United States Patent

[11] 3,598,312

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[54] SYNTHETIC CROSSTIE
5 Claims, 17 Drawing Figs.

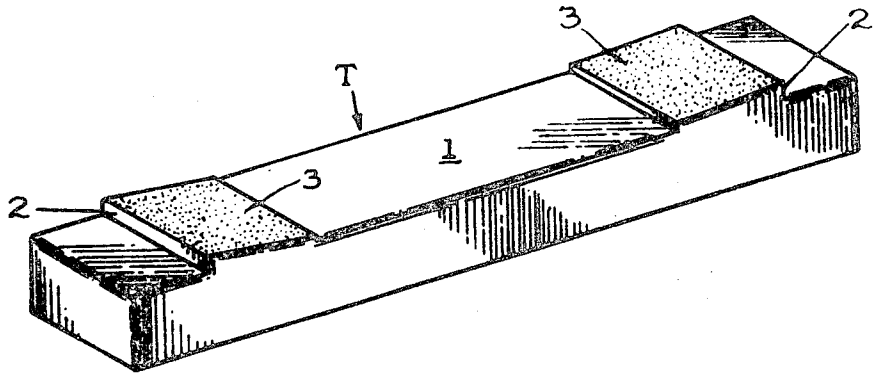
[52] U.S. Cl. 238/29, 238/55, 238/84, 238/64, 238/306
[51] Int. Cl. E01b 3/10, E01b 3/44
[50] Field of Search ..... 238/283, 29, 83, 84, 85, 305, 306, 264, 107, 108, 54, 55, 37, 39, 30—39, 26, 64, 306

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Assistant Examiner—Richard A. Bertsch
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ABSTRACT: A synthetic crosstie for railway track having integral canted rail-supporting portions and also having cross-sectional shapes adapted to adequately embed themselves into the ballast while taking into account minimum interference with ballast-tamping apparatus.



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SHEET 1 OF 2

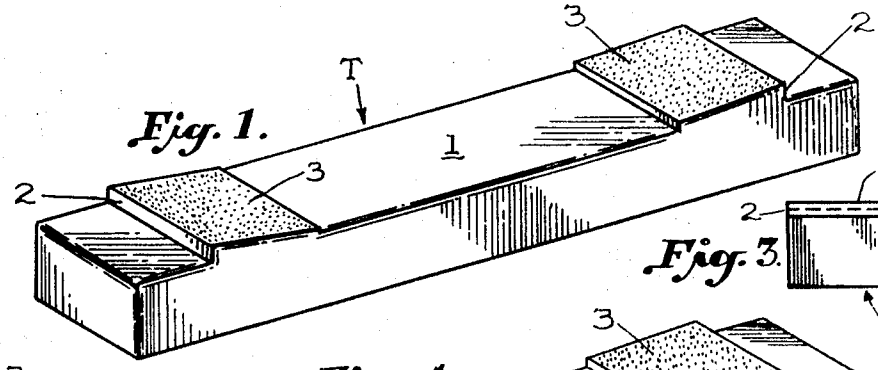


Fig. 1.

Fig. 3.

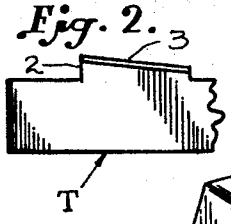


Fig. 2.

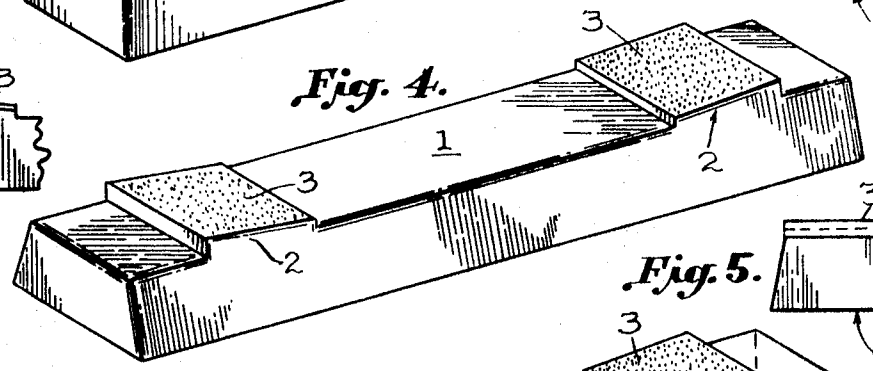


Fig. 4.

Fig. 5.

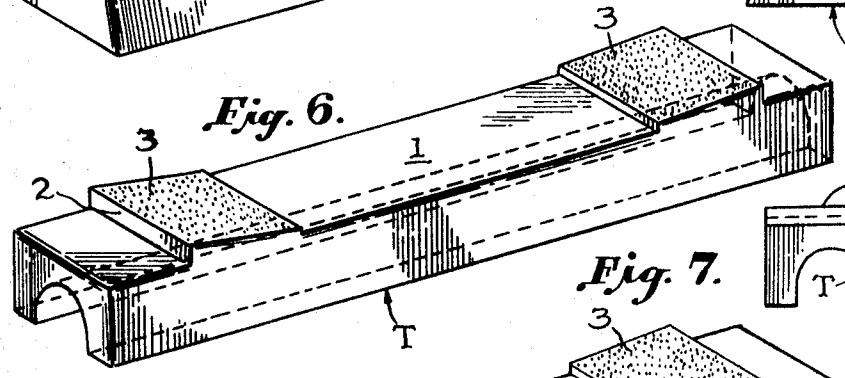


Fig. 6.

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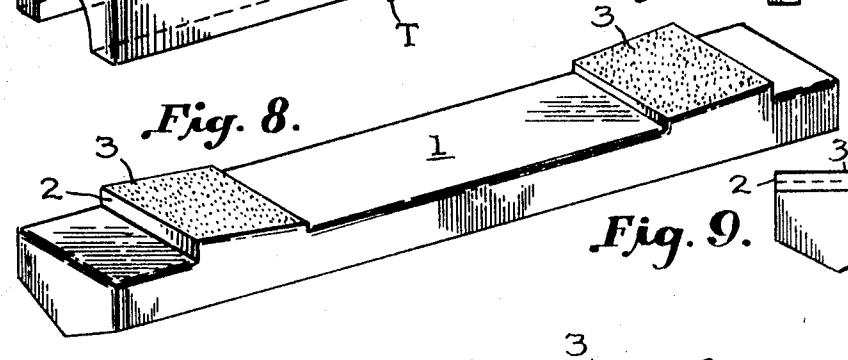


Fig. 8.

Fig. 9.

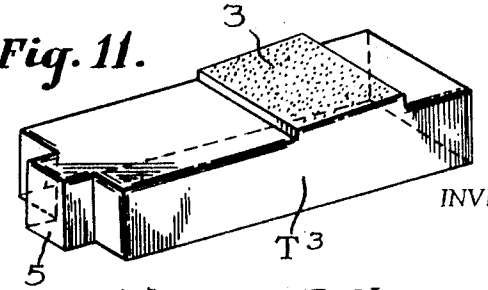


Fig. 11.

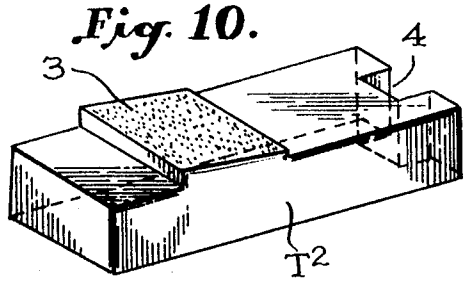


Fig. 10.

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Fig. 12.

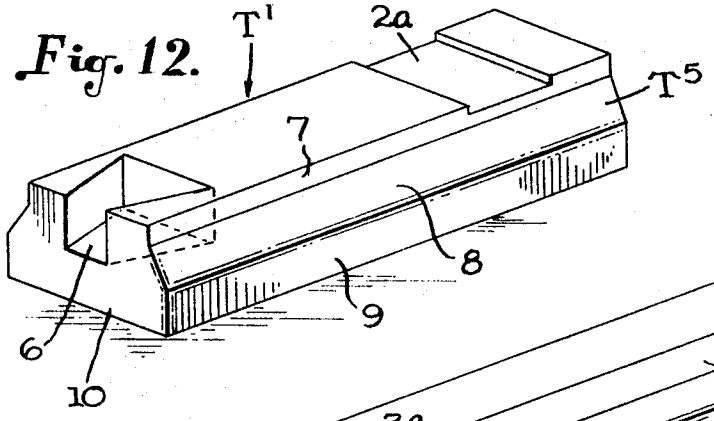


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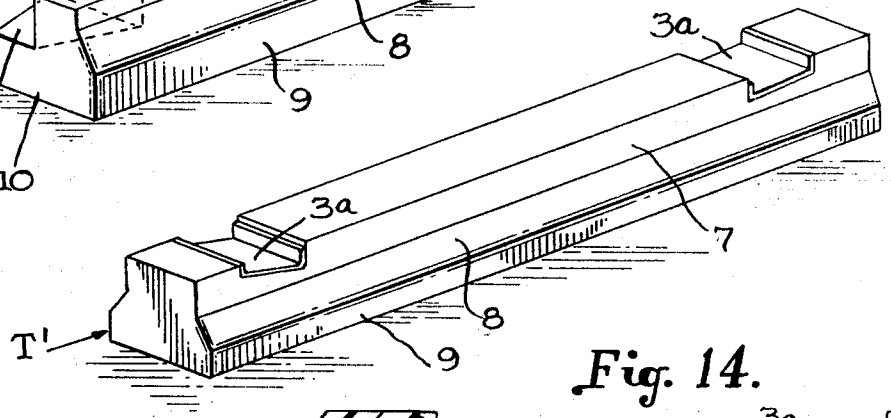


Fig. 14.

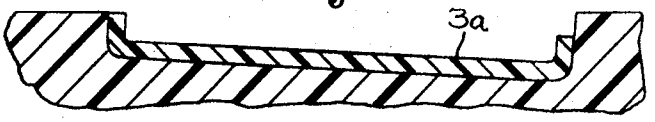


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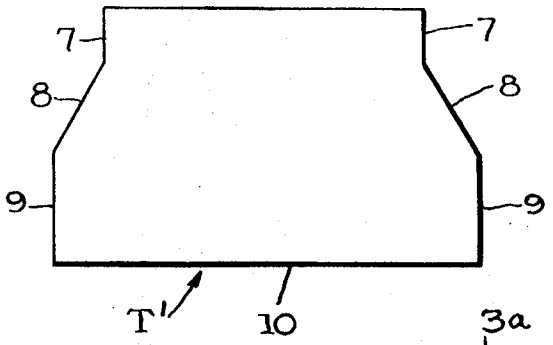


Fig. 16.

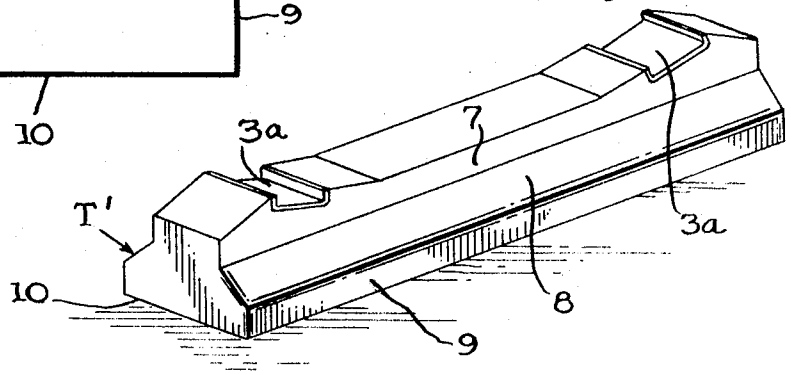
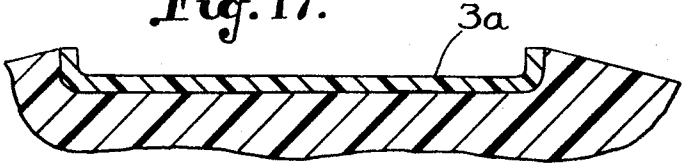


Fig. 17.



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SYNTHETIC CROSSTIE

This invention relates to synthetic, nonconductive crossties for railroad track. For many years it has been standard practice to cant rails inwardly on an inclination equal to the coning of the wheels to insure central loading of the railhead. This helps maintain the gauge of the track and reduces the tendency of the rails to overturn. The canting of the rails is ordinarily accomplished by either the use of inclined tie plates or by adzing the wooden ties. With the present invention the canted rail seats are molded into the tie, thus eliminating the necessity for using inclined tie plates or performing any additional operation to achieve the desired result.

A primary object of the invention is to provide a tie preferably made by molding one of the less expensive resin systems into the desired length and cross-sectional shape, while at the same time forming integral canted rail seat portions either above or below the upper surface of the tie to support the rails in a canted position in accordance with accepted installation practices incident to mounting rails on tie plates. While it is to be understood that is is within the scope of the invention to use metallic rods, cables or the like for internal reinforcement if desired, nevertheless, such internal conductive metallic elements will not in any way be associated with any sort of rail fastenings. In the case of concrete or other molded ties, such reinforcement members when used as a part of the anchoring systems for the rail fastening, form a conductor which prohibits their use in electric signal track.

A further object is to provide a synthetic, nonconductive crosstie which may be made in one piece or in several sections. For example, where the pitch of the canted rail seat is the same, the tie may be made in half sections to facilitate handling, and upon installation the sections may be reversed in a horizontal plane and held in place by a suitable integral or separate interlocking means.

A further object is to provide a crosstie as described in the aforesaid objects which includes a pad or coating or either a thermoplastic or thermosetting material secured to the rail seat surface.

A still further object is to form a nonconductive crosstie using a moldable synthetic compound that is compatible with selected fillers such as wood chips or other wood or nonmetallic products to enable the use of conventional means of fastening the rails to the ties.

An additional object is to provide a tie having vertical faces near the top to afford better bearing for rail anchors, and a larger bottom portion to improve embedment in the ballast.

A preferred and practical form of the invention is shown in the accompanying drawing, in which:

FIG. 1 is a perspective view of one form of the improved tie.

FIG. 2 is a fragmentary side elevation of an end of the tie shown in FIG. 1.

FIG. 3 is an end elevation of the tie shown in FIG. 1.

FIG. 4 is a perspective view of a tie, like FIG. 1, but with a different cross-sectional shape.

FIG. 5 is an elevation of the tie shown in FIG. 4.

FIG. 6 illustrates a tie which has a transversely arched cross section.

FIG. 7 is an end elevation of the tie of FIG. 6.

FIG. 8 is a perspective view of a tie of modified cross section, as also shown in end elevation in FIG. 9.

FIGS. 10 and 11 are perspective views showing how the tie may be made in sections.

FIG. 12 is a perspective view further illustrating one-half of a two-piece tie of synthetic material.

FIG. 13 is a perspective view of a synthetic tie with depressed, canted rail seats.

FIG. 14 is a detail cross section taken transversely of the seat or cradle for receiving the rail base which will rest on a suitable pad.

FIG. 15 is an end profile of a new tie to emphasize the upper vertical faces which constitute abutments for rail anchors and a wider ballast-anchoring base.

FIG. 16 is a perspective view of an entire tie having the cross-sectional profile of FIG. 15.

FIG. 17 is a detail cross section of a portion of a tie where the rail seat is not canted.

Similar reference characters designate similar parts in the several figures of the drawing.

As will be seen from FIG 1, the tie T is elongated and can be made in the shape of any selected cross section, preferably as shown in FIGS. 1, 4, 6, 8 and 13. The top surface 1 of the tie is provided adjacent each end thereof with an integral canted rail support or seat 2 upon which the rail base rests. As shown in FIGS 1—11, the seat extends above the general plane of the top surface 1 of the tie to provide the aforesaid rail seat 2 whose surface is canted inwardly and downwardly approximately 1:40, and is covered with a pad 3 of synthetic material, preferably bonded to the surface of said seat. The pad material may be a thermosetting material such as polyurethane or a thermoplastic material such as nylon, polyethylene or polyvinyl chloride. These pads may be flat as in FIGS 1—11, or cupped, or of substantially shallow U-shape, as shown at 3*a* in FIGS 13, 14, 16 and 17 so as to fit the depressed rail seats 2*a* provided in this embodiment of the invention. The aforesaid bonding of the pad to the rail seat may be accomplished in various ways. For example, when the tie is molded, the pad is put into place on the rail seat and during the curing cycle the pad becomes firmly bonded to the tie. Alternatively, the pad can be bonded to the rail seat after the tie is completely cured by means of appropriated adhesives.

As an alternative instead of using a pad as described above, the seats 2, 2*a* may be provided with a suitable coating of thermosetting or thermoplastic material previously described to which the base of the rail is bonded, thereby securing the rail and tie directly together.

The tie itself is preferably made from one of the less expensive resin systems such as phenolic, polyester or even some of the thermoplastic materials, although this does not rule out such materials as epoxy, polyurethane, etc., which are more expensive. Urethane has high abrasion resistance and will not cut or powder in this type of application. For purposes of density and economics the resin material may be filled with shaved wood chips, wood flour, or such nonmetallic elements as ground cornstalks. Wood products, however, are more desirable since they enhance the use of conventional means of fastening the rail to the tie when it is not bonded directly thereto.

FIGS 10 and 11 illustrate a tie made of two mating sections T^2 and T^3 with section T^2, for example, having a vertical groove 4 to receive a mating tongue 5 of the section T^3. This facilitates initial handling and repair when required without replacing an entire tie. Preferably, the tongue and groove are secured together by bonding with a thermosetting resin coating such as epoxy or polyester.

FIG. 12 shows one section T^5 of a tie, including the improvements described herein, which is provided with a pocket 6 in its inner end. An identical mating section (not shown) may be lined up with the section shown so that the related inner pockets 6 will be in registry and then both pockets are filled with a synthetic substance which provides a link or key. With this arrangement, the same mold may be used to provide multiple sections such that any two aligned halves T^5 may be used interchangeably. Thus, in a tongue and groove method of joining the two halves of the tie as shown in FIGS. 10 and 11 the two halves meet in the middle. However, with two separated halves T^5, as illustrated in FIG. 12, connected by a link which is bonded into the separate halves, provision is thus made for gauging of the rail. The aforementioned link could be wood, synthetic material or metal and could be of any variety of shapes such as square, tee, angle or I-beam. The ends of the link may be shaped either to conform to the shape of the receiving pocket or to approximately that shape so that in the one case a mechanical link could be formed, and in the latter a resin could be poured into the pocket to bond the link and tie together upon curing. Furthermore, the link may be of

any desired length as required by the particular application such as when the inner faces of the tie halves are abutting or when they are spaced apart, for example, a distance of several feet.

FIGS. 12, 13, 15 and 16 all show a new cross-sectional shape of the tie T'. It will be seen that the base 10 of the tie is considerably wider than the top surface which is of the same width as conventional wood ties, namely 9 inches. The width of the base is preferably 12 to 15 inches, although this may vary as conditions may require. Referring particularly to FIGS. 13 and 16 it will be seen that a rail seat recess is provided at either side of the rail base and functions much the same as a double shoulder tie plate. In this embodiment, the rail is held in position with a line spike the same as on conventional ties. The embodiments of FIGS. 13 and 16 are basically the same with the exception that FIG. 16 shows a built-up cradle or rail seat extending above the top surface of the tie, and FIG. 13 shows the rail seat disposed below the top surface of the tie.

In cross section, the tie T' has symmetrically formed sidewalls having spaced upper and lower vertical surfaces 7 and 9, respectively, with a sloping intermediate wall 8 therebetween. The upper vertical surfaces 7 provide a bearing surface for conventional hook-type rail anchors whereas the lower vertical surfaces 9, which would be substantially embedded in the track ballast, assist the operator of a tamping device to locate the edge of the tie and minimizes damage to the tie such as might occur if the sloping walls 8 were extended outwardly to a substantially feathered edge as shown for example in FIG. 4. Fasteners of appropriate types will provide means of holding the rail in line or gauge and will eliminate the necessity of having a receiver embedded into the tie as in the case of concrete ties.

An advantage in the base of the tie being wider than the base of a conventional tie is that it reduces the inert load between the tie and the ballast and thus allows wider placement of ties in a track structure thereby requiring less ties per mile and a more economical system.

I claim: c8

1. A railway crosstie including, a longitudinally extending body of molded synthetic resinous composition having a top surface, said body provided with a pair of integral rail seats molded adjacent opposite ends thereof, each said rail seat having an upper planar surface disposed in a plane disposed both offset from and angled with respect to the adjacent said body top surface, a separate tie pad element overlying each said rail seat and bonded to said upper planar surface, each said tie pad comprising a disparate planar layer of synthetic resinous composition compatible with said tie body composition and adhered thereto to provide an integral synthetic crosstie and pad unit.

2. A railway crosstie according to claim 1 wherein the rail seats are elevated above the top surface of the tie.

3. A railway crosstie according to claim 1 wherein the rail seats are recessed beneath the top surface of the tie.

4. A railway crosstie according to claim 1 wherein the base of the tie is substantially wider than the top thereof to reduce the inert load between the tie and the ballast.

5. A railway crosstie according to claim 1 wherein, said body includes a pair of identical half sections, the juxtaposed end faces of each said half section provided with a keystone pocket, and connecting means insertable in said pair of opposed pockets to fixedly join said pair of half sections.