March 18, 1958 P. WEIDLINGER 2,827,002

ROOF STRUCTURE

Filed June 4, 1953

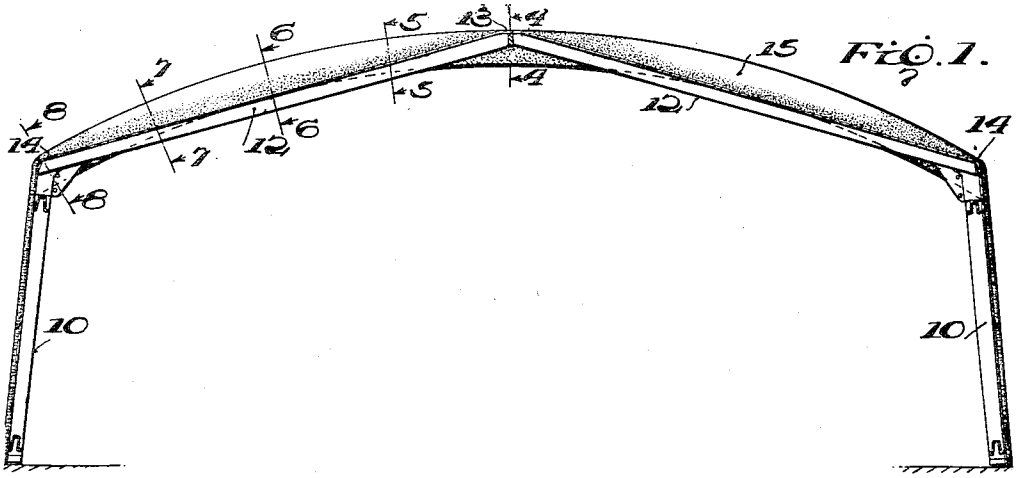


Fig. 1.

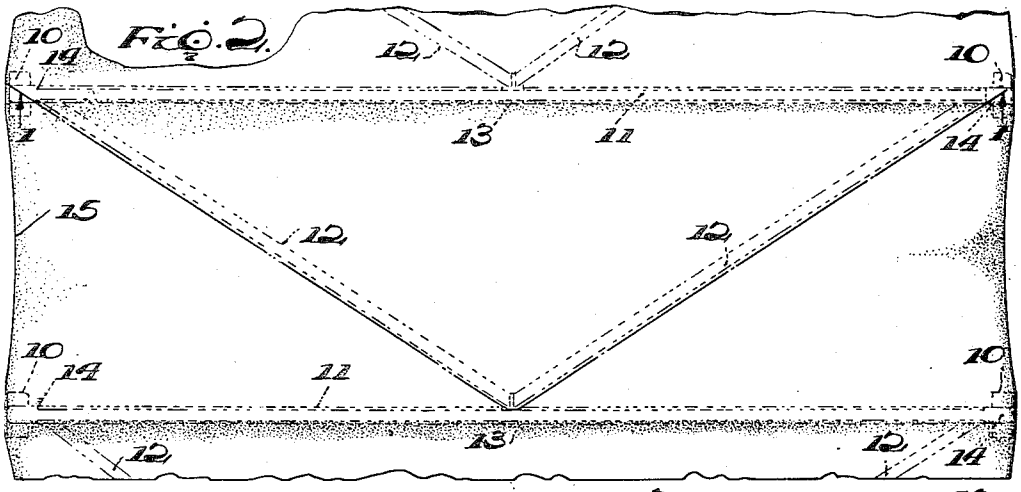


Fig. 2.



Fig. 4.



Fig. 5.

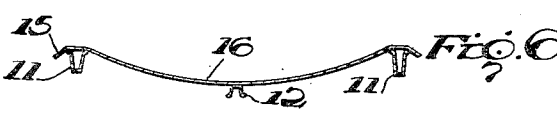


Fig. 6.

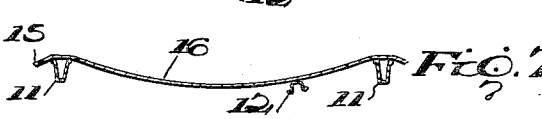


Fig. 7.

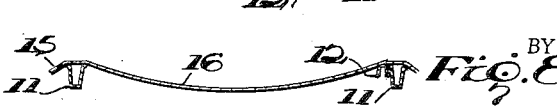


Fig. 8.

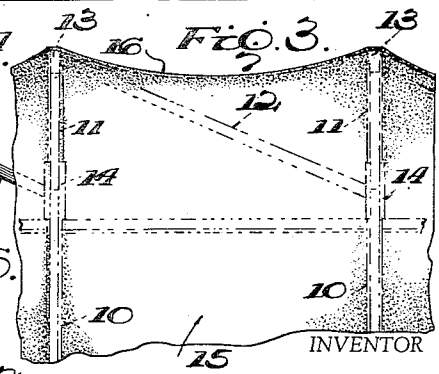


Fig. 3.

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ROOF STRUCTURE

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6 Claims. (Cl. 108—1)

My invention relates to roof structures and more particularly to such structures wherein flexible roof fabric is draped between arcuate frame members in catenary curves.

In such structures the usual horizontal purlins, X-struts or the like cannot be used to connect the frame members because they engage and raise the draped fabric so as to form pockets in the upper surface in which rain water, leaves, etc., collect whereby to rot the fabric. This problem is particularly acute where the arcuate frame members are formed with a substantially flat curve. In such roofs it is essential that each catenary curve of the fabric be unbroken throughout whereby to provide open troughs draining downwardly from the crests to the eaves.

With the foregoing in view, it is an object of the invention to provide a roof structure including frame members, connecting struts or the like and flexible roof fabric overlying said frame members and struts and draping between said members in catenary curves without more than tangential contact with the struts.

A further object is to provide an improved roof structure including flexible fabric draped in catenaries and means for supporting and bracing the roof without distorting the catenaries.

Other objects and advantages reside in the particular structure of the invention, the structure of the elements thereof, combinations and arrangements of such elements, all of which will be readily apparent to those skilled in the art upon reference to the attached drawing in connection with the following specification, wherein the invention is shown, described and claimed.

In the drawing:

Figure 1 is a transverse, vertical sectional view through a roof structure embodying the invention taken substantially on the planes of the line 1—1 of Figure 2;

Figure 2 is a fragmentary plan view thereof;

Figure 3 is a fragmentary side elevational view thereof; and

Figures 4–8 inclusive are respectively diagrammatic longitudinal vertical sectional views taken substantially on the planes of the lines 4—4, 5—5, 6—6, 7—7, and 8—8 of Figure 1.

Referring specifically to the drawing, wherein like reference characters have been used throughout the several views to designate like parts, **10**, **10** are suitable uprights which support a plurality of arcuate roof frame members **11**. The frame members **11** are maintained in spaced and parallel relation by struts **12**. In the embodiment illustrated, the struts are straight and each extends from the region of the crest **13** of one frame member **11** to the region of an eave portion **14** of an adjacent frame member **11**. Preferably the struts **12** are arranged in pairs as shown so that two are connected to one frame member in the region of its crest **13** and extend in downwardly diverging directions to the regions of the eave portions **14** of an adjacent frame member.

The roof proper comprises a body of flexible roof fabric **15** which overlies the struts **12** and frame members **11** so as to drape between the latter in catenary curves **16**, best seen in Figures 3–8.

As is clearly seen in Figures 1 and 4–8 the curve of the catenaries **16** and of the frame members **11**, together with the construction and arrangement of the struts **12** is such that the latter have no more than a tangential contact with the undersurface of the fabric **15** at any point along the length of each strut. Thus, the fabric **15** cannot be upwardly distorted at any point by the struts **12** whereby the catenaries **16** provide unobstructed drainage channels in opposite directions from the crests thereof to the eaves. As aforesaid, this is particularly desirable in a structure such as is herein disclosed where the curve of the frame members is a substantially flat one. Of course, the invention is equally applicable to all curved roofs irrespective of the curvature or the type of curve. At the same time, the frame members **11** are adequately braced. Obviously, additional struts **12** crossing those shown could be added if necessary.

In the structure illustrated, the arched members **11** have circular arcs substantially 60° in length. Clearly the invention is applicable to circular arcs of any length up to 180°. Moreover, it is believed that the invention is applicable to structural members having non-circular arcs such as parabolas, hyperbolas and the like.

In any form of the invention, the length of the arc of the arched members **11**, the spacing of the same from each other, and the depth of drape of the catenaries must be so calculated that the struts **12** have no more than tangential contact with the undersurface of the covering **15** throughout the length of the struts. Actually, such contact is not necessary and may even be undesirable. Hence, in practice sufficient space between the covering **15** and struts **12** should be left to allow the covering to stretch in use and still have no more than a tangential contact with the struts.

Thus, while I have shown and described what is now thought to be a preferred form of the invention, it is obvious that the same is susceptible of other concepts and expressions. Consequently, I do not limit myself to the precise structure shown and described hereinabove, except as hereinafter claimed.

I claim:

1. In a roof structure, a plurality of arcuate rafter-like frame members, each frame member having two eave portions and a crest portion, rigid and substantially straight struts connecting said frame members together in spaced parallel relation, each strut extending from the region of the crest portion of one frame member to the region of an eave portion of an adjacent frame member, flexible roofing fabric overlying said frame members and draping therebetween in catenary curves, and the curvature of said frame members as well as the catenary curves of said fabric being such that each strut throughout its length is substantially tangent to the undersurface of said fabric whereby to assure unimpeded drainage from the upper surface of said fabric.

2. The structure of claim 1, wherein said struts are arranged in pairs, each pair having inner ends connected to one frame member in the region of the crest thereof, and each pair having outer ends connected to an adjacent frame member in the region of said eave portions thereof.

3. The structure of claim 2, wherein all of said struts are of substantially the same length.

4. The structure of claim 3, wherein said frame members are formed with a substantially flat arch.

5. In a roof structure, a plurality of spaced, parallel, arcuate, rafter-like frame members each having two eave portions and a crest portion, straight rigid struts connecting adjacent frame members together, each strut extend-

ing from the crest portion of one frame member to an eave portion of an adjacent member, flexible roof fabric overlying said frame members and draping therebetween in caternary curves, and the arch curvature as well as the fabric catenary being such that each strut throughout its length is substantially tangent to the undersurface of said fabric, whereby to assure unimpeded drainage from the upper surface of said fabric.

6. In a roof structure, the combination with a plurality of spaced, parallel, arched, rafter-like, frame members each having at least one eave portion and a crest portion, flexible roof fabric overlying said frame members and draping therebetween in catenary curves; of rigid and substantially straight struts connecting adjacent frame members together, each strut extending from the region of the crest portion of one frame member to the region of the eave portion of an adjacent frame member, and each of said struts being constructed and arranged to be substantially tangent to the undersurface of said fabric throughout its length.

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