June 13, 1939. G. T. WILLARD 2,162,365

RAILWAY TIE PLATE AND CLIP

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Fig. 1.

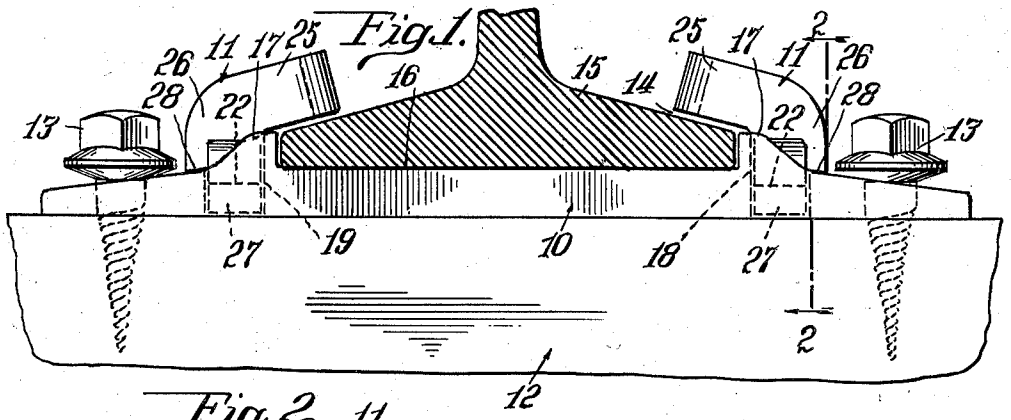


Fig. 2.

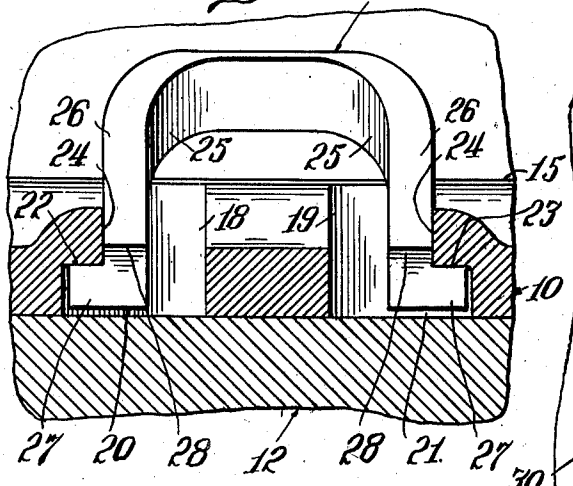


Fig. 4.

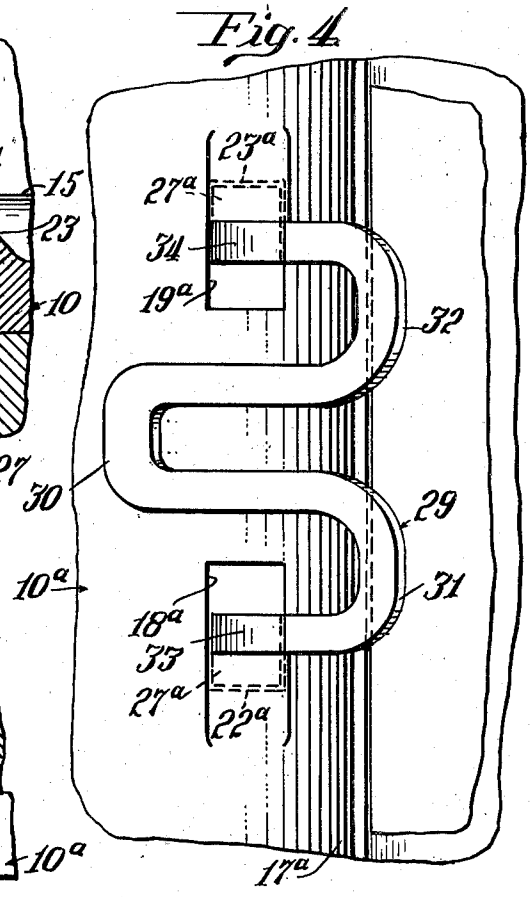
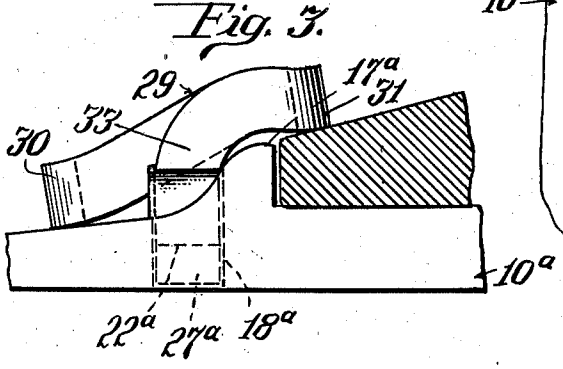


Fig. 3.



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Fig. 5.

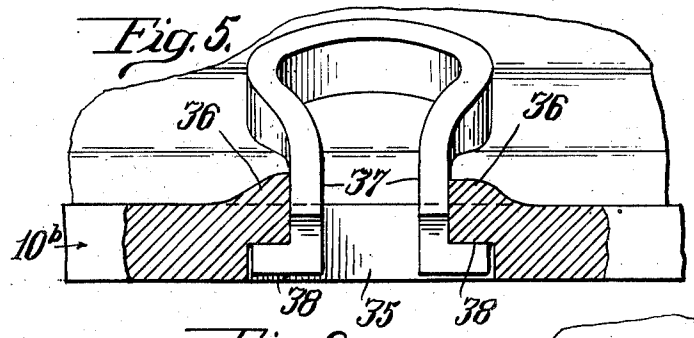


Fig. 7.

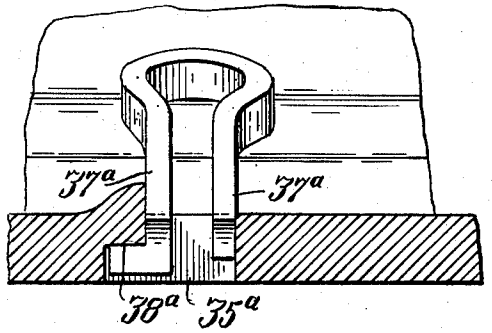


Fig. 6.

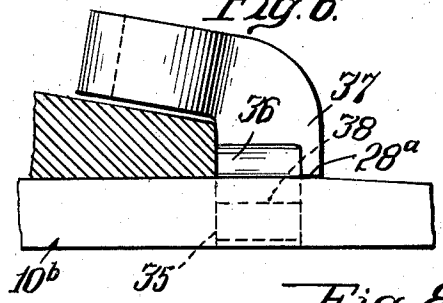


Fig. 8.

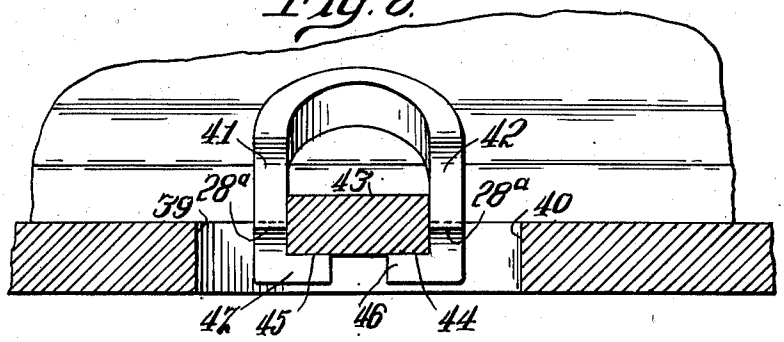
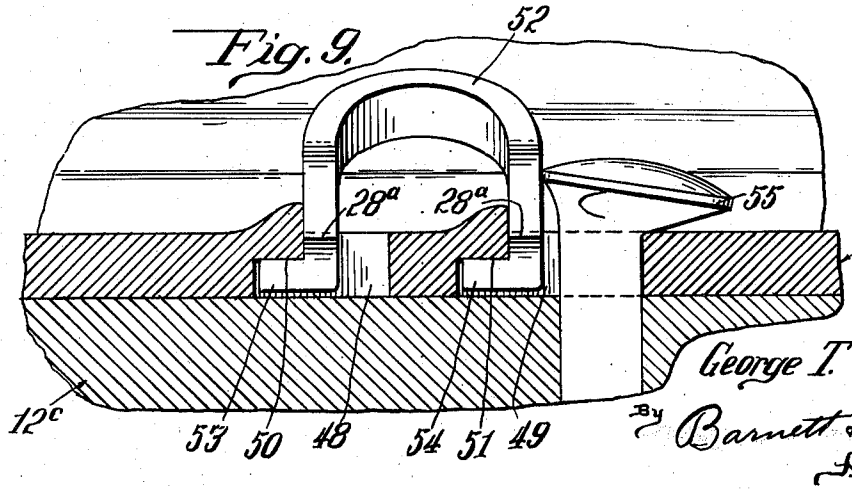


Fig. 9.



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2,162,365

RAILWAY TIE PLATE AND CLIP

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Application November 4, 1937, Serial No. 172,769

16 Claims. (Cl. 238—349)

This invention relates to certain new and useful improvements in a railway tie plate and clip structure for maintaining a railroad rail in its proper position.

A principal object of the invention is to provide a tie plate of simplified construction and one or more clip members adapted to interlock with the plate and overlie the marginal portion of a rail base flange for a substantial distance lengthwise of the rail. Specifically, the invention provides a resilient clip which can be readily applied to and removed from the plate and which is so formed that it is necessary to flex the clip lengthwise of the rail to engage with openings in the plate.

According to the invention, the tie plate member is formed with one or more openings in which resilient leg portions of the clip are inserted and then permitted to flex lengthwise of the rail into interlocking engagement with undercut shoulders formed in the openings. The undercut shoulders are formed, preferably, by pressing the metal of the plate upwardly from the bottom thereof. The wall of the opening engaged by the clip is therefore moved vertically to a position above the top surface of the plate and provides a wide bearing surface for the clip at a location above the undercut shoulder. Furthermore, the undercut shoulder, or shoulders, as the case may be, extends lengthwise of the rail. Consequently the clip receiving openings may be positioned relatively close to the rail seat so that the clips may serve as lateral abutments, for example, in flat top tie plates or in plates having but one lateral shoulder.

The clip members are preferably formed from spring metal and comprise in each case a metal strip bowed intermediate its ends and bent laterally to provide spaced arms which project over the upper surface of the rail base flange at locations spaced longitudinally of the rail. The clips may be formed to grip the top surface of the rail base and thereby clamp it firmly to the tie plate, or they may be formed to provide a suitable clearance above the rail base whereby the rail may move a limited distance vertically of the tie plate.

Other objects and advantages of the invention will be readily apparent from the detailed description of the several embodiments illustrated in the accompanying drawings.

In the drawings:

Fig. 1 shows one embodiment of the improved tie plate and clip structure supported on a cross tie with the base portion of a rail positioned on the plate.

Fig. 2 is drawn on a larger scale and shows a cross section through the plate on line 2—2 of Fig. 1 to illustrate the manner in which the clip member interlocks with the tie plate member.

Fig. 3 is a fragmentary view showing one side portion of a modified embodiment in which the clip is formed to press resiliently on the top surface of the rail base.

Fig. 4 is a plan view of the structure shown in Fig. 3.

Fig. 5 is a fragmentary sectional view showing a modified form of clip member adapted for use with a tie plate having a single opening for receiving the clip member.

Fig. 6 is a view in elevation of the plate and clip shown in Fig. 5.

Fig. 7 is a fragmentary sectional view illustrating another modification along the lines of Fig. 5.

Fig. 8 illustrates a tie plate and clip construction in which the portion of the plate between the clip openings is pressed upwardly to provide two undercut shoulders with which the clip has a snap lock engagement.

Fig. 9 is a further modification in which the clip member may be made relatively rigid and is held in its operative interlocking engagement on the plate by means of a fastening device which is driven through the clip opening and into the tie.

Referring first to the embodiments shown in Figs. 1 and 2: The combination structure comprises a tie plate member 10 and a pair of clip members 11—11. The tie plate 10 is preferably secured rigidly to the upper surface of a cross tie 12 by means of suitable fastening devices 13, there being spaces 14—14 between the rail base 15 and the clip members to prevent vertical movement of the rail. The tie plate member may be of any suitable construction, for example, it may be provided with ribs extending across the plate to provide lateral abutments for the rail base and the rail engaging seat portion 16 may be flat, cambered or inclined. At opposite sides of the rail seat 16 the tie plate is provided with punched openings 18—19 which extend, preferably, through portions of the ribs 17—17. The lower portions 20 of the openings 18 and the lower portions 21 of the openings 19 are enlarged lengthwise of the rail to provide undercut shoulders 22—23. The said undercut shoulders are formed, preferably, by pressing

the metal adjacent the lower portion of the openings upwardly above the plane of the top surface of the plate. This method of forming the said shoulders provides vertical walls 24—24 (Fig. 2) which extend above the top surface of the plate and thereby provides relatively wide bearing surfaces for the clip member.

The clip member 11, illustrated in connection with this embodiment, preferably comprises a strip of spring metal bowed intermediate its ends to provide spaced arms 25—25 (Fig. 2) which overlie the marginal portion of the rail base at locations spaced longitudinally of the rail. The end portions of the bar are bent downwardly to provide resilient legs 26—26, the lower ends of which are turned to provide portions 27—27 extending lengthwise of the rail and adapted to interlock with the under-cut shoulders 22—23 of the plate. Preferably the outer edges of the legs 26—26 are notched, as indicated at 28, to provide shoulders adapted to seat on the top surface of the tie plate and support the clip in its operative position in the clip receiving openings of the plate.

In applying a clip member to its operative position, the legs 26—26 are flexed toward each other to permit the lower ends of the legs to be inserted in the restricted upper portions of the openings 18—19 in the plate. Upon moving the clips downwardly in the openings until the shoulders 28—28 engage the top surface of the plate (Fig. 1), the angular portions 27—27 reflex lengthwise of the rail and thereby snap into locking position beneath the undercut shoulders 22 and 23. Any upward movement exerted against the clip and tending to turn it about an axis extending lengthwise of the rail is resisted by the angular portions 27—27 and the shoulders 28—28 of the clip.

In the embodiment illustrated in Figs. 3 and 4 of the drawings, the tie plate member 10*a* may be and preferably is the same as illustrated in Fig. 1 except that the openings 18*a*—19*a* are located somewhat farther apart and are spaced somewhat farther outwardly from the inner face of the rail abutment rib 17*a*. The undercut shoulders 22*a*—23*a*, however, are formed in the same manner as previously described in connection with Figs. 1 and 2. The clip members 29 of this embodiment are formed with a central or intermediate bend 30 which is adapted to bear on the top surface of the tie plate 10*a* (Fig. 3) and the end portions of the clip are provided with bowed portions 31—32 which overlie and bear against the top surface of the rail base. Vertically disposed leg portions 33—34 are connected to the bowed portions 31—32 respectively, and are provided at their lower ends with angular portions adapted to snap into engagement with the undercut shoulders 22*a*—23*a* of the plate. In applying this form of clip to its interlocked engagement with the tie plate, the legs 33—34 are pressed toward each other so as to permit the angular portions 27*a* of the legs to be inserted through the restricted upper portion of the openings 18*a*—19*a*. Pressure is then applied to the upper surface of the legs 33—34 so as to spring them downwardly relative to the rail engaging portions 31—32 until the angular end portions of the clip snap under the undercut shoulders of the plate.

The modified construction shown in Figs. 5 and 6 comprises a flat top tie plate, that is to say, a plate formed without the continuous rib 17 of the previous embodiments. The plate is designated 10*b* and is formed with single openings 35 through the plate at either side of the rail seat. The openings 35 may be so arranged that the up-pressed portions 36—36 together with legs 37—37 of the clip serve as lateral abutments to maintain the rail centered on the plate. The clip member is in the form of a lateral open loop having downwardly extending resilient legs 37—37 which are inserted in the single opening 35 in the plate by pressing them together and then permitting them to reflex into interlocking engagement with the undercut shoulders 38—38. The shoulders 28*a* of this clip correspond to the shoulders 28 of Fig. 1. The modification of Figs. 5 and 6 may be further modified, as shown in Fig. 7, by forming the opening 35*a* smaller than the opening 35 and by omitting one shoulder 38*a* and by providing only one of the legs 37*a*—37*a* of the clip with an angular portion for interlocking engagement with the undercut shoulder.

Referring now to Fig. 8: Numerals 39—40 indicate spaced openings in the plate for receiving the resilient downturned legs 41—42 of the clip member. The metal intermediate said openings 39—40 is pressed upwardly, as indicated at 43, to provide shoulders 44—45 for interlocking engagement with inturned end portions 46—47 of the resilient legs 41—42, respectively. In applying the clip member, of this embodiment, to its operative position, the legs 41—42 are spread outwardly with relation to each other to permit the angular end portions 46—47 to be inserted in the upper restricted portions of the openings 39—40. Downward movement of the clip member brings the lateral shoulders 28*a* into engagement with the top of the tie plate in the manner indicated in Fig. 1, and the angular portions 46—47 of the clip snap beneath the up-pressed portion 43.

In the embodiment illustrated in Fig. 9 of the drawings, a pair of openings 48—49 in the plate 10*c* are spaced from each other lengthwise of the rail and are formed on the left hand wall, as viewed in Fig. 9, with undercut shoulders 50—51. The clip member 52 is formed with downturned legs, as illustrated in the previous embodiment, but the angular portions 53—54 are bent in the same general manner to extend in the same general direction. With this form of plate and clip, the downturned leg portions of the clip are inserted in the openings 49—50 and the clip is moved bodily lengthwise of the rail until the portions 53—54 interlock with the shoulders. The clip is held in its applied position by means of the shoulders 28*a* which rest on the top surface of the tie plate, as indicated in Fig. 1, and by means of a rail spike 55 which is driven into the opening 49 so as to prevent movement of the clip in a direction to disengage the angular portions 53—54 from the undercut shoulders of the plate. The spike 55, in addition to maintaining the clip member on the rail, serves also to attach the plate 10*c* to the underlying cross tie 12*c* and thereby dispenses with the use of separate tie plate fastening devices.

I claim:

1. A rail supporting and retaining structure comprising, in combination, a tie plate member having a rail seat and formed at one side of the seat with an opening through the plate, the lower portion of which opening is enlarged to provide an undercut shoulder; and a spring clip formed intermediate its ends with a portion for overlying the base flange of a rail and with a pair of legs adapted to be flexed into resilient pressure engagement with spaced vertical faces on the plate to maintain the clip in suitable opera-

tive position, one of the legs being provided with an angularly disposed end adapted to snap into interlocking engagement with the said undercut shoulder.

2. A rail supporting and retaining structure comprising, in combination, a tie plate member having a rail seat and formed at one side of the seat with an opening through the plate, the lower portion of which opening is enlarged in a direction lengthwise of the seat to provide an undercut shoulder; and a rail retaining clip member comprising a metal strip formed intermediate its ends with a portion for overlying a base flange of the rail and at one extremity with a leg portion having an angularly disposed foot extending lengthwise of the rail seat and adapted to snap into interlocking engagement with the undercut shoulder and the other end of the strip being formed to provide a leg for resiliently engaging a vertical face of the plate to maintain the clip in suitable operative position.

3. A rail supporting and retaining structure comprising, in combination, a tie plate having a rail seat and formed at one side of the seat with a pair of openings through the plate, the lower portion of the openings being enlarged lengthwise of the rail to provide undercut shoulders; and a spring clip formed with a laterally bowed portion for overlying the base flange of the rail in edgewise relation to the top surface of the flange and with leg portions spaced apart and provided with angularly disposed ends for interlocking engagement with the undercut shoulders; the said leg portions being so spaced with relation to each other that it is necessary to flex them to insert them into said openings.

4. A rail supporting and retaining structure comprising, in combination, a tie plate having a rail seat and formed at one side of the seat with a pair of openings through the plate, the lower portion of the openings being enlarged lengthwise of the rail to provide undercut shoulders; and a spring clip comprising a metal strip bent laterally to form a portion for overlying a base flange of the rail in edgewise relation to the top face of the flange and to provide leg portions spaced apart and having angularly disposed ends for interlocking engagement with the undercut shoulders of the plate; the said leg portions being so spaced with relation to the openings in the plate that it is necessary to flex said legs toward each other to insert them in the openings in the plate.

5. The combination of a tie plate having a rail seat and formed at one side of the seat with a pair of openings, the lower portions of which are enlarged lengthwise of the seat to provide undercut shoulders; and a rail retaining clip comprising a metal strip bowed intermediate its ends and the said bowed portion bent laterally to provide arms disposed edgewise to the top surface of the flange which overlie the said top surface at locations spaced longitudinally of the rail, the end portions of the strip providing spaced leg members, the lower ends of which are bent lengthwise of the rail seat for engagement with said undercut shoulders.

6. The combination of a tie plate having a rail seat formed at one side of the seat with a pair of openings, the lower portions of which are enlarged lengthwise of the seat to provide undercut shoulders; and a resilient clip member comprising a strip of spring metal bent intermediate its ends to provide a bowed configuration and bent laterally to overlie a rail base flange at locations spaced longitudinally of the rail seat, the ends of the strip providing legs, the lower ends of which are bent lengthwise of the rail and adapted, when inserted in the openings of the plate, to snap into position beneath the said undercut shoulders.

7. The combination of a tie plate having a rail seat and formed at one side of the seat with a pair of openings, the lower portions of which are enlarged lengthwise of the seat to provide undercut shoulders; and a resilient clip member comprising a strip of spring metal bent intermediate its ends to provide a bowed configuration and bent laterally to overlie a rail base flange at locations spaced longitudinally of the rail seat, the ends of the strip providing legs, the lower ends of which are bent lengthwise of the rail and adapted, when inserted in the opening of the plate, to snap into position beneath the said undercut shoulder, there being means formed on the legs above the top of the plate for engagement with the top surface thereof to support the clip in the said openings of the plate.

8. The combination of a tie plate having a rail seat and formed at one side of the seat with a pair of openings, the lower portions of which are enlarged to provide undercut shoulders; and a resilient clip member comprising a metal strip bowed intermediate its ends to provide laterally extending arms which overlie a rail base flange at locations spaced longitudinally of the rail, the end portions of the metal strip providing legs adapted to be inserted in the openings in the plate and are provided with angularly disposed portions for snap lock engagement with the undercut shoulders of the plate, and stop shoulders formed on the clip for limiting its applying movement.

9. The combination of a tie plate having a rail seat and formed at one side of the seat with a pair of openings, the lower portions of which are enlarged to provide undercut shoulders; and a resilient clip member comprising a metal strip bowed intermediate its ends to provide laterally extending arms which overlie a rail base flange at locations spaced longitudinally of the rail, the end portions of the metal strip providing legs adapted to be inserted in the openings in the plate, the said legs being so spaced in relation to the said openings that it is necessary to flex them toward each other to effect insertion in said openings.

10. The combination of a tie plate having a rail seat and formed at one side of the seat with a pair of openings, the lower portions of which are enlarged lengthwise of the seat to provide undercut shoulders; and a rail retaining clip comprising a metal strip bowed intermediate its ends and bent laterally to provide arms which overlie the top face of a rail base at locations spaced longitudinally of the rail, the end portions of the strip providing spaced leg members which are so spaced in relation to the openings in the plate that it is necessary to flex them toward each other to position the leg portions in the openings, and the lower ends of the legs being turned outwardly from each other so as to have snap lock engagement with the undercut shoulders.

11. The combination of a tie plate having a rail seat and formed at one side of the seat with spaced apart shoulder portions, and a rail retaining clip member adapted to press resiliently on the top portion of the plate and on the top surface of the rail base positioned on the seat; the said clip comprising a strip of spring metal bent adjacent to its opposite ends to provide depending legs adapted to interlock with said shoulders

of the plate and to provide spaced bowed portions for engaging the said top surface of the rail base and bent intermediate the first mentioned bends to provide a portion for bearing on the top surface of the tie plate.

12. The combination with a tie plate having a rail seat and formed at one side of the seat with spaced apart shoulders portions, and a rail retaining clip member adapted to press resiliently on the top portion of the plate and on the top surface of a rail base positioned on the plate at locations spaced longitudinally of the rail; the said clip comprising a spring metal blank bent intermediate its ends to provide an outwardly bowed portion for bearing against the said top surface of the tie plate and bent adjacent the opposite ends thereof to provide the spaced portions for bearing against the top surface of the rail base and depending leg portions adapted to interlock with the said shoulders of the tie plates; the said leg portions of the clip being so disposed with the shoulders of the plate that it is necessary to flex them with relation to each other in moving the clip to its interlocking engagement with the shoulders.

13. In a rail supporting and retaining structure comprising, in combination, a tie plate member having a rail seat and formed at one side of the seat with an opening through the plate, the lower portion of which opening is enlarged to provide an undercut shoulder; and a spring clip formed with a portion for overlying the base flange of a rail positioned on the plate and having a pair of legs adapted to be flexed to permit their insertion in the restricted upper portion of said opening, one of said legs being provided with an angularly disposed end portion adapted upon the reflex of the said leg to project under said undercut shoulder.

14. A rail supporting and retaining structure comprising, in combination, a tie plate member having a seat for supporting the base of a rail and formed at one side of the seat with an opening through the plate, the lower portion of which opening is enlarged to provide an undercut shoulder; and a spring clip formed with a portion for overlying the base flange of the rail and with a pair of legs adapted to be flexed to permit their insertion in the restricted upper portion of said opening, both of the legs being provided with angularly disposed end portions adapted upon the reflex of the legs to extend beneath the said undercut shoulders in the openings in the said plate.

15. A rail supporting and retaining structure comprising, in combination, a tie plate having a rail seat and formed at one side of the seat with an opening, the lower portion of which is enlarged to provide undercut shoulders, and a clip member formed with portions for overlying the base flange of a rail positioned on the plate at a location spaced longitudinally of the rail and having spaced resilient leg portions adapted to be flexed lengthwise of the rail into resilient engagement with the walls of said opening; the enlarged portion of the opening being formed by pressing the metal of the plate upwardly, whereby the displaced metal provides bearing surfaces for the clip legs at locations above the top surface of the plate.

16. A rail supporting and retaining structure comprising, in combination, a tie plate having a rail seat for supporting the base portion of a rail and formed at one side of the seat with a pair of openings through the plate, the lower portions of the openings being enlarged lengthwise of the rail to provide undercut shoulders; and a spring clip formed with a portion for overlying the base of a rail and for interlocking engagement with the undercut shoulder portions of said openings; the said undercut shoulders being formed by pressing the metal of the plate upwardly whereby the displaced metal provides bearing surfaces for the clip legs above the plane of the top surface of the plate.

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