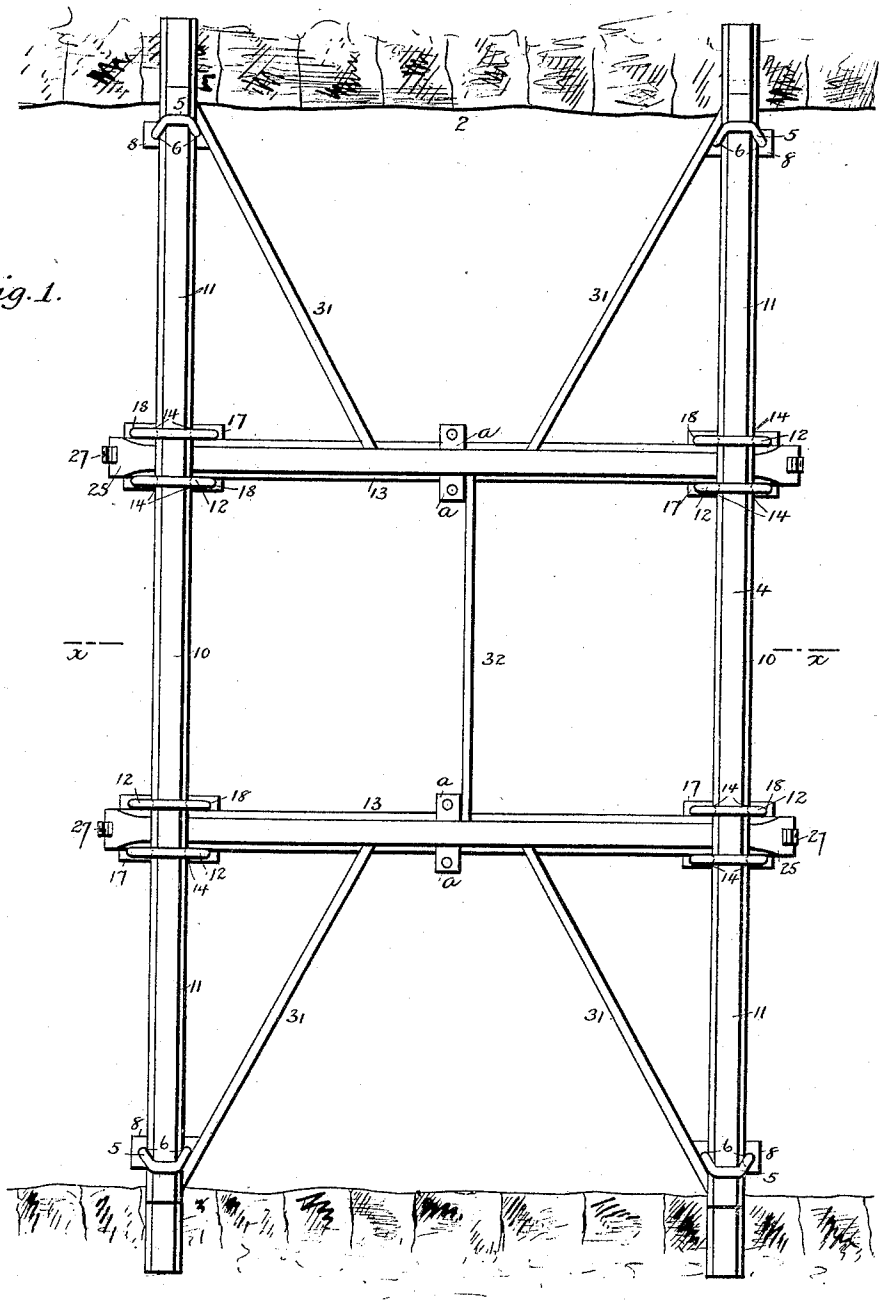
(No Model.) 3 Sheets—Sheet 1.

D. F. LANE.

TRUSS BRIDGE.

No. 424,318. Patented Mar. 25, 1890.

Fig. 1.



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Fig. 2.

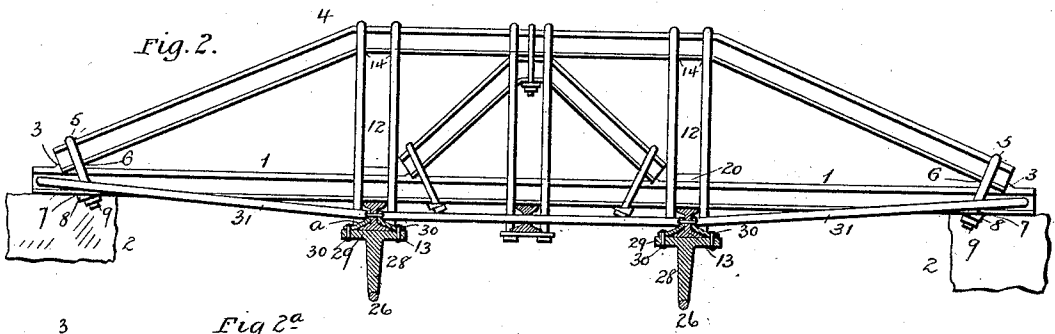


Fig 2a



Fig. 2b

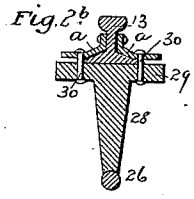


Fig. 2c

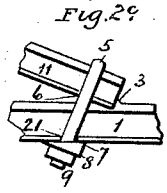


Fig. 3.

Fig. 3a

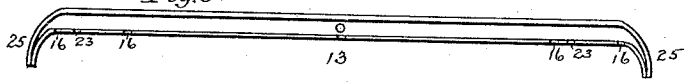


Fig. 4.

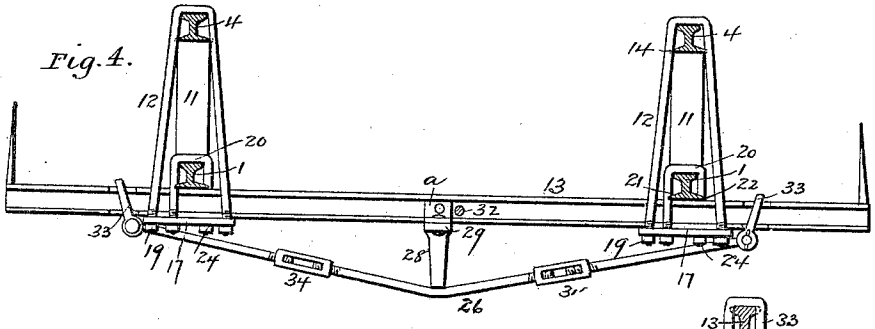


Fig. 4a

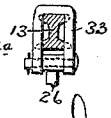
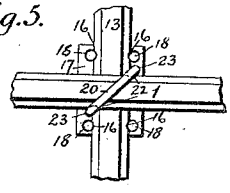


Fig. 5.



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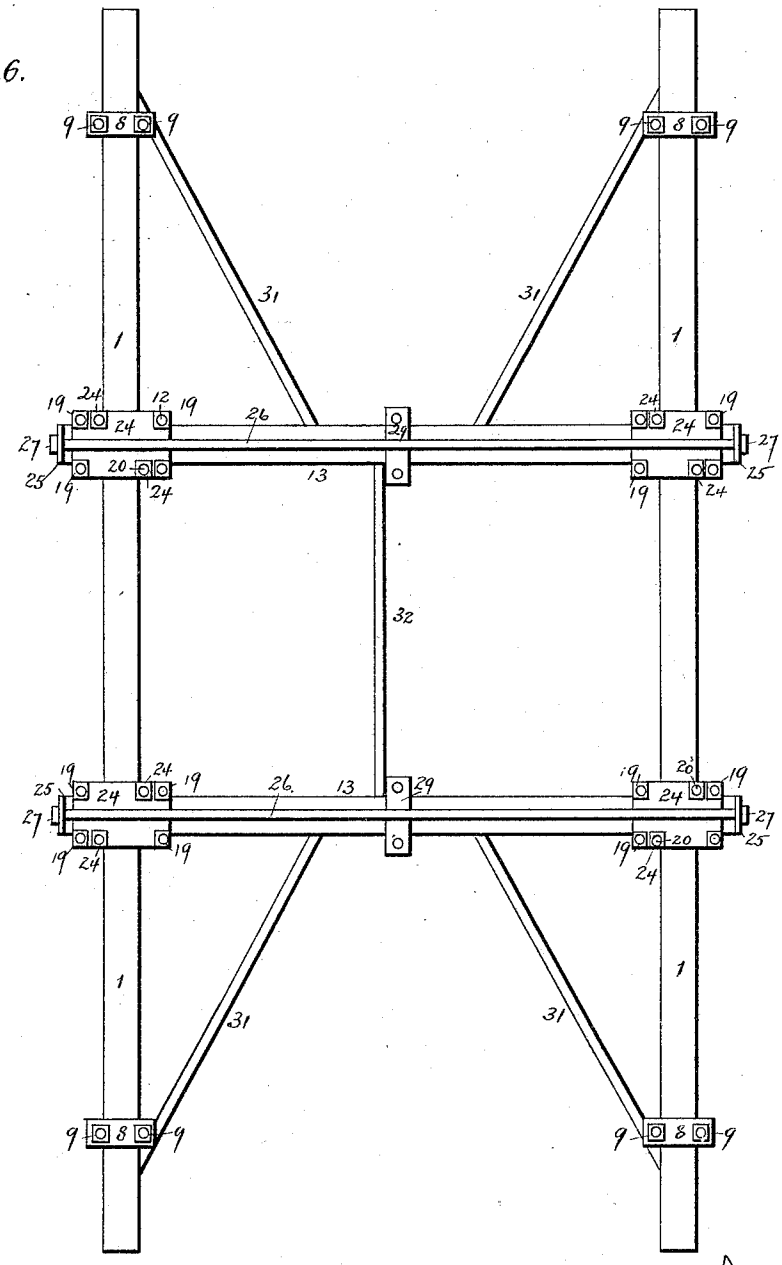
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Fig. 6.



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UNITED STATES PATENT OFFICE.

DANIEL F. LANE, OF HORNBY, NEW YORK.

TRUSS BRIDGE.

SPECIFICATION forming part of Letters Patent No. 424,318, dated March 25, 1890.

Application filed January 13, 1890. Serial No. 336,815. (No model.)

To all whom it may concern:

Be it known that I, DANIEL F. LANE, a citizen of the United States, residing at Hornby, in the county of Steuben and State of New York, have invented new and useful Improvements in Truss Bridges, of which the following is a specification.

My invention is directed to the improvement of bridges constructed of railway-rails; and the object of my improvement is to provide a strong and durable bridge in which the floor or chord beams, the top or truss beams, and the cross-beams or girders for the chords are constructed of railway-rails and supported and bound together by clips and shackle-plates, and truss-rods bound to the ends of the girders, and the particular novel matters of construction and combination will be specifically pointed out in the claims concluding this specification.

Referring to the drawings which illustrate my improvements, Figure 1 represents a plan or top view of my improved bridge. Fig. 2 is a central longitudinal vertical section of the same. Fig. 2^a is a side view of one of the chord rails or beams. Fig. 2^b shows in detail section the connection of the queen-post with the truss-rod and the cross-girder. Fig. 2^c shows in detail the clip-connection of the chord and the truss-beam. Fig. 3 is a cross-section of the bridge on the line $x\ x$ of Fig. 1. Fig. 3^a is a side view of one of the cross-girders. Fig. 4 is a cross-section showing a modification of some parts of the bridge. Fig. 4^a shows in detail the eyed-stirrup connection for the truss-rod with the cross-girder shown in Fig. 4. Fig. 5 shows in detail top view the clip-connection of the chord-rail and cross-girder, and Fig. 6 shows the bridge in bottom view.

The chord-beams 1 rest upon the abutments 2 2 for the bridge. These chord-beams are preferably of the form of railroad-iron, and the cap is formed with notches 3 near each end of the rail and with notches 7 in the base-flange near the top notches 3, as seen in Fig. 2^a. The cap of this chord-beam is about one and a quarter inch thick and the notches 3 extend about half-way through it, and they are so cut as to form a raised shoulder at that side of said notch next the end of the chord to form good bearing projections for the inclined ends of the top truss-beams. The chord-beams rest about fifteen inches upon the abutments to bring the notched parts of the chords over the abutments with a firm support. The top truss-beams 4 are also of the I form of railroad-iron, and their ends are inclined downward and rest in the notches 3 upon the ends of the chords and against the shoulders of said notches. At these abutting ends I fasten the top truss-beams to the chord-beams by means of clips 5, which straddle both beams, fitting in notches 6 and 7 in the base-flanges of both beams, and passing through the projecting ends of a shackle-bar 8, are secured by nuts 9, so as to bind the shackle-bars against the under side of the chord-beam. To render this fastening effective, the clips stand in oblique positions toward the middle of the bridge and the shackle-bars are made wedge shape in cross-section, as shown in Fig. 2^c, so that when the beams and shackle-bars are thus bound together the clips are locked at each side in the notches of the beams.

At points vertically below the junction of the inclined and horizontal portions of the top truss-beams I secure a cross-girder 13 beneath the chord-beams by means of clips 12, which straddle the horizontal portions of the top truss-beams and the chord-beams in pairs and are secured to the girders as follows: To the ends of these clips 12, I secure shackle-plates 17 by nuts 19, which bind the plates against the under side of the said girder, and thereby bind the latter to the under side of the chord-beam, as seen in Fig. 3. For this purpose this shackle-plate is provided with holes 18, (seen in Fig. 5,) and the base-flange of this girder has notches 16, (seen in Figs. 3^a and 5,) which are coincident with the clip-holes 18, whereby the said clips 12, fitting into the said notches, are locked to the girder, while the base-flanges of the top truss-beams have notches 14, into which the clips are also locked. The clips in pairs, therefore, bind and lock the truss-beams, the chord-beams, and the girders firmly and securely together. Supplementing these clip-fastenings I provide an independent clip-fastening 20 for the chord-beam and the girder-beam,

so that it straddles the junction of these beams obliquely, as seen in Fig. 5, and is secured by nuts 24 to the shackle-plates 17, which for the purpose is provided with holes 23, the said clips being also locked to the girder by notches 21 and 22 in the base-flange of the girder-rail, as seen in Fig. 3. The ends of the girders are bent downward to form perforated arms 25, to which are secured truss-rods 26 by nuts 27. These truss-rods cross beneath the girders and serve to support the middle of the latter by means of props or queen-posts 28, the upper ends of which are formed with flat heads 29, which are secured to the under sides of the girders by bolts 30, which pass through angle-pieces *a*, which are bolted to the girder, as seen in Fig. 2[b]. The lower end of the queen-post is securely fitted upon the truss-rod and the latter is deflected from said post upward to the girder-arms. Brace-rods 31 are secured to the ends of the chord-beams, preferably, by being bent and passed through holes in and riveted to said beam ends, and extend inward obliquely and are secured to the cross-girders at or near the middle of their length, preferably, in the same way, while one or more rods 32 connect the girders to each other, being secured to them in the same way as the brace-rods, whereby the chords and the cross-girders are braced against lateral or longitudinal strain and the structure rendered stiff and firm. The flooring of the bridge, which is not shown in the drawings, is supported upon the girders in any suitable way.

In bridges constructed with sidewalks at the outer sides of the truss-beams, as seen in Fig. 4, the cross-girders are extended beyond the chord-beams to the desired width of the sidewalk. When these girders are so extended, I provide for connecting the truss-rods to them by means of eyed stirrups or clevis 33, (shown in detail in Fig. 4[a],) which straddle the girder just outside of the truss-beams, and projecting below the latter are secured at their eyed ends to the truss-rods 26 by bolts which pass through said eyes and through a perforated head on the said truss-rod, the said stirrup being keyed and locked to the cross-girders by being fitted into notches in the base-flange of the girder-rail. In this modification of the truss-rod connection I provide for taking up any slack in such connection by means of turn-buckles 34, which connect the truss-rod sections.

All the parts of the bridge are firmly united, and yet are sufficiently free to expand and contract, by reason of the capacity of the clip-fastenings to compensate for such expansion and contraction within the notches by which they are locked to the beams. It is obvious that the number of cross-girders can be increased to suit the length of the bridge and fastened by long and short clips in the way described. The shackle-bars 8 prevent the clips 5 from spreading and form clamping-bars for these clips. The cross-girders may be used in pairs side by side and the long clips and shackle-plates arranged to suit the double girders, and in such construction the truss-rod may be dispensed with. Referring to the long clips 12, it will be noticed that they spread or flare from the top truss-beam to the shackle-plate in the line of the girder to support and brace the truss-beams against side strain, and for this purpose the lower ends of these clips are about eighteen inches apart, while the shackle-plates are about two feet and a half long and are placed lengthwise of the girder. The flooring runs crosswise of the bridge, and it may be supported on railway-rails running the same way as the chord-beams.

To support the top truss-beams against the strain of the long clips, I secure a railway-beam of arch form with its ends resting upon the chord-beams and its crown against the under side of the said top beams, as seen in Fig. 2.

The bridge may be made of single or double track. Wherever a clip binds the beams it also locks them together by means of notches in the flanges of the beams, into which the clips fit. The girders may be of **I** form.

I claim as my improvement—

1. The combination, in an iron bridge, of the flanged chord-beams having the top notches 3 and the side flange notches 7, the truss-beams 4, the short end clips 5, locked in said chord-flange notches 7, the binder-plates 8, and the nuts 9, with the cross-girders 13, the middle clips 12, arranged in pairs straddling the said top and bottom beams, the short clips 20, obliquely straddling the chords and girders, the shackle-plate 17, and the nuts 19 and 24, the said clips 12 and 20 being locked in notches 16 and 22 in the flanges of the beams and of the girders for securing and binding the parts together in the way described.

2. The combination, in an iron bridge, of the chord-beams, the truss-beams, and the girder-beams, constructed and arranged as described, with the long clips 12, arranged in pairs, the shackle-plates 17 for said clips, and the short clips 5 and their shackle-plates, the said clips being locked in notches in the said beams and secured to their shackle-plates by the nuts 9, substantially as described, for the purpose specified.

3. The combination, in an iron bridge, of the chord-beams, the truss-beams, and the girder-beams, constructed and arranged as described, with the long clips 12, arranged in pairs, their binding shackle-plates, the short clips 20, secured to said shackle-plates, and the short clips 5 and their binder-plates 8, and the nuts 9, 19, and 24 for the said clips, substantially as described, for the purpose stated.

4. In an iron bridge, the combination of the chord-beams, the truss-beams, and the cross-girder beams 13, constructed and arranged as described, with the truss-rod 26, secured to said cross-girder, the prop or queen-post 28, secured to said truss-rod and cross-

girder, and the clips 12, 20, and 5, and the nuts 9, 19, and 24, for binding the several beam parts in the way described.

5. In an iron bridge, the combination of the chord-beams and the truss-beams with the cross-girder beams having downwardly-bent perforated ends 25, the truss-rod 26, its securing-nuts 27, the queen-post 28, having a flat head 29, and the clips 12, 20, and 5, substantially as described.

6. The combination, in an iron bridge, of the chord-beams, the truss-beams, and the girder-beams, constructed and arranged and bound together with clips as described, with the oblique rods 31, connecting the chord-beams with the cross-girders, and the rod 32, connecting the girders, and the truss-rods supporting the girders, substantially as described.

7. The bridge-frame consisting of the beams 1, 4, and 13 of the form of flanged rails, in combination with the long clips 12, the short clips 20, the shackle-plates 17, the nuts 19 and 24 for said clips, the short clips 5, their binder-plates 8 and nuts 9, and the truss-rod 26, the said long and short clips 12 and 20 being secured to the said shackle-plates 17 in the way and for the purpose described.

8. The combination, in an iron bridge, of the chord-beams, the truss-beams, and the cross-girders, with the long clips straddling the truss-beams and flaring at their lower ends and the shackle-plates secured as described, the short clips 5, their binders 8, and nuts 9, whereby to support the truss-beams against side strain.

In testimony whereof I have hereunto set my hand in the presence of three subscribing witnesses.

DANIEL F. LANE.

Witnesses:
C. G. WHEAT,
FARREN SANDS,
F. A. WILLIAMS.