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J. W. KLAGES  
COLLAPSIBLE SHELTER

2,928,404

Filed Aug. 13, 1958

3 Sheets-Sheet 1

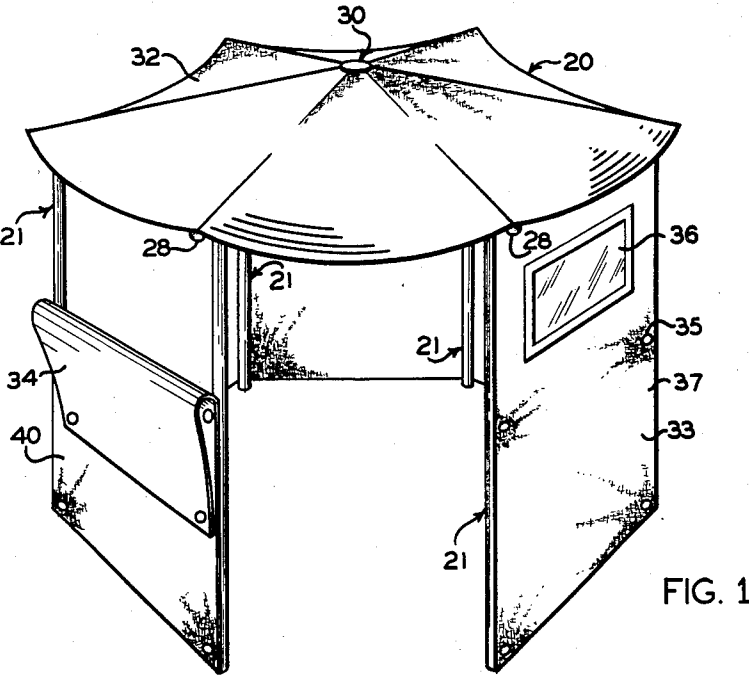


FIG. 1

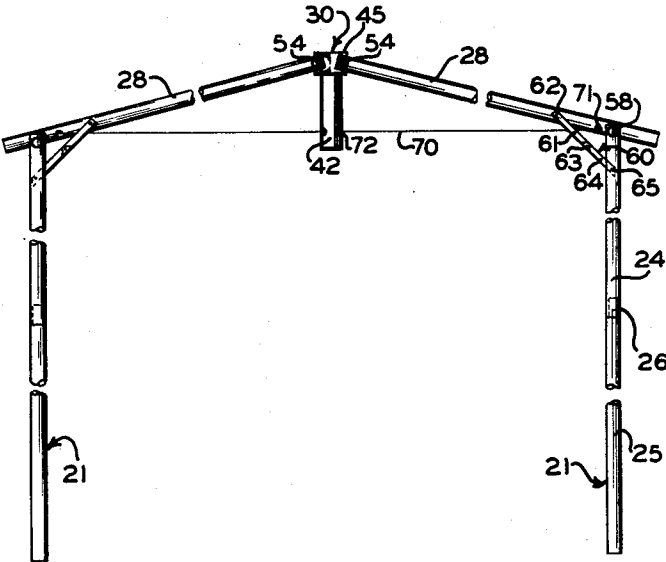


FIG. 2

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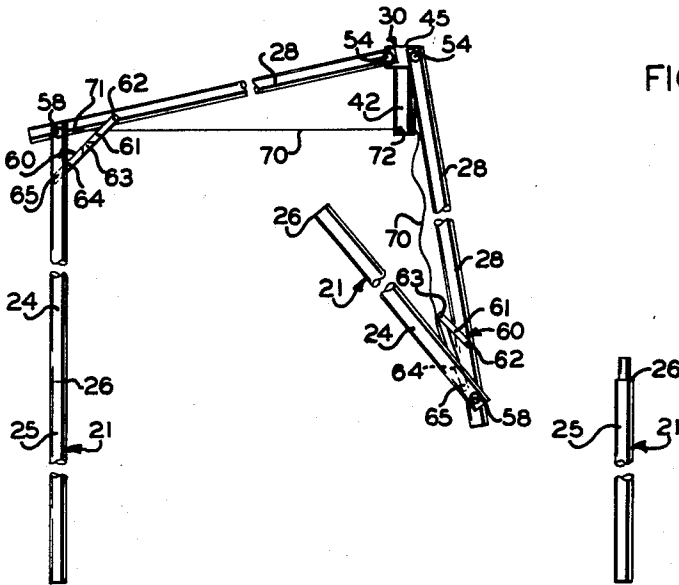


FIG. 3

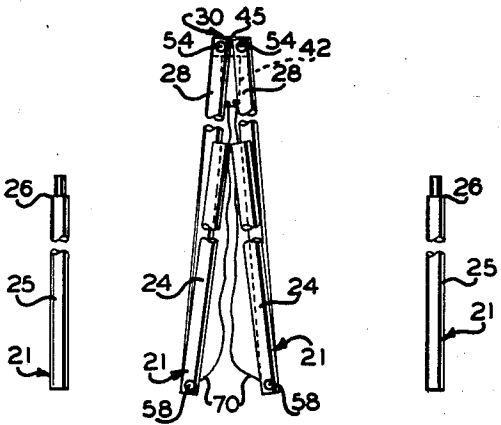


FIG. 4

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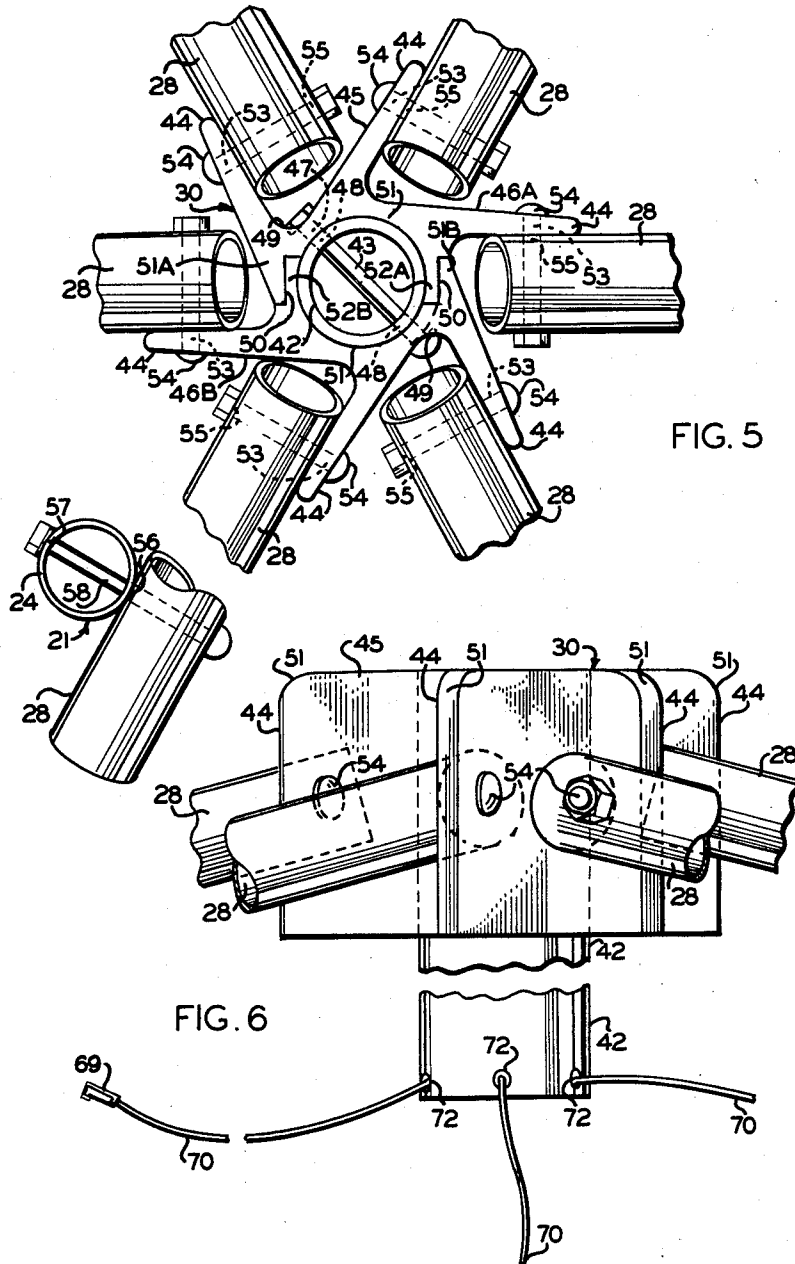
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3 Sheets-Sheet 3



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## COLLAPSIBLE SHELTER

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1 Claim. (Cl. 135—4)

This invention relates generally to a novel shelter for use by sportsmen and particularly to a collapsible shelter that can be compactly packaged for ease of transportation.

In general the present invention relates to a shelter structure which includes a roof frame consisting of a plurality of tubular members extended radially outwardly from a hub. The inner ends of the roof members are attached to the hub whereby the roof members can be folded in compact co-extensive relationship with each other. The shelter of the present invention further includes a sidewall frame formed by a plurality of upright tubular members each of which consists of a plurality of telescope segments of substantially the same length as the previously mentioned tubular roof frame members. The upper segment of each sidewall member is pivotally connected to a respective roof frame member and is of substantially the same length whereby the upper segments of the sidewall members can be folded into compact co-extensive disposition with the roof frame members.

As another aspect of the present invention, the outer ends of the radially outwardly extending roof frame members are connected to the hub of the roof frame by a plurality of quickly detaching radially outwardly extending flexible tension members. These tension members cooperate with the tubular roof frame members and hub to form a rigid truss construction.

As still another aspect of the present invention, a quickly detachable multiple segment covering is provided for the above described frame structure to afford protection to the occupants from inclement weather and the like.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred form of embodiment of the invention is clearly shown.

In the drawings:

Figure 1 is a front perspective view of a shelter constructed according to the present invention;

Figure 2 is a side elevational view, partly in section, illustrating the framework of the shelter of Figure 1;

Figure 3 is a second side elevational view, partially in section, showing the framework of the shelter of Figure 2 in a partially folded configuration;

Figure 4 is a third side elevational view, partially in section, showing the frame structure in a more completely folded configuration;

Figure 5 is a partial top view of a hub structure comprising a portion of the roof frame of the shelter of the preceding figures; and

Figure 6 is a partial side view of the hub structure of Figure 5.

Referring in detail to the drawing, a shelter constructed according to the present invention is indicated generally at 20 in Figure 1. The shelter includes a plurality of upright wall members 21 each of which comprises a plurality of segments 24 and 25 adjoined together at a

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telescoping junction 26. The frame further includes a plurality of roof members 28 which extend readily outwardly from a hub indicated generally at 30.

It is seen in Figure 1 that the shelter includes a flexible roof covering 32 formed of canvas or the like and a plurality of detachable wall panels 33 and 34 formed of the same material as the roof covering. Panel 33 includes a window 36 preferably formed from a transparent material such as cellophane or the like. It should be mentioned that a screen made of plastic, fiber glass, or the like, can be readily substituted in place of window 36 or the transparent material forming window 36 can be discarded entirely, as the case may be, without departing from the spirit of the instant invention.

Panels 33 and 34 are detachably connected to upright wall members 21 by a plurality of snap fasteners 35 such panels when so connected being arranged in overlapping relationship at the junctions thereof as indicated at 37. Each of the panels can be partially connected as shown in Figure 1 wherein lower portion 40 of panel 34 is connected to members 21 by the lowermost fasteners 35. It should be understood that snap fasteners 35 are attached to upright wall members 21 and are adapted to receive and retain the wall panels in the manner as described.

An access to shelter 20 is shown in Figure 1 by the random removal of a panel, it being understood that such access is also possible by disconnecting, as desired, any of the several combinations of snap fasteners 35 appropriately connecting the selected panel to upright wall members 21.

Hub 30 includes a tubular element 42 and a fitting hereinafter referred to as a spider 45 into which an upper end portion of element 42 is inserted. Spider 45 is a composite of a sleeve and a plurality of lugs 44 formed integrally thereof and extending tangentially therefrom. Preferably, spider 45 is an extrusion formed in two sections 46A and 46B and readily assembled in surrounding relationship with element 42 at the upper end portion thereof, and retained in this relationship by a fastener 43, Figure 5.

It should be pointed out that section 46A and section 46B are identical such that the rotation of the configuration, for example, section 46A through 180° of arc, about the center of element 42 as shown in Figure 5, will result in the rotated configuration accurately defining the precise configuration of section 46B, similarly shown in Figure 5.

Each of the sections 46A and 46B includes a curved surface 51, the extension of two or more lines normal to surface 51 and from any point on surface 51 will intersect at a common point which point is also the center of element 42 when sections 46A and 46B are assembled therewith. It should be understood that surface 51, when sections 46A and 46B are arranged as shown in Figure 5, forms the inner peripheral surface of the previously mentioned sleeve. Preferable, the diameter of an opening defined by curved surface 51 of sections 46A and 46B, when disposed as shown in Figure 5, is slightly larger than the outside diameter of tubular element 42.

With further reference to Figure 5, each of the sections 46A and 46B is provided with an opening 47; similarly, an opening 48 is provided in the upper end portion of tubular element 42. Opening 47 is provided preferably at a fillet 49 which fillet is located between the lugs 44 nearest junction 50 of sections 46A and 46B.

Section 46A includes a lip 51A which overlaps an inner peripheral extension 52B on section 46B. Similarly, section 46B includes a lip 51B which overlaps an inner peripheral extension 52A of section 46A. Thus, a first junction 50 is formed by lip 51B and extension

52A and a second junction 50 is formed by lip 51A and extension 52B.

Opening 47 aligns with opening 48 to receive fastener 43 for the purpose of mounting spider 45 to tubular element 42. It should be understood that the placement of opening 47 and the projection of lips 51A and 51B and their associated extensions 52B and 52A respectively in the manner as previously described assures a strong connection of spider 45 to tubular element 42 and any possibility of sections 46A and 46B separating especially at the junctions 50 is minimized and virtually eliminated.

With continued reference to Figure 5, each of the lugs 44 is provided with an opening 53 to receive a fastener 54 for pivotally connecting tubular roof member 28 to hub 30. An opening 55 is provided in each of the roof members 28 near the inner end thereof.

An opening 56 is provided at the outer end of roof member 28 to receive a fastener 58 which extends through opening 56 and hence through opening 57 located at the upper end of segment 24 to pivotally connect each of the roof members 28 to a respective upright wall member 21.

With reference to Figures 2 and 3, a typical brace 60 is provided at each of the junctions of upright wall members 21 and roof members 28 and adds rigidity to the structure when erected in the operational configuration of Figure 1. With continued reference to Figures 2 and 3, brace 60 includes an upper member 61 pivotally connected to roof member 28 by a fastener 62. Similarly, lower member 64 is pivotally connected to segment 24 of upright wall member 21 by a fastener 65. Members 61 and 64 are hinged at 63 and are co-extensive of each other when shelter 20 is erected. When segments 24 are disconnected from their respective segments 25 at telescoping junctions 26 and subsequently disposed inwardly toward the folded storage configuration of Figure 4, it is seen in Figure 3 that upper member 61 and lower member 64 are moved downwardly about pivotal fasteners 62 and 65 respectively and about hinge 63.

With continued reference to Figures 2 and 3, a tension member 70 is detachably connected by a typical spring clip 69, Figure 6, to an eye bolt 71, or its equivalent, mounted on roof member 28 at the outer end thereof. Tension member 70 extends through openings 72 provided in the lower portion of tubular element 42 and is connected to a diametrically opposite roof member 28 in a similar manner. Preferably, each of the oppositely directed pairs of roof members is provided with a tension member 70 although a fewer number of tension members may be utilized without departing from the spirit of the instant invention. Tension members 70 cooperate with tubular roof members 28 and hub 30 to form a truss structure. The pitch of this truss structure is determined by the length of tension members 70 which members are formed of a preferred length to achieve the desired pitch. Others may incorporate means to adjust the length of tension members 70, and hence to vary the pitch of roof member 28, without departing from the spirit of the instant invention.

With particular reference to Figure 6, tubular element 42 is provided with holes 72 each of which is in vertical alignment with a respective roof member 28. It should be understood that each of the tension members 70 can be detachably connected by a second clip 69 to a fastener,

not shown, mounted in holes 72 of element 42 whereas in the preferred structure tension members 70 are not connected to element 42 but rather pass diametrically therethrough and are detachably connected at the outer end of roof member 28 as previously described. It is seen in Figure 6 that each of the lugs 44 is provided with a rounded upper edge to prevent damage to the flexible material which forms the roof covering of the instant invention.

Shelter 20 is readily transportable when disposed in the storage configuration of Figure 4 wherein is shown the folded disposition of segments 24, roof members 28, hub 30, and tension members 70. Roof covering 32 and panels 33 and 34 are not shown in Figure 4 but it should be understood that same can be readily folded compactly to facilitate transportation thereof.

When shelter 20 is to be erected, roof members 28 are disposed outwardly and segments 24 are subsequently moved downwardly whereupon brace 60 is extended to its locking disposition as shown in Figure 2. Lower segment 25 is then connected to upper segment 24 at telescoping junction 26. Thus the framework of shelter 20 has been erected.

Flexible roof covering 32 is placed over roof members 28 and secured thereto by tie strings, not shown, attached to cover 32 on the bottom surface thereof. Wall panels 33 and 34 are then detachably connected to upright wall members 21 as desired.

While the form of embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claim which follows.

I claim:

A collapsible shelter structure comprising, in combination, hub means including a plurality of peripheral portions, a post portion disposed between said peripheral portions and extending downwardly therefrom, and means for clamping said hub portions together, said peripheral portions forming a plurality of arms, each of which extends outwardly laterally of and substantially parallel with a radial line through the center of said hub means; a plurality of upright wall members each of which includes an upper end portion; a plurality of roof members extending radially outwardly and downwardly from said hub, each of said roof members including an inner end having a side extending along a side of one of said arms in lap-joined relationship therewith, a free side, and a longitudinal axis extending through the center of said hub, each of said roof members further including an outer end portion attached to an upper end portion of one of said wall members at a junction; a plurality of flexible tension members extending radially from said post and in force transmitting relationship with certain of said end portions; a brace connected between said outer end portions and said upper end portion at said junction; and a flexible material secured to said members and forming the roof and wall covering for said members.

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