



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.11.2011 Bulletin 2011/45

(51) Int Cl.:
B61K 3/00 (2006.01) E01B 7/26 (2006.01)

(21) Application number: **11160572.1**

(22) Date of filing: **31.03.2011**

(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

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(30) Priority: **07.05.2010 IT VR20100100**

(54) **Device and method for applying lubricating grease to the mobile blades of railway points**

(57) A device for applying lubricating grease to the mobile blades of railway points comprises a supporting structure (9), at least one applicator element (13) mounted on the supporting structure (9) and comprising a contact portion (14) against which in practice a blade (2) of a set of railway points (3) can rest when the blade is in its non-operating position; and feed means (15) for feeding grease to the contact portion (14). Also claimed is a

method for applying lubricating grease to the mobile blades of railway points, in which when the blade (2) is in its non-operating position at least part of its surface to be greased rests on a contact portion (14) of an applicator element (13), and during and by means of said resting contact the grease is applied, in such a way that when the blade (2) subsequently returns to its operating position, it carries with it at least part of the grease with which it made contact.

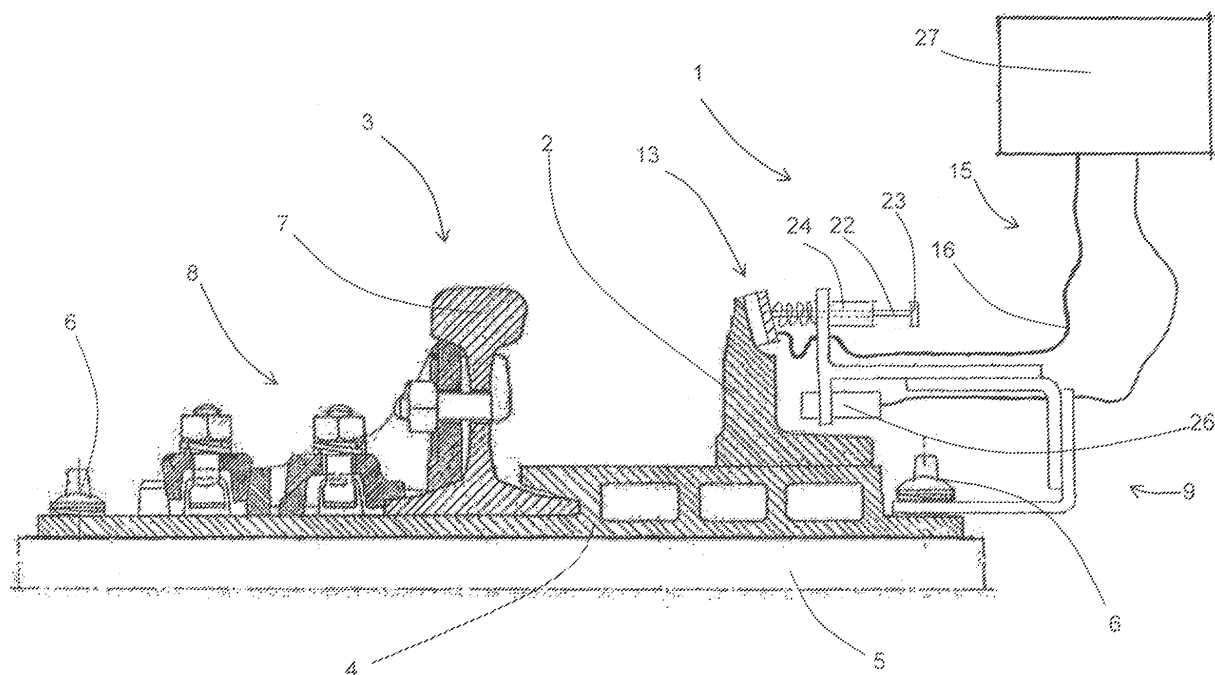


FIG. 2

Description

[0001] This invention relates to a device and a method for applying lubricating grease to the mobile blades of railway points.

[0002] A problem particularly felt in the railway sector is that of wear on rails following the passage of trains. That problem manifests itself in particular at curved stretches where the lateral thrust of the wheel on the rail is particularly high and, therefore, where friction between the two is at its maximum.

[0003] To overcome the problem over the years many devices have been developed which can apply lubricant on the rail at the most critical points.

[0004] In particular, the first automatic lubricating devices were devices able to apply lubricating oil. In most cases they were mounted close to the rail, at a distance allowing the train wheel to pass, and applied the oil by spraying it onto the rail.

[0005] The main disadvantage of that type of device is that it cannot guarantee an adequate lubricating effect because the oil, having a low viscosity, tends to run down the side of the rail and is wasted.

[0006] Therefore, to overcome that disadvantage solutions were developed which were able to automatically apply lubricating grease to the rail. In particular, initially solutions were developed in which the grease, like the oil, was dispensed by spraying, such as that described in patent EP 787 638. However, subsequently, to guarantee improved application of the grease, the Applicant provided a device able to apply a strip of lubricating grease to the rail, described in patent EP 1 999 000. Said device comprises a mobile nozzle which on one hand can be moved close to the rail when it must dispense the grease and distanced from the rail when a train must pass, and on the other hand is able to move along a predetermined stretch of rail.

[0007] However, at present none of the prior art devices has proved able to lubricate another point of the railway lines which is particularly subject to wear, the blades of the points. In fact, all of the prior art devices must be able to be installed in a very precise way at a predetermined distance from the part to be lubricated. But that is quite complicated with the blades of points, which are not fixed like the rails, but instead are mobile. In particular, lubricating devices cannot be positioned close to the blade when it is in the operating position because they would prevent its subsequent movement. At the same time, they cannot be positioned with the required precision when the blade is in its non-operating position, because it is not possible to guarantee that this position is always the same. Moreover, the prior art devices have dimensions which in many situations would complicate their positioning near the set of points.

[0008] Tests have shown how for the blades too, adequate lubrication requires the use of lubricating grease rather than oil.

[0009] Consequently, at present, the blades are only

lubricated manually.

[0010] In this context, the technical purpose which forms the basis of this invention is to provide a device and a method for applying lubricating grease to the mobile blades of railway points which overcome the above-mentioned disadvantages.

[0011] The technical purpose and the aims indicated are substantially achieved by a device and a method for applying lubricating grease to the mobile blades of railway points as described in the appended claims.

[0012] Further features and the advantages of this invention are more apparent in the detailed description, with reference to the accompanying drawings which illustrate several preferred, non-limiting embodiments of a device and a method for applying lubricating grease to the mobile blades of railway points, in which:

- Figure 1 is a schematic front view of a device made in accordance with this invention, coupled to a set of points (in turn shown in cross-section) whose blade is in the operating position;
- Figure 2 illustrates the device of Figure 1 with the blade of the set of points in the non-operating position;
- Figure 3 is a view, partly in cross-section, of an alternative embodiment of part of the device of Figure 1;
- Figure 4 is a schematic axonometric view of a detail of the devices of the previous figures;
- Figure 5 is a schematic top section of a part of the detail of Figure 4.

[0013] With reference to the accompanying drawings, the numeral 1 denotes in its entirety a device for applying lubricating grease to the mobile blades 2 of railway points 3 made in accordance with this invention.

[0014] Figure 1 schematically illustrates a cross-section of a part of a set of railway points 3. The set of points 3 comprises a base 4, fixed to a sleeper 5 below by sleeper screws 6, to which the stock rail 7 is fixed by conventional fixing systems 8. Resting on a raised flat bearing of the base 4 there is the blade 2, which can move between the operating position of Figure 1 in which it is drawn near the stock rail 7, and the non-operating position of Figure 2 in which it is distanced from the stock rail 7.

[0015] According to this invention, the lubricating device 1 comprises first a supporting structure 9. Advantageously, in the preferred embodiment, the supporting structure 9 can be fixed directly to the base 4 of the set of railway points 3, as shown in Figures 1 and 2, so as to guarantee that it remains stably and precisely positioned. In particular, this can be achieved by fixing the supporting structure 9 to the base 4 of the set of points 3 directly using one or more sleeper screws 6 which fix the base 4 to the sleeper 5 below. Alternatively the lubricating device 1 may be suitably fixed to the sleeper or to the stock rail (for example with brackets or clips).

[0016] In the embodiments illustrated, the supporting

structure 9 comprises a plurality of shaped flanges 10 (extending perpendicularly to the plane of the drawing of Figures 1 to 3) which are connected to each other. In particular, in the embodiment in Figures 1 and 2 there is one T-shaped and two L-shaped flanges 10 which are welded to each other. In contrast, in the embodiment in Figure 3 they are connected to each other by a plurality of bolts 11 inserted through aligned slots 12 which are made in the flanges 10. Therefore, in this case, the position of the various flanges 10 relative to each other may be modified in such a way as to be able to adjust the position in space of the operating part of the device 1 (advantageously in a plane substantially perpendicular to the direction of extension of the stock rail 7).

[0017] The device 1 also comprises at least one applicator element 13 mounted on the supporting structure 9, designed to apply grease to the blade 2. In particular, the applicator element 13 comprises a contact portion 14 against which in practice the blade 2 of the set of railway points 3 can rest 2 when it is in its non-operating position, as shown in Figure 2.

[0018] Finally, the device 1 comprises feed means 15 for feeding the lubricating grease to the contact portion 14. In general, in the known way, the feed means 15 comprise a tank for the grease, a pump whose intake inlet is connected to the tank and whose delivery outlet is connected to a dispensing duct 16 whose other end is in turn connected to the applicator element 13. In the accompanying drawings only the duct is shown.

[0019] The principle on which this invention is based is that the grease is transferred from the applicator element 13 to the blade 2 after the blade 2 has come to rest against the contact portion 14 of the dispensing element. For that purpose, the feed means 15 may, for example, be made in such a way that they distribute the grease on the contact portion 14 before the blade 2 rests on it.

[0020] However, in the preferred embodiment (Figures 4 and 5), the contact portion 14 comprises a contact surface 17 able to adhere to a lateral surface of the blade 2 and at least one recess 18 made in the contact surface 17. The recess 18, which in Figure 4 has the shape of a slot at the contact surface 17, in practice can be positioned directly opposite the blade 2, and is fed with the grease by the feed means 15, in such a way that it can be substantially filled with the grease. As shown in Figure 5, in the embodiment illustrated this is achieved using passages 19 made in the applicator element 13 and connected to the dispensing duct 16. However, preferably the mouths 20 of the recesses have an elongate shape parallel with what in practice is the direction of extension of the blade 2.

[0021] Advantageously, at least the portion 21 of the applicator element 13 which forms the contact surface 17 is made of elastically compressible material (for example, rubber), in such a way that it adheres in the best possible way to the wall of the blade 2, creating a certain seal as the grease passes around the open mouths 20 of the recesses.

[0022] Preferably, as illustrated in the accompanying drawings, the applicator element 13 is mounted on the supporting structure 9 in such a way that it can move, relative to the supporting structure, between a home position (Figures 1 and 3) and an operating position (Figure 2). In the embodiment illustrated this is done by fixing, cantilever-style, to the applicator element 13, two parallel rigid rods 22 with the outer end 23 enlarged to act as an end of stroke element. The two rods 22 are slidably inserted in two bushings 24, welded to one of the flanges 10 of the supporting structure 9.

[0023] In the embodiment illustrated, in the home position the applicator element 13 is distanced from the supporting structure 9, whilst in the operating position it is close to it.

[0024] Advantageously, the applicator element 13 is mounted on the supporting structure 9 in such a way that the pressure of the blade 2 on the contact portion 14 causes the applicator element 13 to pass from the home position to the operating position.

[0025] As shown in the accompanying drawings, there are also preferably elastic means 25 interposed between the supporting structure 9 and the applicator element 13 for pushing the applicator element 13 towards the home position in the absence of the blade 2. In the particular case illustrated the elastic means are two coil springs mounted so that they are coaxial with the rods 22 supporting the applicator element 13, between the applicator element and the supporting structure 9. Thanks to the elastic means 25 the device 1 can therefore compensate in the best possible way for any irregular positioning of the set of points 3.

[0026] Finally, in the most complex embodiments, the device 1 also comprises at least one sensor 26 for detecting the presence of the blade 2 resting on the contact portion 14, as well as control means 27 which are operatively associated with the sensor 26 and with the feed means 15 for enabling grease feed according to what the sensor 26 detects. In general, the sensor 26 may be a contact sensor 26 (for example, mechanical) or a contactless sensor (for example, electromagnetic, as shown in the accompanying drawings, or optical or ultrasonic).

[0027] Operation of the feed means 15 depends on the device 1 operating logic.

[0028] In the case illustrated, the control means 27 activate the feed means 15 when the sensor 26 detects the presence of the blade 2, in such a way as to fill the recesses 18 with the grease which therefore makes contact with the lateral surface of the blade 2 which closes off the recesses 18. Consequently, when the blade 2 returns to its operating position, it draws with it part of the grease, partly emptying the recesses 18.

[0029] However, operation could be different if the grease were dispensed directly onto the contact portion 14. In that case, the control means 27 would issue the command to dispense a predetermined quantity of grease at the moment when the sensor 26 detected the absence of the blade 2.

[0030] In the absence of the sensor 26, the feed means 15 could instead be activated periodically at predetermined time intervals.

[0031] Obviously, this invention also relates to a set of railway points 3 equipped with the applicator device 1 described above.

[0032] The method for applying lubricating grease to the blades 2 of railway points 3 comprises two main operating steps.

[0033] The first operating step comprises applying the grease on at least one part of the surface to be greased while said surface is resting on a contact portion 14 of an applicator element 13, in such a way that the next time it returns to its operating position the blade 2 carries with it at least part of the grease with which it made contact. This can be achieved, for example, with the device 1 described above in any of the ways indicated.

[0034] The other main operating step comprises putting the blade 2 in contact with the applicator element 13, making at least part of its surface to be greased rest on the contact portion 14 of the applicator element 13, at the moment when the blade 2 is in its non-operating position, precisely as indicated with reference to the greaser device 1 described above.

[0035] The other steps of the method according to this invention are those which in practice are implemented by the device 1 described above, which implements a possible embodiment of the method.

[0036] This invention brings important advantages.

[0037] Thanks to this invention, it was possible to provide a device which is simple to make and whose cost is quite limited, which guarantees correct greasing of the blade.

[0038] The invention described above may be modified and adapted in several ways without thereby departing from the scope of the inventive concept.

[0039] Moreover, all details of the invention may be substituted with other technically equivalent elements and the materials used, as well as the shapes and dimensions of the various components, may vary according to requirements.

Claims

1. A device for applying lubricating grease to the mobile blades of railway points, **characterised in that** it comprises:

a supporting structure (9);
at least one applicator element (13) mounted on the supporting structure (9) and comprising a contact portion (14) against which in practice a blade (2) of a set of railway points (3) can rest when the blade is in its non-operating position;
and
feed means (15) for feeding the grease to the contact portion (14).

2. The device according to claim 1, **characterised in that** the contact portion (14) comprises a contact surface (17) which is able to adhere to a lateral surface of the blade (2), and also comprises at least one recess (18) made in said surface and which in practice can be positioned directly opposite the blade (2), the feed means (15) being connected to the recess (18) in such a way that they can feed grease to it.

3. The device according to claim 1 or 2, **characterised in that** the applicator element (13) comprises at least one portion forming the contact surface (17), made of elastically compressible material.

4. The device according to claim 1, 2 or 3, **characterised in that** it also comprises at least one sensor (26) for detecting the presence of the blade (2) resting on the contact portion (14), and control means (27) operatively associated with the sensor (26) and with the feed means (15) for enabling grease feed according to what the sensor (26) detects.

5. The device according to claim 4, **characterised in that** the sensor (26) is an electromagnetic, optical, mechanical or ultrasonic sensor (26).

6. The device according to any of the foregoing claims, **characterised in that** the applicator element (13) can move relative to the supporting structure (9) between a home position and an operating position, the pressure of the blade (2) on the contact portion (14) causing the applicator element (13) to pass from the home position to the operating position.

7. The device according to claim 6, **characterised in that** it also comprises elastic means (25) interposed between the supporting structure (9) and the applicator element (13) for pushing the applicator element (13) towards the home position in the absence of the blade (2).

8. The device according to any of the foregoing claims, **characterised in that** the feed means (15) comprise a tank for the grease, a pump connected to the tank and to a dispensing duct (16) which is in turn also connected to the applicator element (13).

9. A set of railway points, **characterised in that** it comprises an applicator device (1) made according to any of the foregoing claims.

10. A method for applying lubricating grease to the blades of railway points which are mobile between an operating position in which the blades are in contact with a stock rail (7) and a non-operating position in which they are distanced from it, **characterised in that** it comprises the operating steps of:

when the blade (2) is in its non-operating position, bringing it into contact with an applicator element (13), resting at least part of its surface to be greased on a contact portion (14) of the applicator element (13);

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using the applicator element (13) to apply grease on at least part of the surface to be greased while it is resting on the contact surface (17), so that when it subsequently returns to its operating position the blade (2) carries with it at least part of the grease with which it made contact.

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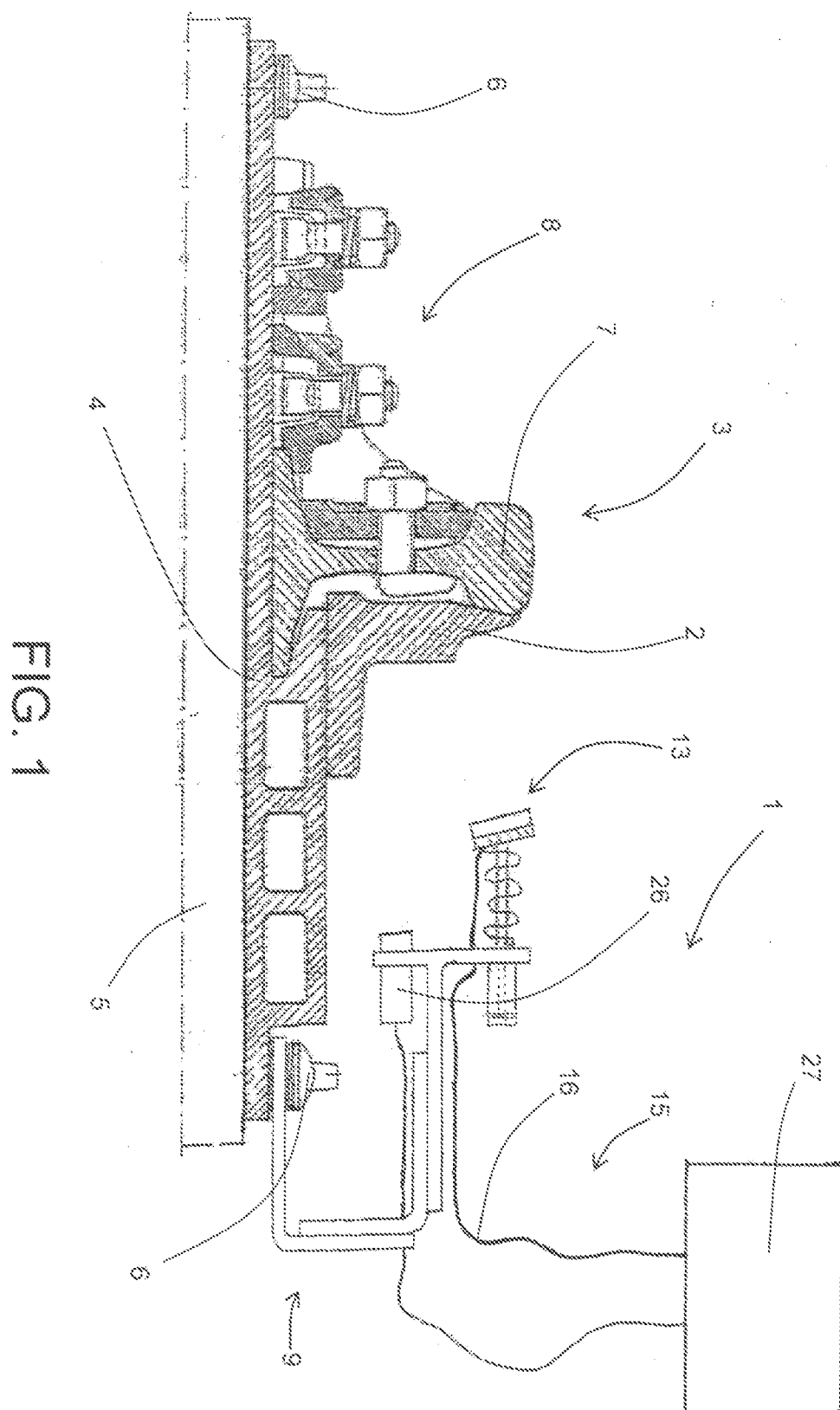
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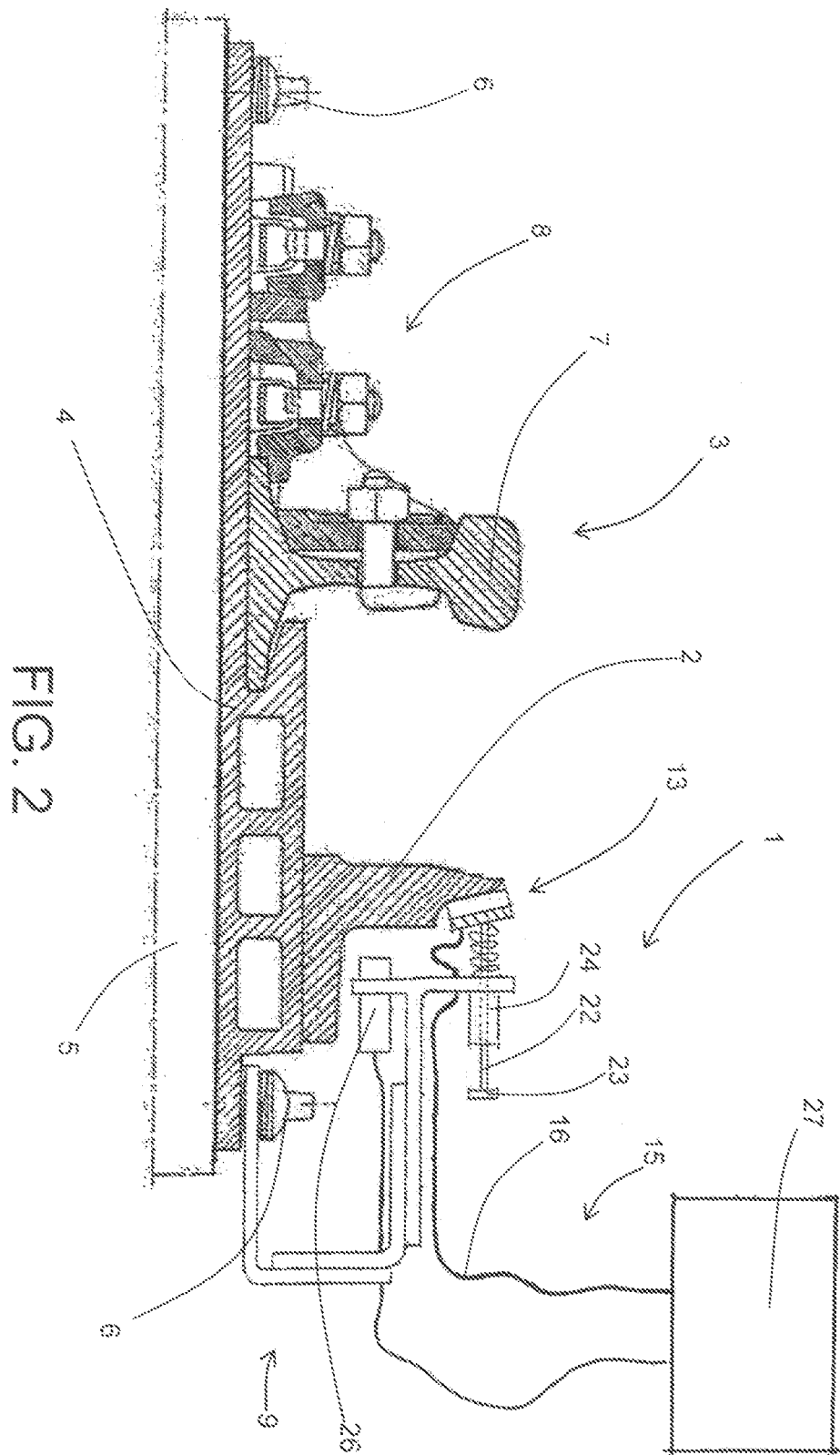
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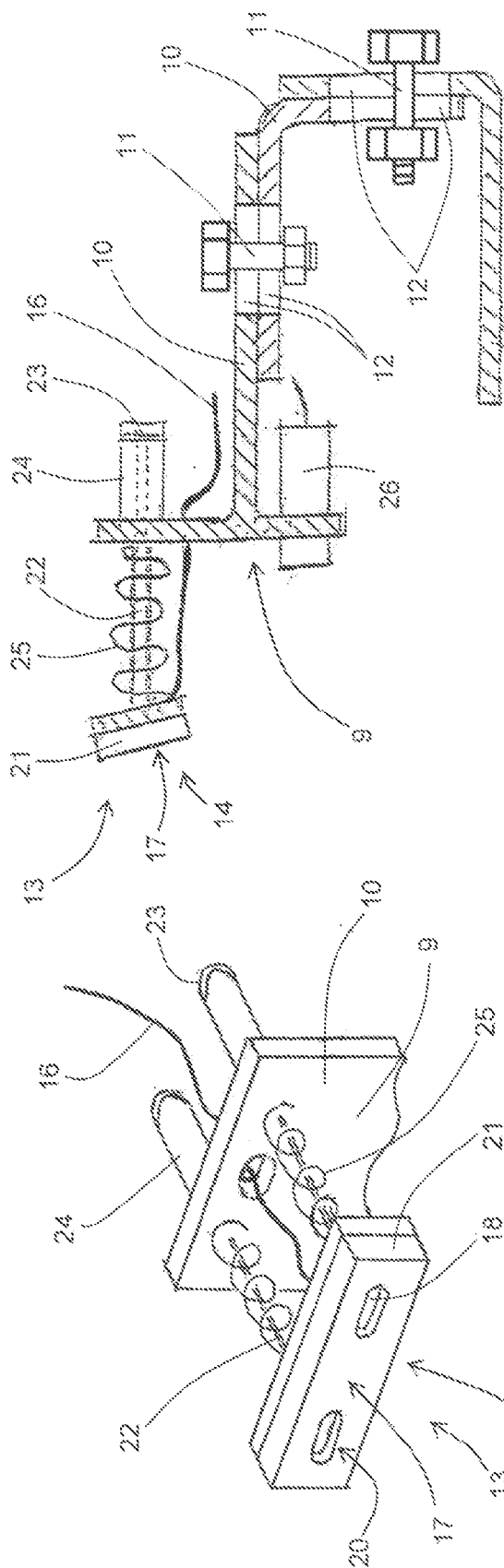


FIG. 3

FIG. 4

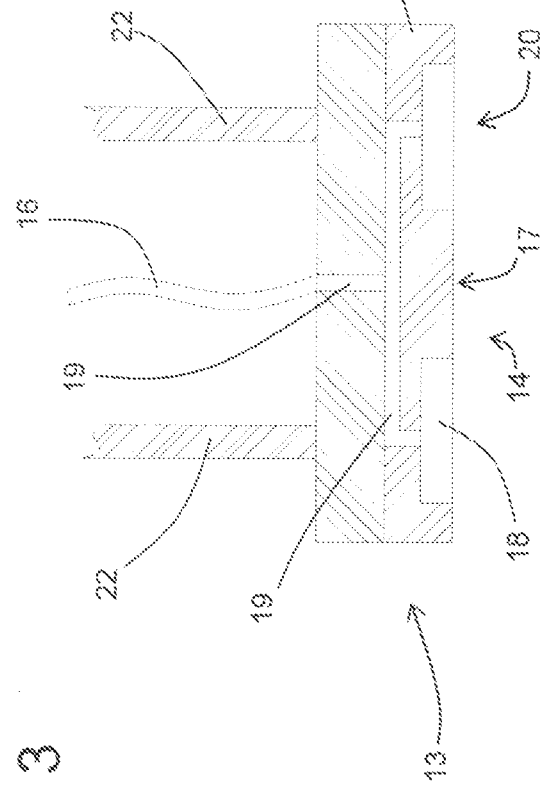


FIG. 5



EUROPEAN SEARCH REPORT

Application Number
EP 11 16 0572

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			B61K E01B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 25 August 2011	Examiner Fuchs, Aloïse
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 E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 16 0572

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25-08-2011

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