United States Patent

Kirkham

[15] **3,699,986**

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[54] **MODULAR SHELTER SYSTEM**

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[52] **U.S. Cl.** .....**135/1 R**

[51] **Int. Cl.** **A45f 1/00,** E04b 1/347

[58] **Field of Search** ....135/1 R, 3 R, 3 E, 4 R; 52/71, 52/79, 81

[56] **References Cited**

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Attorney—B. Deon Criddle

[57] **ABSTRACT**

A number of tent modules are arranged to be interconnected, as desired, to form various arrangements of combined shelter configurations. A single modular unit can be used and other modules can be acquired as necessary to accommodate immediate and subsequently changing needs or to lay out a shelter structure conforming to the natural terrain and terrain obstacles.

10 Claims, 15 Drawing Figures

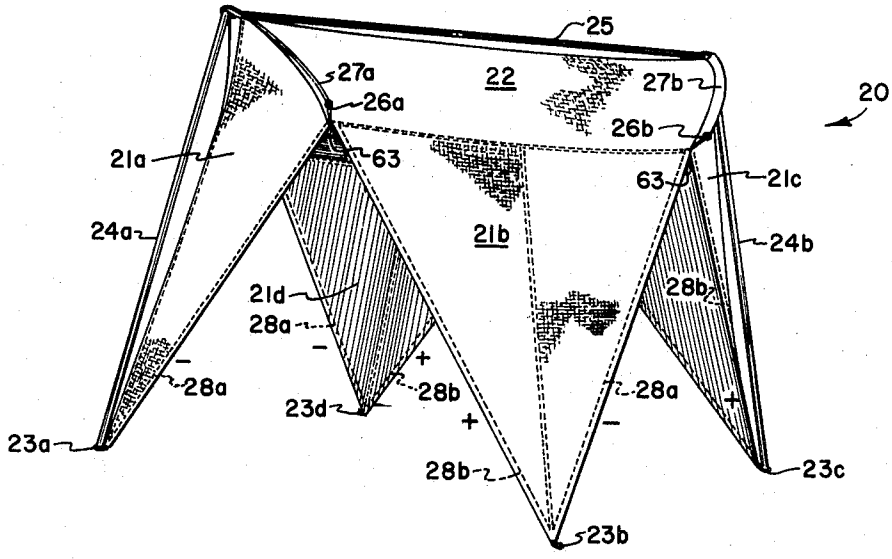


FIG 1

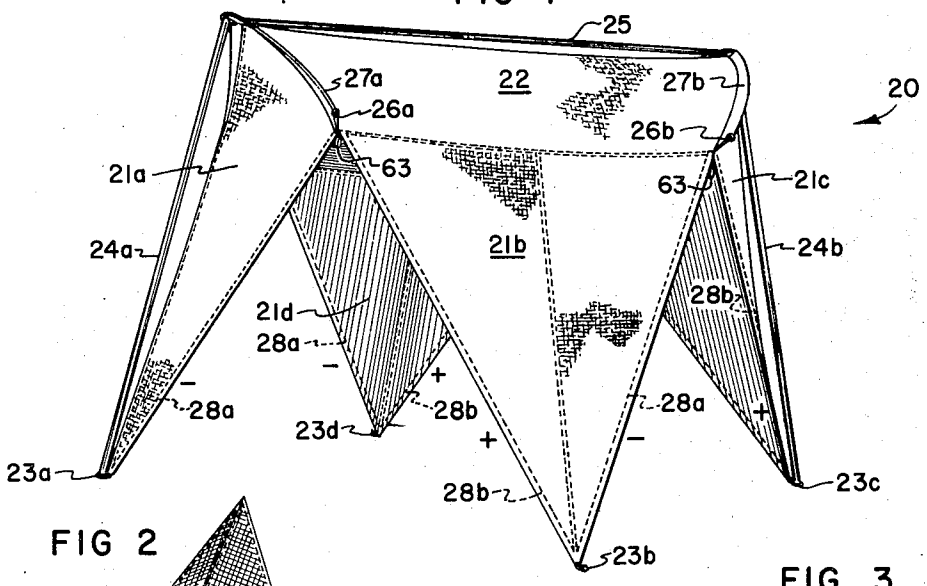


FIG 2

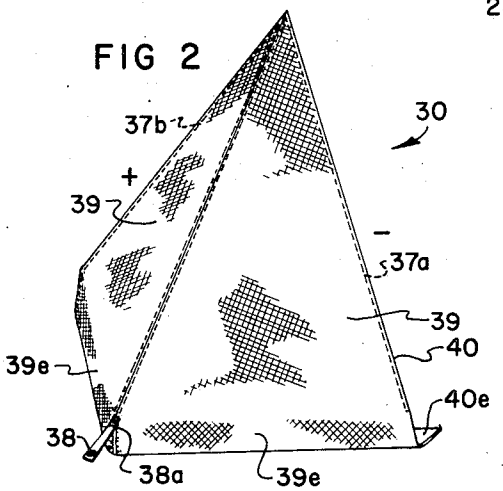


FIG 3

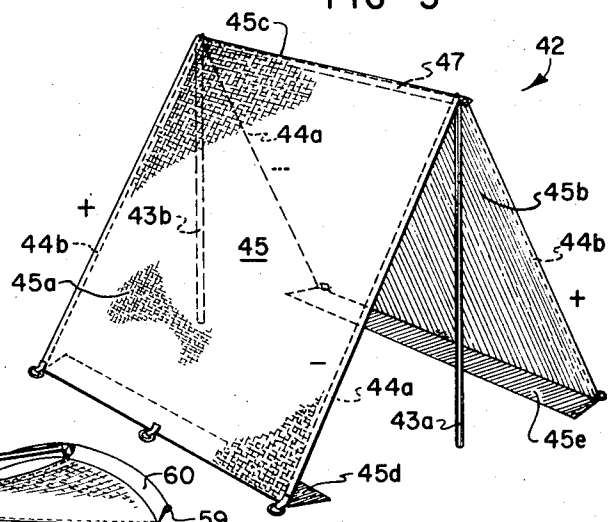
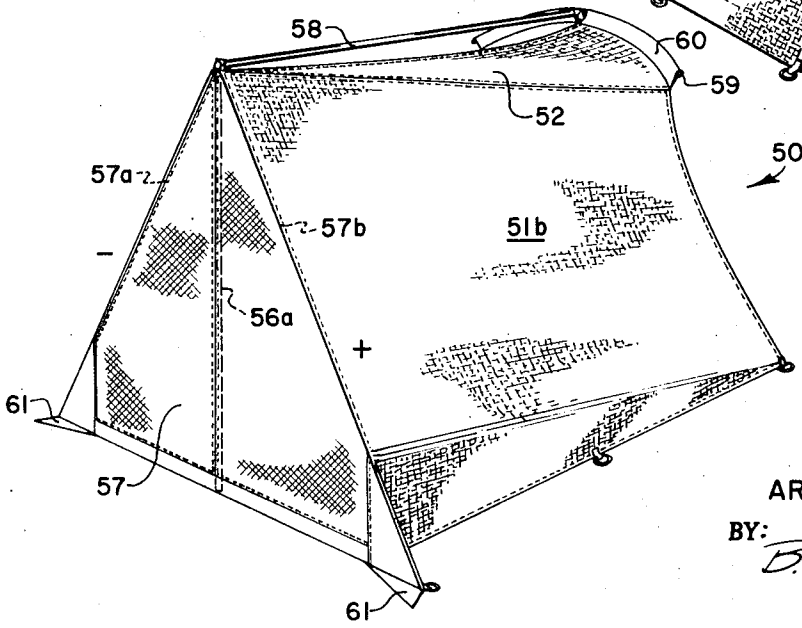


FIG 4



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FIG 5

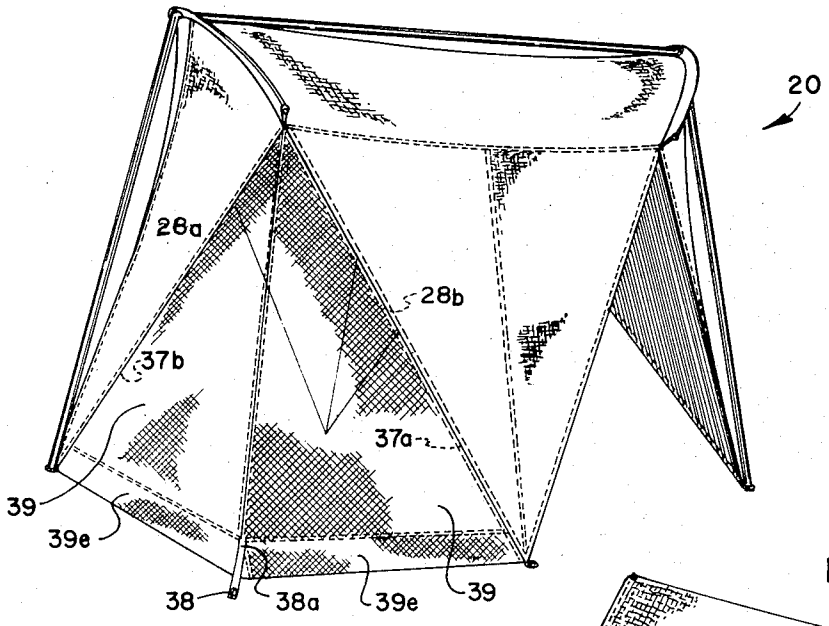


FIG 6

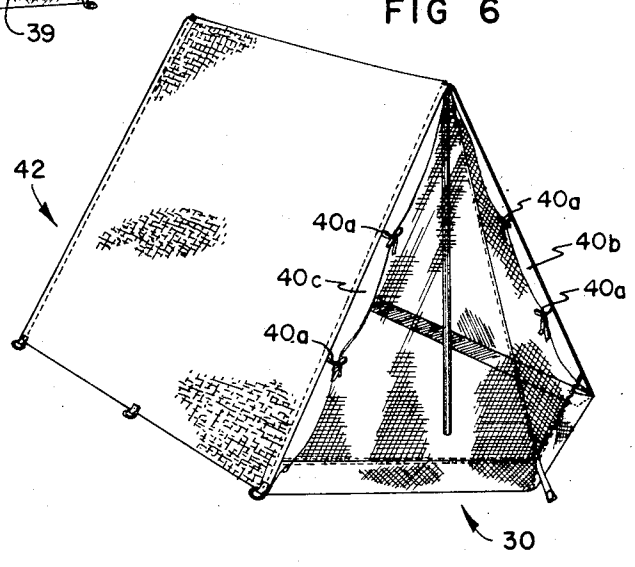
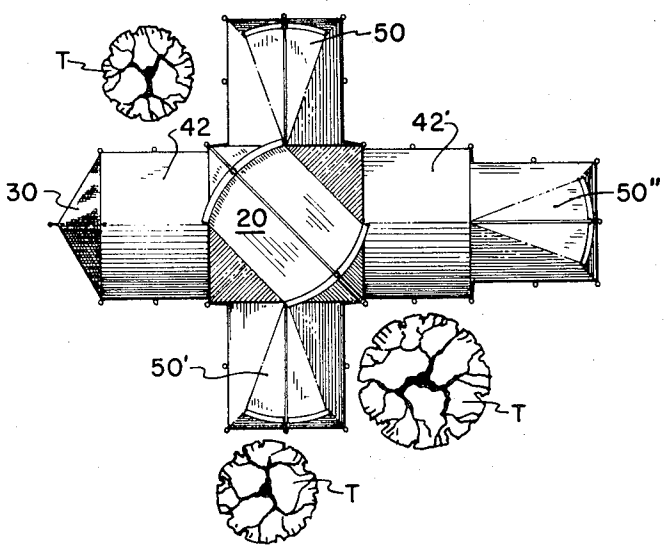


FIG 7



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FIG 8

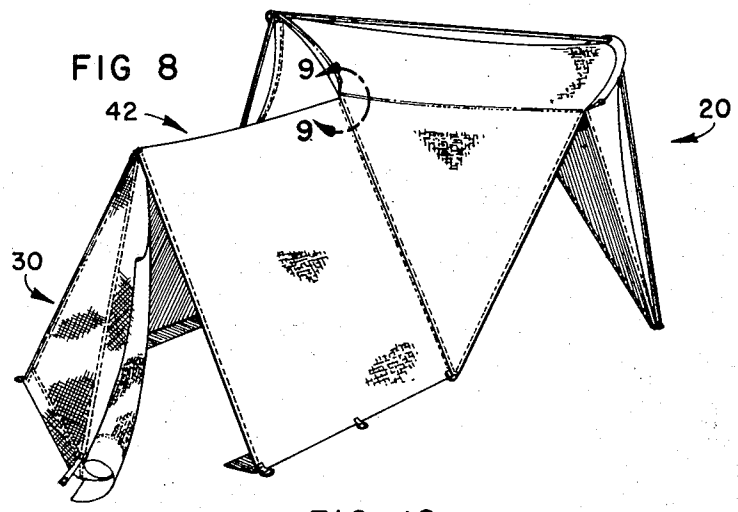


FIG 9

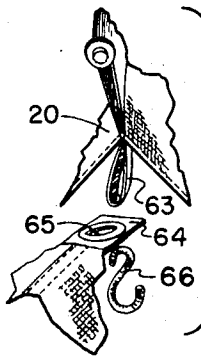


FIG 10

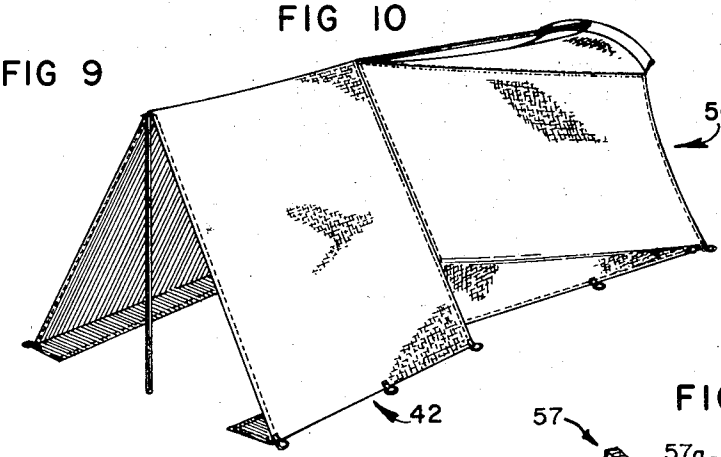


FIG 12

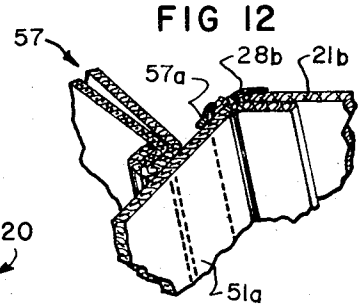
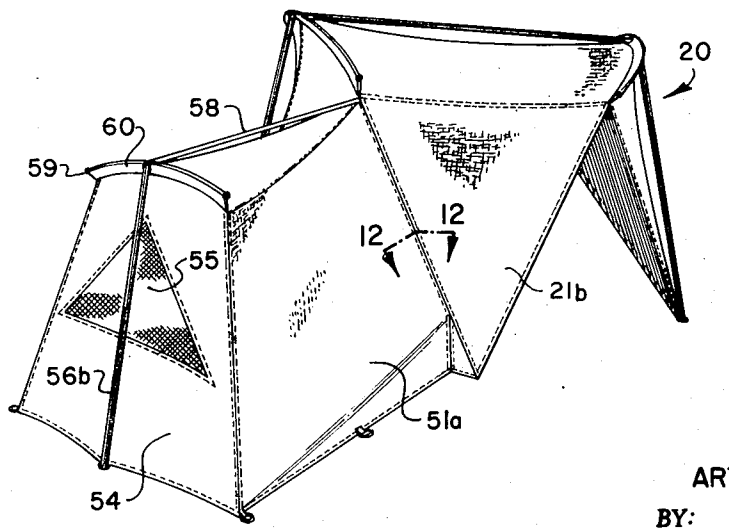


FIG 11



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FIG 13

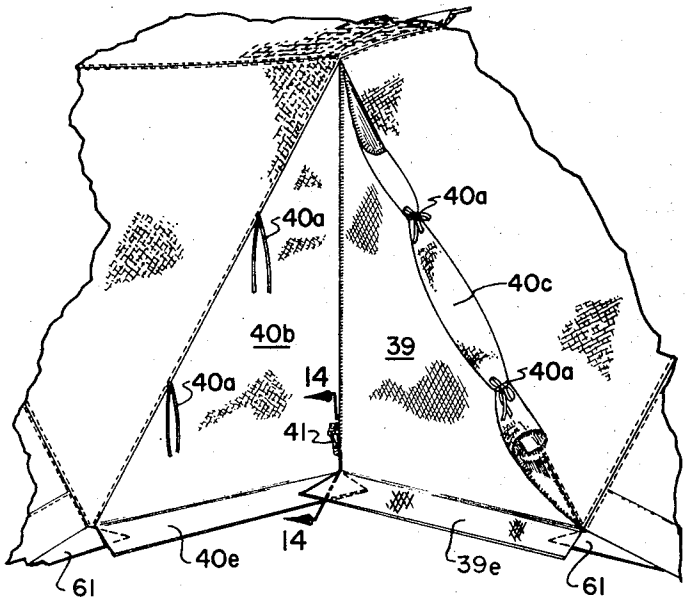


FIG 14

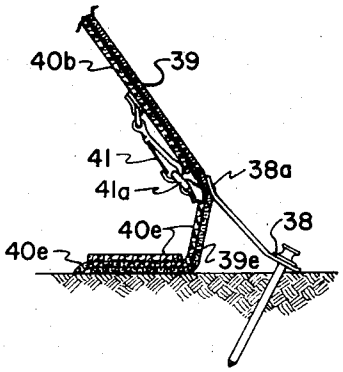
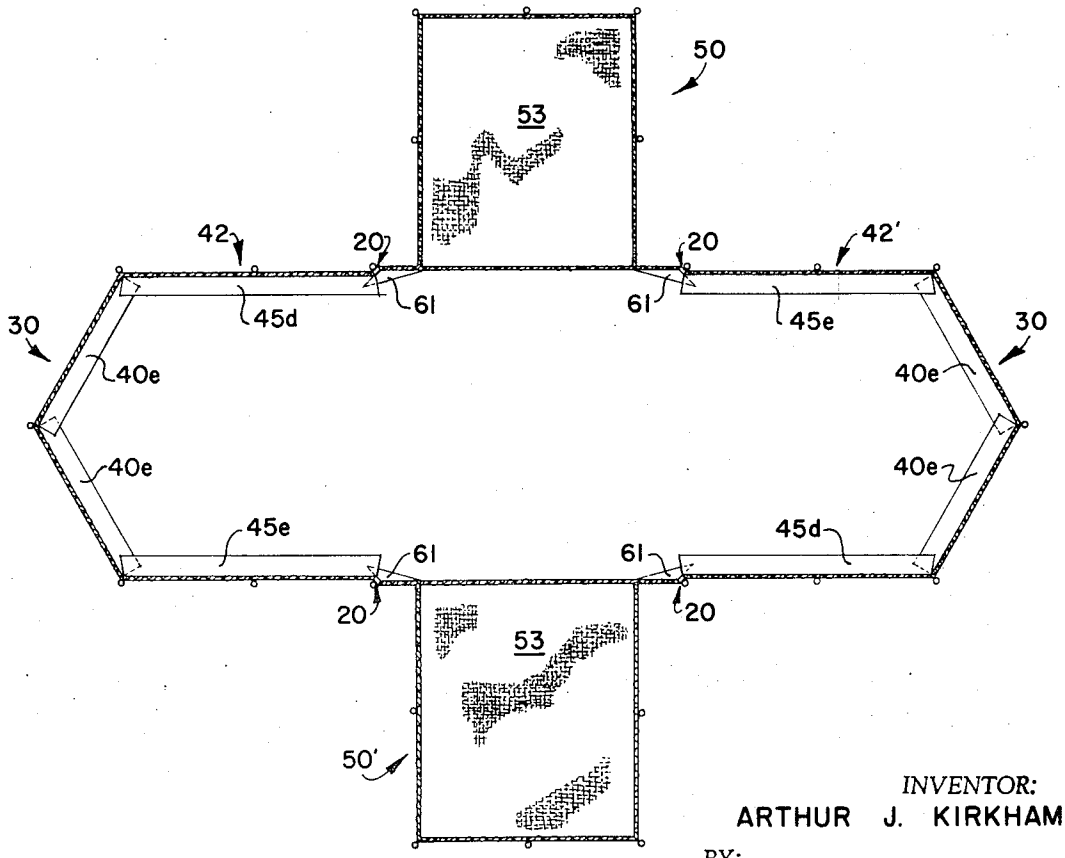


FIG 15



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MODULAR SHELTER SYSTEM

BRIEF DESCRIPTION OF THE INVENTION

1. Field of the Invention

This invention relates to tentage and particularly to tentage selectively providing single or multiple rooms under cover to meet diverse use requirements.

2. Prior Art

Tents have long been favored temporary shelter. This has been due to their relative low cost, their lightweight and their ease of assembly. As is well known, they are available in many different styles and sizes. Some have even included dividers, whereby a single tent structure can be compartmentized, if necessary. Dining flys and overhead shelter constructions have also long been utilized.

Basically the construction of tents has not changed much over the many years of their use. However, some different support structures have been developed, as shown, for example, in my U.S. Pat. Nos. 3,128,781, 3,367,348 and 3,371,671 and changes have been made in the type of materials sometimes used in their construction.

Generally, tents, dining flys, etc., have provided some sort of cover for a predetermined ground area. In the case of tents some form of wall structure has been employed to define and surround the ground area to be covered.

In the past, if it was desired to cover a large area a large tent was used. If it was desired to cover a small area a small tent was used. If it was desired to cover a small area and only a large tent was available, there may have been wasted space, the load involved may have been unduly heavy or, because of terrain limitations, etc., it may not have been possible to set up the large tent that was available. Conversely, if only a small tent were available, there was no way to stretch it to make it suitable to meet the requirement for a large tent. Even if a number of smaller tents were available they could not be coupled to provide a single larger structure.

While tents have been and continue to be popular as low cost temporary shelters it is quite obvious that they have not, heretofore, been sufficiently versatile to allow for different needs under differing circumstances.

No one, so far as I am aware, has heretofore developed a tent system embodying modular units that can be used to form independent, free standing units or that can be arranged to form enlarged structures of desired size made up of mutually supported modular unit components.

SUMMARY OF THE INVENTION

It is a principal object of the present invention to provide a tent system that is sufficiently versatile to allow for its use under a great many different situations. Thus, it is an object to provide such a system wherein individual free standing pavilions and tents and attachable closures can be used in various combinations, or the tents and pavilions can be used individually, as circumstances require.

Principal features of the invention include four module units that form the basic structures of the invention. As will become apparent, one of the units comprising a closed room module, can be used individually as a tent, another open-ended module can be

individually used as either an open-ended shelter or a closed tent, and another of the modules can be used selectively as an open pavilion or as a tent. The remaining module unit forms a closure structure useful in converting the otherwise open pavilion and open-ended modules to closed tents, or of providing closures for terminal ends of combined modules.

The pavilion module will normally serve as the central or main structure of any combination of the module units, but some combinations not involving the pavilion module can be developed. The pavilion module consists of a generally rectangular top and four depending side panels of generally triangular configuration. The bases of the triangular side panels are each secured to a side edge of the top such that the corners of adjacent triangular panels meet at the corners of the rectangular top and a fastening means, such as a zipper track is fixed to each side edge of the triangular side panels.

When the pavilion is assembled the apexes of the triangular side panels are secured to the ground, as by stakes, the top is stretched taut by a central brace having resilient cross arms at the ends thereof and the pavilion is held in an erect position by poles extending upwardly from the ground to the ends of the central brace. The space formed between adjacent side edges of the triangular side panels and the ground is then of triangular configuration, especially adapted to serve as a mating opening in the manner to be hereinafter described in detail.

The open-ended room module is arranged to be connected at the mating opening and an independently usable closed room module is adapted to be connected to either the pavilion at the mating openings or to the open-ended room module.

A closure module can be connected into a mating opening or to either end of the open-ended room module to thereby close these otherwise open modules and to serve as reclosable openings.

Additional objects and features of the invention will become apparent from the following detailed description and drawings, disclosing what are presently contemplated as being the best modes of the invention.

THE DRAWINGS

FIG. 1 is a prospective view of the central or pavilion module;

FIG. 2, a prospective view of the closure modules;

FIG. 3, a prospective view of the open-ended room module;

FIG. 4, a prospective view of the closed room module;

FIG. 5, a prospective view of the pavilion module with a closure module in place at one of the pavilion openings;

FIG. 6, a prospective view of an open-ended room module with a closure module in place at one end thereof;

FIG. 7, a top plan layout of a typical one of the possible combination of modules erected so as to conform within existing terrain obstructions;

FIG. 8, a prospective view showing a pavilion module with an open-ended room module having one end attached to one of the pavilion openings and with a closure module attached to the other end, one side of the

closure module liner being released to allow entry to and exit from the open-ended room module;

FIG. 9, an enlarged, fragmentary, exploded view showing the roof line connection used for coupling the room and pavilion modules;

FIG. 10, a prospective view of an open-ended room module joined at one end to a closed room module;

FIG. 11, a prospective view of a closed room module attached to one of the openings in a pavilion module;

FIG. 12, an enlarged horizontal section taken on the line 12—12 of FIG. 11 and showing a coupling arrangement between a closed room module and a pavilion module;

FIG. 13, an elevation view of a closure module closing an opening of a pavilion, taken from beneath the pavilion canopy;

FIG. 14, an enlarged fragmentary section view, taken on the line 14—14 of FIG. 13; and

FIG. 15, a floor plan of a typical layout of the system.

DETAILED DESCRIPTION

Referring now to the drawings:

FIGS. 1–4 illustrate the four building modules of the present invention. The pavilion module **20**, shown best in FIG. **1**, in its set up condition consists of four upstanding triangular shaped panels or walls **21***a*, **21***b*, **21***c* and **21***d*. Each triangular wall has its apex secured to the ground and its base connected to an overhead canopy **22**. Walls **21***a*, **21***b*, **21***c*, and **21***d* may be connected to the ground by stakes **23***a*, **23***b*, **23***c* and **23***d*, for example. Upright support poles **24***a* and **24***b* extend upwardly from the ground to hold the walls taut. The poles extend outside of walls **21***a* and **21***c* and preferably rest on the tops of stakes **23***a* and **23***c* so that they counteract any tendency of the stakes to pull free. The tops of poles **24***a* and **24***b* are inserted into opposite ends of a central rod **25** that extends above canopy **22**. The ends of rod **25** engage and bow resilient cross arms **26***a* and **26***b*, inserted through sleeves **27***a* and **27***b*, respectively, at opposite ends of the canopy, to hold the cross arms in tension. This stretches the canopy and tensions the walls such that no additional support structure is required. The openings formed between adjacent walls and the ground are of generally triangular configuration. Coupling means are included along each wall edge defining a mating opening between walls. Preferably, such coupling means include a zipper arrangement of the type shown. Thus, a zipper track **28***a* having a guide for attachment into a zipper slide runs the length of one edge and a zipper **28***b* having a slide mounted thereon runs the length of the other edge. As will be hereinafter described in detail the other modules have a similar zipper arrangement and, particularly in FIGS. **1–4** zipper tracks without slides on the modules will be designated by a (−) while those with a slide will be designated by a (+).

A closure module **30** is shown best in FIG. **2**. This module is used to close openings formed by the walls of the pavilion or in the other modules to be hereinafter described in detail. The closure module is adapted to be connected to each of the other modules and for this purpose has mating zipper structures. As best shown in FIGS. **5** and **13** zipper track **37***d* (+) is constructed with a slide and is arranged to cooperate with zipper track **28***a* (−) in the pavilion module, for example. In this arrangement, it can be seen that zipper track **37***a* (−) which does not have a slide, is arranged to cooperate with the slide of zipper track **28***b* (+) of the pavilion module. The closure module **30** includes a layer of screen mesh material **39** to which the zippers **37***a* and **37***b* are attached and a stake loop **38** that is fixed to a central reinforcement strip **38***a* and that provides a means whereby the closure module may be maintained in its spread position. The closure module is provided with a fabric liner shown generally at **40**, and ties **40***a*, each having one end secured to the mesh, are provided for tying one half of the liner to one side of the screen so that an open screen area is provided by the closure. The liner **40** is made up of liner halves **40***b* and **40***c*, each including one half of a zipper track, and one including a zipper slide so that they can be zippered together. A hook **41** is secured to one of the fabric liner halves at the bottom of its zipper track portion and is arranged to be removably connected to a D-ring **41***a* secured to the mesh on the side opposite from stake loop **38**. When the hook **41** is connected to the D-ring **41***a* and the liner halves are zippered together the fabric liner is held against the mesh material and is in essentially the same spread position as the screen. The closure module **30** can be partially opened by unzipping one of the zippers **37***a* or **37***b* and by laying one half of the module back against the other, or simply allowing it to sag such that movement past the closure is possible.

A skirt **40***e* extends downwardly from each of the liner halves and is angularly cut to extend outwardly beyond the lowermost corners of the liner halves such that when the skirts are turned in with respect to the module and the closure module is connected to a pavilion module the ends of the skirts extend past the apexes of the adjacent walls of the pavilion. If desired, the skirt **40***e* can also be turned outwardly with respect to the closure module for use as a sod cloth. A similar skirt **39***e* is fixed to and extends downwardly from the screen **39** and can also be used as a sod cloth.

The closure module is also adaptable to close the ends of an open-ended room module, as shown best in FIG. **6**.

The open-ended room module **42** is made to be free standing and has spaced vertical support poles **43***a* and **43***b* extending upwardly from the ground to opposite ends of a horizontal ridge pole **47**. A sheet of fabric **45** is placed over the ridge pole and is secured to the ground by stakes inserted through stake loops spaced along lower edges of the fabric. The structures thus formed has walls **45***a* and **45***b* extending downwardly from a common ridge **45***c* and is essentially a large open-ended pup tent. If desired, spaced end stakes and guy lines (not shown) interconnecting the tops of the support poles **43***a* and **43***b* and the ground can be used to make the module into a free standing shelter unit. As with the closure module, skirts **45***d* and **45***e* extend downwardly from walls **34***a* and **45***b*, respectively, such that they can be turned outwardly for use as sod cloths or inwardly for use with a ground cloth. The ends of the skirts are cut to extend downwardly from the walls for a purpose to be hereinafter described in detail.

Zipper track **44***a* (+) having a slide and a zipper track **44***b* (−) without a slide are respectively provided on the opposite ends of walls **45***a* and **45***b* such that a

pair of tracks (+) and (−) will be arranged on each end of the module to match with a corresponding (−), (+) set of zipper tracks on the pavilion module or the closure module.

The fourth module of the invention is a closed room module **50** shown best in FIGS. **4** and **11**. This module, like the pavilion module **20** and the extension module **40**, can be free standing and can be used alone as a tent or in conjunction with the other modules of the invention. The module consists of side walls **51***a* and **51***b* connected along their top edges to a roof panel **52**. A floor **53** (FIG. **15**) is attached to the lowermost edges of the side walls **51***a* and **51***b*, and to the lowermost edge of an end panel **54**, FIG. **11**. A window **55**, made of netting material, is formed in the end panel **54**. In conventional fashion, a covering of the water shedding fabric, not shown, is arranged to cover the net window **55**. The module side walls **51***a* and **51***b* are stretched apart until the floor **53** is taut and are then staked to the ground. Vertical support is provided by vertical support poles **56***a* and **56***b*. A center ridge pole **58** connects the tops of poles **56***a* and **56***b* through a resilient cross arm **59**. The cross arm is inserted through a sleeve **60** that extends from the roof panel **52**, above the end panel **54**. The resilient cross arm **59** is bowed to tension the unit and stretches the roof panel **52** and the end panel **54** taut. The usual tent door **57**, including tie-back flaps and a net screen cover is provided in the end of the module opposite panel **54**.

Connection means are provided for optionally joining the closed room module **50** with the pavilion module **20**, as seen best in FIG. **11**, and with the extension module **42**, as shown in FIGS. **8** and **10**. As shown, the connection means consists of zipper tracks **57***a* (−) and **57***b* (+). Zipper track **57***a* does not have a slide and is cooperable with the zipper tracks of the pavilion module and of the extension module having such slides. Likewise, zipper track **57***b*, which does have a slide thereon, is cooperable with the zipper tracks of the pavilion module of the extension module that do not have a slide thereon.

Sod cloth extensions **61** are provided at each bottom front corner of the closed room module. These can be used in conventional fashion as sod cloths and can be weighted, to help stabilize the unit when it is used as a free standing tent. When used with the other modules of the invention however, the extensions, which reach outwardly beyond sides of the unit overlap with other module sod cloth portions to underlie a ground cloth, as best seen in FIG. **15**.

The ridges of the room modules are easily connected to the tops of the openings of the pavilion module with attachment means shown best in FIG. **9**. As shown, a fabric loop **63** is provided at each such opening and hangs beneath the canopy of the pavilion module at the apex of the opening. A tab **64** having a hole **65** therethrough is secured to the fabric of the room module and projects from the ridge such that loop **63** can be inserted downwardly through hole **65**. A hook **66** is then looped through loop **63** to keep it from being pulled back through the hole. The hook can be used to hang items from the top of the combined structure and, since the room module is supported by the loop, tab and hook, the vertical support pole of the connected end of the room module can be removed, if desired, to achieve a fully unobstructed passage between the room module and the pavilion module.

The module units described can be combined in a great many ways. As shown in FIGS. **5**, **6** and **8**, for example, the closure module **30** can be used to close the openings of each of the pavilion and open end room modules **20** and **42**, respectively, and can be used on the doorway end of the closed room module **50**.

The open ended room module **42** can be attached to the openings of the pavilion module or to the doorway end of the closed room module and can also be attached to the end of a similar open-ended room module.

The closed room module **50** can be attached to the closure module and the open ended room module as described above and can also be attached to the openings of the pavilion module.

A great many possible combinations of the modules are possible to meet particular needs. For example, as shown in FIG. **6**, a pavilion module **20** can be used with oppositely arranged closed room modules **50** and **50'**. An open-ended room module **42** provides a covered entranceway to the pavilion and a closure module **30** seals the open-ended room module while providing access thereinto. Another open-ended room module **42'** has one of its ends connected to the pavilion opening opposite module **42** and a closed room module **50** connected to the other end. As shown the combined unit fits within a number of trees T and in a typical arrangement (using standard production sizes) will provide approximately 320 square feet of covered area. To provide a comparable covered area in conventional tenting would require a tent 18 feet square and such a tent in addition to being heavy and bulky to transport and requiring extensive support structure could not be used within the terrain limitations imposed by the trees T. With the arrangement of FIG. **7**, for camping purposes cooking and eating can be done beneath the pavilion module, the closed room modules can be used for sleeping and camping equipment can be stored beneath the closed room modules.

In FIG. **15** another typical layout is shown. In this floor plan arrangement, a pair of opposed closed room modules **50** and **50'** extend normal to a pair of open ended room modules **42** and **42'**, each of which has a closure module **30** connected to the outermost end thereof. Each of the open ended room modules and the closed room modules are connected by a pavilion module, **20**, only the lowermost corners of which are visable in the floor plan view. The closed room modules include floors and the modules all have sod cloth flaps, i.e. skirts **40***e*, **43***d* and **43***e* and extensions **61**, arranged such that a ground cloth, not shown, can be placed over the flaps to provide a sealed floor for the area encompassed by the pavilion, open ended room, and closure modules. The flaps overlap inside of the ground engaging corners of the pavilion module to thereby provide a complete seal for the edge of the combined unit.

While specific combinations of modules have been shown it should be apparent that other combinations can be used to meet other requirements. More than one pavilion module can be used, for example, with the pavilion modules used being interconnected by open ended room modules.

Various materials can be used for the modules of the invention. Preferably, however, good quality canvas or nylon fabrics of the type commonly used for tent construction are employed for all walls, panels and tops and the floors are of a stronger rubberized or otherwise waterproofed fabric.

Although preferred embodiments of my invention have been herein described, it is to be understood that the present disclosure is made by way of example and that variations are possible, without departing from the scope of the hereinafter claimed subject matter, which subject matter I regard as my invention.

I claim:

1. A modular shelter system comprising
a tent pavilion module having
two generally triangular side walls and two generally triangular end walls of flexible sheet material, the bases of said adjacent triangles being connected and the apexes of said triangles engaging the ground, a top of flexible sheet material fixed to each of said bases, means stretching said top tautly between said bases, and means for tautly stretching said walls upwardly from the ground; and
means for coupling other modular tent components having an apex to the pavilion module at each opening formed between adjacent triangular side and end walls with the apex of the other modular tent component adapted to be coupled at the junction of the adjacent bases forming the opening.

2. A modular shelter system as in claim 1, further including
at least one closure module coupled to at least one opening, said closure module including means for selectively opening and closing passage into and out of the pavilion module through the opening at which the said closure module is coupled.

3. A modular shelter system as in claim 1, further including
at least one open ended room module coupled to at least one opening, said open-ended room module including side walls, but being open at both ends thereof, with one of said ends coupled to said opening.

4. A modular shelter system comprising
a pavilion module having
generally triangular side and end walls, the bases of said adjacent triangles being connected and the apexes of said triangles engaging the ground, a top fixed to said bases and stretched tautly therebetween; and
means for coupling other modular components to the pavilion module at each opening formed between adjacent side and end walls;
at least one open ended room module coupled to at least one opening, said open-ended room module including side walls, but being open at both ends thereof, with one of said ends coupled to said opening; and
a closure module coupled to the end of the open-ended room module remote from the opening of the pavilion module to which the open-ended room module is coupled, said closure module including means for selectively opening and closing passage into and out of the open ended room module through the opening at which said closure module is coupled.

5. A modular shelter system comprising
a pavilion module having
generally triangular side and end walls, the bases of said adjacent triangles being connected and the apexes of said triangles engaging the ground, a top fixed to said bases and stretched tautly therebetween; and
means for coupling other modular components to the pavilion module at each opening formed between adjacent side and end walls;
at least one open ended room module coupled to at least one opening, said open ended room module including side walls, but being open at both ends thereof, with one of said ends coupled to said opening;
a closed room module comprising an independently supported shelter having a door opening in one end thereof and means for coupling the closed room module with either end of the open-ended room module, whereby the door opening of the closed room module is adapted to be positioned at the open end of the open-ended room module remote from the end connected to the pavilion and the closed room module is releasably coupled to the open-ended room module.

6. A modular shelter system comprising
a pavilion module having
generally triangular side and end walls, the bases of said adjacent triangles being connected and the apexes of said triangles engaging the ground, a top fixed to said bases and stretched tautly therebetween; and
means for coupling other modular components to the pavilion module at each opening formed between adjacent side and end walls;
a closed room module comprising an independently supported shelter having a door opening in one end thereof, and means for engagement with the coupling means of the pavilion module, whereby the door opening of the closed room module is positioned within one opening formed between triangular side and end walls of the pavilion module and the closed room module is releasably coupled to the pavilion module.

7. A modular shelter system as in claim 1, further including
modular units adapted to be coupled with the coupling means at the openings of the pavilion module.

8. A modular shelter system comprising
a pavilion module having
generally triangular side and end walls, the bases of said adjacent triangles being connected and the apexes of said triangles engaging the ground, a top fixed to said bases and stretched tautly therebetween; and
means for coupling other modular components to the pavilion module at each opening formed between adjacent side and end walls; and
modular units adapted to be coupled with the means for coupling other modular components to the pavilion module, said modular units comprising

a closed room module, an open-ended room module, and a closure module, each of said modular units including flaps extending therefrom to reach past adjacent apexes of the triangular side and end walls of the pavilion module when they are connected to the pavilion module.

9. A modular shelter system as in claim **8**, wherein the pavilion module, closed room module, open-ended room module and closure module are each constructed of tent fabric.

10. A modular shelter system as in claim **8**, wherein the means for coupling on the pavilion module comprise a zipper track on each side of each opening of the said module one of said tracks at each opening having a zipper slide thereon, the said tracks with slides being separated by a track without a slide; and

the closed room module, open ended room module and the closure module each include zipper tracks, one track of which has a zipper slide thereon, said zipper tracks being arranged to mate with the zipper tracks at an opening of the pavilion module.

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