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- **Seelam, Suresh Ratna Kumar**
560066 Bangalore (IN)
- **Nilsson, Mattias**
262 74 Ängelholm (SE)
- **Clausen, Nicolai A.**
2750 Ballerup (DK)

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(74) Representative: **Grünecker, Kinkeldey, Stockmair & Schwanhäusser**
Leopoldstrasse 4
80802 München (DE)

(71) Applicant: **Schneider Electric Industries SAS**
92500 Rueil-Malmaison (FR)

(72) Inventors:
• **Pramod, Mithun Rao**
560066 Bangalore (IN)

(54) **Switch with lighting means and retrofittable electronic module**

(57) The present invention relates to a switch (101) comprises a rocker (102), a electronic module (103), an intermediate cover (104), an insert (105), a supply PCB (108), a control PCB (109), and a lighting means (110). The rocker (102) is configured to perform rocking movement between an ON position and an OFF position and being operable to turn said switch (101) ON/OFF and the electronic module (103) is provided with illuminating

means (110) configured to assume an elevated position or a depressed position relative to said switch's frontal plane in response to the movement of the electronic module (103). The rocker (105) is provided with a light transmitting portion (111) and the light emitted from said illuminating means (110) emerges through said light transmitting portion (111) of the rocker. The present invention also provides a novel electronic module (103) for rocker type switch.

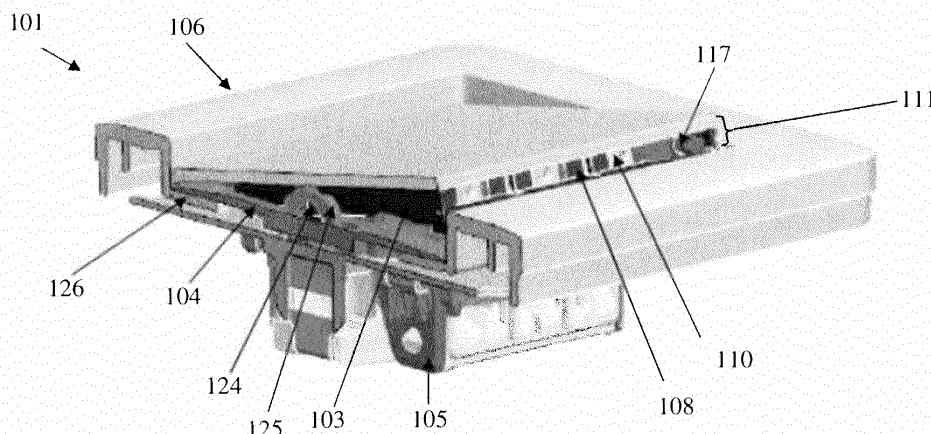


Figure 10

Description

Field of invention:

[0001] The present invention relates to switch provided with lighting means for floor lighting and/or for acting as locators or ON/OFF indicators. The present invention also provides a electronic module, having lighting means, for a rocker type switches.

Background of the invention:

[0002] Rocker type electrical switches provided with lighting means for floor light or locators or ON/OFF indicators are available in the market. Such rocker switches are of various types. The electronic circuit for such lighting means is very cumbersome and complex. Providing electrical wiring to such electronic circuit is a tedious job and the manufactures have to put in lots of effort while designing such electrical switches since very little space is available within the switch. At the same time the electrical safety of the switch cannot be compromised with.

[0003] EP 1944784 discloses an installation with light switches or indicator buttons which lights up the underneath of an electrical switch. The exact location of the switch can be detected from distance with the help of the light that comes emerges from the switch. EP 1944784 suggests the use of light guide for guiding the light out of the switch.

[0004] US 4,755,913 discloses a light emitting diode assembly installed on the back of an electrical switch wall plate to indicate the location of the switch wall plate in the dark, or to the ON/OFF condition of the switch. In US 4,755,913, the electrical connection to the locator circuit is achieved through live and neutral terminals.

[0005] US 6,621,025 discloses a rocker switch with led indicator. The LEDs are fixed and does not move with the rocker. The rocker is provided with slits through which the light coming from the LEDs is visible.

[0006] The disadvantage associated with conventional indicator and floor light type rocker switches, like the ones disclosed in the above-mentioned patents, is that in most cases the circuit or the electronic module for the lighting means is integrally formed with the INSERT. Such circuit arrangement often leads to complexity in manufacturing the product since care has to be taken that the wiring/circuit for the lighting means inside the switch is not affected by the movement of the rocker and vice-versa. Often, in such conventional switches there is leakage of light through the periphery of the racker as well as other portions of the switch, which is undesirable. Further, in such conventional rocker switches if the rocker is removed or broken the live wires of the switch become exposed, which can lead to fatal consequences. Moreover, in none of such switches the electronic module for the lighting means is retrofittable and skilled persons are required for assembling the components of the switch.

[0007] With a view, therefore to overcome the disad-

vantages associated with conventional rocker switches with floor light or locators or ON/OFF indicators, the inventors felt the need to develop a novel switch having the lighting means incorporated with the electronic module for such lighting means. The electronic module is retrofittable and is adapted to swivel along with the rocker. As compared to prior art, the invented switch is simpler in construction and has lesser components. In the invented switch the electronic module occupies very little space within the switch. The wiring to the electronic module has been properly disposed within the switch to cater free movement of the rocker. Moreover, in the invented switch, the live parts of the switch are not exposed even when the rocker is removed. Further, in the invented switch, undesirable leakage of light has also been taken care of. The invented switch is easy to assemble and at the same time cost effective.

Summary of the invention:

[0008] Accordingly, the present invention provides a switch comprising :

- a rocker configured to perform rocking movement between an ON position and an OFF position and being operable to turn said switch ON/OFF, said rocker being provided with at least a peripheral light transmitting portion,
- an intermediate cover for providing pivotal connection to said rocker,
- an insert provided with electrical terminals for establishing electrical connection with an external power supply, said insert is adapted to be actuated by said rocker for making or breaking an electric circuit,
- an electronic module movably disposed within said switch, said electronic module comprises:
 - a control PCB electrically connected to said insert, and
 - at least an illuminating means provided along one edge of said electronic module operatively connected to said control PCB and being adapted to emit light through the peripheral light transmitting portion of said rocker , said illuminating means being configured to assume an elevated position or a depressed position relative to said switch's frontal plane in response to the movement of the electronic module, and
 - an electronic module casing for housing said control PCB

wherein the movement of said electronic module is controlled by the rocking movement of the rocker and wherein the light emitted from said illuminating means emerges through said light transmitting portion of the rocker only when said electronic module assumes its elevated position.

[0009] Preferably said switch is provided with a supply PCB, and the electrical connection between said control PCB and said insert is established through said supply PCB. Resilient connectors such as pair of compression springs or leaf spring may be used to establish the electrical connection between said control PCB and said supply PCB. The electrical connection between said control PCB and said supply PCB may also be established by means of rails.

[0010] According to a particular embodiment of the invention, said control PCB is electrically connected to said insert by means of a pair of compression springs.

[0011] According to a preferred embodiment of the invention, said illuminating means is configured to move between its depressed position and its elevated position following a curved path.

[0012] According to another embodiment of the invention said electronic module is attached with said rocker and is adapted to perform rocking movement together with said rocker to allow said illuminating means to assume an elevated or depressed position. Preferably, when the electronic module is adapted to perform rocking movement together with said rocker it is removably attached to said rocker's dorsal surface.

[0013] According to yet another embodiment of the invention, said electronic module is pivotally attached with said intermediate cover and is adapted to perform rocking movement in sync with said rocker to allow said illuminating means to assume an elevated or depressed position. Preferably, when said intermediate cover and is adapted to perform rocking movement in sync with said rocker said electronic module is removably attached with said intermediate cover. The electronic module and said rocker may be adapted to perform rocking movement about the same pivotal point.

[0014] According to a further embodiment of the invention said illuminating means is configured to move between its depressed position and its elevated position following a linear path. Preferably, when illuminating means is configured to move following a linear path, said electronic module is provided with at least a resilient retracting member configured to be compressed and expanded by the movement of said rocker such that when the retracting member expands from its compressed condition the electronic module is propelled to its elevated position from its depressed position.

[0015] The illuminating means may be disposed on the surface of said control PCB and the illuminating means may be configured to emit light only during OFF condition of the switch. The peripheral light transmitting portion may defined by an opening at the base of the rocker. The base of the rocker may also be made of transparent material, such as a lens, to define said light transmitting portion.

[0016] According to a further embodiment of the invention said control PCB is provided with a photo sensor for monitoring the ambient light condition and to turn OFF said illuminating means when the intensity of the ambient

light reaches a predetermined value. The control PCB may also be provided with a potentiometer for controlling the luminance of said illuminating means, said potentiometer being provided with an actuating knob accessible through the base of said rocker. Preferably, said illuminating means comprises an array of LEDs.

[0017] The rocker may be detachably attached with the pair of inner rockers of the insert.

[0018] According to another preferred embodiment of the invention, said switch module is provided with an outer-frame circumscribing said rocker, said outer-frame being provided with inwardly extending flanges and the intermediate cover is adapted to rest on the inwardly extending flanges.

[0019] According to a still further embodiment of the invention said electronic module casing comprises two outwardly protruding engaging limbs and a slotted transverse member, each of said engaging limbs is provided with a lug for pivotally engaging with a corresponding recess provided on said intermediate cover, and said slotted transverse member is provided slot(s) for housing said control PCB. Preferably, during ON condition of the switch the rocker is adapted to flush with the surface of the outer frame in order to conceal said illuminating means, and wherein during OFF condition of the switch the rocker is adapted to incline in one direction to protrude said illuminating means above the surface of said outer frame.

[0020] According to a most preferred embodiment of the invention said electronic module is retrofittable.

[0021] The present invention also provides an electronic module for rocker type switch.

[0022] According to a preferred embodiment the invented electronic module for a rocker type switch comprises:

- a control PCB provided with at least an illuminating means and configured to be electrically connected with the electrical circuit of said switch,
- and a electronic module casing for housing said control PCB, wherein said control PCB is configured to assume an elevated position or a depressed position relative to said switch's frontal plane and wherein the movement of said electronic module between its elevated position and its depressed position is controlled by the rocking movement of a rocker of said switch.

[0023] According to another embodiment of the invented electronic module said electronic module casing comprises two outwardly protruding engaging limbs and a slotted transverse member, each of said engaging limbs is provided with a lug for pivotally engaging with a corresponding recess provided on said intermediate cover, and said slotted transverse member is provided with a slot for housing said control PCB.

[0024] According to yet another embodiment of the invented electronic module said control PCB is provided

with a photo sensor for monitoring the ambient light condition and to turn OFF said illuminating means when the intensity of the ambient light reaches a predetermined value. Preferably, said control PCB is provided with a potentiometer for controlling the luminance of said illuminating means.

[0025] According to a further embodiment of the invented electronic module said illuminating means is an array of LEDs disposed on said control PCB.

[0026] According to a still further embodiment of the invented electronic module said electronic module is provided with at least a resilient retracting member configured to be compressed and expanded by the movement of said rocker such that when the retracting member expands from its compressed condition the electronic module is propelled to its elevated position from its depressed position. Preferably, the invented electronic module is retrofittable.

Brief description of the Drawings:

[0027] For better understanding various embodiments of the invention will now be described with reference to the accompanying drawings. It will, however, be appreciated that the embodiments exemplified in the drawings are merely illustrative and not limitative to the scope of the invention, because it is quite possible, indeed often desirable, to introduce a number of variations in the embodiments that have been shown in the drawings. In the accompanying drawings:

Figure 1 is a schematic dismantled view of a particular embodiment of the invented switch.

Figure 2 is a schematic perspective view of the rocker mounted on the insert according to the particular embodiment of the invention.

Figure 3 is a schematic top perspective view of the insert according to the particular embodiment of the invention.

Figure 4 is a schematic front perspective view of the insert according to the particular embodiment of the invention.

Figure 5 and 6 are schematic bottom views of the rocker according to the particular embodiment of the invention.

Figure 7 is a schematic top perspective view of the intermediate cover according to the particular embodiment of the invention.

Figure 8 is another schematic perspective view of the rocker mounted on the insert and snapped to the intermediate cover according to the particular embodiment of the invention.

Figure 9 is a schematically sectional view of a particular embodiment of the switch show the working position of the rocker and the electronic module under ON condition of the switch.

Figure 10 is a schematically sectional view of a particular embodiment of the switch show the working position of the rocker and the electronic module under OF condition of the switch.

Figure 11 schematically shows the assembling of the electronic module with the rocker according to the particular embodiment of the invention.

Figure 12 is a sectional perspective view of the particular embodiment of the switch showing the assembling of the electronic module within the switch under OFF condition, with the rocker removed, according to the particular embodiment of the invention.

Figure 13 is a sectional bottom view of the particular embodiment the switch schematically showing the control PCB housed within the electronic module casing and the supply PCB housed within the intermediate cover.

Figure 14 schematically shows a particular embodiment of the invented electronic module.

Figure 15 schematically shows a dismantled view of the insert and the fixing frame according to a particular embodiment of the invention.

Figure 16 schematically shows an isometric view of a particular embodiment of the invented electronic module sans casing.

Figure 17 schematically shows an isometric view of another embodiment of the invented electronic module sans casing.

Figure 18 schematically shows a bottom perspective view of another embodiment of the electronic module attached to a rocker.

Figure 19 is a schematic sectional view of another embodiment of the switch under ON condition; the switch being provided with the electronic module illustrated in figure 18.

Figure 20 schematically shows an isometric view of a further embodiment of the invented electronic module sans casing.

Figure 21 schematically shows an isometric view of yet another embodiment of the invented electronic module sans casing.

Figure 22 schematically shows an isometric view of a still further embodiment of the invented electronic module sans casing.

Figure 23 schematically shows an isometric view of still another embodiment of the invented electronic module sans casing.

Figure 24 schematically shows an isometric view of an additional embodiment of the invented electronic module sans casing.

Figure 25 (a) schematically shows an isometric view of a preferred embodiment of the invented electronic module with retracting member under compressed condition.

Figure 25 (b) schematically shows an isometric view of a preferred embodiment of the invented switch under ON condition, sans rocker, with the electronic module as illustrated in figure 25 (a).

Figure 26 (a) schematically shows an isometric view of a preferred embodiment of the invented electronic module with retracting member under expanded condition.

Figure 26 (b) schematically shows an isometric view of a preferred embodiment of the invented switch under OFF condition, sans rocker, with the electronic module as illustrated in figures 26 (a).

Figure 27 (a) is a schematic sectional view of the preferred embodiment of the switch provided with the electronic module illustrated in figure 26 (a) under ON condition.

Figure 27 (b) is a schematic sectional view of the preferred embodiment of the switch provided with the electronic module illustrated in figure 26 (b) under OFF condition.

Figure 28 is a schematic perspective view of yet another embodiment of the invented switch, sans insert, provided with the electronic module as shown in figure 23.

Figure 29 schematically shows another perspective view of the invented switch, sans insert, illustrated in figure 28.

Detailed Description of the Drawings:

[0028] Figure 1 of the accompanying drawings illustrates a particular embodiment of the invented switch (101). As seen in figure 1 the switch (101) comprises a rocker (102), an electronic module (103), an intermediate cover (104), an insert (105), an outer frame (106), a fixing

frame (107) and a supply PCB (108) (not seen in figure 1). The rocker (102) is configured to perform rocking movement between an ON position and an OFF position and being operable to turn said switch (101) ON/OFF. The electronic module (103) is movably disposed within said switch (101). The electronic module (103) comprises a control PCB (109), an array of LEDs (110) to constitute an illuminating means for the switch (101) and a electronic module casing (C) for housing said control PCB (109). The array of LEDs (110) are operatively connected to the control PCB (109), and are disposed on the surface of said control PCB (109). The LEDs (110), i.e. the illuminating means, are configured to assume an elevated position and a depressed position relative to the frontal plane of the switch (101) in response to the movement of the electronic module (103). The rocker (102) is provided with an opening (111) (as shown in figure 10) near its base to define a peripheral light transmitting portion for the switch (101). This opening (111) ensures that light emitted from the LEDs (110) emerges only through the opening (111). Preferably, the LEDs (110) are illuminated only during OFF condition of the switch (101). Thus the light that is emitted from the LEDs (110) and that emerges from opening (111) act as "floor light" and at the same time it aids in locating the switch (101) during darkness. The LEDs can also be used as ON/OFF indicator, indicating the condition of the switch (101). The fixing frame (107) is provided for fixing the switch (101) to a rigid surface such as wall. The intermediate cover (104) provides pivotal connection to the rocker (102) and is disposed above the insert (105).

[0029] As seen in figure 1, the electronic module (103) is pivotally connected to said intermediate cover (104) and is disposed between the rocker (102) and the intermediate cover (104). The insert (105) is provided with electrical terminals (112) (shown in figure 15) for establishing electrical connection with an external power supply. The insert (105) is adapted to be actuated by the rocker (102) for establishing or breaking an electric circuit.

[0030] The supply PCB (108) is provided with spring members (113) as conductor paths for establishing electrically connection with said insert (105), while the control PCB (109) is provided with electrical wires (114) as conductor paths for establishing electrical connection with said supply PCB (108) as shown in figures 11, 13 and 14 of the accompanying drawing. The wires (114) are soldered (S) at their respective ends to the control PCB (109) and to the supply PCB (108). Thus, the electrical wiring between control PCB (109) and supply PCB (108) has been provided in such a way that it does not create any hindrance to the rocking movement of the rocker (102). As seen in figure 13 the supply PCB (108) is housed within said intermediate cover (104) and the control PCB (109) is housed within said electronic module casing (C).

[0031] The electronic module (103) is configured to move along with said rocker (102) in sync. Thus, when

the rocker (102) performs rocking movement, the electronic module casing (C), the control PCB (109) and the LEDs (110) are adapted to move in sync with the rocker (102). The rocker (102) and the electronic module (103) are adapted to perform the rocking movement about the same pivotal axis of the intermediate cover (104) as seen in figures 9 and 10 of the accompanying drawings.

[0032] Referring to figure 11 of the accompanying drawings the control PCB (109) is provided with a photo sensor (115) for monitoring the ambient light and turn off the LEDs (110) when the intensity of the ambient light reaches a predetermined value.

[0033] According to a particular embodiment of the invention, as shown in figure 16 of the accompanying drawing the control PCB (209) is provided with SMD photo sensor (215) ; and according to another embodiment of the invention, as shown in figures 17, 20, 21, 22, 23 and 24 of the accompanying drawings each of the control PCBs (309, 409, 509, 609, 709, 809) is provided with a through hole photo sensor (315, 415, 516, 615, 715, 815) . The photo sensors (215, 315, 415, 516, 615, 715, 815) monitor the ambient light condition and turn the respective LEDs (210, 310, 410, 510, 610, 710, 810) OFF when the intensity of the ambient light reaches a predetermined value. Thus photo sensors (215, 315, 415, 515, 615, 715, 818) are provided as energy saving feature of the invention.

[0034] Referring as shown in figures 11, 13 to 17 and figures 20 to 24 of the accompanying drawings each of the control PCBs (109, 209, 309, 409, 509, 609, 709, 809) is also provided with a potentiometer (116, 216, 316, 416, 516, 616, 716, 816), respectively, for controlling the intensity of the light emitted from the LEDs (110, 210, 310, 410, 510, 610, 710, 810) . Each of the potentiometers (116, 216, 316, 416, 516, 616, 716, 816) is actuated by means of the knob (117, 217, 317, 417, 517, 617, 717, 817) respectively. The potentiometers (116, 216, 316, 416, 516, 616, 716, 816) can be used to turn OFF the LEDs (110, 210, 310, 410, 510, 610, 710, 810) if the user so wishes.

[0035] As seen in figures 2, 3, 4 and 15 the insert (105) comprises:

- a pair of inner rockers (118(a), 118(b)),
- a base cover (119) on which said pair of inner rockers ((118(a), 118(b))) are supported,
- electrical terminals (112) (shown in figure 15 only) disposed below said base cover (119), and
- a base unit (120) for housing said electrical terminals (111) and for supporting said base cover (119).

[0036] The electrical connection between said switch (101) and an external power supply is established through said terminals (112). The insert (105) under assembled condition has been illustrated in figure 4 of the accompanying drawings. The rocker (102) is detachably attached the insert (105) as shown in figures 2 and 8. The rocker (102) is attached to the pair of inner rockers

118(a) and 118(b) of the insert (105) by means of ribbed members (121) shown in figures 5 and 6.

[0037] Referring to figure 14, the electronic module casing (103) comprises of two outwardly protruding engaging limbs (122) and a transverse slotted member (123) extending between said engaging limbs (122). Each of said engaging limbs (122) is provided with a lug (124) for pivotally engaging with a corresponding recess (125) provided on the intermediate cover (104). The transverse slotted member (123) is provided with a slot (not shown) within which the control PCB (109) is housed, as seen in figure 14. The knob (117) protrudes out from the transverse slotted member (123). According to this preferred embodiment the transverse slotted member (123) has transparent regions through which the LEDs (110) are visible.

[0038] Referring to figures 9, and 10 of the accompanying drawing, the outer-frame (106) circumscribes said rocker (102). The outer-frame being provided with inwardly extending flanges (126) and the intermediate cover (104) is adapted to rest on these flanges (126), as seen in figure 9 and 10 of the accompanying drawings.

[0039] The electronic module (103) is pivotally and detachably attached to said intermediate cover (104) as seen in figures 9 and 10 of the accompanying drawing. The rocker (102) is pivotally attached to the intermediate cover (104) by means of clips (127) shown in figures 5 and 6. As seen in figure 7, the intermediate cover (104) is provided with corresponding protrusions (128) to removably engage with the clips (127).

[0040] The electrical connection between each of the control PCBs (109, 209, 309) and their respective supply PCB (108, 208, 308) may be established by means of wires (114, 214, 314) and the electrical connection to each the supply PCBs (108, 208, 308) is established through the respective spring member (113, 213 and 313) as shown in figures 11, 13, 14, 16 and 17 of the accompanying drawings respectively. Referring to figures 21 and 22 of the accompanying drawings, each of the control PCBs (509, 609) is electrically connected to the respective supply PCB (508, 608) by means of a pair of compression springs (529, 629), respectively while, the electrical connection to each of the supply PCBs (508, 608) is established through respective spring member (513, 613) .

[0041] Referring to figures 23, 28 and 29 of the accompanying drawings the control PCB (709) of the electronic module (703) (not seen in figure 23) is electrically connected to the supply PCB (708) by means of a pair of leaf springs (729). The electronic module (703) is adapted to execute rocking movement in sync with rocker (702). The electrical connection to the supply PCB (708) is established through a pair of spring members (713).

[0042] Referring to figure 24 the control PCB (809) is electrically connected to the supply PCB (808) through rails (830). The electrical connection to the supply PCB (808) is established through a pair of spring members (813).

[0043] As seen in figures 18 and 19 of the accompanying drawings, the electrical connection between the control PCB (409) and the insert (405) is established directly through a pair of compression springs (413); there is no supply PCB according to this embodiment.

[0044] Referring to figures 1, 2, and 8 to 13 of the accompanying drawings the electronic module (103) is adapted to execute rocking movement in sync with the rocker (102). According to the embodiment of the switch (401) illustrated in figure 19, the electronic module (403) is attached at the dorsal surface (431), i.e. at the back surface of the rocker (402) as can be seen in figure 18. The electronic module (403) is adapted to execute rocking movement together with the rocker (402). Thus, according to the embodiments illustrated in figures 1, 2, 8, 9, 10, 11, 12, 13, 18 and 19 the electronic modules (103, 403) are adapted to follow a curved path while moving between their raised position and their depressed position.

[0045] Referring to figures 21, 25 (a), 25(b), 26 (a), 25 (b), 27(a), and 27 (b) of the accompanying drawings, the electronic module (503) is provided with a pair of resilient retracting members (532). The resilient retracting members (532) are configured to be compressed and expanded by the movement of the rocker (502) as seen in figures 27 (a) and 27(b). When the retracting members (532) expand from their compressed condition the electronic module (503) is propelled to its elevated position from its depressed position. The electronic module (503) is removably attached to the intermediate cover (504) and the intermediate cover (504) is disposed on insert (505) as seen in figures 25(b) and 26 (b) of the accompanying drawings.

[0046] The working of a particular embodiment of the invented switch (101) shall now be explained with the aid of figures 9 and 10 of the accompanying drawings. During ON condition of the switch (101) the rocker (102) is adapted to remain flush with the surface of the outer frame (106) and thereby concealing the LEDs (110). The LEDs are then in their depressed position. When switch (101) is turned OFF from ON condition, the top portion of the rocker (102) is adapted to incline backwardly and the base portion of the rocker is adapted to incline upwardly. By this movement of the rocker (102) the LEDs (110) are protruded above the surface of said outer frame (106), i.e. above the frontal plane of the switch (101) and are moved to their elevated position from their depressed position. The light emitted from the LEDs (110) become visible from the base portion of the rocker (102).

[0047] According to another embodiment of the switch (401), as illustrated in the figure 19 of the accompanying drawings, the movement of the electronic module (403) is controlled by the movement of the rocker (402). When the switch (401) is under ON condition the rocker (402) remains in flush with the outer frame (not shown) of the switch (401). In other words, when the switch (401) is on LEDs (410) are retained their depressed position and are concealed by the outer frame (not shown) of the switch

(401). When the switch (401) is turned OFF, the base portion of the rocker (402) together with the LEDs (410) protrude above the frontal plane of the switch (401), which in this case is the frontal plane of the outer frame (not shown) of the switch (401). The light emitted from LEDs (410) and through the base portion of the rocker (402) becomes visible.

[0048] The working of the invention according to a further embodiment of the invented switch (501) shall now be explained with reference to figures 25 (a) , 25 (b), 26 (a), 26 (b), 27 (a) and 27 (b) of the accompanying drawing. During ON condition of the switch (501) the rocker (502) is adapted to remain flush with the outer frame (506), as seen in figure 27 (a), and the resilient retracting members (532) (only one is visible) are adapted to remain in contracted condition. During this ON condition of the switch (501), the LEDs (510) are retained in their depressed position as shown in figures 25 (a) and 25 (b) of the accompanying drawings. When the switch (501) is turned OFF, the base part of the rocker (502) moves above the frontal plane of the switch (501), which in this case is the frontal plane of the outer frame (506) and the resilient retracting members (532) are now allowed to expand, as seen in figures 26 (a), and 26 (b) . The LEDs (510) are now propelled to their elevated position, as seen in figure 26 (b) and light emitted from the LEDs becomes visible from outside though the base portion of the rocker (502) . Thus, the movement of the LEDs (510) are controlled by the movement of the rocker (502) and the electronic module (503) is adapted to move in a linear plane relative to the frontal plane of the switch (501) . As seen in figures 27 (a) and 27 (b), the retracting members (532) are rested on the supply PCB (508) so that the thrust required for expansion and contraction of the retracting members (532) can be obtained from the surface of the supply PCB (508) . The electronic module (503) is provided with potentiometer (516) for controlling the luminance of the LEDs (510) . The potentiometer is (516) is actuated by the knob (517) .

[0049] As already mentioned the foregoing description is illustrative of the invention and not limitative to its scope; because it will be apparent to persons skilled in the art to devise other alternative embodiments without departing from the broad ambit of the disclosures made herein.

Claims

1. A switch comprising :

- a rocker configured to perform rocking movement between an ON position and an OFF position and being operable to turn said switch ON/OFF, said rocker being provided with at least a peripheral light transmitting portion,
- an intermediate cover for providing pivotal connection to said rocker,

- an insert provided with electrical terminals for establishing electrical connection with an external power supply, said insert is adapted to be actuated by said rocker for making or breaking an electric circuit,
 - an electronic module movably disposed within said switch, said electronic module comprises:
 - a control PCB electrically connected to said insert, and
 - at least an illuminating means provided along one edge of said electronic module operatively connected to said control PCB and being adapted to emit light through the peripheral light transmitting portion of said rocker, said illuminating means being configured to assume an elevated position or a depressed position relative to said switch's frontal plane in response to the movement of the electronic module, and
 - an electronic module casing for housing said control PCB
 wherein the movement of said electronic module is controlled by the rocking movement of the rocker and wherein the light emitted from said illuminating means emerges through said light transmitting portion of the rocker only when said electronic module assumes its elevated position.
2. The switch as claimed in claim 1, wherein said switch is provided with a supply PCB, and the electrical connection between said control PCB and said insert is established through said supply PCB.
 3. The switch as claimed in claim 1, wherein said control PCB is electrically connected to said insert by means of a pair of compression springs.
 4. The switch as claimed in claim 2, wherein said control PCB is electrically connected to said supply PCB through resilient connectors such as pair of compression springs or leaf spring
 5. The switch as claimed in claim 2, wherein said control PCB is electrically connected to said supply PCB by means of rails.
 6. The switch as claimed in any of the preceding claims, wherein said illuminating means is configured to move between its depressed position and its elevated position following a curved path.
 7. The switch as claimed in claim 6, wherein said electronic module is attached with said rocker and is adapted to perform rocking movement together with said rocker to allow said illuminating means to assume an elevated or depressed position.
 8. The switch as claimed in claim 7, wherein said electronic module is removably attached to said rocker's dorsal surface.
 9. The switch as claimed in claim any of claims 1 to 6, wherein said electronic module is pivotally attached with said intermediate cover and is adapted to perform rocking movement in sync with said rocker to allow said illuminating means to assume an elevated or depressed position.
 10. The switch as claimed in claim 9, wherein said electronic module is removably attached with said intermediate cover.
 11. The switch as claimed in claim 10, wherein said electronic module and said rocker are adapted to perform rocking movement about the same pivotal point.
 12. The switch as claimed in any of the preceding claims 1 to 5, wherein said illuminating means is configured to move between its depressed position and its elevated position following a linear path.
 13. The switch as claimed in claim 12, wherein said electronic module is provided with at least a resilient retracting member configured to be compressed and expanded by the movement of said rocker such that when the retracting member expands from its compressed condition the electronic module is propelled to its elevated position from its depressed position.
 14. The switch as claimed in any of the preceding claims, wherein said illuminating means is disposed on the surface of said control PCB.
 15. The switch as claimed in any of the preceding claims, wherein said illuminating means is configured to emit light only during OFF condition of the switch.
 16. The switch as claimed in any of the preceding claims, wherein said peripheral light transmitting portion is defined by an opening at the base of the rocker.
 17. The switch as claimed in any of the preceding claims, wherein the base of the rocker is made of transparent material to define said light transmitting portion.
 18. The switch as claimed in any of the preceding claims, wherein said control PCB is provided with a photo sensor for monitoring the ambient light condition and to turn OFF said illuminating means when the intensity of the ambient light reaches a predetermined value.
 19. The switch as claimed in any of the preceding claims, wherein said control PCB is provided with a potentiometer for controlling the luminance of said illuminating means.

nating means, said potentiometer being provided with an actuating knob accessible through the base of said rocker.

20. The switch as claimed in any of the preceding claims, wherein said illuminating means comprises an array of LEDs. 5
21. The switch as claimed any of the preceding claims, wherein said rocker is detachably attached with the pair of inner rockers of the insert . 10
22. The switch module as claimed in any of the preceding claims, wherein said switch module is provided with an outer-frame circumscribing said rocker, said outer-frame being provided with inwardly extending flanges and the intermediate cover is adapted to rest on the inwardly extending flanges. 15
23. The switch as claimed in any of the preceding claims, wherein said electronic module casing comprises two outwardly protruding engaging limbs and a slotted transverse member, each of said engaging limbs is provided with a lug for pivotally engaging with a corresponding recess provided on said intermediate cover, and said slotted transverse member is provided slot(s) for housing said control PCB. 20
24. The switch module as claimed in any of the preceding claims, wherein during ON condition of the switch the rocker is adapted to flush with the surface of the outer frame in order to conceal said illuminating means, and wherein during OFF condition of the switch the rocker is adapted to incline in one direction to protrude said illuminating means above the surface of said outer frame. 25
25. The switch as claimed in any of the preceding claims, wherein said electronic module is retrofittable. 30
26. An electronic module for a rocker type switch comprising: 35
- a control PCB provided with at least an illuminating means and configured to be electrically connected with the electrical circuit of said switch, 40
 - and a electronic module casing for housing said control PCB, 45
- wherein said control PCB is configured to assume an elevated position or a depressed position relative to said switch's frontal plane and wherein the movement of said electronic module between its elevated position and its depressed position is controlled by the rocking movement of a rocker of said switch. 50

claimed in claim 26 wherein said electronic module casing comprises two outwardly protruding engaging limbs and a slotted transverse member, each of said engaging limbs is provided with a lug for pivotally engaging with a corresponding recess provided on said intermediate cover, and said slotted transverse member is provided with a slot for housing said control PCB.

28. The electronic module for a rocker type switch as claimed in any of the preceding claims 26 and 27, wherein said control PCB is provided with a photo sensor for monitoring the ambient light condition and to turn OFF said illuminating means when the intensity of the ambient light reaches a predetermined value. 15
29. The electronic module for a rocker type switch as claimed in any of the preceding claims 26 to 28, wherein said control PCB is provided with a potentiometer for controlling the luminance of said illuminating means. 20
30. The electronic module for a rocker type switch as claimed in any of the preceding claims 26 to 29, wherein said illuminating means is an array of LEDs disposed on said control PCB. 25
31. The electronic module as claimed in any of the preceding claims 26 to 30, wherein said electronic module is provided with at least a resilient retracting member configured to be compressed and expanded by the movement of said rocker such that when the retracting member expands from its compressed condition the electronic module is propelled to its elevated position from its depressed position. 30
32. The electronic module for a rocker type switch as claimed in any of the preceding claims 26 to 31, wherein said electronic module is retrofittable. 35

27. The electronic module for a rocker type switch as

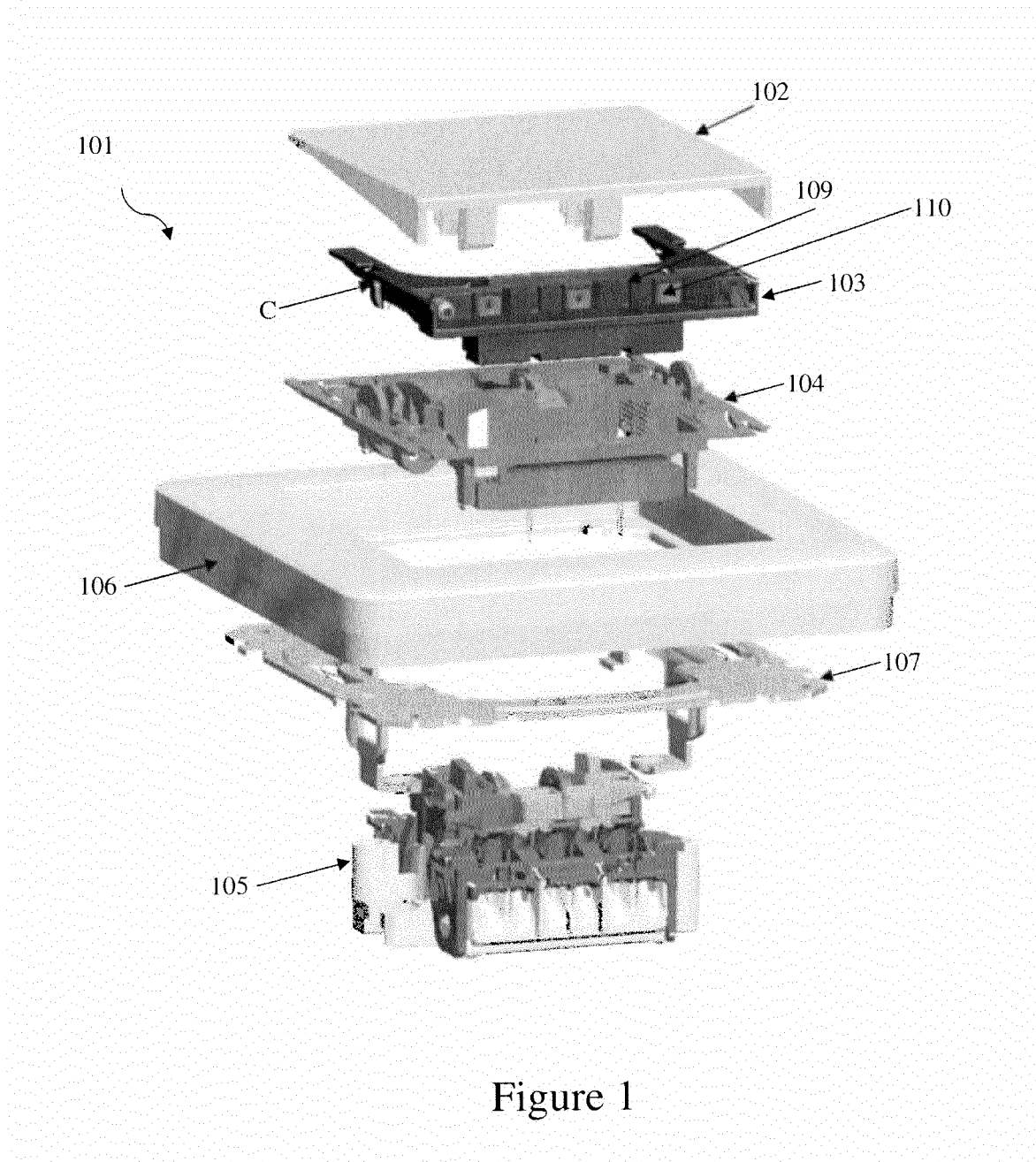


Figure 1

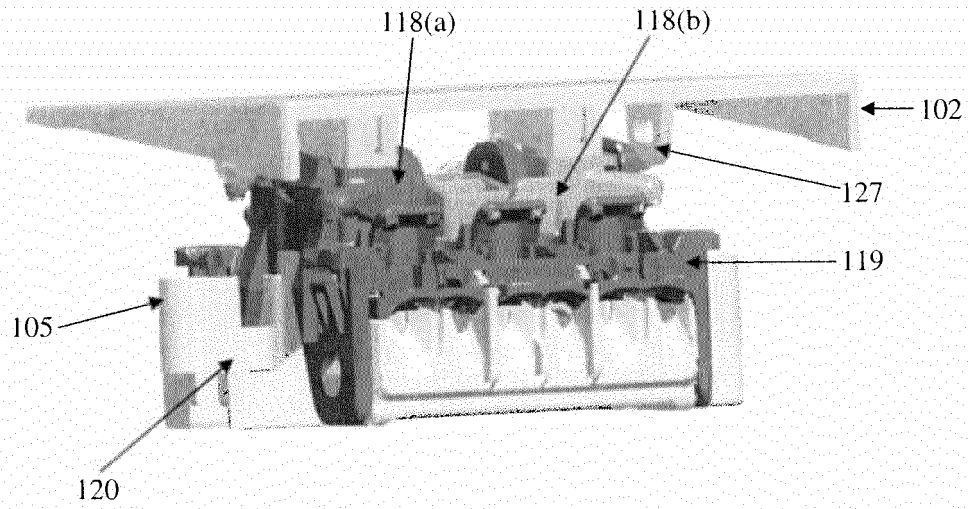


Figure 2

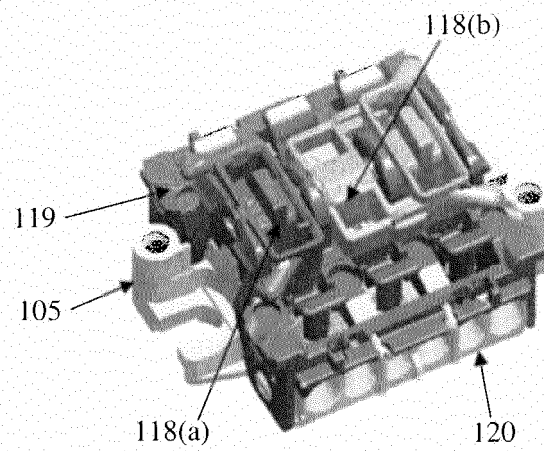


Figure 3

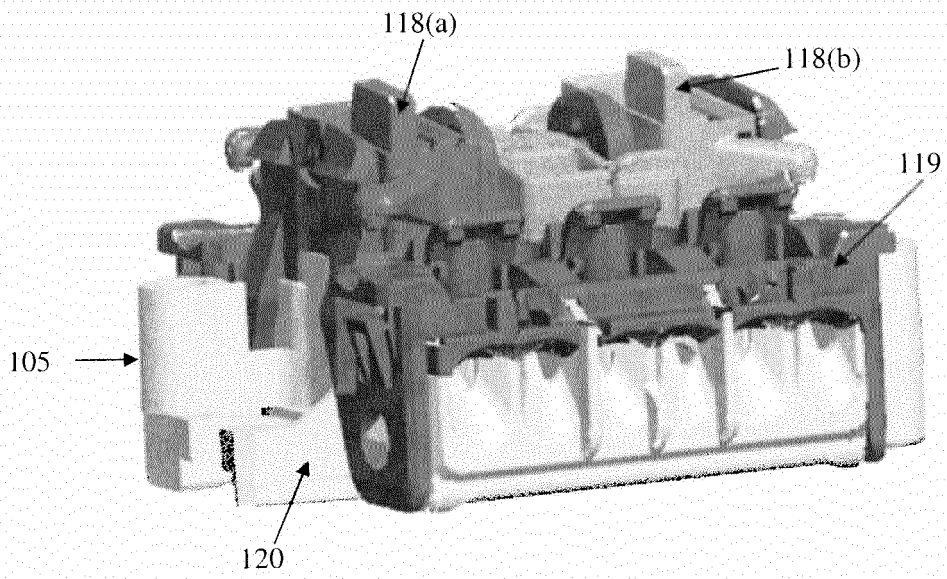


Figure 4

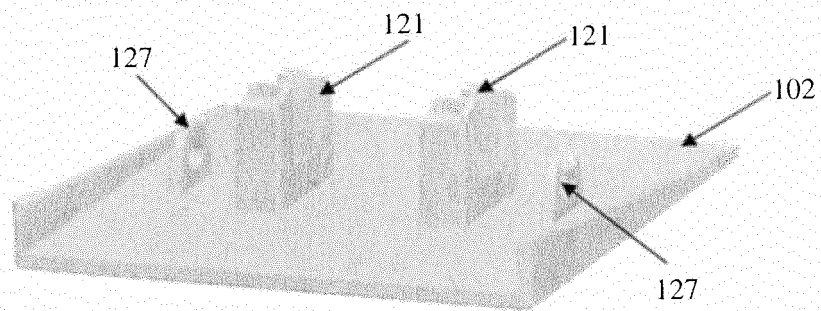


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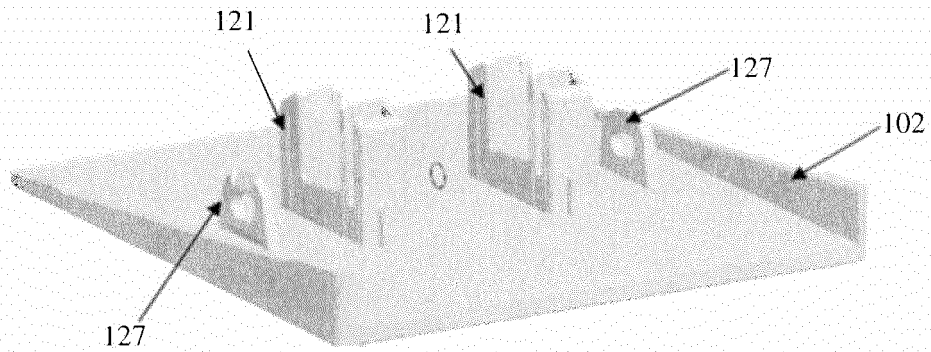


Figure 6

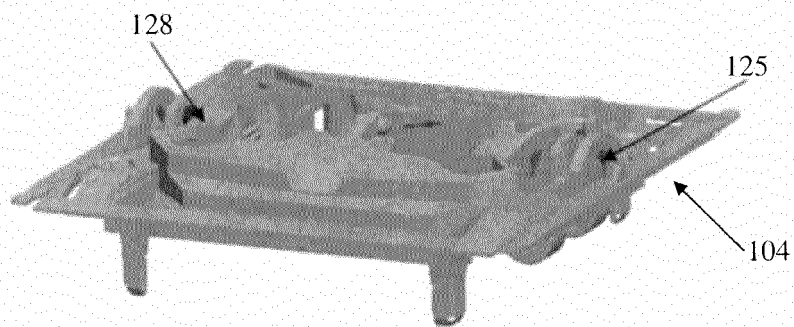


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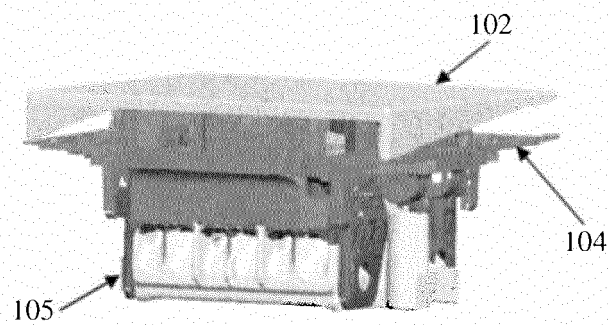


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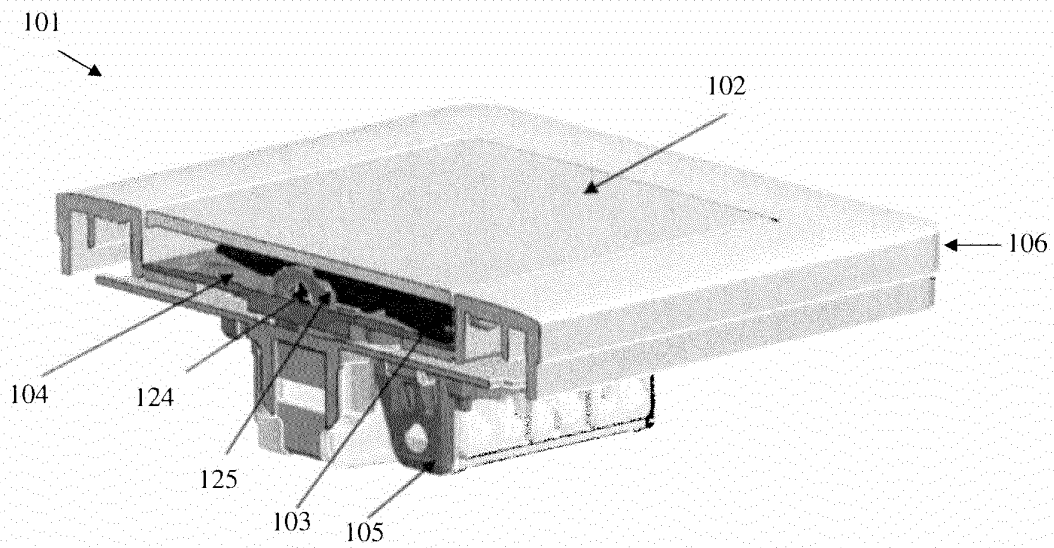


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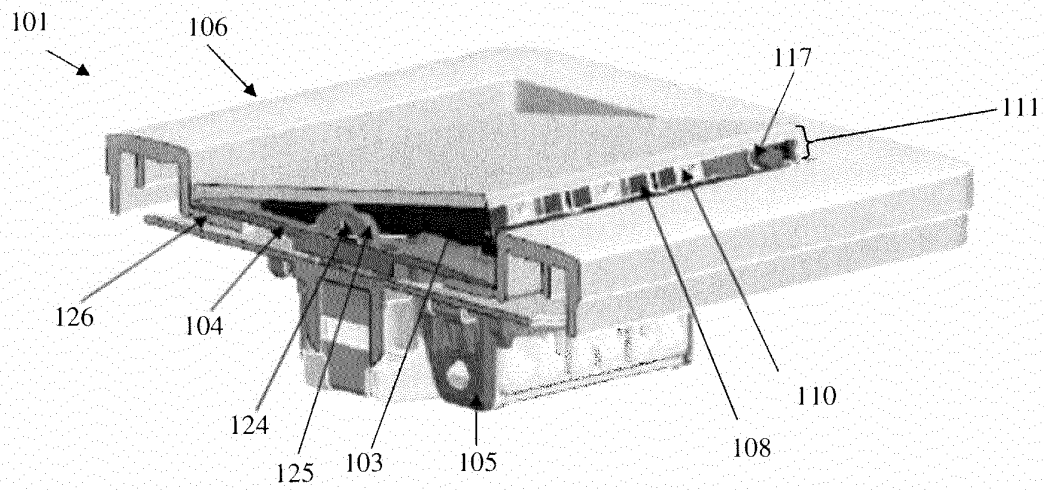


Figure 10

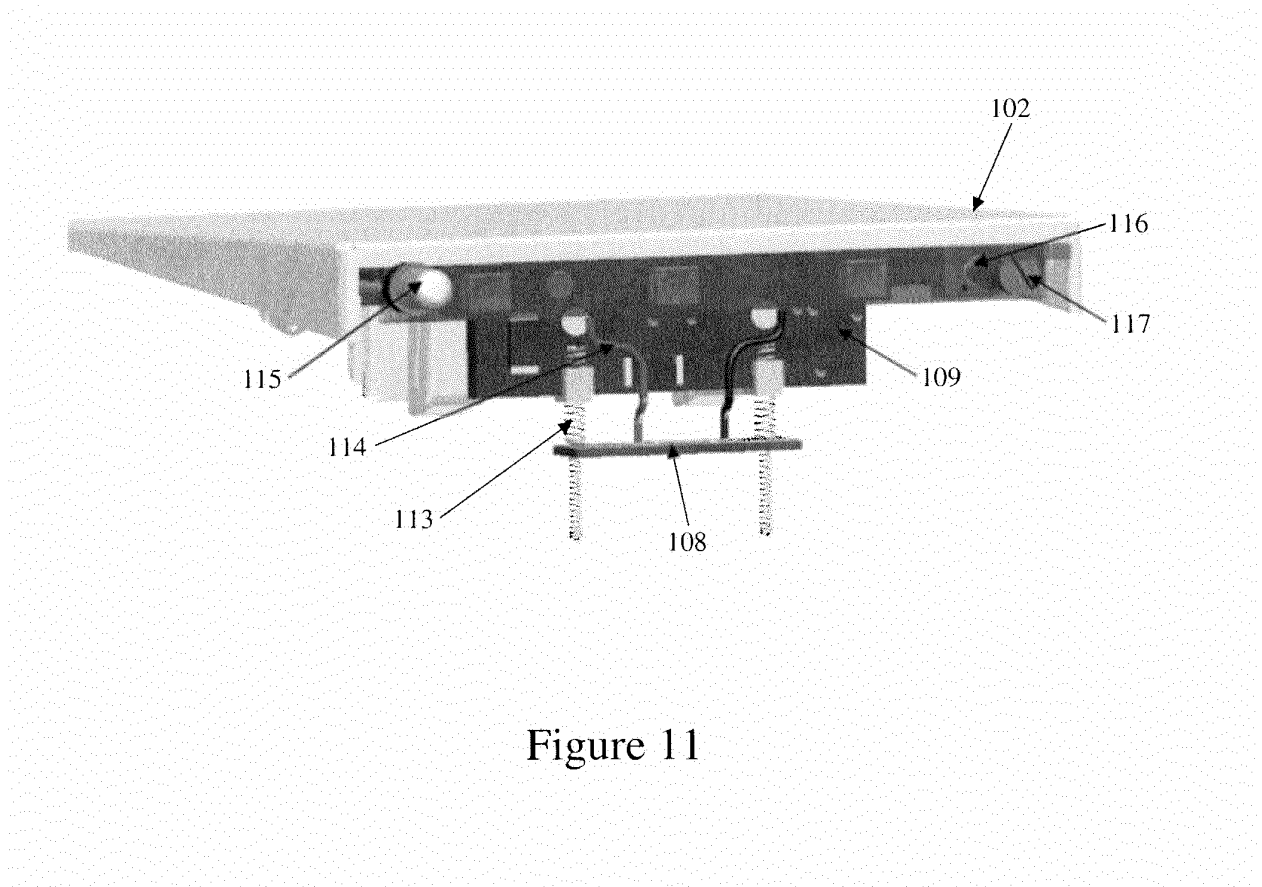


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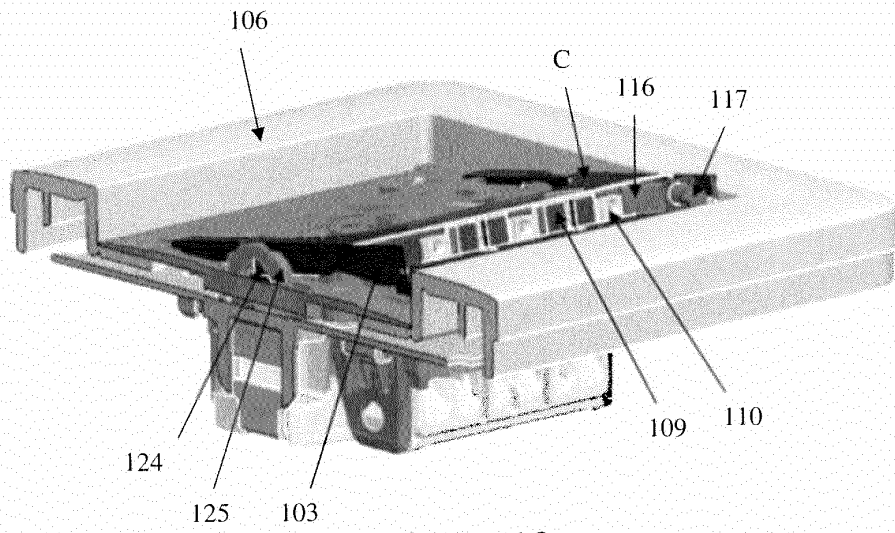


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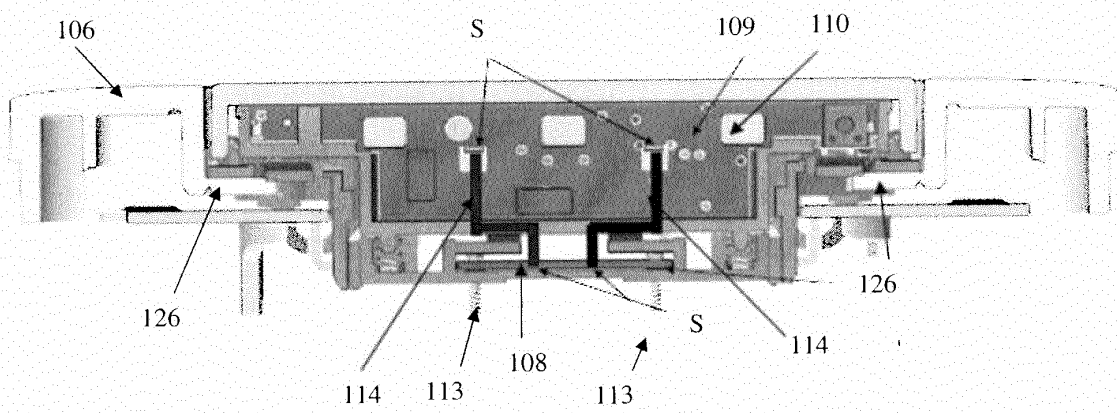


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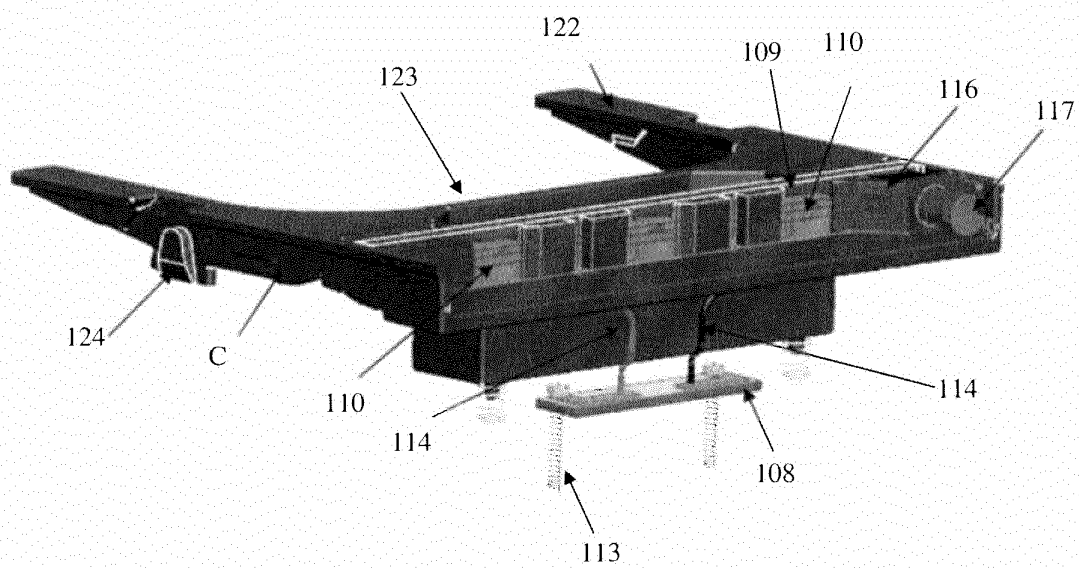


Figure 14

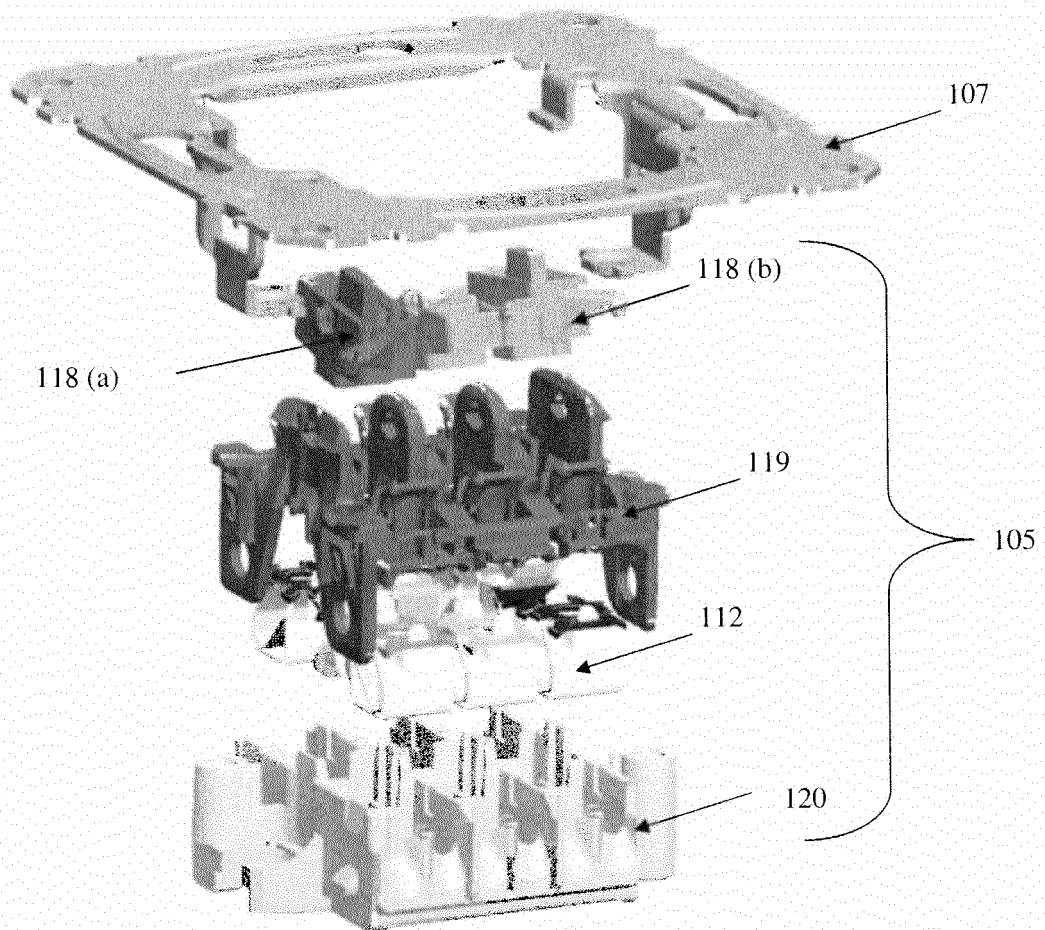


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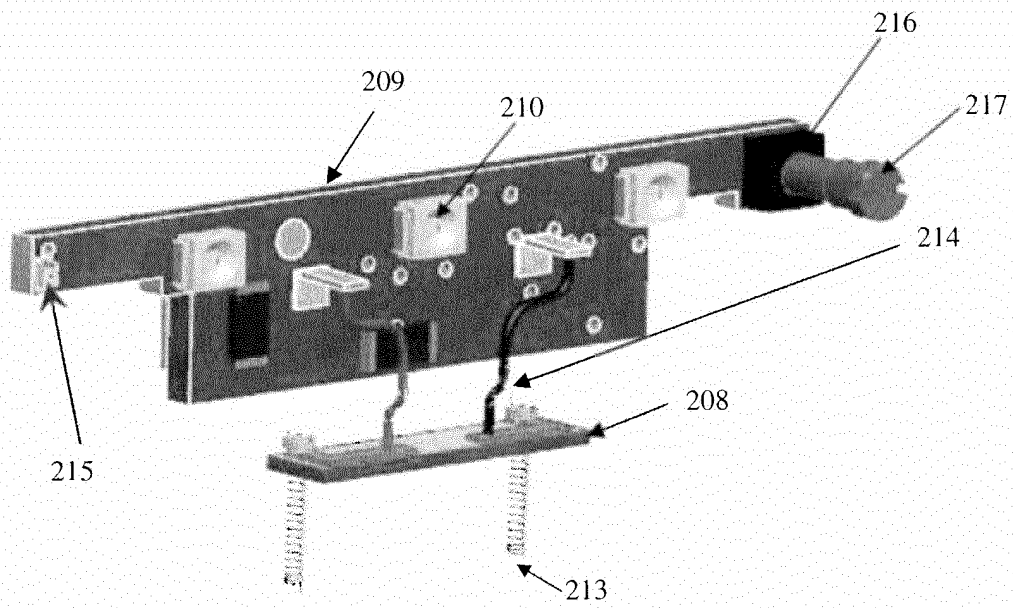


Figure 16

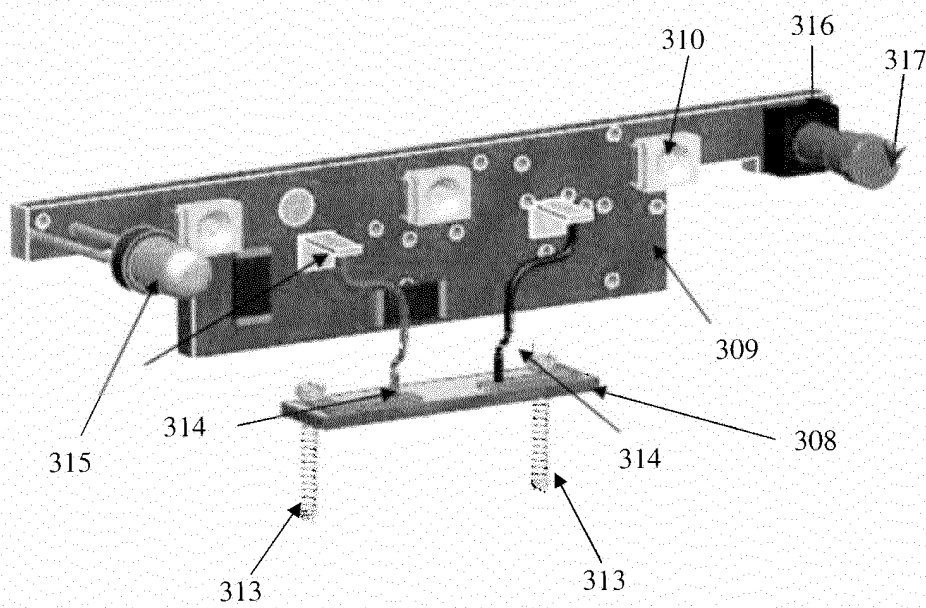


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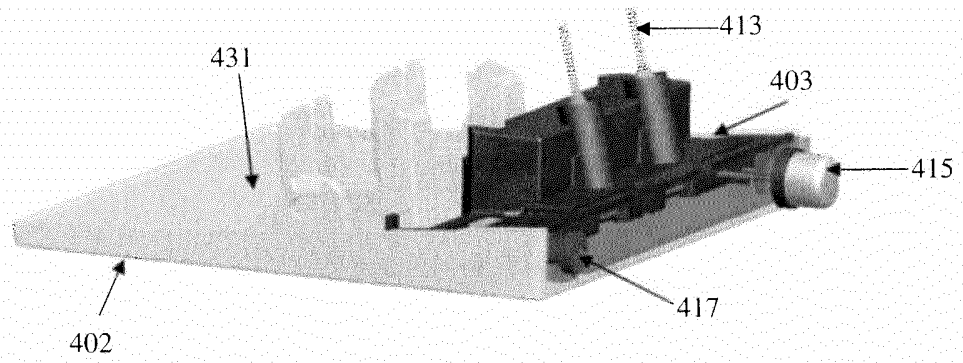


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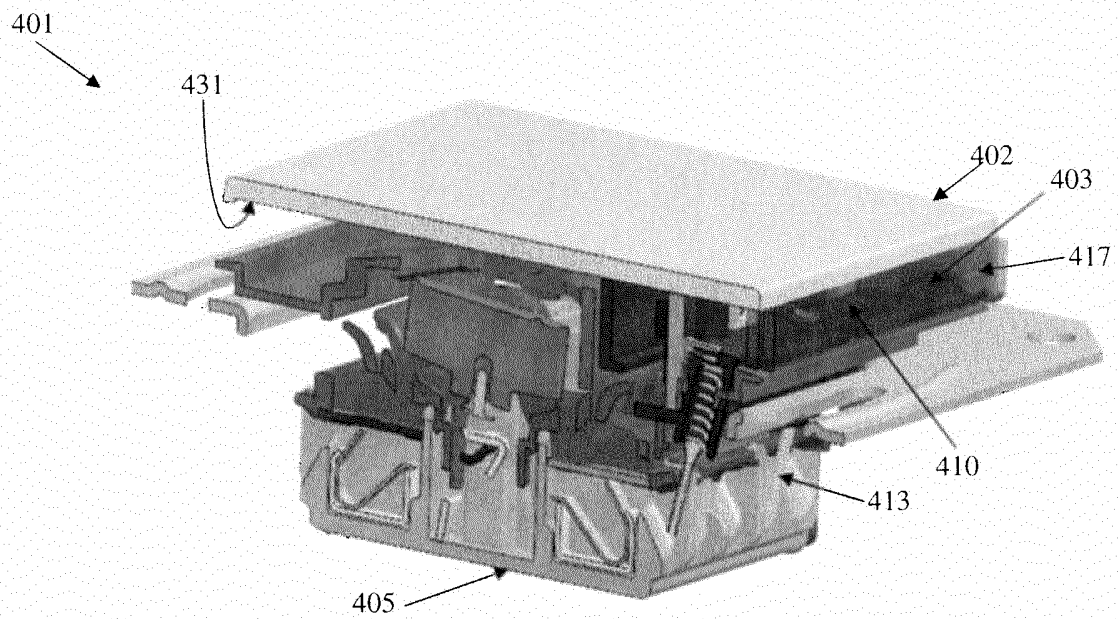


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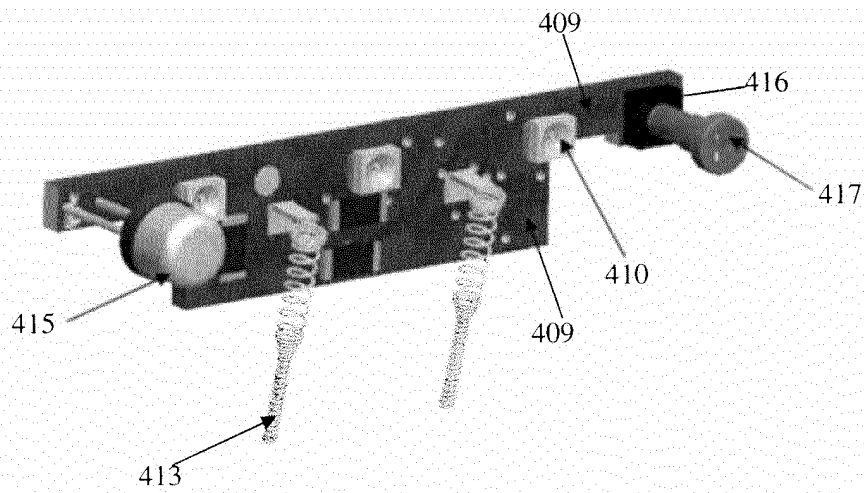


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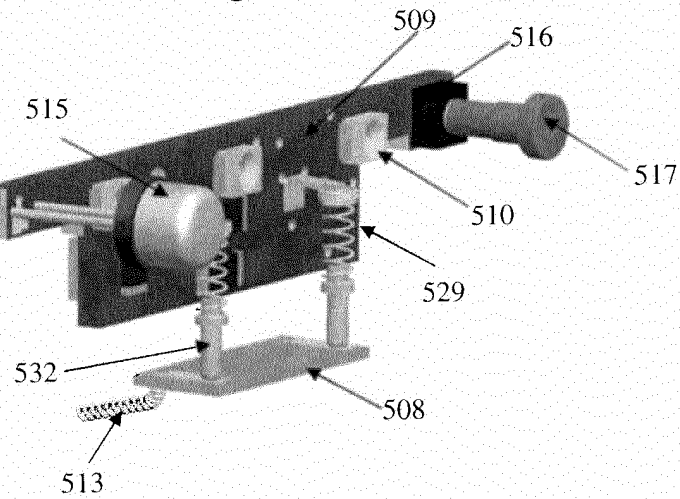


Figure 21

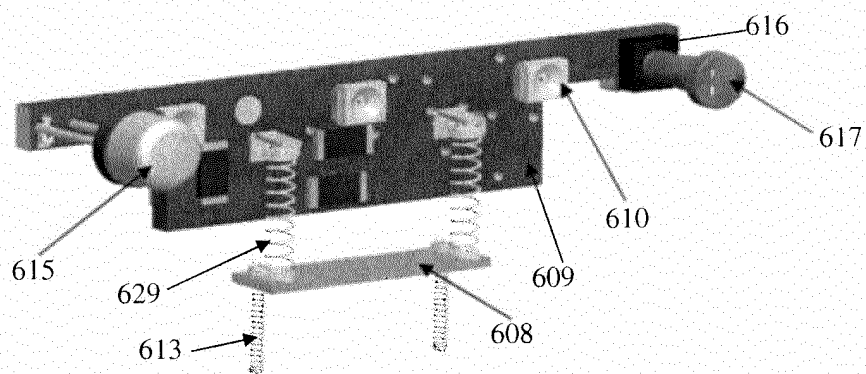


Figure 22

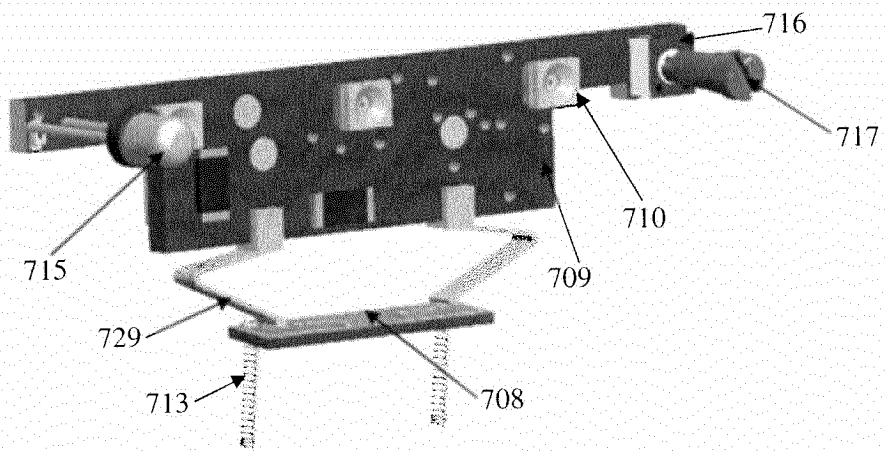


Figure 23

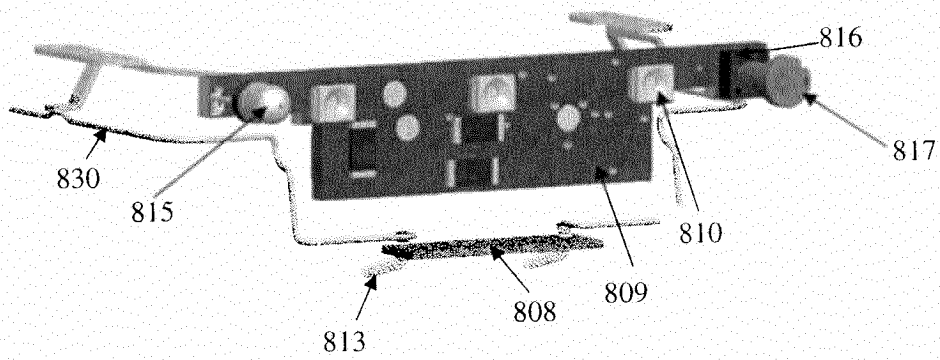


Figure 24

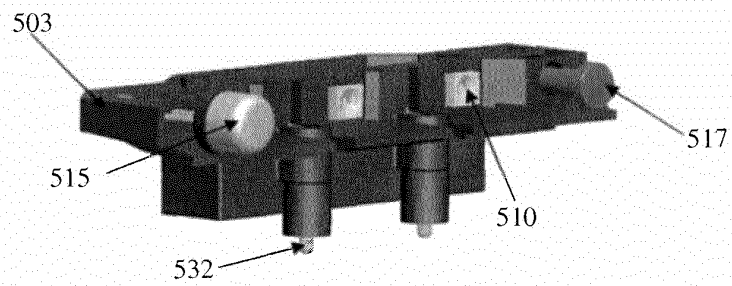


Figure 25(a)

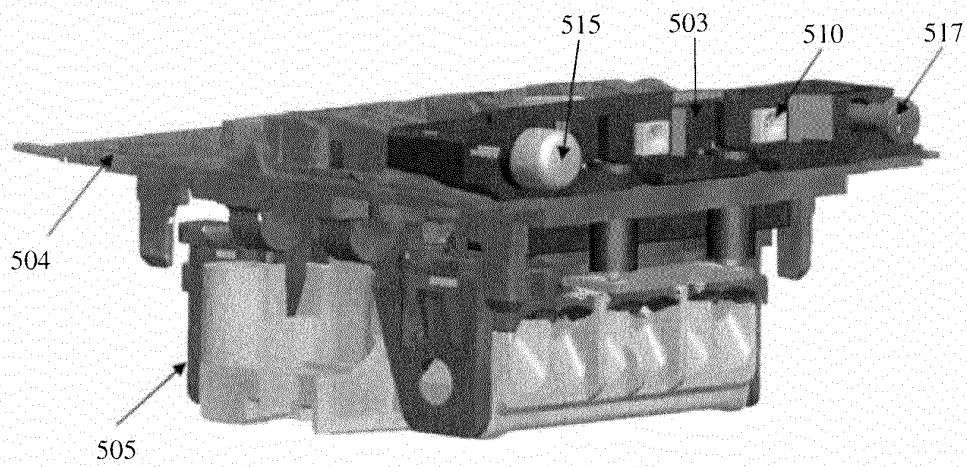


Figure 25(b)

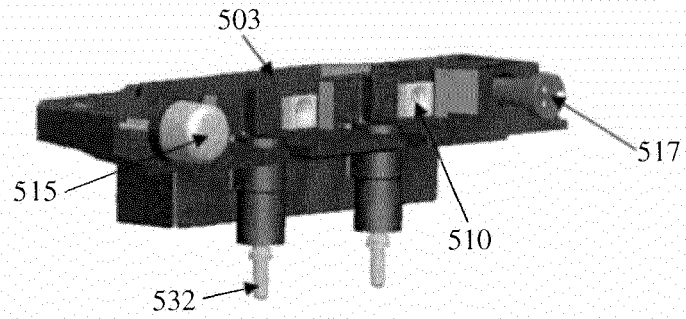


Figure 26(a)

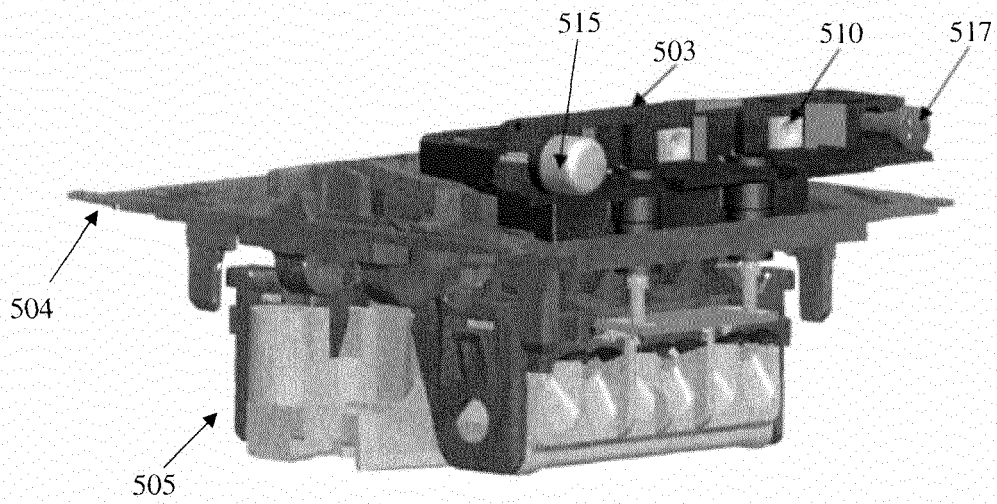


Figure 26(b)

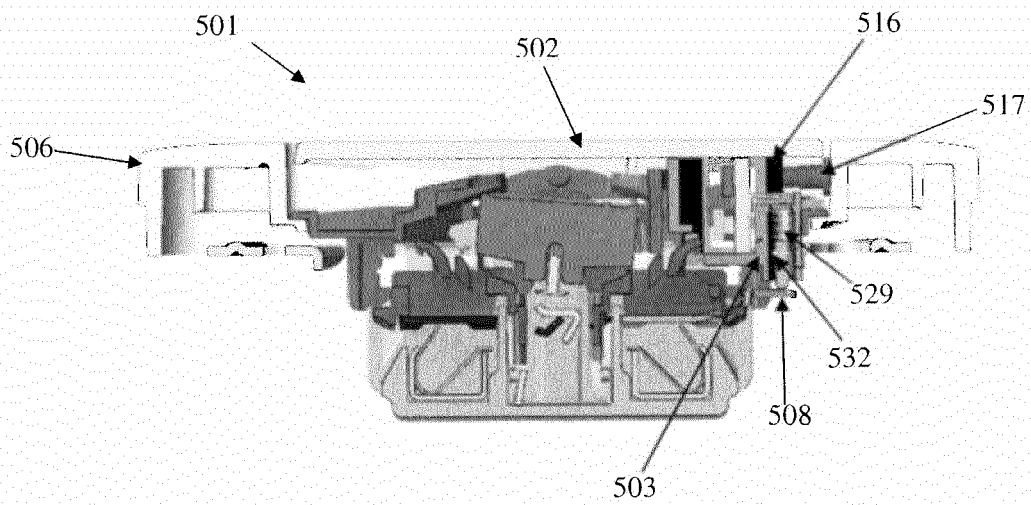


Figure 27(a)

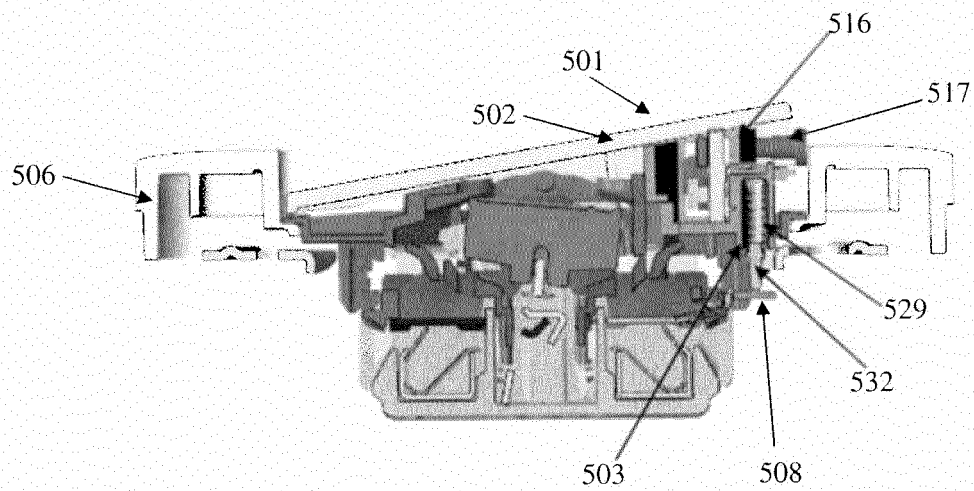


Figure 27(b)

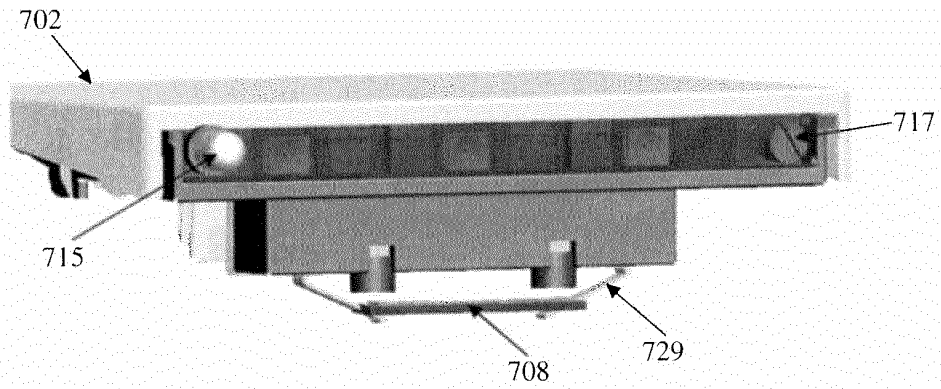


Figure 28

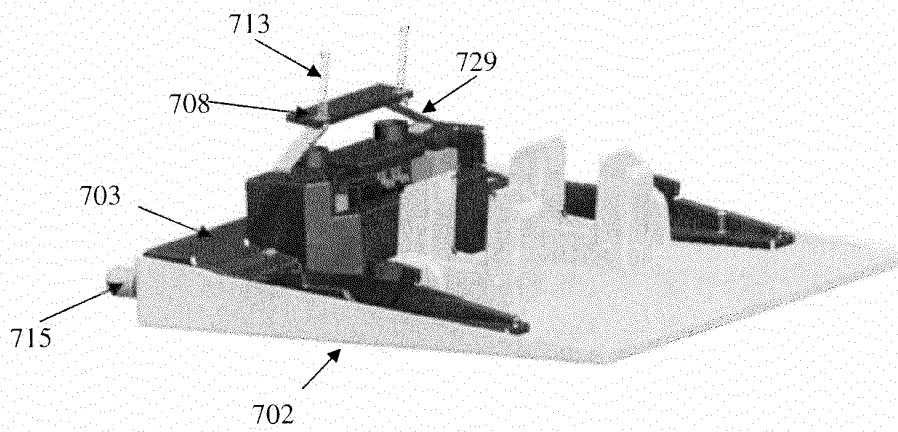


Figure 29



EUROPEAN SEARCH REPORT

Application Number
EP 13 16 4318

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 348 522 A2 (ABB AG [DE]) 27 July 2011 (2011-07-27)	26,30,32	INV. H01H23/02
Y	* the whole document *	1-25, 27-29,31	
Y	----- DE 298 13 430 U1 (HOCHKOEPPER PAUL GMBH [DE]) 5 November 1998 (1998-11-05) * the whole document * -----	1-25, 27-29,31	
			TECHNICAL FIELDS SEARCHED (IPC)
			H01H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 25 June 2013	Examiner Fribert, Jan
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03/82 (P04C01)

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

EP 13 16 4318

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The members are as contained in the European Patent Office EDP file on
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25-06-2013

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

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