

M. H. VAIL.

CONSTRUCTION FOR BUILDINGS HAVING CIRCULAR OR REGULAR SHAPED
ROOFS CONVERGING IN ONE POINT.

(Application filed Nov. 12, 1900.)

(No Model.)

3 Sheets—Sheet 1.

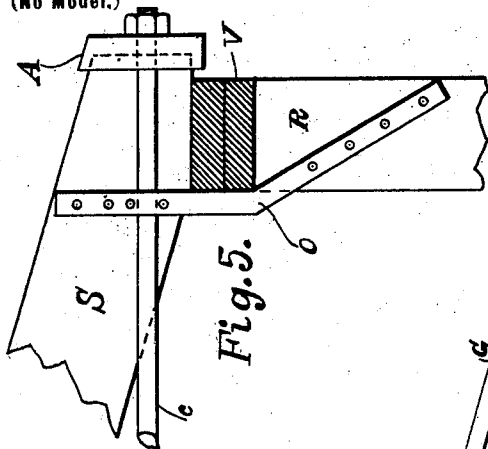


Fig. 5.

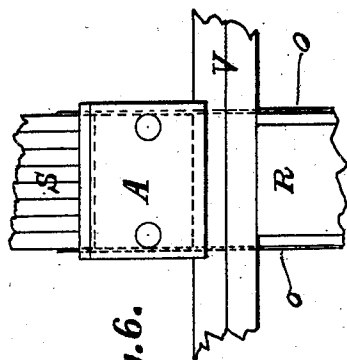


Fig. 6.

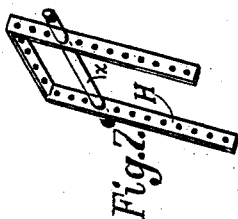


Fig. 7.

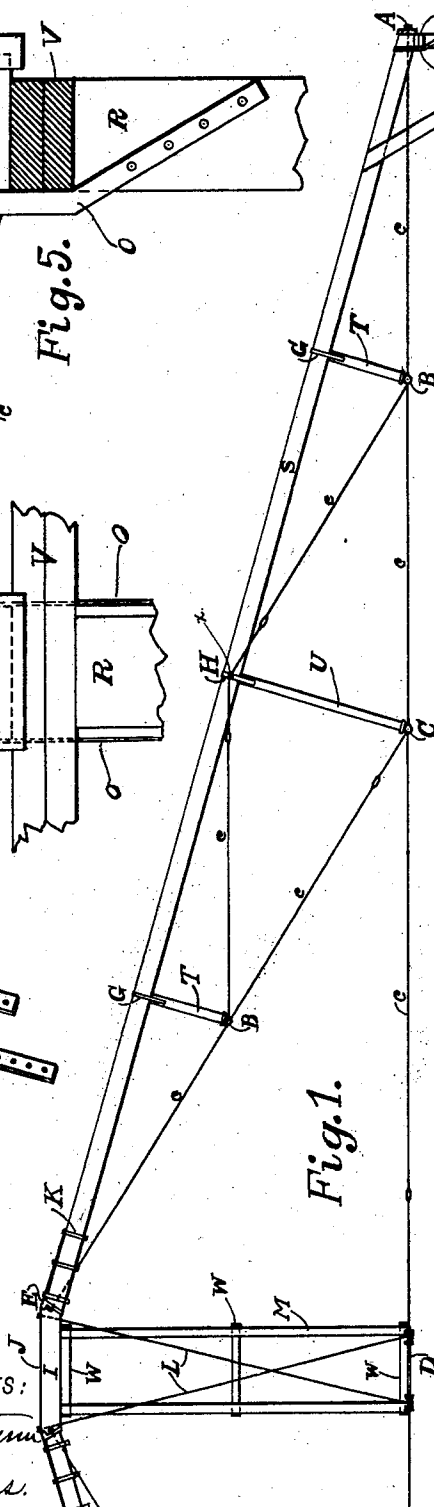


Fig. 1.

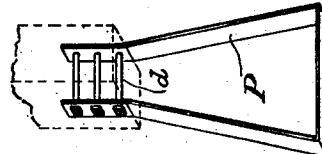


Fig. 4.

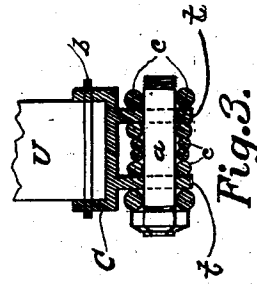


Fig. 3.

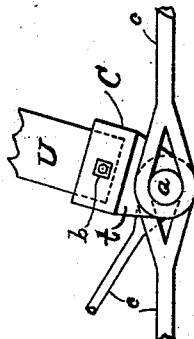


Fig. 2.

WITNESSES:

Electrician
A. H. Barnes.

INVENTOR

Morrison H. Vail

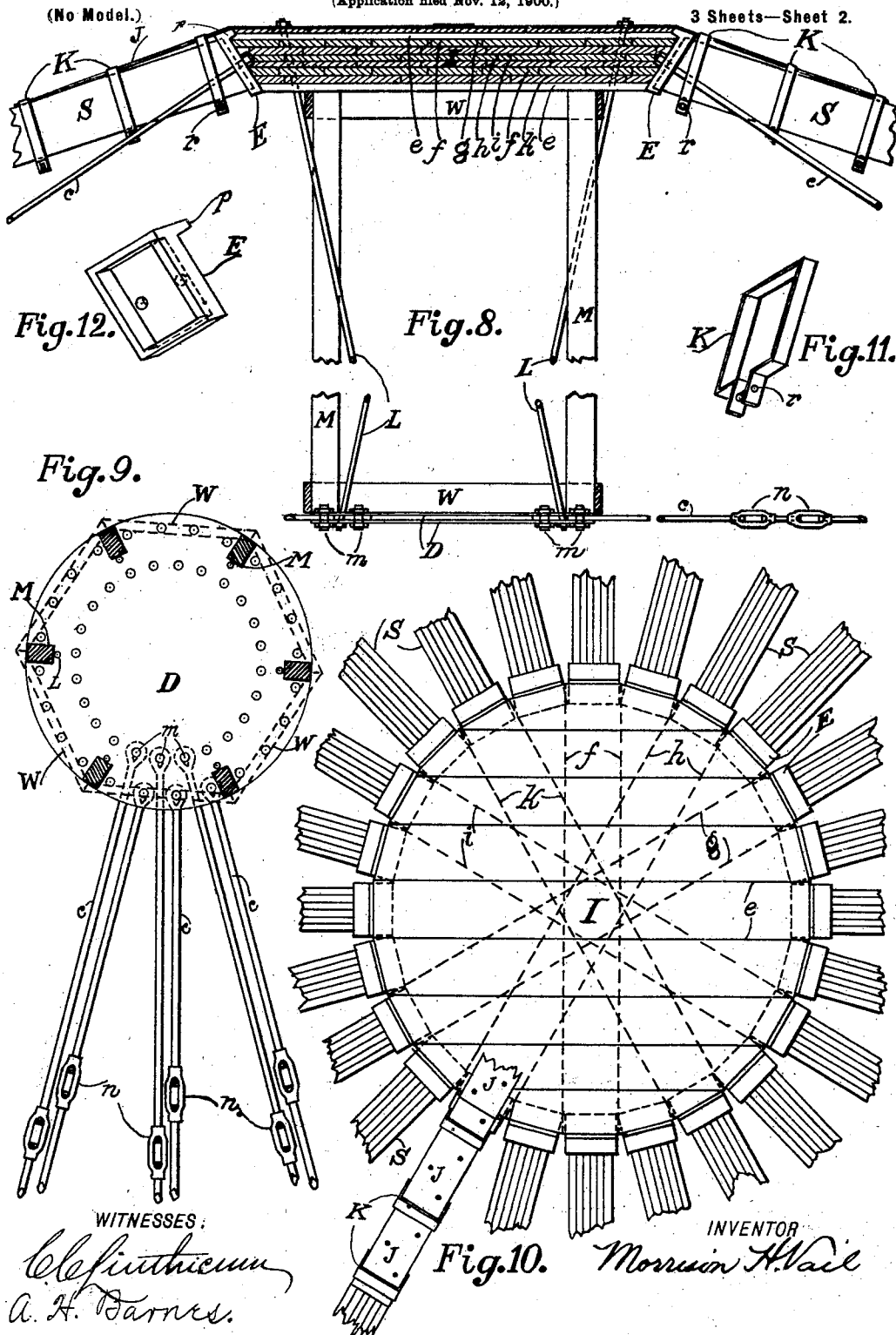
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3 Sheets—Sheet 3.

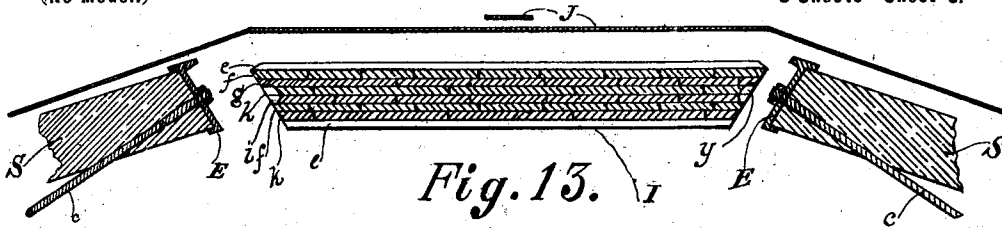


Fig. 13.

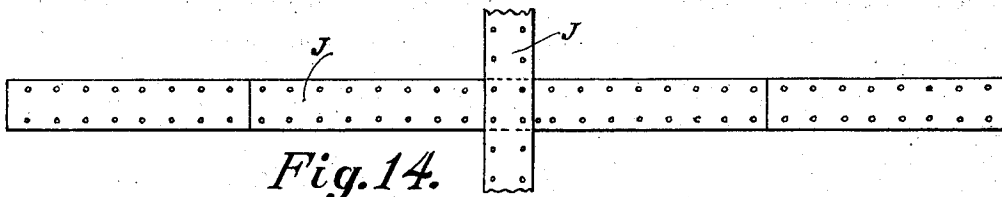


Fig. 14.

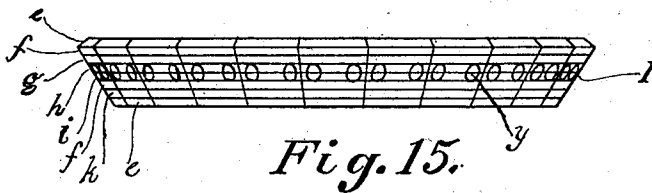


Fig. 15.

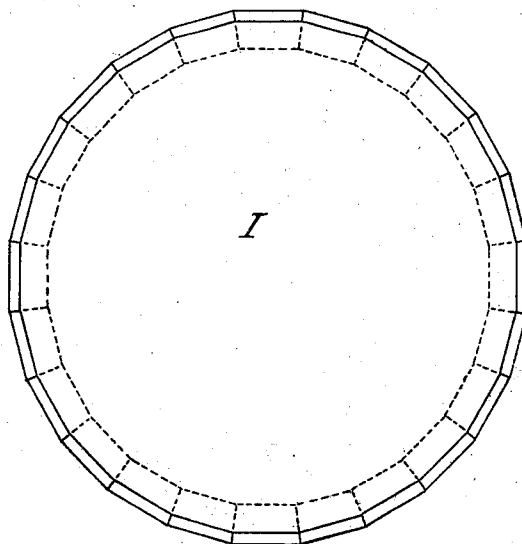


Fig. 16.

WITNESSES:

S. N. Pond,
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INVENTOR

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UNITED STATES PATENT OFFICE.

MORRISON H. VAIL, OF CHICAGO, ILLINOIS.

CONSTRUCTION FOR BUILDINGS HAVING CIRCULAR OR REGULAR SHAPED ROOFS CONVERGING IN ONE POINT.

SPECIFICATION forming part of Letters Patent No. 693,989, dated February 25, 1902.

Application filed November 12, 1900. Serial No. 36,316. (No model.)

To all whom it may concern:

Be it known that I, MORRISON H. VAIL, of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Constructions for Buildings Having Circular or Regular Shaped Roofs Converging in One Point, of which the following is a specification.

My invention relates to improvements in the constructive details of buildings which have a roof supported by trusses resting upon posts, columns, or mason-work and converging to a common center; and the objects of my improvements are, first, to provide a construction which shall be cheap, safe, durable, able to withstand any strain of wind and snow, and adaptable to large as well as small buildings; second, to provide a construction which can be examined and adjusted easily and readily throughout, and, third, to provide a construction which shall give the best acoustics and unobstructed vision throughout the space inclosed and which can be erected with despatch and at small expense. I accomplish these objects by the devices illustrated in the accompanying drawings, in which—

Figure 1 is a vertical sectional elevation of one-half of the structure. Fig. 2 is a detail view of the pin-plates. Fig. 3 is a cross-section of the pin-plates. Fig. 4 is a detail of the post-anchors. Figs. 5 and 6 are detail views of the joint at the lower end of the roof-truss. Fig. 7 is a perspective view of a truss-strap. Fig. 8 is a detail showing in section the center of the roof structure. Fig. 9 is a top plan view of the center tie-plate. Fig. 10 is a top plan view of the roof center or core. Fig. 11 is a perspective view of strut-straps, and Fig. 12 is a perspective view of certain head-plates. Fig. 13 is a sectional elevation of the central core, the adjacent ends of the rafters with their plates, and of certain tie-plates. Fig. 14 is a plan view of said tie-plates, one of them being broken away. Fig. 15 is an elevation showing the central core in edge view, and Fig. 16 is a plan view of the same in outline only.

In Fig. 1, Q is a section of the foundation in which are built the wrought-iron post-anchors P, which by their peculiar form are made very solid and secure. To said anchors P the posts R are fastened by the bolts *d* and are thus prevented from moving sidewise or being raised up by the wind. The trusses are

fastened down to the posts R by the ties N 55 and the wrought-iron straps O, which by their peculiar shape secure a vertical downpull on the truss ends without cutting wall-plates V. The cast-iron foot-plate A is so shaped as to bind the members of the truss-rafter S together and keep it from crushing or spreading apart under the strains. The cast-iron pin-plates C and B, as shown in Figs. 2 and 3, are so formed as to bind the ends of the struts U and T, being held up in place by the bolts *b*, and the position of the ears *t* spreads the outer pair of the tie-rods *c*, thus giving added lateral stiffness to the trusses. The wrought-iron strap H is so formed as to bind the pin *x*, the strut U, and the truss-rafter S in their proper positions and assist the rafter S with the strains on the pin *x*. The wrought-iron straps G bind the struts T to the truss-rafter S in their proper positions. The steel tie-rods *c* are held immovably in place on the pins *a* and *x* by the pin-plate ears *t* and nuts on the ends of said pins. 60 65 70 75

I employ two or more tie-plates J, two being illustrated in the drawings, Figs. 8 and 14, and their positions being at right angles to each other. The plates J are long steel plates, the exact width of the truss-rafters S, extending across the top of the center core I and down opposite truss-rafters S, being bound to said truss-rafters by the wrought-iron straps K, which are shaped so that they can be tightened by the bolts *r*, and these plates J, being also securely fastened to the center core I by bolts and lag-screws, prevent it from twisting out of its proper position. 80 85 90

The center core I is built up, as shown in Figs. 8, 10, 13, and 15, of several layers of planks, (marked respectively *e f g h i k*), each of said layers being composed of planks lying parallel to and abutting each other and the several layers being so positioned that the individual planks of one layer will cross the planks of the underlying layer at an angle thereto. As shown in Fig. 8, the superposed layers are shown in their relative horizontal arrangement. In Fig. 10 the solid lines show the planks of the top layer, while the dotted lines indicate the direction of the planks in each of the lower layers. The core-pieces are shaped to fit the head-plates E and are gouged out, as shown at *y*, to receive the nuts on the ends of rods *c*, whereby the head-plates E are clamped upon the 95 100 105

ends of the rafters. The planks of the several layers of the core are so arranged as to cross each other, and thus to form a solid body of circular outline, as indicated in Fig. 16, and of a thickness substantially equal to the width of the vertical end faces of the rafters and affording a bearing upon the head-plates, which makes the apex of the roof practically a solid structure. These head-plates are of cast-iron and are formed, as shown in Fig. 12, to bind together the end of the truss-rafter S and with the clip *p*, which fits over the center core I, and prevents it from being forced upward.

The truss-rafter S is built up of several thicknesses of planks, which break joints and are securely bound together by lag-screws, spikes, or bolts.

The center tie-plates D are two circular steel plates with holes, Fig. 9, for the bolts *m* and rods L and so placed that the ends of the steel tie-rods *c* rest between them. The ends of the tie-rods *c* are secured to the tie-plates D in their proper positions by the bolts *m*. The posts M, Figs. 8 and 9, are so placed between the plates D and the core I as to prevent any portion of either moving out of its proper plane toward the other, and said posts M are held together and in place by the framework W. The steel rods L, Figs. 1 and 8, are so placed as to prevent the plates D or the core I from moving out of its proper plane away from each other. This center construction is designed to make the whole truss-work rigid and prevent any twist or tip from unequally-distributed loads or strains. The turnbuckles *n* are so placed on the steel tie-rods *c* so that any slack or overstrain can be adjusted throughout the trusswork.

I am aware that previous to my invention buildings have been constructed with circular or regular shaped roofs converging to one point. I therefore do not claim such buildings broadly; but

I do claim as my invention and desire to secure by Letters Patent—

1. In a building having a circular or regular shaped roof, the combination with rafters or roof-supports converging toward a central point, of a central core composed of a plurality of layers of planks and having a thickness corresponding to the depth or vertical thickness of the rafters and connected to the ends thereof, substantially as described.

2. In a building having a circular or regular shaped roof, the combination with rafters or roof-supports converging toward a central point, of a central core composed of a series of layers or elements crossing each other and connected to the ends of the rafters, substantially as described.

3. In a building having a circular or regular shaped roof, the combination with rafters or roof-supports converging toward a central point, head-plates intermembered with said rafters and a central core composed of a series of layers or elements crossing each other

and also engaged with said head-plates, substantially as described.

4. In a building having a circular or regular shaped roof, the combination with rafters or roof-supports, and a central core of head-plates intermembering with said rafters and said core, tension members connecting the base ends of opposite rafters and struts interposed between the roof-supports and tension members, substantially as described.

5. In a building having a circular or regular shaped roof, the combination with rafters or roof-supports, foot-plates and head-plates engaging the opposite ends of said rafters, a central core interlocked with the head-plates and a tension member connecting the foot-plates, substantially as described.

6. In a truss-roof for buildings of circular or regular form, the combination with rafters or roof-supports, head-plates embracing the upper ends of said rafters, a central core engaging the head-plates of the several rafters, foot-plates engaging the lower ends of the rafters, a tension member connecting the foot-plates of opposite rafters, and strut members interposed between the tension members and the rafters, substantially as described.

7. In a building of the class described, the combination with roof-supports or rafters, straps embracing said rafters, tension members connecting the bases of the rafters, plates connected with said tension members and struts interposed between said tension-member plates and said straps and connected to each, substantially as described.

8. In a building of the class described, the combination with rafters and roof-supports converging to a common point, a central core to which said rafters are connected, tension members connected with the bases of said rafters and extending toward a common center, plates to which said tension members are secured and struts interposed between said plates and said core, substantially as described.

9. In a building of the class described, the combination with rafters or roof-supports converging toward a central point, a central core to which said rafters are connected, plates disposed axially below said core, struts interposed between said plates and the core, tension members connecting the bases of the rafters with the plates and means for tensioning said members, substantially as described.

10. In a building having a circular or regular shaped roof, the combination, with rafters or roof-supports converging toward a central point, of a central core interposed between and connected to the ends of the rafters, and plates extending across said central core and connected to the rafters and the core, whereby to prevent twisting of said members, substantially as described.

MORRISON H. VAIL.

Witnesses:

C. C. LINTHICUM,
ADA H. BARNES.