

(19)



(11)

EP 3 086 418 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
26.10.2016 Bulletin 2016/43

(51) Int Cl.:
H01R 24/78 ^(2011.01) **H01R 13/703** ^(2006.01)

(21) Application number: **16166196.2**

(22) Date of filing: **20.04.2016**

(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:
MA MD

(71) Applicant: **Niko NV**
9100 Sint-Niklaas (BE)

(72) Inventor: **Devenyn, Diederik Jozef Luc**
9820 Merelbeke (BE)

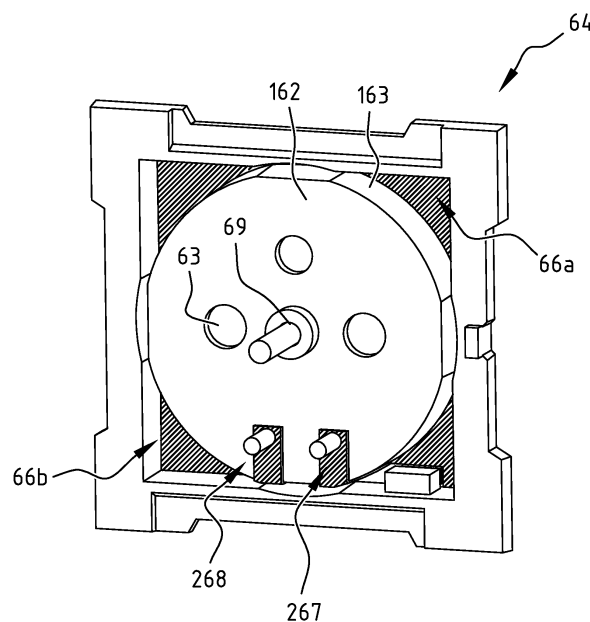
(74) Representative: **D'Halleweyn, Nele Veerle Trees
Gertrudis et al
Arnold & Siedsma
Bezuidenhoutseweg 57
2594 AC The Hague (NL)**

(30) Priority: **21.04.2015 BE 201505257**

(54) SOCKET ASSEMBLY FOR FLUSH-MOUNTED INSTALLATION IN A WALL

(57) A socket assembly for flush-mounted installation in a wall, comprising a base (10, 20) and a central member (64); said base (10) comprising a socket function (50); said central member (64) comprising at least two through-holes for at least two pins of a plug; said central member (64) being removeably attachable to said base (10, 20), with a rear side of the central member (64) facing a front side of the base (10, 20); wherein said base (10, 20) comprises a controllable switch (32) connected to the socket function (50) for controlling the provision of power, a microcontroller (42) configured to control the

switch (32), and a communication module (43); wherein the central member (64) is provided with an antenna (66a, 66b), said antenna (66a, 66b) being couplable to said communication module (43) when the central member (64) is attached to the base (10, 20). The central member (64) has a front side which is provided with a recess (161) for receiving a plug (90). Further, the central member (64) is provided with the antenna (66a, 66b) and the antenna (64) is arranged in an area surrounding said recess (161).

**FIG. 7****EP 3 086 418 A1**

Description

Field of Invention

[0001] The invention relates to a socket assembly for flush-mounted installation in a wall for facilitating, and/or controlling and/or measuring the provision of power to an electrical load.

Background

[0002] A socket assembly comprises a base and a cover. The base is provided with the electrical socket function. The cover typically comprises a central member (also called central plate or finishing set) and a cover frame (also called cover plate or flush surround plate) extending around the central member.

[0003] When smart functionalities have to be added to the socket assembly, there is typically included a PCB with a communication part and an antenna attached to the base.

Summary

[0004] The object of the present invention is to provide a smart socket assembly with improved communication capabilities whilst being robust and safe to manipulate.

[0005] According to a first aspect, a socket assembly is provided for flush-mounted installation in a wall, for facilitating and/or controlling and/or measuring the provision of power to an electrical load. The socket assembly comprises a base and a central member. The base comprises a socket function and is intended for being at least partially built-in in an opening in the wall. The central member comprises at least two through-holes in which at least two pins of a plug are insertable for being electrically connected to the socket function. The central member is configured for being part of a cover covering the opening. The central member is removeably attachable to the base, with a rear side of the central member against a front side of the base. The base comprises a controllable switch connected to the socket function for controlling the provision of power, a microcontroller configured to control the switch, and a communication module connected to the microcontroller. The central member is provided with an antenna, and the antenna is coupled to the communication module when the central member is attached to the base. This coupling may be a contact coupling or a non-contact coupling such as a capacitive coupling. Further, according to the invention, the central member has a front side which is provided with a recess for receiving a plug. The central member is further provided with an antenna which is arranged in an area surrounding this recess.

[0006] In other words, the antenna may be arranged in an area of the central member which is not covered by the plug when the plug is inserted. This further improves the antenna behaviour.

[0007] By providing the central member with an antenna whilst the communication module, microcontroller and controllable switch are located in the base, the antenna behaviour will be less influenced by the metal components of the socket function. Also, for embodiments where the cover frame (flush surround plate) is made of metal, providing the central member with the antenna is advantageous, since the central member is not covered by the cover frame. Further, because the antenna is located at the front side of the opening in the wall, the antenna behaviour is improved compared to solutions where the antenna is arranged in the base, i.e. at a certain depth in the opening. On the other hand, by locating the communication module, microcontroller and controllable switch in the base, the communication module, microcontroller and controllable switch may be protected such that the base can be manipulated by an installer during installation without touching those components.

[0008] In the context of the present invention the term wall may refer to a side wall, a ceiling or a floor.

[0009] In the context of the present invention, the term "socket assembly" refers to an assembly suitable for placement in a fixed location in the building and configured for facilitating or controlling the provision of power to a load in the wall, or for measuring the power provided to the load. Typically the assembly is intended and configured for being mounted at least partially in an opening in the wall where the socket function is connected to electrical wires present in the wall. Typically, the electrical wires in the wall comprise wires connected to the mains. However, in other embodiments the electrical wires in the wall may comprise wires connected to a DC power source. More generally the wires in the wall may be connected to any AC or DC power source.

[0010] According to embodiments of the invention, the recess in the front side may correspond with a protrusion at the rear side of the central member and the antenna may be arranged in an area surrounding the protrusion.

[0011] In an exemplary embodiment, the antenna may be arranged against the rear side of the central member. The rear side of the central member may be provided with a groove in which the antenna is fixed, e.g. by gluing. In a further developed embodiment the recess for the plug in the front side corresponds with a protrusion at the rear side of the central member, and the groove extends around the protrusion.

[0012] In other exemplary embodiment, the antenna may be at least partly integrated in the central member. The antenna may e.g. be placed in the mould and overmoulded by a plastic material to form the central member.

[0013] In a preferred embodiment, the rear side of the central member may be provided with at least one contact terminal, and the base may be provided with at least one corresponding contact terminal connected to the communication module, such that the antenna is automatically electrically connected to the communication module when the central member is attached to the base. The at least one contact terminal on the rear side of the central

member may be positioned e.g. on the protrusion. The at least one corresponding contact terminal of the base may comprise at least one spring contact. In an alternative embodiment a non-contact coupling, e.g. a capacitive or inductive coupling, may be provided between the antenna and the communication module. The advantage of such a non-contact coupling is that the antenna may be completely taken up within the cover part, wherein the antenna may be entirely surrounded by plastic material. Further, also the central member may have coupling parts which are covered, e.g. integrated within the central member or mounted against an interior surface of the central member.

[0014] In other exemplary embodiment, the central member may be made of a plastic material, or more generally any material that does not significantly influence the behaviour of the antenna. The base may be provided with a metal frame configured for fixing the base in the opening in the wall. Because the antenna is located in the central member, such a metal frame will not significantly influence the antenna behaviour.

[0015] In a preferred embodiment the antenna may be a dipole antenna. In case of such a dipole antenna, the antenna may comprise a first metal part and a second metal part which are arranged symmetrically in or against the central member. According to other embodiments of the invention, the antenna may also be a monopole antenna.

[0016] In a further developed embodiment the socket assembly may further comprise a cover frame configured for surrounding the central member, such that the cover frame and the central member cover the entire opening in the wall.

[0017] In a preferred embodiment the microcontroller, the communication module and the controllable switch may be arranged in the base in such a manner that the base can be manipulated by an installer without touching the microcontroller, the communication module and the controllable switch. In an exemplary embodiment the base may comprise a rear base part with a rear side and a front side, and a front base part with a rear side and a front side. The rear side of the rear base part faces away from the cover and the front side of the rear base part is attached to a rear side of the front base part. The front side of the front base part faces towards the cover. The communication module and optionally also the microcontroller may be received in a recess of the front base part, preferably a recess provided in the rear side of the front base part. By providing a base with multiple parts a more compact electrical assembly may be provided. Further, by providing the front base part with the microcontroller and the communication module, a part of the circuitry that needs to be connected to the antenna can be brought further forward resulting in better reception compared to a case where the antenna has to be connected to circuitry arranged at the rear side of the base.

[0018] In an exemplary embodiment the controllable switch may comprise a relay arranged in a recess pro-

vided in the rear side of the rear base part. A relay is typically a relatively large component and by locating the relay in such a recess the built-in depth of the assembly may be further limited.

[0019] The base may comprises power conversion circuitry configured for converting a first voltage present on wires into the wall into a lower second voltage for feeding at least the microcontroller and the communication module. Preferably the power conversion circuitry may be arranged in or against the rear side of the rear base part.

[0020] The base may further comprise measurement circuitry configured for measuring a measure representative for the power consumed by a load connected to the socket function, and the measurement circuitry may be connected to the microcontroller. The microcontroller may be configured to communicate the measure via the communication module. If the measurement circuitry comprises a low voltage measurement IC, this measurement IC may be arranged in the front base part, and an electrical connection may be provided between the front base part and the rear base part to transfer a measure representative for the power, e.g. a voltage over a shunt resistor, to the measurement IC.

[0021] In an exemplary embodiment the controllable switch and the power conversion circuitry may be arranged on a PCB, the PCB being attached to the rear side of the rear base part. The PCB may comprise circuitry on both sides, e.g. a relay on a first side, wherein the relay extends into a recess in the rear side of the rear base part, and a power conversion circuitry on the other side. Further the microcontroller and the communication module may be arranged on a second PCB, the second PCB being arranged between the front base part and the rear base part, preferably in a recess in the rear side of the front base part. In other exemplary embodiments, the electronic circuitry may comprise dedicated integrated circuits.

[0022] The microcontroller may be configured for processing data received by the communication module and for configuring or operating the electrical function accordingly, and/or for wirelessly sending data via the communication module to a another electrical assembly and/or to a mobile device and/or to a gateway. The term "mobile device" may refer to any mobile device such as a smart phone, a smart watch, a tablet, a mobile computer, a proprietary remote control device, etc.

[0023] In an exemplary embodiment, two communication modules may be provided: a first communication module configured to operate in a spectrum range above 1,5 GHz; and a second communication module configured to operate in a spectrum range below 1,5 GHz. Alternatively, the second or the first communication module may be provided. In an embodiment with two communication modules, two antennas or one antenna covering the entire frequency range of both communication modules may be provided. When two antennas are provided, both antennas may be provided at or in the central member. Alternatively one antenna may be provided at or in

the central member and the other antenna could be provided in the base.

Brief description of the figures

[0024] The accompanying drawings are used to illustrate presently preferred non-limiting exemplary embodiments of devices of the present invention. The above and other advantages of the features and objects of the invention will become more apparent and the invention will be better understood from the following detailed description when read in conjunction with the accompanying drawings, in which:

Figure 1 illustrates an exploded perspective view looking from the front to the back of a first exemplary embodiment of a socket assembly of the invention; Figure 2 illustrates an exploded perspective view looking from the back to the front of the first exemplary embodiment of a socket assembly of the invention;

Figures 3A and 3B are respective views of the assembly in the mounted position with and without plug inserted in the socket outlet;

Figure 4 is a detailed perspective view of the assembled base and the central member of the first exemplary embodiment, looking from front to back;

Figure 5 is a detailed perspective view of the assembled base and the central member of the first exemplary embodiment, looking from back to front;

Figures 6A and 6B are perspective views of the first and second electronic circuitry according to an exemplary embodiment of the invention; and

Figure 7 illustrates a variant of the central member of figure 5.

Description of embodiments

[0025] In the description different embodiments will be used to describe the invention. Therefore reference will be made to different drawings. It has to be understood that these drawings are intended to be non-limiting, the invention is only limited by the claims. The drawings are thus for illustrative purposes, the size of some of the elements in the drawings may be exaggerated for clarity purposes.

The term "comprising" is not to be interpreted as limiting the invention in any way. The term "comprising", used in the claims, is not intended to be restricted to what means is described thereafter; it does not exclude other elements, parts or steps.

Not all embodiments of the invention comprise all features of the invention. In the following description and claims, any of the claimed embodiments can be used in any combination.

The present invention provides a socket assembly for flush-mounted installation in a wall, for facilitating, controlling, or measuring the provision of power to an elec-

trical load. The socket assembly comprises a base and a central member. The base comprises a socket function and is intended for being at least partially built-in in an opening in the wall. The central member comprises at least two through-holes in which at least two pins of a plug are insertable for being electrically connected to the socket function. Further, the central member is configured for being part of a cover covering the opening; and the central member is removeably attachable to the base, with a rear side of the central member facing a front side of the base. The base further comprises a controllable switch connected to the socket function for controlling the provision of power, a microcontroller configured to control the switch and a communication module connected to the microcontroller. The central member is provided with an antenna that is couplable to the communication module when the central member is attached to the base. According to the invention, the central member has a front side which is provided with a recess for receiving a plug, and the antenna is provided on the central member in an area surrounding the recess.

[0026] The present invention will hereinafter be described by means of different embodiments. It has to be understood that these embodiments are only for the ease of understanding the invention and are not intended to limit the invention in any way.

[0027] Figures 1, 2, 3A and 3B, 4 and 5 illustrate a first exemplary embodiment of a socket assembly for flush-mounted installation in a wall. The socket assembly controls the provision of power to an electrical appliance via a plug 90 inserted in the socket outlet. The assembly is intended to be built-in in an opening in the wall, where the socket function 50 is connected to electrical wires present in the wall. Typically, the electrical wires in the wall comprise wires connected to the mains.

[0028] In the first exemplary embodiment, the electrical assembly comprises a multi-part base 10, 20 and a cover 60. The base 10, 20 comprises an electrical function, here a socket function 50 with contact busses. The base 10, 20 is intended and sized for being at least partially built-in in an opening in the wall. To that end, the assembly may further comprise a mounting box 80 which can be placed in the opening in the wall and which is sized and configured for receiving the base 10, 20. The electrical wires present in the wall extend in the mounting box 80 and are connected to contacts 51, 52, 53 of the socket function 50 in the base 10, 20 in a known manner. In the first exemplary embodiment the cover 60 is a multi-part cover configured for being attached to the base 10, 20 and for covering the opening in the wall, see also figures 3A and 3B.

[0029] The cover 60 comprises a central member 64 comprising at least two through-holes 63 for receiving at least two pins of a plug 90 for being electrically connected to the socket function 50. The central member 64 is removeably attachable to the base 10, 20 by means of a central screw 69 with a rear side of the central member 64 against a front side 11 of the base 10, 20.

[0030] The base comprises a rear base part 20 with a rear side 22 and a front side 21, and a front base part 10 with a rear side 12 and a front side 11. The front base part 10 may comprise a plastic part 14, e.g. an injection moulded part, and a metal frame 16. The metal frame 16 may be provided with a plurality of holes and/or with a plurality of protruding parts for fixation purposes. The rear base part 20 is typically a plastic part, e.g. an injection moulded part. The rear side 22 of the rear base part 20 faces away from the cover 60, and the front side 11 of the front base part 10 faces towards the cover 60. The front side 21 of the rear base part 20 is attached to a rear side 12 of the front base part 10. The rear base part 20 is provided with first electronic circuitry 30. The front base part 10 is provided with second electronic circuitry 40 which is connected to the first electronic circuitry 30.

[0031] The multi-part cover 60 comprises a cover frame 62 (also called flush surround plate) and a central member 64 (also called central plate or finishing set). When mounting the assembly, first the multi-part base 10, 20 with the first and second electronic circuitry 30, 40 is arranged in the mounting box 80, and next the central member 64 is fixed to the base 10, 20, whereupon the cover frame 62 is fixed around the central member 64. Preferably, the central member 64 is made of a plastic material or another material which does not significantly influence the behaviour of the antenna (see further). The base 10, 20, and typically front base part 10, may be provided with a metal frame 16 configured for fixing the base 10, 20 in the opening in the wall.

[0032] The central member 64 is provided with an antenna 66, e.g. a dipole antenna (see figure 2). The antenna 66 comprises a first metal part 66a provided with a first contact portion 67, and a second metal part 66b provided with a second contact portion 68, see figure 5. The contact portions 67, 68 are electrically connectable to the one or more communication modules 43 when the central member 64 is attached to the base 10, 20. The antenna 66a, 66b is arranged in an area of the central member 64 which is not covered by the plug 90 when the plug 90 is inserted. The central member 64 has a front side which is provided with a recess 161 for receiving the plug 90, and the antenna 66a, 66b is arranged at the rear side of the central member 64, in an area surrounding the recess 161. The rear side of the central member 64 is provided with a groove 163 in which the antenna 66 is fixed. The recess 161 in the front side corresponds with a protrusion 162 at the rear side of the central member 64, and the groove 163 extends around the protrusion 162.

[0033] The rear side of the central member 64 is provided with the contact terminals 67, 68, and the front side of the base is provided with corresponding contact terminals 117, 118 connected to the one or more communication modules 43, such that the antenna 66 is automatically electrically connected to the one or more communication modules 43 when the central member 64 is attached to the base 10, 20. In the illustrated exemplary

embodiment the contact terminals 67, 68 on the rear side of the central member 64 are positioned on the protrusion 162, and the at least one corresponding contact terminal 117, 118 are provided on the front side 11 of the base 10, 20.

[0034] An exemplary embodiment of the first and second electronic circuitry 30, 40 is shown in more detail in figures 6A and 6B. The first electronic circuitry 30 comprises a PCB 31 on which a number of electronic components 33, 34, 35, and 36 are mounted and connected. The PCB 31 has a front side 37 arranged against the rear side 22 of the rear base part 20, and a rear side 38. On the front side 37 of PCB 31 there is mounted a relay 32. For accommodating the relay 32, a recess 23 is provided in the rear side 22 of the rear base part 20. On the rear side 38 of the PCB 31 there are provided power conversion circuitry 33, protection circuitry 34, a shunt resistor 35, and a fuse 36. The first PCB 31 may be protected against damage by a cap 70 which is fixed over the first circuitry 30 to the rear side of the rear base part 20.

[0035] The power conversion circuitry 33 is configured for converting a first voltage present on the wires in the wall into a lower second voltage, typically 12 or 24 Volt DC, for feeding low-voltage components of the first and/or second circuitry. In the exemplary embodiment of the figures, the low-voltage components are part of the second circuitry and are arranged on a second PCB 41. The power conversion circuitry 33 typically comprises electrolytic capacitor, an AC/DC convertor, and any other necessary components for connecting the AC/DC convertor. The protection circuitry 34 may be a voltage dependent resistor which provided protection against excessive transient voltages.

[0036] The second PCB 41 is arranged in a recess 13 provided in the rear side 12 of the front base part 10, and more in particular in a recess 13 provided in the plastic part 14 of the front base part 10. The second PCB 41 has a front side 47 and a rear side 48. On the rear side 48 a microcontroller 42 and communication circuitry 43 may be provided (shown in figure 6B but not in figures 1 and 5). The communication circuitry 43 is couplable to an antenna 66 arranged against a rear side of the central member 64.

[0037] The microcontroller 42 is configured for processing data received by the communication circuitry 43 and for configuring or operating the electrical function 50 accordingly, and/or for wirelessly sending data via the communication circuitry 43 to another electrical assembly, to a gateway, or to a mobile device (not shown). The microcontroller 42 may consist of one control unit or of a plurality of control units. In case of a plurality of control units, the control units may be part of the second circuitry but one or more thereof could also be part of the first circuitry.

[0038] In a particular embodiment, the communication circuitry 43 may comprise a first communication module and/or a second communication module. The first communication module may be configured to operate in a

spectrum range above 1.5 GHz. This first communication module may be e.g. a Bluetooth low energy module configured to operate according to the Bluetooth low energy protocol, also called Bluetooth smart protocol, e.g. as specified in the Bluetooth core specification version 4.0, 4.1 or 4.2. A spectrum range above 1.5 GHz allow for more channels and a small antenna. This first communication module may be used e.g. to communicate with a mobile device. The second communication module may be configured to operate in a spectrum range below 1.5 GHz, e.g. between 800 and 900 MHz. This lower frequency range has a better penetration through concrete and steel compared to the higher range of the first communication module, and has a longer range for a given output power. Hence, the second communication module may be used to communicate with other electrical assemblies in the building.

[0039] In addition to the microcontroller 42, other components such as a time knowledge module, a data storage, measurement circuitry on the second PCB 41 or the like may also be provided. Such measurement circuitry may be configured for measuring a measure representative for the power consumed by a load connected to the socket outlet of the socket assembly. In an exemplary embodiment, a shunt resistor 35 may be provided on the first PCB 31, and the voltage over the shunt resistor 35 may be transferred to a measurement IC (not shown) present on the second PCB 41. The measurement IC (not shown) may be provided e.g. on the front side 47 of the PCB 41. The measurement IC is connected to the microcontroller 42, and the microcontroller 42 is configured to communicate this measure via the communication circuitry 43.

[0040] Also, a number of interface components may be provided, such as an input means, e.g. a button or a sensor, or an output means, which are accessible from the front side of the cover 60. In the illustrated embodiment, a button 44 may be provided on PCB 41. The button may be manually operated by a user in order to manually switch the relay 32. The front base part 10 is provided with a hole in which a movable pin 18 is arranged (see figure 4). Further, the central member 64 is provided with a hole 65 (see figure 2). The movable pin 18 is accessible through the hole 65 for operating the button 44. More generally the central member 64 may be provided with a through-opening in which an interface means, such as input means (e.g. a mechanical button, a touch button, a sensor, etc.) or output means (e.g. a display, a led, etc.), is arranged or through which an interface means is accessible. Such an interface means may be connected to the PCB 41, and in particular to the microcontroller 42.

[0041] The relay 32 is connected to the socket function 50 for controlling the provision of power, the microcontroller 42 is configured to control the relay 32. The one or more communication modules 43 are connected to the microcontroller 42. The microcontroller 42, the one or more communication modules 43 and the relay 32 are

arranged in the base 10, 20 in such a manner that the base 10, 20 can be manipulated by an installer without touching the microcontroller 42, the one or more communication modules 43 and the relay 32. Further, in the exemplary embodiment, components of the first circuitry 30 are arranged on the rear side of PCB 31, and to protect those components a cap 70 may be provided which is fixed on rear base part 20.

[0042] In the embodiment of figures 6A and 6B, contact terminals 217, 218 are provided in the form of cylindrical spring contacts. Alternatively, so-called spring fingers may be used. Preferably, the spring contacts 217, 218 do not protrude outwardly out of the front base part 10. The front base part 10 is provided with holes allowing access to the spring contacts 217, 218. Such an embodiment may be used in combination with the embodiment of figure 7, see further.

[0043] Figure 7 illustrates a variant of the central member 64 of figure 5. In the exemplary embodiment of figure 7 the antenna parts 66a, 66b each extend over substantially half the circumference of the protrusion 162 instead of over substantially a quarter of the circumference as in figure 5. Further, contact terminals 267, 268 protrude outwardly from the rear side of the central member 64, such that they can extend in holes of the front base part 20 to contact spring contacts 217, 218. The skilled person understands that other variants are possible. Also, it is possible to arrange a monopole antenna in the groove 163 instead of a dipole antenna. Further, it is possible to provide a non-contact coupling such as a capacitive or inductive coupling between the antenna and the communication module instead of a contact coupling.

[0044] In the exemplary embodiments the antenna is shown to be arranged in a groove 163. However, in alternative embodiments the antenna may be at least partially integrated in the central member. In case a non-contact coupling is used, the antenna may even be entirely integrated in the central member. In an exemplary embodiment the antenna 66 may be placed in a mould in which the central member 64 is formed. In such embodiments, also contact terminals 117, 118 may be arranged within the base 10, 20.

[0045] The functions of the various elements shown in the figures, including any functional blocks labelled as "units" or "modules", may be provided through the use of dedicated hardware as well as hardware capable of executing software in association with appropriate software. When provided by a processor, the functions may be provided by a single dedicated processor, by a single shared processor, or by a plurality of individual processors, some of which may be shared. Moreover, explicit use of the term "processor" or "controller" should not be construed to refer exclusively to hardware capable of executing software, and may implicitly include, without limitation, digital signal processor (DSP) hardware, network processor, application specific integrated circuit (ASIC), field programmable gate array (FPGA), read only memory (ROM) for storing software, random access memory

(RAM), and non volatile storage. Other hardware, conventional and/or custom, may also be included.

[0046] It should be appreciated by those skilled in the art that any block diagrams herein represent conceptual views of illustrative circuitry embodying the principles of the invention.

[0047] Whilst the principles of the invention have been set out above in connection with specific embodiments, it is to be understood that this description is merely made by way of example and not as a limitation of the scope of protection which is determined by the appended claims.

Claims

1. A socket assembly for flush-mounted installation in a wall, for facilitating, controlling, or measuring the provision of power to an electrical load; said socket assembly comprising a base (10, 20) and a central member (64);
said base (10, 20) comprising a socket function (50) and being intended for being at least partially built-in in an opening in the wall;
said central member (64) comprising at least two through-holes in which at least two pins of a plug are insertable for being electrically connected to the socket function (50); said central member (64) being configured for being part of a cover covering said opening; and said central member being removeably attachable to said base (10, 20), with a rear side of the central member (64) facing a front side of the base (10, 20);
wherein said base (10, 20) comprises a controllable switch (32) connected to the socket function (50) for controlling the provision of power, a microcontroller (42) configured to control the switch, and a communication module (43) connected to said microcontroller (42);
wherein the central member (64) is provided with an antenna (66a, 66b), said antenna being couplable to said communication module when the central member (64) is attached to the base (10, 20);
wherein the central member (64) has a front side which is provided with a recess (161) for receiving a plug (90), and wherein the central member (64) is provided with the antenna (66a, 66b) and the antenna (64) is arranged in an area surrounding said recess (161).
2. The socket assembly of claim 1, wherein said recess (161) in the front side corresponds with a protrusion (162) at the rear side of the central member (64), and wherein the antenna (66a, 66b) is arranged in an area surrounding the protrusion (162).
3. The socket assembly of any one of the previous claims, wherein the antenna (66a, 66b) is arranged

against the rear side of the central member (64).

4. The socket assembly of any one of the previous claims, wherein the rear side of the central member (64) is provided with a groove (163) in which the antenna (66a, 66b) is fixed.
5. The socket assembly of claim 2 and 4, wherein said groove (163) extends around said protrusion (162).
6. The socket assembly of any one of the previous claims, wherein the rear side of the central member (64) is provided with at least one contact terminal (267, 268), and the base (10, 20) is provided with at least one corresponding contact terminal (217, 218) connected to the communication module (43), such that said antenna (66a, 66b) is automatically electrically connected to said communication module (43) when the central member (64) is attached to the base (10, 20).
7. The socket assembly of claim 5 and 6, wherein the at least one contact terminal (267, 268) on the rear side of the central member (64) is positioned on the protrusion (162).
8. The socket assembly of claim 6 or 7, wherein the at least one corresponding contact terminal (217, 218) on the base (10, 20) comprises at least one spring contact.
9. The socket assembly of any one of the previous claims, wherein the antenna (66a, 66b) is at least partially integrated in the central member (64).
10. The socket assembly of any one of the previous claims, wherein a non-contact coupling is provided between the antenna (66a, 66b) and the communication module (43), such as a capacitive coupling.
11. The socket assembly of any one of the previous claims, wherein the base (10, 20) is provided with a metal frame (16) configured for fixing the base (10, 20) in the opening in the wall.
12. The socket assembly of any one of the previous claims, wherein the antenna (66a, 66b) is any one of the following: a dipole antenna or a monopole antenna.
13. The socket assembly of any one of the previous claims, wherein said base (10, 20) comprises a rear base part (20) with a rear side (22) and a front side (21), and a front base part (10) with a rear side (12) and a front side (11); the rear side (22) of said rear base part (20) facing away from said cover and the front side (21) of the rear base part (20) being attached to a rear side (12) of said front base part (10),

said front side (11) of said front base part (10) facing towards said cover (60); wherein the communication module is received in a recess of said front base part (20).

5

14. The socket assembly of claim 13, wherein the controllable switch comprises a relay (32) arranged in a recess (23) provided in the rear side (22) of the rear base part (20).

10

15. A central member (64) for use in a socket assembly according to any one of the previous claims; said central member (64) comprising at least two through-holes in which at least two pins of a plug are insertable for being electrically connected to the socket function (50); said central member (64) being configured for being part of a cover covering said opening; and said central member (64) being removeably attachable to said base (10, 20), with a rear side of the central member (64) facing a front side of the base (10, 20); wherein the central member (64) is provided with an antenna (66a, 66b), said antenna (66a, 66b) being couplable to a communication module (43) of the base (10, 20), when the central member (64) is attached to the base (10, 20); wherein the central member (64) has a front side which is provided with a recess (161) for receiving a plug (90), and wherein the antenna (66a, 66b) is arranged in an area surrounding said recess (161).

15

20

25

30

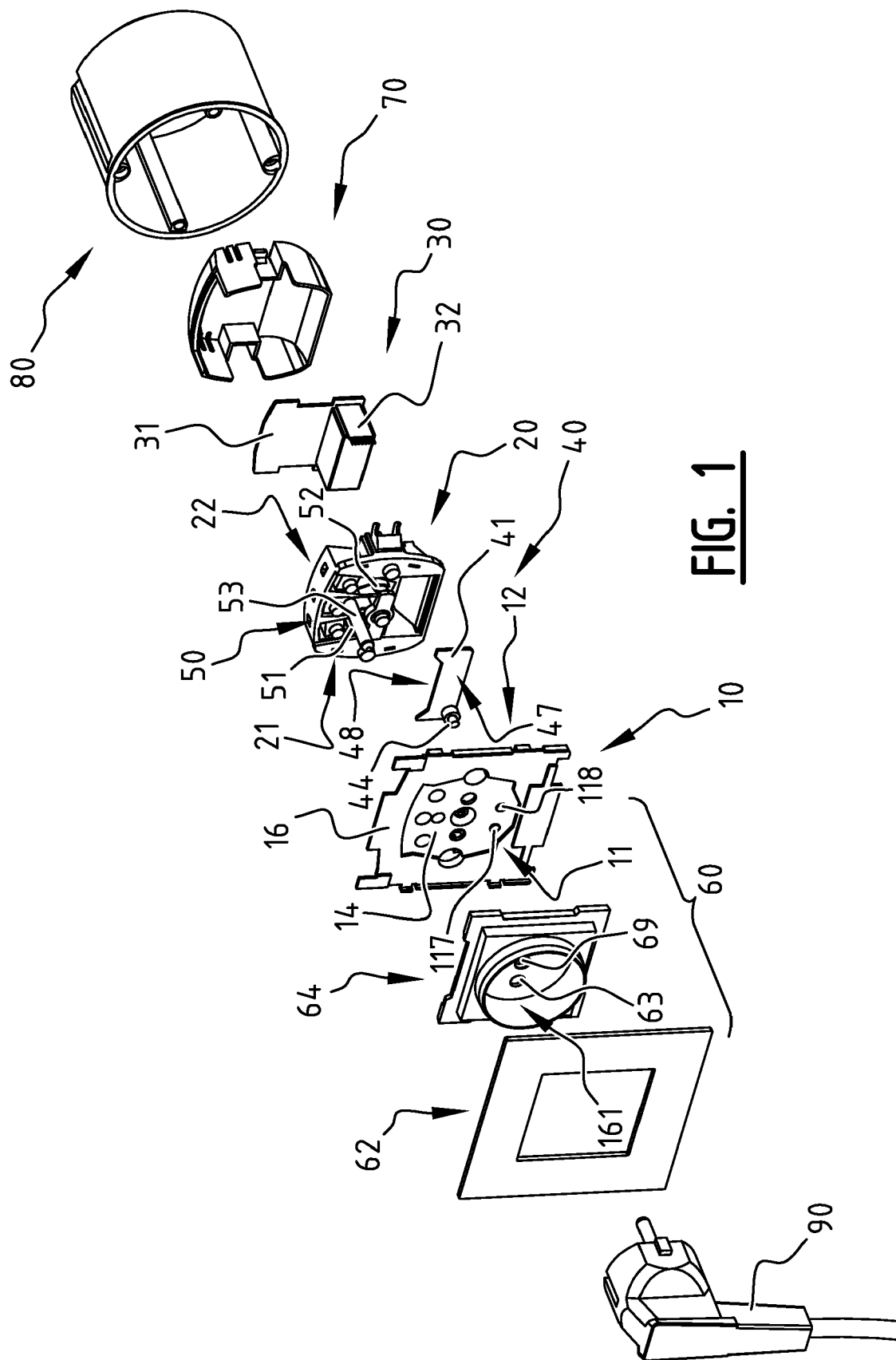
35

40

45

50

55



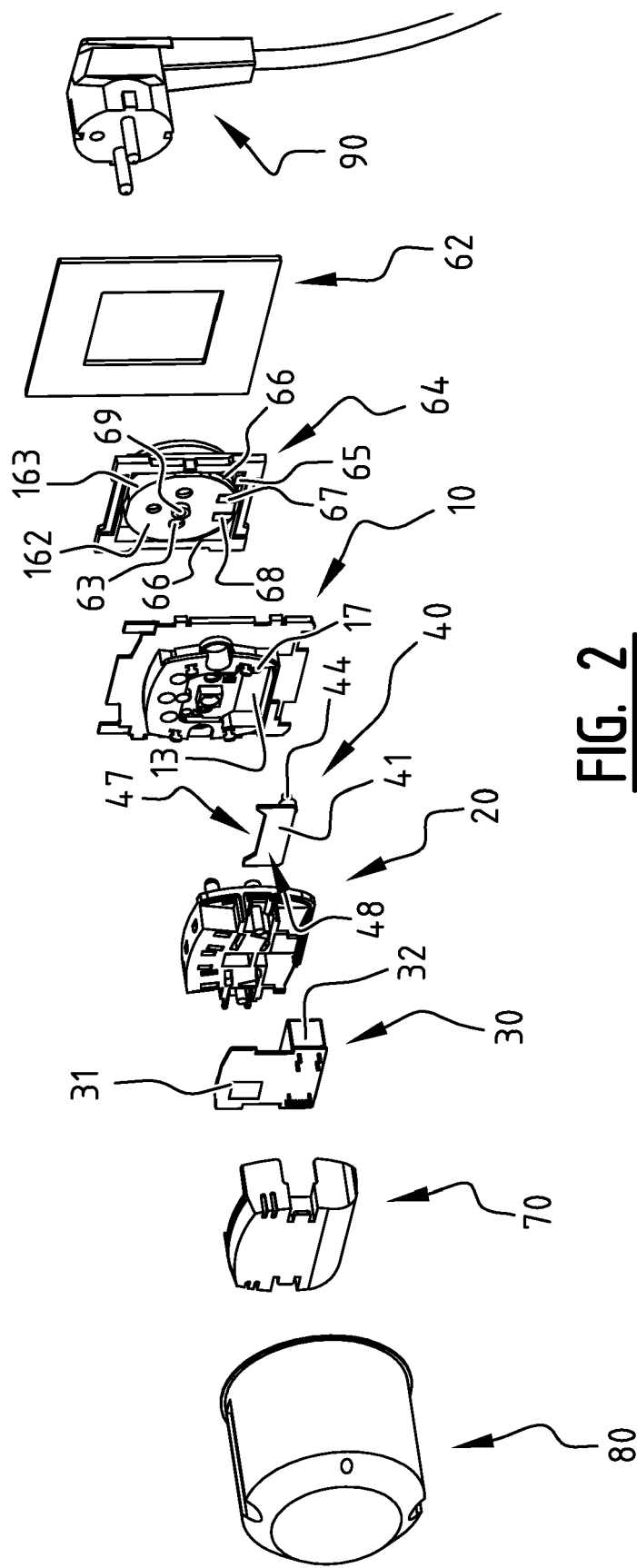


FIG. 2

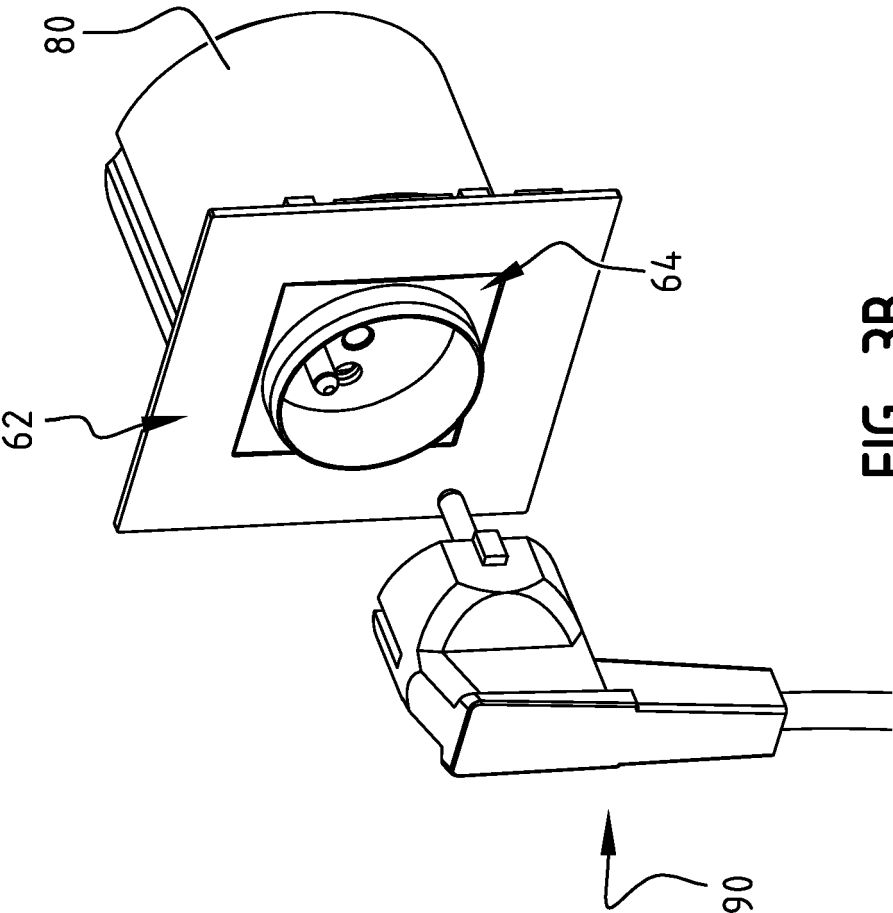


FIG. 3B

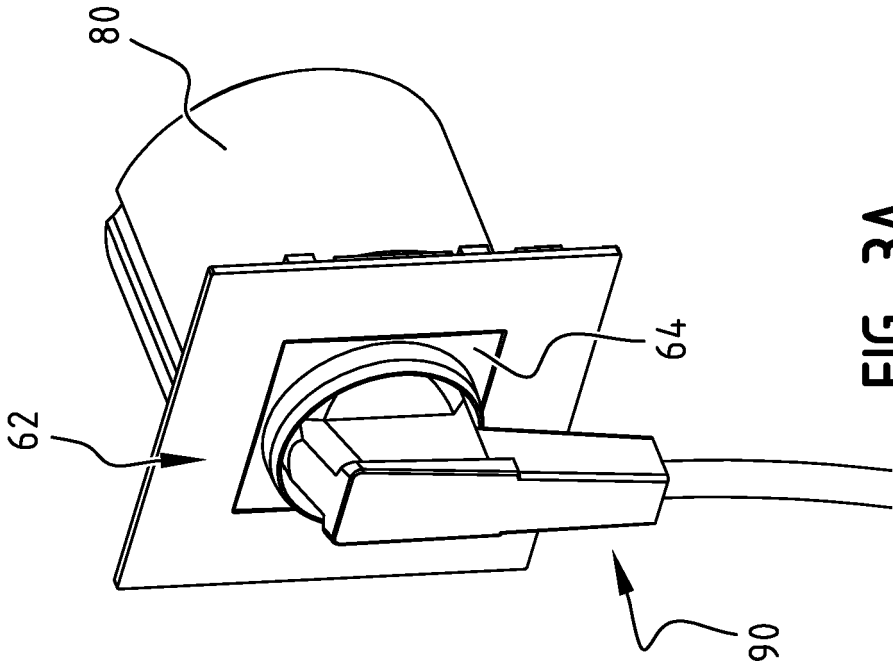


FIG. 3A

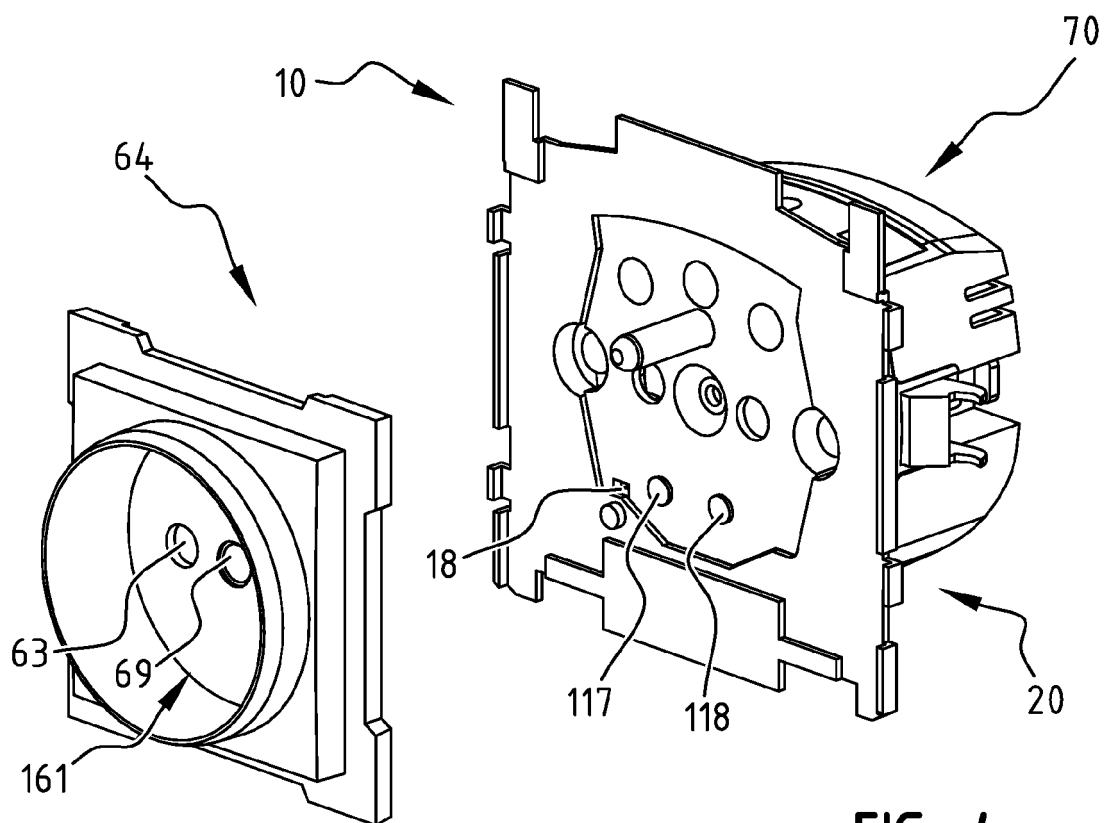


FIG. 4

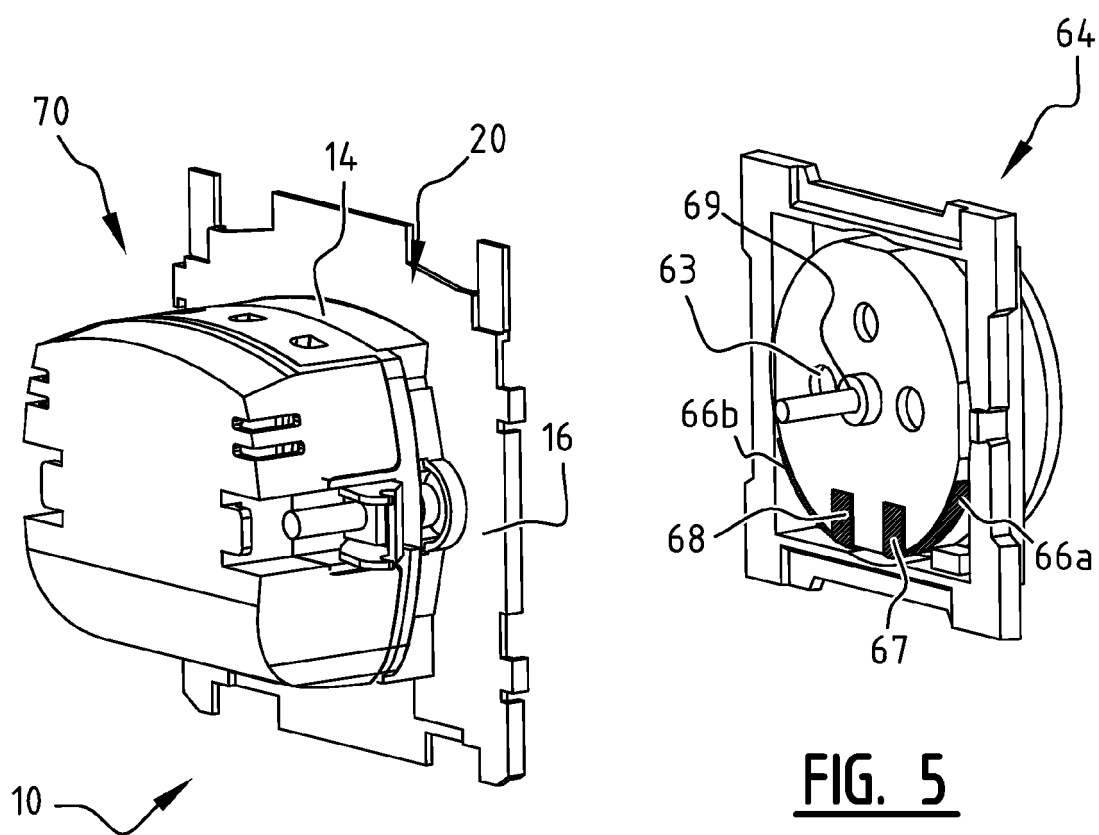
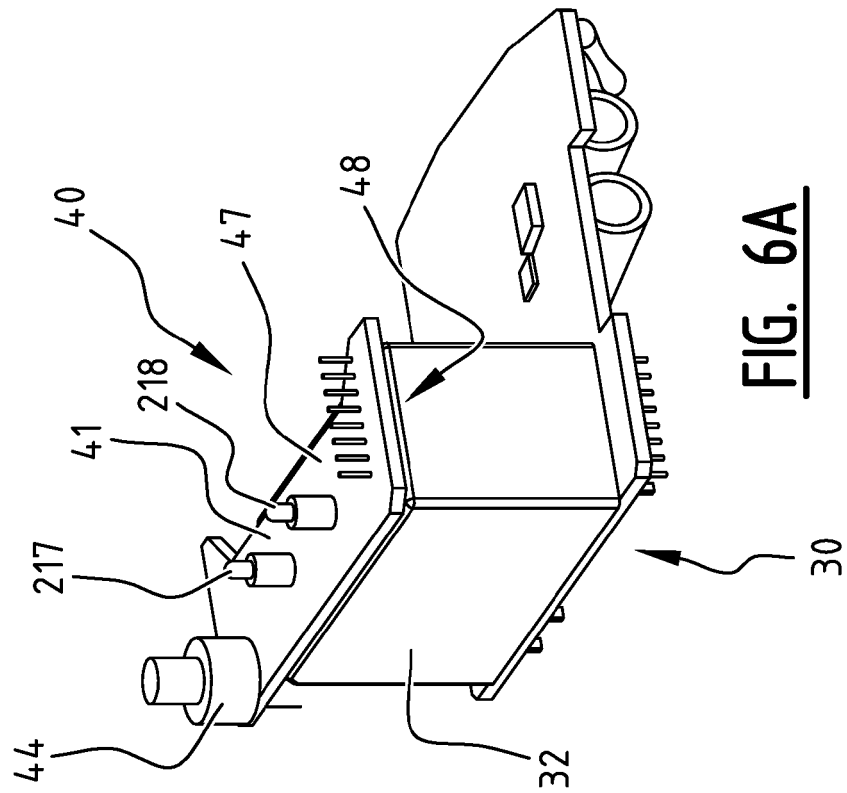
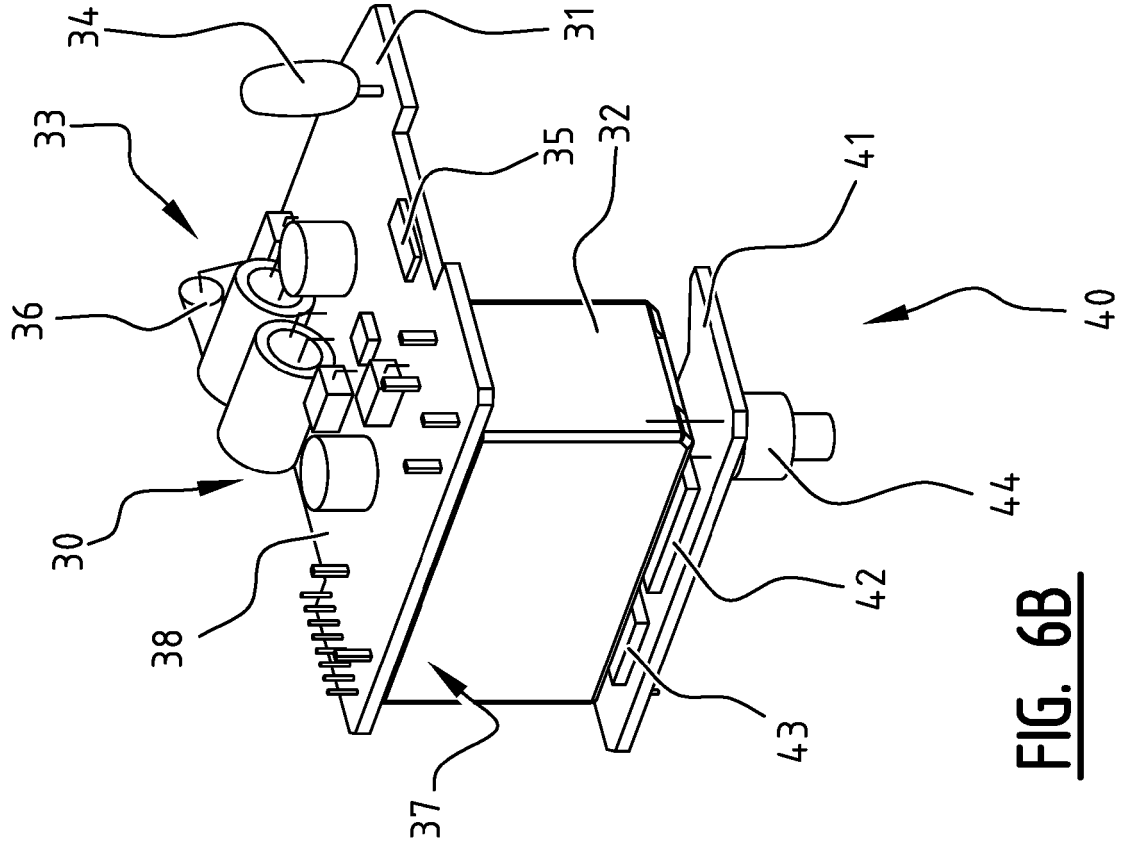


FIG. 5



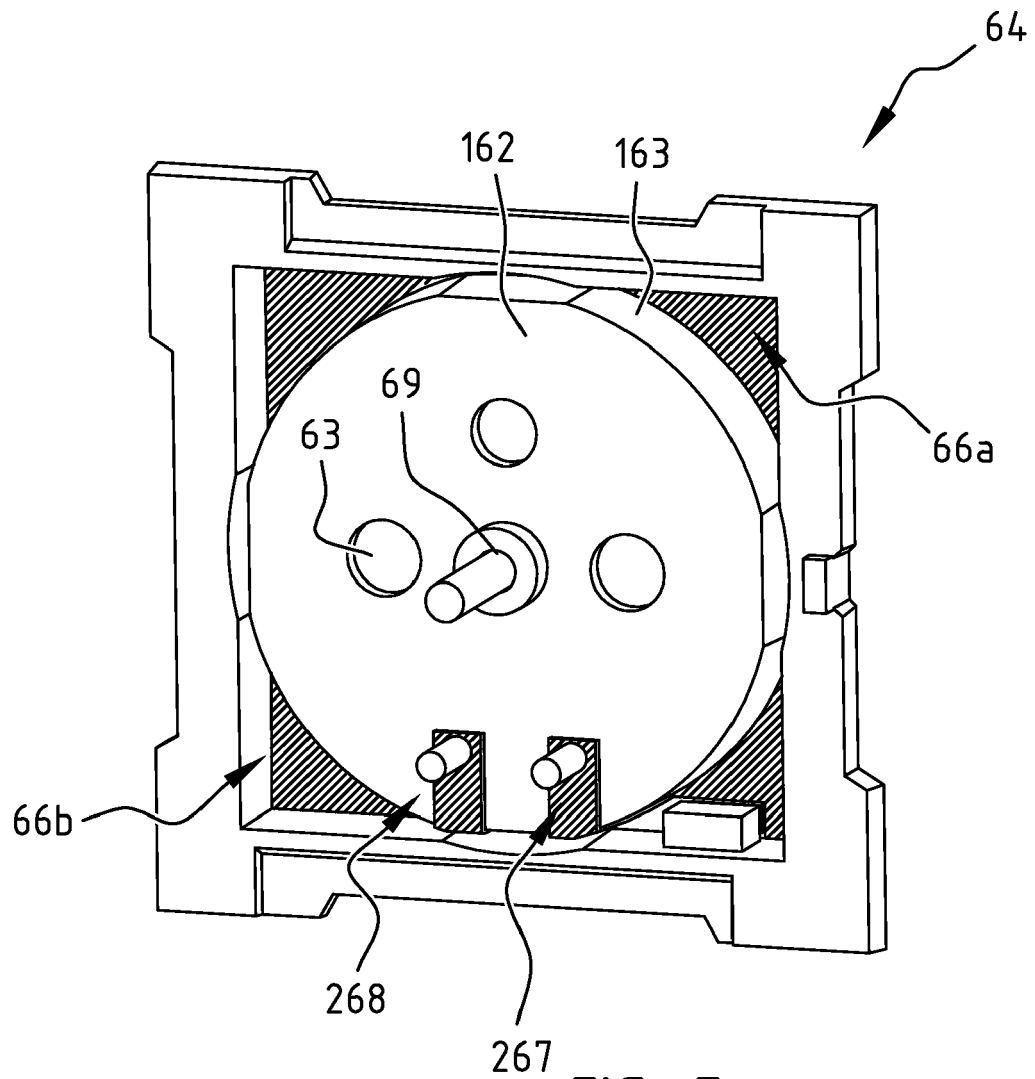


FIG. 7



EUROPEAN SEARCH REPORT

 Application Number
 EP 16 16 6196

5

10

15

20

25

30

35

40

45

50

55

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 2 696 448 A1 (BERKER GMBH & CO KG [DE]) 12 February 2014 (2014-02-12) * paragraph [0024]; figures 2,4,7,9 * -----	1,6,9, 12-15	INV. H01R24/78 H01R13/703
X	US 2014/132084 A1 (PHAM HOA [US] ET AL) 15 May 2014 (2014-05-15) * paragraph [0054] - paragraph [0055]; figures 3-9 *	1,3,4,6, 9,12,15	
X	US 2006/276144 A1 (CAMPBELL JACK [US]) 7 December 2006 (2006-12-07) * paragraph [0027]; figure 1 * -----	1,3,5,6, 11,15	
			TECHNICAL FIELDS SEARCHED (IPC)
			H01R H02G
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 5 September 2016	Examiner Corrales, Daniel
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			

 1
 EPO FORM 1503 03.02 (P04C01)

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

EP 16 16 6196

5

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-09-2016

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2696448	A1	12-02-2014	NONE
US 2014132084	A1	15-05-2014	NONE
US 2006276144	A1	07-12-2006	NONE

15

20

25

30

35

40

45

50

55

EPO FORM P0459

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