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(54) A railway rail-fastening clip and a railway rail-and-fastening assembly

(57) A clip for fastening a railway rail (11) consists of a bent metal rod having, proceeding along the rod from one end to the other end, a substantially straight first portion (1) for insertion in a downgoing hole in a foundation (10) for the rail (11), a bent second portion (2), a third substantially straight portion (3) for lying on the foundation (10) beside one edge of the flange (12) of the rail (11) to locate the rail (11), a U-bend (4), a fifth portion (5) on one side of and spaced from the third portion (3), a U-bend (6) and a seventh portion (7) on the opposite side of and spaced from the third portion (3) for bearing downwardly on the rail flange (12). The clip can be secured to the foundation (10) by a fastening device (13) passing between the third and fifth portions (3 and 5) and into the foundation (10), with an enlarged head (13A) pressing the third and fifth portions (3 and 5) down on to the foundation (10).

FIG. 5.

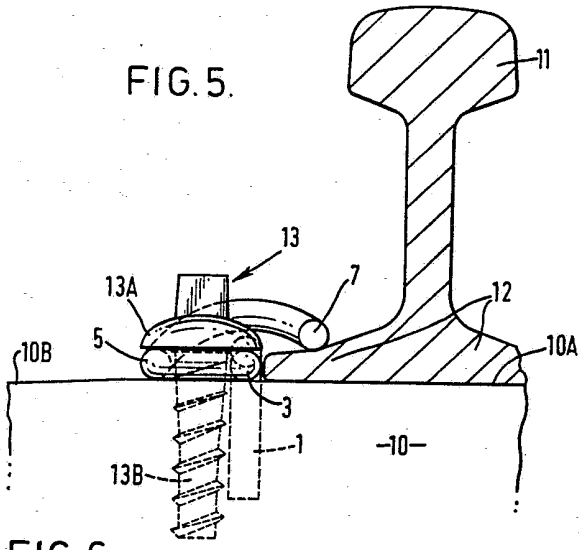
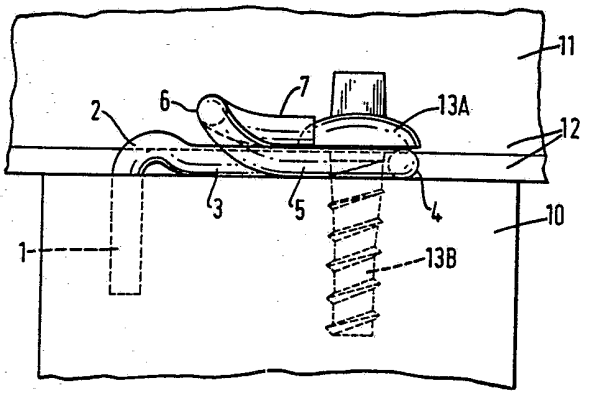


FIG. 6.



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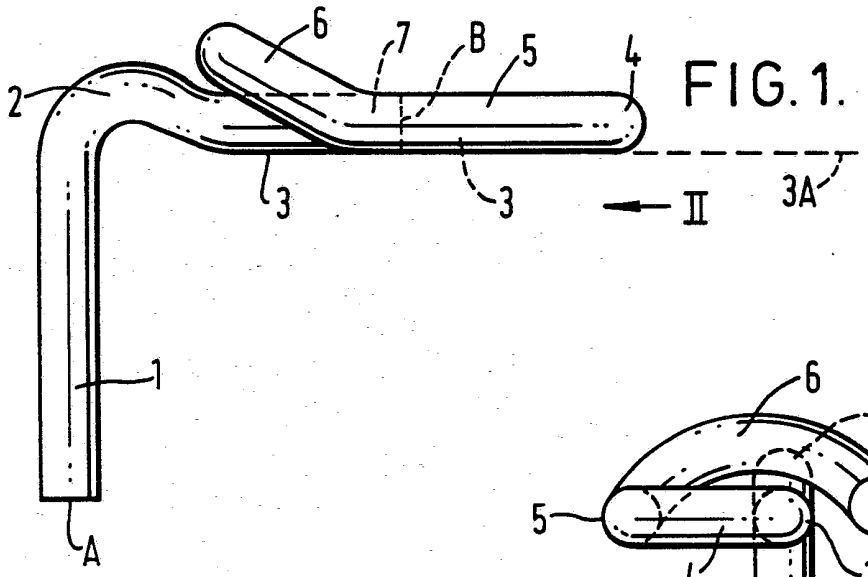


FIG.1.

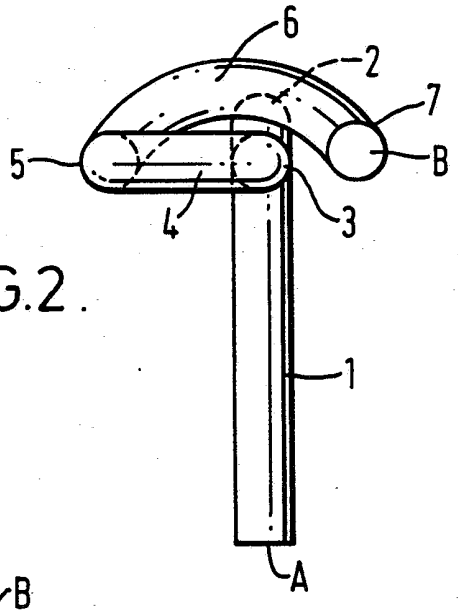
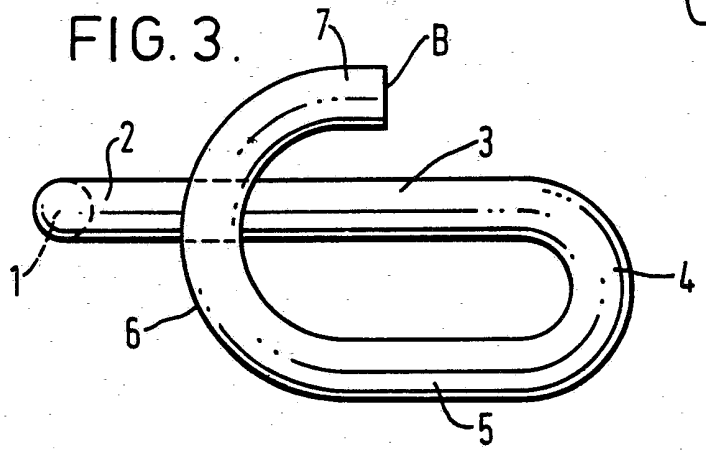


FIG.2.

FIG.3.



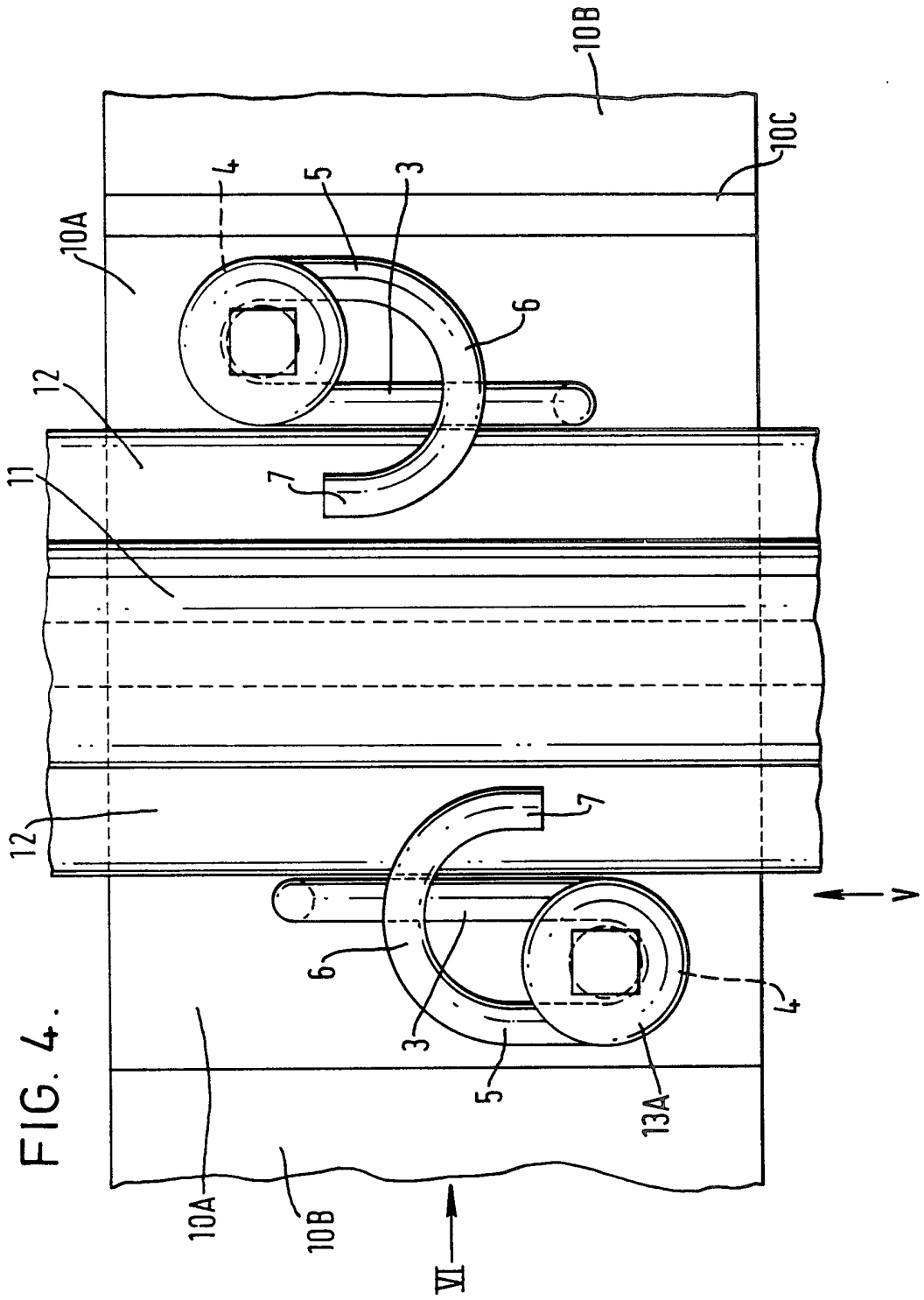


FIG. 4.

FIG. 5.

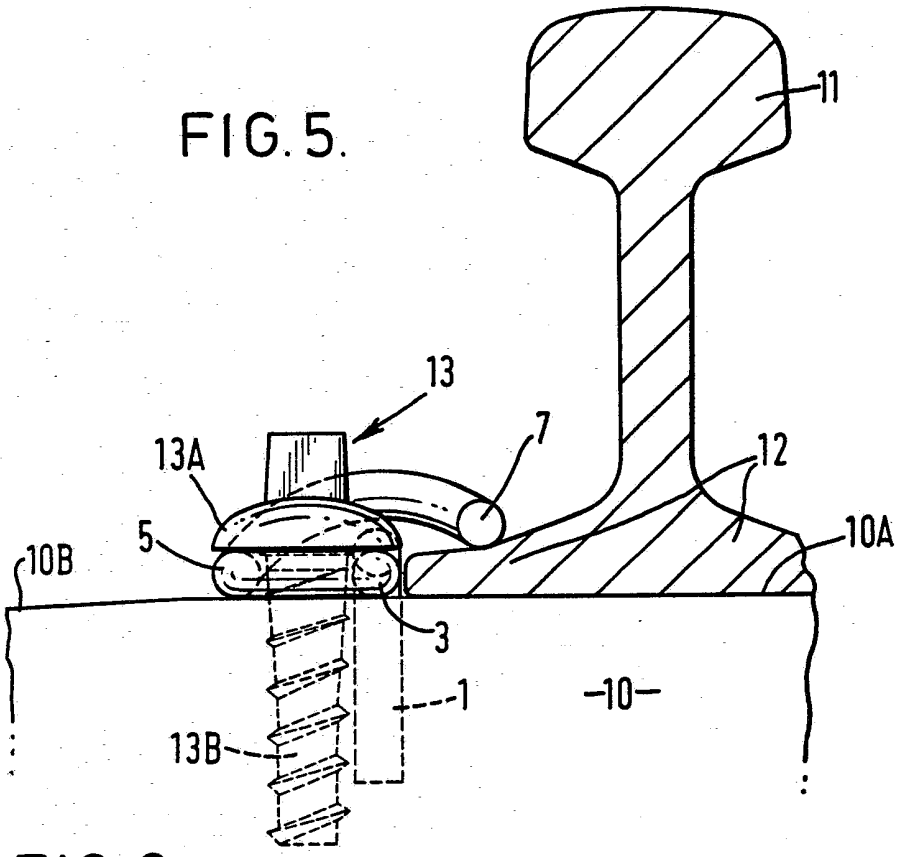
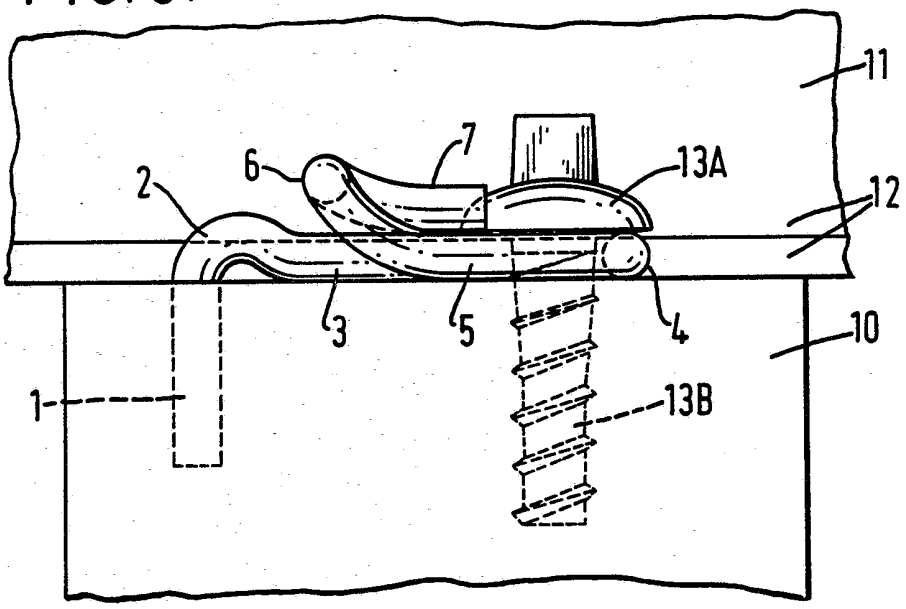


FIG. 6.



A railway rail-fastening clip and a railway rail-and-fastening assembly.

According to a first aspect of the present invention, there is provided a clip which is suitable for fastening a railway rail, the clip being a rod of metal which has been bent so as to have, proceeding along the rod from one end of it to the other end, firstly a substantially straight first portion, then a bent second portion, then a substantially straight third portion the axis of which makes an angle substantially more than 45° to the axis of the first portion, the two axes lying in the same plane as one another, then a fourth portion which is a reverse bend, then a fifth portion, then a sixth portion which is another reverse bend and finally a seventh portion, the construction being such that it is possible to place the clip in a particular position such that the third portion is horizontal and such that when the clip is viewed from above the fifth and seventh portions appear to be on opposite sides of the third portion.

Preferably the axes of the first and third portions are substantially perpendicular to one another. The second portion is preferably such that when the clip is in said position no part of the second portion is below the level of the lower side of the third portion.

According to a second aspect of the invention, there is provided a railway rail-and-fastening assembly comprising a foundation for a railway rail, the foundation having a hole in it extending downwardly from its upper surface, a railway rail having a flange at its bottom, one edge of the flange being beside the hole, a rail-fastening clip having a portion inserted downwardly into the hole, a further portion extending substantially parallel to the length of the rail beside the edge of the flange on the rail so as to limit

sideways movement of the rail, another portion beyond said further portion, as seen from the rail, bearing downwardly on the rail foundation and an additional portion overlying the flange of the rail and bearing downwardly on its upper surface, the assembly further comprising means for holding parts of said further portion and said another portion down on the rail foundation.

Preferably the clip in an assembly according to the second aspect of the invention is a clip according to the first aspect of the invention, in which case the portion in the hole is the first portion, said further portion is the third portion, said another portion is the fifth portion and said additional portion is the seventh portion.

An example in accordance with the invention is described below with reference to the accompanying drawings, in which:-

Figure 1 shows a side view of a rail-fastening clip,

Figure 2 shows another side view of the clip, taken as indicated by the arrow II in Figure 1,

Figure 3 shows a plan view of the clip,

Figure 4 shows a plan view of a portion of railway rail held down on a railway sleeper by two clips according to Figures 1 to 3, and

Figures 5 and 6 show side views, taken as indicated by the arrows V and V1, respectively, in Figure 4, of part of what is shown in Figure 4.

The clip shown in Figures 1 to 3 is made by bending a rod of resilient steel of circular cross-section and at least 0.8 cm. diameter. Proceeding along the bent rod from one end A to the other end B, the clip consists of a first portion 1 which is straight, a second portion 2 which could be a 90° bend but is preferably bent as shown, a third portion 3

which is also straight and has its axis perpendicular to the axis of the portion 1, these two axes lying in a common plane, a further portion 4 which is in the form of a reverse-bend or a U, a fifth portion 5 which lies alongside the third portion 3, a sixth portion 6 which is in the form of another reverse-bend or U and which passes approximately directly vertically above the junction between the third portion 3 and the second portion 2, and finally a seventh portion 7 which lies alongside the third portion 3. When the clip is in the illustrated position, with the third portion 3 horizontal, and it is viewed from above, the fifth and seventh portions 5 and 7 appear to be on opposite sides of the third portion 3.

When the clip is in the above-mentioned position, the portions 3 and 5 of it are at the same horizontal level as one another, i.e. a single horizontal plane contains the axis of the third portion 3 and the axis of the fifth portion 5.

The second portion 2 is wholly above the level 3A of the lower side of the third portion 3, i.e. no part of the second portion 2 is below that level. This is to enable the first portion 1 to be inserted in a vertical hole in a railway sleeper without enlarging the mouth of the hole to accommodate part of the bent portion 2.

Apart from the fact that it has the first and second portions, the clip is rather like a so-called "e-clip" which is disclosed in United Kingdom Patent Specification No. 1510224.

Further examples of a clip according to the first aspect of the invention could be obtained by adding the first and second portions 1 and 2 shown in the drawings to the free end of the substantially straight leg of a so-called "round-toe PR clip", as shown in United Kingdom Patent Specification No. 869385, or a so-

called "flat-toe PR clip" as shown in British Patent Specification No. 1213762.

The fifth portion 5 could be at a level higher than that of the third portion 3 and the seventh portion 7 could be at a level higher than that shown, provided that the clip can be so positioned that the third portion is horizontal and when the clip is viewed from above the fifth and seventh portions appear to be on opposite sides of the third portion.

Clips as described above can be used in a low-cost fastening system for securing a railway rail to an underlying structure and at the same time preventing sideways movement of the rail. To illustrate such a system, Figures 4 to 6 show a wooden railway sleeper 10 formed with a recess the floor of which constitutes a rail seat 10A, sloping downwardly from left to right, considering Figure 5, with a gradient of 1:20, upon which rail seat a railway rail 11 having a flange 12 at its base is directly placed, although there could be a resilient pad or a metallic plate placed on the rail seat and separating it from the bottom of the flange on the rail. Two vertical holes extend downwardly from the rail seat adjacent to respective edges of the rail flange and into these holes are inserted the first portions 1 of two clips according to Figures 1 to 3. The third portions 3 of the clips lie on the rail seat, beside opposite edges of the rail flange, and parts of the fifth portions 5 of the clips are each pressed downwardly into contact with the rail seat at a location, as seen from the rail, which is beyond the third portion 3 of the clip, and the seventh portions 7 of the clips are pressed downwardly on to the upper surface of opposite sides of the rail flange. This is done by a collar 13A on the head of a screw spike 13, the shank 13B of which passes between the portions 3 and 5 of the clip in each case and into a vertical hole

in the sleeper. If the screw spike becomes loose after a time, nevertheless the fact that the first portion 1 of the clip projects into a vertical hole in the sleeper will have the consequence that the third portion 3 of each clip remains substantially in its intended position and prevents sideways movement of the rail. The first portions of the clips projecting into the holes in the sleeper also resist any tendency for the clips to move along the rails.

The rail seat 10A forms the upper surface of the sleeper in the vicinity of the rail and the clips. There is another recess in the sleeper, the floor of which constitutes another rail seat on which there rests another rail (not shown) which is held down by two more clips. Except at the recesses in the sleeper, the upper surface of the sleeper is flat and horizontal, as shown at 10B. At the right-hand side of the recess in the sleeper there is an inclined wall 10C defining one end of the recess but there is no such wall at the left-hand side of the recess because the depth of the recess smoothly decreases from right to left, to zero at its left-hand side.

If desired, there could be a metal plate between the lower surface of the portion 5 of the clip and the upper surface of the sleeper, in order to reduce wear on the sleeper.

CLAIMS

1. A clip which is suitable for fastening a railway rail, the clip being a rod of metal which has been bent so as to have, proceeding along the rod from one end of it to the other end, firstly a substantially straight first portion, then a bent second portion, then a substantially straight third portion the axis of which makes an angle substantially more than 45° to the axis of the first portion, the two axes lying in the same plane as one another, then a fourth portion which is a reverse bend, then a fifth portion, then a sixth portion which is another reverse bend and finally a seventh portion, the construction being such that it is possible to place the clip in a particular position such that the third portion is horizontal and such that when the clip is viewed from above the fifth and seventh portions appear to be on opposite sides of the third portion.

2. A clip according to claim 1 in which the axes of the first and third portions of the clip are substantially perpendicular to one another.

3. A clip according to claim 1 or 2 in which, when the clip is in said position, no part of the second portion is below the level of the lower side of the third portion.

4. A clip according to any preceding claim in which, when the clip is in said position, the third and fifth portions of it are at the same horizontal level as one another.

5. A clip according to any preceding claim in which, when the clip is in said position, the sixth portion of it passes approximately directly vertically above the junction between the second portion and the third portion.

6. A clip which is suitable for fastening a railway rail, substantially as hereinbefore described with reference to Figures 1 to 3 of the accompanying

drawings.

7. A railway rail-and-fastening assembly comprising a foundation for a railway rail, the foundation having a hole in it extending downwardly from its upper surface, a railway rail having a flange at its bottom, one edge of the flange being beside the hole, a rail-fastening clip having a portion inserted downwardly into the hole, a further portion extending substantially parallel to the length of the rail beside the edge of the flange on the rail so as to limit sideways movement of the rail, another portion beyond said further portion, as seen from the rail, bearing downwardly on the rail foundation and an additional portion overlying the flange of the rail and bearing downwardly on its upper surface, the assembly further comprising means for holding parts of said further portion and said another portion down on the rail foundation.

8. An assembly according to claim 7 in which the clip is a clip according to any one of claims 1 to 6.

9. An assembly according to claim 7 or 8 in which said means is a screw spike having a shank which passes between the third and fifth portions of the clip and into a hole in the sleeper and an enlarged head which presses downwardly on the third and fifth portions.

10. A railway rail-and-fastening assembly, substantially as hereinbefore described with reference to Figures 4 to 6 of the accompanying drawings.

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