

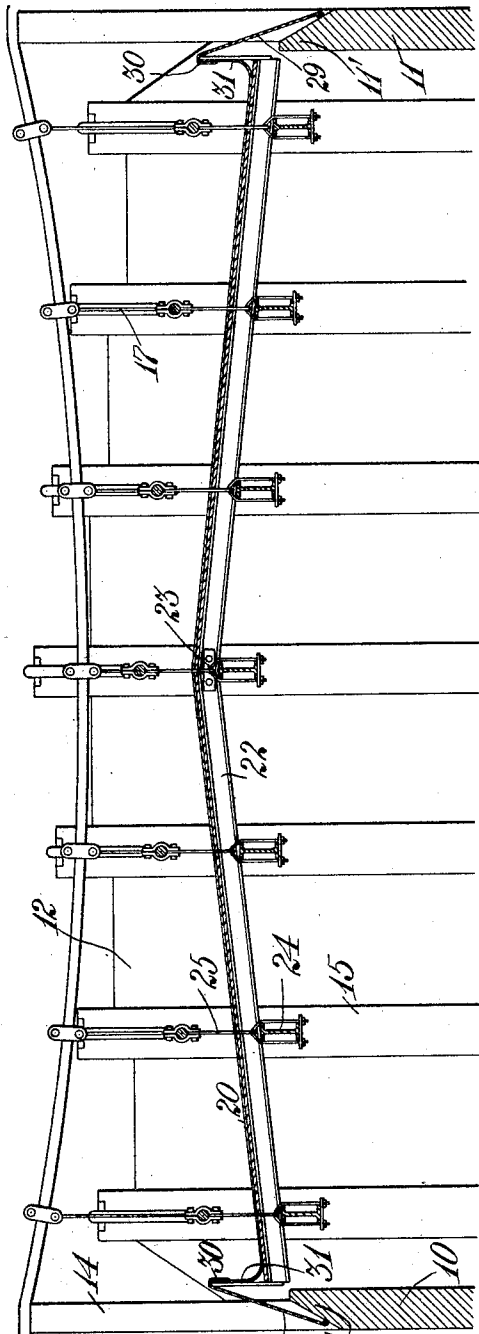
C. BUTLER.
SUSPENSION ROOF.

APPLICATION FILED AUG. 23, 1913.

1,109,399.

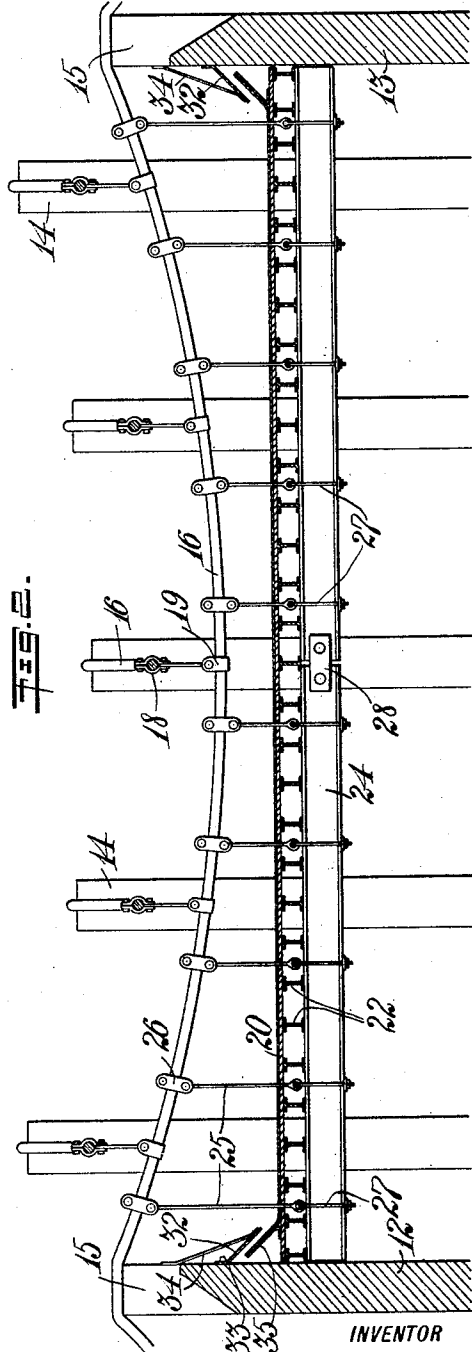
Patented Sept. 1, 1914.

2 SHEETS-SHEET 1.



WITNESSES
G. Robert Thomas
Geo. L. Beeler

FIG. 1.



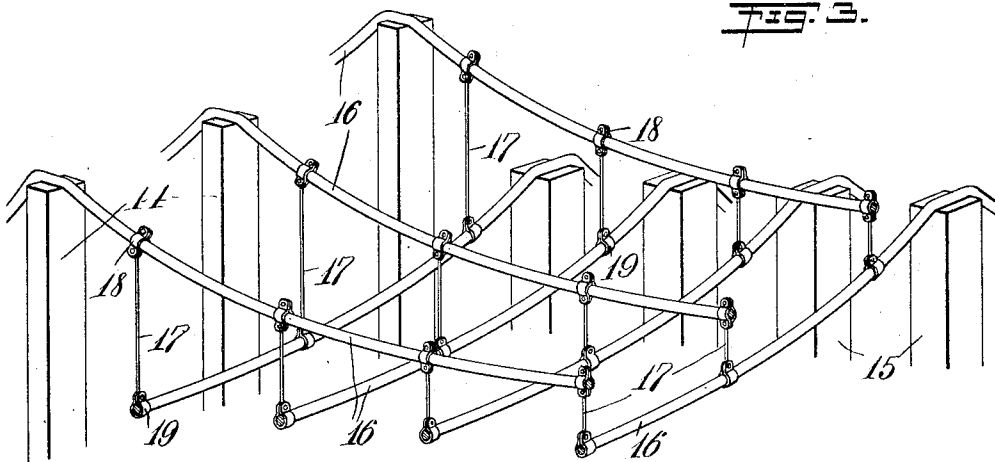
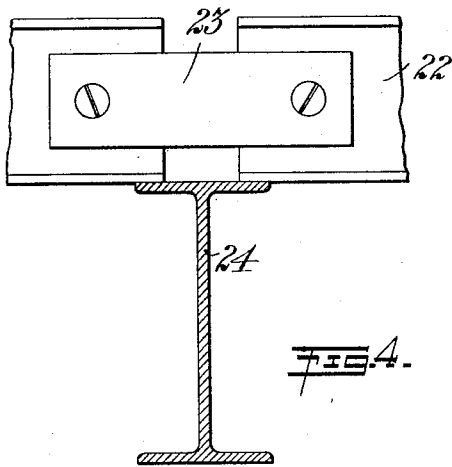
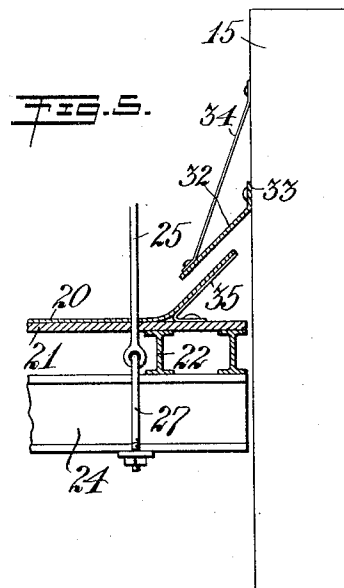
INVENTOR
Cooley Butler
BY Munnies
ATTORNEYS

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UNITED STATES PATENT OFFICE.

COOLEY BUTLER, OF NEW YORK, N. Y.

SUSPENSION-ROOF.

1,109,399.

Specification of Letters Patent.

Patented Sept. 1, 1914.

Application filed August 23, 1913. Serial No. 786,262.

To all whom it may concern:

Be it known that I, COOLEY BUTLER, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Suspension-Roof, of which the following is a full, clear, and exact description.

This invention relates to architecture or building construction and has particular reference to a roof construction adapted to cover a wide expanse of surface.

Among the particular objects of the invention is to provide a suspension means for a roof whereby a roof of any desired size or area may be supported from or beyond its edges only, leaving the space beneath the roof wholly unobstructed. Roofs of this type are designed to inclose areas large enough to accommodate circuses, fairs, field meets, baseball, football or other athletic games, whereby such events may be held in all kinds of weather or even at night by the provision of suitable lighting facilities which may be supported from the roof. The lighting features, however, not constituting *per se* any part of this invention, are not shown.

The foregoing and other objects of the invention will hereinafter be more fully described and claimed and illustrated in the drawings forming a part of this specification in which like characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a longitudinal section, somewhat diagrammatic, of one form of this invention; Fig. 2 is a transverse view of the same; Fig. 3 is a perspective view indicating one corner of the suspension cables and hangers which I employ in this construction; Fig. 4 is a detail indicating the means for pivotally connecting adjacent roof beams; and Fig. 5 is a detail indicating the manner of rendering the edges of the roof substantially storm-proof.

From what has been stated above, it will be obvious that the relative sizes and proportions of the parts of this construction may be varied to a large extent without departing from the spirit of the invention and likewise the materials used may be varied as may be found suitable for any particular contract.

The area sought to be inclosed by the roof may be regarded as substantially rectangu-

lar and of a breadth equal to its length. As shown in Figs. 1 and 2, the said area will be understood as being bounded by end members 10 and 11 and side members 12 and 13. These side and end members may be of any suitable material or elevation and may include any suitable number of columns or towers 14 and 15 arranged opposite each other in pairs.

A suspension member preferably in the nature of a cable 16 is arranged across and supported upon each pair of towers 14 and 15, and for purposes of maximum strength and reliability the cables are arranged in two series, one above the other and substantially transverse thereto. The cables of one series are suspended beneath the cables of the other series by means of hangers 17. Each of said hangers is connected at its ends to the cables by clips 18 and 19 or in any other suitable manner.

The roof proper may consist of a layer of any suitable water-proof fabric or other material, the same being laid upon flooring or filling material 21 secured to longitudinal beams or stringers 22. These stringers will, of course, be made up of any suitable lengths or pieces, depending upon the scope of the roof, and at any desired places, especially at the center or along the comb of the roof, they are connected together by joints or plates 23 in order to provide for the effect of contraction and expansion of the suspension members 16 due to changes of season or temperature. The stringers 22 in turn are supported upon heavy beams 24 which lie beneath and at right angles to said stringers throughout the width of the inclosure. Said beams 24 are supported from the suspension members 16 by means of hangers 25 connected by clips 26 or otherwise to the lower series of said suspension members and at their lower ends by stirrups 27 which surround the respective beams 24. The beams 24 likewise are made up of any suitable number of pieces which will be pivoted together wherever necessary by plates 28. It will be apparent, therefore, that the roof proper is not connected directly to the supporting columns or towers 14 and 15, but is fitted within them for free vertical movement.

In order to exclude rain and other elements from between the edges of the roof and the side and end supports, I provide preferably the following mechanism: At 29

I show inclined pieces or sheets of flashing, preferably of sheet metal, each piece having its upper edge engaged over a flange or bracket 31 carried by the end edge of the roof. The water-proof material 20 of the roof also may extend upwardly beneath the hook connection 30 of said flashing, as shown in Fig. 1. The lower edge of the plate 29 extends outwardly overlapping the upper edge 10' or 11' of the main end support with which it has a certain amount of free slidable movement and yet maintaining the storm-proof connection. The other side walls 12 and 13 are provided with downwardly and inwardly projecting ledges 32 which consist of a plate or a succession of plates connected along the upper edge at 33 to its wall and having the lower edge braced as at 34, making a stiff and rigid construction. The adjacent side edge of the roof is provided with an upwardly projecting flange 35 which preferably carries also the adjacent edge of the water-proof roofing 20, the latter extending well up beneath the ledge 32 but preferably spaced therefrom to compensate for any vertical movements of the roof.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. The herein described roof construction comprising, in combination, elevated supports arranged opposite each other in pairs, suspension members, each of such members resting upon and suspended between a pair of said supports, one set of said members being above another set thereof, hangers extending vertically between the two sets of members, a roof proper arranged beneath said suspension members and movable vertically with respect to said supports, and a series of hangers depending from the lower set of suspension members and constituting the only means for supporting the roof proper.

2. In a roof structure of the character set forth, the combination of elevated supports arranged in pairs crosswise and lengthwise of the roof, the supports of each pair being widely spaced from each other, a series of suspension members, each member being supported upon a pair of said supports, a series of stringers and roof beams beneath the suspension members and extending between said supports but independent thereof, a series of hangers between the beams and said members, means to connect the upper ends of the hangers to the suspension members and the lower ends thereof to the beams, and a storm and water-proof roof proper arranged between the suspension members

and the stringers and supported by said stringers and beams.

3. In a device of the character set forth, the combination of pairs of elevated supports arranged opposite each other at great distances, flexible suspension members extending between and supported upon said pairs of supports, the intermediate portions of the suspension members being otherwise unsupported, all of said suspension members being of substantially the same length and half of them being arranged at right angles to the other half, a roof construction extending between the elevated supports and independent thereof for vertical movements, and hanger means to support the roof from beneath the suspension members whereby the roof is not only supported but may partake of any vertical movements incident to changes of season or variations in temperature.

4. The herein described roof construction comprising stringers, beams arranged beneath the stringers and at an angle thereto, water-proofing material extending from one end of the roof to the other above said stringers, elevated supports, suspension members each extending from one support to another at a great distance and some of said members being arranged at right angles to and spaced above the rest, means to support the roof beams from said suspension members, the ends of the roof being free to move vertically with respect to said supports, and means to exclude rain and snow from the space between the roof and the supports.

5. In a suspension roof construction comprising, in combination, elevated supports arranged opposite each other in pairs crosswise and lengthwise of the roof, a series of flexible suspension members extending across and supported upon said pairs of supports, certain of said suspension members being at right angles to the others and spaced vertically therefrom, a series of hangers extending between the upper series of suspension members and the lower series thereof, a roof construction proper arranged within all of said supports and independent thereof, and means to support the roof construction proper from the lower series of suspension members.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

COOLEY BUTLER.

Witnesses:

HARRY SCHROEDER,
EDGAR W. ROSSIG.