Oct. 11, 1932. F. A. PRESTON 1,881,937

TIE PLATE

Filed May 13, 1931

Fig. 2.

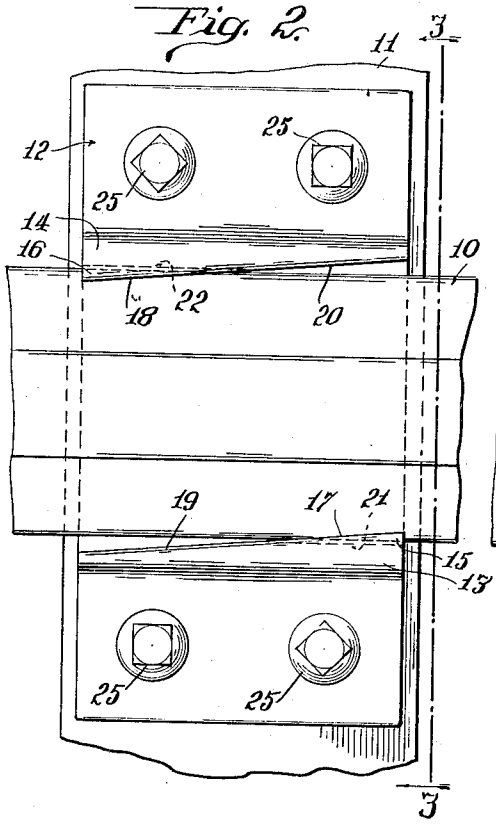



Fig. 1.

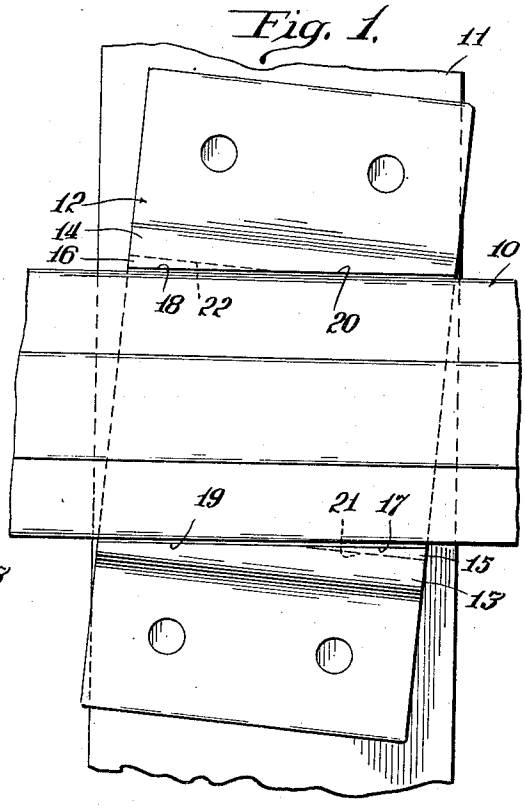
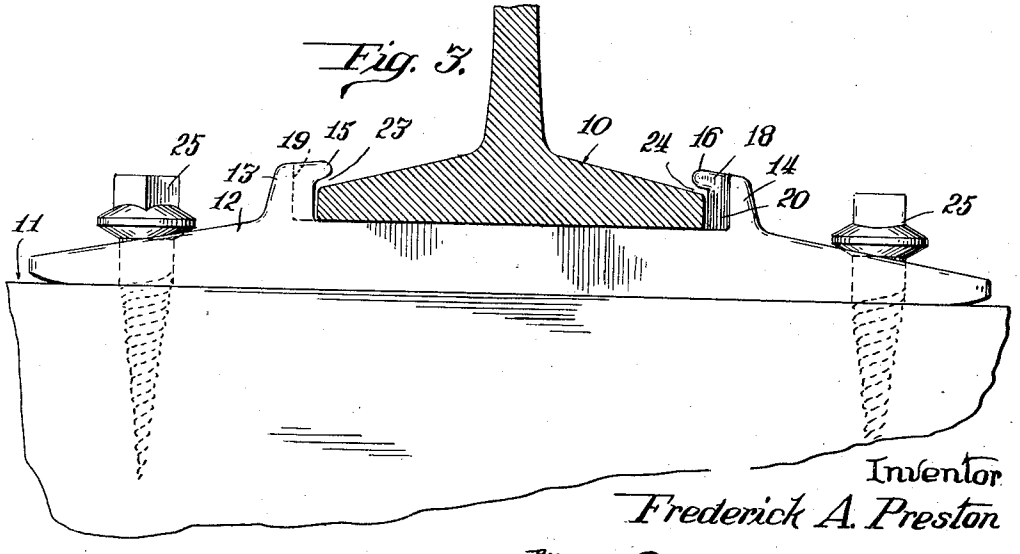



Fig. 3.




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# UNITED STATES PATENT OFFICE

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## TIE PLATE

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This invention relates to improvements in tie plates for supporting a railroad rail in proper position on a cross tie.

It has been customary heretofore to secure the railroad rails to the cross ties by means of fastening devices separate from the tie plates, for example by means of spikes driven into the ties and so located that the heads of the spikes project over the upper edges of the rail base at opposite sides of the rail. When the rails are held in close contact with the cross ties, the vertical or wave movement of the rails impart vertical or pumping movements to the cross ties. In addition to the said pumping movements of the tie the wave movement of the rails imparts a rolling movement to the cross tie. Said pumping and rolling movements of the ties permit ballast to work beneath them and thus impair the alignment and surface of the track. The vertical or wave motion of the rails tends to withdraw the spikes from the ties and thereby provides excessive clearance between the rail base and the heads of the partially withdrawn spikes. Furthermore, any clearance between the base of the rail and the heads of the spikes permits the tie plates to vibrate between the rail base and the tops of the ties. Such vibratory movements of the tie plates are objectionable in that they tend to imbed the plates in the tops of the ties, thereby damaging the ties and increasing the clearance between the rail base and the heads of the rail spikes.

The object of the present invention is to provide an improved tie plate construction which will overcome the above mentioned and other incidental objections encountered in the use of tie plates in connection with separate rail fastening devices. In this connection the invention includes the provision of a tie plate formed with means which overlie the marginal portion of the rail base at opposite sides of the rail so as to prevent separation of the rail from the plate but which provides for sufficient movement of the rail relative to the plate to prevent the wave motion of the rail from imparting to the tie the vertical and rolling movements above referred to. A specific embodiment of the invention includes a tie plate of the above general character which may be interposed between the rail and a cross tie at any desired location, the initial position of the plate being slightly diagonal with respect to the opposite edges of the rail base and adapted to be rotated about its vertical axis to move the rail retaining portions of the plate into their normal operative positions.

The invention is illustrated in one specific embodiment in the accompanying drawing, wherein:

Fig. 1 is a plan view of a railroad rail in connection with the improved tie plate of this invention, the tie plate being shown in a position assumed during the application of the plate to the base portion of the rail.

Fig. 2 is a plan view similar to Fig. 1 but illustrating the tie plate moved into a position to engage over opposite upper edges of the rail base; and

Fig. 3 is a vertical section through the rail taken on line 3—3 of Fig. 2 illustrating the tie plate in its operative position.

Referring to Figs. 1 to 3 inclusive of the drawing, 10 designates the base portion of a railroad rail, 11 one of the cross ties and 12 a tie plate constructed in accordance with this invention interposed between the base portion 10 of the rail and the top surface of the tie 11. The tie plate 12 is formed on its upper surface with spaced upstanding shoulders 13 and 14 which extend the full width of the plate and provide abutments for opposite sides of the rail base. The abutment function of the shoulders prevents any substantial lateral movement of the rail base relative to the plate. Each shoulder, 13 and 14, is provided with an inwardly projecting portion adapted to overlie the marginal portion of the rail base at opposite sides of the rail when the tie plate is in its fully applied position. One of the projections is designated in the drawing by reference numeral 15 and is located at one end of the shoulder 13. The other inwardly projecting portion is indicated by the numeral 16 and is located at the opposite end of the other shoulder 14. The inner edges 17 and 18 of the projections taper longitudinally of the rail and merge into the inner faces 19 and 20 of the said shoulders

at substantially the middle of the plate. With this construction, the said inner edges 17 and 18 of the inwardly projecting portions and the inner face portions 19 and 20 of the shoulders assume positions parallel to the edge of the rail when the plate is arranged in the diagonal position shown in Fig. 1. In this position of the plate, the base portion of the rail may be readily positioned between the shoulders 13 and 14, whereupon rotation of the plate about its vertical axis moves the projections 15 and 16 into a position overlying the marginal upper surfaces of the rail base, as shown in Fig. 2 of the drawing. The inner face portions 21 and 22, located beneath the projections 15 and 16, are angularly disposed with relation to the inner face portions 19 and 20 so that when the plate is rotated in its applied position, (Fig. 2) the said face portions 21 and 22 assume a position parallel to the opposite edges of the rail base and function as abutments to prevent lateral movement of the rail. The plate may be secured to the cross tie by means of screws 25 so that the plate will be held in close contact with the tie.

There are preferably suitable clearances 23 and 24 between the under faces of the projections 15 and 16 and the upper faces of the rail base flanges to permit a limited vertical movement of the rail relative to the tie plate so that the normal wave motion of a rail, during the passage of traffic thereover, will not impart any substantial vertical or pumping movement to the cross tie. The said clearances between the rail base and the projections 15 and 16 at opposite edges of the tie plate permit the rise and fall of the rail at opposite edges of the tie during the wave motion of the rail without imparting any substantial rotational movement to the tie. When the rail is held in close contact with the tie, the wave motion of the rail (similar to the depression of the rail at one side of the tie and raising it relative to the other edge of the tie) exerts a downward force at one edge of the tie and an upward force at the opposite edge of the tie, thereby imparting a rotational movement to the tie in addition to a vertical or pumping movement. It will be seen, therefore, that by providing the shoulders 13 and 14 with inward projections 15 and 16, the clearances between the said projections and the edge of the rail will permit the rigid attachment of the plate to the tie so as to avoid vibratory movement of the plate between the rail base and ties and at the same time prevent the wave motion of the rail from imparting undersirable movement to the cross tie. The clearances indicated between the opposite edges of the rail base and the vertical walls of the abutments 13 and 14 are preferably such as to accommodate rail bases of slightly different widths, there being ordinarily slight variations in the width and thickness of the rails due to the wearing of the rolls used in the manufacture of the rails.

I claim:

1. Supporting and retaining means for a railroad rail comprising a plate member interposed between the base of the rail and the rail supporting means of the roadbed, and having spaced abutments thereon adapted to engage the full edge thickness of the base flange to hold the rail against substantial lateral movement, the plate being so arranged that the abutments, respectively, stand adjacent opposite flanges of the rail base, and inwardly projecting means formed on the abutments and projecting over the adjacent flange of the rail base at opposite edges of the plate but spaced from said rail base to retain the rail in position with capacity for limited vertical movement relative to the said plates.

2. Supporting and retaining means for a railroad rail, comprising a tie plate having means thereon movable into position to project inwardly above the upper surfaces of opposite flanges of the rail base by rotational movement of said tie plate relative to the said rail base; said inwardly projecting means being normally spaced from the said upper surfaces of the rail base flanges to permit limited vertical movement of the rail relative to the tie plate when the latter is in its operative position.

3. A tie plate for retaining a rail in position with capacity for limited vertical movement relative to the plate and comprising a plate formed with spaced shoulders providing abutments adapted to engage the full edge thickness of opposite flanges of the rail base; each shoulder being formed with angularly disposed inner faces which converge toward the middle of the plate, an inwardly projecting portion at one end of the shoulder, the inner edge of which merges into the plane of the angularly disposed inner face at the other end of said shoulder; the said inwardly projecting portions being disposed out of alignment transversely of the rail and the inner edges of the said portion being parallel to each other, whereby movement of the plate to a diagonal position moves the inner edges of said inwardly projecting portions into parallel position with the opposite edges of the rail base to permit insertion of said rail base between said projecting portions and whereby movement of the plate toward a position perpendicular to the rail moves said projecting portions into positions overlying the rail base.

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