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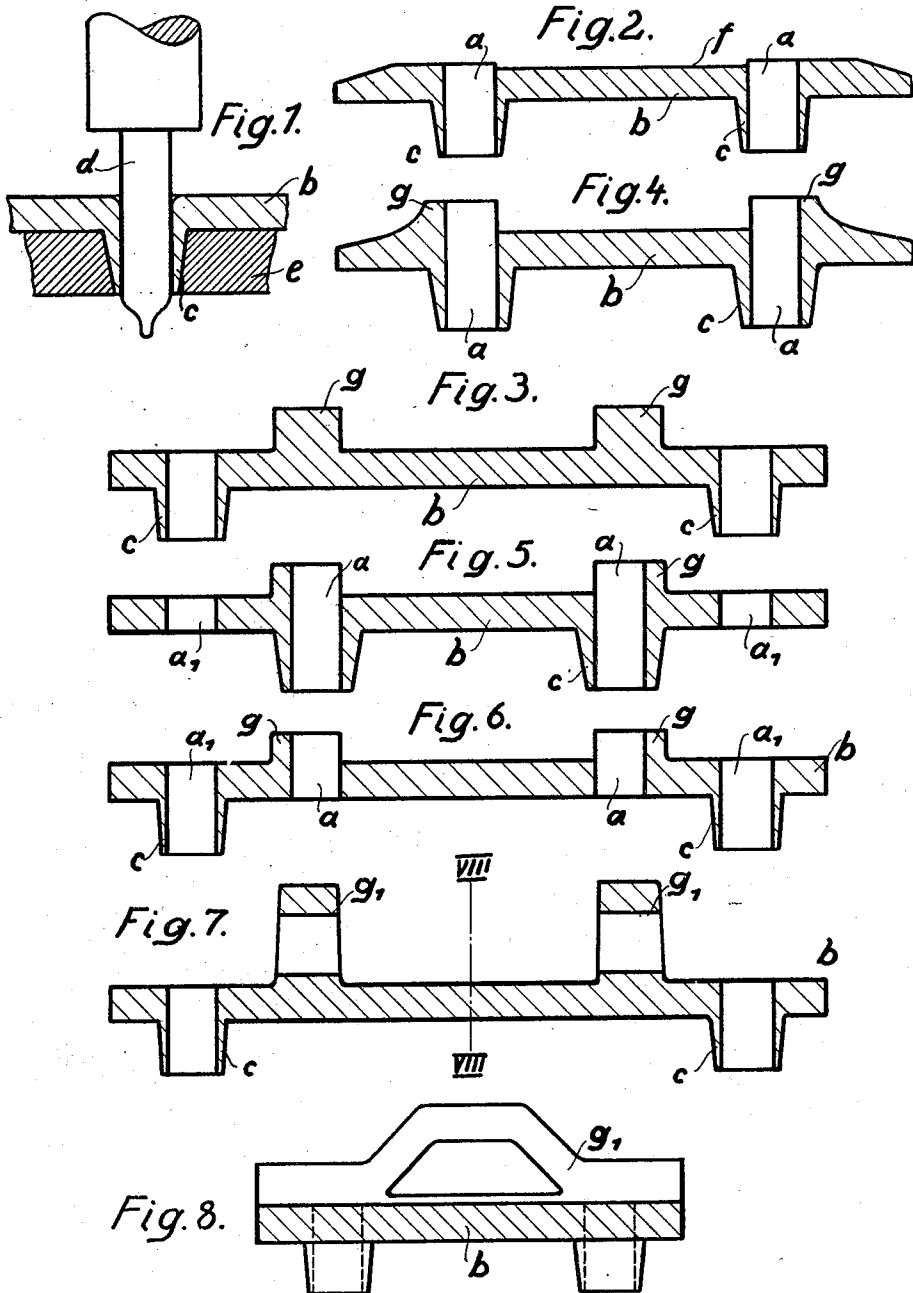
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1,834,256

RAIL FASTENING

Filed Dec. 9, 1930

3 Sheets-Sheet 1



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Fig. 9.

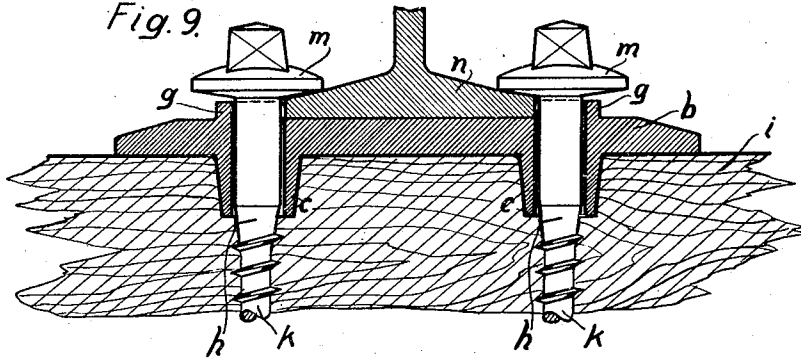


Fig. 10.

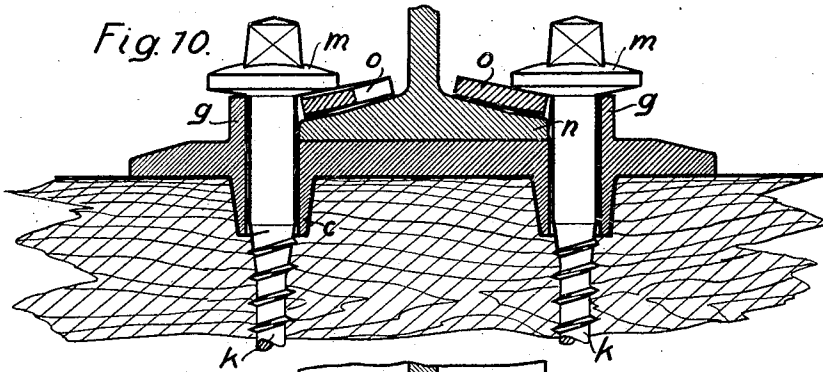
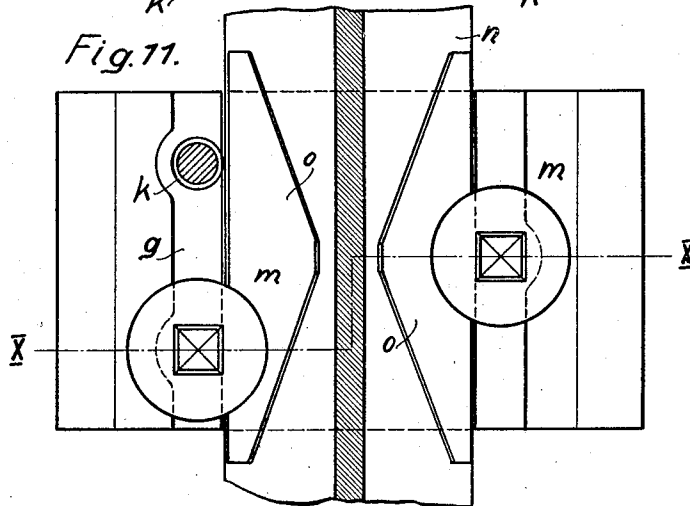


Fig. 11.



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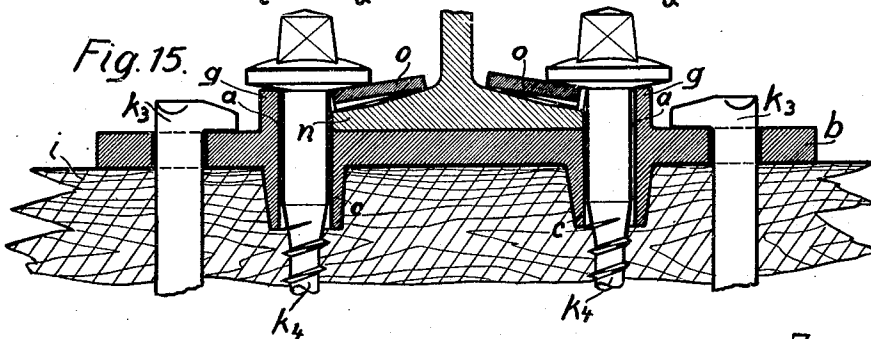
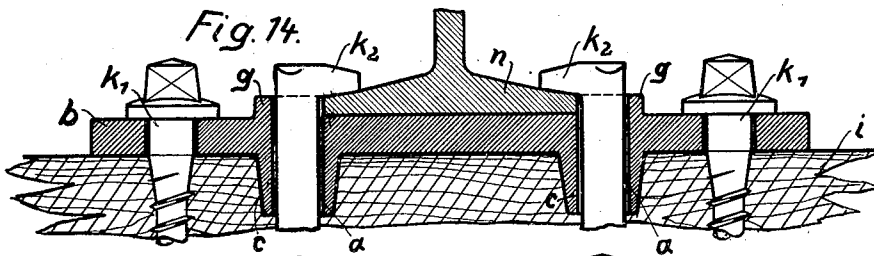
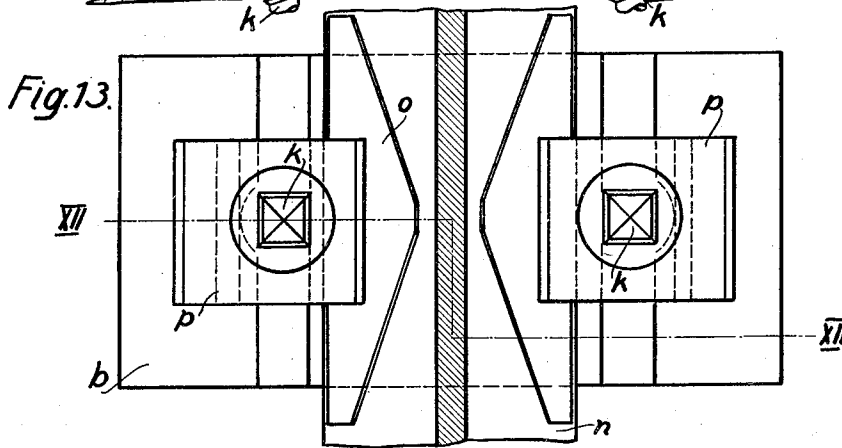
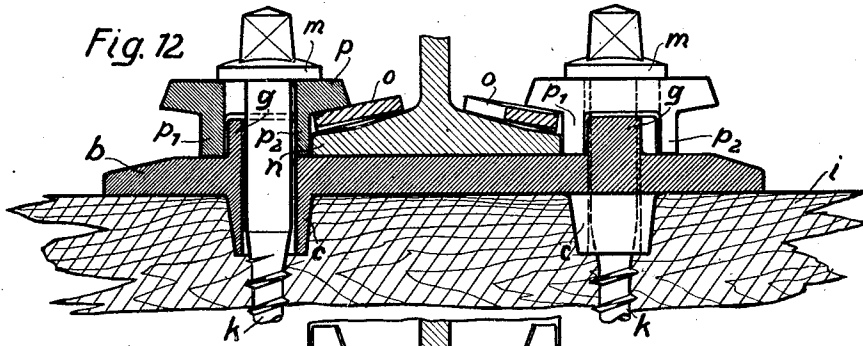
M. RÜPING

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RAIL FASTENING

Filed Dec. 9, 1930

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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RAIL FASTENING

Application filed December 9, 1930, Serial No. 501,111, and in Germany May 18, 1928.

This application, which is a continuation in part of application filed May 7, 1929, Serial No. 361,086, relates to tie plates for fixing rails on wooden ties and to rail fastenings which can be made with these tie plates.

According to the invention rolled iron tie plates are used for this purpose, in which, while in the hot state, holes for the fasteners are made with a mandrel having a conical lower part and the displaced material is formed into projections on the under surface of the plate, which surround the holes for the fasteners (spikes or screws). These projections may be drawn out to a tubular shape. The tubular projections are thus integral with the rolled plate which has hitherto only been the case in cast plates. Such cast plates are, however, far too costly for use in the permanent way. Rolled plates with which the tubular projections are integral were hitherto not known as there was no known process of making these tubular projections in a simple and cheap manner. The suggestion has certainly been made to substitute the tubular extension in rolled plates by inserted tubes. This suggestion, however, has never been carried out in practice, as tubular projections which are not integral with the plate are not capable of withstanding the dynamic stresses in the track. The tubular projections forced out of the rolled plate are suitably given a light, slightly conical form with thin walls, so that they fit snugly in a screw or spike hole which is only slightly widened. With this object in view and in order that the projections when forced out shall be uniform, a matrix is placed below the plate, in which by means of a mandrel the displaced material is pressed to form projections of the desired shape.

In order to prevent the plate shifting when in use, the tubular projections engage in the screw or spike holes of the wooden tie, which holes may for his purpose be widened at the top.

In order that the tubular projections shall always have a firm hold in the recesses of the tie, it is of great advantage to press the tubular projections into the holes in the tie by the pressure of a strong spring. For this purpose

springs are provided, which lie on the foot of the rail and which bear directly or indirectly against the heads of the fasteners, thereby pressing the tubular projections into the tie holes.

In order to prevent the fasteners being directly loaded laterally by the rail foot, the plates are preferably provided on their upper surface in a known manner with shoulders for receiving the rails.

The fasteners will thus only be stressed in tension. Hence in the construction of the fasteners no regard need be had to lateral stressing, so that they may be made in the most suitable dimensions and shape for withstanding stresses in tension only. The shoulders may be formed by recesses for receiving the rolled foot or by ribs disposed next to the rail foot. If in the latter case the holes for the fasteners extend through the ribs, a still better support and guide for the fasteners is provided.

The provision of the holes in the abutment ribs has the further great advantage that when they are being made considerably more material is displaced than if they were disposed outside the ribs. By this means the tubular projections become longer. When springs are used, the ribs are with advantage made so high that when in the operative position the screw or spike heads rest on them, so that the ribs so limit the depth to which the fasteners are screwed or driven in, that the fasteners cannot press the springs completely flat on to the rail foot, whereby a certain play in the spring is ensured.

Besides the holes with the projections other holes without projections can of course be provided in the plates. The number of holes with or without projections depends on the kind of wood from which the ties are made, on the substructure and on the working stresses to which the track is subjected. In most cases it will be sufficient to provide in a plate two holes with projections, more particularly if the plate be provided with ribs and the holes are made in the ribs. In such rail fastenings, in which the fasteners are stressed in tension only, screws are preferably used as fasteners.

In the accompanying drawings various examples of the arrangement according to the invention are shown.

Fig. 1 shows in side elevation the device for making the holes and projections.

Figs. 2 to 7 are vertical cross-sections through tie plates of rolled iron with projections on fastener holes according to the invention.

Fig. 8 is a section on line VIII—VIII of Fig. 7.

Figs. 9 and 10 show two constructional forms of rail fastenings on wooden ties with the tie plate according to Fig. 4.

Fig. 11 is a plan view of the constructional form shown in Fig. 10.

Fig. 12 shows a third constructional form of a rail fastening also with the tie plate according to Fig. 4.

Fig. 13 is a plan view of Fig. 12.

Figs. 14 and 15 show a fourth and fifth constructional form of the rail fastening in section.

In the plate shown in Fig. 2 the fastener holes a in a rolled tie plate b are provided with projections c . As shown in Fig. 1 these projections c have been formed from the material displaced in punching through the heated plate b by means of a mandrel d and with the aid of a matrix e . The projections c are thus integral with the plate b . In this constructional form the plate is provided with a recess f , the edges of which form shoulders for the lateral edges of the rail foot.

In the form of plate shown in Fig. 3 two ribs g are provided on the plate b which also form shoulders for the edges of the rail foot.

In the constructional form shown in Fig. 4 the holes a extend through the ribs g so that, on the mandrel being forced through them, more material is displaced and consequently the tubular projections c formed from this material become longer and thicker.

In the constructional form shown in Fig. 5 the plates are provided with holes a_1 in addition to the holes a extending through the ribs g . These holes a_1 need not be provided with tubular projections as the tubular projections of the holes a are quite sufficient for enabling the plate to resist lateral forces.

The constructional form shown in Fig. 6 differs from that shown in Fig. 5 in that the holes a_1 are provided with tubular extensions instead of the holes a extending through the ribs g .

In the constructional form shown in Figs. 7 and 8 plates according to Fig. 3 are used. The ribs g_1 on the upper side of the plate b , after having their middle part removed, are, however, bent up to form bows, this operation being performed while the plate is hot. Such ribs are capable of receiving holders for the springs such as have been described

in other patent applications by the same inventor, or of serving other purposes.

In the rail fastening shown in Fig. 9 the tie plate according to Fig. 4 is used. The tubular extensions c engage in the screw holes h of the tie i . The screw holes h are for this purpose widened at the top. The screws k have a long and therefore good guide in the long holes extending through the ribs g , the plate b and the tubular extensions c . With their head m they engage over the rail foot n and press the latter against the tie plate b and consequently the projections c tightly into the screw holes. Through the projections c the tie plate is secured against lateral displacement on the tie.

The screws k are relieved of all lateral stressing and are stressed in tension only.

In the rail fastening shown in Figs. 10 and 11 the ribs g are made higher than in the constructional form shown in Fig. 9, so that plate springs o can be disposed between the head m of the screw k and the rail foot n . The height of the ribs g is made such that the space between the lower surface of the screw head and the upper surface of the rail foot is greater than the thickness of the spring o , so that the spring o is still somewhat arched when the screw head m rests on the rib g . Hence, when the screw k is completely screwed down, the spring o still has a certain amount of resilience.

In the constructional form shown in Figs. 12 and 13 a clip p is disposed between the spring o and the head m of the screw k , the clip surrounding the screw k and embracing the rib g . The rib-shaped pieces p_1, p_2 on the under side of the clip are of different thicknesses, so that the clip can also act as a gauge-adjusting means. In this constructional form the edges of the rail foot n rest against the inner rib-shaped piece of the clip p . The rib-shaped pieces p_1 and p_2 bear on the plate b . The screw head m bears against the upper side of the clip p . The distance between the flange of the clip p which engages over the spring o and the rail foot n is again made such that the spring when in the operative position still has a certain amount of play.

In the constructional form shown in Fig. 14 the plate b is fixed on the tie i by means of additional screws k_1 . The rail foot n is held down by spikes k_2 which are driven through holes which extend through the ribs g , the plate b and the tubular extensions c , and owing to their length provide a particularly good guide for the spikes k_2 , so that these spikes are also only stressed in tension, similarly to the screws in the other constructional forms of rail fastenings described above.

In the constructional form shown in Fig. 15 the plate b which is of the shape shown in Fig. 5 is held on the tie by additional spikes k_3 . The rail foot n is held down on

the tie plate *b* by screws *k*, between the heads of which and the rail foot springs *o* are disposed. The screws are guided in the long holes *a* extending through the rib *g*, the plate *b* and the tubular extension *c*.

The plate springs bearing on the rail foot in the examples shown in Figs. 10, 11, 12, 13 and 15 may be stressed by special tools before the screws are screwed in. As, however, the screws are securely supported laterally by the ribs *g* and the tubular extensions *c*, with a tie plate of such construction, the stressing of the spring can be effected by the screwing in of the screws or, when spikes are used, by the driving in of the spikes.

The dimensions of the springs in the examples shown are such that they ensure a permanent and secure connection between the rail foot *n*, the tie plate *b* and the tie *i* under working conditions. The plate springs *o* are preferably tapered in width or thickness towards both ends, so that they have approximately a triangular or stepped shape. If at the broadest place they are made as broad as half of the rail foot they will be secured against displacement perpendicularly to the rail web.

During the manufacture of the plates, which are provided with ribs on their upper side, for instance Fig. 4, through which the holes *a* for the tie screws or spikes are made, before the mandrel *d* is driven in for making the holes *a* and the tubular extensions *c* (Fig. 1), an iron plate is placed between the ribs *g* for preventing any undesired deformation of the ribs.

When spikes are used, for instance Fig. 14, the holes *a* are preferably made four-cornered, a four-cornered mandrel *d* being used to make them.

Owing to the combination of abutment ribs, tubular extensions, and springs, and the advantageous way in which they are arranged with respect to one another, the rail fastenings described above provide a very simple and cheap way of fixing rails which will fulfil all requirements.

What I claim is:

1. As an article of manufacture, a tie plate provided with holes for fasteners attaching the tie plate to the tie and with projections on the under surface of the plate, these projections surrounding the holes for the fasteners, characterized by the fact that the plate is integral with said projections and both consist of rolled iron.

2. As an article of manufacture, a tie plate provided with holes for fasteners attaching the tie plate to the tie and with projections on the under surface of the plate, these projections surrounding the holes for the fasteners, characterized by the fact that the plate is integral with said projections and both consist of rolled iron, the projections being tubularly shaped.

3. As an article of manufacture, a tie plate provided with holes for fasteners attaching the tie plate to the tie and with projections on the under surface of the plate, these projections surrounding the holes for the fasteners, characterized by the fact that the plate is integral with said projections and both consist of rolled iron, the projections being thin-walled and tubularly shaped.

4. As an article of manufacture, a tie plate provided with holes for fasteners attaching the tie plate to the tie and with projections on the under surface of the plate, these projections surrounding the holes for the fasteners, characterized by the fact that the plate is integral with said projections and both consist of rolled iron, the projections being tapering, thin-walled and tubularly shaped.

5. As an article of manufacture, a tie plate as claimed in claim 1, characterized by two shoulders for receiving the rail, the shoulders being provided upon the surface of the plate.

6. As an article of manufacture, a tie plate as claimed in claim 1, characterized by two shoulders for receiving the rail, the shoulders being formed by ribs of the plate.

7. As an article of manufacture, a tie plate as claimed in claim 1, characterized by two ribs forming shoulders for receiving the rail, the ribs being provided with holes for fasteners.

8. As an article of manufacture, a tie plate characterized by two ribs forming shoulders for receiving the rail, the ribs being provided with holes for fasteners for attaching the tie plate to the tie, projections surrounding these holes on the under side of the plate, these projections being integral with the plate, the whole plate consisting of rolled iron.

9. As an article of manufacture, a tie plate characterized by two ribs forming shoulders for receiving the rail, the ribs being provided with holes for fasteners for attaching the tie plate to the tie, projections surrounding said holes on the underside of the plate, said projections being integral with the plate and the whole plate consisting of rolled iron, the plate being provided with other holes beside the ribs, other holes for fasteners being provided in the plate beside the ribs.

10. As an article of manufacture, a tie plate as claimed in claim 1, characterized by two ribs forming shoulders for receiving the rail, the ribs being driven out to the form of a bow.

11. A rail fastening on wooden ties with plates as claimed in claim 8, and with fasteners for holding the foot of the rail, said projections entering tie holes, said fasteners being put throughout said ribs, plate and projections.

12. A rail fastening on wooden ties with plates as claimed in claim 8, and with fasteners for holding the foot of the rail, said projections entering tie holes, said fasteners
5 being put throughout said ribs, plate and projections, characterized by stressed plate springs lying upon the foot of the rail and bearing against the heads of said fasteners, so as to press said projections into the tie
10 holes.

13. A rail fastening on wooden ties with plates as claimed in claim 8 and with fasteners holding the foot of the rail, said projections entering tie holes, said fasteners being put
15 throughout said ribs, plate and projections, characterized by stressed plate springs lying only with their ends upon the foot of the rail and bearing with their backs against the heads of said fasteners so as to press said
20 projections into the tie holes, the heads of the fasteners resting on the ribs.

14. A rail fastening on wooden ties with plates as claimed in claim 8, and with fasteners holding the foot of the rail, said pro-
25 jections being tubularly shaped and entering tie holes, said fasteners being put throughout said ribs, plate and the projections, characterized by stressed plate springs lying upon the foot of the rail and bearing against the
30 heads of said fasteners, so as to press said projections into the tie holes.

15. A rail fastening on wooden ties with plates as claimed in claim 8, and with fasteners holding the foot of the rail, said pro-
35 jections entering tie holes, said fasteners being put throughout said ribs, plate and the projections, characterized by stressed plate springs lying upon the foot of the rail, clips being inserted between the springs and the
40 heads of said fasteners, said springs bearing against said clips so as to press said projections into the tie holes.

16. A rail fastening on wooden ties with plates as claimed in claim 9, and with fasteners for holding the foot of the rail, said
45 projections entering tie holes, said fasteners being put throughout said ribs, plate and projections, in addition to said fasteners, further fasteners being put through said other
50 holes.

17. A rail fastening on wooden ties with plates as claimed in claim 9, and with fasteners holding the foot of the rail, said pro-
55 jections entering tie holes, said fasteners being put throughout said ribs, plate and projections, characterized by stressed plate springs lying upon the foot of the rail and bearing against the heads of said fasteners, thereby pressing said projections into the tie
60 holes, in addition to said fasteners further fasteners being put through said other holes.

In testimony whereof I affix my signature.

MAX RÜPING.