(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 642 025 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
25.09.2013 Bulletin 2013/39

(21) Application number: **11841208.9**

(22) Date of filing: **14.11.2011**

(51) Int Cl.:
E01B 1/00 *(2006.01)* ***E01B 29/02*** *(2006.01)*
E01B 29/04 *(2006.01)* ***E01B 29/24*** *(2006.01)*

(86) International application number:
PCT/ES2011/000336

(87) International publication number:
WO 2012/066163 (24.05.2012 Gazette 2012/21)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **16.11.2010 ES 201001489 P**

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(54) RECOVERABLE TEMPORARY TRAVERSE

(57) The invention is applicable in the construction of tracks consisting of plates with rails that are not interconnected, in order to fix the geometry of the track while the concrete hardens, which maintains the track in its definitive position, without interfering in the running surface. The invention comprises at least. A main structure (1) arranged between the rails (12) and provided with housings (3) and (4) into which part of the rails (12) is introduced, and anchoring elements (5) for fixing secondary parts (2) the pass beneath the rail, tightening said rail against the main structure (1). In addition, the main structure can comprise height adjusting mechanisms (6). The main structure (1) is designed in such a way that it can be turned and rotated in order to be extracted from between the rails (12). Furthermore, the height adjusting mechanisms (6) are independent from the main structure (1) and are built into a supporting substructure (17) arranged between the rails (12), enabling the displacement of the track.

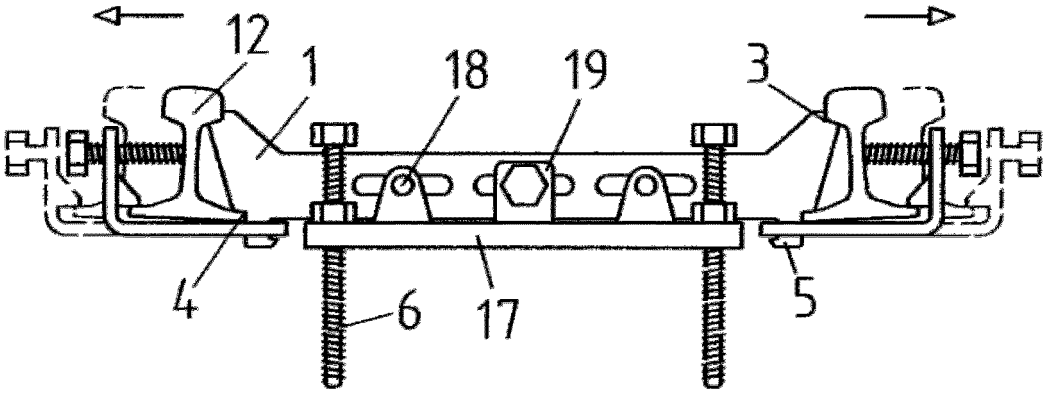

Fig. 7

EP 2 642 025 A1

Description

Object of the invention

[0001] The present invention relates to a recoverable temporary traverse applicable in the construction of railway tracks consisting of plates with rails that are not interconnected, and that are anchored by means of block or plate supports with inserts.

State of the art

[0002] Currently, the construction of railways by means of the so- called plate tracks with rails that are not interconnected and that are anchored by means of block or plate supports with inserts is becoming more common.

[0003] In this type of railway, the rails are held by fixing means that are part of block-shaped supports or plates with inserts that are independent for each rail, which are anchored in place by a setting concrete slab where they are embedded and that holds them when the concrete is set, so in this type of railway it is the setting concrete slab, when hardened, what determines the track gauge, the inclination of the rails, and their position in the space, so that the track and their fittings must be perfectly mounted and positioned before pouring the concrete that will form the slab. To do this, generally a concrete base is firstly poured, on which, once set, the track is assembled by using temporary traverses that are placed every 1.5 to 2 metres away and which are responsible for maintaining the track gauge and the inclination of the rails with respect to the running surface. Then, the track is lifted by jacks, the block supports or plates with insert are hanged to the rails and topographers position the track in that space by making all the necessary corrections. When the track is perfectly aligned and levelled, it is maintained in position by means of shims placed under the rails or the supports, or using threaded levelling rods incorporated to the temporary traverses and that maintain the track in place while the concrete, which will form the setting slab, is poured. Once it has set, the temporary traverses are removed.

[0004] When this type of tracks began to be used, temporary traverse were built lying on the running surface and covering the rail above its head and which, by means of screw, tightly pressed the active side of the rail head and the internal end of the rail foot against the central part of the traverse, thus keeping the rail in the suitable position and preventing it from sliding in case the track were held high by temporary traverses provided with levelling rods. These traverses, being constructed by forming a single piece, were solid and precise, and, as they were removed upwards, they were easy to disassemble. However, as they interfere with the running surface, they prevent the circulation and therefore the use of topographic carts used for the track positioning, which were created afterwards and that are cars with three support points equipped with rollers that allow for its circulation by the track by taking data along the entire path instead on a point to point basis as it was previously done. This enables topographers to do their job quickly and accurately.

[0005] To solve this problem other temporary traverses were designed that position each rail by holding it from the rail foot and allow for the circulation of topography carts but causing other problems. This type of traverses has lost much of its rigidity in the vertical direction because, in most rail tracks of this kind, there are only 25 or 30 millimetres between the setting concrete and the rail foot, which has forced to construct them very thin in the direction where they have to perform a greater effort. Furthermore, the reduced space between the rail foot and the setting slab raise serious challenges, because if the temporary traverses are built in a single piece, then it is necessary to loosen all the rail fixing means in order to lift them and remove the traverses with the aim of recovering them; on the other hand, if they are built divided so they can be removed without having to raise the track just assembled, then they lose stiffness and precision. Moreover, the attachment of the rails at the rail foot, which is the farthest part from the running surface and the active side of the rail, which is where the track parameters must apply, causes the occurrence of deformations that affect the slope of the track and the track gauge, thus complicating the topographer's work and reducing the accuracy of the track.

[0006] It would be therefore desirable to conceive a new kind of recoverable temporary traverse that does not interfere in the circulation of topography carts, ensures the track gauge and the inclination of the rails with respect to the running surface and allows for an easy disassembly without having to move the rails for removal.

Description of the invention

[0007] In order to offer a solution to the above problems presented by the hitherto known temporary traverses, a recoverable temporary traverse having a new structure and functionality is provided.

[0008] The recoverable temporary traverse of the present invention is characterized in that it comprises a main supporting structure to be placed on the inside of the track between the rails, perpendicularly to the axis thereof, and intended to set the track gauge, the inclination of the rails with respect to the running surface and to maintain the rails and stands in the proper position while the setting concrete, which forms the slab, hardens, and at least one pair of secondary elements to be placed from each of the outer faces of the track by passing beneath the rails in order to be temporarily attached to the main structure and intended to press the rails against the main structure by fixing them to it, thus ensuring their correct position.

[0009] The main supporting structure is formed by at least one piece where their vertices form a rectangle perpendicularly oriented to the ground, and in the two upper

corners of which are angular shaped housings in which a portion of the inner lower corners of the rail head is inserted and supported, and in the two lower corners of which are other angular shaped housings in which a portion of the inner upper corners of the rail foot is inserted and supported. Moreover, this main structure has two main anchoring systems located at its bottom and intended for the temporary attachment of the secondary parts. This main structure may also have at least two mechanisms for regulating the height of the structure with respect to the concrete base on which the track is assembled.

[0010] This arrangement allows for the rails to rest against the main structure at two points, one located at the rail head just below the point where the track gauge is measured thus ensuring this, the other located at the corner of the rail foot, that is, the point situated on the same side of the farthest rail from the previous one and therefore ensuring as greater accurately as possible in the inclination angle of the rails. Furthermore, as the rail is engaged by the upper and lower housings of the main structure, it is impossible that a vertical sliding occurs between the main structure and the track in case the track were maintained in an elevated position through temporary traverses provided with mechanism for adjusting the height of the structure. This arrangement also allows for the main support structure to be extracted from the recently assembled track by turning and rotating it, thus making unnecessary to remove any element in the track to facilitate the removal thereof and decreasing the work, increasing the accuracy of the track parameters, while allowing, if desired, the main structure for being made in a single piece, what eliminates potential errors in manufacturing and in the assembly of the joints, increasing the accuracy of the track and making cheaper the manufacture of both, the temporary traverse and the track.

[0011] It should be noted that, in some cases, in order to facilitate the alignment of the track, it may be interesting to separate the height adjusting mechanisms and to integrate them into a substructure independent from the main structure in order to allow that said main structure and the track supported by it to move transversely without the need to move said adjusting mechanisms. For this purpose, the supporting substructure of the height adjusting mechanisms has been provided with at least one sliding mechanism of the main supporting structure and at least a mechanism for adjusting and fixing the position thereof on the substructure.

[0012] Secondary angle parts whose wings form an angle of about 90 degrees are also provided. These pieces have, at the end of the lower wing, an anchoring element which allows to temporarily fixing them to the anchors provided for this purpose on the main frame passing beneath the rail through the space existing between the setting concrete and the bottom face of the rail foot. They also have, at the end of the vertical wing, a tightening mechanism intended to push the rail from the outside of the track by supporting it at its ends against the housings of the main structure. Furthermore, this wing includes at least one projection, situated under the tightening mechanism and intended to rest on the upper and outer face of the rail foot and to prevent the secondary part from sliding from the anchoring element of the main structure because of the pressure mechanism action on the rail by pushing it against the main structure.

[0013] This arrangement allows to attach the rails to the main support structure in a solid and accurate way as it allows for the rails to be pressured against the angular housings of the main supporting structure, but without interfering in any way with the running surface, thereby enabling the use of topography carts, what facilitates the work of topographers and increases the accuracy of the track parameters. Additionally, as they are separate pieces that can be easily assembled and disassembled, they allow the main structure to be extracted from the recently assembled track by turning and rotating it without the need to disassemble any of its parts.

[0014] The features disclosed in the recoverable temporary traverse for tracks in plates with anchoring by means of blocks or plates with inserts provide a solution to the drawbacks described above presented by the temporary traverses previously known.

Description of the drawings

[0015] With the aim of facilitating the understanding of the invention described herein some explanatory drawings have been included.

[0016] These drawings represent an embodiment schematic example of the recoverable temporary traverse object of the present invention.

Figures 1, 2, and 3 represent the temporary traverse according to the present invention, seen respectively in a front elevation (Fig. 1), side elevation (Fig. 2) and plan (Fig. 3) view.

Figure 4 represents an enlarged detail of the attachment of the rail to the temporary traverse.

Figures 5 and 6 represent, respectively, a schematic elevation and plan view of the turning and rotation movements to be performed by the traverse of the invention in order to be removed from the rails.

Figures 7 and 8 are respective front elevation (Fig. 7) and plan (Fig. 8) views of an alternative embodiment of the temporary traverse of the invention in which the height adjusting mechanisms (6) have been integrated on a substructure (17) independent of the main support structure (1).

Figures 9 and 10 show elevation (Fig. 9) and top plan (Fig. 10) views of an embodiment variant of the temporary traverse in which the height adjusting mechanisms are integrated into one independent substructure of the main supporting structure and connected with it by means of a regulating and locking system, in this case a tensioner for the relative at-

tachment in the cross direction.

Preferred embodiment of the invention

[0017] In the example shown in the accompanying figures, the recoverable temporary traverse comprises: a main supporting structure (1), secondary pieces (2) intended to hook onto the opposite ends of the main structure (1) and a tightening mechanism (10), made of screws mounted on said secondary parts and laterally pushing the rails (12) of the track against the opposite ends of the main structure by establishing a fixed separation and inclination of said rails (12).

[0018] The main supporting structure (1) located on the inside of the track between the rails (12) is intended to maintain the track gauge and inclination of the rails (12) while the setting concrete (21), which will definitely attach the track to said concrete base (22), hardens.

[0019] The main supporting structure (1) is formed by a flattened piece, in this case, a cast piece, perpendicularly oriented to the ground and having, at its opposite ends, upper housings (3), of angular shape, into which a portion of the inner lower corners of the heads (13) of the rails (12) are inserted and supported, and other lower housings (4), of angular shape, into which a portion of the inner upper corners of the foot (14) of the rails (12) are inserted and supported.

[0020] Furthermore, this main structure (1) has two hook- shaped anchoring systems (5) located at its bottom and intended for the temporary attachment of the secondary parts (2) .

[0021] This main structure (1) also have two height adjusting mechanisms (6) for adjusting the height of the structure with respect to the concrete base (22) on which the track is mounted.

[0022] The secondary parts (2) have two wings (7, 9) which, in the example shown, form an angle of about 90 degrees.

[0023] These secondary parts (2) have, at the end of the lower wing (7), a housing (8) which allows to temporarily attach them to the hook-like anchoring elements (5) of the main structure (1); said lower wings (7) passing beneath the rails (12) without interfering in the running surface (23).

[0024] Said secondary parts (2) also have, at the end of the wing vertically located (9), a tightening mechanism (10), represented in this case by a screw, intended to push the rail (12) from the outside of the track by supporting it at its ends against the housings (3, 4) of the main structure (1).

[0025] Furthermore, in the exemplary embodiments shown in Figures 1 to 8, this vertically positioned wing (9) includes a projection (11) intended to rest on the upper and outer face of the rail foot (14) and prevent that the secondary piece (2) swing from the anchoring element (5) of the main structure (1) upon actuation of the tightening mechanism (10) on the rail (12) when pushing it against the main structure (1) .

[0026] Figures 5 and 6 represent a schematic elevation (Fig. 5) and plan (Fig. 6) view of the turning (15) and rotation (16) movements to be performed by the traverse of the invention in order to be removed from the rails once its task has finished, in case its main supporting structure (1) is made in a single piece without detachable joints.

[0027] As can be seen in the accompanying figures, the height adjusting mechanisms (6) can have different configurations.

[0028] Specifically, in the embodiments shown in Figures 1 to 6, said height adjusting mechanisms (6) are constituted by threaded rods mounted on two drilled and threaded housings that vertically pass through the axis of the main structure (1), so that they allow for the regulation of the height of the main structure and of the track on the concrete base (22) .

[0029] In Figures 7 and 8, the height adjusting mechanisms (6) are integrated in a substructure (17) situated between the rails and independent from the main supporting structure (1). These height adjusting means allow for keeping the rails (12) and their supporting elements (20) elevated and in position on the concrete base (22) while the setting concrete (21), which is intended to definitely attach the track, hardens.

[0030] This substructure (17) also incorporates sliding mechanisms (18) and a position locking mechanism (19) allowing the cross movement of the main supporting structure (1) and of the track, thus facilitating the alignment of the latter.

[0031] In the illustrative embodiment shown in Figures 9 and 10, the sliding mechanism in the cross direction and the locking mechanism of the substructure (17), which has the height adjusting mechanism, are constituted by an adjustable tensioner (24) that is attached at one of its ends to said substructure (17) and at its opposite end to the main structure (1).

[0032] In said Figures 9 and 10, the vertical wing (9) does not have the projection intended to rest on the upper and outer surface of the rail foot (14), having, however, the lower wing (7) of each of the secondary parts (2) two housings (8) for being hooked onto the respective pairs of anchoring elements (5) defined at the lower areas of the respective ends of the main structure. This double anchor prevents the swinging of the secondary parts (2) with respect to the main structure (1) during the pushing of the rails (12) against said main structure by means of the tightening mechanisms (10).

Claims

1. Recoverable temporary traverse applicable in the construction of railway tracks on plates with rails that are not interconnected and anchored by means of block or plate supports with inserts, and intended to attach and position in a given space rails (12) provided with a head (13) and a foot (14) defining a

running surface and forming a track and anchoring supports (20) thereof while performing a mounting, levelling and alignment process of the track and pouring and hardening on a concrete base (22) a setting concrete (21) that will definitively secure said track in a position, **characterized in that** it comprises:

- a main supporting structure (1) intended to be placed between the rails (12) perpendicularly to the axis of the track, said main structure having, at its opposite ends, upper housings (3) wherein at least one portion of the heads (13) of the rails (12) are inserted and are laterally and vertically supported, and lower housings (4) wherein at least one portion of the feet (14) of the respective rails (12) are laterally and vertically supported in a given position, said main structure (1) having at least two anchoring systems (5) for temporary attaching secondary parts (2);
- at least two secondary parts (2) having: a lower wing (7) provided with a housing (8) or the like for temporary attachment to at least one anchoring system (5) of respective lateral end of the main structure (1) and intended to be positioned beneath the corresponding rail (12) without interference with a running surface (23) of the track, and an vertical wing (9) arranged on the outer side of the corresponding rail (12),
- tightening mechanisms (10) mounted on the vertical wings (9) of the secondary parts (2) and intended to push the rails (12) from the outer side of the track against the housings (3, 4) of the main structure (1); said main structure (1) determining, in the pushing operating position of the tightening mechanisms (10), the track gauge and the inclination of the rails (12) with respect to the running surface (23).

2. Recoverable temporary traverse, according to claim 1, **characterized in that** it comprises at least two main structure (1) height adjusting mechanisms (6) for keeping the rails (12) and supports (20) thereof at a suitable height and position relative to the concrete base (22) during hardening of the setting concrete (21) that definitely secures the supports (20) on said concrete base (22).

3. Recoverable temporary traverse according to claim 2, **characterized in that** the height adjusting mechanisms (6) are located at the ends of the main structure (1).

4. Recoverable temporary traverse according to any of the preceding claims, **characterized in that** the vertical wing (9) of the secondary parts has at least one projection (11) located beneath the tightening mechanism (10) and intended to rest on an upper face of the rail foot (14) and prevent the secondary part (2) from swinging from the anchoring system (5) of the main structure (1) while the tightening mechanism (10) actuates sidewards against the rail (12) and pushes against the main structure (1).

5. Recoverable temporary traverse according to claim 1, **characterized in that** the main supporting structure (1) is formed by a single part without detachable attachments, wherein the housings (3, 4) for lateral support of the heads (13) and feet (14) of the respective rails (12) have vertical faces arranged parallel to one another, so as to allow to turn (15) the main structure (1) over in the same direction as the axis of the rails (12) and then rotate it (16) to be removed from between the rails of the track.

6. Recoverable temporary traverse according to any of claims 1 and 2, **characterized in that** the height adjusting mechanisms (6) are independent from the main structure (1) and are incorporated into a supporting substructure (17) located between the rails and equipped with a sliding and guiding mechanism (18) and a position locking mechanism (19) allowing the main structure (1) to be moved transversally relative to the height adjusting mechanisms and the track to be alligned without having to move the supporting substructure (17).

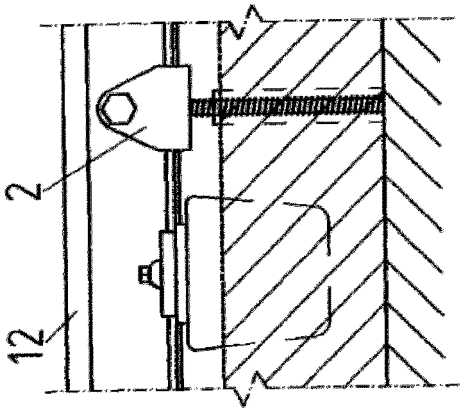

Fig. 2

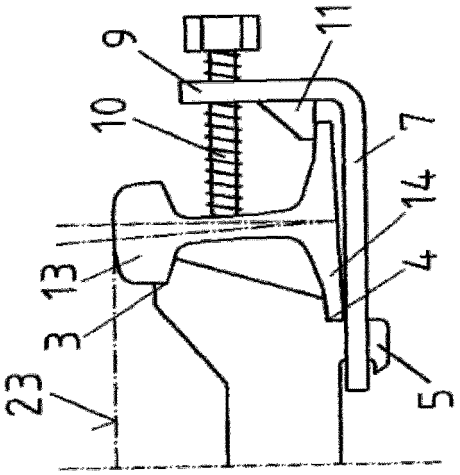

Fig. 4

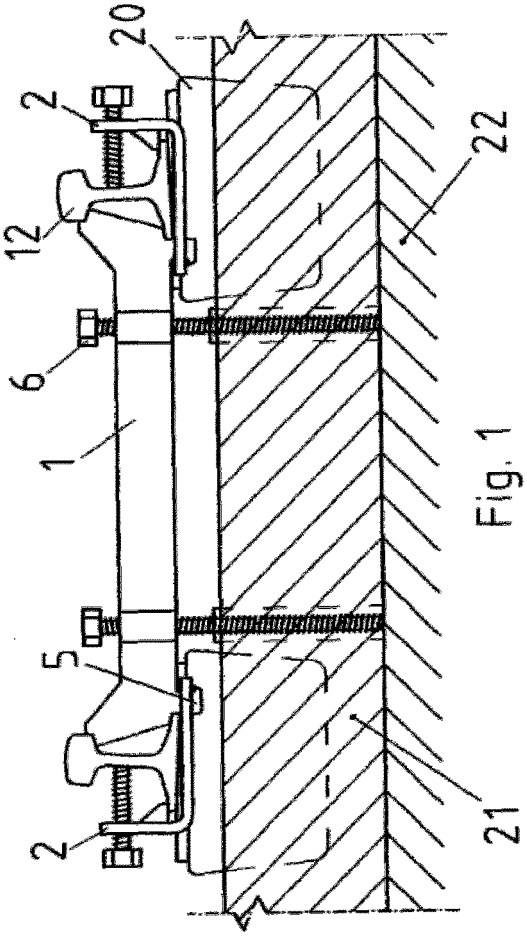

Fig. 1

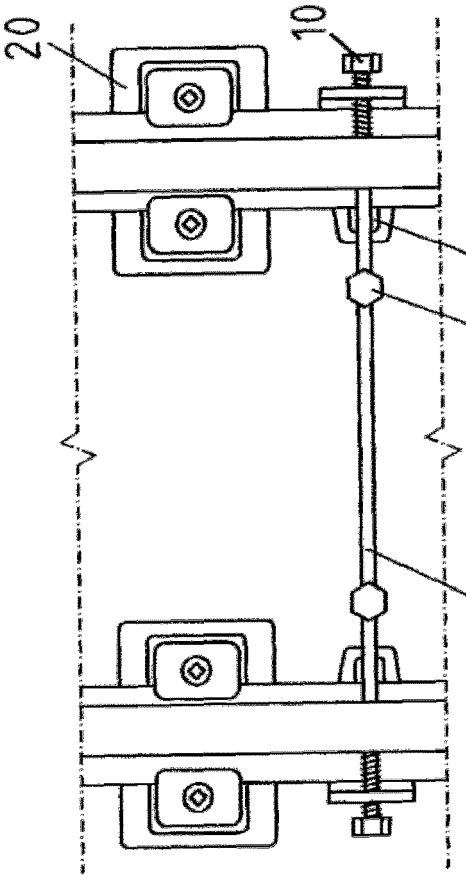

Fig. 3

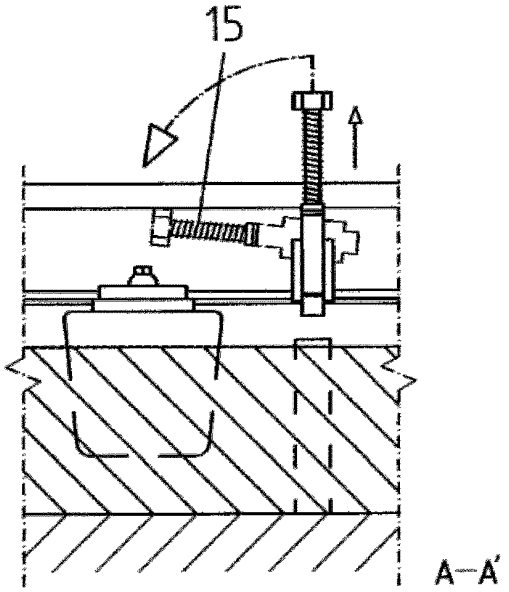

Fig. 5

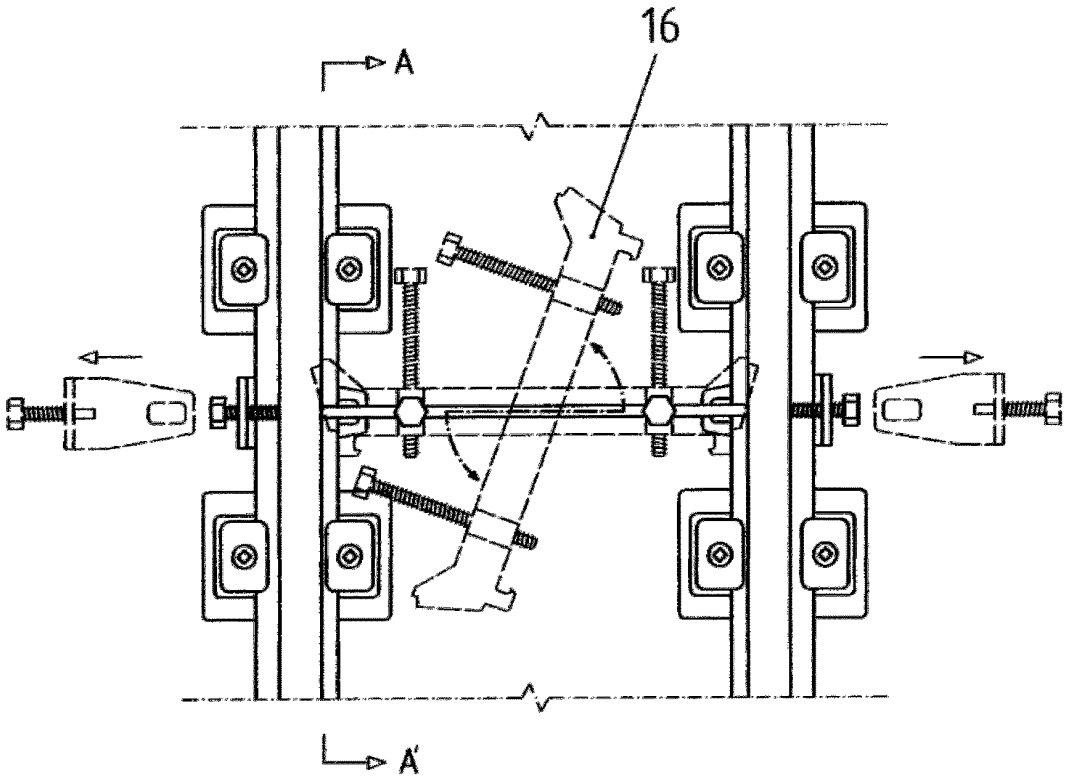

Fig. 6

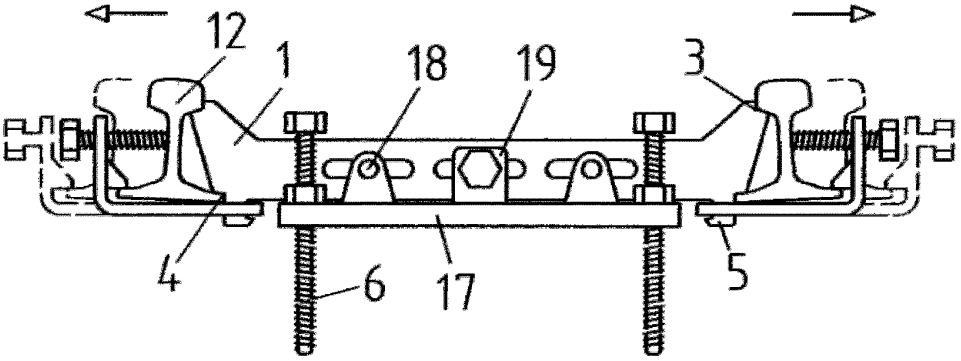

Fig. 7

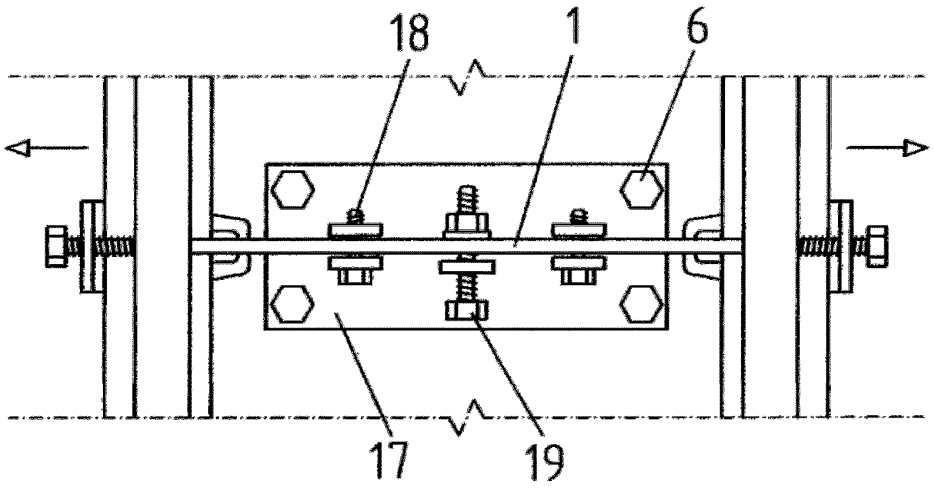

Fig. 8

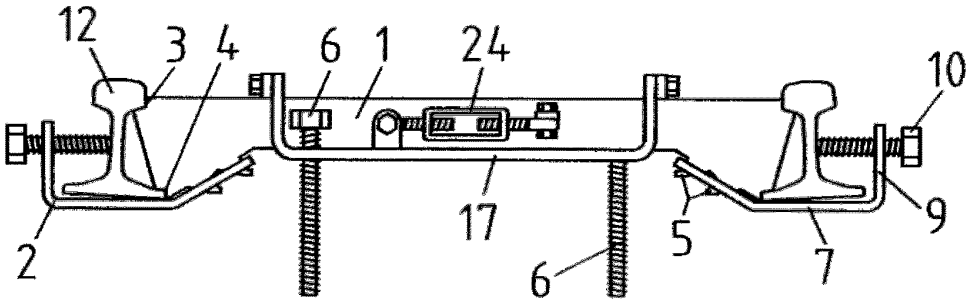

Fig. 9

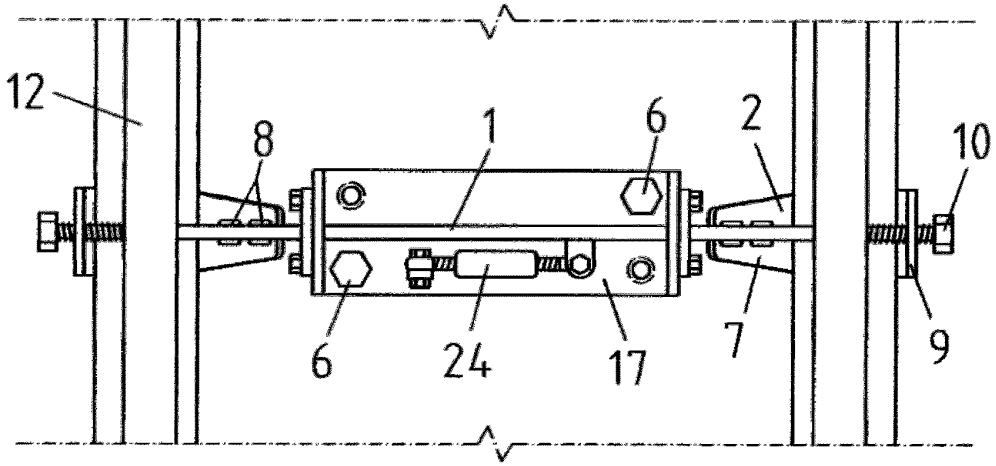

Fig. 10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2011/000336

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E01B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
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Date of the actual completion of the international search	Date of mailing of the international search report
04/04/2012	**(11/04/2012)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer I. Rodríguez Goñi Telephone No. 91 3493447

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2011/000336

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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Form PCT/ISA/210 (continuation of second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

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CLASSIFICATION OF SUBJECT MATTER

E01B1/00 (2006.01)
E01B29/02 (2006.01)
E01B29/04 (2006.01)
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