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(54) ELECTRICAL POWER OUTLET

(57) The present invention relates to an electrical power outlet comprising a sub-assembly with an axially movable cover. The axially movable cover includes several guide pins that are guided in corresponding slots of a casing of the sub-assembly with an outer side guide stop. The axial movement of the cover is also delimited by two projections included in the cover itself and a stop on the casing of the sub-assembly.

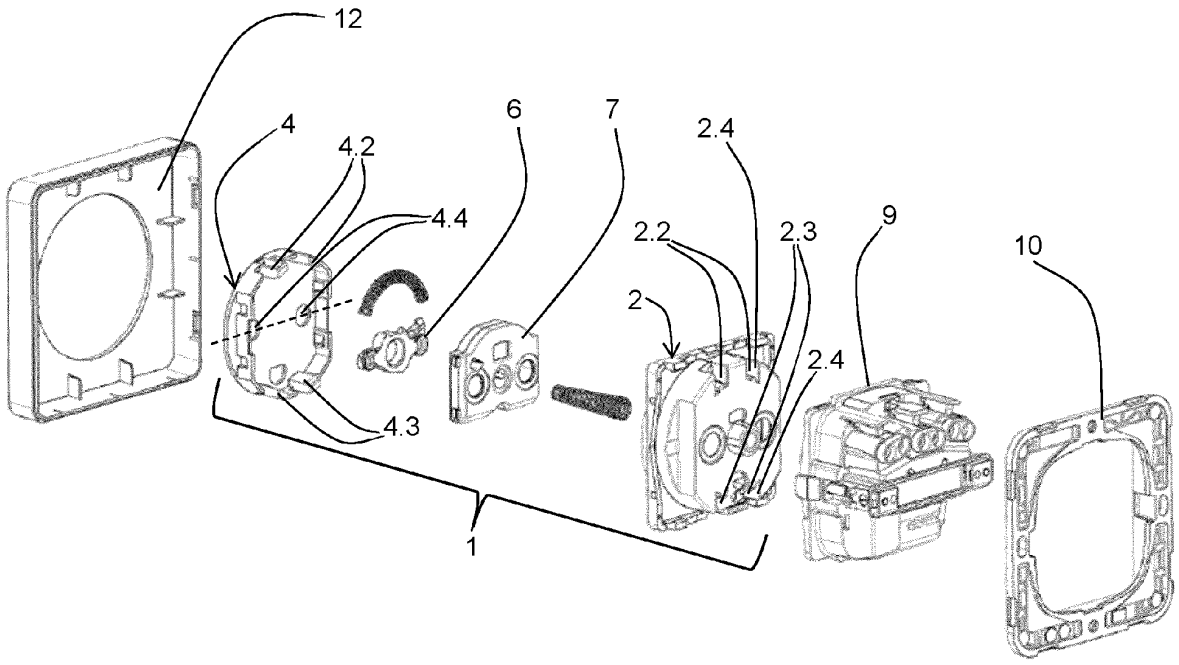

FIG. 1

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Description

Technical field

[0001] The present invention relates to the technical sector of power outlets intended to be fixed on flat surfaces, normally walls or partitions, and which consist, essentially although not exclusively, of a fastening frame for fastening to said surface, a mechanism box, a functionally diverse sub-assembly that includes at least one cover, and possible corresponding trim elements.

State of the art

[0002] Power outlets of the type mentioned in the previous section are characterised by having a fastening frame, which is the first element in contact with the mounting wall, a mechanism box (with conductive metal parts for connecting the corresponding cables and inserting the pins of the respective male plug) and a series of additional elements, some of which are optional and which, herein, are referred to as the (outlet) sub-assembly. In addition, they may include different trim elements or components, such as an exterior trim frame.

[0003] The aforementioned sub-assembly usually includes a cover that has, on a front surface that is visible to the user, holes for the passage of the pins of the corresponding plug. The power outlet, in particular the mechanism box, incorporates elastic means to allow the axial collapse of the cover, towards the wall, and its subsequent recovery until it is level with the decorative frame. One of the common solutions to fasten the sub-assembly to this front cover is to use the frame of the outlet that is mounted on the wall as an anchoring area for the same. In relation to the attachment of the mechanism box to the installation box that is fastened to the wall, or for its direct fastening to the opening made in the wall, there are cases, such as the outlets used, for example, on the Danish market, in which the claws or fastening means for fastening the power outlet are arranged inside the mechanism box are not accessible after fastening the aforementioned sub-assembly to the frame. This arrangement makes it difficult to subsequently adjust or remove the outlet.

[0004] As a document representative of the prior art, it is worth mentioning patent EP3512045 in which the sub-assembly is fastened to the frame, and in which the axial movement of the cover of the outlet is limited by a stop comprised in the mechanism box.

Object of the invention

[0005] Considering the objectives and advantages outlined in the previous section, a general description of the elements and features that collaborate in obtaining the same is provided, according to which the present invention provides an electrical power outlet with the following features. To facilitate the interpretation of said elements and technical features, the following parts known in outlets of this type are distinguished: a fastening frame to fasten the outlet on a mounting wall, a mechanism box, an exterior trim and a sub-assembly that includes an axially movable cover in a casing, and a shutter and a housing inside said casing of the sub-assembly. In order to mount the axially movable cover in casing of the sub-assembly, there are a series of guide pins. At a minimum, it comprises an upper guide pin and a lower guide pin; in this specific case, "upper" and "lower" define a position with respect to the imaginary axis that joins the two side electrical connection holes of the outlet, as seen from the front face of the outlet. To complement the action of these pins, the casing of the aforementioned sub-assembly includes corresponding slots (in a one-to-one correspondence with respect to the pins) arranged so as to guide the movement of the pins and, therefore, the cover, in its axial movement, limiting the lateral movement of the pins with at least one side wall of the slots.

[0006] The upper and lower arrangement of the pins of the cover prevents their interaction with the claws, determining a more robust configuration adaptable to any type of electrical outlet.

[0007] In addition to the guidance provided by the circular configuration of the casing in correspondence with the circular configuration of the cover, the guidance of the slots of the casing acts as a lateral stop for the pins of the cover, thereby avoiding misalignments or jamming of said cover in its axial movement.

[0008] Furthermore, one of the features of the power outlet of the invention relates to defining the axial movement of the cover of the outlet. To this end, the axial guide pins comprise an upper projection or edge and a lower projection or edge; in this case, "upper" and "lower" refer to a position along the pin from the part of the pin closest to the cover or furthest from the mounting wall (upper projection) to the part furthest from the cover or closest to the mounting wall (lower projection). These two upper and lower projections, when the cover moves axially, must have their axial travel interrupted by a stop formed or fastened in the groove of the casing corresponding to each pin. Thus, it is understood that the projections and the complementary action stop project in opposite directions; in a preferred case, the projections project radially outwards from the outlet and the respective stop projects radially inwards from the outlet. The pin comprises an upper projection, aligned with the surface of the cover, and a lower projection, both projections projecting outward from the centre of the power outlet, and the casing comprising a stop configured such that, in the operational position, the stop limits the downwards axial movement of the cover by physical contact with the upper projection, and in the inactive position, it limits the upwards axial movement of the cover with the lower projection.

[0009] "Operational position" means the mounted position of the power outlet and when the plug is inserted into the power outlet, and "inactive position" when there is no plug inserted.

[0010] Thanks to this configuration, the sub-assembly itself comprises, in the casing and in the corresponding pins of the cover, both the guide elements of the cover and the axial movement stop elements, unlike the documents known in the state of the art in which the intervention of the mechanism box is necessary for correct movement of the cover. In this way, the dimensions of the outlet sub-assembly are reduced, obtaining a more compact and aesthetic power outlet, and with less probability of failures derived from jams that may occur due to the intervention of several pieces for guidance. Furthermore, only the sub-assembly is replaced if it has defects or due to aesthetic modifications.

[0011] Preferably, the sub-assembly will be fastened to the mechanism box in a removable manner by means of fastening means such as clipping.

[0012] The fastening of the sub-assembly to the mechanism box by means of clipping elements arranged on the sub-assembly in correspondence with fastening elements arranged in the mechanism box facilitates the assembly and disassembly of the power outlet, preventing the frame from being released when handled or from being forced thus misaligning said frame with the consequent aesthetic defects of the mounted electrical outlet.

[0013] According to a feature of the invention, the aforementioned guide pins comprise (or simply are) a projection that projects from the surface of the cover in the direction towards the casing of the sub-assembly, that is, towards the mounting wall, in a substantially perpendicular manner. Furthermore, each corresponding slot comprises a side guide wall; this side guide wall is located in the part of each slot furthest from the centre of the outlet, in such a way that a surface of the corresponding pin laterally abuts against that part of the slot furthest from the centre of the outlet when the pin moves axially, guiding the correct positioning of the entire cover. Each slot could comprise only that side guide wall furthest from the centre, or, also, another additional side guide wall closer to the centre of the outlet, thereby constituting a kind of channel through which moves the respective pin.

[0014] This feature facilitates guiding and stability in the axial movement of the cover.

[0015] According to another feature of the invention, the power outlet comprises two upper guide pins and two lower guide pins. It could also comprise a greater number of pins; the number of pins and side walls for guiding each pin can be varied depending on design considerations, economics, ease of manufacture, durability, ease of operation and similar factors. Furthermore, in the case corresponding to two upper guide pins and two lower guide pins, a preferred, but not exclusive, embodiment arranges said pins symmetrically with respect to an axis that passes perpendicularly through the joining axis of the two side electrical connection holes and just at the same distance from said two side holes.

[0016] Thanks to this configuration, a more robust sub-assembly of the power outlet is achieved, which allows it to be manufactured in a more compact way.

[0017] In relation to the upper projection of the pin, it is constituted by a part or area of the surface itself of the cover. That is, it is not an addition, but rather the configuration itself of the surface of the cover, and due to the geometry of the pin, the projection of the casing interacts with the cover itself to act as a lower stop.

[0018] Lastly, the power outlet, in one of the preferred embodiments thereof, includes an insulating cover to protect against contact with the conductive parts or terminals included in the mechanism box. This cap or flap can be fastened to the mechanism box on the front face thereof, covering the connection area between the electrical terminals and the wires of the installation, and obviously leaving two holes for the passage of the pins of the male plug. Furthermore, in its upper portion, it may comprise three tabs or buttons that project such that they pass through the mechanism box through *ad hoc* existing or made openings in such a way that said buttons protrude from the rear face of the mechanism box and can be pressed or pushed with the hand or a tool to release the wires that are connected, through a mechanical compression action, to the terminals of the mechanism box.

[0019] "Wall" or "mounting wall", without further specification, generally refers to the construction wall or similar on which the power outlet as a whole is mounted. It should be noted that the mounting support illustrated herein in the form of a wall could be any other surface other than a wall, and that has the appropriate construction features for the assembly of the electrical outlet disclosed, without affecting the essence of the presented (constructive and/or functional) technical features, as will be deduced from the description and the attached claims.

Description of the Figures

[0020] The drawings attached herein to illustrate and facilitate the interpretation of the power outlet disclosed in this invention are listed and briefly described below by way of nonlimiting example.

Figure 1 is a rear perspective view of an exploded view of the power outlet of the present invention, which is useful for understanding the main components of said outlet and their functional and constructive interrelation.

Figure 2 is a front perspective view of an exploded view of the power outlet disclosed in the present invention.

Figures 3 and 4 are two cross-sectional views of the power outlet of the invention with the cover, respectively, in the upper and lower position in the axial movement thereof.

Figure 5 is a rear perspective view of the assembled sub-assembly of the power outlet of the present

invention, and where the relative positioning of the guide pins and the slots of the casing of the sub-assembly can be seen.

Figure 6 is a rear view corresponding to the same assembly of Figure 5.

Detailed description of the invention

[0021] Next, a detailed description of a practical embodiment of the invention will be performed with reference to the figures listed above.

[0022] As mentioned above, Figure 1 shows an exploded perspective view as seen from the rear of the power outlet of the present invention. From right to left, we first see a fastening frame (10) for fastening to a mounting wall, and then, a mechanism box (9), a sub-assembly (1) and a trim (12).

[0023] The sub-assembly (1) in turn includes a casing (2), in which a box (7) with a shutter (6) and a cover (4) is housed. Normally, in currently existing power outlets, the sub-assembly (4) is fastened to the frame (10). Furthermore, in the power outlets to which the present invention is especially, but not exclusively, directed, the general fastening claws of the outlet are arranged in the mechanism box (9), such that, when the sub-assembly (1) is assembled, said claws are hidden and occupy the space where the cover of the sub-assembly guide is usually arranged; outlets of this type are those commonly used, for example, in Denmark, and they also have the particular feature that the earth pin (of the male plug) is located below the axis that joins the two electrical connection holes (4.4).

[0024] The present invention proposes a fastening system for fastening the sub-assembly (1) to the mechanism box (9) and not to the frame (10), although the sub-assembly (1) could be fastened to the frame (10) maintaining the features that define the invention. This fastening is preferably carried out by clipping with tabs of the casing (2) in correspondence with projections of the mechanism box (9). Furthermore, the cover (4) of the power outlet that is illustratively represented in these figures has an axial movement mechanism (that is, perpendicular to the mounting wall) such that said cover (4) has two limit positions: one upper position or level with the trim frame (12) (figure 3) and another lower position or lowered with respect to the trim (12) (figure 4). The main use of this mechanism is aesthetic and to prevent the accumulation of dirt in the usual cavity found in outlets that lack this axial path. Figures 1 and 2 show the conical elastic element (spring) that is part of the axial movement mechanism of some of the outlets of this type and that is arranged in the mechanism box (9).

[0025] The axial movement of the cover (4) is guaranteed by the guide between the circular geometry of the "well" of the casing (2) and the geometry corresponding to the surface of the cover (4). However, in addition, and as a distinctive element of the present invention, the correct axial movement of the cover (4) is guaranteed through the use of guide pins (4.2, 4.3) of the cover (4) and slots (2.2, 2.3) of the casing (2) intended to allow the movement of said pins (4.2, 4.3) guiding them in their axial movement preventing the lateral movement thereof.

[0026] The guide pins (4.2, 4.3) are arranged on the cover (4) itself and, in the figures, upper pins (4.2) and lower pins (4.3) can be distinguished, depending on whether they are positioned above or below the imaginary axis that joins the electrical connection holes (4.4) (represented in figures 1 and 2 with a dashed line). Furthermore, the slots (2.2, 2.3) are arranged in the casing (2) of the sub-assembly (1) and the position and dimensions thereof are such that they facilitate the axial movement of the cover (4) and final positioning thereof with the holes (4.4) aligned with the corresponding holes of the housing (2) (and, therefore, of the mechanism box (9), to obtain a comfortable and functional insertion of the pins of the male plug (not shown).

[0027] The correct operation of the mechanism is intended with only one upper pin (4.2) and another lower pin (4.3) but it is considered that the use of two upper pins (4.2) and two lower pins (4.3) ensures greater stability and durability of the system, this being one of the preferred embodiments of the invention. In any case, the number of both upper (4.2) and lower (4.3) pins does not limit this invention, and it is intended to include all possible combinations as long as there is at least one upper pin (4.2) and one lower pin (4.3), and the corresponding slots (2.2, 2.3).

[0028] In figures 5 and 6, both the pins (4.2, 4.3) and the slots (2.2, 2.3) can be seen better. The references (2.2, 2.3) of the slots have been omitted in Figure 6 so as not to excessively hinder the visibility of the different components, although their location can be clearly seen considering that said slots (2.2, 2.3) are the housings or cavities in which the pins (4.2, 4.3) are inserted, taking figure 5 itself as a reference. In this embodiment, a parallelepiped contour that matches a corresponding contour of the slots (2.2, 2.3) has been adopted as the profile of the pins (4.2, 4.3), seen from the rear portion of the outlet (figure 6), although any other shape could be taken for said contours as long as their complementarity facilitates the axial sliding of the pins (4.2, 4.3) and, therefore, of the cover (4).

[0029] In relation to this feature, the slots (2.2, 2.3) must comprise at least one side wall (2.4) as a stop to prevent lateral movement during the axial displacement of the pins (4.2, 4.3) of the cover (4), therefore being able to omit the other side wall. This configuration can be clearly seen in Figure 6, wherein the two upper slots (2.2) have the shape of a parallelepipedic tray with two vertical side walls (one of them, reference 2.4) and a transverse wall oblique to said side walls, such that the set of said three walls encloses or surrounds a large portion of the contour of the corresponding pin (4.2); conversely, the lower slots (2.3) only comprise an outer side wall (2.4), having omitted the inner side wall that the

upper slots (2.2) do have.

[0030] This is done to facilitate the arrangement of the opening or hole through which the lower grounding pin of the male plug (not shown) must pass and is revealed as a sufficient feature to correctly guide the pins (4.3) on the slots (2.3), such that the same could also be applied, in other embodiments, to the upper slots (2.2). That is, in a variant of the power outlet of the invention, any or all of the slots (2.2, 2.3) could have only the side guide wall (2.4) for guiding the corresponding pins (4.2, 4.3), thereby omitting the opposite side wall that is closest to the centre of said outlet; as there are at least two upper pins (4.2) and two lower pins (4.3), this single outer side wall (2.4) is sufficient to delimit or prevent the possible lateral or rotary movement of the cover (4) in the axial movement thereof.

[0031] The previous feature of a single side wall (2.4) opens the possibility, therefore, of making a pin (4.2, 4.3) that has a width less than that shown in the figures since it would only be required for its outer side wall to act as a stop or be located very close to the side guide wall (2.4) of the corresponding slot (2.2, 2.3); the limit or width of the thickness of said pin (4.2, 4.3) would only be limited by the requirement that the pin (4.2, 4.3) present sufficient resistance to withstand a certain number of operating cycles (as an explanatory note, this width, in Figures 5 and 6, is the length of the oblique wall of the aforementioned parallelepiped contour).

[0032] Figures 3 and 4 show another feature of the invention that is also part of the sub-assembly, and is how the axial movement of the cover (4) in this power outlet is limited. In said figures, two cross sections of the power outlet of the invention are represented according to a cutting plane that passes through the middle of two of the pins (4.2, 4.3) and the corresponding slots (2.2, 2.3). The casing (2) includes a stop (2.5) in each of the slots (2.2, 2.3) that protrudes towards the centre of the power outlet and said stop (2.5) is confined between two upper (4.5) and lower (4.6) projections formed in or fastened to the corresponding guide pin (4.2, 4.3) of the cover (4). In this way, the cover (4) has an axial path that corresponds to the separation between both projections (4.5, 4.6).

[0033] In figure 3, the cover (4) is shown in its highest position (furthest from the mounting wall), flush or level with the outer surface of the casing (2) and, in figure 4, the cover (4) is in its closest position to the mounting wall, its upper projection (4.5) abutting against the stop (2.5) of the casing (2). Preferably, the upper projection (4.5) is a part of the outer face of the cover (4), as illustrated in the figures, but the same could be formed in another way, as long as it is included in the cover (4), either in a single piece therewith or as an independent piece firmly fixed thereto (the same consideration applies to the lower projection (4.6) and the stop (2.5)).

[0034] Returning to Figure 2, it shows another of the characteristic technical elements of the outlet of the present invention. In this case, it is a cap or flap (11) that has three buttons (11.1). One of the functions of this cap (11) is to prevent or limit contact with the metal parts of the mechanism box (9) that are subject to a certain voltage. The cap (11) is fastened to the front face of the box (9) leaving space only for the pins of the male plug. It also has three buttons (11.1) that pass through the box (9) and protrude from the rear face thereof, such that by pressing them from above ("above" as seen in figure 2) they release the electrical wires connected, by mechanical compression, to the terminals of said box (9). These buttons (11.1) are flexible and obviously have an elastic recovery capacity to return to the rest position thereof after the pressure force exerted with the fingers or any suitable device or tool has ceased. Illustratively, three buttons (11.1) are shown in correspondence with the terminals of the power outlet shown in the figures, but the number of said elements could be lesser or greater depending on each specific case.

[0035] Although one of the main uses of the technical features of the invention is intended for power outlets of the type in which the fastening claws are arranged on the sides, said features could also be applied to other types of outlets provided that the constructive arrangement of its elements so permits.

Claims

1. A power outlet comprising a fastening frame (10) for fastening to a mounting wall, a mechanism box (9), an outer trim (12) and a sub-assembly (1), between the mechanism box (9) and the trim (12), said sub-assembly (1) including an axially movable cover (4) for the arrangement thereof level with the outer trim (12) in an inactive position, with a shutter (6) that blocks the passage through the holes for the passage of the pins of a plug, a box (7) for housing said shutter (6) and a casing (2), **characterised in that** the cover (4) comprises at least one upper guide pin (4.2), located above the axis that joins the two side electrical connection holes (4.4), and at least one lower guide pin (4.3), located below of the same aforementioned axis, the casing (2) comprising respective slots (2.2, 2.3) to respectively guide said guide pins (4.2, 4.3) in the axial movement of the cover (4) limiting the lateral movement of the pins (4.2, 4.3) with at least one side wall (2.4) of the slots (2.2, 2.3); and wherein at least one of the pins (4.2, 4.3) comprises an upper projection (4.5), aligned with the surface of the cover (4), and a lower projection (4.6), both projections (4.5, 4.6) projecting outward from the centre of the power outlet, and the casing (2) comprising a stop (2.5) configured such that in the operational position, the stop (2.5) limits the downwards axial movement of the cover (4) by physical contact with the upper projection (4.5), and in the inactive position, it limits the upwards axial movement of the cover (4) with the lower projection (4.6).

2. The power outlet according to claim 1, wherein the sub-assembly (1) is removably fastenable to the mechanism box (9).

3. The power outlet according to claim 1 or 2, wherein each of the pins (4.2, 4.3) is in the form of a projection projecting in a substantially perpendicular direction towards the mounting wall in an operative position, and each of the slots (2.2, 2.3) comprise a side wall (2.4) as a lateral stop, arranged to abut against a corresponding vertical profile of the pin (4.2, 4.3) located more outwardly with respect to the centre of the outlet.

4. The power outlet according to any of the preceding claims, comprising two upper guide pins (4.2) and two lower guide pins (4.3), and wherein both the two upper guide pins (4.2) and the two lower guide pin (4.3) are located symmetrically with respect to a central axis perpendicular to the line that joins the two side electrical connection holes (4.4).

5. The power outlet according to any one of the preceding claims, wherein the upper projection (4.5) is part of the surface of the cover (4).

6. The power outlet according to any of the preceding claims, comprising an insulation cap (11) that can be fastened to the mechanism box (9) on the front face thereof, in such a way that it prevents contact with the metal parts of said box (9) that have electrical voltage, said cap (11) further comprising buttons (11.1) that pass through the mechanism box (9), protruding from the rear face thereof, and that are adapted such that their actuation by pressing releases the wire or wires corresponding to each electrical terminal of the box (9).

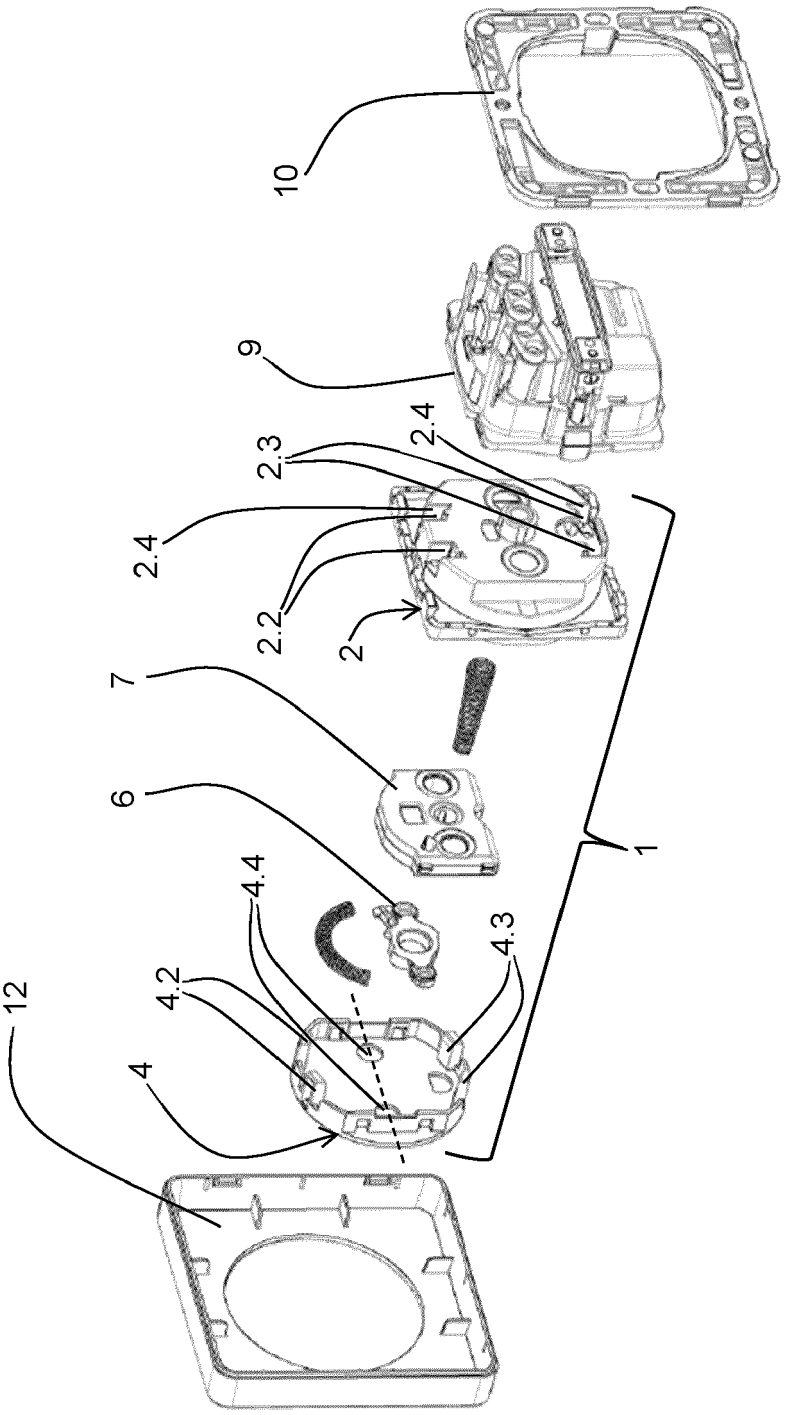

FIG. 1

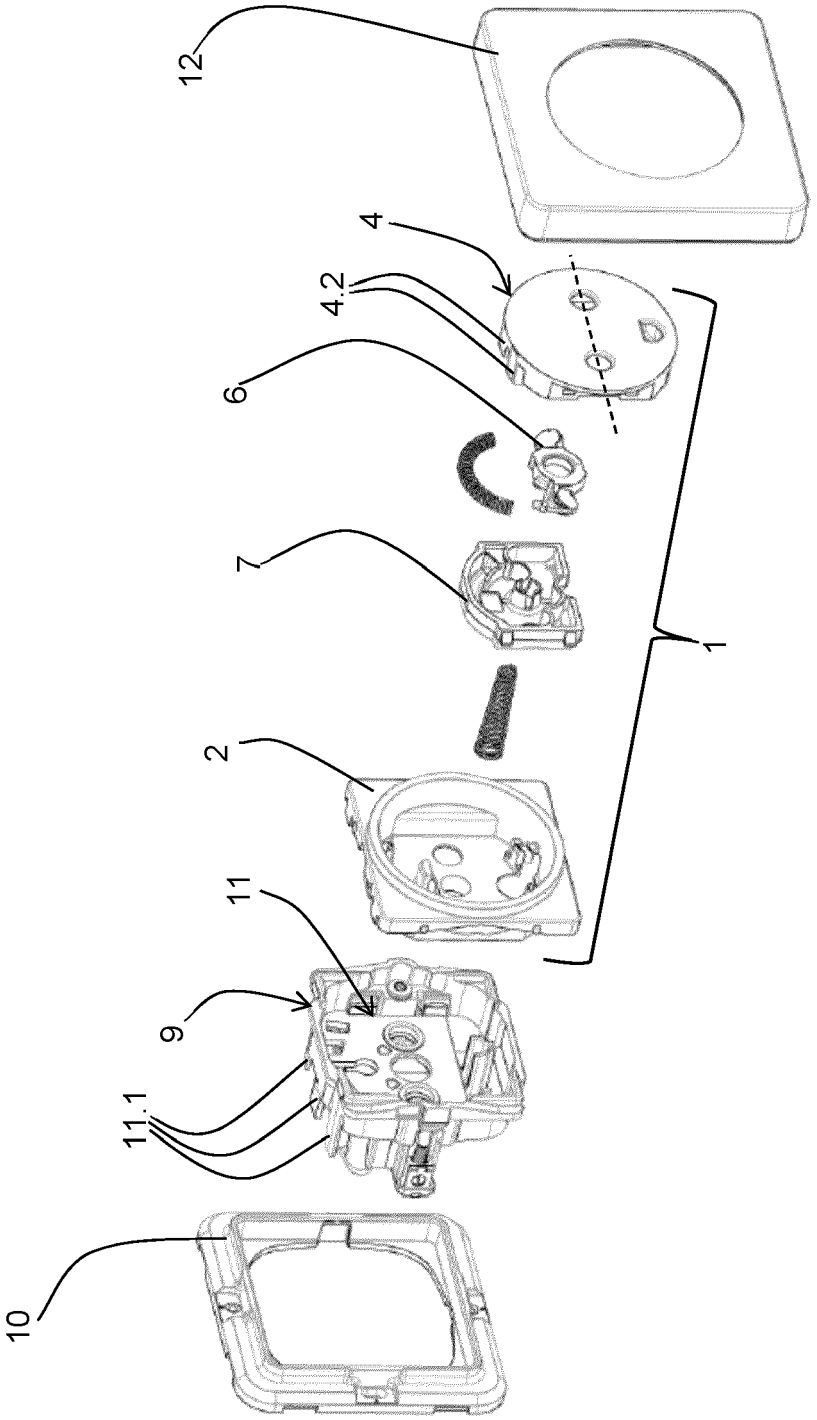

FIG. 2

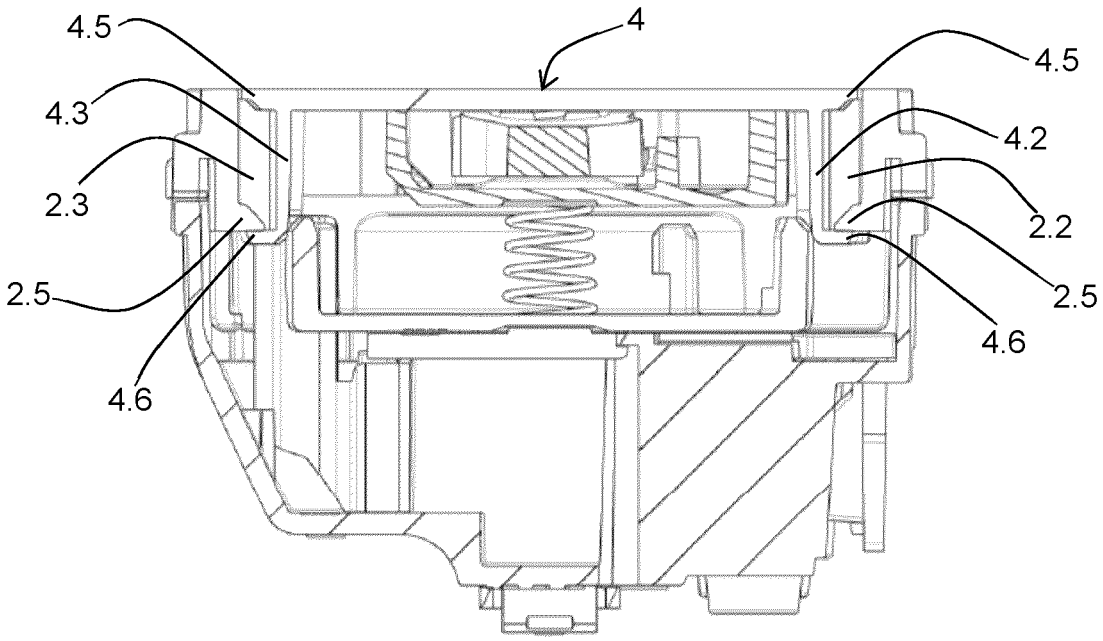

FIG. 3

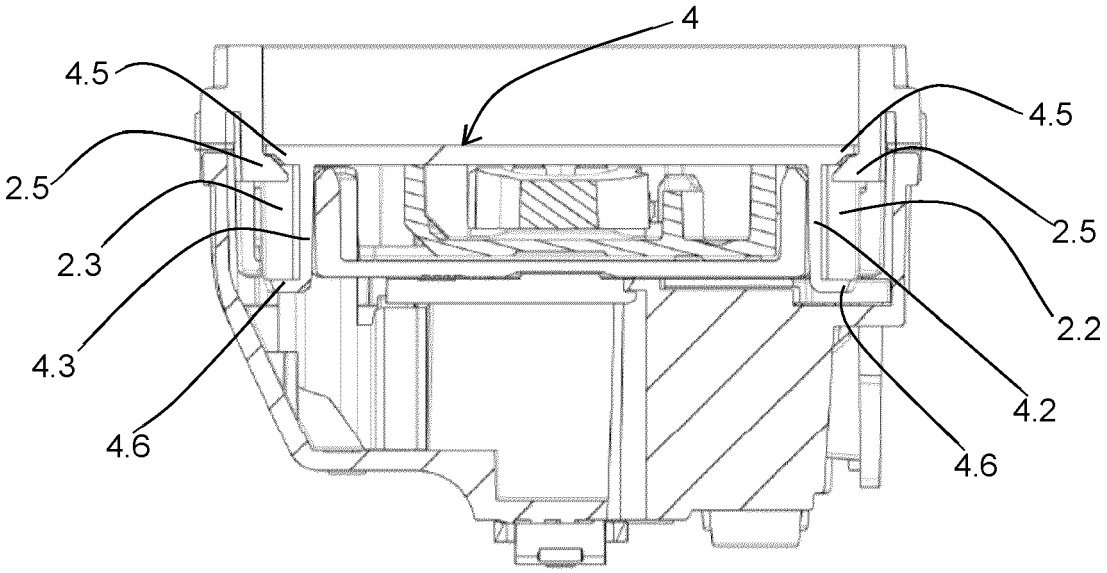

FIG. 4

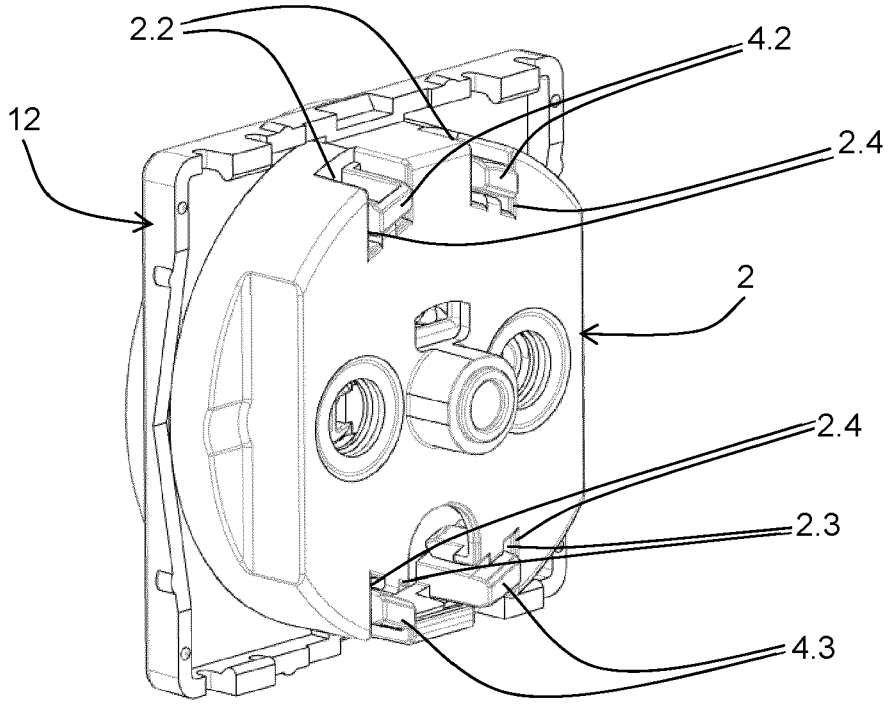

FIG. 5

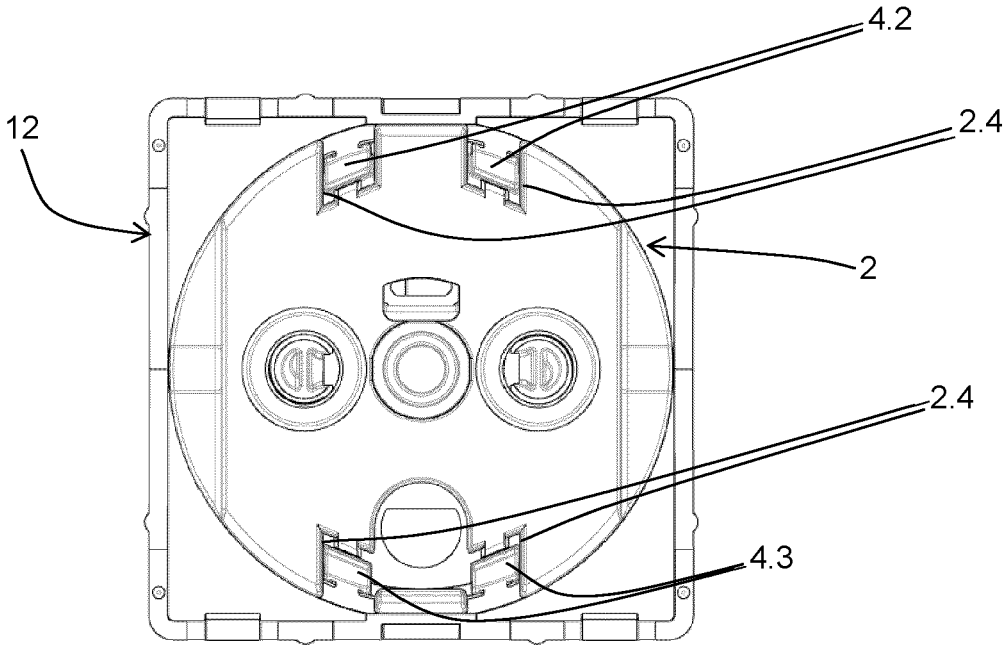

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 24 38 2007

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	3 June 2024	Kandyla, Maria

CATEGORY OF CITED DOCUMENTS

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