April 6, 1937. A. F. FIFIELD 2,076,019

TIE PLATE

Filed May 3, 1932 2 Sheets-Sheet 1

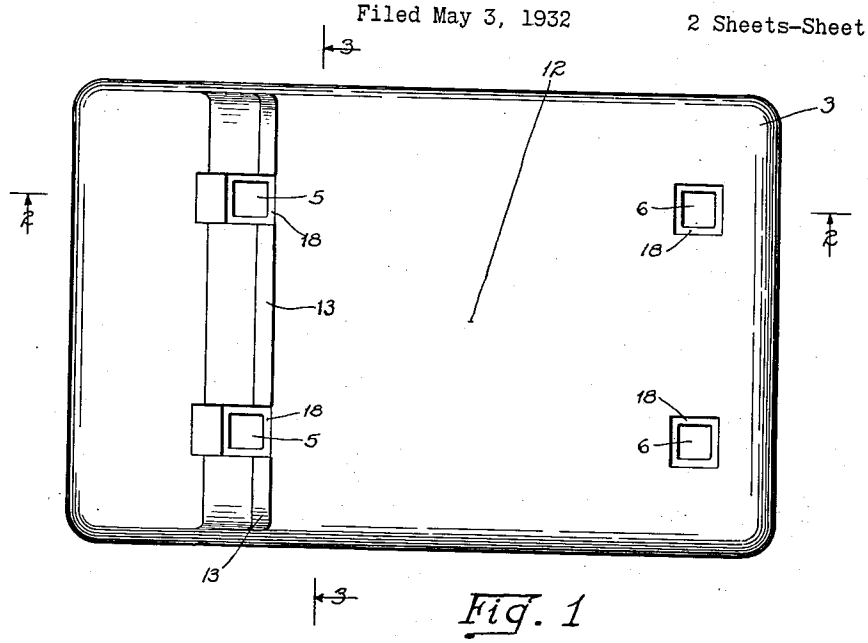

Fig. 1

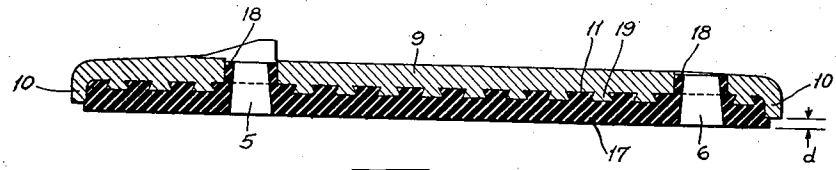

Fig. 2

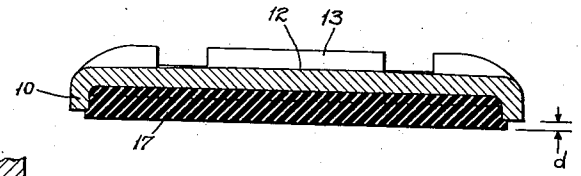

Fig. 3

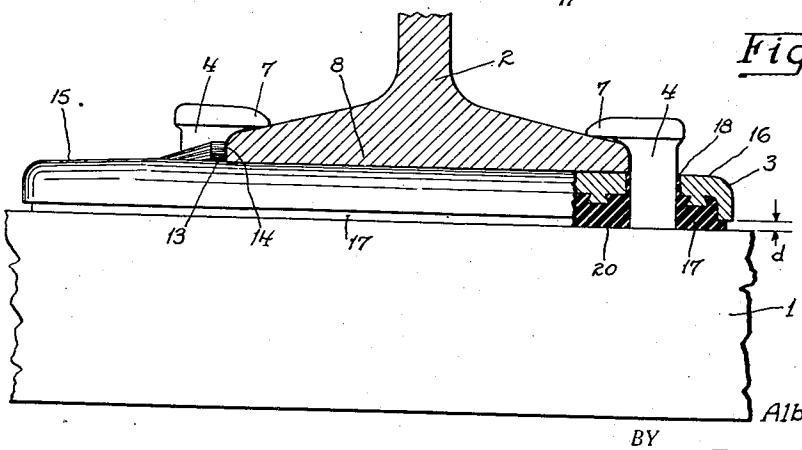

Fig. 4

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TIE PLATE

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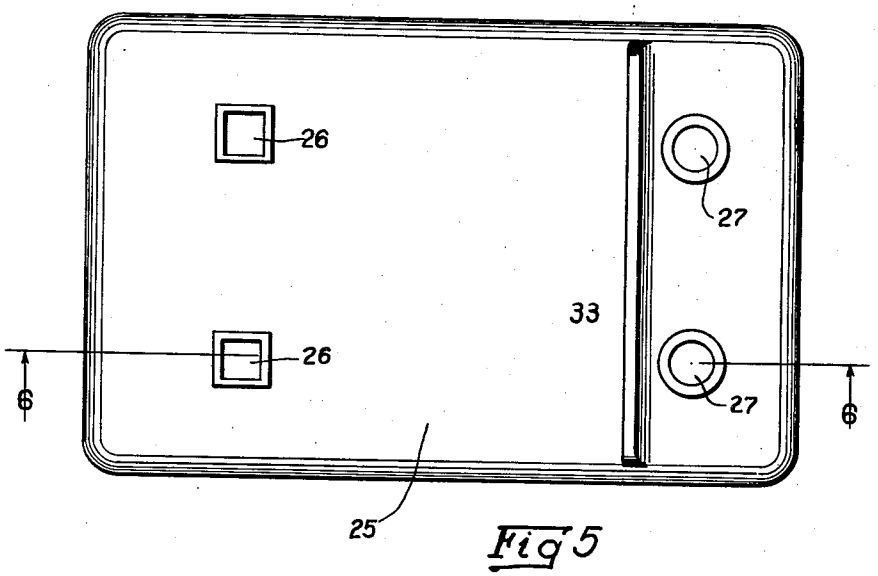

Fig 5

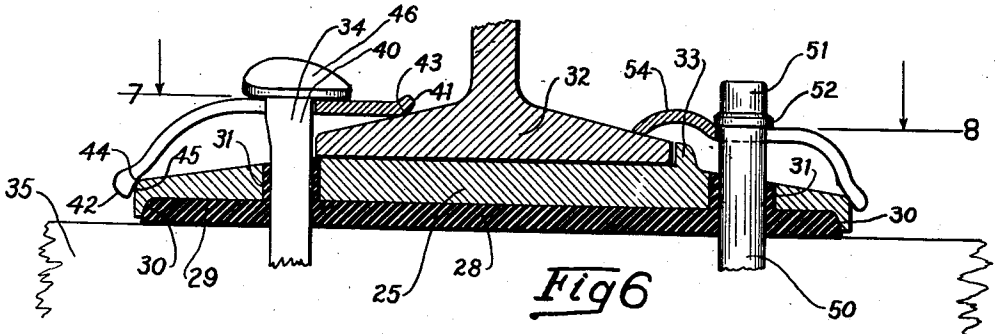

Fig 6

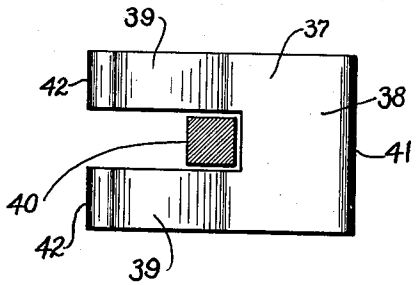

Fig 7

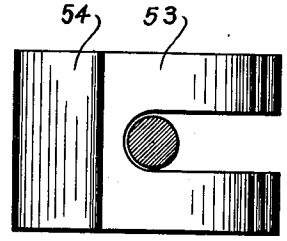

Fig 8

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UNITED STATES PATENT OFFICE

2,076,019

TIE PLATE

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Application May 3, 1932, Serial No. 608,949

7 Claims. (Cl. 238—283)

My invention relates to railway tie plates, and more particularly relates to an improved composite tie plate adapted to be placed intermediate the base of a road rail and the cross ties of the railway for supporting the rails on the cross ties.

In the early days of railway construction, the cross ties employed to support the rails were exceedingly plentiful and inexpensive, and therefore the relatively short life of the cross ties in use was a matter of relatively small importance, consideration being had also to the fact that labor was correspondingly low priced.

However, to minimize the cutting of the rail ties by the narrow rail base, a piece of metal was laid between the base of the rail and the tie as a protective device, said pieces being called tie plates, bearing plates or wearing plates. Since the first use of tie plates, the cost of railway ties, together with the labor cost of replacement, has increased enormously, so that at the present time great consideration is being given the subject of increasing the life of railway ties.

Also, in the early days of railroading, travel by rail was so much more comfortable than travel by any other means, such as by horse stages, that for a long time little attention was given to improvements tending to make travel by rail more comfortable to the traveler on the trains traversing the railways.

However, at the present time, the motor bus, and other motor vehicles have offered the traveler another means of travel in comfort, which is seriously competitive with the transportation offered by the railroads.

An object of my present invention, therefore, is to provide an improved tie plate for railways, which in use will increase the life of the railway ties and at the same time make travel by railroad more comfortable.

A singular object of my invention, therefore, is to provide an improved tie plate, the use of which will increase the useful life of the railway ties upon which it is used.

Another singular object of my invention is to provide an improved tie plate, which will cushion the otherwise unpleasant shocks and noises incidental thereto, which result from the travel of the heavy locomotives and cars over the rails.

Another object of my invention is to provide an improved cushioning and tie preserving tie plate.

Another object of my invention is to provide an improved tie plate employing as a cushioning element a body of cushioning material integrally affixed to a metal outer container therefor.

Another object of my invention is to provide an improved tie plate employing rubber or rubber composition material as the cushioning means wherein the rubber material will not separate from an encasing iron or steel element of the tie plate.

Another object of my invention is to provide an improved composite iron or steel and rubber tie plate, wherein the rubber is vulcanized to the metal at all contacting portions of each, whereby moisture may not be admitted between the opposing surfaces of the rubber and metal portions.

Another object of my invention is to provide a composite cushioning tie plate of metal and cushioning material.

Another object of my invention is to provide an improved composite metal and cushioning material tie plate with openings therethrough for the rail securing spikes provided with sealing bushing portions of the cushioning material to restrain moisture from flowing through said openings when the securing spikes are in place.

Another object is to provide a cushioned tie plate having improved means for holding the plate upon the tie and the rail upon the plate.

Another object is to provide a tie plate having means associated with the rail to firmly hold the plate upon the tie by reaction of the rail when tending to leave the plate.

Another object is to provide an improved cushioned tie plate having resilient means associated with the rail to firmly hold the plate upon the tie and the rail upon the plate.

Other objects of my invention and the invention itself will become more apparent to those skilled in the art to which my invention appertains by reference to the following description of an embodiment thereof, and in which description reference will be had to the accompanying drawings illustrating the said embodiment.

In the drawings:—

Fig. 1 is a plan view of a tie plate which is an embodiment of my invention;

Fig. 2 is a section taken from plane 2—2 of Fig. 1;

Fig. 3 is a section taken from plane 3—3 of Fig. 1;

Fig. 4 is a sectional view of a fragment of a railroad rail supported by the tie plate of the foregoing figures, shown partly in elevation and partly in transverse section, together with a fragment of a railroad tie underlying the tie plate and with securing spikes in place;

Fig. 5 is a view similar to Fig. 1 illustrating another embodiment of my invention;

Fig. 6 is a view similar to Fig. 4 further illus-

trating the embodiment of Fig. 5 and illustrating two alternative means for securing the rail and plate to the tie;

Figs. 7 and 8 are, respectively, fragmentary views taken from the planes 7 and 8 of Fig. 6.

Referring now to the different figures of drawings, in all of which like parts are designated by like reference characters, at 1 a fragmentarily illustrated railway tie, which extends transversely of a spaced parallel pair of rails, such as the rail 2, is provided with individual tie plates, such as 3, interposed between each of the rails and the tie, there being a plurality of securing means, such as the ordinary type of rail spikes 4, projected through openings 5 and 6 of the plate into the tie with head flanges 7 brought down over the lateral portions of the rail base flanges to secure the rail base 8, and the interposed tie plate 3, to the tie.

The tie plate comprises a metal casing body portion 9 having downturned side walls 10 and an end wall having alternately disposed ribs 19 and grooves 11.

The apertures 5 and 6 are provided through the end wall of the tie plate and the upper surface of the plate comprises a rail seat portion 12 disposed intermediate the spike apertures 5 and 6, an upstanding flange 13 adapted to abut against a side edge of the rail base flange 14, and end portions 15 and 16 disposed outwardly of the apertures 5 and 6.

The downturned side walls 10 provide a cavity on the underside of the tie plate for the reception of rubber or like cushioning material 17, which is preferably molded within said cavity and preferably vulcanized, according to the well known process, to the inner walls thereof, whereby a body of rubber is provided of a volume sufficient to fill the cavity, and to extend downwardly therefrom and thereout of a suitable distance, such as the distance *d*, below the bottom edges of the side walls 10 of the body portion; and there is also provided a tubular bushing portion 18 to line the walls of the apertures 5 and 6.

The bore or passage through the bushings 18 is continued through the entire block of cushioning material and is preferably made as shown with downwardly divergent inner walls.

It will be particularly noted that the side walls 10, trap the bulk of the rubber material of the rubber body 17 and resist outward movement tendencies thereof when the rubber is put under compression in use.

Also in the use of the tie plate, the weight of railroad cars and the like passing over the rails, such as 2, will be carried entirely by the rubber material 17, and the trains comprising said cars will travel over such rails in a quieter manner and with less vibration than heretofore. The rubber material being vulcanized in all contacting surface portions to the metal plate element 9 will not become separated therefrom, and will not abrade the wood material of the ties by slight sliding and vertical movements thereon, since the rubber material along the bottom surface 20 in contact with the wood fibres along the upper surface of the tie 1 will become interfitted with said fibres and the rubber material being elastically plastic will yield in such manner that although upper portions of the rubber material may move slightly with the metal plate 15, the portions in contact with the wood fibres along the surface 20 will be held immovable relative to the wood tie portions to reduce the frictional abrasion of the wood material which now commonly takes place.

Although the metal casing 9 may be made of steel material of varying alloy compositions and of differing degrees of hardness and elasticity, I preferably form said casing of a relatively high carbon steel alloy, that known as 80 carbon steel, and subjected to heat treatment to give it a substantially spring temper, which is preferred, and as illustrated in the drawings, I preferably make the upper wall of the tie plate casing relatively thin, whereby the tie plate may, when the rail 2 is traversed, resiliently yield to some extent to increase the cushioning effect upon supported railway cars.

The intimate contact between the rubber 17 and the walls of the metal casing, particularly the top wall, subdue any sound producing vibratile effects, otherwise producing the "hammering" of rails against the tie plates during use of the railway, on the same principle that a bell having an interior filling will not ring, the tonal vibrations being restrained and modified to subdue resultant noise effects.

As a further feature of improvement, I preferably apply a suitable adhesive to the bottom outer surface of the body of rubber 17, of a kind which will effect a cementitious bond between the wood fibres of the railroad tie 1 and the rubber material, an air curing cement being preferably employed for the purpose.

There also will be no pumping action exerted between relatively movable alternately contacting and separating portions of rubber and metal as would be the case were vulcanization of the contacting surface not had, whereby water would be alternately drawn into and partially expressed from the spaces between the rubber and metal.

In the modified embodiment of my invention in Figs. 5 to 8 inclusive, I have illustrated at 25 a tie plate having apertures 26 and 27, and rubber or the like cushioning material 28 disposed within and preferably vulcanized to the inner surfaces of a cavity formed on the underside of the plate 25 and having an inner cavity end wall 29 and peripheral depending side walls 30—30; and the cushioning material 25 comprises integral bushing portions 31—31 lining the inner wall of the apertures 26 and 27.

The construction thus far described of this embodiment is similar to or may be identical to that of the first described form.

A rail 32 may be seated with the bottom surface of its base upon the plate 25 and with an edge of the base abutting against an upstanding ridge 33 on the base.

A spike 34 is driven downwardly through the bushing 31 and through the cushioning material 28 and into the tie 35. The spikes 34 are first driven part way into the tie and then a U-shaped clamp device 37 comprising a closed end portion 38 and legs 39 is placed around the shank 40 of the spike with the legs 39 straddling the shank, the clamp device 37 being preferably formed from resilient metal, or sheet metal such as steel and is preferably of the form illustrated in the drawings. In general plan view as in Fig. 7, the device is rectangular and is provided with a generally rectilinear edge 41 along the closed end portion and corresponding rectilinear edges 42 at the ends of the legs 39. The legs 39 are bent transversely to the form illustrated in Fig. 6, and when the device is in its spike shank straddling position illustrated, a preferably rounded edged portion 43 adjacent the edge 41 engages the upper sur-

face of the rail base 32 and an inner shoulder 44 on each of the legs adjacent the edge 42 and preferably parallel to the rounded surface 43 engages the exterior corner 45 of the adjacent edge of the plate 25.

With the spike and the clamp device 37 in the position illustrated and described, the spike is now driven farther into the tie and the head 46 of the spike, overlapping the legs 39 and a portion of the closed end portion 38, draws the clamp device downwardly putting it under resilient stress and firmly but resiliently, by means of the edge portion 43 clamps the rail flange upon the plate 25 and the plate upon the tie placing the rubber cushioning material 28 between the plate and the tie under compression, and, by means of the shoulder 44, clamps the plate 25 upon the tie 35 through the cushioning material 28.

A double function is effected by the clamp construction above described. Normally the rail is clamped upon the plate and the plate upon the tie, and the purposes and advantages of the first described form will be effected; with the form under consideration however, the tendency of the rail flange 32 to rise relative to the tie at a portion thereof which sometimes occurs during the passage of railway cars thereover, rocks the clamp device 37 around the spike head 46 as a fulcrum and increases the pressure of the shoulder 44 upon the plate 25. This ensures that the plate 25 will not rise relative to the tie 35 and will not loosen the intimate contact engagement of the cushioning material 28 with the tie.

Thus, even after long continued service, the cushioning material 28 will have substantially no movement relative to the surface of the tie 35 with the attendant advantages above discussed.

The clamp plate 37 and the spike 34 above described are illustrated at the left-hand portion of the drawing. A spike 34 and plate 37 identical to those illustrated may be employed on the other side of the rail or in the right-hand portion of the drawing. But if preferred, an alternative construction illustrated in the right-hand portion of the drawing may be employed. The mode of operation and construction of this alternative form is generally the same as that of the form described. The differences reside in the employment of a lag screw 50 preferably circular in cross section instead of a rectangular section spike, and the leg screw 50 may have a wrench-receiving head 51 and an integral collar 52 thereon. Upon screwing the lag screw 50 into the tie, the collar 52 may engage the clamp device 53 to effect the purposes described for the clamp device 37; and the clamp device 53 in addition to the form and functions thereof above described for the clamp device 37, may be provided with an upwardly convex closed end portion 54 to increase the resilience of the clamp device 53.

Having thus described my invention in certain embodiments thereof I am aware that numerous departures may be made therefrom without departing from the spirit of my invention and sacrificing its advantages.

I claim:

1. In combination with a tie plate comprising a perforated metal upper plate having depending peripheral flanges and an integral rubber base disposed inwardly of and extending downwardly beyond the flanges and provided with perforations aligned with the plate perforations, said metal plate and base being disposed between a rail and a tie, the lower face of said rubber base being cementitiously affixed to the upper surface of the tie, lever means actuated by upward movement of the rail to compress the plate and base against the tie to restrain relative movements of the tie and rubber base, said lever means comprising a headed element projected through said perforations engaging the tie, and maintained spaced from engagement with the metal plate by encircling rubber, and a lever projected underneath the element head adapted to engage a rail base flange at one end and the metal plate at the other end.

2. In combination, a tie plate comprising a downwardly and peripherally flanged metal upper plate and a rubber base vulcanizingly interlocked to the said metal plate within the flanges, the metal plate and base being provided with aligned perforations and portions of the base projecting upwardly to provide an encircling lining for the plate perforations, the said plate and base being disposed between a rail and a tie, lever means including an element projected through said perforations and engaging the tie actuated by upward movement of the rail to compress the plate and base against the tie to restrain vertical movements of said rubber base relative to said upper plate and said tie, tending to separate the abutting surfaces of said plate base and tie.

3. In combination, a tie plate, adapted to be disposed between a rail and tie, comprising a perforated metal upper plate and a rubber base interlocked to the metal plate and provided with perforations aligned with the plate perforations, the base being adapted to be cementitiously affixed to a tie, lever means comprising a headed element projected through the perforations adapted to rigidly engage the tie, the headed element being maintained spaced from the metal plate, and a lever element adapted to be projected tranversely of the rail, beneath the element head to engage a rail flange at one end and the metal plate at the opposite end.

4. In combination, a tie plate adapted to be disposed between a rail and tie, comprising a perforated metal upper plate and a rubber base secured to the said upper plate to prevent relative lateral shifting of the plate and base and provided with perforations aligned with the plate perforations, lever means comprising an element projected through the aligned perforations adapted to rigidly engage the tie, and provided with a shoulder, a lever element adapted to be projected laterally under the shoulder and engaging the underside of the shoulder at an intermediate portion of the lever and engaging at one end portion the upper side of the rail flange and at the opposite end portion engaging the metal plate, whereby upon rising movement of the rail the lever element may press the plate downwardly upon the rubber base to maintain the plate in engagement with the base and the base in engagement with the tie and tubular extensions on the rubber base extending into the plate perforations cushioningly surrounding the element projected through the aligned perforations.

5. A tie plate for supporting a rail comprising a metal plate and a rubber base secured thereto for engagement with a rail tie, a plurality of aligned perforations in the metal plate and the base through which a rail securing spike may be driven into the tie, and tubular rubber portions of the base extending into and lining the plate perforations providing centering means for the spike and cushioning relative lateral move-

ments of the spike and the wall of the plate perforations.

6. A tie plate for supporting a rail comprising a metal plate having depending peripheral flanges and a rubber base disposed within the flanges, extending downwardly therebetween and secured to the said metal plate for engagement with a rail tie, the metal plate having a plurality of spaced perforations and the base having a corresponding plurality of tubular projections extending into and substantially coaxial with the plate perforations through which rail securing spikes may be driven into the ties and the tubular projections centering the spikes in the said perforations and cushioning relative lateral movement of the spikes and the walls of the said perforations.

7. In combination, a tie plate comprising a downwardly and peripherally flanged metal upper plate and a rubber base secured to the said metal plate within the flanges to prevent relative lateral shifting, the metal plate and base being provided with aligned perforations and portions of the base projecting upwardly to provide an encircling lining for the plate perforations, the said plate and base being disposed between a rail and a tie, lever means including an element projected through said perforations and engaging the tie actuated by upward movement of the rail to compress the plate and base against the tie to restrain vertical movements of said rubber base relative to said upper plate and said tie, tending to separate the abutting surfaces of said plate base and tie.

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