

(19)



(11)

EP 2 985 779 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
31.03.2021 Bulletin 2021/13

(51) Int Cl.:
H01H 85/02 (2006.01) H01H 31/12 (2006.01)

(21) Application number: **14382313.6**

(22) Date of filing: **13.08.2014**

(54) Fuseholder base

Träger eines Sicherungshalters

Base pour un porte-fusible

(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**

(43) Date of publication of application:
17.02.2016 Bulletin 2016/07

(73) Proprietor: **PRONUTEC, S.A.U.**
48340 Amorebieta (Vizcaya) (ES)

(72) Inventor: **Gomez Barbero, Jose Julio**
48340 Amorebieta (Vizcaya) (ES)

(74) Representative: **Carpintero Lopez, Francisco et al**
Herrero & Asociados, S.L.
Cedaceros 1
28014 Madrid (ES)

(56) References cited:
EP-A2- 2 053 627 ES-A1- 2 400 995
US-A- 4 661 807 US-A1- 2007 053 127
US-A1- 2011 275 237 US-A1- 2014 126 117

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 985 779 B1

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 necessary 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 ES20100031663 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. The corresponding publication ES 2400995 A1 discloses a vertical fuseholder base according to the preamble of claim 1.

[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.

[0014] US 4661807 discloses a fuseholder base comprising one or more current sensor(s) fixed inside its housing.

Description of the invention

[0015] 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.

[0016] Specifically, the vertical fuseholder base of the invention is a vertical fuseholder according to claim 1. Further aspects of the invention are according to the dependent claims.

[0017] The vertical fuseholder base 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.

[0018] 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.

[0019] 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.

[0020] 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.

[0021] 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.

[0022] In this way, 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.

[0023] 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

[0024] 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 of 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

[0025] 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.

[0026] 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.

[0027] 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.

[0028] 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).

[0029] 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.

[0030] 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.

[0031] 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.

[0032] 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.

[0033] 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.

[0034] 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.

[0035] 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.

[0036] 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), each pair of contacts (2) being configured to be connected electrically to a fuse (6) so that the fuse (6) may be 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), wherein the vertical fuseholder base further comprises anchoring means for the fastening

and removal of the at least one current sensor (5).

2. Vertical fuseholder base according to the foregoing claim, **characterized in that** the anchoring means are located on the base plate (1) or at the connection terminals (3).
3. 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 at least one current sensor (5) that impedes accidental contact with live parts and protects the at least one current sensor (5) from accidental blow.
4. Vertical fuseholder base according to any of the foregoing claims, **characterized in that** a lower part of the vertical fuseholder base is formed with a U-shaped section.
5. Vertical fuseholder base according to any of the foregoing claims, **characterized in that** the vertical fuseholder base includes a power connection, in the housing area (4).
6. Vertical fuseholder base according to claim 5, **characterized in that** the power connection has an output connector.
7. Vertical fuseholder base according to any of claims 5-6, **characterized in that** the power connection includes overload and/or short circuit protection means.
8. Vertical fuseholder base according to any of claims, 6-7, **characterized in that** the A/D converter is applied to the power connection.
9. A measurement apparatus comprising: the vertical fuseholder base according to claims 1 to 8, and one or more current sensors (5).
10. The measurement apparatus according to claim 9, **characterized in that** the one or more sensors (5) form a single measuring unit or block.
11. The measurement apparatus according to claims 9 or 10, **characterized in that** the one or more current sensors (5) comprise an output connector.
12. The measurement apparatus according to claims 9 or 10, **characterized in that** the one or more current sensors (5) present a single common output connector.
13. The measurement apparatus according to claims 9 or 10, **characterized in that** the one or more current

sensors (5) comprise an output where an A/D conversion module is connected.

Patentansprüche

1. Vertikale Sicherungshalterbasis, aufweisend:

- eine Grundplatte (1), die Paare von Kontakten (2) aufnimmt, wobei jedes Paar von Kontakten (2) ausgestaltet, ist mit einer Sicherung (6) elektrisch derart verbunden zu werden, dass die Sicherung (6) mit diesen gekoppelt und entkoppelt sein kann, wodurch der elektrische Schaltkreis geöffnet und geschlossen wird, und
- zumindest eine Anschlussklemme (3), zum Bereitstellen einer Stromversorgung für eine Last, **dadurch gekennzeichnet, dass** er ferner ein Gehäuse (4) aufweist, das sich für die Installation zumindest eines Stromsensors (5) im Bereich der Anschlussklemmen (3) befindet,

wobei die vertikale Sicherungshalterbasis weiter Verankerungsmittel zur Befestigung und Demontage des zumindest einen Stromsensors aufweist.

2. Vertikale Sicherungshalterbasis gemäß dem vorherigen Anspruch, **dadurch gekennzeichnet, dass** die Verankerungsmittel auf der Grundplatte (1) oder an den Anschlussklemmen (3) angeordnet sind.

3. Vertikale Sicherungshalterbasis nach einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** er im Bereich, der für die Aufnahme des zumindest einen Stromsensors (5) vorgesehen ist, ein Schutzelement (8) aufweist, welches einen versehentlichen Kontakt mit stromführenden Teilen verhindert und den zumindest einen Stromsensor von versehentlichen Stromschlag schützt.

4. Vertikale Sicherungshalterbasis nach einem der vorherigen Ansprüche, **dadurch gekennzeichnet, dass** ein unterer Teil des vertikalen Sicherungshalter-Trägers mit einem U-förmigen Abschnitt ausgebildet ist.

5. Vertikale Sicherungshalterbasis nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der vertikale Sicherungshalter-Träger einen Stromanschluss im Gehäusebereich (4) aufweist.

6. Vertikale Sicherungshalterbasis nach Anspruch 5, **dadurch gekennzeichnet, dass** der Stromanschluss einen Ausgangsanschluss aufweist.

7. Vertikale Sicherungshalterbasis nach einem der Ansprüche 5 bis 6, **dadurch gekennzeichnet, dass**

der Stromanschluss Überlast- und/oder Kurzschlusschutzmittel aufweist.

8. Vertikale Sicherungshalterbasis nach einem der Ansprüche 6 bis 7, **dadurch gekennzeichnet, dass** der A/D-Wandler an den Stromanschluss angeschlossen ist.

9. Messvorrichtung aufweisend: die vertikale Sicherungshalterbasis nach einem der Ansprüche 1 bis 8 und einen oder mehrere Stromsensoren (5).

10. Messgerät nach Anspruch 9, **dadurch gekennzeichnet, dass** der eine oder die mehreren Sensoren (5) eine einzige Messeinheit oder einen Block bilden.

11. Messgerät nach Anspruch 9 oder 10, **dadurch gekennzeichnet, dass** der eine oder die mehreren Stromsensoren (5) einen Ausgangsanschluss aufweisen.

12. Messvorrichtung nach Anspruch 9 oder 10, **dadurch gekennzeichnet, dass** der eine oder die mehreren Stromsensoren (5) einen einzigen gemeinsamen Ausgangsanschluss aufweisen.

13. Messgerät nach Anspruch 9 oder 10, **dadurch gekennzeichnet, dass** der eine oder die mehreren Stromsensoren (5) einen Ausgang aufweisen, an dem ein A/D-Wandlermodul angeschlossen ist.

Revendications

1. Base pour porte-fusible vertical qui comprend :

- une plaque de base (1) recevant des paires de contacts (2), chaque paire de contacts (2) étant configurée pour être connectée électriquement à un fusible (6) de sorte que le fusible (6) puisse être couplé à et découplé de ceux-ci, ouvrant et fermant ainsi le circuit électrique, et
- au moins une borne de connexion (3) pour fournir une alimentation en puissance à une charge,

caractérisée en ce qu'elle comprend en outre un boîtier (4) situé dans la zone des bornes de connexion (3) pour l'installation d'au moins un capteur de courant (5), dans laquelle la base pour porte-fusible vertical comprend en outre des moyens d'ancrage pour la fixation et le retrait de l'au moins un capteur de courant (5).

2. Base pour porte-fusible vertical selon la revendication précédente, **caractérisée en ce que** les moyens d'ancrage sont situés sur la plaque de base (1) ou

- au niveau des bornes de connexion (3).
3. Base pour porte-fusible vertical selon l'une quelconque des revendications précédentes, **caractérisée en ce qu'elle** comprend un élément de protection (8) dans la zone destinée à loger l'au moins un capteur de courant (5) qui empêche tout contact accidentel avec des pièces sous tension et protège l'au moins un capteur de courant (5) contre un claquage accidentel. 5
10
 4. Base pour porte-fusible vertical selon l'une quelconque des revendications précédentes, **caractérisée en ce qu'une** partie inférieure de la base pour porte-fusible vertical est formée d'une section en forme de U. 15
 5. Base pour porte-fusible vertical selon l'une quelconque des revendications précédentes, **caractérisée en ce que** la base pour porte-fusible vertical comprend une connexion de puissance, dans la zone du boîtier (4). 20
 6. Base pour porte-fusible vertical selon la revendication 5, **caractérisée en ce que** la connexion de puissance a un connecteur de sortie. 25
 7. Base pour porte-fusible vertical selon l'une quelconque des revendications 5 et 6, **caractérisée en ce que** la connexion de puissance comporte des moyens de protection contre les surcharges et/ou les courts-circuits. 30
 8. Base pour porte-fusible vertical selon l'une quelconque des revendications 6 et 7, **caractérisée en ce que** le convertisseur A/N est appliqué à la connexion de puissance. 35
 9. Appareil de mesure comprenant : 40
la base pour porte-fusible vertical selon les revendications 1 à 8, et
un ou plusieurs capteurs de courant (5).
 10. Appareil de mesure selon la revendication 9, **caractérisé en ce que** les un ou plusieurs capteurs (5) forment un bloc ou une unité de mesure unique. 45
 11. Appareil de mesure selon les revendications 9 ou 10, **caractérisé en ce que** les un ou plusieurs capteurs de courant (5) comprennent un connecteur de sortie. 50
 12. Appareil de mesure selon les revendications 9 ou 10, **caractérisé en ce que** les un ou plusieurs capteurs de courant (5) présentent un connecteur de sortie commun unique. 55
 13. Appareil de mesure selon les revendications 9 ou 10, **caractérisé en ce que** les un ou plusieurs capteurs de courant (5) comprennent une sortie où est connecté un module de conversion A/N.

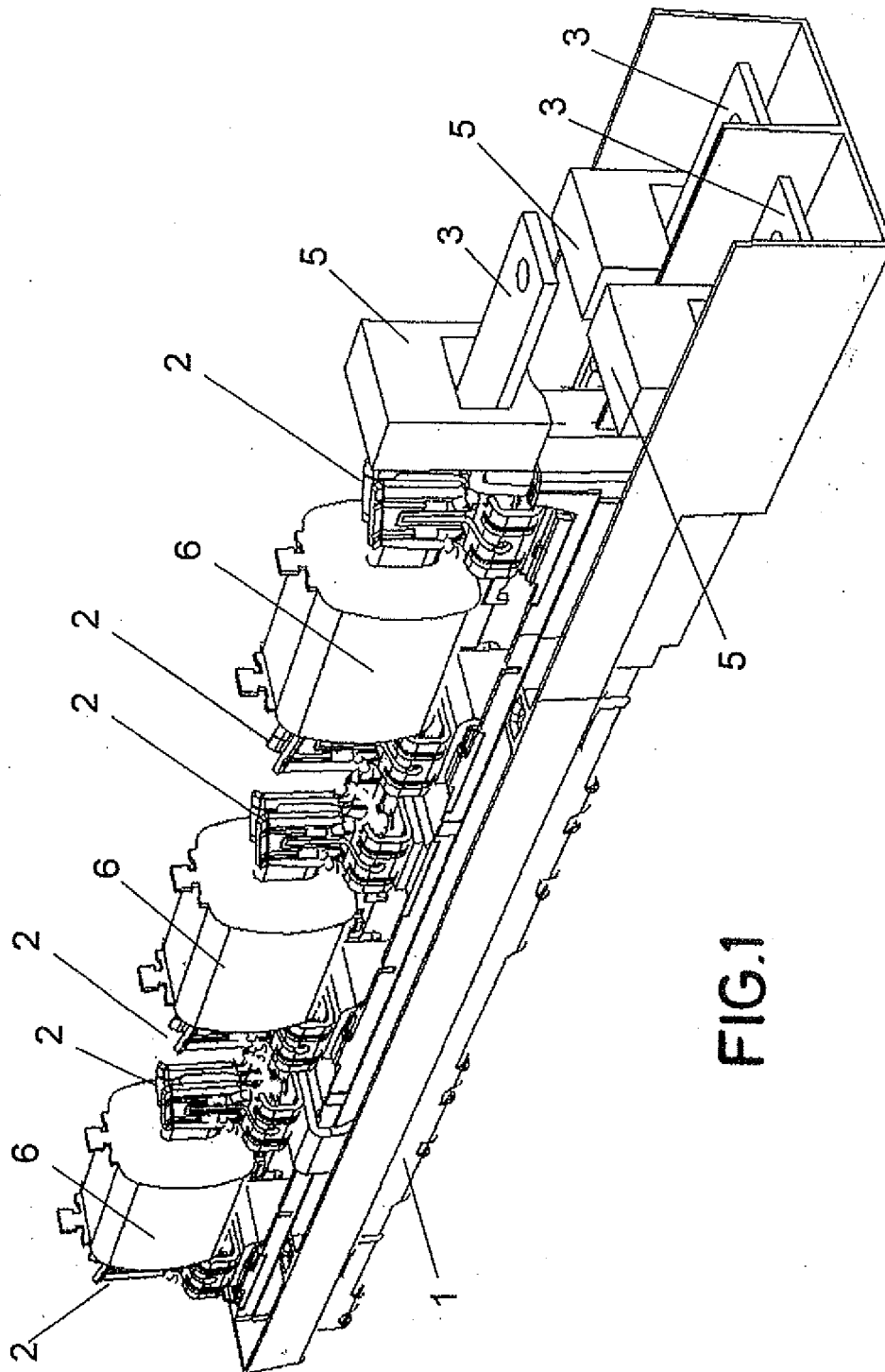


FIG.1

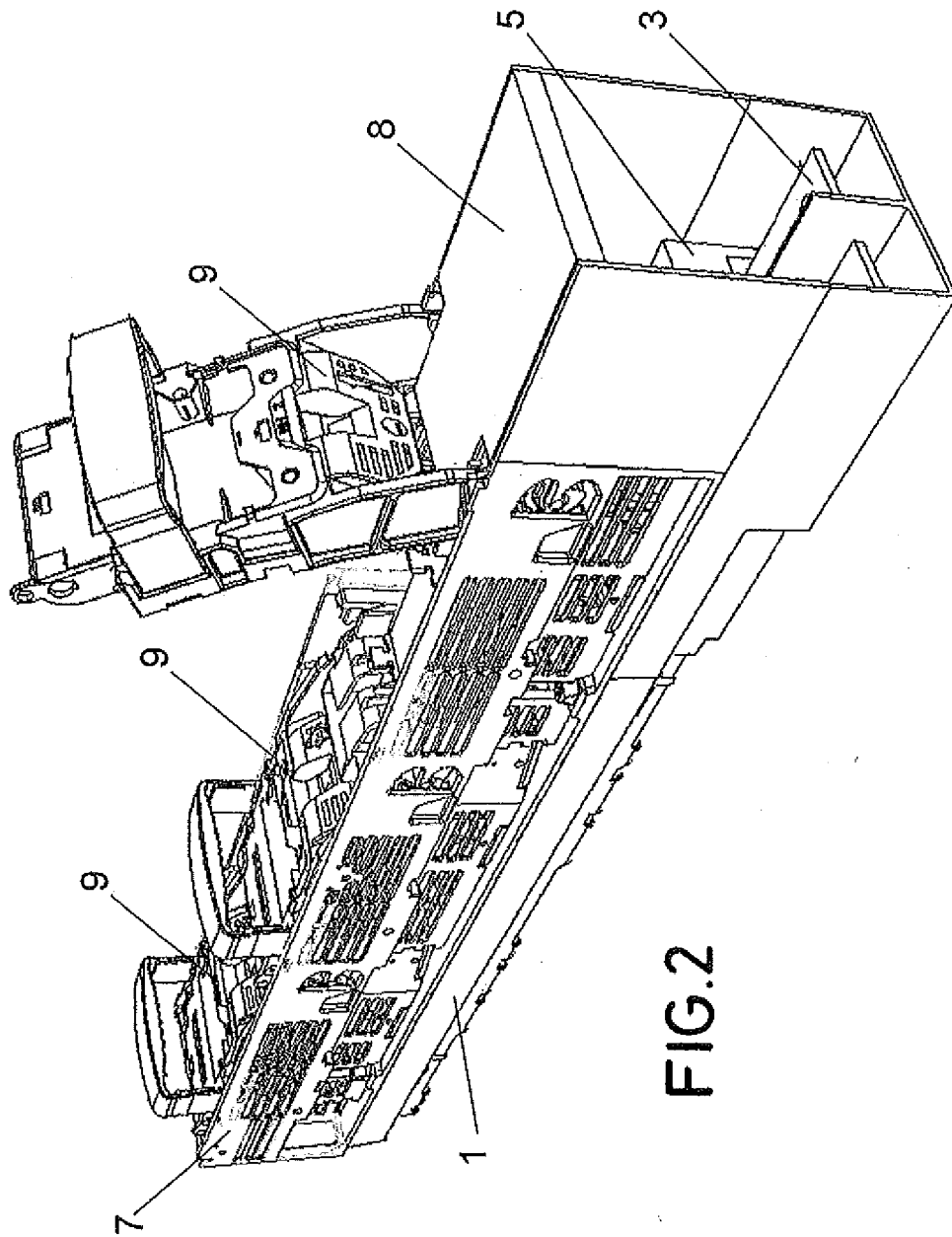


FIG.2

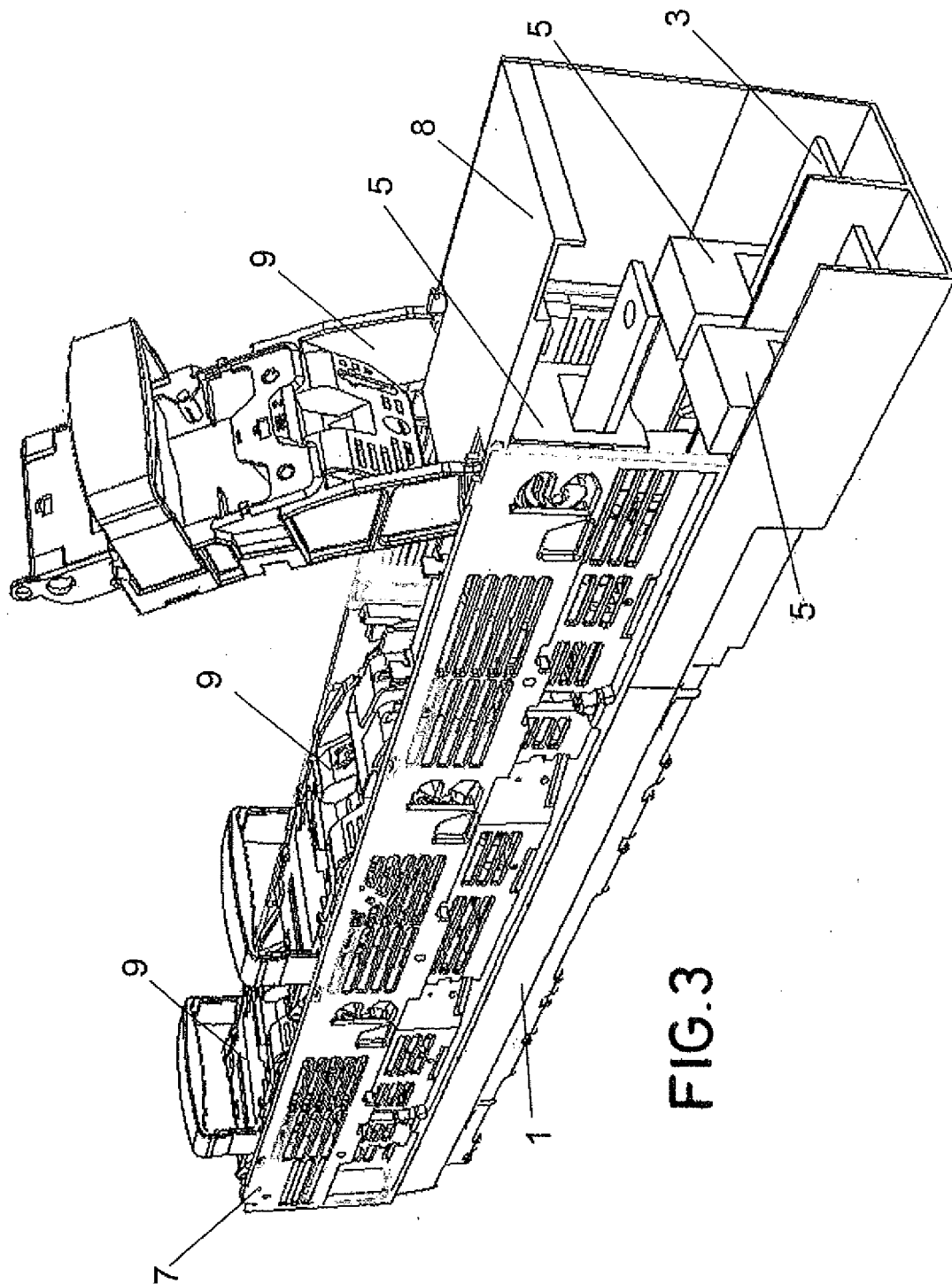


FIG.3

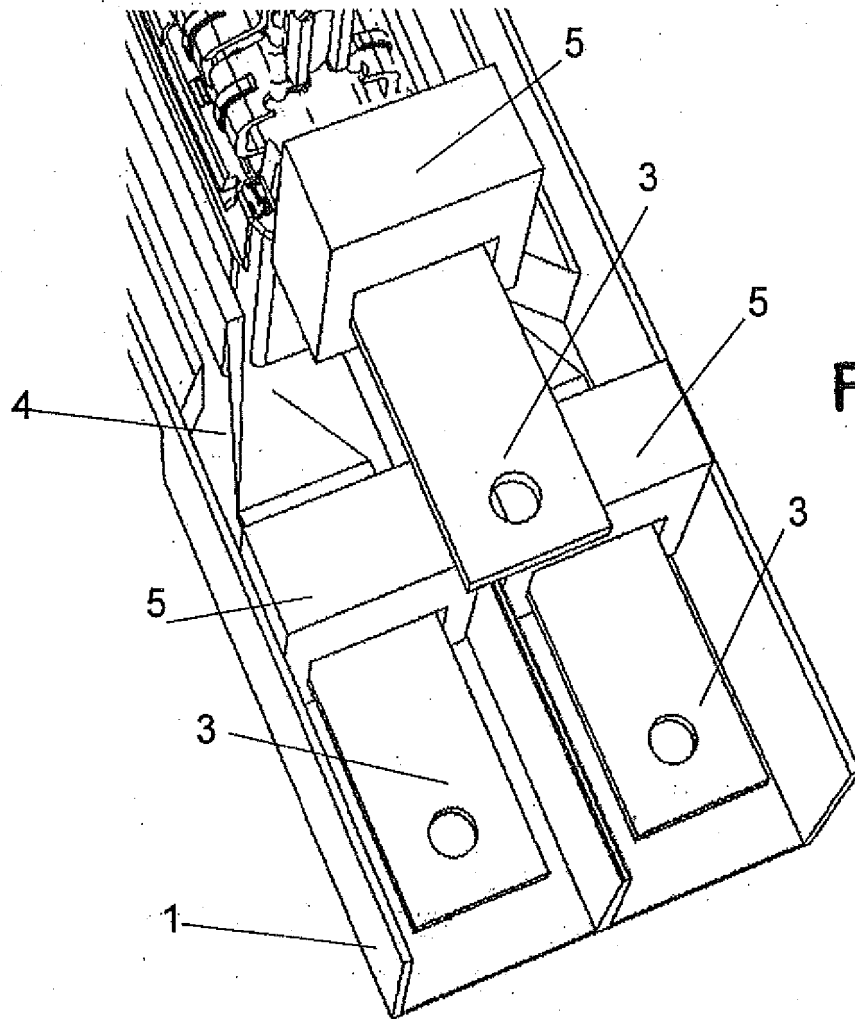


FIG.4

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- DE 10062644 [0007]
- DE 29705224 [0008]
- DE 10002800 A1 [0009]
- DE 202010017635 [0011]
- ES 20100031663 [0011]
- ES 2400995 A1 [0011]
- US 4661807 A [0014]