

March 24, 1970

J. R. CORBIN

3,502,091

TENT SUPPORTING FRAME

Filed Sept. 12, 1968

3 Sheets-Sheet 1

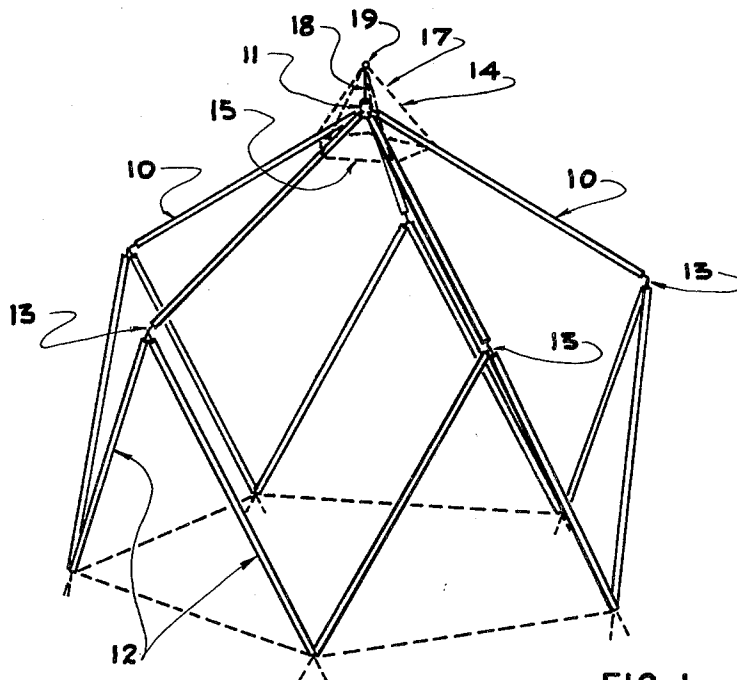


FIG. 1

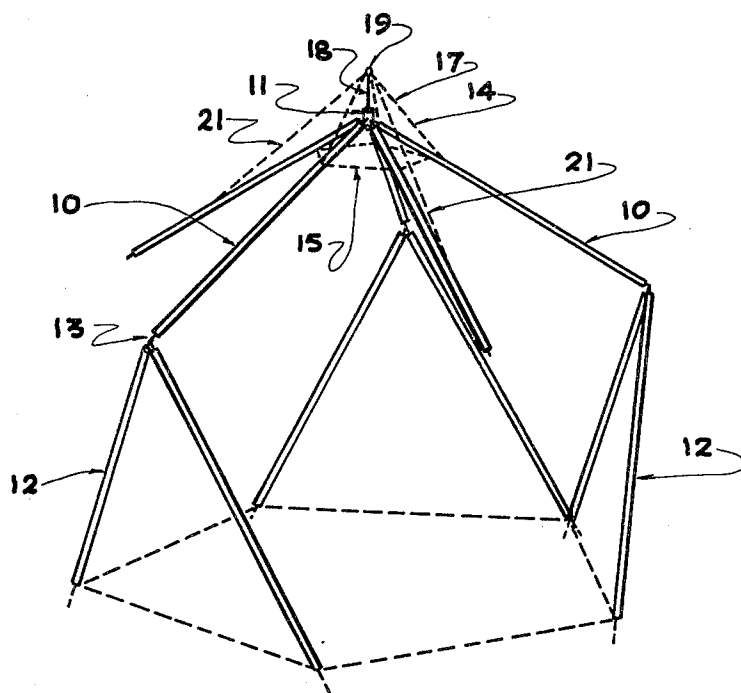


FIG. 2

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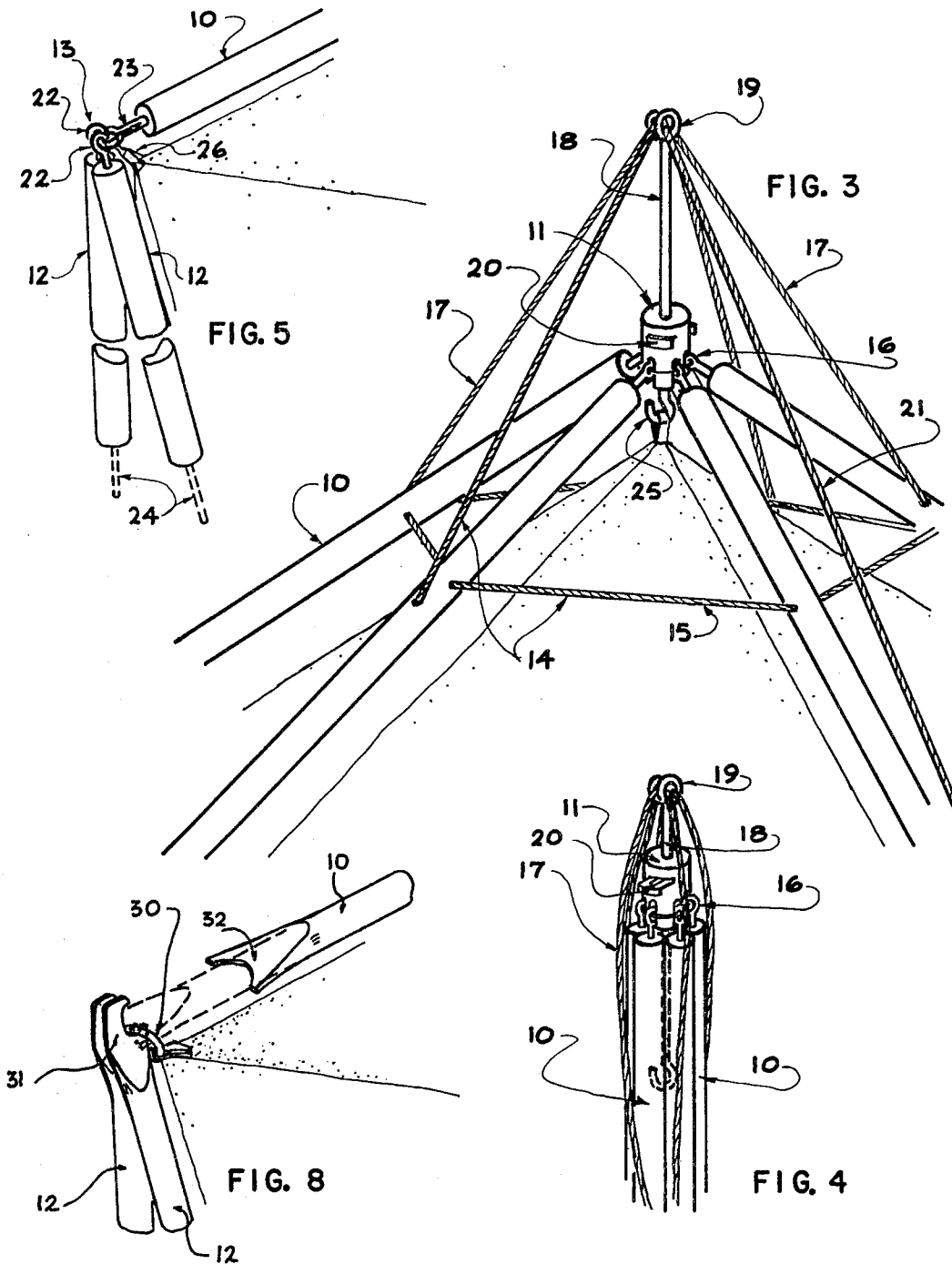
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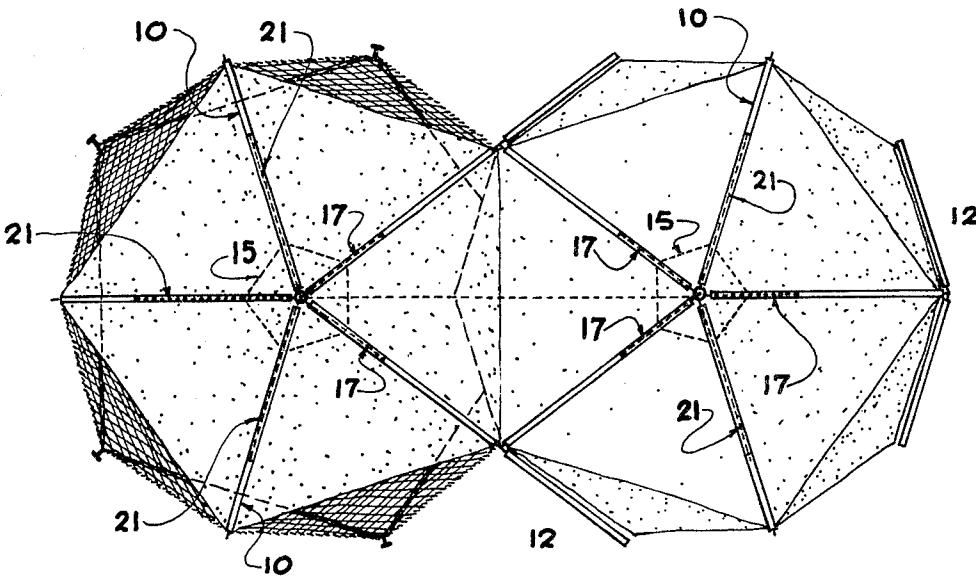


FIG. 6

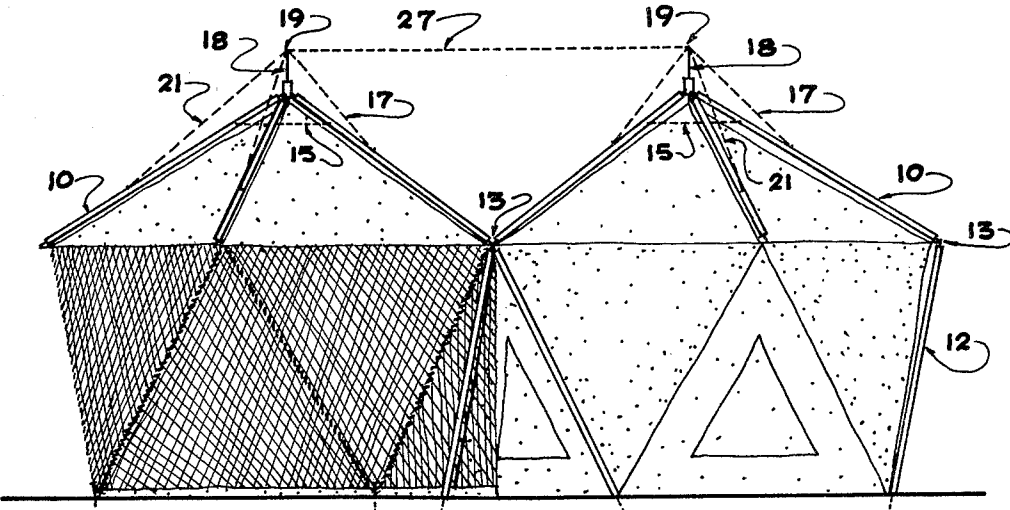


FIG. 7

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TENT SUPPORTING FRAME

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U.S. Cl. 135—4

6 Claims

ABSTRACT OF THE DISCLOSURE

A supporting structure for a tent or the like having a dome-like roof truss formed by a plurality of ridge struts radiating from a common hub and a plurality of triangular side struts for supporting the ridge truss. Eave struts between the ends of the ridge struts and selected triangular side struts are made unnecessary and are eliminated by drawing the ridge struts, forming the roof truss, rigid by means of a cable truss at the hub. The cable truss includes first cables extending between adjacent ridge struts and second cables extending between the ridge struts and the upper end of an extendible compression rod extending above the hub. A similar roof truss may be supported in a cantilever manner from a main tent and held in place by an overhead cable attached to the common hub of the truss to provide an auxiliary tent utilizing no side supporting truss.

SUMMARY AND OBJECTS OF INVENTION

The present invention relates generally to a light-weight and compact framework for a tent or the like, and specifically to a tent framework which provides maximum volume and is, as well, made compact by employing a minimum number of rigid supporting members.

The very nature of a tent demands that it be light-weight and compact in order that the tent may be easily transported to the site of its use. To satisfy such criteria, the rigid framework employed in the tent must be of the type which can be folded into a relatively small package for transporting from one place to another. As would be expected, the fewer number of rigid supporting elements employed in the supporting structure of the tent, the lighter and more portable the tent will be. However, as a general rule, tents which employ a small number of rigid supporting elements do not have satisfactory headroom or overall internal volume when set up. Thus, a real problem exists in providing a tent with acceptable strength and volume which does not utilize an unacceptable number of rigid supporting members.

One such tent available today which suffers from the foregoing problem is a tent of dome-like configuration which employs a structural framework composed of a plurality of triangles joined at a common apex forming a roof truss which is supported by a plurality of triangular side struts. A five sided tent of this nature uses 5 ridge struts and 5 eave struts in the triangles which form the dome-like roof truss. Additionally, this type of tent employs 10 side struts which make up the triangular side struts for supporting the dome-like roof truss. Thus, in all, 20 such struts must be employed in a supporting framework for a 5 sided dome-like structure of this nature.

Accordingly, while the dome-like tent provides superior volume and head room, the necessary number of rigid supporting elements found necessary have, to date, made this tent design unacceptable.

Therefore, it is an object of the present invention to provide a supporting tent structure of the dome-like type which employs a roof truss so designed as to eliminate the necessity for all eave struts and to further eliminate the need for a side strut at every point.

It is a further object of the present invention to provide a supporting structure for an auxiliary tent which is carried entirely by a main tent and which does not employ any ground engaging side supporting structure.

In one form of the present invention, the roof truss is formed of a plurality of ridge struts which are pivotally connected at a common hub in order that they may be compactly folded parallel to one another whenever the tent is disassembled and, during assembly thereof, expanded to extend radially and downwardly from the hub to define a dome-like roof truss. The ridge struts are held rigidly in respect to one another to form the rigid roof truss by means of a cable truss disposed at the common hub. The cable truss, in general, includes tension cables between adjacent ridge struts and a plurality of cables extending from an extendible rod above the hub to each of the ridge struts. The extendible rod, when extended above the common hub, will expand the ridge struts until they pull the cables taut thus forming a rigid roof truss without the use of eave struts. Inasmuch as the roof truss is rigid within itself, it need not be supported at all of the ridge struts.

In another aspect of the invention, a similarly constructed roof truss may form an auxiliary tent supporting structure which utilizes no ground engaging side struts of its own. The roof truss made rigid by the cable truss, as above described, is attached in a cantilever manner to the supporting structure of the main tent by the end of two of the ridge struts. An overhead supporting cable is utilized between the hub of the auxiliary roof truss and the upper portion of the main supporting structure of the tent to maintain the auxiliary roof truss in parallel relationship with the ground.

Other objects and advantages of the present invention will become apparent from the drawings and detailed description thereof following.

DESCRIPTION OF DRAWINGS

FIGURE 1 is a perspective view of the supporting structure of the present invention omitting only eave struts.

FIGURE 2 is a perspective view of the supporting structure of the present invention omitting both eave struts and selected side struts.

FIGURE 3 is a perspective view of the roof truss and associated cable truss of the present invention in expanded position.

FIGURE 4 is a perspective view of the roof truss of the present invention in collapsed position.

FIGURE 5 is a perspective view of the connection between the side truss and roof truss of the present invention.

FIGURE 6 is a plan view of the main tent supporting structure and auxiliary tent supporting structure of the present invention with the tents assembled thereto.

FIGURE 7 is a side view of the main tent supporting structure and auxiliary tent supporting structure of the present invention with the tents assembled thereto, and

FIGURE 8 is a perspective view of a modification of the connection between the ridge struts and side struts.

DESCRIPTION OF INVENTION

Referring now to FIGURE 1, the tent supporting structure of the present invention is shown in assembled position. The structure includes a plurality of ridge struts 10, which, in the embodiment of FIGURE 1, comprise five such struts. The ridge struts 10 are pivotally connected at one end thereof to a common hub 11 and extend downwardly and radially away from the common hub 11 to form a roof truss.

The entire roof truss is supported at each of the ends of the perspective ridge struts 10 by means of triangular side struts. The side struts are formed by two equal

length side struts 12 which have one end thereof in engagement with the ground and the opposite end thereof joined with the companion side strut and the end of the ridge strut at a common point 13.

The embodiment of FIGURE 1 is characterized by the absence of eave struts which normally extend between adjacent points 13 in structures such as this heretofore known. In these former structures, the eave struts were necessary to maintain the roof truss in position.

In accordance with the present invention, as shown in more detail in FIGURE 3, the roof truss is maintained rigid in the absence of such eave struts by means of a cable truss 14 disposed in the region of the common hub 11. The cable truss 14 includes a first cable 15 which is suspended between each of the adjacent ridge struts 10. The cable 15 will permit the ridge struts 10 to be folded into parallel relationship one to another by their hinge parts 16 as shown in FIGURE 4. However, whenever the ridge struts 10 are expanded away from their parallel relationship, as shown in FIGURES 1 and 3, the cable 15 will restrict their angle of expansion to a predetermined angle as defined by the length of the cable 15. The cable 15 will also maintain the struts 10 in proper horizontal angular relationship one to another when the struts are expanded to the limits of the cable.

The cable truss 14 also includes a plurality of second cables 17 and an extendible compression rod 18. The extendible rod 18 is journaled within the hub 11 and is designed for axial sliding movement therein. On the upper end of the rod 18 is a cable connector 19 to which all of the cables 17 are joined. The opposite ends of the cables 17 are connected to each of the ridge struts 10 at a point substantially adjacent that at which the cables 15 are connected.

During assembly of the roof truss, the extendible rod 18 is pushed upwardly through the hub 11. As the upper end 19 of the rod moves above the hub 11, it will draw or pull the ridge struts 10 from their folded position as shown in FIGURE 4 to an expanded position as shown in FIGURE 3. The degree of expansion thereof will be limited by the cables 15 as they become taut. When this occurs, a lock mechanism 20 in the hub 11 is engaged to secure the rod 18 in its extended position and the cables 17 will now prevent the ridge struts 10 from returning to their folded position. The cables 15 will likewise prevent the ridge struts 10 from further expanding and will, as well, maintain them in the proper horizontal angular relationship one to another. Thus, in the locked position, the roof truss is now quite rigid in all planes and the necessity for eave struts has been eliminated.

In the embodiment shown in FIGURE 1, the tent supporting structure is shown as one having five sides and, accordingly, employs five ridge struts and ten sidewall struts making a total of fifteen struts in all. In tent structures of this type which employ eave struts, the total number of struts would be 20 in all. Accordingly, the cable truss of the present invention has permitted the elimination of 25 percent of the struts formerly found necessary.

It is possible, in accordance with the present invention, to eliminate still further struts from the supporting structure without seriously weakening the structure. In this embodiment, as shown in FIGURE 2, selected ones of the ridge struts 10 are indirectly supported by means of a special cable 21 and do not require the direct support of the side struts 12. The cables 21 are connected to the same cable connector 19 as before, however, the opposite end of the cable is connected to the particular ridge strut in question at a point approximately $\frac{2}{3}$ of the distance toward the unsupported end thereof. This arrangement will make the particular unsupported ridge strut sufficiently rigid to be able to carry the weight of the tent in the absence of the side struts 12.

In the five sided embodiment shown in FIGURE 2, it is possible to suspend two of the five ridge struts by cables 21 and thus eliminate four additional struts over the embodiment shown in FIGURE 1. In this embodiment, there will then be a total elimination of nine struts from the total of twenty heretofore found necessary in a structure of this type. This represents a total reduction of struts of approximately 45 percent.

The details of the connection between the side struts 12 and ridge struts 10 at the common point 13 may be seen in FIGURE 5. Each of the side struts 12 have a screw eye 22 in one end thereof. A snap ring 23 is secured in the end of the ridge strut 10 and is adapted to pass through the eyes of the screw eyes 22 to provide a swiveling or pivotal joint.

Pins 24 are positioned in the opposite ends of each of the side struts 12 and are adapted to be pushed into the ground to anchor the side struts in their proper triangular truss position as shown in FIGURES 1 and 2.

Whenever the entire structure has been assembled, the tent itself is then assembled within and supported from the structure as shown in FIGURES 6 and 7. First, the lower edges of the tent are secured to the ground by passing the pins 24 in the side struts through tabs on the base of the tent. Next, the apex of the tent, as shown in FIGURE 3, is suspended from a hook 25 formed on the opposite end of the extendible rod 18. Finally, as shown in FIGURE 5, each of the side panels of the tent are suspended from the common point 13 of the ridge struts and side struts by means of a hook 26.

An alternate method of securing the two side struts 12 and ridge strut 10 together at the common point 13 is shown in FIGURE 8. The hooks 26 on the sides of the tent are replaced with a ring 30 likewise secured to the tent.

Each of the side struts are modified at their upper end with flattened and cut out portions 31. During assembly, the ring 30 is hooked over the cutout portions 31 to retain them in place.

The ridge struts 10 are also modified with flattened and concave lower end portions 32. During assembly, the lower end portion 32 is engaged with the cut out portions of the side struts 12 and held in place as shown in broken lines in FIGURE 8.

This alternate arrangement has special advantage in the part of manufacture of the ridge and side struts and, as well, permits quicker assembly of the tent structure.

An auxiliary tent supporting structure is also provided, in accordance with the present invention, as shown in FIGURES 6 and 7. The auxiliary supporting structure employs a roof truss substantially identical to that employed in the embodiment of FIGURE 2, the only exception being that three of the roof truss cables 21 are of extended length rather than two, as in the case of FIGURE 2. The auxiliary roof truss, once expanded as above described, is then connected, by the two ridge struts employing the shorter cables, to the main tent at the common point 13 formed by the ridge struts and side struts.

The auxiliary roof truss, so disposed in a cantilever manner, is held in proper angular relationship with respect to the ground by means of a tension cable 27 suspended between the cable connection 19 of each of the expandable rods 18 associated with both the auxiliary roof truss and the main roof truss. In this arrangement, no side struts are necessary and the tent itself may be attached to and suspended from the auxiliary truss in a manner similar to that just described for the main tent. The lower edges of the auxiliary tent are appropriately staked to the ground in a normal fashion. The auxiliary tent may be of a solid waterproof material or it may be of a light weight mosquito netting material to provide a dining fly.

It is also possible to utilize more than one auxiliary tent in respect to one main tent and, indeed, as many auxiliary tents could be used as there are sides to the

main tent. In the case where more than one auxiliary tent is used, it is preferable that all of the ridge struts be supported by triangular side trusses to provide the added stability for carrying the auxiliary tents.

The tent structure of the present invention has been described and shown in respect to a five sided structure employing equilateral triangles. However, the invention is equally applicable to a structure of any number of sides and is not necessarily limited to equilateral triangles. Accordingly, the present invention is not to be taken as limited by the illustrations and descriptions of particular embodiments thereof, but is to be interpreted in respect to the following claims.

I claim:

1. In a supporting frame for a tent or the like which employs a dome-like roof truss formed of a plurality of ridge struts pivotally attached to and extending radially from a common hub and joined at their opposite ends to eave struts and which employs a side truss which includes at least one ground engaging side strut at the juncture of each ridge and eave strut for supporting the roof truss, the improvement in said roof truss permitting elimination of all eave struts and selected ones of said side struts comprising;

first cable means substantially at said hub and between adjacent ridge struts for limiting both the horizontal radial separation and vertical angle of expansion of said ridge struts one from another; and

second cable means substantially at said hub for drawing said ridge struts into expanded position until the ridge struts draw the first cable means taut to provide a rigid roof truss in the absence of eave struts and a roof truss which may be supported without side struts at every ridge strut.

2. The supporting frame of claim 1 in which said second cable means includes an elongated compression rod supported within the hub for axial movement therein and having an upper end thereof extending above the hub;

tension cables extending from said upper end of said rod to each of said ridge struts; and

lock means for selectively securing said rod against axial movement whereby, as the upper end of the rod is extended upwardly from the hub, the ridge struts will be drawn from a collapsed position to an expanded position as limited by the first cable means and the rod may be locked to maintain the roof truss rigid.

3. The supporting structure of claim 2 in which the cables associated with any unsupported ridge strut are attached to the ridge strut further from the hub than the cables associated with the supported ridge struts.

4. A roof truss for an auxiliary tent adapted to be secured to and supported by a main tent without the use of ground engaging support poles for the auxiliary tent comprising;

a plurality of ridge struts pivotally attached to and extending radially from a common hub;

first cable means at said hub and interconnected between said hub and each of said ridge struts to secure said ridge struts into a dome-like polyhedron;

connecting means at the free ends of two adjacent ridge struts adapted to secure said roof truss in a cantilever manner to the supporting structure of the main tent; and

overhead cable means connected between the hub of the auxiliary roof truss and the upper portion of the supporting structure of the main tent to maintain the roof truss in proper alignment above the ground.

5. The roof truss of claim 4 wherein said first cable means includes a first cable substantially at the hub connected between adjacent ridge struts for limiting both the horizontal radial separation and vertical angle of expansion of said ridge struts one from another;

an elongated rod supported within the hub for axial movement therein and having an upper end thereof extending above the hub;

tension cables extending between the upper end of said elongated rod and each of the ridge struts; and

lock means for selectively securing said rod against axial movement whereby as the upper end of the rod is moved upwardly from the hub, the ridge struts will be drawn from a collapsed position to an expanded position as limited by the first cable means and locked to maintain the ridge struts in rigid position one to another.

6. A supporting structure for a tent or the like having one or more indirectly supported roof elements comprising;

a central hub;

a plurality of ridge struts extending radially and downwardly from the central hub forming a polyhedral roof truss;

means for supporting said roof truss including two side wall struts at the opposite end of each of selected ones of said ridge struts, the opposite ends of said two side wall struts engaging the ground in spaced-apart relationship forming a triangular side-wall truss;

first cable means at the apex of the roof truss between unsupported ridge struts and adjacent supported ridge struts for maintaining the unsupported ridge struts in a proper horizontal angular relationship to the supported ridge struts; and

second cable means between the central hub and the unsupported ridge struts for maintaining the unsupported ridge struts in proper vertical angular relationship to the supported ridge struts.

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PETER M. CAUN, Primary Examiner

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,502,091

March 24, 1970

John R. Corbin

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading to the printed specification, lines 3 to 5, "John R. Corbin, Cherry Hill, N. J., assignor to Wendel V. Goltermann, Reutlinger, Wurttemberg, Germany, a corporation of Germany" should read -- John R. Corbin, 404 Gorwood Drive, Cherry Hill, N. J. 08034 --.

Signed and sealed this 15th day of December 1970.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

WILLIAM E. SCHUYLER, JR.

Commissioner of Patents