April 10, 1962 T. H. CLIFT, JR 3,028,871

COLLAPSIBLE SHELTER

Filed April 15, 1959 2 Sheets-Sheet 1

Fig. 1.

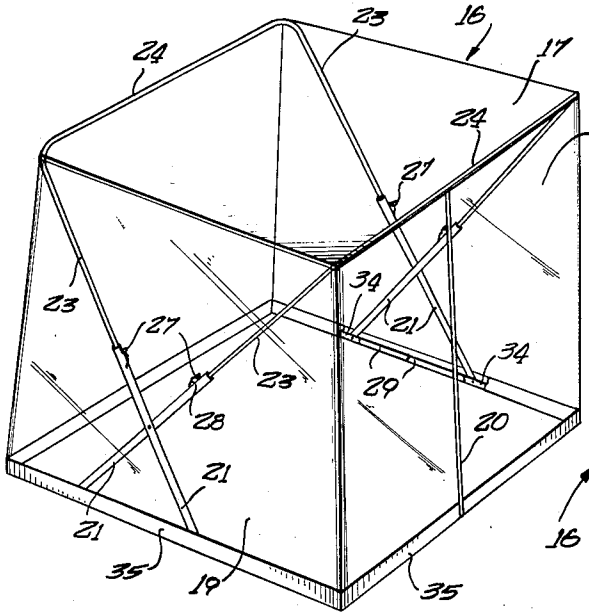


Fig. 2.

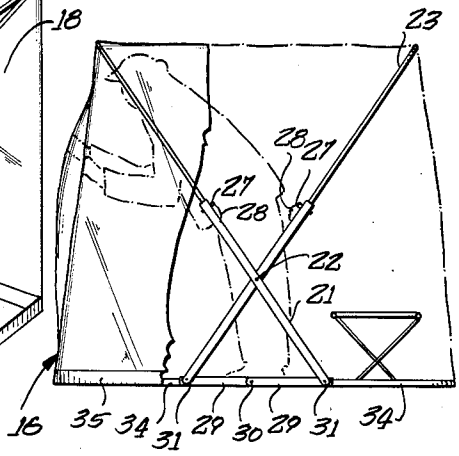


Fig. 3.

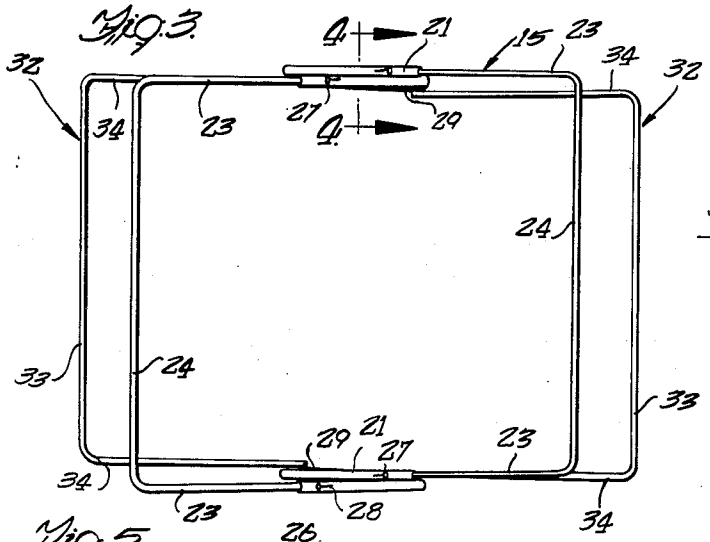


Fig. 4.

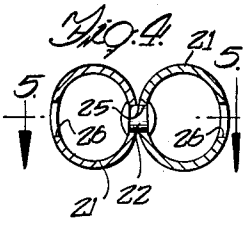
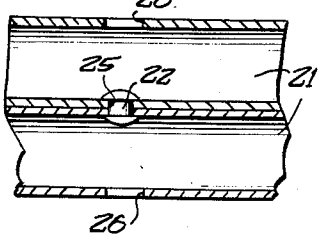


Fig. 5.



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Fig. 6.

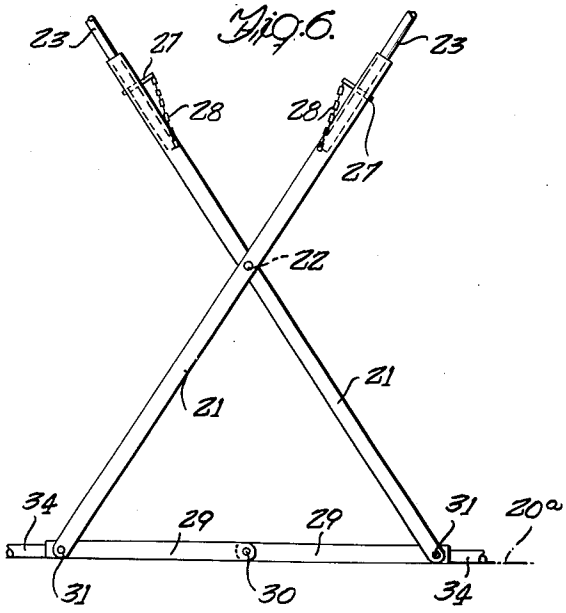


Fig. 7.

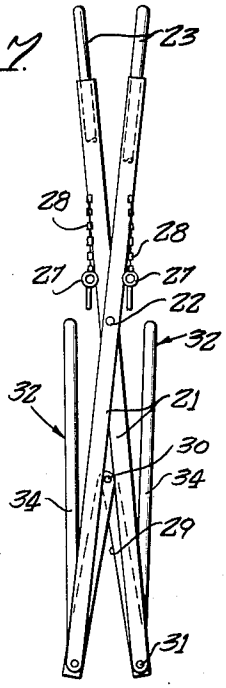


Fig. 8.

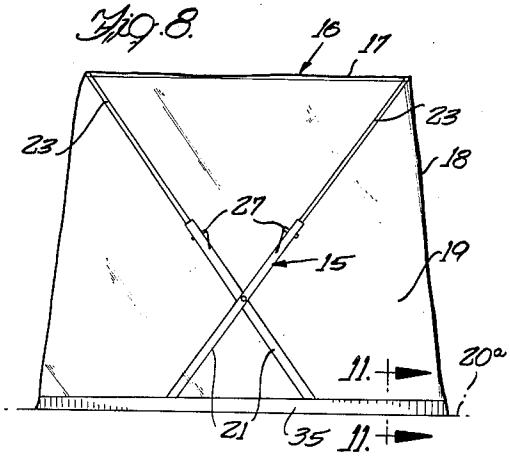


Fig. 9.

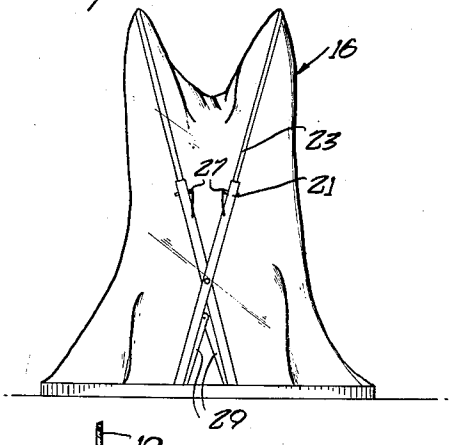


Fig. 10.

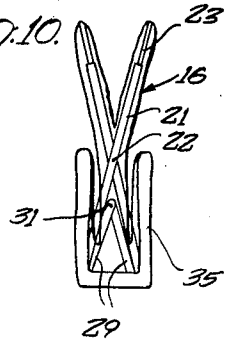
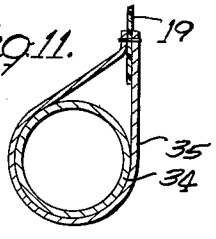


Fig. 11.



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United States Patent Office 3,028,871 Patented Apr. 10, 1962

3,028,871

COLLAPSIBLE SHELTER

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Filed Apr. 15, 1959, Ser. No. 806,637
5 Claims. (Cl. 135—1)

This invention relates to shelters of the type having a flexible cover enclosing and supported by a framework which is collapsible along with the cover to form a package smaller than the shelter for transporting the parts from one place to another.

A general object of the invention is to provide a novel shelter of the above character which is of simple and inexpensive construction, is easy for one man to set up and collapse, and collapses to an easily handled package of very small volume compared to its expanded volume.

Another object is to construct the framework in a novel manner such that it is rigid and of large size when expanded but collapses easily to a small size convenient to carry.

A further object is to interconnect the framework and cover in a novel manner, facilitating the initial assembly of these parts while avoiding interference with the collapse of the parts.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings in which:

FIGURE 1 is a perspective view of a collapsible shelter embodying the novel features of the present invention;

FIG. 2 is a side elevational view of the shelter with the cover partially broken away and shown schematically;

FIG. 3 is a plan view of the framework with the cover removed;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 3;

FIG. 5 is a fragmentary sectional view taken along the line 5—5 of FIG. 4;

FIG. 6 is a fragmentary enlarged view similar to FIG. 2;

FIG. 7 is a side elevational view of the framework in collapsed condition;

FIG. 8 is a side elevational view of the shelter with the parts in fully extended postions;

FIG. 9 is a view similar to FIG. 8 with the parts partially collapsed;

FIG. 10 is a view similar to FIGS. 8 and 9 with the parts in their fully collapsed positions; and

FIG. 11 is a fragmentary sectional view taken along line 11—11 of FIG. 8.

The invention is shown in the drawings for purposes of illustration embodied in a shelter of generally rectangular shape comprising a collapsible framework 15 and a cover 16 enclosing and supported by the framework. The cover preferably is formed of a sheet of transparent or translucent material such as polyethylene which also is flexible so that it may be collapsed with the framework. The shape of the cover is rectangular with top, end, and side walls 17, 18 and 19 and a slit 20 extending vertically along one end wall 18 and having some suitable closing means such as a zipper or snaps (not shown). In this instance, the top is formed as a rectangular sheet separate from the other walls which are parts of a single elongated rectangular sheet of material with one side edge overlapping and secured as by sewing or heat sealing to the edges of the top sheet.

In accordance with the present invention, the framework 15 is constructed in a novel manner to enable the cover 16 to be made of large dimensions and still provide adequate support for the cover while collapsing to a

relatively smaller, easy-to-carry package. To these ends, the framework comprises two X-frames each with two legs 21 pivotally connected to each other at 22 and telescoping with different legs 23 of two U-frames. The U-frame legs are slidable along and relative to the X-frame legs and also are swingable therewith about their pivotal connections 22 between expanded positions shown in FIGS. 1, 2, 3, 6 and 8 and collapsed positions shown in FIGS. 7 and 10. In the expanded positions, the X-frame legs and the planes of the U-frames are disposed at large included angles and the U-frame legs extend beyond the X-frame legs so that crosspieces 24 connecting the U-frame legs fit into the corners at the intersections of the top cover wall 17 with the end walls 18 with the lower edges of the end walls and the side walls 19 touching a horizontal surface 20*a* supporting the X-frames. When the legs are collapsed, the U-frame legs extend substantially along the full lengths of the X-frame legs and past their pivotal connections.

The U-frame legs 23 in the present instance are formed integral with their connecting crosspiece 24 as straight end portions of a single piece of tubing bent into parallelism with each other at the ends of the crosspiece which also is straight. Each of these legs telescopes within a different one of the X-frame legs 21 which also are straight tubes. To enable the U-frame legs to slide past the pivotal connections 22 between the X-frame legs, these connections are formed by rivets which join only the adjacent contacting portions of the X-frame legs and are spaced from the opposite portions of the tubes (see FIGS. 4 and 5). The rivets extend through registering holes 25 in the contacting portions of the tubes and other holes 26 are formed in the diametrically opposite portions of the tubes, to receive suitable tools (not shown) for engaging and upsetting the ends of the rivets. Herein, the X-frame legs are of approximately the same length as the straight parts of the U-frame legs with the pivotal connections 22 offset from the centers of the X-frame legs and located closer to the ends receiving the U-frame legs than to the other ends.

The U-frame legs 23 are held releasably in their extended positions with respect to the X-frame legs 21 by suitable detents which may comprise eyelet pins 27 shiftable into and out of holes formed in the upper end portions of the X-frame legs and the lower or free end portions of the U-frame legs and registering with each other when the U-frames are in their extended positions. To retain the pins when they are removed from the holes, they may be attached to the X-frame legs by chains 28.

To avoid stretching of the cover 16, particularly the top wall 17, means is provided for limiting the movement of the X-frame legs 21 outwardly to positions in which the crosspieces 24 of the U-frame members are spaced apart horizontally a distance substantially equal to but not greater than the length of the top wall. This means comprises two pairs of links 29 each pivotally connected at one end to the other link of the pair and at its other end to the lower end of an X-frame leg, each pair of links connecting the legs of a different one of the X-frames. By virtue of their pivotal connections to each other and the X-frams legs, the links may be folded to collapsed positions between these legs when the legs are folded to their collapsed positions as shown in FIGS. 7 and 9. In view of this and because the links are located in the inner sides of the legs, any increase of the overall size of the collapsed framework is avoided. Herein, the pivotal connections 30 between the links are rivets. The other connections 31 between the links and the legs, however, are formed by bolts with nuts which are removable for assembly and disassembly of the parts.

The side and end walls 17 and 18 of the cover 16 preferably are maintained in their desired positions defining

a rectangle by stiffeners 32 extending along the bottom edges of these walls. These stiffeners are connected to the framework and to the walls not only to keep the parts in their proper relation after they are set up with the framework extended, but also, to reduce the time required for the setting up. Such attachment is accomplished in a novel manner avoiding interference with collapse of the framework. To this end, the stiffeners are formed as U-shaped members having cross-pieces 33 extending along and secured to the lower edges of the end walls 18 and laterally spaced parallel legs 34 extending partially along the side walls 19 from the end walls with their free ends joined to the X-frame legs 21 at the pivotal connections 31 on the inner side of the links 29. Also, the side and end walls are connected only to the stiffeners and remain disconnected from the links thereby leaving the links free to swing between their collapsed and extending positions. Like the other frame members, the stiffeners are formed by bending tubing.

In the present instance, the cover 16 is attached to the stiffeners 32 through the medium of a strip 35 of cloth which is folded longitudinally upon itself and is sewn to the lower edges of the end and side walls 18 and 19 to form a tube extending along these walls as shown in FIG. 11. At the pivotal connections 31 where the X-frame legs 21 are joined to the stiffeners, the tube is opened to permit the end portions of the stiffeners to project outside of the tube, the portions of the tube between such pivotal connections remaining disengaged from the framework. Herein, such disengaged portions extend along the outer sides of the links.

Assuming that the rivets 30 and 22 for the links 29 and the X-frame legs 21 are in place, that the legs 23 of the U-frame members are telescoped within the X-frame legs, and that the cover 16 has been formed with the side and end walls 19 and 18 secured to the top wall 17 and the cloth strip 35, the assembly of the shelter is completed by first inserting the stiffeners 32 within the tube defined by the cloth strip. Then, after the U-frame and X-frame members have been inserted within the cover, the stiffeners and the links are attached to lower ends of the X-frame legs by assembling the nuts and bolts for the pivotal connections 31.

With the parts assembled, the shelter is set up by first swinging the X-frame legs 21 and the links 29 to their extended positions and placing the links on a horizontal supporting surface. Then, the stiffeners are folded down onto the surface with the links and the U-frame legs 23 are shifted to their extended positions where they are retained by inserting the pins 27 into the registering holes in the U-frame legs and the X-frame legs. In these positions, the U-frame crosspieces 24 are disposed in the corners at the intersections of the top and end walls 17 and 18 of the cover to support the cover. This is accomplished without stretching the top wall because of the links limiting the extent of outward swinging of the X-frames and U-frames from their collapsed positions.

Due to the stiffeners 32, the lower ends of the X-frames are retained at their proper spacing and the lower edges of the side and end walls 19 and 18 remain close to the supporting surface and follow the desired rectangular outline. To retain the stiffeners and the cloth strip 35 against the supporting surface, suitable anchors (not shown) may be provided or, in the case where the shelter is used outdoors in below-freezing weather as for ice fishing, snow or loose dirt may be piled against the strip particularly at the ends of the shelter.

When it is desired to collapse the shelter, the X-frame legs 21 and the U-frame legs 23 are swung inwardly about the pivots 22 as the links 29 are folded together about their pivots 30 as shown in FIG. 9. Such movement is facilitated due to the disconnection of the links from the cover strip 35. Also, the stiffeners 32 are swung upwardly about the pivotal connections 31 and inwardly against the X-frames. During this swinging and the inward swinging of the U-frames, the cover is tucked inwardly as shown in FIGS. 9 and 10. Either before or after the swinging of the U-frames and stiffeners, the pins 27 are retracted and the frame legs 23 are telescoped within the X-frame legs to their inner positions (FIGS. 7 and 10) in which they extend past the X-frame pivots. With all of the parts in their fully collapsed positions as shown in FIG. 10, they form an easy-to-carry package substantially smaller than the set-up shelter, the wide difference in size being made possible by the novel pivotal and telescoping arrangement of the parts.

I claim as my invention:

1. A collapsible shelter comprising, in combination, a pair of X-frames each formed of two straight tubes pivotally connected intermediate their ends and hollow throughout substantially their entire lengths, a pair of first U-shaped members each having parallel legs and a crosspiece connecting the legs, said legs telescoping within adjacent ends of said tubes and movable relative thereto between collapsed positions in which substantial portions of the legs are disposed within the tubes and extended positions in which the major portions of the legs are outside of the tubes, releasable means acting between said tubes and said legs to hold the latter in said extended positions, two sets of limiting means connecting the other ends of the tubes of the respective X-frames and swingable from straight positions in a common plane to collapsed positions between the tubes, a pair of second U-shaped members each having parallel legs and a crosspiece connecting the legs, said legs of said second members being pivotally connected at their outer ends to said other ends of said tubes and swingable between extended positions in said plane and collapsed positions adjacent said X-frames, a cover of translucent material and generally rectangular shape having top, side and end walls and an open bottom with the corners between said top and end walls receiving said crosspieces of said first U-shaped members and with said side and end walls and an open bottom with the corners between said top and end walls receiving said crosspieces of said first U-shaped members and with said side and end walls extending vertically between the top wall and said crosspieces and legs of said second U-shaped members when the latter lie flat against a horizontal surface and said limiting means and all of the members are in their extended positions, and means extending along the bottom edges of said side and end walls and defining a tubular attaching means receiving said second U-shaped members to attach the members and cover together while leaving the limiting means free to move independently of the cover.

2. A collapsible shelter comprising, in combination, a pair of X-frames each formed of two generally straight elements pivotally connected intermediate their ends, a pair of first U-shaped members each having parallel legs and a crosspiece connecting the legs, said legs telescoping with adjacent ends of said elements and movable relative thereto between collapsed positions in which substantial portions of the legs extend into the elements and extended positions in which the major portions of the legs project beyond the elements, releasable means acting between said elements and said legs to hold the latter in said extended positions, two sets of limiting means connecting the other ends of the elements of the respective X-frames and movable from straight positions in a common plane to collapsed position between the elements, a pair of second U-shaped members each having parallel legs and a crosspiece connecting the legs, said legs of said second members being pivotally connected at their outer ends to said other ends of said elements and swingable between extended positions in said plane and collapsed positions adjacent said X-frames, and a cover of translucent material and generally rectangular shape having top, side and end walls and an open bottom with the corners between said top and end walls receiving said crosspieces of said first U-shaped members and with said side and end

walls extending vertically between the top wall and said crosspieces and legs of said second U-shaped members when the latter lie flat against a horizontal surface and said limiting means and all of the members are in their extended positions.

3. A collapsible shelter comprising, in combination, a pair of X-frames each formed of two generally straight elements pivotally connected intermediate their ends, a pair of first U-shaped members each having laterally spaced legs, a crosspiece connecting the legs, said legs telescoping with adjacent ends of said elements and movable relative thereto between collapsed positions in which substantial portions of the legs extend into the elements and extended positions in which the major portions of the legs project beyond the elements, releasable means acting between said elements and said legs to hold the latter in said extended positions, a pair of second U-shaped members each having laterally spaced legs and a crosspiece connecting the legs, said legs of said second members being pivotally connected at their outer ends to said other ends of said elements and swingable between extended positions in a common plane and collapsed positions adjacent said X-frames, a cover of translucent material and generally rectangular shape having top, side and end walls and an open bottom with the corners between said top and end walls receiving said crosspieces of said first U-shaped members and with said side and end walls extending vertically between the top wall and said crosspieces and legs of said second U-shaped members when the latter lie flat against a horizontal surface and are in their extended positions, and means securing the bottom edges of said side and end walls to said second U-shaped members.

4. In a collapsible shelter, the combination of a pair of X-frames each formed of two straight tubes pivotally connected intermediate their ends and hollow throughout substantially their entire lengths, a pair of first U-shaped members each having laterally spaced legs and a crosspiece connecting the legs, said legs telescoping within adjacent ends of said tubes and movable relative thereto between collapsed positions in which substantial portions

of the legs extend into the tubes and extended positions in which the major portions of the legs are outside of the tubes, releasable means acting between said tubes and said legs to hold the latter in said extended positions, two sets of limiting means connecting the other ends of the tubes of the respective X-frames and movable from straight positions to collapsed positions adjacent each other between the tubes, a pair of second U-shaped members each having laterally spaced legs and a crosspiece connecting the legs, said legs of said second members being pivotally connected at their outer ends to said other ends of said tubes and swingable between extended positions in a common plane with said limiting means and collapsed positions adjacent said X-frames.

5. In a collapsible shelter, the combination of, a pair of X-frames each formed of two generally straight elements pivotally connected intermediate their ends, a pair of first U-shaped members each having laterally spaced legs and a crosspiece connecting the legs, said legs telescoping with adjacent ends of said elements and movable relative thereto between collapsed positions in which substantial portions of the legs are within the elements and extended positions in which the major portions of the legs are outside of the elements, releasable means acting between said elements and said legs to hold the latter in said etxended positions, and a pair of second U-shaped members each having laterally spaced legs and a crosspiece connecting the legs, said legs of said second members being pivotally connected at their outer ends to said other ends of said elements and swingable between extended positions in a common plane and collapsed positions adjacent said X-frames.

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