T. J. & W. V. MOORE.

BRIDGE.

APPLICATION FILED JAN. 13, 1915.

1,153,099.

Patented Sept. 7, 1915.

2 SHEETS—SHEET 1.

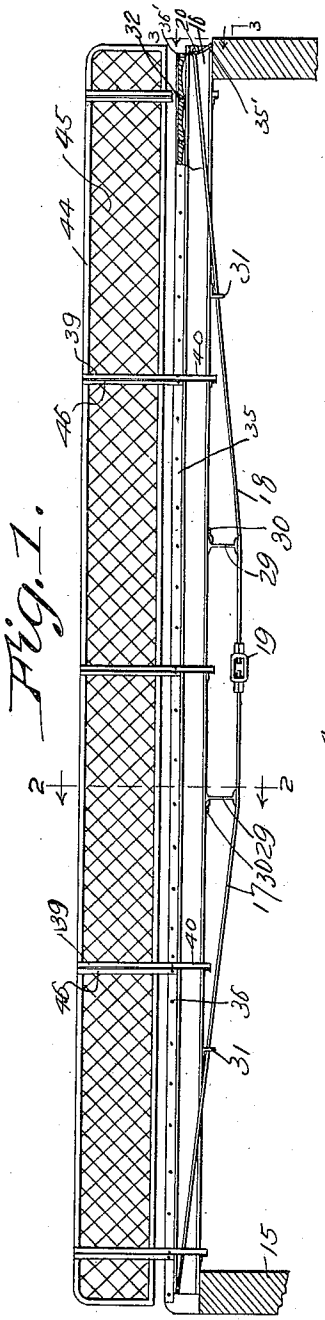


Fig. 1.

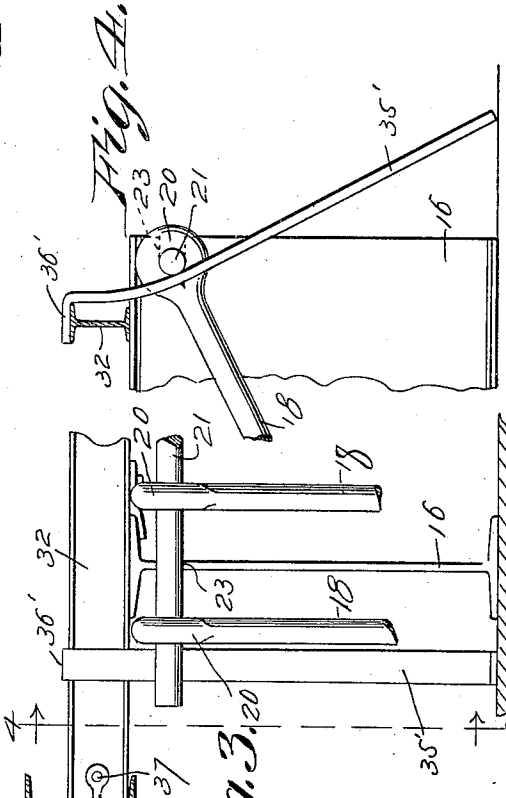


Fig. 4.

Fig. 3.

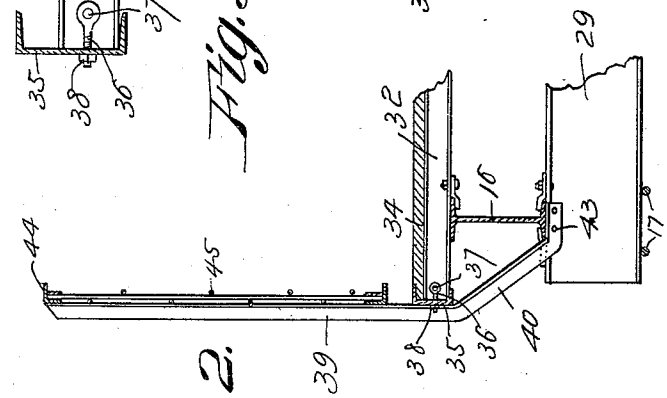


Fig. 2.

Witnesses

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2 SHEETS—SHEET 2.

Fig. 6.

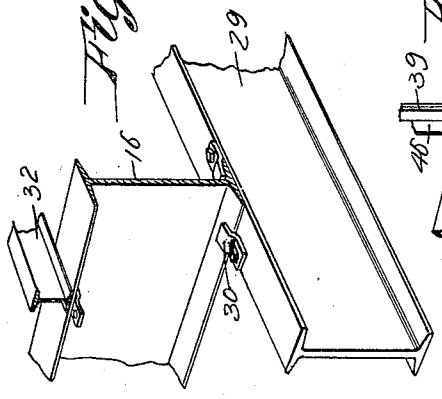


Fig. 13.

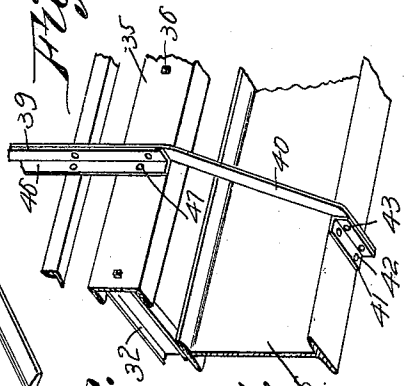


Fig. 14.

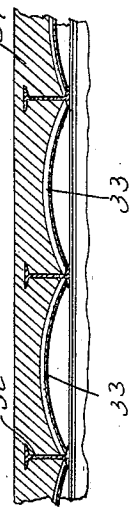


Fig. 7.

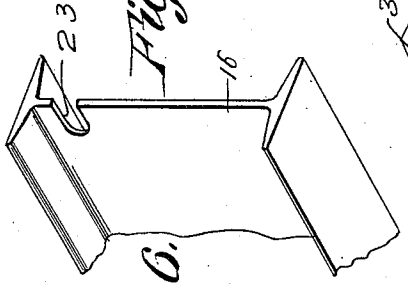


Fig. 12.

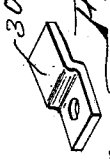


Fig. 11.



Fig. 10.

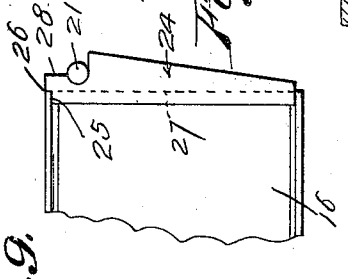


Fig. 6.

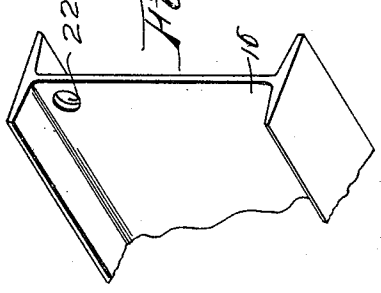


Fig. 9.

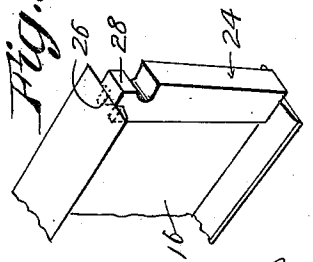
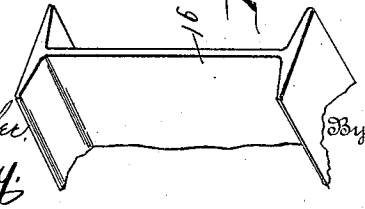


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

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BRIDGE.

1,153,099. Specification of Letters Patent. Patented Sept. 7, 1915.

Application filed January 13, 1915. Serial No. 2,041.

To all whom it may concern:

Be it known that we, THOMAS J. MOORE and WILLIAM V. MOORE, citizens of the United States of America, and residents of Sandusky, in the county of Sanilac and State of Michigan, have invented certain new and useful Improvements in Bridges, of which the following is a specification.

This invention relates to bridges and particularly to means for forming a bridge with a concrete roadbed in which means are provided for protecting the side edges of the roadbed; the said invention furthermore including the provision of novel means for supporting that portion of the roadbed between I-beams while in the course of construction and thereafter, thus doing away with scaffolding and other structure usually necessary to support the workmen and for supporting the material forming the roadbed.

A still further object of this invention is to provide a structure in which the truss-beams, stringers and floor beams are secured together in a manner to insure proper positioning of the I-beams so that they may be retained in perpendicular positions on the abutments or stringers, the said invention furthermore including means whereby the load on the bridge is distributed so as to prevent undue strain at any given point.

With the foregoing and other objects in view, the invention consists in the details of construction, and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this specification wherein like characters denote corresponding parts in the several views, and in which—

Figure 1 illustrates a view in elevation, partly in section illustrating a bridge embodying the invention; Fig. 2 illustrates a sectional view of a fragment of a bridge on a line corresponding with the line 2—2 of Fig. 1; Fig. 3 illustrates a sectional view on the line 3—3 of Fig. 1; Fig. 4 illustrates a sectional view on the line 4—4 of Fig. 3; Fig. 5 illustrates a perspective view of a fragment of a stringer; Fig. 6 illustrates a similar view of the said stringer having means for engaging a shaft; Fig. 7 illustrates a perspective view of a stringer with a modified construction for holding a shaft; Fig. 8 illustrates a perspective view of a fragment of the bridge section showing fragments of metallic parts in assembled relation; Fig. 9 illustrates a perspective view of a fragment of a stringer with a modified shaft anchoring device. Fig. 10 illustrates a view in side elevation of the device shown in Fig. 9 with the shaft applied thereto; Fig. 11 illustrates a top plan view of the shaft anchoring device, detached; Fig. 12 illustrates a perspective view of a clamp; and Fig. 13 illustrates a perspective view of fragments of the bridge structure in assembled relation. Fig. 14 illustrates a sectional view of a fragment of the bridge and road bed.

In these drawings 15 denotes the piers, posts or other supports of a bridge on which the stringers 16 are placed, said stringers having means for anchoring the ends of truss-rods, the said truss-rods being here illustrated as comprising the sections 17 and 18 connected by a turn buckle 19, the ends of the said truss-rods remote from the turn buckle having eyes such as 20 to receive the shaft 21, the shaft 21 in turn being anchored to or at the ends of the stringers. As has been stated, the rods may be anchored in different ways and for the purpose of illustration, we have shown in Fig. 6 that the stringer has an aperture 22 for the reception of a shaft, whereas in Fig. 7, the stringer has a notch 23 forming a seat for the said shaft.

In Figs. 9 and 10, there is shown a modified means for anchoring the shaft to the stringer, the same consisting in a shoe 24 fitted to the end of a stringer, such as is shown in Fig. 5 of the drawing, the said shoe having cut away portions to form shoulders 25 and 26 engaging the under surface and the end of the flange of the stringer and the said shoe furthermore having a slot 27 to receive the web of the stringer. The manner of applying the shoe to the stringer is well shown in Figs. 9 and 10 and the manner of applying the shaft 21 to the seat 28 formed in the edge of the shoe is also well illustrated.

It is apparent, therefore, from the foregoing description that various methods may be employed for creating an anchorage for the shaft, some of which have been illustrated herein, as stated.

The truss-rods are shown as supporting truss-beams 29, the upper flanges of which

are secured to the under surfaces of the stringers by the clamps 30, a type of such clamps being illustrated in Fig. 12. It will be seen that the clamp has an aperture for a bolt by which it is secured in place and these clamps are employed at different places in the construction of the bridge and they will hereinafter be referred to by the term "clamps" and it is to be understood that elements of the character described or their equivalents are meant thereby.

Near the point of intersection of the truss-rods and stringers, the said stringers have L-irons 31, the bases of which are secured to the stringers and the flanges of which depend to engage the truss-rods. The floor beams 32 extend transversely of the stringers and are preferably secured thereto by clamps, the said floor beams being preferably of the I-beam construction and the spaces between the said floor beams being guarded by the corrugated steel sheets 33 transversely curved, the convexed surface thereof extending upwardly and the side edges of the said corrugated sheets resting on the base flanges of the floor beams.

By reason of the construction just described, the spaces between the floor beams are guarded and the said corrugated sheets constitute supports for the roadbed 34 which roadbed may be made of concrete or other suitable material. It will be observed also that the spaces between the edges of the corrugated sheets and the top flanges of the floor beams constitute pockets in which the material forming the roadbed may be lodged, and the said floor beams are practically embedded in the said roadbed, adding materially to the stability of the structure and to the rigidity thereof.

As a means for supporting the shaft, a supporting bar 35′ is supplied, preferably at the outer side of each stringer, said shaft support having an angular upper end 36′ which rests on a floor beam, whereas the lower end thereof is supported by the pier or post 15. By reason of the construction of the shaft support, it will be seen that the said shaft has a bearing of metal, as shown in Figs. 3 and 4, and the said shaft support furthermore aids in reinforcing the concrete and facilitates the assembling of the parts owing to the fact that the shaft will rest on the bar.

At each end of the floor beams we apply a channel iron 35ª, the lower flange of which fits under the floor beams and the upper flange of which extends above the floor beams a distance approximately equal to the thickness of the roadbed, so that the roadbed or the material thereof, will enter the space between the upper surfaces of the floor beams and the upper flange of the channel iron and the channel iron will therefore protect the edges of the roadbed and retain the material in place. As a means for securing the channel iron to the floor beams, the said channel iron is provided with apertures for the reception of the eye-bolts, such as 36, the eye of each of the bolts being engaged by a stud or pin 37 projecting from a web of a floor beam and the shank of each eye-bolt extends through an aperture of the channel iron and is engaged by a nut 38 so that the channel iron is clamped against the ends of the floor beams.

There is a series of standards 39 at the ends of the floor beams and these standards each have downwardly and inwardly projecting extensions 40 anchored to L-plates 41 secured to the bottom flanges of the stringers by any appropriate fastenings, as 42. The manner of attaching the lower ends of the standards to the L-plates is an immaterial detail of construction but fastenings 43 are illustrated. They may be rivets, bolts or other appropriate means. The bridge has a guard rail or frame 44 holding the lattice work 45 and the said frame is secured to the standards through the medium of the frame supports 46 which frame supports are secured, to the standards and to the channel irons 35 by the bolts 47.

The construction of a bridge will, it is thought, be understood from the foregoing description, and it will be seen from an inspection of the drawing and the foregoing description that numerous advantages could be enumerated for the construction and relation of parts shown and described. It is particularly noted that by embedding the floor beams, the beams are held erect, the steel shaft is suitably supported irrespective of its connection with the stringers and the truss-rods are tied against movement. The guard rails or lattice work may be readily removed or applied and many other advantages will be apparent to those skilled in the art.

We claim—

1. In a bridge, stringers, truss rods, shafts for anchoring the ends of the truss rods to the stringers, floor beams supported by the stringers, truss beams resting on the truss rods and engaging the stringers, corrugated plates between and supported by the floor beams, a roadbed supported by the plates and floor beams, channel irons embracing the ends of the floor beams and the roadbed, and means for holding the channel irons on the floor beams.

2. In a bridge, stringers, means for supporting the stringers, shafts, means for anchoring the shafts at the ends of the stringers, truss rods connected to the said shafts, truss beams supported by the truss rods, means for clamping the truss beams to the stringers, floor beams supported by the stringers, plates between and supported by the floor beams, channel irons connected

to the ends of floor beams, a roadbed supported by the floor beams, standards having extensions anchored to the stringers, and a guard frame secured to the said standards.

3. In a bridge, stringers having truss rod anchoring means at the ends, truss rods extending therefrom, truss beams held against the under surface of the stringers by the said truss rods, floor beams carried by the stringers, channel irons at the ends of the floor beams and extending thereabove, means for securing the channel irons to the floor beams, and metal sheets interposed between the floor beams and forming with the floor beams supports for the roadbed.

4. In a bridge, stringers, truss rods, shafts to which the truss rods are connected, means for anchoring the shafts to the ends of the stringers, and shaft-supporting bars comprising members having angular portions resting on the floor beams, said supporting bars being of curved formation extending under the shafts to produce a bearing therefor.

5. In a bridge, stringers, truss rods, means on the ends of the stringers for anchoring the truss rods thereto, truss beams interposed between the truss rods and the stringers, floor beams supported by the stringers, channel irons having apertures therein, means attached to the floor beams and engaging the channel irons for holding said channel irons on the ends of the floor beams, and metal plates interposed between the floor beams and constituting with said floor beams supports for the roadbed.

6. In a bridge, stringers, truss rods, means on the ends of the stringers for anchoring the truss rods thereto, truss beams interposed between the truss rods and the stringers, floor beams supported by the stringers, channel irons having apertures therein, means attached to the floor beams and engaging the channel irons for holding said channel irons on the ends of the floor beams, and metal plates interposed between the floor beams and constituting with said floor beams supports for the roadbed, standards having their lower portions attached to the stringers, guard frames, and means for attaching the guard frames to the standards.

In testimony whereof, we affix our signatures in the presence of two witnesses.

THOMAS J. MOORE.
WILLIAM V. MOORE.

Witnesses:
WM. DAWSON,
FRED J. BENEDICT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."