The present invention relates generally to a tent construction and to a method of erecting the same. More particularly, this invention primarily relates to a novel support structure for conveniently and safely erecting tent constructions and a novel method for tent erection, easily performed by a single person in a short time, so that the covering is taut and the tent construction is made surprisingly stable and self-supporting both horizontally and vertically. This stability is uniquely achieved by use of a yoke interconnecting a ridge member and a ridge member fulcrumed relative to the ridge member, two elongated members and a novel yoke or bracket traversing diagonally across the corner formed by the fulcrum of the upright and ridge members immediately adjacent said fulcrum. The yoke is preferably pivotally joined at one end to the ridge member, with the lower end of the yoke being slidably or otherwise displaceably interposed between the tent covering and the upright member. Though other constructions could be used, the lower end of the yoke preferably comprises a recessed sleeve adapted to snugly, though releasably anchor the proximal ends of the elongated members in oppositely disposed, transversely extending relation so that the yoke and elongated member form a T. Thus, with the tent covering staked down, preferably at only the periphery of the base or floor of the tent, an upright member may be generally vertically situated beneath the covering near the ridge line at each end member fulcrum. The yoke is then inserted, with which yoke is displaced from a partially collapsed position to an erected position by leverage action effected as a result of relative fulcrum displacement of the upright and ridge members.

Generally speaking, prior commercial tent constructions have possessed certain objectionable structural features and erection thereof has been cumbersome, confusing, and occasionally dangerous to a layman. Fundamentally, such prior devices have not succeeded in combining all the following desirable features into one tent construction: (1) a virtual absence of interior and exterior obstructions, e.g., centrally located interior poles regardless of tent size, exterior guy rope supports and the like, except for comparatively long tents; (2) a highly stable and essentially self-supporting obstructionless tent support structure which not only holds the covering taut and smooth but has the structural integrity and rigidity necessary to withstand the normal forces of weather, without material deflection or deformation; (3) a tent support structure which does not encumber the tent or render the use of the tent, aggravating or hazardous and which fully resists normal wind, snow and like loads regardless of the magnitude and line of direction of the components thereof; (4) a self-supporting tent which is completely safe to erect and use; (5) a tent possessing an abundance of head room and well-arranged floor space for living; (6) a tent support structure which resiliently imparts tension to stretch the covering taut, both horizontally and vertically; (7) a convenient method of erecting and taking down a tent construction which can be easily practiced by one non-technical person in a relatively short time and which obviates inadvertent collapse, in whole or in part, when used during normal weather conditions in the erected position.

The above-mentioned deficiencies of the prior art were substantially overcome, as verified by practical use and experimentation, by my prior inventions disclosed in United States Patent 3,128,781 and in United States patent application Ser. No. 503,079, filed Oct. 23, 1965.

While research and field experimentation have conclusively confirmed that the inventions of the mentioned patent and patent application possess, individually and collectively, distinct advantages over the prior art, continued research and experimentation led to conception of improved methods of tent erection and improved tent support structure which exhibit unobvious advantages, under some conditions, over my prior inventions.

In its presently preferred form, the invention of this application comprises an essentially self-supporting, highly stable tent support structure which utilizes four basic structural members, i.e., a ridge member, an upright member fulcrumed relative to the ridge member, two elongated members and a novel yoke or bracket traversing diagonally across the corner formed by the fulcrum of the upright and ridge members immediately adjacent said fulcrum. The yoke is preferably pivotally joined at one end to the ridge member, with the lower end of the yoke being slidably or otherwise displaceably interposed between the tent covering and the upright member. Though other constructions could be used, the lower end of the yoke preferably comprises a recessed sleeve adapted to snugly, though releasably anchor the proximal ends of the elongated members in oppositely disposed, transversely extending relation so that the yoke and elongated member form a T. Thus, with the tent covering staked down, preferably at only the periphery of the base or floor of the tent, an upright member may be generally vertically situated beneath the covering near the ridge line at each end member fulcrum. The yoke is then inserted, with which yoke is displaced from a partially collapsed position to an erected position by leverage action effected as a result of relative fulcrum displacement of the upright and ridge members.

Another primary object of this invention is the provision of novel tent construction support structure which, during erection, accommodates pulling of the covering peripherally and centrally taut and stressing of the support structure incurred by leveraged displacement of the support members easily effectuated by one person, and, after erection, affords improved stability against both horizontal and vertical load forces, maximum safety and unencumbered interior space.

These and other objects and features of the present invention will become more fully apparent from the following description and appended claims taken in conjunction with the accompanying drawings wherein:

FIGURE 1 is a perspective view of the presently preferred tent support structure embodiment of this invention, the support structure being illustrated in the collapsed position prior to erection;

FIGURE 2 is a perspective view of the embodiment of FIGURE 1 illustrating the support structure in its fully erected position;

FIGURE 3 is a cross section taken along line 3—3 of FIGURE 2 illustrating the novel yoke or bracket in support and the presently preferred manner in which the elongated members are joined to the yoke;

FIGURE 4 is a perspective representation of tent support structure similar to that of FIGURE 1 but adapted to be used central of a relatively long tent; and

FIGURES 5 through 10 are schematic views depicting method steps used in erecting a tent using the support structure of this invention.
3,367,348

3 Structure

Specific reference is now made to FIGURES 1-3, inclusive, which depict a presently preferred tent support structure, generally designated 300. The support structure 300 is adapted to erect a tent, comprising a suitable flexible covering, into taut condition and to stably hold the tent in such erect position during use. The covering may be provided, as is conventional, with a suitable number of windows, doors and the like. The self-supporting structural support system 300 utilizes a combination of four basic structural members, i.e., (a) an elongated upright member, generally designated 302, adapted to be disposed immediately adjacent an end wall of the tent covering in the erect position, (b) a ridge member 304 adapted to be disposed along the ridge line of the tent covering and pivotally related to the upright member; (c) a yoke or bracket, generally designated 308, diagonally spanning the corner formed by the juncture of the ridge and upright members; and (d) elongated members 306. It is the aforesaid four basic structural members each assume, in the erected position, an orientation immediately adjacent the tent covering so that neither the space interior of the tent nor the space immediately exterior of the tent are obstructed by the support structure, with the single exception of where the tent is unusually long and requires one or more intermediate upright supports.

The upright member 302 of the support structure comprises outer and inner telescopic tubular members 310 and 312, respectively. The ground-engaging or floor-engaging end of the inner telescopic member 310 is preferably protected by a suitable abrasion-resistant, non-slip tip 309, preferably manufactured from a suitable elastomer material. A thumb screw 314, threaded into an open ended bore at projection 316 of member 312, functions as a clamp and serves to securely lock the telescopic members 310 and 312 at whatever effective length might be desired, and to release at will the inner member 310 from the outer member 312 to alter the combined effective length of members 310 and 312. The upper end of the member 312 is integrally joined to a “U-shaped” bracket 318, as, for example, by welding, and the bracket 318 is in turn pin connected at 320 to the tubular ridge member 304. Thus, the upright member 302 is pivotally related to the ridge member 304.

The bracket 318 is also integrally joined, as, for example, by welding, to an upwardly pin 322, adapted to extend through a grommet or the like in the tent covering when the tent is in the erected position.

The yoke 308 pivotally joined to the ridge member 304 at pin 326, spaced a short distance from pin 320. The bracket 308 comprises a pair of spaced arms or struts 328, respectively apertured at 330 near the upper end thereof to rotatably receive the pin 326. The arms 328 diagonally traverse or span between the ridge member 304 and the upper tubular member 302 and are integrally joined by a rigidifying cross brace 332. The lower end of each arm 328 is integrally united, as by welding or the like, at 329 to a transversely disposed hollow tubular member 334, member 334 slides restly by force of gravity against, the outwardly facing edge or surface of the member 312 remote from the ridge member 304. Though other configurations could be used, the relatively short tubular member 334 is illustrated as being a sleeve having a central indentation 335 and opposed, angularly related ends comprising recesses 336 and 338 respectively (FIGURE 3), which recesses are sized and shaped to respectively receive the proximal end 340 of one elongated member 366 with the indentation 335 serving as a stop to limit the distance the ends 340 may be displaced into the recesses 336 and 338. Each elongated member 366 preferably comprises a rod which may be either relatively stiff or comparatively yieldable or resilient, the latter being preferred and, therefore, is illustrated in the drawings. The distal end of the rod is covered by a commercially available press-fit cap 342.

Where the support structure 300 is used to erect comparatively long tent coverings, it may be desirable to use at least one intermediate upright structure. One such upright structure, generally designated 350, is illustrated in FIGURE 4 and comprises several structural components identical to support structure 300 and some additional component. The components comprising duplicates of structure 300 have been so numbered and will not again be described. The differences comprise a ridge hinge, generally designated 352 (comprising front and back plates 356 and 358, both pin joined at 360 and 362 to respective left and right ridge members 304), and an upwardly extending pin 354 integrally disposed at the top of the outer telescopic member 312. The pin 354 is adapted to extend through a grommet in the tent covering.

Method

Reference is now made to FIGURES 5-10 inclusive which illustrate the presently preferred method steps to be used in erecting tent constructions.

With reference to FIGURE 5, it is sometimes desirable, though not critical, to construct the tent covering 370 such that the eave lines 372 have substantially less length than the ridge line 374 and to construct each end panel 376 so as to have a substantial windback configuration. However, wide variety of covering variations in height, width, length and configuration may be successfully used with the present invention.

Normally, as illustrated in FIGURE 5, the floor or base 378 of the tent is externally staked taut at the periphery thereof in a conventional way by driving suitable stakes 380 appropriately through tent loops 382. In this way, the floor of the tent is held against displacement relative to the ground.

The upright members 302 (usually two—one for each end of the tent) are preferably telescopically adjusted to approximately the desired height by first loosening the thumb screw 314 of each upright, next sliding the inner tubular member 310 relative to the outer tubular member 312 until the desired combined effective length of the two members is achieved, and last, tightening the thumb screw 314 to retain such effective length (see FIGURE 6).

To erect the tent, as best seen in FIGURE 7, an upright member is generally vertical in the covering and the floor inside the tent near each end of the tent, the pin 322 of each upright member passing through a grommet in the covering at one end of the ridge line. In this position, the yoke or bracket 308 will loosely hang downward from pin 326 under force of gravity with the sleeve 334 resting on the surface of member 312 most remote from the upright member 304. Likewise, ridge member 304 will loosely hang downward from pin 320 as the tent covering is suspended in slack condition by the upright members. For safety purposes, a cord 384, firmly attached at one end 386, as by sewing or the like, has a loop 388 into which the lower end of the member 310 may be placed when in the described position of FIGURE 7. In this way, the ground-engaging end of the telescopic member 302 cannot materially slip and resultant injury to the occupant of the tent is thereby avoided.

With the tent construction position as depicted fragmentarily in FIGURE 7, the sleeve 334 of the yoke 308 is disposed at a convenient height to freely though oppositely receive the proximal ends 340 of the elongated members 306 in respective recesses 336 and 338 (FIGURE 3). When such has been accomplished, the elongated members 306 will be cantilever-supported by the yoke (not the covering) and will not be subjected at this point in time to stress induced by external loads (see FIGURE 8). The distal end of each elongated mem-
ber 306 adjacent the end cap 342 may be carried in a tent loop 390, though such loops or other tent anchoring means are not necessary using the disclosed embodiment of this invention. In any event, the end caps at this point in time will each be disposed in a corner of the tent where the cove line 372 intersects the end wall 376, with each upright member 302 and each yoke 308 remaining gravity suspended from their respective pivot pin supports.

Remembering that the top end of each upright member 302 and the adjacent end of the adjacent ridge member 304 are formed with respect to each other, either integrally as depicted or separately (not shown), the two ridge members are pivoted from their respective gravity-suspended positions (shown in dotted lines in FIGURE 9) into connected generally coaxial, horizontally extending relation (shown in solid lines in FIGURE 9). More specifically, one ridge member 304 may have a ball fitting 392 at its free end while the other may have a socket fitting 394 at its free end. Properly adjusted and sized, the ball and socket fittings will be brought into matched forcible contact as the ridge members 304 complete their arcuate traversing of the paths indicated by arrows 396 and 398 in FIGURE 9). When the ridge members 304 have been forced into co-axial, horizontal relation, the two ridge members will be exerting an outward, essentially horizontally longitudinal force on the covering tending to draw the covering taut in that direction. A locking sleeve 400, slidably carried concentrically about one ridge member may be slipped over the ball and socket fittings 392 and 394 in the erected position to lock them in such erected position. For a more detailed description of the erection of the ridge members see U.S. patent application 503,079.

Using the embodiments of this invention shown in the figures, placement of ridge members 304 in their erected, coaxial position will tend to partially bow or otherwise stress the elongated members 306, as the end caps 342 and the adjacent distal ends of the elongated members 306 are restrained in the eave corners of the tent covering while the yoke is displaced to a somewhat higher elevation.

Either prior to or after placement of the ridge members in the erected position, the thumb screw 314 of each telescopic upright member 302 is successively loosened and the upright members are respectively shifted from the position of FIGURE 9 to that of FIGURE 10 as indicated by arrows 304 and 402. Thereafter, the thumb screws are securely tightened with the effective length of each telescopic upright member correctly set to cause the tent covering to tend to be vertical taut. Each upright member, using the embodiment of this invention illustrated in the drawings, will be inclined with respect to the vertical with the lower end thereof disposed outward beyond the upper end, when the upright members are fully erected.

Placement of the upright members 302 in their erected position of FIGURE 10 increases the included angle between adjacent upright and ridge members, as does erection of the ridge members. As a consequence, a leverage action is exerted upon each yoke 308 which pivots the left yoke clockwise and the right yoke counterclockwise about pins 326 as viewed in FIGURES 9 and 10. The leverage action mentioned requires very little force so that one person, even a woman or child, can easily and safely erect the tent. Also, due to the elongated angle and the mentioned pivoting of each yoke about pin 326 forcibly lifts the lower end of the yoke at sleeve 334 essentially linearly along the exterior surface of the member 312 immediately adjacent the end wall of the covering. The described combined pivotal and linear displacement of the yoke, respective to increasing the elongated angle between the upright and ridge members to erect the same, correspondingly lifts the proximal end 340 of each elongated member 306 while the distal end of each elongated member 306 is restrained by the covering, thereby bowing the members 306. Of course, if the members 306 were essentially stiff or rigid rather than yieldable, appreciable bowing would not take place though the members would nevertheless be stressed. Thus, in any event the covering is caused to become generally taut and essentially smooth longitudinally, vertically, transversely and peripherally (see FIGURE 10) and each triangularly-related yoke 308, upright member 302 and ridge member 304 disposed at one end of the ridge line surprisingly stabilizes the erected tent construction.

Where a comparatively long tent is used, the support structure 350 (FIGURE 4) may be installed intermediate to the end upright members 302. The placement steps required to erect the structure 350 are essentially the same as those used to erect the structures 300. The ridge members 304 of structure are pivoted into coaxial horizontal relation with the ridge members 304 of structure 300 and locked in such erected position, the elongated members 306 are installed in the yoke 308, the telescopic member 302 are placed at the desired effective length and oriented essentially vertical, all as depicted in FIGURE 4.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. In a tent construction comprising a flexible covering and a support structure, said support structure including a ridge member associated with an upright member for relative pivotal movement, the improvement comprising yoke means pivotally associated with the ridge member and comprising means diagonally spanning between the ridge member and the upright member and terminal means joined to said diagonal means so as to be slidably interposed between the upright member and the flexible covering for displacement between erected and collapsed positions, said terminal means including a pair of elongated members generally oppositely disposed in transversely extending relation such that said elongated members and the flexible covering are essentially relaxed when said terminal means are in the collapsed position and said elongated means are stressed and said flexible covering is forced generally taut when said terminal means are in the erected position.

2. A device as defined in claim 1 wherein said diagonal means comprises a pair of struts in generally parallel spaced relation respectively situated on opposite sides of the ridge and upright members.

3. A device as defined in claim 2 wherein said struts are integrally joined by at least one cross brace member disposed essentially normal to the axes of said struts.

4. A device as defined in claim 1 wherein said terminal means comprises hollow sleeve means to receive the proximal ends of the elongated members at a convenient height when the yoke means are in the erected position, said covering being while said flexible covering is generally slack, and to lift the elongated members into the erected positions by leverage created by relative pivotal movement between the ridge and the upright member which increases the magnitude of the included angle between the ridge and upright members to forcibly urge the distal end of each elongated member against the covering thus bending the elongated members within their elastic limit and drawing the flexible covering taut, whereby the erected tent construction is stabilized by a distribution of stress through the triangularly-related yoke means, upright member and ridge member.
5. A device as defined in claim 4 wherein said hollow sleeve means comprises oppositely disposed, angularly-related recesses adapted to slidably receive the respective proximal ends of the elongated members.

6. In a method of erecting a tent construction such that the covering is stressed essentially taut by support structure which comprises an upright member, a ridge member fulcrumed relative to the upright member, a yoke having one end displaceably along a surface of one of said two members remote from said other member and the other end pivotally associated with said other member, and at least two elongated resilient components, the performance of the following steps in desired order:

(a) interposing the upright member between the floor of the tent or the ground and the covering near the ridge line of the covering such that the covering is partially elevated though generally slack;

(b) positioning the proximal end of each elongated resilient component in anchored relation with the displaceable end of the yoke so that said components extend generally normal to the longitudinal axis of the upright member on respective opposite sides thereof in an essentially unstressed condition;

(c) increasing the included angle between the upright and ridge members;

(d) jointly pivoting the yoke about its pivotal association with the other member and displacing the displaceable end of the yoke relative to the one member in a direction toward the fulcrum between the members;

(e) restraining the distal ends of the elongated resilient components at the covering;

(f) forcing the elongated resilient components into a bowed configuration to stress the covering generally taut.

7. In a tent construction, support structure comprising a ridge member and a fulcrum related upright member, the improvement comprising:

a load-transmitting support bracket comprising (a) means pivotally uniting the support bracket with one of said members, (b) means displaceably biased against a remote surface of the other member, (c) means forming a diagonal bridge between the members near the fulcrum therebetween, and (d) means receiving the proximal ends of elongated members to generally oppositely dispose such elongated members generally normal to the upright and ridge members whereby the displaceable means will (1) travel upward along said remote surface tending to stress the elongated members and draw the tent generally taut as the included angle between the upright and ridge member is increased, and (2) travel downward along said remote surface tending to relax the elongated members and slacken the tent as the included angle between the upright and ridge members is decreased.

8. In a method of erecting a tent construction using a support structure comprising relatively fulcrumed upright and ridge members, and a yoke moveably associated with each said member having two oppositely extending elongated components, the steps of: disposing the upright member in a generally vertically extending disposition beneath the generally slack tent covering, increasing the magnitude of the included angle between the upright and ridge members, concurrently (a) pivoting the yoke relative to one said member and (b) generally linearly displacing the yoke relative to the other said member toward said fulcrum between said members, and forcing the tent and support structure into erected position.

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