J. H. FLOOD.

REINFORCED CEMENT RAILROAD TIE.

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1,032,198.

Patented July 9, 1912.

Fig. 1.

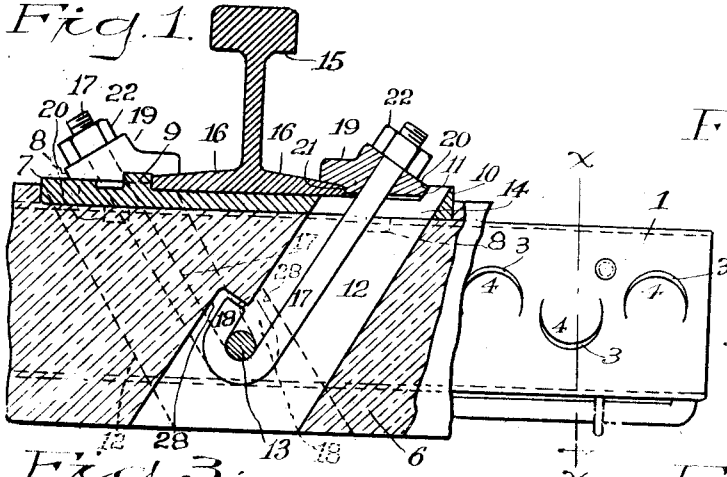


Fig. 2.

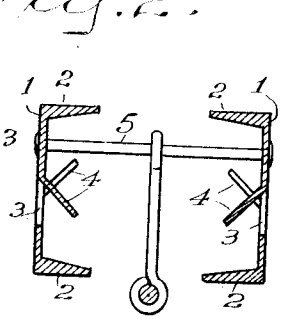


Fig. 3.

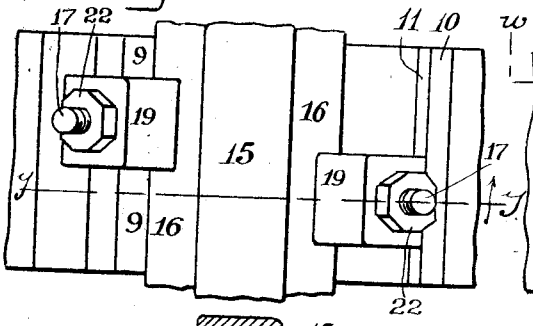


Fig. 4.

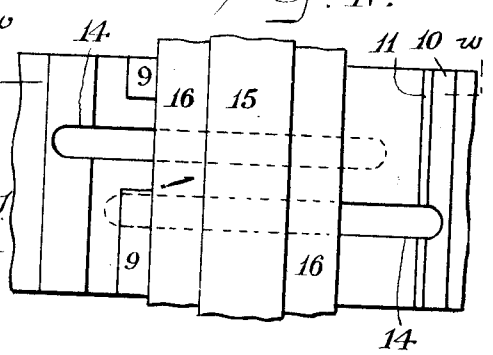


Fig. 5.

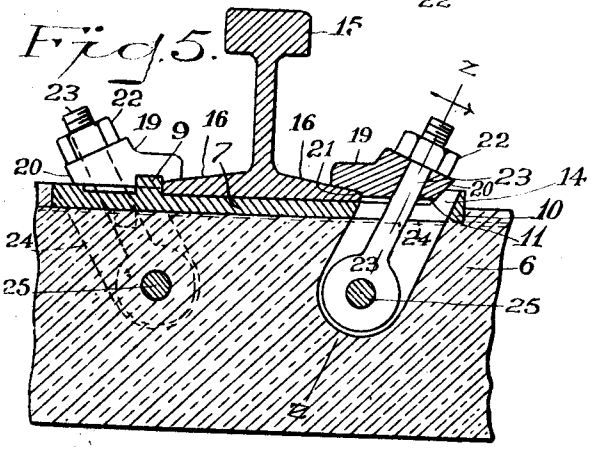


Fig. 6.

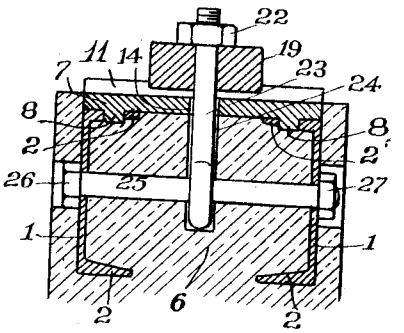
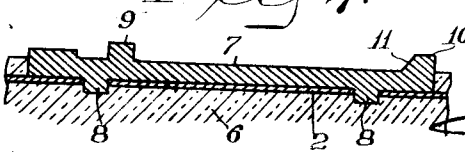


Fig. 7.



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REINFORCED-CEMENT RAILROAD-TIE.

1,032,198. Specification of Letters Patent. Patented July 9, 1912.

Application filed September 30, 1911. Serial No. 652,030.

To all whom it may concern:

Be it known that I, JOHN H. FLOOD, a citizen of the United States, residing in the city of Bridgeport, county of Fairfield, State of Connecticut, have invented certain new and useful Improvements in Reinforced-Cement Railroad-Ties; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to certain improvements in reinforced cement railroad ties, and is an improvement on the structure shown and described in Letters Patent, No. 1,003,590, issued to me, September 19, 1911.

The particular objects of the present improvement are to provide approved devices for securing the rails to the ties, and furthermore to so support the bases of the rails on a metal structure that there shall be no cement formation that would be apt to crumble.

With these ends in view my invention consists of the novel devices and structures hereinafter fully described and then particularly pointed out in the claims which conclude this description.

In the accompanying drawing Figure 1 is a broken sectional elevation of my improved tie on the line *y*, *y*, of Fig. 3, showing the manner of clamping a rail thereto and also certain improvements in the reinforcing channel plates—Fig. 2 a section at the line *x*, *x*, of Fig. 1—Fig. 3 a broken plan view of the structure shown at Fig. 1—Fig. 4 a view similar to Fig. 3 with the clamping elements removed—Fig. 5 a sectional elevation showing a modified form of my improved clamping devices—Fig. 6 a section at the line *z*, *z*, of Fig. 5, and Fig. 7 a section at the line *w*, *w*, of Fig. 4, with the rail removed.

Similar numerals of reference denote like parts in the several figures of the drawing.

1 are the channel plates having inwardly extending flanges 2 at the top and bottom edges said plates being connected by cross tie bars one of which is shown and is designated by the numeral 5 which bars connect said plates and keep them from spreading, all constructed and arranged as set forth in my aforesaid Letters Patent. The sides of these plates are lanced and the stock thrown inwardly so as to provide perforations 3 and ledges 4 which latter extend inwardly from said perforations and afford anchorages within the cement. In my said Letters Patent these ledges extended in planes substantially at right angles to the sides of the plates 1, but in my present improvement these ledges extend from said plates at angles of about 45° and are alternately disposed in opposite directions, as clearly shown at Figs. 1 and 2, and this construction affords a far better clenching or anchorage between the cement and the channel plates so that there is no possibility of any independent vibration between these parts.

The reinforcing metal structure is embedded and inclosed within a cement structure 6, and in the completed tie the top flanges 2 of the channel plates generally extend a short distance below the upper surface of the completed tie except at those locations where the railroad rails are to be supported, and at these locations a top plate 7 rests directly upon the top flanges 2 and extends across the width of the tie. This top plate has pins 8 near each of its corner extremities, which pins fit within suitable perforations formed within the top flanges 2, so that it will be readily understood that said plate is thus secured directly to these flanges in such manner as to resist side or end thrusts. I prefer to detachably secure this plate to the top flanges, although it may be bolted thereto or otherwise secured if desired.

9 is an elongated abutment at one side of the plate 7, and 10 is also an elongated abutment at the opposite side of said plate, this last named abutment being formed with an inclined inner face 11, for the purpose presently to be explained.

The cement structure is cored out so as to provide channels or pathways 12 in parallelism longitudinally of the tie, which channels or pathways extend from the upper face of the tie near the sides thereof downwardly to points below the bar 13, the latter extending through the sides of the channel plates 1 so as to be firmly supported thereby and form a part of the reinforcing structure. These channels 12 are separated by a wall of cement, so that the tie will not be materially weakened, and their width is only

a trifle greater than the thickness of the lock bolts which are passed therethrough in the manner hereinafter described.

14 are openings in the top plate 7 which register with the pathways 12, and these pathways and openings are preferably in parallel vertical planes that are at right angles to the top plate 7 as shown at Fig. 4.

15 is the railroad rail whose base 16 rests directly upon the plate 7 between the abutments 9, 10.

17 are the lock bolts which are provided with hooks 18 at their lower ends and are threaded at their upper ends. The pathways 12 are of such dimensions that the bolts may be inserted at an angle therein through the openings 14 and hooked around the cross bar 13, as clearly shown at Fig. 1 and this hook connection will allow these bolts 17 to have a swinging movement for the purpose presently to be explained.

19 are clamp blocks which are preferably constructed alike so that they may be interchangeable, each block having a beveled rear edge 20 and a shouldered portion 21 in its bottom face and each being perforated to admit the bolts 17 therethrough.

In securing a rail the outer edge of the base of the latter is forced against the abutment 9 and nuts 22 are driven on the ends of the bolts 17 against suitably disposed faces on the blocks 19. As the nut, that is nearest to the incline 11, is driven on its bolt the beveled rear edge of its block will engage said incline and will force said block toward the rail, thereby causing the shoulder on this block to engage the inner edge of the rail base so as to force the latter firmly against the abutment 9 while at the same time the tightening of these nuts will cause the forward extremities of the blocks 19 to clamp downwardly upon the rail base so as to hold the same firmly in position upon the plate 7.

The bases of the railroad rails vary more or less in width, but the engaging inclined surfaces 11 and 20 provide for such variation, since, the narrower the width of the rail base the farther downwardly will the block be set along the incline 11, and the lock bolts 17 do not interfere in the slightest degree with the inward and outward movements of the clamping blocks because said bolts are capable of swinging movements.

While I prefer, under some circumstances, to utilize the clamping blocks with the beveled rear edge 20 coöperating with the inclined abutment 11 and the abutment 9, I do not limit myself to such use, since when the nuts 22 are driven against the clamping blocks the latter will be forced against the edges of the rail base, the swinging lock bolts permitting of this clamping motion of the blocks.

The lock bolts are readily removable and since these bolts are disposed at an angle to each other so that they diverge from their lower to their upper ends, they are not directly opposed to any side thrust of the rail base and therefore it is impossible to shear these bolts off.

When the nuts 22 are driven firmly against the clamping blocks any tendency of the hooks at the lower ends of the locking bolts to straighten out will be resisted and such straightening prevented by the cement structure at the point denoted by the numeral 28 in Fig. 1 of the drawing. Adjustments may be made from time to time in order to correct any slack between the clamping devices and the rail bases.

The bars 13 around which the bolts are connected may be the ordinary cross bars of a structure such as is shown in my Letters Patent aforesaid, or they may be special cross bars supported within reinforcing structure, it being merely necessary that the pathways 12 should open up ready passageways to said bars for the hooked ends of the lock bolts, but in all instances it is absolutely necessary that these bars 13 should pass through and be supported within the sides of the channel plates 1, so that any vibration or strain communicated to these bars through the bolts 17 may be wholly taken up and resisted by the channel plates themselves, since if said bars were supported solely by the cement structure the latter would speedily crumble owing to such vibrations and strains.

At Fig. 1 I have illustrated a form of lock bolts having open hooks at their extremities, but in Figs. 5 and 6 I have illustrated eye bolts 23 inserted downwardly through the openings in the top plates 7 within suitable pathways 24, the eyes of said bolts being engaged by special cross bars 25 detachably inserted through openings in the cement structure that extend from side to side of the tie. I have shown at Fig. 6 one of these cross bars 25 provided with a head 26 at one end, and secured in position by means of a nut 27 driven on the other end so that it will be clear that the clamping devices may be readily removed by simply withdrawing the bars 25. These cross bars 25 when inserted through the tie in the manner above set forth, will pass through snugly fitting openings in the sides of the channel plates 1, so that said bars will be wholly supported by said plates, and therefore the cement cannot become crumbled or otherwise injured by any shocks or vibrations communicated to these bars through the medium of the bolts 17. It is therefore immaterial whether the lock bolts are formed at their inner ends with open hooks or with eyes, or whether the cross bars engaged thereby are permanently fixed within the tie or are detachable therefrom.

My improvement is not limited in its application to any special form of reinforced railroad tie, although I have illustrated the same in connection with an approved form of tie such as is shown in my Letters Patent aforesaid. So far as the securing of the rails is concerned, it is merely necessary that suitable cross bars or equivalent means be provided, as a part of the metal reinforcing structure, so that the lock bolts may be inserted through the pathways and detachably engaged at their lower ends with the reinforcing structure, it being of course understood that said bolts when thus engaged must diverge upwardly and protrude through the openings in the plate 7 so as to be engaged by the clamping devices in the manner hereinbefore described.

While it is only necessary that the adjustable clamp blocks should be applied at the inside of the rail base, nevertheless, if desired, the clamping construction employed at the inside of said base may be duplicated as a clamping structure at the outside of said base.

The pathways within the cement structure may be of any suitable dimensions and disposition so long as they permit of the insertion of the locking bolts and the proper engagement thereof at diverging inclines with the internal reinforcing structure, and I prefer to core these pathways out so that they will extend clear through the bottom of the tie, so that water which finds its way within these pathways at the top of the tie may be readily discharged into the earth.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a reinforced cement railroad tie, comprising oppositely disposed metal channel plates and metal cross bars extending through said plates and supported thereby and forming a part of the reinforcing structure the latter embedded within a cement body, the herein described means for securing the rails to the ties, consisting of lock bolts extending downwardly through suitable pathways in the cement body and having detachable hinge connections at their lower ends with said bars, said bolts diverging upwardly and protruding from the top of the tie, rail clamping devices engaging said bolts, and means coöperating with the latter for binding said devices firmly against the bases of the rails.

2. In a reinforced cement railroad tie, comprising oppositely disposed metal channel plates having flanges that extend inwardly from the upper edges of said plates and extending longitudinally of the tie near the sides thereof and cross bars extending through the sides of these plates and supported thereby and forming a part of the reinforcing structure the latter embedded within a cement body, the herein described means for securing the rails to the ties, consisting of top plates on which the rails rest, said plates supported directly upon said flanges and provided with openings at opposite sides thereof, pathways formed within the cement structure and in planes that are parallel longitudinally of the tie, which pathways are separated by a cement wall and coincide with said openings, said pathways leading downwardly below said cross bars, lock bolts extending downwardly through said openings and pathways and having detachable hinge connections at their lower ends with said cross bars, said bolts diverging upwardly and protruding through said openings at the top of the tie, clamp blocks around the upper ends of said bolts and overlapping the bases of said rails at opposite sides thereof, and nuts driven on the ends of said bolts against said blocks whereby the rail is firmly clamped to the tie.

3. In a reinforced cement railroad tie, the herein described means for securing the rail to the ties, comprising metal cross bars supported by and forming a part of the internal reinforcing structure, the latter embedded within a cement body, pathways formed within the cement and disposed on opposite sides of said rails and leading from the top of the tie down to said bars, lock bolts within the pathways and secured at their lower ends to said bars and diverging upwardly, rail clamping devices engaging said bolts, and means coöperating with the latter for binding said devices firmly against the bases of the rails.

4. In a reinforced cement railroad tie, the herein described means for securing the rails to the ties, comprising metal cross bars supported by and forming a part of the internal reinforcing structure the latter embedded within a cement body, pathways formed within said structure and disposed on opposite sides of said rails and leading from the top of the tie down below said cross bars, lock bolts within said pathways and having at their lower ends open hooks that are engaged around said cross bars, said hook portions being in close proximity to a cement surface whereby the latter will resist the straightening out of said hooks, said lock bolts diverging upwardly and extending above the tie, rail clamping devices engaging said bolts, and means coöperating with the latter for binding said devices firmly against the bases of the rails.

5. In a reinforced cement railroad tie of the character described, the oppositely disposed channel plates having flanges which extend inwardly from the upper edges, top plates having dowel connections with said flanges on which plates the rails rest, suitable openings and pathways formed within

said plates and the main body of the tie, lock bolts inserted through said openings and pathways and having at their lower ends hinge connections with the internal metal structure of the tie and diverging upwardly and extending through said openings in the plates, rail clamping devices engaging said bolts, and means coöperating with the latter for binding said devices firmly against the bases of the rails.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. FLOOD.

Witnesses:
F. W. SMITH, Jr.,
M. T. LONGDEN.