

Nov. 9, 1937.

N. F. FONER

2,098,935

TIE PLATE ASSEMBLY

Filed June 18, 1936

2 Sheets-Sheet 1

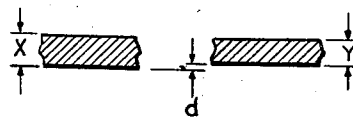
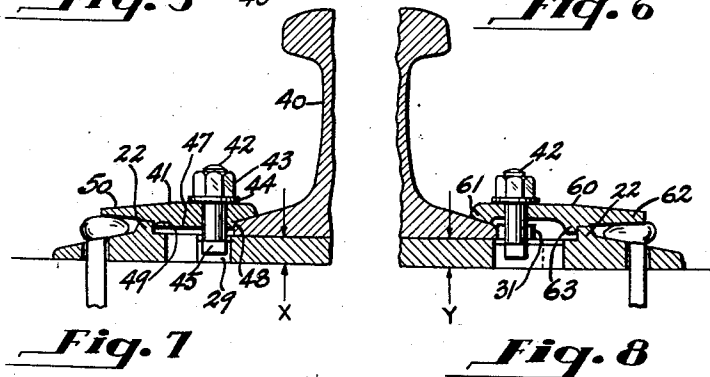
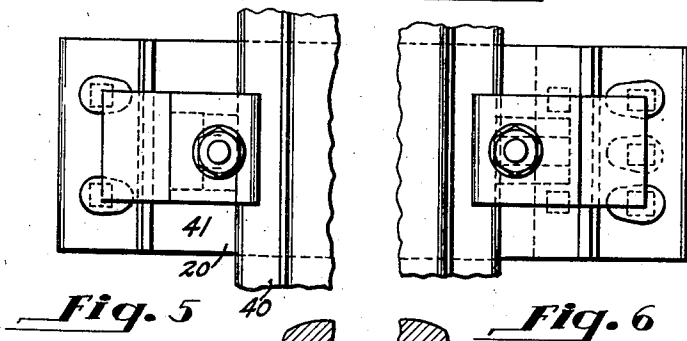
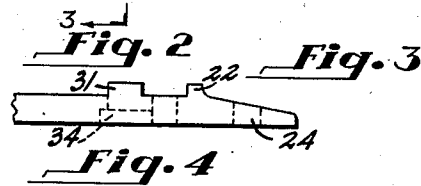
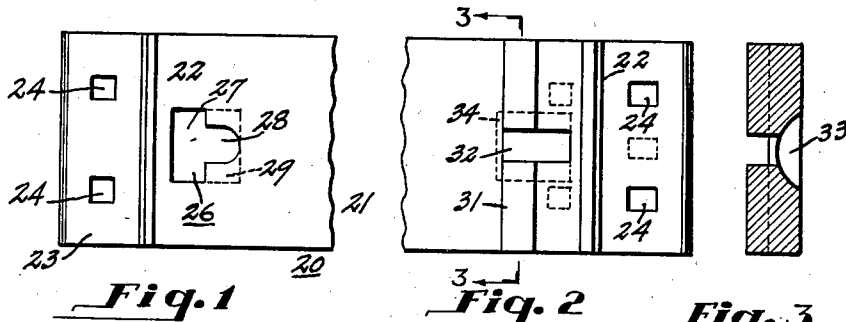


Fig. 9

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TIE PLATE ASSEMBLY

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2 Sheets-Sheet 2

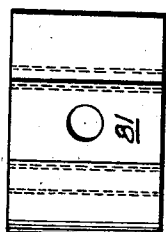


Fig. 14

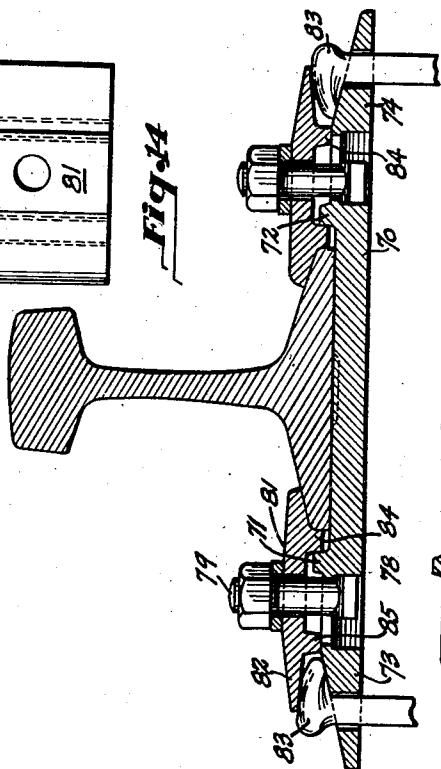


Fig. 10



Fig. 11

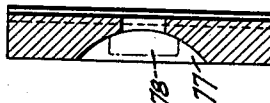


Fig. 13

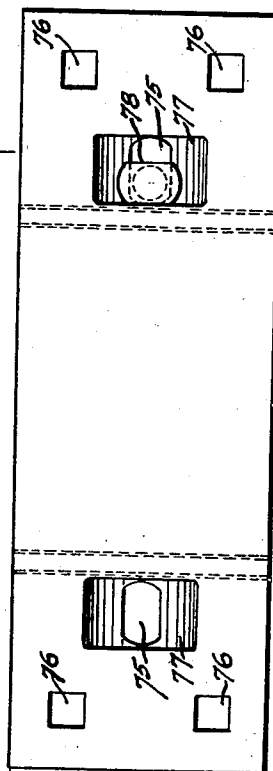


Fig. 12

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UNITED STATES PATENT OFFICE

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TIE-PLATE ASSEMBLY

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Application June 18, 1936, Serial No. 85,935

9 Claims. (Cl. 238—338)

This invention relates to railway track equipment, and is directed particularly to tie-plate assemblies for supporting and positioning the rails.

5 One object of my invention is to provide a tie-plate assembly of such construction that the rails shall be positively held in position by anchored shearing elements that shall also serve to hold the spikes or lag screws against displacement, which normally are used to secure the tie-plate on a tie.

10 A further object of my invention is to provide tie-plate assemblies including the base plate for supporting the rail, and the shearing elements to cooperate between the rail and the tie-plate, in such manner as to restrain the rail against transverse movement relative to the tie-plate.

15 A further object of my invention is to provide tie-plates and shearing elements of such shape and construction that the plate and the shearing elements may be formed from rolled sections.

20 A further object of my invention is to provide an assembly in which the tie-plate may be employed for use with rails of various weights, while only the shearing element of slightly different dimensions need be used to provide the proper cooperative relation between the tie-plate and the particular rail that may be supported thereby.

25 A further object of my invention is to provide a tie-plate assembly for anchoring a rail, in which assembly the shearing element may be adjustably positioned to compensate for any discrepancies in the rail dimensions introduced during the operation of rolling the rail.

30 Still another object of the invention is to provide an assembly in which the base plate itself shall absorb the sidekick or thrust of the rail.

35 In the accompanying drawings, I have illustrated several modified forms of tie-plate assemblies embodying the principles of my invention, and have illustrated the application of the tie-plates to wooden ties of the usual type. As shown in the drawings,

40 Figure 1 is a plan view of one end of a tie-plate of one form;

Figure 2 is a plan view of one end of a second tie-plate of a different construction;

45 Figure 3 is a transverse sectional view of the tie-plate in Figure 2 taken along the line 3—3;

50 Figure 4 is a side elevational view of one end of the tie-plate shown in Figure 2;

55 Figure 5 is a plan view of the one end of the tie-plate such as shown in Figure 1, with a portion of a rail and a shearing element in place

to hold the rail in position and also to hold the anchoring spikes against displacement.

Figure 6 is a similar plan view of a portion of a tie-plate such as shown in Figure 2, with its shearing element in position between the rail and the tie-plate;

Figure 7 is a vertical sectional view of an assembly, showing half of the tie plate and of the rail, with a shearing element on one side of the rail between the rail and the tie-plate, involving the tie-plate of the construction shown in Figure 1.

Figure 8 is a vertical sectional view of a tie-plate assembly showing half of the rail and half of the tie-plate, utilizing the tie-plate of modified form shown in Figures 2, 3, and 4, with a shearing element also of modified form.

Figure 9 illustrates the relatively smaller thickness of the base of the tie-plate that may be utilized for a tie-plate of the construction shown in Figure 8, compared to the thickness proper for the construction shown in Figure 7.

Figure 10 is a transverse sectional view of a rail and tie-plate assembly in which a modified form of tie-plate and a modified form of shearing element are employed.

Figure 11 is a vertical sectional view of a portion of a tie-plate such as shown in Figure 10, in which the outer end is formed to embody a portion below the normal base line of the plate to provide an additional gripping edge against the wooden tie on which the plate is to be secured.

Figure 12 is a bottom view of the tie-plate shown in Figure 10.

Figure 13 is a transverse sectional view of the plate shown in Figure 12, taken along the lines 13—13; and

Figure 14 is a plan view of a shearing element of modified form used in the assembly shown in Figure 10.

40 In Figure 1, one-half of a tie-plate 20 of one form is shown. The tie-plate 20 consists of a central base portion 21 for receiving a rail, and, on each side of its transverse center line, is symmetrically formed to embody a rib 22 extending the full width of the plate, and a tapered anchoring portion 23 provided with two openings 24 for receiving the anchoring spikes that are to secure the tie-plate to a wooden tie. The body of the tie-plate is also provided with a bolt 50 receiving hole 26 on each side of its center line adjacent the rib 22. The hole 26 is provided with one substantially rectangular portion 27 of the hole which extends entirely through the body of the tie-plate, and the hole is further pro- 55

vided with a short side slot 28 to accommodate the shank of a bolt for holding a shearing element in place, as will be explained later. The under surface of the plate is suitably recessed, as indicated by the space within the dotted rectangle 29, to receive the head of the bolt that is to be used in holding the shearing element in place.

The other end of the plate of the type shown in Figure 1 is correspondingly formed and shaped symmetrically about the center line of the tie-plate.

In Figure 2, I have illustrated the right half of a tie-plate of modified form which is similar to that in Figure 1, except that it is also provided with a transverse rib 31 between the transverse center line of the tie-plate and the rib 22 corresponding to that shown in Figure 1. The plate of Figure 2 is perforated with a single rectangular opening 32 disposed longitudinally on the longitudinal center line of the plate. The under surface of the plate in Figure 2 is milled out to provide a narrow circular channel or recess 33 as indicated in Figure 3 in an area substantially as outlined within the space enclosed by the dotted square 34 in Figure 2.

As shown in Figures 5 and 7, the rail 40 is held in central position on the tie-plate 20 by a shearing element 41 which is held against casual displacement by a bolt 42 tightened in position by a nut 43 and a lock washer 44. The bolt 42 is of T-shape and its head 45 is of such size as to permit it to be inserted into the rectangular opening 26 in the base and then shifted laterally to place the shank of the bolt in the opening 28 with the head 45 in the milled recess 29.

The shearing element 41 consists of a body portion 47 that is adapted to be positioned in the space between the edge of the rail base 48 and the side surface of the rib 22 in such manner as to provide a relatively tight fit between the rail and the rib. The portion of the shearing element adjacent the rail base is formed to have a contour on its under surface corresponding substantially to the contour of the rail base, so that a relatively close fit may be established between the rail base and the shearing element. The other end of the shearing element is provided with a slightly tapering surface 49 where it engages the rib 22 and the body of the shearing element is further provided with an extension or tail piece 50 which extends over and beyond the rib 22 to a position where it extends over the heads of the spikes that hold the tie-plate in position on the tie.

In Figures 6 and 8, the modified assembly is shown, including the base plate illustrated in Figures 2, 3, and 4. In that assembly the bolt is also of T-shape, and, after the head of the bolt is inserted into the opening 32 in the plate, the bolt is rotated into position where the head of the bolt will be located under the rib 31. In this construction, the rail base rests directly against the rib 31, which serves as the shearing element to restrain the rail against side motion. An auxiliary shearing element 60 is held in position by the bolt to provide an additional downward and side reaction pressure against the base of the rail, and also to provide the portion for holding the spikes against further displacement. The auxiliary shearing element 60, as illustrated, consists of the body portion, one end 61 of which rests against the rail base, and the other end 62 of which serves as the tail piece to rest against the heads of the spikes. A rib 63 on the under

surface is provided to rest against the transverse rib 22 on the tie-plate.

Where the tie-plate is made of the form shown in Figure 1 and correspondingly perforated, the plate thickness must be greater than the thickness of the plate provided with the shearing rib 31 of the type and construction shown in Figure 2. Where the additional shearing rib 31 is employed to engage the rail base directly, the remainder of the tie-plate body portion need not be as thick as is necessary in the construction such as shown in Figure 1. As indicated in Figure 9, the thickness of the plate of Figure 2 may be less than the thickness of the plate in Figure 1, by the small difference d , which will mean a saving in the amount of metal required for each tie-plate of the type shown in Figure 2.

In Figure 10, I have shown still another form of tie-plate assembly, in which a tie-plate 70 is provided with two continuous transverse ribs 71 and 72 equally spaced from the transverse center line of the tie-plate 70. The tie-plate further embodies two end wings 73 and 74 beyond the ribs 71 and 72. Each end wing of the tie-plate is provided with a bolt hole 75 and two spike holes 76. The under surface of the plate 70 adjacent each bolt hole 75 is milled out to provide a curved channel or recess 77 to receive and accommodate the head 78 of a bolt 79 that is to be used to hold a shearing wedge plate 81 in position between the rail and each of the transverse ribs 71 and 72.

The shearing wedge plate 81 has its main body portion extending from the top surface of the rail base to a position above the spike holes 76, so that the tail piece 82 of the wedge plate would be above the spikes that are used to hold the tie-plate in position on the tie, thereby to prevent the spikes from being displaced. The under surface of the wedge plate is provided with two ribs 84 and 85. The rib 84 cooperates with the front end of the plate where it engages the base of the rail and is so shaped as to conform substantially to the shape of the base of the rail, in order to provide a relatively close fit within the degree permitted by the degree of accuracy of the rolling processes that are used in manufacturing rails and the parts of the tie-plate assembly. The inner surfaces of the ribs 84 of the wedge plates are slightly tapered, both to permit easier rolling operation of the wedge plate, and to permit easy adjustment and close fit in the tie-plate assembly. The taper on the inner surface of the depending rib 84 of the wedge plate corresponds substantially to a similar taper on the inner surface of the ribs 71 and 72 on the tie-plate, thus permitting the wedge ribs 84 to adjust themselves easily and readily to fit closely in the space provided between the tie-plate ribs 71 and 72 and the side edges of the rail base, to compensate for any discrepancies introduced by the operation of rolling the rails.

Each wedge plate 81 is also provided, as already mentioned, with the additional rib 85, which serves as a supporting rib to maintain the wedge plate in proper, relatively horizontal, position. The second rib 85 also serves as a pivot, so that if the rail has any tendency to tilt, the rail will tend to raise the shearing plate around the bolt as a center, and will press the rib 85 down against the plate and against the spikes 83. Conversely, if the spikes should tend to raise for any reason, they will press upward against the wing 82 of the shearing plate, and will tend to press the front

end of the shearing plate down against the base of the rail.

In the process of manufacture, the relatively long section of metal will be rolled having a transverse contour corresponding to that of the tie-plate 70. The tie-plates will then be sheared from such long section, according to the width of plate desired. As the lengthy section is periodically advanced and stopped for the shearing operation, the under surface of the plates will be milled. As the plate is sheared, the spike holes 76 and the bolt hole 75 may be simultaneously formed, so that the entire plate is finished easily, quickly, and economically.

The tie-plate will be made of one size, as a standard plate for rails of various weights, such as, for example, 100 pound, 130 pound, or 150 pound rails. Only the shearing wedge plate need be changed to adapt the assembly to the rails of the various weights. Thus, as traffic conditions require a change to a heavier rail, the shearing wedge plates may be removed, the heavier rail substituted for the lighter rail, and new shearing wedge plates substituted to fit the new, heavier rail.

With the tie-plate assembly that is illustrated in Figure 10, the side thrust of the rail is taken directly by the rib on the rail plate, through the depending wedge rib 84 of the shearing plate. By reason of the tapered form of the wedge rib 84 and the similarly tapered form of the shearing strip rib 71 or 72 on the tie-plate, the shearing plate will readily adapt itself to take up for any variations in the rail base dimensions, and will provide a tight, solid, fit between the rail and the ribs of the tie-plate.

It will be observed that both the tie-plate and the shearing plates are substantially channel members with side wings, that are relatively easy to roll.

The shearing wedge plates will be made from a long, rolled strip, and sheared to the desired width, which usually will be such as to provide enough metal to cover a portion of each spike head, so that the spikes will be held against displacement.

It will be observed that the end wing of the tie-plate and the tail piece of the shearing wedge plate are formed with suitable tapers to provide an angular space sufficient to accommodate the spike head when it is properly positioned.

An advantage of this construction in which the same tie-plate of standard size may be used for various weights, is that the ties may be provided with spike holes properly spaced to exact dimensions, so that the tie holes may also be protected when the tie is treated with creosote.

In a further modification of the tie-plate as shown in Figure 11, the end edge portions of the tie-plates may be formed to embody an anchoring strip portion 90, depending a short distance z below the normal base line of the plate. With such construction, when the plate is fastened to the tie, the anchoring strip 90 will be pressed into the body of the tie, and a greater thrust resisting area will be provided between the tie and the tie-plate, when any side thrust is induced in the rail by a vehicle passing over it.

In each of the modifications shown, the bolt is held against rotation while the nut is being applied or removed. In the modification shown in Figure 5, the side surface of the bolt head is held against the side wall of the milled portion 29 by the shearing plate 41. Thus so long as the plate 41 is in position, the bolt cannot move side-

ways in a manner that would permit the bolt head to rotate while the nut is applied to or removed from the bolt. The bolt in Figure 8 is similarly held against sidewise displacement when the shearing plate 60 is in position. In that assembly in Figure 8, the rib 22 serves to hold the plate against sidewise movement, which would permit the plate 60 and the bolt 42 to shift sidewise away from the rail.

The rib 71 on the tie-plate 70 and the rib 84 on the wedge plate 81 are made of such dimensions that the lower surface of the rib 84 will not touch and will be above the top surface of the tie-plate 70 when the rib 84 occupies its lowermost position, as controlled by the front portion of the plate resting upon the base of the associated rail.

My invention is not limited to any of the details of construction that are illustrated, since they may be variously modified without departing from the spirit and scope of the invention, as set forth in the various objects recited in the specification and as defined in the claims.

I claim as my invention:

1. A rail fastening comprising a plate to be secured to a tie and to serve as a rest for a rail, the plate having its longitudinal contour substantially uniform and transversely continuous in the direction of rail length from the rolling of a section from which the plate is sheared during manufacture, a pair of spaced holes in the plate shaped to permit the insertion of a bolt head into each hole from the top of the plate, the under surface of the plate adjacent the hole being recessed and spaced from the bottom plane of the plate to provide space to receive the head of the bolt after it is so inserted, with the body of the plate serving as a side-wall closure at one side of the recess to provide a side-stop for the bolt head, a shearing strip on top of the plate adjacent each recess and extending transversely of the plate, a bolt with a head to fit into the hole and into the recessed space under the plate against the side wall, and a clamping plate to be held in position by the bolt and serving in turn to hold the bolt head in the recessed space to prevent shifting of the bolt from the recess, the clamping plate overlying the rail base and embodying a shearing strip to engage the edge of said rail base and extending therefrom to said shearing strip on the plate.

2. A tie-plate assembly for a rail, comprising a base plate having a substantially uniform contour in the direction of rail length and provided with two spaced ribs transversely disposed on the plate and raised from the upper surface of the plate, the space between the ribs being sufficient to receive the base of a rail, and the plate body having a hole therethrough adjacent the outer side of each rib shaped to receive a bolt head when inserted from the top of the plate, the lower surface of the plate, adjacent each hole, being recessed and formed to embody a shoulder against which the bolt head may be placed, after the bolt head is inserted into the hole, to hold the bolt against rotation during tightening of a nut on the bolt; and a rail clamp to co-operate with the base plate, said clamp having a body section provided with a depending shearing element to fit between the rail base and one of the vertical ribs on the plate body, and also provided with a second depending element to rest upon the tie-plate body and to serve as a freely movable pivot element for the first-mentioned depending shearing element, the body of the clamp

having a centrally disposed hole; and a bolt with a head to be inserted into the hole and moved into holding position in the tie-plate and to have its shank extending up through the hole in the clamp to receive a locking nut to hold the clamp locked in position on the tie-plate.

3. A tie-plate assembly for a rail comprising a tie-plate having a substantially uniform contour in the direction of rail length, and embodying two vertical ribs transversely disposed on the plate equidistant from the transverse center line of the plate, and spaced sufficiently to accommodate the base of a rail, the plate being perforated adjacent the outer side of each rib, and the under surface of the plate being recessed to provide an arcuate bearing surface to accommodate a bolt head, the under surface of the plate embodying a shoulder serving as a side wall for the recess to position and brace a side surface of the bolt head to prevent undesired rotation of the bolt during tightening operation; a rail clamp which abuts the top surface of the rail base and has a depending rib to be disposed in a space between one of the vertical ribs and the adjacent edge of the rail, the clamp being provided with a centrally disposed hole therethrough to receive the shank of a holding bolt; and a bolt having a head to extend through the opening in the plate body, said bolt being then movable into holding position, the lower surface of the head being arcuate in shape to accommodate itself against the arcuate recess on the under surface of the plate body, to permit the clamping plate and the bolt to adjust their respective positions on the base plate upon the occurrence of expansion and contraction of the rail, with consequent relative movement between the rail and the plate; and a locking nut for the shank on the bolt.

4. A rail fastening comprising a plate to be secured to a tie and to serve as a rest for a rail, the plate having its longitudinal contour substantially uniform and transversely continuous in the direction of rail length, a pair of spaced holes in the plate shaped to permit the insertion of a bolt head into each hole from the top of the plate, the under surface of the plate adjacent the hole being recessed and spaced from the bottom plane of the plate to provide space to receive the head of the bolt after it is so inserted, with the body of the plate serving as a side-wall closure at one side of the recess to provide a side-stop for the bolt head, the under surface of the plate at the recess being shaped to provide an arcuate bearing surface to accommodate the bolt head, a shearing strip on top of the plate adjacent each recess and extending transversely of the plate, a bolt with a head to fit into the hole and into the recessed space under the plate against the side wall, the under surface of the bolt head being arcuate in shape to rest against the arcuate under surface of the plate at the recess, and a clamping plate to be held in position by the bolt and serving in turn to hold the bolt head in the recessed space to prevent shifting of the bolt

from the recess, the clamping plate overlying the rail base and embodying a shearing strip to engage the edge of said rail base and extending therefrom to said shearing strip on the plate.

5. A tie-plate assembly for a rail comprising a tie-plate having a substantially uniform contour in the direction of rail length to be susceptible of manufacture by rolling process, the tie-plate having two vertical ribs transversely disposed on the plate and substantially equidistantly spaced from the transverse center line of the plate, and spaced sufficiently to accommodate the base of a rail, the plate being also perforated adjacent each rib, and the under surface of the plate being recessed adjacent the perforation to accommodate a bolt head, the recess being shaped to permit the non-recessed portion of the plate to serve as a side wall for the recess, in co-operation with a clamp to position and brace a side surface of a bolt head to prevent undesired rotation of the bolt during tightening operation; a rail clamp having a substantially uniform contour in the direction of rail length to be susceptible of manufacture by rolling process, said clamp having a depending rib to be disposed in the space between one of the vertical ribs and the adjacent edge of the rail, the clamp being provided with a centrally disposed hole therethrough to receive the shank of a holding bolt; and a bolt having a head shaped to extend through the perforation in the plate body adjacent the rib, the bolt head being then movable into the recess adjacent the perforation to be anchored against direct withdrawal from the plate, the shank of the bolt extending upwardly through the hole in the rail clamp, and a locking nut for the threaded end of the shank of the bolt.

6. A tie-plate assembly as in claim 5, in which the under surface of the bolt head and the under surface of the plate at the recess are, respectively, of arcuate shape to permit relative adjustment of the clamp on the plate in response to expansion and contraction of the rail.

7. A tie-plate assembly as in claim 5, in which the plate is provided with holes for spikes to secure the plate to a wooden tie, the rail clamp embodying one edge portion to engage the rail base and an opposite edge portion to extend over and substantially rest upon the heads of spikes when in position, whereby the clamp will function as a beam about the bolt as a fulcrum to transmit pressure moments in either direction between the rail and the spikes, thereby to prevent or limit rising motion of the spike from its tie.

8. A tie-plate assembly as in claim 5, in which the plate section beyond each transverse rib is greater than the section of the central part of the plate upon which the rail rests.

9. A tie-plate assembly as in claim 5, in which the top surface of the plate beyond each transverse rib is higher than the top surface of the plate between the two ribs.

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