No. 894,253. PATENTED JULY 28, 1908.

J. H. BOWDITCH.

REINFORCED CONCRETE CROSS TIE.

APPLICATION FILED SEPT. 30, 1907.

Fig. 1.

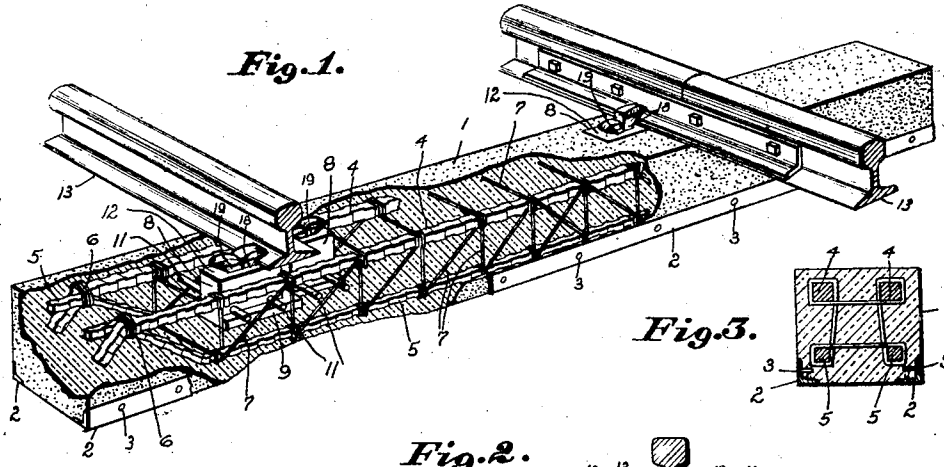


Fig. 3.

Fig. 2.

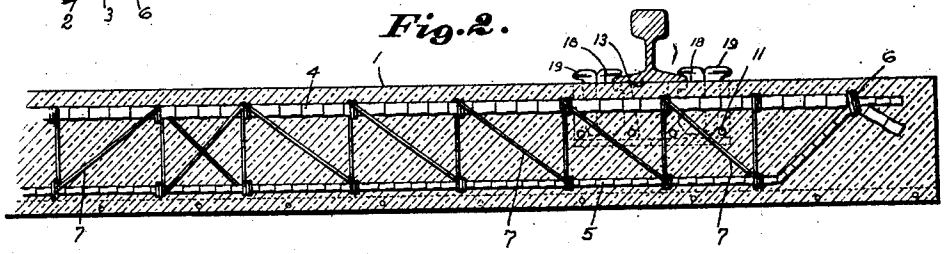


Fig. 5.

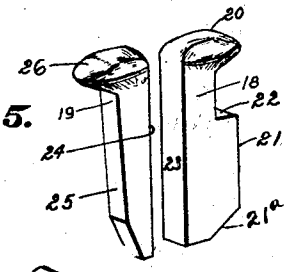


Fig. 4.

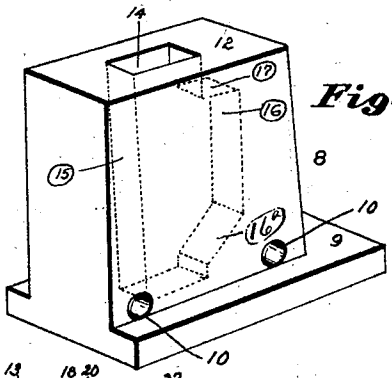


Fig. 6.

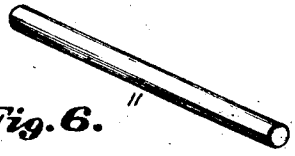
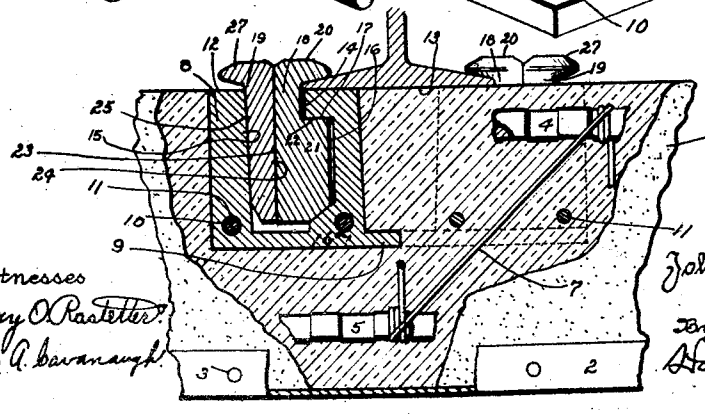


Fig. 7.



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REINFORCED CONCRETE CROSS-TIE.

No. 894,253. Specification of Letters Patent. Patented July 28, 1908.

Application filed September 30, 1907. Serial No. 395,193.

To all whom it may concern:

Be it known that I, JOHN H. BOWDITCH, a citizen of the United States, residing at New Brighton, on Staten Island, in the State of New York, have invented a new and useful Reinforced Concrete Cross-Tie, of which the following is a specification.

The invention relates to a railroad cross-tie made of concrete or other cement product reinforced with iron or steel or other metallic bars, rods and wire, and provided with suitable metallic spike boxes by means of which the rail is secured on the tie; and among the objects of the invention are to provide a concrete cross-tie which will withstand the abrasion or breaking of the lower corners of the tie when in use or when crushed stone or other ballast is tamped under and around it, to provide a tie of substantially uniform strength throughout its length so that there will be no tendency to break in the middle on an uneven road-bed or when the tie is improperly tamped, and to provide a suitable means for detachably fastening the rail on the tie. These general objects with other minor advantages are attained by the construction and arrangement illustrated in the drawings herewith forming part of this specification, in which:—

Figure 1 is a perspective view of the tie with two rails thereon having parts broken away to show the details of construction; Fig. 2, a longitudinal section of part of the tie showing one rail fastened thereon and showing the reinforcing truss in side elevation; Fig. 3, a general cross section of the tie; Fig. 4, a detached perspective view of one spike box; Fig. 5, a detached perspective view of one rail spike and one key spike, slightly separated; Fig. 6, a detached perspective view of one box retaining-rod; and Fig. 7, a fragmentary longitudinal section of the tie showing details of the rail fastening and of one truss bar, rod and wire.

Similar numerals refer to similar parts throughout the drawings.

The body 1 of the tie is made of a suitable concrete mixture, which may be in the proportion of one part cement, two parts sand and three parts of clean crushed stone of a diameter or largest dimension not exceeding one inch; and the rail fastening may be set in a mixture of cement and sand mortar in the proportion of one part of cement and two parts of sand. The entire mass of concrete is worked and tamped in the tie mold or form so as to insure perfect contact with all metal surfaces; which mold or form may be of the character usually employed in making concrete products.

In the two lower longitudinal angles of the form are located, prior to the placing therein of the concrete mixture, two iron angle bars 2 extending the entire length of the form, which bars are provided with suitable inwardly extending spikes or pins 3 having heads counter sunk in the angle bars, by means of which spikes the bars are bonded into the concrete body of the tie. These angle bars serve to protect the lower edges of the tie from being chipped or abraded by the use of track tools or by the tamping of the tie.

The reinforcing frame of the tie preferably consists of four roughened or corrugated steel bars 4 and 5 extending substantially the full length of the tie; of which bars the two larger ones 4 are spaced apart in the upper portion of the tie body and the smaller ones 5 are spaced apart in the lower portion of the tie body, and near the ends of the ties the lower bars are bent upward to a juncture with the upper bars and thence directly outward, and at the point of juncture the upper bars are bent downward. At the point of juncture the two bars on each side are fastened together, as by means of the wire 6 being wrapped around them. The frame work is completed by interweaving the truss wires 7, which are arranged to vertically and horizontally connect the longitudinal frame members at spaced intervals throughout their length, and also to provide diagonal truss or tension members in each of the longitudinal spaces between the upper and lower bar on each side of the tie. There is thus formed on each side of the tie an inverted truss adapted to resist tension in the upper members and compression in the lower members.

The spike boxes 8 are preferably made of cast iron or steel, and may be formed with the comparatively wide base plate or flanges 9. The transverse apertures 10 are preferably provided in the body of each box near the base, in which apertures are located the transverse binding rods 11 which extend laterally each way in to the body of the concrete. The wide base plate and the binding rods serve to prevent any loosening or breaking away of the boxes from their concrete envelop and to provide an enlarged

bearing to withstand the impact or pounding of a moving load on the rails. The upper faces 12 of the spike boxes are located flush with the upper surfaces of the body of the tie and constitute a metallic bearing for the base 13 of the rail thus obviating the use of a special tie plate to protect the tie against an abrasion by the rail.

One spike box is located on each side of the rail and the boxes for each rail are preferably located on different sides of the median line of the tie so that they do not come directly opposite each other. Each tie box is provided with the recess or cavity 14, the outer wall 15 of which is inclined downward and inward, and the recess 16 in the inner wall forming the shoulder 17 which may be square as shown. The rail spike 18 and the key spike 19 are adapted to be entered in the box cavity, and to fasten the rail in the tie in the following manner. The rail spike 18 is provided with a suitable head 20, the inner lower edge of which is beveled or inclined to correspond with the inclination of the rail base 13. The lug 21 is provided on the inner side of the rail spike which lug is adapted to enter the recess 16 in the inner wall of the spike box and forms the shoulder 22 adapted to engage under the recess-shoulder 17 of the spike-box. The lower end of the spike-lug 21 is preferably beveled, as at 21^a, which beveled end is adapted to abut on the similarly beveled face 16^a in the bottom of the recess 16. The outer side of the rail spike 18 is formed with a straight surface 23 against which the similar straight surface 24 on the inner side of the key spike is adapted to operate. The outer side 25 of the key spike is beveled or inclined downward and inward to correspond with the similar inclination of the outer wall of the spike box cavity; and the head 26 is preferably provided on the key spike and extends outward beyond its outer beveled side. The spike boxes are so located in the tie that the edges of the base 13 of the rail will register substantially with the inner walls of the spike boxes. The rail spikes are then inserted in the box cavities and pushed inward so that the spike shoulder will engage under the box recess shoulders, which brings the beveled under side of the head in contact with the inclined faces of the rail base. The key spikes are then inserted in the box cavity between the rail spikes and the outer walls of the cavities and the wedge action of the key spike serves to firmly clamp the rail base on the spike boxes. And at the same time the rail spike is rigidly held in the spike-box by the wedging of its lug 21 between the recess shoulder 17 and the inclined bottom 16^a of the box.

It is evident that numerous spike boxes can be located in various positions on any given tie, so that switch ties can easily be made to carry and securely hold two or more bars or rails. It is evident that by firmly seating the metallic spike box in the concrete and by sustaining the wedge action of the spikes against walls of the boxes there will be no tendency to chip or break the cement body of the tie when the rail is being fastened or when it is subjected to a moving load.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A reinforcing frame for a concrete tie comprising two pairs of corrugated bars spaced apart and located one pair above the other, the ends of the lower bars being bent upward and connected with the upper bars, and wires interlaced with the bars to connect them together at spaced intervals and to form truss members between each upper and lower bar in the longitudinal spaces thus formed.

2. A reinforcing frame for a concrete tie comprising two pairs of corrugated bars spaced apart and located one pair above the other, and wires interlaced with the bars to connect them together at spaced intervals and to form truss members between each upper and lower bar in the longitudinal spaces thus formed.

3. A spike-box for a concrete tie having a base plate thereon and transverse apertures with binding rods therein extending laterally each way from the box.

4. A spike-box for a concrete tie having transverse apertures with binding rods therein extending laterally each way from the box.

5. A spike-box for a concrete tie having a cavity therein with one wall inclined and the other wall recessed to form a shoulder above and an inclined bottom below, a rail-spike having one side flat and having an inclined-faced head on one side, a lug on the same side of the rail-spike adapted to engage under the recess-shoulder and having an inclined face on its lower end adapted to abut against the inclined bottom of the recess, and a wedge-shaped key-spike adapted to be entered in the cavity between its inclined wall and the flat face of the rail-spike.

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