C. A. REED.

RAILWAY TIE.

APPLICATION FILED MAR. 13, 1908.

943,268.

Patented Dec. 14, 1909.

2 SHEETS—SHEET 1.

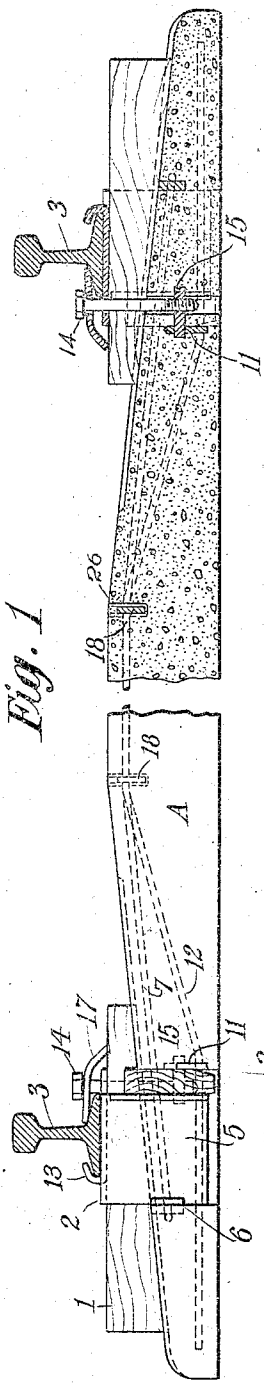

Fig. 1

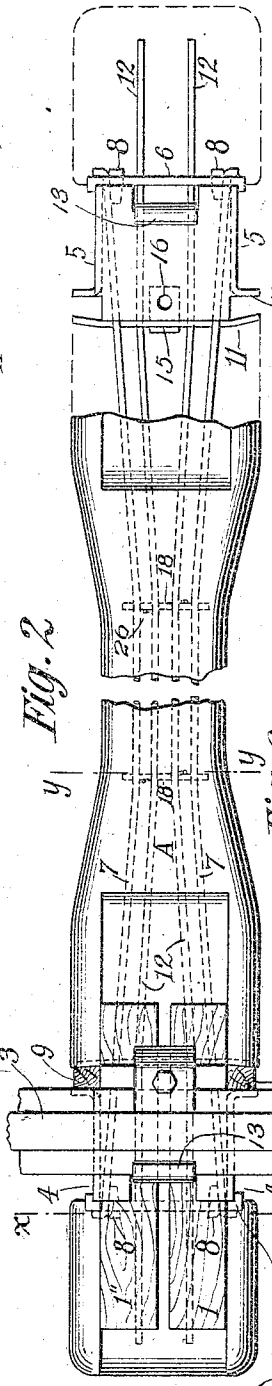

Fig. 2

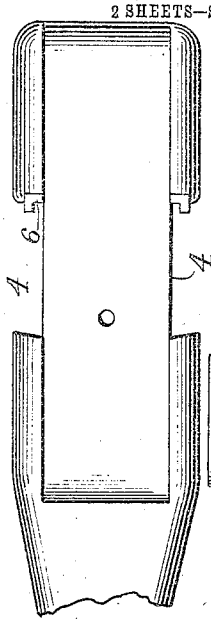

Fig. 5

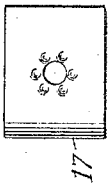

Fig. 13

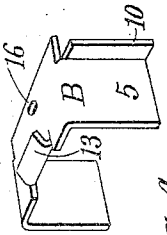

Fig. 6

Fig. 12

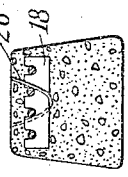

Fig. 4

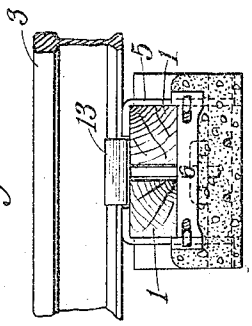

Fig. 3

Witnesses:

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2 SHEETS—SHEET 2.

Fig. 10

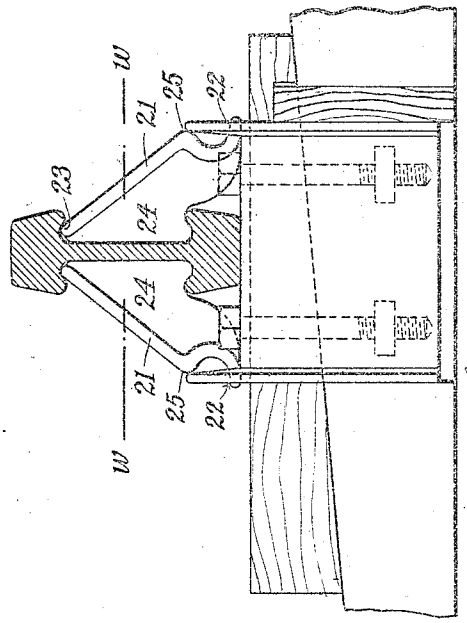


Fig. 11

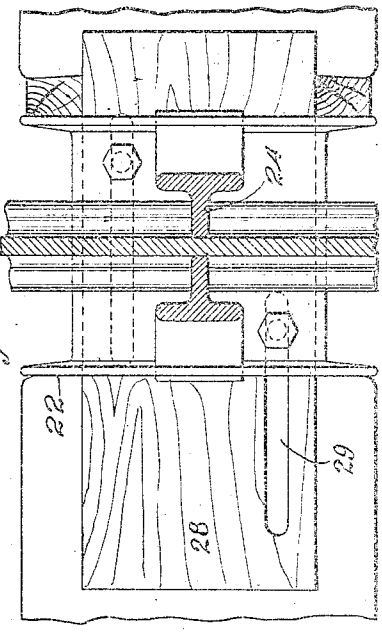


Fig. 7

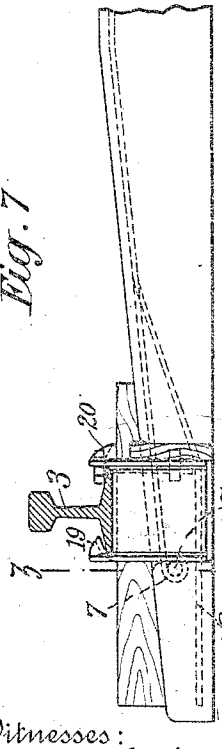


Fig. 8

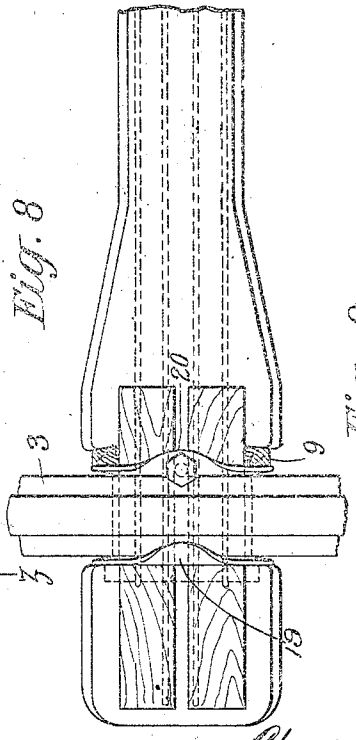
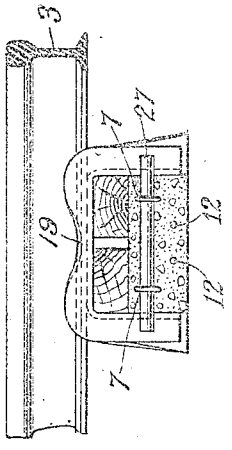


Fig. 9



Witnesses:
Raphaël Netter
Catharine Henry

Charles A. Reed Inventor
By his Attorney L. Deschamps

UNITED STATES PATENT OFFICE.

CHARLES A. REED, OF ST. PAUL, MINNESOTA.

RAILWAY-TIE.

943,268. Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed March 13, 1908. Serial No. 420,793.

To all whom it may concern:

Be it known that I, CHARLES A. REED, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented new and useful Improvements in Railway-Ties, of which the following is a specification.

My invention relates to improvements in railway ties and consists in the features of construction hereinafter described and claimed.

In the accompanying drawings forming part of this specification Figure 1 is a side elevation and partial longitudinal section of my improvement showing the shim, connecting yoke and rail in proper position. Fig. 2 is a plan of the same. Fig. 3 is a cross-section on line *x—x* of Fig. 2. Fig. 4 is a cross-section on line *y—y* of Fig. 2. Fig. 5 is a plan of the end of the tie with rail, yoke and shim removed. Fig. 6 is an isometrical view of the connecting yoke. Fig. 7 is a partial elevation showing a modified form of connecting yoke. Fig. 8 is a plan of the same. Fig. 9 is a transverse section of the same on line *z—z* of Fig. 7. Fig. 10 is a detail elevation of a modification of Fig. 7, to provide support for a double-headed rail. Fig. 11 is a horizontal section on line *w—w* of Fig. 10. Fig. 12 is a detail of the under face of the head of the stud-bolt for receiving the rail, and Fig. 13 is a detail of the upper face of the spring-washer or clip interposed between the bolt head and rail flange.

As shown on the drawings, the tie A is beveled on top toward each end. Upon each of these beveled portions are fitted in pairs compensating beveled shims 1, upon which is seated a tie plate 2 in the form of a yoke, which tie plate carries the rail 3.

The connection between the tie and the rail is secured by forming into the sides of the concrete tie the chases 4 (shown in Figs. 2 and 5) into which the pendent arms 5 of the yoke Fig. 6 are inserted and held in accurate position for proper gage of track by bearing against the cast iron plate 6 which is embedded in the concrete of the tie. The plate 6 is also held in place by the reinforcing rods 7 which pass through holes in the plate and are fastened to it by turning down their ends, and by the keys 8.

The chases 4 are made sufficiently wide to allow of the insertion of the yoke B after the tie and rail are in place. When the yoke is in place, the chases are filled taut with the wedges 9 driven between the wings 10 of the yoke and the concrete at the end of the chases. Additional support is given by the plate 11 embedded in the concrete, through slots in which pass the reinforcing rods 12. By this means the yoke is held from horizontal movement, while allowing it to move vertically.

The rail 3 is seated on the yoke 2 with its outer flange engaged in the lip 13 of the yoke, its inner flange being secured by the stud bolt 14 which engages an oblong nut 15 embedded in the concrete, one end of the nut passing through a slot in the plate 11. The stud bolt passes through the hole 16 of the yoke plate, and is provided with a spring steel washer 17 so shaped as to engage the flange of the rail, and bent down at an angle which allows its lower edge to cut into the shims when the bolt is tightened. This washer is so formed as to provide by its elasticity for the wave movement in the rail, but acts positively as soon as the outer edge of the flange is raised sufficiently to come in direct contact with the washer 17. Undulations or teeth are formed on the under side of the head of the bolt (see Fig. 12) with similar teeth formed upon the washer (see Fig. 13) which engage each other when the head of the bolt presses down upon the washer, forming a lock for the bolt to prevent its being loosened by vibrations. The rail is secured to the yoke by means of the lip 13 and the washer 17 and stud bolt 14, while the stud bolt and washer and nut 15 inserted in the slot of the plate 11, secure both rail and yoke to the tie. Adjustment of the rail to grade is obtained by shifting the shims 1 and the adjustment of the stud bolt 14, thereby providing a vertical adjustment of the rail within the distance provided for in the design, while still holding it in position from moving horizontally through its bearing upon lip 13 of the yoke, and the shank of the bolt 14, through the bearings of the pendent arms 5 of the yoke against the plates 6 and 11, while the tendency of the rail to overturn outward is prevented by means of the stud bolt 14 and the washer 17, as well as by the bearing of the wedge 9 against the edge of the chase 4 and the plate 11. This object is also accomplished with economy of material by so placing the reinforcing rods 7 and 12, which are used in strengthening the concrete tie, as to

accomplish this purpose as well as the purpose of securing the rail, and the parts are also arranged so as to hold each other in proper position in the mold in which the tie is formed.

Figs. 7, 8 and 9 show a variation in the form of construction in which the yoke is made from a channel iron instead of a plate, one flange of which is turned inward to form the lip 19 while the opposite flange is turned outward to form the seat of the bolt 20. In Figs. 10 and 11 is shown the variation of the channel yoke adapted to the support of a special double headed rail by means of the bracing clips 21, formed with the outer flange engaged in the slot 22 cut through the flange of the channel just above its intersection with the web. The upper edge of this flange of the clip is shaped so as to fit a groove on the under side of the head of the rail. The webs 24 of these clips are shaped as shown by the drawing to fit against the web of the rail and the shape of the groove in the reversed head. The flange of the clip is shaped at 25 so as to bear against the very top of the flange of the channel. The depth of the groove in the under side of the head is so proportioned that in driving the clips into place, the shoulder 25 will spring outward the flange of the channel within the limits of elasticity while the end 23 of the clip is passing under the head and into the groove made to receive the same, the flange of the channel of the yoke returning to position through its elasticity holding the same in place. The reinforcing rods 7 and 12 are carried in the notches of the plate 18 and thus held from displacement in the construction of the tie itself, the plates being held in place by a wire 26 which is connected with the bottom of the mold into which the concrete is filled and cut off even with the top of the tie when it is removed from the mold. In the construction shown in Figs. 7 and 8 the cross-bar or rod 27 is substituted for the plate 6 in Figs. 1, 2 and 3 the reinforcing rods 7 being secured to the bar by being bent partially around the same as shown.

In the construction shown in Figs. 10 and 11 only one shim 28 is illustrated instead of two. In this case slots 29 are provided in the shim through which the securing bolts are passed.

The methods of assembling the parts for original and new construction, and the method of maintaining the track after the construction is in place, are as follows: In new construction the ties are placed in proper position, the shims are placed upon them, and the yoke upon the shims, the wedges 9 being then driven into place. The rail is then set upon the yoke with the flange engaging the lip 13, and the stud bolt inserted with the washer 17 in place and turned down until the space between the outer edge of the lower flange of the rail and the washer is about one-eighth ($\frac{1}{8}$) of an inch.

In placing a tie in an old track, the yoke is set in place in its chases in the tie and the tie slid underneath the rails to its proper position. The yoke is then raised and canted outward until the lip 13 passes over the flange of the rail, the wedges 9 are then driven into place and the stud bolt inserted with the washer 17, and screwed down to the position described above. It is the intention that the gage of the track shall be absolutely fixed by the bearing of the arm of the yoke 5 against the face of the plate 6. Too wide gage can be readily obviated by the driving of steel wedges between the bearing face of the plate 6 and the edge of the arm 5.

In maintaining the track the gage being made accurate the rails are held from spreading by the bearing from steel to steel, and any narrowing of the gage is adjusted by the wedges 9.

In maintaining the track the proper grade or surface is cared for as follows: The track inspector by tapping with a hammer the outer end of the beveled shim will drive it inward and thereby take up any looseness caused by wear on it by the bearing of the yoke. If the tie is not firmly bedded upon the ground underneath, its weight through the stud bolt 14 bearing on the spring clip 17, will spring the clip downward so as to close up partly or wholly the $\frac{1}{8}$" space properly left between it and the outer edge of the flange of the rail. When this space is less than it should be, the inspector will "back up" the stud bolt 14, thereby allowing the tie to settle into its place, when by a blow upon the outer end of the shims the bearing is again secured between the yoke and the tie. When it is lowered into proper position, the outer edge of the spring clip 17 will cut into the shim as the bolt is tightened or the shim driven, and hold the shim in proper position, the angle of the bend in the clip 17 being such as to prevent any tendency to tighten the wedge unduly by reason of the motion caused by the undulation of the rail under traffic.

If the tie in becoming firmly bedded is canted so that the seat for the shims is not parallel with the rail, the driving of one shim farther than the other will increase the bearing surface between yoke and shims.

The construction of the stud bolt 14 with undulations or teeth on the underside of the head engaging with the teeth or undulations in the steel clip 17, forms a lock that prevents vibrations of the rail under traffic from loosening the bolt.

I claim:

1. In combination, a beveled railway tie, a compensatingly beveled rail-supporting shim, a rail seated on said shim, and means

interconnecting the rail and tie and securing the rail from horizontal displacement while permitting its vertical adjustment.

2. In combination, a beveled railway tie, a compensatingly beveled shim adjustable on said tie, a rail supported on said shim, a rail-securing stud-bolt, and a spring clip engaged by the head of said bolt and engaging the rail base and shim.

3. In combination, a beveled railway tie, a compensatingly beveled shim adjustable thereon, a rail seated on said shim, a rail-securing stud-bolt, and a spring clip engaged by the bolt head, one end thereof bearing upon the rail base and the other adapted to engage and hold the shim in adjusted position.

4. In combination, a beveled railway tie, a compensatingly beveled shim thereon, a vertically adjustable, rail-securing bolt, and a spring clip interposed between the bolt head and rail adapted to yield to the weight of a suspended tie and to indicate its displacement to the eye.

5. In combination, a beveled railway tie, a compensatingly-beveled rail-supporting shim, and a vertically adjustable channel-shaped yoke having depending ends engaging said tie.

6. The combination with a beveled concrete tie, and compensatingly-beveled rail-supporting-shims, of a vertically-adjustable-yoke seated upon said shims and having depending ends arranged in chases in the sides of said tie, bearing plates for the edges of said depending yoke ends, and rods interconnecting the bearing plates in opposite ends of said tie.

7. In combination with a beveled railway tie and compensatingly beveled rail-supporting-shims, a vertically-adjustable, channel-shaped yoke having depending ends adapted to engage chases in the sides of said tie.

8. The combination with a railway tie, and a rail seated thereon, of a rail securing bolt and a spring washer interposed between the head of said bolt and the base of said rail, said washer and bolt head having interlocking members comprising projections on one engaging depressions in the otner.

In witness whereof, I have hereunto set my hand at the city of New York, this 11th day of March, 1908.

CHARLES A. REED.

Witnesses:

E. J. Esselstyn,

Catharine Henry.