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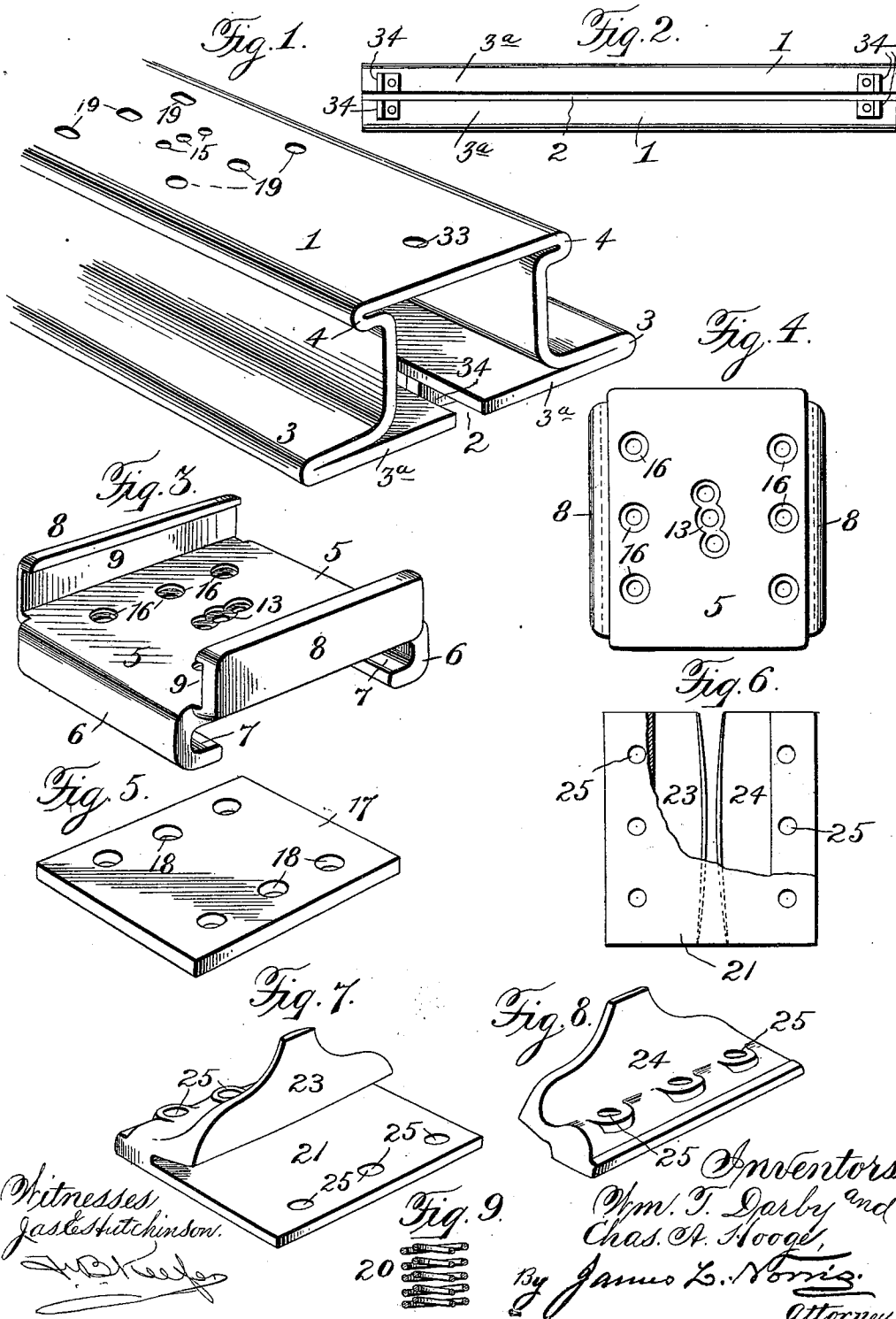
Patented Feb. 13, 1900.

W. T. DARBY & C. A. HOOGE.  
RAILROAD TIE AND RAIL FASTENING.

(No Model.)

(Application filed Oct. 18, 1899.)

3 Sheets—Sheet 1.



Witnesses  
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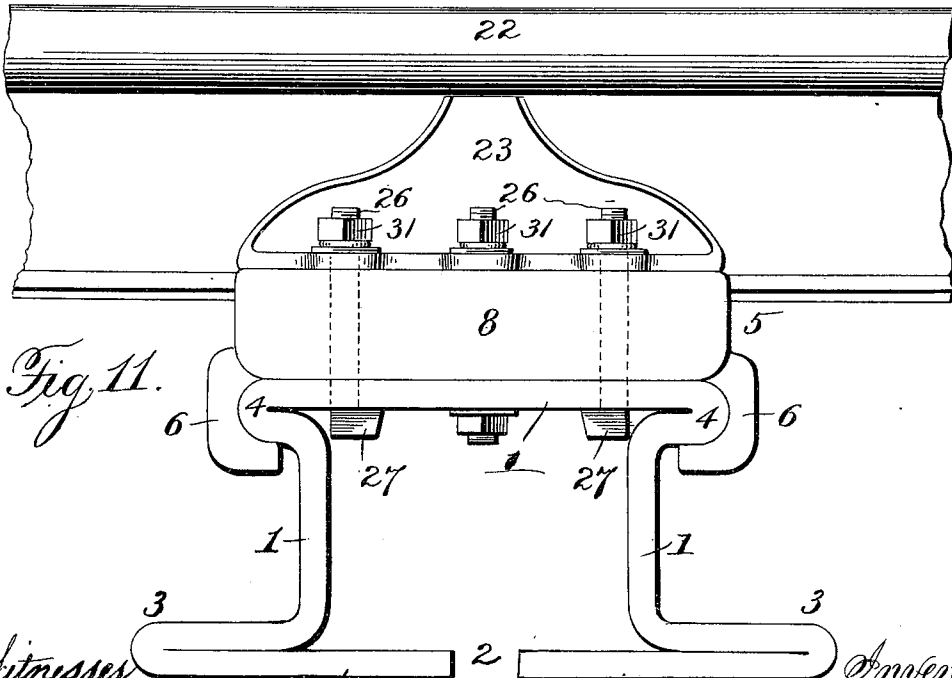
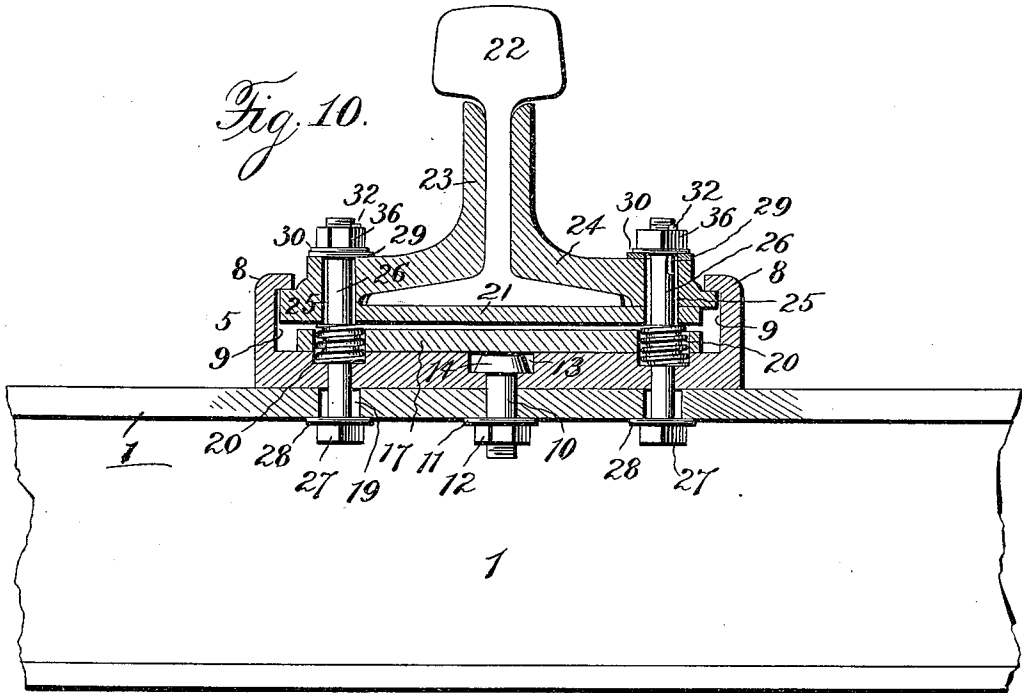
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Fig. 12.

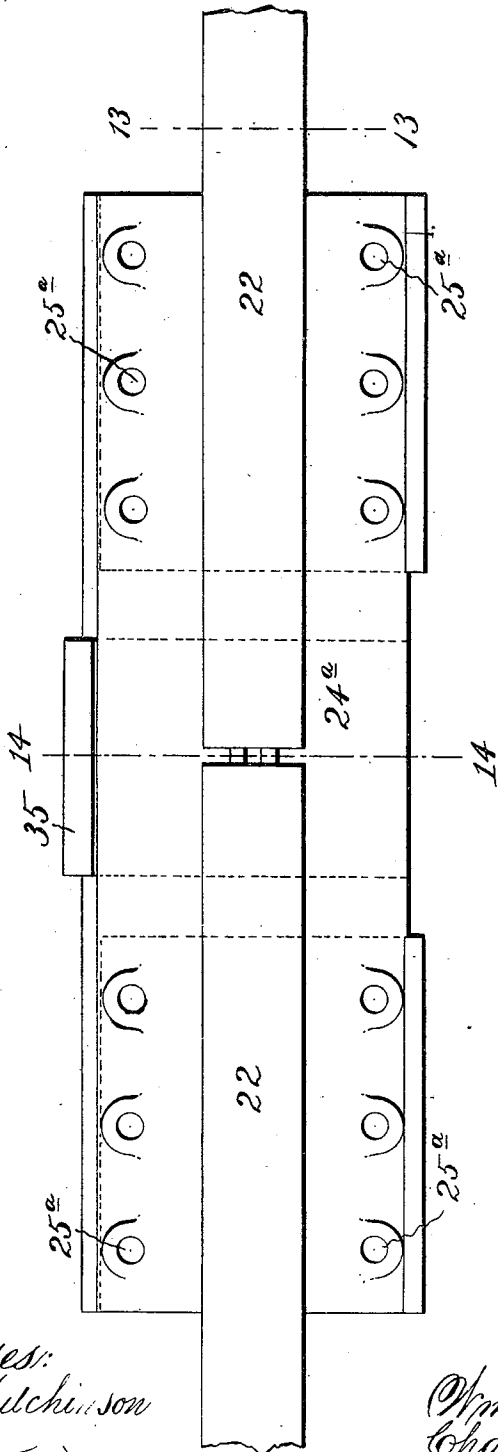


Fig. 14.

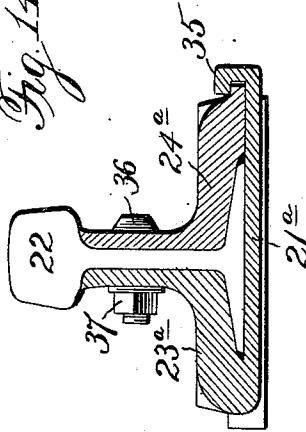
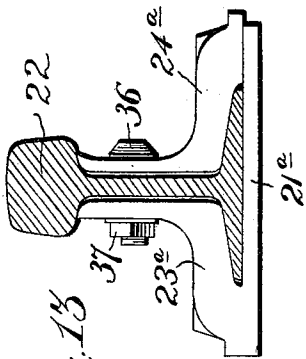


Fig. 13.



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# UNITED STATES PATENT OFFICE.

WILLIAM T. DARBY AND CHARLES A. HOOGE, OF MARTINSBURG, WEST VIRGINIA.

## RAILROAD-TIE AND RAIL-FASTENING.

SPECIFICATION forming part of Letters Patent No. 643,477, dated February 13, 1900.

Application filed October 18, 1899. Serial No. 733,986. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM T. DARBY and CHARLES A. HOOGE, citizens of the United States, residing at Martinsburg, in the county of Berkeley and State of West Virginia, have invented new and useful Improvements in Railroad-Ties and Rail-Fastenings, of which the following is a specification.

This invention relates to railway-ties and rail-fastenings; and the chief objects of the invention are to provide new and improved means for cushioning or deadening the sound of a train passing over the rails, to provide new and improved means for securing the railway-rails in position, and to provide novel devices for connecting the abutting ends of the rails.

To accomplish these objects, our invention involves the features of construction and the combination or arrangement of parts hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a perspective of an end portion of our improved metal cross-tie. Fig. 2 is an under plan view, on a smaller scale, of the metal cross-tie. Fig. 3 is a perspective of a tie-cap. Fig. 4 is a plan of the same. Fig. 5 is a perspective of a sound-deadening plate or cushion. Fig. 6 is an under plan view, partly broken away, of an improved rail-chair. Fig. 7 is a perspective of the main or bed portion of the chair. Fig. 8 is a perspective of a detachable chair-plate or rail-fastening device. Fig. 9 is a view of concentric springs employed to provide a yielding support for the track-rails. Fig. 10 shows a portion of the hollow metallic cross-tie in longitudinal section, with the cap, chair, and rail mounted thereon. Fig. 11 is an end elevation of a hollow metallic cross-tie, with railroad-track rail and fastening devices in side elevation. Fig. 12 is a plan of portions of two abutting rails and the connecting devices therefor. Fig. 13 is a cross-section through a track-rail on the line 13 13 of Fig. 12, with the rail-chair in end elevation. Fig. 14 is a transverse section through the rail-fastening devices on the line 14 14 of Fig. 12, with one of the track-rails in end elevation at a rail-joint.

In order to enable those skilled in the art

to make and use our invention, we will now describe the same in detail, referring to the accompanying drawings, wherein—

The numeral 1 indicates the flat top wall of the railway cross-tie. This cross-tie is constructed hollow throughout its entire length and is provided with open ends. The top wall 1 is flat and is integral with the sides and bottom wall. The flat top wall is formed with the bolt-holes 15, 19, and 33, hereinafter explained, and the bottom wall is composed of two horizontal inwardly-projecting flanges 3<sup>a</sup>, separated along the median line of the tie through the medium of a longitudinal slot 2, by which construction the sound of a train passing over the railway-rails mounted on the cross-tie is materially diminished. The opposite side edges of the flattened top and bottom walls of the cross-tie are formed integral with folded flanges, as at 4 and 3, Fig. 1.

The cross-tie possessing the features above referred to is preferably rolled in shape, and in this rolling process the top and bottom folds 4 and 3 are crimped closely together. The sides of the cross-tie are preferably closed; but they may be constructed with openings for the passage of water-pipes or other conduits.

The top and bottom folded flanges 4 and 3 materially and substantially brace and stiffen the cross-tie, and the flat horizontal flanges 3, which constitute the bottom wall of the cross-tie, afford a firm, strong, and substantial base of support for the tie.

Mounted on each cross-tie near each of its two ends and also, if necessary, at any other point on the tie that may be required in putting in switch-rails and crossovers there is a tie-cap 5, Figs. 3, 4, 10, and 11, made from any suitable metal. Each tie-cap 5 is provided along its two longitudinal sides with depending flanges 6, which are hook-shaped or have their inner sides provided with longitudinally-extended grooves 7 to fit over and along the top flanges 4 of the cross-tie. At its ends each tie-cap 5 is provided with upwardly-extended flanges 8, that are located transversely of the cap or at right angles to the under flanges. Each of these upwardly-extended flanges 8 is provided along its inner side with a groove 9, Figs. 3 and 10, to be engaged by

the rail-chairs or fastening devices, herein-after described. The tie-caps 5 are each secured to the metal cross-tie 1 by means of a bolt 10 with washer 11 and nut 12 on its lower end, as shown in Fig. 10. In order to provide for adjustment of either tie-cap 5 on the hollow metallic tie 1, each tie-cap is provided near its two ends with a diagonally-arranged series of bolt-holes 13, Figs. 1, 3, 4, and 10.

The head 14 of the bolt 10 is received in a countersunk upper end of one of the bolt-holes 13, and by providing a series of these bolt-holes closely arranged and extended diagonally, as shown, provision is made for a nice adjustment of either tie-cap to accord with any necessary variations in the gage of the track-rails. A corresponding straight series of bolt-holes 15 is provided in each cross-tie. Each tie-cap 5 is provided also near its ends with transversely-arranged series of countersunk bolt-holes 16, Figs. 3 and 4. The upper face of each tie-cap is recessed between the two upwardly-extended flanges 8 to receive a sound-deadening plate or cushion 17, Figs. 5 and 10, which may be composed of any suitable elastic material adapted to take up the shocks of vibration due to the passage of trains, and thereby prevent or diminish noise. This elastic sound-deadening plate or cushion 17 is provided with a series of bolt-holes 18, corresponding with the bolt-holes 16 of the tie-cap and also with elongated bolt-openings 19 in the cross-tie. The bolt-openings 19 of the cross-tie are elongated lengthwise of said tie to permit adjustment of the tie-caps as required.

In the countersunk upper end of each bolt-hole 16 in the tie-cap 5 there is placed a spirally-coiled spring 20 or preferably two concentrically-arranged coiled springs 20, Fig. 9. As shown in Fig. 10, the springs 20 extend normally above the elastic plate or cushion 17 through the bolt-holes 18 therein. These springs 20 afford elastic supports for the base portion 21 of a railroad-chair in which the base of each rail 22 is seated. By employing concentric springs 20 adequate yielding support is provided for the rail-chairs and rail without requiring very heavy springs.

Each chair comprises a base portion 21, Figs. 6, 7, and 10, having a fixed jaw 23 thereon, which is extended upwardly and inwardly to contact with one side of the rail-web. A detachable chair-jaw 24, Fig. 8, is provided on the opposite side of the rail-web. The two parts of each chair are provided with bolt-holes 25, Figs. 7 and 8, for passage of vertical bolts 26, Figs. 10 and 11, by which the two parts of the chair are made fast to each other and to the metallic cross-tie 1 and its caps 5 to secure the track-rails in position. These bolts 26 have heads 27 on their lower ends, and, as shown in Figs. 10 and 11, they are passed upwardly through the elongated bolt-holes 19 in the top of the tie and through the bolt-holes 16 of the tie-caps, bolt-holes 18 of the elastic cushion 17, and bolt-holes 25 of the

chair parts. On the lower ends of these bolts washers 28 are provided immediately beneath the top of the tie, as shown in Fig. 10. On the upper ends of these bolts are placed washers 29 and coiled springs 30 beneath nuts 31, Figs. 10 and 11, that fasten said bolts, so as to secure the metal cross-tie and the rail-fastenings firmly together. A nut-locking pin 32 may be provided for each of said nuts.

On placing the rails in position the tie-caps 5 are first secured to the metallic cross-tie 1 in any adjusted position required by means of the bolts 10, passed through the required bolt-holes 13 of the tie-cap and secured by the washers 11 and nuts 12, as before mentioned. The depending flanges 6 of the tie-caps serve to prevent the caps from turning on the tie and hold each cap in proper parallelism with the tie. After the tie-caps have been placed the sound-deadening plates or cushions 17 are put in position, one on each cap, and the coiled springs 20 are inserted through the openings 18 of the cushion 17 and into the countersunk upper ends of the bolt-holes 16 of each cap-piece. The main portion of the chair is then placed in position, with its base 21 resting on the springs 20, that normally project above the elastic plate or cushion 17, as before mentioned. The base of the rail 22 is engaged with the jaw 23 on the main part of the chair, and the adjustable chair-jaw 24 is then placed in position on the other side of the rail, and all said parts are secured by the bolts 26 and their fastenings, as already described. The upwardly-extended flanges 8, with the grooves 9 on their inner sides, receive the outer portions of the chair-jaws and assist in holding them in place. It will be observed by reference to Fig. 6 that the faces of the chair-jaws 23 and 24 adjacent to the rail-webs are beveled or drawn off toward their ends to provide suitable facility for giving any slight curvature to the rails, if necessary, and to provide for expansion and contraction.

If the metal cross-ties 1 are to be laid on a bridge or trestle, the end of each tie may be provided with a bolt-hole 33, Fig. 1, for passage of a vertically-arranged bolt to engage a convenient portion of the bridge or trestle, and the under side of each cross-tie at each end may be provided with depending lugs 34, Figs. 1 and 2, for the purpose of engaging longitudinal beams or stringers of the bridge or trestle to prevent lengthwise displacement of the cross-tie.

It will be observed by reference to Fig. 10 that the rail and its chair are supported normally on the springs 20, which project slightly above the elastic sound-deadening plate or cushion 17, a slight space being left between said elastic plate or cushion and the base of the chair. The rail is thus provided with an elastic or yielding support, independent of the plate or cushion 17, which is designed to take up vibrations and deaden sound on passage of trains. The construction of the tie-caps 5

and the engagement of the chair parts therewith, together with the manner of fastening these devices to the hollow metallic cross-tie, provides a very secure and yet elastic support for the track-rails, while the arrangement of the bolt-holes in the chair, tie-caps, and cross-tie provides for necessary adjustments to accord with required variations of gage either at curves or elsewhere. All these devices for supporting and securing the rail are of simple, durable, and economical construction.

In Figs. 12, 13, and 14 we have shown a modification in the form of the railway-chair, whereby it is adapted to serve as a substitute for the ordinary fish-plate in connecting the ends of two abutting rails. The chair shown in Figs. 12, 13, and 14 is of greater length than the rail-fastening chair hereinbefore described, and it may be sufficiently long to extend from the tie-caps of one cross-tie to the tie-caps of an adjoining tie. The base portion 21<sup>a</sup> of this chair is provided with a fixed jaw 23<sup>a</sup> to bear against one side of the rail-web. On the opposite side of the chair-base there is formed an upwardly-projecting lip 35, that provides a bearing for the outer edge of the detachable chair-jaw 24<sup>a</sup>, that is to bear against the opposite side of the rail-web. These jaws 23<sup>a</sup> and 24<sup>a</sup> are to be secured to the rail-web by means of bolts 36 and nuts 37, as shown in Figs. 13 and 14. Each chair part 23<sup>a</sup> and 24<sup>a</sup> is provided with vertical bolt-holes 25<sup>a</sup> for passage of bolts to secure the said chair to the tie-cap and metallic cross-tie, substantially as hereinbefore described with reference to the chair that is employed to fasten the rails intermediate their ends.

It will be understood that by providing the hollow open-ended metallic cross-ties or sleepers with a longitudinally-extended slot or opening 2 at the bottom the disagreeable roaring noise due to the passage of trains over hollow metallic ties will be greatly diminished. The elastic sound-deadening plates 17 and spirally-coiled spring-supports 20 also contribute to this result and make the road-bed practically noiseless. The construction of the tie-caps and rail-chairs is such that the rails can be readily adjusted to any required variations of gage wherever necessary and at the same time they afford secure fastenings for the rails.

It will be obvious that a track once laid with our metal cross-tie, chair, and fastenings will greatly reduce the cost of repairs and will last the life of the rail without any work being done on the track, as frequent changing of ties will not be necessary. Consequently it will take but little labor to keep the track in perfect condition, and as every tie forms a water-drain the road-bed will be thoroughly drained in wet locations or wet weather.

Rolling-stock running over this track will last much longer, as the springs under the chairs will give to the track a resiliency that will relieve hammering and vibrations, and

consequently there will be no churning of ties and the breaking of rails will be obviated, and besides a track put down with this tie-chair and fastening is proof against water and fire.

What we claim as our invention is—

1. A hollow metallic railroad-tie, open at both ends and constructed with a solid flattened top containing bolt-holes, a flattened bottom wall composed of two inwardly-projecting horizontal flanges having the inner edge of one separated from the inner edge of the other by a continuous longitudinally-extended slot for diminishing the sound of a passing train, and folded outward-extended portions or flanges at the top and bottom of the tie, on each side thereof, substantially as described.

2. A railroad-tie, consisting of a single piece of rolled metal constructed with a flattened top wall containing bolt-holes, a flattened bottom wall composed of inwardly-projecting horizontal flanges having the inner edge of one separated from the inner edge of the other by a continuous longitudinal slot for diminishing the sound of a passing train, and formed with folded portions at the opposite sides of its top and bottom portions, substantially as described.

3. A hollow, rolled metallic railroad-tie open at both ends, and formed integral with a flat top wall, opposite side walls, top and bottom folds at its opposite sides, and inwardly-projecting, horizontal flanges having the inner edge of one separated from the inner edge of the other by a continuous slot for diminishing the sound of a passing train, substantially as described.

4. A hollow, rolled metallic railroad-tie open at both ends, and formed integral with a flat top wall, opposite side walls, top and bottom folds at its opposite sides, inwardly-projecting, horizontal flanges having the inner edge of one separated from the inner edge of the other by a continuous longitudinal slot for diminishing the sound of a passing train, and constructed with depending lugs to engage longitudinal beams or stringers and prevent lengthwise displacement of said cross-tie, substantially as described.

5. A hollow and open-ended metallic railroad-tie having bolt-holes in its top and provided at the bottom with a longitudinally-extended slot or opening, in combination with flanged tie-caps adjustable on said tie, an elastic sound-deadening plate supported by each tie-cap and provided with perforations, coiled springs arranged in said perforations and supported by the tie-caps, a rail-chair supported on said springs and having a fixed jaw to bear against one side of the rail-web and a detachable jaw for the other side of the rail-web, and bolts for securing the tie-caps and rail-chairs, substantially as described.

6. The combination with a hollow open-ended metallic railroad-tie provided with top

flanges, of tie-caps having depending longitudinally-grooved flanges to fit said top flanges of the tie and provided with upward-extended and longitudinally-grooved flanges at right angles to said depending flanges and with bolt-holes intermediate the upward-extended flanges, an elastic sound-deadening plate supported by each tie-cap and provided with perforations, coiled springs arranged in said perforations and supported by the tie-caps, a rail-chair supported on said springs and having a fixed jaw to bear against one side of the rail-web and a detachable jaw for the other side of the rail-web, and bolts for securing the tie-caps and rail-chairs, substantially as described.

7. The combination with a hollow metallic railroad-tie, of tie-caps provided with depending flanges to fit the tie and with upward-extended and longitudinally-grooved flanges at right angles to said depending flanges, each tie-cap being provided also with transversely-arranged series of bolt-holes between its upward-extended flanges and with a diagonally-arranged series of bolt-holes intermediate the transversely-arranged bolt-holes to facilitate adjustment of said tie-caps, an elastic sound-deadening plate supported by each tie-cap and provided with perforations, coiled springs arranged in said perforations and supported by the tie-caps, rail-chairs and rails supported on said springs, and bolts for securing the tie-caps and rail-chairs, substantially as described.

8. The combination of a hollow metallic railroad-tie, the tie-caps adjustable on said tie, elastic sound-deadening plates supported by the tie-caps and provided with perforations, concentrically-arranged coiled springs placed in said perforations and supported by the tie-caps, rail-chairs and rails supported on said springs, and bolts passed through said springs and through the rail-chairs, tie-caps

and top of the hollow tie, substantially as described.

9. The combination with a hollow and open-ended metallic railroad-tie having bolt-holes in its top near each end and a longitudinally-extended slot or opening in its under side, of flanged tie-caps each provided with transversely-arranged bolt-holes and with a series of diagonally-arranged bolt-holes to facilitate adjustment of said caps on the tie, rail-chairs having yielding support in said tie-caps, and rails secured by said chairs, substantially as described.

10. The combination with a hollow metallic railroad-tie, and tie-caps, of elastic sound-deadening plates supported by said tie-caps, rail-chairs and rails, and spiral springs to support the rail-chairs, substantially as described.

11. The combination with a hollow metallic railroad-tie, and tie-caps, of elastic sound-deadening plates supported by the tie-caps and provided with perforations, concentric spiral springs arranged in said perforations and normally projecting above the said elastic plates, rail-chairs supported on said springs, and rails secured by said chairs, substantially as described.

12. The combination with hollow metallic railroad-ties open at both ends and at the bottom, of flanged tie-caps adjustable on said ties, rail-chairs extended from the caps of one tie to the caps of an adjacent tie and adapted to serve as fish-plates for the ends of abutting rails, and yielding supports for said chairs, substantially as described.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

WILLIAM T. DARBY.  
CHARLES A. HOOGE.

Witnesses:

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CHARLES E. AULD.