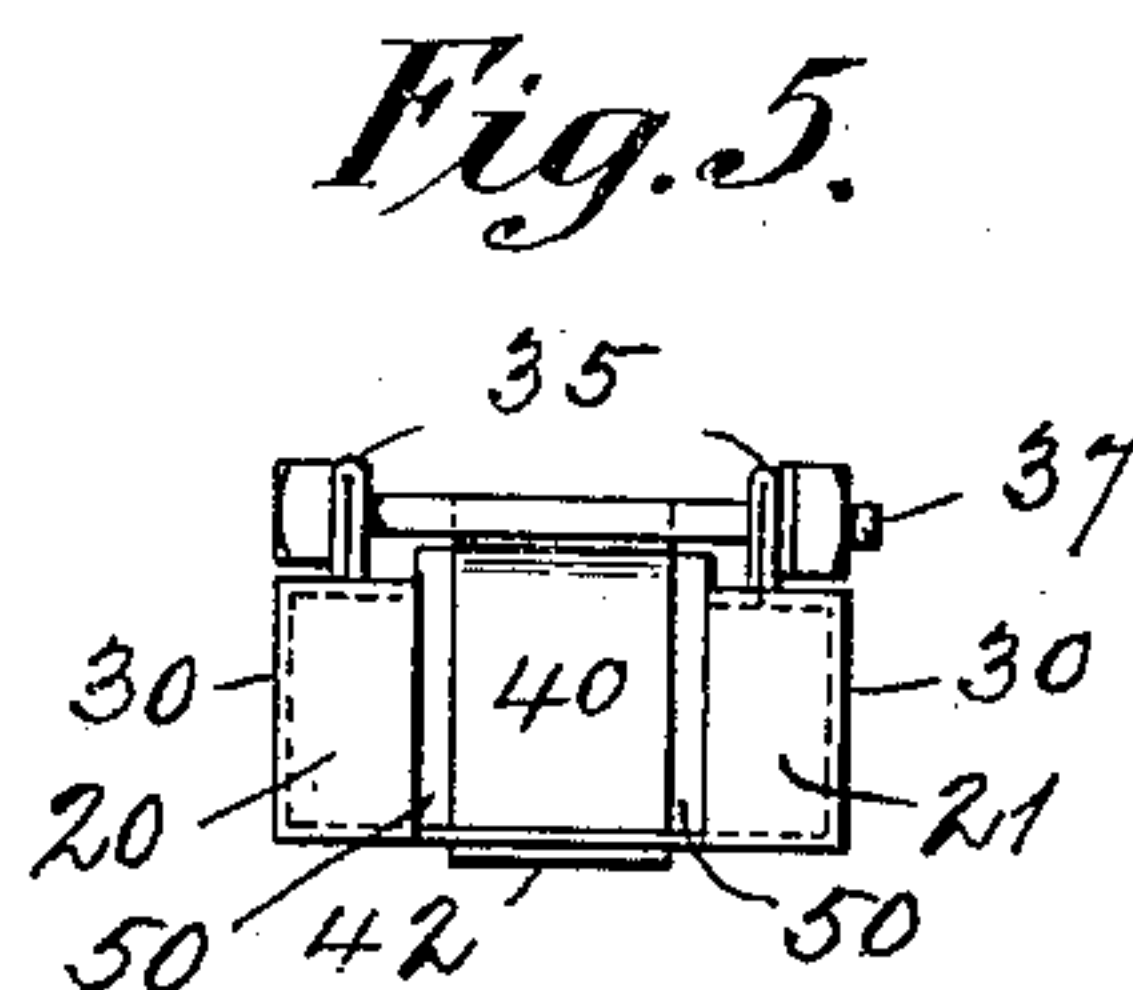
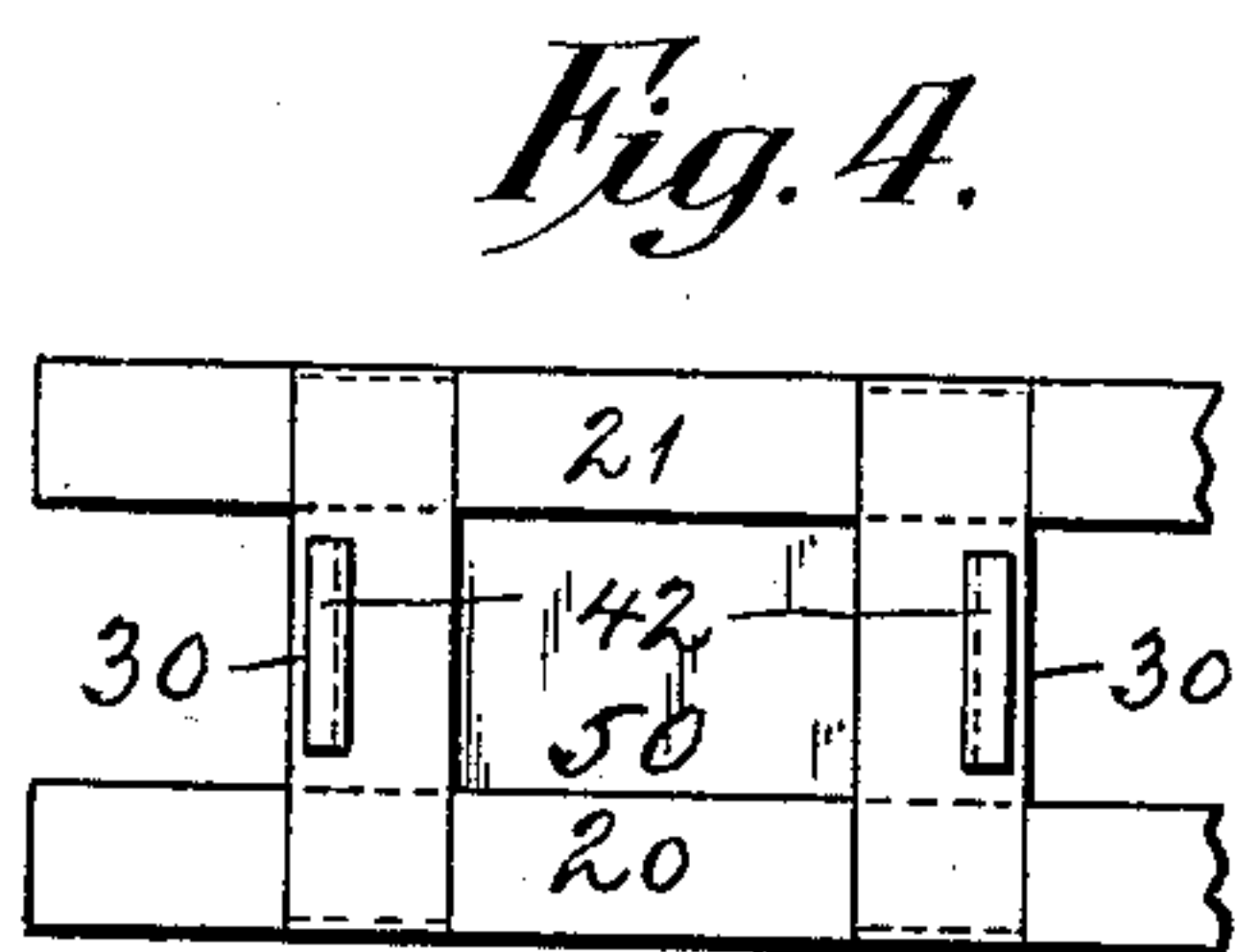
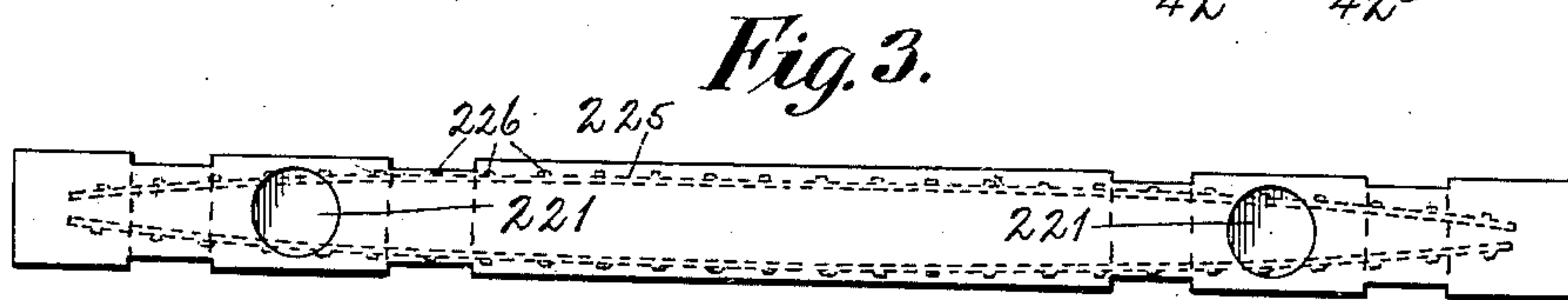
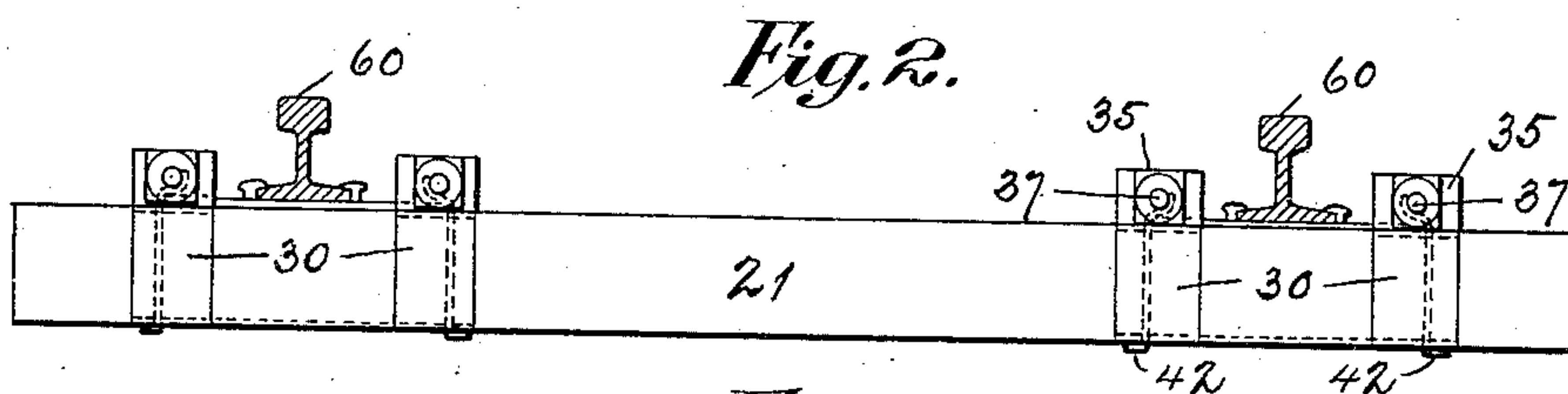
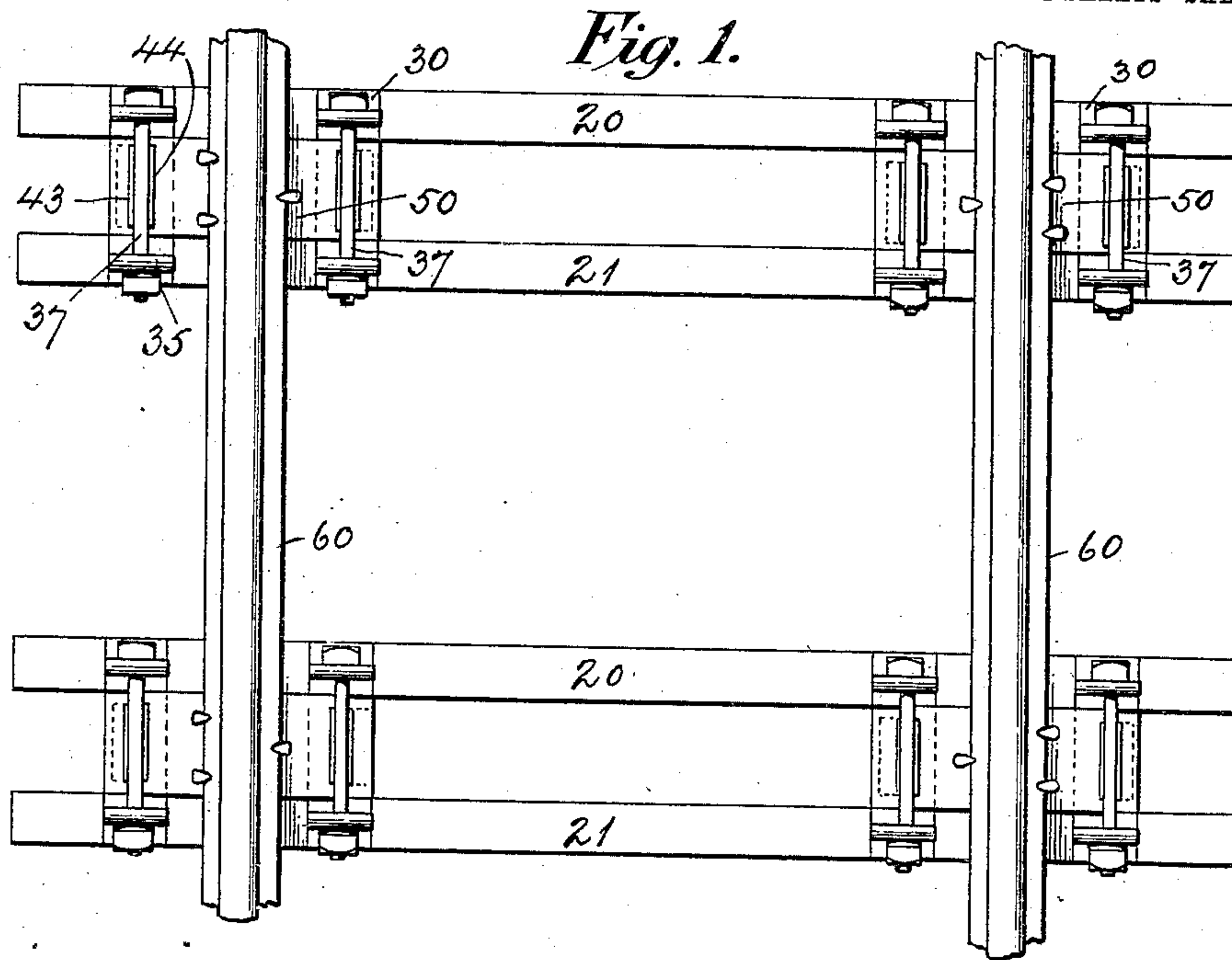


No. 862,709.

PATENTED AUG. 6, 1907.

R. M. CHAPMAN.
COMPOSITE RAILWAY TIE.
APPLICATION FILED MAR. 12, 1907.

2 SHEETS—SHEET 1.



Attest:
Stephen S. Newton
Alan Mc Donnell.

Richard M. Chapman Inventor:
by *William R. Baird*
his Att'y.

No. 862,709.

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2 SHEETS—SHEET 2.

Fig. 6.

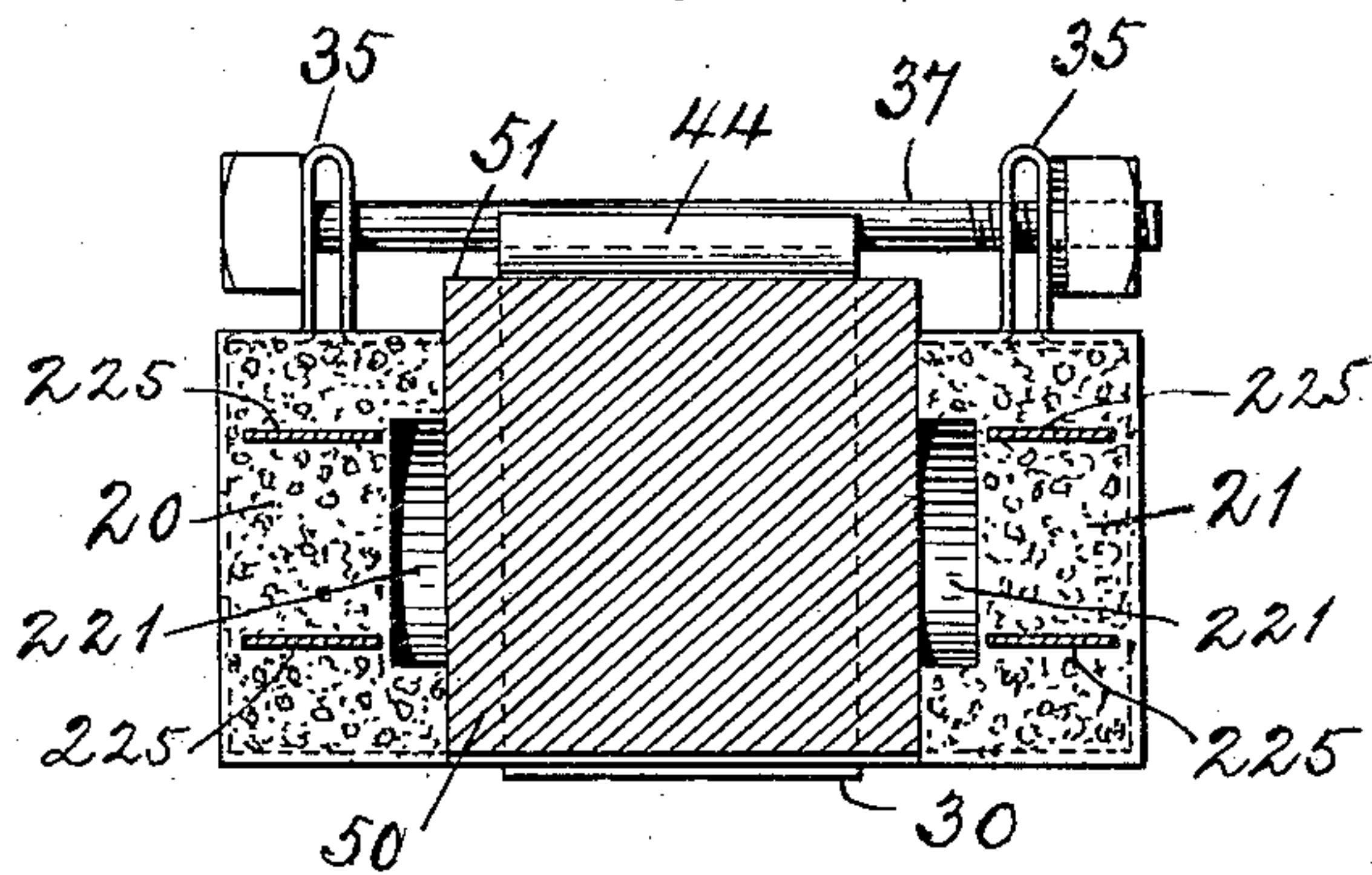


Fig. 7.

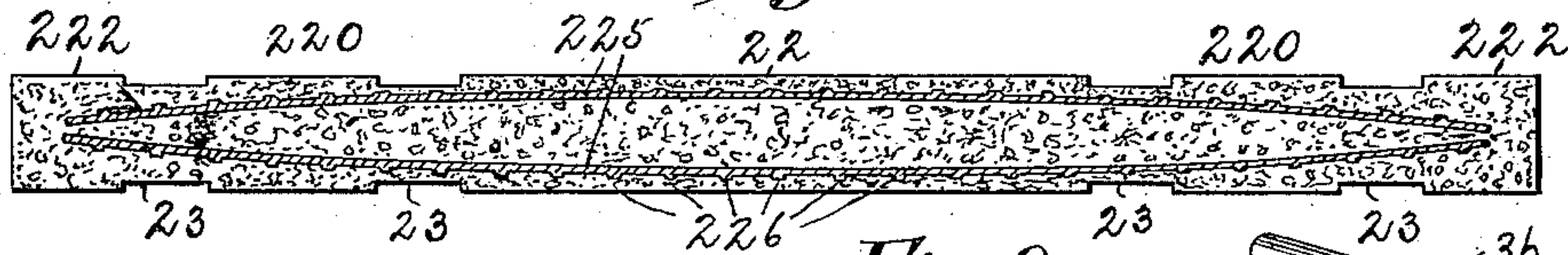


Fig. 10.

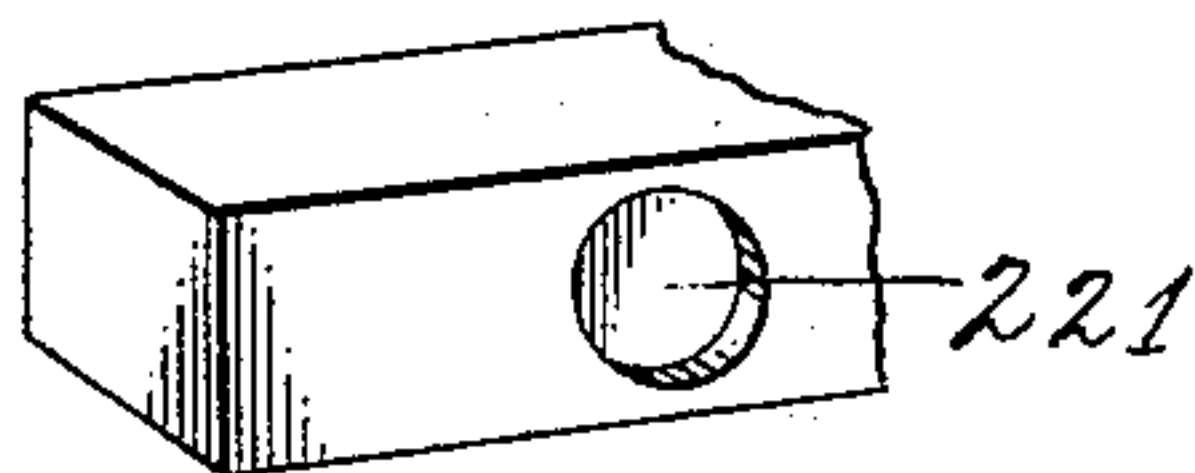


Fig. 11.

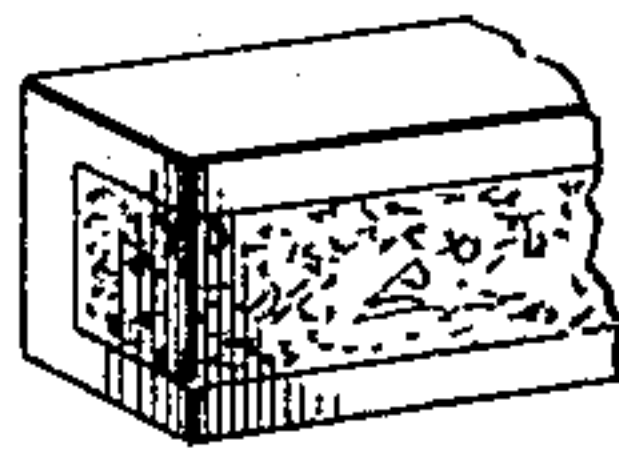


Fig. 8.

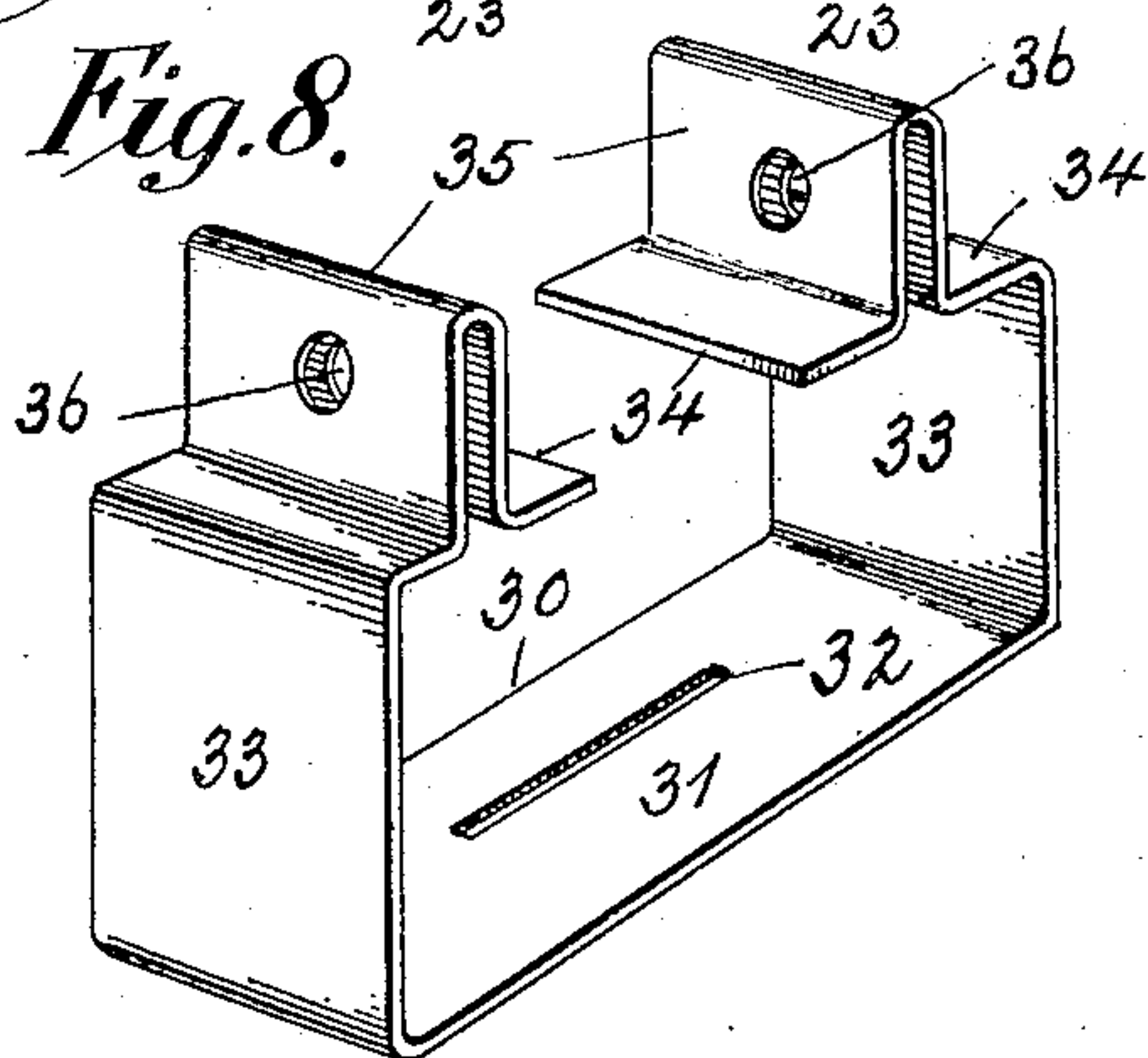
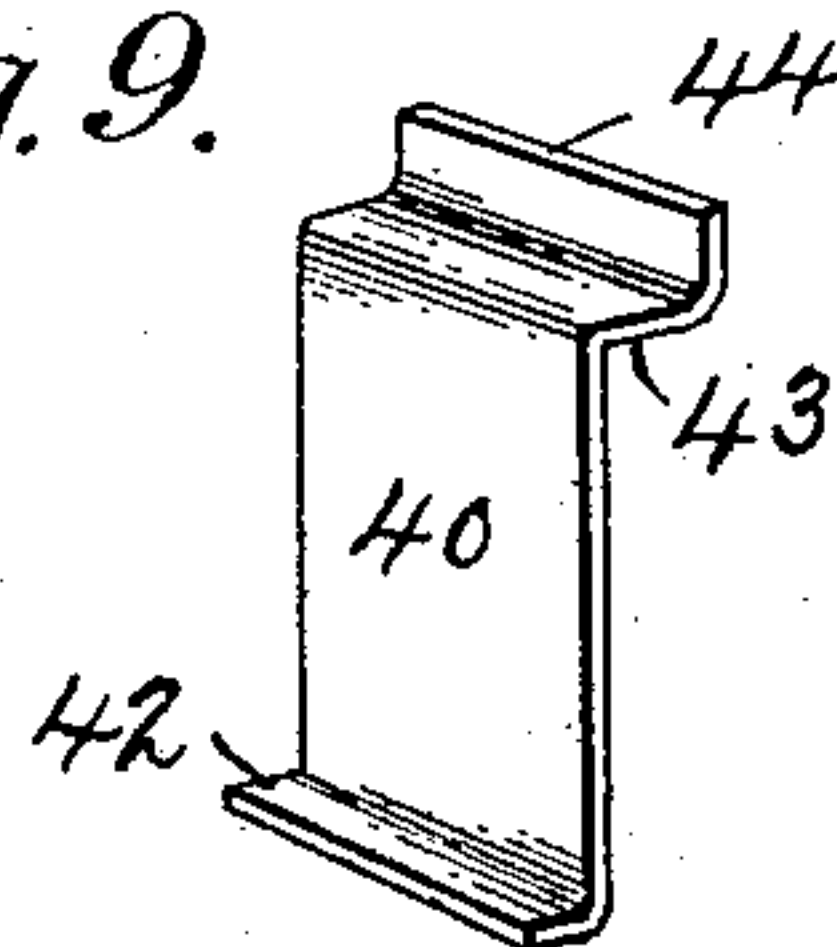


Fig. 9.



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Stephen S. Hewton
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UNITED STATES PATENT OFFICE.

RICHARD M. CHAPMAN, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO HELEN CLEMENS, OF NEW YORK, N. Y.

COMPOSITE RAILWAY-TIE.

No. 862,709.

Specification of Letters Patent.

Patented Aug. 6, 1907.

Application filed March 12, 1907. Serial No. 361,983.

To all whom it may concern:

Be it known that I, RICHARD M. CHAPMAN, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Composite Railway-Ties, of which the following is a specification.

My invention relates to composite railroad ties and its novelty consists in the construction and adaptation of the parts.

It has long been desirable to make a railroad tie of some other material than wood, and attempts have been made to form such ties of steel, cement and other materials, but so far as known to me, they have been unsuccessful, because of the fact that there is needed under the surface of the rail not only an elastic support, but one which to a certain extent is soft. Pursuant to these requirements, attempts have been made to make composite ties of steel or concrete, in which blocks of wood designed to support the rails have been secured or embedded. The use of such ties, however, has so far been unsuccessful, because of the necessity of embedding the blocks of wood in the concrete and the consequent rupture of the latter when the wood has been swelled from moisture necessarily brought into contact therewith.

It is the purpose of my invention to make a composite railway tie composed of concrete, steel and wood, so arranged that the rails shall be supported upon wooden supports entirely and to which they shall be bolted in the usual manner, but which in addition shall be provided with members preventing the longitudinal displacement of the wooden blocks, which members are preferably made of concrete and with other members preventing the lateral displacement of the blocks, the device being so arranged that when the wooden blocks are subjected to the action of moisture and are expanded thereby they are permitted slightly to yield in whatever direction is necessary in such a manner that the more rigid members of the tie are not ruptured or injuriously affected thereby.

In the drawings, Figure 1 is a top plan view of two of my composite ties with a portion of the rails in place; Fig. 2 is a front elevation of one of the ties with the rails in section; Fig. 3 is a front elevation of the inner face of one of the members with the reinforcing bars indicated in dotted outline; Fig. 4 is a bottom plan view of one end of one of the ties; Fig. 5 is an end view of the same, the rail being omitted; Fig. 6 is an enlarged transverse vertical section of one end of the tie showing some parts in elevation; Fig. 7 is a longitudinal central section of one of the tie members; Fig. 8 is an enlarged perspective of the steel strap; Fig. 9 is a perspective of one of the side plates; Fig. 10 is a perspective of one

end of a modified form of one of the longitudinal members showing it made of uniform material, and Fig. 11 is a similar view to that shown in Fig. 10 with the tie member made of two materials.

In the drawings, 20 and 21 are the longitudinal members of my composite tie. They are preferably made of a cementitious material, such as concrete, and in the form substantially of rectangular prisms. Each member has a central portion 22 of uniform cross sectional area and is provided at each end with a pair of shallow recesses 23 extending across the upper and lower edges of the prism and its outer face, but not across its inner face. The function of these recesses is to receive the steel straps 30 presently to be described. The portions 220 of the longitudinal members between these recesses are each provided on their inner faces with shallow recesses 221. The ends 222 of each of the members are of the same cross sectional area as the central portion 22. Each of the members 20 and 21 is provided with reinforcing bars 225 which are shown in dotted outline in Fig. 3 and in section in Fig. 7. These bars are preferably arched to secure the greatest resistance to strain for their length and cross sectional area and are provided with suitable projections 226, to prevent slipping. The manner of embedding these reinforcing bars in the concrete and arranging them is well known in the art and needs no particular description.

Arranged in pairs on each end of the members 20 and 21, are steel straps 30 adapted to engage in the recesses 23 and the outer surfaces of which are substantially flush with the outer surface of the members 20 and 21. Each of these straps (shown in enlarged detail in Fig. 8) has a bottom piece 31 provided with a slit 32, two side pieces 33, and two top pieces 34. Each of the latter is bent upwardly to form a flange 35 which is apertured, as shown at 36 Fig. 8, to permit of the passage of a threaded bolt 37.

Side plates 40 are provided with bottom flanges 42 which engage the slits 32 of the straps 30 and are bent over inwardly at 43 and provided with top flanges 44 to engage the bolts 37.

Two wooden blocks 50 are placed between each pair of members 20 and 21. The upper surface 51 of each of these blocks is slightly above the level of the upper edges of the prisms 20 and 21. Each block rests upon the bottom 31 of its strap 30 and is prevented from lateral displacement by the side plates 40 which in turn are held in position by the bolts 37.

The rails 60 are laid along the tops of the blocks 50 and are bolted thereto in the usual manner.

In Fig. 10, I have illustrated a form of prism made for instance of cast iron, but which in all other respects conforms to the construction of the prisms 20 and 21 of concrete. In Fig. 11 I have shown a modified form

of this construction in which the upper, lower and outer faces of the prism are made of cast iron and the interior filling between these faces is made of concrete.

The wooden blocks are preferably made square in cross section, so that each of their faces may in turn be presented uppermost and form the support for the rail laid thereon. These blocks may be made, either in one piece, or may be composed of several similar pieces matched together, without any difference in either efficiency or durability, and in fact old wooden ties can be cut up into blocks for the use indicated herein.

It will be observed that the space formed between the recesses 221 and the wooden blocks 50 give to the latter an opportunity for expansion under the influence of moisture which will prevent the rupture of the concrete at that point. In addition, whenever such tendency to expansion occurs, the strains generated are transmitted to the inner surfaces of the concrete prisms and thence to the steel straps 30 and as a slight elasticity obtains between the flanges 35 and along the bolts 37, it is practically impossible to subject the concrete members 20 and 21 to any other strains than those due to compression, and the compressive strength of concrete is very great. Whenever strains may be generated from the cause stated, and which are not taken up, in the manner mentioned, are readily taken care of by the elasticity of the side pieces 40 and the slight freedom of movement permitted by the manner of their adjustment to the straps 30 and the bolts 37.

By the use of my invention it will be seen that the permanent way practically consists of wooden blocks firmly secured to a continuous bed of stone. All shocks due to the passage of loads over the rails are softened by transmission through the wooden members 50 which serve as cushions and no direct jar or blow can be given to the concrete members tending to crack or chip them. The concrete forming the greater part in bulk of the tie is practically undisturbed and in most cases will be as permanent as the ground upon which it rests. The steel or iron straps 30 will outlast the rails, and the wooden members may be turned around and at least three sides used for top surfaces to receive the rail spikes before such blocks need to be replaced entirely by new ones. The wooden blocks when worn out can be replaced simply by removing the bolts and end pieces and without moving the tie, as a whole, or disturbing the permanent way beyond clearing a few inches of space necessary to shift the old block from under the rail in either direction to insert a new one in its place.

The rails are secured in the customary manner and consequently need no change in the equipment or in the training of the men employed along the permanent way, and the composite ties can consequently gradually be installed in the place of wooden ones as the latter are condemned and the cost of such installation will be an expense which may be charged to operating expense and not to capital account.

The composite ties are composed of parts readily made by unskilled labor. The parts are of usual form and exceedingly cheap. They can be assembled either at the factory where they are made, or along the road where used, and whether shipped either in whole or in part, they can be packed upon the cars in approximately close formation.

What I claim as new is:—

1. A composite railway tie comprising two rigid members, a block of wood placed between these members and means for holding the block in position, one of said members having a recess so related to the block as to permit the latter to expand without danger of rupture of the rigid member. 70
2. A composite railway tie, comprising two rigid members, a block of wood placed between said members and means for holding the block in position, said members having recesses so related to the block as to permit the latter to expand without danger of rupture of the rigid members. 75
3. A composite railway tie, comprising two rigid members, a block of wood placed between them, means for securing it in position and means for taking up the strains induced by the swelling of the wood when wet. 80
4. A composite railway tie, comprising two rigid members, a block of wood placed between them, means for securing it in position and means for taking up the strains induced by the swelling of the wood when wet, consisting of recesses in the rigid members opposite the block and into which recesses the latter can expand. 85
5. A railway tie, comprising two concrete members, the upper surfaces of which, when in position, are in substantially the same horizontal plane, two wooden blocks placed between the concrete members to receive the rails and having their upper surfaces above the plane of the concrete members, and means whereby the expansion of the wooden members is permitted. 90
6. A railway tie, comprising two concrete members, the upper surfaces of which, when in position, are in substantially the same horizontal plane, two wooden blocks placed between the concrete members to receive the rails and having their upper surfaces above the plane of the concrete members, and the concrete members having recesses adjacent to the abutting walls of the wooden members and into which the latter can expand. 95
7. A composite railway tie, comprising two concrete members, the upper surfaces of which, when in position, are in substantially the same horizontal plane, two wooden blocks placed between the concrete members to receive the rails and having their outer surfaces above the plane of the concrete members, and means adapted to prevent the lateral displacement of said wooden blocks. 100
8. A composite railway tie, comprising two concrete members, the upper surfaces of which, when in position, are in substantially the same horizontal plane, two wooden blocks placed between the concrete members to receive the rails and having their outer surfaces above the plane of the concrete members, and means adapted to prevent the lateral displacement of said wooden blocks, consisting of straps encircling said blocks and anchored to the concrete members. 105
9. A composite railway tie, comprising two rigid members, a block of wood of prismatic form placed between them, so that its upper surface will lie at the same level no matter on which of its sides it rests, said tie having means for permitting a limited expansion of the wooden block with respect to the rigid members. 110
10. A composite railway tie, comprising two rigid members, a block of wood of prismatic form placed between them, so that its upper surface will lie at the same level no matter on which of its sides it rests and means for permitting a limited expansion of the wooden block with respect to the rigid members, comprising recesses in the walls of the rigid members opposite the prismatic sides of the wooden members. 115
11. A composite railway tie comprising two concrete members, a block of wood placed between but not embedded in them, said members provided with recesses to allow for the expansion of the wood and straps secured to the concrete to support the wooden block from below. 120
12. A composite railway tie comprising two concrete members, a block of wood placed between but not embedded in them, said members provided with recesses to allow for the expansion of the wood, straps secured to the concrete to support the wooden block from below and side pieces secured to the straps adapted to prevent lateral displacement of the blocks. 125
13. A composite railway tie comprising two concrete 130 135 140 145

members, a block of wood placed between but not embedded in them, said members provided with recesses to allow for the expansion of the wood, straps secured to the concrete to support the wooden block from below and side pieces secured to the straps adapted to prevent lateral displacement of the blocks but adapted to yield slightly to lateral strains developed therein.

14. A composite railway tie comprising two concrete members, a block of wood placed between but not embedded in them, said members provided with recesses to allow for the expansion of the wood and straps secured to the concrete to support the wooden block from below and held by bolts across the block.

15. A composite railway tie comprising two concrete members, a block of wood placed between but not embedded in them, said members provided with recesses to allow for the expansion of the wood and straps secured to the concrete to support the wooden block from below and held across the block by adjustable means.

16. A composite railway tie comprising two concrete members, a block of wood placed between but not embedded in them, said members provided with recesses to allow for the expansion of the wood and straps secured to the concrete to support the wooden block from below and provided with upwardly extending flanges secured together by bolts.

17. A composite railway tie comprising two concrete members, a block of wood placed between but not em-

bedded in them, said members provided with recesses to allow for the expansion of the wood and straps secured to the concrete to support the wooden block from below and provided with upwardly extending flanges secured together by bolts and side pieces secured to the straps and adapted to prevent lateral displacement of the block.

18. A composite railway tie comprising two concrete members, a block of wood placed between but not embedded in them, said members provided with recesses to allow for the expansion of the wood and straps secured to the concrete to support the wooden block from below and provided with upwardly extending flanges secured together by bolts and side pieces adapted to prevent lateral displacement of the block and engaging with the strap and its bolt.

19. A composite railway tie comprising two concrete members, a block of wood removably placed between them, means as recesses in the concrete to permit of the expansion of the block in two directions, and straps secured to the concrete to support the block from below and adapted slightly to yield to expansion laterally.

Witness my hand this 11th day of March 1907, at the city of New York, in the county and State of New York.

RICHARD M. CHAPMAN.

Witnesses:

MAY HUGHES,

ALAN McDONNELL.