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FOLDING PORTABLE SHELTER

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2 Sheets-Sheet 1

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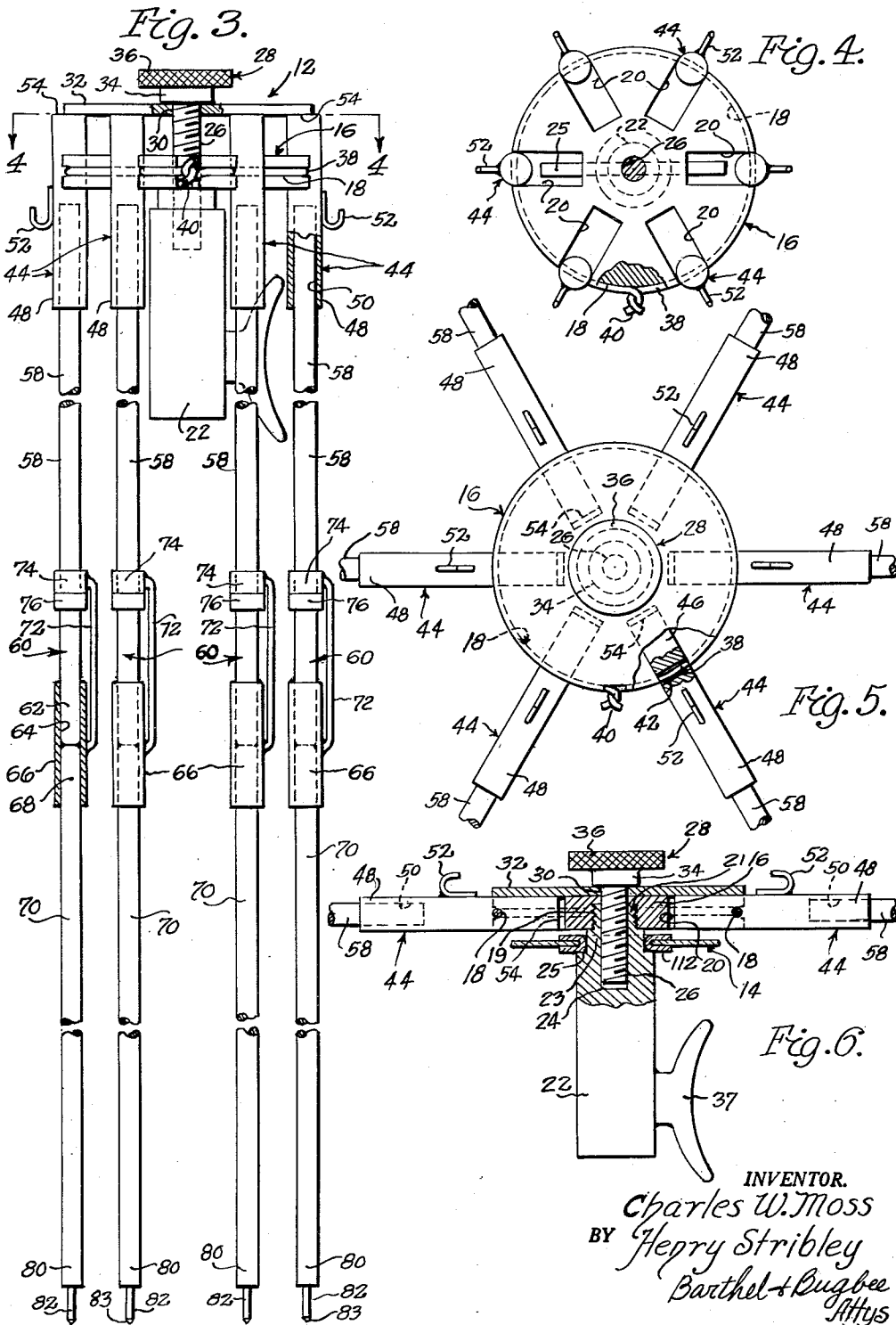
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2 Sheets-Sheet 2



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FOLDING PORTABLE SHELTER

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This invention relates to portable shelters and, in particular, to folding portable shelters.

One object of this invention is to provide a folding portable shelter which is capable of being folded into a narrow elongated space for transportation or storage but which is quickly and easily unfolded and set up, and which, when set up, is strongly resistant to overturning by wind and gives a large amount of head room to its occupants.

Another object is to provide a folding portable shelter of the foregoing character provided with pivoted ribs of flexible material which can be bowed into arcuate form so as to stretch an approximately hemi-spherical shelter cover into its hemi-spherical form, and held in this position by a simple clamping mechanism.

Another object is to provide a folding portable shelter of the foregoing character which furnishes complete protection from the weather for hunters using it as a shooting blind, fishermen using it as a fishing shanty, campers using it as a tent, photographers using it as an animal or bird photography blind, or bathers or vacationers using it as a beach cabana.

Another object is to provide a folding portable shelter of the foregoing character wherein the ribs are in two or more sections which are fitted together end to end and yet are easily removable for folding the shelter lengthwise when it has been collapsed.

Another object is to provide a folding portable shelter of the foregoing character wherein the ribs of the frame structure thereof are extended beyond the flexible cover so as to be capable of being embedded in the ground, thereby providing still further resistance to overturning by strong winds.

Other objects and advantages of the invention will become apparent during the course of the following description of the accompanying drawing, wherein:

Figure 1 is a side elevation of a folding portable shelter, according to one form of the invention, with the shelter erected and the ribs embedded in the ground, the upper portion of the flexible cover being omitted to show the frame construction;

Figure 2 is a top plan view of the frame structure of the folding portable shelter shown in Figure 1, with the cover removed to show the frame structure more clearly;

Figure 3 is an enlarged side elevation of the frame structure of the folding portable shelter of Figures 1 and 2, with the structure in its folded position and with the cover removed, the midportions of the ribs being omitted to shorten the drawing and increase the scale thereof;

Figure 4 is a horizontal cross-section taken along the line 4—4 in Figure 3;

Figure 5 is an enlarged fragmentary top plan view, partly in horizontal section, of the central portion of Figure 2, showing the rib anchorage pivoting and clamping arrangement;

Figure 6 is a side elevation of Figure 5, partly in central vertical section;

Figure 7 is a slightly enlarged fragmentary horizontal section taken along the line 7—7 in Figure 1;

Figure 8 is an enlarged fragmentary side elevation of the bottom portion of the shelter adjacent the lower end of one of the ribs; and

Figure 9 is an enlarged fragmentary vertical section taken along the line 9—9 in Figure 8.

Referring to the drawings in detail, Figures 1 and 2 show a folding portable shelter, generally designated 10, according to one form of the invention as consisting generally of a foldable frame structure, generally designated 12, and a foldable fabric cover of approximately hemispherical shape, generally designated 14. In Figure 1, the upper portion of the flexible cover 14 has been broken away to indicate the frame structure construction more clearly. The frame structure 12 (Figures 3 to 6 inclusive) consists of a base disc or plate 16 of circular shape having an annular groove 18 extending around the periphery thereof and radial notches 20 spaced at intervals around the periphery. The base plate 16 is bored and threaded as at 19 to receive the threaded smaller diameter upper end 21 of a rod 22. The rod 22 is provided with an intermediate diameter portion 23 separated from the main part of the rod 22 by an annular shoulder 25. The rod 22 is provided with an axial internally-threaded socket 24 into which the threaded shank 26 of a hand screw 28 is threaded. The screw 28 passes through a central hole 30 in a circular clamping disc 32 and has an integral enlargement 34 between the shank 26 and the knurled head 36 thereof. A cleat 37 is welded or otherwise secured to one side of the rod 22.

Extending peripherally around the base plate 16 and seated in the groove 18 thereof is a pivot wire 38 (Figure 4) which crosses the various radial notches 20 at their outer ends and has its opposite ends interconnected as at 40. Pivotaly mounted upon the pivot wire 38 and having bores 42 receiving the pivot wire 38 are rib holders 44, the inner end portions 46 of which are adapted to swing into the notches 20 (Figure 5), whereas the outer end portions 48 are provided with sockets 50. Hooks 52 are also secured to the rib holders 44 in any suitable manner, as by welding or by the use of suitable fasteners (not shown). The inner end portions 46 of the rib holders 44 are provided with ends 54 adapted to be engaged by the clamping plate 32 in the folded position of the shelter (Figure 3).

Inserted in the sockets 50 of the rib holders 44 are the upper ends of upper sections 58 of jointed ribs, generally designated 60, the lower ends 62 of the upper section 58 being inserted in the upper part of the bores 64 of tubular ferrules 66, the lower portions of which similarly receive the upper ends 68 of the lower sections 70 of the jointed ribs 60. The upper and lower rib sections 58 and 70 are thus separable from one another, and the ferrules 66 are slidable upward or downward along the upper rib sections 58 and retained in position by rods 72 connected at their lower ends to the ferrules 66 and at their upper ends to sleeves or rings 74, the path of travel being limited by stop collars 76 mounted on the upper rib sections 58. The lower end portions 82 of the lower rib sections 70 are preferably pointed as at 83 in order to dig into the ground and thereby more securely anchor the frame structure 12 against wind pressure tending to overturn it, as explained below in connection with the operation of the invention. The upper and lower rib sections 58 and 70 are made of resilient material, such as from rods of fibrous glass material.

Mounted on the inside of the framework formed by the jointed ribs 60 of the frame structure 12 is the flexible cover 14 of suitable material, such as nylon impregnated with vinyl resin. The cover 14 is of approximately hemispherical shape when extended and is composed of gus-

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sets 84 interconnected at their adjacent edges by inner and outer flexible strips 86 and 88 stitched or otherwise secured together through the intervening gussets 84 as at 90 (Figure 7). The outer strips 88 extend outward to form rib tunnels or tubular pockets 92 for receiving the upper and lower sections 58 and 70 of the jointed ribs 60. A gap 94 is left in each strip 88 (Figure 1) at the location of the ferrule 66, so as to permit access to the ferrule 66. One of the gussets 84 is provided with an entrance opening 96 closed by a slide fastener 98 and another is provided with a window opening 100 closed by a flap 102 or by loosely hanging strips (not shown) in the event that the shelter is being used for a hunting blind. The material 103 of the flexible cover 14 at the bottom thereof is bent outward to form a hem 104, the lower fold 106 of which is continued inwardly to form a sod cloth or floor 108 (Figure 9). The hem 104 strengthens the cover 14 at the bottom thereof against the outward pull of the flexible ribs 60. The hem 104 is pierced at intervals to receive grommets 110 through which the rib portions 82 extend downwardly. The top of the cover 14 at its center is pierced to receive an upper central grommet 112 (Figure 6) which fits over the intermediate diameter portion 23 of the rod 22 against the shoulder 25 and is retained in position by the base disc 16 threaded onto the threaded end 21.

In the operation of the invention, let it be assumed that the hand wheel 28 is unscrewed partway from the socket 24 in an upward direction to permit the clamping disc 32 to engage the upper ends 54 of the rib holders 44 when they have been swung downward parallel to one another in the folded position of the shelter 10 (Figure 3). Assuming that the cover 14 has been mounted on the ribs 60 in the manner shown in Figure 1, the person erecting the shelter pushes or pulls downward on the hand wheel 28 or cleat 37 respectively while forcing the pointed ends 82 of the lower rib sections 70 into the ground. This downward pressure on the plate 32 causes the flexible ribs 60 to be bowed outward at their midportions into approximately semi-circular shape, whereupon their upper end portions 46 swing inwardly into approximately horizontal positions directed radially toward the shank 26 of the hand screw 28 (Figure 5). While applying downward pressure upon the hand wheel 28 to hold the ribs bowed in this position, so that the ribs 60 in assembly enclose an approximately spherical or pumpkin-shaped space, the operator then screws down upon the hand wheel 28 to engage the disc 32 firmly with the inner end portions 46 of the rib holders 48 and with the upper side of the base plate or disc 16 (Figure 6). The operator then lifts upward on the hand wheel 28 or boss 22 to release the lower ends 83 of the ribs 60 from their engagement with the ground, so that the flexible ribs 60 snap outward into the positions shown in Figure 1, causing the cover 14 and shelter 10 to assume an approximately hemi-spherical or igloo shape (Figure 1). If desired, then the lower end portions 82 or points 83 of the lower rib sections 70, which project downward below the hem 104 can be pushed into the ground or ice (where the shelter 10 is used as a fishing shelter) in order to further anchor the shelter 10 to the ground. In order to further stabilize the shelter 10 in areas having high winds, guy ropes (not shown) anchored to conventional tent pins (also not shown) may be secured at their upper ends to the hooks 52.

To take down and fold the shelter 10, the operator reverses the foregoing procedure by unscrewing the hand screw 28 so that its head 36 and enlargement 34 move upward away from the disc 16, permitting the inner end portions 46 of the rib holders 48 to swing upward into positions parallel to the shank 26 of the hand screw 28 (Figures 3 and 4), thereby enabling the ribs 60 to assume positions approximately parallel to one another, with the cover 14 inside them. In order to further shorten

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the bundle thus formed, the ferrules 66 may be slid upward along the lower ends 62 of the upper rib sections 58, permitting the lower rib sections 70 to be removed from the lower ends of the bores 64 and folded lengthwise alongside the upper sections 58.

What we claim is:

1. A folding portable shelter comprising a distensible cover of flexible material, and a supporting frame for said cover including a central hub, a plurality of flexible ribs having their top end portions pivotally mounted on said hub and adapted to flex into arcuate shape, said cover being disposed in flexing-restraining engagement with said ribs, and means engageable solely with said top end portions of said ribs adjacent their pivotal mountings on said hub for forcing the top end portions of said ribs into a substantially common plane to flex the ribs into arcuate form to take the form of the cover, said means being the sole means of flexing the ribs into arcuate distending engagement with said cover.

2. A method of erecting a folding portable shelter having a flexible distensible cover supported by multiple radially-disposed resilient ribs pivotally connected to one another near their upper ends radially to a hub, said method comprising positioning the ribs substantially vertical and parallel to one another with their lower ends resting upon a sustaining surface, applying a downward pressure upon the connection between the upper ends of said ribs to simultaneously spring the ribs outwardly away from one another into substantially semi-circular shapes against the sustaining surface as an abutment while simultaneously moving the upper ends of the ribs into a substantially common plane at their interconnections, securing the upper ends of the ribs in said common plane while holding the ribs in their substantially semi-circular sprung shape, and lifting upward upon the interconnected upper ends of the ribs to release the lower ends of the ribs from engagement with the sustaining surface whereby to effect outward springing of the lower ends of the ribs into distending engagement with said cover with said ribs assuming the form of said cover.

3. A folding portable shelter comprising a supporting frame including a central hub, a multiplicity of flexible ribs pivotally mounted on said hub and adapted to flex into arcuate shape, and a clamping device on said hub movable into and out of clamping engagement with said ribs; and an approximately hemispherical cover of flexible material secured to said ribs inside said frame and having a central aperture, said cover being distensible into its hemi-spherical shape in response to the arcuate flexing of said ribs, said hub having a threaded bore therein and said clamping device including a clamping plate having a hole therein, and a clamping screw having a head disposed outside said cover and engageable with said clamping plate and a threaded shank threadably engageable with said bore.

4. A folding portable shelter comprising a supporting frame including a central hub, a multiplicity of flexible ribs pivotally mounted on said hub and adapted to flex into arcuate shape, and a clamping device on said hub movable into and out of clamping engagement with said ribs; and an approximately hemi-spherical cover of flexible material secured to said ribs inside said frame and having a central aperture, said cover being distensible into its hemi-spherical shape in response to the arcuate flexing of said ribs, said hub having a boss extending downwardly therefrom with a threaded bore therein and said clamping device including a clamping plate having a hole therein, and a clamping screw having a head disposed outside said cover and engageable with said clamping plate and a threaded shank threadably engageable with said bore.

5. A folding portable shelter comprising a distensible cover of flexible material, and a supporting frame for said cover including a central hub, a plurality of flexible ribs having their top end portions pivotally mounted on said

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hub and adapted to flex into arcuate shape, said cover being disposed in flexing-restraining engagement with said ribs, and means engageable solely with said top end portions of said ribs adjacent their pivotal mountings on said hub for forcing the top end portions of said ribs into a substantially common plane to flex the ribs into arcuate form to take the form of the cover, said means being the sole means of flexing the ribs into arcuate distended engagement with said cover, the upper ends of the ribs extending inwardly toward the center of the hub beyond their pivotal mountings thereon and the rib-forcing means engaging the top end portions of the ribs between the pivotal mountings thereof and the center of the hub.

6. A folding portable shelter comprising a distensible cover of flexible material, and a supporting frame for said cover including a central hub, a plurality of rib holders pivotally mounted on the central hub and having outwardly-facing sockets therein, a plurality of flexible ribs having their top end portions secured in said sockets and adapted to flex into arcuate shape, said cover being disposed in flexing-restraining engagement with said ribs,

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and means engageable solely with said rib holders adjacent their pivotal mountings on said hub for forcing said rib holders into a substantially common plane while simultaneously flexing the ribs into arcuate form to take the form of the cover, said means being the sole means of flexing the ribs into arcuate distending engagement with said cover.

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