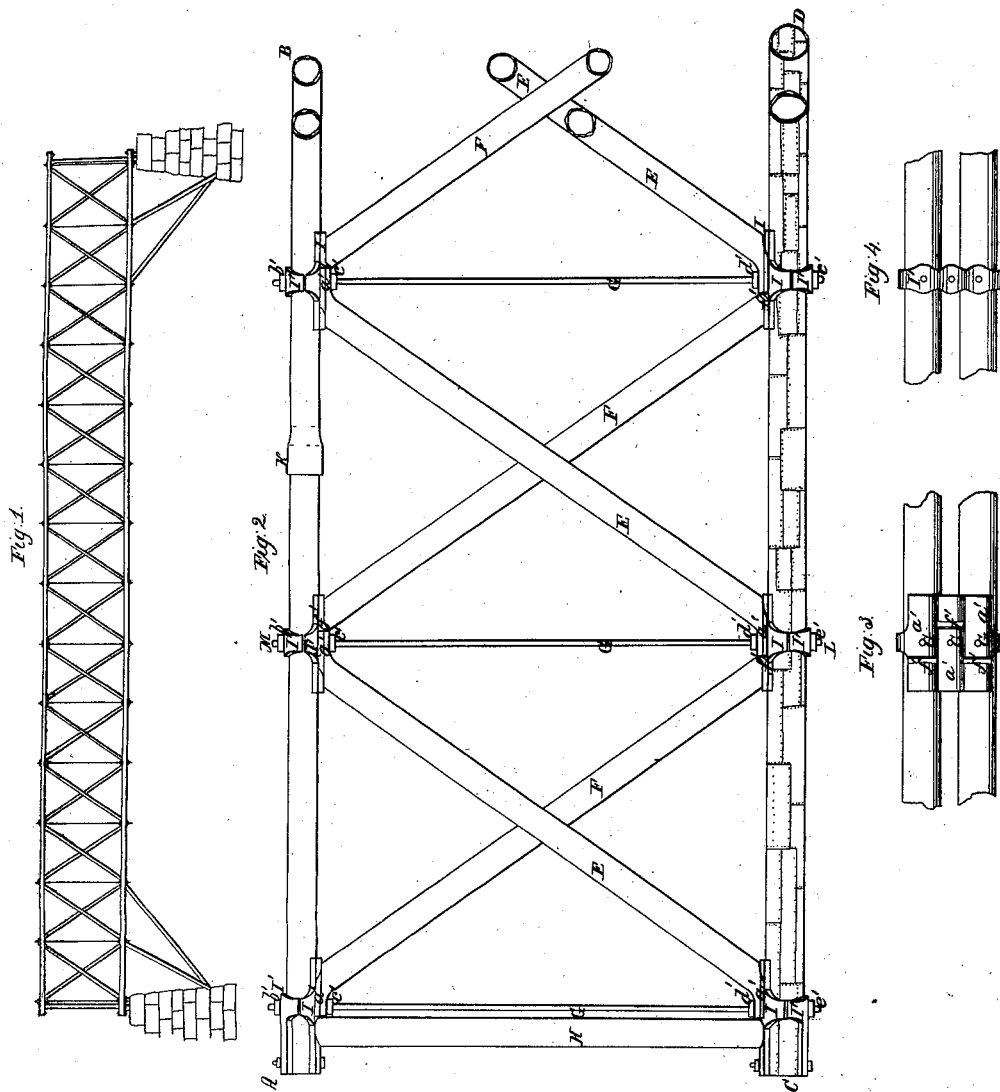


F. Harbach.
Truss Bridge

No. 4,694.

Patented Aug 12, 1846.



UNITED STATES PATENT OFFICE.

FREDK. HARBACK, OF PITTSFIELD, MASSACHUSETTS.

BRIDGE.

Specification of Letters Patent No. 4,694, dated August 12, 1846.

To all whom it may concern:

Be it known that I, FREDERICK HARBACK, of Pittsfield, in the county of Berkshire and State of Massachusetts, have invented a new and useful Improvement in Truss-Frames for Bridges, Roofs, &c.; and I do hereby declare that the same is fully described and represented in the following specification and accompanying drawings, letters, figures, and references thereof.

Of said drawings Figure 1 exhibits a longitudinal elevation of my improved truss frame; Fig. 2, a longitudinal and vertical elevation of a part of it, taken through one of the beams of either the top or bottom cords; Fig. 3, a top view of a part of the bottom cord, and saddle or stirrup, at the junction of the braces and suspension bolts or rods. Fig. 4 is a bottom view of part of said bottom cord, exhibiting one of the counter stirrups on which the lower beams of the lower cord rest. Fig. 5 is a transverse section taken through one end of the vertical suspension rods of the truss.

In my improved truss frame I make use of hollow metallic cylindrical beams, for all or any of the main cords, and braces, and counter braces. The said beams being made in the shape of cylinders, can be manufactured so as to combine great strength and stiffness. Although I consider the adoption of such to constitute a great improvement in trusses for bridges, etc., I make use in connection therewith of another of much importance, and by so doing obtain a truss frame whose capability to resist vertical strains far exceeds that of any combination of like character of which I am aware is now in use.

A B, Fig. 2, is the top cord or stringer, composed of two parallel cast iron or other proper metallic tubular beams, each of which is made in sections which are connected together, by lapped joints (one of which is seen at K), or in any other convenient and proper manner.

C D is the lower cord similarly constructed of two parallel tubular beams made of boiler wrought iron plates riveted together, in the manner of those of steam boilers. E E E &c. are the principal braces and F F F the counter diagonal braces all made of cylindrical tubes of wrought or cast iron and each cast with a toe piece, *a'*, at each end of it and projecting from opposite sides of it as seen in the drawing.

G G, are the vertical suspension bolts or rods, which pass down through the cords, and toe pieces of the braces, and counter braces. They are placed three abreast with four screw nuts, *b'*, *c'*, *d'*, *e'*, upon each, (as seen in Fig. 2) and the said bolts connect the cords or stringers and at the same time confine the braces and counter braces, in their proper positions. At each end of the truss a cylindrical tubular post H, may be inserted between the top and bottom cords in order to aid in keeping them at their proper distances apart.

I I, &c., denote metallic saddles suitably shaped to receive and support the cords which rest against them. In connection with the said stirrups counter stirrups or saddles I' I' are disposed with respect to the cords and made to fit them as seen in Fig. 5. The ends of the braces and counter braces, rest in contact with saddles I I their positions thereon being insured by projections *f' f'* raised upon the saddles, the toes of the braces abutting against the said projections. The stirrups and saddles serve as safeguards to prevent the cords from being crushed, or flattened, by the action of the screw bolts and nuts; the toe pieces of the diagonal braces being made to receive the suspension bolts, G G, through them to be confined to the stirrups and saddles by screws and screw nuts, placed upon the bolts as seen in the drawings. By confining the toe pieces of each diagonal brace and counter brace directly to the saddle I, I, by supplementary screws and screw nuts upon the bolts I convert the said brace and counter brace into a suspension brace, and counter brace as well as a thrust brace and counter brace; that is to say I enable them to act by tension as well as thrust.

In what is known as "Howe's patent bridge" which consists of diagonal braces, abutting blocks and tension rods, the braces act by thrust only. They in no respect operate by tension or as suspension braces.

By combining with the braces, and counter braces, the toe pieces and with the tension rods the supplementary screws and nuts as above described, I effect a very important improvement in such a bridge truss, as the braces and counter braces may thus be made to act as suspension or tension, as well as thrust braces, and thus to resist the vertical strains upward as well as downward. In railway viaducts this is a very important

matter, as when a bridge is to be subjected to the rolling of a heavy train of cars over it, we should guard as much as possible against undulatory motion, so destructive to bridges, wherein the braces and counter braces act by thrust only, and are confined to the chords by abutting blocks and suspension bolts.

Although I have described the tubular beams and claim the right to use such in a bridge it will be evident that other arrangements or constructions of beams may be used, and therefore I do not confine myself strictly to the proportions of the various parts as expressed in the drawings nor to the material or materials as above set forth but intend to vary such as circumstances may require while I maintain an analogous combination or combinations of them. I do not therefore claim as my invention the combination of diagonal thrust braces and counter braces (which act by thrust only) and vertical suspension rods, but

That which I do claim as my improvement thereon consists in—

A combination of devices by which the diagonal braces operate either by thrust or tension, at pleasure, while the vertical rods at the same time operate either by tension or thrust; the said combination, by which this peculiarity is derived being composed of the attachments of the diagonal braces and counter braces, and upper and lower stringers—together with the double sets of nuts upon the vertical rods, one set being above and the other being below each stringer, the whole being substantially as hereinbefore specified.

In testimony whereof I have hereto set my signature this eighth day of June A D. 1846.

FREDERICK HARBACK.

Witnesses:

JAMES D. COLT,
S. A. WRIGHT.