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(54) POWER SOCKET HAVING A BASE PART, AN AESTHETIC COVER, AND A DRIVE MEMBER FOR A MOVABLE COVER OF THE AESTHETIC COVER

(57) A power socket arrangement (100) comprises a base part (102) and an aesthetic cover (150). A housing (118) comprising shutter means (120) is arranged at a bottom end (108) of the base part (102), for selectively blocking or permitting access to electrical terminals (110) likewise arranged at the bottom end (108). The housing (118) is movably suspended in the base part (102), the suspension permitting a linear movement of the housing (118) between a position at or near the bottom end (108) of the base part (102) and a position near the insertion end (106) of the base part (102). The base part (102) or the housing (118) is provided with a drive member (112), for applying a force to the housing that is directed towards the insertion end (106). The aesthetic cover (150) has an insertion well (154) for a power plug and a movable cover (156) that is supported force-free inside the insertion well (154), and that is pushed towards a front plate (152) of the aesthetic cover (150) by the housing (118).

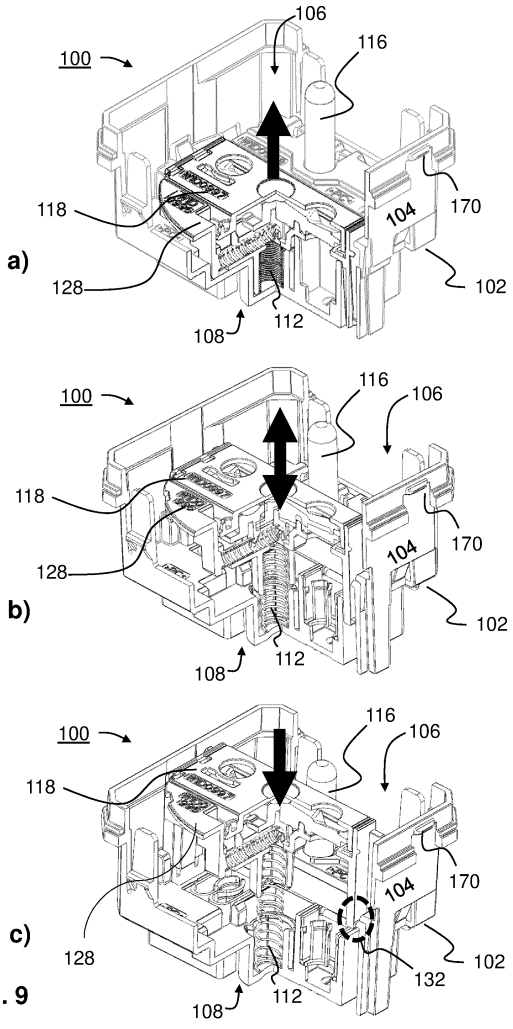

Fig. 9

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Description

TECHNICAL FIELD

[0001] The present invention relates to electrical safety arrangements, specifically to mains power sockets or mains power outlets that are configured to receive power plugs in order to connect electrical appliances to a power source, and in particular to a front cover device for such power sockets and power sockets equipped with such front cover device.

BACKGROUND ART

[0002] The safety of electrical installations is a major concern in residential and commercial buildings. Measures taken to increase the safety include installing line breakers, residual current breakers and the like. While some of these measures significantly reduce the risk of fatal electric shocks if a live wire of an electrical installation is inadvertently touched, an even improved protection can be achieved by preventing touching live wires or contacts at all. The wires of electrical installations are typically not exposed. However, power sockets are explicitly meant to provide access to the live wires, or electrical terminals connected therewith, though only using dedicated power plugs.

[0003] Today's power sockets typically comprise a base part that accommodates the electrical terminals and corresponding connection means for connecting electrical wires, and a frame or shell that permits mechanical installation of the power socket in a cable conduit or a pattress or fitting box.

[0004] Once mechanically installed, the power socket can be equipped with an aesthetic cover. The aesthetic cover can be a one-piece part or can comprise a central part that covers the electrical terminals and a framing part that surrounds the central part. In some power sockets the electrical terminals are placed in a recessed part of the power socket, also referred to as insertion well, which may be shaped to receive a corresponding power plug. In this type of power socket, the central part may form or comprise the insertion well.

[0005] In order to prevent body parts or inappropriate tools contacting electrical terminals of power sockets, the electrical terminals are typically located a few millimetres below the surface of an aesthetic cover of the power socket, and are accessible only through small openings that permit passage of protruding contact pins of the power plug.

[0006] Additional covers may provide further protection. One type of covers known since long comprises caps or lids that are placed in the insertion well, which caps, or lids, must be manually removed from the recess prior to inserting the power plug, and must be re-inserted when the power plug is removed. This is cumbersome and may require a special tool for removing the cap or lid and, once removed, the cap or lid may be misplaced and eventually lost. Also, a user may forget to re-insert the cap or lid into the insertion well after removing the power plug from the socket, obviating the purpose of the cap or lid.

[0007] Another known type of cover comprises a cover member that is movable, inside the insertion well of the power plug, between a front position that is typically flush with the front of the aesthetic cover of the power plug and a rear position that is next to the rear end of the insertion well. The movement towards the rear position is caused by the power plug when it is inserted into the power socket. The cover member may be spring loaded to return the cover member to the front position when the power plug is removed from the power socket. This type of cover may comprise many moving parts and may consequently be complex to make and be expensive.

[0008] For further enhanced safety, many of these power sockets come with shutter means covering the electrical terminals. These shutter means may be attached to the aesthetic cover, or a part thereof, or to the base part, the latter variant reducing the risk of touching the terminals even when an aesthetic cover is not installed.

[0009] When the shutter means are a part of the movable cover member, they may cover or close the openings in the movable cover member provided for letting pass the contact pins of the power plug for contacting the electrical terminals of the power socket. In addition to possibly being complex to make and expensive, this type of movable cover may also be bulky, and it does not provide any protection against touching the electrical terminals when the aesthetic cover is removed from the base part of the power socket.

[0010] Aesthetic covers comprising a central part and a framing part typically offer great flexibility and design choice for the user, allowing, for example, installing a central part that has an insertion well with a moving cover member in those power sockets that are infrequently used and installed in visible places, and installing a - typically less expensive - central cover having a simple, fixed-bottom insertion well in those power sockets that are placed invisibly and/or in which power sockets are connected at almost all times, even within the same multi-socket framing part.

[0011] Inconveniences can arise when the base parts of power sockets are specifically designed for aesthetic covers having a movable cover or aesthetic covers having a fixed-bottom insertion well, respectively, because it is not possible to simply swap the aesthetic covers, and the base parts may not be correctly placed in the electrical installation. It may also be desirable to change aesthetic covers without having to change the entire power socket. Thus, it may be more economical when the aesthetic cover is of low complexity, notably when the aesthetic cover has an insertion well that is provided with a movable cover member, and when the base part can be retrofitted with any kind of aesthetic cover.

SUMMARY OF THE INVENTION

[0012] It is, therefore, desirable, to provide a base part of a power socket having shutter means for covering electrical contact terminals and being adapted to be matched with a simple-construction aesthetic cover that provides an aesthetically pleasing movable cover of an insertion well or a fixed-bottom aesthetic cover that does not have a cover for an insertion well. It is further desirable to provide a simple-construction aesthetic cover for the base part of the power socket that has a movable cover of an insertion well and that is easy to attach to the base part, preferably an aesthetic cover that does not have a drive member on its own for operating the movable cover.

[0013] A base part of a power socket according to a first aspect of the present invention has a frame or shell with an open insertion end for receiving and/or fixing at least a part of an aesthetic cover, and further has a bottom end, opposite of the insertion end. The frame or shell may also be considered a casing, and the casing may or may not have a rim at the insertion end, depending on the requirements of the installation space. The bottom end may be located in a recess or depression of the frame or shell, when viewed from the insertion end. The aesthetic cover may be a one-piece part or may comprise a central part that is complemented by a framing part at least partly surrounding the central part. Electrical terminals adapted for receiving and contacting contact pins of a power plug are arranged at the bottom end of the base part. A housing comprising shutter means is arranged in the base part, for preventing accidental contact with the electrical terminals. The housing has openings adapted for letting pass contact pins of a power plug. Apart from the openings the front surface of the housing is preferably closed. A movable obturator is arranged inside the housing, for selectively blocking or permitting access to the electrical terminals. The movable obturator is operable by the contact pins of a power plug and may be pivotably, slidably or rotatably arranged inside the housing. The housing is movably suspended in the base part, the suspension permitting a linear movement of the housing between a position at or near the bottom end of the base part and a position near the insertion end of the base part. The movement is independent from the operating state of the shutter means, i.e., the housing may be moved even when no contact pin of a power plug has been inserted and has operated the shutter means. The base part or the housing is provided with at least one drive member, for applying a force to the housing that is directed towards the insertion end of the base part. The drive member may be adapted to preferably exert a force essentially perpendicular to a plane covering the bottom end of the base part, and may comprise springs, resilient compressible elements, flexible levers and the like. A front surface of the housing is adapted to be in contact with the back side of a freely movable cover of an aesthetic cover that may be mounted to the base part, for imparting a force on the movable cover, targeted to flush align the movable cover with the front plate of the aesthetic cover when no power plug is inserted.

[0014] In one or more embodiments, cooperating retention means are provided on the base part and on the housing, for releasably retaining the housing in the position at or near the bottom end of the base part. Retaining the housing at or near the bottom end of the base part may be useful in case an aesthetic cover is not affixed to the base part, e.g., prior to the installation of the aesthetic cover or in case the aesthetic cover is removed after an initial installation, for securing movable parts and better preventing accidentally touching the electrical terminals. In this case, the power socket remains safely usable even without an aesthetic cover attached to it, without the movably suspended housing encumbering inserting a power plug. Also, attaching an aesthetic cover may be facilitated.

[0015] In one or more embodiments, cooperating limiting or blocking means are provided on the base part and on the housing, for limiting or stopping the movement of the housing near the insertion end of the base part. The limiting means may be part of the guiding means or implemented separately. The limiting means preferably limit the movement of the housing in a position that ensures that at least a minimal force is applied to the housing in this position.

[0016] In one or more embodiments, cooperating guiding means are provided with the housing and the base part, for guiding the movement of the housing in the base part, preferably for guiding on a linear path.

[0017] In one or more embodiments, a front surface of the housing, facing towards the insertion end of the base part, is adapted to be releasably engaged with a movable cover of an aesthetic cover that may be received from the insertion end of and attached to the base part. This may be useful for further enhancing the protection against accidentally touching internal parts of the power socket by keeping the movable cover of an aesthetic cover attached to the movably suspended housing, in those implementations in which the aesthetic cover can be separated from the movable cover. In embodiments where retention means are provided for retaining the movably suspended housing at or near the bottom end of the base part, the movable cover will likewise be retained at or near the bottom end of the base part, additionally providing improved aesthetics even with a removed aesthetic cover. Releasably engaging and disengaging may be implemented by snap-in or click-connection, by bayonet-coupling, or the like.

[0018] In one or more embodiments, the housing does not extend over the entire area at the bottom end of the base part, and the base part is adapted to receive a dummy cover covering the remaining area, the front sides of the housing and the dummy cover preferably being flush aligned when the housing is retained at the bottom end of the base part. The housing may, for example, be arranged to cover only an energized and a neutral contact terminal, while an earth terminal or pin may not be covered by the housing, but by the dummy cover. Alternatively, the bottom end of the base part may be shaped so as to have a recess or depression for accommodating the housing, the remaining areas being

elevated over the recess or depression, preferably to a level at which the surface of the bottom end is flush aligned with the front surface of the housing when it is retained at or near the bottom end.

[0019] In one or more embodiments, alignment means are provided on or near the front side of the housing, adapted to cooperate with corresponding alignment means on the back side of the movable cover, for aligning the openings of the movable cover and the openings in the housing. The alignment means may comprise recesses, holes, protrusions and the like.

[0020] An aesthetic cover according to a second aspect of the present invention, adapted to be received by a base part as presented above, comprises a front plate, an insertion well for receiving a power plug, and a cover, inside the insertion well, having a front surface with openings for letting pass contact pins of a power plug. The cover is movable in the insertion well between a position distal from the front plate and a position, in which the front plate and the front surface of the cover are essentially flush aligned. The expression flush aligned generally means that the front plate and the front surface lie in the same plane but may comprise alignments where minor offsets between the two outer surfaces may be present in either direction. The movable cover is arranged or supported force-free inside the insertion well, i.e., it does not take a specific default position within its range of motion unless forced by a drive member, and it is freely movable within the insertion well. Cooperating guiding means are provided with the movable cover and the insertion well, for guiding the movement of the cover in the insertion well. The guiding means may preferably be adapted for linearly guiding the movable cover inside the insertion well between the position distal from the front plate of the aesthetic cover and the position, in which the front plate and the front surface of the movable cover are flush aligned. The guiding means may comprise one or more protrusions, recesses or slots at the aesthetic cover that slidingly engage with corresponding recesses or protrusions of the movable cover. Two or more guiding means are preferably distributed at the circumference of the insertion well and the movable cover, more preferably evenly distributed. The guiding means may alternatively or additionally comprise slots, recesses, protrusions or the like at the movable cover that slidingly engage with corresponding shapes of the base part.

[0021] In one or more embodiments, the back side of the movable cover is adapted to be in contact with the front side of the housing of the base part, and to receive a force imparted from the housing, the force pushing the movable cover into the direction of the front plate. The back side of the movable cover may releasably engage with the front side of the housing of the base part. This may be useful for further enhancing the protection against accidentally touching internal parts of the power socket by keeping the movable cover of an aesthetic cover attached to the movably suspended housing, in those implementations in which the aesthetic cover can be separated from the movable cover. Releasably engaging and disengaging may be implemented by snap-in or click-connection, by bayonet-coupling, or the like.

[0022] In one or more embodiments, alignment means are provided with the back side of the movable cover, adapted to cooperate with corresponding alignment means on the front side of the housing, for aligning the openings of the movable cover and the openings in the housing. The alignment means may also facilitate releasably engaging the movable cover and the movably suspended housing. The alignment means may include mutually matching protrusions and recesses or depressions or the like.

[0023] In one or more embodiments the aesthetic cover comprises releasing means, preferably at that end of the insertion well that is distal from the front plate, for operating the retention means to release the housing that may be retained in the position at or near the bottom end of the base part. Releasing means are preferably provided with aesthetic covers that have a movable cover and may not be present with aesthetic covers having an insertion well with a fixed bottom end. More generally spoken, some aesthetic covers may be capable of or adapted for releasing the housing, while others are not. To this end a part of the aesthetic cover received in the insertion end may operate a mechanism to unlock or release the housing, e.g., by operating a snap hook that retains the housing at or near the bottom end of the base part or the like. The releasing means may be a protruding part of the insertion well of the aesthetic cover.

[0024] A power socket arrangement comprises a base part in accordance with the first aspect of the invention or embodiments thereof and an aesthetic cover in accordance with the second aspect of the invention or embodiments thereof.

[0025] More specifically, the base part of the power socket arrangement is arranged to receive an aesthetic cover having a movable cover for an insertion well for a power plug, the cover being supported force-free in the insertion well such that it can slide between a position in which the movable cover and the front of the aesthetic cover are flush aligned and a position in which the movable cover is located at the rear end of the insertion well or can be removed at the rear end of the insertion well. The base part further comprises a housing that is movably suspended, e.g., in a space provided for receiving the insertion well of the aesthetic cover. The housing or the base part are provided with a drive member exerting a force on the housing that is directed towards the front plate of an aesthetic cover that may be mounted to the base part. The housing is in contact with the movable cover and thus also pushes the movable cover towards the front plate of the aesthetic cover. The movable cover is moved by the housing that is movably suspended and loaded by a force imparted from the drive member. The movable cover, therefore, does not need a drive member on its own.

[0026] The power socket arrangement presented hereinbefore provides an efficient way of resiliently moving a cover inside an insertion well of a power socket, while at the same time ensuring that shutter means are arranged in the base

part of the power socket at all times, irrespective of whether an aesthetic cover is mounted. The present invention thus improves the reliability and touch-protection of the power socket over previous solutions in a simple and efficient manner.

BRIEF DESCRIPTION OF DRAWINGS

[0027] In the following section an exemplary embodiment of the invention will be described in greater detail with reference to the attached drawings, in which

- Fig. 1 shows an isometric view of a power socket arrangement according to the invention with a movable cover flush aligned with the front plate of an aesthetic cover,
- Fig. 2 shows an isometric view of the power socket arrangement of figure 1 with the movable cover in a position distal from the front plate of the aesthetic cover,
- Fig. 3 shows an isometric view of a base part of the power socket arrangement according to the invention,
- Fig. 4 shows an isometric view of a housing comprising shutter means of the power socket arrangement according to the invention,
- Fig. 5 shows an isometric exploded view of the housing comprising shutter means of figure 4,
- Fig. 6 shows an isometric sectional view of the housing comprising shutter means of figure 4,
- Fig. 7 shows an isometric view of the base part with the housing comprising shutter means mounted and in a position at or near the bottom end,
- Fig. 8 shows an isometric view of the base part with the housing comprising shutter means mounted and in a position near the insertion end,
- Fig. 9 a) shows an isometric view of the base part with the housing and the drive member arranged therein in a position at or near the bottom end,
- Fig. 9 b) shows an isometric view of the base part with the housing and the drive member arranged therein in a position between the bottom end and the insertion end,
- Fig. 9 c) shows an isometric view of the base part with the housing and the drive member arranged therein in a position near the insertion end,
- Fig. 10 shows a sectional view of the base part of the power socket arrangement with the housing in a position near the insertion end,
- Fig. 11 shows a sectional view of the base part of the power socket arrangement with the housing retained in a position at or near the bottom end,
- Fig. 12 shows an isometric view of an aesthetic cover of a power socket arrangement in accordance with the invention,
- Fig. 13 shows an isometric exploded view of the aesthetic cover of figure 12,
- Fig. 14 shows an isometric exploded view of the back side of the aesthetic cover of figure 12,
- Fig. 15 a) shows an isometric view of an aesthetic cover according to the invention in a position for mounting to a base part of the power socket, in a partially cut away view,
- Fig. 15 b) shows an isometric view of the completed power socket in a partially cut away view,
- Fig. 16 shows an isometric sectional view of the power socket arrangement with the movable cover flush aligned with the front plate of the aesthetic cover,
- Fig. 17 shows an isometric sectional view of the power socket arrangement with the movable cover in a position distal from the front plate of the aesthetic cover.

[0028] In the figures of the drawings like or similar elements are referenced using the same reference signs. Throughout the description of the figures, elements and their function that had already been described may be omitted in the description of subsequent figures for clarity.

DESCRIPTION OF EMBODIMENTS

[0029] Figure 1 shows an isometric view of a power socket arrangement 100 according to the invention with a movable cover 156 flush aligned with the front plate 152 of an aesthetic cover 150. The aesthetic cover 150 is attached or mounted to a base part 102. Two openings 160 in the movable cover 156 are covered or obturated from the underside by shutter means (not visible in the figure). A third opening 160 is obturated by an earth pin 116, of which only the very tip is visible.

[0030] Figure 2 shows an isometric view of the power socket arrangement 100 of figure 1 with the movable cover 156 in a position distal from the front plate 152 of the aesthetic cover 150. This position may be attained when a power plug (not shown in the figure) is inserted into the insertion well 154, or when the movable cover 156 is pushed back by hand. The shutter means (not visible in the figure), which may be operated by the contact pins of a power plug, still covers the openings and protects against accidentally touching the electrical terminals of the power socket. The earth pin 116 is

now fully visible, as is the insertion well 154 for receiving a power plug. The exemplary insertion well 154 shown in the figure has a generally circular cross section, but other shapes are likewise conceivable, depending on the respective local or regional plug and socket standards. The tubular side walls of the insertion well 154 comprise slots that serve as guiding means 164 for assuring a linear movement of movable cover 156 inside the insertion well 154. The movable cover has corresponding protrusions (not shown in the figure) that slidingly engage with the slots.

[0031] Figure 3 shows an isometric view of the base part 102 of the power socket arrangement 100. The electrical terminals 110, that are arranged at the bottom end 108 of the base part 102 inside the shell or frame 104, are accessible since no shutter means, which prevent accidentally touching the electrical terminals 110, has yet been mounted to the base part 102. The earth pin 116 is fully visible inside the frame or shell 104 of the base part 102. A dummy cover 136 is arranged around the earth pin 116, for covering any live contacts or wires underneath. It is readily apparent in the figure that a power plug may be inserted from an insertion end 106 of the frame or shell 104, but that no insertion well of a particular shape is present. Rather, an aesthetic cover 150 (not shown in the figure) having a suitably shaped insertion well is meant to be inserted into the frame or shell 104 from the insertion end 106, for completing the power socket. The aesthetic cover 150 may be removably attached to the base part 102, e.g., by a snap-in connection, screws or the like. In the figure, protruding hooks 170 of a snap-in connection are visible at the insertion end 106 of the frame or shell 104 which engage with corresponding latches 172 of the aesthetic cover 150.

[0032] Figure 4 shows an isometric view of a housing 118 comprising shutter means 120 (not visible in the figure) of the power socket arrangement 100 according to the invention. The housing 118 has a front surface 122 with openings 124 for letting pass contact pins of a power plug for operating the shutter means 120 and eventually contacting the electrical terminals 110 of the power socket arrangement 100. A drive member 112 is provided at the back side of the housing 118. The drive member 112 may comprise a spring, as shown in the figure, or any other suitable means that may impart a directed force on the housing, e.g., a resiliently compressible plastic part or the like. The force imparted by the drive member may be essentially directed towards the front surface 122 of the housing 118. Protruding fins 126, cooperating with correspondingly shaped parts in the base part 102, act as guiding means for linearly guiding the housing 118 in the base part 102. A projecting surface 128 may be present that extends the area of the base part 102 covered by the housing 118. The front surface 122 of the housing 118 is adapted to be in contact with a back side of a freely movable cover of an aesthetic cover that may be mounted to the base part, for resiliently forcing the movable cover to be flush aligned with the front surface of the aesthetic cover when no power plug is inserted. Alignment means (not shown in the figure) may be provided that cooperate with corresponding alignment means of a movable cover of an aesthetic cover that may be mounted to the base part, for aligning the movable cover 156 and the housing 118. The alignment means may comprise protruding parts and recesses that engage with each other, e.g., a pin that engages with a hole or recess. It is readily apparent that the movably suspended housing represents a subassembly that may be composed of one single part or from multiple parts, including multiple parts from different materials.

[0033] Figure 5 shows an isometric exploded view of the housing 118 comprising shutter means 120 of the power socket arrangement 100 according to the invention. The shutter means 120 is pivotably mounted inside the housing 118, which comprises an upper shell 118a and a lower shell 118b. The shutter means 120 may be coupled to a spring 121 that resiliently forces the shutter means 120 to be in contact with an underside of the upper shell 118a for closing the openings 124. Other means applying a resilient force on the shutter means 120 are conceivable, e.g., resiliently compressible or bendable plastic parts or the like. The drive means 112 are held in a correspondingly shaped part of the lower shell 118b. The cylindrical part inside the dashed circle may cooperate with alignment means 176 of the movable cover 156, for lining up the openings 124 in the housing 118 with the openings 160 of a movable cover 156 of an aesthetic cover 150, when such aesthetic cover is mounted to the base part.

[0034] Figure 6 shows an isometric sectional view of the housing 118 comprising the shutter means 120. In this figure retention means (130) are visible, for releasably retaining the housing 118 in the position at or near the bottom end 108 of the base part. The retention means 130 may be implemented as engagement hooks cooperating with corresponding latches in the base part (not shown in the figure). Blocking members 132 are provided for blocking the movement of the housing 118 near the insertion end 106 of the base part, keeping the housing 118 engaged with the base part 102. The blocking members may likewise be implemented as engagement hooks cooperating with corresponding latches in the base part.

[0035] Figure 7 shows an isometric view of the base part 102 of the power socket arrangement 100 with the housing 118, comprising shutter means 120, mounted and in a position at or near the bottom end 108 of the base part 102. The elements of the base part 102 and the housing 118 correspond to those described further above. This figure clearly shows how the projecting surface 128 covers a part of the base part 102 opposite of the earth pin 116. The electrical terminals of the base part 102 are fully covered and not visible in the figure. The fins 126 of the housing 118 may be glidingly received in corresponding recesses 114, the outer shape of which is visible in the figure. The front surface 122 of the housing 118 is essentially level with the surface of the dummy cover 136.

[0036] Figure 8 shows an isometric view of the base part 102 of the power socket arrangement 100 with the housing 118, comprising shutter means 120, mounted and in a position near the insertion end 106 of the base part 102. In this

figure the electrical terminals 110 are visible. However, they are not easily accessible from the insertion end. The elements of the base part 102 and the housing 118 correspond to those described further above and are not described in detail.

[0037] Figure 9 a) shows a partially cut away isometric view of the base part 102 with the housing 118 that is movably suspended in the base part 102 and the drive member 112 arranged therein in a position at or near the bottom end 108 of the base part 102. This view shows how the drive means 112 are compressed and the only movement possible, indicated by the bold arrow, is towards the insertion end 106. Accordingly, figure 9 b) shows a partially cut away isometric view of the base part 102 with the housing 118 and the drive member 112 arranged therein in a position between the bottom end 108 and the insertion end 106. The partially relaxed drive member 112 permits a movement of the housing 118 in two directions. Figure 9 c) shows the housing 118 in a position near the insertion end 106 of the base part 102. The blocking member 132 is engaged with the corresponding shape of the base part 102 and prevents further movement of the housing 118 towards the insertion end 106. The only movement that is possible in this position is towards the bottom end 108 of the base part 102.

[0038] Figure 10 shows a sectional view of the base part 102 of the power socket arrangement with the housing 118 in a position near the insertion end 106. Referring to this figure the function of the blocking member 132 may be easily understood. The engagement hook 132 of the housing 118 rests against a protrusion of the shell or frame 104 of the base part, preventing any further movement of the housing 118 towards the insertion end 106. The drive member 112 is now only lightly compressed, preventing any free movement of the housing 118 in the base part 102.

[0039] Figure 11 shows a sectional view of the base part 102 of the power socket arrangement with the housing 118 retained in a position at or near the bottom end 108. In this position the retention means 130 of the housing 118 are engaged with engagement hooks 134 of the shell or frame 104 of the base part 102. The retention means 130 may simply be protrusions at the housing 118 which, when the housing 118 is moved towards the bottom end, push the flexibly suspended engagement hooks 134 outwards until they are located below the hooks 134. The engagement hooks 134 have a sloped shape that facilitates the temporary displacement, and that may be engaged by corresponding parts of an aesthetic cover that may be mounted to the base part 102 or by a tool, for releasing the housing 118 from the retained position.

[0040] Figure 12 shows an isometric view of an aesthetic cover 150 of a power socket arrangement in accordance with the invention. The movable cover 156 with its three openings 160 for letting pass contact pins is flush aligned with the front plate 152. Latches 172 are provided at the aesthetic cover 150 that engage with corresponding hooks 170 at the base part 102 for attaching the aesthetic cover 150 to the base part 102.

[0041] Figure 13 shows an isometric exploded view of the aesthetic cover 150. It is readily apparent that in its simplest form the aesthetic cover 150 comprises only two parts, the aesthetic cover itself and the movable cover 156. The movable cover is supported freely movable in the insertion well 154 of the aesthetic cover. Protrusions 165 of the movable cover 156 may slidingly engage with corresponding slits 164 in the insertion well 154, allowing for a linear movement of the movable cover 156 inside the insertion well. The protrusions 165 may generally be aligned with the fins 126 of the housing when the aesthetic cover 150 is mounted to the base part 102. As the movable cover 156 is supported against the housing 118, the guiding means need not be particularly pronounced. It is sufficient when a rotation of the movable cover 156 inside the insertion well 154 is effectively prevented. The movable cover 156 may be removed from the insertion well 154 at an end opposite to the front plate 152. However, the movable cover 156 may be held inside the insertion well 154 by engagement hooks 166, which prevent the movable cover 156 from accidentally falling out. The engagement hooks 166 may need to be pushed outwards for removing the movable cover 156, if needed.

[0042] Figure 14 shows an isometric exploded view of the back side of the aesthetic cover 150. In this view the slits 164 and the protrusions 165 slidingly engaging therein are well visible. Engagement hooks 166 may be provided for preventing the movable cover 156 from falling out of the insertion well 154 when the aesthetic cover 150 is not mounted to a base part. Fixing hooks 168 may be provided at the underside of the movable cover 156, for releasably engaging the movable cover 156 with the housing 118. The releasable engagement may be rather weak, merely keeping the movable cover and the housing together so as to prevent separation during normal operation. However, the releasable engagement may also be stronger, which may be useful in case the aesthetic cover 150 is removed from the base part; in this case the movable cover remains attached to the base part and helps covering a significant part thereof. The fixing hooks 168 may also serve as alignment means for lining up the housing 118 and the movable cover 156. The protrusions 165 may serve as guiding means that are generally aligned with the fins 126 of the housing 118 when the aesthetic cover 150 is mounted to a base part 102.

[0043] Figure 15 a) shows an isometric view of an aesthetic cover 150 according to the invention in a position for mounting to a base part 102 of the power socket assembly 100, in a partially cut away view. This figure serves for illustrating the alignment of the parts for mounting, and for illustrating how movable cover 156 of the aesthetic cover 150 is held in place by the fixing hooks 168 prior to mounting of the aesthetic cover 150 to the base part 102. The hooks 170 of the frame or shell 104 of the base part 102 are aligned so as to engage with the corresponding latches 172 of the aesthetic cover 150, indicated by the dashed double-pointed arrow.

[0044] Figure 15 b) shows an isometric view of the completed power socket assembly 100 in a partially cut away view.

The aesthetic cover 150 is now mounted to the base part 102, and the housing 118, spring loaded by the drive member 112, will push the movable cover 156 towards the insertion end 106, indicated by the bold arrow.

[0045] Figure 16 shows an isometric sectional view of the power socket arrangement 100 with the movable cover 156 in flush aligned with the front plate 152 of the aesthetic cover 150. This view illustrates how a part of the aesthetic cover 150, in this case an extended part of the insertion well 154, pushes against the resiliently suspended engagement hooks 134 of the base part 102, for releasing the housing 118 from the retained position at or near the bottom end 108. The extended part of the insertion well 154 forms a kind of releasing means. Also illustrated is the engagement of the movable cover 156 and the movably suspended housing 118 by means of the fixing hooks 168, which snap-engage with corresponding recesses of the housing 118.

[0046] Figure 17 shows an isometric sectional view of the power socket arrangement 100 with the movable cover 156 in a position distal from the front plate 152 of the aesthetic cover 150. In the embodiment shown in this figure the slit 164 that functions as a part of the guiding means for the movable cover has a tapered form. The tapering may help facilitating the sliding of the movable cover 156 in the insertion well 154 and may provide noticeable friction only when the movable cover is very close to the front plate 152 of the aesthetic cover 150. This may serve as a means for providing an initial insertion resistance that is cancelled once the movable cover 156 has moved into the insertion well 154 by a small distance. As the movable cover 156 may be releasably affixed to the housing 118, which has a proper guiding means on its own in the base part 102, close guidance may not be necessary for the movable cover 156. The tapering may be less emphasized in actual implementations. The tapering also may provide a better alignment of the openings 124 of the housing 118 and the openings 160 in the movable cover 156 when the movable cover is close to the front plate 152. The alignment of the holes in this position is more important, since it should be easy to pass the contact pins of a plug through the openings. Once the contact pins of the plugs are inserted, the contact pins will keep the openings aligned and provide the guidance of the movable cover 156 inside the insertion well 154.

[0047] While the invention has been described hereinbefore with reference to the exemplary embodiments shown in the drawings, in particular with regard to a power socket of the CEE 7/5 type, it will be obvious to the skilled person that the invention is not limited thereto, and that it is likewise applicable with other types of power sockets including, but not limited to, power sockets of the CEE 7/3 type.

REFERENCE SIGNS LIST

100	power socket	170	hook
102	base part	172	latch
104	frame/shell	176	alignment means
106	insertion end		
108	bottom end		
110	terminal		
112	drive member		
114	recess		
116	earth pin		
118	housing		
118a	upper shell		
118b	lower shell		
120	shutter means		
121	spring		
122	front surface		
124	opening		
126	fin		
128	projecting surface		
130	retention means		
132	blocking member		
134	engagement hook		
136	dummy cover		
150	aesthetic cover		
152	front plate		
154	insertion well		
156	movable cover		
160	opening		

(continued)

164	slit
165	protrusion
166	engagement hook
168	fixing hook

Claims

1. Base part (102) of a power socket (100) having a frame or shell (104), the frame or shell (104) having an open insertion end (106) for receiving and/or fixing at least a part of an aesthetic cover (150), and further having a bottom end (108) located opposite to the insertion end (106), wherein electrical terminals (110) adapted for receiving and contacting contact pins of a power plug are arranged at the bottom end (108) of the base part (102), wherein a housing (118) comprising shutter means (120) is arranged in the base part (102), the housing (118) having openings (124) for letting pass contact pins of a power plug, a movable obturator being arranged inside the housing (118), for selectively blocking or permitting access to the electrical terminals (110), the movable obturator being operable by the contact pins of a power plug, **characterized in that** the housing (118) is movably suspended in the base part (102), the suspension permitting a linear movement of the housing (118) between a position at or near the bottom end (108) of the base part (102) and a position near the insertion end (106) of the base part (102), irrespective of the operating state of the shutter means (120), wherein the base part (102) or the housing (118) is provided with at least one drive member (112), for applying a force to the housing that is directed towards the insertion end (106) of the base part (102), and wherein a front surface (122) of the housing (118) is adapted to be in contact with the back side of a freely movable cover (156) of an aesthetic cover (150) that may be mounted to the base part (102), for imparting a force on the movable cover (156), targeted to flush align the movable cover (156) with the front plate (152) of the aesthetic cover (150) when no power plug is inserted into the power socket (100).

2. Base part (102) according to claim 1, wherein cooperating retention means (130) are provided on the base part (102) and on the housing (118), for releasably retaining the housing (118) in the position at or near the bottom end (108) of the base part (102).

3. Base part (102) according to claim 1 or 2, wherein cooperating limiting means (132) are provided on the base part (102) and on the housing (118), for limiting or stopping the movement of the housing (118) near the insertion end (106) of the base part (102).

4. Base part (102) according to one of claims 1 to 3, wherein cooperating guiding means (126, 114) are provided with the housing (118) and the base part (102), for guiding the movement of the housing in the base part (102), preferably for guiding on a linear path.

5. Base part (102) according to one of claims 1 to 4, wherein a front surface of the housing (118), facing towards the insertion end (106) of the base part (102), is adapted to releasably engage with a movable cover (156) of an aesthetic cover (150) that may be received from the insertion end (106) of, and attached to, the base part (102).

6. Base part (102) according to one of claims 1 to 5, wherein the housing (118) does not extend over the entire area at the bottom end (108) of the base part (102), and wherein the base part is adapted to receive a dummy cover (136) covering the remaining area, the front side of the housing (118) and the dummy cover (136) preferably being flush aligned.

7. Base part (102) according to one of claims 1 to 6, wherein alignment means are provided on or near the front side of the housing (118), adapted to cooperate with corresponding alignment means (165,168, 176) on the back side of a movable cover (156) of an aesthetic cover (150) that may be mounted to the base part (102), for aligning the openings (160) of the movable cover (156) and the openings (124) in the housing (118).

8. Aesthetic cover (150) adapted to be received by a base part (102) according to one of claims 1 to 7, the aesthetic cover (150) comprising a front plate (152), an insertion well (154) for receiving a power plug, and a cover (156) having a front surface with openings (160) for letting pass contact pins of a power plug, the cover (156) being movable in the insertion well (154) between a position distal from the front plate (152) and a position, in which the front plate (152) and the front surface of the cover (156) are flush aligned, **characterized in that** the movable cover

(156) is arranged or supported force-free inside the insertion well (154), and **in that** cooperating guiding means (165, 164) are provided with the movable cover (156) and the insertion well (154).

9. Aesthetic cover (150) according to claim 8, wherein the back side of the movable cover (156) is adapted to be in contact with the front side of the housing (118) of the base part (102), preferably to releasably engage with the front side of the housing (118) of the base part (102) according to claim 5.

10. Aesthetic cover (150) according to claim 8 or 9, wherein alignment means (165, 168, 176) are provided on the back side of the movable cover (156), adapted to cooperate with corresponding alignment means on the front side of the housing (118), for aligning the openings (160) of the movable cover (156) and the openings (124) in the housing (118).

11. Aesthetic cover (150) according to any one of claims 8 to 10, further having releasing means, preferably at that end of the insertion well (154) that is distal from the front plate (152), for operating the retention means (130) to release a housing that may be retained in the position at or near the bottom end (108) of the base part (102).

12. Aesthetic cover (150) according to any one of claims 8 to 11, wherein the guiding means (164) are adapted for linearly guiding the movable cover (156) inside the insertion well (154) between the position distal from the front plate (152) of the aesthetic cover (150) and the position, in which the front plate (152) and the front surface of the movable cover (156) are flush aligned.

13. Power socket arrangement (100) comprising a base part (102) according to one or more of claims 1 to 7 and an aesthetic cover (150) according to one or more of claims 8 to 12.

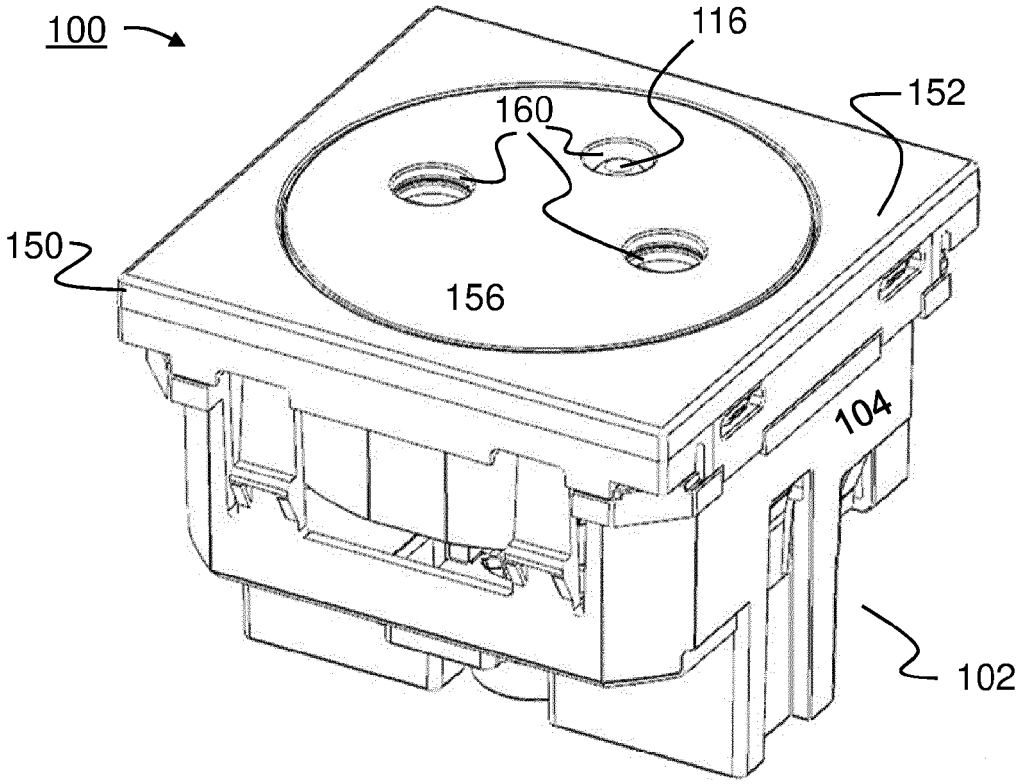
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Fig. 1

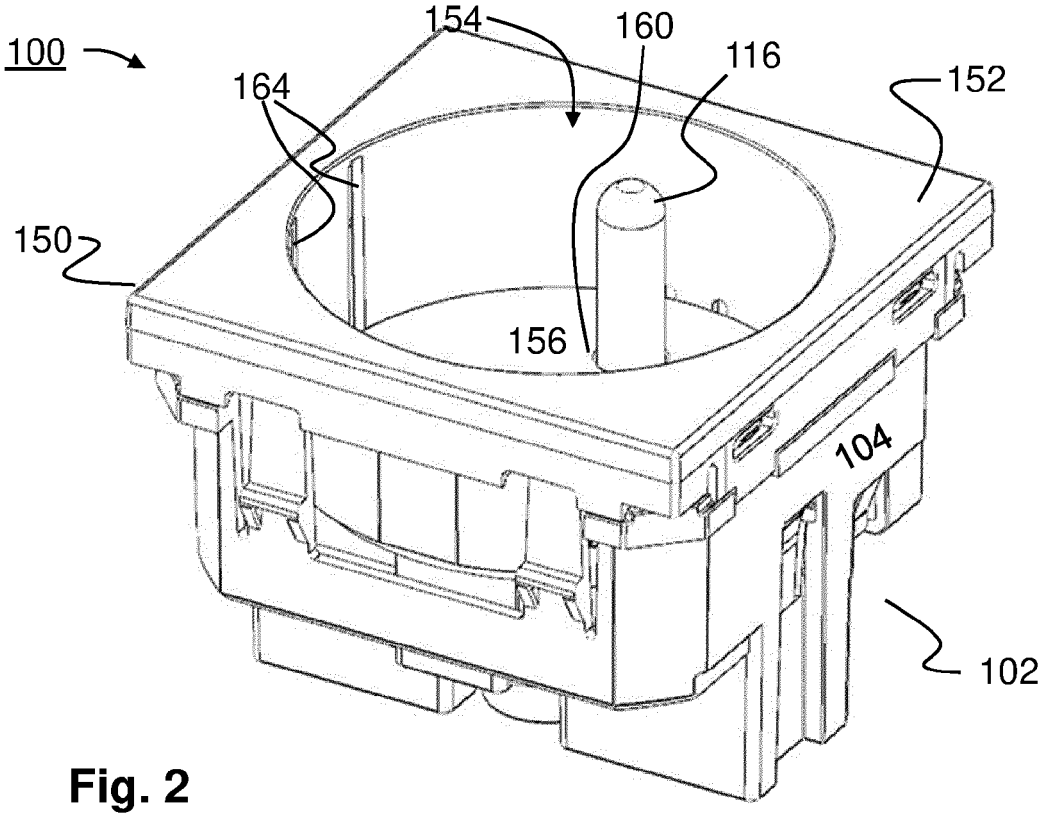
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Fig. 2

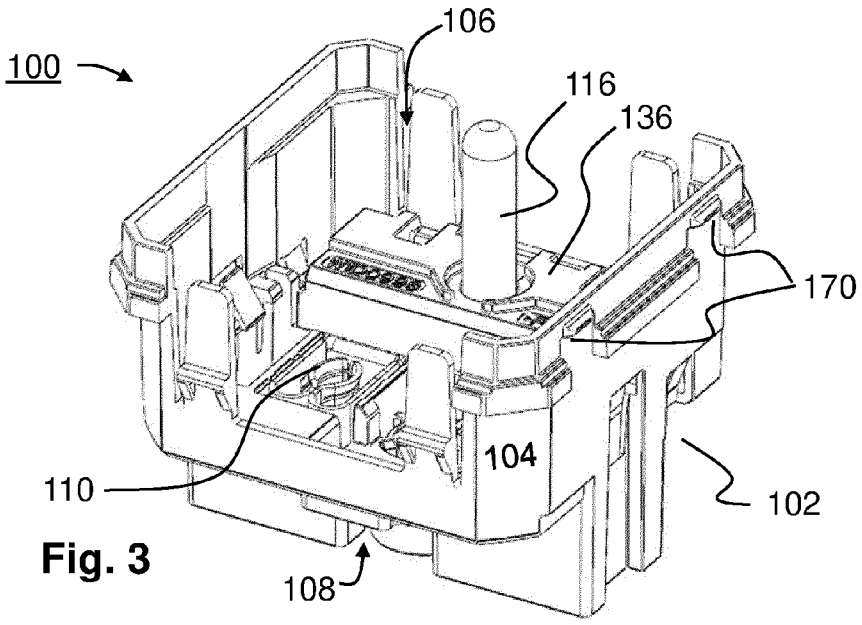


Fig. 3

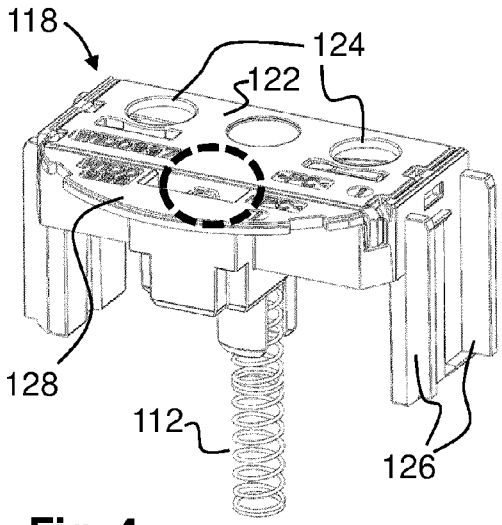


Fig. 4

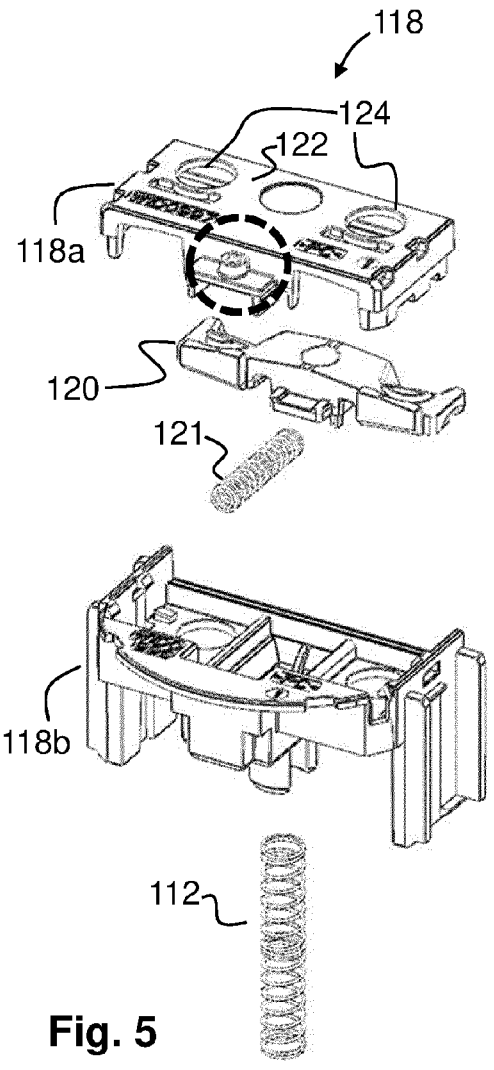


Fig. 5

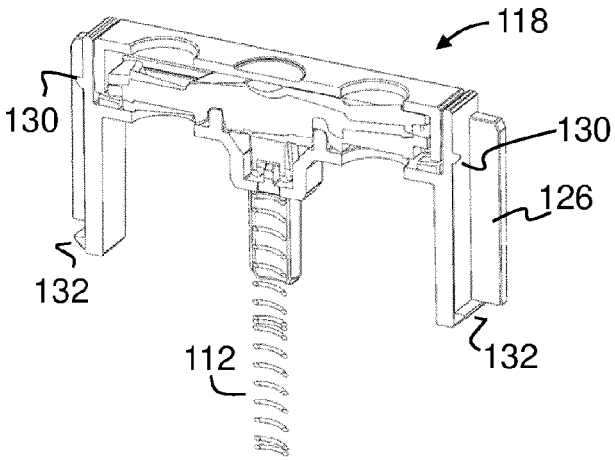


Fig. 6

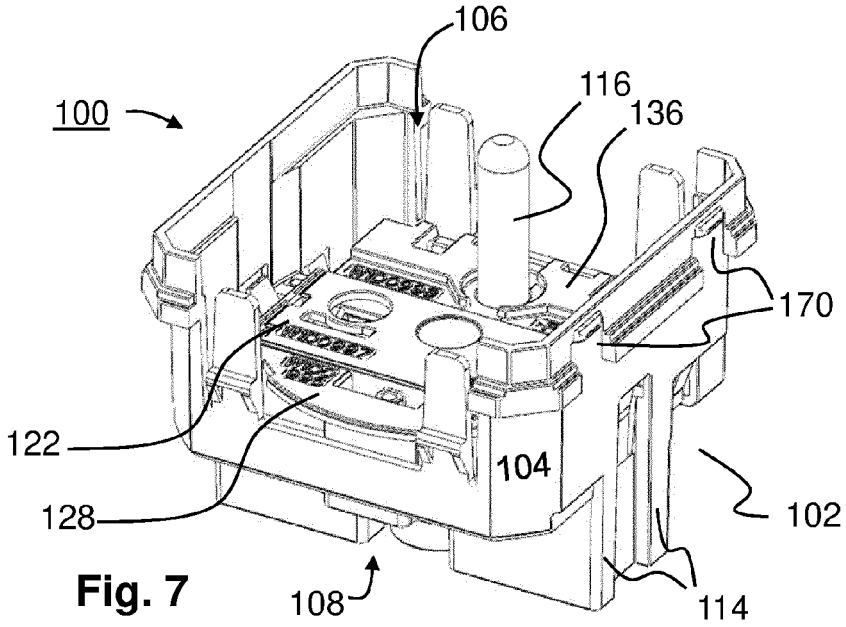
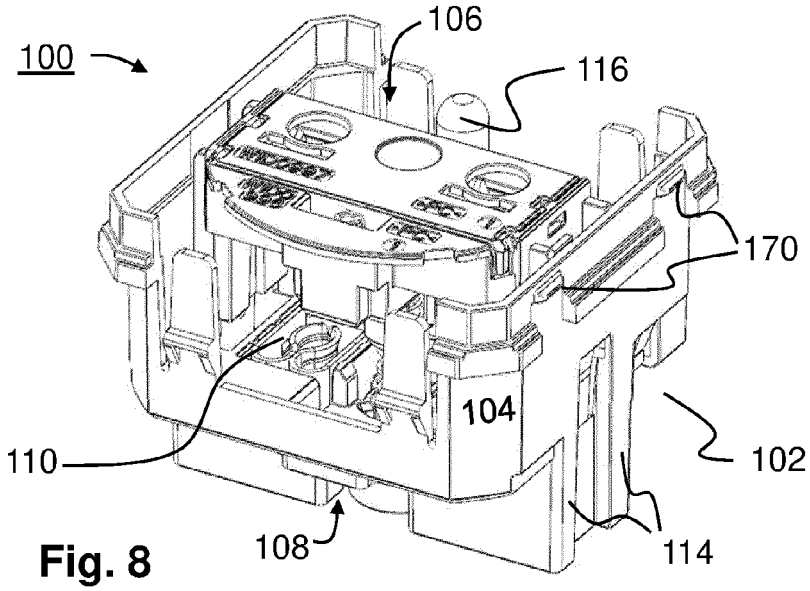


Fig. 7



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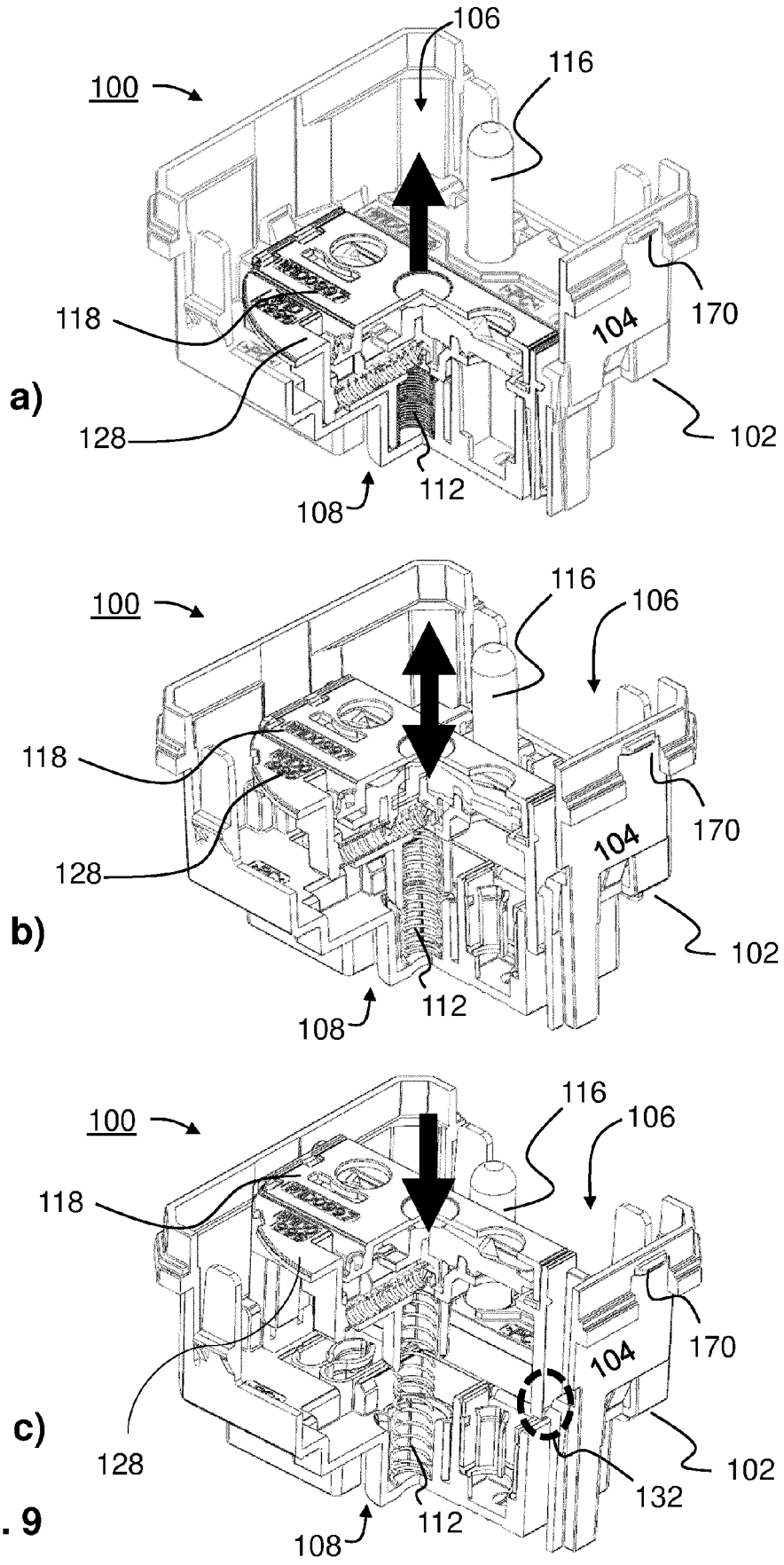
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Fig. 9

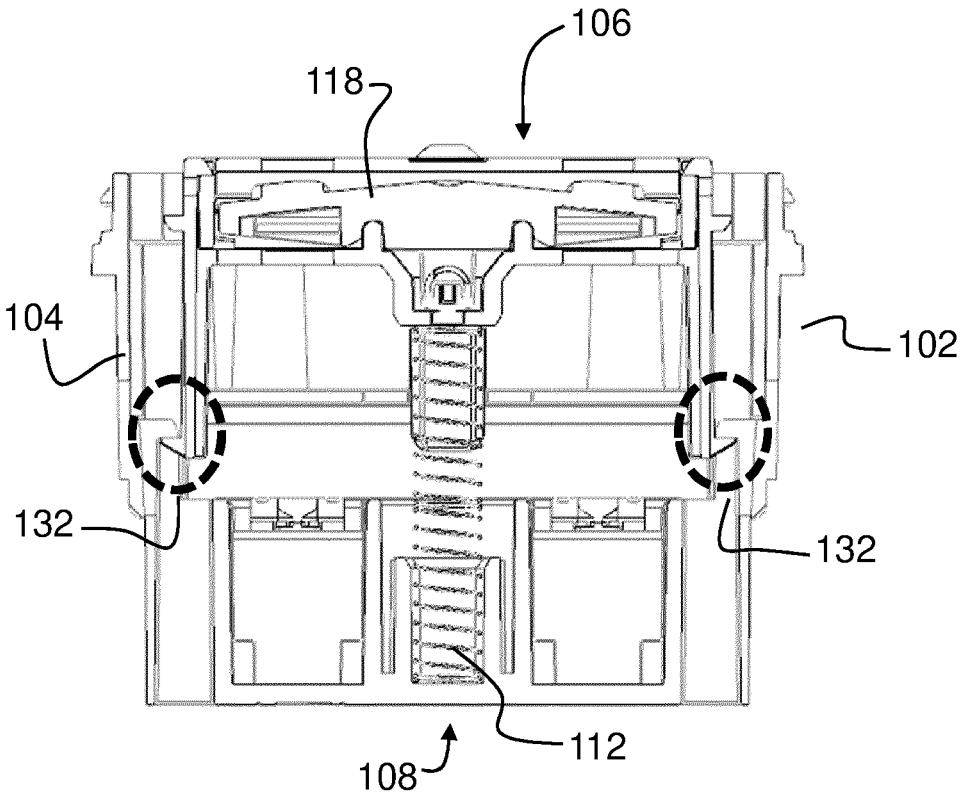
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Fig. 10

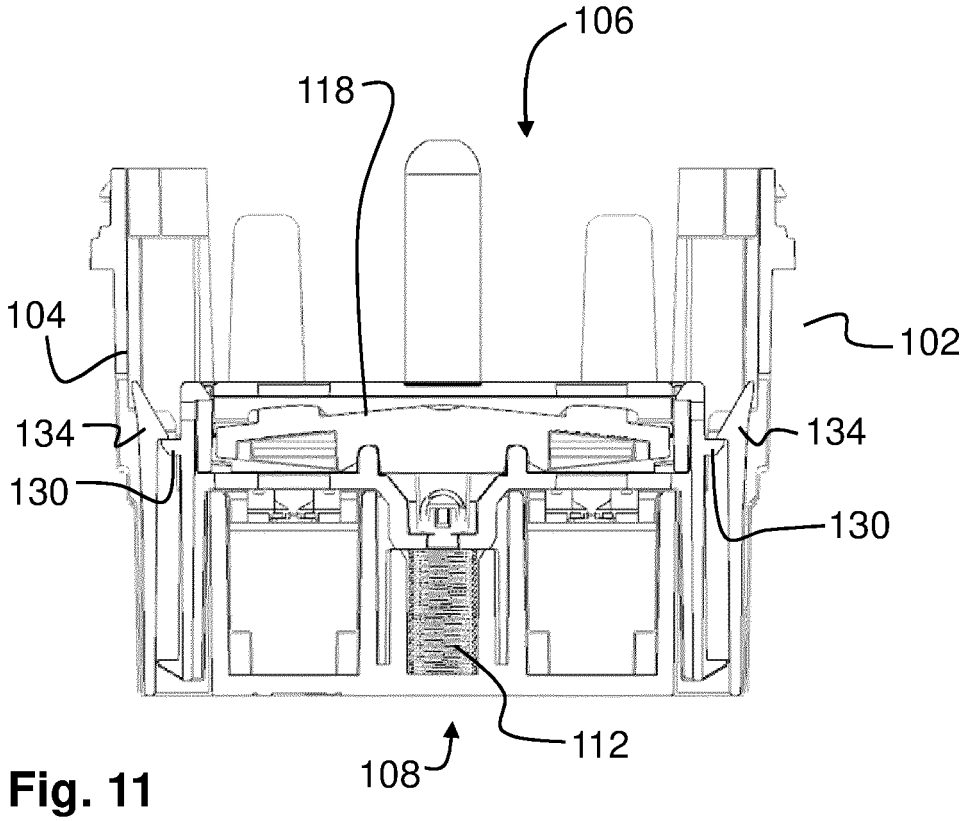
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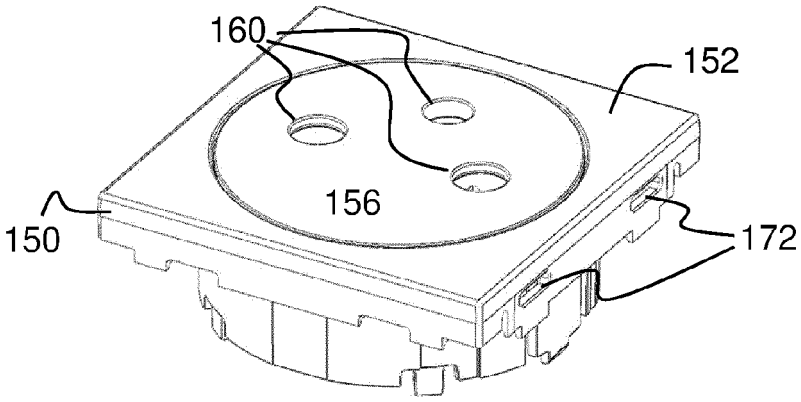
Fig. 11



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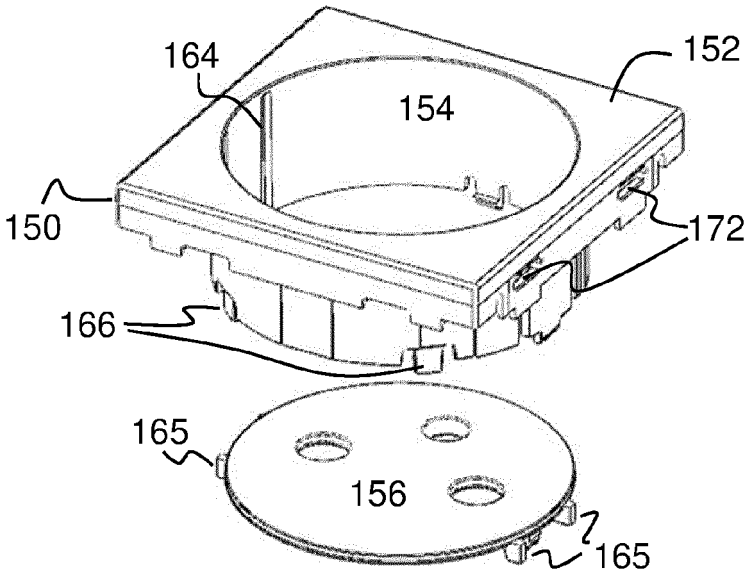
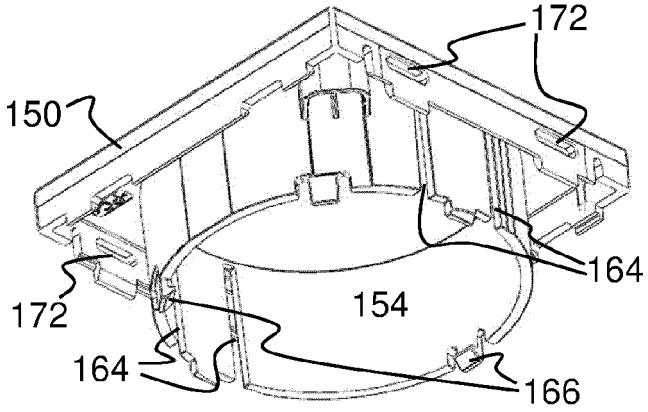


Fig. 13



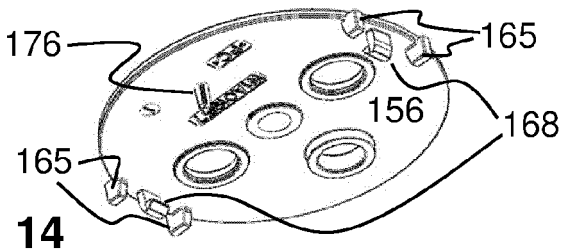
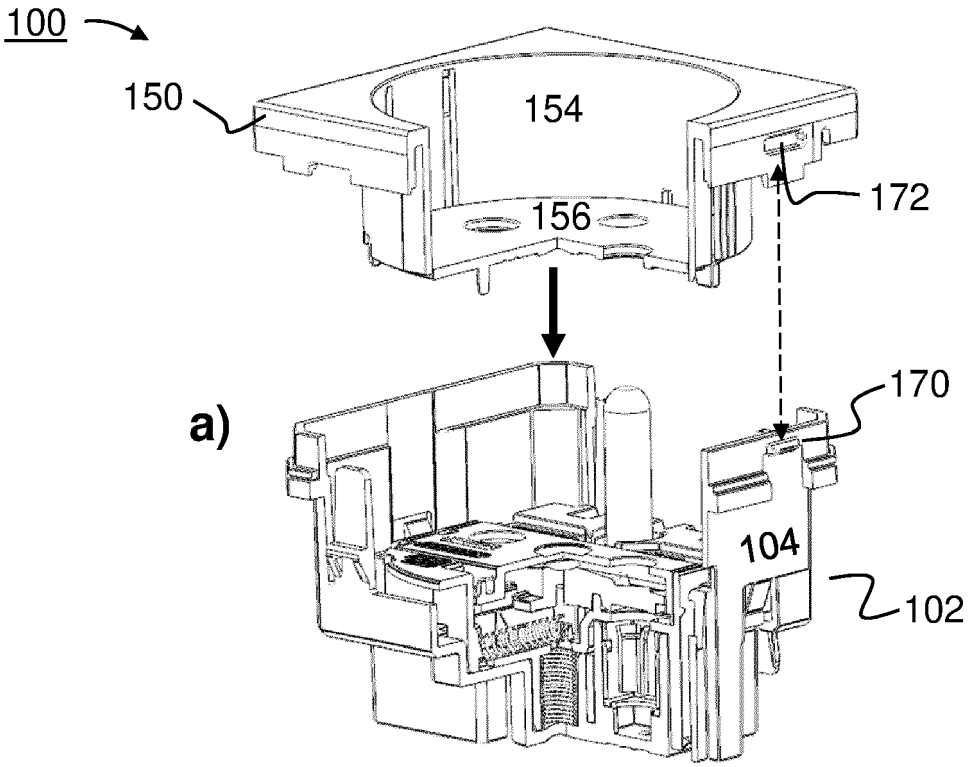


Fig. 14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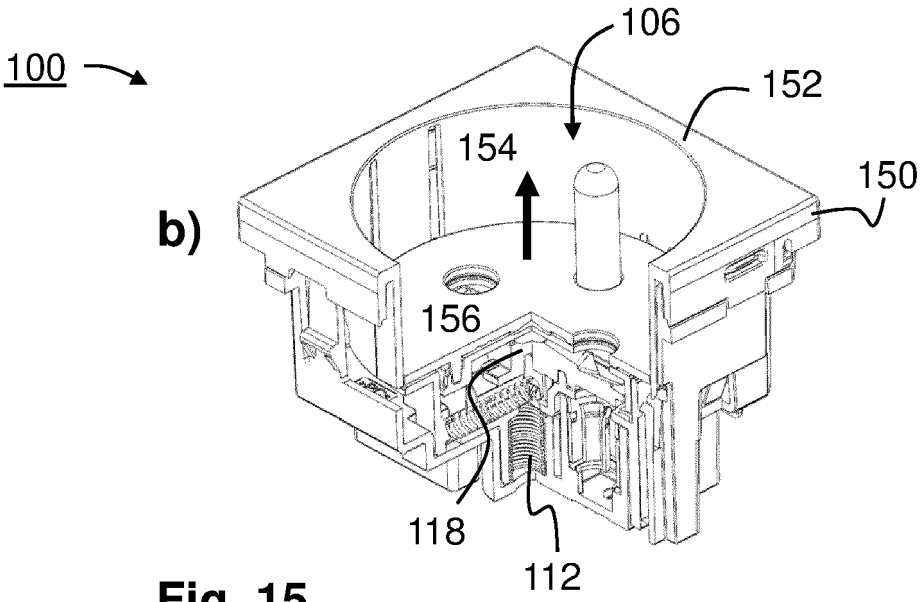
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Fig. 15

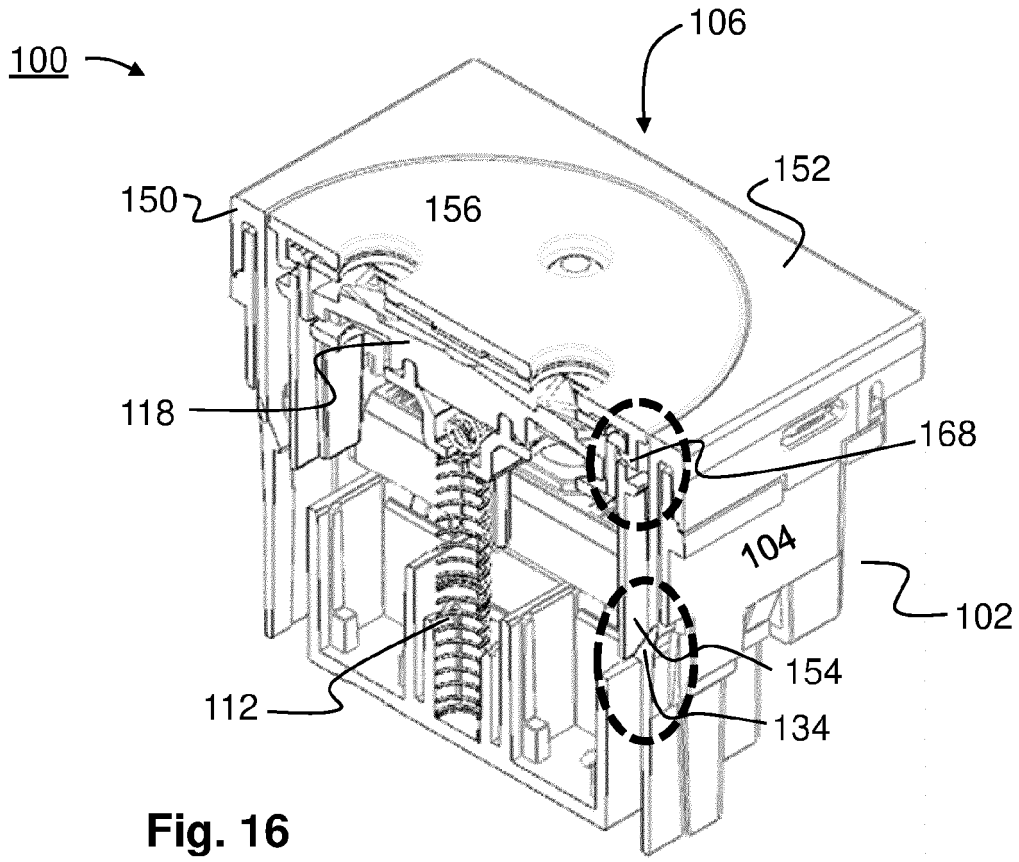
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Fig. 16

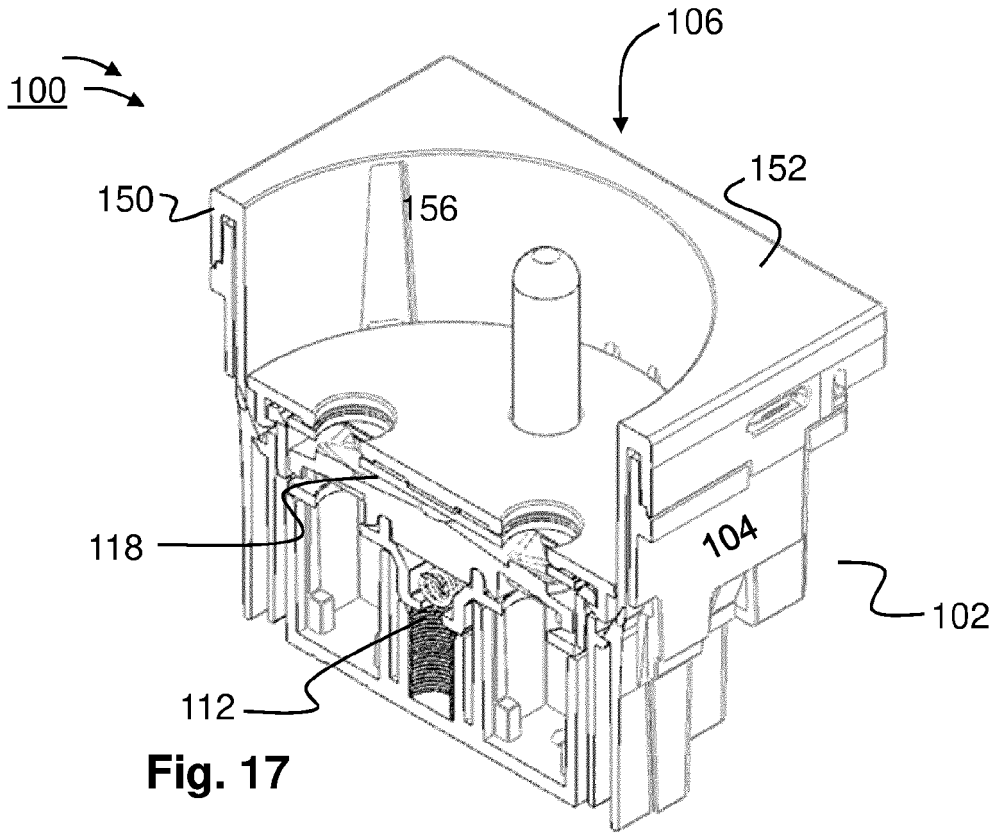
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Fig. 17

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EUROPEAN SEARCH REPORT

Application Number
EP 20 18 8685

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H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	6 November 2020	Mateo Segura, C

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