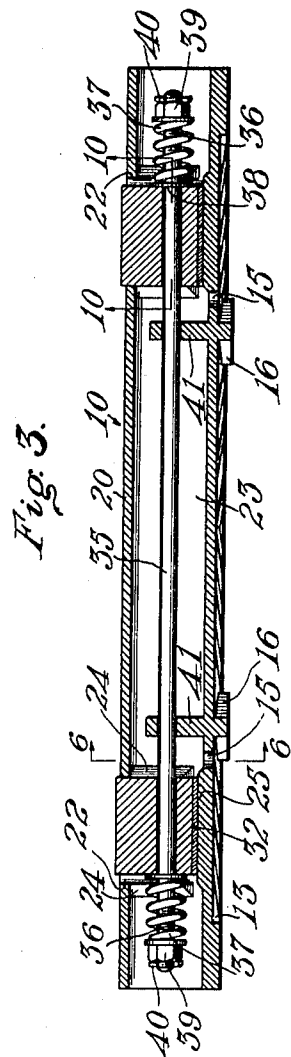
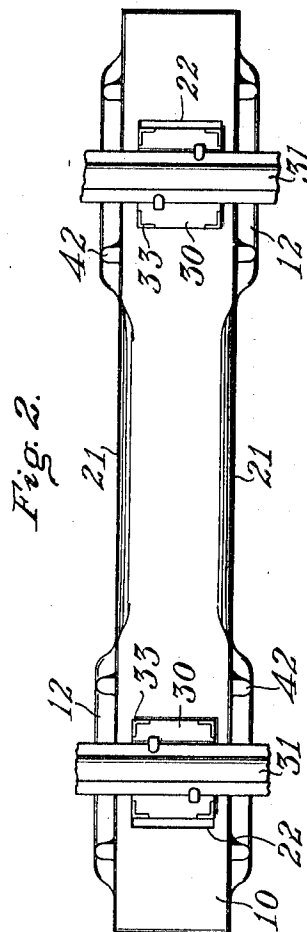
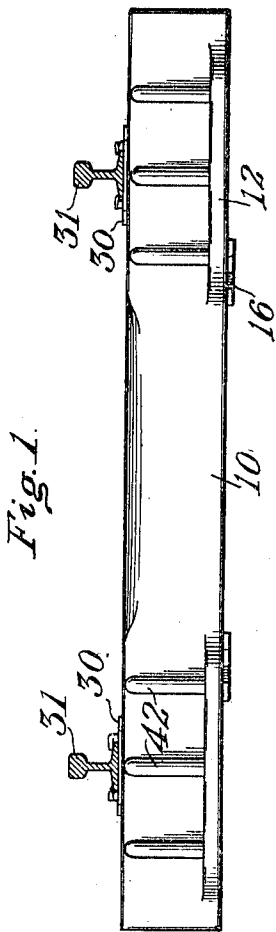


CROSS TIE.

1,020,886.

3 SHEETS—SHEET 1.



WITNESSES
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CROSS TIE.

APPLICATION FILED SEPT. 21, 1911.

1,020,886.

Patented Mar. 19, 1912.

3 SHEETS-SHEET 2.

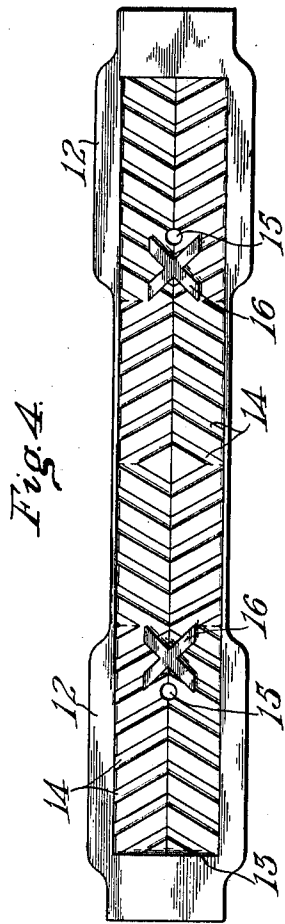


Fig. 4.

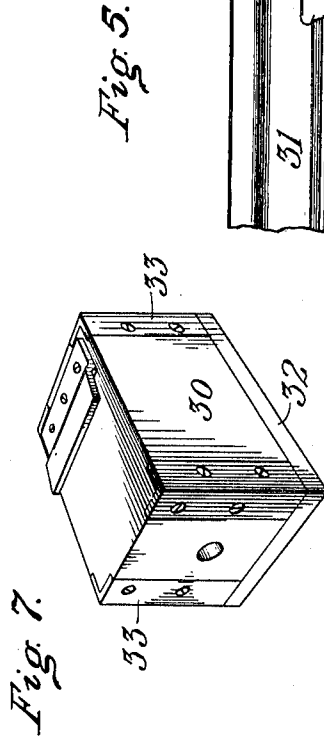


Fig. 5.

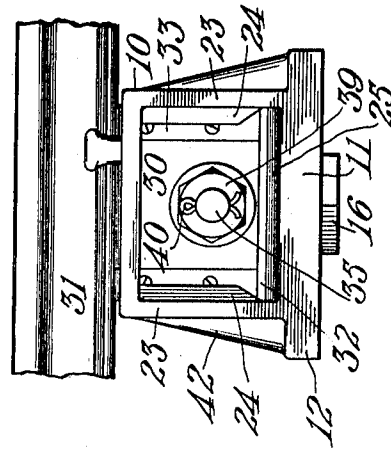
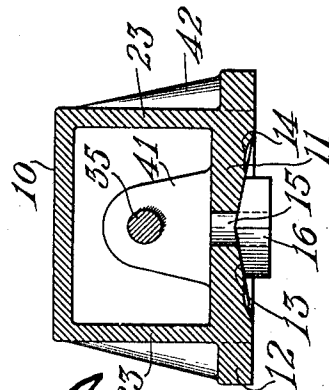


Fig. 6.



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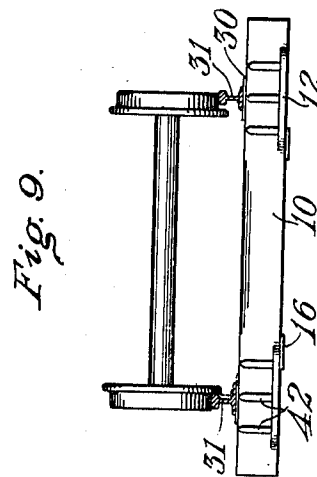
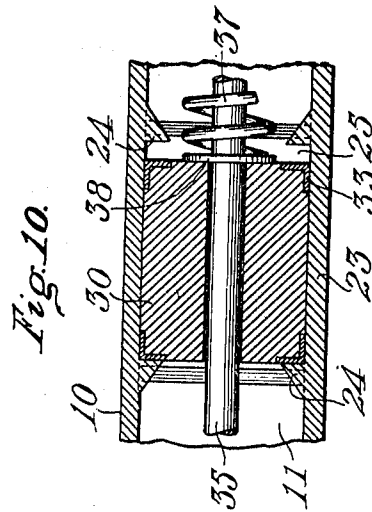
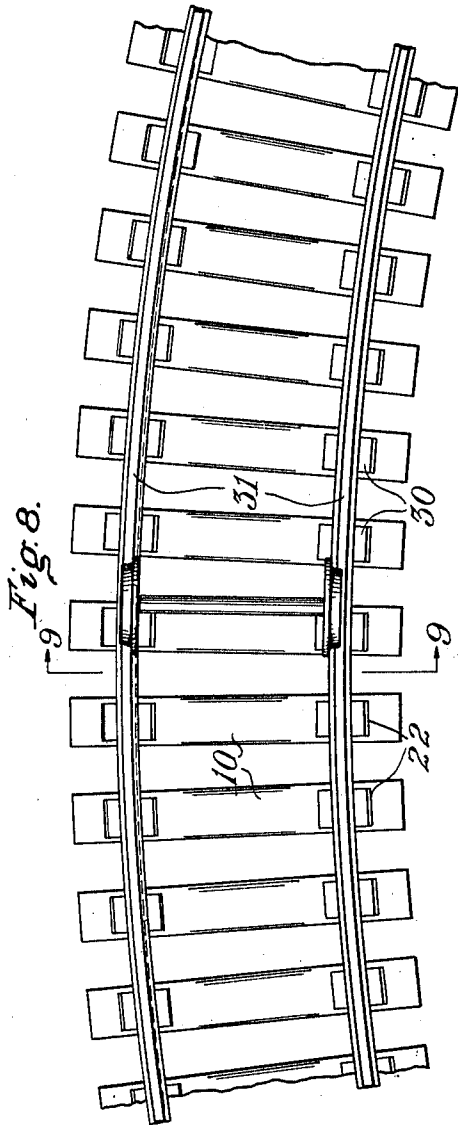
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3 SHEETS-SHEET 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

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CROSS-TIE.

1,020,886.

Specification of Letters Patent. Patented Mar. 19, 1912.

Application filed September 21, 1911. Serial No. 650,493.

To all whom it may concern:

Be it known that I, JAMES H. COLLINS, a citizen of the United States, and a resident of the city of Harrisburg, county of Dauphin, and State of Pennsylvania, have invented certain new and useful Improvements in Cross-Ties, of which the following is a full, clear, and exact description.

The object of this invention is to provide an improved cross tie or rail support capable of permitting the rails thereon to yield laterally to compensate for the expansion and contraction thereof and to partly absorb the transverse thrust of the vehicle trucks, thereon, particularly at curves, switches, etc.

With this and other objects in view, such as are brought out fully in the following specification and appended claims, the invention presents a construction illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation; Fig. 2 is a top plan view; Fig. 3 is a central, vertical, longitudinal section; Fig. 4 is a bottom plan view; Fig. 5 is an end view; Fig. 6 is a section on the line 6—6 of Fig. 3, Fig. 7 is a perspective of the immediate rail support; Fig. 8 is a plan view of a curve of track employing the device; Fig. 9 is a section on the line 9—9 of Fig. 8; and Fig. 10 a section on the line 10—10 of Fig. 3.

Referring to the drawings, the tie consists primarily in a hollow casing 10, slightly oblong in cross section, with a bottom wall 11 considerably thicker than the others, and oppositely extended in the regions of its ends to form a reinforced supporting surface 12. The bottom wall is furthermore provided with a recess 13, increasing in depth toward the transverse center, and this recess is in turn provided with a series of converging grooves 14, for a purpose hereinafter described. Extending from the recess 13 into the casing 10 are a plurality of holes 15, adapted to drain the interior of the tie, while protruding outwardly and downwardly therefrom are abrupt projections 16. The top wall 20 of the casing is substantially flat, with its side edges 21 rounded throughout a part of their length, to offer less obstruction to any chains, hose-couplings, etc., which might hang from cars passing thereover. The wall 20 is furthermore provided with rectangular apertures 22, disposed centrally above the reinforced sup-

porting surfaces 12 of the bottom wall and extending flush with the inner side walls of the tie. Immediately adjacent to said apertures and integral with the side walls 23 of the casing 10 are inwardly projecting shoulders 24, beginning directly beneath the top wall 20 and extending to within a short distance of the bottom 11 of the casing.

Within the tie resting upon the reinforced portions 25 of the base and extending approximately one-half inch through and beyond the apertures 22, are blocks 30, from one-half to one inch shorter than said apertures. The block is made of any suitable material, and this may act when made of wood, for instance, as a cushion for the rails 31 secured in any desired manner thereto. Covering and secured to the bottom of the block 30 is a metallic plate 32, while L plates 33 are secured to and arranged to protect the vertical edges thereof. Each of the blocks 30 is drilled substantially centrally throughout its length, and extending through and between the two blocks is a rod 35. The rod 35 is provided with threads 36 for a considerable distance inward from each end, and around said threaded portions are similar heavy tension springs 37, pressing normally against washers 38, adjacent to the respective blocks and held in semi-compressed condition by nuts 39, said nuts in turn being prevented from disengagement with the rod by cotter pins 40, or the like. Furthermore, the rod 35 at intervals throughout its length between the blocks 30, extends through and in sliding engagement with a plurality of brackets 41, integral with and extending upwardly from the base of the tie casing. By this construction the tie as a whole is raised when the rails 31, secured to the blocks 30 are raised, and said blocks are thereby maintained in normal position adjacent to the bottom of the tie casing. On the outside of the casing and extending upwardly from the lateral projections of the reinforced portions 12 are webs 42, tying the said projections to the side walls of the cross tie and adapted to make the latter aid in the support of the upward pressure upon the former.

The device as a whole in its preferred form when assembled is best shown in Fig. 3 in cross section, and operates as follows: The rails 31 are secured to the blocks 30, which are normally pressed with equal

force against the innermost walls of the apertures 22 in the top wall 20 of the casing 10, the inward pressure being also shared by the shoulders 24, adjacent to each aperture. When placed in position on a road-bed the tie rests upon any well known form of ballast (not shown), which extends upward into the recess 13 and encircles the projections 16. As is customary, the ballast is tamped beneath the tie, and engaging the projections 16 and the end walls of the groove 13, prevents the tie from any material longitudinal movement. There is then left practically unrestrained the horizontal vibrations of the tie, principally those in a longitudinal direction, and these vibrations by the construction of the recessed and grooved base are utilized to solidify or settle the ballast once tamped thereunder; the inverted V-shaped recess tending to force the particles of ballast toward the transverse center, while the converging grooves also assist to the same end in the same direction, as well as increasing the compression toward the longitudinal center.

In the operation of the device, when in position on the road-bed and with the respective rails secured to the blocks thereover, said rails are normally maintained at their innermost limit of movement, which may be any predetermined gage. When a car or train is sent over the rails at any rate of speed within a predetermined limit, no relative change takes place in the position of either rail, but when a train at high speed takes a curve or switch provided with this device, as with all others, the coefficient of safety of the outer rail against spreading decreases with an increase in the speed of the train. When the speed of the train has become such that all of the coefficient of safety on the rail mentioned is eliminated, something must give, such as a wheel, flange or rail, either of which often breaks, or in the latter case, are thrown from their fastenings and spread, and in either case permitting part or all of the train to leave the track. With these facts in view, the present invention has been designed to permit the "necessary something" to give, and that "something" is the rail against which the great side thrust is exerted. But in permitting the rail to yield, in extreme cases the amount and extent of that same yielding is governed and limited, the former by the tension of the springs, and the latter by the extent of the aperture surrounding the rail supporting blocks. Furthermore, by the longitudinal position of the rod 35 being entirely governed by the blocks, any displacement of either block causes one-half as much displacement of the rod, thereby permitting both springs to share equally any rail displacing thrust on either block.

While the foregoing use of the device, as stated, is designed for controlling the outcome in the case of excessive speeds only, there is another use for which it is designed, and which makes the employment of the cross tie on straight stretches of track desirable as well as on curves, switches, etc. This use is to control the shape and position of the rails when forced to curve by contraction and expansion, due to changes in temperature. Whereas in the present case in which rails so affected pull out or shear off the spikes intended to secure them to the ties and bow upwardly or horizontally, the device herewith presented forces the bowing to remain in a horizontal plane and permits it to extend over a greater portion of the track without loosening the grip of the spikes thereupon, and at every point limits the extent of the bowed displacement from one-half to one inch. With this restriction and the fact that a standard wheel base outside the flange is at least three inches, it is clear that while one or both rails may be zigzagged for quite a distance, at no place will a wheel ever get nearer to the inner edge of a rail than from one to two inches.

It is not intended in the foregoing description to limit this device to the exact details of construction described and illustrated, but any alterations may be made therein which do not depart from the spirit of the invention or the scope of the appended claims.

Having thus described my invention, what I desire to protect by Letters Patent of the United States is:

1. The combination of a pair of spaced rails with resilient means local to each rail and operative to force said rails together, and means connecting said resilient means to equalize the respective tensions thereupon.

2. The combination of a pair of spaced rails with resilient means local to each rail and operative to force said rails together, means to limit the relative approach of said rails, and means connecting said resilient means to equalize the respective tensions thereupon.

3. The combination of a pair of spaced rails with a cross tie comprising a pair of spaced blocks to which said rails are respectively secured, and resilient means operative to force said blocks together.

4. The combination of a pair of spaced rails with a cross tie comprising a pair of spaced blocks to which said rails are respectively secured, resilient means operative to force said blocks together, and means to limit the relative approach of said blocks.

5. The combination of a pair of spaced rails with a cross tie comprising a pair of spaced blocks to which said rails are respectively secured, resilient means operative to force said blocks together, means to limit the

relative approach of said blocks, and means extending between said resilient means to equalize the respective pressures thereupon.

6. The combination of a pair of spaced rails with a cross tie comprising a pair of spaced blocks to which said rails are respectively secured, resilient means operative to force said blocks together, means to limit the relative approach of said blocks, means extending between said resilient means to equalize the respective pressures thereupon, said last-named means being in slidable engagement with the body of said tie.

7. The combination of a pair of spaced rails with a cross tie comprising a pair of spaced blocks to which said rails are respectively secured, resilient means operative to force said blocks together, means to limit the relative approach of said blocks, means extending between said resilient means to equalize the respective pressures thereupon, and means integral with the body of said tie for holding said last-named means in permanent spaced relation therefrom.

8. The combination of a rail with a cushion support therefor, said support being armored on its base and edge portions respectively.

9. The combination of a pair of rails, with resilient means local to each rail, and operative to permit either of said rails to yield outwardly, and means connecting said resilient means to equalize their respective pressures when one of said rails is shifted.

10. The combination of a pair of rails, with adjustable resilient means local to each rail, and operative to permit either of said rails to yield outwardly, and means connecting said resilient means to equalize their respective pressures when one of said rails is shifted.

11. A hollow tie substantially rectilinear in cross section, the bottom wall thereof being reinforced on the inner side adjacent to the ends and the top wall being provided with apertures opposite to said reinforced portions, a block on each of said reinforced portions and projecting upwardly through said apertures, said blocks being substantially equal in width and less in length than said apertures, and rails secured to said blocks.

12. A hollow tie substantially rectilinear in cross section, the bottom wall thereof being reinforced on the inner side adjacent to the ends, and the top wall being provided

with apertures opposite to said reinforced portions, a block on each of said reinforced portions and projecting upwardly through said apertures, said blocks being substantially equal in width and less in length than said apertures, rails secured to said blocks, a rod extending through said blocks, and a spring surrounding each end of said rod, and cooperating to press said blocks toward each other.

13. A hollow tie substantially rectilinear in cross section, the bottom wall thereof being reinforced on the inner side adjacent to the ends, and the top wall being provided with apertures opposite to said reinforced portions, a block on each of said reinforced portions and projecting upwardly through said apertures, said blocks being substantially equal in width and less in length than said apertures, rails secured to said blocks, a rod extending through said blocks, a spring surrounding each end of said rod, and cooperating to press said blocks toward each other, and means to limit the movement of said blocks while under the influence of said springs.

14. A tie comprising a hollow body, a plurality of rail supports slidably mounted therein, rails mounted on said supports, and means to normally hold each rail to gage with the other.

15. A tie comprising a hollow body, a plurality of rail supports slidably mounted therein, rails mounted on said supports, and cooperating means local to each rail to normally hold said rails to gage with each other.

16. The combination of a pair of rails, with a tie comprising a resilient means local to each rail, to permit said rails to yield outwardly, and means to prevent said rails from yielding inwardly.

17. The combination of a pair of rails, with yielding resilient means operative to permit said rails to yield outwardly, and means local to each rail and operative to positively prevent said rails from approaching each other closer than their normal, predetermined gage.

In witness whereof I have hereunto set my hand this 13 day of September, A. D., 1911.

JAMES H. COLLINS.

Witnesses:

NETTIE O. FREEMAN,
J. STUART FREEMAN.