RAILWAY RAIL-HOLDING DEVICE


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4 Claims. (Cl. 238—349)

This application is a continuation-in-part of the application Ser. No. 434,875 filed on February 24, 1965, now abandoned, by Lester T. Burwell, now deceased.

This invention relates to devices for holding rails on their ties or sleepers, and more particularly the invention is directed to such a device for use with reenforced concrete sleepers and including a resilient plate or clamp bolted to the tie or sleeper to hold the rail against longitudinal and transverse movement and to reduce to the minimum the loosening of the grip of the holding means on the rail and the sleeper.

One type of resilient rail holding device is shown in United States Patent No. 2,480,388 dated August 30, 1949 and includes a U-shaped clip having upper and lower arms secured to the sleeper with the end of the lower arm adapted to engage the edge of the rail flange and the end of the upper arm resiliently held in overlying contact with the rail flange. This known construction is difficult to manufacture and does not provide adequate strength, adjustability and resiliency for firmly holding the rail against longitudinal movement on the sleeper.

A primary object of the invention is to provide a novel and improved combination of a resilient clamping plate and a separate relatively rigid main plate both of which are secured to the sleeper by the same fastening means such as a screw or bolt, whereby the holding means shall be simple and inexpensive in construction and shall firmly but resiliently and reliably clamp the rail in position on the sleeper.

This invention contemplates a novel and improved combination of a main plate, a resilient clamp plate and a screw or bolt to be secured in the sleeper and pass through holes in said plates, the main plate to be fixed on the sleeper between the edge of the rail base flange and an abutment on the sleeper, the main plate having a seat or engaging part for one end of the clamping plate which is upwardly bowed between its ends and the other end of which is adapted to abuttingly overlie the top of the rail base flange, and the screw or bolt serving to press the clamping plate into its seat and into resilient engagement with the rail base flange.

Another object of the invention is to provide a rail holding device of this character wherein the main plate has a shoulder in spaced relation to the edge of the rail flange and the outer end of the clamp plate is returned or bent downwardly and inwardly toward the other end and adapted to resiliently abut said main plate shoulder in such a manner as to permit longitudinal sliding and rocking adjustment of the clamp plate with respect to the main plate.

Other objects, advantages and results of the invention will be brought out by the following description in conjunction with the following drawings in which:

FIGURE 1 is a fragmentary plan of a rail, the flange of which is supported on a tie and held thereon by devices embodying the invention;

FIGURE 2 is a transverse sectional view on the line 2—2 of FIGURE 1, in the direction of the arrows;

FIGURE 3 is a perspective view of one of the resilient clamping members of a rail-holding device embodying the invention;

FIGURE 4 is a similar view of one form of a main plate of a rail holding device of the invention;

FIGURE 5 is a fragmentary horizontal sectional view on the line 5—5 of FIGURE 6, in the direction of the arrows, illustrating another embodiment of the invention;

FIGURE 6 is a fragmentary transverse sectional view on the line 6—6 of FIGURE 5, in the direction of the arrows;

FIGURE 7 and 8 are perspective views of main plates, such as shown in FIGURE 4, but involving modifications;

FIGURE 9 is a view similar to FIGURE 2 showing a modification of the invention but showing the tie and rail-holding devices in side elevation;

FIGURE 10 is a perspective view of one of the resilient clamping members of the rail-holding device shown in FIGURE 9;

FIGURE 11 is a perspective view of one of the main plates, particularly the gauge plate of the rail-holding device shown in FIGURE 9;

FIGURE 12 is a similar view of the main field plate shown in FIGURE 9;

FIGURE 13 is a view similar to FIGURE 9 showing a modification of the invention;

FIGURE 14 is a perspective view of the resilient clamping member shown in FIGURE 13; and

FIGURE 15 is a top plan view of the main field plate shown in FIGURE 13.

Referring to the drawings in detail and first considering the embodiment of the invention illustrated in FIGURES 1 to 4, inclusive, there is shown a railroad rail 11, the flange 12 of which is supported on a reinforced concrete tie or sleeper 13. The tie 13 of the present embodiment is indicated as preferably formed of reinforced concrete, but other types of ties or sleepers or supporting structures are contemplated. Disposed between the bottom surface of the flange 12 and the top surface of the tie 13 is a pad or sheet of resilient material, which may be a plastic, such as polyethylene, or rubber. The opposite side of the flange 12 of the rail 11 is here shown as firmly pressed against the tie 13 or pad 14, if used, by a holding device 15 embodying the invention.

Each holding device 15, at least one on each side of a tie-supported portion of a rail flange 12, is tightened in place by means of heads 16 threaded on the ends of screws 17 shown as inserted through the main plate 18 which, in the present embodiment, comprises a main normally horizontal portion 19 which rests on the flat upper surface of the tie 13 or the plate 14, if used, an inner upstanding flange 21 which normally engages the adjacent edge of the rail flange 12 and an outer portion 22. The plate 18 is of such width, or dimension transverse to the rail, that when used with a rail of selected size, its outer portion 22 curves first downwardly and then upwardly to nest in a pocket 23 formed in the upper surface of the tie 13, which pocket thereby provides a shoulder 24 on each side of the rail engaged by the upstanding outer flange portion 25 of the adjacent plate 18, while the flange 21 at the same time engages the adjacent edge of the rail flange 12. The main plate thus serves as a gauge on the inside of the rail to set the rail to gauge.

Resting on the top of each plate 18 is a resilient clamping member or clip 26, desirably bowed upwardly between its end and at its outer end returned or bent downwardly and back upon itself toward its other end, as indicated at 27, to first engage the inner surface of the view plate flange 25 then continue downwardly and inwardly to lie on the top surface of said tie plate, bridging the space between said top surface and said flange over the downwardly-bowed or curved portion of said plate. The member 26 is continued downwardly and inwardly, with
its inner edge 28 desirably beveled, as illustrated, to provide a flat surface engaging the top surface of the rail flange 12. This resilient member 26, desirably formed of tempered spring steel, is held tightly in place against the top of the rail flange 12 and the top of the tie plate 18 by having an aperture 29 generally coaxial with an aperture 31 in the tie plate 18 and through which passes the upper portion of the bolt 17. These apertures 29 and 31 are of a size to allow for the proper clearance to avoid binding of the bolt 17 on the resilient member 26 and plate 18, which may interfere with the proper functioning thereof.

Head 16 of said bolt is gripped by a wrench to rotate the screw and apply the proper pressure to the clamping member which may be indicated by applying a template over the member 26 to show the amount of bending, so as to resiliently press the flange of the rail against the tie and its plate 14, if used. The purpose of the flange 21 on the tie plate 18 is to insure that there is a substantial surface engagement between said plate and the rail flange 12, rather than a mere line engagement, or at least that there is an engagement of the flange 21 above the bottom surface thereof. It will be understood that the plates 18 are tailored to the rail 12, so that each bridges the space between the adjacent tie shoulder 24 and the adjacent edge of the rail flange 12 in such a manner as to serve as a guide.

Referring now to the embodiment of the invention illustrated in FIGURES 5, 6 and 7, there is shown only the righthand portion of a rail 11a, the flange 12a of which is held in place by bolt-hold apertured rail-holding devices 15a, only one of which is here illustrated, similar to the devices 15 of the preceding embodiment, except that the tie plates 18a, only one of which is shown, instead of each having an upstanding flange 21 at its inner end, is curved upwardly and inwardly, as indicated at 21a. This raises the place of engagement between said inner end 21a and the adjacent edge of the rail flange 12a above the lower surface of said flange and thereby avoids a tendency to pry under the adjacent edge of the rail flange 12a, accomplishing a result similar to that obtained by the flange 21 of the preceding embodiment. Except for this change, and the squaring off of the inner edge 28a to provide a relatively sharp edge in engagement with the top surface of the adjacent portion of the rail flange 12a, the construction may be identical for holding the rail 11a on a tie 13a, here also indicated as of concrete and similarly constructed. A resilient member 14a is also desirably employed on each device 15a as in the preceding embodiment, but by a nut 16a threaded on the upper end portion of a bolt or stud 17a, the lower portion of which is imbedded in or otherwise secured to the tie 13a.

FIGURE 8 discloses an embodiment similar to that of FIGURE 4, except that there is a flange 21b on each side of each tie plate 18b, as indicated at 21b, instead of only one on the end adjacent the rail flange. This flange rigidifies the plate transversely of the rail, or longitudinally of its tie, and at the same time provides engagement with the adjacent edge of the rail flange above the lower surface thereof by the effective raising of the engaged surface of the tie plate because of said upstanding flanges 21b. Other than that, the tie plate 18b may be identical with the plate 18 of FIGURE 4.

FIGURES 9 through 12 of the drawings illustrate the modification of the invention particularly with respect to the main plates, that is, the plates that rest on the tie one of which constitutes a gauge plate while the other is known as a field plate. The gauge plate 34 has an inner upstanding flange 36 corresponding in effect to the flanges 21 and 21a, while the outer end portion of the plate has a portion 37 that curves first downwardly and then upwardly to nest in the pocket 38 of the tie, the portion 37 merging into convex cylindrically curved shoulders the outer end of the outer one 39 of which terminates in an approximately straight portion 40 overlying the upper surface of the tie. The resilient clamping plate 42 is in general similar to the plate 26, being bowed upwardly between its ends and at its outer end returned or bent downwardly at 45 to abut the convex shoulder 38a of the main plate, and the extremity of the clamping plate lies in the upwardly facing concavely curved portion 37 of the main plate. The two plates are held in position and the clamping plate is clamped against the tie and the main plate by a bolt 43 that corresponds to the bolt 17. This construction permits adjustment of the clamping plate longitudinally of itself, the curved end portion 41 of the clamping plate being rideable and rockable on the shoulder 39 on the main plate, both to permit accurate alignment of the holes 44 and 45 in the respect to the tie and plate, for example, to compensate for rail base flanges having different thicknesses or different angles of slope of their top surfaces and main plate and also to insure snug and firm clamping of the rail by the clamping plate. The upwardly bowed portion of the clamping plate and the downwardly bowed end portion 41 of the clamping plate and the bolt 43 is tightened so as to distribute the pressure through the clamping plate and firmly resiliently clamp the base flange 12 of the rail. The shapes of the main plates may be modified and as shown the main plate 35 on the side of the rail has a deeper curved portion 36b in the tie and the intermediate portion of the plate is bowed upwardly at 35b to provide resiliency in the main plate, in contrast to the flat substantially non-resilient contact of the main plate 18 with the tie. In many instances it is desirable that both of the main plates 34 and 35 possess this resiliency so they may extend or contract longitudinally between their ends upon tightening and loosening of the bolts.

A further modification of the invention is shown in FIGURE 15 where the main plate 34a may be substantially the same as the main plate 34 and is set on the tie in substantially the same manner as the plate 34 with its upwardly facing curved portion 37a seated in the socket or groove 38a of the tie. The clamping plate 46 is resilient and has an upwardly bowed portion 47 between its ends and its inner end 48 turned downwardly at an angle in the same manner as the end portion of the plate 41. The outer end portion of the clamping plate has a downwardly and inwardly curved portion 49 corresponding to the portion 41 of the plate 42 but disposed in spaced relation to the convex shoulder 39a of the main plate. The extremity of the portion 49 and the plate 46 provide a C-curve as indicated at 50 and sets edgewise in the upwardly facing curved portion 37a of the main plate.

With this construction, the clamping plate may be adjusted longitudinally to insure that the holes 51 and 41 in the clamping plate and the main plate, respectively, are positioned in alignment or coaxially with each other, the edge of the portion 50 sliding along the curved portion 37a. Added resiliency and strength are afforded by the end portions 49, 50, and 48 as the bolt 43 is tightened. The portion 49 and consequently the C-curve as distinguished from the simple C-curve of the other clamping plates.

While as hereinbefore indicated, the same clamping device may be used at both the gauge side and field side of the rail it is also desirable in some cases to use a different rail holding device on the field side of the rail. One such device is shown in FIGURES 13 and 15 and comprises a tie plate 52 that has a shoulder portion 53 at its inner end to abut the edge of the rail flange 12, which merges into an end portion 54 that overlies and abuts the top of the rail flange 12 and the other end portion of the plate is curved as indicated at 55 similarly to the end portion 22 of the plate 18 and seats in the groove or pocket 56 in the tie. The plate is clamped in position and against the rail by a bolt 57 that corresponds to the bolts 16, 43 and 43a hereinbefore described.
It will be noted that in all forms of the invention an important structural and functional feature is the upwardly bowed resilient clamping plate having an outer end portion returned or curvedly bent toward its other end and abutting a shoulder on a separate main or tie plate, with the tie plate firmly seated near its outer end in a socket or groove in the upper surface of the tie; and in one preferred form of the invention the shoulder on the main plate is convexly cylindrical and is abutted with approximately a line contact by the returned end portion of the clamp plate. In another form of the invention the curved outer end portion has an edge that seats in the upwardly facing curved portion of the main plate. In all forms of the invention the clamping plate may readily become adjusted to the main plate and to the bolt and in all positions will firmly resiliently grip the rail flange as the bolt is tightened. In some forms of the invention the main plates are upwardly curved from the tie intermediate their ends to provide resiliency to supplement the resiliency of the clamping plates. The shoulder or flange 22 and the shoulders 39 and 39′ resist bodily longitudinal movement of the clamp plates on the main plates so that when the holding devices are installed the rail is firmly held against both lateral movement and tilting.

While several embodiments of the invention have been illustrated and described to explain the principles of the invention, it will be understood that modifications may be made in the construction of the rail-holding device within the scope of the invention.

What is claimed is:

1. A railway rail-holding device for use with a railway tie and a rail having base flanges supported thereon, said tie having an abutment seat spaced from the edge of said base flange, said outer portion having an engaging part for a resilient clamp plate consisting of a concavely curved upwardly facing portion resiliently engaging said abutment seat and said inner portion engaging with the shoulder and end of the clamp plate against the top of the base flange and its outer end against said engaging part of the main plate upon tightening of said fastening means.

2. A railway rail-holding device as in claim 1 characterized in that said engaging part of the main plate has one of said shoulders convexly curved upwardly extending outer end portion of the clamp plate is downwardly and curvedly returned toward the other end of the clamp plate and abuts said shoulder.

3. A railway rail-holding device as in claim 1, characterized in that said downwardly curved upwardly facing engaging outer portion of the main plate is abutted between said shoulders by the edge portion of the clamp plate at the end of said downwardly extending end portion.

4. A railway rail-holding device comprising the combination of a railway tie and a rail having base flanges supported thereon, said tie having an abutment pocket spaced from the edge of one rail base flange, a rigid main plate having an outer portion abutted in said abutment seat and an inner portion engaging the adjacent edge of said one base flange, said outer portion having an engaging part for a resilient clamp plate consisting of a concavely curved upwardly facing portion forming into convexly curved shoulders, a resilient clamp plate upwardly bowed between its inner and outer ends with its inner end engaging the top surface of said base flange and its outer end downwardly and curvedly returned toward said inner end abutting said concavely curved upwardly facing portion of the engaging part of the main plate, providing for longitudinal sliding and rocking movement of said clamp plate relatively to said concavely curved portion and shoulders of said engaging part of the main plate, said main plate and said clamp plate having aligned holes therein, and fastening means having a part secured in said tie and passing through said holes and another part abutting the top of said bowed portion of said clamp plate to resiliently force the inner end of the clamp plate against the top of the base flange and its outer end against said engaging part of the main plate upon tightening of said fastening means.

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ARTHUR L. LA POINT, Primary Examiner.

R. A. BERTSCH, Assistant Examiner.