

(No Model.)

J. R. WORCESTER.
BRIDGE FLOORING.

No. 480,483.

Patented Aug. 9, 1892.

Fig. 1.

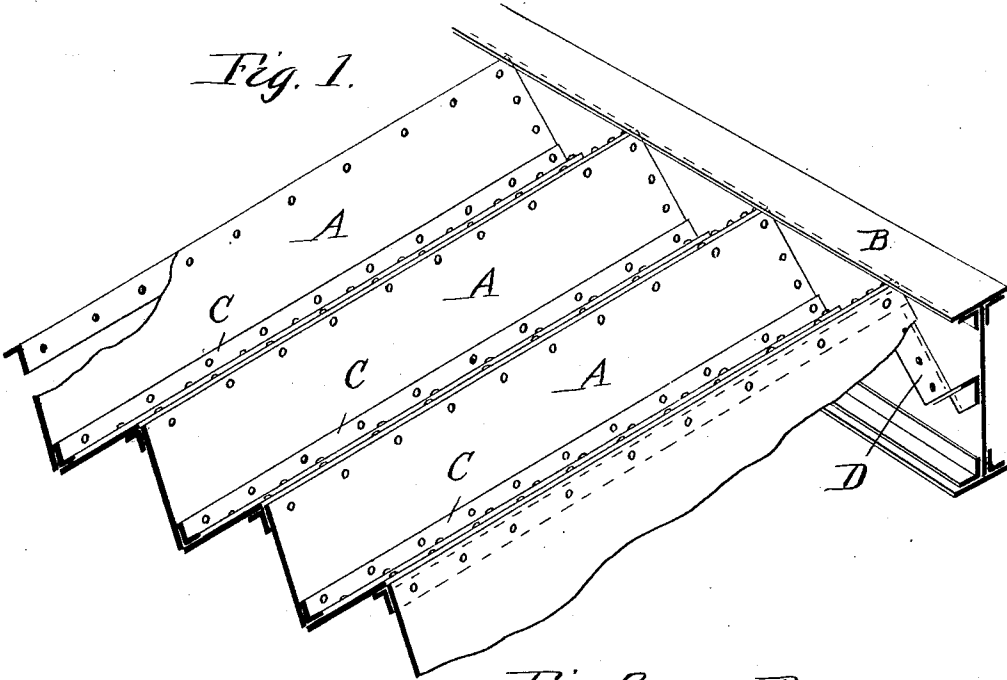


Fig. 2.

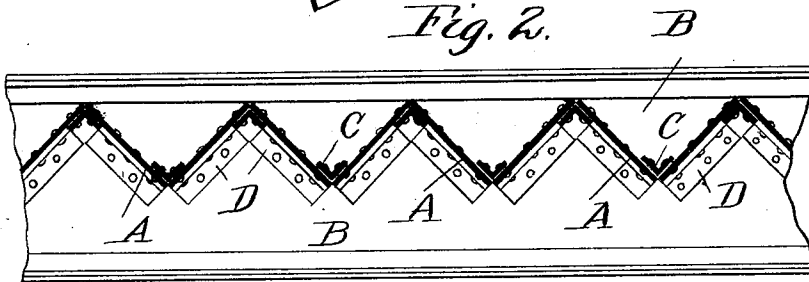
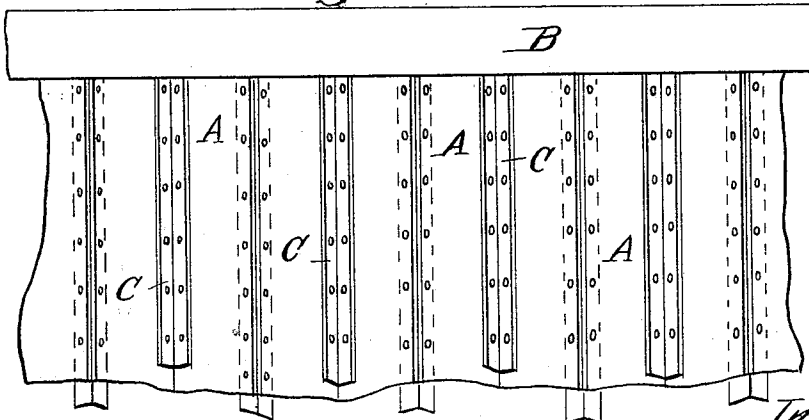


Fig. 3.



Witnesses—
W. P. Keene.
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UNITED STATES PATENT OFFICE.

JOSEPH R. WORCESTER, OF WALTHAM, ASSIGNOR OF ONE-HALF TO DAVID H. ANDREWS, OF BOSTON, MASSACHUSETTS.

BRIDGE-FLOORING.

SPECIFICATION forming part of Letters Patent No. 480,483, dated August 9, 1892.

Application filed October 26, 1891. Serial No. 409,851. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH R. WORCESTER, civil engineer, a citizen of the United States, residing at Waltham, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Bridge-Flooring, of which the following is a specification.

My invention relates to bridges, and more particularly to bridge-floors, and has for its object to provide a floor for a railroad or highway bridge which shall be capable of sustaining a heavy load and at the same time be of simpler and cheaper construction than others which have gone into use, while admitting of more accurate computation of strength.

To this end I construct my floor of a foundation of iron put together in a peculiar way, which is more fully described hereinafter, the peculiarities of construction and their attendant advantages being pointed out in the specification hereunto annexed, while the elements of novelty are more particularly set forth in the claims.

Heretofore bridges have been floored by heavy planking laid over floor-beams of any pattern; but with the increased speed and weight of railroad-trains this has become insufficient. Where the rails are so closely attached to the bridge structure it has been found desirable to employ a higher class of labor to repair the track than was otherwise necessary. This has increased the outlay for maintenance of way, and has sometimes caused delay in repairs. The same reasons for a change of practice exist, though necessarily to a less degree, in ordinary highway-bridges. For the reasons indicated those railroads carrying heavy traffic have endeavored to substitute a floor on bridges which would not only carry the usual live load, but would be of such strength as to admit of a solid concrete bed topped by the usual depth of ballast, in which the ties are embedded. Upon these ties the rails are laid. It will be seen that the roadway upon bridges is similar to other parts of the line, and the ordinary section-hands have no difficulty in preserving its grade and alignment. The additional strength needed has, however, been attained in some cases by having the flooring of un-

desirable depth, not only increasing the cost of bridges, but making the grades approaching them unnecessarily steep, involving expense of filling and of locomotive-fuel. The construction named is particularly objectionable where the railroad crosses a canal or highway or the highway crosses a canal, in which cases it is desirable to approximate the two grades as closely as possible. One form adopted of flooring which has been previously used has a section showing a top horizontal line of about five inches, a similar bottom line, and an inclined line connecting the two. The inclined lines of adjacent sections lap and are joined by rivets. The main objection to this is the fact that there is an uncertainty involved in calculating the strains produced in this section by a concentrated load, for unless the concentration falls over the center of a section transverse strains are produced, which must necessarily be resisted by the transverse stiffness of the web, which is comparatively small, and, further, in order to make this form of section special rolls are necessary, which involve a considerable expense and limit the use of the form to special sizes. Another form has been a square plate having the center dished to the form of a spherical segment; but this cannot be used in many places, as it is only suitable for very short spans.

My invention obviates the defects named in previous structures, and is fully illustrated in the accompanying drawings, hereby referred to and made a part of this specification, showing the form in which I prefer to embody my invention, in which—

Figure 1 is an isometric projection; Fig. 2, a cross-section on the line 2 2 of Fig. 3, looking toward the beam B; and Fig. 3 a plan of my improved floor.

A A, &c., are pieces of flat plate-iron of a width suited to the depth of floor desired, this depth being determined by the span of the floor and the intended load. The pieces A A are connected at their edges by angle-irons C C, &c., riveted to the plain web in the usual way, so that a cross-section shows a series of triangles with one side missing, each connected to its neighbor at the apices of the missing side. The floor is thus composed of

a series of alternate triangular prisms having an open side. These angle-irons are shown on the inside of the angle formed by two adjacent webs A A; but it is manifest that they may be on the outside thereof without affecting the identity of my invention. The flooring is shown connected to an ordinary built-up I-beam B by means of ordinary brackets formed of triangular angle-iron, as shown at D, Figs. 1 and 2. The flooring thus arranged has a wide range of adjustment, and may be proportioned with great accuracy to the load to be carried. It may be used to span the distance between trusses, thus obviating the necessity for cross floor-beams and stringers and saving much in necessary depth of floor. If the space between the trusses is wide, the angles may be sharpened, and as the web is thus more nearly vertical it is greatly increased in strength. In case the span is so great that it would require a large amount of material to so construct the floor the trusses may be connected by floor-beams, between which my flooring may be built in the manner set out.

In addition to the advantages already described, my flooring may be riveted by an ordinary riveting-machine, while the old forms

already described require a machine of special construction having peculiarly-formed jaws, involving extra expense.

Having thus described my invention, what I claim, and wish to protect by Letters Patent of the United States, is—

1. A bridge-flooring composed of a metallic web and having a cross-section composed of a series of triangles with one side missing, each triangle connected to its neighbor at the apices of the missing side, substantially as described.

2. A bridge-flooring composed of a metallic web so arranged as to form a series of alternate triangular prisms having an open side, substantially as described.

3. A bridge-flooring composed of plain strips of plate metal, as A A, connected at their edges by angles, as C C, so as to form alternate triangular prisms having an open side, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JOSEPH R. WORCESTER.

Witnesses:

GEO. H. WILLIAMS, Jr.,
ERNEST T. PEVERLY.