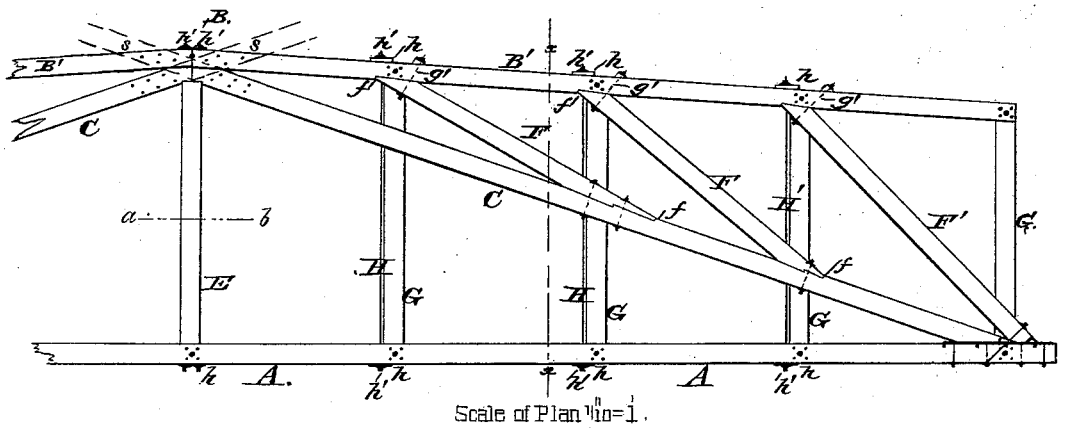
G. W. COOLEY.
Truss for Bridges.

No. 208,155. *Fig. 1.* **Patented Sept. 17. 1878**



Scale of Plan 1/10=1.

Fig. 2.

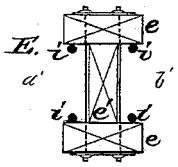


Fig. 3.

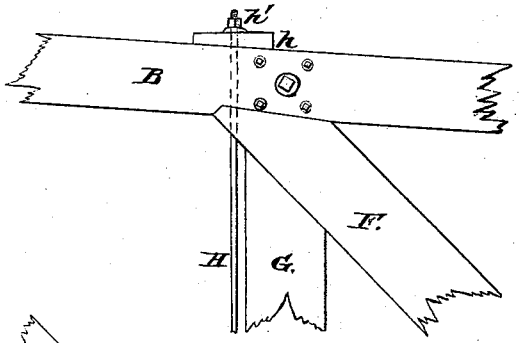


Fig. 5.

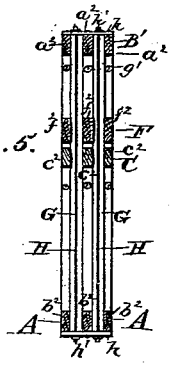
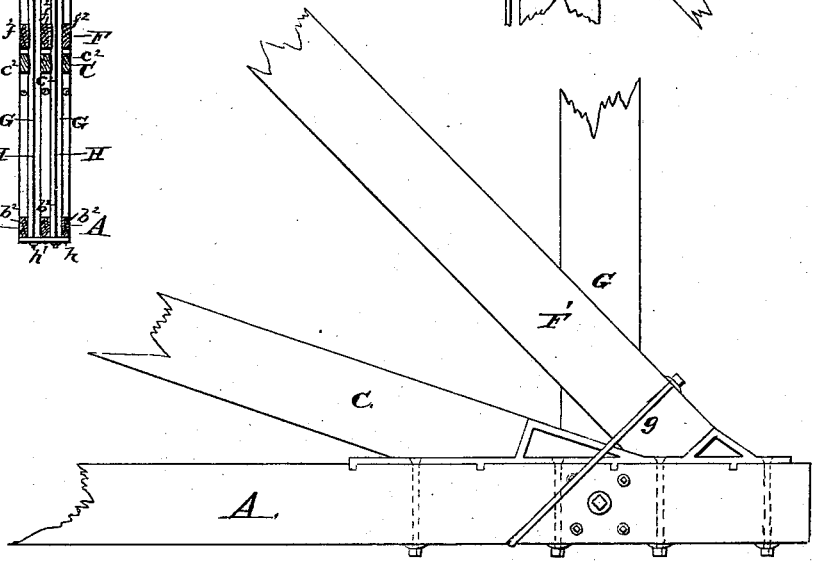


Fig. 4.



Scale of Details 1/2=1.

ATTEST:
Leroy S. Buffington.
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INVENTOR:
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UNITED STATES PATENT OFFICE

GEORGE W. COOLEY, OF MINNEAPOLIS, MINNESOTA.

IMPROVEMENT IN TRUSSES FOR BRIDGES.

Specification forming part of Letters Patent No. **208,155**, dated September 17, 1878; application filed December 31, 1877.

To all whom it may concern:

Be it known that I, GEORGE W. COOLEY, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Trusses for Bridges, &c., of which the following is a specification:

The object of this invention is the construction of bridge and roof trusses in such a manner that the strain resulting from a load upon the roadway or top may be communicated directly to the main compressive member of the truss, and thence by direct thrust to the abutments; and to this end the improvement consists, first, in the combination, in a bridge or roof truss, of two oblique shoreward-thrust rafters, having their upper ends notched to rest level upon a center post, a bottom chord, upon the ends of which the feet of said rafters and center post rest, a top chord, between and resting against which and the upper sides of said rafters are arranged only shoreward-thrust braces, suspension-rods connecting said top and bottom chords, and upright braces arranged between said chords, whereby the entire downward strain upon said truss will be directed toward its abutments; second, in a compound center post for bridge and roof trusses, the same consisting of a central member clamped edgewise between the broad sides of two side posts, having equal dimensions therewith, and connected by bolts outside of the said central member.

In the accompanying drawing, Figure 1 represents a side view of one half of the truss, the other half being identical therewith. Fig. 2 is a horizontal section of the center post on the line *a b*, Fig. 1. Fig. 3 is a detail side elevation, showing the connection of the uprights, braces, and suspension-rods with the top chord. Fig. 4 is a detail side elevation, showing the junction of the lower chord, rafter, upright, and shore-brace; and Fig. 5 is a cross-section of the truss at one side of the center post.

The letter A indicates the lower chord, which extends between the piers or abutments. B is the top chord, composed of the two slightly-inclined beams B′ B′. C C are the rafters, having their lower ends shaped to fit seats having approximately vertical and horizontal sides, and their upper ends notched so as to rest level upon and meet over the top of the center post E.

F indicates the braces between the rafters and the upper chord, B, these braces on each side of the center post inclining downwardly toward the shore ends of the truss, and having their ends fitted into notches *f* in the rafters and upper chord. F′ designates the shore-braces, and G the uprights extending between the upper and lower chords and intermediately bolted to the rafters. H indicates suspension-rods extending through the rafters and braces, and having screw-threaded ends which project through the upper and lower chords and binding-plates *h* on the outer edges of said chords, and are provided with tightening-nuts *h′*.

Obliquely through the upper chords and transversely through the upper ends of the braces extend bolts g^1, which serve to hold said braces snugly in place and prevent them from displacement by shrinkage, warping, or jolting. Similar bolts g^2 bind the lower ends of the braces to the rafters.

The center post E is composed of three separate parts, *e e e′*, of equal dimensions, and having an oblong cross-section, the center member, *e′*, being arranged edgewise between broad faces of the side posts *e e*, which are firmly clamped against it by transverse side posts, but not through the central member, *e′*. The four center suspension-rods *i i i i*, having their opposite ends secured by nuts and plates on the upper surface of the bottom chord, pass between the flanges formed by the members *e e* of the center post.

In the foregoing description I have referred to the chords, rafters, braces, and uprights as if they were each laterally-continuous pieces; but they may each be composed of two or more parallel and similar parts or members, and I prefer to construct the chords, rafters, and braces each of the three parallel members, and the uprights each of two members, one of which stands at each side of the central member of a chord, brace, or rafter, and between the outer and center members of the same, as shown in Fig. 5, where A designates the members of the bottom chord, B′ of the top chord, C of the rafters, F of the braces, and G G of the uprights, and in this arrangement I du-

plicate the suspension-rods, as shown at H H, and locate them between the parallel members of the chords, rafters, and braces, firmly connecting their upper ends to metal plates arranged across the upper edge of the complete top chord and their lower ends to similar plates beneath the complete lower chord.

In arranging the oblique braces between the rafters and top chord, I place the ends of said braces either in notches cut in the rafter and chord or in suitably-formed head and foot plates properly bolted in place; and I may use any number of said braces, but I usually have their number equal to the number of uprights; and while their tops are attached to the top chord at the junction therewith of certain of the uprights their lower ends rest upon the rafters alongside other uprights closer to the shore end of the truss, so that the bolts which bind the uprights to the rafters directly assist said rafters in resisting the downward thrust of the said braces.

The suspension-rods and bolts should, of course, always be made of metal; but the other members of the truss may be made of wood or metal, as desired.

The upper ends of the rafters and the abutting ends of the parts B′ B′ of the top chord are connected by splice-bracing, as shown in dotted lines at *s*, Fig. 1.

The shore-panels of the upper chord and the shore-uprights may be omitted, if desired, or retained to secure additional stiffness in case of a number of spans; and the top chord, when the truss is used for a bridge, may be continuously horizontal instead of inclining each way, but will be, preferably, inclined when used for a roof or bridge.

It is obvious that any downward strain upon the center of either chord of the truss will have a tendency to spread the rafters, and thus give them an endwise thrust against the shoulders at the shore end of the bottom chords, which thrust is resisted by the abutments, which are usually of firm stone-work or other masonry; and it will also be readily seen that downward strain at any intermediate part of the truss will give an endwise thrust to the braces, which is communicated to the rafters, and through the rafters to the abutments, as before described, so that at whatever point of the truss strain is brought to bear it is thrown shoreward, where resistance can, with the most facility, be provided, and the bridge or roof relieved of liability to break down.

What I claim is—

1. The combination, in a bridge or roof truss, of two oblique shoreward-thrust rafters, having their upper ends notched to rest level upon a center post, a bottom chord, upon the ends of which the feet of said rafters and center post rest, a top chord, between and resting against which and the upper sides of said rafters are arranged only shoreward-thrust braces, suspension-rods connecting said top and bottom chords, and upright braces arranged between said chords, whereby the entire downward strain upon said truss will be directed toward its abutments.

2. The truss center post composed of three parts of approximately equal dimensions, and the outer parts forming flanges connected by bolts for securing the center part in place, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

GEO. W. COOLEY. [L. S.]

Witnesses:

L. S. BUFFINGTON,

B. W. FISK.