April 11, 1939. J. G. DELFOX 2,154,151

RAIL SUPPORTING AND RETAINING MEANS

Filed July 6, 1937 2 Sheets-Sheet 1

Fig. 1.

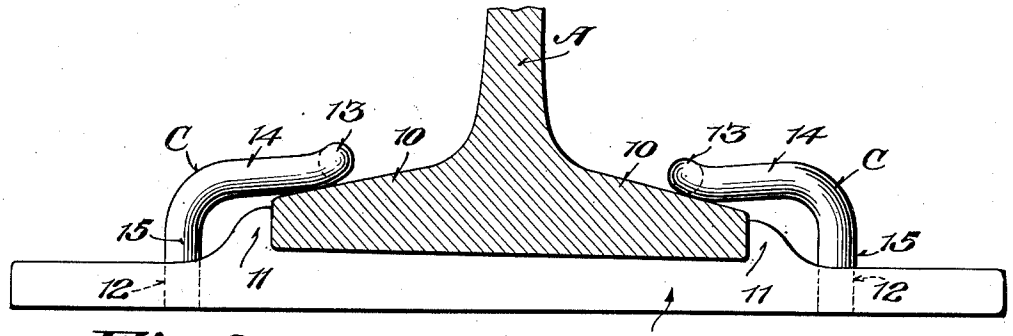


Fig. 2.

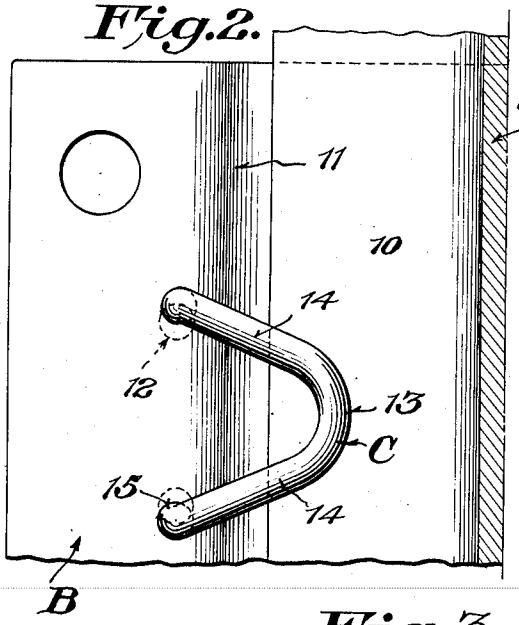


Fig. 4.

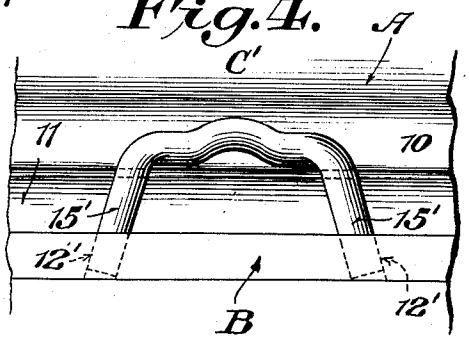
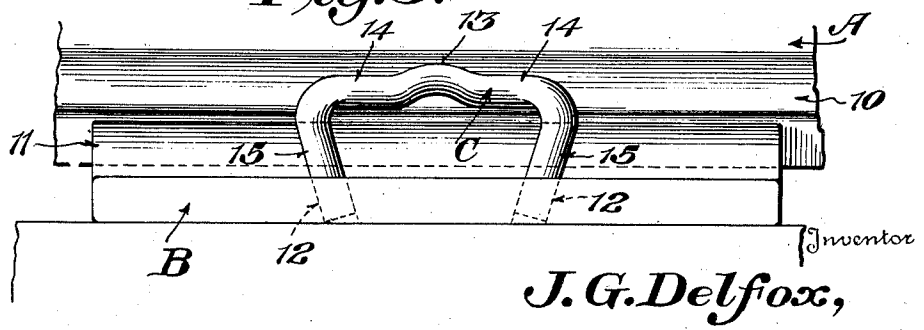


Fig. 3.



Inventor

J. G. Delfox,

By O. P. Holhaupter

Attorney

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Filed July 6, 1937 2 Sheets-Sheet 2

Fig. 5



Fig. 6.



Fig. 7.

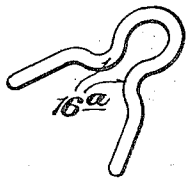


Fig. 8.

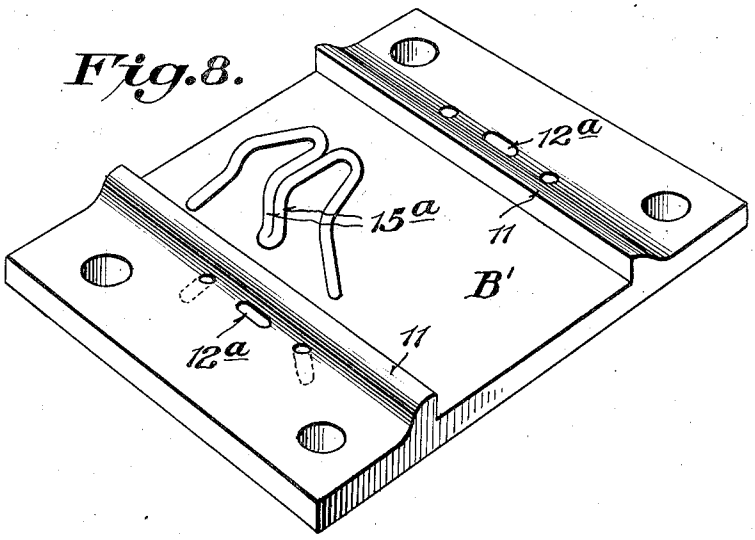
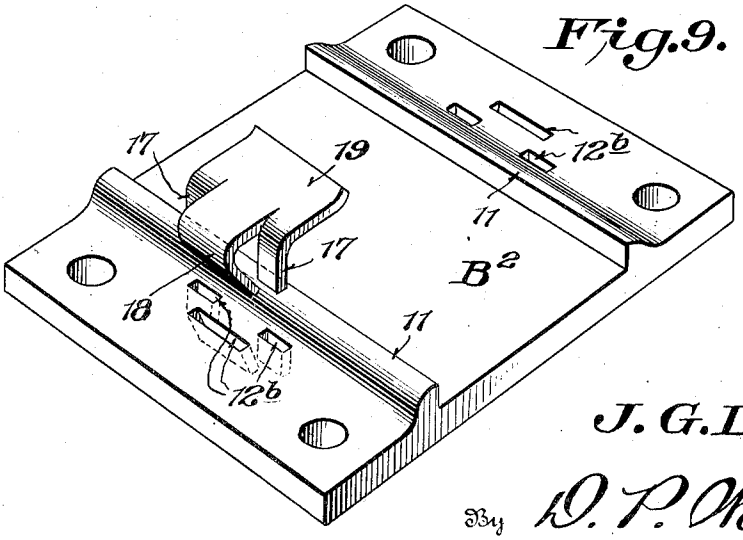


Fig. 9.



Inventor

J. G. Delfox,

By O. P. Volhaupter

Attorney

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UNITED STATES PATENT OFFICE

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RAIL SUPPORTING AND RETAINING MEANS

James G. Delfox, Flushing, N. Y., assignor to Poor & Company, New York, N. Y., a corporation of Delaware

Application July 6, 1937, Serial No. 152,223

11 Claims. (Cl. 238—349)

This invention relates to supporting and retaining means for railway rails, and has particular reference to improvements in tie plate and rail retaining clip combination.

Generally speaking, the object of the invention is to provide tie plate and rail retaining clip combinations which are cheap and easy to make and easy to install and which, at the same time, are highly efficient in service and practically indestructible.

More particularly, the invention has in view to provide tie plate and rail retaining clip combinations in which the rail retaining clips are, or may be, of one-piece construction and are capable of very economical production from standard rod or bar material by a simple bending operation, or operations, and in which the tie plates are, or may be, of standard construction except that they are provided with holes which may readily, easily and economically be punched or otherwise formed therein to accommodate retaining leg portions of the clips.

Further, the invention has in view to provide for connecting the rail retaining clips with the tie plates simply by striking the clips to drive their retaining leg portions into the holes formed in the tie plates, and to provide for securely interlocking the clips with the plates against the possibility of their accidental separation from said plates, simply by inclining the tie plate holes, and the retaining leg portions of the clips, relative to each other.

With the foregoing and other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in the novel tie plate and rail retaining clip combinations, and in the novel features of construction of the tie plates and the clips, as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the accompanying drawings, wherein like characters of reference denote corresponding parts in related views:

Figure 1 is a transverse section through a rail illustrating one practical embodiment of the present rail supporting tie plate and rail retaining clip combination.

Figure 2 is a plan view of the combination shown in Fig. 1.

Figure 3 is a side elevation of the combination shown in Fig. 1.

Figure 4 is a view similar to Fig. 3 illustrating an alternative embodiment of the invention.

Figures 5, 6 and 7 are perspective views illustrating different practical embodiments of rail retaining clips having the general characteristics of the clips shown in Figs. 1 to 4.

Figure 8 is a perspective view of a clip and a tie plate according to another alternative embodiment of the invention; and

Figure 9 is a view similar to Fig. 8 illustrating still another alternative embodiment of the invention.

Referring to the drawings in detail, first with particular reference to the practical embodiment of the invention illustrated in Figs. 1 to 3, A designates, generally, a railway rail and B designates, generally, a tie plate which is understood to be secured upon the top of a cross tie and which has the rail A seated thereon in accordance with well known practice, the rail including, as usual, base flanges 10, and the tie plate having rising therefrom, as usual, a pair of rail seat defining ribs 11 which cooperate with the edges of the base flanges 10 of the rail to hold the latter against lateral movement.

An important feature of the present invention is that the tie plate B may be of any standard or other design and that the punching or the otherwise forming therethrough or therein of holes is all that is required to adapt said plate for use with the present rail retaining clips. In this connection and as illustrated in Figs. 1 to 3, a pair of holes 12, 12 are formed through said plate B outwardly of each of the ribs 11 and the holes of each pair are spaced apart longitudinally of the tie plate and are disposed in downwardly converging relationship in a common vertical plane parallel to the rail 10. However, this disposition and relationship of said holes is not essential, but may be varied in many ways, as will hereinafter become apparent.

Two of the present rail retaining clips, each designated generally as C, are used with the tie plate B, one at each side of the rail A, and said clips are duplicates of each other, each being bent to shape from a single length of rod and comprising, according to the Figs. 1 to 3 embodiment of the invention, a substantially horizontally disposed, substantially V-shaped rail flange overlying portion 13 composed of a pair of outwardly diverging arms 14, 14 joined together at their inner ends, and a pair of legs 15, 15 extending downwardly in convergent relationship from, and as continuations of, the outer ends of said arms 14, 14, respectively.

Preferably, but not necessarily, the spaced apart and the convergent relationship of the legs 15, 15 of each clip is the same as the spaced apart

and the convergent relationship of the holes 12, 12 of each pair. Moreover, the holes 12 and the rod from which the clips are formed preferably, but not necessarily, are of circular cross section and the holes preferably are only slightly larger in diameter than the legs 15, 15 so as to more or less snugly accommodate the latter. Finally, the rod comprising the clips is either inherently resilient, or the clips are suitably tempered after being formed, so that the legs 15, 15 may be sprung apart and, when sprung apart, will tend to return to their normal positions.

From the foregoing it is apparent that in order to apply any given clip C to one of tie plates B, all that is required is to spread apart the legs 15, 15 of the clip until the free or lower ends of said legs are spaced apart corresponding to the spacing of the upper ends of a related pair of holes 12, 12, to then enter the free or lower ends of said legs in said holes, and then to release said legs and tap the clip downwardly until the rail flange overlying portion 13 thereof is brought into contact with, or in desired spaced relationship to the top of the related rail flange 10. Due to the tendency of the spread apart legs 15, 15 to spring inwardly when released, and due to the downward and inward convergence of said legs and the holes 12, 12, only a very light blow, or blows, is required to drive the clip downwardly to its operative position. In fact it may be possible in some instances to apply the clips simply by shoving them downwardly by hand after their legs have once been spread apart, entered in the holes 12, 12 and released. Conversely, it is practically impossible, due to binding of the legs 15, 15 against the walls defining the openings 12, 12, to remove an applied clip merely by exerting upward pressure upon the rail flange overlying portion 13 thereof. Therefore, the clip remains securely applied because the only clip loosening force exerted by the rail flange is upwardly against the portion 13 of the clip. On the other hand, the clip may readily and easily be removed by exerting a spreading force upon the legs 15, 15 simultaneously with exertion of an upward force upon the clip, and in this connection any suitable tool may be provided for exerting a spreading force upon the legs 15, 15 whenever removal of a clip may be desired. Further in this connection it is apparent that a removed clip is in no way harmed by its removal. Therefore, the clips are capable of repeated application and removal. Moreover, when any given clip is applied to a tie plate with its more or less resilient portion 13 overlying the flange of a rail seated on the tie plate, it is apparent that while the rail is held effectively on the tie plate, it is, at the same time, held yieldably so that there is no interference with passage through the rail of the natural wave motion to which it is subjected in service.

Figure 4 of the drawings illustrates a clip C' which differs from the clips C of the Figs. 1 to 3 embodiment of the invention only in the respect that its legs 15', 15' diverage downwardly relative to each other. This, of course, requires that the holes 12', 12' in the tie plate B' diverge downwardly. Otherwise, the tie plate and clip combination of Fig. 4 is structurally the same, and has the same mode of operation, as the tie plate and clip combination illustrated in Figs. 1 to 3.

Figure 4 not only illustrates that the legs of the present clips may diverge downwardly, but, considered in the light of the downwardly converging clip legs illustrated in Figs. 1 to 3, suggests that the clip legs and the pairs of holes in the tie plate may have various other inclined dispositions relative to each other. It is apparent, for example, that one of the clip legs and one of the tie plate holes may be vertically disposed and the other may be inclined, either inwardly or outwardly relative thereto; or, that both of the clip legs and both of the tie plate holes may be inclined in the same general direction, one at a greater inclination than the other; or, that, as viewed from the front of the clip the legs thereof may be disposed in parallelism and one may be inclined inwardly and the other outwardly. In fact, it is apparent that the clip legs and the tie plate holes may be disposed relative to each other in many different manners, so long as they have an inclined relationship to each other, to accomplish the purpose of the invention.

As has heretofore been stated, removal of an applied clip cannot be effected simply by exerting upward pressure upon its rail flange overlying portion, but requires simultaneous lateral pressure upon its legs, depending upon the direction of inclination of its legs. In this connection, and to facilitate the use of a suitable tool for exerting lateral pressure upon the legs, Fig. 5 of the drawings illustrates that the clip arms, preferably but not necessarily, at their junction with the clip legs, may be formed with tool accommodating eyes 16. On the other hand, Fig. 6 illustrates that in cases where it is necessary to press the clip legs outwardly relative to each other, the clip arms may be formed simply with outwardly bowed tool accommodating formations 16', and Fig. 7 illustrates that in cases where it is necessary to press the clip legs inwardly relative to each other, the clip arms may be formed simply with inwardly bowed tool accommodating formations 16^a.

In some cases it may be desirable to employ a clip having greater strength and holding power than the clips illustrated in Figs. 1 to 7 without increasing, or without materially increasing, the cross sectional area of the clip stock, and in such cases the clip may be of the three-leg, dual rail flange overlying formation type illustrated in Fig. 8. In other words, the clip illustrated in Fig. 8 is the equivalent of two of the clips illustrated in either of Figs. 1 to 7 disposed in side to side relationship with their adjacent legs 15^a, 15^a joined together at their lower ends and together forming the third leg of the clip intermediate the two outermost legs. A third hole 12^a is, of course, formed in the tie plate to accommodate the said third leg of the clip and, as is apparent, the three legs and the three tie plate holes may have any suitable inclined relationship.

According to each of the Figs. 1 to 8 embodiments of the invention the clip is formed from rod and bar stock of circular cross section. Manifestly, however, the stock used may have any other suitable or desired cross section. In fact, instead of forming the clips from rod or bar stock, they may be formed from sheet metal, as will be apparent from the form of the invention illustrated in Fig. 9. According to Fig. 9 the clip is formed from a rectangular blank of sheet metal slitted from one end to provide an outer pair of legs 17, 17 and an intermediate leg 18, and these legs are bent downwardly from the body 19 of the blank in suitable spaced and inclined relationship to each other to enter correspondingly spaced and inclined holes 12^b formed in the tie plate B^2, the said body portion 19 of the blank constituting the rail flange overlying portion of the clip as is manifest. In the specific example

of Fig. 9, the leg 18 is disposed outwardly of the legs 17, 17 and is inclined downwardly and inwardly relative to the legs 17.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claims.

I claim:

1. In combination, a tie plate having a rail seat and a pair of spaced holes at the side of said seat inclined relative to each other, and a clip including a rail flange overlying portion and a pair of legs having the same general spacing and inclination as the tie plate holes for insertion into said holes to secure the clip to the tie plate, said holes being straight and of uniform cross sectional size and shape throughout their lengths, the portions of said legs which are insertable into said holes being straight and of uniform cross sectional size and shape throughout their lengths, and the rail flange overlying portion being resilient to permit said legs to be sprung relative to each other for insertion into and removal from said holes.

2. In combination, a tie plate having a rail seat and a pair of spaced holes at the side of said seat inclined relative to each other, a clip including a rail flange overlying portion and a pair of legs having the same general spacing and inclination normally as said tie plate holes for insertion into said holes to secure the clip to the tie plate, and means whereby said legs may be sprung relative to each other to facilitate their insertion into and removal from said holes and whereby they tend constantly to assume their normal spaced and inclined relationship, said holes and the portions of said legs which are insertable therein being straight and of uniform cross sectional size and shape throughout their lengths.

3. In combination, a tie plate having a rail seat and holes at the side of said seat inclined relative to each other, a clip having a rail flange overlying portion and resiliently connected legs for engagement in said holes, and means whereby said clip is secured to the tie plate against removal therefrom by pressure exerted upwardly against the clip, solely by cooperation of the sides of said legs with the sides of the walls defining said holes along their respective lengths.

4. In combination, a tie plate having a rail seat and a pair of spaced holes at the side of said seat inclined relative to each other, and a clip formed from a single length of spring material and comprising a substantially V-shaped rail flange overlying portion including a pair of arms and legs depending from said arms for insertion into said tie plate holes to secure the clip to the tie plate, said holes being straight and the portions of said legs which are insertable into said holes being straight throughout their lengths and of such cross section and inclination as to frictionally engage along their lengths with the sides of the walls defining the tie plate holes along the lengths of said walls when said legs are operatively disposed in said holes.

5. In combination, a tie plate having a rail seat and a pair of spaced holes at the side of said seat inclined relative to each other, a rail clip formed from a single length of material and comprising a rail flange overlying portion including a pair of resiliently connected arms and a pair of legs depending from said arms and having the same general spacing and inclination normally as said holes for insertion into the latter to secure the clip to the tie plate, and formations in said arms to facilitate the engagement therewith of a tool for relatively moving the said legs to facilitate their insertion into and removal from said openings.

6. In combination, a tie plate having a rail seat and a plurality of spaced holes at the side of said seat inclined relative to each other, and a clip including a rail flange overlying portion and a pair of outer legs and an intermediate leg depending from said rail flange overlying portion for insertion into said holes to secure the clip to the tie plate, said legs having the same general spacing and inclination as said holes and said rail flange overlying portion being resilient and resiliently connecting said legs to permit the latter to be sprung for insertion into said holes.

7. The combination as set forth in claim 1 in which the clip is formed from sheet metal.

8. The combination as set forth in claim 6 in which the clip is formed from sheet metal.

9. In combination, a tie plate having a rail seat and a pair of spaced holes at the side of said seat inclined relative to each other, and a clip including a resilient rail flange overlying portion and a pair of legs resiliently connected by said rail flange overlying portion so as to be sprung relative to each other for insertion into said holes to secure the clip to the tie plate, said holes and the portions of said legs which are insertable therein being straight and of uniform cross sectional size and shape throughout their lengths.

10. In combination, a tie plate having a rail seat and a pair of spaced holes at the side of said seat inclined relative to each other, a clip including a rail flange overlying portion and a pair of legs to secure the clip to the tie plate, and means whereby said legs may be sprung relative to each other to facilitate their insertion into and removal from said holes and whereby they tend constantly to assume their normal spaced inclined relationship, said holes and the portions of said legs which are insertable therein being straight and of the same cross sectional size and shape throughout their respective lengths.

11. In combination, a tie plate having a rail seat and a pair of spaced holes at the side of said seat inclined relative to each other, and a clip formed from a single length of resilient material and comprising a substantially V-shaped rail flange overlying portion including a pair of arms and legs depending from said arms for insertion into said tie plate holes to secure the clip to the tie plate, said holes and the portions of said legs which are insertable therein being straight and of uniform cross sectional size and shape throughout their lengths and of such cross sectional size, shape and inclination as to frictionally engage along their lengths with the sides of the walls defining the tie plate holes along the lengths of said walls when said legs are operatively disposed in said holes.

JAMES G. DELFOX.