

June 19, 1962

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3,039,695

REINFORCED CONCRETE RAILWAY TIE

Filed March 16, 1959

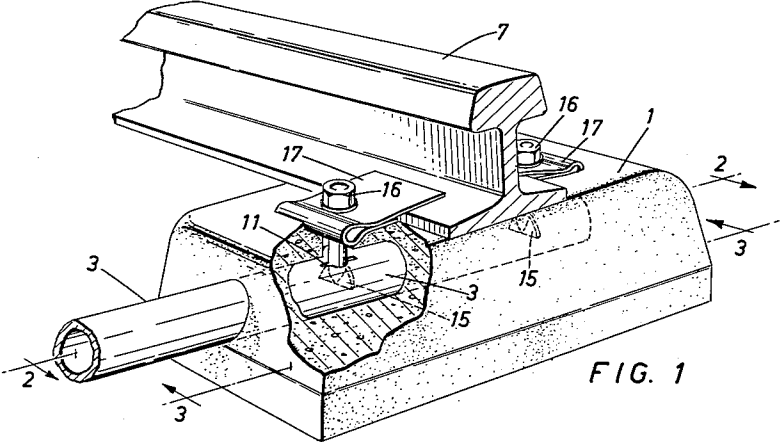


FIG. 1

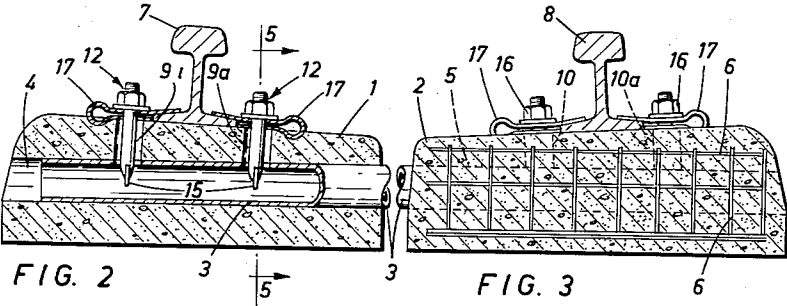


FIG. 2

FIG. 3

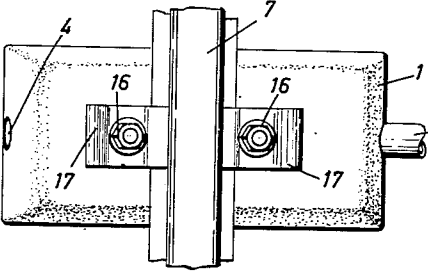


FIG. 4

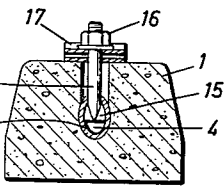


FIG. 5

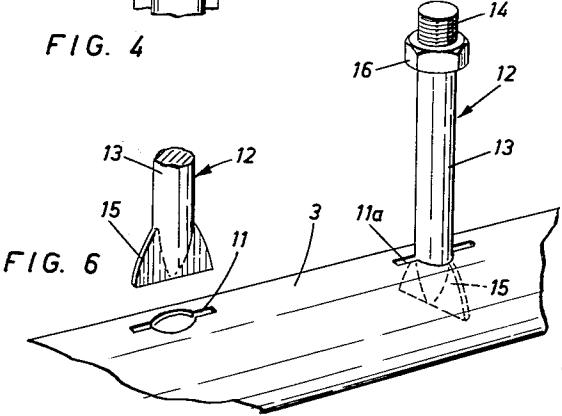


FIG. 6

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REINFORCED CONCRETE RAILWAY TIE

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Filed Mar. 16, 1959, Ser. No. 799,579

4 Claims. (Cl. 238-117)

This invention relates to railway ties.

Although concrete railway ties have achieved widespread acceptance on the European and other continents, they have not as yet attained substantial application in North America.

While there are many reasons why this has been the case, most of these are directly related to the cost of concrete ties as against conventional wooden ties which are generally readily available in North America. Concrete railway ties do afford many advantages over conventional wooden ties, however, which makes their application particularly desirable from maintenance and other standpoints.

Prior to my invention the design of concrete railway ties has been limited to those for main line applications. Ties for these applications require a high resistance against vibration, shocks and lateral forces all of which result from high speed or heavy traffic.

For private industrial track, however, or for branch lines where traffic is neither heavy nor high speed, tie requirements are less stringent than for main line traffic. So far as I am aware, there has been no previous attempt to provide a concrete railway tie especially designed for low speed, low density traffic.

It is the principal object of this invention, therefore, to provide a concrete railway tie especially adapted for private industrial track or branch line track usage.

It is another important object of this invention to provide such a concrete railway tie as will be less expensive than the present concrete ties now in use and which will in fact compete in price with conventional wooden ties.

It is another important object of this invention to provide such a concrete railway tie which will be adjustable for railway gauge widening in small radius curves.

It is yet another important object of this invention to provide such a concrete railway tie as may be laid without the use of special equipment.

It is a still further object of this invention to provide such a concrete railway tie as may more readily be transported and handled than has heretofore been the case.

These and other advantageous objects will become apparent through a consideration of the following detailed description taken in conjunction with the attached drawings in which:

FIGURE 1 is a perspective view partly in section of one side of a portion of railway tie constructed to embody features of this invention having some parts broken away.

FIGURE 2 is a vertical cross section taken along line 2-2 of FIGURE 1.

FIGURE 3 is a vertical cross section taken along line 3-3 of FIGURE 1.

FIGURE 4 is a plan view of one of the blocks of FIGURE 1.

FIGURE 5 is a view taken along line 5-5 of FIGURE 2 and FIGURE 6 is a detailed view of some of the components of the railway tie shown in FIGURE 1.

The invention consists broadly in the provision of a concrete railway tie consisting of a pair of concrete blocks one adapted to support each rail, each block having an aperture extending at least partially transversely therethrough together with a tie bar preferably of a standard metal shape or metal pipe each end of which is adapted to fit snugly into one of the block apertures, means for retaining the rails in position on the blocks and means

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for locking the tie bar into the aperture to provide a unitary structure comprising both blocks and the interconnecting tie bar.

The invention will now be described in detail with reference to the drawings.

The invention comprises two concrete blocks 1 and 2 retained together as a unitary structure by means of a tie bar 3 illustrated in the drawings as a length of a hollow pipe 3. Each of the concrete blocks 1 and 2 has an aperture 4 and 5 respectively extending therethrough which aperture may be formed in the block by placing a core therein when the blocks are cast. For reasons which will become apparent hereafter this aperture is preferably of non-circular configuration and in fact is shown in the drawings as elliptical or oval.

The tie bar 3 as illustrated in the drawings may be a standard length of pipe flattened to fit snugly into the apertures 4 and 5 at either end thereof.

The concrete blocks are preferably reinforced concrete and a cage of reinforcing wires 6 of conventional design will provide the best results.

Each block is adapted to support a rail 7 or 8 thereon.

According to an essential feature of this invention means is provided to lock the tie bar 3 into the apertures 4 and 5 so as to provide a unitary tie structure comprising the two blocks and the interconnecting tie bar.

In the embodiment of the invention shown, two apertures 9 and 9a are provided from the bearing surface of the block substantially vertically downward and communicating with the lateral aperture 4. These passages 9, 9a, 10, 10a may also be formed by inserting a core prior to casting the block which can be removed after the block has set.

Each end of the tie bar 3 is provided with apertures 11, 11a of keyhole configuration as may best be seen by reference to FIGURE 3. These apertures are on centres spaced apart from each other an amount equal to the centres of the apertures 9, 9a in the blocks.

Retaining members 12 are provided each comprising a shank 13 threaded as at 14 at its upper end and having a laterally projecting flange 14 at its lower end. The diameter of the shank 13 and the lateral extension and width of the flange 15 are such that the securing member 12 fits through the keyhole shaped apertures 11, 11a etc. in one position but not when rotated from that position.

A nut 16 is provided adapted to work on the threads 14 of each securing member 12.

It is necessary to provide some means for retaining the rails on the blocks and preventing transverse movement thereof. For this purpose I employ a spring clip 17 through which the retaining means 12 is adapted to fit, and in the manner shown in the drawings to anchor the rail 17 firmly in place on the blocks 1 or 2 as the case may be. Illustrated is the standard R.N. double elastic fastening system which provides a grooved rubber pad between the rail base and the concrete block and a steel clip adapted to engage the base of the rail. This particular clip offers special advantages when used in conjunction with this invention as will hereinafter be pointed out in detail. These fastening clips do not, however, form part of this invention in themselves and it is to be understood that any other convenient means for retaining the rails on the blocks may be substituted, although these clips are preferred since the single securing element 12 is, when said clips are employed, capable both of anchoring the rail to the block and of securing the tie bar to the block in the manner hereinafter described in detail.

As shown in the drawings the blocks 1 and 2 will not

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be of rectangular configuration but will preferably be formed so that the bearing surfaces incline towards each other for reasons which will be obvious to those in the railway art.

While the precise dimensions of the blocks and other components which form the subject of this invention are not critical to the practice of the invention, I have found that for a normal private industrial siding, cast concrete blocks approximately 11 inches wide (i.e. measured from left to right as viewed in FIGURES 2 and 3) and approximately 24 inches long measured along the base of the block (i.e. measured left to right as viewed in FIGURES 4 and 5) are sufficient to provide a satisfactory bearing capacity. The length of the tie bars and the spacing of the apertures 11, 11a on opposite sides of the tie bar will of course be dictated by the gauge of the track in question, since this dimension determines the spacing apart of the blocks and consequently the rails. Standard two inch hollow steel pipe has been used for the tie bar with satisfactory results and it has been discovered that blocks so constructed can be spaced fifty per hundred feet as against sixty per hundred feet of track length for conventional timber ties.

It is an important feature of this invention that the ties may be constructed and transported as individual components comprising blocks, tie bars and fasteners. At the site where the track is to be constructed, the tie units are assembled by inserting each end of the tie bar into the hollow core of one of the tie blocks. The apertures 11, 11a in the tie bars are then aligned with the apertures 9, 9a in the blocks. If the tie bar is non-circular, it will not only preclude rotation of the bar in the aperture, but will orient the bar so that the apertures 11, 11a are uppermost thus facilitating alignment with the apertures 9, 9a in the blocks. After the apertures 9, 9a and 11, 11a have been aligned, the retaining members 12 are inserted through the holes in the block and the keyhole slots in the tie bar, flange downward and after being so inserted are rotated 90° into the interior of the pipe so that the flange locks in the interior of the tie bar 3 in the manner shown in FIGURE 1. The fastening clip may then be placed over the thread or uppermost portion of the retaining member and the nut 16 applied. A particular advantage in the embodiment shown is that the same force that compresses the clip onto the rail base provides the anchorage of the tie bar in the concrete block.

It will thus be seen that a railway tie constructed according to the invention already described provides the advantages set out in the objects listed.

The fact that the components may be shipped individually greatly facilitates the transportation problem.

The individual components may easily be assembled by the unskilled workman in the field without the use of any special tools whatever and when it is necessary to alter the gauge for small radius curves or other reason, the only change required is in the length of the tie bar 3 and a corresponding change in the spacing of the apertures 11, 11a from their corresponding apertures in the end of the tie bar.

The practice of the invention offers high track stability both laterally (due to the fact that each block provides four vertical spaces embedded in the ballast) and vertically (due to the greater width of the concrete blocks than the timber ties). In addition, in case of damage, components can be individually replaced giving rise to a substantial cost saving.

The invention has been described with reference to preferred embodiments. It is to be understood, however, that the invention is not limited to such embodiments and such embodiments of the invention as come within the scope and purview of the appended claims are to be considered as part of this invention.

What I claim as my invention is:

1. A railway tie comprising a pair of substantially identical concrete blocks each block having a bearing

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surface adapted to support one of the rails, each block being formed with an aperture extending at least partially transversely through each of said blocks, two substantially vertical passages being formed in said blocks spaced transversely apart therein and extending downwardly from the bearing surface to communicate with said transverse aperture, a removable tie bar consisting of a length of pipe flattened to elliptical or oval cross section, said apertures being of such dimensions and configurations as to receive the ends of the tie bars removably but snugly therein, a pair of apertures in the upper surface of each tie bar, said apertures being of keyhole configuration and being on centres corresponding to the centres of the vertical block passages, means for retaining the rails in position on the block bearing surfaces, said means including a spring clip adapted to engage the rail base, said clips having holes therein, a fastening member comprising a shank having a threaded upper end and a laterally projecting flange at its lower end, said shank being adapted in one position to fit into said keyhole shaped tie bar apertures but to preclude withdrawal of the shank after such insertion and upon rotation thereof, said shank being adapted to extend through said vertically extending passages and said clip holes, and a nut adapted to be threaded upon the shank and upon tightening to engage the upper surface of the clip and to cause the clip to engage the rail base and simultaneously to retain the tie bar in the block aperture as a unitary structure.

2. A railway tie comprising a pair of concrete blocks, each having a bearing surface adapted to support one rail, each block being formed with an aperture extending at least partially transversely therethrough, and being formed with at least one passage extending from the bearing surface downward to communicate with said transverse opening, a removable tie bar comprising a length of hollow metal pipe of elliptical or oval cross section, each end of the tie bar being adapted to fit removably into the aperture in a block, said aperture being of corresponding cross section, retaining means for retaining the rails in position on the block bearing surfaces said retaining means comprising a rail clip adapted to engage the lower rail flange and to bear against the block bearing surface, and a securing member comprising a shank, said securing member being adapted to be secured in the interior of said tie bar, said shank extending through said passage and said rail clip and being secured at its upper extremity by means adapted to retain said block, tie bar and rail clip together as a unitary structure.

3. A railway tie as claimed in claim 2 wherein each tie bar has a keyhole shaped aperture in each end thereof adapted to align with each block passage and wherein said securing member comprises a shank having a laterally extending flange at its lower extremity adapted to fit through said keyhole aperture in one position only said shank being threaded at its upper extremity, together with a nut adapted to act on said threads, said securing means being adapted when inserted through said passage and said keyhole aperture and upon rotation thereof and upon tightening of said nut to retain said block bar and clip together as a unitary structure.

4. A railway tie as claimed in claim 3 wherein the laterally extending flange on the lower extremity of said securing means comprises a flattened extension of said shank being of reduced thickness than said shank and extending transversely beyond the shank in a configuration coinciding with the interior cross-sectional configuration of said tie bar, said keyhole aperture having a central portion adapted to receive the shank and longitudinally extending projections of reduced width adapted to receive the transverse flange projection whereby said flange may be inserted into the interior of said pipe in one position only.

(References on following page)

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References Cited in the file of this patent

UNITED STATES PATENTS

408,964	Forbes et al. -----	Aug. 13, 1889
889,028	Mavis -----	May 26, 1908
899,089	Westbrook -----	Sept. 22, 1908
1,436,847	Wilson -----	Nov. 28, 1922
1,699,197	Lossl -----	Jan. 15, 1929

1,718,098
1,761,705
2,656,115

5

6

Yeomans -----	June 18, 1929
Buente -----	June 3, 1930
Sonneville -----	Oct. 20, 1953

FOREIGN PATENTS

Austria -----	Nov. 10, 1951
Germany -----	Aug. 24, 1935
Germany -----	Feb. 3, 1936

169,433
615,639
625,082