June 25, 1940. H. G. WARR 2,205,584

TIE PLATE AND SPRING CLIP

Filed Aug. 4, 1938

Fig. 1.

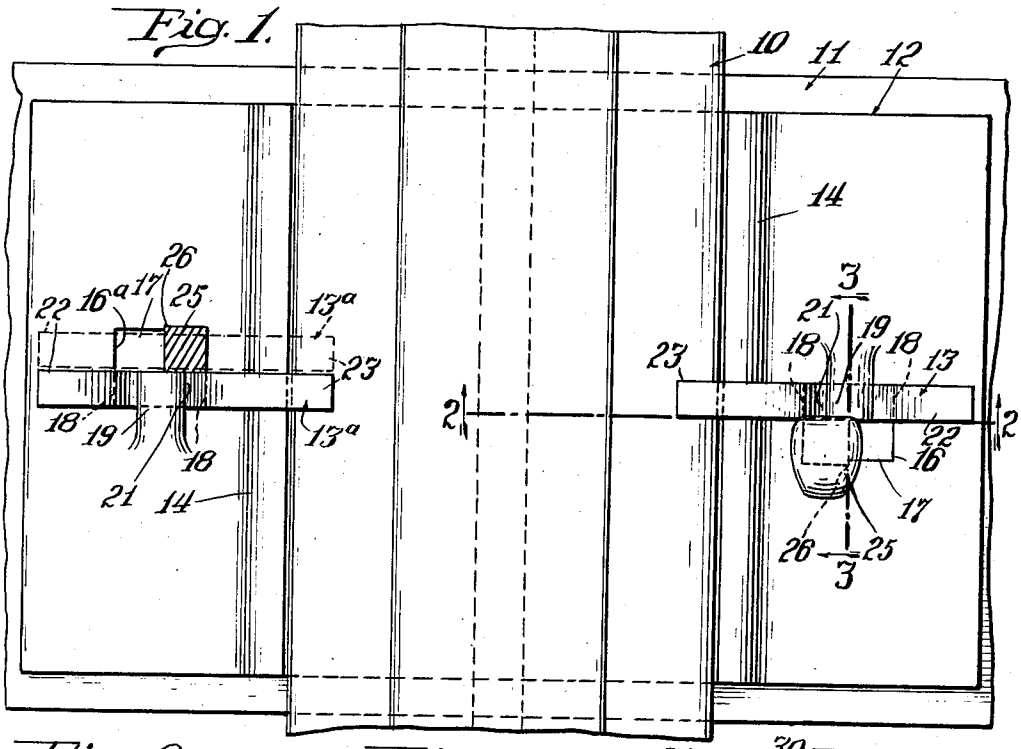


Fig. 2.

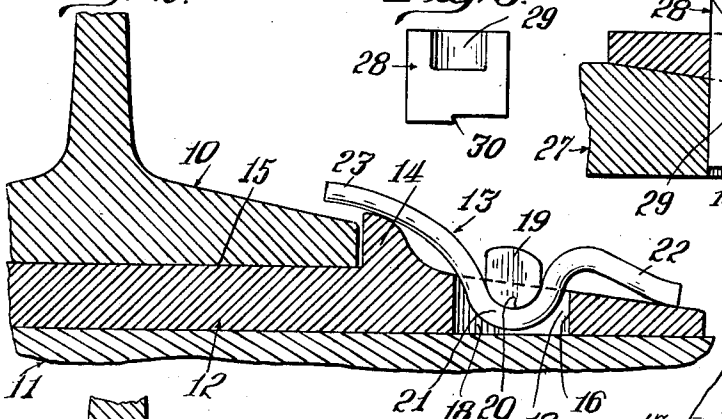


Fig. 6.

Fig. 5.

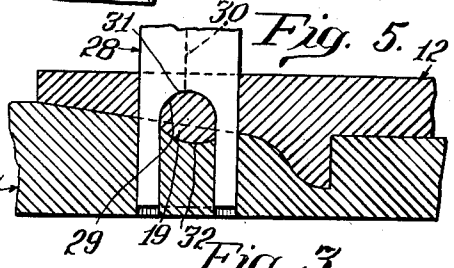


Fig. 3.

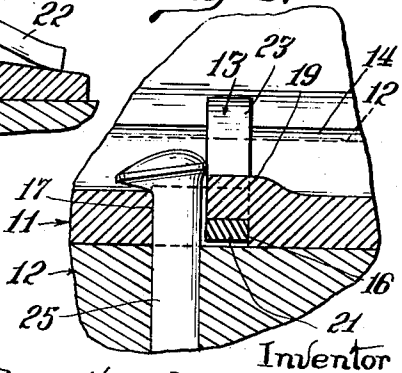
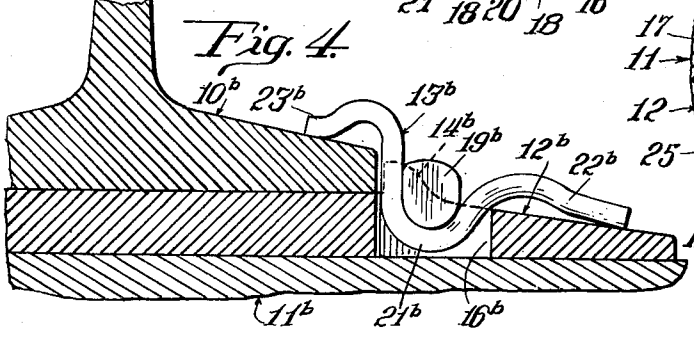


Fig. 4.



Inventor

Harold G. Warr

By Barnett & Truman

Attorneys

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TIE PLATE AND SPRING CLIP

Harold G. Warr, Park Ridge, Ill., assignor to Poor & Company, Chicago, Ill., a corporation of Delaware

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12 Claims. (Cl. 238—304)

This invention relates to a new and improved tie plate and rail clip assembly for maintaining a railroad rail in its proper position.

A principal object of the invention is to provide an improved combination structure of the above character in which the tie plate and clip elements are so formed as to simplify the manufacture and facilitate quick and convenient assembly of the parts and whereby the clip element is maintained under tension when it is in its applied position.

According to the present invention the tie plate is formed with one or more openings through the plate, preferably one at either side of the rail supporting seat, for receiving spring clip members. A wall of each opening is provided with a lug which projects into the said opening and thereby imparts a substantially U-shaped configuration thereto. Each spring clip comprises a metal strip bent intermediate its ends to form a downwardly bowed portion adapted to be inserted in the relatively wide portion of the U-shaped opening in the plate. The clip is then moved laterally in the opening to a position beneath the said lug. In order to position the clip beneath the said lug it is necessary to force the U-shaped portion of the clip downwardly in a manner to tension the clip. Inasmuch as the clip is free of relatively sharp bends the tension imparted thereto is distributed throughout its length. The clip is maintained in its applied position and the tie plate is secured to an underlying cross-tie by means of an ordinary track spike adapted to be driven through the opening in the plate and into the said cross-tie.

It is a specific object of this invention to provide a tie plate and rail clip assembly in which the constructions and operation of the assembly as a whole and the several parts thereof include the novel arrangements and constructions such as briefly described hereinabove and as disclosed more in detail in the specification which follows.

In the drawing:

Fig. 1 is a plan view of a tie plate and clip assembly constructed in accordance with this invention.

Fig. 2 is a fragmentary sectional view taken on line 2—2 of Fig. 1, and showing the parts of the assembly on a larger scale than Fig. 1.

Fig. 3 is a fragmentary sectional view taken on line 3—3 of Fig. 1, illustrating the manner in which the rail clip member is locked in its applied position beneath a projecting lug on the plate.

Fig. 4 is a view similar to Fig. 2 but illustrates a modified construction.

Fig. 5 is a fragmentary sectional view illustrating the punch and die used to form the clip receiving opening in the tie plate, and

Fig. 6 is an inverted plan view of the punch member showing its general U-shaped configuration and corresponding in shape to the opening as it appears from the top surface of the tie plate.

Referring first to the embodiment shown in Figs. 1, 2 and 3 of the drawing, 10 designates the base portion of a railroad rail, 11 an ordinary wooden cross-tie, 12 a tie plate interposed between the cross-tie and the base portion of the rail, and 13—13*a* designates the rail retaining clip members for retaining the rail in its proper position on the plate.

The tie plate 12, as herein illustrated, is formed with spaced ribs 14—14 which extend across the plate and function as lateral abutments for the base portion of the rail and also define rail seat portion 15 of the plate. Clip receiving openings 16—16*a* are formed in the plate at opposite sides of the rail seat and comprise in each case a relatively wide portion 17 and a pair of narrower slots 18—18 which extend laterally from one side thereof and define the opposite sides of a lug 19. The lower face of the lug is preferably rounded, as shown at 20, so as to correspond with a curvature in the clip member and the entire lug is pressed upwardly relative to the bottom of the tie plate to provide a space between the lug and the lower edge of the opening. Accordingly, when the clip opening is viewed from the top of the plate, it has a substantially U-shaped configuration, but when viewed from the bottom of the plate, the opening presents a substantially rectangular form provided on one of its side walls with a lug projecting into the opening.

The clip members 13—13*a* comprise, in each case, a strip of steel of uniform width and thickness bent intermediate its ends to provide a downwardly bowed portion 21 and oppositely extending spring arms 22 and 23. When the said clip is in its applied position, the downwardly bowed intermediate portion 21 fits beneath the rounded bottom surface of the lug 19, the resilient arm 22 bears upon the top surface of the tie plate and the arm 23 overlies the base flange of the rail. In this present embodiment, the said arm 23 of the clip bears resiliently on the rib 14 of the plate and provides suitable clearance between the lower surface of the clip and the top surface of the rail base flange, whereby the

rail is free to move vertically of the plate to the extent of said clearance. The amount of spring pressure exerted by the arm 23 on the rib 14, or on the rail base flange when the arm engages the flange, has a direct relation to the length of the arm. This resilient pressure, therefore, may be varied to suit the conditions required in different situations by forming the clip arm 23 of the appropriate length to provide the required resilient pressure. When it is desired to provide a clip arm 23 of greater spring pressure, the clip arm is made shorter than shown herein and the clip opening is formed in the plate at a location nearer the edge of the rail base so as to accommodate the said arm of shorter length. If a clip arm 23 of greater flexibility and less pressure is desired, the said arm may be formed somewhat longer than shown in the drawing and the clip opening is formed in the plate to accommodate the longer arm.

When applying the improved clip to its operative position, the downwardly bowed portion 21 is inserted in the wide portion 17 of the clip opening, as illustrated in the dotted line position of the clip 13a. The said clip is then moved laterally from the dotted line position to force the downwardly bowed portion 21 beneath the lug 19. The said bowed portion 21 is so formed relative to the bearing surfaces of the arms that it is necessary to flex the clip downwardly and thereby tension it before the bowed portion will clear the lower edge of the lug 19. This result may be readily accomplished in several ways. For example, a suitable pinch bar may be inserted between the clip and a wall of the clip opening whereby pressure can be applied to force the clip laterally beneath the lug 19. Likewise the tapered lower end of the track spike 25 may be wedged between the clip and one wall of the clip opening so that the driving of the spike to its applied position in the cross-tie, will force the clip downwardly and laterally beneath the said lug. It is also practicable to apply the clip by striking the top surface of the clip arms with a suitable implement at an angle to depress the arms relative to the plate and at the same time force the clip laterally beneath the said lug 19. The track spike 25 locks the clip in its applied position and also holds the plate firmly on the tie. Preferably, the spike is positioned in the corner portion of the clip opening so that the spike will have a wide surface contact with adjacent walls of the spike opening for resisting horizontal movements of the plate. In order to insure accurate positioning of the spike, one wall of the clip opening its recessed, as indicated at 26, to receive the shank portion of the spike.

In the modified embodiment of the invention shown in Fig. 4 of the drawing, the clip receiving opening 16b is of the same shape and size as the opening 16 shown in the previous embodiment, but is so positioned that the inner edge of the U-shaped opening coincides with the inner face of the rail abutment shoulder 14b on the tie plate. The clip member 13b of the modified embodiment is formed with a substantially vertically extending portion and an arm 23b which is somewhat shorter than the arm 23 of the previous embodiment and is arranged to exert resilient pressure on the top surface of the rail base. The downwardly bowed intermediate portion 21b is tensioned and moved to a position beneath the lug 19b in the same manner as indicated in the previous embodiment, and the arm designated 22b bears upon the top surface of the tie plate. The said clip 13b is applied to its operative position in the same manner as indicated in the previous embodiment and is locked in its applied position by means of a rail spike 25.

The U-shaped openings 16—16b and the associated lugs 19—19b of the tie plates are formed by a combined punching and pressing operation. These operations are, preferably, performed while the metal of the plate is relatively hot. However, the metal of the plate being of relatively soft steel, will permit the punching and pressing operations to be satisfactorily performed after the plate has cooled.

In forming the said openings in a tie plate, the plate is supported in an inverted position on a die member 27 and the openings are punched through the plate from the bottom thereof. The hole forming end of the punch 28, preferably conforms to the contour of the clip receiving opening, that is to say, one side of the punch is recessed, as indicated at 29, to provide a space for the unpunched lug portion 19 of the plate. The opposite face is formed with a wide flat ridge 30 to form the offset recess 26 for receiving the shank of the spike. If desired the said recess 29 may extend entirely through the punch. In that event the lug 19, in its initial form, will extend entirely across the clip opening; the end of the lug being subsequently cut away by a shearing or punching operation. The upper end of the recess 29 is curved, as indicated at 31. This surface of the punch is adapted to engage the bottom face of the lug 19 with sufficient pressure to offset the lug relative to the bottom face of the plate and to impart the desired curvature to the lug. In offsetting the lug and in displacing the metal thereof to form the lug with a curved surface, the lug is pressed into a recess or depression 32 formed in the upper face of the die member 27.

I claim:

1. A tie plate and rail clip assembly comprising a tie plate having a rail supporting seat, an opening through the plate at one side of the seat and formed with a lug which projects into the said opening from one wall of the opening and in spaced relation to the adjoining walls thereof and having its bottom surface located between the top and bottom planes of the tie plate; a resilient clip having an end portion for overlying the rail seat, an end portion for exerting resilient pressure on the tie plate, and a downwardly bowed intermediate portion adapted to be inserted in said opening adjacent the end of said lug and moved laterally therein to a position embracing the bottom and opposite sides of said lug.

2. A tie plate and rail clip assembly comprising a tie plate having a rail supporting seat, an opening through the plate at one side of the seat and formed with a lug which projects into the said opening from one wall of the opening and in spaced relation to the adjoining walls thereof and having its bottom surface located between the top and bottom planes of the tie plate; a resilient clip having an end portion overlying the rail seat, an end portion for exerting resilient pressure on the tie plate, and a downwardly bowed intermediate portion adapted to be inserted in said opening adjacent the end of said lug and moved laterally therein to a position embracing the bottom and opposite sides of said lug, the position of the downwardly bowed portion relative to the ends of the clip being normally such that it is necessary to tension the

clip to force the said bowed portion beneath the said lug.

3. A tie plate and rail clip assembly comprising a tie plate having a rail supporting seat, an opening through the plate at one side of the seat and formed with a lug which projects into the said opening from one wall of the opening and in spaced relation to the adjoining walls thereof and having its bottom surface located between the top and bottom planes of the tie plate; a resilient clip having an end portion for overlying the rail seat, an end portion for exerting resilient pressure on the tie plate, and a downwardly bowed intermediate portion adapted to be inserted in said opening adjacent the end of said lug and moved laterally therein to a position embracing the bottom and opposite sides of said lug; and means for locking the clip in its applied position.

4. A tie plate and rail clip assembly comprising a tie plate having a rail supporting seat, an opening through the plate at one side of the seat and formed with a lug pressed upwardly relative to the top of the plate and which projects lengthwise of the rail and extends into the said opening from one wall thereof with the bottom of the lug located intermediate the top and bottom surfaces of the plate; and a resilient clip having an end portion for overlying the rail seat, an end portion for exerting resilient pressure on the tie plate, and a downwardly bowed intermediate portion adapted to be inserted in said opening adjacent the end of said lug and moved laterally therein to a position beneath said lug.

5. A tie plate and rail clip assembly comprising a tie plate having a rail supporting seat, an opening through the plate at one side of the seat and formed with a lug projecting into the said opening from one wall thereof and in spaced relation to the adjoining walls and offset relative to the bottom face of the plate to position the bottom face of the lug between the top and bottom surfaces of the plate; and a resilient clip having an end portion for overlying the rail seat; an end portion for exerting resilient pressure on the tie plate and a downwardly bowed intermediate portion adapted to be inserted in said opening and moved laterally therein to a position beneath said lug, the position of the downwardly bowed portion relative to the ends of the clip being normally such that it is necessary to tension the clip to force said bowed portion beneath the said lug.

6. A tie plate and rail clip assembly comprising a tie plate having a rail supporting seat, an opening through the plate at one side of the seat and formed with a lug projecting lengthwise of the rail and extending into said opening from one wall thereof with the lower face of the lug positioned intermediate the top and bottom faces of the plate; a resilient clip comprising a metal strip bent intermediate its ends to provide an arm for overlying a portion of the rail seat, an arm for bearing on the top of the tie plate, and a downwardly bowed intermediate portion adapted to be inserted in said opening adjacent the end of the lug and moved laterally to a position beneath said lug; and means for holding the clip in its applied position comprising a track spike adapted to be driven through said opening and into an underlying cross-tie.

7. A tie plate and rail clip assembly comprising a tie plate having a rail supporting seat, an opening through the plate at one side of the seat and formed with a lug projecting into the said opening from one side thereof and having a curved lower face spaced upwardly from the bottom surface of the plate and below the top surface thereof; and a resilient clip having an end portion overlying the rail seat, an end portion for exerting resilient pressure on the tie plate, and a downwardly bowed intermediate portion adapted to be inserted in said opening adjacent the end of the lug and moved laterally therein to engage the rounded lower surface of said lug.

8. A tie plate and rail clip assembly comprising a tie plate having a rail supporting seat, an opening through the plate at one side of the seat and formed with a lug which projects into said opening from one wall thereof and in spaced relation to the adjoining walls and having its bottom surface located between the top and bottom planes of the tie plate; a resilient clip comprising a metal strip bent intermediate its ends to provide upwardly diverging arms adapted to bear on the tie plate and an open loop portion adapted to be inserted in said opening and flexed to a position beneath said lug with the said diverging arms positioned in the spaces at opposite sides of said lug and means comprising a rail spike adapted to be driven through said opening and into an underlying cross tie for maintaining the clip in its applied position and for clamping the plate to the cross tie; the said opening in the tie plate having a recess in one wall for receiving a side face of the rail spike.

9. A tie plate and rail clip assembly comprising a tie plate having a rail supporting seat, and having an opening through the plate at one side of the seat, which opening is substantially U-shaped and defines the sides and end faces of a lug spaced upwardly from the bottom planes of the tie plate extending horizontally between the legs of the said U-shaped opening; and a resilient clip bent intermediate its ends to provide a downwardly bowed portion adapted to be inserted in the wide portion of said opening adjacent the end face of the lug and moved laterally therein to position the upwardly diverging legs of the bowed portion on opposite sides of the lug of said plate, the said downwardly bowed portion of the clip being formed to stand above the lower face of the lug when the clip is in its initial position in the said wide portion of said U-shaped opening, whereby it is necessary to flex the clip downwardly relative to the lug preliminary to said lateral movement of the clip to its applied position.

10. A tie plate and rail clip assembly comprising a tie plate having a rail supporting seat and having a clip receiving opening formed in the plate at one side of the seat, which opening is substantially U-shaped, comprising a relatively wide portion and spaced laterally extending slots which define an intervening laterally extending lug which is offset upwardly relative to the bottom of the plate; a resilient clip bent intermediate its ends to provide a downwardly bowed portion adapted to be inserted in the wide portion of said opening and moved laterally therein to position the said downwardly bowed portion beneath the said lug, the said downwardly bowed portion of the clip being formed to stand above the lower face of the lug when the clip is in its initial position in the said wide portion of said U-shaped opening, whereby it is necessary to flex the clip downwardly relative to the lug preliminary to said lateral movement of the clip to

its applied position, and means for locking the clip in its applied position.

11. A tie plate and rail clip assembly comprising a tie plate having a rail supporting seat, clip receiving openings formed in the plate at opposite sides of the seat, each opening having a lug projecting laterally from one side of the opening and in spaced relation to the adjoining sides thereof, the latter of which is offset upwardly from the bottom face of the plate to position the lower face of the lug between the top and bottom surfaces of the plate; a resilient clip having an end portion overlying the rail seat, an end portion for exerting resilient pressure on the tie plate and a downwardly bowed intermediate portion to be inserted in said opening adjacent the end of the lug and moved laterally therein to engage the lower face of the lug; and means at the end of the lug for locking the clip in its applied position.

12. A tie plate and rail clip assembly comprising a tie plate having a rail supporting seat, an opening through the plate at one side of the seat and formed with a lug projecting into said opening from one side thereof in spaced relation to the adjoining sides of the opening and having its bottom surface located between the top and bottom planes of the tie plate; a resilient clip having an end portion overlying the rail seat, an end portion for exerting resilient pressure on the plate, and a downwardly bowed intermediate portion adapted to be inserted in said opening adjacent the end of the lug and moved laterally therein to engage the lower surface of said lug and into the spaces at opposite sides thereof; and means removably positioned in the opening at the end of the lug for locking the clip in its applied position.

HAROLD G. WARR.