

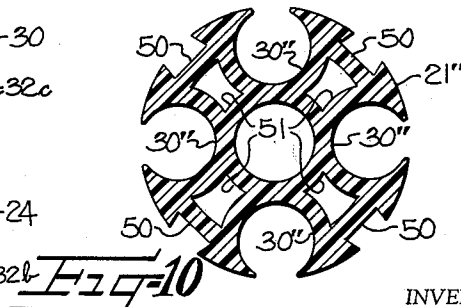
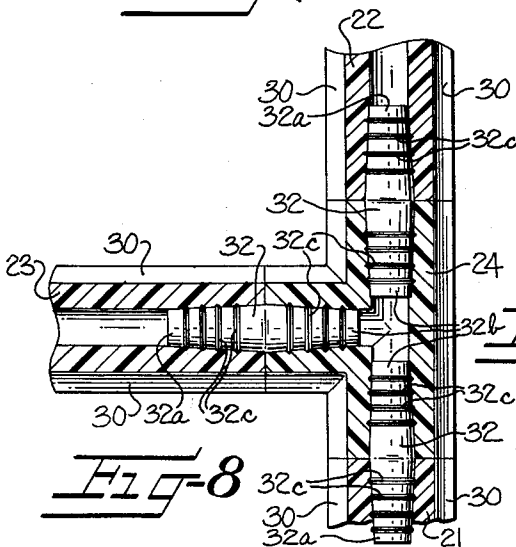
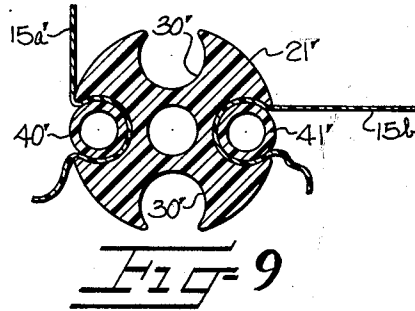
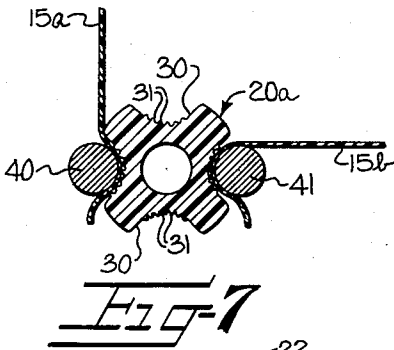
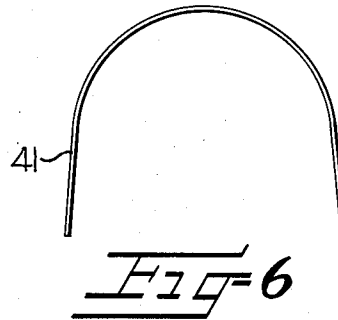
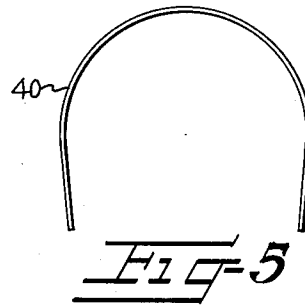
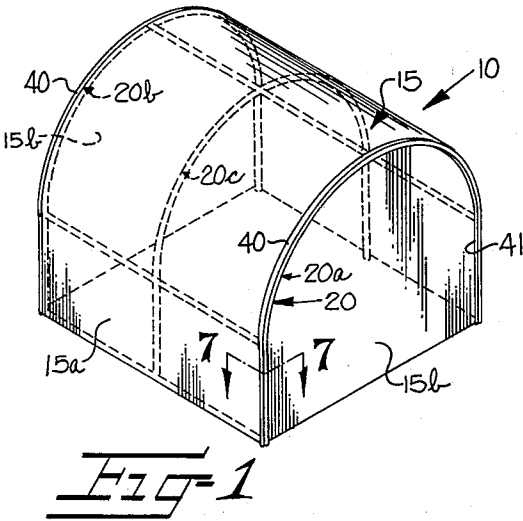
Jan. 12, 1965

T. W. BROOKS
BUILDING CONSTRUCTION

3,165,110

Filed Aug. 11, 1961

2 Sheets-Sheet 1



INVENTOR:
THOMAS W. BROOKS
BY *Eaton, Bell, Hunt & Dellyer*
ATTORNEYS

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2 Sheets-Sheet 2

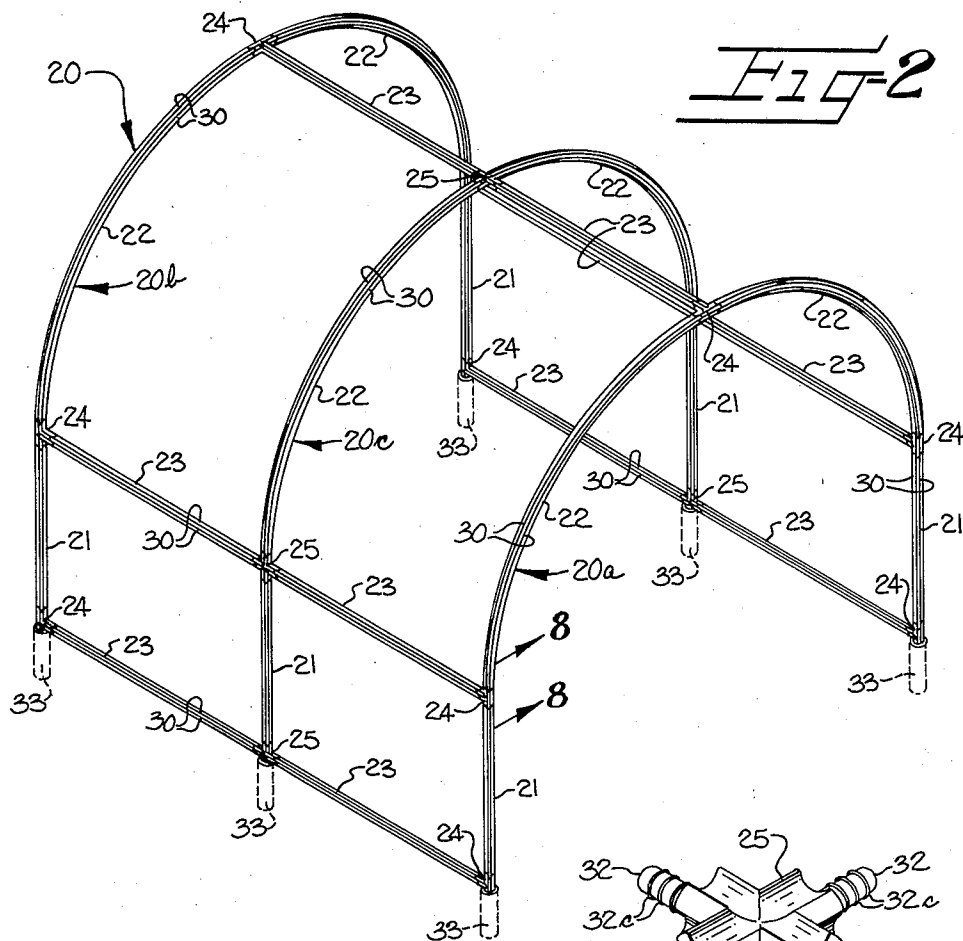


FIG-2

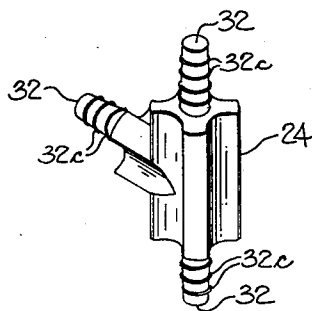


FIG-4

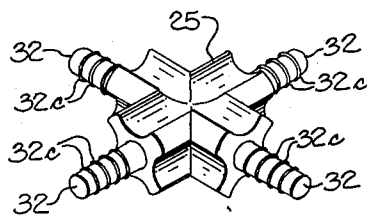


FIG-3

INVENTOR:
THOMAS W. BROOKS

BY *Eaton, Bell, Hunt & Seltzer*

ATTORNEYS

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3,165,110

BUILDING CONSTRUCTION

Thomas W. Brooks, Box 11421, Charlotte, N.C.

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11 Claims. (Cl. 135-1)

This invention relates to building constructions and more particularly to a novel building construction comprising a plurality of sectional units which may be quickly and easily assembled to form a sturdy and weatherproof building.

More particularly, the building construction of the present invention relates to the general class of building constructions utilizing a frame covered by a suitable pliable covering material. Examples of this general class of buildings are greenhouses, tents and other analogous structures. There have been several attempts to provide a building of this general class which is constructed in segmental units to render the same more readily portable while providing sturdiness and weatherproofness. However, problems have been encountered in the use of these prior type buildings since the same are time consuming in assembly and usually require more than one person in the assembly and disassembly thereof. Also, many of these prior type building constructions have the required sturdiness and weatherproofness, but are less portable and more expensive to manufacture and construct. The prior type building constructions which have the desired portability are not of sufficient sturdiness to withstand the elements and rigorous use to which buildings of this type are subjected for an appreciable length of time and therefore the cost of maintenance and replacement has been quite high. Still further, buildings of this prior type have suffered from lack of weather tightness and from inadequate insulation from the elements, weather tightness and element insulation being highly desirable characteristics in buildings of this general class.

Accordingly, it is an object of the present invention to provide a novel building construction which is readily portable and easily and quickly assembled into a sturdy, weatherproof building which provides adequate insulation against the elements.

A more specific object of the present invention is to provide a building construction of the character described having a frame of lightweight, sturdy material, a covering of pliable material, and resilient means for securely clamping the covering in weatherproof and insulating relation to the frame.

A still more specific object of the present invention is to provide a novel building construction of the character last described wherein the frame is constructed in segments and novel connecting means are provided for connecting the frame segments together to form frames of a variety of sizes and shapes.

A further object of the present invention is to provide a readily portable building construction which is simple in construction, inexpensive to manufacture, and which may be easily and quickly assembled by a single person into a sturdy, weatherproof building.

Some of the objects of the invention having been stated, other objects will appear as the description proceeds when taken in connection with the accompanying drawings, in which—

FIGURE 1 is an isometric view of a building construction embodying the features of the present invention;

FIGURE 2 is an isometric view of the frame for the building construction shown in FIGURE 1;

FIGURE 3 is an isometric view of a cross-type of connecting member for connecting the segments of the frame shown in FIGURE 2;

FIGURE 4 is an isometric view of a T-type of connect-

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ing member for connecting the segments of the frame shown in FIGURE 2;

FIGURE 5 is an elevational view of a resilient member for securing the covering material to the outside of the building frame;

FIGURE 6 is an elevational view showing a resilient member for securing the covering material to the inside of the building frame;

FIGURE 7 is an enlarged section taken substantially along line 7-7 of FIGURE 1;

FIGURE 8 is a fragmentary enlarged section taken substantially along line 8-8 of FIGURE 2;

FIGURE 9 is a view similar to FIGURE 7 of a modified form of a frame member and material securing members; and

FIGURE 10 is a view similar to FIGURES 7 and 9 illustrating still another modified form of a frame member.

Referring now to the drawings, and more particularly to FIGURE 1, there is shown a building generally indicated at 10. Building 10 comprises a covering 15 supported by a frame 20. Covering 15 comprises a first sheet 15a, defining the side walls and roof of building 10, and a pair of sheets 15b defining the end walls of building 10. Sheets 15a and 15b are constructed of any suitable, pliable, weather-repellent material which may be either transparent or opaque as desired.

Frame 20 (FIGURE 2) comprises a plurality of vertical straight frame sections 21 which form the vertical portion of the side walls of building 10, a plurality of curved frame sections 22 which define the roof portion of building 10, a plurality of horizontal straight frame sections or brace members 23, a plurality of T-type connecting members 24 and a plurality of cross-type connecting members 25.

All of the frame sections 21, 22 and 23 and the intersecting legs of the connecting members 24 and 25 are of substantially the same cross-sectional configuration (FIGURE 7). These are preferably tubular to make the same lighter in weight and provide a savings of material and are preferably constructed of a relatively hard plastic or resinous material. However, it should be understood that the same may be formed of any suitable material without departing from the scope of the present invention. Also, the openings through the center of the frame sections and the legs of the connecting members are utilized in a manner to be presently described to interconnect the frame sections and the connecting members into the composite frame 20. Frame sections 21, 22 and 23 and connecting members 24 and 25 are preferably provided with grooves 30 formed in equi-spaced relation around the periphery thereof and extending longitudinally for substantially the entire length of the frame sections and the intersecting legs of the connecting members. Each of the grooves 30 has at least a portion of the walls defining the same roughened as at 31 to increase the friction between the walls of the groove and the covering 15. Frame sections 21, 22 and 23 are preferably formed in the aforementioned configuration by an extrusion method, but it is contemplated that other suitable methods may be used without departing from the spirit of the instant invention.

Connecting members 24 and 25 have plug members 32, provided for each of the right angled or intersecting legs of the connecting members. Opposite end portions 32a, 32b of plug members 32 are oppositely tapered outwardly from the central portion of the plug members. The periphery of the tapered end portions 32a, 32b of plug members 32 are suitably knurled or roughened such as by providing raised rings 32c therearound, to increase the friction between the plug members 32 and the walls

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defining the openings through the center of the frame sections 21, 22, 23 and the legs of the connecting members 24, 25. One end portion, as for example end portion 32a, of plug members 32 is inserted into the opening in the center of each of the legs of the connecting members 24, 25 with a tight fit such that the plug members are retained within the opening by the frictional contact between the plug members and the walls of the opening, which frictional contact is increased by rings 32c. When it is desired to connect two frame sections together, a connecting member is suitably selected and the other end portions 32b of plug members 32 are inserted in the openings through the center of the adjacent ends of the frame sections securely connecting the two frame sections to the connecting member and hence, to each other.

In the embodiment shown, two curved frame sections 22 are connected to one of the legs of a connecting member 24 by the insertion of end portions 32b of plug members 32 into the adjacent ends of the openings extending through the frame sections which securely connects the frame sections together. A pair of straight frame sections 21 are connected in like manner by a pair of connecting members 24 to the opposite ends of the interconnected frame sections 22 to form an end or terminal frame member 20a. A second end or terminal frame member 20b is formed in like manner and is disposed at the opposite end of frame 20. An intermediate frame member 20c is formed in like manner to end frame members 20a, 20b except that connecting members 25 are used to interconnect the frame sections instead of connecting members 24. It is noted that appropriate connecting members 24, 25 are connected to opposite ends of each of the frame members 20a, 20b, and 20c for reasons to be presently described.

Frame members 20a, 20b, and 20c are disposed in spaced relation and are connected together by brace members 23. A brace member 23 is connected between each pair of oppositely disposed connecting members 24, 25 which interconnect the frame sections to form the frame members, and between each pair of connecting members provided at opposite ends of frame members 20a, 20b, and 20c.

Frame 20 is suitably disposed on a suitable surface upon which the completed building 10 is to rest. Relatively short lengths of tubular material 33 are embedded in the surface and the downwardly extending end portions of plugs 32 on the connecting members provided at opposite ends of frame members 20a, 20b, and 20c are inserted into the openings in tubular members 33 to securely anchor frame 20 to the surface.

The number of intermediate frame members 20c to be used in the desired building construction may be varied as determined by the desired length of the completed building. Also, it is noted that more or less frame sections 21 and 22 may be interconnected into the frame members 20a, 20b, and 20c to vary the width and height of the building construction. Further, although the building is shown as being of substantially inverted U-shape, it is contemplated that the same may be formed in any desired shape without departing from the scope of the instant invention. For convenience of reference, the aforementioned configurations shall hereinafter be referred to as arch-shaped or arched members. It is to be understood, however, that the term "arch" is not to be limited to its technical definition, but is to be defined as including any desired shape.

The frame members 20a, 20b, and 20c are assembled in such a manner that one of the grooves 30 is disposed on the outside or in the outer surface of the frame members and one of the grooves 30 is disposed on the inside or in the inner surface of the frame members. The sheet 15a of covering material is preferably placed over frame 20 with the opposite end portions thereof in juxtaposed relation to the grooves 30 on the outside of the end or terminal frame members 20a and 20b. A material securing member 40, constructed of suitable resilient material, is placed in clamping relation to the portions of sheet 15a in juxtaposed relation to the grooves 30. Member 40 is formed in substantially inverted U-shaped configuration similar to the configuration of frame members 20a, 20b, and 20c except that the leg portions of the U-shape converge toward the free ends thereof when in relaxed position. To place member 40 in position within grooves 30, the converging legs are spread apart and member 40 is placed in juxtaposed relation to the portions of sheet 15a in juxtaposed relation to groove 30. The inherent resilience of member 40 forces said portions of sheet 15a into the grooves and securely clamps the sheet 15a to the frame members 20a, 20b in weatherproof relation. It is noted that sheet 15a is of such width that the sides extend into close proximity and in weatherproof relation to the surface on which frame 20 is resting.

The sheets 15b of covering material are preferably disposed within the area bounded by the terminal or end frame members 20a, 20b with at least a portion thereof disposed in juxtaposed relation to the grooves 30 on the inside of the terminal frame members 20a, 20b. A second material securing member 41, also constructed of resilient material, is disposed in clamping relation to the portions of the sheet 15b of covering material in juxtaposed relation to the grooves 30 on the inside of the terminal frame members 20a, 20b. Material securing member 41 is likewise constructed in a substantially inverted U-shaped configuration except that the legs diverge toward the free ends thereof when in relaxed position such that the legs must be moved inwardly toward each other when the members 41 are placed within the bounds of the terminal frame members 20a, 20b. The material securing members 41 will exert an expansive force outwardly on the frame members 20a, 20b, and will thereby move said portions of sheets 15b into the grooves 30 and will securely clamp the same to the terminal frame members 20a, 20b in weatherproof relation. It is noted that sheets 15b are of such a dimension that the entire area bounded by the terminal members is covered and hence, closed thereby when the same are in operative position.

Referring now to FIGURE 9 wherein like reference characters with the prime notation added are used to designate like parts, there is shown a modified cross-sectional form of the frame sections, and intersecting legs of the connecting members. In this embodiment, the frame sections 21', 22', 23' are formed of a larger outside diameter than the frame sections 21, 22, 23 of the previous embodiment, and the grooves 30' formed therein are deeper and of circular cross section with the openings into the grooves being of lesser width than the diameter of the grooves. This necessitates that the edges of the opening be deformed for the insertion of the material securing members 40', 41' into the grooves. It is noted that the diameter of grooves 30' is of such a dimension relative to the outside diameter of the material securing members 40', 41' that said members are securely held in the grooves by the tight fit therebetween and by the resilience of the overhanging edges of the openings into grooves 30'. Material securing members 40', 41' are preferably formed of tubular lightweight material and are flexible to aid in manipulation thereof. The walls of the tubular material securing members 40', 41' are of such thickness that they may be deformed upon sufficient pressure being exerted thereon to aid in placing the members within the grooves 30', but have sufficient resilience to return to their original configuration when placed within the grooves and to thereby securely clamp the sheets 15a', 15b' against the walls of grooves 30' to hold the same in taut, weatherproof relation.

Referring now to FIGURE 10 wherein like reference characters with the double prime notation added are used to designate like parts, there is shown still another modified cross-sectional form of the frame sections and the intersecting legs of the connecting members. The frame sections 21'', 22'', 23'' and intersecting legs of the connecting members 24'', 25'' are formed of a still larger

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outside diameter and the grooves 30'' are of substantially the same configuration as grooves 30' previously described. The portions of the frame sections 21'', 22'', 23'' and legs of the connecting members 24'', 25'' between grooves 30'' are extruded with outwardly opening dove-tailed grooves 50 formed in the periphery thereof and extending longitudinally throughout substantially the entire length of the frame sections and intersecting legs. These dove-tailed grooves 50 provide an auxiliary means for securing pliable fabric to the frame sections and connecting members when the pliable fabric or covering material is clamped within the grooves 50 by a suitable co-operating dove-tailed key member (not shown). Also, the portions between the grooves 30'' are extruded with suitable openings 51 formed therein and extending longitudinally thereof to make the frame sections and connecting members lighter in weight and to provide a savings of the material of which the frame sections and connecting members are constructed. Material securing members (not shown) which are substantially the same as material securing members 40', 41' may be used with grooves 30'' in substantially the same manner as previously described.

In operation, the frame 20 is formed by interconnecting frame sections 21, 22 and 23 in the manner previously described and by clamping the sheets 15a and 15b of covering material thereto by the material securing members 40 and 41. The thus formed building 10 is anchored to the surface by the aforementioned tubular members 33 which are embedded in the surface and receive the end portions of plugs 32 on the connecting members provided at opposite ends of the frame members 20a, 20b, and 20c.

When it is desired to disassemble the thus formed building, the material securing members 40 and 41 are removed, sheets 15a and 15b of covering material are removed and folded and frame sections 21, 22 and 23 are disconnected by removing the end portions 32b of the plug members 32 from the openings in the center thereof.

The operation of the modified forms illustrated in FIGURES 9 and 10 is substantially the same as described above except that the material securing members 40', 41' do not function to clamp the sheets of covering material to the frame members by their inherent tendency to assume an elevational configuration as was the case with material securing members 40, 41. As aforementioned, material securing members 40', 41' are flexible and have no tendency to assume a particular elevational configuration. Therefore, the resilience of the walls defining the grooves 30' and 30'' securely holds the material securing members within the grooves, and thereby securely fastens the sheets of covering material to the frame members.

It will therefore be apparent that a novel building construction which is readily portable and easily and quickly assembled and disassembled is provided which is extremely sturdy and has excellent weatherproof and element insulating characteristics.

In the drawings and specification, there has been set forth a preferred embodiment of the invention and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. A building construction comprising a frame including a plurality of spaced, parallel, elongate arch-shaped frame members having longitudinally extending uninterrupted grooves formed in the opposing outer and inner surfaces thereof and brace means interconnecting said frame members, a first sheet of material covering the outer surface of said frame, second and third sheets of material disposed in and covering the area bounded by the frame members defining the ends of said frame, and a material securing member disposed in each of said outer and inner grooves and frictionally cooperating with the walls defining said grooves to clamp the sheets of covering material

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to said frame, said grooves and said material securing members being of such relative size that the material securing members are tightly and snugly received in said grooves to tightly clamp the sheets of material to the frame.

2. A building construction comprising a frame including more than two spaced, parallel, elongate arch-shaped frame members and a plurality of brace members interconnecting said frame members, at least the two frame members defining the ends of said frame having longitudinally extending uninterrupted grooves formed in the opposing outer and inner surfaces thereof, each of said frame members comprising a plurality of independent frame sections and means connecting said frame sections together, at least the frame sections forming said end frame members and said connecting means therefor having grooves in opposite sides thereof which form said uninterrupted grooves in the end frame members, a first sheet of pliable material covering the outer surface of said frame, second and third sheets of pliable material disposed in and covering the area bounded by the two end frame members, and a material securing member positioned in each of said outer and inner grooves in said end frame members and cooperating with the walls defining said grooves to clamp the sheets of pliable material to said frame.

3. The structure as set forth in claim 2 wherein said means for connecting said frame sections together comprises a connecting member positioned between the adjacent ends of each pair of frame sections and having a pair of legs disposed at right angles to each other, one leg being disposed in alinement with the frame sections and the other leg being disposed in alinement with one of the brace members, at least the legs of the connecting members in alinement with the sections of the end frame members having grooves therein alined with the grooves in the frame sections to define said uninterrupted grooves in the end frame members, and means connecting said legs to the adjacent ends of the frame sections and the adjacent end of the brace members.

4. The structure as set forth in claim 2, wherein said means for connecting said frame sections together comprises a first connecting member positioned between the adjacent ends of each pair of frame sections in said end frame members, said first connecting member having a pair of legs disposed at right angles to each other and defining a T-shape, one of said legs being disposed in alinement with the frame sections and having grooves therein cooperating with the grooves in said frame sections to form said uninterrupted grooves in the end frame members, and the other leg being disposed in alinement with one of the brace members, a second connecting member positioned between the adjacent ends of each pair of frame sections in the frame member disposed between the end frame members, said second connecting member comprising a pair of legs disposed at right angles to each other and defining a cross-shape, one of the legs of said second connecting member being disposed in alinement with the frame sections and the other leg of said second connecting member being disposed in alinement with each pair of brace members, and means connecting said legs to the adjacent ends of the frame sections and the adjacent ends of the brace members.

5. The structure as set forth in claim 4, wherein said frame sections, brace members, and legs of the connecting members are tubular and wherein said last named means comprises a plurality of elongate plug members having one end portion positioned in each of the tubular legs of the connecting members and the other end portion positioned in an adjacent end of the tubular frame sections and tubular brace members, said plug members fitting in the tubular legs and in the tubular frame sections and tubular brace members with a sufficiently tight fit to frictionally interconnect the same and having means thereon increasing the frictional contact therebetween.

6. A building construction comprising a frame including a plurality of spaced, parallel, elongated arch-shaped frame members each comprising a plurality of independent frame sections and means connecting said frame sections together in end-to-end relation, and a plurality of brace members interconnecting said frame members, at least the frame members defining the ends of said frame having longitudinally extending uninterrupted grooves formed in the opposing outer and inner surfaces thereof, sheet material enclosing said frame, a first arch-shaped material securing member positioned in each of said outer grooves and having the free ends thereof biased toward each other by the inherent resilience thereof when the same is positioned in said outer grooves, and a second arch-shaped material securing member positioned in each of said inner grooves and having the free ends thereof biased away from each other by the inherent resilience thereof when the same is positioned in said inner grooves, said first and second material securing members cooperating to clamp the sheet material to said frame.

7. A building construction comprising a frame including more than two spaced, parallel, elongated arch-shaped frame members each comprising a plurality of independent frame sections and means connecting said frame sections together in end-to-end relation, said frame members having longitudinally extending uninterrupted grooves formed in the opposing outer and inner surfaces thereof and a plurality of brace members interconnecting said frame members, a first sheet of pliable material covering the outer surface of said frame, second and third sheets of pliable material disposed in and covering the area bounded by the two frame members defining the ends of said frame, a first arch-shaped material securing member positioned in each of said outer grooves in said end frame members and having the free ends thereof biased toward each other by the inherent resilience thereof when the same is positioned in said outer grooves to clamp said first sheet of pliable material to said frame, and a second arch-shaped material securing member positioned in each of said inner grooves in said end frame members and having the free ends thereof biased away from each other by the inherent resilience thereof when the same is positioned in said inner grooves to clamp the second and third sheets of pliable material to said frame.

8. A building construction comprising a frame including a plurality of spaced, parallel, elongate, arch-shaped frame members and brace means connecting said frame members, said frame members each comprising a plurality of independent frame sections and means connecting said frame sections in end-to-end relation, at least the frame members defining the ends of said frame having longitudinally extending uninterrupted grooves formed in the opposing outer and inner surfaces thereof, said grooves being circular in cross-section and the opening therein being narrower than the diameter of said grooves, a first sheet of pliable material covering the outer surface of said frame, second and third sheets of pliable material disposed in and covering the area bounded by said end frame members, and a material securing member positioned in each of said outer and inner grooves in clamping relation to the sheets of pliable material, said material securing members being circular in cross-section and of substantially the same outside diameter as the diameter of said grooves so that the walls of the grooves enclose more than half of the cross sectional area of said material securing members to securely retain the same within the grooves whereby the sheets of pliable material are clamped to said frame.

9. An elongate arch-shaped frame member for use in a frame for a building having sheet material defining the walls and roof, said frame member comprising a plurality

of independent frame sections and means connecting said frame sections in end-to-end relation, said frame sections having outer and inner surfaces and a longitudinally extending groove formed in one of said surfaces, said groove extending throughout said frame member and being circular in cross-section and the opening therein being narrower than the diameter of said groove, and a securing member positioned in said groove and being circular in cross-section and of substantially the same outside diameter as the diameter of said groove such that the walls of the groove enclose more than half of the cross-sectional area of said securing member to securely retain the same within the groove, said securing member and the walls of said groove being adapted to receive the sheet material therebetween in clamping relation.

10. An elongate arch-shaped frame member for use in a frame for a building having sheet material defining the walls and roof, said frame member comprising a plurality of independent frame sections and means connecting the frame sections together in end-to-end relation, said frame sections having longitudinally extending grooves formed in the opposing outer and inner surfaces thereof which extend throughout said frame member, said grooves being circular in cross-section and the openings therein being narrower than the diameter of said grooves, and a securing member positioned in each of said grooves and being circular in cross-section and of substantially the same outside diameter as the diameter of said grooves such that the walls of the grooves enclose more than half of the cross-sectional area of said securing members to securely retain the same within the grooves, said securing members and the walls of said grooves being adapted to receive the sheet material therebetween in clamping relation.

11. A building construction comprising a frame including more than two spaced, parallel, elongate arch-shaped frame members each comprising a plurality of independent frame sections and means connecting said frame sections together in end-to-end relation, and a plurality of brace members interconnecting said frame members, at least the two frame members defining the ends of said frame having longitudinally extending uninterrupted grooves formed in the outer surface thereof, and at least one other surface thereof, a first sheet of pliable material covering the outer surface of said frame and overlying the grooves in said end frame members, second and third sheets of pliable material disposed in and covering the area bounded by the two end frame members and disposed in juxtaposed relation to the grooves in said at least one other surface of said end frame members, and a material securing member positioned in each of said grooves in said end frame members and frictionally cooperating with the walls defining said grooves to clamp the sheets of pliable material to said frame.

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