

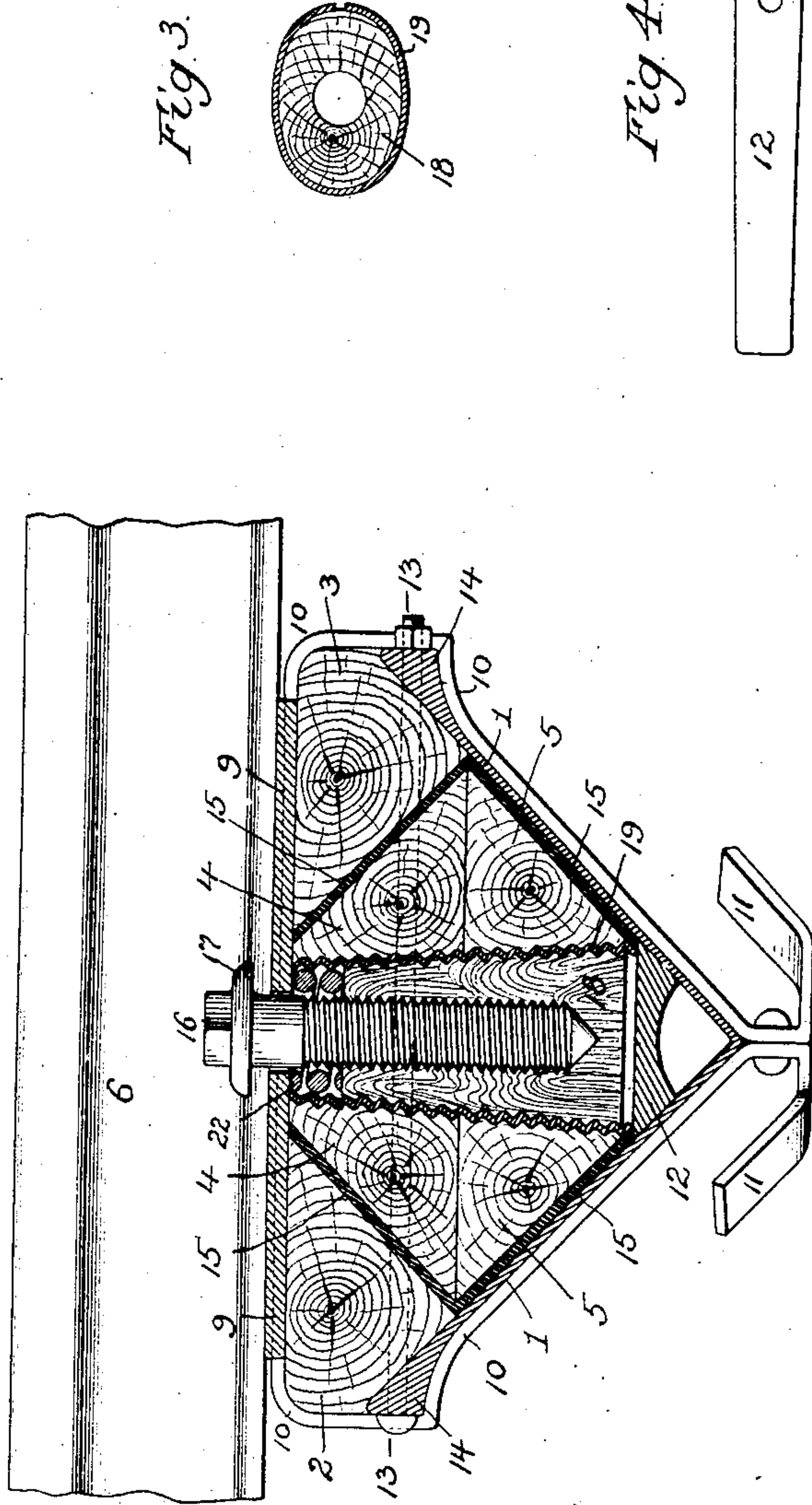
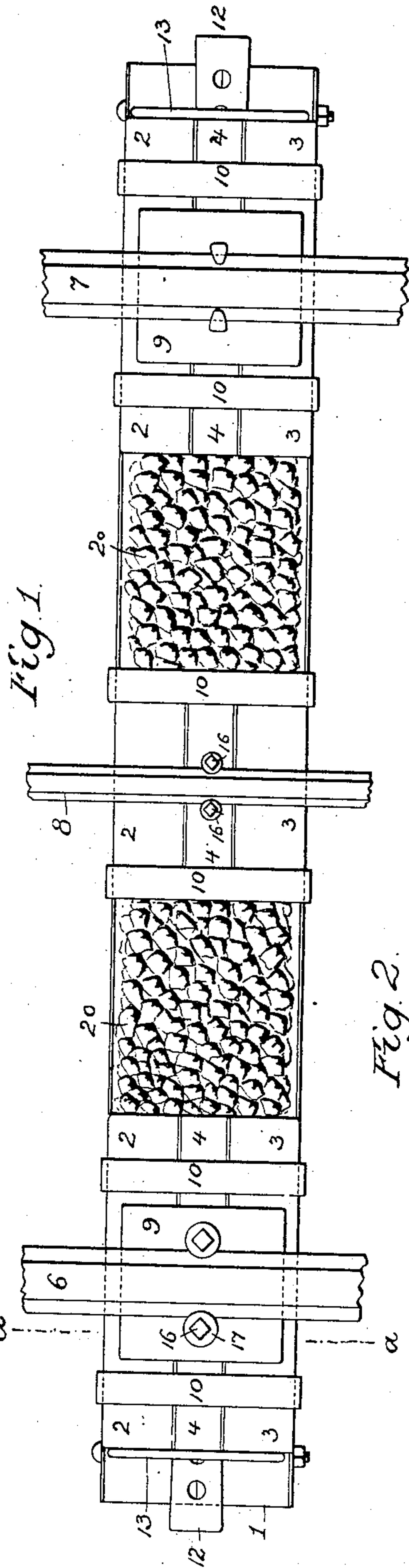
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J. S. ALEXANDER.

RAILWAY TIE.

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Witnesses:  
*Frank L. A. Graham*  
*Titus H. Innes*

Inventor:  
*John S. Alexander*,  
 by his Attorneys,  
*Howson & Howson*



# UNITED STATES PATENT OFFICE.

JOHN S. ALEXANDER, OF NEW YORK, N. Y.

## RAILWAY-TIE.

SPECIFICATION forming part of Letters Patent No. 786,254, dated April 4, 1905.

Application filed March 14, 1904. Serial No. 197,958.

*To all whom it may concern:*

Be it known that I, JOHN S. ALEXANDER, a citizen of the United States, and a resident of New York city, State of New York, have invented certain Improvements in Railway-Ties, of which the following is a specification.

One object of my invention is to provide a metallic railroad-tie having a support for the rails which is as elastic as or more elastic than the support presented by the ordinary wooden tie and permits of the use of the same class of rail-fastenings as are permissible in the case of a wooden tie, further objects of the invention being to insure the proper drainage of the tie, to provide a secure fastening for the rails, to permit of the ready replacing of the perishable portions of the tie at small expense, and to adapt the tie for use in electric railways where the track-rails serve as return-conductors for the current.

In the accompanying drawings, Figure 1 is a plan view of a railway-tie constructed in accordance with my invention. Fig. 2 is an enlarged transverse section of the same on the line *a a*, Fig. 1; and Figs. 3 and 4 are views of certain elements of the structure.

The tie proper consists of a metallic beam 1 of V-section disposed with its apex downward, although the beam may be truncated or of other angular form in cross-section and still embody certain features of my invention. Fitted within this tie at each end and also at the center are a series of wooden blocks 2, 3, 4, and 5, suitably shaped to fit together and fill the space within the tie except at the bottom, the said blocks 2, 3, and 4 projecting above the top of the tie and serving for the support of the track-rails 6 and 7 and also for the support of an intermediate third rail 8 when the tie is used for an electric railway, this central third rail serving as the means whereby the current is conveyed to the motors on the car. The central block may be in one piece, if desired, instead of being composed of upper and lower sections 4 and 5, or a single suitably-shaped block may take the place of the series of blocks described.

Bearing-plates 9 are interposed between the base-flange of each rail and the blocks 2, 3, and 4, so as to distribute the weight of the

rail and its load throughout a large area of said blocks, and thus prevent such wear of the same as might result if the bearing-surface was limited simply to that portion of the base-flange of the rail which would otherwise be in contact with the blocks. These wooden rail-supporting blocks are retained in the tie in the following manner: Passing round the tie and over the tops of the blocks 2, 3, and 4 on each side of the rail is a metallic strap 10, which conforms to the shape of the tie and blocks and is riveted or otherwise secured together at the base of the tie, the strap being also, by preference, provided with upturned projecting portions 11 for engaging with the ballast in which the tie is embedded, and thereby increasing the hold of the tie upon the ballast, so that lateral displacement of the tie will not depend wholly upon the masses of ballast at the ends of the tie and upon its frictional hold upon the intervening mass of ballast. Concrete may be massed about these upturned ends of the confining-straps and may also increase the metallic portion of the tie, if desired, in order to increase the stability of the tie. The blocks and straps being properly adjusted upon the tie, a wedge 12 with beveled sides is driven longitudinally beneath the lower block 5 or beneath the single central block, if only one is used, the beveled sides of this wedge bearing upon the beveled sides of the tie, so that the effect of the longitudinal driving of the wedge is to lift the entire series of blocks and to force the same firmly against the enveloping-straps 10, the operation being practically the reverse of that of driving hoops upon a barrel and the result being the rigid confinement of the wooden blocks to the metallic tie in their proper longitudinal positions in respect thereto.

The under side of each wedge 12 is preferably arched, as shown in Fig. 2, so that said wedge will not interfere with the free longitudinal escape of water from the bottom of the tie, proper drainage of the latter being thereby insured, and the objections which might arise from the freezing of water in the tie being effectually overcome. In order to prevent longitudinal displacement of the supporting-blocks on the tie due to outward thrust of the



wheels upon the rails, a bolt 13 extends transversely across the upper portion of the tie in contact with the outer faces of each set of supporting-blocks, as shown in Fig. 1, and in order to provide proper support for these bolts, as well as to stiffen and strengthen those portions of the tie with which the bolts engage, said tie is ribbed or thickened at each of its upper edges, as shown at 14 in Fig. 2, and it may also be ribbed in such other places as will increase its hold on the ballast, such thickening of the edge portions of the tie and ribbing of other portions of the same being readily effected during the rolling operation whereby the tie is produced.

In order to increase the elasticity of the rail-support afforded by the wooden blocks, cushions 15, of paper, vulcanized fiber, felt, or other suitable material, are interposed between the block 4 and the blocks 2 and 3 and also between the block 5 and the tie, and similar cushions may be interposed between the blocks 2 and 3 and the tie, if desired, these cushions also having the effect of absorbing shocks and overcoming any tendency of the rail to lift the tie as said rail rises after the passage of the wheel of an engine or car over the same, the loosening of the rail in the ballast due to such lifting of the same being thereby prevented. The rails may, if desired, be secured by the usual spikes, which can be driven directly into the blocks 4 and 5, as shown at the right-hand side of Fig. 1; but I prefer to use as a rail-fastening a threaded bolt 16, which has a flange 17 bearing upon the base-flange of the rail and is screwed into a dowel-pin 18, the latter being contained in an opening formed in the blocks 4 and 5, which opening is tapered, being largest in diameter at the bottom, so that the upward pull of the bolt 16 upon the dowel-pin 18 tends to wedge the latter more and more firmly in the opening. The dowel-pin and opening may be of oval or other than circular cross-section in order to prevent the pin from turning when the bolt is screwed into it.

The dowel-pin 18 can be made of hard wood, while the blocks 2, 3, 4, and 5 can be made of softer and cheaper wood, or some of these blocks 2, 3, 4, and 5 may be made of harder wood than the others. For instance, the blocks 2 and 3, which are exposed, may be made of harder wood than the blocks 4 and 5, which are protected, this provision for making the rail-support of different kinds of wood being one of the reasons for the use of the series of blocks in said rail-support and another reason being that any one of the series of blocks which may become defective by reason of wear or climatic conditions may be removed and replaced without disturbing or renewing any of the other blocks with consequent economy as compared with the use of a rail-supporting block in one piece. In carrying out this feature of my invention, how-

ever, it may not be necessary to use as many blocks in each rail-support as I have shown and described. For instance, in some cases an upper and lower block only may be needed, or in other cases but one or two longitudinal blocks only may be used.

In order to increase the hold of the dowel-pin 18 upon the blocks 4 and 5, I interpose between said dowel-pin and the blocks a sleeve 19, of metal or other suitable material, preferably corrugated, as shown in Fig. 2, so that as the dowel-pin is drawn up by the action of the bolt 16 the corrugations will bite into the surface of the same and also into the blocks 4 and 5, and thus retain a firm hold upon each, the sleeve being split, as shown in Fig. 3, so as to permit it to expand under the wedge-like action of the tapering dowel-pin. Between the top of the dowel-pin and the plate 9 or other fixed bearing above the pin is inserted a cushion 22, which imparts a certain degree of elasticity to the rail-fastening. This cushion is shown in the drawings as consisting of a coiled spring; but it may be a helical spring or a mass of elastic or semi-elastic material, such as rubber, paper, vulcanized fiber, or the like.

The wooden blocks which constitute the rail-supports serve to insulate said rails from the metallic portion of the tie, and consequently from each other and from the third rail 8 when the latter is employed, these conditions being necessary in the case of an electric road. By making the tie in the form of an angular beam or bar open at the top the same can be weighted with ballast, as shown, for instance, at 20 in Fig. 1, as well as embedded in the ballast like an ordinary tie. Hence the tie becomes a part of the permanent way instead of a part of the track structure, and vertical movements of the track under the pressure of passing loads are absorbed by the elastic track-supports of the tie without causing any corresponding vertical movement of the tie itself, thus overcoming the objection to ordinary metallic ties in which the wedging or bolting together of the tie and rail makes the tie a part of the rail structure, so that it rises and falls with the flexing of the rail under a rapidly-moving train, and thereby causes a churning of the road-bed, especially at the end of the tie, with the effect of crushing and squeezing out the ballast, while the hard-tamped ballast under the center of the tie remains intact or "balled" and supplies a fulcrum, which permits a seesaw motion of the tie, resulting in the vertical bending of the latter and corresponding impairment of the proper alinement of the track. The open top of the tie may be filled with concrete instead of ballast, if desired.

The use of spikes or bolts as a rail-fastening in my improved tie overcomes the objection to the steel wedges or bolts and nuts sometimes used in connection with metal ties,



which lack elasticity and are continually working loose under the great vibrations due to heavy modern engines and trains. Furthermore, the wedges are easily tampered with and stolen and are objectionable on that account.

Each of the wedges 12 employed in connection with my improved tie is embedded in the ballast, and therefore difficult of access, and it is furthermore driven so tightly as to be difficult to remove by hand. Each wedge is, however, provided, as shown in Fig. 4, with a series of openings 21 for the reception of a crow-bar or other implement whereby it can be loosened when it is desired to remove any of the blocks of the rail-support. In light track construction or in roads upon which the traffic is light a single band 10 may be sufficient for each rail-support, and by properly disposing the rail-supports upon the tie rails may be permitted to cross the tie at any desired point and at any desired angle, as in the case of switches, frogs, or crossings.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination of a metallic railway-tie of angular cross-section, open at the top, with wooden rail-supporting blocks, each composed of upper and lower sections fitted together, the upper section being divided longitudinally, substantially as specified.

2. The combination of a metallic railway-tie consisting of a beam or bar open at the top, wooden rail-supporting blocks confined to said tie, and cushions interposed between said rail-supporting blocks and the tie, substantially as specified.

3. The combination of a metallic railway-tie consisting of a bar or beam of angular cross-section, open at the top, with rail-supporting blocks confined to said tie, and each consisting of a series of sections, with cushions interposed between the blocks and the tie and also between the sections of the blocks, substantially as specified.

4. The combination of a metallic railway-tie consisting of a bar or beam of angular cross-section, open at the top, with wooden rail-supporting blocks confined to said tie, and discontinued some distance above the apex of the angle at the base of the tie, so as to provide a drainage-passage at the bottom of the tie, substantially as specified.

5. The combination of a metallic railway-tie consisting of a bar or beam of angular cross-section, open at the top, rail-supporting blocks fitted to said tie, and retaining-straps enveloping said tie and its contained blocks, and having bent ends for engaging with the ballast in which the tie is embedded, substantially as specified.

6. The combination of a metallic railway-tie consisting of a bar or beam of angular cross-section, open at the top, rail-supporting blocks fitted to said tie, confining-straps for said

blocks, and wedges interposed between the blocks and the tie, and serving to force said blocks into contact with the confining-straps, substantially as specified.

7. The combination of a metallic railway-tie consisting of a bar or beam of angular cross-section, open at the top, rail-supporting blocks fitted to said tie, confining-straps for said blocks, and wedges interposed between the blocks and the tie, and serving to force said blocks into contact with the confining-straps, said wedges being recessed to form drainage-openings at the base of the tie, substantially as specified.

8. The combination of a metallic railway-tie consisting of a bar or beam of angular cross-section, open at the top, rail-supporting blocks fitted to said tie and receiving the rail-fastenings, and transverse bolts engaging the tie and preventing lateral displacement of said blocks, and of the fastening devices carried thereby, substantially as specified.

9. A metallic railway-tie consisting of a bar or beam of angular cross-section, open at the top, and having its upper edges ribbed or thickened, substantially as specified.

10. The combination of a metallic railway-tie consisting of a bar or beam of angular cross-section, open at the top, and having its upper edges ribbed or thickened, rail-supporting blocks fitted to said tie, and transverse bolts crossing the tie and engaging the thickened edge portions of the same, said bolts providing a bearing for the rail-supporting blocks and preventing lateral displacement of the same, substantially as specified.

11. The combination of a metallic railway-tie consisting of a bar or beam of angular cross-section open at the top, rail-supporting blocks fitted to said tie and receiving the rail fastenings, and transverse bolts engaging the tie and crossing the same at the outer ends of the blocks, said bolts bearing upon and preventing outward lateral displacement of said blocks, substantially as specified.

12. The combination of a rail-support having a tapering opening therein, greater in diameter at the bottom than at the top, with a dowel-pin fitted to said openings, and a rail-securing device engaging said dowel-pin, substantially as specified.

13. The combination of a rail-support having an opening therein, a dowel-pin engaging said opening and receiving the rail-fastening device, and a sleeve interposed between said dowel-pin and the rail-support, substantially as specified.

14. The combination of a rail-support having an opening therein, a dowel-pin engaging said opening and receiving the rail-fastening device, and a sleeve interposed between said dowel-pin and the rail-support, said sleeve being split so as to permit of expansion and contraction, substantially as specified.

15. The combination of a rail-support hav-



ing an opening therein, a dowel-pin engaging  
said opening and receiving the rail-fastening  
device, and a sleeve interposed between said  
dowel-pin and the rail-support, said sleeve be-  
5 ing corrugated horizontally, substantially as  
specified.

16. The combination of a railway-tie having  
an opening therein, a dowel-pin fitted to said  
opening, a rail-securing device engaging said  
10 dowel-pin, and an elastic medium which re-  
sists upward movement of the dowel-pin, sub-  
stantially as specified.

17. The combination of a railway-tie having  
an opening therein, a rail-bearing plate mount-  
15 ed upon said tie, a dowel-pin fitted to the open-  
ing in the tie, a rail-securing device engaging

said dowel-pin, and an elastic medium inter-  
posed between the top of the dowel-pin and  
the rail-bearing plate, substantially as speci-  
fied.

18. The combination of a railway-tie having  
an opening therein of other than circular cross-  
section, a dowel-pin fitted to said opening and  
a rail-securing device engaging said dowel-  
pin, substantially as specified.

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

JOHN S. ALEXANDER.

Witnesses:

W. R. TRAVERS,  
M. MORAN.