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(54) **MODULAR RAIL FASTENING SYSTEM**

(57) A modular rail fastening system that comprises two side pieces (10) joined to both sides of a central support (11), where each side piece (10) comprises a cast base (14) and an elastic component (16) adhered to said cast base (14), forming a compact adhesive body (12), the system comprising a special bearing plate (9) that covers the entirety of an elastic plate (6) placed on the central support (11) and partially covering each one of the side pieces (10), and also comprising an insulation and adjustment sheet (3) under the plate to separate it from the concrete and level of the track.

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Description

TECHNICAL FIELD OF THE INVENTION

[0001] The present invention relates to a modular rail fastening system, integrated by bonded components, which is applicable in the railroad industry as a fastening system for a ballastless track or on ties and more specifically, in relation to the track apparatuses that require highly elastic fastening systems to improve their performance.

[0002] The benefits arising from an increase in the elasticity of the track lead to a reduction in the dynamic overloads on it, an increase in passenger comfort and a significant reduction in the noise levels and vibrations generated by railroad traffic.

[0003] These improvements make the development and use of the elastic components for rail fasteners especially interesting for the purpose of using them in metropolitan railroad operations and, in general, in all operations that seek to improve the performance of infrastructure when faced with problems arising from a rigid track.

BACKGROUND OF THE INVENTION

[0004] Currently, the elastic fasteners used on railroad tracks are based on one of the following two models:

a) A model that uses sheets or pads placed under the running rail or under the bearing plate in order to obtain the elasticity required.

b) A model that uses elastic bearing plates manufactured for a bonding or vulcanizing method that joins, integrates and compacts the main parts of these plates by injecting an elastic component such as rubber.

[0005] Fastener is taken to mean that which is formed by the rail bearing plate with its elastic clips and its pre-installable sheets or pads under the running rail and under the bearing plate. Anchors on the ties or on the concrete slab also form part of fasteners. The elastic characteristics of the fastener depend on the geometry, dimensions and composition of the elastomer used.

[0006] Both systems a) and b) are to be applied to tracks on ties (ballast track) and tracks on concrete slab, the latter being assembled with the 'Top-Down' or 'Bottom-Up' system.

[0007] The type and method of anchoring the fasteners to the concrete slab or to the ties and the components such as eccentric bushings or toothed regulators of the plate position complete the materials of the fastening system, although, on occasion, they do not form part of the development of the elastic system itself.

[0008] Among track apparatuses, there is combined use of two types of plates: standard and special. There are various types of special plates, object of this invention, within the same apparatus, and they adapt geometrically and functionally to the different areas of the track apparatus, which are mainly switches and crossings.

[0009] The current state of the art, in terms of highly elastic fasteners for track, is summarized below.

[0010] The standard elastic fastener of type a) which is used on ties or concrete slab achieves elasticity using an elastic sheet (6) under the bearing plate (9). The assembly is completed by elastic clips (1) and their screws, the pre-installable elastic sheet under the rail (2), the insulation and adjustment sheet under the plate (3) and the anchors (4) to the tie or concrete slab. Figure 1 shows an example of this type.

[0011] The special elastic fastener for track apparatuses of type a) which is used on ties or concrete slab, achieves elasticity using an elastic sheet (6) under the bearing plate (9). The assembly is completed by elastic clips (1) and their screws, the pre-installable elastic sheet under the rail (2), the insulation and adjustment sheet under the plate (3) and the anchors (4) to the tie or concrete slab. Figure 2 shows an example of this type.

[0012] The standard elastic fastener of type b) represented in figure 3 is used with ties or concrete slab, and elasticity is achieved by using a compact bonded plate system (5 = 5a + 5b + 5c), where (5a) is the upper plate, (5b) is the elastic plate and (5c) is the lower plate. The assembly is completed by elastic clips (1) and their screws, the pre-installable elastic sheet under the rail (2), the insulation and adjustment sheet under the plate (3) and the anchors (4) to the tie or concrete slab.

[0013] The special elastic fastener of type b) represented in figure 4 specifically for track apparatuses is used with ties or concrete slab, and elasticity is achieved by using a compact bonded plate system (7 = 7a + 7b + 7c), where (7a) is the upper plate, (7b) is the elastic plate and (7c) is the lower plate. The assembly is completed by elastic clips (1) and their screws, the pre-installable elastic sheet under the rail (2), the insulation and adjustment sheet under the plate (3) and the anchors (4) to the tie or concrete slab.

DESCRIPTION OF THE INVENTION

[0014] The present invention relates to the development of the special bonded fasteners with application to the track and to the special bearing plates of the track apparatuses. This invention is an alternative to some of the current technical proposals, such as the ones represented in figures 2 or 4.

[0015] The special bearing plates of a track apparatus are all of those that are not standard, for example: slide bars, plates composed of the heel of the switch, plates composed of embedded switches, guard-rail supports, plates composed of the crossing entrance and exit or the crossing bearing plates.

[0016] The bonded fastener of the invention is based on a concept of modularity, for which reason each special bearing plate of the bonded fastener has been divided into different and independent main parts that offer the

possibility of remaining joined together, forming an assembly adapted to the dimensions required by the track apparatus, or being separated to facilitate maintenance and replacement tasks.

[0017] This modular fastening system object of the invention can be described from bottom to top in the following way:

The first level has the insulation and adjustment/levelling sheet of the assembly, manufactured, for example, with HDPE material, which insulates the rest of the components that make up the fastener with respect to the concrete slab or tie. Preferably, the insulation sheet is adjustable in length based on the total length of the fastener, and is also adjustable in thickness, for the proper levelling of the track.

The second level has two bonded shoulders or side pieces which are the same and joined by a central support upon which a plate with the same elasticity as the pieces is placed in line with a bonding of the shoulders. The shoulders and the central support comprise the joining means that allow for the coupling of each shoulder to the central support. The shoulders have a geometry that is adapted to integrate the attachment anchors into the concrete slab. There is also the possibility that they comprise a system for adjusting the position of the modular fastening system within the track apparatus.

The third level has the upper plate of the track apparatus, relative to a special bearing plate and generally manufactured with ribbed plates or steel sheets. It is placed under the rails and contains elastic clips and the necessary pre-installable sheets. This plate is surrounded on its ends, preferably around the perimeter, by the bonding of the shoulders and is attached to them by threaded bolts. The perimeter bonding limits the longitudinal and lateral movements of the plate.

[0018] Preferably, the fourth level has stop ends, nails or latches that are attached to the shoulders which limit the vertical upward movements of the upper plate.

[0019] The invention of this fastening system, in addition to having the same capabilities as any other similar system, has certain advantages with respect to the current state of the art, such as:

- A conceptual design that is simpler than that of the current systems on the market and which facilitates the manufacturing process and effectively limits the lateral and vertical movements of the track under the effect of loads.
- Greater flexibility to use any type of plate or track apparatus project, since the system modularity allows the bonded plate to have any length since it is adjustable by default. Designs that are completely free from limitations can be developed. In this case, the invention is adapted to the design of each apparatus. On the other hand, to date, the projects of bonded plates for track apparatuses are conditioned designs because they must adapt to the existing lengths of the bonded models (generally between three and five different types).
- Since the system is entirely modular, the partial and mass manufacture of the elements that comprise the assembly is possible, independent of the type of upper plate that is used. This way, the manufacture of a single special plate or a spare part is very streamlined, with a minimal delivery period.
- Optimization of the design and manufacturing periods. The design and manufacture of the components of the track apparatus would not be sequential, but they could be taken on in parallel since the bonded components of each one of the special plates are the same. Therefore, the manufacture of those bonded components is not conditioned by the existence or the lack thereof of the manufacturing project nor by the type of track apparatus to be developed. With the current state of the art it is necessary to first have the complete project of the track apparatus available and afterwards each bonded plate of the switch or crossing can be manufactured individually.
- With this invention the bonded plates can be attached to the slab with four anchoring points, which reduces the amount of stress per unit of anchoring. The bonded shoulders increase the surface of support and improve load distribution and transmission to the slab.
- Unlike other systems, this invention contains a system that neutralizes the vertical upward stress of the plates, materialized in stop ends, nails or latches that vertically fix the position of the upper plate within the bonded assembly, limiting the tensile stress on the plates.
- With this invention the manufacturing process of the bonded plates is simplified because there is no need for a casting model or a rubber injection mold for each desired length, which therefore reduces the investment in tools.
- There is no need to have stock of each one of the complete bonded plates for new installations and maintenance, meaning that stock and storage costs are reduced.
- The modular system facilitates the assembly and disassembly of all of its components, allowing for the complete or partial substitution of any of the integrated fastening parts that are worn-out or deteriorated, meaning that maintenance tasks are streamlined.
- This modular system can be applied to the existing track apparatuses of the Rail Network which require a change in elasticity for reasons of exploitation, thus taking advantage of both the iron of the apparatus as well as the ties placed on the track. With the currently existing monoblock plates, the ties could not be reused.

DESCRIPTION OF THE DRAWINGS

[0020] As a complement to the description provided herein, and for the purpose of helping to make the characteristics of the invention more readily understandable, in accordance with a preferred practical embodiment thereof, said description is accompanied by a set of figures constituting an integral part of the same, which by way of illustration and not limitation represent the following:

Figure 1 is a schematic view, with a transverse cross section, of a standard fastener based on the elasticity of the sheet under the bearing plate according to the state of the art.

Figure 2 is a schematic view, with a transverse cross section, of a special fastener of the track apparatus also based on the elasticity of the sheet under the bearing plate according to the state of the art.

Figure 3 is a view of a standard bonded fastener according to the state of the art.

Figure 4 is an upper view of a special bonded fastener of the track apparatus according to the state of the art.

Figure 5 is an example of a complete modular bonded plate according to the invention, where side bonded shoulders or pieces, the central support, the special bearing plate, latches and the insulation and adjustment plate are seen.

Figure 6 shows in detail one of the bonded shoulders according to the invention, with its latch, inserted for the attachment of the special bearing plate and the guide bushings for the rods of the central support.

Figure 7 shows in detail one of the bonded shoulders according to the invention, in which one of the lightening blocks that simplify the bonding process and the castings of the elastic bonded component that improve the absorption of vibrations and noise can be seen.

Figure 8 is an example of a complete modular bonded fastener according to the invention in working position, where the bonded shoulders or side pieces, the central support, the special bearing plate, latches, the insulation and adjustment plate, anchors to the concrete slab, elastic clips for the rail and the pre-installable elastic sheets can be seen.

Figure 9 is an example of a complete modular bonded fastener according to the invention in working position, adapted to a standard solution, where the bonded shoulders or side pieces, the special bearing plate, latches, the insulation and adjustment plate, anchors to the concrete slab, elastic clips for the rail and the pre-installable elastic sheets can be seen.

Figure 10 is a schematic perspective view of the central support with an elastic plate.

PREFERRED EMBODIMENT OF THE INVENTION

[0021] With reference to the figures discussed above, it can be observed how in one of the possible embodiments of the modular rail fastening system proposed by the invention, that it comprises, according to figure 5, two side bonded pieces (10), also called shoulders, that are joined (with the appropriate assembly or disassembly means) by a piece whose length is adjustable to the needs of the track called the central support (11), which are integrated together to make up a compact and mechanically resistant assembly called a bonded body (12).

[0022] As observed in figures 6 and 10, each shoulder (10) and central support (11) preferably comprise joining means that allow for the coupling of each shoulder (10) to the central support (11), which restrict movement between the side pieces (10) and the central support (11), except in the longitudinal direction of the attachment, which is transversal to the fixed rail, such as rods (8) that emerge from the central support (11) and are inserted into the guide bushings (19) located on the side pieces (10).

[0023] An elastic plate is placed on the central support (11) which, together with the bonded shoulders (10), make up the elastic base of the bonded body (12), upon which the special bearing plate (9) is placed. This bearing plate contains the elastic clips (1) and the pre-installable elastic sheets under the rail (2), such that the special bearing plate (9) covers the entirety of the elastic plate (6) and partially covers each one of the bonded shoulders (10).

[0024] The elastic plate (6) is fitted upon the retaining central support (11) to prevent longitudinal and transversal movements that can be produced during assembly and to define a central area between the two side pieces (10).

[0025] Preferably, the elastic plate (6) comprises a plurality of castings (23) distributed strategically such that they allow for the adjustment of the elasticity of the existing central area between the two side pieces (10).

[0026] Lastly, the entire assembly is mounted on an insulation and adjustment sheet (3) under an adjustable-length plate based on the total length of the fastener and on the thickness, which is also adjustable, to achieve proper levelling of the track. This prevents the rest of the pieces from coming into direct contact with the concrete, permitting easier maintenance when having to change the components of the special fastener.

[0027] The bonded shoulder (10) is one of the modules of this invention and it is seen in detail in figures 6 and 7. It has the hollows and recesses necessary to achieve the range of elasticity desired and it is made up of the following parts:

[0028] A cast base (14) that contains the housings (15) on the two sides of the cast base (14), defining an anchor point on each side of each side piece (10) for the attachments to the concrete, and it comprises the elastic bonded component (16), which is generally rubber-based. The

cast base (14) with the elastic bonded component (16) partially surrounds the area of the special bearing plate (9) through elevated areas (21), remaining fitted to the ends of the special bearing plate (9) and acting as a perimeter stop end that limits its longitudinal and lateral movements.

[0029] The housings (15) comprise a toothed regulator (22) to withstand the transversal forces to the rail and adjust the position of the modular fastening system.

[0030] The cast base (14) comprises a plurality of lightening blocks (20) which makes filling with the elastic bonded component (16) easier, simplifying the bonding process.

[0031] The elastic bonded component (16) comprises a plurality of castings (20') that favor its deformation, improving the absorption of vibrations and noise.

[0032] An insert (17) forming a compact block is embedded in the elastic bonded component (16) and contains threaded bolts (18) to attach the special bearing plate (9) to the bonded body (12).

[0033] A nail or latch (13) that attaches the special bearing plate (9) to the side pieces (10) is screwed onto the cast base (14) in order to limit the vertical stress on the plates, and it preferably comprises an elastomer bonded to the latch (13) itself that supports the special bearing plate (9) through said bonded elastomer (16'), on the one hand avoiding metal-to-metal contact and on the other, elastically absorbing the vertical movements on the special bearing plate (9).

[0034] The fastener system of the invention limits deflection and vertical and lateral movements by having the special bearing plate (9), preferably metal, fitted or surrounded by elastic material in the areas previously indicated, such that the stress and vibrations coming from the track are absorbed and minimized.

[0035] Figure 8 shows an example of a complete modular plate in a working position on a track apparatus.

[0036] On the other hand, it is envisaged to arrange the corresponding pre-installable elastic sheets under the rail (2) in order to avoid direct metal-to-metal contact between the rail and the special bearing plate (9). Finally, each rail is securely attached to the special bearing plate (9) with two clips (1) that exert a load on each one of the rails. Each clip (1) is screwed to the special bearing plate (9) assembly with a screw set comprising a hook, nut and bolt.

[0037] The central support (11) and the elastic plate (6) are adaptable and adjustable in length to any measurement required by the track apparatus. Likewise, the side pieces (10) are common and the same for any of the plates of the track apparatus.

[0038] The modular fastening system can be used to transform the elasticity of apparatuses in service with the maximum use of the components installed on the track.

[0039] Therefore, as can be seen from the foregoing, the concept of the bonded monoblock plate described in the background section has been changed for the concept of a modular fastening system, which can be assembled/dissembled and adjusted, creating the opportunity to place it on existing track apparatuses, while using most of the components of those apparatuses.

[0040] Figure 9 shows an alternative use, relative to an example of a complete modular bonded fastener according to the invention in working position, adapted to a standard solution, where the bonded shoulders or side pieces (10), the standard bearing plate, latches (13), the insulation and adjustment plate (3), anchors (4) to the concrete slab, elastic clips for the rail (1) and the pre-installable elastic sheets (2) can be seen.

[0041] This alternative use is applied to those cases that require the fastening of a single rail, without having to do anything more than disassemble the central support (11) and directly join both side pieces (10) together through the joining means and adjusting the insulation and adjustment sheet (3) to the new length, according to the dimensions, in order to fasten a single rail.

[0042] The side pieces (10) on both sides, equipped with the respective latches (13) and anchors (4), are the same ones used in fastening the special bearing plate (9), according to a modular design shared by both types of fasteners.

[0043] In this case, elasticity is exclusively defined as the elastic bonded component (16) of the side pieces (10), since there is no elastic plate (6).

[0044] The characteristics offered by the modularity of the fastener in this case are the following:

- By being a shared design, there is a smaller number of different components and units of storage and therefore, of casting models and bonding molds, which reduces the initial investment.
- A total of four anchors are required to prevent the side pieces from rotating when faced with loads in the longitudinal direction of the rail caused by the acceleration and braking of the rolling stock.

[0045] In view of this description and the set of figures, a person skilled in the art will understand that the embodiments of the invention that have been described can be combined in multiple ways within the object of the invention. The invention has been described according to preferred embodiments thereof, but for the person skilled in the art, it will be evident that multiple variations can be introduced in said preferred embodiments without departing from the object of the invention as has been claimed.

Claims

1. A modular rail fastening system **characterized in that** it comprises two side pieces (10) joined to both sides of a central support (11), where each side piece (10) comprises a cast base (14) and an elastic component (16) bonded to said cast base (14), forming a compact bonded body (12), the system comprising

a special bearing plate (9) that covers the entirety of an elastic plate (6) placed on the central support (11) and partially covering each one of the side pieces (10), and also comprising an insulation and adjustment sheet (3) under the plate for separating it from the concrete and levelling the track.

2. The modular fastening system according to claim 1, wherein each side piece (10) comprises an insert (17) that is embedded into the elastic bonded component (16) forming a compact block, wherein said insert (17) houses at least one threaded bolt (18) upon which the special bearing plate (9) is mounted.

3. The modular fastening system according to any of the previous claims, wherein each side piece (10) and central support (11) comprise joining means that allow the coupling of each side piece (10) to the central support (11) and that restrict movement between the side pieces (10) and the central support (11) except in the longitudinal direction of the attachment.

4. The modular fastening system according to claim 3, wherein said joining means comprise rods (8) housed in the central support (11) and inserted in the guide bushings (19) located on the side pieces (10).

5. The modular fastening system according to any of the previous claims, wherein the elastic bonded component (16) comprises a plurality of castings (20') that favor its deformation, improving the absorption of vibrations and noise.

6. The modular fastening system according to any of the previous claims, wherein each side piece (10) has elevated areas (21) coated with the elastic bonded component (16) that act as perimeter stop ends, and in which the ends of the special bearing plate (9) fit, limiting the longitudinal and sideways movements of the track.

7. The modular fastening system according to any of the previous claims, wherein the cast base (14) comprises a plurality of lightening boxes (20) that simplify and facilitate the bonding process.

8. The modular fastening system according to any of the previous claims, wherein each side piece (10) comprises at least one housing (15) suited for anchoring to a concrete slab.

9. The modular fastening system according to claim 8, wherein each housing (15) is located at one end of the cast base (14), defining an anchor point on the side piece (10).

10. The modular fastening system according to claim 9, wherein, on each anchor point, the housing (15) comprises a toothed regulator (22) to withstand the transversal forces to the rail and adjust the position of the fastening system.

11. The modular fastening system according to any of the previous claims, wherein the elastic plate (6) is fitted on the retaining central support (11), defining a central area between the two side pieces (10).

12. The modular fastening system according to claim 11, wherein the elastic plate (6) comprises a plurality of castings (23) that allow the elasticity of the existing central area between the two side pieces (10) to be adjusted.

13. The modular fastening system according to any of the previous claims, which comprises at least one latch (13) that attaches the special bearing plate (9) to the side pieces (10) in order to limit the vertical stress on the plates.

14. The modular fastening system according to claim 13, wherein said latch (13) comprises an elastomer (16') bonded to said latch (13) and which supports the special bearing plate (9) through said bonded elastomer (16'), on one side preventing metal-to-metal contact and on the other, elastically absorbing the vertical movements of the special bearing plate (9).

15. The modular fastening system according to claim 11, wherein the central support (11) and the elastic plate (6) are adaptable and adjustable in length to any measurement required by the track apparatus, while at the same time, the side pieces (10) are common and the same for any of the plates of the track apparatus.

16. The modular fastening system according to any of the previous claims, which can be used to transform the elasticity of the apparatuses in service with the maximum use of the components installed on the track.

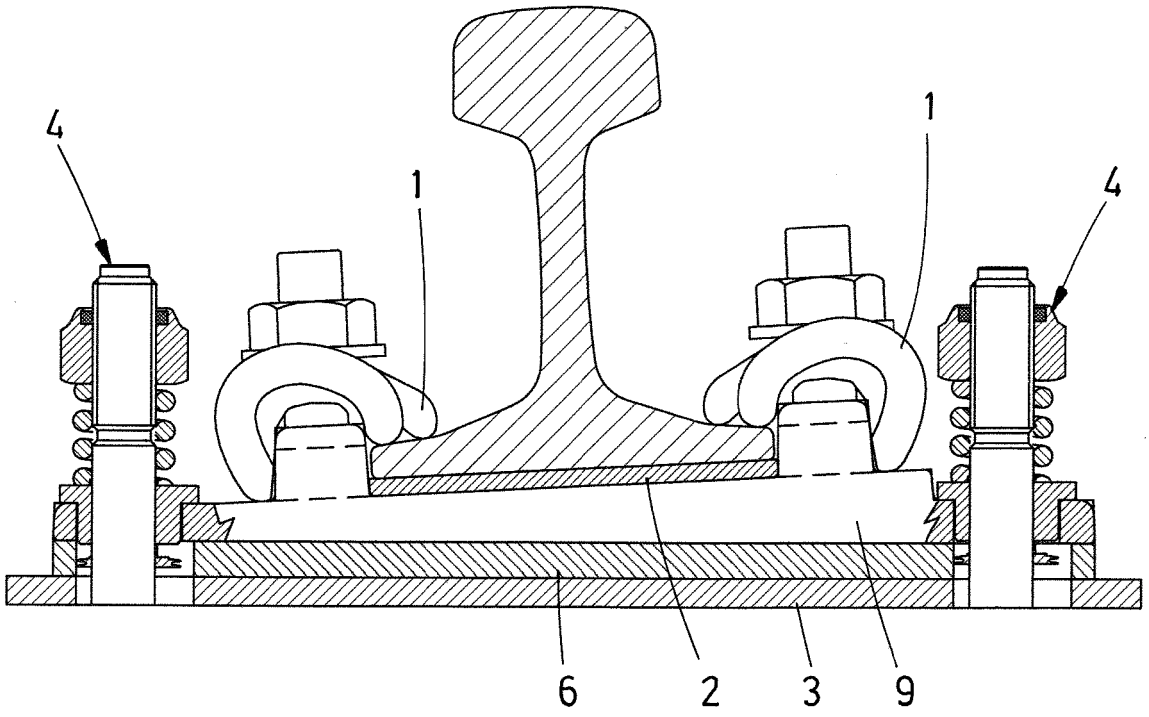

FIG.1

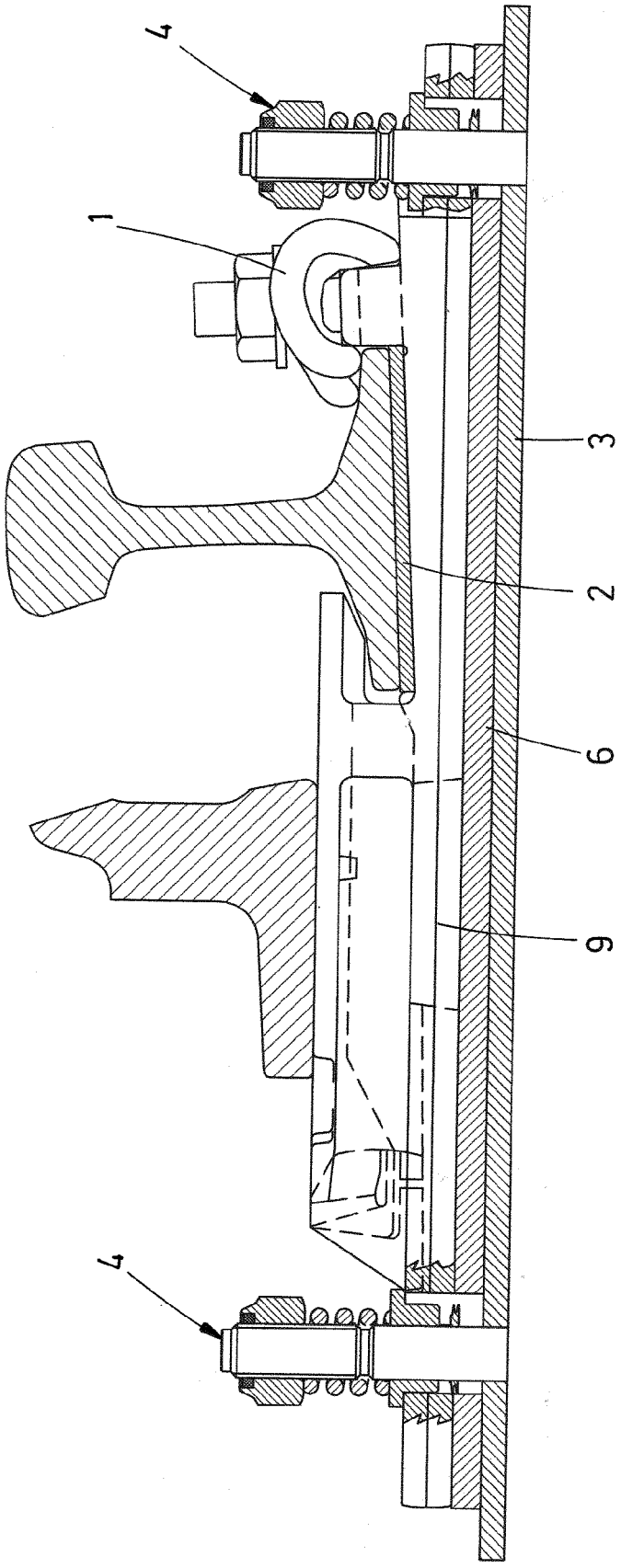

FIG.2

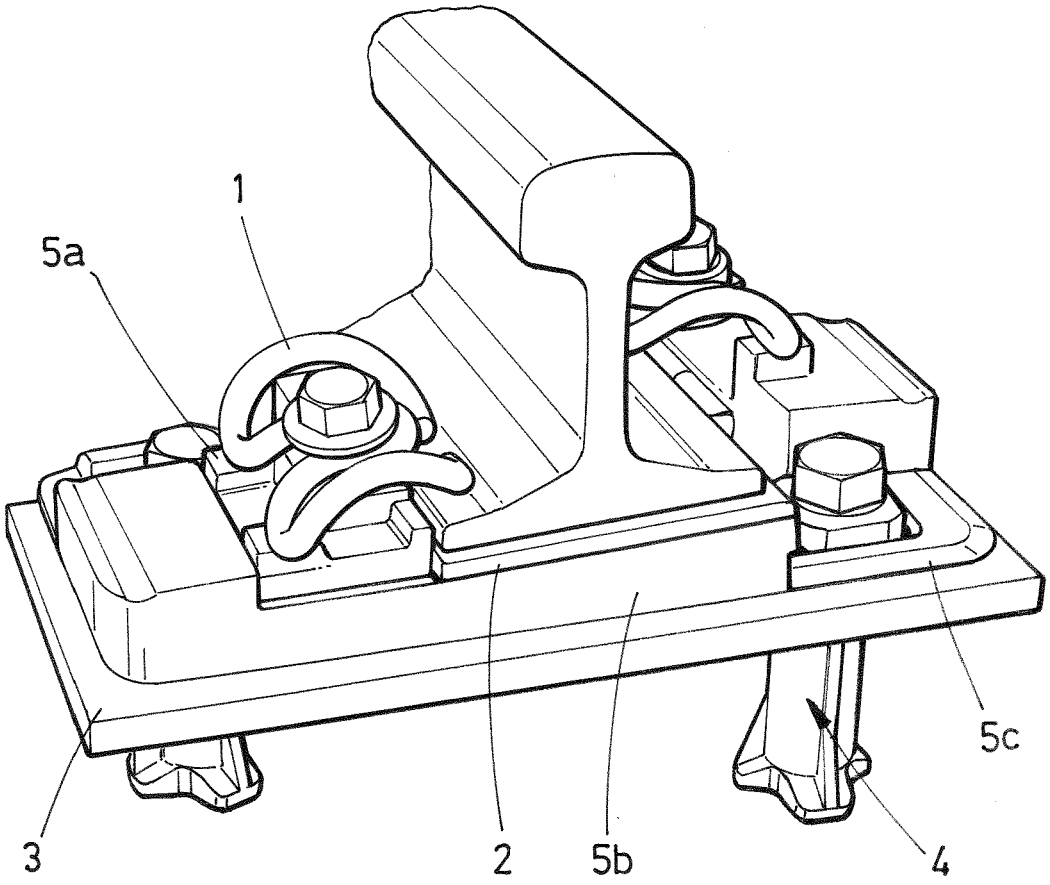

FIG.3

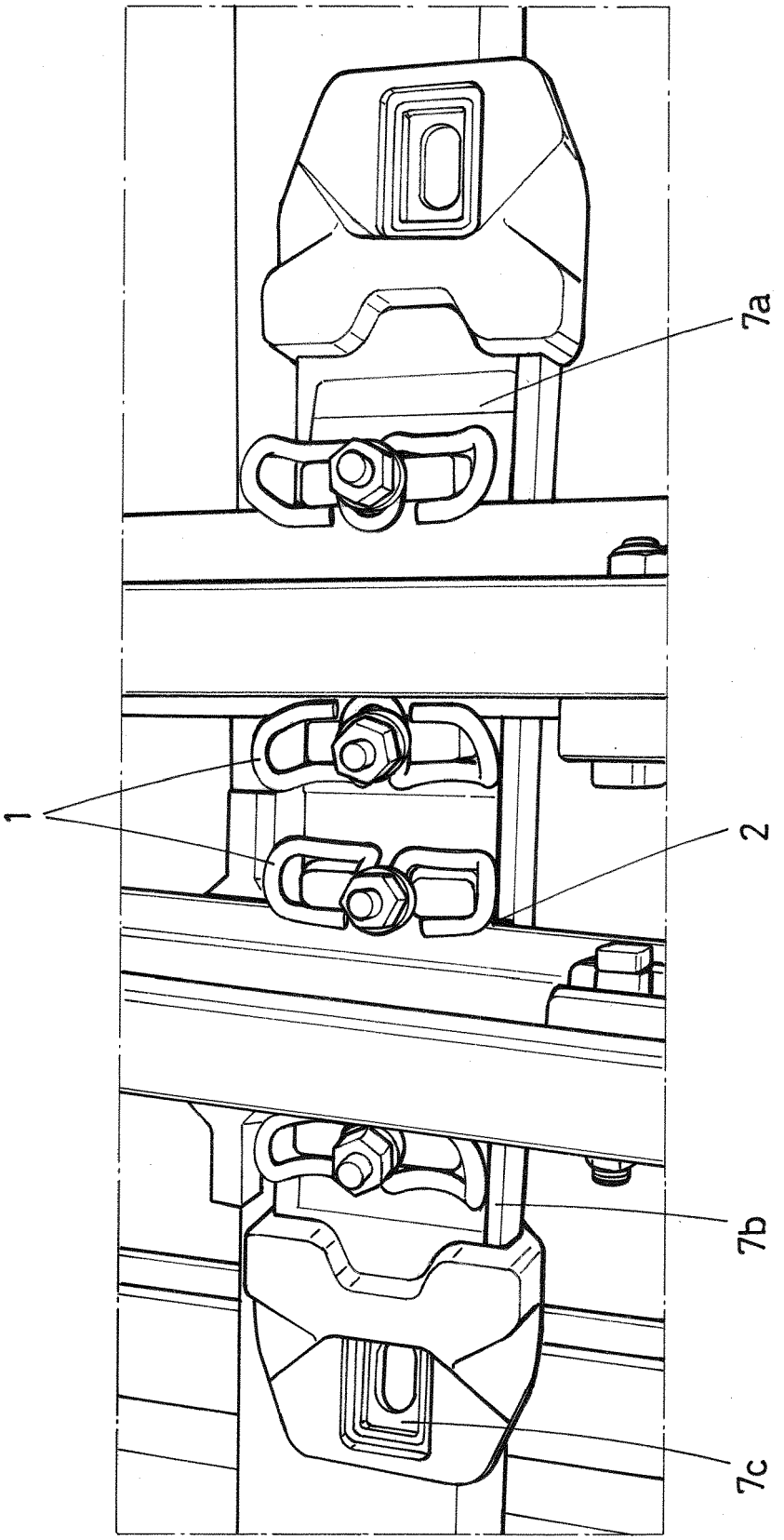

FIG.4

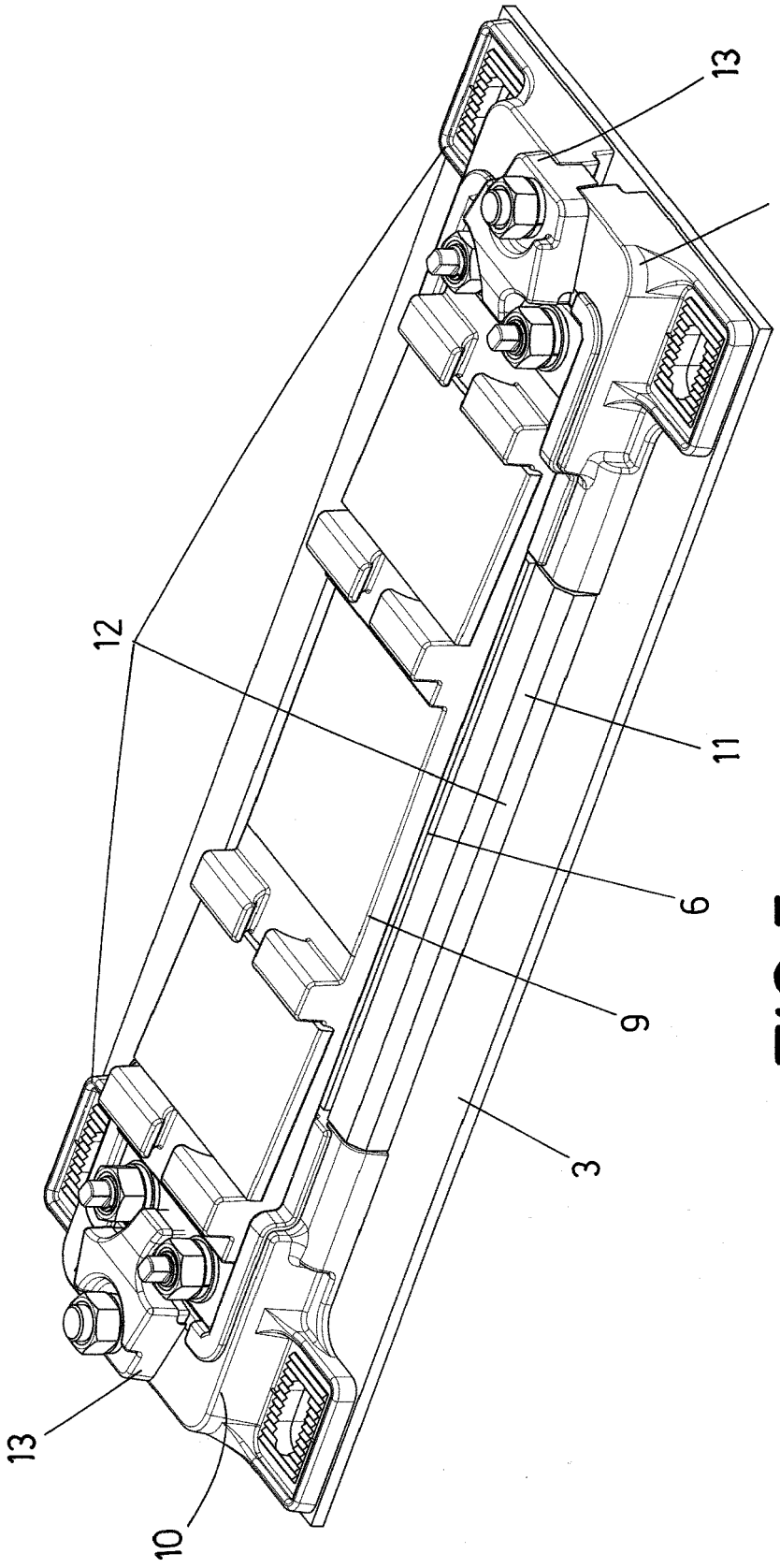

FIG.5

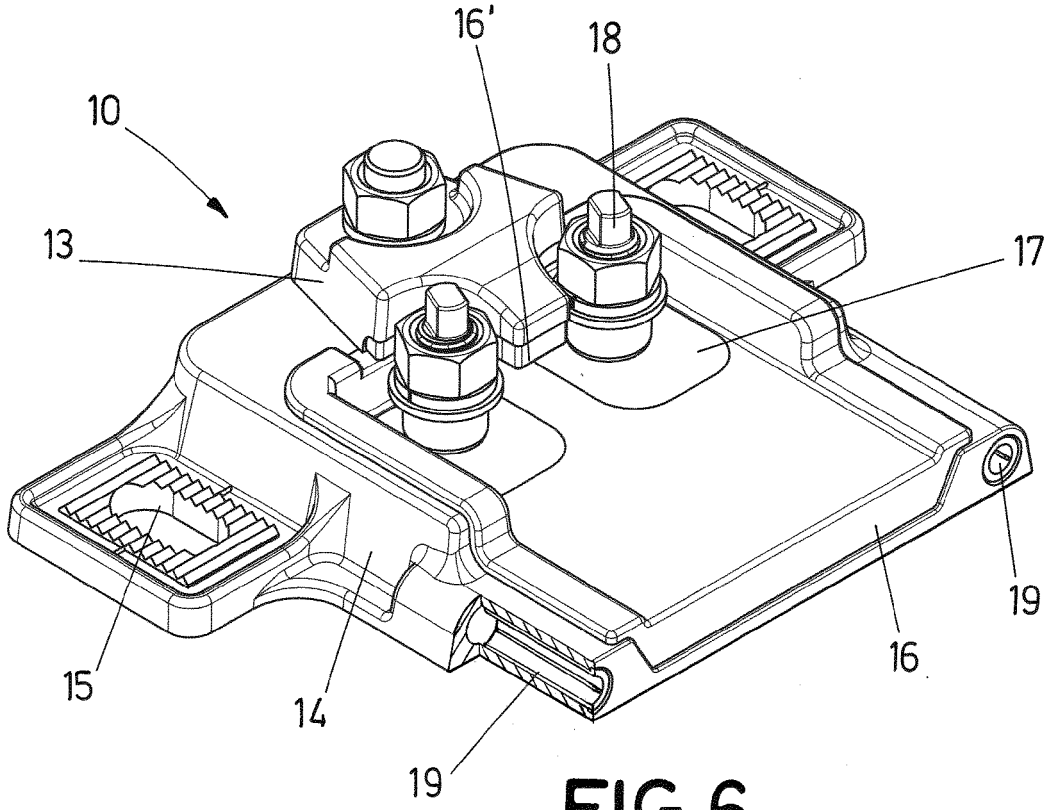

FIG.6

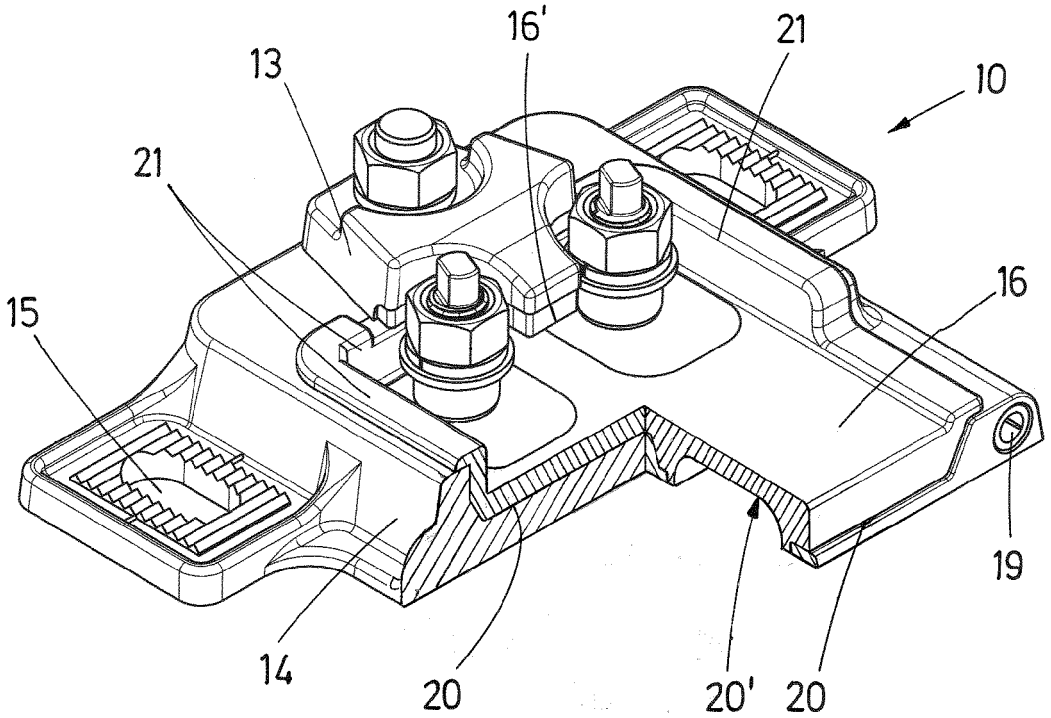

FIG.7

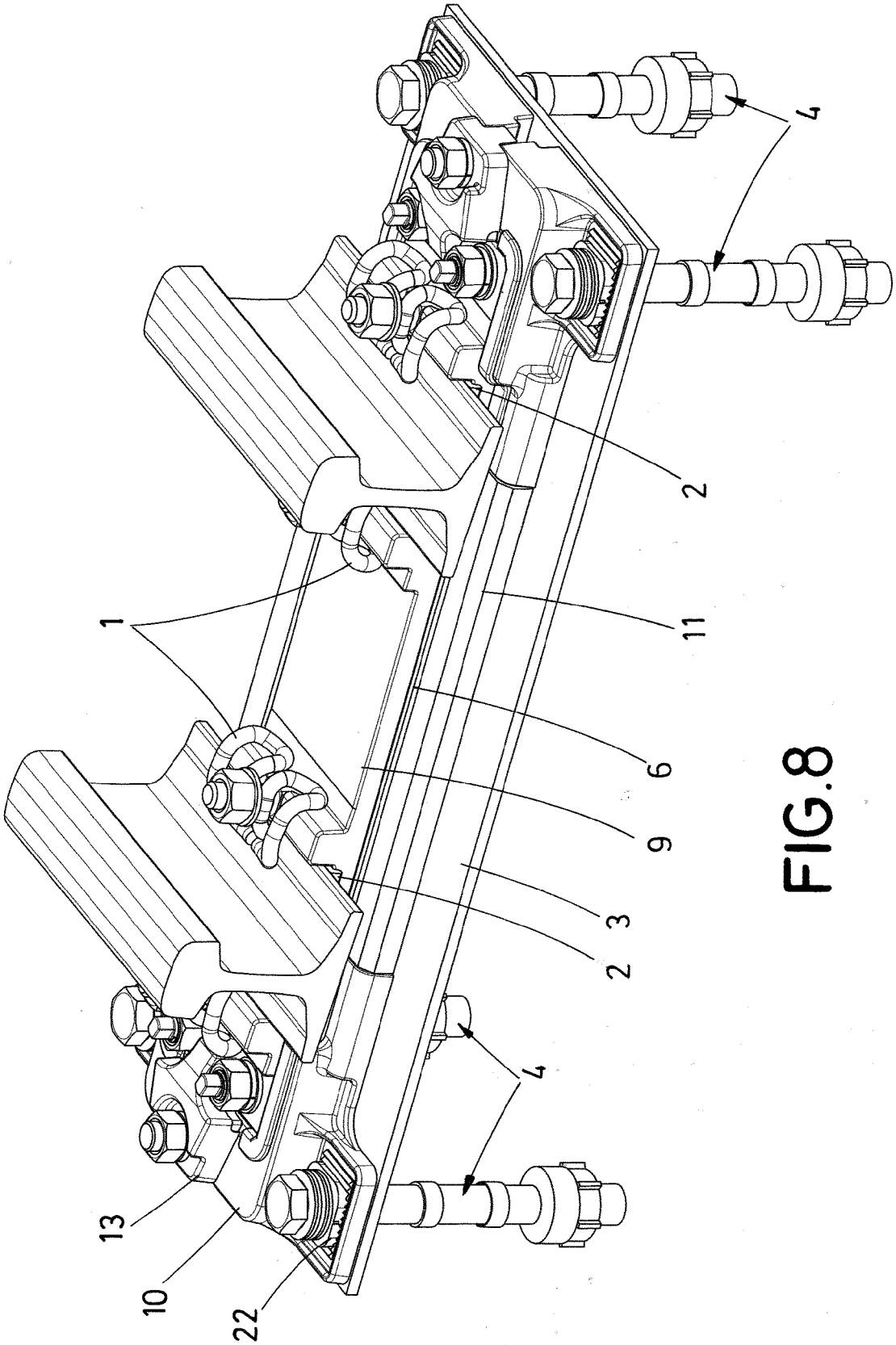

FIG.8

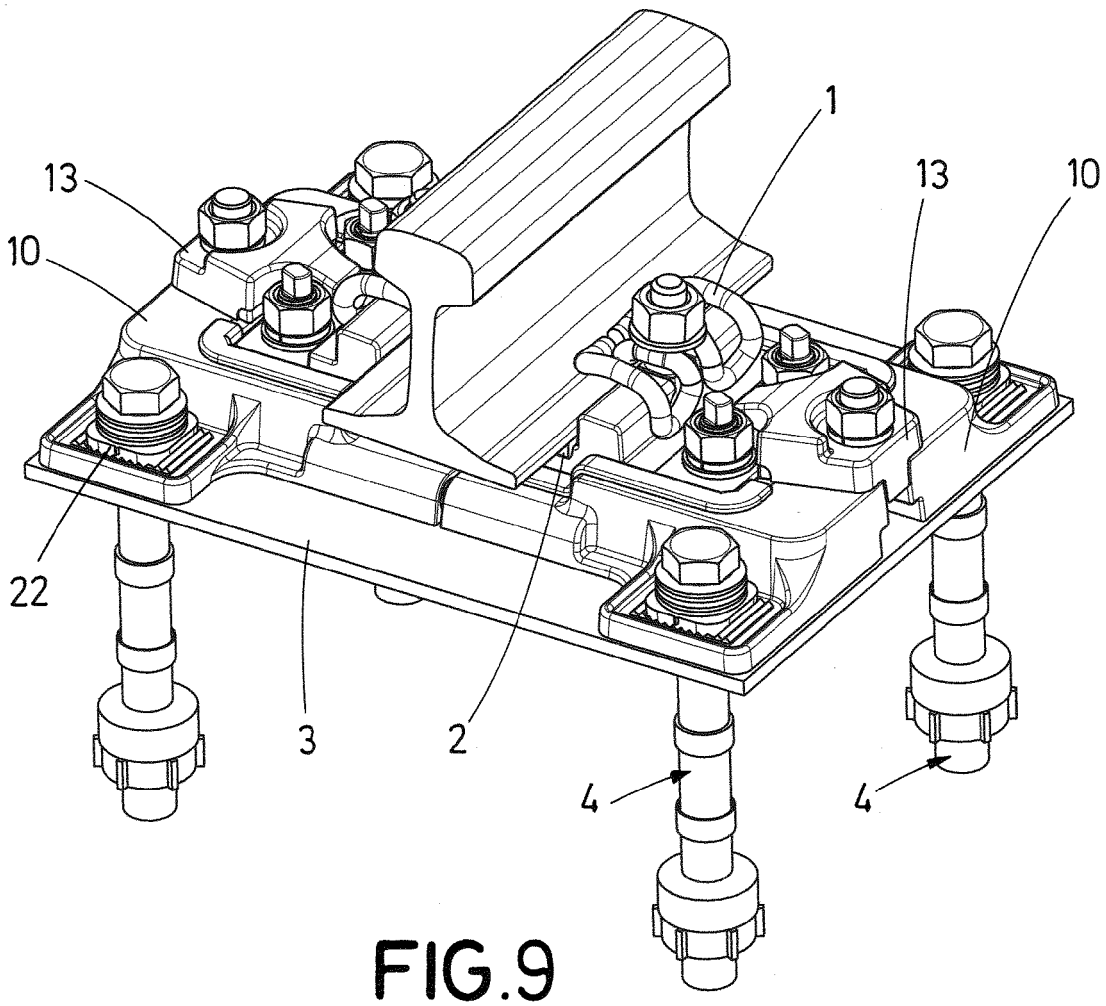

FIG.9

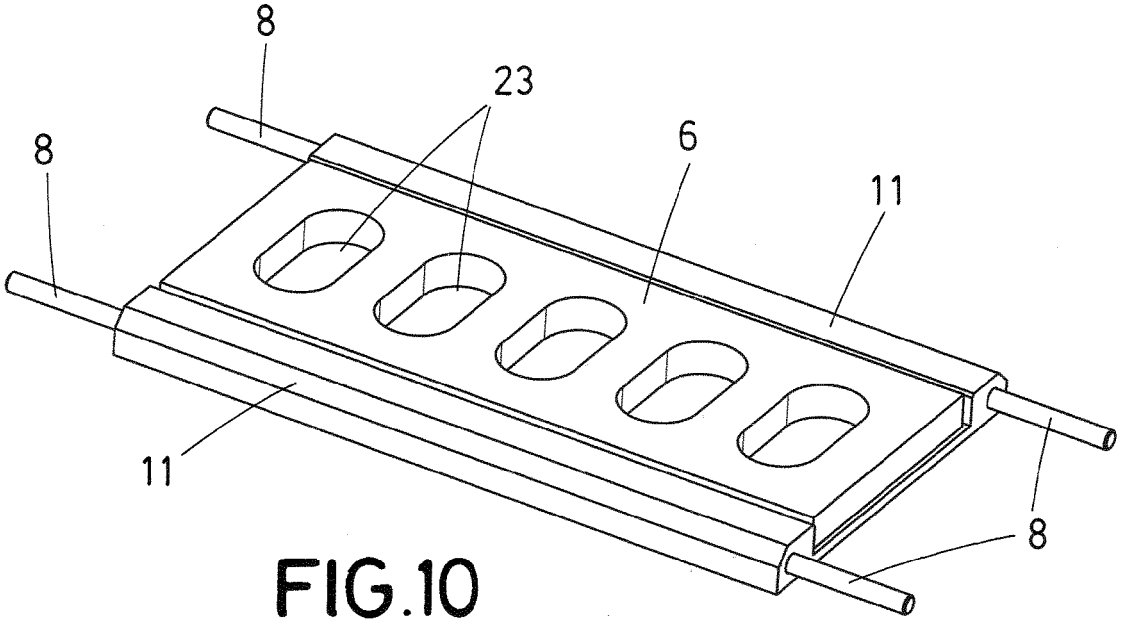

FIG.10

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EUROPEAN SEARCH REPORT

Application Number
EP 16 38 2411

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 0 627 525 A1 (LORD CORP [US]) 7 December 1994 (1994-12-07)	1,3,8,9, 11,13, 15,16	INV. E01B7/22 E01B9/42
A	* column 4, lines 24-51; figures 7-10 * * column 6, line 30 - column 7, line 6 *	2,6	
A	WO 03/012204 A1 (CHOI TAE WOONG [KR]) 13 February 2003 (2003-02-13) * abstract; figures 1-6 *	1-16	
A	ES 1 058 662 U (SUMINISTROS PARA FERROCARRILES [ES]) 16 January 2005 (2005-01-16) * figures 1-4 *	1-16	
A	US 3 576 293 A (LANDIS ROBERT L ET AL) 27 April 1971 (1971-04-27) * column 3, line 59 - column 4, line 58; figures 1-4 *	1-16	
A	DE 20 2011 104261 U1 (VOSSLOH WERKE GMBH [DE]) 3 November 2011 (2011-11-03) * page 6, paragraph [0042]; figures 3,4 *	1	TECHNICAL FIELDS SEARCHED (IPC) E01B
A	ES 1 073 354 U (TALLERES ALEGRIA S A [ES]) 2 December 2010 (2010-12-02) * figure 3 *	1	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 March 2017	Fernandez, Eva

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
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D : document cited in the application
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& : member of the same patent family, corresponding document

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 16 38 2411

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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08-03-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0627525 A1	07-12-1994	CA 2097556 A1	03-12-1994
		EP 0627525 A1	07-12-1994
		US 5249743 A	05-10-1993
WO 03012204 A1	13-02-2003	KR 20030011000 A	06-02-2003
		WO 03012204 A1	13-02-2003
ES 1058662 U	16-01-2005	NONE	
US 3576293 A	27-04-1971	NONE	
DE 202011104261 U1	03-11-2011	NONE	
ES 1073354 U	02-12-2010	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82