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(54) **Fuseholder base**

(57) The present invention refers to a vertical fuseholder base, preferably for NH type fuses, which is provided with means for the measuring and/or monitoring of different electrical parameters and which basically comprises a base plate (1) in which there are housed pairs of contacts (2), a fuse (6) connected to each pair of contacts (2), so that it may be coupled to and uncoupled from them, thereby opening and closing the electrical circuit, at least one connection terminal (3) to provide power supply at a load, and a housing (4) situated in the area of the connection terminals (3) for the installation of at least one current sensor (5).

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Description

Object of the invention

[0001] The present invention lies within the field of electrical installations and refers to a vertical fuseholder base used on electrical distribution boards, preferably for fuses of the type known as "NH".

[0002] More specifically, the vertical fuseholder base of the invention is the three-pole type and has means for measuring and/or monitoring different electrical parameters.

Prior art

[0003] At the present time there is an increasing trend towards monitoring electricity consumption with a view to saving energy and, as a result, to saving costs at the same time as a benefit is achieved for the environment and an optimization of electrical distribution installations.

[0004] To this end, it is necessary to know a series of parameters of the network, such as the power consumed, its active and reactive component, energies, balance between phases, etc., so measuring devices should be installed on the low-voltage boards of the respective electrical installation that will enable us to ascertain the values of voltages and currents consumed, which, when processed, will allow us to obtain the desired parameters.

[0005] In the case of low-voltage board fuseholder bases, using for this purpose either a current transformer (toroidal transformer) or other types of current sensors (Rogowski coil type or others), which are wound in place on a conductor through which the current flows, between the connection strips of the fuseholder base and the busbar of the low-voltage board, is already known.

[0006] These solutions, however, entail a certain complexity in their installation, as amongst other things it is necessaary to fit each one of the toroidal transformers on its respective terminal post.

[0007] Examples of installations where alternative means are known may be found in such documents as DE-10062644, where it is shown how current transformers are installed between the fuseholder base and the low-voltage board, for which purpose it is necessary to set a conductor bushing in place between the low-voltage board input connection strips and conductor strips.

[0008] Similarly, in patent document DE-29705224 the transformers are mounted on a special support bracket, which is attached between the fuseholder base and the low-voltage board connector strips.

[0009] Lastly, in DE-10002800-A1 we may see another arrangement wherein the transformers present a special layout which permits its attachment to the base input strips.

[0010] These cases, however, also have the disadvantage of complexity during on-site assembly, besides the problem entailed in the fact that they are installed on the rear side, not visible in normal working conditions and in one of the hottest areas of the base. To this, furthermore, we have to add that they are not suitable for fuseholder bases already installed previously on distribution boards, in which case they would require at least the complete removal of the base.

[0011] To overcome these problems, modules or accessories have appeared in the state of the art in a way that they are connected to the fuseholder bases, such as for example the one shown in DE202010017635 or in Spanish patent application P201031633 of this same applicant, wherein a module is described in one piece that includes three conductor strips that are connected to each one of the contacts of the fuseholder base, at least one current transformer, and a connection terminal block for easy installation.

[0012] Although these modules or accessories comply with their objective of providing data on the current and voltage consumed by a device or appliance connected to it they also suffer from certain disadvantages.

[0013] Specifically, these drawbacks are mainly due to the fact that these modules are an additional connection point on the base, so they represent points of risk for the appearance of hot spots in the base. In addition, it is common that on fuseholder bases installed previously there is no space available on the board, so that they cannot be installed in a straightforward manner.

Description of the invention

[0014] The vertical fuseholder base of the invention overcomes the afore-mentioned problems of the state of the art, as it allows us to know/measure the main electrical parameters without this impairing its installation.

[0015] Specifically, the vertical fuseholder base of the invention is the three-pole type for fuses of the type known as "NH" and it comprises three pairs of contacts, each pair of contacts, one per phase, being connected electrically to a fuse and to the base input and output conductors. These input and output conductors permit, respectively, the connection of the base to the busbar system of the distribution board and to the corresponding conductors that enable the base to be connected to the units supplied.

[0016] On base models with a load break switch, as is the case of the base of the invention, in each pair of contacts there is coupled the actual fuse, which is fitted on a cover folding in relation to the body of the fuseholder base where the pairs of contacts are located. In this way, when the cover is closed on the base, the fuses are coupled in their respective contact pairs, thereby closing the electrical circuit, and when the cover is opened, the fuses are disconnected in respect of these contacts.

[0017] Finally, at its output the vertical fuseholder base has three connection terminals to which the respective electrical cables are connected to provide the units situated downstream with the power supply. As is already known, these terminals may be of different types depending on the type of connection desired, for example of the

screw, nut, direct connection flange, etc. type.

[0018] Additionally, the vertical fuseholder base of the invention comprises a housing situated in the area of the connection terminals so that it may prove possible to install at least one current sensor inside it.

[0019] For this purpose, in this area the vertical fuseholder will comprise means of anchorage by way of which the sensors will be attached firmly to the base, permitting in turn their removal if so required.

[0020] In this way, according to a preferred embodiment the current sensor or sensors will be amenable to possible removal for replacement or servicing purposes without the need to carry out complex tasks, with simple re-installation. This will also enable these sensors to be fitted to any fuseholder base according to the present invention without the need for them to be installed initially. In other words, a user will be able to acquire the vertical fuseholder base of the present invention and fit later, if so required, one or more sensors with which to monitor or measure the electrical parameters.

[0021] All this means that the vertical fuseholder base of the present invention may overcome the above-mentioned state-of-the-art problems, since:

- Installation of the measuring systems is facilitated as these may be installed or fitted ex-works on the actual base;
- The sensors may be fitted and/or removed easily.
- The appearance of hot spots is prevented through not adding new connections;
- Space is saved in relation to the solutions in which the measuring modules are external.
- The sensors continue to be accessible and may even be visible from the front.
- The transformer area is fully protected and only the connection points are exposed.

Description of the figures

[0022] To supplement the description that is being given and in order to assist the better understanding of the features of the invention, in accordance with a preferred example of practical embodiment of same, there is adjoined as an integral part of this description a set drawings, wherein there is represented on an illustrative and non-restrictive basis the following:

Figure 1.- It shows a perspective view of the vertical fuseholder base according to a possible embodiment of the present invention, in which the body has been removed.

Figure 2.- It shows a perspective view of the vertical fuseholder base of Figure 1, wherein both the body and the folding covers have already been attached.

Figure 3.- It shows a perspective view of the vertical fuseholder base of Figure 2, wherein part of the protection element has been removed for better viewing of the connection terminals and of the current sensors.

Figure 4.- It shows a schematic perspective view of the end of the vertical fuseholder base of the invention, wherein there may be observed more clearly a possible installation of the sensors coupled to the connection terminals.

Preferred embodiment of the invention

[0023] As may be observed in the example shown in the figures, the vertical fuseholder base of the present invention, of the three-pole type, comprises a body (7) and a base plate (1) in which there are housed three pairs of contacts (2) for the connection to the respective vertical fuseholder base input and output conductor strips.

[0024] In each pair of contacts (2) there is coupled the actual fuse (6), which is mounted on a cover (9) folding in relation to the base plate (1) of the vertical fuseholder base where the pairs of contacts (2) are housed. In this way, when the cover (9) is closed on the vertical fuseholder base, the fuses (6) are coupled in their respective pairs of contacts (2), closing the electrical circuit and, when the cover is opened, as may be seen in figures 2 and 3, the fuses (6) are disconnected in respect of these contacts (2), thereby opening the circuit.

[0025] As it may also be seen in the figures, at its output the vertical fuseholder base is equipped with connection terminals (3), three in this case, to which the respective electrical cables are connected to provide the power supply at a load situated downstream.

[0026] Additionally, the vertical fuseholder base of the invention comprises a housing (4) located in the area of the connection terminals (3) so that provision is made for the installation within it of at least one current sensor (5) for said connection terminals (3), which may be attached, in accordance with different embodiments of the invention, either to the actual connection terminal (3) or else to the base plate (1).

[0027] In both cases, however, this attachment between the current sensor or sensors (5) and the vertical fuseholder base, whether by way of connection terminals (3) or else via the base plate (1), will be effected using means of anchorage that permit both its connection and its disconnection.

[0028] These current sensors (5), which may for instance be inductive current transformers, Rogowski or open-core coils, etc., each present their respective output connector or, according to a possible embodiment too, a single common output connector that conveys the data of all the phases monitored.

[0029] These output data may moreover be analogical ones measured directly or else digital, incorporated for which purpose there is an A/D conversion module, connected to an output of the current sensors (5), which will in turn be provided with an output that may be connected

to a data processor for analysis of the information obtained from the sensor measurements.

[0030] Furthermore, according to another possible embodiment of the invention, not shown, the current sensors (5) may be arranged conjointly so that they form a single unit or measuring block, which will also be able to be incorporated into the vertical fuseholder base of the invention by way of the anchoring means.

[0031] In addition, with a view to preventing accidental contacts, the area of the vertical fuseholder base intended to accommodate the current sensors (5) will be provided with a protection element (8) that will impede accidental contact with live parts and which at the same time will protect these current sensors (5) from any accidental blow.

[0032] Furthermore, it may be seen in the example of embodiment shown in the figures, especially in figures, that the lower part of the vertical fuseholder base intended to house the current sensors (5) is made from a U-shaped section.

[0033] Lastly, the vertical fuseholder base of the present invention is amenable to the inclusion, according to another possible embodiment, of a power connection (not represented) in the housing (4), a power connection that may in turn be protected by overload and/or short-circuit protection means, such as for instance its own fuse (not represented), and be provided with a single output connector, and it will be where the signals are collected from the three current sensors and the power connections.

[0034] Finally, according to another possible embodiment, the A/D converter is applied to the power connection.

Claims

1. Vertical fuseholder base which comprises:

- a base plate (1) housing pairs of contacts (2),
- a fuse (6) connected to each pair of contacts (2) so that it may coupled to and uncoupled from them thereby opening and closing the electrical circuit, and
- at least one connection terminal (3) to provide a power supply at a load.

characterized in that it further comprises a housing (4) situated in the area of the connection terminals (3) for the installation of at least one current sensor (5).

2. Vertical fuseholder base according to a first claim, **characterized in that** it comprises anchoring means for the fastening of the current sensor or sensors (5).

3. Vertical fuseholder base according to a second claim, **characterized in that** the anchoring means are located on the base plate (1) or at the connection terminals (3).

4. Vertical fuseholder base according to a second claim, **characterized in that** the anchoring means are such that they permit the removal of the current sensors (5).

5. Vertical fuseholder base according to any of the foregoing claims, **characterized in that** the current sensors (5) form a single measuring unit or block.

6. Vertical fuseholder base according to any of claims 1-5, **characterized in that** the current sensors (5) comprise an output connector.

7. Vertical fuseholder base according to any of claims 1-5, **characterized in that** the current sensors (5) present a single common output connector.

8. Vertical fuseholder base according to any of claims 1-7, **characterized in that** the current sensors (5) comprise an output where an A/D conversion module is connected.

9. Vertical fuseholder base according to any of the foregoing claims, **characterized in that** it comprises a protection element (8) in the area intended for accommodation of the measuring sensors (5).

10. Vertical fuseholder base according to any of the foregoing claims, **characterized in that** the current sensors (5) are housed in the lower part of the vertical fuseholder base and **in that** said lower part is formed with a U-shaped section.

11. Vertical fuseholder base according to any of the foregoing claims, **characterized in that** it comprises a power connection, in the housing area (4), associated with each connection terminal (3).

12. Vertical fuseholder base according to claim 11, **characterized in that** each power connection has an output connector.

13. Vertical fuseholder base according to claim 12, **characterized in that** the output connector is single and will be where the signals from the three current sensors and the power connections are collected.

14. Vertical fuseholder base according to any of claims 11-13, **characterized in that** the power connection includes overload and/or shortcircuit protection means.

15. Vertical fuseholder base according to claim 8 and any of claims, 11-14, **characterized in that** the A/D converter is applied to the power connection.

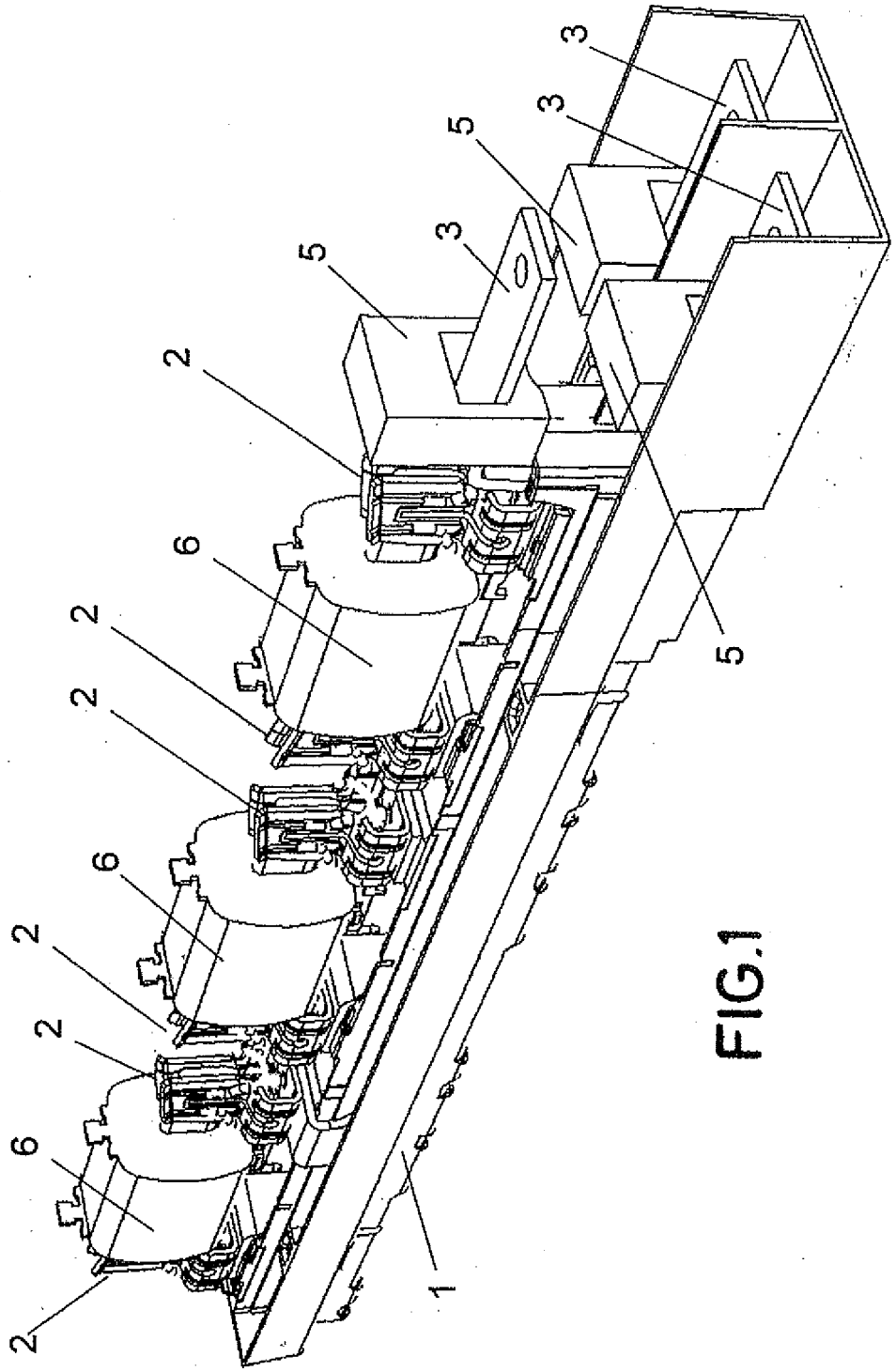

FIG.1

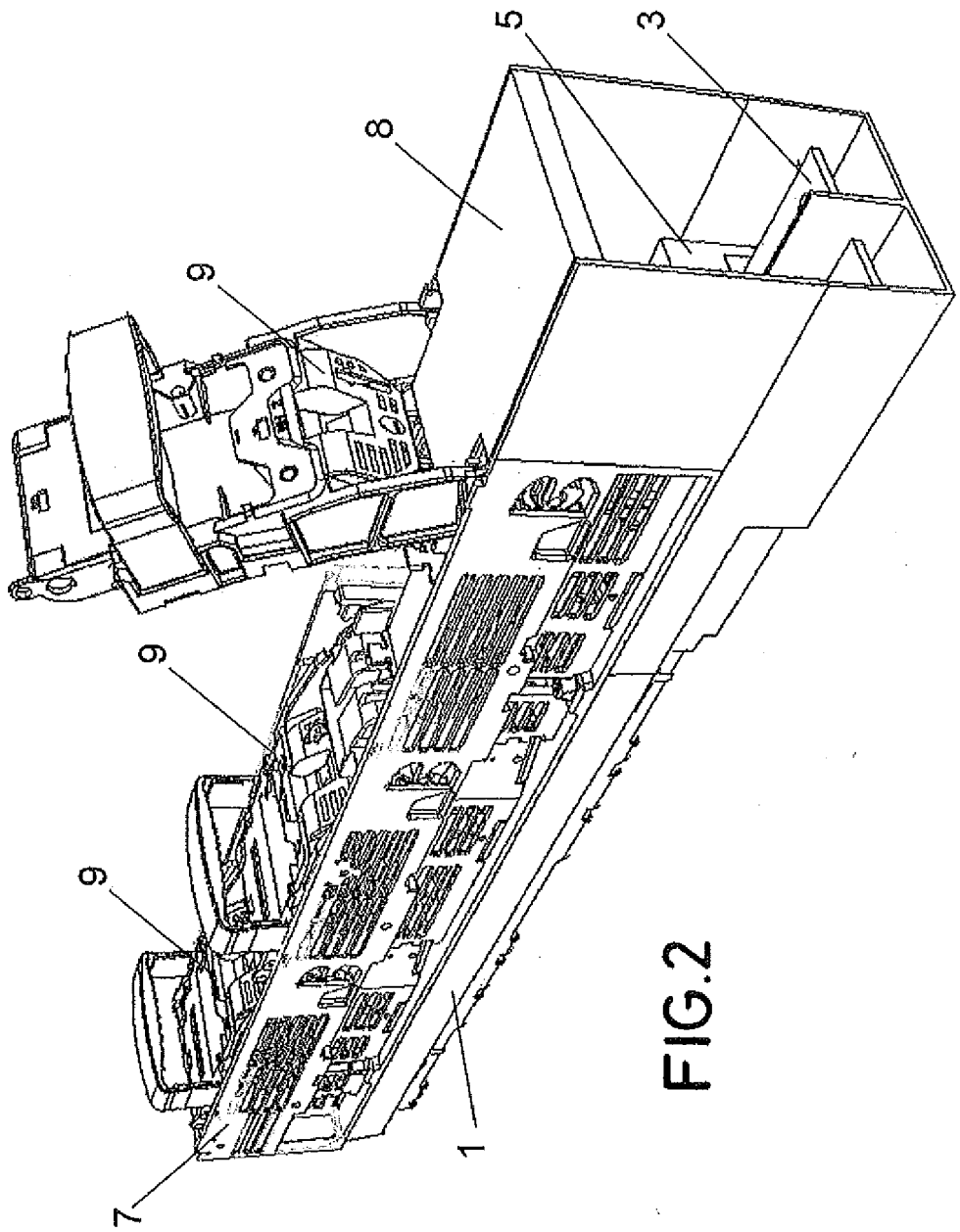

FIG.2

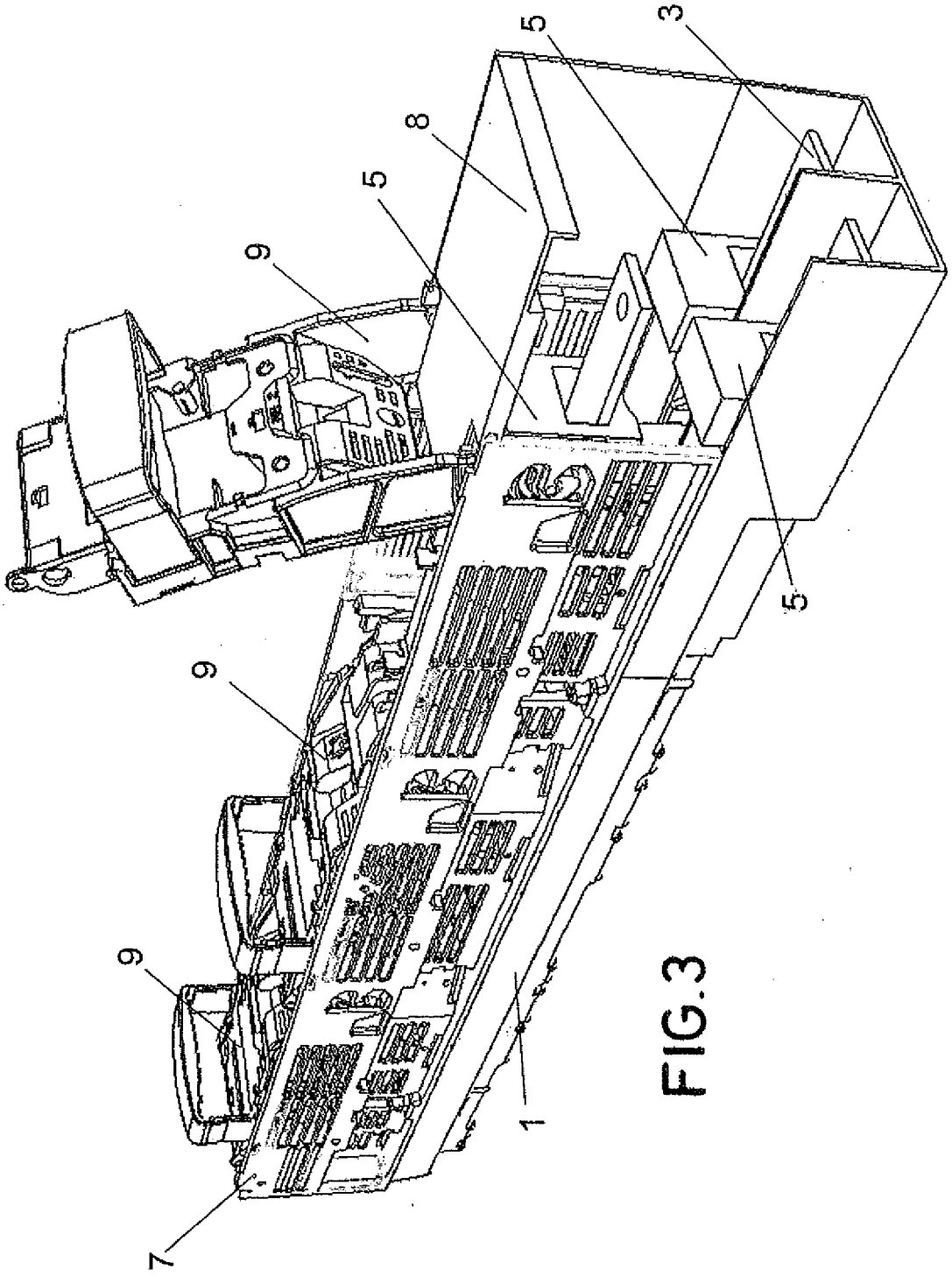

FIG.3

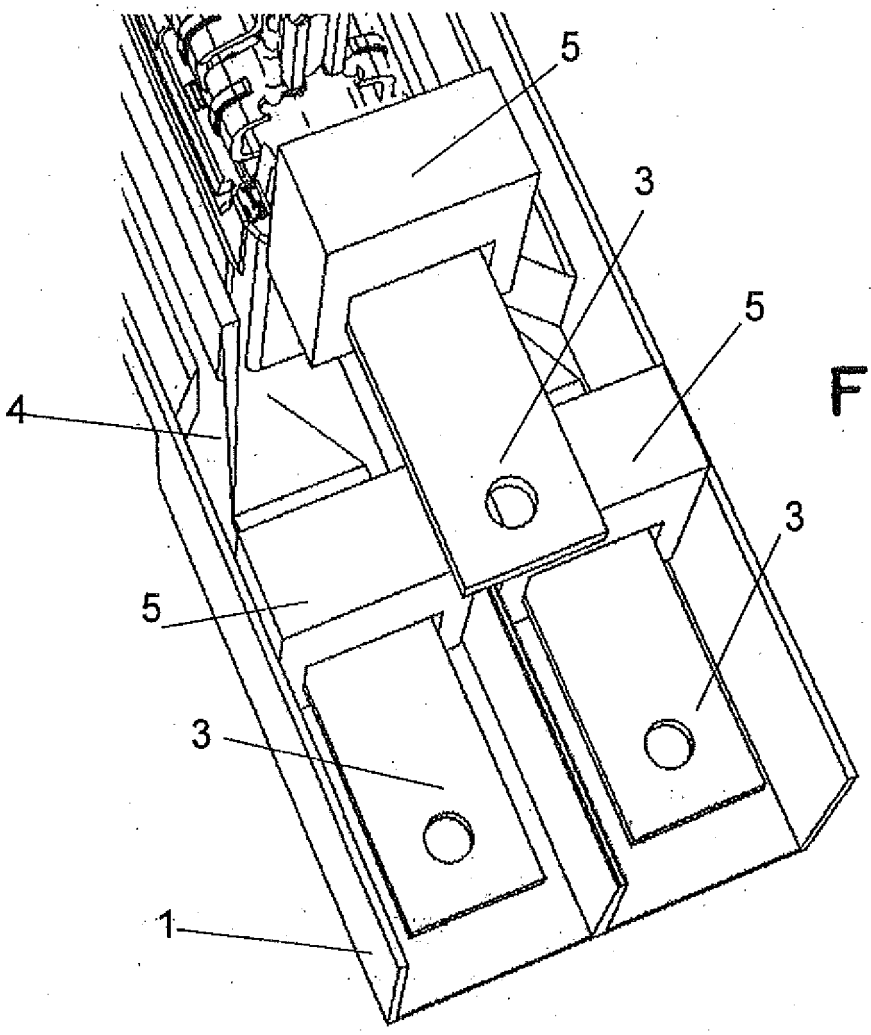

FIG.4

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EUROPEAN SEARCH REPORT

Application Number
EP 14 38 2313

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	23 January 2015	Bilard, Stéphane

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 14 38 2313

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

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