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(54) **Twin-block sleeper for ballastless slab track**

(57) Twin-block sleeper for ballastless slab track, related to a railway sleeper of the type to be used in particular for ballastless track or (concrete) slab track and comprising two concrete blocks joined by a reinforcing steel frame, said blocks being provided with holes intended to house an fastening to secure a rail, preferably four holes which allow the sleeper to be used for two different

track gauges, thus being multipurpose, and in any case with the particularity that said sleeper blocks have an improved structural configuration which provides significant advantages, both in their manufacturing and in their effectiveness for absorbing displacements and loads of the fastenings which support the rails, with respect to the systems currently known for such purpose

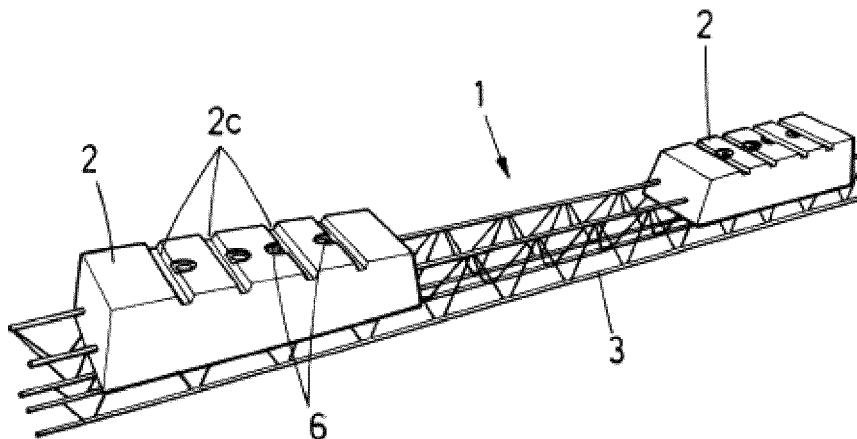


FIG.1

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Description

OBJECT OF THE INVENTION

[0001] The present invention, twin-block sleeper for slab track without ballast, relates to a railway sleeper of the type to be used in particular for ballastless track or (concrete) slab track, comprising two concrete blocks joined by a reinforcing steel frame, said blocks being provided with holes intended to house a fastening to secure a rail, preferably four holes which allow the sleeper to be used for two different track widths, thus being multipurpose, and in any case with the particularity that said blocks of the sleeper have an improved structural configuration which provides significant advantages, both in their manufacturing and in their effectiveness for absorbing displacements and loads of the fastenings which support the rails, with respect to the systems currently known for such purpose.

[0002] The field of application of the present invention belongs to the sector of the industry dedicated to the manufacturing of railway installations and tracks, focusing in particular on the field of twin-block sleepers equipped for ballastless slab track.

BACKGROUND OF THE INVENTION

[0003] In the prior art, sleepers of the type concerned here are known and which basically consist of mono-block sleepers which have a distinct elasticity and of sleepers formed by two twin-blocks joined by a reinforcing steel frame. Each block may have up to four holes for housing an fastening, such that two holes or another two will be used according to the width of the track to be installed (thus multipurpose). In the case of mono-block, this has eight holes or bores. Said holes or bores are composed of a dowel inserted during the manufacturing process of the block and which will subsequently house the securing element of the fastening to the sleeper or block. These types of sleepers of the prior art are known as PR series and are used on ballast.

[0004] The rails remain secured to the block or sleeper by way of the fastenings, such that the wheels of the train transmit their forces to the rail, this to the fastening and this to the plate.

[0005] These blocks should serve so that the fastenings can principally absorb the lateral forces and movements of the rail, even though they must also absorb the vertical forces of the same. These forces to be absorbed by the fastenings cause some lateral and vertical displacements in the same, said displacements being greatest in the slab track fastenings than in mono-block sleeper fastenings. This is due, amongst other things, to the fact that the tracks in mono-block sleepers are supported on ballast which aids in distributing the pressures and forces which the track transmits to the ground, a ballast which is not present in ballastless slab tracks and is also due to the fact that all the flexibility must be provided by

the fastening.

[0006] The blocks for slab track in the prior art have some lateral protrusions or shoulders on the upper surface of the blocks in which the fastenings are supported in order to achieve the absorption of the lateral forces (see Figure 5), however, these blocks, although they fulfil their function, have aspects which can be improved upon, in particular relating to their ease of manufacturing and complexity of the fastenings to be installed on the sleepers, the essential object of the present invention being to develop an improved structural configuration of the blocks of this type of twin-block sleeper for slab track both to reduce the cost of its manufacture by making it simpler as well as to facilitate the use of more effective fastenings. The securing of the fastenings of these types of multipurpose sleepers is complicated as well as the shape of the securing means itself, since it is necessary to support the fastenings on the protrusions or shoulders, which means the fastening must be enlarged to achieve said support since the same are only secured to two of the four bores or dowels.

[0007] Specifically, the present invention, a twin-block sleeper for ballastless slab track, is to be used with highly flexible fastenings which can be height-regulated which cause lateral and vertical forces greater than the sleepers used on ballast.

DESCRIPTION OF THE INVENTION

[0008] The twin-block sleeper for slab track without ballast relates to a reinforced twin-block sleeper of the type to be used in ballastless track and which comprises two concrete blocks joined by a reinforcing steel frame, said blocks being provided with a structural configuration which provides significant advantages compared to the blocks of the sleepers known at present and geared towards improving their manufacture as well as their effectiveness in absorbing displacements of the fastenings which are inserted into them for supporting the rails. An example of the fastenings with the characteristics previously mentioned, as well as the components of the same, is shown in Figures 6 and 7. Specifically, these are fastenings whose components are the object of patent applications by the company, Schwihaag AG.

[0009] In particular, each one of said blocks is configured as a pyramidal truncated body with a rectangular base and inclined upper surface, preferably with a slope of approximately 1:20, which has a flat upper surface with transversal recesses or channels with a depth of at least 15 mm, preferably 18 mm and a surface width of between 20 and 40 mm, preferably 30 mm, the width in the deep part of the channel or recess being approximately one third of said surface width. The objective of said channels or recesses is the absorption of the forces generated in the fastenings of the rails by the wheels of the train. Each one of said blocks has at least two recesses which run the width of the block. These recesses or channels preferably have a depth greater than that of the sleepers in

the prior art used in slab track.

[0010] The object of said recesses is the introduction into the same of the angled side plates of the fastening, plates which are supported on the inclined surfaces of the channels or recesses for the subsequent transmission of forces from the rail to the block. In the prior art, said plates are supported on the shoulders of the blocks and not on the channels or recesses.

[0011] Moreover, the blocks have, on their upper surface, at least two bores or holes per block, located on the longitudinal axis of symmetry of the block for the securing of the fastening of the rail, at least one recess being located between said holes or bores. Said bores preferably have an inclination with respect to the upper surface of the block, that is to say, their axial axis is inclined with respect to the support plane of the rail with the object of allowing longer-lasting securing of the fastenings to the block, extending the path of the bolts which are threaded in said bores. Although there is mention of the presence of bores in the block for the subsequent introduction of the bolts which secure the fastenings to the block, said bolts are threaded in dowels which are inserted into the block during the manufacturing process of the same. Said dowels are made from a different material to that of the block. For the purposes of the present application, it is irrelevant to designate said bores, holes or dowels.

[0012] It is possible to include four bores in the block, relating each pair of bores two by two and with differing or the same inclination in order to be able to use the twin-block sleeper for slab track with two different track widths, that is to say, the twin-block sleeper is transformed into a multipurpose sleeper.

[0013] The blocks also have a greater width in their upper surface than the sleepers of the prior art, their width being at least 200 mm, preferably 210 mm, instead of 160 mm.

[0014] Based on the foregoing, the advantages which the sleeper, which is the object of the invention, provides, are principally:

- Ease of manufacture,
- Less wear of the element, thus more reliable, since its manufacture is simpler,
- Direct type fastening and absorbed by the block, without the presence of a reinforcing element being required between the concrete and the track,
- The lateral forces are absorbed by means of channels or recesses without the shoulders or protrusions of the prior art being required which makes fastening securing means difficult in multipurpose solutions,
- Greater flexibility since it can be used for ballastless tracks. The ballast provides flexibility in conventional sleepers whereas here the flexibility is provided by the fastening.
- Regulatable to different heights since in the conventional sleeper the ballast elevates the track and with the solution described, it is the fastening which ele-

vates the track.

DESCRIPTION OF THE DRAWINGS

[0015] In order to complement the description and with the aim of facilitating the understanding of the characteristics of the invention, various figures are adjoined, in which the following is represented in an illustrative and non-limiting manner:

Figure 1 shows a perspective view of an example of the twin-block sleeper for ballastless slab track, which is the object of the invention, wherein its general configuration can be observed.

Figure 2 shows a perspective view of one of the blocks of the sleeper according to the invention, without including the reinforcing steel frame which joins the two blocks in Figure 1 and wherein the configuration of its upper surface as well as the position of the bores it incorporates for the fastenings can be observed.

Figures 3 and 4 show two views, in plan view and lateral elevation, of the example of the block of the sleeper without including the reinforcing steel frame, according to the invention, shown in Figure 2.

Figure 5 shows a sectioned schematic view of an example of a conventional sleeper block, which represents the prior art.

Figures 6 and 7 show an exemplary fastening, suitable for the present invention, which are the objects of the patent applications on the part of Schwihaag AG.

PREFERRED EMBODIMENT OF THE INVENTION

[0016] Below and in conjunction with the Figures 1 to 4, an exemplary embodiment of the sleeper, which is the object of the present invention, will be described. The twin-block sleeper (1) for slab track, comprises two concrete blocks (2) joined together by a reinforcing steel frame (3), said blocks being configured as a pyramidal truncated body with a rectangular base (2a) and inclined upper surface (2b), with the particularity that said upper surface (2b) has a flat configuration in which there are present at least two transversal recesses (2c) to be used to absorb the forces of the fastenings (4) which support the rails (5).

[0017] Each block (2) also has at least two bores, holes or dowels (6), provided on the vertical plane of symmetry, to be used for the insertion of the bolts of the aforementioned fastenings (4), such bores being formed such that the axial trajectory or axis of the same, instead of being perpendicular, is inclined with respect to the inclined upper surface (2b) of the block (2), this surface being the one that constitutes the support plane of the rail (5), with the object of allowing longer-lasting securing of the fastenings to the block.

[0018] Optionally, when the sleeper is of a multipur-

pose type, in order to be able to be adapted to two track widths, each block (2) has a greater number of transversal recesses (2c), preferably four, as well as two pairs of bores (6).

[0019] Figure 1 shows a twin-block sleeper (1), which is the object of the invention, having two concrete blocks (2), of the type normally used for these types of applications, joined together by a reinforcing steel frame (3). In Figures 2 to 4, one of the two blocks (2), which form the sleeper (1), is shown.

[0020] Said blocks (2) have a width in their upper surface (2b) of approximately 263 mm and a length of approximately 705 mm. The base (2a) of the blocks (2) has an approximate width of 300 mm and a length of approximately 765 mm. As mentioned, the upper surface (2b) of the block (2) is inclined, the height of the block (2) at one of its sides being approximately 277 mm and at the opposite side approximately 242 mm.

[0021] On the upper surface (2b), each block has four transversal recesses (2c), as long as the width of the upper surface (2b), and each having a width on the upper surface of approximately 30 mm. The approximate depth of each recess (2c) is approximately 18 mm and the width at the bottom of said recess (2c) is approximately 10 mm.

[0022] In Figure 5, an exemplary sleeper (1) is observed which is known from the prior art, in which it is observed how the blocks (2) of the same have two protrusions (21) to be used to absorb the forces of the fastenings (4) which support the rails (5). In the example shown, the block is a multipurpose sleeper which has four bores (6) for enabling two different positions of the rail (5), said bores (6) being formed perpendicular to the upper surface of the block.

(2).

3. The sleeper according to claim 2, **characterized in that** each block (2) has four transversal recesses (2c) as well as two pairs of bores, holes or dowels (6) when the sleeper is of the multipurpose type for being adapted to two track widths.

4. The sleeper according to claim 1, **characterized in that** the width of the upper surface of the block is at least 200 mm.

5. The sleeper according to claim 1, **characterized in that** the recesses have a depth of at least 15 mm.

6. The sleeper according to claim 1, **characterized in that** the width on the upper surface of the recess is between 20 and 40 mm, the width at the deep part of said recess being approximately one third of the width at the surface.

Claims

1. A twin-block sleeper for ballastless slab track, of the type composed of two concrete blocks (2) joined together by a reinforcing steel frame (3) and said blocks being configured as a pyramidal truncated body with a rectangular base (2a) and inclined upper surface (2b), which constitutes the support plane of the rail (5) supported by means of fastenings (4) in one or two positions by means of bolts threaded in pairs of bores, holes or dowels (6) in each one of said blocks (2), **characterized in that** the upper surface (2b) of each one of said blocks (2) has a flat configuration comprising at least two transversal recesses (2c) to be used to absorb the lateral forces exerted on the fastenings (4) supporting the rails (5).
2. The sleeper according to claim 1, **characterized in that** each one of the blocks (2) has at least two bores, holes or dowels (6) to be used to secure the fastenings (4) by means of bolts, said bores, holes or dowels having an inclination in their axial axis with respect to the inclined upper surface (2b) of the block

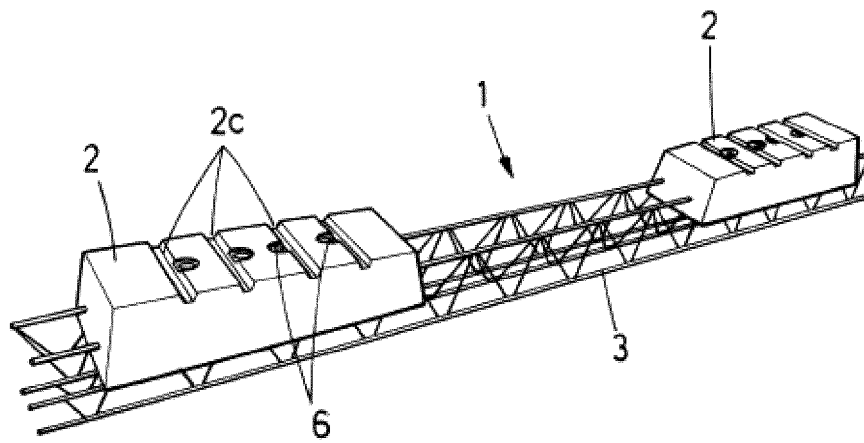


FIG.1

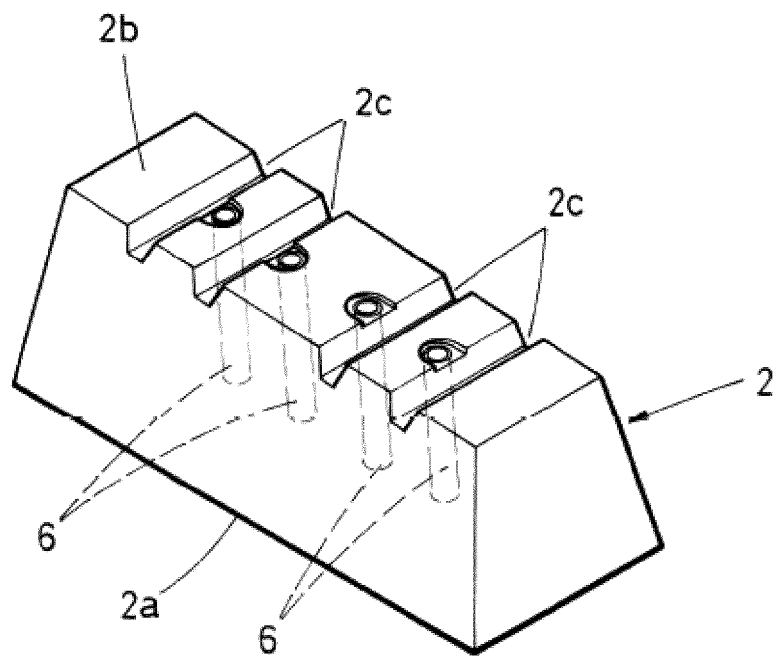


FIG.2

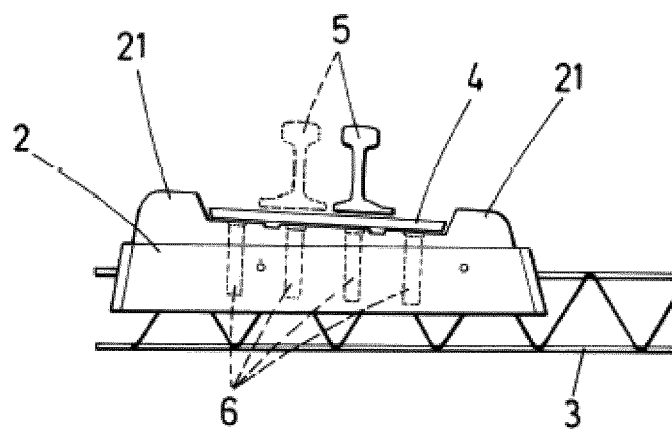
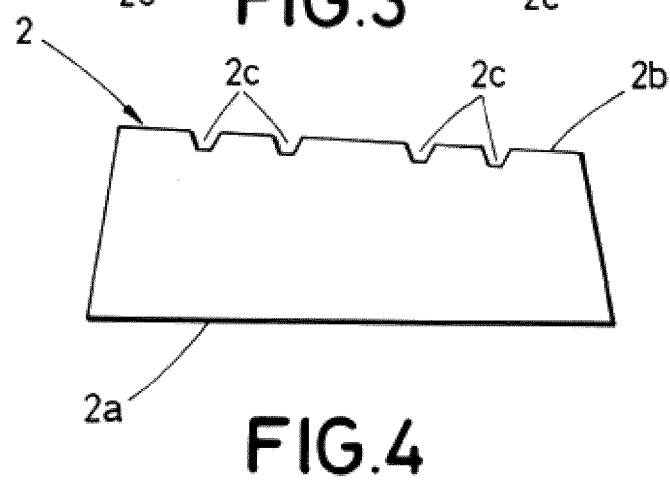
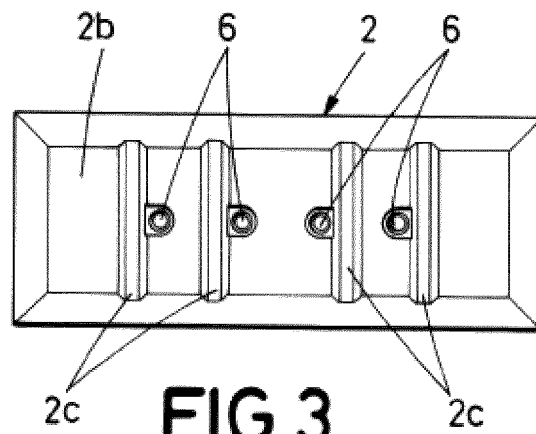


FIG. 5

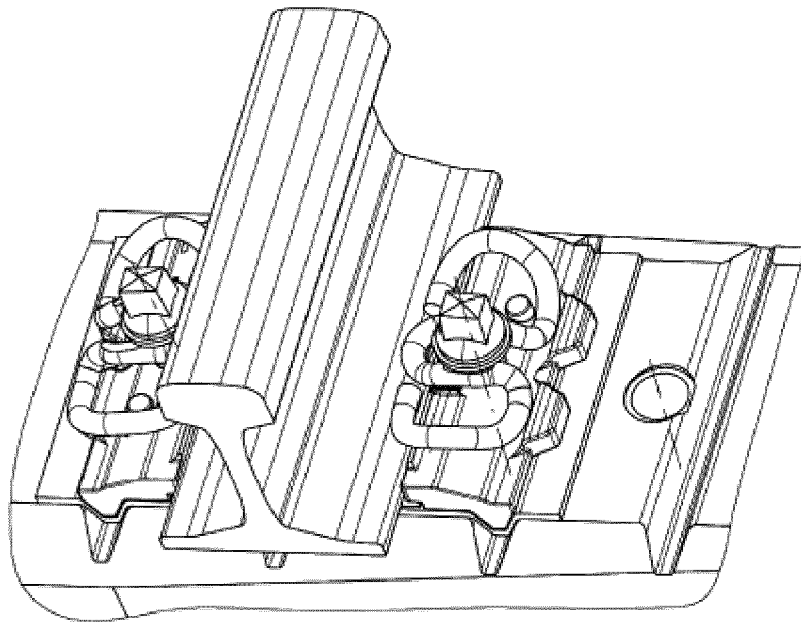


FIG. 6

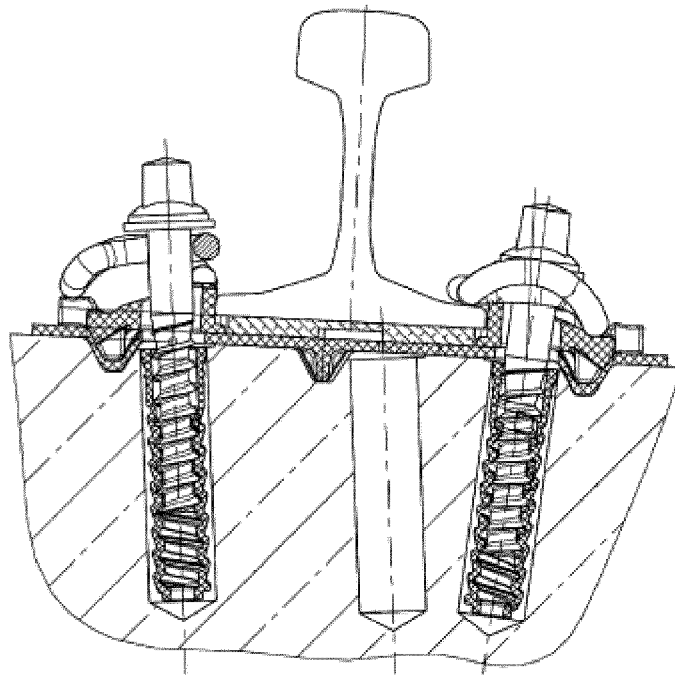


FIG. 7



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Application Number
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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 19 May 2015	Examiner Movadat, Robin
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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