No. 816,800. PATENTED APR. 3, 1906.

J. KAHN.

RAILWAY CROSS TIE.

APPLICATION FILED JULY 13, 1904.

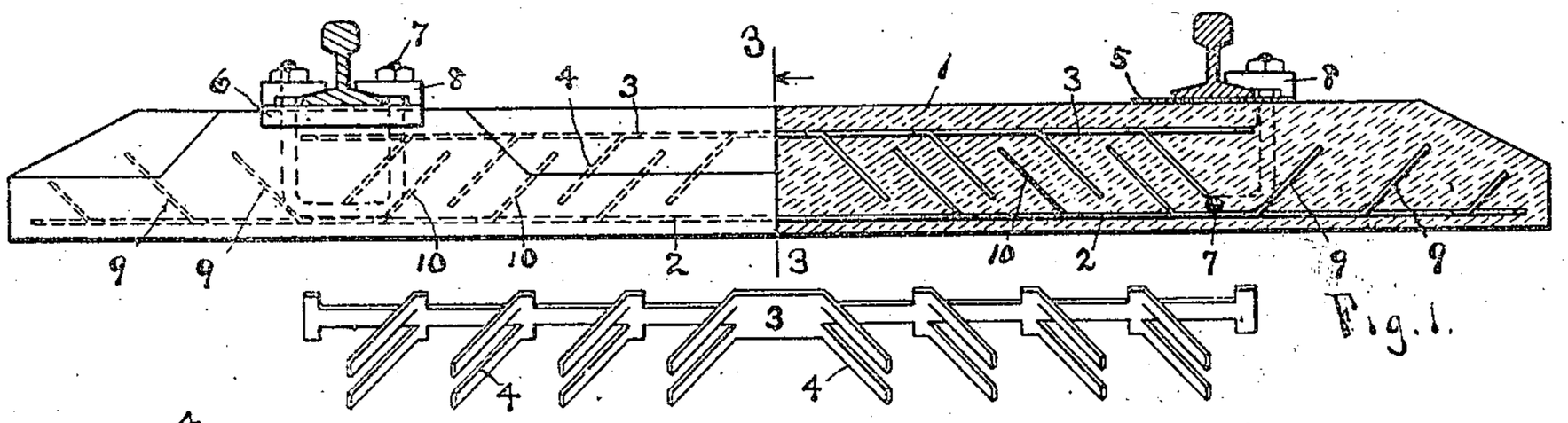


Fig. 1.

Fig. 2.

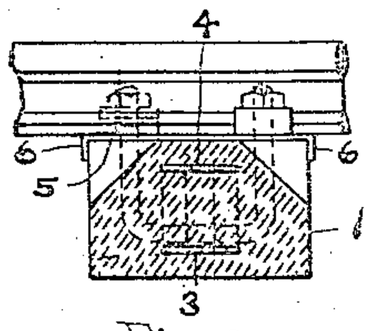


Fig. 3.

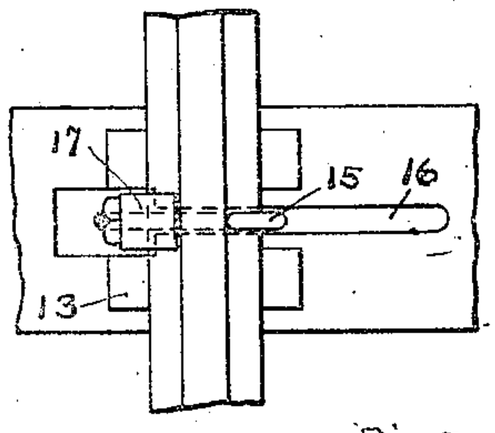


Fig. 7.

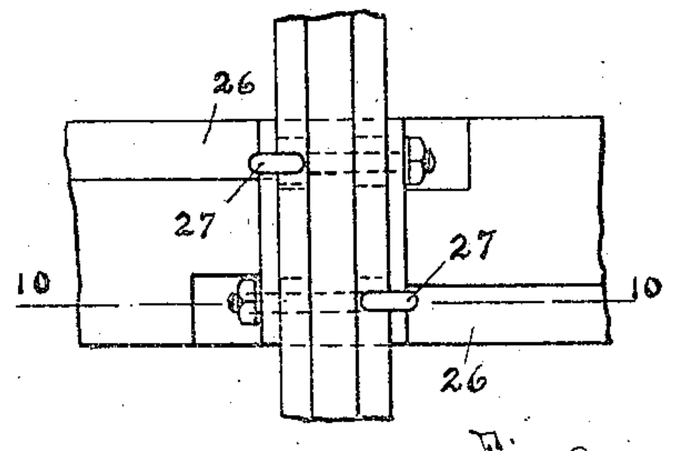
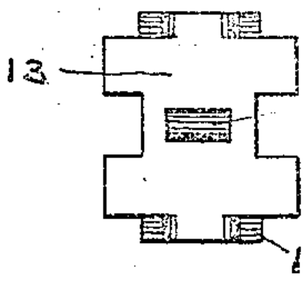


Fig. 9



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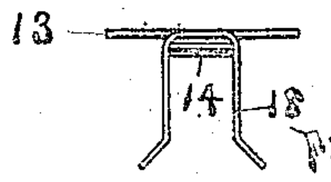


Fig. 5.

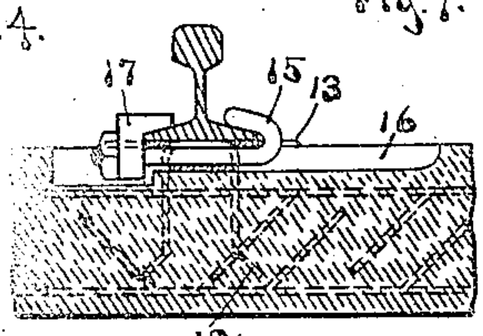


Fig. 8.

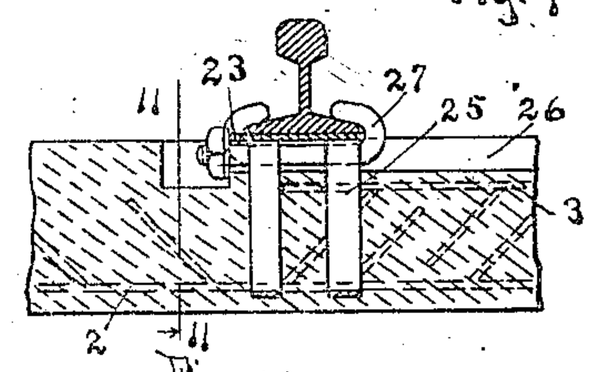
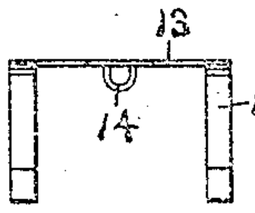


Fig. 10.



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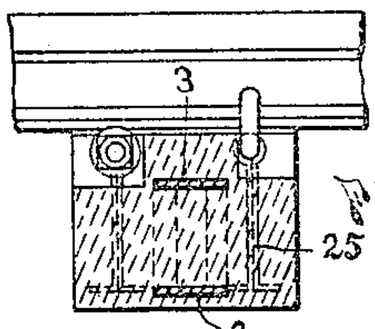

Fig. 11.

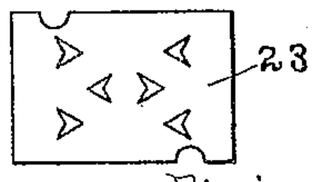

Fig. 12.

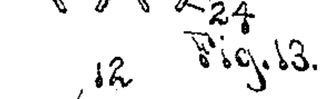

Fig. 13.

Fig. 14.

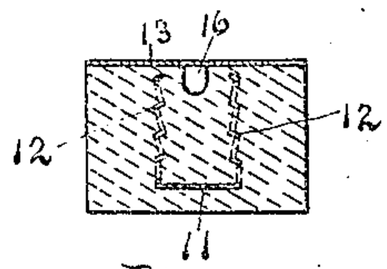

Fig. 15.

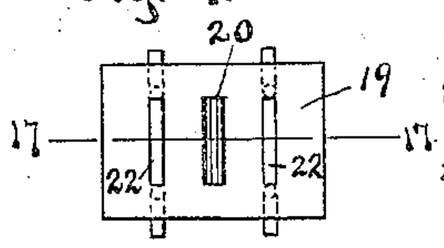

Fig. 16.

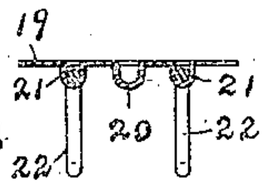

Fig. 17

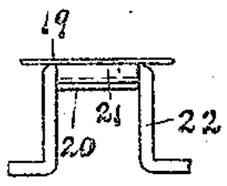

Fig. 18.

Witnesses:
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Emma Petersen.

Inventor
Julius Kahn.
By his Attorney
Edward N. Pagelsen.

UNITED STATES PATENT OFFICE.

JULIUS KAHN, OF DETROIT, MICHIGAN, ASSIGNOR TO TRUSSED CONCRETE STEEL COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

RAILWAY CROSS-TIE.

No. 816,800. Specification of Letters Patent. Patented April 3, 1906.

Application filed July 13, 1904. Serial No. 216,324.

To all whom it may concern:

Be it known that I, JULIUS KAHN, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Railway Cross-Tie, of which the following is a specification.

My invention relates to reinforced concrete cross-ties for railroads; and the objects of my improvements are to provide a cross-tie of this character constructed to withstand the stresses produced by unequally-solid track-ballast, to provide a reinforced concrete cross-tie in which the reinforcing members will lie across the line of greatest stress, to provide a concrete cross-tie with suitable foot-plates for the rails, and to provide means for attaching the rails to the cross-ties that can be easily and quickly put in place to fasten the rail and as easily released. I attain these objects by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a view, partially in longitudinal cross-section, of a cross-tie embodying my invention. Fig. 2 is a perspective of a reinforcing-bar. Fig. 3 is a cross-section on the line 3 3 on Fig. 1. Figs. 4, 5, and 6 are views of one form of foot-plate. Figs. 7 and 8 illustrate the manner of using this foot-plate to secure the rail to the cross-tie. Fig. 9 is a plan of another form of foot-plate and the fastening means for the rail. Fig. 10 is a cross-section on the line 10 10 of Fig. 9. Fig. 11 is a cross-section on the line 11 11 on Fig. 10. Figs. 12 and 13 are views of the foot-plate used in these figures. Fig. 14 is a view, partly in longitudinal cross-section, of a cross-tie embodying another modification of my invention. Fig. 15 is a cross-section of this tie under a rail. Fig. 16 is a plan of another form of foot-plate and the means for securing it in place. Fig. 17 is a cross-section on the line 17 17 on Fig. 16, and Fig. 18 is an end view of the same.

Similar reference characters refer to like parts throughout the several views.

Combined concrete and metal cross-ties as usually constructed are either too expensive on account of the large amount of steel used or they are liable to be broken when heavy trains pass over them unless the ballast of the road is in perfect condition. When supported unevenly, so that they are compelled to act as a beam, their slight strength is insufficient. As a rule the foot-plates under the rails are either insufficiently secured to the cross-tie or else this fastening increases the price to a prohibitive degree. The connecting means between the cross-tie and the rail are also a constant source of trouble. In the drawings cross-ties are shown that have sufficient strength, the various forms of foot-plates are such as to form a permanent union with the cross-tie, and the fastening means between the cross-tie and rail are easily applied and removed.

In Fig. 1 is shown a concrete cross-tie 1, in which are embedded two tension-bars 2 and 3. These members are formed from flat bars having auxiliary tension members or tongues struck up from the same and inclined at such an angle that when in place these tongues will lie across the usual line of fracture. Foot-plates 5, having flanges 6, rest on these cross-ties, and U-shaped bolts 7, having washers 8, project on opposite sides of the rail on opposite sides of the center line of the cross-tie. As shown in Fig. 1, these bolts and washers firmly unite the cross-ties and rails. The bottom of the cross-tie is left flat to obtain the maximum bearing, while the material on the top may be cut away, as indicated in the drawings. If, as often happens, the ballast is rammed less firmly under the middle of the cross-tie than under the ends, there is danger of a fracture extending from under the rail downward and outward. This is prevented by the auxiliary tension members 9 on the bar 2, which transmit the tension stress set up in the concrete toward the bar 4, the concrete of the top of the bar acting as the compression member of the truss. This tension is transmitted largely by the tongues 10. When the cross-tie is supported in the middle, it is liable to break between the rails. The tensional stress is set up in the top of the cross-tie, which stress is taken up by the bar 3 and the tongues 4. In fact, any unusual stress will be taken up by either one or the other of the bars 2 and 3. Compression stresses are never great enough to rupture the large amount of concrete necessary to cover sufficient earth area to support the load.

In Figs. 14 and 15 is shown a trough-shaped tension member comprising a flat bar 11,

having upturned sides 12 struck up in the form of the well-known expanded metal. This metal forms a lattice of inclined tension members that cross the usual lines of fracture near the rails and transmit the tensional stresses to the bar and from the bar to the concrete. In the form shown the cross-tie becomes a latticed girder of great strength, the bar and the struck-up portions together forming a metal part truss having great tensional strength, while the concrete forms the compression member.

The foot-plates 13 (shown in Figs. 4 to 8, inclusive) are formed from flat plates of the proper form by pressing between dies or from malleable iron. A U-shaped depression 14 is formed in the center to form a socket for the bolt 15, that holds down the rail. A groove 16 is molded in the cross-tie to admit the bolt, the washer 17, and the nut. The arms 18 are formed on each end of the plate and are molded into the concrete, thereby forming anchors to hold the foot-plate in place. As the cross-tie is molded upside down, the concrete can be well rammed around these arms. With this foot-plate the cross-tie can be slid underneath rails already in place, the bolt and washer being put in place afterward.

Instead of the arms 18, forming part of the plate, I may use the construction shown in Figs. 16, 17, and 18. This plate 19 is rectangular, having a length equal to the width of the cross-tie. It is provided with three sockets, the middle one 20 being similar to socket 14 in Figs. 4 to 8. The side sockets 21 are to receive the two round rods 22, which are inserted and then bent to the form shown. The cross-tie is provided with grooves, as in Figs. 7 and 8.

Where extremely heavy service is required, as on curves, the construction shown in Figs. 9 to 13, inclusive, will be found of great value. A foot-plate 23 is provided with a number of integral tongues 24, which are molded into the concrete. Stirrups 25, formed of flat bars, are molded in the cross-tie, their feet being near the bottom, while their round upper ends form sockets that extend into the grooves 26, where they engage the bolts 27. These bolts engage the flange of the rail on opposite sides and securely hold it in place. Instead of the nuts on the bolts contacting with the edge of the foot-plate the bolts may be provided with the washers 17 of Figs. 7 and 8.

In all these forms of foot-plates it will be noticed that the bolts can be removed and the tie slid out endwise from under the rails without disturbing the rails.

Having now explained my improvement, what I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a rail-bearing plate for cross-ties comprising a body having parallel depressed portions to receive bolts, and bolts passing under the body of said plate and through said depressed portions and having upturned hooks at one end and nuts and washers at the other, said hooks adapted to engage the rail-flange on opposite sides.

2. In a combined concrete and metal cross-tie, the combination of a trough-shaped tension member extending near the bottom of the same and having struck-up sides projecting upward and the top edges of said sides inclined in opposite directions from vertical lines passing through the rails, and concrete molded around the same to form the body of the cross-tie.

3. A metal tension member for combined metal and concrete construction, comprising a solid longitudinal portion and a portion of the same expanded laterally.

4. In a combined concrete and metal tie, the combination of a concrete body, a solid-metal tension member extending longitudinally of the same and having extending latticed projections in the form of "expanded metal."

5. A rail-bearing plate for cross-ties comprising a body having a depressed portion to receive a bolt, and arms extending downwardly from each end.

6. A bearing-plate and connecting means for cross-ties and rails, comprising a body having a depressed socket to receive a bolt, arms extending downward from each end, and a bolt having an upturned hook passing through said socket.

7. In a concrete cross-tie, the combination of a plate resting on said cross-tie, and having a depressed socket, arms extending downward to secure the plate to said cross-tie, a bolt passing under the body of said plate and through said socket having an upturned hook on one end and on the other a washer having a projecting portion, said hook and washer adapted to engage a rail-flange, said cross-tie having a groove to permit the insertion of the bolt and washer.

8. In a combined concrete and metal cross-tie, the combination of a metal tension member extending near the bottom of the same and having auxiliary tension members extending upward, concrete molded around the same to form the body of the cross-tie, a bearing-plate comprising a body having a depressed socket to receive a bolt and arms extending downward into the concrete from the plate, and a bolt having an upturned hook to secure a rail to said cross-tie, said bolt passing through said socket.

9. In a combined concrete and metal cross-tie, the combination of the concrete body, a flat metal tension member extending longitudinally near the bottom of the same and having upwardly-extending latticed projections in the form of "expanded metal," the upper edges of said "expanded-metal" portions

being of uneven height being highest at the points immediately under the bearing-points of the rails.

10. In a combined concrete and metal tie, the combination of a concrete body, a metal tension member extending longitudinally near the bottom of the same and having struck-up auxiliary tension members lying across the lines of greatest tensional stress in said concrete to transmit the tensional stresses to said main tension member, plates on said cross-tie at the points of contact of the rails bolts passing beneath said plates, and anchors extending into the concrete to hold said bolts and thereby secure the rails and cross-ties together.

11. In a combined concrete and metal cross-tie, the combination of the concrete body, a flat metal tension member extending longitudinally near the bottom of the same and having upwardly-extending latticed projections in the form of "expanded metal," the upper edges of said "expanded-metal" portions being of uneven height, being highest at the points immediately under the bearing-point of the rails, a plate resting on said cross-tie, and having a depressed socket, arms extending downward to secure the plate to said cross-tie, a bolt passing under the body of said plate and through said socket, a washer, having a projecting portion to engage a rail, on one end of said bolt, the other end having a hook to engage the flange of a rail to secure the same to the cross-tie.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JULIUS KAHN.

In presence of—
ANNA M. GREGORY,
EDWARD N. PAGELSEN.