleeve **160'** can be independent of the canopy **114'** and can be supported on the chains **150'** so as to encapsulate the chains **150'** and a portion of the canopy support member **142a'**. Furthermore, in some embodiments, the sleeve **160'** can be coupled to the canopy **114'**, for instance by stitching. In addition, in some embodiments, the sleeve **160'** and the canopy **114'** can cooperate to encapsulate and encompass the chains **150'**. Moreover, it will be appreciated that each chain **150'** can be encompassed by an individual sleeve **160'**. The sleeve **60** can encompass and encapsulate the chains **150'** to reduce exposure of the chains **150'** and to keep unwanted foreign materials (e.g., dirt and/or debris) from contacting the chains **150'**. Thus, the chains **150'** can be less susceptible to corrosion. Additionally, the sleeve **160'** can make the structure **110'** more aesthetically pleasing because the chains **150'** can be less visible.

[0051] Referring now to FIG. 6, the frame assembly **212** is shown according to various other exemplary embodiments. Components that are similar to the embodiments of FIGS. 1A-4 are indicated with corresponding reference numerals increased by **200**.

[0052] As shown, the canopy support members **242a-242d** can include a single chain **250** extending between the respective cap **219** and the respective support member **242a-242d**. Additionally, a turnbuckle **252** (FIG. 5) can be included on the chain **250** for adjusting the length of the chain **250**. The turnbuckle **252** can include a rigid tube **271** with a threaded inner surface. The turnbuckle **252** can also include threaded fasteners **273a, 273b** that are fixed to respective links of the chain **250**. The fasteners **273a, 273b** can be threadably advanced to either increase the overall length of the chain **250**. Thus, the turnbuckle **252** allows the tension in the chain **250** to be varied, such that proper support of the canopy (not shown) can be maintained.

[0053] Furthermore, as shown in FIG. 6, the struts **248** can be rotatably attached to the respective leg support member **218** via a ball and socket joint **275**. For instance, a ball can be fixed to the leg support member **218**, and the ball can be received in a rounded recess defined in the end of the strut **248**. Accordingly, the ball and socket joint can allow the strut **248** to pivot about a plurality of different axes as discussed above.

[0054] It will be appreciated that the chains **150, 150', 250** can advantageously allow a fair amount of movement between the canopy support members **142a-142d, 142a'-142d', 242a-242d** and the other portions of the frame assembly **112, 112', 212**. As such, the canopy **114, 114', 214** can flex and move relative to the frame assembly **112, 112', 212** to absorb loads due to wind, precipitation, and the like. The chains **150, 150', 250** can also allow the canopy support members **142a-142d, 142a'-142d', 242a-242d** to move more easily between the extended and retracted configurations. Also, the struts **148, 148', 248** can provide robust support for the canopy support members **142a-142d, 142a'-142d', 242a-242d** for maintaining the support members **142a-142d, 142a'-142d', 242a-242d** extended such that the canopy **114, 114', 214** is less likely to excessively sag.

[0055] Now referring to FIGS. 7 and 8, another embodiment of the structure 310 is illustrated. Components that are similar to the embodiments of FIGS. 1A-4 are indicated with corresponding reference numerals increased by 300.

[0056] As shown, the canopy support member 342b can include a plurality of fork members 354. The fork members 354 can be made out of any suitable material, such as metallic, polymeric, or any other suitable material. The fork members 354 are each coupled to the canopy support member 342b at one end, and the fork members 354 branch away from each other and are pivotally coupled to respective ones of the leg support members 318 via pivot joint members 351 of the type described above.

[0057] It will be appreciated that features of the embodiments discussed above could be arranged in any suitable combination with each other. For instance, the chains 150, 150' of the embodiments of FIGS. 5A and 5B could be used to connect the canopy support members 42a-42d of FIG. 2 to the projection member 21 of FIG. 1. Furthermore, the chains 150, 150' could be used to connect the fork members 354 of FIGS. 7 and 8 to the leg support members 318.

[0058] In summary, the frame assembly 12, 112, 212, 312 of the present disclosure can be relatively robust and can withstand substantially strong forces due to gusts of wind, rain, and the like. However, the frame assembly 12, 112, 212, 312 is relatively light weight, thereby allowing the frame assembly 12, 112, 212, 312 to move between the extended and retracted configurations relatively easily, and also allowing the frame assembly 12, 112, 212, 312 to be moved relatively easy. In addition, the canopy 14 can be supported without excessive sagging.

[0059] The foregoing description of the embodiments has been provided for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention. Individual elements or features of a particular embodiment are generally not limited to that particular embodiment, but, where applicable, are interchangeable and can be used in a selected embodiment, even if not specifically shown or described. The same may also be varied in many ways. Such variations are not to be regarded as a departure from the invention, and all such modifications are intended to be included within the scope of the invention.

What is claimed is:

1. A portable shelter comprising:
a canopy; and
a frame assembly that supports the canopy, the frame assembly including a lower portion that defines an area, the frame assembly further including a resiliently flexible canopy support member extending over the area and supporting the canopy over the area, the frame assembly further including a collapsible coupling with a first end operably coupled to the lower portion and a second end operably coupled to the canopy support member, a distance between the first end and the second end being variable.
2. The portable shelter of claim 1, wherein the collapsible coupling includes a chain with a plurality of interlocking links.
3. The portable shelter of claim 1, further comprising a sleeve that encompasses at least a portion of the collapsible coupling.
4. The portable shelter of claim 1, wherein the lower portion of the frame assembly includes a plurality of legs that are supported upright, and wherein the lower portion of the frame

assembly also includes a plurality of leg supports that interconnect and support respective ones of the legs.

5. The portable shelter of claim 4, wherein the plurality of leg supports each include a plurality of pivotally attached, rigid, elongate members.

6. The portable shelter of claim 4, further comprising a strut with a first end operably coupled to the canopy support member and a second end operably coupled to either one of the plurality of legs or one of the plurality of leg supports.

7. The portable shelter of claim 6, wherein the strut is resiliently flexible.

8. The portable shelter of claim 6, wherein the second end of the strut is pivotally coupled to the one of the plurality of legs or the one of the plurality of leg supports to pivot about a plurality of different axes.

9. The portable shelter of claim 8, wherein the second end is coupled via a ball and socket joint.

10. The portable shelter of claim 6, wherein the strut includes a first strut and a second strut, wherein the first end of the first strut and the first end of the second strut are each operably coupled to the same canopy support member.

11. The portable shelter of claim 1, wherein the collapsible coupling includes a turnbuckle.

12. The portable shelter of claim 1, wherein the frame assembly is moveable from an extended position in which the canopy is unfurled and a retracted position in which the canopy is furled.

13. A portable shelter comprising:

a canopy; and

a frame assembly that supports the canopy, the frame assembly being moveable between an extended position in which the canopy is unfurled and a retracted position in which the canopy is furled, the frame assembly including a lower portion that defines an area, the frame assembly further including a resiliently flexible canopy support member extending over the area and supporting the canopy over the area, the frame assembly further including a chain with a plurality of interlocking links, the chain having a first end operably coupled to the lower portion and a second end operably coupled to the canopy support member.

14. The portable shelter of claim 13, wherein the canopy includes a sleeve that encompasses at least a portion of the collapsible coupling.

15. The portable shelter of claim 13, wherein the lower portion of the frame assembly includes a plurality of legs that are supported upright, and wherein the lower portion of the frame also includes a plurality of leg supports that interconnect and support respective ones of the legs.

16. The portable shelter of claim 15, further comprising a strut with a first end operably coupled to the canopy support member and a second end operably coupled to either one of the plurality of legs or one of the plurality of leg supports.

17. The portable shelter of claim 16, wherein the strut is resiliently flexible.

18. The portable shelter of claim 16, wherein the second end of the strut is pivotally coupled to the one of the plurality of legs or the one of the plurality of leg supports to pivot about a plurality of different axes.

19. The portable shelter of claim 13, wherein the collapsible coupling includes a turnbuckle.

20. A portable shelter comprising:

a foldable canopy; and

a frame assembly that supports the canopy, the frame assembly being moveable between an extended position in which the canopy is unfurled and a retracted position in which the canopy is furled, the frame assembly including:

a plurality of upright, rigid legs that define an area between the plurality of legs;

a plurality of scissoring, pivotally attached, rigid leg supports that extend between and interconnect respective ones of the plurality of legs;

a plurality of resiliently flexible canopy support members extending over the area and supporting the canopy over the area;

a plurality of resiliently flexible struts operably coupled to respective ones of the legs and operably coupled to respective ones of the canopy support members; and a plurality of chains, each with a plurality of interlocking links, the chains each having a first end operably coupled to respective ones of the legs, the chains each having a second end operably coupled to the canopy support member, the chains allowing the canopy support members to resiliently flex relative to the legs when the frame assembly is in the extended position.

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