

June 24, 1958

E. P. D'AZZO

2,840,400

CLAMPING STRUCTURE FOR TUBULAR BARS

Filed Nov. 28, 1952

3 Sheets-Sheet 1

Fig. 1-

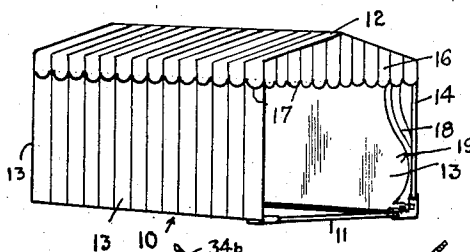


Fig. 2-

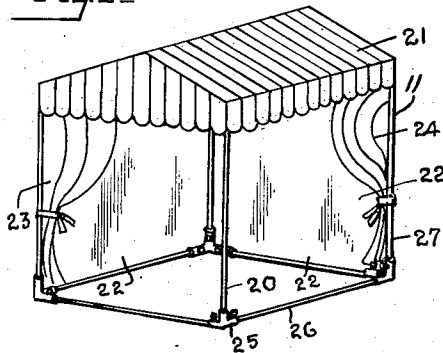


Fig. 3A-

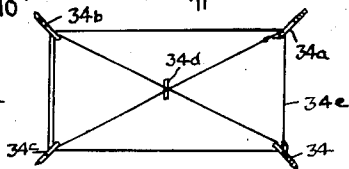
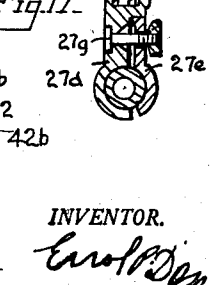
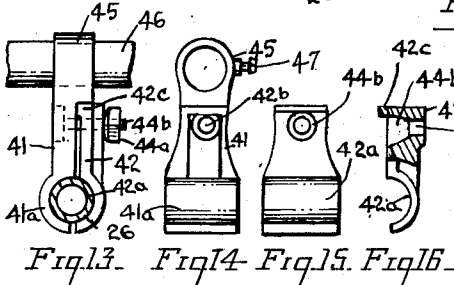
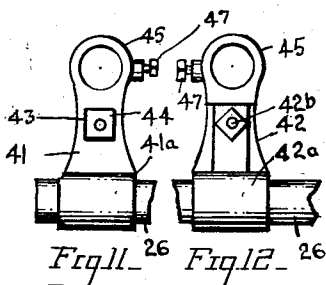
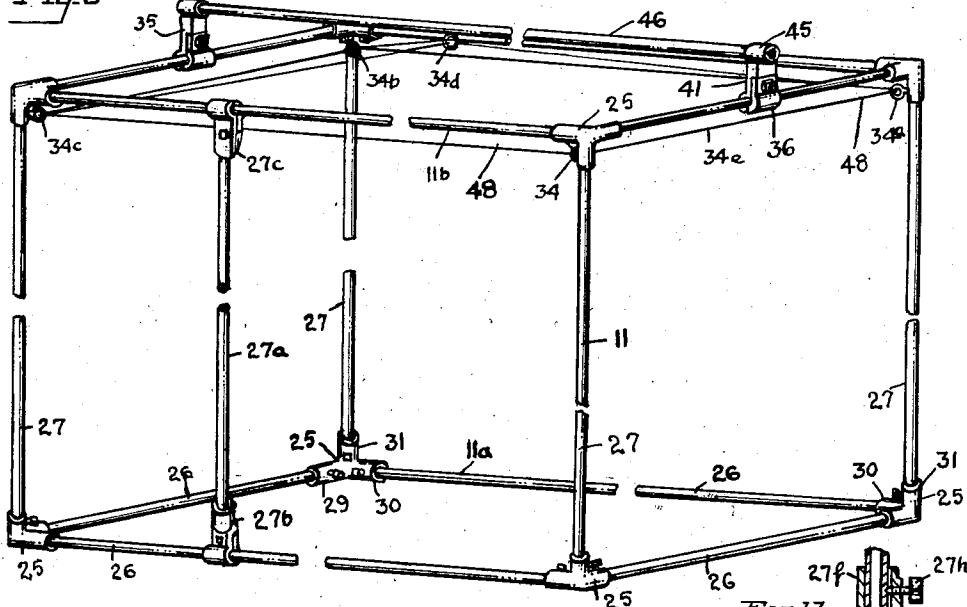


Fig. 3



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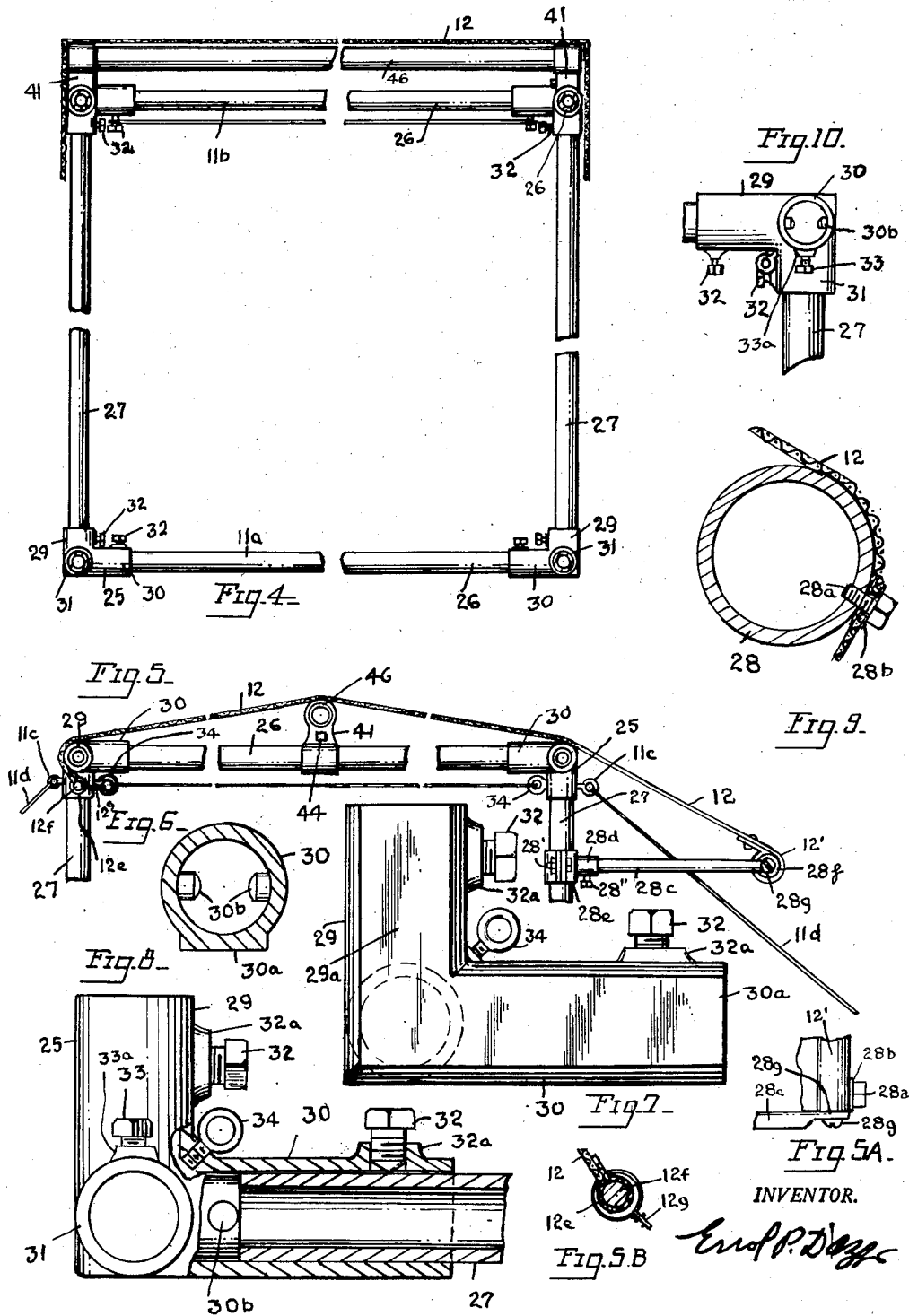
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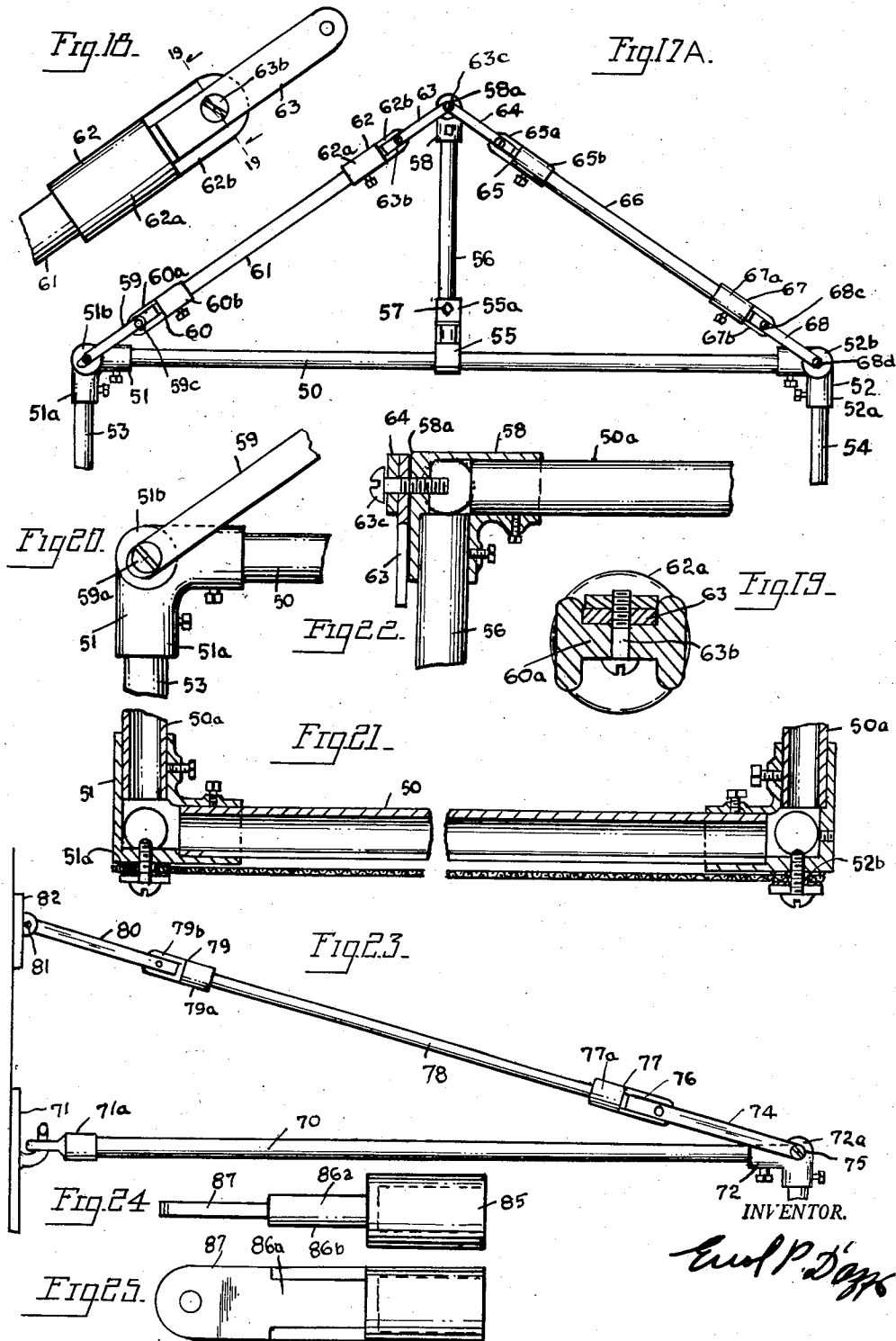
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CLAMPING STRUCTURE FOR TUBULAR BARS

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CLAMPING STRUCTURE FOR TUBULAR BARS

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Application November 28, 1952, Serial No. 323,027

5 Claims. (Cl. 287—55)

This invention relates to an outdoor shelter which can be erected in a short time by an inexperienced person, which will provide protection from the rain or sun, which can serve as a play or rest center in the open air, and which can safely protect occupants of the shelter against insects in localities infested by them.

One of the objects of the invention is to provide a portable shelter which is constructed from tubular elbow fittings and pipe sections, secured to each other for ready detachment and knockdown packing or transportation in an automobile or power or row boat, and a covering of fabric, which can be readily placed in position over the frame of the shelter.

A further object of the invention is the provision of a shelter having a frame constructed from special elbow fittings and upright and horizontal members fitted into and secured to the elbow fittings, an elevated roof support, and a top covering which is stretched over the elevated roof support and secured under tension to the corner fittings of the frame.

A further object of the invention is the provision of a frame for a portable knockdown shelter, with a roof fabric covering, and a wall covering, which is supported interiorly of the vertical frame bars within a decorative border skirt of the roof fabric covering, to impart a pitched roof effect to the completed shelter.

Another object of the invention is the provision of a shelter frame with an elevated roof bar which is extended forwardly at one end, and an auxiliary frame carried by the upper part of the shelter frame which projects forwardly to support an outside drapery or entrance guarding curtain, to exclude insects from the interior of the shelter.

A still further object of the invention is an elbow fitting which has a flat seat on one side thereof, to rest evenly on the ground, and which is provided with an interior stop or stops projecting inwardly from the wall thereof, to receive the end thrust of a pipe frame bar inserted in the elbow.

A still further object of the invention is to provide a support for the overhead roof bar, which has a split lower end and a screw tightened clamp to grip a horizontal frame bar of the shelter, and a tubular socket on its upper end through which the roof bar may be extended and secured in place.

With the above and other objects in view the invention comprises certain new and useful constructions, combinations and arrangements of parts, clearly described in the following specifications, and fully illustrated in the drawings, in which:

Fig. 1 is an isometric view showing the shelter arranged to house an automobile, with one of the end curtains in open position.

Fig. 2 is a similar view showing the shelter arranged for beach or lawn service, with two sides of the shelter open.

Fig. 3 is an isometric view of the frame, before the

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covering fabric has been applied thereto, certain parts being broken away, also showing an auxiliary intermediate vertical bar and end clamps for coupling the same to opposite horizontal bars.

Fig. 3A is a diagrammatic view showing how the tension cord or cable, or wire, is connected to the corners of the frame and across the central part thereof.

Fig. 4 is a vertical sectional view through the frame, showing the roof fabric in place on the overhead bar.

Fig. 5 is a cross sectional view through the frame, broken away, showing the roof elevating bar and the entrance awning bar and extension for the roof fabric.

Fig. 5A is a plan view of a corner of the roof extension.

Fig. 5B shows in cross section means for securing the roof fabric to a reinforcement rod.

Fig. 6 is a detail cross sectional view through an elbow showing internal pipe bar stops therein.

Fig. 7 is a bottom plan view of an elbow, showing the flat bottom seats thereof.

Fig. 8 is a top plan view thereof, partly in section.

Fig. 9 is a detail sectional view showing a grommet eyelet connection between the roof fabric and a bar.

Fig. 10 is a detail side view of a top elbow.

Fig. 11 is a side view of a clamp, on a reduced scale.

Fig. 12 is a view of the opposite side thereof.

Fig. 13 is an edge view thereof.

Fig. 14 is a view of the inside of a clamp member.

Fig. 15 is a similar view of the other member.

Fig. 16 is an edge view of the latter, partly in section.

Fig. 17 is a detail longitudinal sectional view of another clamp member.

Fig. 17A shows a roof structure for the shelter.

Fig. 18 shows a tie bar structure.

Fig. 19 is a sectional view taken on lines 19—19 of Fig. 18.

Figs. 20 and 22 are side and end views respectively of a corner of the roof structure.

Fig. 21 shows a brace bar and means for attaching a roof fabric thereto.

Fig. 23 shows a modified roof structure for a shelter. Figs. 24, 25 show side and plan views of a tie bar.

Referring to the accompanying drawings, which illustrate the practical embodiment of the invention, 10 designates a shelter or carport, for housing an automobile or the like, which includes a pipe bar frame 11, the roof fabric covering 12, which is tailored to fit the top of the frame, and the pendant side wall curtains 13. The roof fabric 12 is provided with pendant scalloped drapes 17, which enclose the upper edges of the pendant curtains 13. In Fig. 1 this carport shelter is shown with an open front end, which is protected by means of a pendant collapsible curtain 18, slidably mounted at its upper edge, and held in collapsed condition by the stay or strap 19, tied to the adjacent frame post 14.

In Fig. 2 I show the application of the invention for a personal shelter, which includes a pipe frame 11, the tailored roof fabric 21, the pendant fabric side walls 22, and the collapsible pendant curtains 23 and 24. In this case two sides of the shelter are shown to be open, and one or both of these sides may be closed by sliding the curtain or curtains 23 and 24 to closed position. This type of shelter provides a safe enclosure for persons changing clothes, or to partly or wholly expose their bodies to the sun or open air.

The shelter frame comprises a base frame 11a and a top frame 11b, and vertical posts 27 connecting the base and top frames to each other.

The base frame and the top frame is made up of corner elbows 25 and horizontal pipe bars 26. Each corner elbow includes horizontal hollow legs 29 and 30, and a vertical hollow leg 31, disposed at right angles

to the legs 29 and 30, the latter also being disposed at right angles to each other. The horizontal legs 29 and 30 are each provided with an external boss 32a which is pierced by a set screw 32 threaded through it to engage the pipe bar enclosed by the leg. The vertical leg 31 is provided with a similar external boss 33a through which the set screw 33 is threaded to engage the vertical post end enclosed by the leg. A screw eye 34 is threaded into the leg at the meeting zone of the horizontal legs 29 and 30. The leg 30 is formed with opposed internal stops 30b, designed to limit the enclosed end of the horizontal bar or pipe 26, as shown in Fig. 8, while permitting free telescopic adjustment outwardly of the stops.

The bottom side of the horizontal leg 29 is formed with a flat longitudinal seat 29a and the bottom side of the leg 30 is formed with a flat longitudinal seat 30a, both seats being disposed in a common horizontal plane, when the elbow is seated on a flat pavement or other horizontal surface.

The opposite elbows 25 are connected by inserting the ends of the horizontal pipe bars 26 in the horizontal elbow legs 29 and 30, and tightening the set screws 32 against these inserted pipe bar ends. Due to the internal stops 30b the two enclosed bar ends cannot interfere with each other within the elbow, nor develop a crushing thrust against each other, or against the walls of the elbow. The bottom frame 11a is connected with the top frame 11b by means of the vertical pipe posts or bars 27, which are inserted in the vertical legs 31, and the screws 33 tightened against the inserted ends of the corner posts. A limited telescopic adjustment is permitted between each horizontal bar and each post and the elbows engaged thereby, which may be used to compensate for differences in lengths or other errors or irregularities.

To provide a tilted roof construction, opposing vertical clamps 35 are mounted on opposite horizontal bars 26 of the top frame 11b. Each clamp includes a vertical post or shank 41, having an integral C-shaped clamping jaw 41a on its lower end, and a detachable clamping member 42, having an integral C-shaped clamping jaw 42a on its lower end. The shank 41 is formed with a socket 43 in its outer side which snugly receives the squared head of the bolt 44, and is provided with a recess or clearance 41c around the bolt hole, to allow a differential movement of the shank on the bolt. The detachable jaw member 42 is formed with an integral fulcrum 42c on its inner side and with a wide clearance 42d, around the bolt hole 42b, to allow tilting of the jaw member on the bolt. A nut 44a, having a rounded inner side, is threaded on the bolt 44, so that the rounded inner side will rock on the outer side of the jaw member 42, and allow the jaw member to adjust itself to any irregularities in the surface of the horizontal pipe bar 26 clamped between the jaws 41a and 42a.

The shank 41 is formed with an integral circular socket 45, to receive the horizontal roof bar 46, and is provided with a set screw 47, threaded through the socket 45 to clamp the roof bar 46 thereto. The length of the shank 41 determines the elevation of the roof bar 46 over the top of the frame. This bar is supported midway of the top frame, or in any other position found useful.

A flexible member 48, which may be a cord, rope, cable or wire, is secured to one corner screw eye 34, then extended to and through the screw eye 34a, as shown in Fig. 3A, then extended through the screw eye 34b, then extended through the screw eye 34c, all arranged in a common horizontal plane of the top frame, and then extended again through the screw eye 34, and is then extended diagonally through the screw eye 34d, attached to the overhead bar 46, between its ends, and is then passed through the corner eye 34b, then through the corner screw eye 34c, and again through the overhead screw eye 34d, and is then secured to the corner screw eye 34a. In this way a flexible truss connection is established between all corners of the top frame, and hori-

zontal curtain supports 34e are provided under all of the top cross or horizontal bars 26.

On the horizontal curtain supporting wires or members 34e, the wall curtains 13 and 22 may be suspended, by tubular edging, or by hooks, in the usual manner. The horizontal curtain supports 34e are also provided with connections which support the same inside of the posts 27, and thereby position the suspended curtains 13 and 22 within the frame.

Referring now to Figs. 5, 5A, 5B, one end of the flexible roof fabric 12 is provided with a metal stiffening bar or rod 12f which is enclosed by the tubular edging 12e formed on the fabric 12, and a tension wire 12g is placed around this shielded rod 12f and is connected to the adjacent screw eyes. The other end of the fabric 12 is also provided with a tubular edging 12', which encloses the horizontal rod or bar 28f. To each end of this bar an eye 28f formed on the brace bar 28c is connected by means of the screw 28g, as shown in Fig. 5A. The fabric end 12' is provided with one or more grommets 28b, and a screw 28a is threaded through each grommet into the bar 28f, thereby holding the fabric under tension and preventing the fabric from gathering or shifting horizontally on the bar 28f.

The inner end of the brace bar 28c is secured to the post 27 by means of a split clamp, which includes the socket 28d, formed integral with the clamp jaw 28e. This clamp jaw is secured to the clamp jaw 28m by means of the bolts or screws 28'. The end of the brace bar or pipe 28c is secured in the socket 28d by means of the set screw 28''.

Each corner elbow of the upper pipe frame is provided with an external screw eye 11c, to which a stay wire 11d is connected, and the outer end of this stay wire is secured to a ground stake or fixed support, well outward of the shelter.

When the frame is made large enough to require it an auxiliary post 27a may be used as shown in Fig. 3. The lower end of this post is secured in place by means of the fitting 27b, to the horizontal bar 26, and the upper end is secured in place by means of the fitting 27c to the top horizontal frame bar. Each fitting includes a vertical post socket 27d and a split clamp 27e as shown in Fig. 17, to engage the horizontal frame bar. The members of the split clamp are secured to the horizontal frame bar by means of the bolt or set screw 27g. Set screw 27h secured the vertical post in recess 27f of the fitting.

Referring to Figs. 17A to 25 inclusive, 50 designates a horizontal cross bar for a shelter frame having its opposite ends clamped or secured in the corner elbows 51 and 52. The elbow 51 is provided with a vertical leg 51a which receives the upright bar or pipe 53, and the elbow 52 is provided with a vertical leg 52a which receives the upright bar or pipe 54. Midway of the ends of the horizontal bar or pipe 50 a clamp fitting 55 is secured, and this fitting is constructed with a socket end 55a which receives the upright pipe or post 56, which is secured in place by the set screw 57, threaded in the socket 55a. On the upper end of the post 56 an elbow 58 is secured, and this elbow is formed with a flat end seat 58a. The elbow 51 is formed with a flat end seat 51b and the elbow 52 is formed with a flat end seat 52b. The three elbow seats 51b, 52b and 58a may be and are normally disposed in a common vertical plane.

The length of the intermediate lift bar or support 56 governs the height of the peak of the shelter. To the elbow 51 a flat tie bar 59 is secured by means of the screw 59a, which is threaded into the elbow to hold the end of the tie bar 59 against the flat seat 51b of the elbow 51. The upper end of the tie bar 59 is received by the channel shaped lower end 60a of the coupling or fitting 60, the upper end of which is formed with an integral socket 60b which receives the pipe section 61. The upper end of the pipe section 61 is received by the socket 62a of the fitting or coupling 62, and this fitting

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or coupling is formed with a channel end 62b which receives the tie bar 63. The tie bar 59 is secured by the screw or bolt 59c to the channel end 60a, and the tie bar 63 is secured by a screw or bolt 63b to the channel end 62b. The upper end of the tie bar 63 is secured by the screw 63c to the elbow 58 against the seat 58a thereof. Another tie bar 64 is disposed against the tie bar 63 and held in place by the same screw 63c, which extends through said tie bar 64. To the lower end of the tie bar 64 the channel end 65a of the fitting or coupling 65 is secured by the screw or bolt 65b. The fitting or coupling 65 is formed with a socket 65b which receives the pipe section 66, and the lower end of the pipe section 66 is received by the socket 67a of the fitting or coupling 67, the lower end of which is formed with a channel end 67b, which receives the upper end of the tie bar 68, which is secured in place by means of the screw or bolt 68c. The lower end of the tie bar 68 is secured by the screw 68d against the flat end seat of the elbow 52.

In this way each end of the frame of the shelter is provided with oppositely pitched supports for the cover, made of parts so constructed that the length of the support may be governed by the length of the pipe section, which may be cut to size at the job location, so that perfect tailored awning fitting or shelter construction may be provided.

The tie bar in each case is snugly received in the channel of the engaged fitting or coupling, so that there is a rigid connection between the tie bar and the coupling, when the connecting screw or bolt is tightened. The height of the pitched roof of the shelter is also determined by the length of the vertical pipe sections at each end of the shelter, which may be cut at the location.

The couplings or fitting may be standard in length so that from stock sizes of pipe or bars any roof for any shelter of the type disclosed may be readily constructed.

In Fig. 23 I show the use of the invention for bracing a canopy or awning frame, and in this view 70 designates a cross bar which is supported at one end by the hook bracket 71, and connected at its outer end by means of the elbow 72 with a horizontal frame bar. The elbow is formed with a flat seat 72a which is engaged by the tie bar 74, which is secured in place by the screw 75, which is threaded into the elbow 72 through the flat seat 72a. The upper end of the tie bar is secured in the channel end 76 of the coupling 77 by the screw 74a, and the fitting or coupling 77 is provided with an integral socket 77a which receives the lower end of the pipe bar section 78, the upper end of the pipe bar section being secured to the socket 79a of the coupling 79, which is formed with a channel end 79b which receives the lower end of the tie bar 80, which is connected in place by means of the screw 81. The upper end of the tie bar 80 is held in place on the wall bracket 82. The intermediate pipe bar section 78 may be cut to provide for the pitch of the canopy or awning required for any particular job, at the site of the job. This construction provides for a direct axial connection with the front horizontal bar of the canopy or awning, which is variable to meet any service or job conditions.

All frames of the type shown are employed in connection with fabric covering or awning material, which is placed over the frames. The ends of this fabric covering or awning has a marked tendency to slide on any horizontal bar over which it is looped or otherwise connected. To prevent this I provide a grommet on each end of the fabric covering or awning material, as shown in Fig. 21 of sheet 3, and extend the tie bar screws of the upper corner elbows through the tie bar ends and the grommet and then thread the screw into the elbow, so as to clamp the tie bar ends and the grommet against the flat external seat or side face of the elbow. In this way the fabric is held under tension on the cross bar 50, or against it, and it cannot shift longitudinally, so as to open rain drip spaces at the edges of the covering. By holding the

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fabric covering or awning under tension the covering is held taut and the rain will drip or drain better than if the covering is allowed to buckle, and the protection afforded by the covering is at its maximum.

This connection applies to the take down shelter and to any other equivalent use of the fittings and combined units shown.

Having described the invention I claim as patentably new:

1. In a shelter structure, the combination comprising a pair of spaced bars, a clamp connecting said bars together, said clamp being disposed at one end of one of the bars and at an intermediate portion of the other of said bars; said clamp including two separable complementary parts each having an integral C-shaped portion at one end, said portions forming a clamping means when said parts are secured together, said intermediate portion of said other bar being disposed between said C-shaped portions, a bolt and nut securing the parts together, one of said parts having a shank formed with a recess at one side and receiving the head of said bolt therein, said recess communicating with an oversize bolt hole extending through the shank to the other side thereof to allow an adjustable movement of the bolt in the hole, the other of said parts being formed with a fulcrum extension on its other end and having an oversize bolt hole at an intermediate portion thereof and extending therethrough so that said other part can tilt on the bolt, said nut having a rounded inner side to allow said other part to adjust to irregularities in said other bar, said one part having an integrally formed cylindrical socket at its other end receiving one end of said one bar.

2. In a shelter structure, the combination comprising a pair of spaced bars, a clamp connecting said bars together, said clamp being disposed at one end of one of the bars and at an intermediate portion of the other of said bars; said clamp including two separable complementary parts each having an integral C-shaped portion at one end, said portions forming a clamping means when the parts are secured together, said intermediate portion of said other bar being disposed between said C-shaped portions, a bolt and nut securing the parts together, one of said parts having a shank formed with a recess at one side and receiving the head of said bolt therein, said recess communicating with an oversize bolt hole extending through the shank to the other side thereof to allow an adjustable movement of the bolt in the hole, the other of said parts being formed with a fulcrum extension on its other end and having an oversize bolt hole at an intermediate portion thereof and extending therethrough so that said other part can tilt on the bolt, said nut having a rounded inner side to allow said other part to adjust to irregularities in said other bar, said one part having an integrally formed cylindrical socket at its other end receiving one end of said one bar, said socket having its axis disposed perpendicular to the sides of the shank so that the bars are secured together perpendicular to each other in coplanar relationship.

3. In a shelter structure, the combination comprising a pair of spaced bars, a clamp connecting said bars together, said clamp being disposed at one end of one of the bars and at an intermediate portion of the other of said bars; said clamp including two separable complementary parts each having an integral C-shaped portion at one end, said portions forming a clamping means when the parts are secured together, said intermediate portion of said other bar being disposed between said C-shaped portions, a bolt and nut securing the parts together, one of said parts having a shank formed with a recess at one side and receiving the head of said bolt therein, said recess communicating with an oversize bolt hole extending through the shank to the other side thereof to allow an adjustable movement of the bolt in the hole, the other of said parts being formed with a fulcrum extension on

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its other end and having an oversize bolt hole at an intermediate portion thereof and extending therethrough so that said other part can tilt on the bolt, said nut having a rounded inner side to allow said other part to adjust to irregularities in said other bar, said one part having an integrally formed cylindrical socket at its other end receiving one end of said one bar, said socket having its axis extending parallel to the sides of the shank so that the bars are secured together perpendicular to each other in spaced planes.

4. In a shelter structure having a pair of spaced bars, a clamp for connecting said bars together, said clamp being adapted to secure one end of one of the bars to an intermediate portion of the other of said bars; said clamp including two separable complementary parts each having an integral C-shaped portion at one end and portions forming a means for clamping said intermediate portion of said other bar, a bolt and nut securing the parts together, one of said parts having a shank formed with a recess at one side and receiving the head of said bolt therein, said recess communicating with an oversize bolt hole extending through the shank to the other side thereof to allow an adjustable movement of the bolt in the hole, the other of said parts being formed with a fulcrum extension on its other end and having an oversize bolt hole at an intermediate portion thereof and extending therethrough so that said other part can tilt on the bolt, said nut having a rounded inner side to allow said other part to adjust to irregularities in said other bar, said one part having an integrally formed cylindrical socket at its other end for receiving one end of said one bar.

5. A clamp structure for connecting a pair of spaced bars, comprising two separable complementary parts each having an integral C-shaped portion at one end, said

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portions forming a clamping means for one of said bars, a bolt and nut securing the parts together, one of said parts having a shank formed with a recess at one side and receiving the head of said bolt therein, said recess communicating with an oversize bolt hole extending through the shank to the other side thereof to allow an adjustable movement of the bolt in the hole, the other of said parts being formed with a fulcrum extension on its other end and having an oversize bolt hole at an intermediate portion thereof and extending therethrough so that said other part can tilt on the bolt, said nut having a rounded inner side to allow said other part to adjust to irregularities in said one bar, said one part having an integrally formed cylindrical socket at its other end for receiving one end of the other of said bars.

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