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

Schalter mit Beleuchtungsmitteln und nachrüstbare elektronischen Modul

Commutateur avec des moyens d'éclairage et module électronique évolutif

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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 4,755913, 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] EP 2348522 discloses a switch comprising the features of the preamble of claim 1.

[0007] 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 rocker 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.

[0008] With a view, therefore to overcome the disadvantages 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:

[0009] Accordingly, the present invention provides a switch comprising the features of claim 1.

[0010] 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.

[0011] 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.

[0012] 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.

[0013] 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.

[0014] 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.

[0015] 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.

[0016] 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.

[0017] 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.

[0018] The rocker may be detachably attached with the pair of inner rockers of the insert.

[0019] 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.

[0020] 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.

[0021] According to a most preferred embodiment of the invention said electronic module is retrofittable.

[0022] The present invention also provides an electronic module for rocker type switch.

[0023] 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.

[0024] 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.

[0025] 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.

[0026] According to a further embodiment of the invented electronic module said illuminating means is an array of LEDs disposed on said control PCB.

[0027] 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:

[0028] 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:

[0029] 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).

[0030] 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.

[0031] 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).

[0032] 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.

[0033] 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.

[0034] 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 intention.

[0035] 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.

[0036] 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).

[0037] 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.

[0038] 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.

[0039] 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.

[0040] 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).

[0041] 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 though 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).

[0042] 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).

[0043] 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).

[0044] 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.

[0045] 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.

[0046] 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.

[0047] 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).

[0048] 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.

[0049] 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).

[0050] 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 (101; 401; 501) comprising:

a rocker (102; 402; 502) configured to perform rocking movement between an ON position and an OFF position and being operable to turn said switch (101; 401; 501) ON/OFF, said rocker (102; 402; 502) being provided with at least a peripheral light transmitting portion (111),
an intermediate cover (104; 504) for providing pivotal connection to said rocker (102; 402; 502), an insert (105; 405; 505) provided with electrical terminals (112) for establishing electrical connection with an external power supply,
a control PCB (109;...; 809) electrically connected to said insert (105; 405; 505), and
at least an illuminating means (110;...; 810) operatively connected to said control PCB (109;...; 809) and being adapted to emit light through the peripheral light transmitting portion (111) of said rocker (102; 402; 502), said illuminating means (110;...; 810) being configured to assume an elevated position or a depressed position relative to said switch's frontal plane,

characterized in that
the insert (105; 405; 505) is adapted to be actuated by said rocker (102; 402; 502) for making or breaking an electric circuit,
the control PCB (109;...; 809) and the illuminating means (110;...; 810) are provided in an electronic module (103; 403; 503) movably disposed within said switch (101; 401; 501), the illuminating means (110;...; 810) is provided along one edge of said electronic module (103; 403; 503) and configured to assume the elevated position or the depressed position relative to said switch's frontal plane in response to the movement of the electronic module (103; 403; 503), and
said electronic module (103; 403; 503) further comprises an electronic module casing (C) for housing said control PCB (109;...; 809),
wherein the movement of said electronic module

(103; 403; 503) is controlled by the rocking movement of the rocker (102; 402; 502) and the light emitted from said illuminating means (110;...; 810) emerges through said light transmitting portion of the rocker (102; 402; 502) only when said electronic module (103; 403; 503) assumes its elevated position.

2. The switch (101; 401; 501) as claimed in claim 1, wherein said switch (101; 401; 501) is provided with a supply PCB (108;...; 808), and the electrical connection between said control PCB (109;...; 809) and said insert (105; 405; 505) is established through said supply PCB (108;...; 808).

3. The switch (401) as claimed in claim 1, wherein said control PCB (409) is electrically connected to said insert (405) by means of a pair of compression springs (413).

4. The switch (101; 401; 501) as claimed in claim 2, wherein said control PCB (109;...; 809) is electrically connected to said supply PCB (108;...; 808) through resilient connectors such as pair of compression springs (529; 629) or leaf spring (729).

5. The switch (101; 401; 501) as claimed in claim 2, wherein said control PCB (109;...; 809) is electrically connected to said supply PCB (108;...; 808) by means of rails (830).

6. The switch (101; 401; 501) as claimed in any of the preceding claims, wherein said illuminating means (110;...; 810) is configured to move between its depressed position and its elevated position following a curved path.

7. The switch (101; 401; 501) as claimed in claim 6, wherein said electronic module (103; 403; 503) is attached with said rocker (102; 402; 502) and is adapted to perform rocking movement together with said rocker (102; 402; 502) to allow said illuminating means (110;...; 810) to assume an elevated or depressed position.

8. The switch (401) as claimed in claim 7, wherein said electronic module (403) is removably attached to said rocker's dorsal surface (431).

9. The switch (101; 401; 501) as claimed in claim any of claims 1 to 6, wherein said electronic module (103; 403; 503) is pivotally attached with said intermediate cover (104; 504) and is adapted to perform rocking movement in sync with said rocker (102; 402; 502) to allow said illuminating means (110;...; 810) to assume an elevated or depressed position.

10. The switch (101; 401; 501) as claimed in claim 9, wherein said electronic module (103; 403; 503) is removably attached with said intermediate cover (104; 504).

11. The switch (101; 401; 501) as claimed in claim 10, wherein said electronic module (103; 403; 503) and said rocker (102; 402; 502) are adapted to perform rocking movement about the same pivotal point.

12. The switch (501) as claimed in any of the preceding claims 1 to 5, wherein said illuminating means (510) is configured to move between its depressed position and its elevated position following a linear path.

13. The switch (501) as claimed in claim 12, wherein said electronic module (503) is provided with at least a resilient retracting member (532) configured to be compressed and expanded by the movement of said rocker (502) such that when the retracting member (532) expands from its compressed condition the electronic module (503) is propelled to its elevated position from its depressed position.

14. The switch (101; 401; 501) as claimed in any of the preceding claims, wherein said illuminating means (110;...; 810) is disposed on the surface of said control PCB (109;...; 809).

15. The switch (101; 401; 501) as claimed in any of the preceding claims, wherein said illuminating means (110;...; 810) is configured to emit light only during OFF condition of the switch (101; 401; 501).

16. The switch (101; 401; 501) as claimed in any of the preceding claims, wherein said peripheral light transmitting portion (111) is defined by an opening (111) at the base of the rocker (102; 402; 502).

17. The switch (101; 401; 501) as claimed in any of the preceding claims, wherein the base of the rocker (102; 402; 502) is made of transparent material to define said light transmitting portion.

18. The switch (101; 401; 501) as claimed in any of the preceding claims, wherein said control PCB (109;...; 809) is provided with a photo sensor (115; ...; 815) for monitoring the ambient light condition and to turn OFF said illuminating means (110;...; 810) when the intensity of the ambient light reaches a predetermined value.

19. The switch (101; 401; 501) as claimed in any of the preceding claims, wherein said control PCB (109;...; 809) is provided with a potentiometer (116; ...; 816) for controlling the luminance of said illuminating means (110;...; 810), said potentiometer (116; ...; 816) being provided with an actuating knob accessible through the base of said rocker (102; 402; 502).

20. The switch (101; 401; 501) as claimed in any of the preceding claims, wherein said illuminating means (110;...; 810) comprises an array of LEDS (110;...; 810).

21. The switch (101) as claimed any of the preceding claims, wherein said rocker (102) is detachably attached with the pair of inner rockers (118(a), 118(b)) of the insert (105).

22. The switch (101; 501) as claimed in any of the preceding claims, wherein said switch (101; 501) is provided with an outer-frame (106; 506) circumscribing said rocker (102; 502), said outer-frame (106; 506) being provided with inwardly extending flanges (126) and the intermediate cover (104; 504) is adapted to rest on the inwardly extending flanges (126).

23. The switch (101) as claimed in any of the preceding claims, wherein said electronic module casing (C) comprises two outwardly protruding engaging limbs (122) and a slotted transverse member (123), each of said engaging limbs (122) is provided with a lug (124) for pivotally engaging with a corresponding recess (125) provided on said intermediate cover (104), and said slotted transverse member (123) is provided with slot(s) for housing said control PCB (109;...; 809).

24. The switch (101; 501) as claimed in any of the preceding claims, wherein during ON condition of the switch (101; 501) the rocker (102; 502) is adapted to be flush with the surface of the outer frame (106; 506) in order to conceal said illuminating means (110;...; 810), and wherein during OFF condition of the switch (101; 501) the rocker (102; 502) is adapted to incline in one direction to protrude said illuminating means (110;...; 810) above the surface of said outer frame (106; 506).

25. The switch (101; 401; 501) as claimed in any of the preceding claims, wherein said electronic module (103; 403; 503) is retrofittable.

Patentansprüche

1. Schalter (101; 401; 501), der umfasst:

eine Wippe (102; 402; 502), die so eingerichtet ist, dass sie Kippbewegung zwischen einer AN-Position und einer AUS-Position durchführt und betätigt werden kann, um den Schalter (101; 401; 501) AN/AUS zu schalten, wobei die Wippe (102; 402; 502) mit wenigstens einem Lichtdurchlassabschnitt (111) am Rand versehen ist, eine Zwischen-Abdeckung (104; 504), die Schwenkverbindung mit der Wippe (102; 402; 502) herstellt,

einen Einsatz (105; 405; 505), der mit elektrischen Anschlüssen (112) zum Herstellen elektrischer Verbindung mit einer externen Stromquelle versehen ist,

eine Steuerungs-Leiterplatte (109; ... ; 809), die elektrisch mit dem Einsatz (105; 405; 505) verbunden ist, und

wenigstens eine Beleuchtungseinrichtung (110;...; 810), die funktional mit der Steuerungs-Leiterplatte (109; ...; 809) verbunden und so eingerichtet ist, dass sie über den Lichtdurchlassabschnitt (111) am Rand der Wippe (102; 402; 502) Licht emittiert, wobei die Beleuchtungseinrichtung (110; ...; 810) so ausgeführt ist, dass sie eine erhöhte Position oder eine vertiefte Position relativ zu der Vorderebene des Schalters einnimmt,

dadurch gekennzeichnet, dass

der Einsatz (105; 405; 505) so eingerichtet ist, dass er von der Wippe (102; 402; 502) betätigt wird, um einen Stromkreis zu schließen oder zu unterbrechen,

die Steuerungs-Leiterplatte (109; ...; 809) und die Beleuchtungseinrichtung (110; ...; 810) sich in einem Elektronikmodul (103; 403; 503) befinden, das beweglich im Inneren des Schalters (101; 401; 501) angeordnet ist,

die Beleuchtungseinrichtung (110; ...; 810) sich an einem Rand des Elektronikmoduls (103; 403; 503) befindet und so ausgeführt ist, dass sie in Reaktion auf die Bewegung des Elektronikmoduls (103; 403; 503) die erhöhte Position oder die vertiefte Position relativ zu der Vorderebene des Schalters einnimmt, und

das Elektronikmodul (103; 403; 503) des Weiteren ein Elektronikmodul-Gehäuse (10) umfasst, das die Steuerungs-Leiterplatte (109; ...; 809) aufnimmt,

wobei die Bewegung des Elektronikmoduls (103; 403; 503) durch die Kippbewegung der Wippe (102; 402; 502) gesteuert wird und das von der Beleuchtungseinrichtung (110; ...; 810) emittierte Licht über den Lichtdurchlassabschnitt der Wippe (102; 402; 502) nur dann austritt, wenn das Elektronikmodul (103; 403; 503) seine erhöhte Position einnimmt.

2. Schalter (101; 401; 501) nach Anspruch 1, wobei der Schalter (101; 401; 501) mit einer Speise-Leiterplatte (108; ...; 808) versehen ist und die elektrische Verbindung zwischen der Steuerungs-Leiterplatte (109; ...; 809) und dem Einsatz (105; 405; 505) über die Speise-Leiterplatte (108; ..; 808) hergestellt wird.

3. Schalter (101; 401; 501) nach Anspruch 1, wobei die Steuerungs-Leiterplatte (409) über ein Paar Druckringe (413) elektrisch mit dem Einsatz (405) verbunden ist.

4. Schalter (101; 401; 501) nach Anspruch 2, wobei die Steuerungs-Leiterplatte (109; ...; 809) über federnde Verbinder, wie beispielsweise ein Paar Druckringe (529; 629) oder eine Blattfeder (729), elektrisch mit der Speise-Leiterplatte (108; ...; 808) verbunden ist.

5. Schalter (101; 401; 501) nach Anspruch 2, wobei die Steuerungs-Leiterplatte (109; ...; 809) über Schienen (830) elektrisch mit der Speise-Leiterplatte (108; ...; 808) verbunden ist.

6. Schalter (101; 401; 501) nach einem der vorangehenden Ansprüche, wobei die Beleuchtungseinrichtung (110; ...; 810) so ausgeführt ist, dass sie sich auf einem gekrümmten Weg zwischen ihrer vertieften Position und ihrer erhöhten Position bewegt.

7. Schalter (101; 401; 501) nach Anspruch 6, wobei das Elektronikmodul (103; 403; 503) an der Wippe (102; 402; 502) angebracht und so eingerichtet ist, dass es zusammen mit der Wippe (102; 402; 502) Kippbewegung durchführt, um zuzulassen, dass die Beleuchtungseinrichtung (110; ...; 810) eine erhöhte oder vertiefte Position einnimmt.

8. Schalter (401) nach Anspruch 7, wobei das Elektronikmodul (403) abnehmbar an der hinteren Fläche (431) der Wippe angebracht ist.

9. Schalter (101; 401; 501) nach einem der Ansprüche 1 bis 6, wobei das Elektronikmodul (103; 403; 503) schwenkbar an der Zwischenabdeckung (104; 504) angebracht und so eingerichtet ist, dass es Kippbewegung synchron mit der Wippe (102; 402; 502) durchführt, um zuzulassen, dass die Beleuchtungseinrichtung (110; ...; 810) eine erhöhte oder vertiefte Position einnimmt.

10. Schalter (101; 401; 501) nach Anspruch 9, wobei das Elektronikmodul (103; 403; 503) abnehmbar an der Zwischenabdeckung (104; 504) angebracht ist.

11. Schalter (101; 401; 501) nach Anspruch 10, wobei das Elektronikmodul (103; 403; 503) und die Wippe (102; 402; 502) so eingerichtet sind, dass sie Kippbewegung um den gleichen Drehpunkt herum durchführen.

12. Schalter (501) nach einem der vorangehenden Ansprüche 1 bis 5, wobei die Beleuchtungseinrichtung (510) so ausgeführt ist, dass sie sich auf einem geradlinigen Weg zwischen ihrer vertieften Position und ihrer erhöhten Position bewegt.

13. Schalter (501) nach Anspruch 12, wobei das Elektronikmodul (503) mit wenigstens einem federnden Einziehelement (532) versehen ist, dass so ausgeführt ist, dass es durch die Bewegung der Wippe (502) so zusammengedrückt und ausgedehnt wird, dass, wenn sich das Einziehelement (532) von seinem zusammengedrückten Zustand ausgehend ausdehnt, das Elektronikmodul (503) von seiner vertieften Position an seine erhöhte Position gedrückt wird.

14. Schalter (101; 401; 501) nach einem der vorangehenden Ansprüche, wobei die Beleuchtungseinrichtung (110; ...; 810) an der Oberfläche der Steuerungs-Leiterplatte (109; ..; 809) angeordnet ist.

15. Schalter (101; 401; 501) nach einem der vorangehenden Ansprüche, wobei die Beleuchtungseinrichtung (110; ...; 810) so eingerichtet ist, dass sie Licht nur während des AUS-Zustandes des Schalters (101; 401; 501) emittiert.

16. Schalter (101; 401; 501) nach einem der vorangehenden Ansprüche, wobei der Lichtdurchlassabschnitt (111) am Rand durch eine Öffnung (111) an der Basis der Wippe (102; 402; 502) gebildet wird.

17. Schalter (101; 401; 501) nach einem der vorangehenden Ansprüche, wobei die Basis der Wippe (102; 402; 502) aus transparentem Material besteht, das den Lichtdurchlassabschnitt bildet.

18. Schalter (101; 401; 501) nach einem der vorangehenden Ansprüche, wobei die Steuerungs-Leiterplatte (109; ...; 809) mit einem Lichtsensor (115; ...; 815) versehen ist, mit dem die Umgebungslicht-Bedingungen überwacht werden und die Beleuchtungseinrichtung (110; ...; 810) AUS geschaltet wird, wenn die Intensität des Umgebungslichtes einen vorgegebenen Wert erreicht.

19. Schalter (101; 401; 501) nach einem der vorangehenden Ansprüche, wobei die Steuerungs-Leiterplatte (109; ...; 809) mit einem Potentiometer (116; ...; 816) zum Steuern der Helligkeit der Beleuchtungseinrichtung (110; ...; 810) versehen ist und des Potentiometer (116; ...; 816) mit einem Betätigungsknopf versehen ist, der über die Basis der Wippe (102; 402; 502) zugänglich ist.

20. Schalter (101; 401; 501) nach einem der vorangehenden Ansprüche, wobei die Beleuchtungseinrichtung (110; ...; 810) eine Anordnung von LEDs (110; ...; 810) umfasst.

21. Schalter (101) nach einem der vorangehenden Ansprüche, wobei die Wippe (102) abnehmbar an dem Paar innerer Wippen (118 (a), 118 (b)) des Einsatzes (105) angebracht ist.

22. Schalter (101; 501) nach einem der vorangehenden

Ansprüche, wobei der Schalter (101; 501) mit einem Außenrahmen (106; 506) versehen ist, der die Wippe (102; 502) umschließt, und der Außenrahmen (106; 506) mit sich nach innen erstreckenden Flanschen (126) versehen ist und die Zwischenabdeckung (104; 504) so eingerichtet ist, dass sie an den sich nach innen erstreckenden Flanschen (126) anliegt.

23. Schalter (101) nach einem der vorangehenden Ansprüche, wobei das Elektronikmodul-Gehäuse (10) zwei nach außen vorstehende Eingriffsglieder (122) sowie ein Schlitz-Querelement (123) umfasst, und jedes der Eingriffsglieder (122) mit einem Ansatz (124) versehen ist, der drehend mit einer entsprechenden Aussparung (125) in Eingriff kommt, die sich an der Zwischenabdeckung (104) befindet, und das Schlitz-Querelement (123) mit einem/mehreren Schlitz/en zum Aufnehmen der Steuerungs-Leiterplatte (109; ..; 809) versehen ist.

24. Schalter (101; 501) nach einem der vorangehenden Ansprüche, wobei die Wippe (102; 502) so eingerichtet ist, dass sie während des AN-Zustandes des Schalters (101; 501) bündig mit der Oberfläche des Außenrahmens (106; 506) ist, um die Beleuchtungseinrichtung (110; ..; 810) zu verbergen, und die Wippe (102; 502) so eingerichtet ist, dass sie in dem AUS-Zustand des Schalters (101; 501) in einer Richtung geneigt ist, in der die Beleuchtungseinrichtung (110; ...; 810) oberhalb der Oberfläche des Außenrahmens (106; 506) vorsteht.

25. Schalter (101; 401; 501) nach einem der vorangehenden Ansprüche, wobei das Elektronikmodul (103; 403; 503) nachgerüstet werden kann.

Revendications

1. Interrupteur (101 ; 401 ; 501) comprenant :

un culbuteur (102 ; 402 ; 502) configuré pour mettre en oeuvre un mouvement de bascule entre une position MARCHE et une position ARRÊT, et utilisable pour positionner ledit interrupteur (101 ; 401 ; 501) sur MARCHE/ARRÊT, ledit culbuteur (102 ; 402 ; 502) étant pourvu d'au moins une portion de transmission de lumière périphérique (111),
un couvercle intermédiaire (104 ; 504) pour procurer une connexion pivotante audit culbuteur (102 ; 402 ; 502),
un insert (105 ; 405 ; 505) pourvu de bornes électriques (112) pour établir une connexion électrique avec une alimentation externe,
un circuit imprimé de commande (109 ;...; 809) connecté électriquement audit insert (105 ; 405 ; 505), et
au moins un moyen d'éclairage (110 ;...; 810) fonctionnellement connecté audit circuit imprimé de commande (109 ;...; 809) et adapté pour émettre de la lumière à travers la portion de transmission de lumière périphérique (111) dudit culbuteur (102 ; 402 ; 502), ledit moyen d'éclairage (110 ;...; 810) étant configuré pour assumer une position relevée ou une position enfoncée par rapport au plan frontal dudit interrupteur,

caractérisé en ce que
l'insert (105 ; 405 ; 505) est adapté pour être actionné par ledit culbuteur (102 ; 402 ; 502) pour établir ou interrompre un circuit électrique,
le circuit imprimé de commande (109 ;...; 809) et le moyen d'éclairage (110 ;...; 810) sont pourvus dans un module électronique (103 ; 403 ; 503) disposé de façon mobile dans ledit interrupteur (101 ; 401 ; 501),
le moyen d'éclairage (110 ;...; 810) est pourvu le long d'un bord dudit module électronique (103 ; 403 ; 503) et configuré pour assumer la position relevée ou la position enfoncée par rapport au plan frontal dudit interrupteur en réponse au déplacement du module électronique (103 ; 403 ; 503), et
ledit module électronique (103 ; 403 ; 503) comprend en outre un boîtier de module électronique (C) pour loger ledit circuit imprimé de commande (109 ;...; 809),
dans lequel le déplacement dudit module électronique (103 ; 403 ; 503) est commandé par le mouvement de bascule du culbuteur (102 ; 402 ; 502) et la lumière émise par ledit moyen d'éclairage (110 ;...; 810) émerge à travers ladite portion de transmission de lumière du culbuteur (102 ; 402 ; 502) uniquement quand ledit module électronique (103 ; 403 ; 503) assume sa position relevée.

2. Interrupteur (101 ; 401 ; 501) selon la revendication 1, dans lequel ledit interrupteur (101 ; 401 ; 501) est pourvu d'un circuit imprimé d'alimentation (108 ;...; 808), et la connexion électrique entre ledit circuit imprimé de commande (109 ;...; 809) et ledit insert (105 ; 405 ; 505) est établie via ledit circuit imprimé d'alimentation (108 ;...; 808).

3. Interrupteur (401) selon la revendication 1, dans lequel ledit circuit imprimé de commande (409) est connecté électriquement audit insert (405) à l'aide d'une paire de ressorts de compression (413).

4. Interrupteur (101 ; 401 ; 501) selon la revendication 2, dans lequel ledit circuit imprimé de commande (109 ;...; 809) est connecté électriquement audit circuit imprimé d'alimentation (108 ;...; 808) via des connecteurs élastiques tels qu'une paire de ressorts de compression (529 ; 629) ou un ressort à lame

(729).

5. Interrupteur (101 ; 401 ; 501) selon la revendication 2, dans lequel ledit circuit imprimé de commande (109 ;...; 809) est connecté électriquement audit circuit imprimé d'alimentation (108 ;...; 808) à l'aide de rails (830).

6. Interrupteur (101 ; 401 ; 501) selon l'une quelconque des revendications précédentes, dans lequel ledit moyen d'éclairage (110 ;...; 810) est configuré pour se déplacer entre sa position enfoncée et sa position relevée en suivant un chemin incurvé.

7. Interrupteur (101 ; 401 ; 501) selon la revendication 6, dans lequel ledit module électronique (103 ; 403 ; 503) est attaché audit culbuteur (102 ; 402 ; 502) et est adapté pour mettre en oeuvre un mouvement de bascule conjointement audit culbuteur (102 ; 402 ; 502) pour permettre audit moyen d'éclairage (110 ;...; 810) d'assumer une position relevée ou enfoncée.

8. Interrupteur (401) selon la revendication 7, dans lequel ledit module électronique (403) est attaché de manière amovible à la surface dorsale dudit culbuteur (431).

9. Interrupteur (101 ; 401 ; 501) selon l'une quelconque des revendications 1 à 6, dans lequel ledit module électronique (103 ; 403 ; 503) est attaché de manière pivotante audit couvercle intermédiaire (104 ; 504) et est adapté pour mettre en oeuvre un mouvement de bascule en synchronisation avec ledit culbuteur (102 ; 402 ; 502) pour permettre audit moyen d'éclairage (110 ;...; 810) d'assumer une position relevée ou enfoncée.

10. Interrupteur (101 ; 401 ; 501) selon la revendication 9, dans lequel ledit module électronique (103 ; 403 ; 503) est attaché de manière amovible audit couvercle intermédiaire (104 ; 504).

11. Interrupteur (101 ; 401 ; 501) selon la revendication 10, dans lequel ledit module électronique (103 ; 403 ; 503) et ledit culbuteur (102 ; 402 ; 502) sont adaptés pour mettre en oeuvre un mouvement de bascule autour du même point de pivotement.

12. Interrupteur (501) selon l'une quelconque des revendications précédentes 1 à 5, dans lequel ledit moyen d'éclairage (510) est configuré pour se déplacer entre sa position enfoncée et sa position relevée en suivant un chemin linéaire.

13. Interrupteur (501) selon la revendication 12, dans lequel ledit module électronique (503) est pourvu d'au moins un élément de rétraction élastique (532) configuré pour être comprimé et détendu par le mouvement dudit culbuteur (502) de telle sorte que quand l'élément de rétraction (532) se détend depuis sa condition comprimée, le module électronique (503) est propulsé vers sa position relevée depuis sa position enfoncée.

14. Interrupteur (101 ; 401 ; 501) selon l'une quelconque des revendications précédentes, dans lequel ledit moyen d'éclairage (110 ;...; 810) est disposé sur la surface dudit circuit imprimé de commande (109 ;...; 809).

15. Interrupteur (101 ; 401 ; 501) selon l'une quelconque des revendications précédentes, dans lequel ledit moyen d'éclairage (110 ;...; 810) est configuré pour émettre de la lumière uniquement durant une condition ARRÊT de l'interrupteur (101 ; 401 ; 501).

16. Interrupteur (101 ; 401 ; 501) selon l'une quelconque des revendications précédentes, dans lequel ladite portion de transmission de lumière périphérique (111) est définie par une ouverture (111) à la base du culbuteur (102 ; 402 ; 502).

17. Interrupteur (101 ; 401 ; 501) selon l'une quelconque des revendications précédentes, dans lequel la base du culbuteur (102 ; 402 ; 502) est constituée d'un matériau transparent pour définir ladite portion de transmission de lumière.

18. Interrupteur (101 ; 401 ; 501) selon l'une quelconque des revendications précédentes, dans lequel ledit circuit imprimé de commande (109 ;...; 809) est pourvu d'un photodétecteur (115 ; ...; 815) pour surveiller la condition de lumière ambiante et pour mettre à l'ARRÊT ledit moyen d'éclairage (110 ;...; 810) quand l'intensité de la lumière ambiante atteint une valeur prédéterminée.

19. Interrupteur (101 ; 401 ; 501) selon l'une quelconque des revendications précédentes, dans lequel ledit circuit imprimé de commande (109 ;...; 809) est pourvu d'un potentiomètre (116 ; ...; 816) pour commander la luminance dudit moyen d'éclairage (110 ;...; 810), ledit potentiomètre (116 ; ...; 816) étant pourvu d'un bouton d'actionnement accessible via la base dudit culbuteur (102 ; 402 ; 502).

20. Interrupteur (101 ; 401 ; 501) selon l'une quelconque des revendications précédentes, dans lequel ledit moyen d'éclairage (110 ;...; 810) comprend un réseau de diodes électroluminescentes DEL (110 ;...; 810).

21. Interrupteur (101) selon l'une quelconque des revendications précédentes, dans lequel ledit culbuteur (102) est attaché de manière amovible à la paire de

culbuteurs internes (118(a), 118(b)) de l'insert (105).

22. Interrupteur (101 ; 501) selon l'une quelconque des revendications précédentes, dans lequel ledit interrupteur (101 ; 501) est pourvu d'un bâti externe (106 ; 506) entourant ledit culbuteur (102 ; 502), ledit bâti externe (106 ; 506) étant pourvu de collerettes qui s'étendent vers l'intérieur (126) et le couvercle intermédiaire (104 ; 504) étant adapté pour reposer sur les collerettes qui s'étendent vers l'intérieur (126).

23. Interrupteur (101) selon l'une quelconque des revendications précédentes, dans lequel ledit boîtier de module électronique (C) comprend deux membres d'engagement saillants vers l'extérieur (122) et un membre transversal rainuré (123), chacun desdits membres d'engagement (122) est pourvu d'une patte (124) pour s'engager de manière pivotante avec un renfoncement correspondant (125) pourvu sur ledit couvercle intermédiaire (104), et ledit membre transversal rainuré (123) est pourvu d'une ou plusieurs rainures pour recevoir ledit circuit imprimé de commande (109 ;...; 809).

24. Interrupteur (101 ; 501) selon l'une quelconque des revendications précédentes, dans lequel, durant une condition MARCHE de l'interrupteur (101 ; 501), le culbuteur (102 ; 502) est adapté pour affleurer avec la surface du châssis externe (106 ; 506) de manière à dissimuler ledit moyen d'éclairage (110 ;...; 810), et dans lequel, durant une condition ARRÊT de l'interrupteur (101 ; 501), le culbuteur (102 ; 502) est adapté pour s'incliner dans une direction pour faire saillir ledit moyen d'éclairage (110 ;...; 810) au-dessus de la surface dudit châssis externe (106 ;...; 506).

25. Interrupteur (101 ; 401 ; 501) selon l'une quelconque des revendications précédentes, dans lequel ledit module électronique (103 ; 403 ; 503) peut être installé postérieurement.

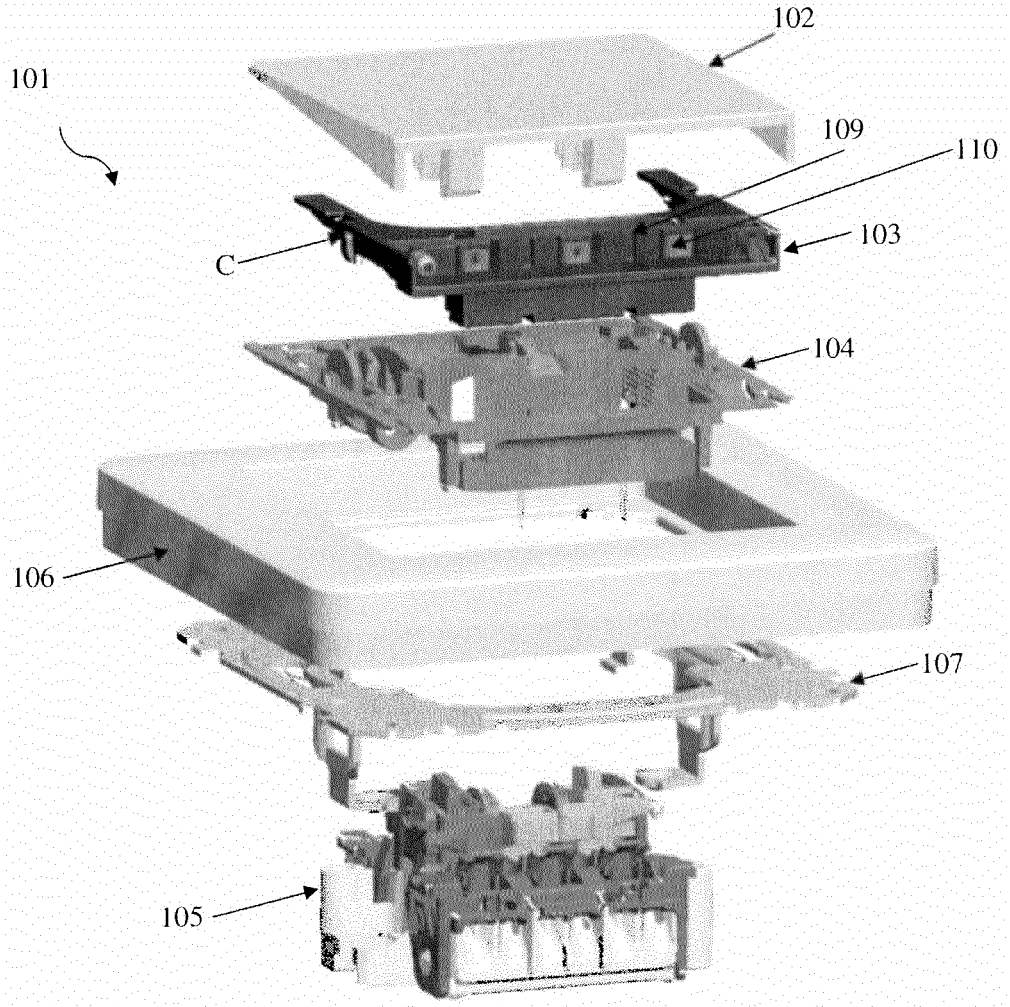


Figure 1

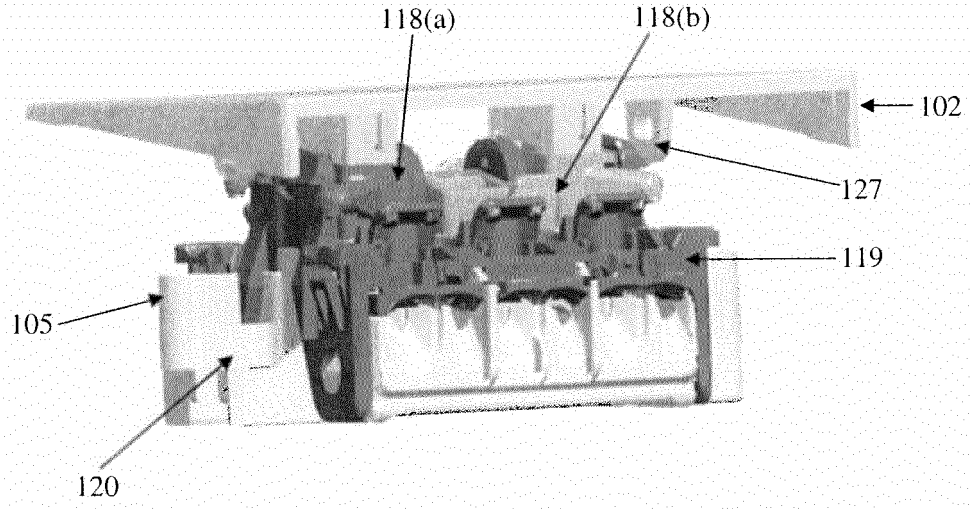


Figure 2

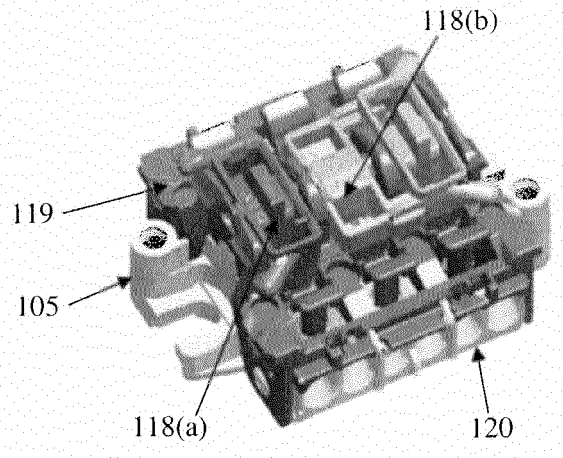


Figure 3

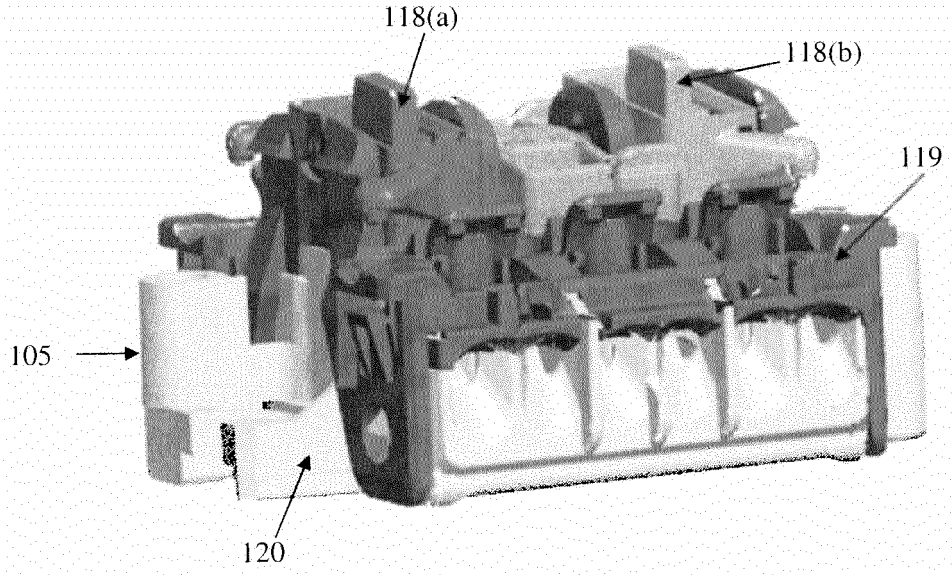


Figure 4

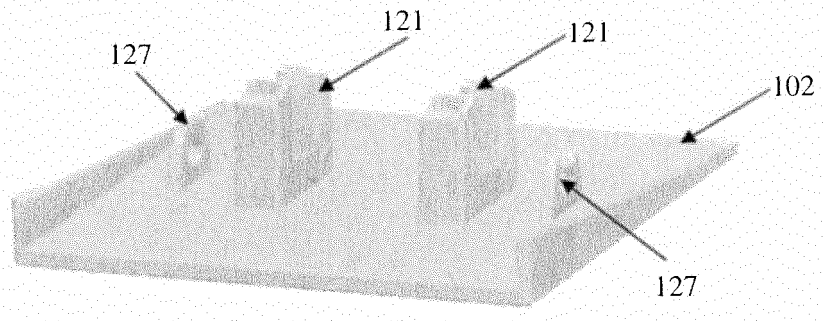


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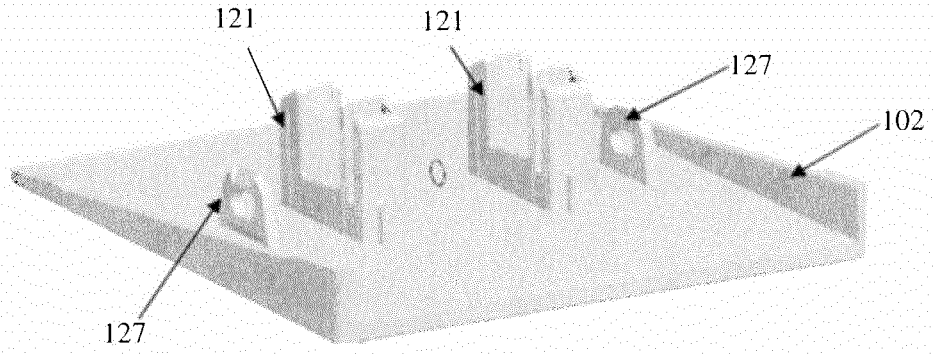


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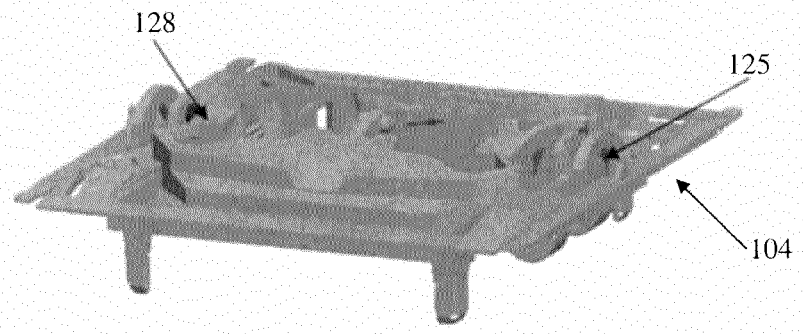


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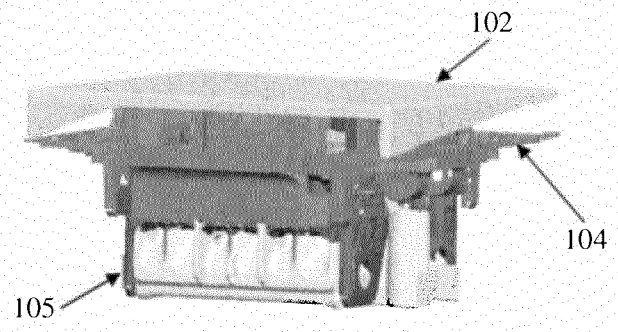


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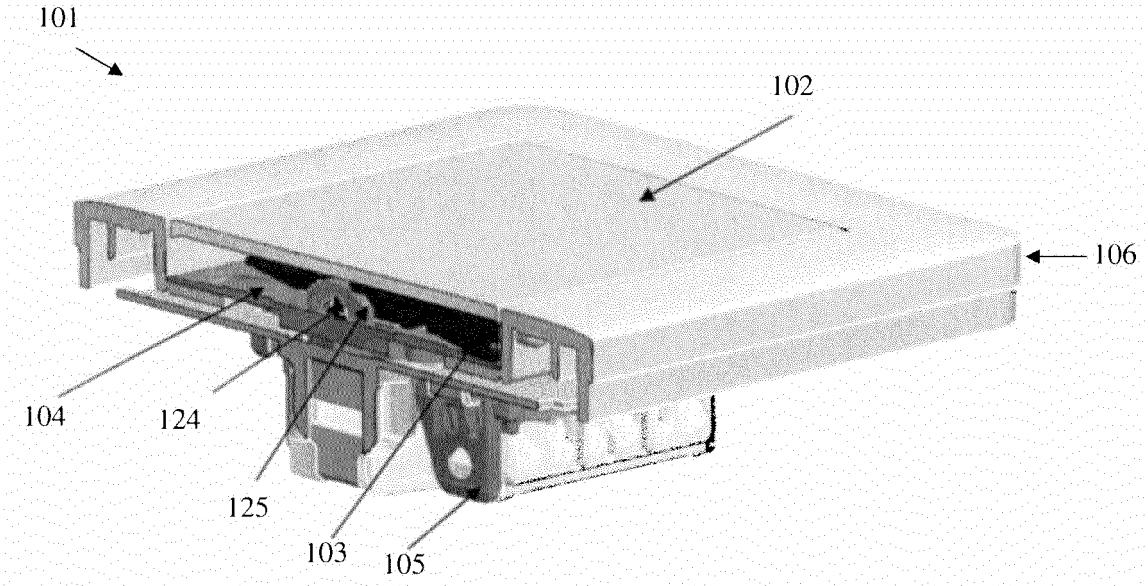


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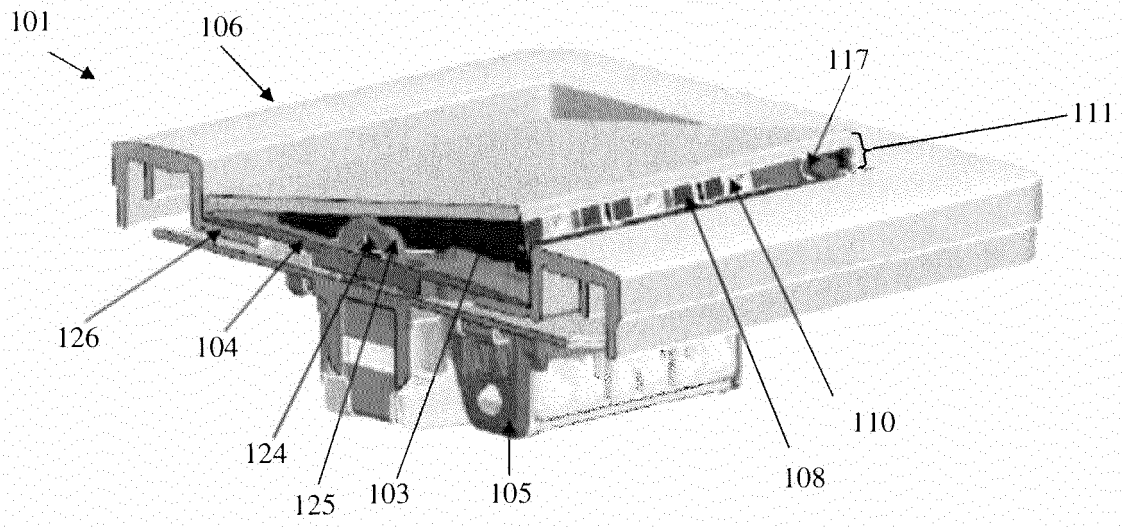


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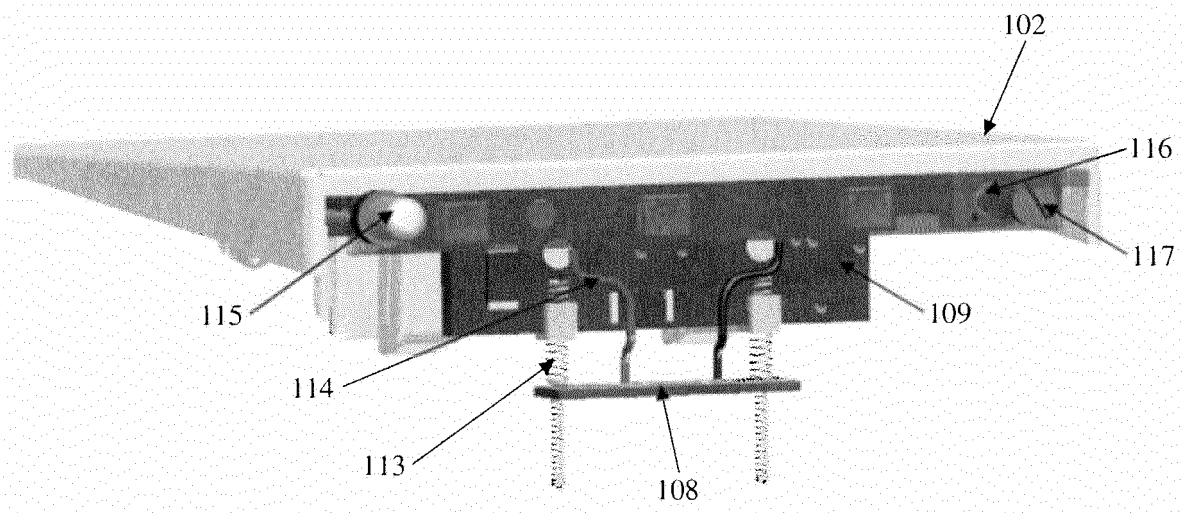


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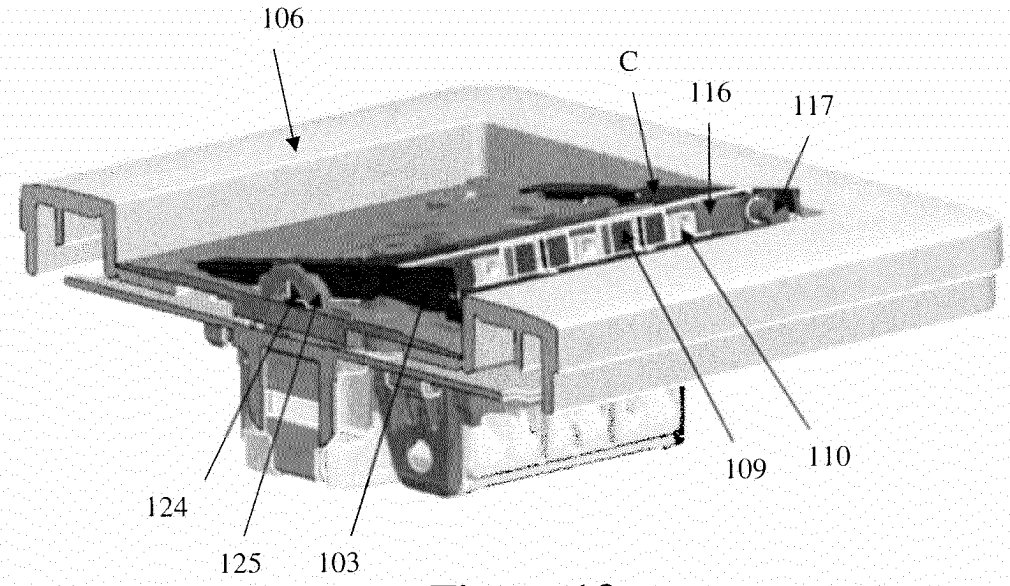


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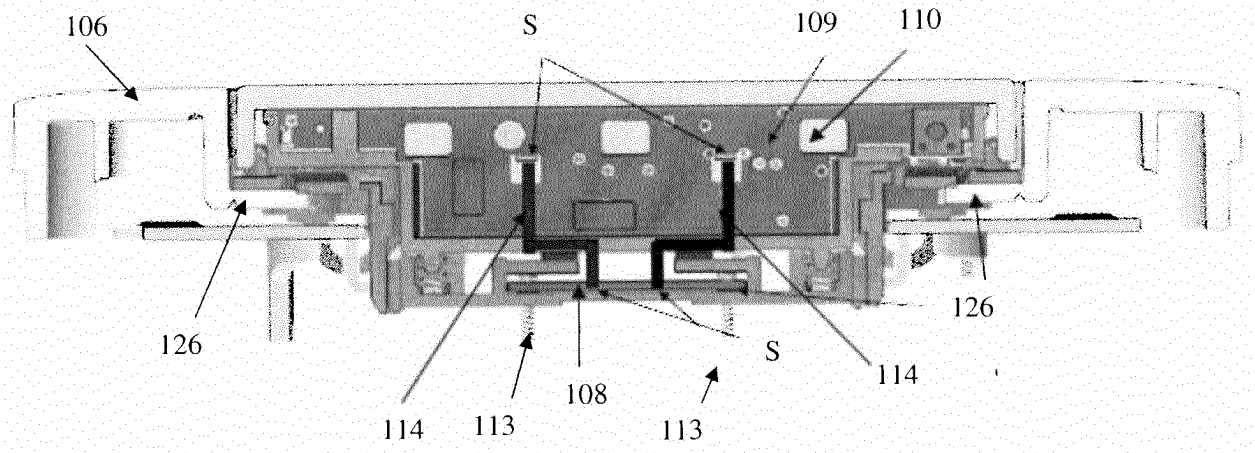


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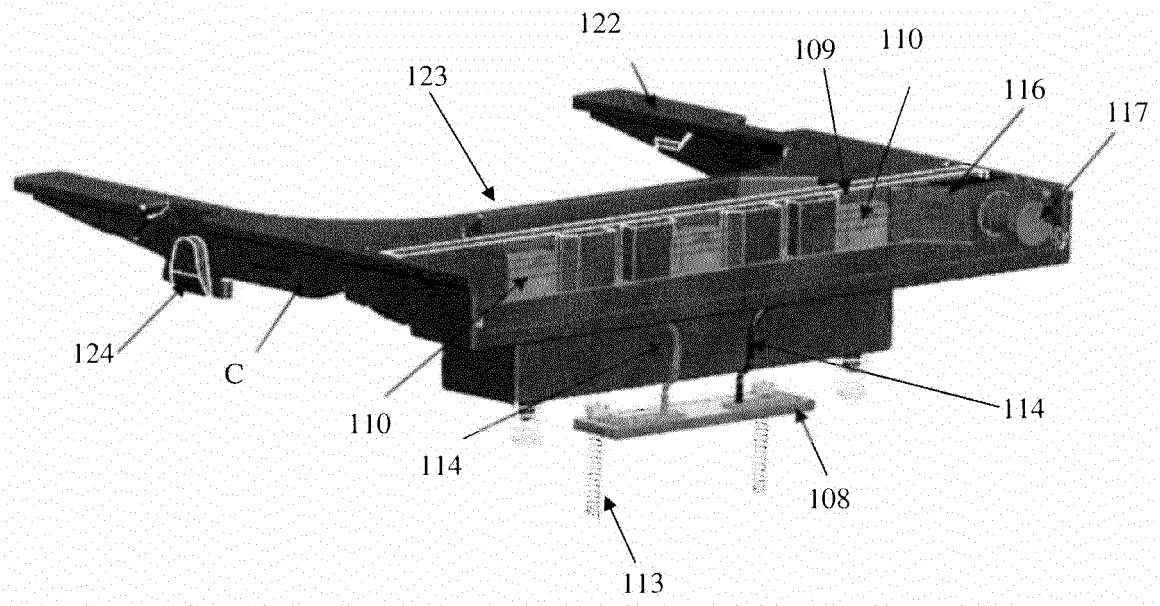


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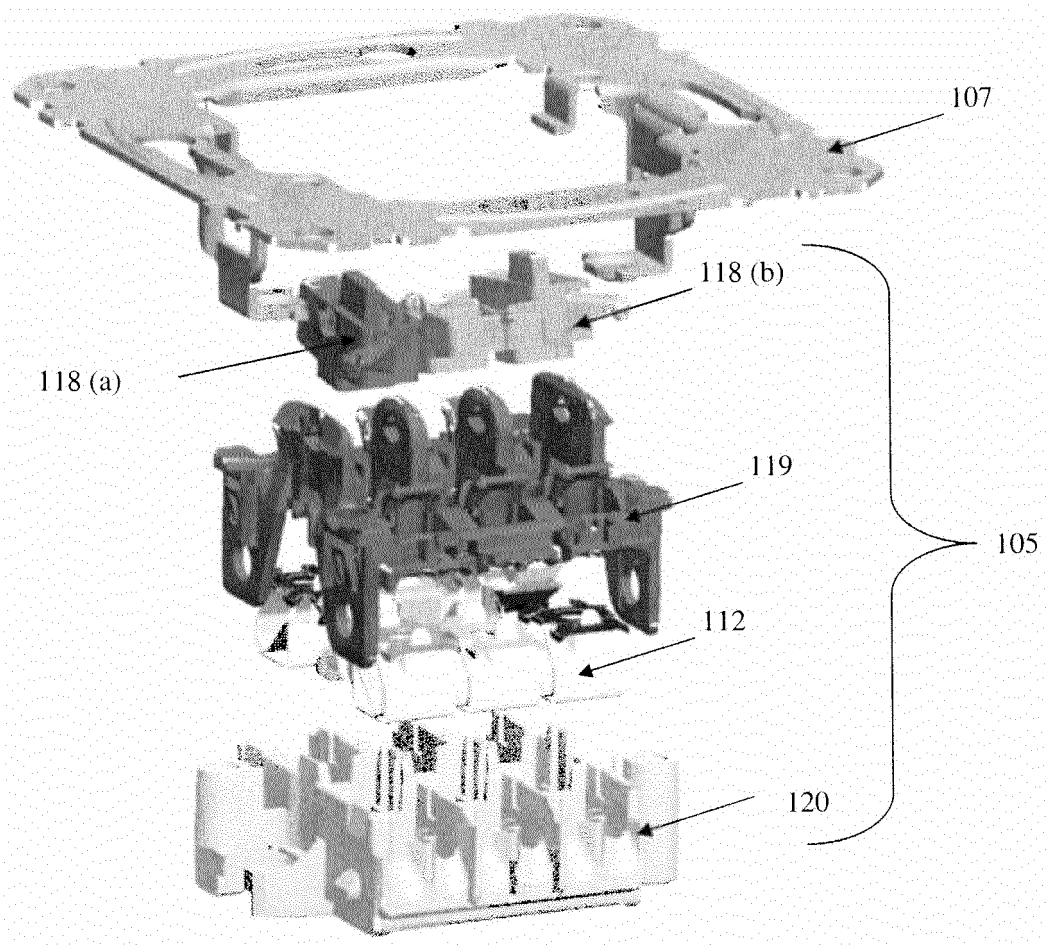


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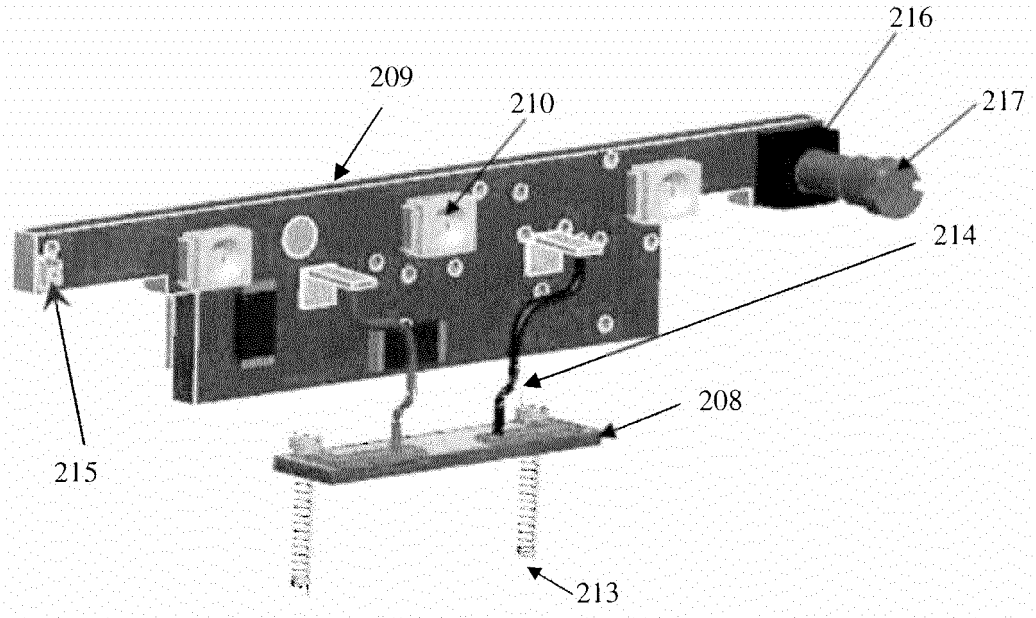


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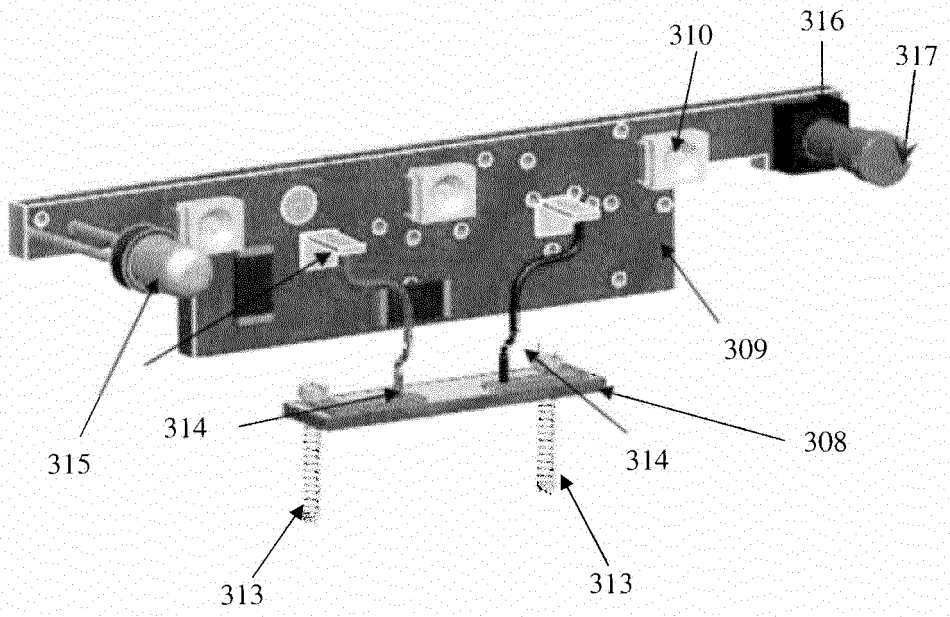


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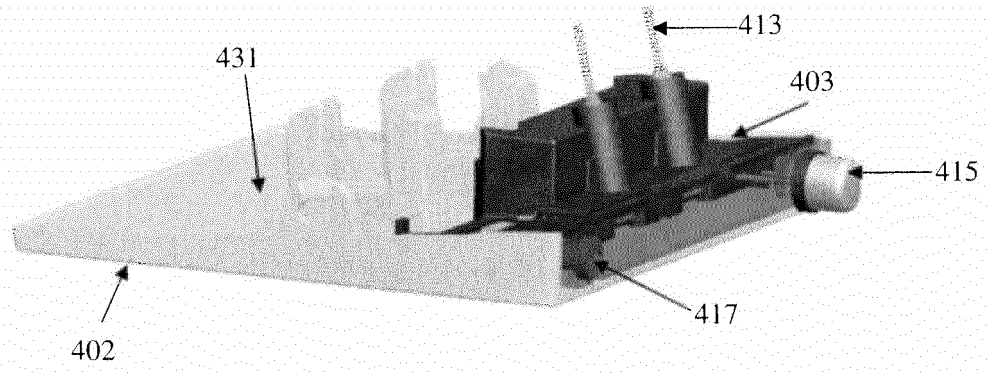


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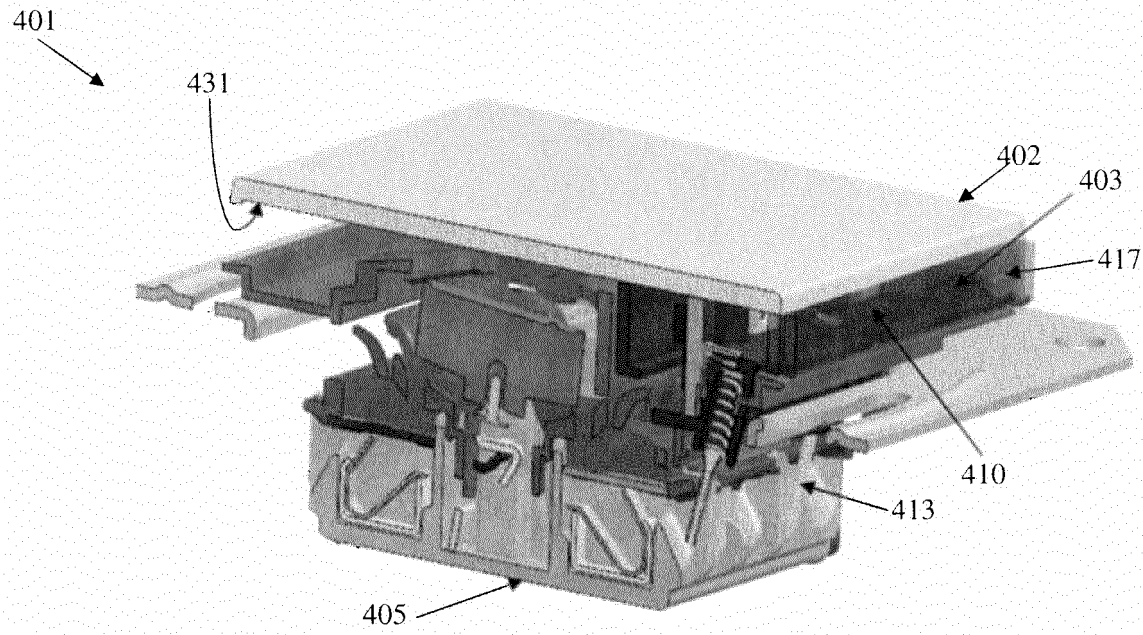


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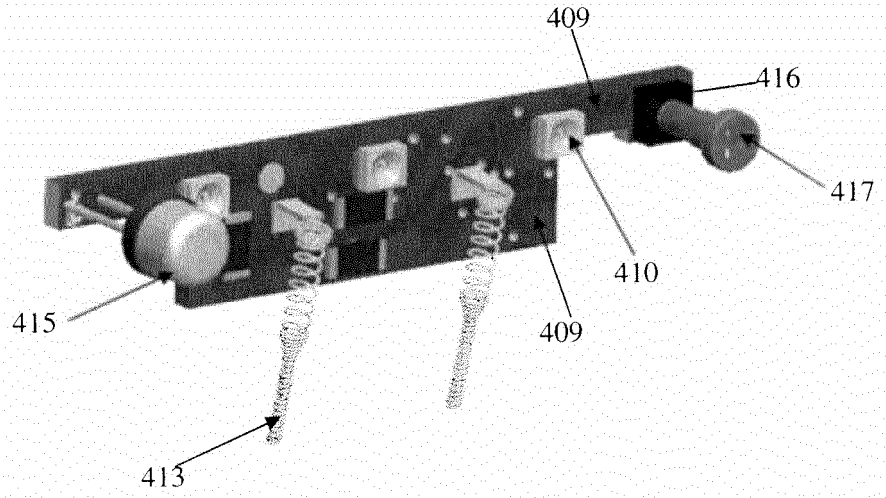


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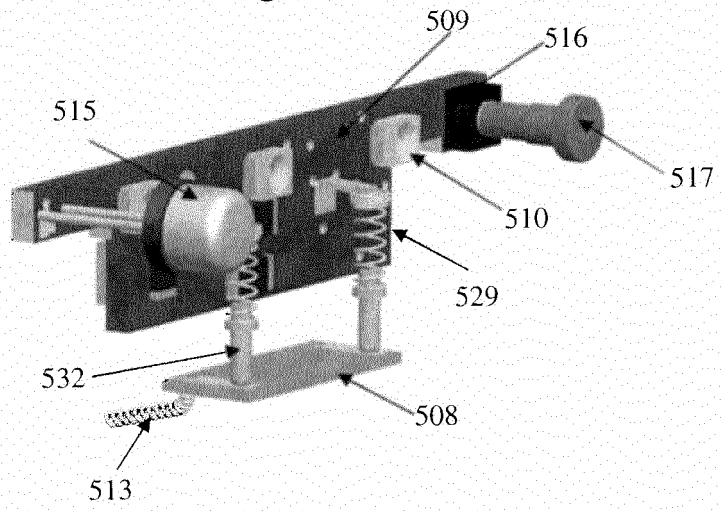


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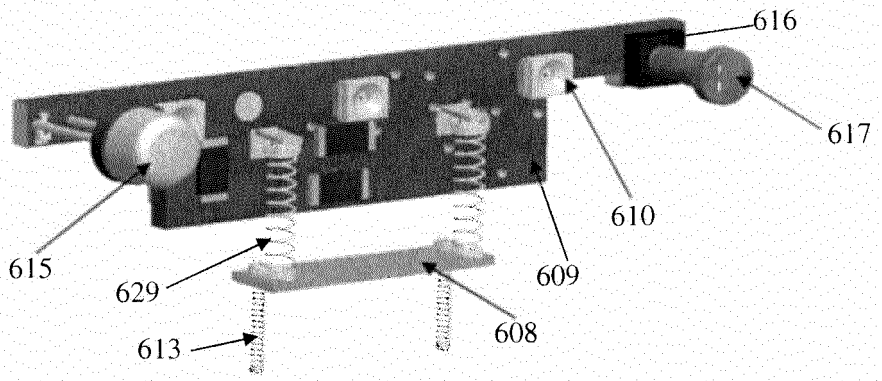


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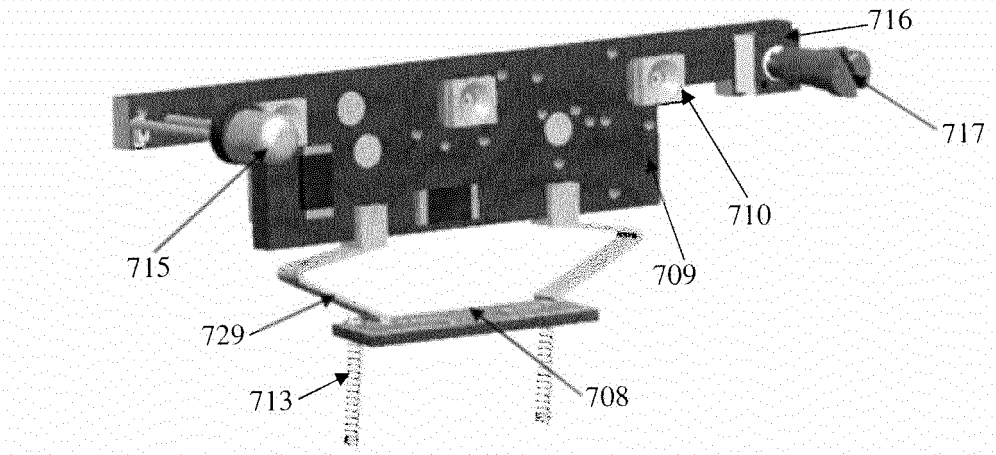


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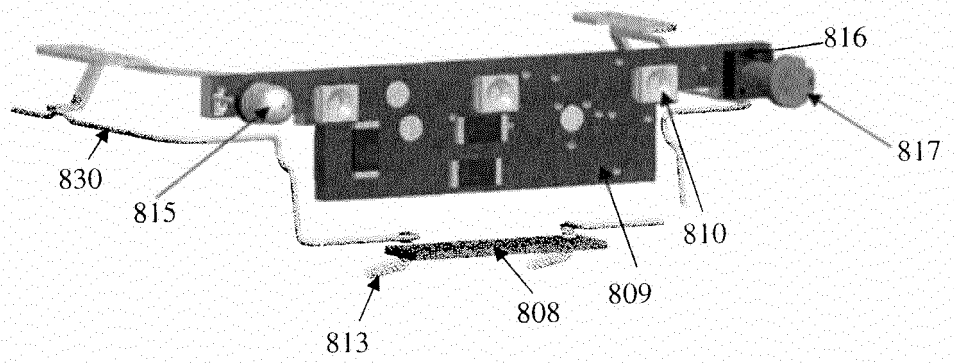


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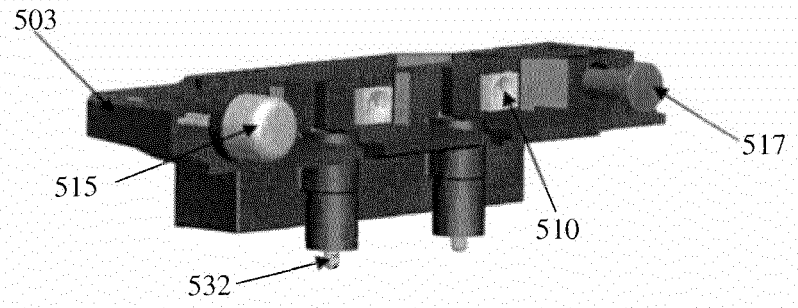


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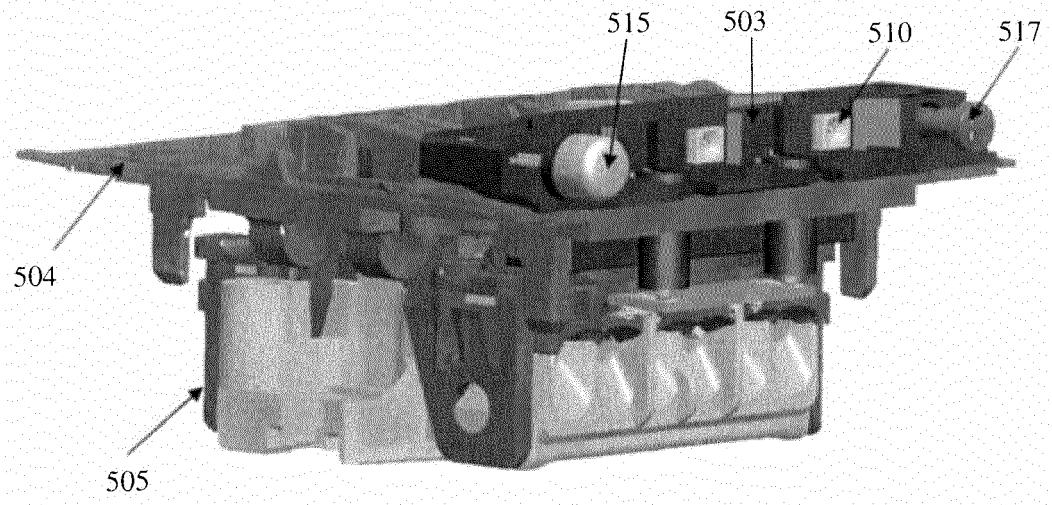


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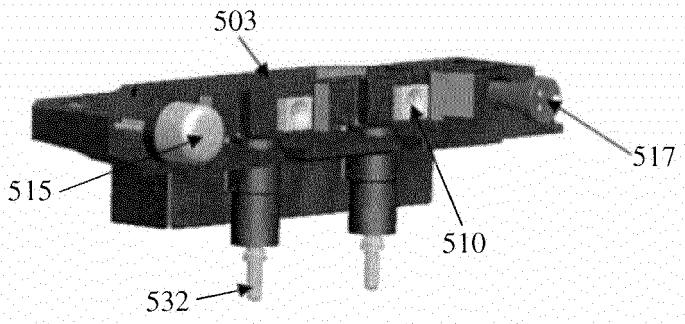


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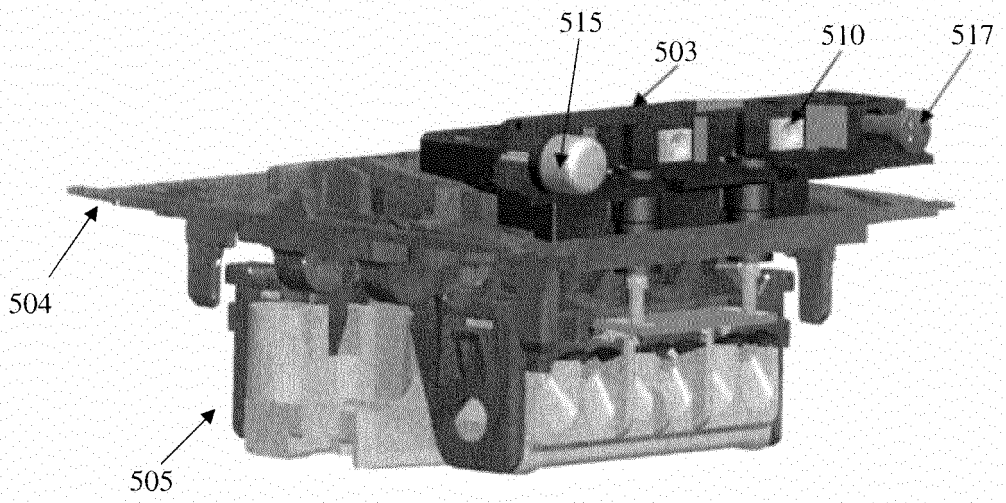


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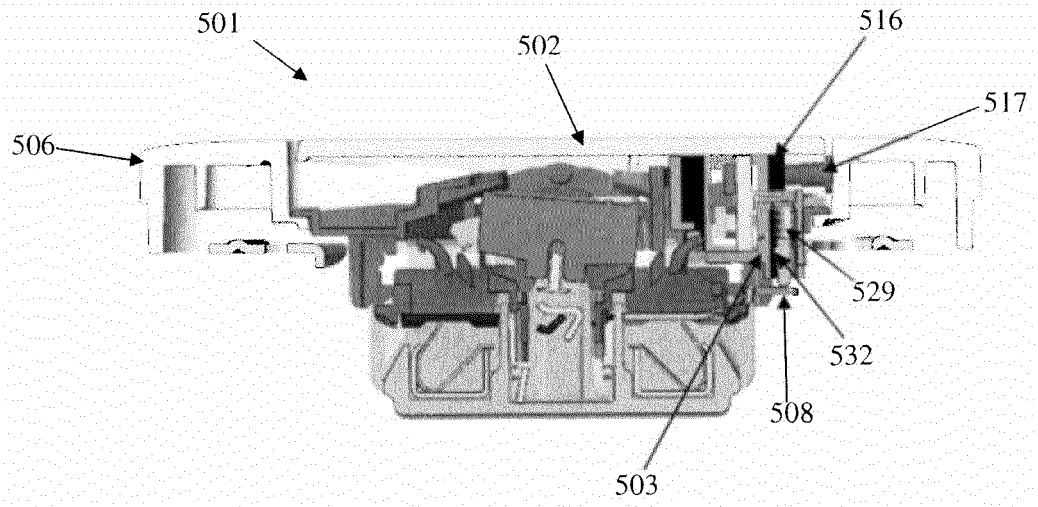


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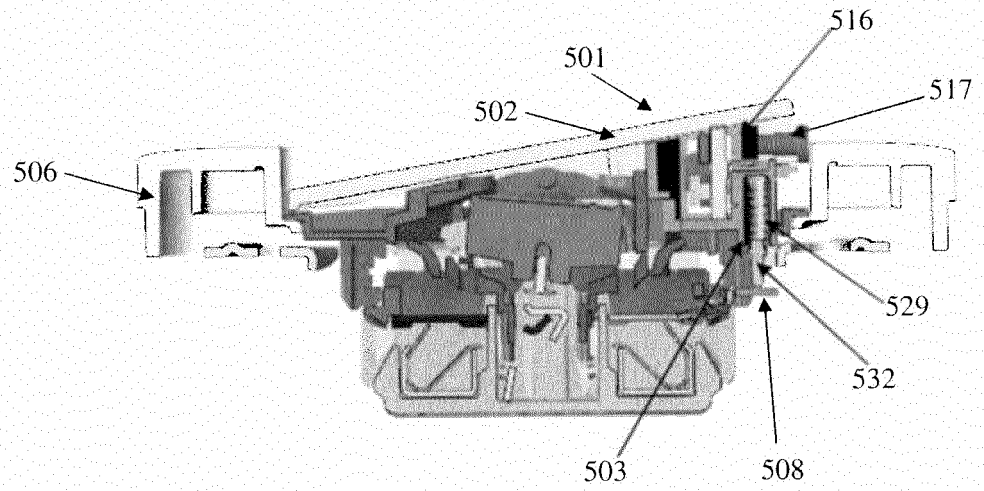


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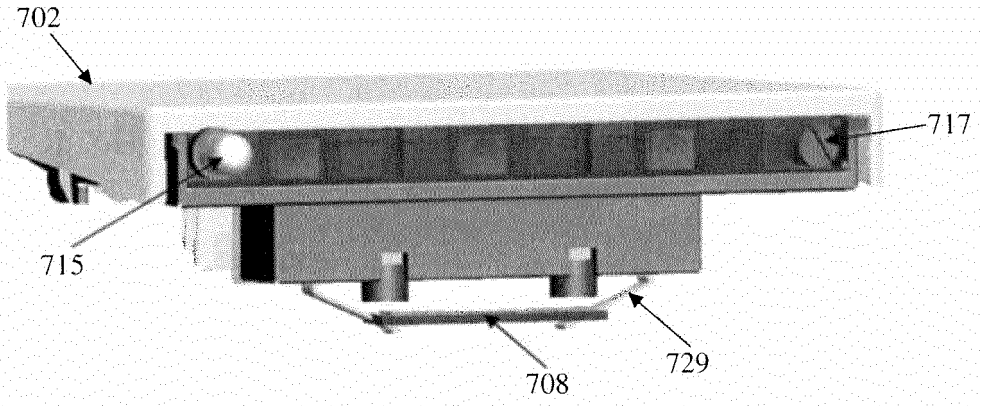


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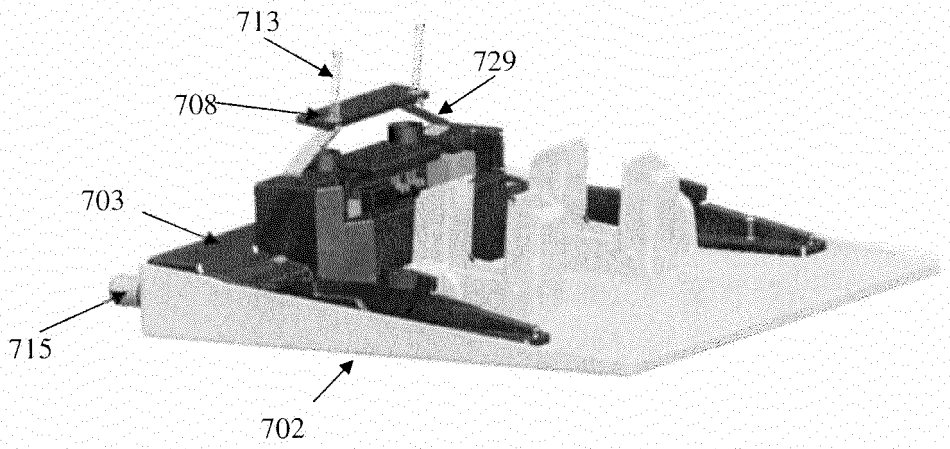


Figure 29

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- US 4755913 A **[0004]**
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- EP 2348522 A **[0006]**