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(54) **A KEY CARD SWITCHING APPARATUS**

(57) The present invention relates to a key card switching apparatus (100) for detecting insertion of a card (102). The key card switching apparatus (100) comprising: an insert assembly (104) mounted inside a wall box with a light source (114) placed within said insert assembly (104); a cover frame (106) disposed on the insert assembly (104); a centreplate (108) and a support member (110) covering at least said PCB and said light source

(114). The support member (110) is disposed about inner surface of said centreplate (108) such that light emitted from said light source (114) is dispersed in a guided manner towards said card insertion slot (112) of said centreplate (108) preventing light rays from passing dispersing through any other opening of said key card switching apparatus (100).

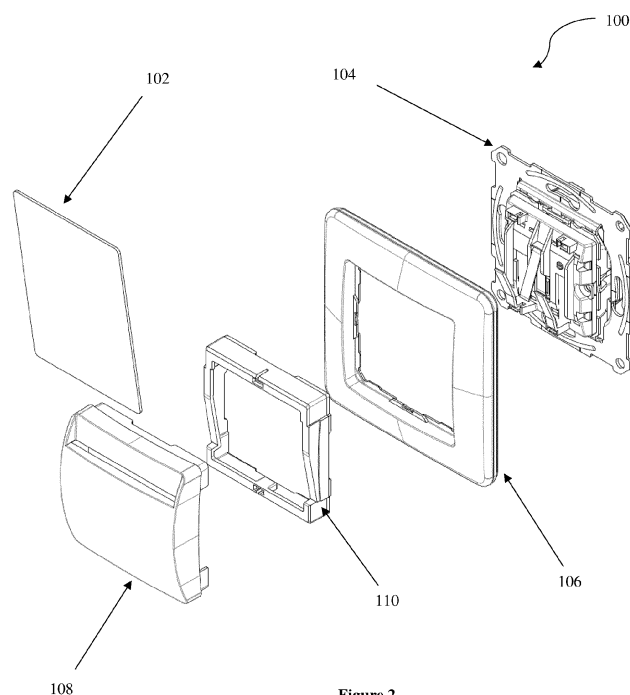


Figure 2

Description

Field of invention:

[0001] The present invention generally relates to a key card switch for activation of electrical power supply. More specifically the invention relates to a key card switch apparatus for indication of card insertion.

Background of the invention:

[0002] The key card switch are an apparatus which functions as an actuation apparatus for an electrical power supply in a place such as a room. Such key card apparatus are found especially in the hotel industry as Main power switch application to allow multiple electrical consumers located in a room to be able to switch it on and off once. This must be done after entering the room a key card in the key card switch can be inserted, whereby the connected electrical consumers are switched on. By removing the key card from the card counter are then connected to it electrical consumers are switched off again.

[0003] When the card switch having an actuation mechanism such as the rocker switch is oriented in its OFF position in such a way that that once the insertion of card is located above the first horizontal axis section of the rocker switch in the OFF position, the rocker mechanism changes its state to ON position. The shift lever is above the first horizontal axis attached to the actuator mechanism i.e. touches the rocker switch, in its OFF position above the first horizontal axis on their upper section which to changes its state to ON position. Such card or key cards are frequent inserted and removed often used with sensitive surfaces such as printing circuit boards (PCBs) and / or sensitive functional elements such as magnetic strips provided thereto.

[0004] Conventionally, a card gate mechanism structuring a part of a card reader has been known. The card insertion part, as known in the art receives the card when inserted through it, and a gate frame formed with a gate port (card insertion port) into which card is to be inserted. The gate frame is formed in a hollow shape and the light source part and the light guide member are disposed inside the gate frame.

[0005] In conventional systems of key card switch, the gate frame is formed of transparent material which transmits light. Therefore, in the card insertion part, when a light is emitted from the light source part toward the light guide member, the gate frame formed with the card insertion port is illuminated. In other words, when a light is emitted from the light source part toward the light guide member in the card insertion part, a peripheral portion of the card insertion port is illuminated. However this mechanism of the light dispersion in the key card switching apparatus gives rise to the following problems:

As shown in figure 1 of the accompanying drawings, in the existing system:

- Light guide (114') will be on the centerplate and insert LED light source will transfer to the front end and indicate the hotel key card status.
- Due to the standard card width & CEE60 centerplate width, Guide & support for the card by reuse the existing insert will leads to complex manufacturing process.
- Light dispersion through the outer contour of the centerplate wall, because of part clearances in the mating area, less thickness and cut-outs, no homogenous light dispersion.

[0006] In the existing key card switch there for methods where the LED at the PCB present in the insert assembly is placed closed to the cut out portion of the centerplate, where the cards are inserted. In this configuration, essentially the position of the LED is changed which might not be possible for numerous cases. The conventional position of the LED does not allows the light to disperse properly though the cut out. Therefore it an objective to use the conventional position of the LED while dispersing light from the cut out such that the insertion of the card becomes easier in the dark.

[0007] With a view therefore to the problem associated with the conventional anchoring/fixing techniques of connector adapter system the inventors felt to need to develop a novel key card switching apparatus for detecting insertion of a card as an activator member. The key card switching apparatus is provided with centreplate and a support member covering at least a circuit board and said light source from a front side in the insertion direction of said card. The support member is disposed about inner surface of said centreplate such that light emitted from said light source is dispersed in a guided manner towards said card insertion slot of said centreplate blocking light rays from passing through any connection clearances.

Summary of the invention:

[0008] Accordingly, the present invention provides a key card switching apparatus for detecting insertion of a card as an activator member. According to one most preferred embodiment of the invention, the key card switching apparatus comprising:

- an insert assembly mounted inside a wall box, said insert assembly having embedded PCB with an light source to remain ON till the full insertion of said card;
- a cover frame disposed on the insert assembly;
- a centreplate and a support member covering at least said PCB and said light source, said centerplate engages with the cover frame and is provided with a card insertion slot;

[0009] According to one prefer embodiment of the invention, said support member is disposed along inner

surface of said centreplate such that light emitted from said light source is dispersed in a guided manner towards said card insertion slot of said centreplate preventing light rays from dispersing through any other opening of said key card switching apparatus.

[0010] According to one object of the invented key card switching apparatus, said support member is moulded with grey or black in colour to block any light dispersion through the connection joints of said centreplate.

[0011] According to one embodiment of the invention, said support member is formed in a flat frame shape and disposed so as to contact with the inner surface of the centreplate.

[0012] According to one embodiment of the invention, said support member is provided with T-shaped ribs to engage with said centreplate.

[0013] According to one embodiment of the invented key card switching apparatus, said insert assembly is provided with an actuation mechanism to be activated with the insertion of the card. According to the embodiment, said actuation mechanism is a rocker switch mechanism.

[0014] According to one preferred embodiment of the invented key card switching apparatus, said support member is provided with a slanted surface defining a recess to receive the card inserted through the insertion slot of the centreplate and guide towards the actuation member of said PCB.

[0015] According to one embodiment of the invention, said support member will stop the card in position once it fully inserted/ travelled to the required length, support member will facilitate the irregular wall (installation surface defaults or additional aesthetic wall paper) installation of the cover frame.

[0016] According to one object of the invention, said support member is provided with protuberance at each side of the bottom end surface to restrict the downwards movement of the card.

[0017] According to one preferred embodiment of the invented key card switching apparatus, said light source is disposed at the bottom portion of said insert assembly.

[0018] According to one preferred embodiment of the invented key card switching apparatus, said light source is a Light Emitting Diode (LED).

Brief description of the drawings:

[0019] For better understanding, an illustrative embodiment of the invention will now be described with reference to the accompanying drawings. It will however be appreciated that the embodiment 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 embodiment that have been shown in the drawings. In the accompanying drawings:

Figure 1 depicts a conventional key card switching

apparatus with the indication light dispersing only through the centerplate.

Figure 2 depicts an exploded view of the invented key card switching apparatus showing different members of the assembly according to one embodiment of the invention.

Figure 3 depicts a cross sectional view of the support member attached to the centreplate and the card is in the insertion portion according to one embodiment of the invention.

Figure 4 depicts the centreplate attached with the cover frame along with the support member according to one embodiment of the invention.

Figure 5 depicts a frontal view of the insert assembly showing the actuation member and the Light Emitting Diode (LED) according to one embodiment of the invention.

Figure 6 is a perspective view of the centreplate and the support member aligned with each other to attach with each other according to one embodiment of the invention.

Figure 7 depicts a frontal cross sectional view of the support member attached with the centreplate according to one embodiment of the invention.

Figure 8 is a perspective view of the support member attached with the centreplate according to one embodiment of the invention.

Figure 9 depicts a cross sectional side view of the support member attached with the centreplate according to one embodiment of the invention.

Detailed description of the drawings:

[0020] With reference to figures 2-9 of the accompanying drawings, a key card switching apparatus (100) is disclosed herein according to one most preferred embodiment of the invention. The key card switching apparatus (100) in this embodiment is configured to receive an actuation member, for example a key card (102) for insertion and activation of the switching apparatus (100). The actuation member in this embodiment, in general is inserted in a slight slanted manner through a cut-out portion at the centreplate (108) which defines the frontal surface of the switching apparatus (100) from the direction of insertion. Upon activation the key card switching apparatus (100) enables the user to use the electrical switchboards and electrical apparatus of a site such a hotel room. The status of the switching apparatus (100), in general is indicated by a light source (114) placed inside the switching apparatus (100). In this embodiment

of the invention the dispersion of the light is blocked about any junctions and only disperse through the card insertion slot (112).

[0021] Now as depicted in the figure 2, the switching apparatus (100) is an assembly of an insert assembly (104), a cover frame (106), an aesthetic centreplate (108) and a support member (110). The assembly as a whole is mounted onto a wall where the insert assembly (104) is mounted inside a wall box. The insert assembly (104) contains at least a rigid circuit board such as a Printed Circuit Board (PCB) which includes at least one indication light source (114). PCB is embedded in the insert assembly (104) and the light source (114) placed around the bottom side of the insert assembly (104). The insert assembly (104) is made substantially of a rectangular shape which in turns matches with the cavity of the wall box.

[0022] To fix the insert assembly (104) to the wall, a cover frame (106) disposed on the insert assembly (104) such the cover frame (106) rests on the wall surface enclosing outer periphery of said insert assembly (104). As shown in the figure 2, said cover frame (106) is also substantially of rectangular shape so that its outer border coincides with outer edges of the insert assembly (104). The front cover also introduces a thickness onto the outer wall providing support to the weight of the circuit board and other inner circuitry. The width of the frame is such that it encloses only the outer periphery defining an opening to the PCB and more specifically to the actuation member of the insert assembly (104).

[0023] The aesthetic centreplate (108) as seen in the figure 2, cover the insert assembly (104) after assembling the cover frame (106) to the insert assembly (104). The centreplate (108) is engaged from the frontal and rear direction and side edges of the centreplate protrudes in an inward manner to engage with the cover frame (106). Different fixing mechanism can be incorporated such as press fit, snap fit etc. The light source (114) on the insert assembly (104) falls on the centreplate (108) illuminating the key card switching apparatus (100) when the card (102) is not inserted. The figures 2 and 6 depict the insertion slot (112) provided at the frontal surface of said centreplate (108). The insertion slot (112) is also on a rectangular profile to match the breadth of the card (102), which is to be inserted in a vertical manner through the card insertion slot (112).

[0024] With reference to figures 2 and 6 of the accompanying drawings, a support member (110) is attached with the centreplate (108) covering at least the PCB and said light source (114) from a front side in the insertion direction of said card (102). The support member (110) functions as a light guide member to convert the light coming from a single light source (114), such as a LED (114) to diffuse through the card insertion slot (112) of the centreplate (108) for a user to locate in insertion slot (112) after entering in room.

[0025] As depicted in the figure 5 of the accompanying drawings, the front face of the insert assembly (104) is

provided with the actuation mechanism (116) and indication light source (114). According to this preferred embodiment, the actuation mechanism (116) is a rocker switch mechanism which upon pressed with the card (102) is activated. The indication light source (114) is disposed below the rocker switch (116), in other words, the light source (114) is mounted on the bottom centre of frontal surface of the insert assembly (104) which shows the status of the invented key card switching assembly (100). The light source (114) in this embodiment is a LED (114) which is controlled by the PCB and with the insertion of the card (102) as depicted in figure 4.

[0026] With reference to figures 8 and 9, the support member (110) is moulded with black or grey colour and assembled with the centreplate (108). The support member (110) has a substantially flat surfaces to fit in the inner contour of the centreplate. The support member (110) is such disposed that the black or grey colour of the support member (110) will suppress the light dispersion through the clearance between cover frame (106) and the centreplate (108). By eliminating the light leakage through the cover frame (106) clearance and ensure the light comes-out /disperse through the cut out for the card insertion slot (112).

[0027] According to one embodiment, the centreplate (108) and the support member (110) can be consider to be pre-attached with each other and serves the purpose of dispersing light through the card insertion slot (112) and eliminate dispersion through the clearances.

[0028] The outer centreplate (108) provides the aesthetic look of the product and which will facilitate the different colour offers, whereas the support member (110) is injected with Grey or Black colour support which fit with outer contour of the aesthetic centerplate and suppress the light disperse through only the cut out of card insertion slot (112) on the Cover. The Support member (110) will function as light guide and ensure the homogenous light through the card insertion slot (112). Further, as seen in figures 3 and 9 of the accompanying drawings, the support member (110) has a vertical slated profile. This slanted profile introduces a recess for the insertion of the card (102) in a guided manner.

[0029] With reference to figures 6 and 7, the support member (110) is provided with a pair of T-shaped ribs (118) and the opposite ends of the support member (110). In this particular embodiment, the ribs are provided at the top and the bottom edge of the support member (110) corresponding to the receiving portion of the centreplate (108). The support member (110) guides the card (102) during the insertion & withdrawal. The support member (110) holds and support the card (102) on position.

[0030] As seen in the figure 3 of the accompanying drawings, the support member (110) is provided with protuberance at each side of the bottom end surface. In this particular embodiment, the portions protrudes the bottom corners of the support member (110) to restrict the downwards movement of the card (102) when inserted for actuation of the switching apparatus (100). The inclined sur-

face of the support member (110) holds the card (102) and guide it towards the actuation mechanism (116) for the activation of the switching apparatus (100).

[0031] 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 disclosure made herein.

Claims

1. A key card switching apparatus (100) for detecting insertion of a card (102), the key card switching apparatus (100) comprising:

- an insert assembly (104) mounted inside a wall box, said insert assembly (104) having embedded PCB with an light source (114) to remain ON till the full insertion of said card (102);
- a cover frame (106) disposed on the insert assembly (104);
- a centreplate (108) and a support member (110) covering at least said PCB and said light source (114), said centerplate engages with the cover frame (106) and is provided with a card insertion slot (112);

wherein said support member (110) is disposed along the inner surface of said centreplate (108) such that light emitted from said light source (114) is dispersed in a guided manner towards said card insertion slot (112) of said centreplate (108) preventing light rays from dispersing through any other opening of said key card switching apparatus (100).

2. The key card switching apparatus (100) for detecting insertion of a card (102) as claimed in claim 1, wherein said support member (110) is moulded with grey or black in colour to block any light dispersion through the connection joints of said centreplate (108).

3. The key card switching apparatus (100) for detecting insertion of a card (102) as claimed in claim 1, wherein said support member (110) is formed in a flat frame shape and disposed so as to contact with the inner surface of the centreplate (108).

4. The key card switching apparatus (100) for detecting insertion of a card (102) as claimed in claim 1, wherein said support member (110) is provided with T-shaped ribs (118) to engage with said centreplate (108).

5. The key card switching apparatus (100) for detecting insertion of a card (102) as claimed in claim

1, wherein said insert assembly (104) is provided with an actuation mechanism (116) to be activated with the insertion of the card (102).

6. The key card switching apparatus (100) for detecting insertion of a card (102) as claimed in claim 5, wherein said actuation mechanism (116) is a rocker switch mechanism (116).

7. The key card switching apparatus (100) for detecting insertion of a card (102) as claimed in claim 1, wherein said support member (110) is provided with a slanted surface defining a recess to receive the card (102) inserted through the insertion slot (112) of the centreplate (108) and guide towards the actuation member of said PCB.

6. The key card switching apparatus (100) for detecting insertion of a card (102) as claimed in claim 1, wherein said support member (110) is provided with protuberance at each side of the bottom end surface to restrict the downwards movement of the card (102).

9. The key card switching apparatus (100) for detecting insertion of a card (102) as claimed in claim 1, wherein said light source (114) is disposed at the bottom portion of said insert assembly (104).

10. The key card switching apparatus (100) for detecting insertion of a card (102) as claimed in claim 1, wherein said light source (114) is a Light Emitting Diode (LED) (114).

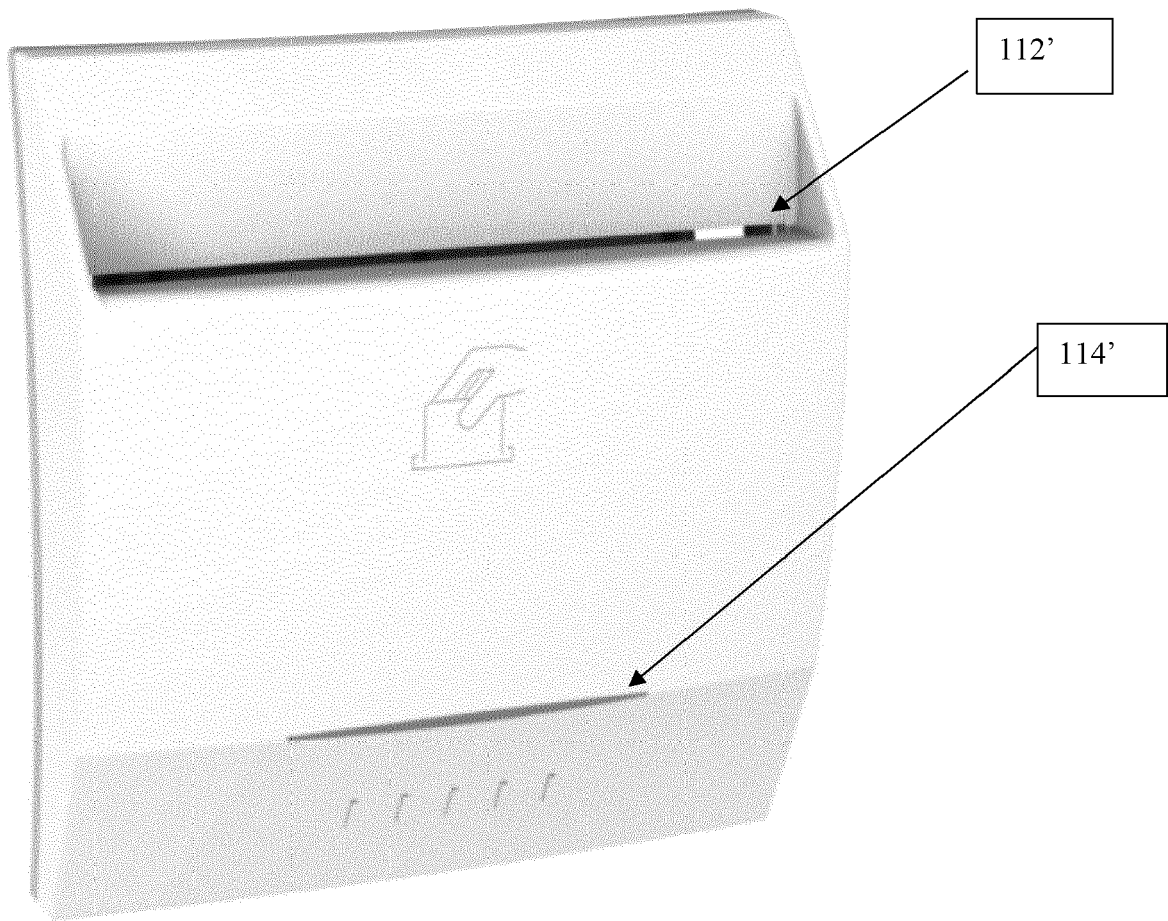


Figure 1
(Prior art)

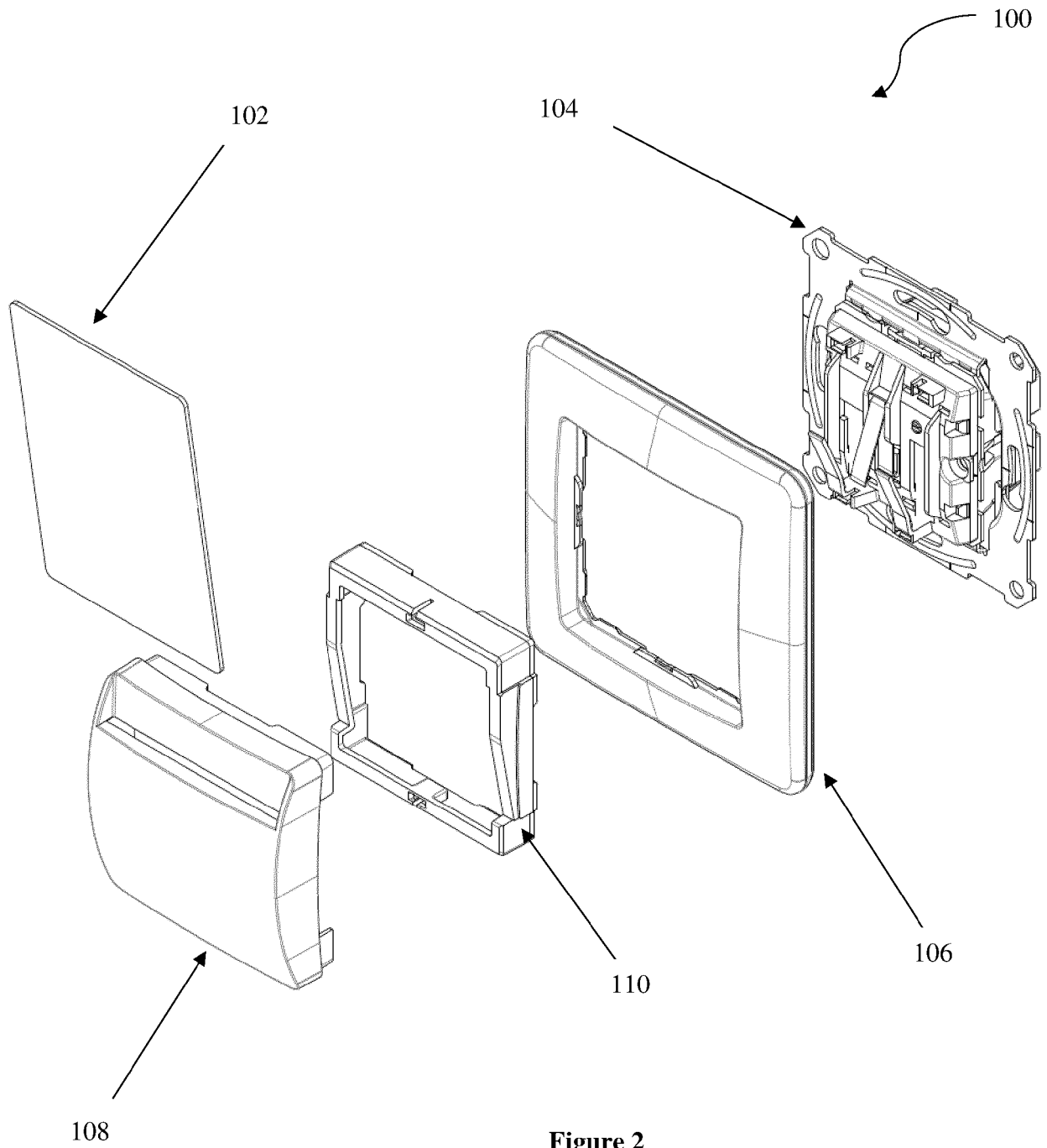


Figure 2

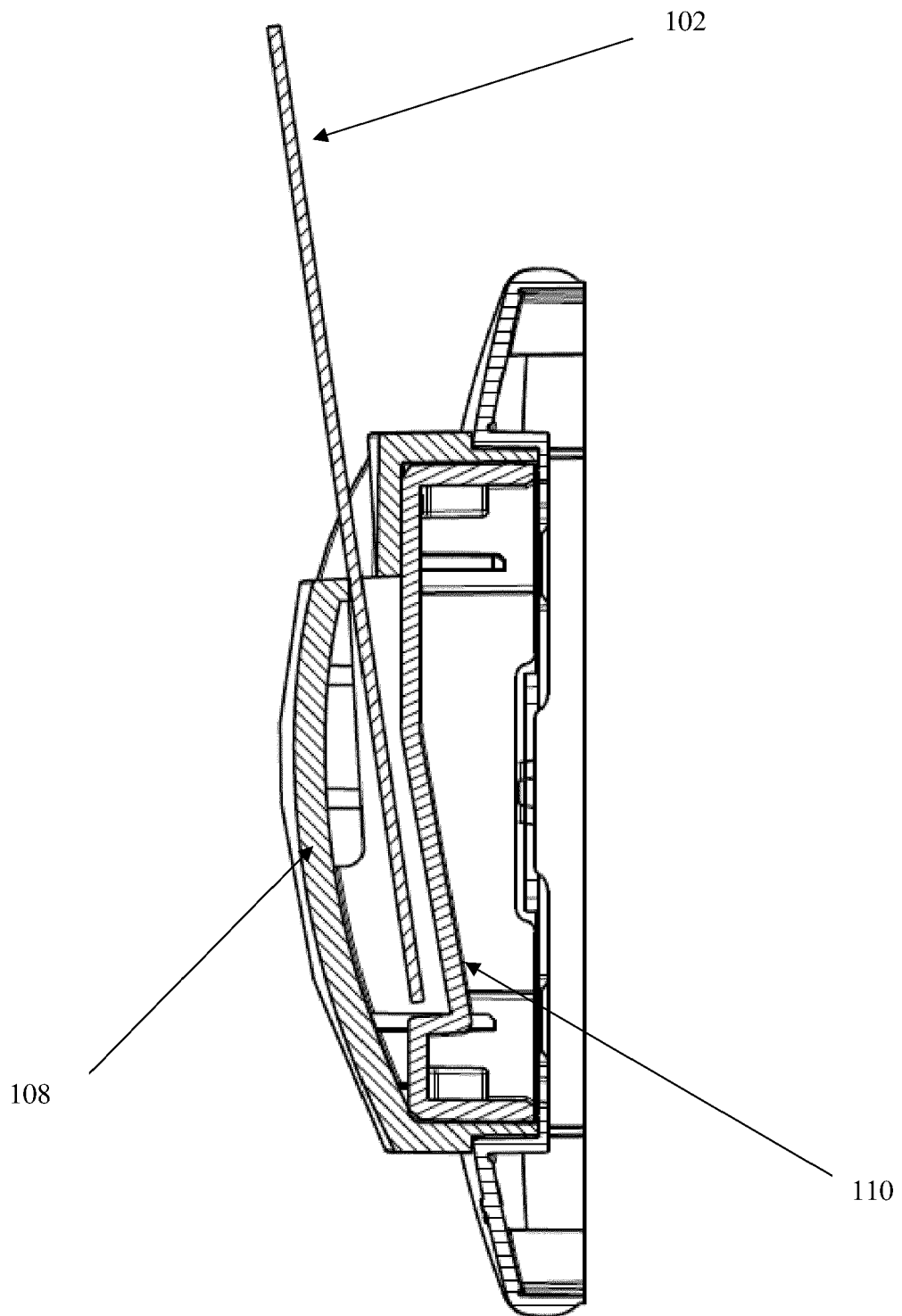


Figure 3

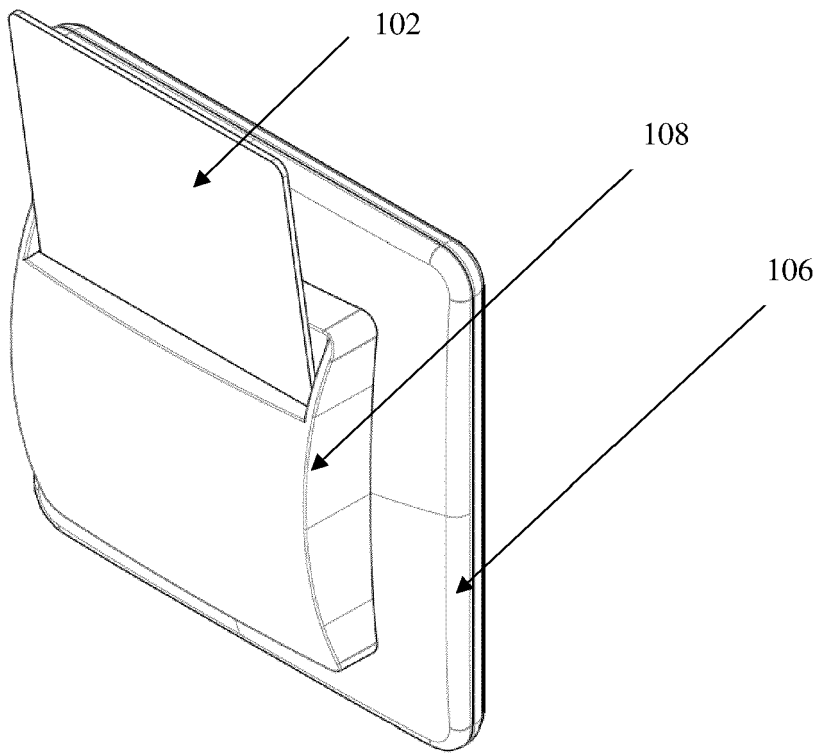


Figure 4

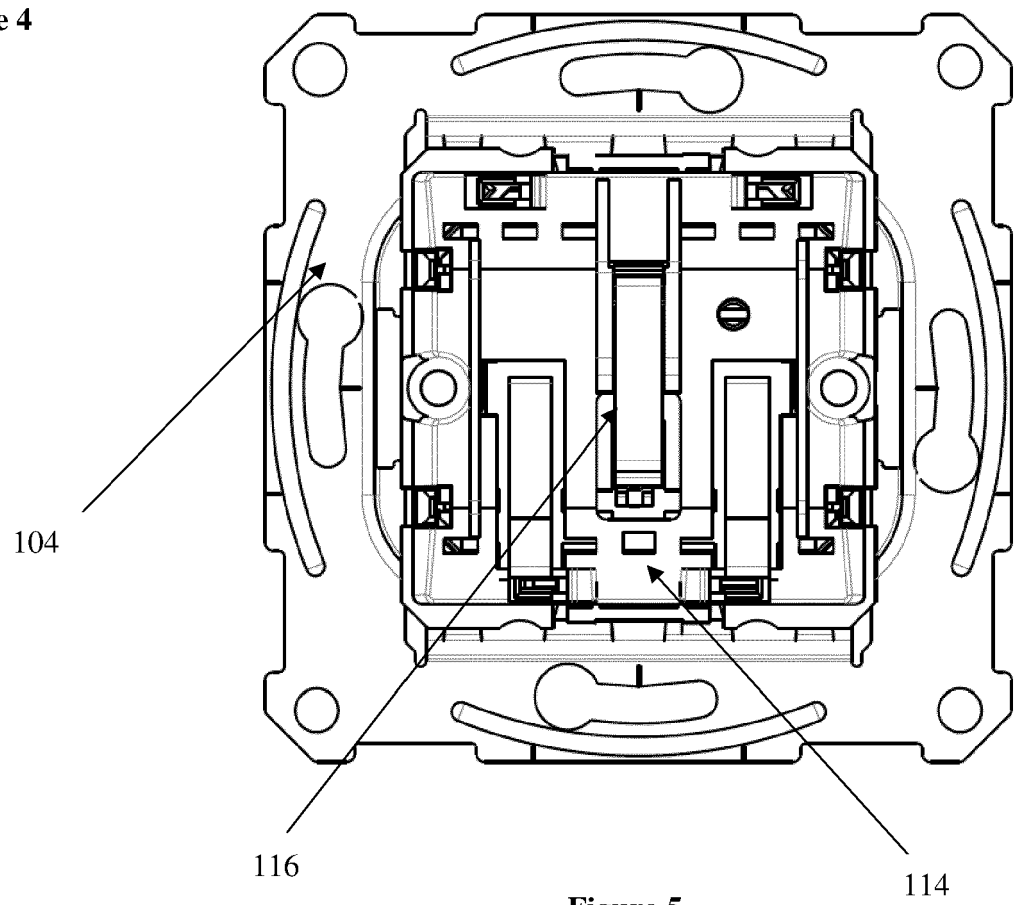
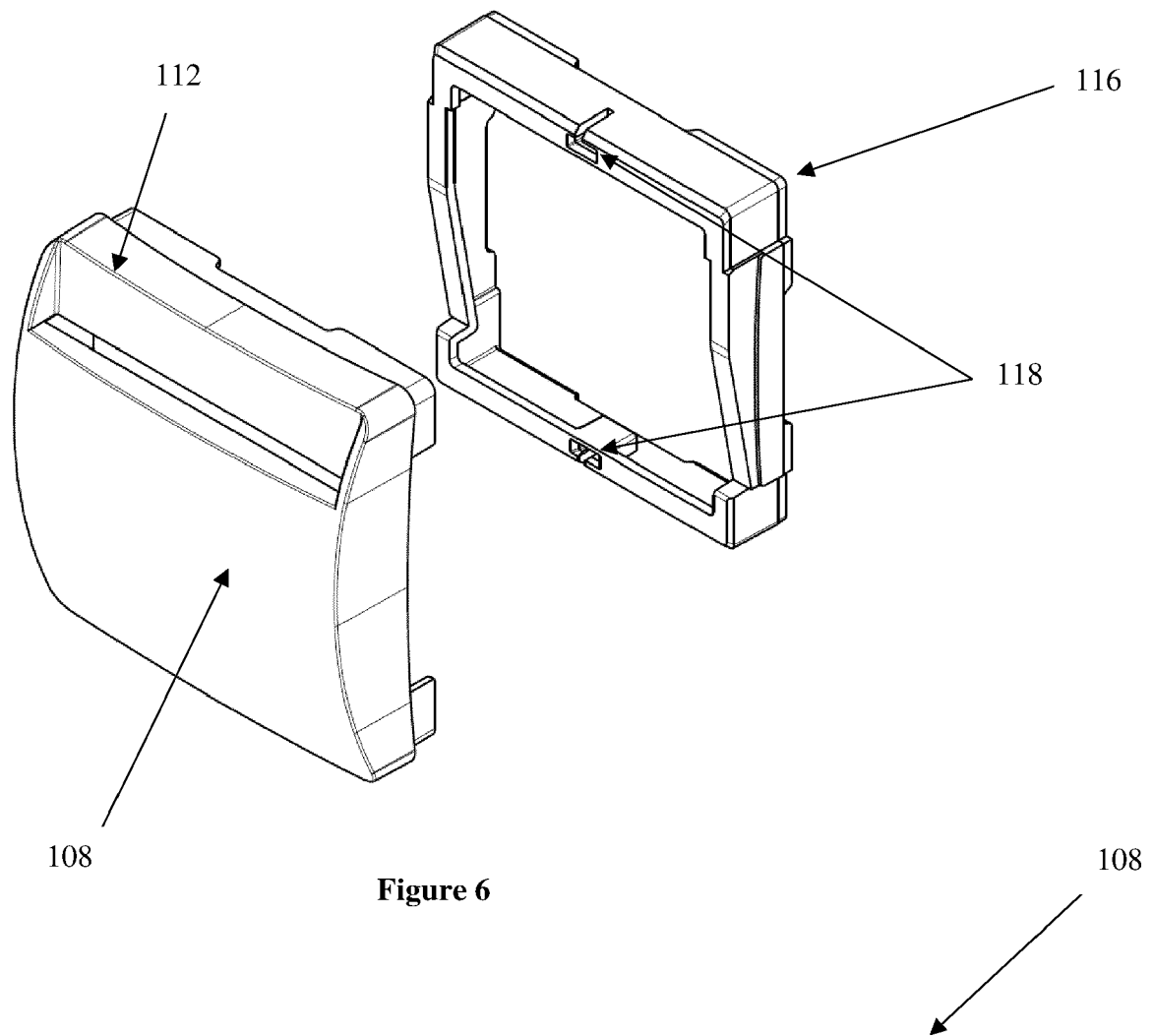


Figure 5



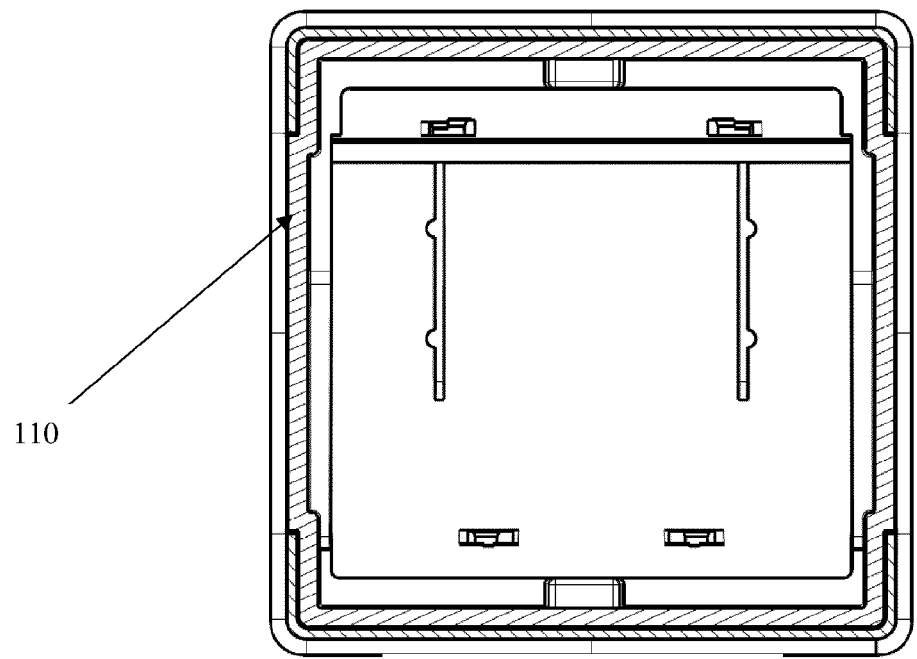


Figure 7

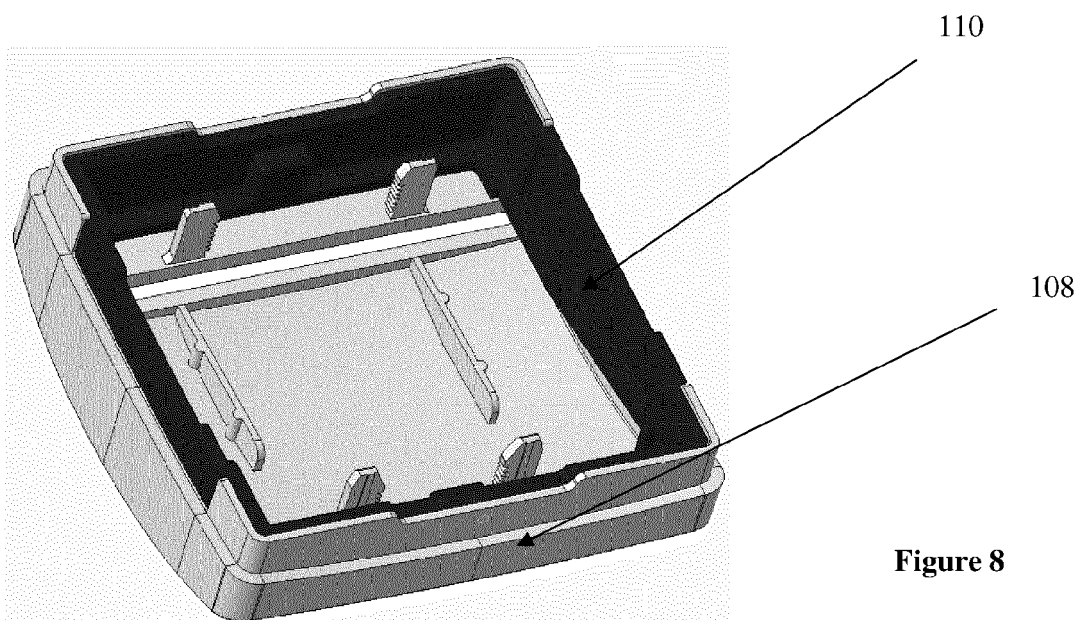


Figure 8

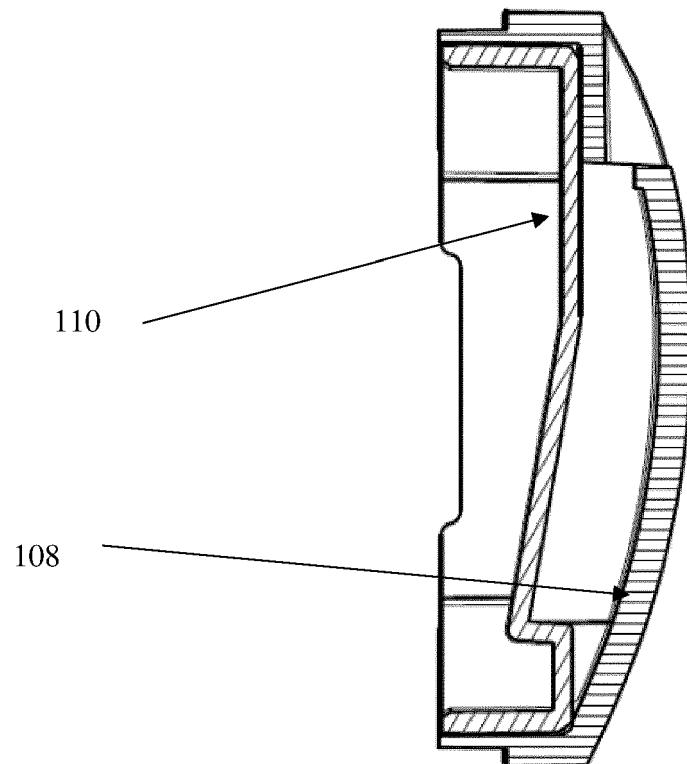


Figure 9



EUROPEAN SEARCH REPORT

Application Number

EP 21 19 5101

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EPO FORM 1503 03.82 (P04C01)

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 2 573 940 A1 (JUNG GMBH ALBRECHT [DE]) 27 March 2013 (2013-03-27)	1-5, 7-10	INV.
Y	* paragraphs [0008], [0010] - [0013]; figures 1, 2 *	6	H01H9/18 H01H27/00
Y	DE 94 20 728 U1 (BERKER GEB [DE]) 2 March 1995 (1995-03-02)	6	
A	* pages 2, 3; figures 1, 2 *	1	
A	EP 3 309 805 A1 (JUNG GMBH ALBRECHT [DE]) 18 April 2018 (2018-04-18)	1	
			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 14 February 2022	Examiner Findeli, Luc
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EP 21 19 5101

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14-02-2022

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2573940 A1	27-03-2013	DE 102011053879 A1	28-03-2013
		EP 2573940 A1	27-03-2013
		ES 2554129 T3	16-12-2015

DE 9420728 U1	02-03-1995	NONE	

EP 3309805 A1	18-04-2018	DE 102016119608 A1	19-04-2018
		EP 3309805 A1	18-04-2018
		ES 2843539 T3	19-07-2021
		PT 3309805 T	03-11-2020

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