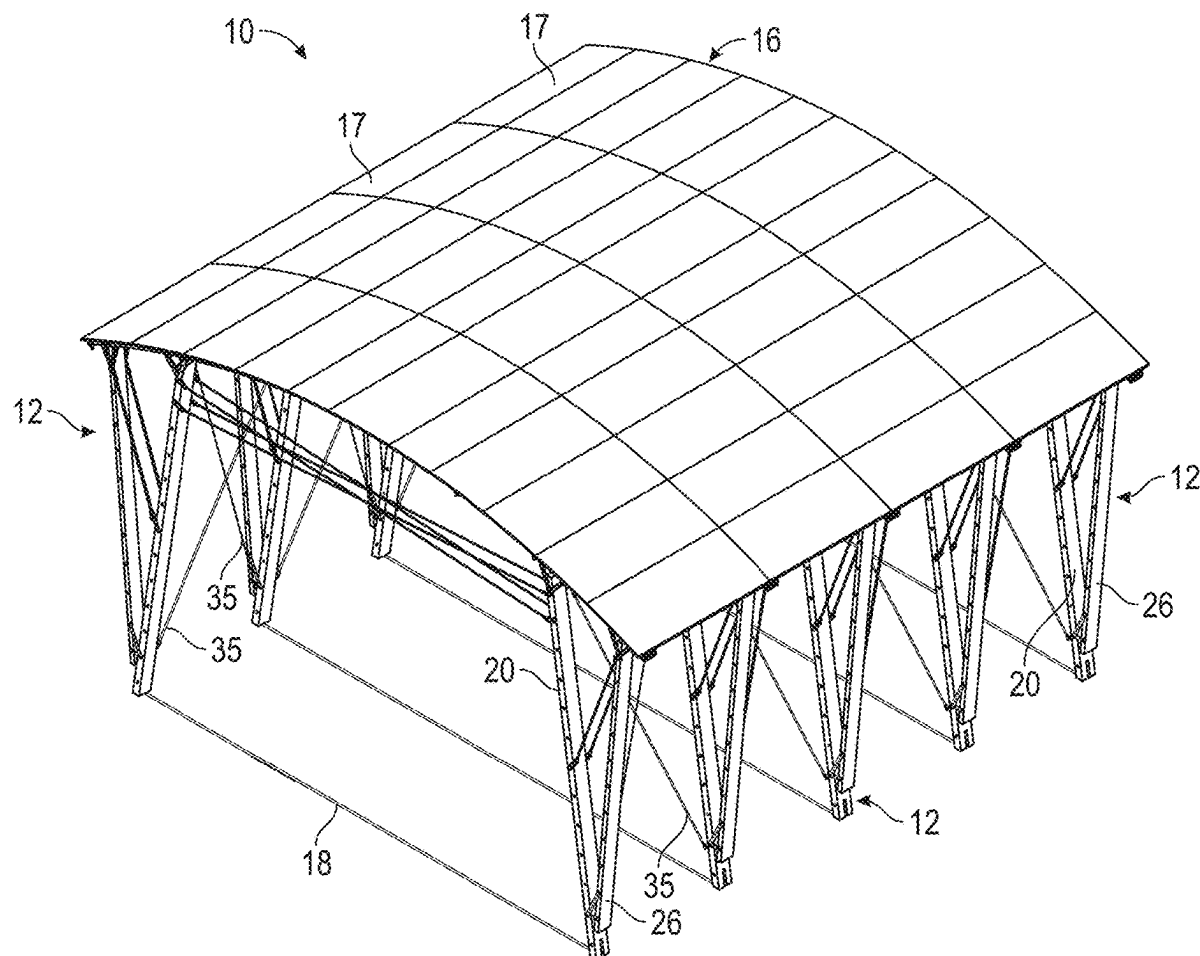




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(19) **United States**(12) **Patent Application Publication**
Fiutak et al.(10) **Pub. No.: US 2025/0257560 A1**(43) **Pub. Date: Aug. 14, 2025**(54) **FRAME ASSEMBLY FOR A TEMPORARY
STRUCTURE AND METHOD OF ASSEMBLY****Publication Classification**(51) **Int. Cl.**
E04B 1/343 (2006.01)(52) **U.S. Cl.**
CPC E04B 1/34317 (2023.08); E04B 1/34326 (2013.01)(71) Applicant: **Anthony Hardwood Composites, Inc.**,
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(US); **Sean P. Joyce**, Veazie, ME (US);
James F. Weber, Jr., Eugene, OR (US)(73) Assignee: **Anthony Hardwood Composites, Inc.**,
Sheridan, AR (US)(21) Appl. No.: **19/051,607**(22) Filed: **Feb. 12, 2025****Related U.S. Application Data**(60) Provisional application No. 63/552,884, filed on Feb.
13, 2024.(57) **ABSTRACT**

A frame assembly for use in a temporary structure includes two compression members, two tension members, a roof support assembly, a restraint member, and a plurality of tension rods. A first end of each compression member is attached to the roof support assembly. Each tension member is attached a lower portion of one of the compression members and to a distal end of the roof support assembly, and the restraint member is connected between a second end of each of the two compression members.



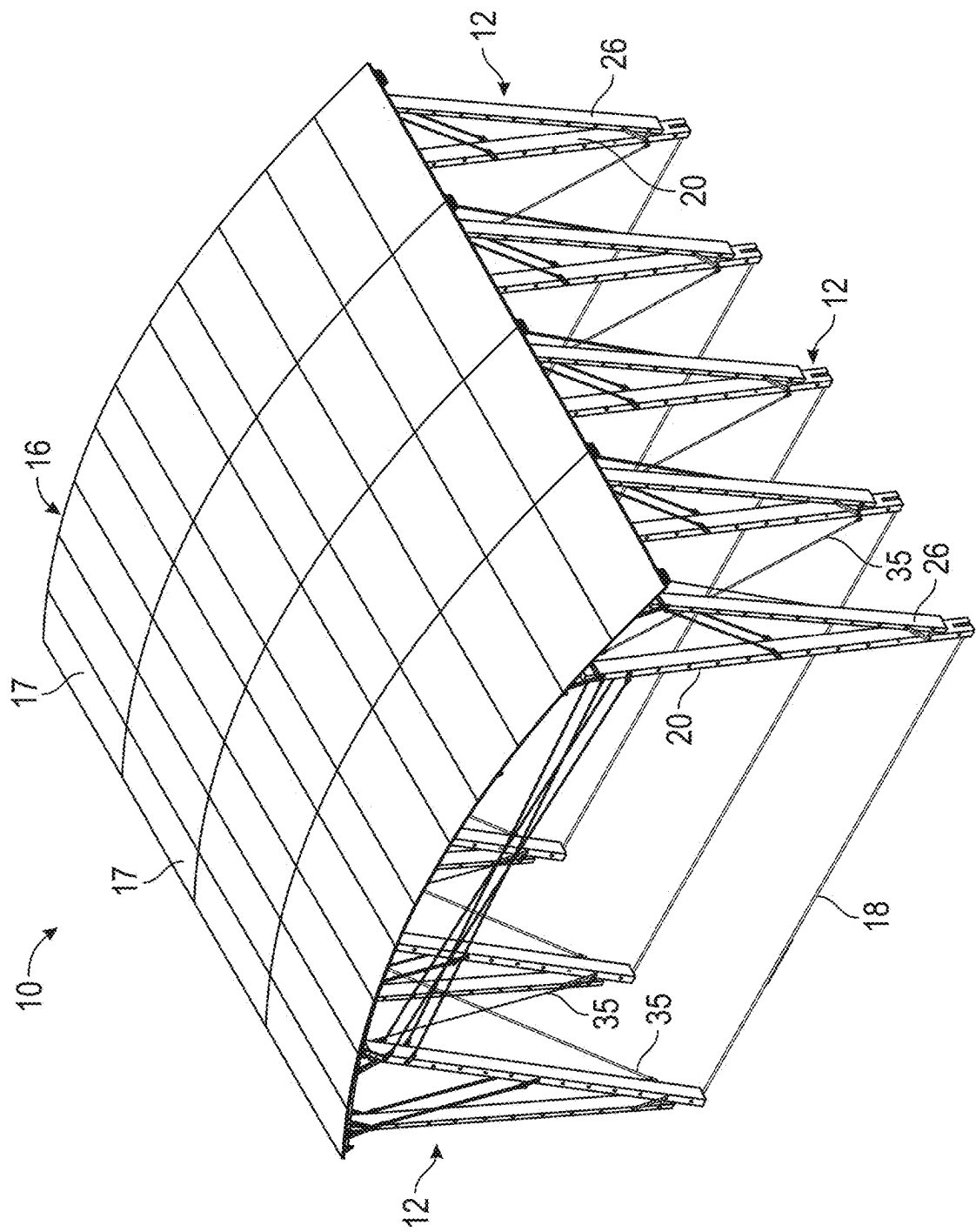


FIG. 1

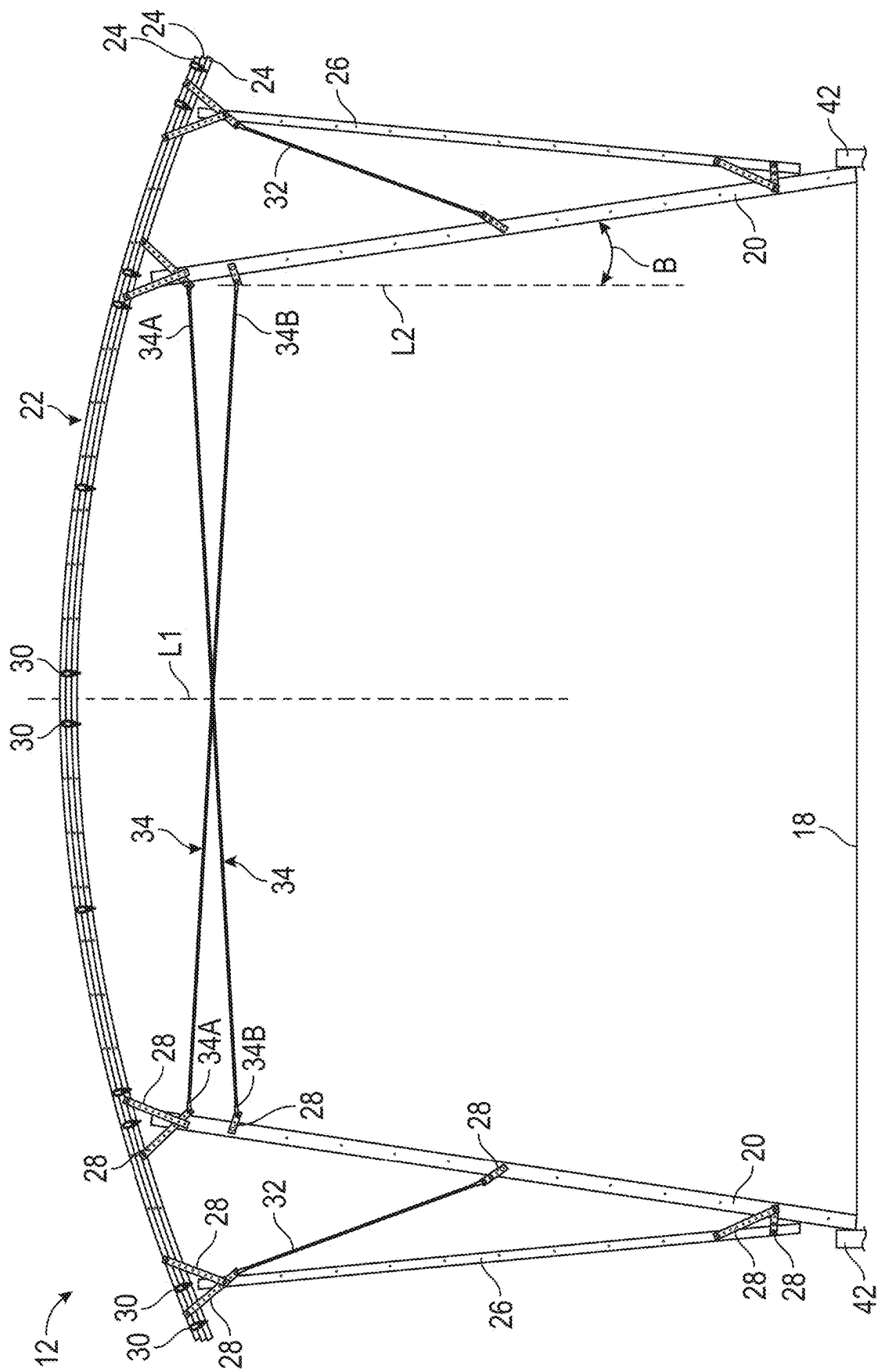


FIG. 2

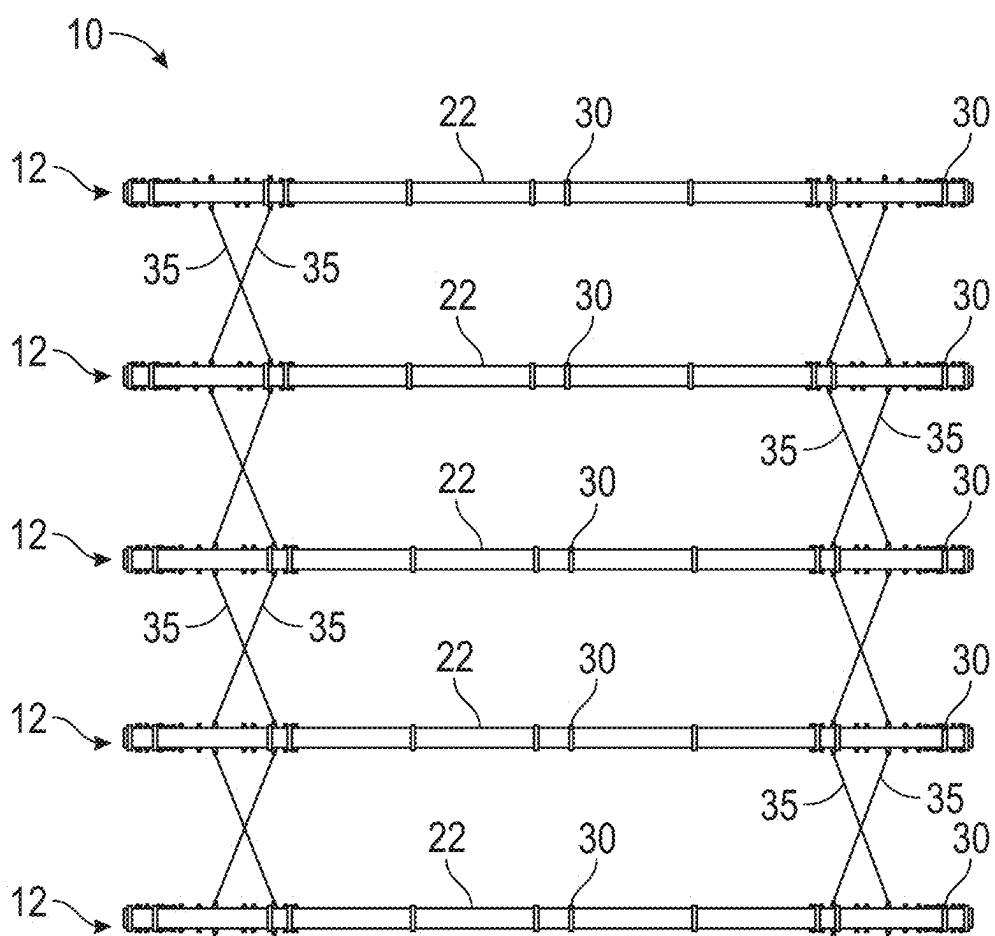


FIG. 3

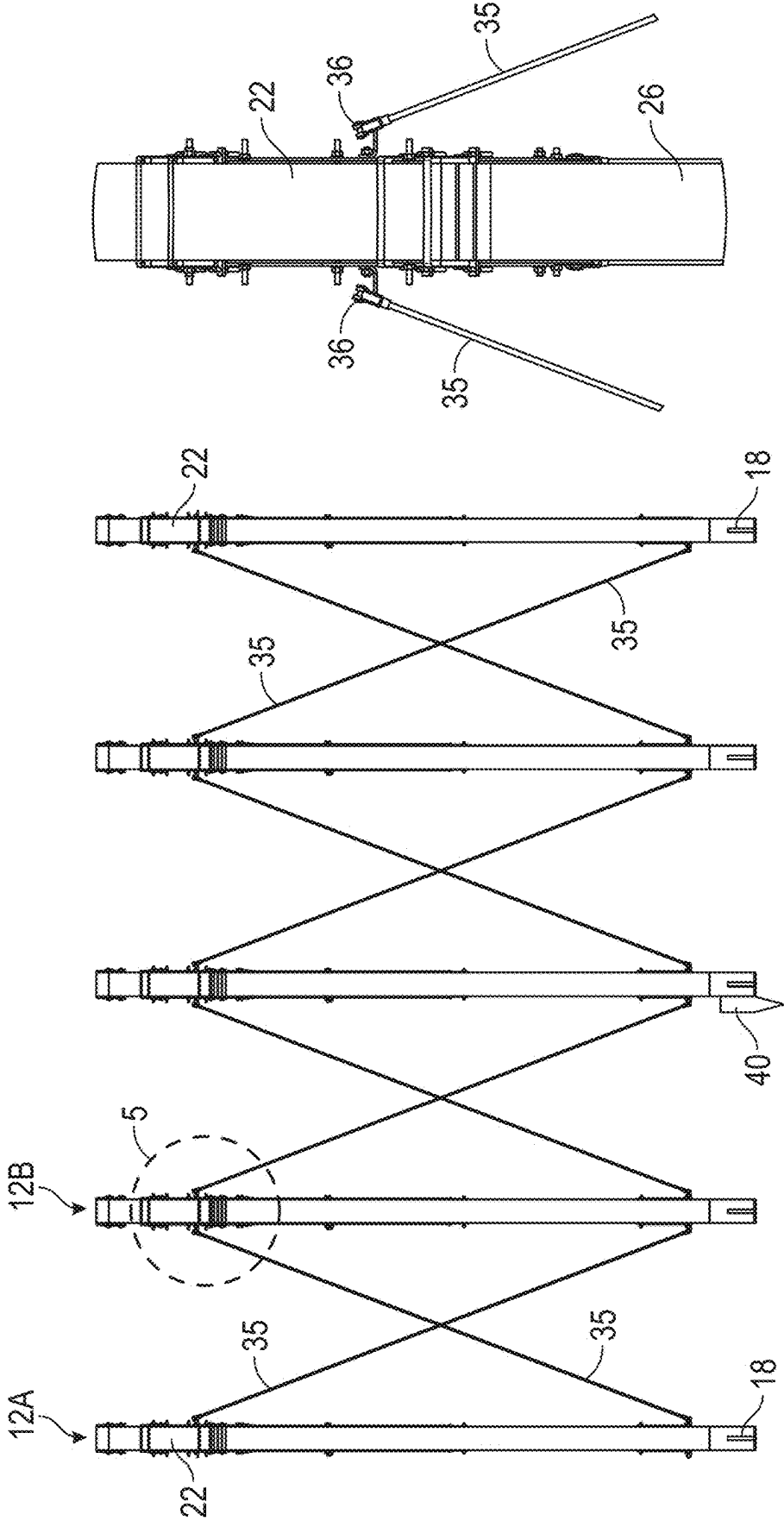


FIG. 5

FIG. 4

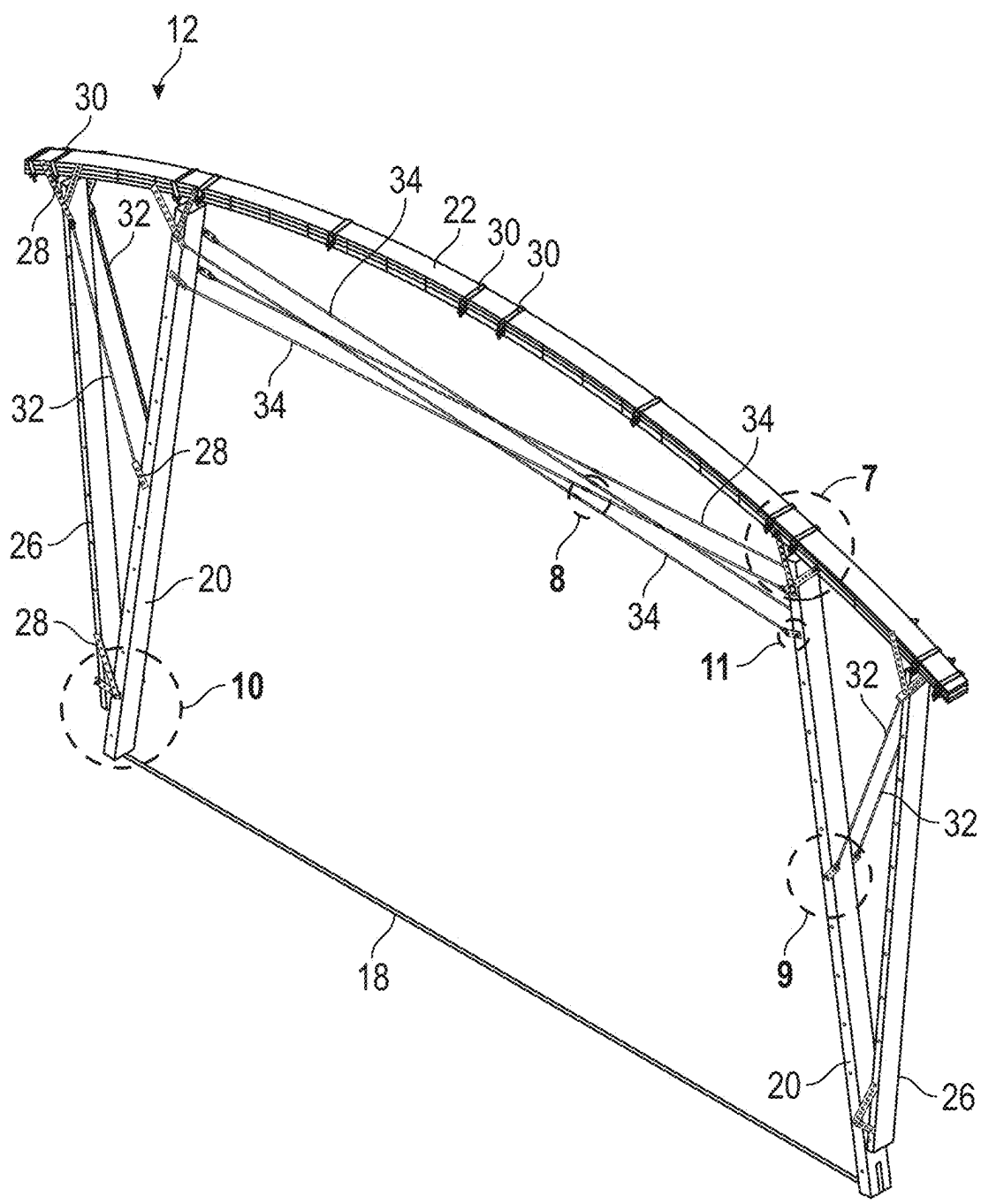


FIG. 6

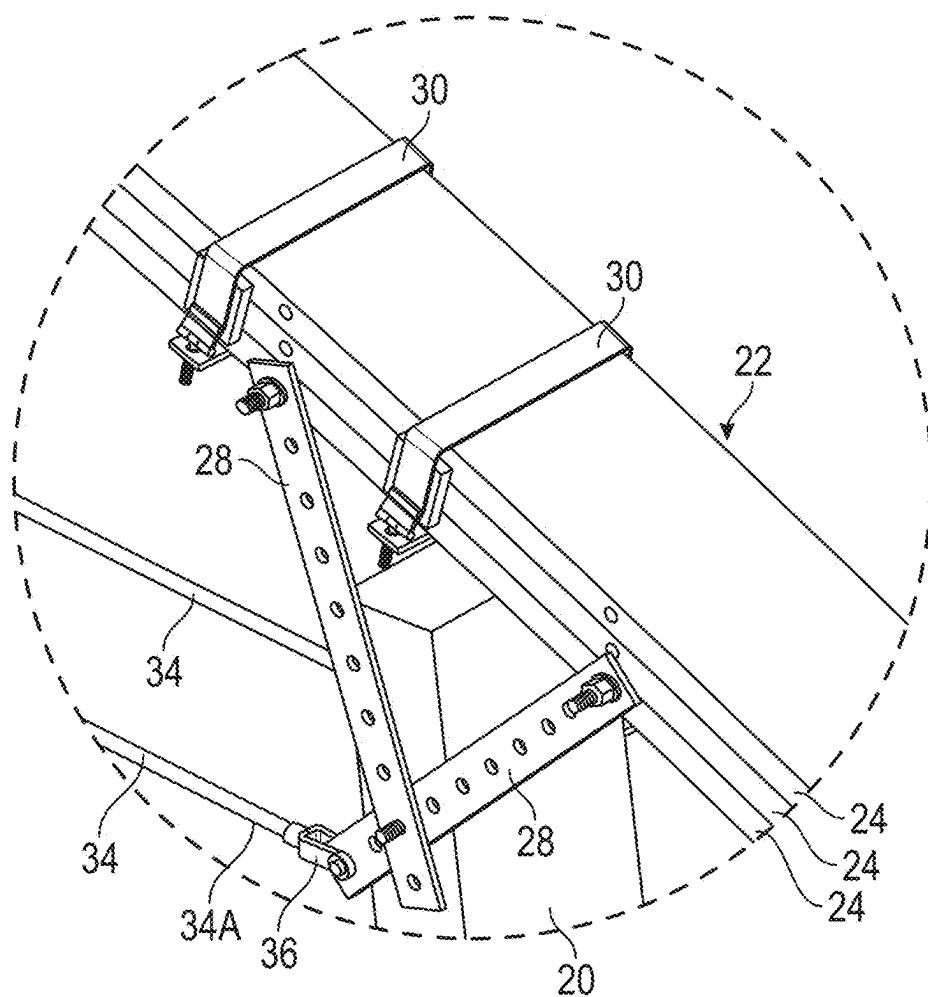


FIG. 7

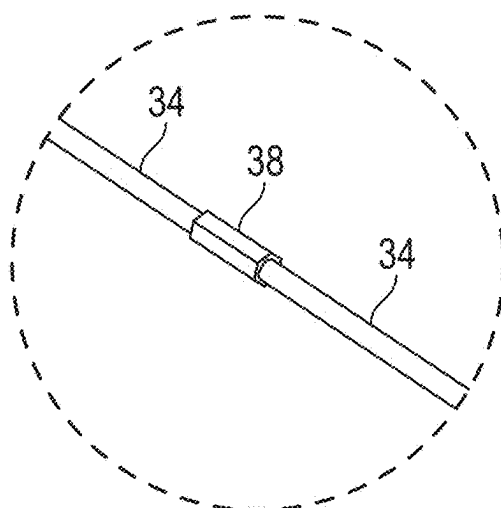


FIG. 8

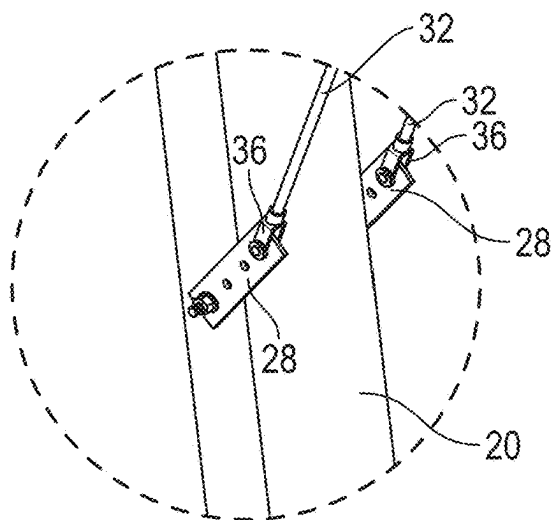


FIG. 9

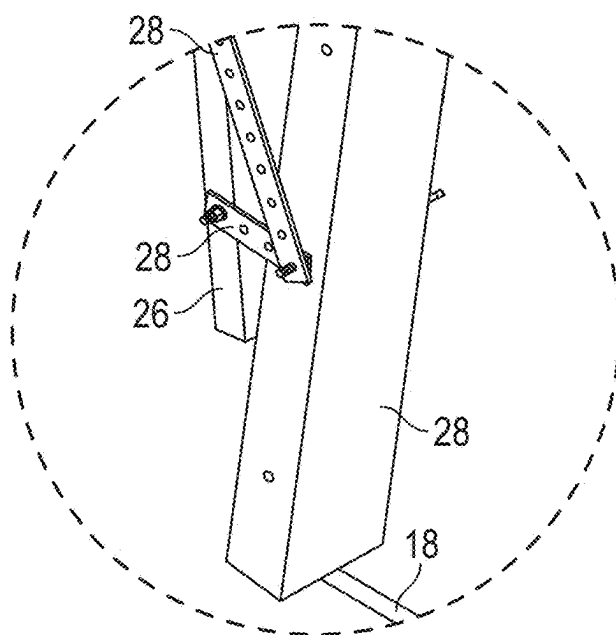


FIG. 10

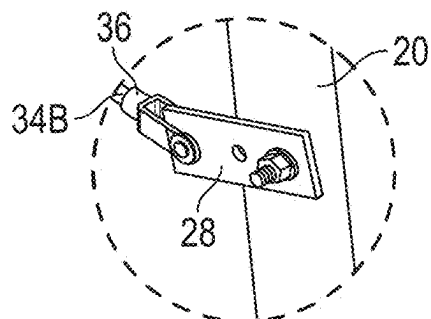


FIG. 11

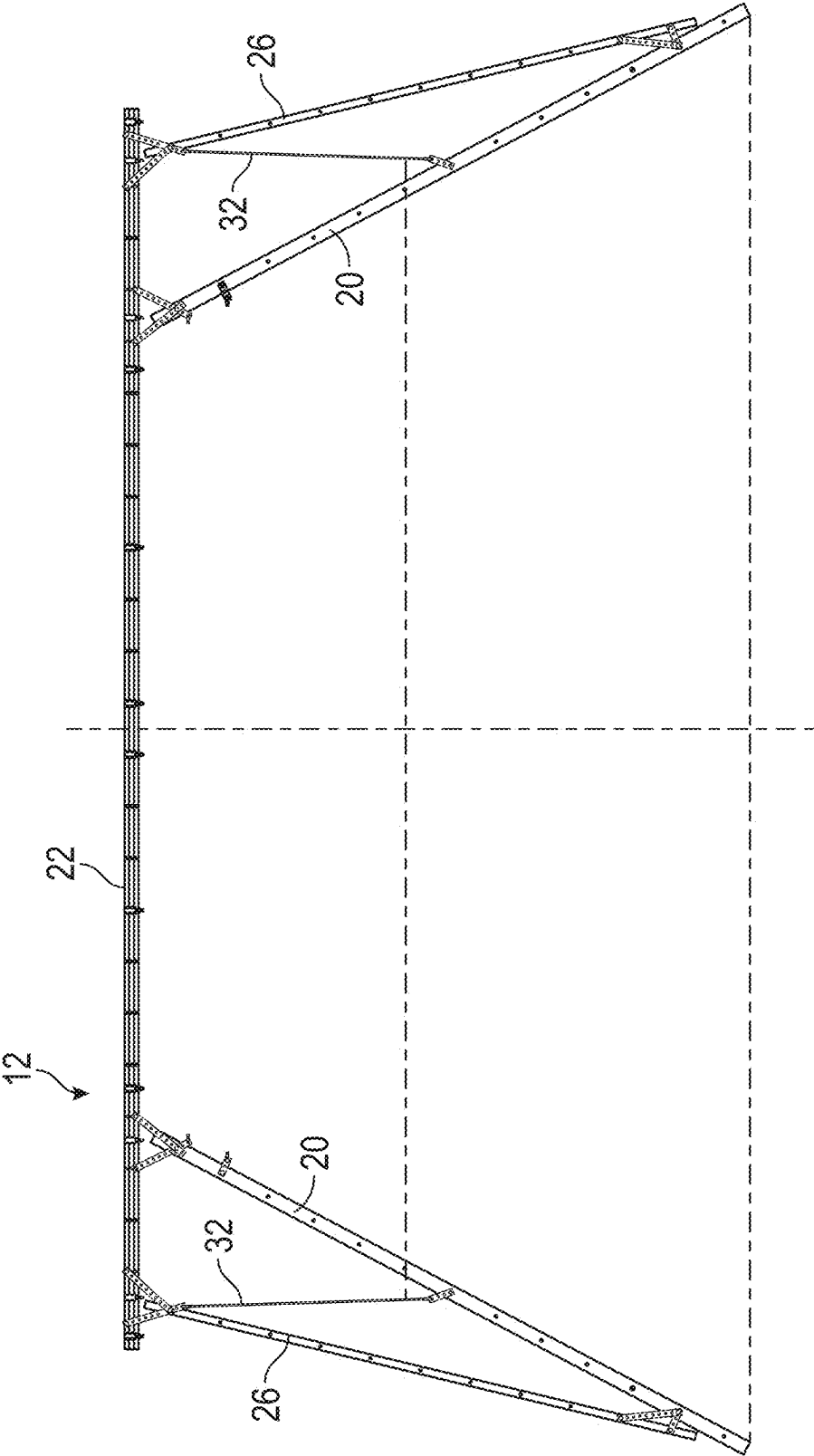


FIG. 12A

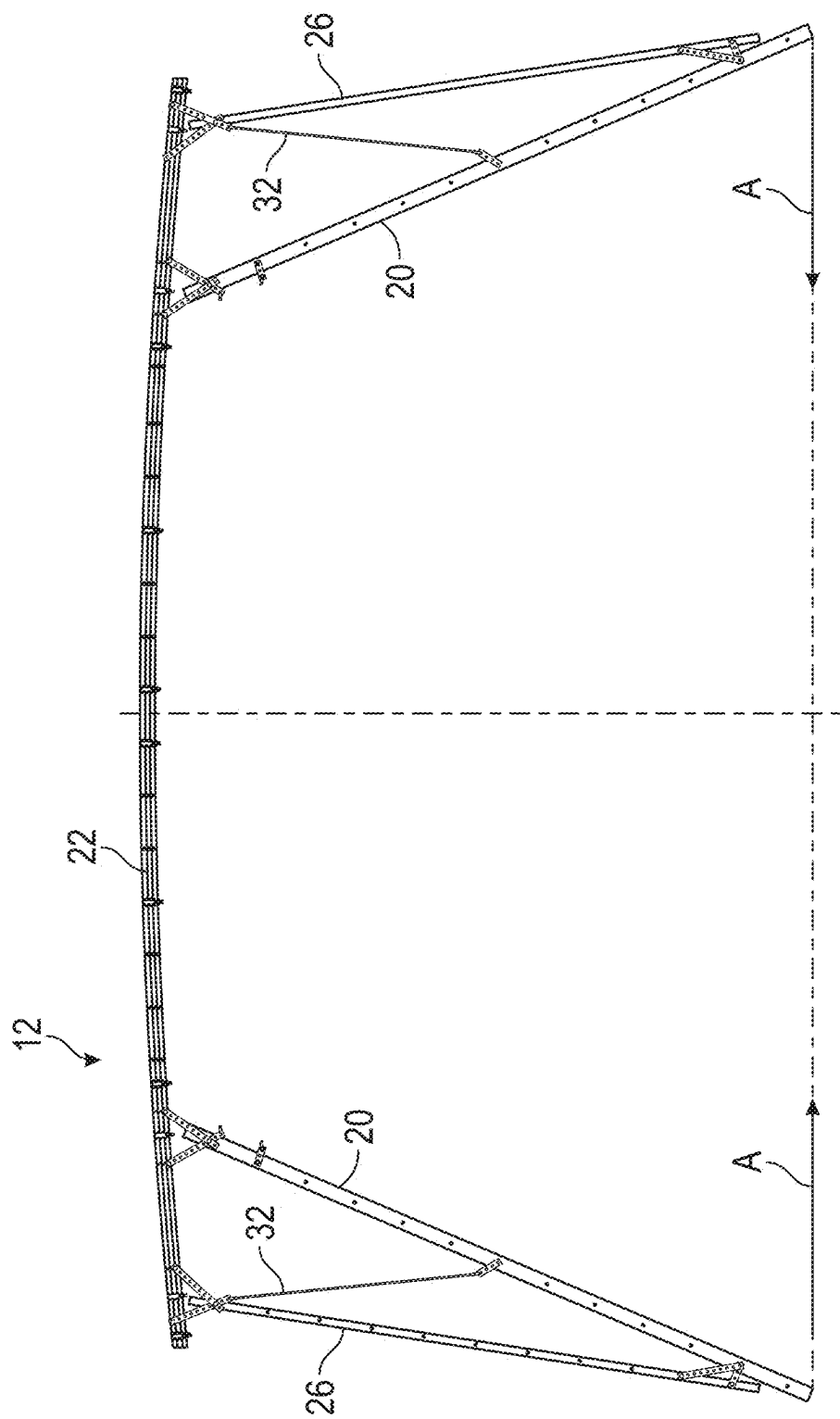


FIG. 12B

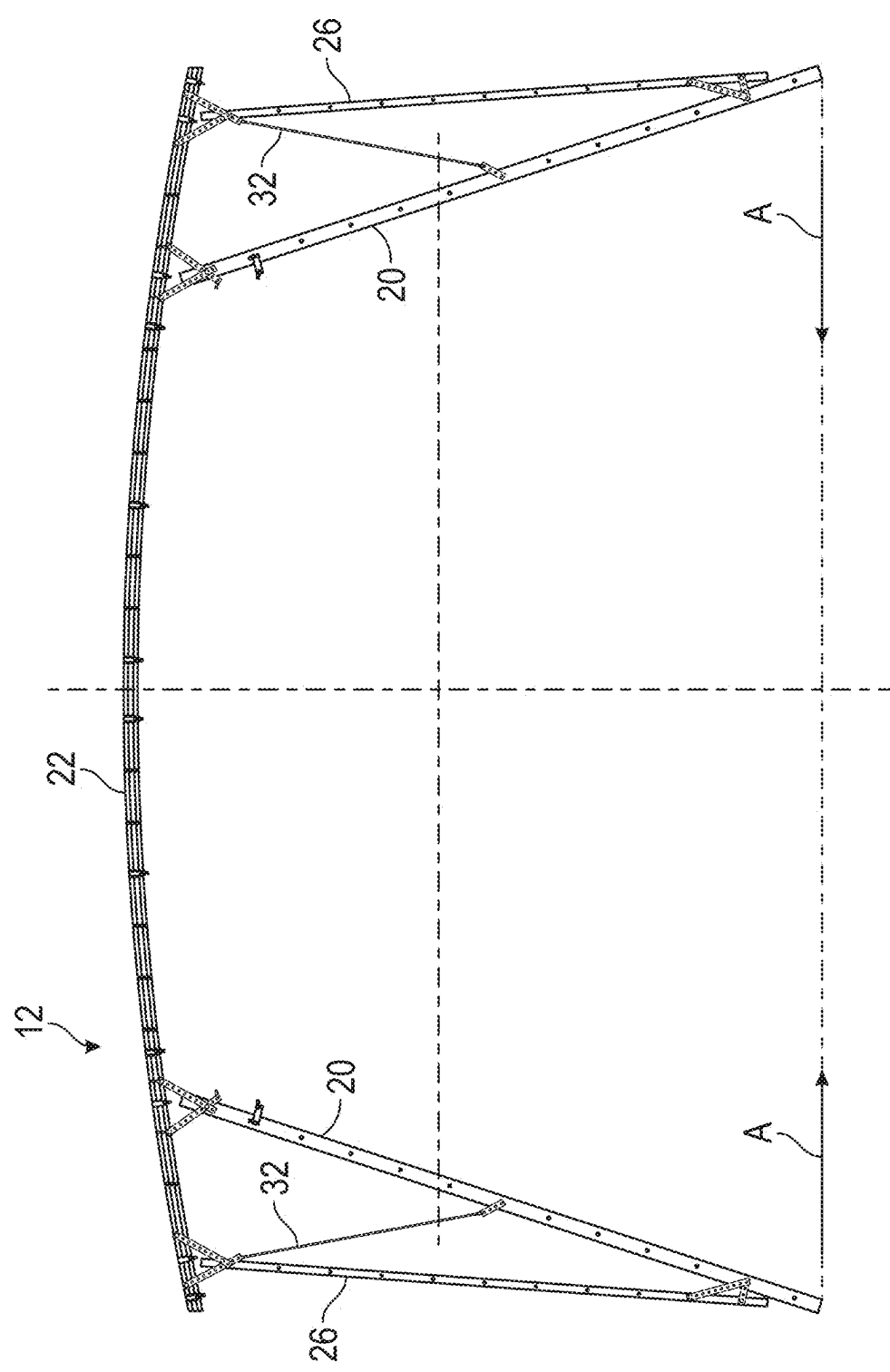


FIG. 12C

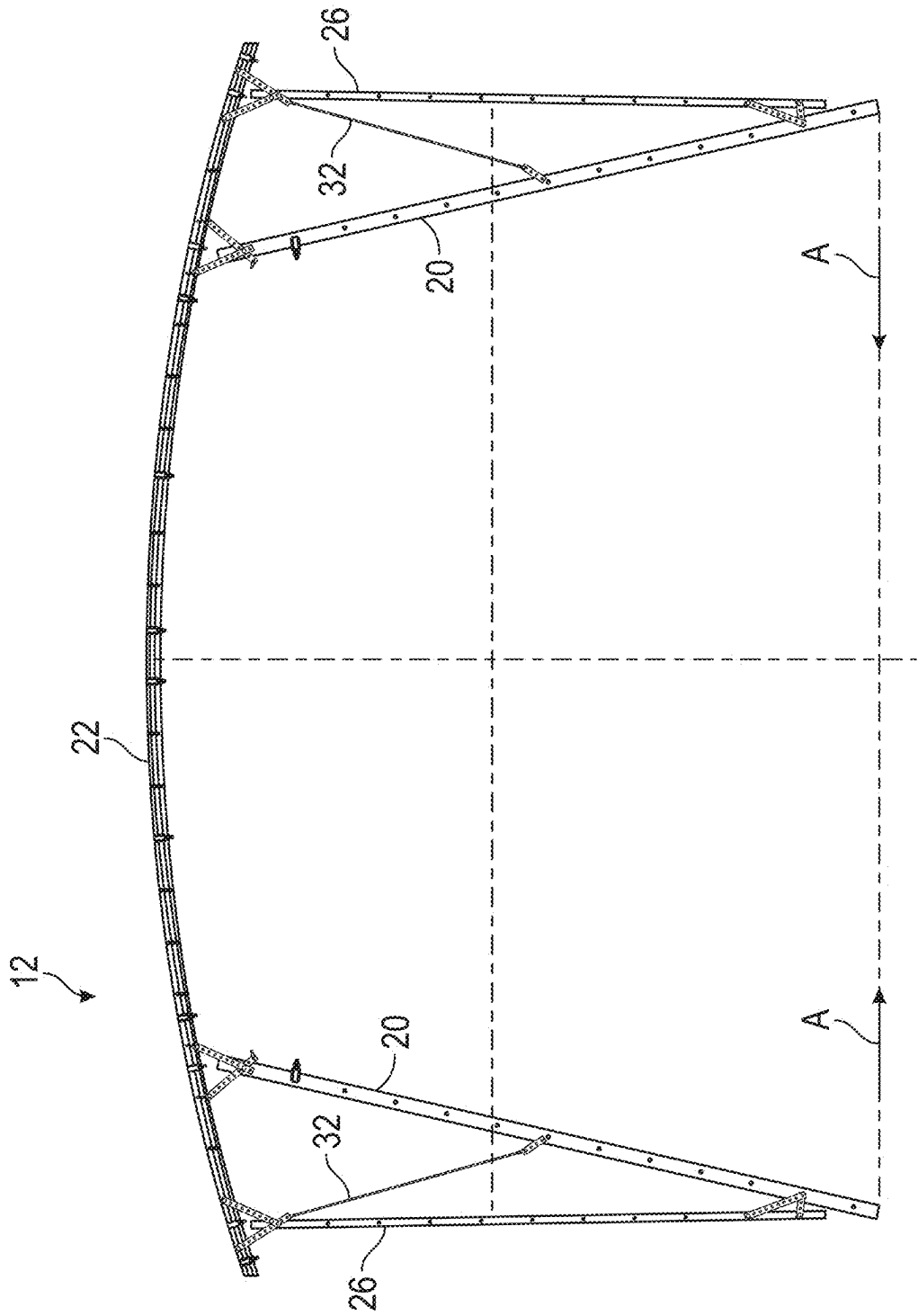


FIG. 12D

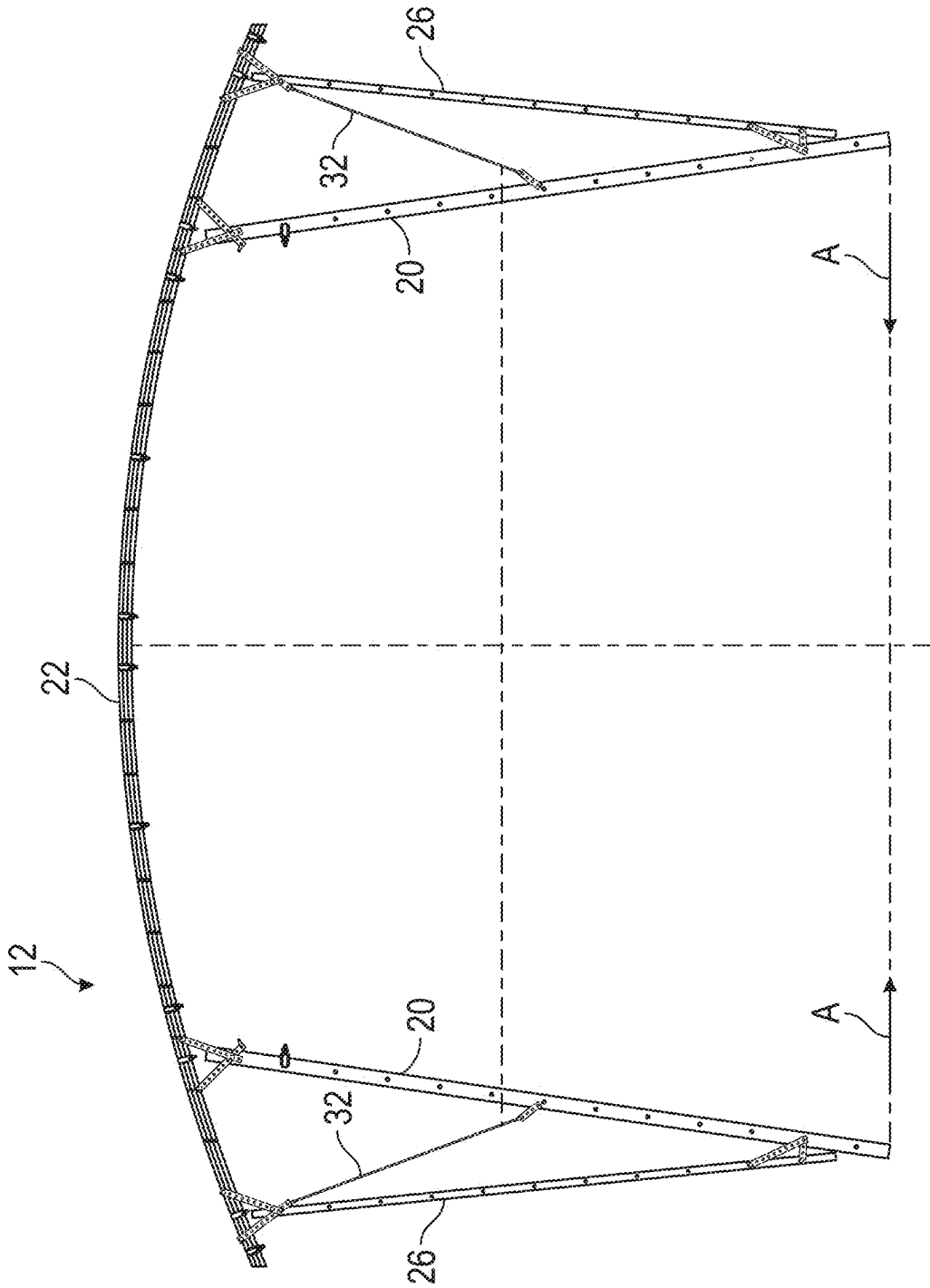


FIG. 12E

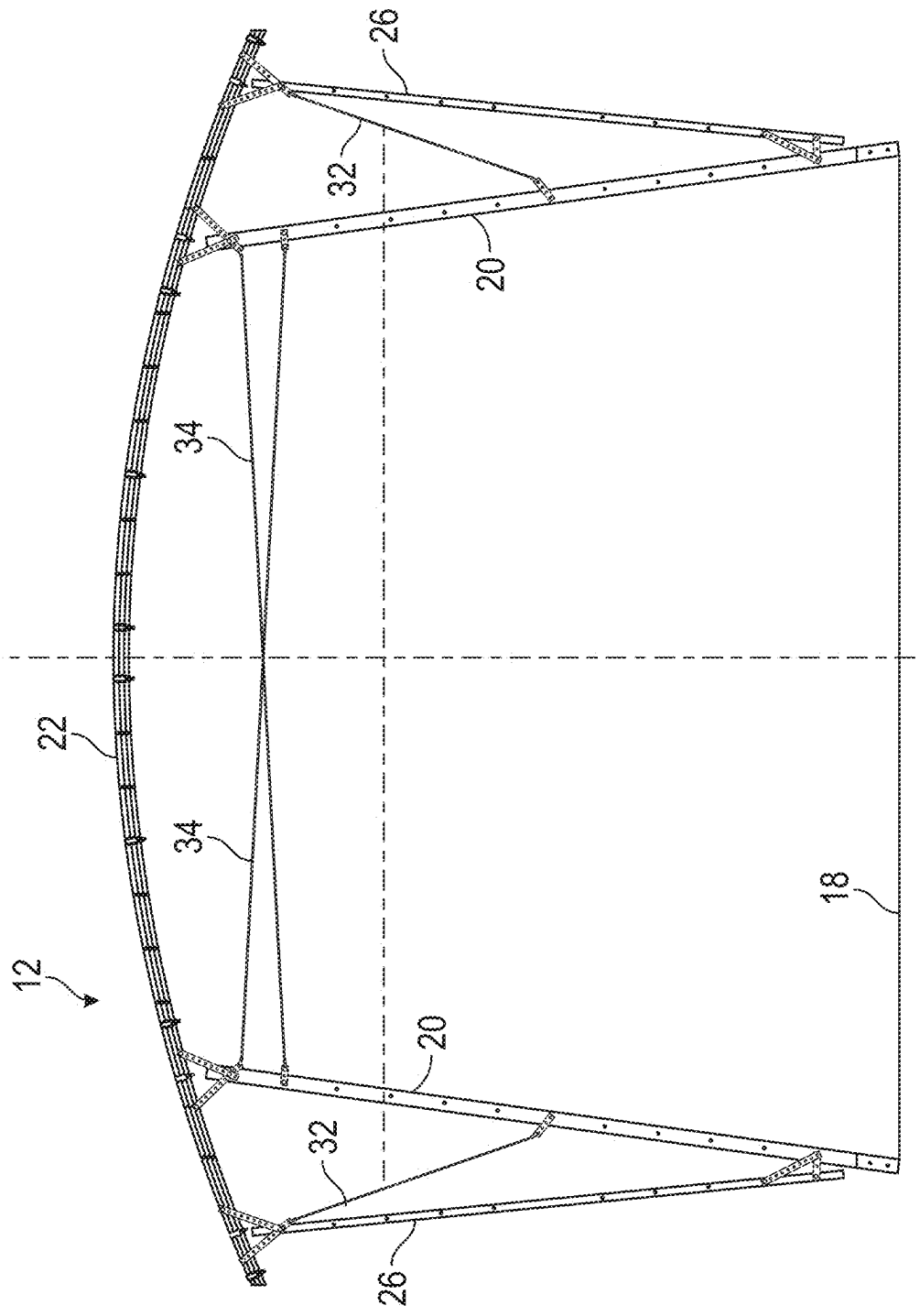


FIG. 12F

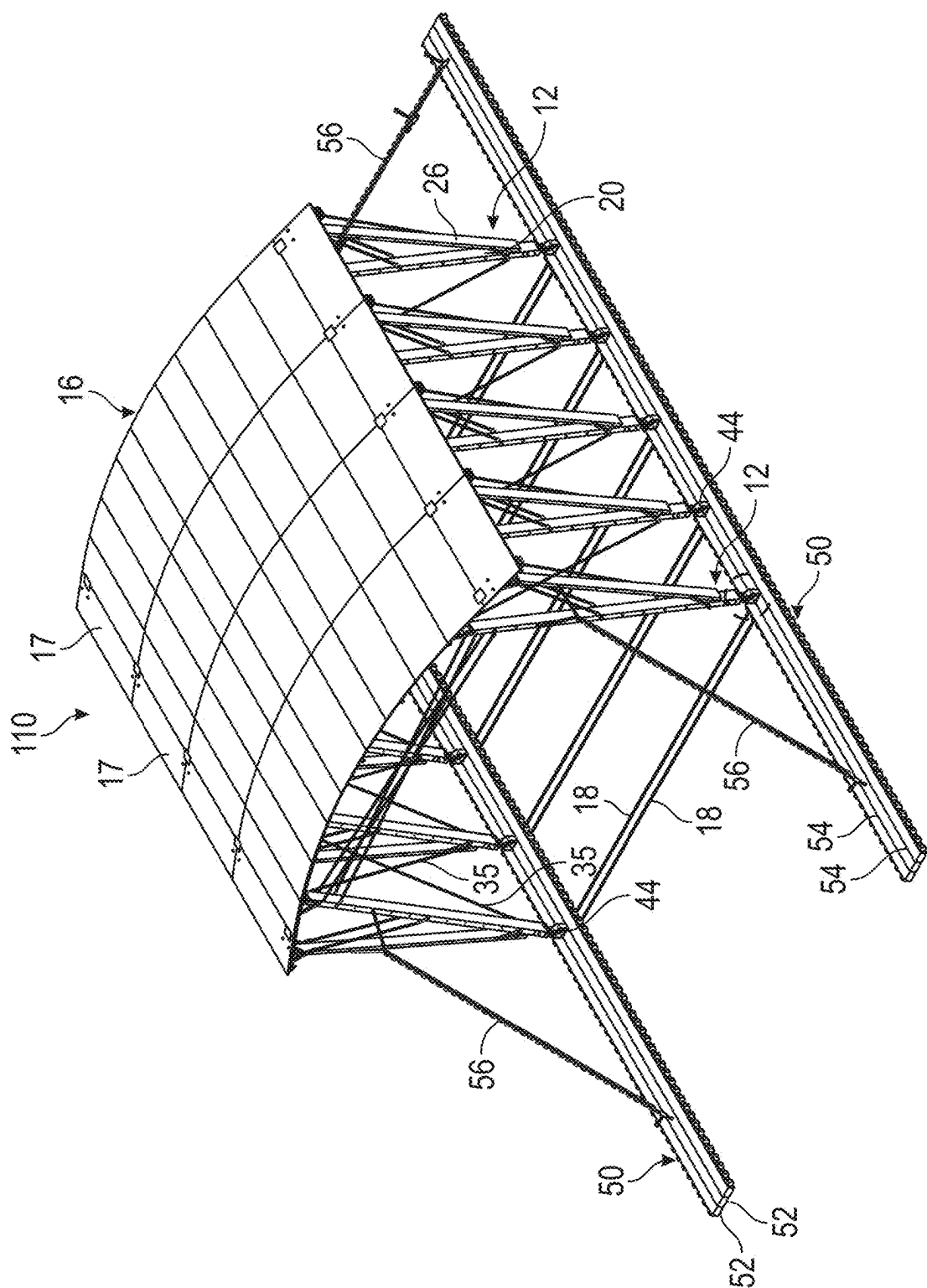


FIG. 13

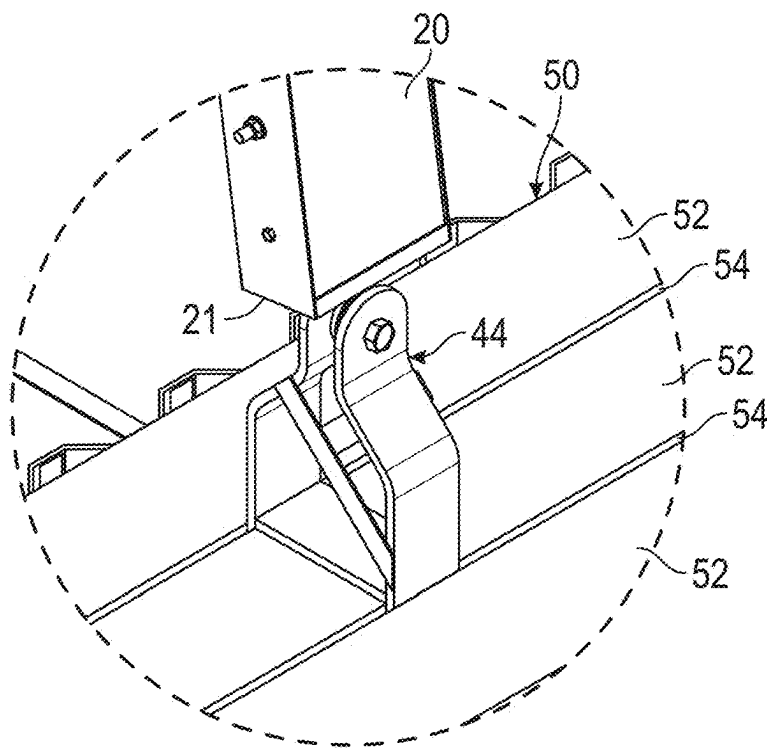


FIG. 14

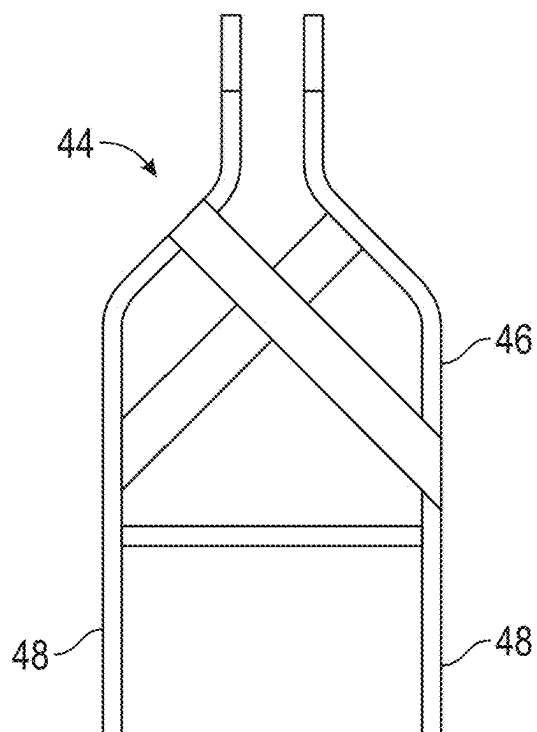


FIG. 15

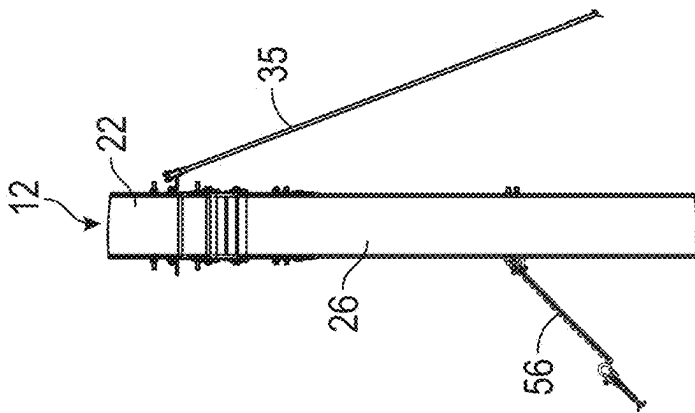


FIG. 17

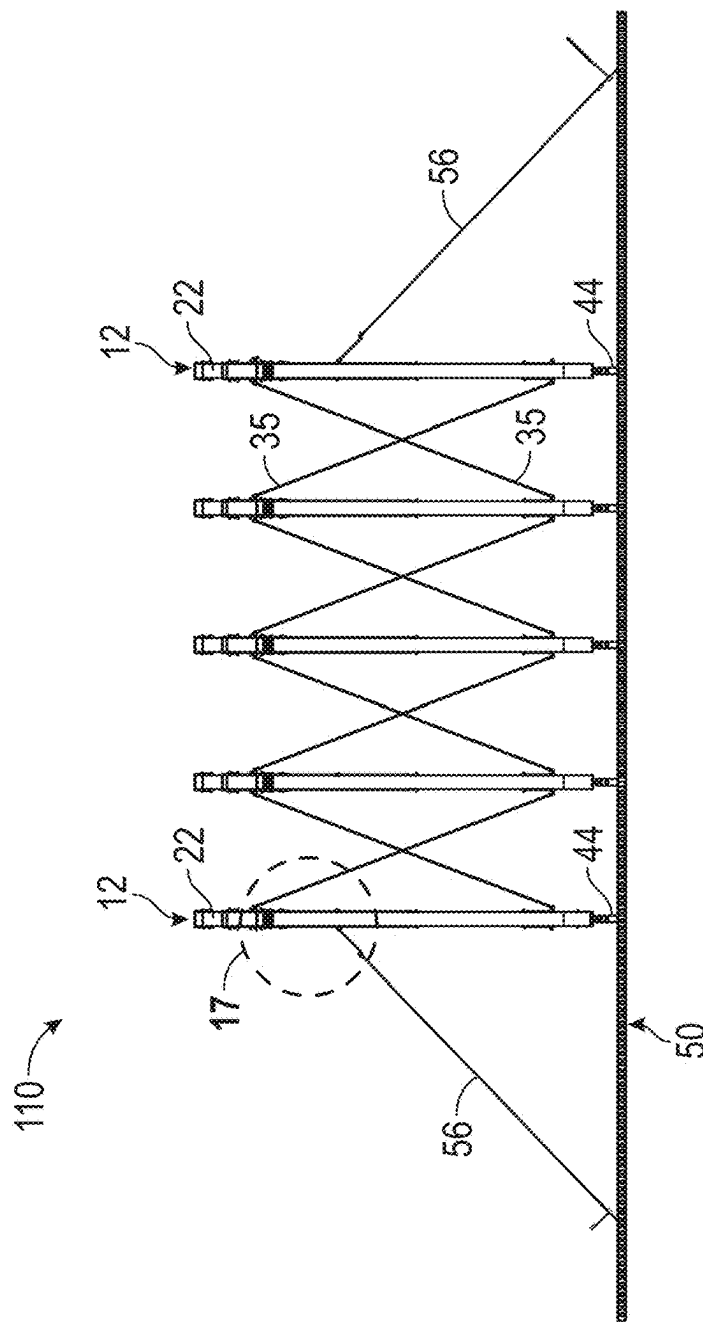


FIG. 16

FRAME ASSEMBLY FOR A TEMPORARY STRUCTURE AND METHOD OF ASSEMBLY

BACKGROUND OF THE INVENTION

[0001] This invention relates in general to a temporary structure. In particular, this invention relates to an improved frame assembly used in a temporary structure, a method of assembling the individual frame assembly, and a method for assembling a temporary structure from multiple assembled individual frame assemblies.

[0002] There is a need in outdoor work environments, particularly at construction sites, for temporary structures. However, conventional structures may be large, heavy, and/or difficult to move, assemble, and disassemble. Thus, it would be desirable to provide an improved frame assembly used in a temporary structure, a method of assembling the individual frame assembly, and a method for assembling a temporary structure from multiple assembled individual frame assemblies.

SUMMARY OF THE INVENTION

[0003] This invention relates to an improved frame assembly used in a temporary structure, a method of assembling the individual frame assembly, and a method for assembling a temporary structure from multiple assembled individual frame assemblies. The frame assembly includes two compression members, two tension members, a roof support assembly, a restraint member, and a plurality of tension rods. A first end of each compression member is attached to the roof support assembly. Each tension member is attached to a lower portion of one of the compression members and to a distal end of the roof support assembly, and the restraint member is connected between a second end of each of the two compression members.

[0004] In another embodiment, a method of assembling a frame assembly for use in a temporary structure includes attaching two compression members to an roof support assembly with a plurality of straps, attaching a first end of each of a pair of tension members to the roof support assembly with a plurality of the straps, attaching a second end of each of the pair of tension members to each compression member with a plurality of the straps, attaching a first pair of tension rods between a mid-point of each compression member and each tension member, attaching two second pairs of the tension rods between first ends of the compression members on opposite sides thereof, and attaching a restraint member between second ends of each of the two compression members, thereby defining the frame assembly.

[0005] In an additional embodiment, a temporary structure includes a plurality of frame assemblies, wherein each frame assembly includes two compression members, two tension members, a roof support assembly, a restraint member, two first pairs of tension rods, and two second pairs of tension rods. A first end of each compression member is attached to the roof support assembly. Each tension member is attached to a lower portion of one of the compression members and to a distal end of the roof support assembly, and the restraint member is connected between a second end of each of the two compression members. The temporary structure also includes two third pairs of tension rods, wherein each of the

plurality of frame assemblies is connected to an adjacent one the plurality of frame assemblies with the two third pairs of tension rods.

[0006] In a further embodiment, a method of assembling a temporary structure includes attaching two compression members to a roof support assembly with a plurality of straps, attaching a first end of each of a pair of tension members to the roof support assembly with a plurality of the straps, attaching a second end of each of the pair of tension members to each compression member with a plurality of the straps, attaching a first pair of tension rods between a mid-point of each compression member and each tension member, attaching two second pairs of the tension rods between first ends of the compression members on opposite sides thereof, and attaching a restraint member between second ends of each of the two compression members, thereby defining a frame assembly. Adjacent ones of a plurality of the frame assemblies are then attached together with two third pairs of the tension rods.

[0007] Various aspects of this invention will become apparent to those skilled in the art from the following detailed description of the preferred embodiment, when read in view of the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a perspective view of a temporary structure in accordance with this invention.

[0009] FIG. 2 is a front elevational view of a first embodiment of the frame assembly illustrated in FIG. 1 shown fully assembled.

[0010] FIG. 3 is a top plan view of the temporary structure illustrated in FIG. 1, shown with the roof removed.

[0011] FIG. 4 is a side elevational view of the temporary structure illustrated in FIGS. 1 and 3.

[0012] FIG. 5 is an enlarged view taken within circle 5 in FIG. 4.

[0013] FIG. 6 is a perspective view of the frame assembly illustrated in FIG. 2.

[0014] FIG. 7 is an enlarged view taken within circle 7 in FIG. 6.

[0015] FIG. 8 is an enlarged view taken within circle 8 in FIG. 6.

[0016] FIG. 9 is an enlarged view taken within circle 9 in FIG. 6.

[0017] FIG. 10 is an enlarged view taken within circle 10 in FIG. 6.

[0018] FIG. 11 is an enlarged view taken within circle 11 in FIG. 6.

[0019] FIG. 12A is a front elevational view of a first step of the method of assembling the frame assembly illustrated in FIGS. 2 and 6.

[0020] FIG. 12B is a front elevational view of a second step of the method of assembling the frame assembly illustrated in FIGS. 2 and 6.

[0021] FIG. 12C is a front elevational view of a third step of the method of assembling the frame assembly illustrated in FIGS. 2 and 6.

[0022] FIG. 12D is a front elevational view of a fourth step of the method of assembling the frame assembly illustrated in FIGS. 2 and 6.

[0023] FIG. 12E is a front elevational view of a fifth step of the method of assembling the frame assembly illustrated in FIGS. 2 and 6.

[0024] FIG. 12F is a front elevational view of a sixth step of the method of assembling the frame assembly illustrated in FIGS. 2 and 6.

[0025] FIG. 13 is a perspective view of a second embodiment of the temporary structure illustrated in FIG. 1.

[0026] FIG. 14 an enlarged view taken within circle 14 in FIG. 13.

[0027] FIG. 15 is an enlarged front elevational view of the frame foot connector illustrated in FIGS. 13 and 14.

[0028] FIG. 16 is a side elevational view of the temporary structure illustrated in FIG. 13.

[0029] FIG. 17 an enlarged view taken within circle 17 in FIG. 16.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0030] Referring now to the drawings, there is illustrated at 10 in FIGS. 1 through 4 a basic structure of a temporary structure 10 in accordance with this invention. The temporary structure 10 includes a plurality of frame assemblies 12 connected by a plurality of third tension rods 35, described below, and a roof 16. The roof 16 may be formed by a plurality of roof panels 17, formed from any desired material such as but not limited to wood, steel and other metals, fiberglass, PVC panels, and coated fabric.

[0031] As best shown in FIG. 2, each frame assembly 12 includes a lower restraint member 18 connected between two compression members 20. The frame assembly 12 also includes a roof support assembly 22 having three roof support members 24, bound together, and extending between and beyond each of the two compression members 20. Tension members 26 extend between a lower portion of each of the compression members 20 and the distal ends of the roof support assembly 22. As best shown in FIG. 7, a first one of the roof support members 24 (the lower roof support member when viewing FIGS. 2 and 7) may be attached to the compression members 20 with a plurality of straps 28. In the illustrated embodiment of the frame assembly 12, the straps 28 are attached to opposite sides of the compression members 20 with threaded fasteners, such as bolts and nuts. Second and third ones of the roof support members 24 may be attached to the first one of the roof support members 24 with brackets 30 to define the roof support assembly 22. It will be understood that the roof support assembly 22 may have more than three or less than three roof support members 24.

[0032] Similarly, a third one of the roof support members 24 (the upper roof support member when viewing FIGS. 2 and 7) may be attached to the tension members 26 with a plurality of the straps 28. In the illustrated embodiment of the frame assembly 12, the straps 28 are attached to opposite sides of the tension members 26 with threaded fasteners, such as bolts and nuts. A second end of each tension member 26 may be attached to each compression members 20 with a plurality of the straps 28. In the illustrated embodiment of the frame assembly 12, the straps 28 are attached to opposite sides of the compression members 20 and the tension members 26 with threaded fasteners, such as bolts and nuts, as shown in FIG. 10.

[0033] As best shown in FIG. 9, a pair of first tension rods 32 extend between a pair of the straps 28 mounted at a mid-point of each compression member 20 and one of the straps 28 that connect each side of the roof support assembly 22 to the tension members 26. Two pairs of second tension

rods 34 extend between first ends of the compression members 20 (the upper end when viewing FIG. 2) on opposite sides thereof. A first end 34A of each of the tension rods 34 is attached to one of the straps 28 that connects the compression member 20 to the roof support assembly 22, as shown in FIG. 7, and a second end 34B of each of the tension rods 34 is attached to a strap 28 mounted to the compression member 20 adjacent to the first end 34A (below the first end 34A when viewing FIGS. 2 and 6), as shown in FIG. 11.

[0034] The illustrated tension rods 32, 34, and 35 are formed from steel, however the tension rods 32, 34, and 35 may also be formed from other metals, including, but not limited to, other metals, cable, nylon, and composite pultrusion. The distal ends of the tension rods 32, 34, and 35 are threaded and are connected to the frame assembly 12 by a pivoting mount 36. The second tension rods 34 may be formed in sections and connected by a threaded coupling nut 38.

[0035] The illustrated lower restraint member 18 may be a strap formed from any desired material including, but not limited to, steel, wood, rope, and composite materials. The distal ends of the lower restraint member 18 are attached to each compression member by any desired means including, but not limited to threaded fasteners and straps. Alternatively, the lower restraint member 18 may be a chain, a cable that is formed from any desired material such as steel, or the lower restraint member 18 may be a rod, similar to the tension rods 32, 34, and 35.

[0036] The illustrated straps 28 are steel straps about 3.0 in wide, 0.375 in thick, and have holes formed therethrough spaced about 3.0 in apart. The lengths of the straps 28 will vary depending on where on the frame assembly 12 the straps 28 are used. It will be understood that the straps 28 may be formed from other materials, and have other widths and thicknesses.

[0037] Each of the compression members 20, roof support members 24, and tension members 26 may be formed from laminated hardwood beams. Alternatively, the compression members 20, roof support members 24, and tension members 26 may be formed from laminated softwood beams.

[0038] Advantageously, the components of the frame assembly 12, i.e., the roof support members 24, the compression members 20, the tension rods 32, 34, and 35, and the lower restraint member 18 are shipped un-assembled and may be assembled together at a work or construction site. The method of assembling each frame assembly 12 from its components is shown in FIGS. 12A through 12F.

[0039] As shown in FIG. 12A, each frame assembly 12 may be assembled such that it includes two compression members 20 attached to the roof support assembly 22 via the straps 28, and two tension members 26, attached via the straps 28 as described above. The pairs of first tension rods 32 are also attached and extend between the straps 28 mounted at the mid-point of each compression member 20 and the straps 28 that connect each tension member 26 to the roof support assembly 22. As shown in FIG. 12A, the roof support assembly 22 is in a first position wherein the roof support assembly 22 is flat, i.e., wherein the roof support assembly 22 has not been bent into an arcuate shape.

[0040] As shown in FIGS. 12B through 12E, distal ends 21 of the compression members 20 are pulled together, thus bending the roof support assembly 22 into a second or arcuate shape. As shown in FIG. 12E, the distal ends 21 of the compression members 20 are pulled together until the

compression members 20 are vertically oriented, but not necessarily parallel, with each other (see the arrows A). For example, the compression members 20 may be pulled together until they are at an angle B of about 10 degrees to about 20 degrees from a line L2 that is parallel to a center line L1 of the frame assembly 12. The compression members 20 may be pulled together by any desired means, including, but not limited to, a ratchet strap, a come-along tool, and other mechanical means.

[0041] As the distal ends 21 of the compression members 20 are pulled together and achieve the shape shown in FIG. 12E, the roof support assembly 22 is bent into the second or arcuate shape, the compression members 20 are compressed, and tension is applied to the tension members 26.

[0042] As shown in FIG. 12F, after the frame assembly 12 has achieved the shape shown in FIG. 12E, the pairs of second tension rods 34 are attached as described above, and the lower restraint member 18 is connected between the distal ends 21 of the compression members 20, thus completing assembly of the frame assembly 12.

[0043] Once a desired number of frame assemblies 12 are assembled, they may then be assembled together with the third tension rods 35. As best shown in FIGS. 1 and 3 through 5, adjacent and spaced apart frame assemblies 12 are connected together with two pairs of the third tension rods 35. One end of a first one of each pair of third tension rods 35 is connected to one of the straps 28 that connects the compression member 20 to the roof support assembly 22 at an upper end of the compression member 20 of a first frame assembly 12A (see FIGS. 4 and 5). The other end of the first one of each pair of third tension rods 35 is connected to one of the straps 28 that connects the tension member 26 to the compression member 20 of a second, adjacent frame assembly 12B (see FIG. 4). Similarly, one end of a second one of each pair of third tension rods 35 is connected to one of the straps 28 that connects the compression member 20 to the roof support assembly 22 at an upper end of the compression member 20 of the second frame assembly 12B (see FIGS. 4 and 5). The other end of the second one of each pair of third tension rods 35 is connected to one of the straps 28 that connects the tension member 26 to the compression member 20 of the first frame assembly 12A (see FIG. 4).

[0044] Roof panels 17 may then be mounted to the roof support assemblies 22 to define the roof 16, thus defining the temporary structure 10. In the illustrated embodiment of the temporary structure 10, five frame assemblies 12 are shown. It will be understood that a temporary structure 10 as described herein may be assembled with more or less than five frame assemblies 12.

[0045] Although the temporary structure 10 is shown with the lower restraint member 18, it will be understood that other methods may be used to ensure that after the distal ends 21 of the compression members 20 are pulled together to achieve the shape shown in FIG. 12E, the compressed shape is retained. For example, the distal ends 21 of the compression members 20 may be anchored into the ground or other surface material upon which the temporary structure is built. If built on a paved or other hard surface, such as concrete, the distal ends 21 of the compression members 20 may be positioned in holes or grooves formed in the hard surface to retain the compression members 20 in place. Additionally, each compression member 20 may be pinned or otherwise attached to a stake 40 embedded in the ground or paved surface, as shown in FIG. 4. Alternatively, each

compression member 20 may abut a stake 42 or other retaining structure that extends outwardly from the ground or paved surface, such as shown in FIG. 2.

[0046] Advantageously, the illustrated temporary structure 10 may be assembled and erected on a plurality of surfaces, including the ground, a paved or other hard surface, such as concrete, and wood, wood laminate, or composite mat and road products, such as described in U.S. Pat. Nos. 7,137,226, 7,818,929, 8,906,480, and 10,125,458, the disclosures of which are incorporated herein by reference in their entireties.

[0047] FIGS. 13 through 17 illustrate a second embodiment of the temporary structure 110. As shown in FIGS. 13 through 17, the temporary structure 110 is similar to the temporary structure 10, but is configured for erecting on two parallel elongated mats 50 formed from billets 52. Adjacent billets 52 are spaced apart by longitudinally extending spaces 54. For example, when the temporary structure 10 will be assembled and erected on a wood, wood laminate, or composite mat or road product, such as the mats 50, a frame foot connector 44 may be mounted to the distal ends 21 of the compression members 20. As shown in FIG. 15, each frame foot connector 44 includes a body 46 having two outwardly extending blades 48 configured to be inserted into the longitudinally extending spaces 54 between the adjacent billets 52 of the elongated mat 50. Additionally, a chain assembly 56 may be attached to each frame assembly 12 after assembly to aid in lifting and erecting the frame assembly 12. If desired, the chain assembly 56 may be used to anchor the end-most frame assemblies 12 of the temporary structure 10 to the mats 50.

[0048] If desired, as shown in FIG. 13, a plurality of the lower restraint members 18 may be attached between the two mats 50 to connect the two mats 50 together and ensure that the two mats 50 remain a fixed distance apart.

[0049] The principle and mode of operation of this invention have been explained and illustrated in its preferred embodiment. However, it must be understood that this invention may be practiced otherwise than as specifically explained and illustrated without departing from its spirit or scope.

What is claimed is:

1. A frame assembly for use in a temporary structure comprising:
 - two compression members;
 - two tension members;
 - a roof support assembly in a first position wherein the roof support assembly is flat;
 - a restraint member; and
 - a plurality of tension rods;
 wherein a first end of each compression member is attached to the roof support assembly;
 - wherein each tension member is attached a lower portion of one of the compression members and to a distal end of the roof support assembly; and
 - wherein the restraint member is connected between a second end of each of the two compression members, such that when the restraint member is connected, the second ends of the compression members are pulled together, thus bending the roof support assembly into a second, arcuate shape.
2. The frame assembly according to claim 1, wherein the roof support assembly includes three roof support members,

bound together, and extending between and beyond each of the two compression members.

3. The frame assembly according to claim 1, wherein the compression members are attached to the roof support assembly with a plurality of straps.

4. The frame assembly according to claim 3, wherein a first end of each tension member is attached to the roof support assembly with a plurality of the straps.

5. The frame assembly according to claim 4, wherein a second end of each tension member is attached to each compression member with a plurality of the straps.

6. The frame assembly according to claim 5, wherein the plurality of tension rods includes two first pairs of tension rods and two second pairs of tension rods; and

wherein one of the two first pairs of tension rods extends between a mid-point of each compression member and the first end of each tension member.

7. The frame assembly according to claim 6, wherein a first end of each of the two first pairs of tension rods is attached to the straps that connect each tension member to the roof support assembly, and a second end of each of the two first pairs of tension rods is attached to a strap mounted at the mid-point of each compression member.

8. The frame assembly according to claim 7, wherein the two second pairs of tension rods extend between the first ends of the compression members on opposite sides thereof.

9. The frame assembly according to claim 8, wherein a first end of a first rod of each of the two second pairs of tension rods is attached to one of the straps that connects each compression member to the roof support assembly, and a second end of the first rod of each of the two second pairs of tension rods is attached to a strap mounted to the compression member adjacent to the first end of a second rod of each of the two second pairs of tension rods.

10. A method of assembling a frame assembly for use in a temporary structure, the method comprising:

attaching two compression members to a roof support assembly with a plurality of straps, wherein the roof support assembly is in a first position wherein the roof support assembly is flat;

attaching a first end of each of a pair of tension members to the roof support assembly with a plurality of the straps;

attaching a second end of each of the pair of tension members to each compression member with a plurality of the straps;

attaching a first pair of tension rods between a mid-point of each compression member and each tension member;

attaching two second pairs of the tension rods between first ends of the compression members on opposite sides thereof;

pulling distal ends of the compression members together, thus bending the roof support assembly into a second, arcuate shape, compressing the compression members, and applying tension to the tension members; and

attaching a restraint member between second ends of each of the two compression members, thereby defining the frame assembly.

11. The method according to claim 10, wherein the first end of each of the first pair of the tension rods is attached to the straps that connect each tension member to the roof support assembly, and the second end of each of the first pair

of the tension rods is attached to a strap mounted at the mid-point of each compression member.

12. The method according to claim 11, wherein the two second pairs of the tension rods extend between first ends of the compression members on opposite sides thereof.

13. The method according to claim 12, wherein the first end of a first rod of each of the two second pairs of tension rods is attached to one of the straps that connects each compression member to the roof support assembly, and a second end of the first rod of each of the two second pairs of tension rods is attached to a strap mounted to the compression member adjacent to the first end of a second rod of each of the two second pairs of tension rods.

14. A temporary structure comprising:

a plurality of frame assemblies including:

two compression members;

two tension members;

a roof support assembly in a first position wherein the roof support assembly is flat;

a restraint member;

two first pairs of tension rods; and

two second pairs of tension rods;

wherein a first end of each compression member is attached to the roof support assembly;

wherein each tension member is attached a lower portion of one of the compression members and to a distal end of the roof support assembly; and

wherein the restraint member is connected between a second end of each of the two compression members, such that when the restraint member is connected, the second ends of the compression members are pulled together, thus bending the roof support assembly into a second, arcuate shape; and

two third pairs of tension rods;

wherein each of the plurality of frame assemblies is connected to an adjacent one the plurality of frame assemblies with the two third pairs of tension rods.

15. The temporary structure according to claim 14, wherein a first end of a first rod of each third pair of tension rods is connected to a first end of each compression member of a first frame assembly;

wherein a second end of the first rod of each third pair of tension rods is connected to a second end of each compression member of a second frame assembly, adjacent the first frame assembly;

wherein a first end of a second rod of each third pair of tension rods is connected to a second end of each compression member of the first frame assembly; and

wherein a second end of the second rod of each third pair of tension rods is connected to a first end of each compression member of the second frame assembly, adjacent the first frame assembly.

16. A method of assembling a temporary structure, the method comprising:

attaching two compression members to a roof support assembly with a plurality of straps, wherein the roof support assembly is in a first position wherein the roof support assembly is flat;

attaching a first end of each of a pair of tension members to the roof support assembly with a plurality of the straps;

attaching a second end of each of the pair of tension members to each compression member with a plurality of the straps;

attaching a first pair of tension rods between a mid-point of each compression member and each tension member;

attaching two second pairs of the tension rods between first ends of the compression members on opposite sides thereof;

pulling distal ends of the compression members together, thus bending the roof support assembly into a second, arcuate shape, compressing the compression members, and applying tension to the tension members;

attaching a restraint member between second ends of each of the two compression members, thereby defining a frame assembly; and

attaching adjacent ones of a plurality of the frame assemblies together with two third pairs of the tension rods.

17. The method according to claim **16**, wherein a first end of a first rod of each third pair of tension rods is connected to a first end of each compression member of a first frame assembly;

wherein a second end of the first rod of each third pair of tension rods is connected to a second end of each compression member of a second frame assembly, adjacent the first frame assembly;

wherein a first end of a second rod of each third pair of tension rods is connected to a second end of each compression member of the first frame assembly; and

wherein a second end of the second rod of each third pair of tension rods is connected to a first end of each compression member of the second frame assembly, adjacent the first frame assembly.

18. The method according to claim **17**, further including attaching a roof to the roof support assemblies of each frame assembly.

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