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(54) **Device for Connecting Rails**

(57) Device for connecting two mutually adjacent rails (2) comprising a first locking element (6) able to be operatively associated to first flanks (4) of the rails (2), a second locking element (7) able to be operatively associated to second flanks (5) of the rails (2) and means (8) for connecting the first locking element (6) to the second locking element (7). The first locking element (6) comprises a base portion (9) and an upper portion (10). The base portion can be associated underneath the rails (2) and extends from a first end (11) to a second end (12), whilst the upper portion (10) in superiorly integral

with the first end (11) of the base portion (9), and has a first face (13) able to be associated in abutment against the first flanks (4) of the rails. The second end (12) has at least a first through hole (14). The second locking element (7) has a second face (15) able to be associated in abutment against the second flanks (5) of the rails (2) and is mounted in removable fashion on the second end (12), with a second through hole (16) aligned to the first through hole (14). The connecting means (8) comprise at least a bolt (17) inserted through the first and the second through hole (16).

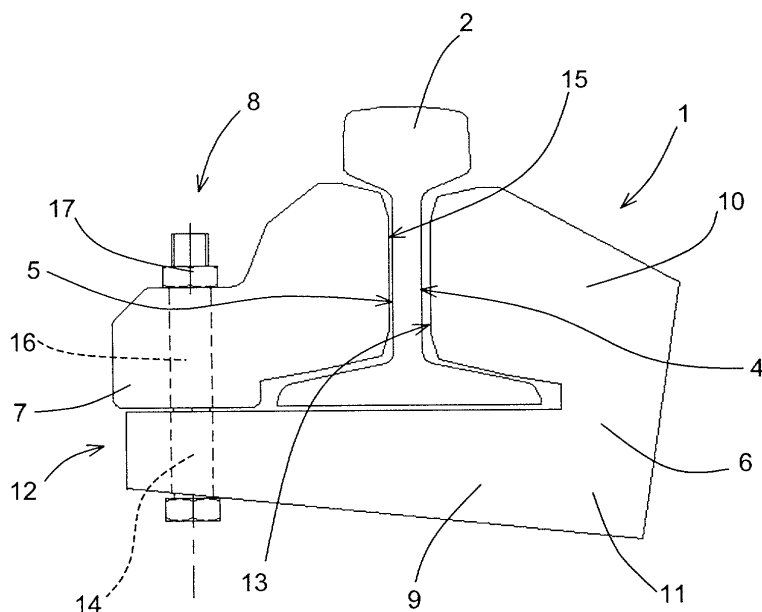


FIG. 2

Description

[0001] The present invention relates to a device for rendering rails safe, comprising the characteristics expressed in the preamble to claim 1.

[0002] As is well known, railway lines are formed by a succession of rails set with their heads mutually adjacent one after the other and mutually connected by means of head welds.

[0003] Such welds also serve the purpose of compensating for length variations of the rails due to the sudden temperature changes whereto the rails are subjected.

[0004] During the normal operation of the railway line, the rails are subject to considerable stresses which, in the long run, can lead to their breakage in correspondence with particularly weak points.

[0005] In particular, the weld point generally constitutes the weakest point of a rail, and hence it is the one where a failure occurs most easily. When a failure takes place, the whole line is paralysed and it is necessary to restore it as soon as possible.

[0006] To do so, two paths can be followed: either proceeding immediately with the final repair of the rail, or perform temporary emergency repairs.

[0007] The first solution obviously requires more time than the second one.

[0008] For this reason, over the years, the preference has been to perform temporary repairs on the line immediately, postponing the final repairs to a later time.

[0009] As is well known, in the cross section of a rail three parts can be substantially identified (Figure 1): the head F, the web G and the flange S.

[0010] The head F is the upper part, destined to support the wheels of the trains.

[0011] The web G, which is the thinnest part of the rail, is located between the head F and the flange S, which serves as a bearing on the sleepers.

[0012] The web G also exhibits two substantially vertical flanks L.

[0013] A first known manner of temporarily repairing the line provides for the use of a junction device able to be mounted on the rail in correspondence with the breaking point, which comprises two plate-like fish-plates that are mounted opposite on the two flanks of the rails, and one or more locking elements destined to maintain the two fish-plates tight against the flanks of the rails.

[0014] Said locking elements are C shaped and have to ends that face each other, whereof at least one is translatable, usually by means of screwing, in such a way as to be able to be approached or moved away from the other, to tighten or release the rails.

[0015] The locking elements, since they must not interfere with the operation of the rail, are mounted around the flange thereof in such a way as to tighten, with their ends, the two fish-plates against the flanks of the rail. The tightening force is adjusted by screwing the movable end of the locking element.

[0016] This solution, however, has some drawbacks linked to the presence of the welding beads on the flanks of the rails.

[0017] Said welding beads prevent a correct positioning of the fish-plates, which are not able to adhere in an optimal manner to the flanks of the two rails to be joined. Before mounting the junction device, therefore, it is necessary to eliminate the welding beads.

[0018] Operating times therefore are long, and the operation requires a considerable amount of work and the availability of appropriate tools.

[0019] Moreover, devices of this kind exhibit a certain constructive complication (two plates, C shaped locking elements) which makes their installation laborious.

[0020] An alternative solution is instead described in Italian patent application VR2000A000090 in the name of this same applicant.

[0021] In this constructive solution, the device is constituted by two complex connecting elements, each constituted by two plates able to be associated to the two rails, and by a connecting element between the plates which allows not to interfere with the welding beads.

[0022] On the two connecting elements are operatively active at least two locking elements of the kind described above.

[0023] This solution allows both to perform temporary and final repairs with no need to remove the device from the rails.

[0024] However, the great versatility of this device, which obviously entails a slightly higher cost than traditional ones, is under-utilised when it has to be used solely to render safe a broken weld while awaiting repairs to be performed at a later time.

[0025] In this situation the technical task constituting the basis for the present invention is to provide a device for rendering rails safe, which overcomes the aforementioned drawbacks.

[0026] In particular, a technical task of the present invention is to provide a device for rendering rails safe which has a reduced cost and allows to render broken rails safe in an easy and rapid manner.

[0027] Yet another technical task of the present invention is to provide a device for rendering rails safe which can be used also for the construction of temporary tracks.

[0028] The specified technical task and the indicated aims are substantially achieved by a device for rendering rails safe, as described in the accompanying claims.

[0029] Further features and advantages of the present invention shall become more readily apparent from the detailed description that follows of a preferred, but not exclusive, embodiment of a device for rendering rails safe, illustrated in the accompanying drawings, in which:

- Figure 1 shows a cross section of a rail;
- Figure 2 shows a front elevation view of a device for rendering rails safe according to the present in-

vention, mounted on a rail;

- Figure 3 shows a plan view of the device of Figure 2;
- Figure 4 shows a front elevation view of a first locking element of the device of Figure 2;
- Figure 5 shows a plant view of the locking element of Figure 4;
- Figure 6 shows a front elevation view of a second locking element of the device of Figure 2; and
- Figure 7 shows a plan view of the locking element of Figure 6.

[0030] With reference to the aforementioned figures, the reference number 1 globally indicates a device for rendering rails 2 safe, according to the present invention.

[0031] The device of the present invention can be applied to the rails 2 in correspondence with a breakage point thereof, or in general with a junction point 3.

[0032] In particular, it can be applied when the weld between two successive adjacent rails 2 breaks.

[0033] Hereinafter, respectively the two flanks 4 of the webs of the two rails oriented towards one side of the rail 2, and the two flanks 5 oriented towards the other side are defined as first and second flanks 4, 5 of the two rails 2.

[0034] The device 1 comprises a first locking element 6 able to be operatively associated to the first flanks 4, a second locking element 7 able to be operatively associated to the second flanks 5 and means 8 for connecting the first locking element 6 to the second locking element 7.

[0035] Advantageously, both the first and the second locking element 7 are constituted each by a single piece of contoured material.

[0036] The locking elements 6, 7 can be made of metallic material (iron, steel, ...), of carbon fibre, resin, or any other material suitable for the purpose.

[0037] The first locking element 6 is constituted by a base portion 9 and by an upper portion 10. The base portion 9, which extends, according to a first direction of development transverse to the rails 2, from a first end 11 to a second end 12, can be mounted below the flanges of the rails 10, whilst the upper portion 10 is superiorly integral with the first end 11 of the base portion 9.

[0038] The two ends 11, 12 of the base portion 9 project laterally relative to the rails 2, when the device 1 is installed.

[0039] The upper portion 10 also has a first face 13 able to be associated in abutment against the first flanks 4 of the rails 2, whereto it is advantageously counter-shaped.

[0040] In turn, the second end 12 has at least a first through hole 14. In the illustrated embodiment, two first through holes 14 are provided, having mainly vertical development.

[0041] The second locking element 7 has a second face 15 able to be associated in abutment against the second flanks 5 of the rails 2 relative to which it is pref-

erably counter-shaped.

[0042] The second locking element 7 is mounted in removable fashion above the second end 12 of the base portion 9 of the first locking element 6, and it has at least a second through hole 16 (two in the illustrated embodiment) aligned to the first through hole 14. In this way, the connection between the two locking elements 6, 7 is obtained through at least a bolt 17, two in the illustrated embodiment, inserted through the first and the second through hole 14, 16 (Figures 2 and 3).

[0043] Alternatively, the second through hole 16 can be threaded in such a way as to constitute a threaded seat. In this case the connection between the two locking elements 6, 7 can be obtained by means of a screw inserted through the first through hole 14, and screwed in the threaded seat (this embodiment is not illustrated herein).

[0044] Additionally, the first and the second face 13, 15 respectively exhibit a first and a second groove 18, 19 developing mainly in a substantially vertical plane, parallel to the first direction of development. Each groove 18, 19 is obtained in an intermediate area 20, 21 of the faces 13, 15, with reference to a horizontal direction perpendicular to the first direction of development, and allows to mount the device 1 in the presence of welding beads 22 between the two rails 2.

[0045] Preferably, the base portion 9 is substantially counter-shape with respect to the flanges of the rails 2, and the first groove 18 extends without interruptions also on said base portion 9 to allow mounting the device 1 even when the welding beads 22 between the two rails 2 develop also below the flanges.

[0046] The mounting of the device 1 for rendering rails 2 safe of the present invention is achieved by initially inserting the first locking element 6 underneath the rails 2 in such a way as to bring the first face 13 to adhere against the flanks of the rails 2.

[0047] Subsequently, the second locking element 7 is positioned on the second end 12 of the base portion 9 of the first element and the screws are inserted in the through holes until they are screwed in the appropriate seats.

[0048] By suitably tightening the screws, one therefore causes the adherence of the second face 15 of the second locking element 7 against the second flanks 5 of the rails 2.

[0049] The present invention achieves important advantages.

[0050] In the first place, the device for rendering rails safe of the present invention has a reduced cost which allows to render damaged rails safe in an easy and rapid manner, requiring limited operating times.

[0051] Moreover, said device can also be used for the construction of temporary track segments, such as those of a railway construction site.

[0052] It should also be noted that the present invention is easy to realise.

[0053] The invention thus conceived can be subject

to numerous modifications and variations, without thereby departing from the scope of the inventive concept that characterises it.

[0054] All components can be replaced by other technically equivalent elements and in practice all materials used, as well as the shapes and dimensions of the various components, can be any depending on requirements.

Claims

1. Device for rendering safe two mutually adjacent rails (2) each exhibiting, according to a section view, an upper head, a lower flange able to be set down on the ground and a web connected between the flange and the head and having a first flank (4) and a second flank (5), the first flanks (4) of the two rails (2) having the same orientation, said device (1) comprising a first locking element (6) able to be operatively associated to said first flanks (4), a second locking element (7) able to be operatively associated to said second flanks (5) and means (8) for connecting the first locking element (6) to the second locking element (7), **characterised in that** said first locking element (6) comprises a base portion (9) able to be associated to said rails (2) below said flanges, and extending according to a first direction of development, which in use is transverse to the rails (2), from a first end (11) to a second end (12), and an upper portion (10) superiorly integral with the first end (11) of the base portion (9), and having a first face (13) able to be associated in abutment against the first flanks (4) of the rails (2), said second end (12) having at least a first through hole (14); **in that** said second locking element (7) has a second face (15) able to be associated in abutment against the second flanks (5) of the rails (2) and at least a second through hole (16), and is mounted in removable fashion above said second end (12), said second through hole (16) being aligned to said first through hole (14); and **in that** said connecting means (8) comprise at least a bolt (17) inserted through said first and second through hole (16).
2. Device as claimed in claim 1 **characterised in that** said first and second locking element (6), (7) are constituted each by a single piece of contoured material.
3. Device as claimed in claim 1 or 2 **characterised in that** said first and second face (13), (15) are substantially counter-shaped with respect to said flanks (4), (5), and exhibit respectively, in their own intermediate area (20), (21) with reference to a horizontal direction perpendicular to the first direction of development, a first and a second groove (18), (19) developing mainly in a substantially vertical plane,

parallel to the first direction of development, to allow the mounting of the device (1) in the presence of welding beads (22) between the two rails (2).

4. Device as claimed in claim 3 **characterised in that** said base portion (9) is substantially counter-shaped with respect to the flanges of said rails (2), and **in that** said first groove (18) extends without interruptions also on said base portion (9).
5. Device as claimed in any of the previous claims, **characterised in that** said second locking element (7) has at least two second through holes (16), **in that** said second end (12) has at least two first through holes (14), and **in that** said connecting means (8) comprise at least two of said bolts (17), each inserted through a first and a second through holes (14), (16).
6. Device as claimed in claim 1 **characterised in that** said second through hole (16) is threaded and defines a threaded seat, and **in that** said connecting means (8) comprise a screw inserted through said first through hole (14) and screwed in said threaded seat.

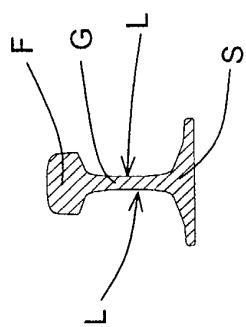


FIG. 1

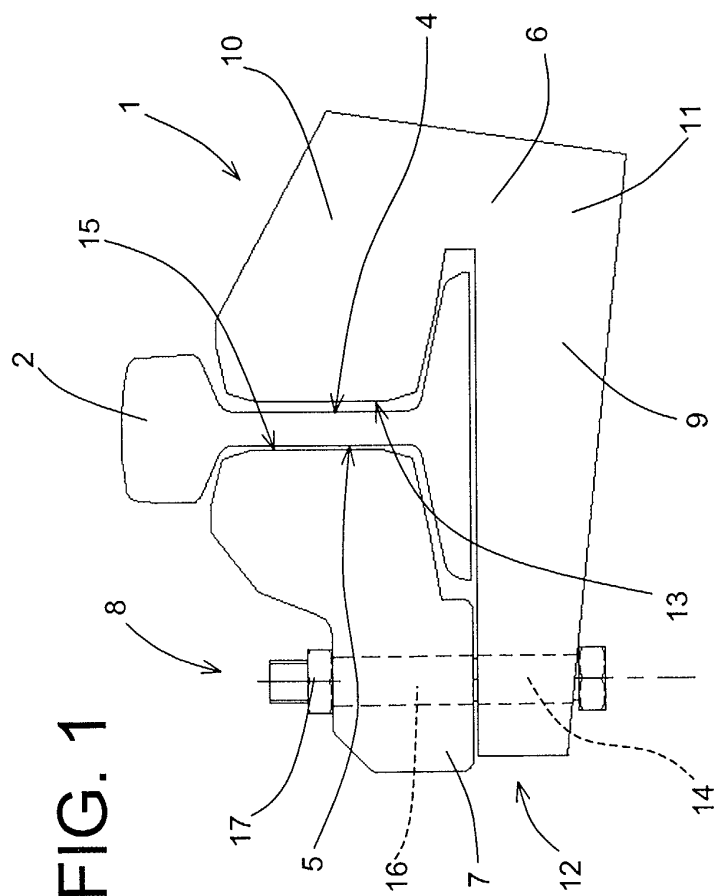


FIG. 2

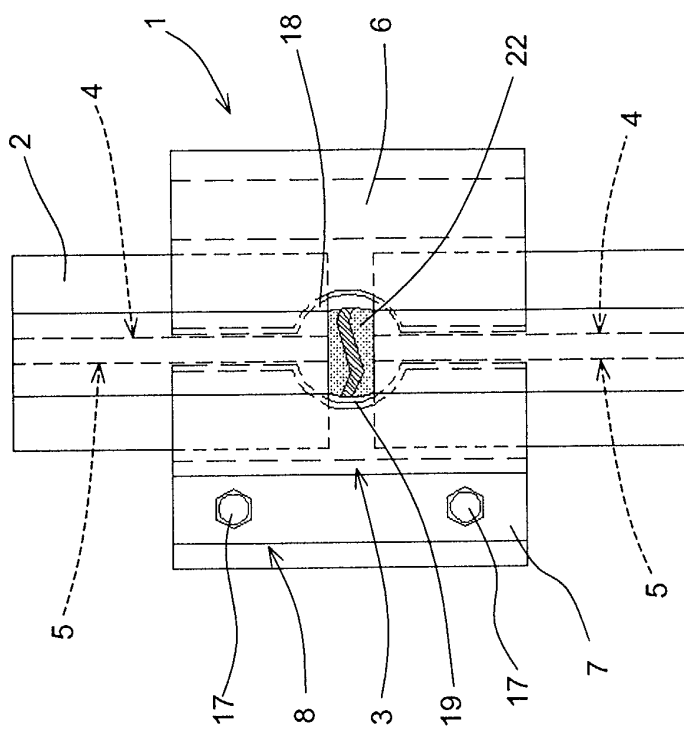


FIG. 3

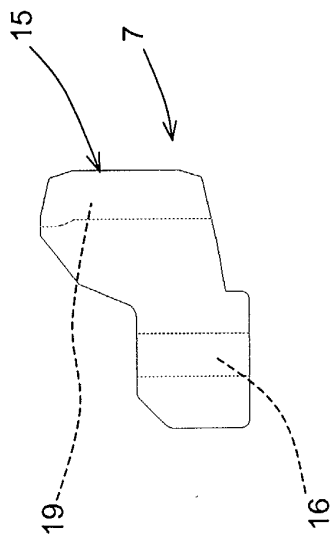
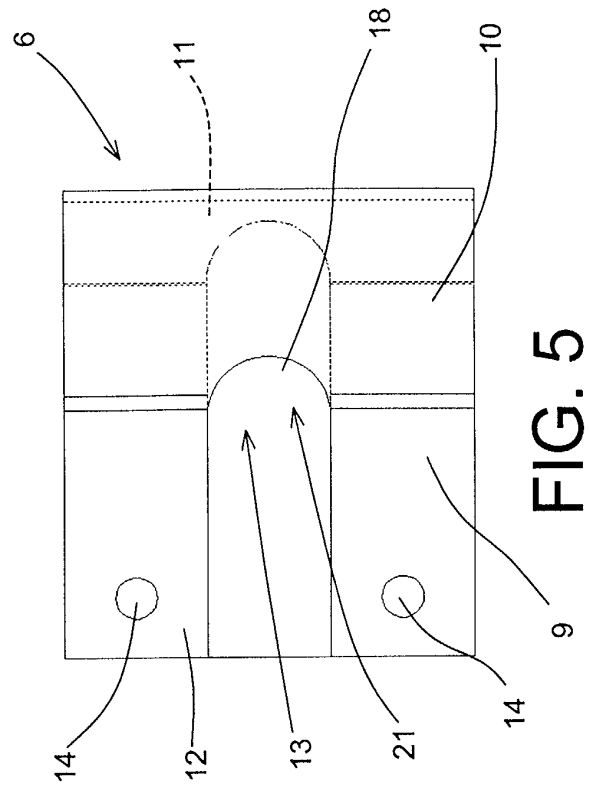
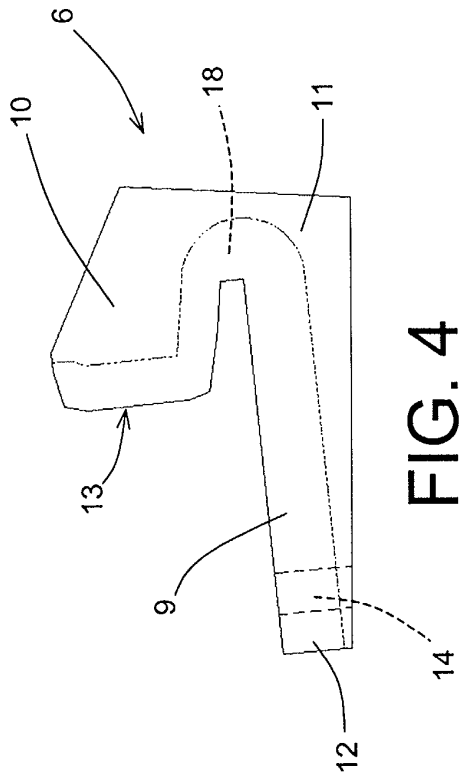
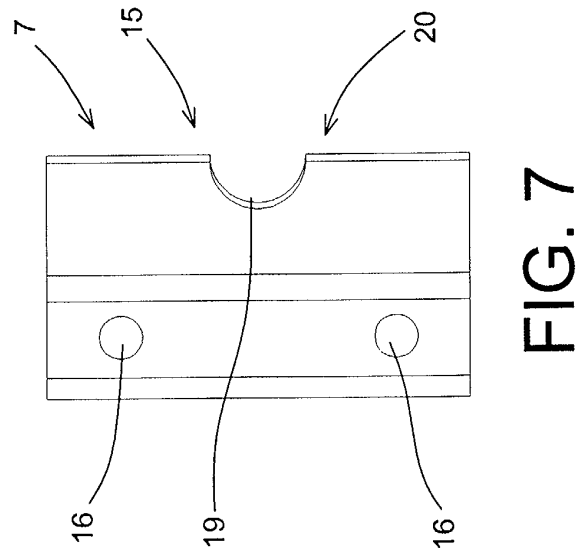


FIG. 6





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5175

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The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 25 July 2002	Examiner Fernandez, E
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 02 42 5175

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