

J. W. EVANS.
Girders for Bridges.

No. 144,751.

Patented Nov. 18, 1873.

Fig. 1.

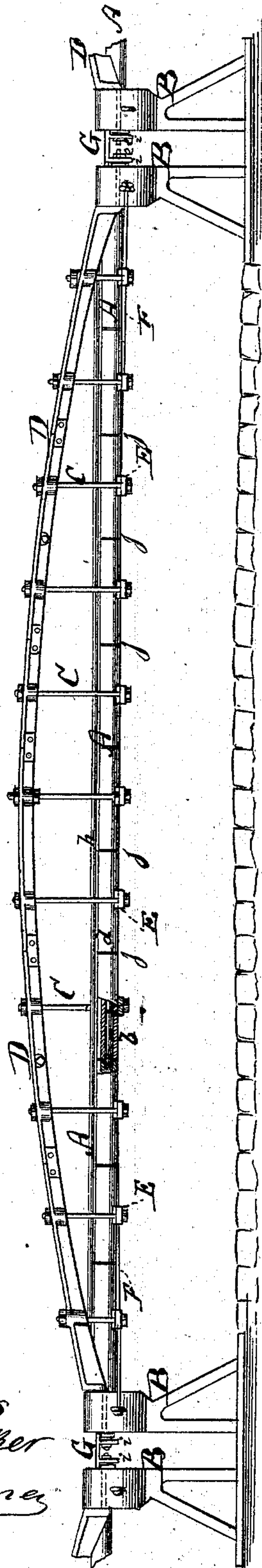


Fig. 2.

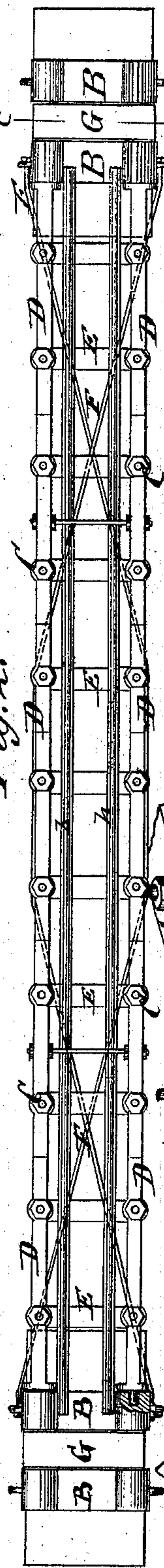


Fig. 3.

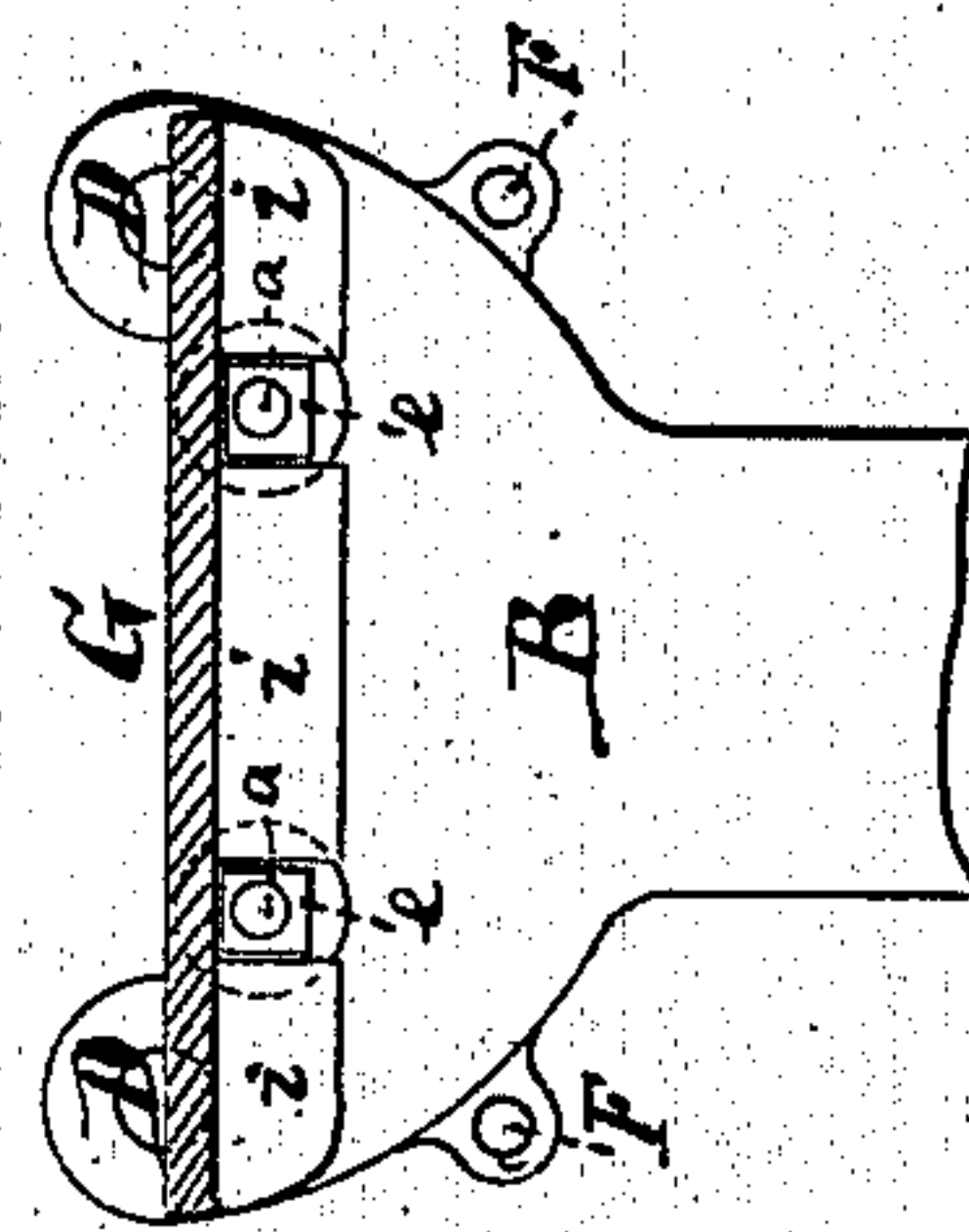
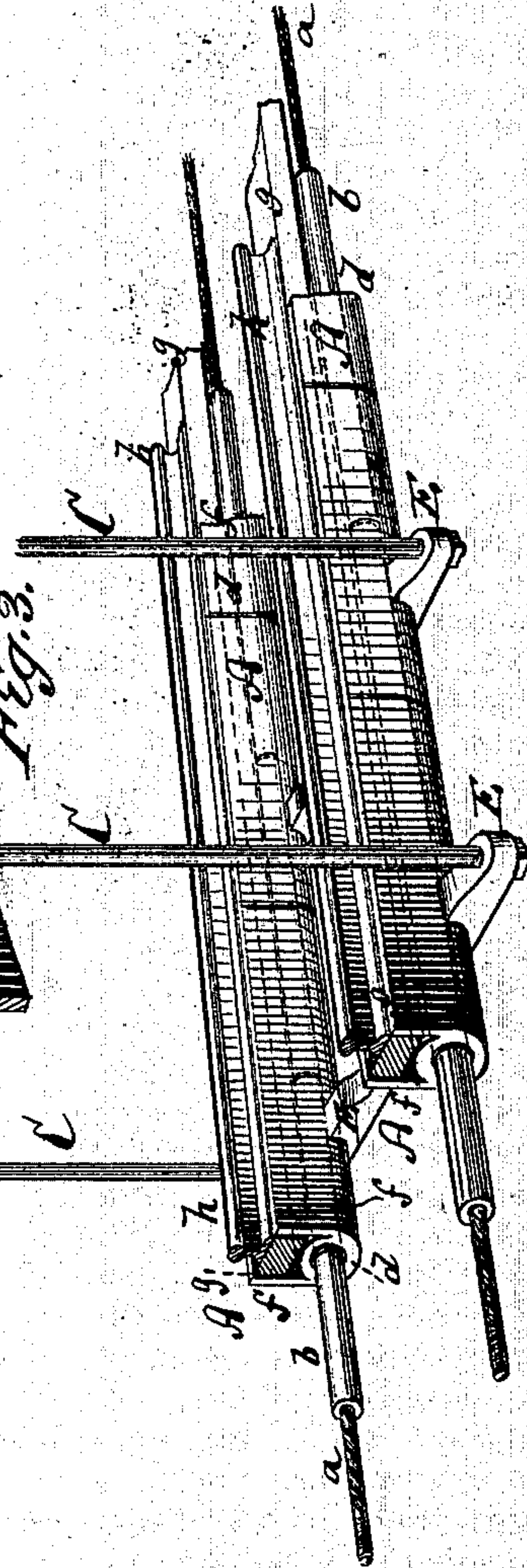


Fig. 3.



Witnesses
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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN GIRDERS FOR BRIDGES.

Specification forming part of Letters Patent No. 144,751, dated November 18, 1873; application filed April 9, 1873.

To all whom it may concern:

Be it known that I, JAMES W. EVANS, of the city, county, and State of New York, have invented an Improved Girder for Bridges, &c., of which the following is a specification:

Figure 1 is a side elevation, partly in section, of my improved girder for bridges. Fig. 2 is a top view of the same; Fig. 3, a sectional perspective view thereof; Fig. 4, a detail transverse section on the line *c c*, Fig. 2.

Similar letters of reference indicate corresponding parts in all the figures.

The object of this invention is to improve the construction of the longitudinal girders of bridges, railroad-crossings, &c., with a view toward increasing their strength, lightness, and cheapness, and for providing free expansion and contraction under the influence of heat and cold. The invention is particularly applicable for use on elevated railroads over streets in cities and towns; and consists in making the lower chord of the girder of three concentric parts, of which the outer is tubular, the next inner also tubular, and the innermost of wire-rope.

The outer part or shell of the chord is made in sections of convenient length, breaking joints with the sections of inner tubing that are embraced by such outer shell, so that the inner tubing will thus prevent all danger of weakness at the joints of the outer shell, and vice versa. The central wire-rope extends to the abutments or posts, and is there properly supported to give the requisite stiffness and main support to the girder.

My invention also consists in casting on the outer shell upwardly-projecting lips, between which the sleepers of the rails, in case the chord is to be used as a support for a railway-track, are embedded, they being thereby properly sustained on the top of the outer shell, and prevented from lateral displacement by the aforementioned lips.

In the accompanying drawing, the letter A represents the lower chord of my improved girder, supported on posts or abutments B B at its ends, and connected, by upright braces C C, with an arch, D, the braces C connecting, at the lower ends, with transverse

beams E, that constitute the suspension-supports of the brace A.

There may be two or more girders on each bridge or crossing; and there may also be a series of oblique braces, F, as shown in Fig. 2, that extend diagonally under the girders, from one to the other, for increasing the strength of the supporting device.

The lower chord A is made of an inner wire-rope, *a*, inner tube *b*, which surrounds the wire-rope, and of an outer tube or shell, *d*, embracing the tube *b*. The wire-rope extends from post to post, and is, at its ends, connected with nuts *e*, that bear against the outer sides of the posts, and can be applied to hold the wire-ropes at their proper tension. The inner tube, *b*, is made in sections of suitable length; the sections of the outer tube, *d*, being substantially of the same length, but so placed, with respect to the sections of *b*, that the joints of the inner and outer tubes will be broken, as shown at the sectional part of Fig. 1, and also indicated in Fig. 3. The outer shell or tube, *d*, has upwardly-projecting lips *f f*, which serve as side supports for the sleepers *g* of the railroad-rails *h*.

When the bridge is not to be used as a support for a railroad, these lips *f* may be dispensed with, although they may be applied, in that case, for holding longitudinal beams that support the bridge planking.

When several spans of a bridge or crossing of this construction are arranged in line, the adjoining posts B B of the two spans have a space left between them, which is bridged by a connecting-plate, G. This plate G has downward-projecting flanges *i*, that are notched to embrace the nuts *e*, and thereby prevent said nuts from turning.

Whenever it is desired to turn these nuts it is first necessary to raise the connecting-plate G off its supports, and thereby to liberate the nuts.

Between every pair of sections of the outer shell, *d*, is placed a washer, *j*, which I prefer to make of corrugated metal; or which may, if desired, be made of elastic material, such as rubber, or otherwise. The elasticity of this washer allows the girder to expand and con-

tract lengthwise, and still serves to keep the joints tight and properly closed.

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

1. The lower chord A, constructed of an outer tubular shell, *d*, inner tube *b*, wire-rope core *a*, substantially as described.

2. The shell *d*, provided with projecting lips *f f* for holding the sleepers *g*, substantially as described.

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Witnesses:

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