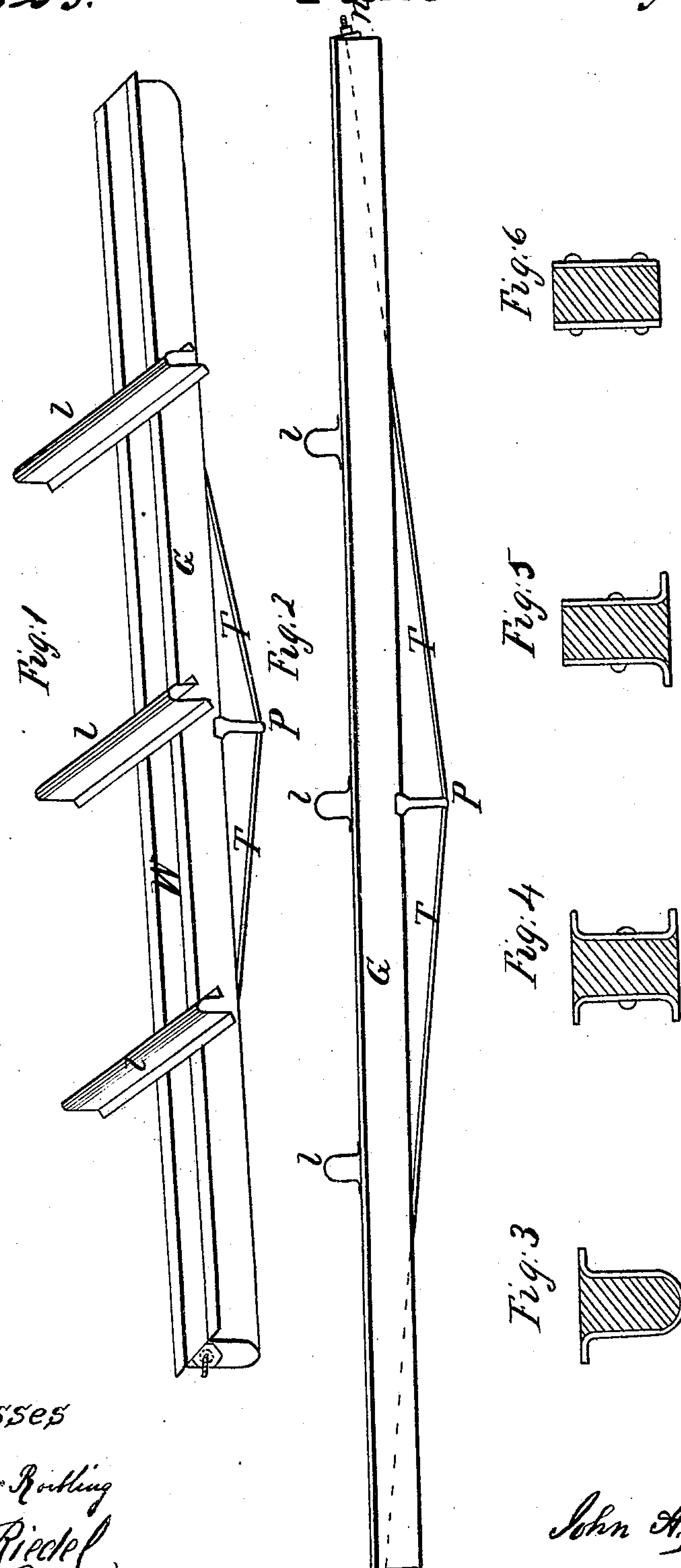
J. A. Roebling.
Bridge Girder.

No. 29,825. Patented Aug. 28, 1860.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN A. ROEBLING, OF TRENTON, NEW JERSEY.

TRUSSED COMPOUND GIRDER.

Specification of Letters Patent No. 29,825, dated August 28, 1860.

To all whom it may concern:

Be it known that I, JOHN AUGUSTUS ROEBLING, civil engineer, of Trenton, in the county of Mercer, in the State of New Jersey, have invented certain new and useful Improvements in the Construction of Trussed Girders, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make a part of this specification, and in which—

Figure 1 represents a perspective view of one of my improved trussed girders, supporting transverse beams, as in the floor of a bridge or railroad car, the points of support of the girder itself being omitted. Fig. 2 shows a side elevation of such a girder, the course of the tension rods on the inside being shown by dotted lines; Fig. 3, a transverse vertical section through the middle of the same, and Figs. 4, 5, and 6 show transverse sections of different forms which may be given to the girder.

In many kinds of structure it is desirable to employ an iron girder filled in with wood, as the iron supports and protects the wood and adds to its efficiency as a beam, whereby the quantity of iron for a required degree of strength may be diminished, while the compound beam thus formed, may be made lighter and cheaper than one wholly of iron. At the same time the inside beam or filling or wood serves to maintain the form of the iron, especially when it is thin, and to prevent a change of shape from lateral shocks or blows. Various forms of compound girders of wood and iron have been used. But when such beams are made of considerable length, it becomes desirable to stiffen them by trussing, and it is for this purpose that my invention has been made. The beam to be trussed being a compound one of wood and iron, it is a matter of great importance that the strain of the tension rods should be properly supported, and also that this support should not be uncertain or varying in its character.

I attain the desired end by passing the tension rods through the wooden beam or filling of the iron girder and causing the strain of the rods to bear upon the ends of the wood by means of suitable washers, plates or other equivalent arrangements.

By this contrivance the wood is firmly supported and its resistance to end pressure much increased, the iron girder is relieved from a strain which would have a tendency to displace and weaken it laterally, while the strain of the tension rods is always thrown upon the same points, independent of any unequal expansion or contraction in length as between the iron girder and its wooden filling, the whole combination being made harmonious in its action as a beam.

Having thus explained the principle of my invention, it will be easy to understand the mode of construction, which I will now proceed to describe as applied to the support of beams transverse to the girder.

An iron girder (G,) is to be made of the proper length and depth, with a section such as is known as the **U** form. Inside of this I place a wooden beam (W,) the surface of which is nicely fitted to the internal surface of the iron girder. Iron tension rods (T, T,) are introduced through perforations proceeding from each end of the wooden filling at the proper angle and through perforations in the iron girder, and are secured to a pedestal (P,) under the center of the girder, or to a piece bearing upon the pedestal. The pedestal itself may be secured and attached to the girder in any convenient way. In some cases a single rod may be used from one end of the beam to the other, passing over and bearing against the pedestal. Plates or washers should be placed at the ends of the beam with perforations to allow the tension rods to pass through them, and the proper degree of tension may be given to the rods by nuts (*n*, *n*,) screwed on their ends and bearing upon the washers which transfer the strain to the wood.

The transverse beams may be secured to the iron girder by bolts passing through its flanges.

It is evident that without departing from the spirit of my invention, various modifications may be made to suit particular circumstances. Sometimes it may be most convenient to invert the position of the girder, turning its concavity downward, in this case the tension rod need only pass through the wood. In some cases the girder may be strengthened on the open part, that is the one distant from the concavity, by straps, or other contrivances fastened to the two flanges, or to the two lips if there are no flanges. By such an arrangement, the two sides of the girder may be kept more closely

applied to the wood and prevented from spreading. In some instances it will be found advantageous to change the form of the section of the girder from the one more commonly known as the U section, to one in which the two lips are made to approach each other, instead of being parallel or diverging, giving a form of section somewhat resembling a horseshoe. Instead of being made in one the iron may consist of two parts placed on each side of the wood and secured together by bolts, the parts having single flanges as in Fig. 5 or double flanges as in Fig. 4.

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

A trussed compound girder, consisting of an iron girder filled in with wood combined with tension rods having their strain directly sustained by the wood.

JOHN A. ROEBLING.

Witnesses:

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