No. 747,511. PATENTED DEC. 22, 1903.

J. TOMLINSON.

BRIDGE CONSTRUCTION.

APPLICATION FILED JUNE 26, 1903.

NO MODEL.

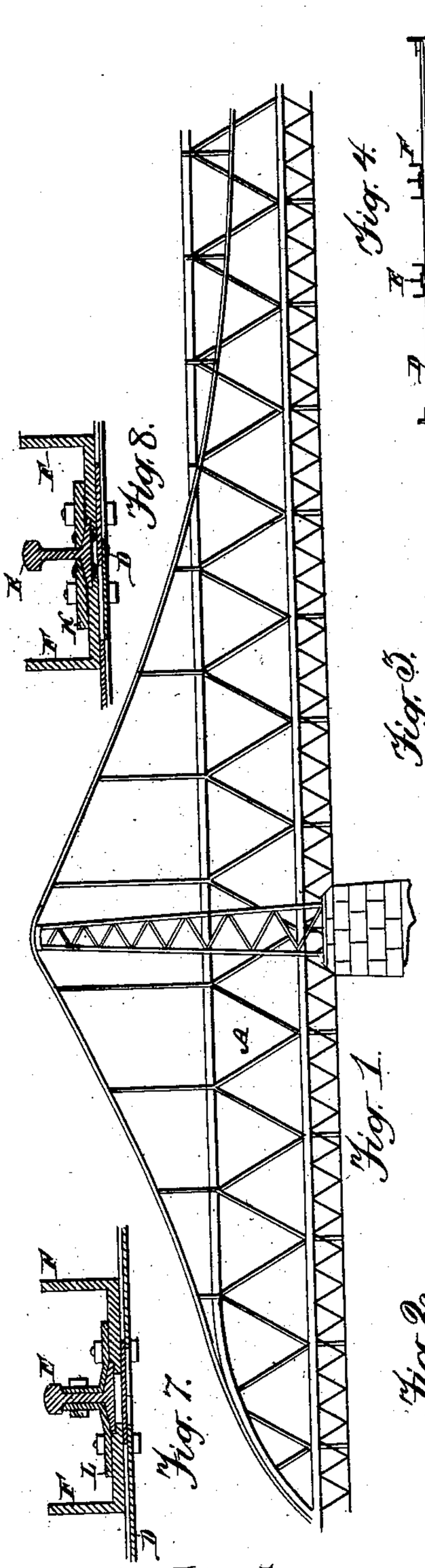

Fig. 1.

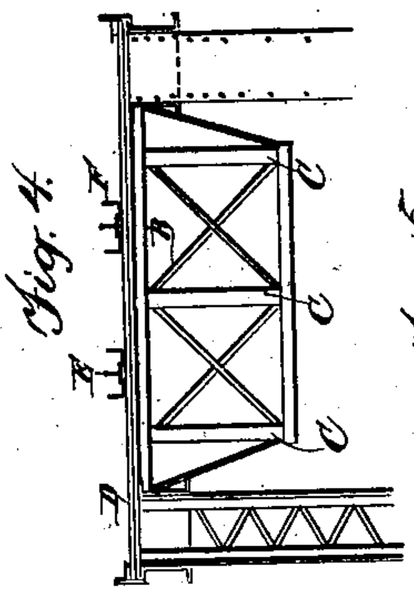

Fig. 4.

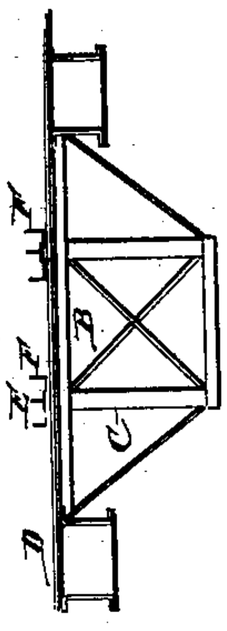

Fig. 5.

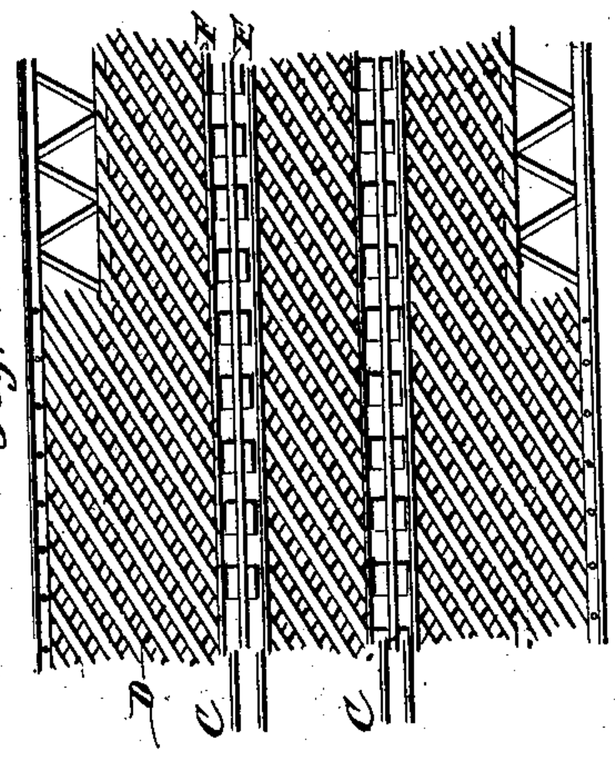

Fig. 3.

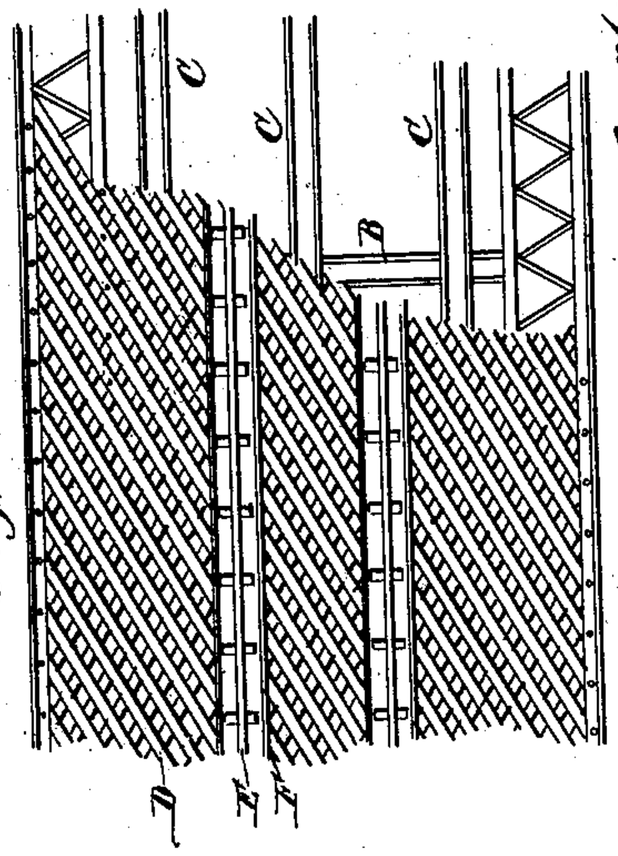

Fig. 2.

Fig. 8.

Fig. 7.

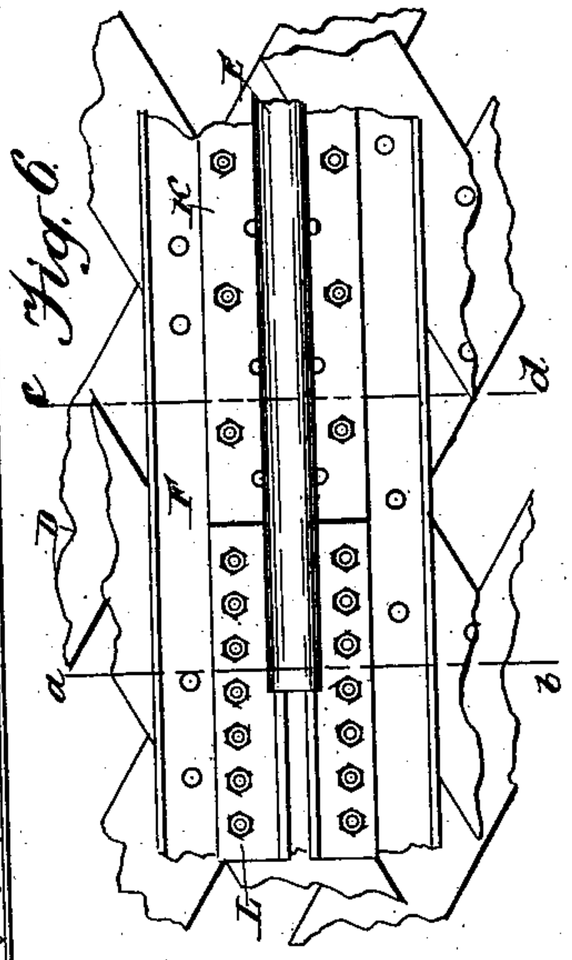

Fig. 6.

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No. 747,511. Patented December 22, 1903.

UNITED STATES PATENT OFFICE.

JOSEPH TOMLINSON, OF CEDAR RAPIDS, IOWA.

BRIDGE CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 747,511, dated December 22, 1903.

Application filed June 26, 1903. Serial No. 163,253. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH TOMLINSON, a citizen of the United States, residing at Cedar Rapids, in the county of Linn and State of Iowa, have invented certain new and useful Improvements in Bridge Construction, of which the following is a specification.

This invention relates to cantaliver suspension-bridges supported on steel chains or wire cables and the like in which the suspended structure is constructed to form a rigid stretcher between the ends of the cables or chains. The whole being formed of steel or iron will expand and contract equally with the cables.

The primary object of my invention is to construct the suspended part of the structure in the strongest possible manner, eliminating as much as possible all weighty materials that do not increase its strength, rigidity, and durability.

The nature of the invention will fully appear from the description and claims following, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a cantaliver suspension-bridge constructed in accordance with my invention. Fig. 2 is a fragmentary plan view of the floor or deck, showing its general construction, the rails in this case being placed midway of the longitudinal girders. Fig. 3 is a similar view, but with the rails placed directly over the longitudinal girders. Fig. 4 shows a transverse girder uniting the chords of the main trusses and supporting the longitudinal girders, in this case three in number. Fig. 5 is a similar view, but showing two instead of three longitudinal girders. Fig. 6 is a framentary plan view showing the manner of mounting the railway-rails on the bridge-floor when placed between the girders. Figs. 7 and 8 are sections taken in the lines *a b* and *c d*, respectively.

In carrying out my invention in practice the main stiffening-trusses are made of great depth, with the bracing forming long panels, as shown in Fig. 1. The transverse girders B, uniting the chords of the main trusses A, have considerable depth and are both very light and very strong, so as to amply support the longitudinal girders C, the floor D, tracks E, and moving loads passing over them.

The longitudinal girders extending the whole length of the structure have depth and strength to support and convey the moving loads to the transverse girders. Their upper chords are formed with angle-irons C′ to unite them by rivets with the lattice-flooring, which serves to hold them straight and adds considerably to their compressive strength.

In Fig. 4 three longitudinal girders are shown placed far enough apart to allow the railway-rails to be mounted on the lattice-floor above and between them. By this construction the spring or slight yield to the impact of passing loads prevents injurious jars that are usually avoided by the use of timber ties.

In Fig. 5 two longitudinal girders are shown, and these are placed directly under the rails E and guard-rails F, which latter may be riveted through the lattice-bars of the floor to the angle-irons of the top chords of the girders.

The floor or deck of the bridge is formed of two layers of steel or iron flat bars long enough to unite the chords of the main trusses and arranged in opposite diagonal lines, as shown. These bars D are securely riveted to the upper angle-irons of the chords to corresponding parts of the girders and to each other at every intersection. The union of both upper edges of the chords takes the place of plates or lacing. This construction, involving comparatively little weight in the flooring, forms a system of lattice-bracing from side to side and the whole length of the structure and adds very greatly to its compressive strength.

In securing the rails and guard-rails to the lattice-flooring midway of the longitudinal girders the guard-rails are riveted to the lattice-bars and add their own stiffness to the compressive strength of the structure. On the rabbeted inner edges of these guard-rails are set the railway-rails and are held securely in place by bolts and clips, as indicated in Fig. 2, or by continuous clamp-bars K and bolts, as shown in Figs. 6 and 8. In the case of the latter construction the clamp-bars may be riveted to the rail-flanges and the latter

in turn bolted to the guard-rails and through the lattice-bars, as shown.

In the case of a foot-bridge channel-bars would take the place of the rails and guard-rails shown, being riveted to the lattice-bars at a suitable distance apart to take the wheels of vehicles. The channel-bars thus add to the compressive strength in the same manner as do the rails and guard-rails and allow the planking to be thinner and lighter than would be required for the concentrated weight of loaded wheels.

The rails are laid on the bridge with closely-abutting ends, which are secured by fish-plates with flaring bottom flanges L, securely bolted to the floor of the bridge. The rails thus become component parts of the bridge and take their part of the compression. No provision need be made for the expansion and contraction of the rails, (as by slotting the fish-plate bolt-holes,) since the rails expand and contract equally with all other parts of the bridge.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a bridge or the like structure, a floor or deck composed of flat steel or iron bars placed obliquely in opposite directions, riveted to each other at the intersections, and to the main trusses and the longitudinal and transverse girders, substantially as and for the purpose set forth.

2. In a railway-bridge, the combination with the rails, of a floor or deck of diagonally-crossing lattice-bars of steel or iron riveted to the bridge trusses and girders, and riveted or bolted to the rails, substantially as described.

3. In a bridge having trusses and girders, substantially as described, a lattice-floor composed of obliquely-crossing flat bars of steel or iron riveted to said trusses and girders and to each other at the intersections, and rails secured to the lattice-work between the girders, substantially as and for the purpose set forth.

4. In a railway-bridge, the combination with the floor composed of obliquely-crossing lattice-bars of steel or iron riveted to the trusses and girders, of rails having clamp-bars riveted to their bottom flanges, guard-rails rabbeted to take the edges of said flanges, and riveted to the lattice-work, the clamp-bars being held by bolts or rivets passing through them, the guard-rails and said lattice.

5. In a railway-bridge, the combination with a steel or iron lattice-floor riveted to the trusses and girders, of guard-rails riveted to the lattice, and rabbeted to take the sides of the rails, clamp-bars extending between the fish-plates, and fish-plates with extended lateral flanges, said clamp-bars and fish-plates being bolted through the guard-rails and lattice-floor, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH TOMLINSON.

Witnesses:
F. J. KUBICEK,
J. M. ST. JOHN.