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RAIL FASTENING

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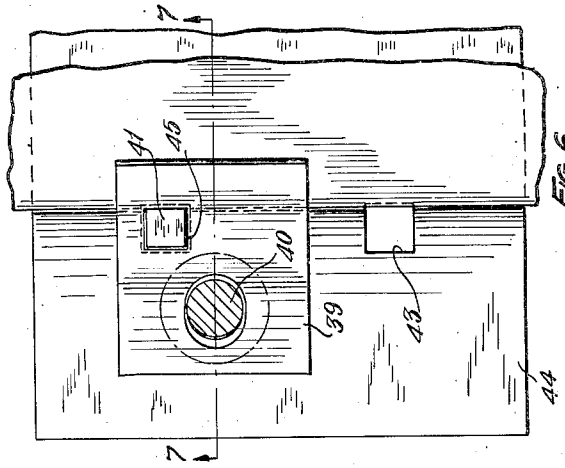


FIG. 6

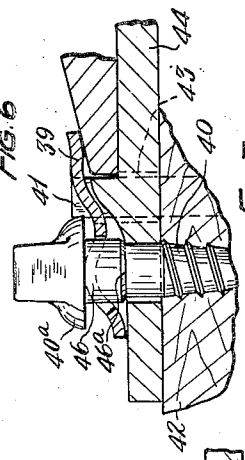


FIG. 7

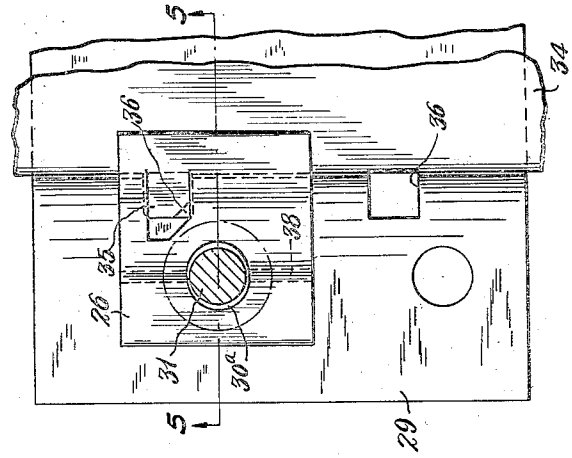


FIG. 4

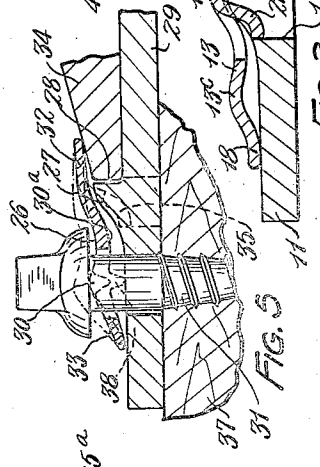


FIG. 5

FIG. 3

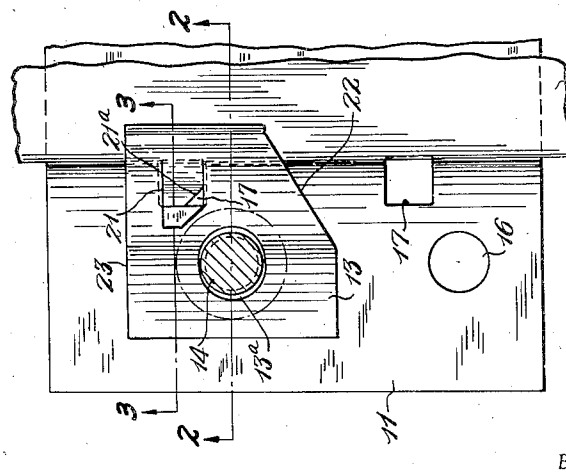


FIG. 1

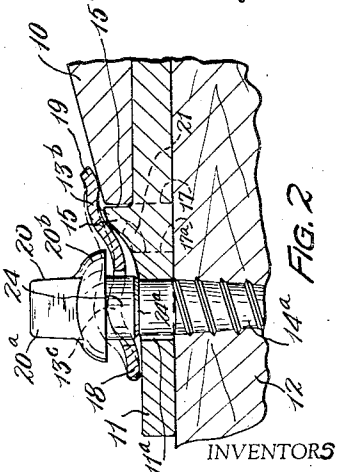


FIG. 2

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RAIL FASTENING

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6 Claims. (Cl. 238—349)

This invention relates to fastenings for railway rails, and more particularly, to improved rail fastenings of the type embodying a resilient clamp.

An object of the present invention is to provide an improved rail clamp of the resilient type which can be economically manufactured and readily applied to railway rails, and which embodies novel means for preventing the clamp from pressing laterally against the fastening spike and for preventing the clamp from turning about the spike.

Another object of the invention is to provide an improved rail fastening of the character mentioned in which the degree of pressure applied to the clamp by the fastening member can be controlled or determined such that the danger of flexing the clamp beyond its elastic limit during assembly will be avoided and yet the clamp will exert sufficient pressure on the rail to hold the rail against creeping and will accomplish this without preventing a desired wave motion of the rail as trains pass thereover.

A further object of this invention is to provide an improved rail fastening embodying a resilient clamp of the character mentioned and in which a stop is employed for limiting the amount of bending of the clamp when the fastening spike is being initially driven.

Other objects and advantages of the invention will be apparent from the following description when taken in conjunction with the accompanying sheet of drawings, in which:

Fig. 1 is a partial plan view showing one form of rail fastening embodying our invention;

Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional view taken substantially on line 3—3 of Fig. 1;

Fig. 4 is a partial plan view showing another rail fastening embodying our invention;

Fig. 5 is a transverse sectional view taken therethrough, as indicated by line 5—5 of Fig. 4;

Fig. 6 is a partial plan view showing still another rail fastening of our invention; and

Fig. 7 is a transverse sectional view taken therethrough on line 7—7 of Fig. 6.

We will now proceed to describe our improved rail fastenings in greater detail and in so doing, further reference will be made to the drawing, but it should be understood that the invention is not to be regarded as limited to the particular forms of clamp and rail fastenings shown in the drawing, but may be embodied in various other similar clamps and fastenings coming within the scope of the appended claims.

In the form of our rail fastening illustrated in Figs. 1 to 3, inclusive, a conventional railway rail having a base flange 10 rests on a tie plate 11, and the rail and tie plate are yieldingly held or clamped against a wood tie 12 by means of the resilient clamp 13 and a fastening spike 14 extending through an opening 13*a* of the clamp and an opening 11*a* of the tie plate.

The tie plate 11 may be a generally flat plate having an upstanding transverse rib on its upper surface providing an abutment face or shoulder 15*a* against which a longitudinal edge of the base flange 10 of the rail bears. The tie plate may have one or more round openings 16 therethrough which are located outwardly of the rib 15 and one of which openings accommodates the fastening member or spike 14. The tie plate may also have one or more substantially square openings 17 therethrough with which a holding means may ccoperate for preventing turning or lateral shifting of the clamp relative to the spike 14, as will be further explained hereinafter. The square holes 17 are preferably formed in the tie plate so as to extend through the upstanding transverse rib 15 with the inner edge of each opening lying just inwardly of the upright plane containing the abutment face or shoulder 15*a*. The holes 17 as thus formed and located will accommodate the usual cut railway spike if it should be found desirable to use a spike of this form in place of or in addition to our resilient clamp and screw spike.

The clamp 13 comprises a resilient plate member of a single thickness or ply which may be stamped or otherwise formed from sheet metal or plate stock and has bearing portions 18 and 19 adjacent its outer and inner edges which bear respectively against the tie plate 11 and the sloping face of the rail flange 10. The clamp 13 may be generally flat, as compared with rail clamps of the type having a reversely bent or angularly extending portion, but is preferably of a wavy or corrugated shape, as shown in the drawing. One of the corrugations of the clamp forms an upwardly bowed section 13*b* which overlies the rib 15 of the tie plate, and another corrugation forms an upwardly bowed section 13*c* which contains the opening 13*a* for the spike 14. The clamp should have the necessary thickness and may be hardened or otherwise treated so that it will have the desired resilient or springy character for yieldingly clamping the rail and tie plate against the tie 12 when pressure is applied to the intermediate section 13*c* by the fastening member or spike 14.

The fastening member 14 for connecting the clamp and tie plate with the tie may be a spike as above referred to, and in this instance is shown as being a screw spike having a threaded portion 14a and a head 20. The upper portion 20a of the head of the spike may be of square or other polygonal shape to facilitate turning of the spike, and the lower portion of the head may be in the form of an annular collar, the under face of which bears against the corrugated section 13c of the clamp.

When the spike 14 is screwed or driven into the tie 12, it may be located so that it is engaged by one edge of the opening 11a of the tie plate 11. In this relative location the spike will prevent lateral shifting of the tie plate and a resulting spreading of the rails, particularly in curves and at switches. The opening 13a of the clamp is substantially aligned with or overlies the opening 11a of the tie plate, but, as shown in Fig. 1, the opening 13a is somewhat larger than the diameter of the spike, and may be laterally elongated so that clearance will be provided between the spike and the edge of this opening for reasons to be presently explained.

It is desirable to prevent the clamp from turning about the spike 14 so as to maintain the bearing portion 19 in engagement with the rail flange, and it is also desirable to hold the clamp from lateral shifting which would cause the edge of the opening 13a to press against the spike 14. If the clamp were permitted to press against the spike, the repeated flexing of the clamp, due to cars or locomotives passing over the rail, might cause loosening of the spike. To prevent such turning or lateral shifting of the clamp we provide holding means, one form of which may comprise a downwardly deflected integral lug 21 depending from the clamp 13 and engaging in one of the square openings 17 of the tie plate. As shown in the drawing, the lug 21 may be formed by partially shearing a corresponding section of metal from the clamp and pressing such partially sheared section downwardly a sufficient distance to extend into the opening 17 when the clamp is in assembled position. The lug 21 thus formed is of a width such that it will enter the opening 17 but will have a snug fit therein and will hold the clamp against turning about the axis of the spike 14. The engagement of the end of the lug against the face or wall 17a of the opening 17 holds the clamp in a position with its opening 13a overlying the opening 11a of the tie plate and prevents the above-mentioned lateral shifting of the clamp into engagement with the spike 14. The clearance provided between the spike and the edge of the relatively larger opening 13a of the clamp takes care of variations which may occur in the clamp or spike, or in the formation or location of the lug 21, and permits the parts to be assembled in the relation shown in the drawing without having the edge of the clamp opening press against the spike.

To avoid unduly decreasing the amount of metal remaining between the opening 13a and the opening from which the lug 21 is sheared, we may form the lug 21 with an angular or beveled side 21a on the portion thereof which lies nearest the opening 13a. Likewise, we may maintain a desired balance between the areas of the plate sections on opposite sides of the opening 13a so that the flexing of the clamp will be more or less uniformly distributed. This may be accomplished by shearing or otherwise removing a corner portion of the clamp so that the straight-line distance from the edge of the opening 13a to the inclined line 22 will be substantially the same as the straight-line distance from the edge of the opening 13a to the side edge 23.

From Figs. 1 to 3, inclusive, and the foregoing detailed description, it will be seen that when the spike 14 is driven into the tie 12, the clamp will be drawn down to its full-line position and will yieldingly hold the rail and tie plate against the tie. The dotted-line position shown in Fig. 2 illustrates the shape of the clamp in its released condition. If it should be desirable to remove the rail for replacement by a new one, it is only necessary to unscrew the spike 14 sufficiently to permit the lug 21 to be lifted out of the opening 17, whereupon the clamp 13 can be rotated sufficiently, such as through 180°, to disengage the clamp from the rail flange and permit the old rail to be removed and the new rail to be moved into position.

It may be desirable to prevent the clamp from being subjected to flexing or bending in excess of its elastic limit when the spike 14 is being initially driven into the tie. For this purpose we provide a stop which will serve to limit downward movement of the arched intermediate portion 13c of the clamp when the spike 14 has been driven into the tie the proper distance. One form of this stop may comprise an enlargement or sleeve 24 on the spike adjacent the under side of the collar 20b and which provides a relatively narrow shoulder 24a at a point below the lower surface of the clamp and which will engage the tie plate 11 when the spike has been driven into the tie the proper distance. The enlargement 24 is of a diameter somewhat larger than the diameter of the opening 16 and is of a length in relation to the resiliency of the clamp such that inward movement of the spike will be positively stopped when the clamp has been given an initial bending or flexing corresponding with an applied pressure on the rail sufficient to hold the rail against creeping without preventing a desired wave motion of the rail as trains pass thereover.

In Figs. 4 and 5 we show another rail fastening generally similar to that shown in Figs. 1 to 3, inclusive, and above described, but in which the clamp 26 may be formed as a rolled section or shape instead of being stamped from sheet metal or plate stock. The clamp here shown is also of wavy or corrugated form having an upwardly bowed portion 27 overlying the rib 28 of the tie plate 29 and another corrugation forming an upwardly bowed intermediate section 30 having an opening 30a through which the fastening member or spike 31 extends. The clamp 26 is so formed that the bowed intermediate portion 30 thereof is of maximum thickness and is substantially rigid in character, while the oppositely extending leg portions 32 and 33 which bear respectively against the rail flange 34 and the tie plate 29 are of tapering thickness and are resilient or flexible so that yielding clamping pressure will be applied to the rail and tie plate when the clamp is drawn down from its released dotted-line position to its full-line position by the spike 31.

The clamp 26 may also be provided with a depending integral lug 35 similar to the lug 21 above described, and which also engages in a square opening 36 of the tie plate and serves to prevent turning of the clamp about the spike. The engagement of the end of the lug 35 with a wall of the opening 36 prevents the clamp from shifting laterally and pressing against the spike.

For limiting the extent of bending of the clamp, particularly when the spike 31 is initially driven into the tie 37, we provide stop means such as that above referred to in connection with the clamp 13, but which in this instance is carried by the clamp instead of the spike. In this case, the stop means may comprise a depending relatively pointed integral rib or lug 38 formed on the under side of the rigid, upwardly bowed intermediate section 30 and the top of which rib or lug provides a relatively narrow shoulder for engagement with the tie plate and which narrow shoulder is located at a point below the lower surface of the clamp. The lug or rib 38 is of a depth in relation to the resiliency of the clamp such that when the spike 31 has been driven into the tie a sufficient distance to bend or flex the clamp an amount which will cause it to grip the rail firmly enough to hold the rail against creeping, the lug or rib will engage the tie plate and prevent the spike from being driven further into the tie. When the spike is initially driven into the tie for the full distance permitted by the stop lug or rib 38, the tie plate and clamp will be more or less rigidly clamped to the tie, but as soon as trains or locomotives have passed over the rail, the tie plate will be partially depressed into the wood tie and a small clearance will then exist between the stop 38 and the tie plate sufficient to thereafter permit the desired flexing of the clamp.

In Figs. 6 and 7 we show a rail fastening which is also generally similar to that illustrated in Figs. 1 to 3, inclusive, but in which the holding means for preventing turning of the clamp 39 about the spike 40 may consist of a cut spike 41 driven into the tie 42 through one of the square openings 43 of the tie plate 44 and through a substantially aligned corresponding square opening 45 of the clamp. The spike 41 may be an ordinary or conventional cut railway spike or may be a headless spike, as shown in this instance. The spike 41 not only holds the clamp against turning about the spike 40, but also holds the clamp from pressing laterally against the spike.

Stop means may also be provided in this form of our rail fastening for limiting the initial bending of the clamp and the distance to which the spike can be initially driven into the tie, as explained above, to thereby control the pressure exerted by the clamp to the amount necessary for holding the rail against creeping. This stop means may be similar to that shown in Figs. 1 and 2 and may comprise an enlargement 46 on the spike adjacent the head which provides a relatively narrow shoulder 46a at a point below the lower surface of the clamp and adapted to engage the tie plate when the spike has been driven the desired distance into the tie 42. Although we have illustrated and described stop means in connection with each of the rail fastenings disclosed for limiting the initial bending of the clamp and the distance to which the spike is to be driven into the tie, it should be understood, however, that such stop means can be omitted from one or all of these rail fastenings.

From the foregoing description and the accompanying drawing, it will now be readily understood that we have provided improved rail fastenings of the type embodying a resilient clamp and it will also be readily seen that the clamp can be economically manufactured and readily applied to the rails. It will likewise be understood that we have provided novel means for preventing the clamp from turning about the spike and for preventing the clamp from pressing laterally against the spike. Furthermore, it will be seen that our improved rail fastenings also embody stop means for limiting the extent of bending of the clamp and the distance to which the spike can be initially driven into the tie.

While we have illustrated and described our improved rail fastenings in a more or less detailed manner, it will be understood, of course, that we do not wish to be limited to the particular details and arrangements herein disclosed, but regard our invention as including such changes and modifications as do not constitute a departure from the spirit of the invention and the scope of the appended claims.

Having thus described our invention, we claim:

1. In a rail fastening the combination of a tie plate adapted to receive a rail thereon, an opening in said tie plate, a resilient metal clamping member having end portions adapted to bear respectively on the rail flange and on the tie plate and also having an upwardly bowed intermediate portion provided with an opening located to overlie the opening of the tie plate, a headed fastening member extending through said openings and adapted to bear against said bowed portion for holding the clamping member in flexed condition for clamping the rail to said tie plate, and depending relatively pointed transverse integral rib means formed on said clamping member and providing relatively narrow stop means at a point below the lower surface of the clamping member, said stop means being located to lie beneath the head of said fastening member and being engageable with the tie plate for limiting the flexing of said clamping member by said fastening member.

2. In a rail fastening the combination of a tie plate adapted to receive a rail thereon, an opening in said tie plate, a single-thickness resilient metal clamping member having end portions adapted to bear respectively on the rail flange and on the tie plate and also having an upwardly bowed intermediate portion provided with an opening located to overlie the opening of the tie plate, and a fastening member extending through said openings and adapted to hold the clamping member in flexed condition for clamping the rail to said plate, said clamping member having depending integral transverse rib means on the underside of said bowed intermediate portion in substantial alignment with the axis of said fastening member and providing relatively narrow stop means at a point below the lower surface of the clamping member and engageable with the tie plate for limiting the flexing of the clamping member by said fastening member.

3. In a rail fastening, a tie plate having a flanged rail thereon and having an upstanding rail-positioning rib extending transversely thereof and adapted to be engaged by the flange of the rail, an opening in the tie plate, a clamp comprising a single-thickness resilient metal plate having bearing portions at its ends engageable respectively with the rail and said tie plate and having an upwardly bowed intermediate portion, said bowed portion having an opening therein above the opening of the tie plate, a fastening member extending through said openings and bearing on said bowed portion for holding the clamp in a flexed condition for yieldingly clamping the rail against the tie plate, the opening of the clamp being of a size to provide clearance for said fastening member, a second opening in said tie plate, and an integral lug depending from

said clamp on the rail side of the opening thereof and extending into said second opening for holding the clamp against turning and lateral shifting relative to the fastening member, said lug extending toward the opening of said bowed portion and having a portion engageable with the wall of said second opening for preventing the edge of the clamp opening from pressing against the fastening member.

4. In a rail fastening, the combination of a tie plate adapted to receive a rail thereon, an opening in said tie plate, a resilient metal clamping member having end portions adapted to bear respectively on the rail flange and on the tie plate and also having an upwardly bowed intermediate portion provided with an opening located to overlie the opening of the tie plate, a headed fastening member extending through said openings and adapted to bear against said bowed portion for holding the clamping member in flexed condition for clamping the rail against said tie plate, and depending relatively pointed transverse integral rib means on the underside of said clamping member and providing a relatively narrow stop which is located to lie beneath the head of said fastening member and extends below the lower surface of the clamping member for engagement with said tie plate for limiting the flexing of said clamping member by said fastening member, said stop being of a height in relation to the resiliency of the clamping member such that when the stop is engaged against the tie plate the distortion of the clamping member will cause an applied pressure on the rail sufficient to hold the rail against creeping.

5. In a rail fastening the combination of a tie, a tie plate adapted to receive a flanged rail thereon and having an upstanding rail-positioning rib extending transversely thereof and adapted to be engaged by the flange of the rail, said tie plate having a pair of spaced openings therein, a single-thickness corrugated resilient metal clamping member having end portions adapted to bear respectively on the rail flange and tie plate and also having an upwardly bowed intermediate portion provided with an opening located in substantial alignment with one of the openings of the tie plate, a headed fastening member extending into the tie through said aligned openings and adapted to bear against said bowed portion for holding the clamping member in flexed condition for clamping the rail to said plate, said opening of the clamping member being of a size to provide clearance for said fastening member, depending stop means integrally formed on the underside of the bowed portion of said clamping member so as to lie beneath the head of said fastening member and providing a relatively narrow shoulder at a point below the lower surface of the clamping member which is engageable with the tie plate for limiting the flexing of said clamping member by said fastening member, and an integral deflected lug on said clamping member extending into the other opening of the tie plate and acting to hold the clamping member against turning and lateral shifting relative to the fastening member.

6. A clamp for use with a fastening spike and a tie plate having an upstanding transverse rib adapted to be engaged by a rail flange and spaced openings one of which is adapted to receive said spike, comprising a single-thickness corrugated resilient metal plate having bearing portions adjacent its ends and also having an opening through one of its upwardly bowed corrugations, the last mentioned opening being of a size to receive said spike with clearance therebetween, said clamp also having a downwardly sloping integral lug on the rail side of the clamp opening and extending toward said last mentioned opening, said lug being adapted to extend into a second one of the openings of the tie plate for holding the clamp against turning about the spike and having an end face engageable with a side wall of such second opening for preventing the edge of the clamp from scraping on the spike.

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