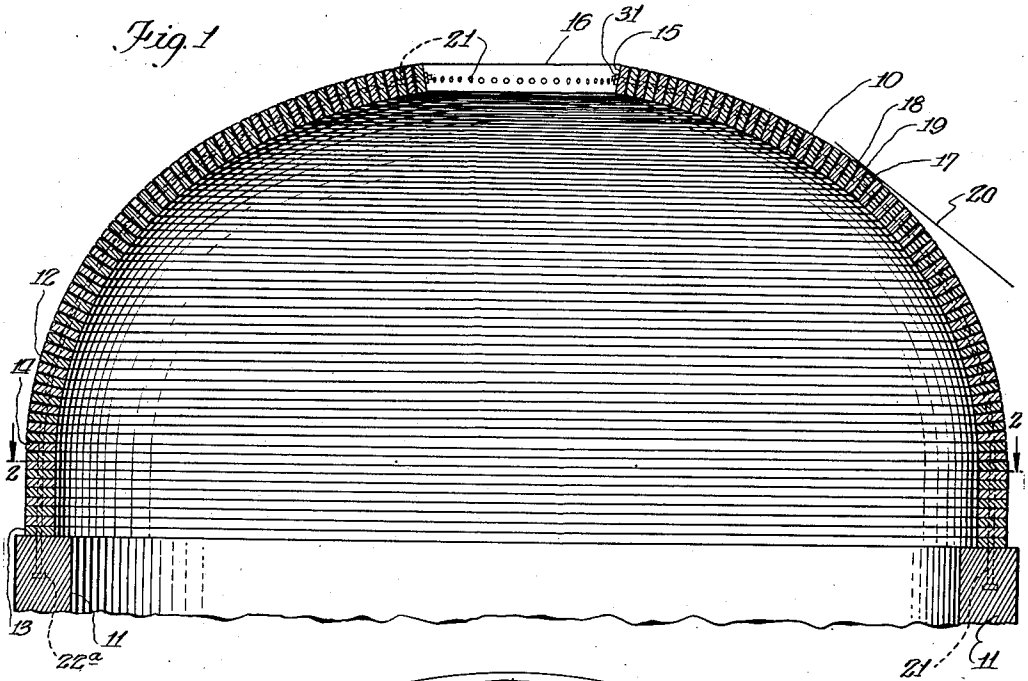
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TRUSSLESS ROOF CONSTRUCTION

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Fig. 1



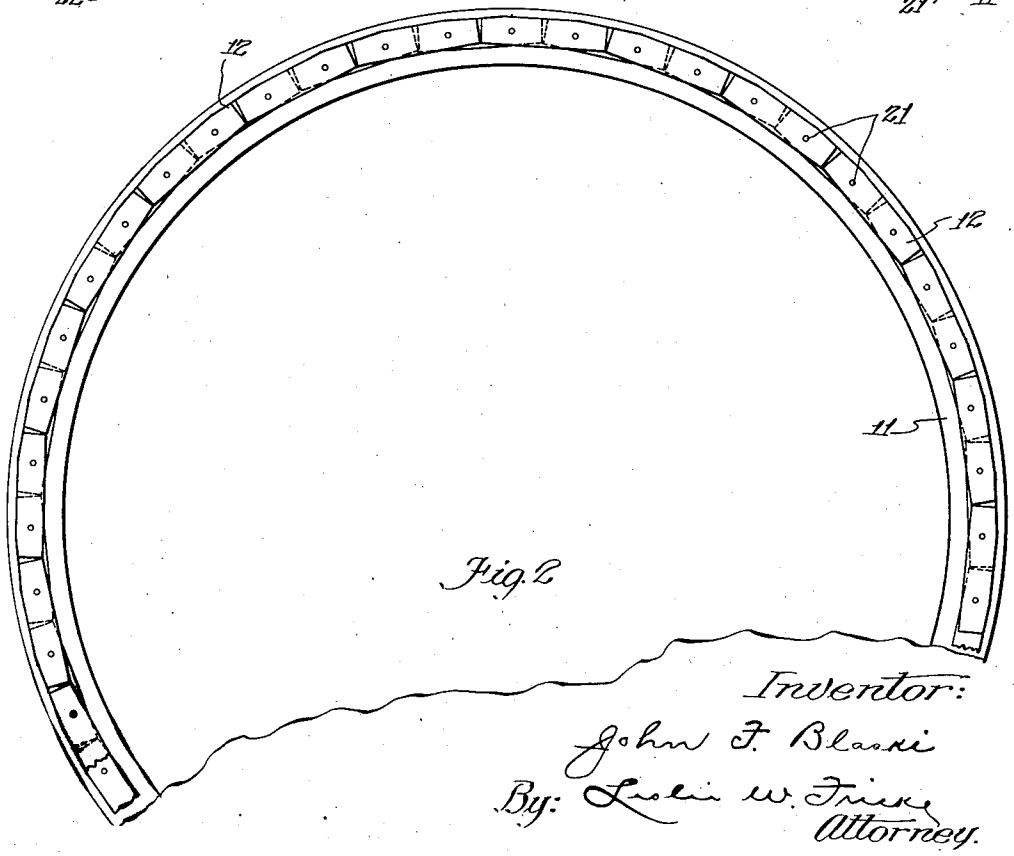


Fig. 2

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Fig. 3

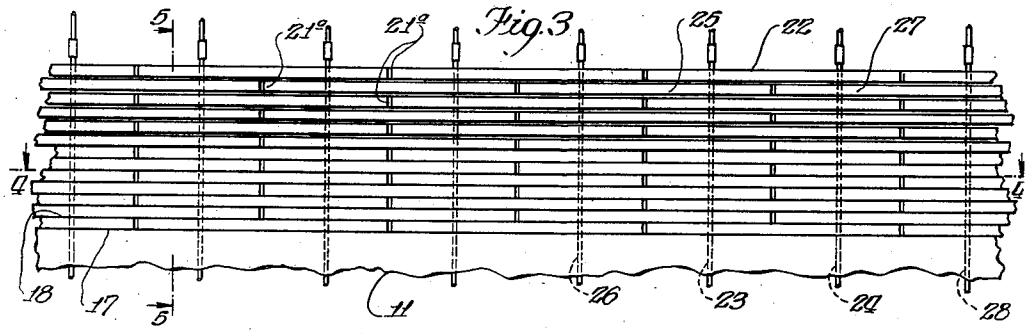
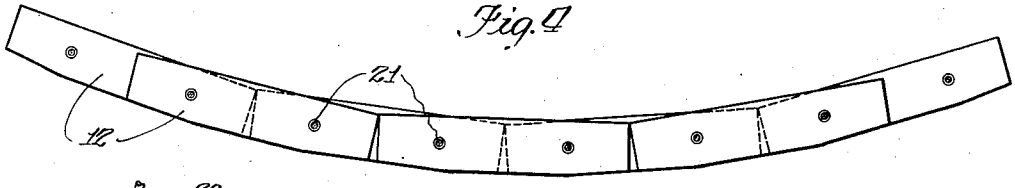


Fig. 4



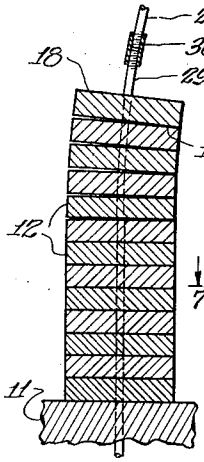
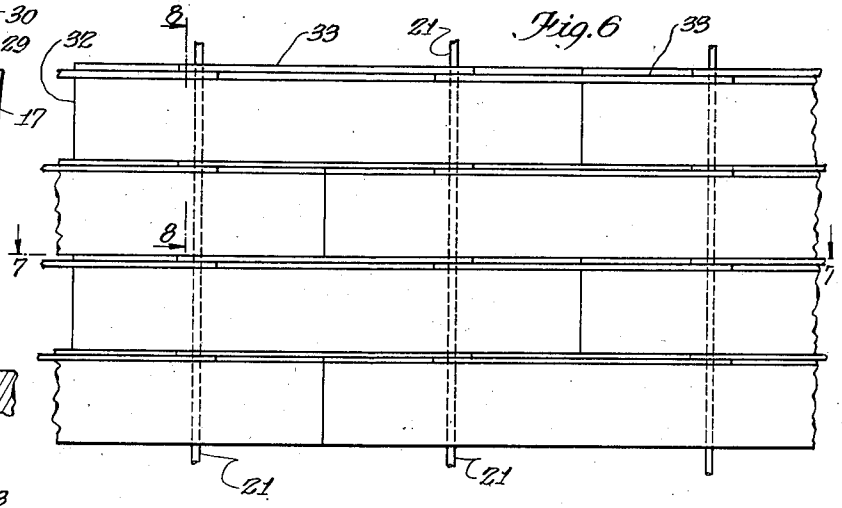


Fig. 5

Fig. 6



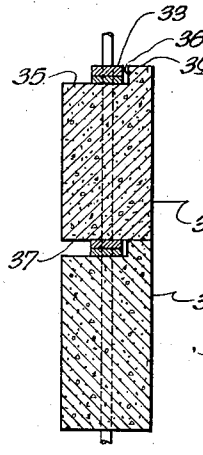
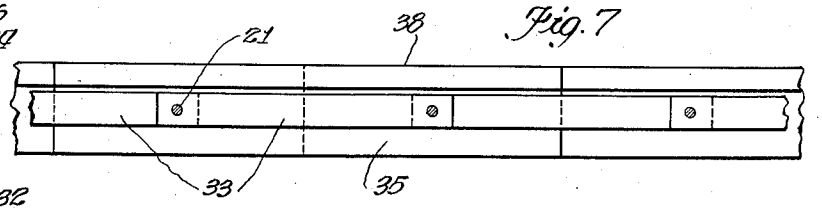


Fig. 8

Fig. 7



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UNITED STATES PATENT OFFICE

2,250,175

TRUSSLESS ROOF CONSTRUCTION

John F. Blaski, Chicago, Ill.

Application February 5, 1940, Serial No. 317,294

8 Claims. (Cl. 108—1)

My invention relates to a roof construction of the dome or conical type.

It is an object of my invention to provide an improved roof construction of this type which is trussless and requires no support, other than the support on which it rests, either inside or outside the roof for sustaining it.

It is another object of my invention to provide an improved roof construction of this type which may be built with the use of inexpensive material and which will be substantially smooth on both its inside and outside.

It is a further object of my invention to provide an improved roof construction of this type which comprises a plurality of building members that may be easily preformed or prefabricated and assembled on the job to form the construction.

It is also an object of my invention to provide an improved roof construction of this type in which the building members thereof are laid in courses and in which reinforcing rods extend through the members between the bottom and the top of the room to form a roof construction which is capable of withstanding appreciable internal stresses due to its own weight and snow and wind loads thereon with the members remaining substantially unchanged in their respective positions.

It is still a further object of my invention to provide an improved roof construction of this type which is provided with auxiliary reinforcing means for withstanding tensional stresses in the construction whereby the construction may be made principally of building members of a material which in itself is incapable of withstanding great tensional stresses.

The invention consists of the novel constructions, arrangements and devices to be hereinafter described and claimed for carrying out the above stated objects and such other objects as will appear from the following description of certain preferred embodiments thereof illustrated in the accompanying drawings, wherein—

Fig. 1 is a vertical cross sectional view of a roof construction embodying the principles of my invention;

Fig. 2 is a horizontal sectional view of the construction taken on line 2—2 of Fig. 1;

Fig. 3 is an elevational view of a portion of the roof construction taken on an enlarged scale;

Fig. 4 is a horizontal sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a vertical sectional view taken on line 5—5 of Fig. 3;

Fig. 6 is an elevational view of a second embodiment of my invention, as viewed from the outside of the roof structure, only a portiton of the roof structure being shown for convenience of illustration;

Fig. 7 is a horizontal sectional view taken on line 7—7 of Fig. 6; and

Fig. 8 is a vertical sectional view taken on line 8—8 of Fig. 6.

Like characters of reference designate like parts in the several views.

Referring to Figs. 1 and 2, the building construction 10 is in the form of a dome and is supported by the side walls 11 of a building as shown. The roof construction comprises a plurality of building members 12 laid end to end in courses. The building members 12 are substantially in the form of rectangular parallelepipedons and may be wood planks of suitable cross sectional size cut into short lengths. The courses are in the form of loops which in the embodiment illustrated are circular. As will be seen in Fig. 1, the bottom courses of the roof between the points 13 and 14 have substantially the same diameter, and the roof construction between these points therefore rises substantially vertically. The courses of building members above point 14 gradually decrease in diameter toward the top of the roof, and the roof extends therefore toward the center assuming a dome-like form. The uppermost course 15 is located at some distance from the center of the roof structure and a central opening 16 is thereby left in the structure. The opening 16 may be closed by any suitable means such as a skylight or the like.

Each of the building members 12 in the roof structure is disposed so that its opposing load-bearing sides, that is to say the sides 17 and 18 indicated in Figs. 1 and 3, which are those sides of the member next to the members of adjacent courses, are located at substantially right angles to the pitch line of the roof at the particular member. The pitch line of the roof is that line indicating the inclination of the roof and is substantially tangential to the general contour of the roof. For example, at the particular member 19 shown in Fig. 1, the faces 17 and 18 of the member are substantially at right angles to the pitch line 20 of the roof at that portion of the roof.

Tie rods 21 extend from the bottom to the top of the roof structure as shown in Fig. 1. The rods are anchored at 22a to the side walls 11 of the building. As will be readily understood, the tie rods 21 function to tie the building members 12 in adjacent courses together. The longitudinal

axes of the rods are substantially coincident to the pitch line of the roof and are at substantially right angles to the opposing load-bearing faces of the members at such members.

As will be seen in Fig. 3, the building members 12 are so laid in their respective courses that the joints 21a between the members in each of the courses are staggered relative to the joints between the members in adjacent courses. Each of the members 12 have two tie rods 21 extending therethrough; for example, the building member 22 has the tie rods 23 and 24 extending therethrough; the building member 25 has the tie rods 23 and 26 extending therethrough; and the building member 27 has the tie rods 24 and 28 extending therethrough. With this construction the tie rods 23 and 24 are held from spreading by the building member 22. Since the tie rods 23 and 24 pass also through the building members 25 and 27 it is apparent that tensional stresses in the roof construction tending to pull members 25 and 27 apart are not effective in doing so as the tie rods 23 and 24 are held against spreading movement. Each of the building members 12 in the respective courses in the roof construction are similarly held from separating from the building members at each end thereof.

With my improved roof construction in which the joints between the members in each course are staggered with respect to the joints between members in adjacent courses and in which each of the building members has at least two tie rods passing therethrough, I have provided a construction which is effectively resistant to tensional stresses therein that may be caused by the weight of the building members in the construction as well as by snow, wind and other loads on the construction and which tend to pull the building members apart and increase the diameters of the loop courses. As is well known by those familiar with such structures, the upper part of a domed roof structure tends to fall in and force out the lower part and there is a tendency to compress each member longitudinally of the member in the upper part of the roof structure and to expand each member longitudinally of the member in the lower part of the roof structure. I have found that with the members 12 so disposed in the roof construction that their opposed load-bearing faces are substantially at right angles to the pitch lines of the roof at the particular members, a domed roof construction of great strength is obtained and without any truss-like support.

As best shown in Fig. 5, each of the tie rods 21 comprises a plurality of rod sections 29 having their ends threaded and connected together by means of threaded nipples 30. As is shown in Fig. 1, the uppermost course 15 of the building members is held in proper position by means of nuts 31 which are screwed on to the threaded ends of the uppermost of the rod sections 29.

My improved dome-like roof construction is built by first putting the lowermost courses of building members 12 in position on the lowermost rod sections 29 which are anchored in the side walls 11 of the building. Then another length of rod sections 29 is connected to the lowermost rod sections by means of the threaded nipples. Other higher courses of building members may then be put into position on the second length of rod sections. When the courses of the building members reach the upper ends of the second length of rod sections the procedure may be repeated and when the last course of building members is in position the nuts on the rods are turned down tight. It is apparent that with the use of tie rods comprising the sections 29 and connectors 30 my improved domed roof may be easily constructed.

It will be readily understood that the building members 12 are cut into suitable lengths and are provided with openings therethrough for receiving the tie rods 21 before the roof construction is started. Since the upper courses of the building members have smaller diameters and therefore smaller circumferences than the lower courses, the individual building members 12 in the upper courses are of shorter length than the building members in the lower courses. It is apparent that if the roof construction is such that the building members 12 in the upper courses become of too short a length, only a fraction of the number of tie rods 21 anchored in the side walls 11 may be extended completely to the top of the roof structure; for example, every second tie rod 21 may be extended to the top course 15 while the tie rods therebetween may be extended only a portion of the way to the top of the roof construction. With such a construction the building members 12 in the upper courses beyond the ends of the short tie rods, with each member being adapted to receive two tie rods, would be just twice the length they would be if all of the tie rods anchored in the side walls were extended to the uppermost course 15.

The embodiment of my improved roof construction shown in Fig. 6 is particularly adapted for the use of building members 32 of concrete, gypsum or other precast material, preferably of a cellular nature for insulation purposes, which in itself can resist only small tensional stresses.

Between the courses of building members 32 are positioned metal bars 33, each having two openings for the passage of tie rods 21 therethrough. Each of the bars 33 acts to prevent adjacent tie rods 21 from spreading. Each of the building members 32, like the building members 12 heretofore described, have two openings for the passage of two tie rods therethrough. The bars 33 thus act as means additional to the building members 32 for preventing the spreading of the tie rods 21, and it is apparent that the tie rods 21 cannot spread even though the members 32 can themselves withstand little tensional stress.

As shown in Fig. 8, the upper side of each of the building members 32, that is to say, the side of each member next to the members 32 of an adjacent upper course, comprises face portions 34, 35 and 36. The face portions 35 form a ledge for the seating of the bars 33. The bottom or opposite side 37 of each of the members 32 bears against the members in the course next below. The opposed load-bearing faces of the members 32 are substantially at right angles to the pitch line of the roof at the respective members. Such construction makes for great stability and strength of the roof structure; and substantially only the inner sides 38 of the building members are visible from the inside of the roof, the bars 33 being hidden on the ledges of the members.

It is apparent that both the inside and outside of my improved constructions are quite smooth and free of projections and this is particularly true with roof constructions of large

size built with building members 12 or 32 of comparatively short length. The exterior surface of the roof may be treated with asphalt and gravel or covered with shingles or roofing paper to make it water-tight. My improved roof constructions are self-supporting, and no unsightly and expensive trusses are required on the inside. My roof structures as a whole may be inexpensively constructed and this is particularly true when wood planks of relatively short lengths are used. In fact, planks 3 or 4 feet in length, too short for most building purposes, are well suited for building my improved roofs. It is practical, therefore, to construct a sound roof from old or used planks.

My improved roof structures are of such strength as to withstand heavy snow, wind or other loads thereon. The roof structures may be easily erected, and if desired, be constructed of building members of gypsum, concrete or other precast material having little inherent strength in itself to withstand tensile stresses. When constructed of wood planks or of precast members of a cellular nature, the roofs afford substantial insulation against heat or cold.

I do not intend to limit the invention to the details of construction shown and described except only insofar as certain of the appended claims are specifically so limited, as it will be obvious that modifications may be made without departing from the principles of the invention.

I claim:

1. In a trussless roof of the dome or conical type, the combination of a plurality of building members laid end to end in courses with the joints between members of one course staggered with respect to the joints between members of adjacent courses, said courses being in the form of loops which gradually decrease in size from the bottom portion of the roof to the top portion thereof, each of said members having its opposing load-bearing sides disposed substantially at right angles to the pitch line of the roof at the member, each of said members being preformed and substantially solid with their inner and outer faces coinciding with and forming portions of the respective inner and outer surfaces of the roof formed by said members, and means for holding each of said members in its respective position in the roof.

2. In a trussless roof of the dome or conical type, the combination of a plurality of building members laid end to end in courses with the joints between members of one course staggered with respect to the joints between members of adjacent courses, said courses being in the form of loops which gradually decrease in size from the bottom portion of the roof to the top portion thereof, each of said members having its opposing load-bearing sides disposed substantially at right angles to the pitch line of the roof at the member each of said members being preformed and substantially solid with their inner and outer faces coinciding with and forming portions of the respective inner and outer surfaces of the roof formed by said members, each of said members having holes extending substantially parallel to said pitch line, and tie rods extending through the holes in said members and between the bottom and top of the roof for holding the members in their respective positions in the roof.

3. In a trussless roof of the dome or conical type, the combination of a plurality of building members laid end to end in courses with the joints between members of one course staggered with respect to the joints between members of adjacent courses, said courses being in the form of loops which gradually decrease in size from the bottom portion of the roof to the top portion thereof, and a plurality of tie rods extending through said members between the bottom and top of the roof for holding the members in their respective positions in the roof, each of said tie rods comprising a plurality of rod sections and connecting means for holding the rod sections together, each of said members having its opposing load-bearing sides disposed substantially at right angles to the pitch line of the roof at the member, and each of said members being preformed and substantially solid with their inner and outer faces coinciding with and forming portions of the respective inner and outer surfaces of the roof formed by said members.

4. In a trussless roof of the dome or conical type, the combination of a plurality of building members laid end to end in courses with the joints between members of one course staggered with respect to the joints between members of adjacent courses, said courses being in the form of loops which gradually decrease in size from the bottom portion of the roof to the top portion thereof, a plurality of tie rods extending through said members between the bottom and top of the roof for holding the members in their respective positions in the roof, and a plurality of bars between said courses and connecting adjacent tie rods for holding the rods from spreading, each of said members being preformed and substantially solid with their inner and outer faces coinciding with and forming portions of the respective inner and outer surfaces of the roof formed by said members.

5. In a trussless roof of the dome or conical type, the combination of a plurality of building members laid end to end in courses with the joints between members of one course staggered with respect to the joints between members of adjacent courses, said courses being in the form of loops which gradually decrease in size from the bottom portion of the roof to the top portion thereof, a plurality of tie rods extending through each of said members between the bottom and top of the roof for holding the members in their respective positions in the roof, and a plurality of bars between said courses and connecting adjacent tie rods for holding the rods from spreading, each of said members having its opposing load-bearing sides disposed substantially at right angles to the pitch line of the roof at the member, and each of said members being preformed and substantially solid with their inner and outer faces coinciding with and forming portions of the respective inner and outer surfaces of the roof formed by said members.

6. In a trussless roof of the dome or conical type, the combination of a plurality of building members laid end to end in courses with the joints between members of one course staggered with respect to the joints between members of adjacent courses, said courses being in the form of loops which gradually decrease in size from the bottom portion of the roof to the top portion thereof, a plurality of tie rods extending through said members between the bottom and the top of the roof for holding the members in their respective positions in the roof, each of said members on one of its opposing load-bearing sides

being provided with a ledge and having said sides including said ledge disposed substantially at right angles to the pitch line of the roof at the member, and a plurality of bars on said ledges connecting adjacent tie rods for holding the rods from spreading, each of said members being preformed and substantially solid with their inner and outer faces coinciding with and forming portions of the respective inner and outer surfaces of the roof formed by said members.

7. In a trussless domed or conical shaped roof section, the combination of a plurality of building members laid end to end in courses with the joints between members of one course staggered with respect to the joints between members of adjacent courses, said courses being in the form of arcs the radii of which gradually decrease from the bottom portion of the roof section to the top portion thereof, each of said members having its opposing load-bearing sides disposed substantially at right angles to the pitch line of the roof section at the member, each of said members being preformed and substantially solid with their inner and outer faces coinciding with and forming portions of the respective inner and outer surfaces of the roof formed by said members, and means for holding each of said members in its respective position in the roof section.

8. In a trussless domed or conical shaped roof section, the combination of a plurality of building members laid end to end in courses with the joints between members of one course staggered with respect to the joints between members of adjacent courses, said courses being in the form of arcs the radii of which gradually decrease from the bottom portion of the roof section to the top portion thereof, each of said members having its opposing load-bearing sides disposed substantially at right angles to the pitch line of the roof section at the member, each of said members being preformed and substantially solid with their inner and outer faces coinciding with and forming portions of the respective inner and outer surfaces of the roof formed by said members, each of said members having holes extending substantially parallel to the pitch line, and a plurality of tie rods extending through the holes of said members between the bottom and top of the roof section for holding the members in their respective positions in the roof section.

JOHN F. BLASKI.