



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
13.11.2019 Bulletin 2019/46

(51) Int Cl.:
E01B 26/00 (2006.01) **B61L 1/02** (2006.01)
E01B 29/32 (2006.01) **B61L 3/12** (2006.01)

(21) Application number: **18460045.0**

(22) Date of filing: **19.07.2018**

(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
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

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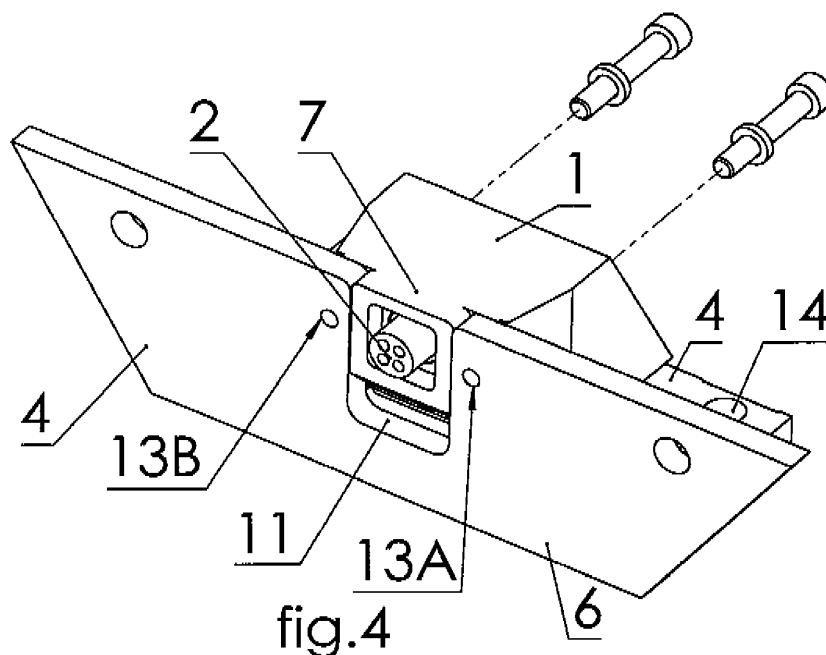
(30) Priority: **08.05.2018 PL 42546118**

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(54) **PLUG FOR INSTALLATION OF TRACK SENSOR CABLE CONNECTORS**

(57) A plug for installation of wired sensor track connectors, including a through body (1) and a plug socket (2) having at least four connectors, wherein the body (1) is provided with a base to be placed in a detachable manner on a centering element (4) configured as an angled profile made of a load-bearing plate and an adjusting plate (6) perpendicular to the load-bearing plate. A frame protrusion (7) is formed on the front wall of the body (1).

Parallel starter guides are provided on both sides of the body base. A semi-circular cable conduit is formed in the middle of the load-bearing plate of the centering element (4), wherein parallel resting guides are formed on both sides of the conduit. An adjusting cut-out (11) having a shape adapted to the frame protrusion (7) is provided in the adjusting plate (6).



Description

[0001] This invention is related to a plug intended for installation of cable connectors of track sensors.

[0002] There are many already known various types of plugs that are adapted to installation of cable connectors of different track sensors, which ensure transmission of signals to receivers.

[0003] Taking into account different environmental conditions, such as vibrations, temperature changes and humidity present in working conditions of tracks, it is often needed to use fixed cable connectors that are permanently connected to the sensor in order to provide the required reliability.

[0004] However, working conditions also require detachable connectors enabling the cable to be disconnected from the sensor, as this facilitates maintenance work within track systems. There are known solutions of detachable plugs which use the Amphenol system with bayonet-type connectors.

[0005] Such Plugs are made of two durable, rigid and detachable plug elements. Their drawback is that even though they provide a good pin-based connections, is that in fact during longer periods of use they are difficult to detach during maintenance works because of corrosion, contamination or local damage.

[0006] Patent disclosure EP 1808531 B1 provides a solution in which a sensor plug is located in a recess within a sensor housing, partially accepting a connecting plug in the connected position. A shield is provided for the connecting plug, which fixes the plug in the connected position in which the shield is installed on the housing.

[0007] A plug for connecting cable connectors of track sensor comprising of a through-body, preferably with an internal assembly compartment, with a plug socket provided with at least four connectors for sensor interior systems according to the invention is characterised in that the plug body, provided with a base, is placed in a detachable manner on a centering element provided as an angled profile including a load-bearing plate and an adjusting plate placed perpendicularly to the load-bearing plate.

[0008] The front wall of the body has a formed frame protrusion, while parallel, first guides are provided at the base of the body, on both sides of the body. A semi-circular cable conduit is formed in the load-bearing plate of the centering element, centrally on the side of the body, with second parallel guides formed on both sides of the conduit. The adjusting plate is provided with a setting cut-out with a shape matching that of the frame protrusion.

[0009] A sliding depression is preferably formed on the load-bearing plate, with its shape adapted to that of the body base.

[0010] First guides are preferably provided as ducts, and second guides are provided as battens, optionally, the first guides may be provided as battens and the second guides are provided as ducts.

[0011] The body with the adjusting plate of the center-

ing element is preferably connected with at least two screw connections, while at least two parallel, longitudinal openings are provided on the load-bearing plates, on both sides of the sliding depression.

[0012] The plug socket is preferably provided with additional connectors for external monitoring of the environment of track sensors, installed in an internal assembly compartment.

[0013] The solution according to the invention is characterised by good operational characteristics, such as: durability, reliability and solid connections between sensor elements and receivers. Plugs according to the invention installed in working conditions also enable easy and safe maintenance works.

[0014] In addition, and contrary to other solutions, in which the cable connector is installed directly to the track sensor, the possibility of sensor damage when the cable is subjected to excessive strain has been eliminated. For example, tearing the cable out can only damage the cable, without any risk of damage to the sensor structure.

[0015] A particularly beneficial characteristic of the solution according to the invention lies in the fact that the plug has a robust design, ensuring effective protection of delicate electronic elements.

[0016] The plug design also allows usage of various cable shield types and installation of additional elements connected to the sensor in the internal compartment of the body, such as overvoltage protectors, sensors adapted to the given working conditions.

[0017] The invention is explained in more details in the description of its embodiments and in the drawing, in which Fig. 1 presents a front axonometric view of the plug body, Fig. 2 presents a rear view of the plug body, Fig. 3 presents the centering element, Fig. 4 presents the plug body connected to the centering element, Fig. 5, Fig. 6, Fig. 7, Fig. 8 present variants of guides connecting the body with the centering element, Fig. 9 presents a block diagram of an example arrangement of the interior of an assembly compartment, Fig. 10 presents an axonometric view of the track with a track sensor installed with a cable using a plug according to the invention connected to the sensor.

Example 1

[0018] As shown in Fig. 1 and in Fig. 2, the through body 1 and the base 3 are provided with a plug socket 2. A frame protrusion 7 is formed in the front wall of the body 1 and first, parallel guides 9 are provided on both sides of base 3.

[0019] As shown in Fig. 4, body 1 is placed in a detachable manner on the centering element 3 presented in Fig. 3 in the form of an angled profile made of a load-bearing plate 5 and an adjusting plate 6 placed perpendicular to the load-bearing plate. A semi-circular cable conduit 10 is formed in the middle of the load-bearing plate 5, on the side of the body 1. Second parallel guides 9 are formed on both sides of the cable conduit 10. An

adjusting cut-out 11 is made in the adjusting plate 6, with a shape adapted to the frame protrusion 7.

[0020] A sliding depression 12 is formed in the load-bearing plate 5, with its shape adapted to base 3 of the body 1. Two parallel, longitudinal openings 14 are provided in the load-bearing plate 5, on both sides of the sliding depression 12.

[0021] When the plug is connected to the track sensor, body 1 is inserted onto the resting guides 9 formed in the load-bearing plate 5 using starter guides 8, while the frame protrusion 7 is pressed into the adjusting cut-out 11 in the load-bearing plate 6. The load-bearing plate 6 of the centering element 4 is connected with the body 1 using two screws 13A and 13B. As shown in Fig. 5, starter guides 8 are provided as battens, and as shown in Fig. 6, resting guides 9 are provided as ducts.

[0022] Fig. 10 presents the plug in its working position.

[0023] A track sensor with a plug socket inside a housing O is installed on track S. A plug centering element W is attached to the housing O using two screws P. The plug W provided with a plug socket 2 is installed on a fixing element M using screw connections placed in longitudinal openings 14A and 14B. The fixing element M is attached to the track S. Cable K placed inside a rubber screen is connected to the plug W.

Example 2

[0024] The plug is provided as in Example 1 with the exception that starter guides 8 are provided as ducts and resting guides 9 are provided as battens, as shown in Fig. 7.

[0025] As Fig. 8 shows, external environment monitoring sensors 19 are installed in the internal assembly compartment 15 placed inside the body 1 and connected to an additional connector 16 installed in the plug socket 2 next to the main connector 17.

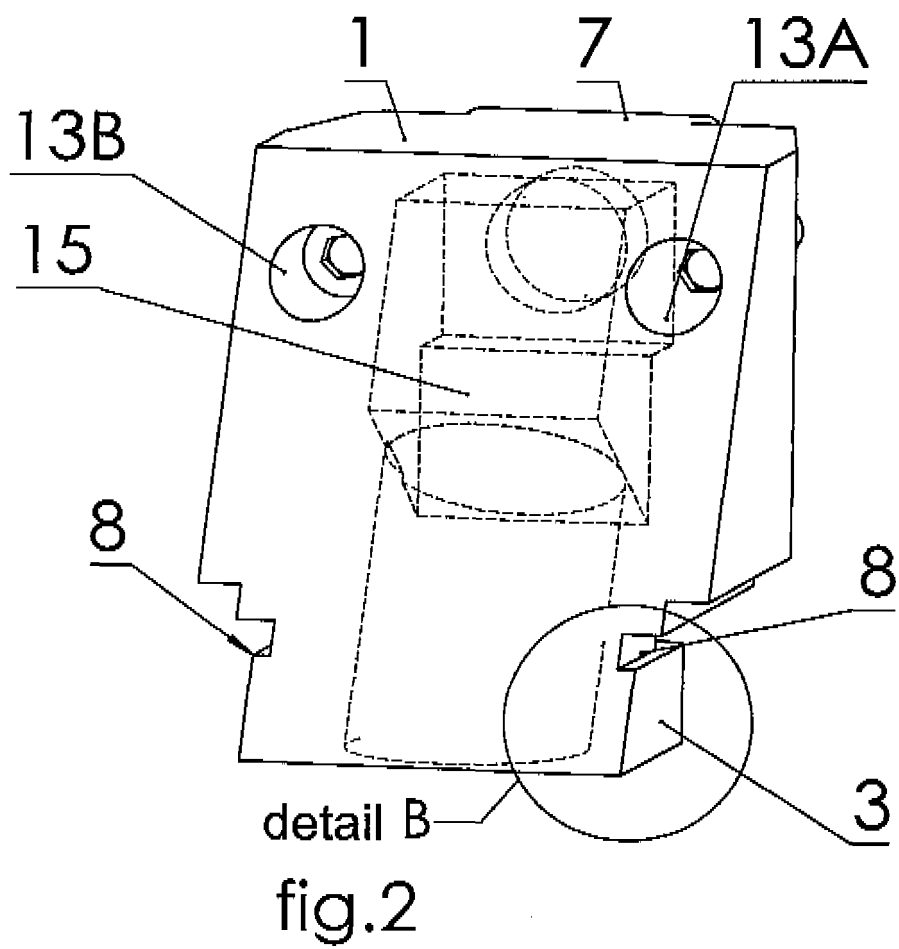
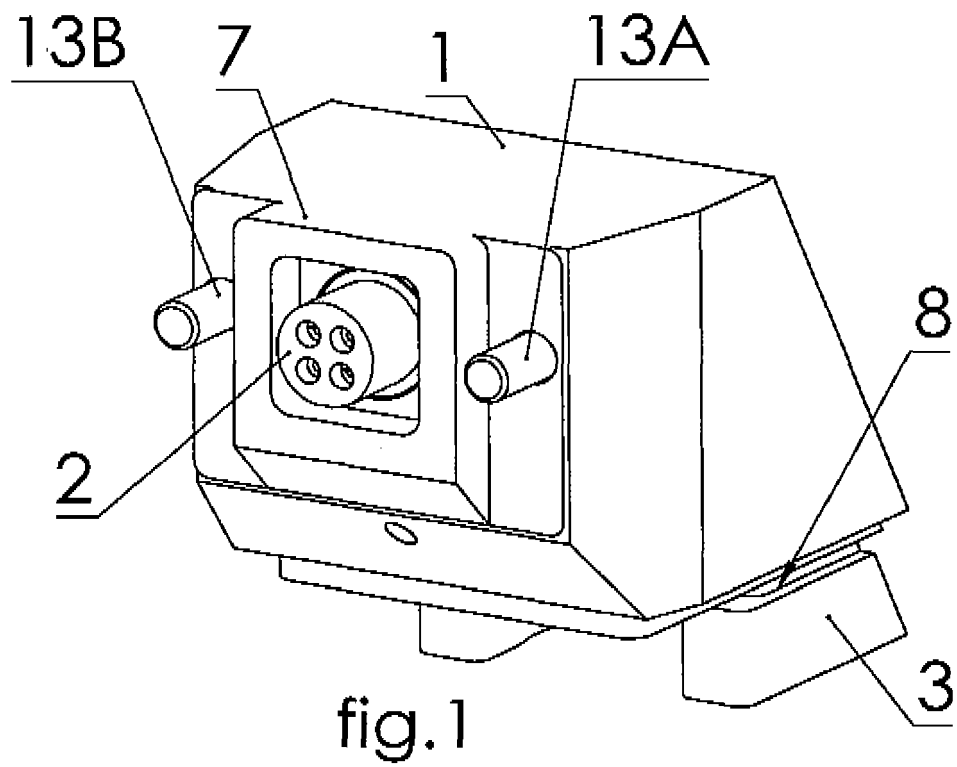
[0026] External environment monitoring sensors 19 include overvoltage protectors and sensors of various types, installed according to local needs.

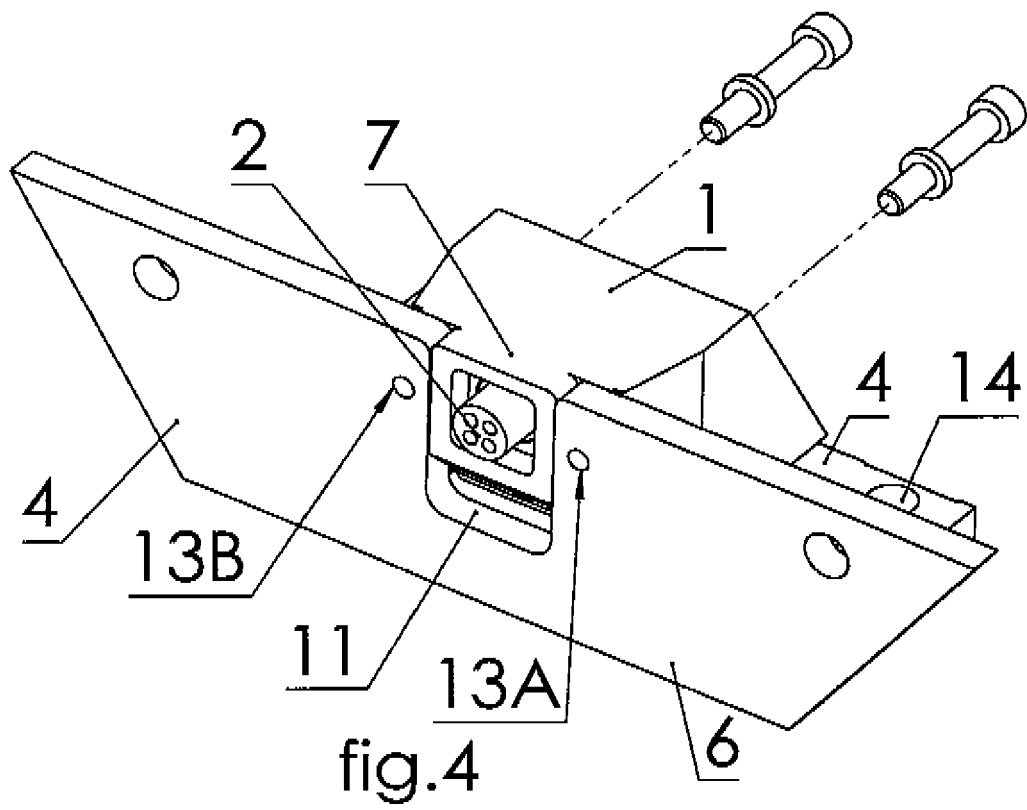
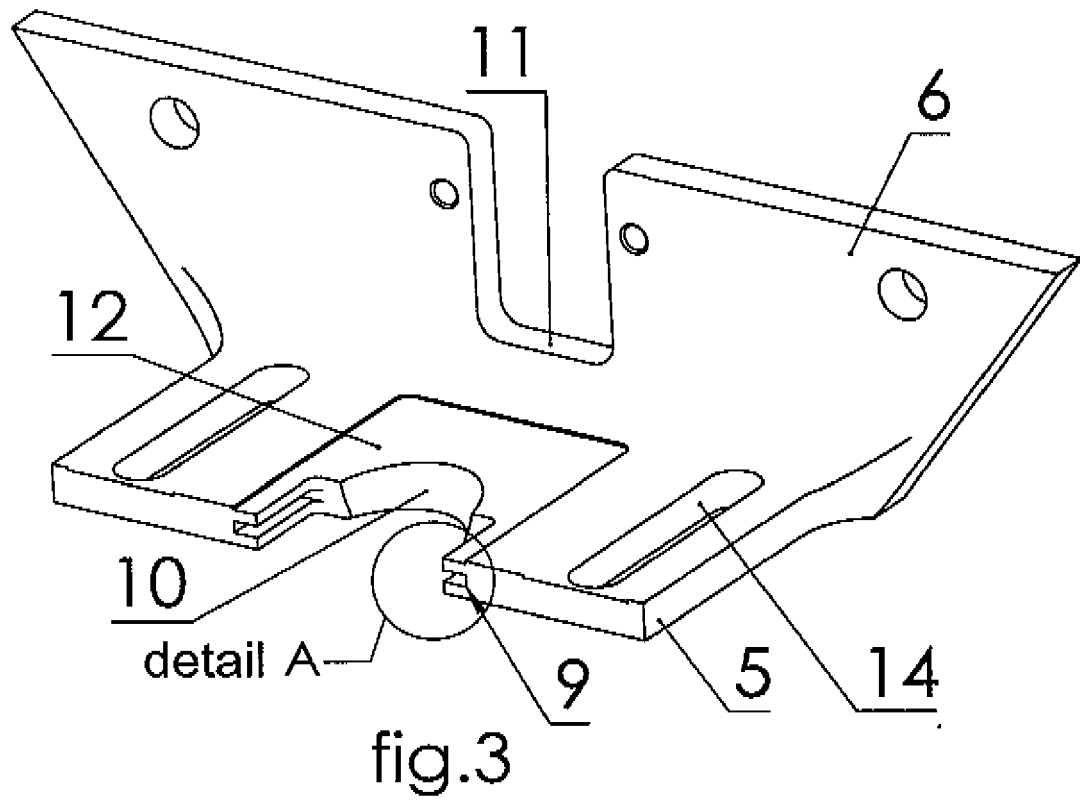
the body (1), with parallel resting guides (9) formed on both sides of the conduit, and an adjusting cut-out (11) is provided in the adjusting plate (6), with a shape matching that of the frame protrusion (7).

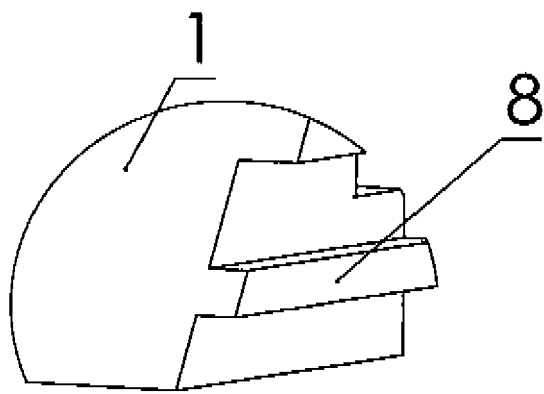
2. A plug according to Claim 1, **characterised in that** a sliding depression (12) is formed on the load-bearing plate (5), with its shape adapted to the base (3) of the body (1).
3. A plug according to Claim 1 or Claim 2, **characterised in that** the starter guides (8) are provided as channels and the resting guides (9) are provided as battens.
4. A plug according to Claim 1 or Claim 2, **characterised in that** the starter guides (8) are provided as battens and resting guides (9) are provided as ducts.
5. A plug according to Claims 1-4, **characterised in that** the body (1) with the adjusting plate (6) of the centering element (4) is connected using at least two screw connections (13A, B), while at least two parallel, longitudinal openings (14) are provided on the load-bearing plate (5), on both sides of the sliding depression (12).
6. A plug according to Claims 1-5, **characterised in that** the plug socket (2) is provided with additional connectors (16) for external environment monitoring sensors (19) installed inside the internal assembly compartment (15).

Claims

1. A plug for installation of wired track sensors, including a through-body, preferably with an internal assembly compartment, with a plug socket provided with at least four connectors, **characterised in that** the body (1) provided with a base (3) is installed in a detachable manner on a centering element (4) formed as an angled profile made of a load-bearing plate (5) and an adjusting plate (6) perpendicular to the load-bearing plate, wherein a frame protrusion (7) is formed on the front wall of the body (1) and parallel starter guides (8) are provided on both sides, at the body base (3), while a semi-circular cable conduit (10) is formed in the middle of the load-bearing plate (5) of the centering element (4), on the side of

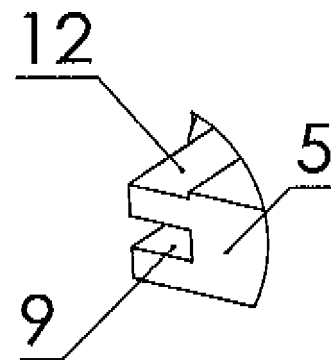






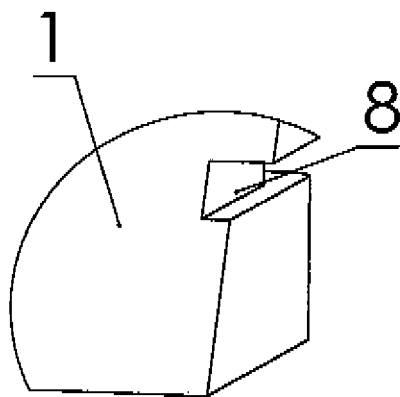
detail B

fig.5



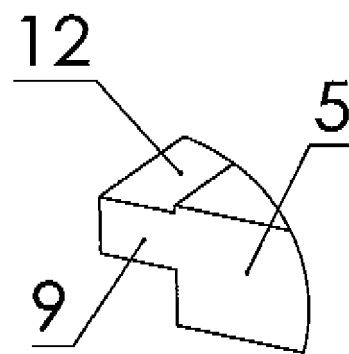
detail A

fig.6



detail B

fig.7



detail A

fig.8

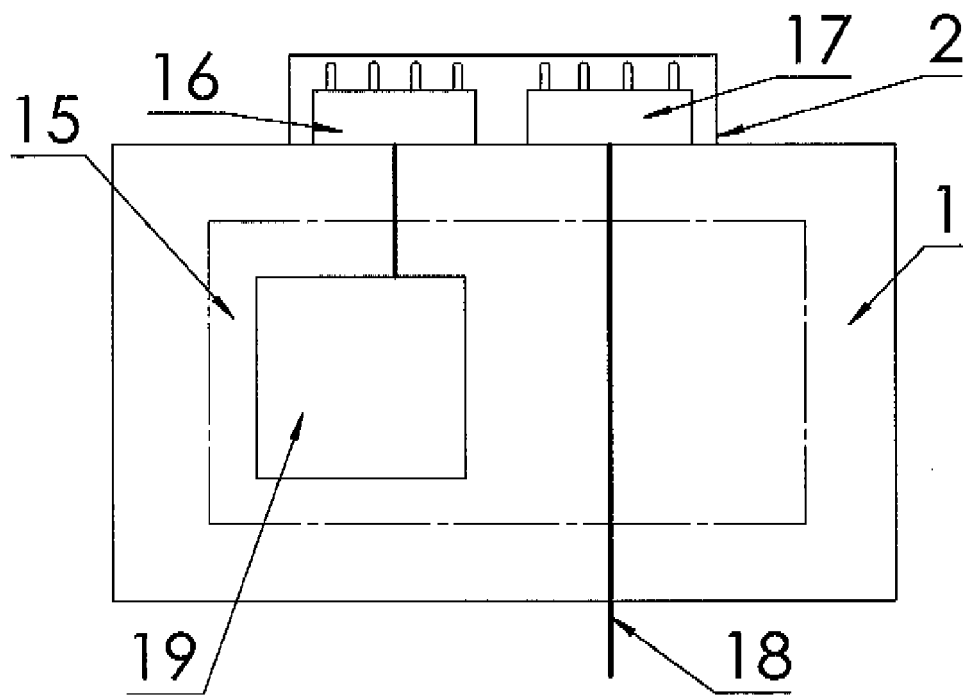


fig.9

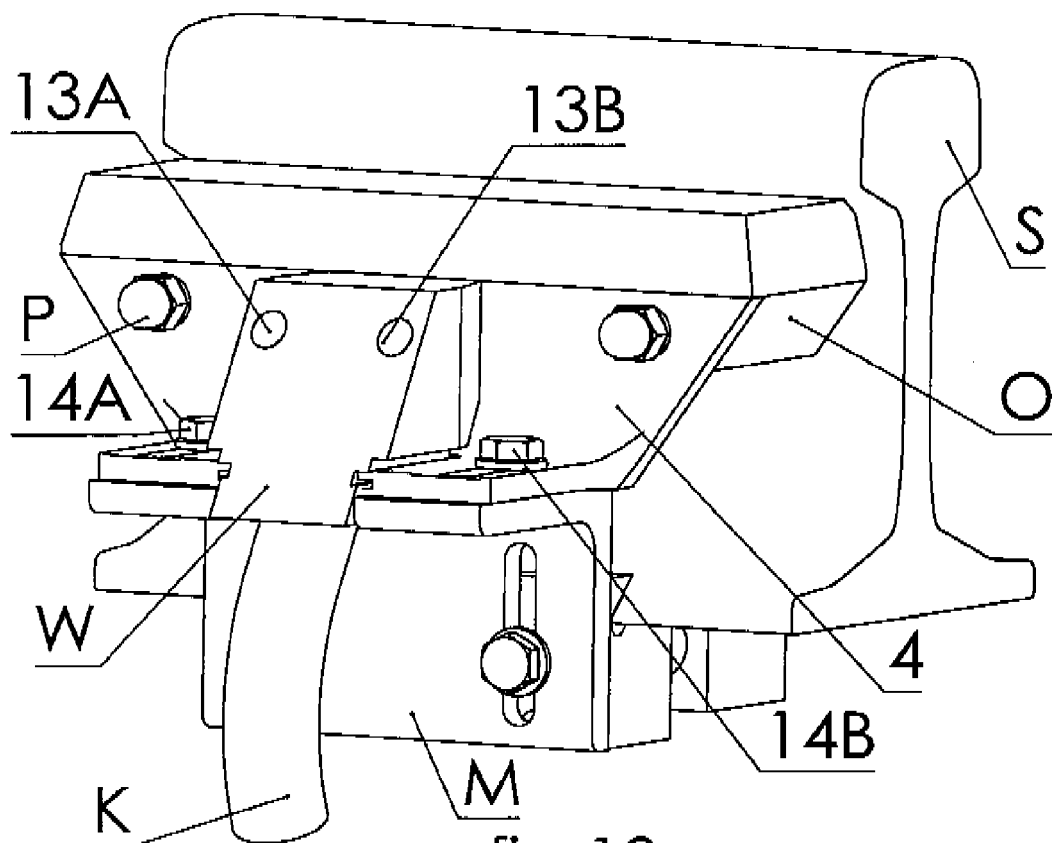


fig.10



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Application Number
EP 18 46 0045

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Place of search		Date of completion of the search	Examiner
Munich		17 May 2019	Fernandez, Eva
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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