This invention relates to a folding or collapsible tent frame.

A primary object of the invention is to provide a tent frame composed of a plurality of sets of members wherein the members of each set are hinged together so that they may assume collapsed positions in side by side relationship or expanded positions in spaced relation to each other except at their hinge connections to each other. In this manner, when the members of the various tent sets are in collapsed position they will occupy a minimum amount of space for storage purposes and for transportation purposes and as they are hinged together the members of the various sets are not apt to become lost or misplaced. On arriving at the site where the tent is to be erected the various sets of members may be expanded and the sets mutually connected together in such a manner as to form a rigid tent frame over which a fabric canopy may be positioned.

The improved construction is made up of different sets of members some of which may be optionally used to form an arch-type tent frame or an arch-type tent frame having half-dome ends. The portions of the tent frame which form the half-dome ends are capable of being mutually assembled together without an intervening arch-type tent frame and when so assembled the half-dome end frames mutually cooperate to form a dome-shaped tent frame over which a dome-shaped canopy may be positioned.

Another object of the invention is to provide a tent frame in which the elements used to effect a detachable connection between the parts are of relatively simple and durable construction and which will enable the elements of the tent frame, when assembled, to be rigidly connected together. The detachable connections are so designed that parts thereof can be permanently attached to the members of the tent frame on which they are mounted so that they likewise are not apt to become lost or misplaced.

With the foregoing and other objects in view, which will be made manifest in the following detailed description and specifically pointed out in the appended claims, reference is had to the accompanying drawings for an illustrative embodiment of the invention, wherein:

Figure 1 is a view in side elevation of one form of tent frame which may be erected by means of the construction embodying the present invention, the form illustrated in this figure being that of an arch-type tent;

Fig. 2 is a view in side elevation of another or dome-shaped tent that may be erected from the members embodying the present invention;

Fig. 3 is a view in side elevation illustrating still a third type of tent that may be erected from the elements of the frame embodying the present invention, the form illustrated consisting of an arch-type center and half-dome type ends;

Fig. 4 is a top plan view of a portion of a tent frame that has been erected to form an arch-type tent and illustrating in dotted lines the manner in which sets of members may be collapsed;

Fig. 5 is a perspective view of the tent frame illustrated in Fig. 4;

Fig. 6 is a perspective view of one of the sets of members that form the improved tent frame in fully collapsed position;

Fig. 7 is a perspective view of one of the sets of members in its expanded position;

Fig. 8 is a perspective view of one of the half-dome shaped end frames in fully set up position;

Fig. 9 is a perspective view of the lower set of members used to form a half-dome shaped tent frame;

Fig. 10 is a perspective view illustrating the members shown in Fig. 9 in fully collapsed position;

Fig. 11 is a top plan view of two half-dome shaped tent frames mutually assembled together to form a dome-shaped tent;

Fig. 12 is a detail of a typical connection used between the lowermost and intermediate sets of members and between the intermediate and uppermost sets of members that are used to form an arch-type tent frame. This detail is of the construction indicated within the circle labeled 12 on Fig. 4;

Fig. 13 is a sectional view taken substantially upon the line 13—13 upon Fig. 12;

Fig. 14 is a detail of the connection between the endmost members of the intermediate and the topmost members and the end members of the arch-type tent frame. This detail is of that portion enclosed within the circle 14 shown in Fig. 4;

Fig. 15 is a detail of the connection between the divided portions of the end members of the arch-type tent frame and may be regarded as typical of the connection enclosed within the circle 15 shown in Fig. 4;

Fig. 16 is a view taken substantially upon the line 16—16 upon Fig. 15;

Fig. 17 is a detail of the connection between opposed topmost sets of members used to form an arch-type tent frame and may be regarded as a detail of what is enclosed within the circle 17 upon Fig. 4;

Fig. 18 is a sectional view taken substantially upon the line 18—18 upon Fig. 17;

Fig. 19 is a detail of the construction used within the circle 19 upon Fig. 4;

Fig. 20 is a detail of the construction employed between the lower ends of the members of the lowermost sets and may be regarded as a detail of what is enclosed within the circle 20 upon Fig. 4;

Fig. 21 is a view taken upon the line 21—21 upon Fig. 20;

Fig. 22 is a detail of the construction employed within the circle 22 upon Fig. 11;

Fig. 23 is a detail of the construction employed within the circle 23 upon Fig. 11; and

Fig. 24 is a detail of the construction employed within the circle 24 upon Fig. 11.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, and particularly to Figs. 4 and 5, the portion of the tent frame that may be utilized to form an arch-type tent consists of two opposed sets of lower arcuate members, generally indicated at 10 and 11. These sets are substantial duplicates of each other and for this reason the detail description will be largely directed to the set 10. This set is shown as consisting of arcuate members 12, 13, 14, 15, 16, and 17. They are hinged together at their tops and bottoms, such as by hinges 18, see Figs. 5 and 12, and hinges 19, see Fig. 20. The hinges 18 and 19 are preferably, but not necessarily, so arranged that their axes are parallel to each other so that the members may assume either an expanded position as shown in Fig. 5 or a collapsed position in side by side relationship. On the outer sides of some or all of these members of the lower set there may be hooks 20 adapted to be hooked beneath pivoted rings or balls 21 that are
The connections between the upper ends of the members of the intermediate sets and the lower ends of the members of the topmost sets are the same, as above described, and as illustrated in Figs. 12 and 13, so that the topmost sets of members are likewise detachably connected to the upper ends of the intermediate set of members adjacent their hinged connections to each other.

The upper ends of the topmost sets are mutually connected to each other as is illustrated in Figs. 17 and 18. This connection consists merely of providing the upper ends of the topmost sets of members with knuckles 52 and 53. These knuckles may be caused to interfit with each other and to register with each other and are designed to receive a headed pin 54 that may be permanently attached with one of the upper sets of members, such as by a chain 55, to prevent the pin from becoming misplaced or lost.

By the construction above described, it will be appreciated that it is possible to assemble the main elements of the tent frame 10 with 24, 11 with 25, 24 with 34, and 25 with 35 while these elements are in collapsed position. This is accomplished by dropping pins 46 into slots 44 while the elements are collapsed. After they have been mutually assembled with each other, as above outlined, these members may be expanded and the upper ends of the topmost sets may be mutually connected to each other by the application of the headed pins 54.

In association with the sets of members previously described there are end members, generally indicated at 86, 87, 88, and 89. The end members are divided into sections, one point of division being indicated at 60 which is opposite the upper ends of the members of the lower sets. At this connection the sections of the end members are rebated and are overlapped as indicated by the portions 61 and 62, see Fig. 15. The portion 61 has a centering stud 63 mounted thereon which is receivable within an aperture 64 in the portion 62. This centering stud is flanked on both sides with rotary pins 65 and 66 carrying eccentrically arranged discs 67 and 68. These discs may be equipped with handles 69 by which they may be rotated.

In the portion 62 there are openings 70 and 71 which are so arranged as to permit the discs 67 and 68, respectively, together with their handles 69 to be passed therethrough when the discs have been rotated into positions in alignment therewith. After the discs have been passed through the openings 70 and 71 they may be turned into the position shown at the left-hand side of Fig. 16. This will tend to repositioning of the portion 61 and thus lock the overlapped ends of portions 61 and 62 together. This type of lock not only locks the sections of the end members against separating in tension but also serves to rigidly lock these sections against bending moments. Above the joints at 60 the end members are also divided at 72, a detail of which is illustrated in Fig. 14. The sections 74 and 73 have the endmost members of the intermediate sets and topmost sets of arcuate members hingedly connected thereto, respectively, as by hinges 75 and 76 so that these portions of the end members are permanently associated with the intermediate sets and topmost sets, respectively. The sections 73 and 74 are locked together by equipping the ends of the sections with interfitting knuckles through which a headed pin 77 is receivable. This pin is preferably attached to a member such as by a chain 78 so that it cannot become lost or misplaced. The upper ends of the section 73 may be mutually connected together by equipping them with arcuate knuckles and a headed pin similar to the headed pin 77. The lowermost portions of the end members indicated at 79 are hingedly connected such as by hinges 80 to the endmost members of the lower set so that these portions of the end members are permanently associated with the lower set.

It will be thus appreciated that the end members, in effect, operate somewhat as tension and compression members between the lower ends of the members of the lower

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sets and the upper ends of the members of the Intermediate sets. Also, as the sections 73 on opposite sides of the arch are mutually connected by them may function as tension and compression members between the lower ends of the opposed topmost sets. These members therefore cooperate with the members of the various sets to form a rigid arch-type frame over which a canvas or fabric canopy 81 may be drawn.

When it is desired to move the tent from place to place the canopy may be removed, the various sets of members disconnected from each other and collapsed into side by side relationship somewhat as is indicated in dotted lines on Fig. 4. The various set of members in this condition can be stored or conveniently transported from place to place, reassembled, and the canopy restored to its position therefore.

The above described construction provides a tent frame having open ends which may be merely closed by tent flaps arranged on the ends of the canopy 81. However, if it is desired to equip the tent frame with half-dome shaped ends additional frame elements may be utilized such as are depicted in Figs. 8, 9, and 10. In these figures there are illustrated a set of lower elements 82, 83, 85, 86, 87, 88, 89, and 90 arranged in three groups around a half circle, see Fig. 11. These elements are arcuately shaped and may or may not be provided at their lower ends with hooks 91 similar to the hooks 20 and used for the same purpose. The lower ends of certain of these elements are hingedly connected together such as by hinges 92 similar to the hinges 19 enabling the elements to be collapsed together into the position shown in Fig. 10 or expanded into the position shown in Fig. 9. The elements that are hingedly connected together at their lower ends are 84 and 85 and 87 and 88. The intervening elements 83, 86, and 89 have detached or unconnected lower ends. Adjacent the upper ends of these elements there are hinges, a detail of which is illustrated in Fig. 23, wherein members 85, 86, and 87 are hingedly connected together such as by hinges 93 and 94. In this manner, all of the members 82 to 90, inclusive, are permanently associated with each other, and by reason of the hinges 92, 93, and 94, they may assume either a collapsed or expanded position.

An upper set of members is also provided to complete the upper portion of the half-dome frame consisting of radial members 95, 96, and 97. Between the members 95 and 96 there is a collapsible brace 98 and between the members 96 and 97 there is a similar collapsible brace 99. These braces are centrally divided and are hingedly connected together such as by hinges, see Fig. 22. These hinges are located on the outer sides of the braces and on the inner sides thereof there are arranged alignable knuckles through which a removable pin 101 is receivable to lock the braces in their expanded or extended position. The removable pin 101 is preferably permanently attached to the brace, such as by chain 102. On removal of the pin 101 the sections of the brace may fold relatively to each other as indicated by the dotted lines of Fig. 22, and the braces consequently can be collapsed inwardly while the radial members 95, 96, and 97 are collapsing towards each other. The upper ends of the radial members 95, 96, and 97 are hingedly connected to each other such as by hinges 103 and 104. At the lower ends of the radial members 95, 96, and 97 there are headed pins 105 similar in arrangement and construction to the headed pins 46. These are receivable in dovetailed slots 106 similar in formation to the slots 44. The headed pins are releasably retained in these slots by leaf spring detents 107 similar to the detent 47.

From the lower ends of the radial members 95 and 97 there extend half-brace sections 108 and 109. These are hingedly connected to the lower ends of these radial members and have at their outer ends knuckles on the inner sides and outer sides thereof through which removable pins similar to the pins 101 are receivable. Comple-
lower hinge connections between the members of the top-most sets to the upper hinge connections of their respective intermediate sets, means detachably connecting the members of each set together so that the members of each set may assume positions in side by side relationship or expanded positions in spaced relation except adjacent their hinge connections to each other, means detachably connecting the lower hinge connections of the members of the intermediate sets to the upper hinge connections of the members of the topmost sets to each other, and end members connecting the lower ends of the endmost members of the lower sets to the connected ends between the endmost members of the intermediate and topmost sets.

3. A collapsible tent frame comprising opposed sets of lower, intermediate, and topmost members, means hingedly connecting the members of each set together so that the members of each set may assume positions in side by side relationship or expanded positions in spaced relation except adjacent their hinge connections to each other, means detachably connecting the lower hinge connections of the members of the intermediate sets to the upper hinge connections of the members of the topmost sets to each other, and end members connecting the lower ends of the endmost members of the lower sets to the connected ends between the endmost members of the intermediate and topmost sets, said end members being divided opposite the connections between the lowermost and intermediate sets and being detachably secured together.

4. A collapsible tent frame comprising opposed sets of lower, intermediate, and topmost members, means hingedly connecting the members of each set together so that the members of each set may assume positions in side by side relationship or expanded positions in spaced relation except adjacent their hinge connections to each other, means detachably connecting the lower hinge connections of the members of the intermediate sets to the upper hinge connections of the members of the topmost sets to each other, and end members connecting the lower ends of the endmost members of the lower sets to the connected ends between the endmost members of the intermediate and topmost sets, and connecting the endmost connections between the intermediate and topmost sets to each other.

5. A collapsible tent frame comprising two half-dome type tent frames, each of said tent frames being collapsible, means detachably connecting the half-dome tent frames to each other so as to form a dome-type tent frame, each of said half-dome type tent frames comprising a lower set of arcuate members hingedly connected together so as to be capable of assuming positions in side by side relationship or spaced positions, and an upper set of arcuate members hingedly connected together to assume collapsed positions in side by side relationship or spaced positions with respect to each other, and means for detachably connecting the lower ends of the members of the upper set to the upper ends of the members of the lower set.

6. A collapsible tent frame comprising two half-dome type tent frames, each of said tent frames being collapsible, means detachably connecting the half-dome tent frames to each other so as to form a dome-type tent frame, each of said half-dome type tent frames comprising a lower set of arcuate members hingedly connected together so as to be capable of assuming positions in side by side relationship or spaced positions, an upper set of arcuate members hingedly connected together to assume collapsed positions in side by side relationship or spaced positions with respect to each other, and means for detachably connecting the lower ends of the members of the upper set to the upper ends of the members of the lower set, and collapsible braces connecting the lower ends of the members of the upper set. 45

7. A collapsible tent frame comprising a lower series of elongated arcuate members hingedly connected to one another so that they may be collapsed together in side-by-side relationship or expanded into spaced positions wherein they are contiguous only adjacent their hinge connections to each other, and an upper set of elongated arcuate members hingedly connected to each other for collapsing movement into side-by-side relationship or expanding movement into positions spaced from each other except adjacent their hinge connections, said upper set of members having headed pins on the lower ends thereof, and certain of said lower members having slots in the upper ends thereof to slidingly receive the headed pins.

8. A collapsible tent frame comprising a lower series of elongated arcuate members hingedly connected to each other so that they may be collapsed together in side-by-side relationship or expanded into spaced positions wherein they are contiguous only adjacent their hinge connections to each other, an upper set of elongated arcuate members hingedly connected to each other for collapsing movement into side-by-side relationship or expanding movement into positions spaced from each other except adjacent their hinge connections, said upper set of members having headed pins on the lower ends thereof, and certain of said lower members having slots in the upper ends thereof to slidingly receive the headed pins, and a spring detent in the slots of the lower members to biasingly retain the headed pins of said upper members therewithin.

References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Patent Number</th>
<th>Date</th>
<th>Inventor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,716,993</td>
<td>Apr. 12, 1953</td>
<td>Mitchell et al.</td>
</tr>
<tr>
<td>1,437,219</td>
<td>Nov. 28, 1922</td>
<td>Berthon</td>
</tr>
<tr>
<td>1,572,790</td>
<td>Feb. 10, 1953</td>
<td>Mitchell et al.</td>
</tr>
<tr>
<td>1,553,567</td>
<td>Apr. 12, 1932</td>
<td>Cross</td>
</tr>
<tr>
<td>2,225,972</td>
<td>Dec. 24, 1940</td>
<td>Grosh</td>
</tr>
<tr>
<td>2,627,865</td>
<td>Feb. 10, 1953</td>
<td>Grish</td>
</tr>
</tbody>
</table>

*References Cited in the file of this patent*