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(54) ELECTRICAL POWER OUTLET WITH IMPROVED SHUTTER

(57) The present invention relates to a power outlet that consists of a subassembly including a cover that can be moved axially, a recovery mechanism for recovering the initial position of said cover, a shutter and a shutter recovery spring. The shutter has a retaining tab and the casing comprises a complementary hook. The positions and dimensions of the tab and the hook are such that the tab and the hook are axially aligned at some point on the downward axial path, with the tab above the hook. This point on the downward axial path can be at the beginning of said path, at any intermediate point thereof or right at the end. Once the point on the path where the retaining tab overlaps above the hook has been reached, further downward axial movement of the cover will cause clipping between the tab and the hook. FIG. 1

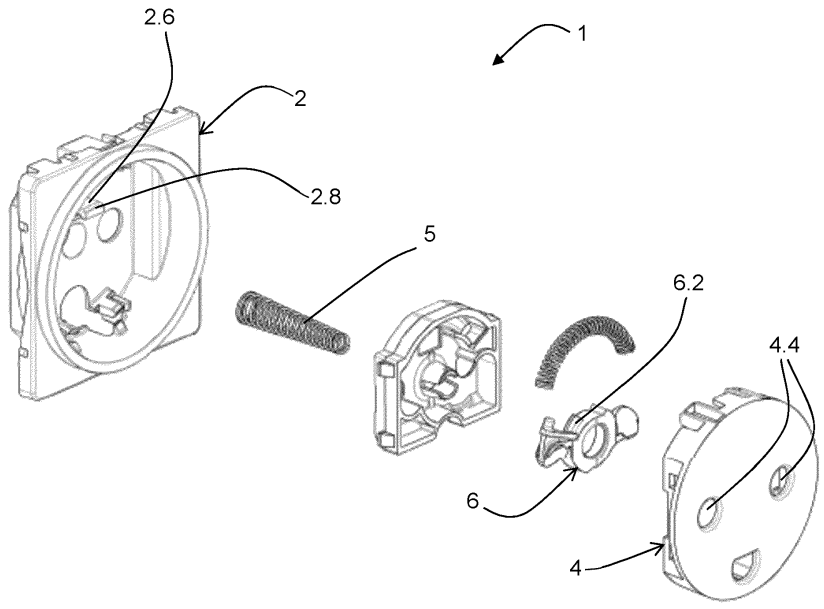

FIG. 1

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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. It specifically relates to power outlets that have a cover or platform that can be moved axially (in a direction perpendicular to the wall) and a blocking mechanism to prevent the pins of the male plug from being inserted into the corresponding holes in the outlet.

State of the art

[0002] To facilitate the interpretation of the present invention, in this case the essential components of power outlets intended to be fixed on a flat surface, such as a wall, are defined as follows: a fixing frame, which is fixed on the corresponding wall, a mechanism box and a subassembly in which a cover or platform is distinguished for convenience, this being the flat surface in which the connection holes for receiving the pins of the male plug are made, and a shutter or blocking mechanism that covers said connection holes when said outlet is not in use (no male plug is inserted) and which must be adapted to unblock the aforementioned holes when a device is to be connected to the outlet.

[0003] In the case at hand, the cover comprising the connection holes, when no male plug has been connected, is arranged in a position further away from the wall, and may even be flush or level with the very trim or outer frame of the outlet. This cover can be moved axially so that when a male plug is inserted into its holes, the latter pushes the cover to its closest position to the wall, in which the metal pins of the plug are placed in full functional electrical contact with the corresponding terminals of the mechanism box. When the plug is removed from the outlet, the cover must return to its initial level "rest" position, mentioned above, owing to return or recovery means that tend to push said cover outwards, away from the wall. At the same time, in this initial position, the shutter mechanism must also reclose the holes in the cover, preventing access to metal parts with an electrical voltage.

[0004] In this sense, document EP3512045 can be mentioned, which essentially comprises the functionalities described above and which further incorporates a retaining tab in the shutter mechanism of the connection holes in the cover, such that when said shutter mechanism rotates around a central axis perpendicular to the cover of the power outlet, leaving the passage through the connection holes free, this tab slides into a housing that comprises a retaining element complementary to the tab mentioned and arranged in such a way that it prevents the cover from moving outwards by the return means mentioned in the previous paragraph with the male plug inserted.

[0005] The present invention focuses on a tab retention mechanism of the type mentioned above, but which, due to its specific features of spatial arrangement and interaction between the tab and its complementary retaining element, provides more effective retaining of the cover, and which relative arrangement (of its component elements) leaves more free space to achieve a more compact subassembly of the outlet.

Object of the invention

[0006] Considering the objectives and advantages mentioned in the previous section, a general description of the elements and features that help obtain it is provided, according to which the present invention provides an electrical power outlet with an improved shutter in accordance with the following features.

[0007] The power outlet of the type that the present invention relates to consists of a so-called subassembly in which elements such as a cover or platform that can be moved axially can be found, with holes for the passage of corresponding metal pins, a recovery mechanism for recovering the initial level position of said cover, usually in the form of a spring, and a shutter to block the passage of the aforementioned pin holes, which also has a spring so that the shutter recovers its initial blocking position when the male plug is removed from the power outlet. This shutter has a retaining tab which, when the cover is in its lowest position and the pins of the male plug are inserted into the connection holes, is located under a corresponding hook (provided for example on the subassembly casing) and, in this way, it prevents or helps to prevent the cover (by the action of its recovery spring) from returning to its highest (level) position, undesirably pushing the inserted male plug out or forcing the spring and reducing the useful life of the power outlet. In normal operation, the closed shutter lowers until it reaches the bottom of the subassembly casing, due to the fact that the force of the spring that moves the platform to its highest position is less than the force of the spring that rotates the shutter to its closed position. Once at the bottom, the shutter opens due to the force of the pins of the male plug, remaining under the aforementioned hook.

[0008] In the present invention, in the event that the shutter opens while the platform lowers, a situation that should not occur in normal operation, the positions of the retaining tab and the corresponding hook are such that, at some point on the path made by the cover towards the wall when the male plug is inserted, the tab and the hook are axially aligned, that is, overlapping, with the tab above the hook. This moment or point on the downward axial path can be any of them: right at the beginning of said axial movement path, at any intermediate point thereof or right when said path is going to end.

[0009] It should also be noted that in this specification terms such as "up", "down", "downward", "upward" and the like refer to the axial direction of the outlet (central axis that runs perpendicular to the surface of the cover or

mounting wall), where the upper portion is considered the area of the outlet furthest from the wall and the lower portion is considered the area of the power outlet closest to the wall.

[0010] Continuing with the previous description, when malfunctioning occurs, once the point on the path where the retaining tab overlaps, at least partially, above the hook corresponding to the rotation of the shutter has been reached, further downward axial movement of the cover will cause the tab to pass the position of the hook in order to be retained in its cavity after a clipping action. Clipping here refers to fitting, also known as snap-on, where one of the two complementary parts passes the position of the other when one or both parts elastically yield. Once clipping is carried out, the retaining tab can continue to slide under the hook and in line with the rotation of the shutter, depending on the specific clipping point on the downward axial path.

[0011] Given this configuration, in the event of unexpected opening of the shutter due to a malfunction, such as inserting the pin very abruptly, etc., the user can insert the pin without having to remove it and insert it again correctly as was the case in the known state of the art.

[0012] Furthermore, the rotation required by the shutter to overcome the tab is less than in the state of the art, meaning that the system can be made more compact.

[0013] Additionally, this configuration avoids the risks of blocking that were problematic in the state of the art, where once the shutter reaches the bottom and has to rotate to be retained in the hook, due to the small margin between the shutter tab and hook, it could get stuck, preventing the shutter from opening. In the present invention, however, there is more space between the shutter tab and the retaining element when it rotates under normal conditions; therefore, the risk of blocking is lower, ensuring correct operation of the power outlet and providing greater security.

[0014] According to one feature of the invention, the hook or the tab, or both elements, may comprise an oblique surface (with respect to the surface of the cover) or a curved surface such that it facilitates the clipping of the tab with the hook.

[0015] In a preferred embodiment, the retaining hook of the tab has been monolithically formed with the subassembly casing, i.e., in a single piece.

[0016] Lastly, in another preferred embodiment, the hook can be an independent element that is fixed in the suitable position on the casing and with sufficient firmness to resist clipping efforts with the corresponding tab.

[0017] "Wall" or "mounting wall", without further specification, generally refers to the site wall or similar on which the power outlet assembly will be mounted. It should be noted that the mounting support represented herein in the form of a wall could be any other surface, other than a wall, that has the suitable construction features for the assembly of the electrical outlet disclosed, without affecting the essence of the (constructive and/or functional) technical features set forth, as will be deduced from the description and the attached claims.

Description of the figures

[0018] 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 a nonlimiting example.

Figure 1 is a perspective view of an exploded view of the subassembly of the power outlet of the present invention, which serves to identify the main components of said subassembly and their interactions.

Figure 2 is a front view of the subassembly of the outlet of the present invention, the cover having been omitted to show the corresponding shutter in an initial blocking or shutter position.

Figure 3 is a front view of the same subassembly shown in figure 2, but with the shutter in a final unblocking position of the electrical connection holes.

Figure 4 is a cross-sectional view of the subassembly of the present invention, with the cover in its initial position, level with the outer surface of the subassembly casing.

Figure 5 is a cross-sectional view of the subassembly shown in figure 4, but with the cover in its lowest position, corresponding to a condition of a male plug fully inserted into the outlet.

Detailed description of the invention

[0019] Next, the invention will be described in detail with reference to the figures that were generally described in the previous section.

[0020] As briefly mentioned above, figure 1 shows an exploded view of the subassembly (1) of an embodiment of the power outlet of the present invention. In said subassembly (1), there is a cover (4), with the corresponding connection holes (4.4), a shutter (6) with a retaining tab (6.2) and a casing (2) of the subassembly (1) that has a built-in hook (2.6) intended to interact with the retaining tab (6.2). In this preferred embodiment, the hook (2.6) forms an integral part of the casing (2), but said hook (2.6) could be an independent part or even be fixed on or form part of another suitable component (with the necessary modifications) such as the mechanism box (not shown), provided that it meets the operating requirements described herein in relation to the tab (6.2). It should also be noted that the term "hook" for this component is intended to simply indicate that its body, or part of its body, is projected in such a way that it retains the position of the retaining tab (6.2) once said tab has been

positioned. under it, but it does not imply an exact shape of the "hook" but rather a functionality (hooking, locking, retention).

[0021] This figure also shows the recovery element (5) for recovering the initial position of the shutter (6), in the form of a spring arranged in a curved or circumference arc configuration, and the recovery element for recovering the initial position of the cover (4), in the form of an axially arranged conical spring. It is considered that the initial position of the shutter (6) is the position where its fins block the passage of the holes (4.4) and the initial position of the cover (4) is the position where said cover is furthest from the mounting wall and level with the outer surface of the power outlet.

[0022] The shutter (6) comprises a retaining tab (6.2) which specific usefulness and operation is better shown in figures 2, 3 and 5, as it can be viewed relative to the hook (2.6). Figure 2 shows the shutter (6) in a blocking position for blocking the holes (4.4). In this case it shows that there is no overlap or superposition of the bodies of the tab (6.2) and the hook (2.6). Figure 3 illustrates said shutter (6) rotated, with the tab (6.2) already located under the hook (2.6) and the holes (4.4) completely cleared (or, rather, occupied by the pins of a male plug, not shown to facilitate interpretation of the figures). In this position, the hook (2.6) prevents the cover (4) from being pushed outward by the action of the aforementioned conical spring, due to its locking interaction with the tab (6.2).

[0023] Figure 4 would correspond to the initial position described in relation to figure 2, but this time representing a section of the subassembly (1) showing that the cover (4) is in its furthest position from the wall, level with the outermost portion of the casing (2). Correspondingly, figure 5 illustrates a section of the subassembly (1) shown in figure 3, with the cover (4) fully recessed against the casing (2) and the tab (6.2) clearly under the hook (2.6).

[0024] The feature of this subassembly (1), and therefore of the power outlet it includes, is one where, in the event of a malfunction where the shutter (6) rotates before reaching the bottom of the casing (2), at some point on the downward path of the cover (4), and therefore of the tab (6.2), said tab, still located above the hook (2.6), is axially aligned with said hook (2.6) and, when continuing with its downward axial movement, it will first come in contact with the upper portion of the hook (2.6) and then (following this path downwards, against the wall) it will pass it by means of a snap-on or clipping action, to arrive at the situation shown in figure 5. This axial alignment of both elements (2.6, 6.2), just before they make physical contact and subsequent clip together, can be partial or complete, in other words, the body of the tab (6.2) and the body of the hook (2.6) can be located in a position of total overlap or overlap of only a portion of them. This will depend on the exact positions and dimensions selected for these components (2.6, 6.2), but the essential operation will not change. For example, in one of the embodiments, the tab (6.2) and the hook (2.6) could overlap partially or completely from a position close to the initial position shown in figure 2, if an unwanted rotation of the shutter has already occurred. In this specific illustrated case, this does not happen since it does not correspond to the preferred embodiment.

[0025] The dimensions of the parts of the tab (6.2) and the hook (2.6) that must be coupled by clipping will be suitable to allow for said coupling and a number of work cycles as is known in the art.

[0026] Likewise, as is the case in the known state of the art for normal operation of the system, the resistance to compression offered, respectively, by the conical springs (with axial movement) and by the shutter (6) is such that the resistance offered by the shutter (6) when pushed by the pins of the male plug is greater than the resistance offered by the conical spring until the shutter does not reach the bottom of the casing (2). Nevertheless, it is also envisaged that for an alternative embodiment of the invention, the resistance offered by the shutter (6) when pushed by the pins of the male plug is greater than the resistance offered by the conical spring up to a certain point of the downward axial movement, whereby the shutter (6) will remain closed up to that specific point, and from there, it will begin to rotate, with the consequent rotation of the tab (6.2) as well. In short, by varying parameters such as the position of the tab (6.2) and the hook (2.6), their dimensions and the dynamic features of the two springs mentioned, it is possible for the clipping or snap-on to occur sooner or later during the downward axial movement.

[0027] It is also foreseen that the complementary coupling surfaces of the tab (6.2) and the hook (2.6) can have a suitable profile to facilitate hooking by clipping, such as the oblique profile that is clearly shown in figure 5 with the contact surfaces (2.8 and 6.4). In this case, both surfaces (2.8, 6.4) have an oblique profile, although only one of them (2.8 or 6.4) could have it or the shape of the profile could be a curve suitable for this purpose, such as two complementary curved surfaces or opposite concave surfaces.

[0028] Given the technical features that have just been disclosed, it is possible to largely avoid the typical blockages of the shutter mechanisms where the coupling between the tab (6.2) and the hook (2.6) occurs only by relative movement between both parts, since, in the case of this patent, there is more play between the tab (6.2) and the hook (2.6) while the rotation of the former occurs under normal conditions.

Claims

1. A power outlet of the type that includes a subassembly (1) comprising, in turn, a cover (4) that can be moved axially in a casing (2), and housing between the cover (4) and said casing (2) a shutter (6) for blocking access to the electrical connection holes

(4.4), the shutter (6) having a retaining tab (6.2) that cooperates with a hook (2.6) to prevent a return spring (5) from pushing the cover (4) in its lowest position, **characterised in that** the tab (6.2) is arranged on the shutter (6) in such a way that, at a point on the downward axial path of the cover (4) and with the rotation of the shutter (6), the tab (6.2) is axially aligned, at least partially, with the hook (2.6) and above it, and the tab (6.2) and the hook (2.6) have a configuration such that a downward axial movement of the cover (4) beyond the point of alignment causes clipping between the tab (6.2) and the hook (2.6) in order to prevent the return spring (5) from pushing the cover (4).

2. The power outlet according to claim 1, wherein at least one of the hook (2.6) and the tab (6.2) comprises an oblique or curved surface (2.8, 6.4) intended to come in contact with the corresponding cooperative element (6.2 or 2.6) just before the clipping action, and the hook (2.6) or the tab (6.2) has a flexible configuration to allow said clipping.

3. The power outlet according to any of the preceding claims, wherein the hook (2.6) forms a single piece with the casing (2) of the subassembly (1).

4. The power outlet according to any of claims 1 and 2, wherein the hook (2.6) is an independent element firmly fixed on the casing (2) of the subassembly (1).

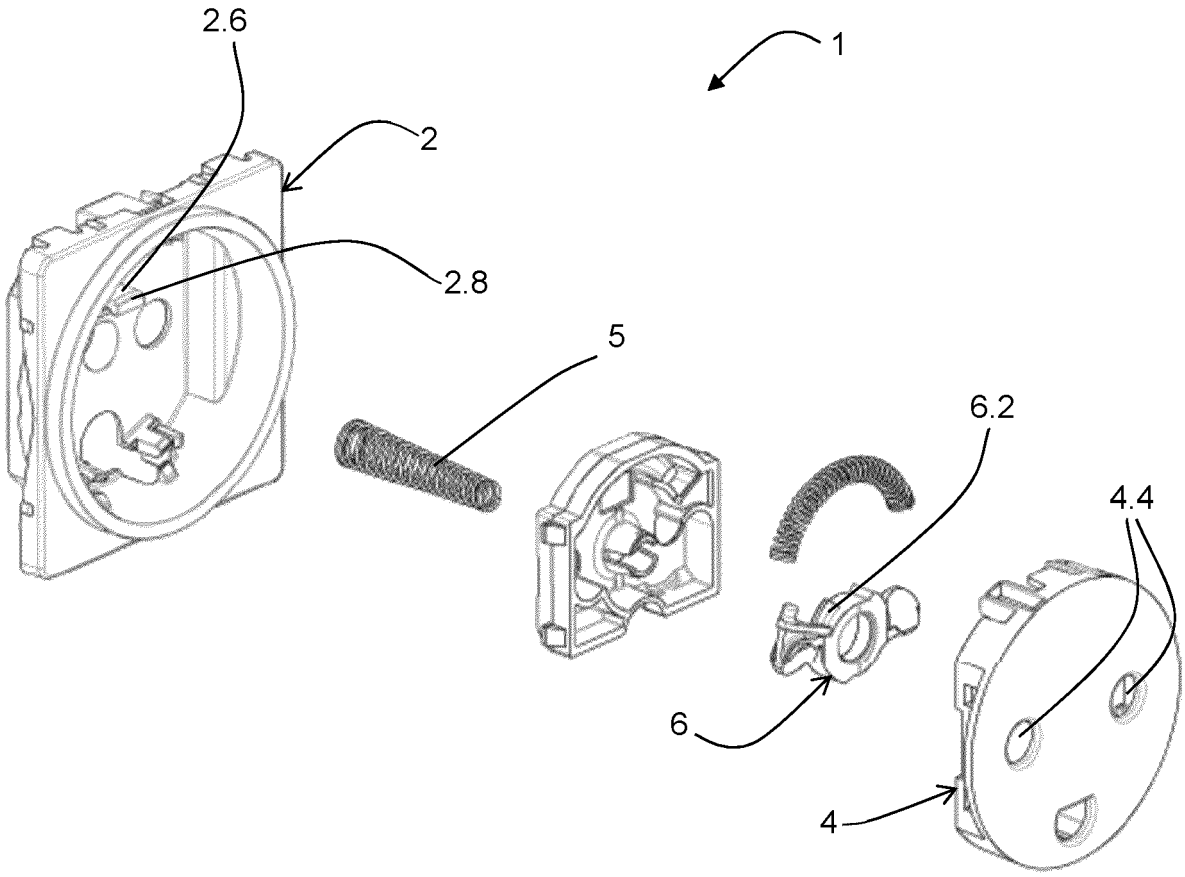

FIG. 1

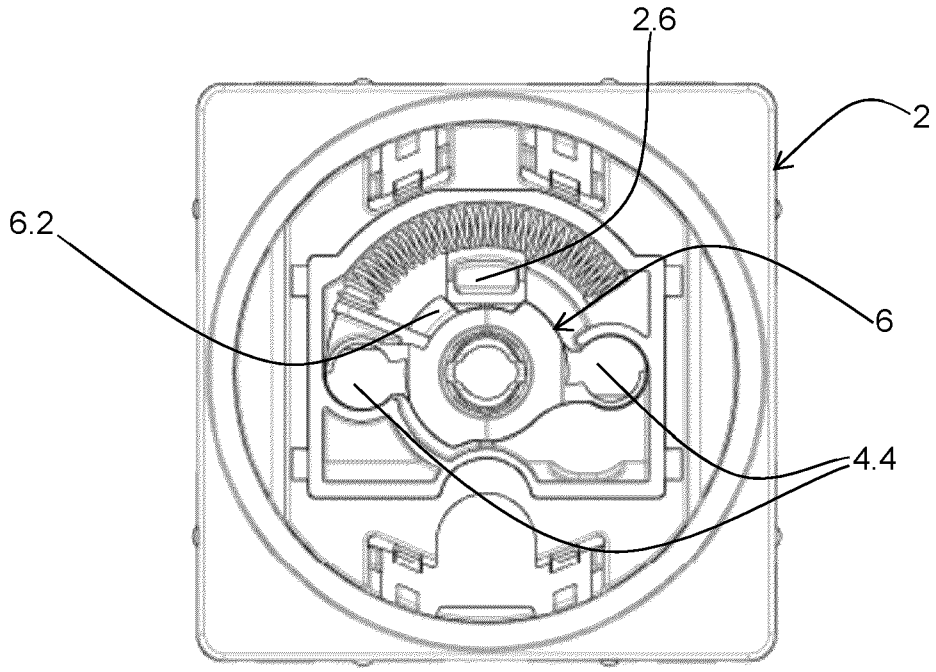

FIG. 2

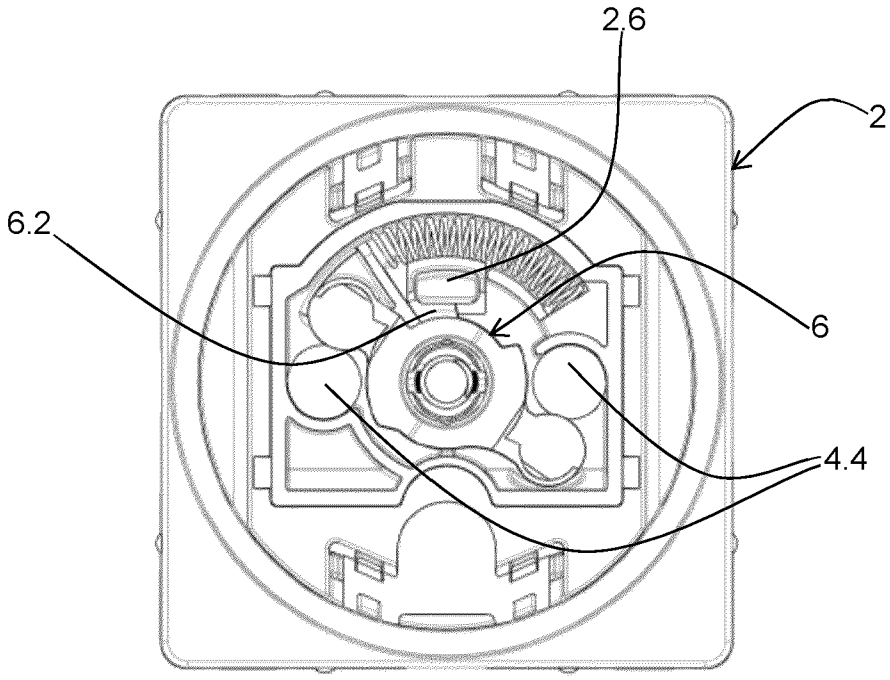

FIG. 3

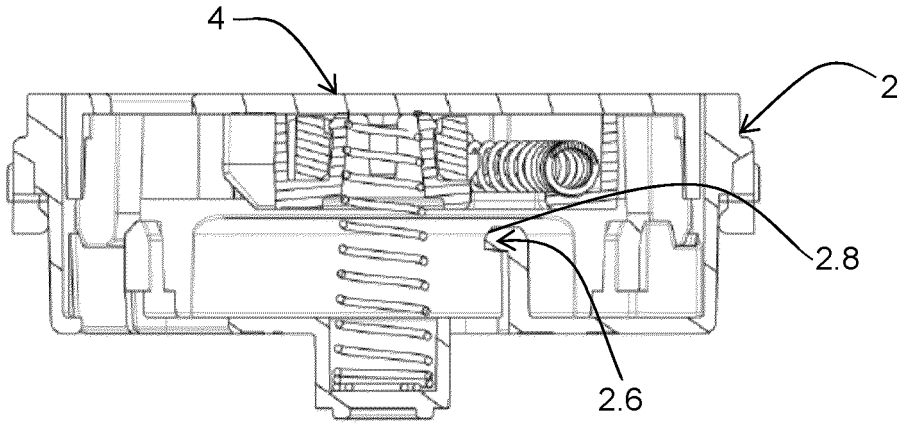

FIG. 4

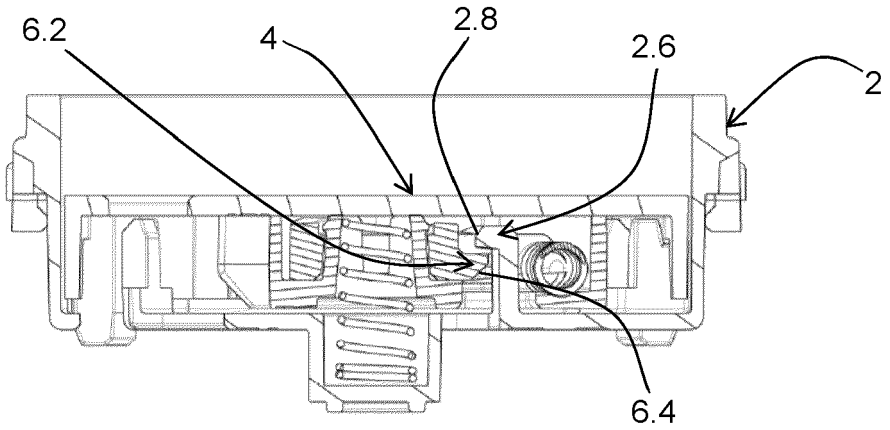

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 24 38 2008

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,D	EP 3 512 045 A1 (SCHNEIDER ELECTRIC ESPANA SA [ES]) 17 July 2019 (2019-07-17) * figures 1-9 * * columns 1-12 *	1-4	INV. H01R13/453 ADD. H01R24/78
A	FR 3 088 145 A1 (LEGRAND FRANCE [FR]; LEGRAND SNC [FR]) 8 May 2020 (2020-05-08) * figures 1-19 * * pages 1-18 *	1	H01R103/00

TECHNICAL FIELDS SEARCHED (IPC)

H01R

The present search report has been drawn up for all claims

1

Place of search	Date of completion of the search	Examiner
The Hague	5 June 2024	Kandyla, Maria

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 24 38 2008

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 3512045 A1	17-07-2019	DK 3512045 T3	04-09-2023
		EP 3512045 A1	17-07-2019
		ES 2719901 A1	16-07-2019
FR 3088145 A1	08-05-2020	NONE	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 3512045 A **[0004]**