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(54) EXTENDABLE ELECTRICAL PLUG

(57) The present invention provides an extendable electrical plug (1). The extendable electrical plug (1) comprises a frame (2) with a front side and a back side. At its back side, the frame (2) comprises a connector (3) with contact pins (4) for plugging into an existing socket outlet (10) in a wall (11). At its front side, the frame (2) comprises a socket function (5) for receiving pins of an electrical plug of an electrical appliance. The electrical plug (1) furthermore comprises at least one interface element (6) for connecting to a compatible interface element (8) of at least one extension module (7), for removably connecting the at least one extension module (7) to the electrical plug (1) for providing an additional functionality to the electrical plug (1). The interface element (6, 8) are adapted for providing power to the at least one extension module (7) and for providing communication between the electrical plug (1) and the at least one extension module (7).

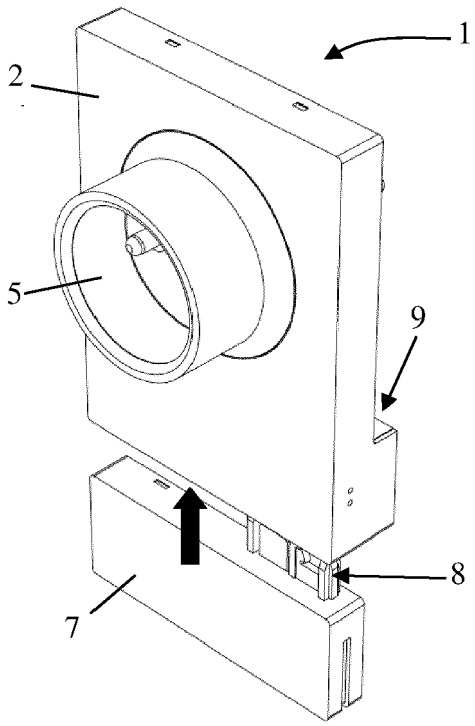

FIG. 7A

EP 3 876 366 A1

Description

Technical field of the invention

[0001] The present invention relates to an electrical plug. More particularly the present invention relates to an electrical plug that is extendable with one or more additional functionalities.

Background of the invention

[0002] Nowadays people require more and more features to be controlled and integrated in their homes. The number of socket outlets provided in a room in an average home is limited and the number of electrical appliances in a home keeps increasing. This means that the provided socket outlets are all quickly occupied, which limits the number of electrical appliances that can be used at the same time.

[0003] WO 01/95692 describes an emergency/night illumination device 100. Figs. 1A and 1B respectively show a side view and a front view of the device 100. The emergency/night illumination device 100 is intended to be used together with a socket. The device 100 is provided with plugs 101 for providing in an existing socket after the cover of that existing socket has been removed, such that the device 100 forms the cover respectively the house of the socket. The device 100 is then secured to the existing socket by means of a screw. The emergency/night illumination device 100 has a socket function 102 and an illumination function 103. Thus, in the device 100 of WO 01/95692 an additional functionality is provided while maintaining the socket function.

[0004] US 8,052,486 describes an electrical power outlet device 200 (see Figs. 2A and 2B). The electrical power outlet device 200 has an electrical power outlet section 200a and a main body section 200b. The electrical power outlet section 200a has an electrical power outlet unit 210 for obtaining an alternating current power signal. The main body section 200b has a circuit device 211a and an output unit 211b, wherein the circuit device 211a performs a signal process action and products a converted signal, and the output unit 211b receives a direct current power signal and sends out the direct current power signal. The electrical power outlet unit 210 has a plurality of sockets of which each is a punctured structure, and an electric plug 212 of an electrical appliance may puncture the sockets of the electrical power outlet unit 210 and may then be inserted and remained firmly in an existing electrical power outlet 213 that is built into a wall. Fig. 2B illustrates that an electrical plug 212 from, e.g. a LCD television 215, may be inserted into the sockets of the electrical power outlet unit 210 to provide power to the LCD television. Further, an electronic device, such as e.g. a mobile phone 214, may be connected with the output unit 211b by a transmission line to obtain the direct power signal. Also in the device of US 8,052,486 an additional functionality is provided while maintaining the socket function.

[0005] US 2017/0187135 describes a socket apparatus 310 comprising a thin plate 350, shaped like wall outlet 318, for being connected to wall outlet 318 (see Figs. 3A and 3B). The connection of socket apparatus 310 to wall outlet 318 is carried out by pressing it only, without any tool, towards wall outlet 318. Plate 310 comprises holes 358 fitted to sockets 340 of wall outlet 318, for inserting prongs 366 of a plug 356 of appliance 354. Socket apparatus 310 comprises at least one electric gadget 320, e.g. an USB outlet, receiving electrical supply from the wall outlet 318. The electrical gadget 320 may also comprise a light bulb 362 and a switch 364 for turning bulb 362 on and off. Fig. 3B shows the usage of the socket apparatus 310 of US 2017/0187135. A mobile phone 316 is charged through an adaptor 314 ending with a USB plug 312 plugged into USB outlet 320 of socket apparatus 310 connected to wall outlet 318 provided in a wall 352.

[0006] All of the above mentioned documents describe electrical plugs having a socket function and an additional functionality. A disadvantage of all of these devices is, however, that the additional functionality is fixedly connected to the socket outlet. Whenever the additional functionality needs to be replaced or removed, for one reason or another, e.g. when the additional functionality does not work anymore or is no longer required or needs to be changed by another additional functionality, the complete electrical plug needs to be changed. The device of WO 01/95692 has the further disadvantage that the cover of the original socket outlet in the wall has to be removed, before the emergency/night illumination device can be plugged in. Although it provides an additional functionality while the socket function remains available, it is not straightforward to plug the emergency/night illumination device in and out of the socket outlet in the wall, as the cover has respectively to be removed or again provided. A further disadvantage of the device 200 of US 8,052,486 is that the device itself does not comprise a real socket function. It only comprises an electrical power outlet unit 210 having a punctured structure through which the pins of the plug can be inserted into the existing electrical power unit 213. Because of that the electric plug 212 of the electrical appliance first needs to be inserted into the electrical power outlet unit 210 and only then can be plugged into the existing socket 213 in the wall, which may not be so easy to use.

Summary of the invention

[0007] It is an object of embodiments of the present invention to provide an extendable electrical plug that provides extra functionality which can easily be removed or interchanged.

[0008] The above objective is accomplished by device according to embodiments of the present invention. The present invention provides an electrical plug. The electrical plug comprises a frame with a front side and a back side. At its back side, the frame comprises a connector

with contact pins for plugging into a socket outlet. At its front side, the frame comprises a socket function for receiving pins of an electrical plug of an electrical appliance. The electrical plug furthermore comprises at least one interface element for connecting to a compatible interface element of at least one extension module, for removably connecting the at least one extension module to the electrical plug for providing an additional functionality to the electrical plug, the interface elements being adapted for providing power to the at least one extension module and for providing communication between the electrical plug and the at least one extension module.

[0009] An extendable electrical plug according to embodiments of the invention is intended for being plugged into an existing socket outlet. It has as an advantage that it thereby keeps the socket function while providing the possibility to plug in any suitable additional functionality module required at a certain location in a home. Thus, the socket function remains available and at least one additional functionality can be provided.

[0010] An electrical plug according to embodiments of the invention is easy to use and can be easily plugged into and out of an existing socket outlet without having to make changes to that existing socket. Further, additional functionality modules can easily be connected to and removed from the electrical plug.

[0011] According to embodiments of the invention, the at least one interface element may be provided in the frame. According to embodiments of the invention, the at least one interface element may be provided at any location in the frame, such as at the front surface or at a lower surface an upper surface or a side surface of the frame. Preferred from practical point of view, the interface element may be provided at a lower surface, an upper surface or a side surface of the frame.

[0012] According to embodiments of the invention, the frame may have a shape that is adapted to fit over an existing socket outlet and to completely cover that existing socket outlet. In that way, when the electrical plug is plugged into the existing socket outlet, that existing socket outlet is completely hidden. According to specific embodiments, the frame may comprise, at its back side, a recess having a thickness substantially equal to the thickness of the existing socket outlet so as to fit over a cover plate of an existing socket outlet that is built in in a wall. With thickness of the existing socket outlet is meant the thickness of the part of the socket outlet that is on the wall, i.e. the thickness measured extending from the wall.

[0013] The frame may further comprises a communication module, such as e.g. a WiFi module, a Zigbee module, a Bluetooth LE module or the like, for communicating with or sending information to a remote electric or electronic device such as a smart phone, a tablet, a computer or a gateway. In other words, according to embodiments of the invention, the electrical plug may be a smart plug. The interface element on the electrical plug and the compatible interface element on the at least one extension module may be formed by a connector to connector connection such as e.g. an electrical connector such as e.g. a pin connector, a spring connector, a USB connector or a USB-C connector, or may be formed by a connector to PCB connection, or by any other suitable connector as known by a person skilled in the art.

[0014] According to embodiments of the invention, and for aesthetical reasons, the frame may have a square or a rectangular shape. However, it has to be understood that the shape of the electrical plug may be adapted to the shape of the existing socket outlet, so as to be able to completely cover that existing socket outlet when the electrical plug is plugged into to that socket outlet.

[0015] According to embodiments of the invention, the frame may furthermore comprise additional properties, such as e.g. but not limited to a feedback light to indicate whether the electrical plug is working, or an small additional push button to make a modus selection or the like.

[0016] According to embodiments of the invention, the at least one extension module may be at least one of an orientation/flash light extension module, a sensor extension module such as e.g. a motion sensor module (PIR, radar), a communication extension module (e.g. a speaker, microphone, camera), an USB extension module, an audio extension module, a scanner extension module (e.g. for QR- or barcode), a programmable button extension module, an access control extension module (e.g. fingerprint, keypad) or an internet extension module.

Brief description of the drawings

[0017] It has to be noted that same reference signs in the different figures refer to same, similar or analogous elements.

Figs. 1A and 1B illustrate an electrical plug according to the prior art.

Figs. 2A and 2B illustrate an electrical plug according to the prior art.

Figs. 3A and 3B illustrate an electrical socket plate according to the prior art.

Figs. 4 to 6 schematically illustrate an electrical plug according to an embodiment of the present invention.

Figs. 7A and 7B illustrate an electrical plug/additional functionality combination according to an embodiment of the invention.

Fig. 8 illustrates an electrical plug/additional functionality combination according to an embodiment of the invention.

Fig. 9 schematically illustrate an electrical plug according to an embodiment of the present invention.

Figs. 10A and 10B schematically illustrate an electrical plug according to embodiments of the invention plugged into an existing socket outlet in a wall.

Description of illustrative embodiments

[0018] 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.

[0019] The term "connected" as used in the claims and in the description has not to be interpreted as being restricted to direct connections, unless otherwise specified. Thus, part A being connected to part B is not limited to part A being in direct contact to part B, but also includes indirect contact between part A and part B, in other words also includes the case where intermediate parts are present in between part A and part B.

[0020] 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.

[0021] The present invention provides an extendable electrical plug. The extendable electrical plug comprises a frame with a front side and a back side. At its back side, the frame comprises a connector with contact pins for plugging into an existing socket outlet. At its front side, the frame comprises a socket function for receiving pins of an electrical plug of an electrical appliance. The electrical plug furthermore comprises at least one interface element for connecting to a compatible interface element of at least one extension module, for removably connecting the at least one extension module to the electrical plug for providing additional functionality to the electrical plug. The interface elements are adapted for providing to the at least one extension module and for providing communication between the electrical plug and the at least one extension module.

[0022] An extendable electrical plug according to embodiments of the invention is intended for being plugged into an existing socket outlet. An advantage of the extendable electrical plug is that thereby the socket function is kept, while the possibility to plug in any suitable additional functionality module required at a certain location in a home is provided. Thus, the socket function remains available while additional functionality is provided.

[0023] A further advantage of an electrical plug according to embodiments of the invention is that it is easy to use and can be easily plugged into and out of an existing socket outlet without having to make changes to that existing socket. Further, additional functionality or extension modules can easily be connected to and removed from the electrical plug. This provides the possibility to add and remove extension modules at any time and whenever required, just by plugging in or out the extension module from the electrical plug. The electrical plug does not even have to be removed from the socking outlet to do so. As from the moment the extension module is plugged into the electrical plug, it starts working. The at least one extension module is hot-pluggable, which means that it can be removed from the electrical plug while even when it is working. Further, also the electrical plug may be hot-pluggable. In other words, the electrical plug may be removed from the socket outlet while it has at least one extension module connected to it that is working.

[0024] 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.

[0025] Figs. 4 to 6 illustrate an electrical plug 1 according to an embodiment of the present invention. The electrical plug 1 comprises a frame 2. At a back side 2a, the frame 2 comprises a connector 3 with connector pins 4 for plugging into an existing socket outlet that is built into a wall (see further). At a front side 2b, the frame 2 comprises a socket function 5 for receiving pins of an electrical plug of an electrical appliance, such as a washing machine, a desk lamp or other device, a coffee machine or the like.

[0026] The electrical plug 1 furthermore comprises at least one interface element 6 for connecting to a compatible interface element (see further) of at least one extension module 7. The interface elements 6 and 8 serve to removably connect the at least one extension module 7 to the electrical plug 1 (see Fig. 6). This gives the possibility to add at least one further functionality to the electrical plug 1, next to the socket function 5. The extension module 7 can be at least one of an orientation/flash light extension module, a sensor extension module (e.g. motion sensor module (PIR, radar), a communication extension module (speaker, microphone, camera), an USB extension module, an audio extension module, a scanner extension module (QR- or barcode), a programmable button extension module, an access control extension module (fingerprint, keypad) or an internet extension module.

[0027] The interface element 6 is provided in the frame 2. According to embodiments of the invention, the interface element 6 may be provided at any location in the frame 2, but may preferably be provided at a lower surface, an upper surface or a side surface of the frame 2. However, according to specific embodiments of the invention and for particular applications, the interface element 6 could also be provided at a front side of the frame 2 or even at a back side of the frame 2. In the latter case, precautions have to be taken as to the shape and thick-

ness of the interface element and the extension module 7, so that the electrical plug 1 can still be plugged into a socket outlet in a wall. In the example given in Fig. 6, the electrical plug 1 comprises one interface element 6. However, it has to be noted that any suitable number of interface elements 6 may be provided in the frame 2. Furthermore, any number of additional functionalities can be obtained while keeping the socket functionality, by stacking electrical plugs 1 according to embodiments of the invention. For example, a first electrical plug 1 according to embodiments of the invention is plugged into a socket outlet, and a second electrical plug 1 according to embodiments of the invention may then be plugged into the socket function 5 of the first electrical plug 1. If, for example, both electrical plugs 1 have two interface elements 6 for connecting extension modules 7, the total number of additional functionalities may be four, while still one socket function 5 is available. In theory there is no limit in the number of electrical plugs 1 that can be stacked, however, in practice a stack of two or three electrical plugs 1 may be the maximum, in particular for aesthetical reasons. Nevertheless, this does not take away the fact that, for particular reasons, more than three electrical plugs 1 can be stacked.

[0028] As mentioned above, the interface element 6 on the electrical plug 1 is adapted for being connected to a compatible interface element 8 of the extension module 7. The interface elements 6 and 8 are adapted for removably connecting the at least one extension module 7 to the electrical plug 1. This has as an advantage that, whenever an extension module 7 is no longer required or does not work anymore, it can easily be replaced by another extension module 7. The interface elements 6 and 8 are adapted to provide power to the at least one extension module 7. Further, the interface elements 6 and 8 are adapted for providing communicating between the electrical plug 1 and the at least one extension module 7. Hence, the interface, formed by interface elements 6 and 8, between the electrical plug 1 and the at least one extension module 7 is a communication and power interface.

[0029] Figs. 7A and 7B illustrate the connection of an extension module 7 to an electrical plug 1 according to embodiments of the invention. The connection can easily be done by connecting the interface element 8 of the extension module 7 to the interface element 6 on the electrical plug 1. Replacing a connected extension module 7 by another extension module 7 can then be done by just plugging out the connected extension module 7 and plug in the new one. Because of the interface elements 6 and 8 which together form the interface between the electrical plug 1 and the extension module, as soon as an extension module 7 is plugged into the electrical plug 1, it is ready for use. According to embodiment of the invention, that interface may comprise a connector to connector connection such as e.g. an electrical connector such as e.g. a pin connector, a spring connector, a USB connector or a USB-C connector, or may be formed by a connector to PCB connection, or by any other suitable connection as known by a person skilled in the art. Further, the interface may be adapted for wireless charging, i.e. for wireless providing power to the at least one extension module 7 and for optical communication between the electrical plug 1 and the at least one extension module 7.

[0030] In the example given in Figs. 7A and 7B, the extension module 7 may be an orientation/flash light. It has to be understood that this is only for the sake of illustration and does not limit the invention in any way. The extension module 7 may be any other suitable extension module 7 as known by a person skilled in the art, such as e.g. a sensor extension module (e.g. motion sensor module (PIR, radar), a communication extension module (e.g. a speaker, microphone, camera), an USB extension module, an audio extension module, a scanner extension module (e.g. for QR- or barcode), a programmable button extension module, an access control extension module (e.g. fingerprint, keypad) or an internet extension module.

[0031] The extension module 7 being an orientation/flash light brings the advantage that it can also be used as a flash light. This is because, according to embodiments of the invention, the extension module, or thus the orientation light 7, can easily be removed from the electrical plug 1. Hence, when a person has to find his/her way in the dark, he/she can remove the orientation light 7 from the electrical plug 1 very easily by just unplugging it and use it as a flash light. Whenever the light is back, the flash light 7 can be plugged back into the electrical plug 1 that has remained in the socket outlet in the wall and be further used as an orientation light again. Advantageously, the orientation/flash light 7 may have its own power supply in the form of a battery, such that it can keep working for a longer time when it is removed from the electrical plug 1 and thus no longer receives power from the electrical plug 1.

[0032] The possibility to add at least one extension module 7 makes the electrical plug 1 very flexible. It gives a user the possibility to add to the plug the functionality he/she desires to have at a certain place. At one moment, a particular extension module 7 can be useful for a user, while at another moment, it might be required to have another extension module 7. It is a big advantage of the present invention that such extensions modules 7 are very easy to be interchanged, as they can easily be plugged in and out of the electrical plug. This is contrary to existing electrical plugs, in which the additional functions are fixed to the plug, and consequently are not interchangeable. So once a particular functionality is chosen, it cannot be changed anymore and if another functionality is required, a new electrical plug has to be bought.

[0033] Fig. 8 illustrates an alternative embodiment of an electrical plug 1 according to the invention. According to this embodiment, the extension module may be a sensor module 7. The sensor module 7 may, for example, be a VOC sensor, a CO2 sensor, a temperature sensor,

an acoustic sensor, a relative humidity sensor or the like.

[0034] Suitable extension modules 7 are not restricted to extension modules having their own power supply or battery. As the interface elements 6 and 8 are adapted for providing power to the at least one extension module 7, the extension module 7 itself does not have to comprise means for powering it, which thus increases the number of types of extension modules 7 that can be used with an electrical plug 1 according to embodiments of the invention. As soon as the extension module 7 is plugged into, and thus connected to an electrical plug 1 according to embodiments of the invention, it receives power and it can work.

[0035] A further embodiment of an electrical plug 1 according to the invention is illustrated in Fig. 9. According to this embodiment, the frame 2 may comprise a first interface element (not shown) at a lower surface and a second interface element (not shown) at a side surface. Hence, two extension modules 7a and 7b may be provided to the electrical plug 1. In the example given, the first extension module 7a may be an orientation/flash light and the second extension module 7b may be a sensor module. However, according to embodiments of the invention, any combination of extension modules 7a, 7b as required by a user may be provided.

[0036] It has to be noted that the electrical plug 1 according to embodiments of the invention can also work without any extension module 7 connected to it. When the electrical plug 1 is plugged into an existing socket outlet and has no extension module 7 connected to it, it can work as a simple socket outlet. According to further embodiments of the invention, however, the electrical plug 1 may also be a smart plug and act as a smart socket. In that case, the electrical plug 1 may furthermore comprise a communication module, such as e.g. a WiFi module, a Zigbee module, a Bluetooth LE module or the like, for communicating with or sending information to a remote electric or electronic device, such as e.g. a smart phone, a tablet, a computer or a gateway. For example, when the extension module 7 is e.g. a sensor module comprising a temperature or humidity sensor, the value sensed by the temperature or humidity sensor may be sent to, for example, a smart phone so that a user can see if, e.g. air conditioning should be activated or a window should be opened. Still further, these sensed values may be sent to a remote gateway, which then can activate the air conditioning so as to optimise the values of temperature and/or humidity. So, in general, information can be sent to a remote device so as to allow a user or an electric or electronic device to take action. Further, the electrical plug 1 may measure the power usage of an electrical appliance that is connected to the electrical plug 1. The measured data can then be sent to a remote device such as a gateway or a smartphone for further analysis. According to still further embodiments of the invention, the data may be sent directly to the cloud for further analysis.

[0037] According to embodiments of the invention, measured data may first be sent from the extension module, e.g. sensor module 7, to the electrical plug 1 and may then, through the communication module, be sent to a remote device. In case the electrical plug 1 is a standalone device, the data will be sent to an app on a smartphone. In case the electrical plug 1 is part of a home automation system, or in other word is incorporated in a home automation system, the data may be sent to a remote gateway.

[0038] The frame 2 may have any suitable shape that is adapted to fit over an existing socket outlet and to completely cover that existing socket outlet (see further). In that way, when the electrical plug 1 is plugged into the existing socket outlet, that existing socket outlet is completely hidden and thus no longer visible, only the electrical plug 1 is. According to specific embodiments, the frame 2 may comprise, at its back side, a recess 9 having a thickness substantially equal to the thickness of the existing socket outlet so as to fit over a cover plate of an existing socket outlet that is built in in a wall. With thickness of the existing socket outlet is meant the thickness of the part of the socket outlet that is on the wall, i.e. the thickness measured extending from the wall

[0039] Figs. 10A and 10B illustrate the plugging in of an electrical plug 1 according to embodiments of the invention into an existing socket outlet 10 in a wall 11. This can be done by just plugging in the connector pins 4 in the holes in the socket outlet 10. Because of the recess 9 in the frame 2, the electrical plug 1 fully fits the socket outlet 10. Thus, the original or existing socket outlet 10 is hidden behind the electrical plug 1, but the socket function is kept. Thereby, at least one additional function is added by the at least one extension module 7. In the example given, only one extension module 7 is provided. However, according to other embodiments of the invention and as already described above, more than one extension module 7 may be provided. Thereby, any suitable combination of extension modules 7, as required by a user, can be provided.

[0040] According to embodiments of the invention, the frame may furthermore comprise additional properties, such as e.g. but not limited to a feedback light to indicate whether the electrical plug is working, or an small additional push button to make a modus selection or the like.

[0041] In the above described examples, the frame 2 has a rectangular shape. However, according to embodiments of the invention, the shape of the frame 2 may be adapted to the shape of the existing socket outlet 10, so as to be able to completely cover the existing socket outlet 10 when it is plugged into that socket outlet 10.

Claims

1. An electrical plug (1) comprising:

- a frame (2) with a front side (2b) and a back side (2a),

- at the back side (2a) of the frame (2), a connector (3) with contact pins (4) for plugging into a socket outlet (10), and
- at the front side (2b) of the frame (2), a socket function (5) for receiving pins of an electrical plug of an electrical appliance,

wherein the electrical plug (1) furthermore comprises at least one interface element (6) for connecting to a compatible interface element (8) of at least one extension module (7), for removably connecting the at least one extension module (7) to the electrical plug (1) for providing an additional functionality to the electrical plug (1), the interface elements (6, 8) being adapted for providing power to the at least one extension module (7) and for providing communication between the electrical plug (1) and the at least one extension module (7).

2. An electrical plug (1) according to claim 1, wherein the at least one interface element (6) on the electrical plug (1) is provided in the frame (2).

3. An electrical plug (1) according to claim 1 or 2, wherein a shape of the frame (2) is adapted to fit over an existing socket outlet (10) in a wall (11).

4. An electrical plug (1) according to claim 3, wherein the frame (2) comprises, at its back side, a recess (9) with a thickness substantially equal to the thickness of the existing socket outlet (11).

5. An electrical plug (1) according to any of the previous claims, wherein the frame (2) further comprises a communication module for communicating with or sending information to a remote electric or electronic device.

6. An electrical plug (1) according to any of the previous claims, wherein the interface element (6) on the electrical plug (1) and the compatible interface element (8) on the at least one extension module (7) are formed by a connector to connector connection such as e.g. an electrical connector such as e.g. a pin connector, a spring connector, a USB connector or a USB-C connector, or may be formed by a connector to PCB connection, or by any other suitable connector.

7. An electrical plug (1) according to any of the previous claims, wherein the frame (2) has a square or rectangular shape.

8. An electrical plug (1) according to any of the previous claims, wherein the frame (2) furthermore comprises a feedback light.

9. An electrical plug (1) according to any of the previous claims, wherein the at least one extension module (7) is at least one of an orientation/flash light extension module, a sensor extension module, a communication extension module, an USB extension module, an audio extension module, a scanner extension module, a programmable button extension module, an access control extension module or an internet extension module.

10. An electrical plug (1) according to any of the previous claims, wherein the electrical plug (1) is a standalone device.

11. An electrical plug (1) according to any of claims 1 to 9, wherein the electrical plug (1) is part of a home automation system.

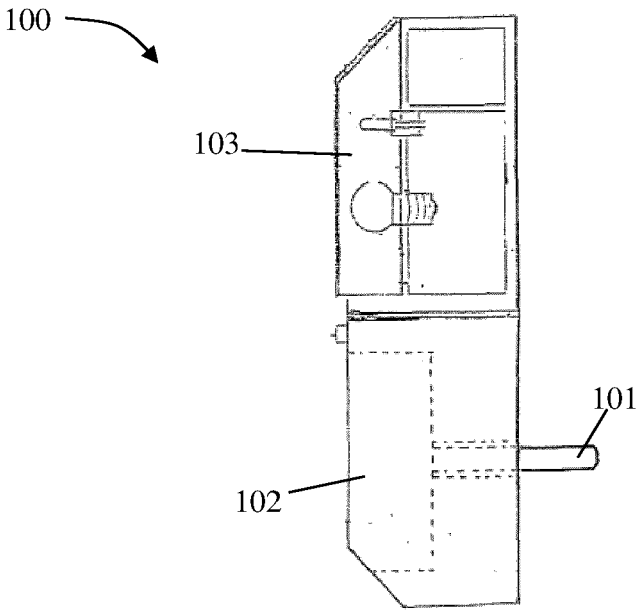

FIG. 1A – PRIOR ART

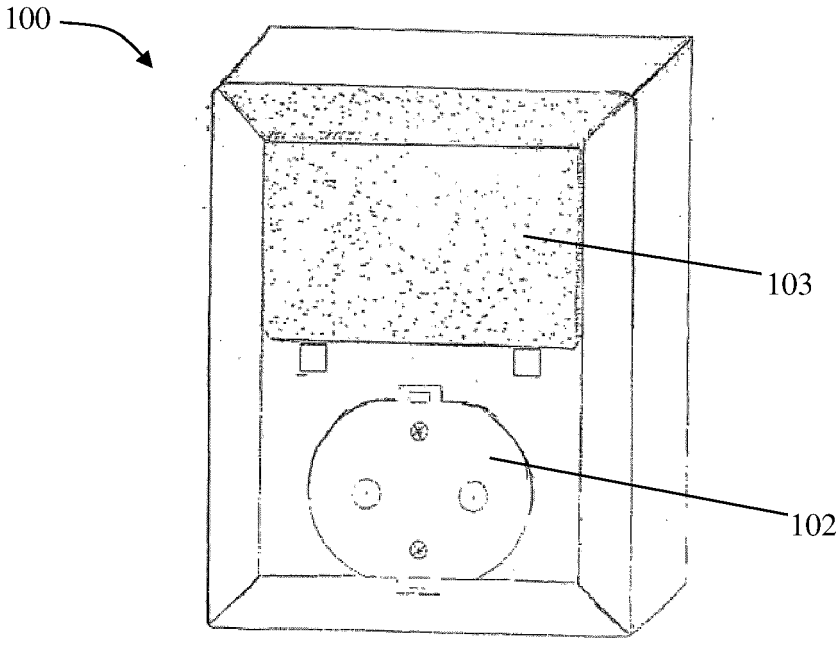

FIG. 1B – PRIOR ART

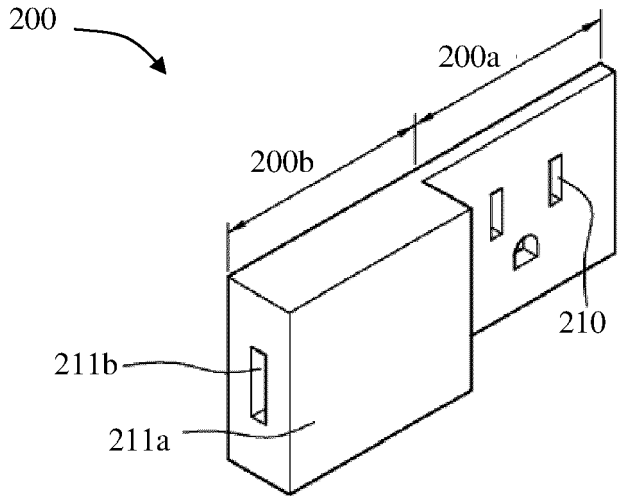

FIG. 2A – PRIOR ART

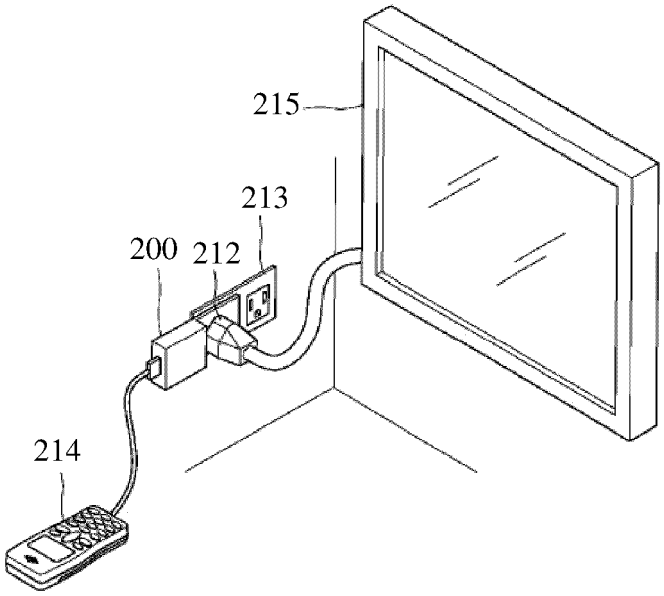

FIG. 2B – PRIOR ART

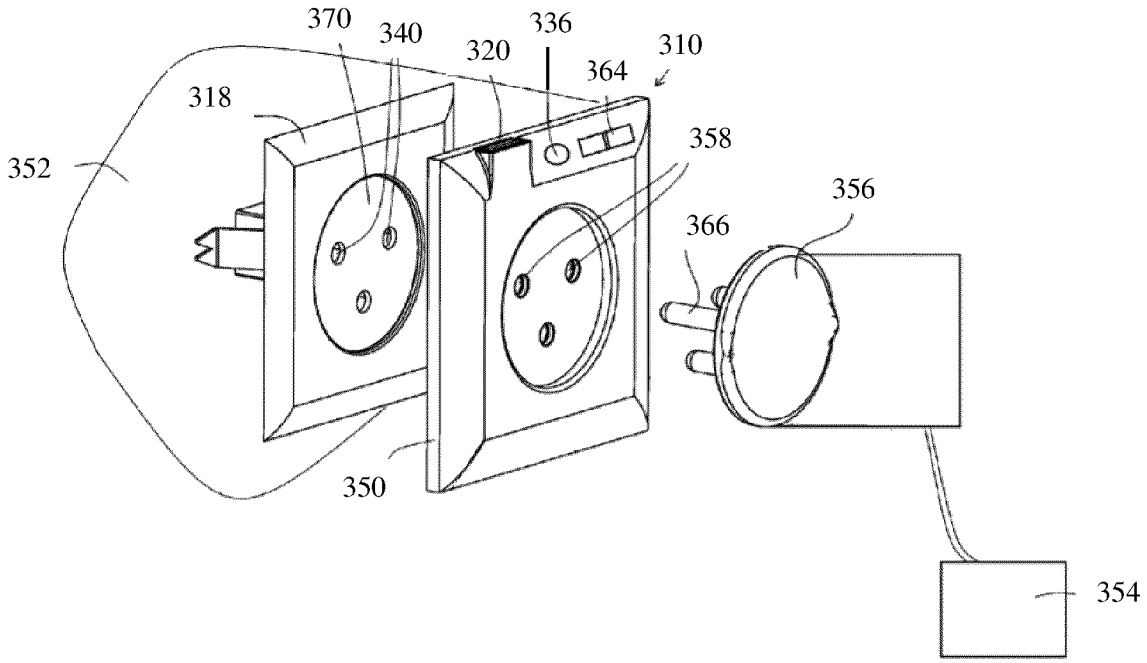

FIG. 3A – PRIOR ART

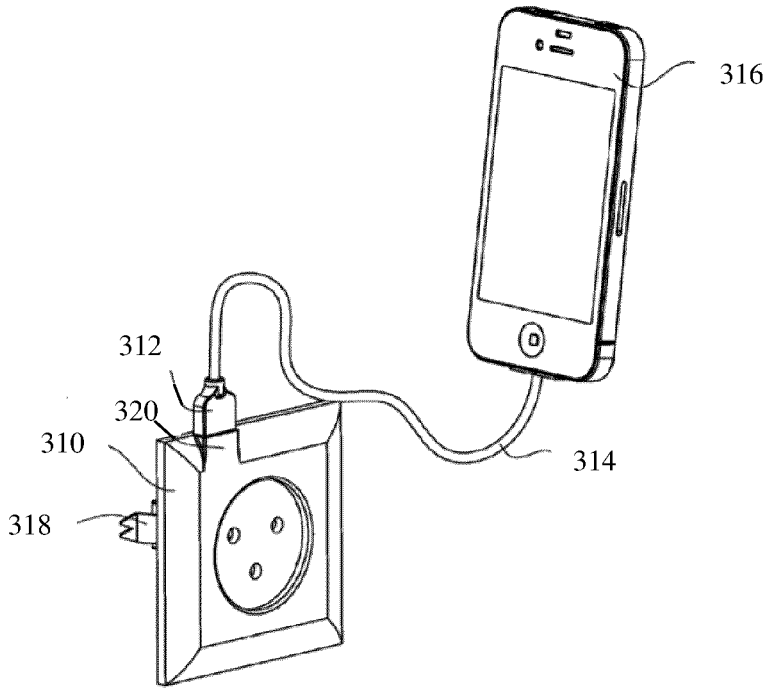

FIG. 3B – PRIOR ART

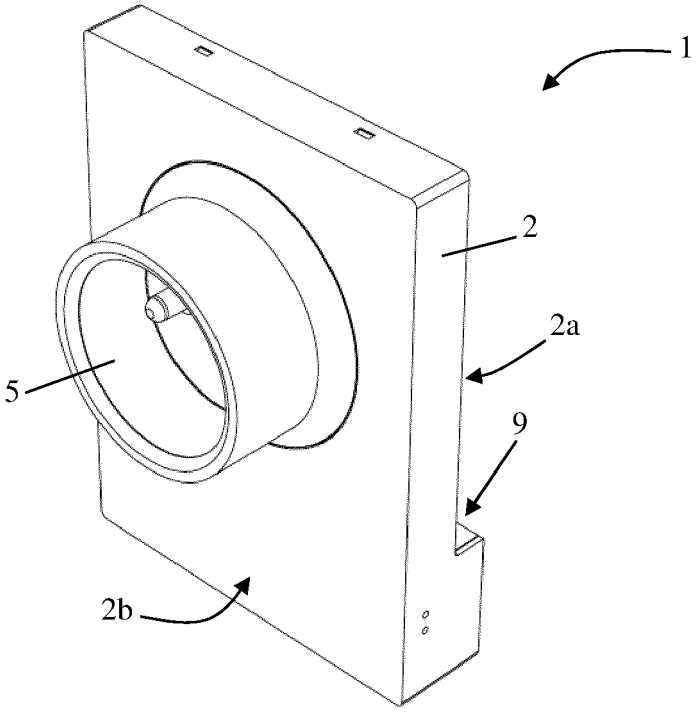

FIG. 4

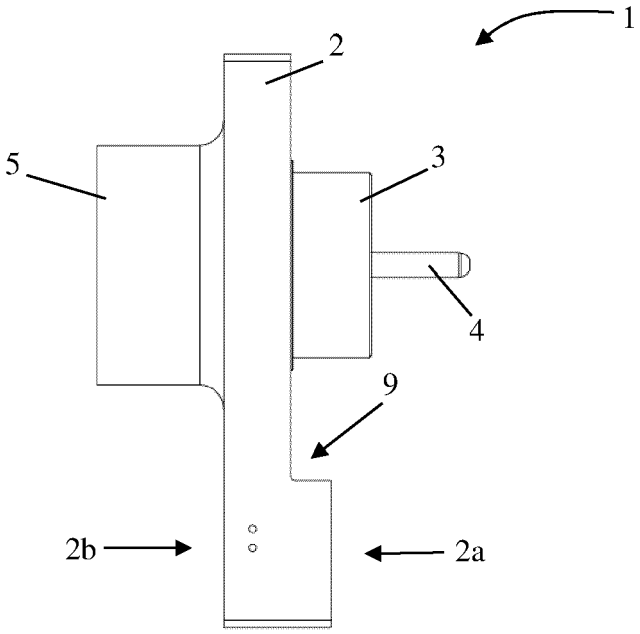

FIG. 5

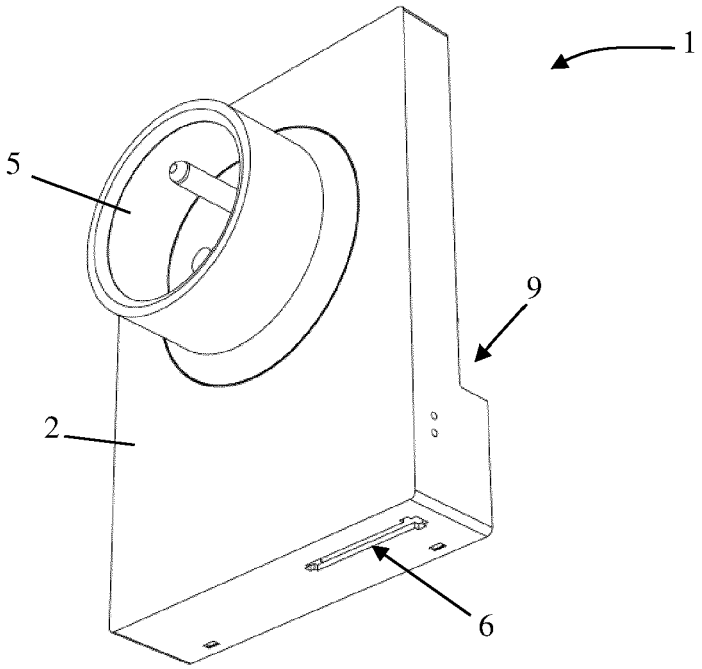

FIG. 6

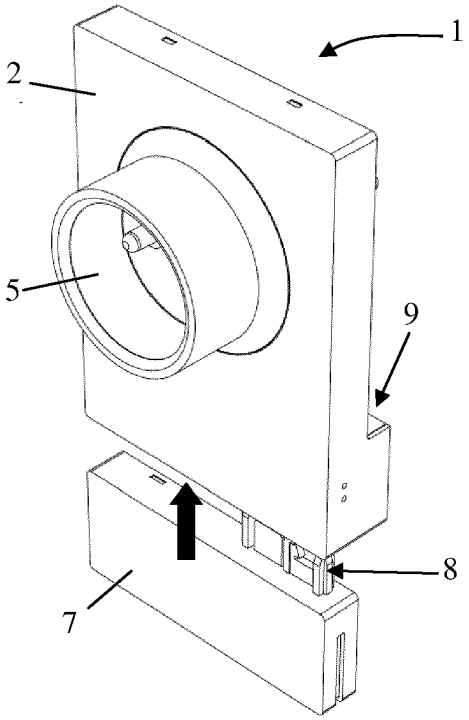

FIG. 7A

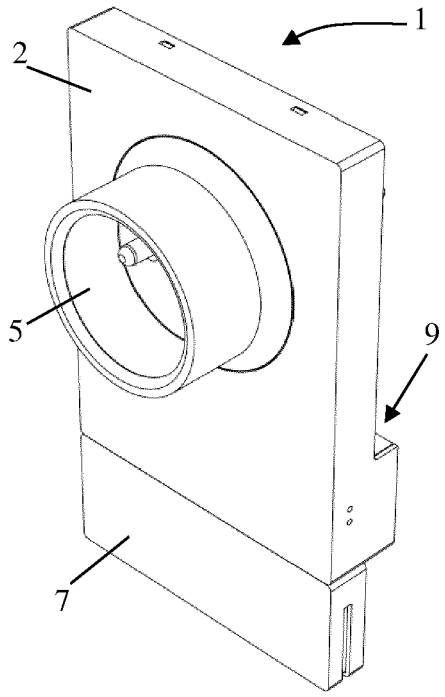

FIG. 7B

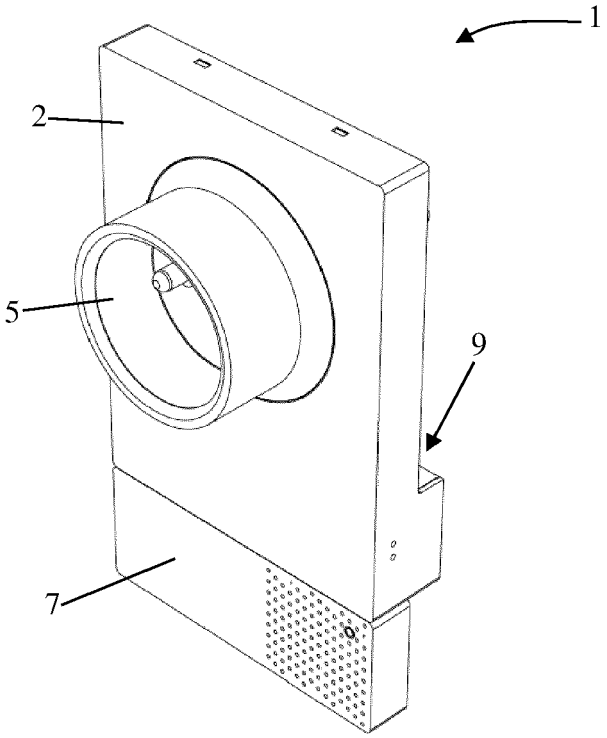

FIG. 8

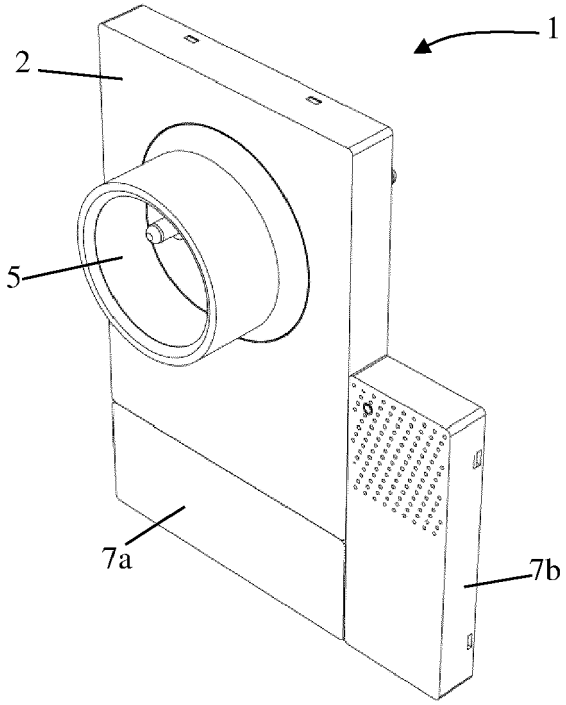

FIG. 9

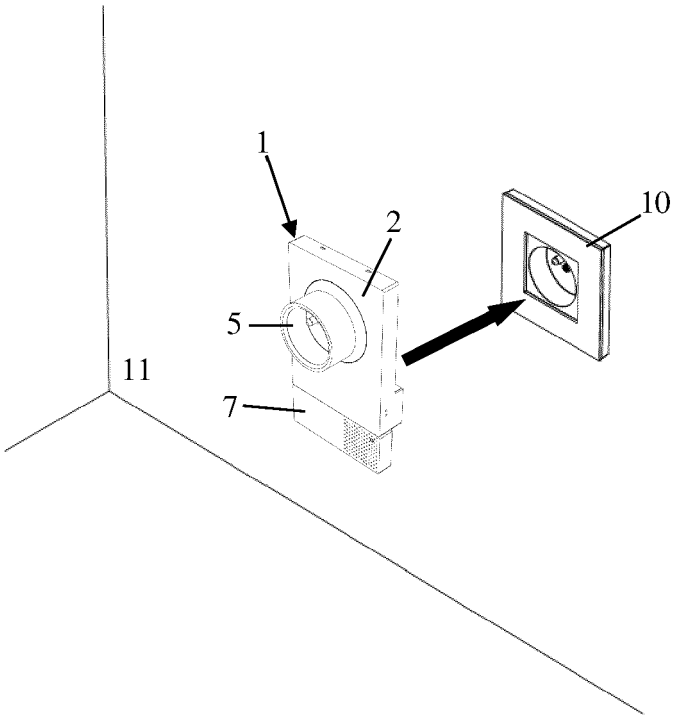

FIG. 10A

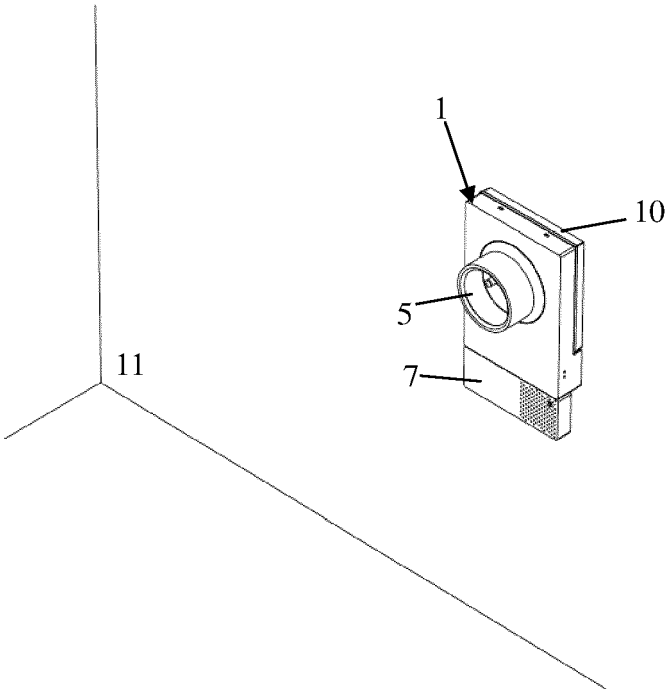

FIG. 10B

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EUROPEAN SEARCH REPORT

Application Number
EP 21 16 1149

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 Y	US 2017/187135 A1 (AZOULAY RAN [IL]) 29 June 2017 (2017-06-29) * abstract; figures 1,2 * -----	1-4,6-8, 10,11 5,9	INV. H01R31/06 H01R24/76 H01R27/02
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TECHNICAL FIELDS SEARCHED (IPC)
H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	29 June 2021	Corrales, Daniel

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29-06-2021

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